IV. Environmental Impact Analysis

E. Geology and Soils

1. Introduction

This section describes the existing geologic setting of the Project Site and vicinity, identifies associated regulatory standards, and evaluates potential impacts. This section provides an analysis of the Project's potential impacts with regard to geology and soils, including fault rupture, ground shaking, ground failure (e.g., liquefaction), expansive soils, and soil stability. This section also addresses potential impacts to paleontological resources. The analysis is based, in part, on the following reports, which are included in Appendix E:

Appendix E-1 *Geotechnical Report, Kaiser Permanente – Vermont Parking Structure Replacement, 1517 North Vermont Avenue, Los Angeles, California*, prepared by GeoBase Inc. (January 2017)

Appendix E-2 *Geotechnical Report, Kaiser Permanente – Medical Office Building, 1526 North Edgemont Street, Los Angeles, California,* prepared by GeoBase Inc. (January 2017)

Appendix E-3 *Additional Subsurface Assessment Report, 1321, 1329, 1345 North Vermont Ave., 1328 North New Hampshire Ave., Los Angeles California 90027,* prepared by Stantec (May 2016)

Appendix E-4 *Geotechnical Feasibility Evaluation, Kaiser Permanente – Vermont New Hampshire MOB, 1321, 1329, and 1345 North Vermont Avenue and 1328 North New Hampshire Avenue, Los Angeles, California,* prepared by GeoBase Inc. (April 2016)

Appendix E-5 *Vertebrate Paleontological Records Check for paleontological resources for the proposed Kaiser Permanente Los Angeles Medical Center Project, in the City of Los Angeles, Los Angeles County, project area,* Unpublished Records Search Results Letter from the Natural History Museum of Los Angeles County, Los Angeles, California (November 2018)

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:

- Alquist-Priolo Earthquake Fault Zoning Act
- Seismic Safety Act
- Seismic Hazards Mapping Act
- California Building Code
- California Environmental Quality Act
- Los Angeles General Plan Safety Element
- Los Angeles General Plan Conservation Element
- Los Angeles Building Code
- City Hillside Grading Areas and Hillside Ordinance Areas

(1) State

(a) Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act (California Public Resources Code [PRC] Section 2621) was enacted by the State of California in 1972 to address the hazard of surface faulting to structures for human occupancy.[1] The Alquist-Priolo Earthquake Fault Zoning Act was a direct result of the 1971 San Fernando Earthquake in Southern California, which was associated with extensive surface fault ruptures that damaged homes, commercial buildings, and other structures. The primary purpose of the Alquist-Priolo Earthquake Fault Zoning Act is to prevent the construction of buildings intended for human occupancy on the surface traces of active faults. The Alquist-Priolo Earthquake Fault Zoning Act is also intended to provide citizens with increased safety and minimize the loss of life during and immediately following earthquakes, by facilitating seismic retrofitting to strengthen buildings against ground shaking.

[1] The Alquist-Priolo Earthquake Fault Zoning Act was originally titled the Alquist-Priolo Geologic Hazards Zone Act.

The Alquist-Priolo Earthquake Fault Zoning Act requires the State Geologist to establish regulatory zones, known as "earthquake fault zones," around the surface traces of active faults and to issue appropriate maps to assist cities and counties in planning, zoning, and building regulation functions. Maps are distributed to all affected cities and counties for the controlling of new or renewed construction and are required to sufficiently define potential surface rupture or fault creep. The State Geologist is charged with continually reviewing new geologic and seismic data and revising existing zones and delineating additional earthquake fault zones when warranted by new information.

Local agencies must 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 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 minimum of 50 feet. The Alquist-Priolo Earthquake Fault Zoning Act and its regulations are presented in California Department of Conservation, California Geological Survey (CGS), Special Publication 42, *Fault-Rupture Hazard Zones in California*.

(b) Seismic Safety Act

The California Seismic Safety Commission was established by the Seismic Safety Act in 1975[2] with the intent to provide oversight, review, and recommendations to the Governor and State Legislature regarding seismic issues. The Commission's name was changed to the Alfred E. Alquist Seismic Safety Commission in 2006. This commission established the Alfred E. Alquist Hospital Facilities Seismic Safety Act[3] of 1983, which established, under the jurisdiction of the Office of Statewide Health Planning and Development (OSHPD), a program of seismic safety building standards for certain hospitals constructed on and after March 7, 1983.

2 Alfred E. Alquist Seismic Safety Commission, About the Commission, 2018.
3 California Legislative Information, AB-232 Hospitals: Seismic Safety (2015-2016), 2015.

The Hospital Facilities Seismic Safety Act was established under Senate Bill (SB) 1953, as a result of the 1994 Northridge earthquake, which caused extensive structural damage to hospitals throughout the Los Angeles region and necessitated the closure of 11 facilities. This bill directed all hospitals in California to comply with three seismic building code safety requirements by specific deadlines, as follows:[4]

- By 2002, major non-structural systems, such as backup generators, exit lighting, etc., were required to be braced.
- By 2008, all general acute care inpatient buildings at risk of collapsing during a strong earthquake were required to be rebuilt, retrofitted, or closed.
- By 2030, all hospital buildings in the State are required to be able to be operational following a major earthquake.

The legislation was estimated at the time of its passage to affect approximately 2,700 general acute care inpatient hospital buildings at approximately 470 hospitals Statewide, at a projected cost of approximately $24 billion.[5] As of 2007, it was estimated that 60 percent of hospitals in Southern California were noncompliant, including 58 hospitals in Los Angeles County. Hospitals were given several interim deadlines and opportunities for possible extensions to comply with the requirements, including:

- By January 1, 2001, hospitals were required to file reports documenting their building status with OSHPD. A 1-year extension for compliance was granted if requested.
- By January 1, 2002, all general acute care inpatient hospital buildings were required to meet specific requirements for bracing nonstructural building elements, as well as installing brace systems for communications, emergency power, bulk medical gas, and fire alarms.

4 California Seismic Safety Commission, Findings and Recommendations on Hospital Seismic Safety, https://ssc.ca.gov/forms_pubs/hosp_seismic_sfty.pdf.

5 California Healthcare Association, SB 1953, Hospital Facilities Seismic Safety Fact Sheet, January 2007.

- By January 1, 2008, all general acute care inpatient hospital buildings were required to meet at least certain requirements to brace structural and nonstructural building elements so as not to pose a risk of collapsing in a major earthquake. Meeting these requirements would allow hospital buildings to remain operational until 2030. Nonstructural mechanical, electrical, and plumbing systems, including fire sprinkler branch lines, were required to be braced and anchored in critical-care areas such as surgery, intensive care, pharmacy, central supply, emergency department, and radiology.

- By January 1, 2030, all general acute care inpatient buildings are required to be in substantial compliance with SB 1953, and buildings must be classified as Seismic Retrofit Program-3, -4, or -5, and have braced all structural and nonstructural building elements and equipment.

Subsequent to the passage of SB 1953, SB 1661 was passed authorizing an additional extension for compliance with SB 1953 of up to 2 years, until January 1, 2015. The extension allowed hospitals that were planning replacement facilities to continue operations until January 1, 2015, provided numerous goals were met.

In addition, Health and Safety Code Section 130060 required that after January 1, 2008, a general acute care hospital building that is determined to be a potential risk of collapse, or to pose significant loss of life in the event of seismic activity, be used only for nonacute care hospital purposes. This Health and Safety Code section was amended in 2015 by Assembly Bill No. 232, Chapter 555, to allow critical access hospitals an extension to submit a seismic safety application, under certain circumstances.

(c) 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 (California PRC Sections 2690–2699). 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 the project site are investigated and appropriate mitigation measures, if any, are 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 Plan and encourage land use management policies and regulations to reduce and mitigate those hazards to protect public health and safety.

Under California PRC Section 2697, cities and counties shall require, prior to the approval of a project located in a seismic hazard zone, a geotechnical report defining and delineating any seismic hazard. Each city or county shall submit one copy of each geotechnical report, including mitigation measures, to the State Geologist within 30 days of its approval. California PRC Section 2698 does not prevent cities and counties from establishing policies and criteria which are stricter than those established by the State Mining and Geology Board.

State publications supporting the requirements of the Seismic Hazards Mapping Act include the CGS Special Publication 117A, Guidelines for Evaluating and Mitigating Seismic Hazards in California,[6] and Special Publication 118, Recommended Criteria for Delineating Seismic Hazard Zones in California.[7] The objectives of Special Publication 117A are to assist in the evaluation and mitigation of earthquake-related hazards for projects within designated zones of required investigations and to promote uniform and effective statewide implementation of the evaluation and mitigation elements of the Seismic Hazards Mapping Act. Special Publication 118 implements the requirements of the Seismic Hazards Mapping Act in the production of Probabilistic Seismic Hazard Maps for the State.

(d) California Building Code

The State regulations protecting structures from geo-seismic hazards are contained in the California Building Code[8] (CBC), which is updated on a triennial basis. These regulations apply to public and private buildings in the State. Until January 1, 2008, the CBC was based on the then-current Uniform Building Code and contained additions, amendments, and repeals specific to building conditions and structural requirements of the State of California. The 2019 CBC, effective January 1, 2020, is based on the current (2018) International Building Code and enhances the sections dealing with existing structures. Seismic-resistant construction design is required to meet more stringent technical standards than those set by previous versions of the CBC.

Chapters 16 and 16A of the 2019 CBC include structural design requirements governing seismically resistant construction, including (but not limited to) factors and coefficients used to establish seismic site class and seismic occupancy category for the soil/rock at the building location and the proposed building design. CBC Chapters 18 and 18A include (but are not limited to) the requirements for foundation and soil investigations (Sections 1803 and 1803A); excavation, grading, and fill (Sections 1804 and 1804A); damp-proofing

6 California Geological Survey (CGS), Guidelines for Evaluating and Mitigating Seismic Hazards in California, Special Publication 117A, 2008.

7 CGS, Recommended Criteria for Delineating Seismic Hazard Zones in California, Special Publication 118, May 1992 and revised April 2004.

8 24 California Code of Regulations (CCR), Part 2.

and water-proofing (Sections 1805 and 1805A); allowable load-bearing values of soils (Sections 1806 and 1806A); the design of foundation walls, retaining walls, embedded posts and poles (Sections 1807 and 1807A), and foundations (Sections 1808 and 1808A); and design of shallow foundations (Sections 1809 and 1809A) and deep foundations (Sections 1810 and 1810A). Chapter 33 of the 2016 CBC includes (but is not limited to) requirements for safeguards at work sites to ensure stable excavations and cut or fill slopes (Section 3304).

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

(e) California Environmental Quality Act

Paleontological resources are limited, nonrenewable resources of scientific, cultural, and educational value and are afforded protection under State laws and regulations, such as the California Environmental Quality Act (CEQA). This Environmental Impact Report was prepared in accordance with CEQA[9] and California PRC Section 5097.5. California PRC Section 5097.5 states:

> A person shall not knowingly and willfully excavate upon, or remove, destroy, injure or deface any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, 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… As used in this section, "public lands" means lands owned by, or under the jurisdiction of the state, or any city, county, district, authority, or public corporation, or any agency thereof.

This analysis also complies with guidelines and significance criteria specified by the Society of Vertebrate Paleontology.[10]

Paleontological resources are explicitly afforded protection by CEQA. Section VII(f) of CEQA Guidelines Appendix G, the Environmental Checklist Form, addresses the potential for adverse impacts to "unique paleontological resource[s] or site[s] or … unique

9 California PRC Section 21000 et seq.

10 Society of Vertebrate Paleontology (SVP), Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources, 2010.

geological feature[s].”[11] 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.[12] Paleontological resources would fall within this category. The California Public Resources Code also regulates removal of paleontological resources from State lands, defines unauthorized removal of fossil resources as a misdemeanor, and requires mitigation of disturbed sites.[13]

(2) City of Los Angeles

(a) Los Angeles General Plan Safety Element

The City of Los Angeles General Plan Safety Element (Safety Element), which was adopted in 1996, addresses public safety risks due to natural disasters, including seismic events and geologic conditions, and sets forth guidance for emergency response during such disasters. The Safety Element also provides generalized maps of designated areas within the City that are considered susceptible to earthquake-induced hazards, such as fault rupture and liquefaction.

Regarding assessment of seismic hazards, California PRC Section 2699 requires that a safety element consider available seismic hazard maps prepared by the State Geologist, pursuant to the Alquist-Priolo Earthquake Fault Zoning Act. The California PRC also requires that the State Geologist map active faults throughout the State. The Safety Element states that those maps that are applicable to the City of Los Angeles are incorporated into Exhibit A of the Safety Element. The Safety Element also states that local jurisdictions are required by the Seismic Hazards Mapping Act to require additional studies and appropriate mitigation measures for development projects in the areas identified as potential hazard areas by the State seismic hazard maps. In addition, the Safety Element states that as seismic maps are released for Los Angeles, those maps will be utilized by the City of Los Angeles Department of Building and Safety (LADBS) to help identify areas where additional soils and geology studies are needed for evaluation of hazards and imposition of appropriate mitigation measures prior to the issuance of building permits.

11 14 CCR 15000 et seq.
12 14 CCR 15064.5 [a][3][D].
13 California PRC Chapter 1.7, Sections 5097.5 and 30244.

The 1996 Safety Element acknowledged that it was based on available official maps at that time, and that exhibits in the Safety Element would be revised following receipt of reliable new information. The State of California released the official and final Earthquake Zones of Required Investigation Map for the Hollywood Quadrangle on November 6, 2014.[14] This map serves as the State of California's official earthquake fault zone map for the Project area and is the most current and accurate map available to delineate the boundaries of earthquake fault zones in the area. Accordingly, the seismic hazards analysis in this section relies primarily on the official State of California map to determine the location of the Project site in relation to the nearest officially mapped earthquake fault zone and other seismic hazard zones.

(b) Los Angeles General Plan Conservation Element

Section 3 of the Los Angeles General Plan Conservation Element, adopted in September 2001, includes policies for the protection of paleontological resources. As stated therein, it is also the City's policy that paleontological resources be protected for historical, cultural research, and/or educational purposes. Section 3 sets as an objective 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."

(c) Los Angeles Building Code

Earthwork activities, including grading, are governed by the Los Angeles Building Code (LABC), which is contained in Los Angeles Municipal Code, Chapter IX, Article 1. Specifically, LABC Section 91.7006.7 includes requirements regarding import and export of material; LABC Section 91.7010 includes regulations pertaining to excavations; LABC Section 91.7011 includes requirements for fill materials; LABC Section 91.7014 includes general construction requirements as well as requirements regarding flood and mudflow protection; and LABC Section 91.7016 includes regulations for areas that are subject to landslides and unstable soils. Additionally, LABC Section 91.803 includes specific requirements addressing seismic design, grading, foundation design, geologic investigations and reports, soil and rock testing, and groundwater. The LABC incorporates by reference the CBC, with City amendments for additional requirements. LADBS is responsible for implementing the provisions of the LABC.

[14] CGS, Earthquake Zones of Required Investigation, Hollywood Quadrangle, March 25, 1999, revised November 2014.

(d) City Hillside Grading Areas and Hillside Ordinance Areas

Projects located within Hillside Grading Areas are subject to a public hearing for projects importing or exporting earth material in excess of 1,000 cubic yards.[15] The Hillside Ordinance governs development of hillside lots for new construction, additions, and remodeling, and establishes regulations and definitions for height, front and side yards, fire protection, lot coverage, parking, street access, sewer connections, and grading.[16]

b) Existing Conditions

The following Existing Conditions section summarizes the seismic, geologic, and soils conditions at the Project Site. As stated in Chapter III, Project Description, of this Draft Environmental Impact Report, the term "Project Site" refers to the properties on which the proposed redevelopment would occur. The Project Site is comprised of six building sites (building sites), identified herein as Sites 1 through 6, and depicted on **Figure II-4,** Proposed Site Plan. Although geotechnical reports have only been completed for proposed Sites 1, 4, and 5, these reports – in combination with regional maps and reports depicting the geologic formations, active faulting, liquefaction zones, and seismically induced landslide zones – adequately characterize the Project Site in order to evaluate the environmental impacts associated with the Project (see CEQA Guidelines Section 15125). These regional maps and reports have been prepared by the CGS, U.S. Geological Survey (USGS), California Department of Water Resources, City of Los Angeles (i.e., Los Angeles General Plan Safety Element, City Hillside Grading Areas, and Hillside Ordinance Areas), and City of West Hollywood (i.e., City of West Hollywood Seismic Technical Background Report).

(1) Regional Geology

The Project Site is located in the northern Los Angeles Basin, which is an alluvial coastal plain bordered by the Santa Monica Mountains to the north; Puente Hills and Whittier Fault to the east; Palos Verdes Peninsula and Pacific Ocean to the west; and Santa Ana Mountains and San Joaquin Hills to the south. The Los Angeles Basin, also referred to as the Coastal Plain of Los Angeles, is located in the northern portion of the Peninsular Ranges geomorphic province. The Peninsular Ranges are characterized by northwest-trending blocks of mountain ridges and sediment-floored valleys. The dominant geologic structural features are northwest-trending strike-slip 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.[17]

15 City of Los Angeles Department of Building and Safety, City of Los Angeles Grading Plan Check List, 2003.
16 City of Los Angeles Engineering, The Hillside Ordinance.
17 U.S. Geological Survey (USGS), Geology of the Los Angeles Basin, California – An Introduction, USGS Professional Paper 420-A, https://pubs.er.usgs.gov/publication/pp420A, accessed October 10, 2018.

(2) Regional Faulting and Seismicity

The CGS[18] classifies faults as follows:

- Holocene-active faults, which are faults that have moved during the past approximately 11,700 years. These faults are capable of surface rupture.
- Pre-Holocene faults, which are faults that have not moved in the past 11,700 years. This class of fault may be capable of surface rupture but is not regulated under the Alquist-Priolo Special Studies Zones Act of 1972, which regulates construction of buildings to be used for human occupancy.
- Age-undetermined faults, which are faults where the recency of fault movement has not been determined.

Holocene-active faults have been responsible for large historical earthquakes in Southern California, including the 1971 San Fernando earthquake (moment magnitude [Mw] 6.7), the 1992 Landers earthquake (Mw 7.3), the 1952 Kern County earthquake (Mw 7.5), and the 1933 Long Beach earthquake (Mw 6.4). Moment magnitude is the most common used method of describing the size of earthquakes. It measures the size of seismic events in terms of how much energy is released, and it relates to the amount of movement of rock. The Southern California region also includes blind thrust faults, which are faults that do not rupture at the surface but are, however, capable of generating substantial earthquakes. Examples include the 1987 Whittier Narrows earthquake (Mw 5.9) and the 1994 Northridge earthquake (Mw 6.7). Both of these earthquakes occurred on previously unidentified thrust faults.[19,20]

(a) Regional Faults

Prominent Holocene-active and pre-Holocene faults in the Project region are listed in **Table IV.E-1**.

[18] CGS, Earthquake Fault Zones, A Guide for Government Agencies, Property Owners/Developers, and Geoscience Practitioners for Assessing Fault Rupture Hazards in California, Special Publication 42, revised 2018.

[19] USGS, The 1987 Whittier Narrows Earthquake in the Los Angeles Metropolitan Area, California, https://pubs.er.usgs.gov/publication/70014343, accessed October 11, 2018.

[20] USGS, The Magnitude 6.7 Northridge, California, Earthquake of 17 January 1994, https://pubs.er.usgs.gov/publication/70017610, accessed October 11, 2018.

TABLE IV.E-1
LIST OF EARTHQUAKE FAULTS

Fault Name	Max. Magnitude (Mw)	Approximate Closest Distance to Project Site (miles)
Hollywood	6.4	0.3
Elysian Park	6.4	2.5*
Puente Hills	7.1	4.5*
Santa Monica	6.6	5.0
Newport-Inglewood	6.9	5.0
Raymond	6.5	6.5
Verdugo	6.9	7.0
Sierra Madre	7.2	11.0
Malibu Coast	6.7	12.0
Anacapa-Dume	7.5	13.5
Northridge	7.0	14.7
San Gabriel	7.2	15.5
Palos Verdes	7.3	15.5

SOURCE: RMA Group, Revised Engineering Geologic Report for Proposed Medical Office Building, 1526 N. Edgemont Street, Los Angeles, CA, January 2017.
NOTE:
* Approximate distance to near-surface portion of low-angle, blind thrust fault. The fault does not extend to the surface.

Based on the Alquist-Priolo Earthquake Fault Zoning Act, only those faults that have direct evidence of movement within the last 11,000 years are required to be zoned. The CGS considers fault movement within this period a characteristic of faults that have a relatively high potential for ground rupture in the present or future. As discussed in the Regulatory Framework section above, the Alquist-Priolo Earthquake Fault Zoning Act requires the State Geologist to establish earthquake fault zones around the surface traces of active faults and to issue appropriate maps to assist cities and counties in planning, zoning, and building regulation functions. These zones, which generally extend 200 to 500 feet on each side of a known active fault based on location, precision, complexity, or regional significance of the fault, identify areas where potential surface fault rupture along an active fault could prove hazardous and identify where special studies are required to characterize hazards to habitable structures. If a site lies within an earthquake fault zone on an official CGS map, a geologic fault rupture investigation must be performed before issuance of permits to demonstrate that the proposed development is not threatened by surface displacement from the fault.

The building sites are not underlain by surface traces of Holocene-active faults. As a result, the building sites are not located within the boundaries of an Earthquake Fault Zone, for fault rupture, as defined by the Alquist-Priolo Earthquake Fault Zoning Act. The nearest such fault zone is located about 2,300 feet north of Site 4, along the Hollywood Fault (**Figure IV.E-1**, Seismic Hazards Zone Map).[21] In addition, the building sites are not located within a City of Los Angeles Fault Hazard Zone.[22] However, because the Project site is located in the seismically active Southern California region, the building sites could be subjected to moderate to strong ground-shaking in the event of an earthquake on one of the many Southern California faults.

At the local level, the City of Los Angeles has established Preliminary Fault Rupture Study Areas throughout the City. According to LADBS, a geologic investigation must be conducted with respect to development sites identified within this zone, to determine the presence or absence of an active fault prior to the issuance of building permits. The criteria for these fault rupture hazard investigations are the same as those established by the CGS for the Alquist-Priolo Earthquake Fault Zoning program. The building sites are not located within the Preliminary Fault Rupture Study area for the Hollywood Fault Zone.[23],[24],[25],[26]

The Hollywood Fault is considered capable of producing surface fault rupture during future earthquake events. This reverse fault is deeply buried, is concealed by dense urbanization, and directly underlies portions of Los Angeles. The Hollywood Fault is the eastern segment of the larger Santa Monica-Hollywood Fault System, which represents the boundary between the northern Los Angeles Basin and the Santa Monica Mountains. The Hollywood Fault has not produced any damaging earthquakes during the historical period and has had relatively minor microseismic activity.[27]

If the entire 9-mile-long Hollywood Fault ruptured, it could produce a moment magnitude Mw 6.6 earthquake. However, if the fault ruptured together with other faults to the west (Santa Monica, Malibu Coast) or to the east (Raymond), earthquakes much larger than Mw 6.6 could result. Assuming a minimum slip rate of 0.35 millimeters per year (mm/yr) for the Hollywood Fault, a recurrence interval of approximately 4,000 years for a Mw 6.6 event was estimated.

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21 CGS, Earthquake Zones of Required Investigation, Hollywood Quadrangle, March 25, 1999, revised November 6, 2014.

22 City of Los Angeles, Safety Element of the Los Angeles City General Plan, City Plan Case No. 95-0371, Council File No. 86-0662, 1996.

23 RMA Group, Revised Engineering Geologic Report for Proposed Medical Office Building, 1526 N. Edgemont Street, Los Angeles, CA, January 2017, included as Appendix D of Appendix E-2 of this EIR.

24 City of Los Angeles, Safety Element of the Los Angeles City General Plan, City Plan Case No. 95-0371, Council File No. 86-0662, 1996.

25 City of Los Angeles, Bureau of Engineering, Department of Public Works, Navigate LA.

26 Geobase Inc., Geotechnical Feasibility Evaluation, Kaiser Permanente – Vermont New Hampshire MOB 1321, 1329, and 1345 North Vermont Avenue and 1328 North New Hampshire Avenue, Los Angeles, California, April 2016, included as Appendix E-4 of this Draft EIR.

27 KFM GeoSciences, City of West Hollywood Seismic Technical Background Report, 2010.

Although the exact date of the most recent rupture of the Hollywood Fault is not known, trench and borehole data suggest that the last rupture occurred approximately 7,000 years ago.[28]

(b) Postulated Olive Hill Faults

Sites 4 and 5 are located immediately southwest and southeast of Olive Hill, respectively (Figure IV.E-1, Seismic Hazards Zone Map), which is comprised of Miocene Puente Formation siltstone and shale. Based on a geotechnical investigation completed for the proposed Edgemont Street Medical Office Building,[29] located at 1526 Edgemont Street (Site 4), Olive Hill may be bounded by two northeast–southwest trending, concealed (buried) faults. One of these postulated faults is assumed to be located approximately 600 feet northwest of Site 4, at 1559 Edgemont Street. The second postulated fault was mapped and assumed to be located approximately 500 feet southeast of Site 4, indicating the fault underlies the southeast portion of the Project Site. Similarly, a geotechnical report completed for 1517 North Vermont Avenue (Building Site 5) indicated that one of these faults is located approximately 1,000 feet to the northwest, and the other fault strand is 170 feet southeast of that property, respectively.[30] These postulated faults are not shown on regional geologic maps, including the geologic map of the USGS 7.5-minute Hollywood Quadrangle,[31] are not considered Holocene-active, and have no impact on new construction in the area.

The geotechnical report completed for 1526 Edgemont Street (Site 4)[32] indicated that a separate geotechnical investigation encountered northwest–southeast trending faults within the Puente Formation, in a boring drilled approximately 900 feet east of Site 4. This distance corresponds approximately to the location of the proposed parking structure at 1517 Vermont Boulevard (Site 5). However, the Puente Formation is middle to upper Miocene in age (approximately 5 to 10 million years old), indicating that these faults are inactive, are not subject to fault rupture, and have not been included in an Alquist-Priolo Fault Zone.

The geotechnical report completed for 1526 Edgemont Street (Site 4)[33] also indicated that a northeast–southwest trending bedrock fault was observed traversing the northwest portion of the proposed medical office building site. However, a fault investigation

28 KFM GeoSciences, City of West Hollywood Seismic Technical Background Report, 2010.
29 RMA Group, Revised Engineering Geologic Report for Proposed Medical Office Building, 1526 N. Edgemont Street, Los Angeles, CA, January 2017, included as Appendix D of Appendix E-2 of this EIR.
30 RMA Group, Revised Engineering Geologic Report for Proposed Medical Office Building, 1526 N. Edgemont Street, Los Angeles, CA, January 2017, included as Appendix D of Appendix E-2 of this EIR.
31 T.W. Dibblee, and H.E. Ehrenspeck, Geologic Map of the Hollywood and Burbank (south ½) Quadrangles, Los Angeles, California, 1991.
32 RMA Group, Revised Engineering Geologic Report for Proposed Medical Office Building, 1526 N. Edgemont Street, Los Angeles, CA, January 2017, included as Appendix D of Appendix E-2 of this EIR.
33 RMA Group, Revised Engineering Geologic Report for Proposed Medical Office Building, 1526 N. Edgemont Street, Los Angeles, CA, January 2017, included as Appendix D of Appendix E-2 of this EIR.

completed at Site 4[34] indicated that the fault does not offset late Pleistocene-age (i.e., 11,000 to 40,000 years old) sediments. The underlying siltstone bedrock was offset less than 6 inches, indicating the fault is a minor bedrock feature with an extremely low slip rate. As a result, the fault is not considered Holocene-active, is not subject to surface rupture, and has not been included in an Alquist-Priolo Fault Zone.

The fault investigation at Site 4[35] concluded that the south edge of Olive Hill is not the location of an active or potentially active fault. Borings in this area document the presence of shallow siltstone bedrock, overlain by a veneer of alluvium. The geometry of the hill front geology is in marked contrast to the Hollywood Fault at the base of the Santa Monica Mountains, where ten to hundreds of feet of geologically young alluvium is found south of the fault trace.

*(a) **Soil Conditions***

The building sites are adjacent to the south side of Olive Hill. The topography is predominantly gently sloping to the southwest, south, and southeast. Based on geotechnical reports for Sites 1, 4, and 5, an environmental site assessment report for Site 1, and regional geologic mapping,[36],[37],[38],[39],[40],[41],[42] the building sites are underlain by a variable amount of artificial fill, due to the extensive development in the area, which is in turn underlain by Holocene alluvium, late Pleistocene older alluvium, and Miocene siltstone of the Puente Formation. The alluvial materials increase in thickness with increased distance from Olive Hill, towards the southwest, south, and southeast, ranging from less than 3 to 5 feet of alluvium in the northern portion of the Project Site (i.e., 1526 Edgemont [Site 4], 1517 Vermont [Site 5]) to 47 feet in the southeastern portion of the Project Site (i.e., 1321, 1329,

34 Geomatrix Consultants, Fault-Rupture Hazard Assessment, Rebuild Sunset Hospital Project, Kaiser Permanente Los Angeles Medical Center, 2017, included as Appendix A, Referenced Boring Logs and Fault Study, in Appendix E-2 of this EIR.

35 Geomatrix Consultants, Fault-Rupture Hazard Assessment, Rebuild Sunset Hospital Project, Kaiser Permanente Los Angeles Medical Center, 2017, included as Appendix A, Referenced Boring Logs and Fault Study, in Appendix E-2 of this EIR.

36 RMA Group, Revised Engineering Geologic Report for Proposed Medical Office Building, 1526 N. Edgemont Street, Los Angeles, CA, January 2017, included as Appendix D of Appendix E-2 of this EIR.

37 Dibblee and Ehrenspeck, Geologic Map of the Hollywood and Burbank (south ½) Quadrangles, Los Angeles, California, 1991.

38 Geomatrix Consultants, Fault-Rupture Hazard Assessment, Rebuild Sunset Hospital Project, Kaiser Permanente Los Angeles Medical Center, 2017, included as Appendix A, Referenced Boring Logs and Fault Study, in Appendix E-2 of this Draft EIR.

39 Stantec Consulting Services Inc., Additional Subsurface Assessment Report, 1321, 1329, 1345 North Vermont Ave., 1328 North New Hampshire Ave., Los Angeles, California 90027, 2016, included as Appendix E-3 of this Draft EIR.

40 GeoBase Inc., Geotechnical Report, Kaiser Permanente – Medical Office Building, 1526 North Edgemont Street, Los Angeles, California, January 2017, included as Appendix E-2 tofthis Draft EIR.

41 GeoBase Inc., Geotechnical Report, Kaiser Permanente – Vermont Parking Structure Replacement, 1517 North Vermont Avenue, Los Angeles, California, January 2017, included as Appendix E-1 of this Draft EIR.

42 Geobase Inc., Geotechnical Feasibility Evaluation, Kaiser Permanente – Vermont New Hampshire MOB 1321, 1329, and 1345 North Vermont Avenue and 1328 North New Hampshire Avenue, Los Angeles, California, April 2016, included as Appendix E-4 of this Draft EIR.

1345 Vermont and 1328 North New Hampshire [Site 1]). Alluvial materials consist primarily of silty sand, sand, clayey sand, silty sand, and clay.

(b) Groundwater

The Project Site overlies the Hollywood Groundwater Basin of the Los Angeles Coastal Plain.43 The sediments containing known aquifers in this basin extend to a maximum depth of 650 feet and include Recent (i.e., Holocene) alluvium and the Lakewood and San Pedro formations of Pleistocene age. The Recent alluvium covers about half of the basin and ranges from 5 to 35 feet thick. Some semi-perched water may be present in these deposits although aquifers have not been differentiated. The late Pleistocene Lakewood Formation extends across the majority of the basin and includes the Bellflower aquiclude and the Exposition and Gage aquifers. The Exposition aquifer is generally 20 to 60 feet thick. The Gage aquifer is the major water-bearing member of the Lakewood Formation and attains a maximum depth of 260 feet locally. The San Pedro Formation aquifers underlie the Lakewood aquifers.

As previously discussed, the building sites are located along the southern flanks of Olive Hill, which is underlain by Puente Formation siltstone. As a result, alluvial deposits thin towards the northern portion of the Project Site (i.e., 1526 Edgemont [Site 4], 1517 Vermont [Site 5], **Figure II-4**), to as little as 3 to 5 feet thick, overlying the siltstone. Based on a groundwater contour map, derived from regional borehole data, the highest historic groundwater level beneath the Project Site has been approximately 25 to 35 feet below ground surface.[44,45] In addition, based on borings drilled at Sites 1 and 4,[46,47,48,49] perched groundwater has been locally detected at depths of 25 to 40 feet beneath the site.

43 California Department of Water Resources, Bulletin No. 104, Planned Utilization of the Ground Water Basins of the Coastal Plain of Los Angeles County, Appendix A – Ground Water Geology, June 1961.

44 California Division of Mines and Geology (CDMG), Seismic Hazard Zone Report for the Hollywood 7.5-Minute Quadrangle, Los Angeles County, California, 1998.

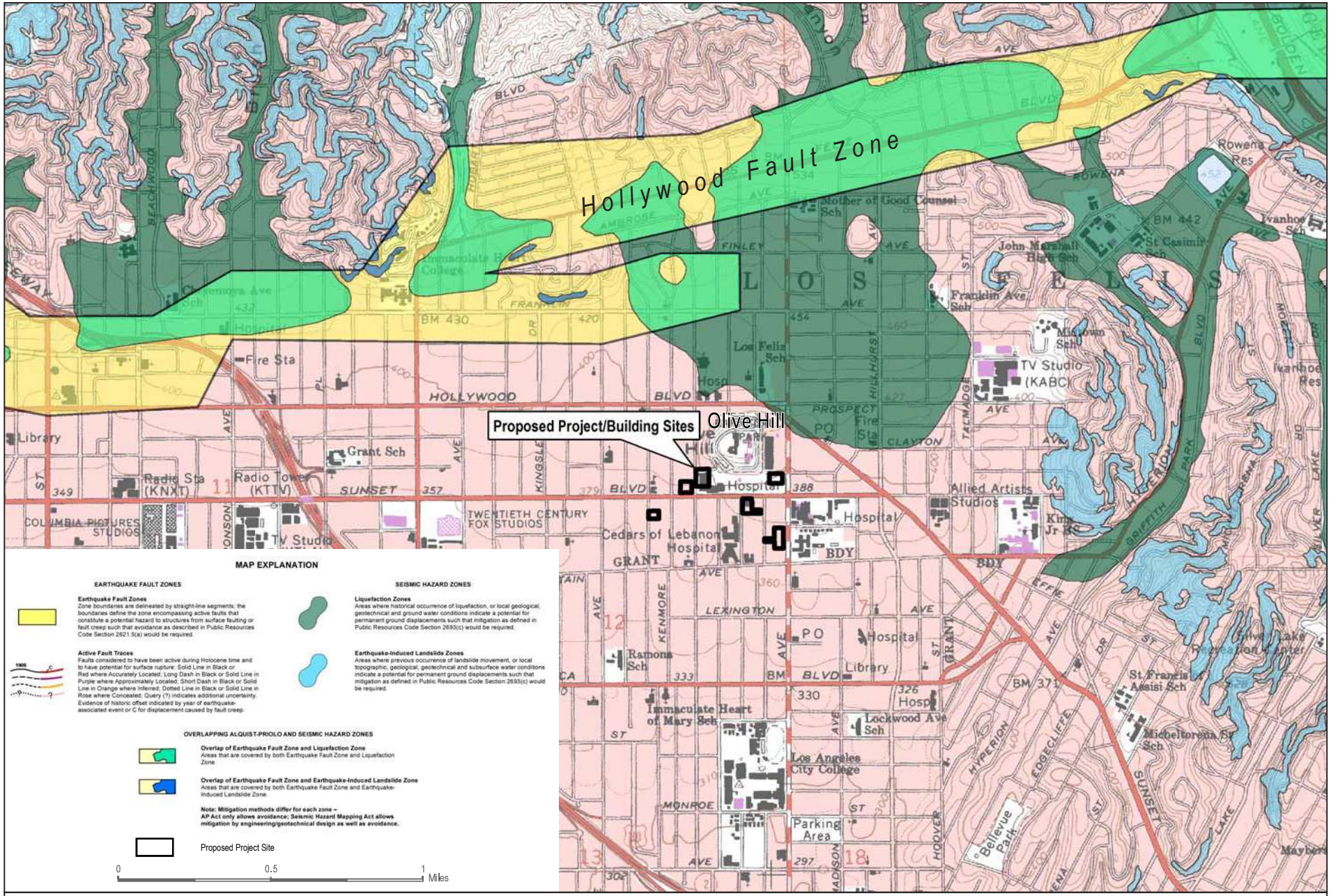
45 Geobase Inc., Geotechnical Feasibility Evaluation, Kaiser Permanente – Vermont New Hampshire MOB 1321, 1329, and 1345 North Vermont Avenue and 1328 North New Hampshire Avenue, Los Angeles, California, April 2016, included as Appendix E-4 to this Draft EIR.

46 RMA Group, Revised Engineering Geologic Report for Proposed Medical Office Building, 1526 N. Edgemont Street, Los Angeles, CA, January 2017, included as Appendix D of Appendix E-2 of this EIR.

47 Geomatrix Consultants, Fault-Rupture Hazard Assessment, Rebuild Sunset Hospital Project, Kaiser Permanente Los Angeles Medical Center, included as Appendix A, Referenced Boring Logs and Fault Study, in Appendix E-2 of this Draft EIR.

48 Stantec Consulting Services Inc., Additional Subsurface Assessment Report, 1321, 1329, 1345 North Vermont Ave., 1328 North New Hampshire Ave., Los Angeles, California 90027, 2016, included as Appendix E-3 of this Draft EIR.

49 Geobase Inc. Geotechnical Feasibility Evaluation, Kaiser Permanente – Vermont New Hampshire MOB 1321, 1329, and 1345 North Vermont Avenue and 1328 North New Hampshire Avenue, Los Angeles, California, April 2016, included as Appendix E-4 of this Draft EIR.



SOURCE: California Geological Survey 2014

FIGURE IV.E-1
Seismic Hazards Zone Map

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(c) Liquefaction/Lateral Spreading

Liquefaction is the process in which saturated, silty to cohesionless soils below the groundwater table temporarily lose strength during strong ground shaking as a consequence of increased pore pressure, during conditions such as those caused by earthquakes. The vast majority of liquefaction hazards are associated with sandy soils and silty soils of low plasticity. Potentially liquefiable soils must be saturated or nearly saturated to be susceptible to liquefaction. Significant factors that affect liquefaction include water level, soil type, particulate size and gradation, relative density, confining pressure, intensity of shaking, and duration of shaking. Liquefaction potential has been found to be the greatest where the groundwater level is shallow and submerged loose, fine sand occur within a depth of about 50 feet or less. The building sites are not located within an area designated by the State Geologist or City of Los Angeles as a liquefaction zone (Figure IV.E-1, Seismic Hazards Zone Map).[50,51] Site-specific geotechnical investigations at Sites 1, 4, and 5[52,53,54] similarly concluded that the potential for liquefaction is low, as subsoils consist primarily of very stiff to hard, cohesive siltstone and shale bedrock.

Lateral spreading is the finite, lateral movement of gently sloping, saturated soils deposits caused by earthquake-induced liquefaction. Based on the low likelihood of liquefaction to occur at the site, the potential for lateral spreading is similarly low.

(d) Seismically Induced Settlement

Seismically induced settlement, or the compaction of dry or moist cohesionless soils, may also occur during a major earthquake. Typically, settlements occur in thick beds of dry and loose sands. For building sites in proximity to Olive Hill (i.e., Sites 4 and 5), the potential for seismically induced settlement is low, due to the shallow depth to bedrock.[55,56] However, the potential for such an occurrence increases in the southern portion of the Project Site (i.e., Sites 1 and 6), where alluvial sediments are up to 47 feet thick.

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50 CGS, Earthquake Zones of Required Investigation, Hollywood Quadrangle, March 25, 1999, revised November 6, 2014.

51 City of Los Angeles, Safety Element of the Los Angeles City General Plan, City Plan Case No. 95-0371, Council File No. 86-0662, 1996.

52 RMA Group, Revised Engineering Geologic Report for Proposed Medical Office Building, 1526 N. Edgemont Street, Los Angeles, CA, January 2017, included as Appendix D of Appendix E-2 of this Draft EIR.

53 GeoBase Inc., Geotechnical Report, Kaiser Permanente – Medical Office Building, 1526 North Edgemont Street, Los Angeles, California, January 2017, included as Appendix E-2 of this Draft EIR.

54 GeoBase Inc., Geotechnical Report, Kaiser Permanente – Vermont Parking Structure Replacement, 1517 North Vermont Avenue, Los Angeles, California, January 2017, included as Appendix E-1 of this Draft EIR.

55 GeoBase Inc., Geotechnical Report, Kaiser Permanente – Medical Office Building, 1526 North Edgemont Street, Los Angeles, California, January 2017, included as Appendix E-2 of this Draft EIR.

56 GeoBase Inc., Geotechnical Report, Kaiser Permanente – Vermont Parking Structure Replacement, 1517 North Vermont Avenue, Los Angeles, California, January 2017, included as Appendix E-1 of this Draft EIR.

(e) Subsidence

Land subsidence is a gradual settling or sudden sinking of the Earth surface due to subsurface movement of earth materials. The main cause of subsidence in California is groundwater pumping. The effects of subsidence include damage to buildings and infrastructure, increased flood risk in low-lying areas, and lasting damage to groundwater aquifers and aquatic systems.[57] Based on the relatively shallow depth to competent shale and siltstone bedrock in the Project area, the potential for subsidence is very low.[58,59]

(f) Expansive and Corrosive Soils

Expansive soils swell when subjected to moisture and shrink when dried. Depending on the soil characteristics and design of building construction, expansive soils can cause extensive damage to building foundations. Based on geotechnical reports completed for Building Sites 1, 4, and 5, on-site soils locally possess a medium to high expansion potential.[60,61,62]

Corrosive soils, which can cause extensive damage to buried utility infrastructure and other support structures, are measured based on soil resistivity, which measures how much the soil is resistant to the flow of electricity, and by evaluating the presence of corrosion characteristics. Based on geotechnical reports completed for the Project site, on-site soils locally have a low to moderate sulfate concentration and are moderately to severely corrosive to metals.[63,64] As such, on-site soils can cause damage to buried utility infrastructure and other support structures in the Project area. Standard geotechnical engineering, such as the use of Type II (if moderate) and Type V (if higher sulfate

57 USGS, Land Subsidence in California, https://www.usgs.gov/centers/ca-water-ls, accessed February 23, 2020.

58 GeoBase Inc., Geotechnical Report, Kaiser Permanente – Medical Office Building, 1526 North Edgemont Street, Los Angeles, California, January 2017, included as Appendix E-2 of this Draft EIR.

59 GeoBase Inc., Geotechnical Report, Kaiser Permanente – Vermont Parking Structure Replacement, 1517 North Vermont Avenue, Los Angeles, California, January 2017, included as Appendix E-1 of this Draft EIR.

60 Stantec Consulting Services Inc., Additional Subsurface Assessment Report, 1321, 1329, 1345 North Vermont Ave., 1328 North New Hampshire Ave., Los Angeles, California 90027, 2016, included as Appendix E-3 of this Draft EIR.

61 GeoBase Inc., Geotechnical Report, Kaiser Permanente – Vermont Parking Structure Replacement, 1517 North Vermont Avenue, Los Angeles, California, January 2017, included as Appendix E-1 of this Draft EIR.

62 Geobase Inc., Geotechnical Feasibility Evaluation, Kaiser Permanente – Vermont New Hampshire MOB 1321, 1329, and 1345 North Vermont Avenue and 1328 North New Hampshire Avenue, Los Angeles, California, April 2016, included as Appendix E-4 of this EIR.

63 GeoBase Inc., Geotechnical Report, Kaiser Permanente – Vermont Parking Structure Replacement, 1517 North Vermont Avenue, Los Angeles, California, January 2017, included as Appendix E-1 of this Draft EIR.

64 Geobase Inc., Geotechnical Feasibility Evaluation, Kaiser Permanente – Vermont New Hampshire MOB 1321, 1329, and 1345 North Vermont Avenue and 1328 North New Hampshire Avenue, Los Angeles, California, April 2016, included as Appendix E-4 of this EIR

resistance) ordinary Portland cement, can reduce the potential for corrosive soils to adversely impact overlying infrastructure.

(3) Paleontological Resources

(a) Records Search

Dudek requested a Vertebrate Paleontology Records Check for paleontological resources from the Natural History Museum of Los Angeles County (LACM) on November 1, 2018. The results were received on November 6, 2018. A copy of this letter is provided in Appendix E-5.

The records search results indicate that the Project Site is located within sedimentary deposits of the Los Angeles Basin. As previously discussed, the Project Site is underlain by Holocene alluvium, Pleistocene age, older alluvial deposits, and a shale/siltstone unit of late Miocene age, referred to as the Puente Formation.[65],[66] There are also exposures of the Puente Formation on Olive Hill, adjacent to the northernmost portion of the Project area.[67] The Pleistocene older alluvial deposits and the Miocene Puente shale/siltstone are considered to have high potential to yield paleontological resources.

Past excavation and trenching activities in the area surrounding the Project Site have encountered paleontological resources in older alluvial deposits. According to the records search results received from the LACM, the closest fossil localities to the Project Site within older alluvial deposits are located west of the Project area (localities LACM 6297–6300) and were found during excavation for the Los Angeles County Metropolitan Transportation Authority Metrorail Red Line tunnels and stations. The localities were discovered between the Hollywood Freeway (Highway 101) and Western Avenue along Hollywood Boulevard at depths of 47 and 80 feet below the ground surface (bgs). Recovered fossils include horse (*Equus*), bison (*Bison*), camel (*Camelops*), and mastodon (*Mammut americanum*). Southeast of the Project area, near the intersection of Madison Avenue and Middlebury Street, locality LACM 3250 produced a specimen of mammoth (*Mammuthus*) at 8 feet bgs. Another locality, LACM 5845, south-southwest of the Project area, produced a specimen of mastodon (Mammutidae) at 5 to 6 feet bgs.[68]

The LACM also has numerous documented localities from the Puente Formation recovered from Metrorail Red Line tunnel and station excavations. The fossils from these

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65 S.A. McLeod, Vertebrate Paleontology Records Check for Paleontological Resources for the Proposed Kaiser Permanente Los Angeles Medical Center Project, in the City of Los Angeles, Los Angeles County, Project Area, 2018, unpublished Records Search Results Letter from the Natural History Museum of Los Angeles County, Los Angeles, California.

66 Dibblee and Ehrenspeck, Geologic Map of the Hollywood and Burbank (south ½) Quadrangles, Los Angeles, California, 1991.

67 McLeod, Vertebrate Paleontology Records Check for Paleontological Resources for the Proposed Kaiser Permanente Los Angeles Medical Center Project.

68 McLeod, Vertebrate Paleontology Records Check for Paleontological Resources for the Proposed Kaiser Permanente Los Angeles Medical Center Project.

localities (e.g., LACM 6948, 6205-6207, and 6946-6947) have yielded a scientifically significant assemblage of fossil fishes.[69]

3. Project Impacts

a) Thresholds of Significance

In accordance with CEQA Guidelines Appendix G, the Project would have a significant impact related to geology and soils if it would result in any of the following impacts to future residents or users on the Project Site:

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 based on other substantial evidence of a known fault. Refer to Division of Mines and Geology[70] 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 risks to life or property.

[69] McLeod, Vertebrate Paleontology Records Check for Paleontological Resources for the Proposed Kaiser Permanente Los Angeles Medical Center Project.

[70] Now the California Geological Survey.

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.

b) Methodology

Information regarding the existing regional geology and seismically induced hazards is based on published maps and reports completed by the CGS, the Safety Element, and the LABC. Specific geologic/soils information for the building sites was based on geotechnical reports prepared by GeoBase, Inc. (Appendices E-1, E-2, and E-4). Additionally, this analysis relies on the Additional Subsurface Assessment Report prepared by Stantec (Appendix E-3). These reports analyzed faulting, seismic hazards, soil stability, and other geological considerations for the proposed Project. The following analysis considers whether the Project would directly or indirectly cause or exacerbate geological/soils hazards.

Construction-related impacts are considered for the Project as a whole. Operational-related impacts of the Project are considered in the context of seismic and/or other geological hazards to structures, employees, and visitors. The potential increased geologic hazards resulting from development under the Project were evaluated with consideration of the mitigating effects of existing safety standards in the CBC and LABC.

A records search was conducted by the LACM on November 6, 2018. A copy of this letter is provided in Appendix E-5. The purpose of the LACM records search is to determine whether there are any known fossil localities in or near the Project Site, identify the sensitivity of geological units present within the Project Site, and assist in determining whether a paleontological mitigation program is warranted to avoid or minimize potential adverse effects of construction on paleontological resources. Published geological maps and unpublished reports were reviewed to identify geological units on the Project Site and determine their paleontological sensitivity.

c) Project Design Features

No specific project design features are proposed with regards to geology and soils.

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 based on other substantial evidence of a known fault. Refer to Division of Mines and Geology[71] Special Publication 42?

ii. Strong seismic ground shaking;

iii. Seismic-related ground failure, including liquefaction; or

iv. Landslides.

(1) Impact Analysis

(a) Known Earthquake Faults

None of the building sites that together form the Project Site are traversed by known active faults or located in a currently established Alquist-Priolo Zone of Required Investigation. Based on a review of the Alquist-Priolo Special Study Zone for the Hollywood Quadrangle, the closest established Alquist-Priolo Zone is along the Hollywood Fault, located about 2,300 feet north of Site 4 (Figure IV.E-1, Seismic Hazards Zone Map). Therefore, the potential for fault surface rupture at the Project Site is considered low. In addition, proposed Project construction and operation would not result in the rupture of the Holocene-active Hollywood Fault Zone, the inactive Olive Hill Fault Zone, or any other regional faults.

(i) Strong Seismic Ground Shaking

As previously discussed, Southern California is an active seismic region. Although the building sites are not located within an Alquist-Priolo Earthquake Fault Zone, the building sites would be susceptible to ground shaking during a seismic event. The main seismic hazard affecting the building sites is moderate to strong ground shaking. However, the Project Applicant would be required to design and construct the Project in conformance with the most recently adopted CBC design parameters, City building codes, and design parameters of the Hospital Facilities Seismic Safety Act (as established by OSHPD), with respect to new construction. These requirements would include adherence to recommendations provided in standard, site-specific geotechnical investigations, which would be required as part of the building permit process. Adherence to the hospital-

[71] Now the California Geological Survey.

specific building codes identified in Section IV.E.2.a, Regulatory Framework, above, and implementation of standard engineering practices would ensure that the Project would not expose people, property, or infrastructure to seismically induced ground shaking hazards that are greater than the average risk associated with locations in the Southern California region. In addition, the Project would not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking. Therefore, impacts related to seismic ground shaking would be less than significant.

(ii) Seismically Related Ground Failure

(a) Liquefaction

Based on the California Geological Survey Seismic Hazard Zones Map of the Hollywood Quadrangle, the building sites are not located within an area of required liquefaction investigation (Figure IV.E-1, Seismic Hazards Zone Map). This classification is consistent with findings of geotechnical investigations completed for Sites 1, 4, and 5, which indicate that the potential for liquefaction is low, as subsoils consist primarily of very stiff to hard, cohesive siltstone and shale bedrock.[72,73,74] Based on a groundwater contour map, derived from regional borehole data from the California Division of Mines and Geology, the highest historic groundwater level beneath the Project site has been approximately 25 to 35 feet bgs.[75,76] In addition, based on borings drilled at Sites 1 and 4, perched groundwater has been locally detected at depths of 25 to 40 feet beneath the site. Individual, continuous aquifers have not been identified within these shallow depths. However, the Project Site is located along the southern flanks of Olive Hill, which is underlain by Puente Formation siltstone. As a result, although the thickness of alluvial deposits ranges from up to 47 feet thick in the southern portion of the Project Site (i.e., 1321, 1329, 1345 Vermont and 1328 New Hampshire [Site 1], Figure II-4), to as little as 3 to 5 feet towards the northern portion of the Project site, overlying the siltstone (i.e., 1526 Edgemont [Site 4], 1549 Edgemont [existing parking structure], 1517 Vermont [Site 5], Figure II-4). Because liquefaction/lateral spreading occurs in relatively thick, groundwater-bearing soft sediments, such as alluvium, the potential for liquefaction and associated lateral

72 RMA Group, Revised Engineering Geologic Report for Proposed Medical Office Building, 1526 N. Edgemont Street, Los Angeles, CA, January 2017, included as Appendix D of Appendix E-2 of this EIR.

73 Geobase Inc., Geotechnical Feasibility Evaluation, Kaiser Permanente – Vermont New Hampshire MOB 1321, 1329, and 1345 North Vermont Avenue and 1328 North New Hampshire Avenue, Los Angeles, California, April 2016, included as Appendix E-4 of this EIR.

74 GeoBase Inc., Geotechnical Report, Kaiser Permanente – Vermont Parking Structure Replacement, 1517 North Vermont Avenue, Los Angeles, California, January 2017, included as Appendix E-1 of this Draft EIR.

75 CDMG, Seismic Hazard Zone Report for the Hollywood 7.5-Minute Quadrangle, Los Angeles County, California.

76 Geobase Inc., Geotechnical Feasibility Evaluation, Kaiser Permanente – Vermont New Hampshire MOB 1321, 1329, and 1345 North Vermont Avenue and 1328 North New Hampshire Avenue, Los Angeles, California, April 2016, included as Appendix E-4 of this EIR.

spreading beneath the Project site is low. Although geotechnical reports are not available for all the proposed building sites, this synopsis is confirmed by the State Geologist, which has determined that the buildings sites are not located within an area of potential liquefaction. In addition, proposed Project construction and operation would not result in liquefaction at the Project Site.

(b) Seismically Induced Settlement

Seismically induced settlement is often caused when unsaturated loose to medium-dense granular soils are densified during ground shaking. Seismically induced settlement typically occurs in areas with thick accumulations of such loose to medium-dense granular soils. For portions of the Project Site located in proximity to Olive Hill (i.e., Sites 4 and 5), the potential for seismically induced settlement is low due to the shallow depth to siltstone and shale bedrock (i.e., a lack of thick accumulations of granular sediments). However, the potential for such an occurrence increases in the southern portion of the Project Site, where the thickness of alluvial sediments is up to 47 feet (i.e., 1321, 1329, 1345 Vermont and 1328 New Hampshire [Site 1], Figure II-4). However, building construction on pile foundations would result in negligible seismic settlement.[77]

Although geotechnical reports are not available for all the proposed building sites, the information presented herein is representative of the Project Site. In addition, Kaiser Permanente would be required to design and construct the Project in conformance with the most recently adopted CBC design parameters, City building codes, and design parameters of the Hospital Facilities Seismic Safety Act (as established by OSHPD), with respect to new construction. These requirements would include adherence to recommendations provided in standard, site-specific geotechnical investigations, which would be required as part of the building permit process, including recommendations provided in Appendices E-1, E-2, and E-4. Because these design parameters and building codes were created to prevent seismically induced ground failure, adherence to current building codes and engineering practices would minimize the potential for seismically induced settlement to occur at the Project site. In addition, proposed Project construction and operation would not result in seismically induced ground settlement at the Project Site.

(iii) Landslides

The building sites are not located within a potential Earthquake-Induced Landslide Zone, as mapped by the CGS (Figure IV.E-1, Seismic Hazards Zone Map). The Project Site lies adjacent to the south side of Olive Hill. The topography is predominantly gently sloping to

[77] Geobase Inc., Geotechnical Feasibility Evaluation, Kaiser Permanente – Vermont New Hampshire MOB 1321, 1329, and 1345 North Vermont Avenue and 1328 North New Hampshire Avenue, Los Angeles, California, April 2016, included as Appendix E-4 of this EIR.

the southwest, south, and southeast throughout most of the Project Site, with small localized areas of moderately sloping topography.

Portions of the Project Site, including 1526 North Edgemont Street (Site 4), and 1515 and 1517 North Vermont Boulevard (Site 5) (Figure II-4, Proposed Site Plan), are located within City Hillside Grading Areas and Hillside Ordinance Areas.[78] However, none of the parcels within the Project Site in these Hillside Grading Areas or Hillside Ordinance Areas are located in City-designated landslide hazard zones.[79]

Because the Project Site is located on gently sloping topography, Project grading and construction would result in temporary and permanent cut and fill slopes, including above-ground slopes and subsurface vertical excavations for a subterranean parking structure (i.e., two below-grade levels at 1517 North Vermont Avenue [Site 5]). Improper construction of slopes and/or shoring of excavation sidewalls could potentially result in slope failure and associated risk of loss, injury, or death. However, the Project Applicant would be required to design and construct the Project in conformance with the most recently adopted CBC design parameters, City building codes, and design parameters of the Hospital Facilities Seismic Safety Act (as established by OSHPD), with respect to new construction. These requirements would include adherence to recommendations provided in standard, site-specific geotechnical investigations, which would be required as part of the building permit process. Construction within the City Hillside Grading Areas and Hillside Ordinance would require an added layer of City oversight with respect to potential slope failures during grading and construction. Adherence to current building codes and engineering practices would minimize the potential for potential landslides or other slope failures to occur at the site.

With compliance with CBC design parameters, City building codes, the City Hillside Grading Areas and Hillside Ordinance, and design parameters of the Hospital Facilities Seismic Safety Act (as established by OSHPD), the Project would not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault; strong seismic ground shaking; seismic-related ground failure, including liquefaction and ground settlement; or landslides. Therefore, impacts would be less than significant.

(2) Mitigation Measures

Impacts regarding earthquake faults, seismically induced ground shaking, seismically induced ground failure, and landslides were determined to be less than significant without mitigation. Therefore, no mitigation measures are required.

[78] City of Los Angeles, Bureau of Engineering, Department of Public Works, Navigate LA.
[79] City of Los Angeles, Zimas, http://zimas.lacity.org/, accessed October 15, 2018.

(3) Level of Significance after Mitigation

Impacts regarding earthquake faults, seismically induced ground shaking, seismically induced ground failure, and landslides were determined to be less than significant without mitigation. Therefore, no mitigation measures were required, 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

During Project construction, activities such as excavation, grading, and site preparation could result in soil erosion susceptibility. Kaiser Permanente would be required to comply with South Coast Air Quality Management District Rule 403 – Fugitive Dust, to minimize wind and water erosion at the site, as well as prepare and implement a Stormwater Pollution Prevention Plan (SWPPP), in accordance with the National Pollutant Discharge Elimination System General Permit for Discharges of Storm Water Associated with Construction Activity and Land Disturbance Activities (i.e., the Construction General Permit). The site-specific SWPPP would be prepared prior to earthwork activities and would be implemented during Project construction. The SWPPP would include Best Management Practices (BMPs) and erosion control measures to prevent pollution in stormwater discharge. See Section IV.H, Hydrology and Water Quality, of this Draft EIR, for related information.

BMPs that Kaiser Permanente would implement during construction include good housekeeping practices (e.g., street sweeping, proper waste disposal, vehicle and equipment maintenance, concrete washout area, materials storage, minimization of hazardous materials, proper handling and storage of hazardous materials, etc.) and erosion/sediment control measures (e.g., silt fences, fiber rolls, gravel bags, stormwater inlet protection, soil stabilization measures, etc.). The SWPPP would be subject to review and approval by the City for compliance with the City's *Development Best Management Practices Handbook, Part A, Construction Activities*. Additionally, all Project construction activities are required to comply with the City's grading permit regulations, which require the implementation of grading and dust control measures, including a wet weather erosion control plan if construction occurs during the rainy season, as well as inspections to ensure that sedimentation and erosion is minimized.

During operations, most of the Project site would be developed with impervious surfaces, and all stormwater flows would be directed to storm drain features, resulting in no contact with bare soil surfaces. However, because the Project would be built in three phases, select properties would remain vacant and unpaved following demolition, but prior to new construction. Specifically, such a scenario would occur at Site 3 (1505 North Edgemont

Street) and Site 4 (1526 North Edgemont Street). Exposure of soils for extended periods of time could result in substantial erosion and loss of topsoil. However, under the Construction General Permit, the Applicant would install post-construction stormwater management measures and establish a long-term maintenance plan. This requirement is intended to ensure that the post-construction conditions at the Project Site do not cause or contribute to direct or indirect water quality impacts (i.e., pollution and/or hydromodification) downstream of the Site, for a minimum period of 5 years. Specifically, the Applicant must demonstrate compliance with the post-construction standards set forth in Section XIII of the Construction General Permit, which includes: (1) use of non-structural and structural controls to replicate the pre-project stormwater runoff volume for the smallest storms up to the 85th percentile storm event; and (2) implementation of post-construction BMPs to reduce pollutants in stormwater discharges that are reasonably foreseeable after all construction phases have been completed at the site. **With implementation of the Construction General Permit, the Project would not result in substantial soil erosion or loss of topsoil, and impacts would be less than significant.**

(2) Mitigation Measures

Impacts regarding soil erosion and loss of topsoil were determined to be less than significant without mitigation. Therefore, no mitigation measures are required.

(3) Level of Significance after Mitigation

Impacts regarding soil erosion and loss of topsoil were determined to be less than significant without mitigation. Therefore, no mitigation measures were required, 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 previously discussed for Threshold (a)(iv), improper construction of slopes and/or shoring of excavation sidewalls could potentially result in slope failure and associated risk of loss, injury, or death. However, the Project Applicant would be required to design and construct the Project in conformance with the most recently adopted CBC design parameters, City building codes, and design parameters of the Hospital Facilities Seismic Safety Act (as established by OSHPD), with respect to new construction. **Therefore, potential impacts associated with landslides are considered less than significant.**

(b) Liquefaction and Lateral Spreading

As discussed under Threshold (a-iii), the Project Site is not located within an area of required liquefaction investigation (Figure IV.E-1, Seismic Hazards Zone Map). This classification is consistent with findings of geotechnical investigations completed at Sites 1, 4 and 5, which indicate that the potential for liquefaction is low, as subsoils consist primarily of very stiff to hard, cohesive siltstone and shale bedrock. Lateral spreading is the lateral movement of gently to steeply sloping, saturated soil deposits caused by earthquake-induced liquefaction. Because liquefaction/lateral spreading occurs in relatively thick, groundwater-bearing soft sediments, such as alluvium, the potential for liquefaction and associated lateral spreading beneath the Project Site is considered to be low**. In addition, the Project would not potentially cause liquefaction/lateral spreading to occur. Project impacts related to liquefaction and lateral spreading are thus considered less than significant.**

(c) Subsidence

Ground surface subsidence generally results from the extraction of fluids or gas from the subsurface, which can result in a gradual lowering of the overlying ground surface. Subsidence can also occur when subsurface peat deposits oxidize and undergo volume loss. Given the trends in water conservation, controlled groundwater pumping, and an associated rise in groundwater levels, the hazard for regional ground subsidence from groundwater lowering in the City is very low. Although oil and gas extraction is active in the region, water injection and water flooding operations, as part of secondary recovery operations, are believed to have largely mitigated subsidence hazards that could otherwise potentially occur as a direct result of oil and gas extraction activities.

Specific to the Project Site, the proposed Project would not involve extraction of oil, gas, or thermal resources. Based on the relatively shallow depth to competent shale and siltstone bedrock in the Project area (e.g., Sites 4 and 5), the potential for subsidence is very low.[80,81] Project-related excavations would not likely have an impact on localized perched groundwater levels. Based on a groundwater contour map derived from regional borehole data, the highest historic groundwater level beneath the Project Site has been approximately 25 to 35 feet below ground surface.[82,83] Based on borings drilled at the

[80] GeoBase Inc., Geotechnical Report, Kaiser Permanente – Medical Office Building, 1526 North Edgemont Street, Los Angeles, California, January 2017, included as Appendix E-2 of this Draft EIR.

[81] GeoBase Inc., Geotechnical Report, Kaiser Permanente – Vermont Parking Structure Replacement, 1517 North Vermont Avenue, Los Angeles, California, January 2017, included as Appendix E-1 of this Draft EIR.

[82] CDMG, Seismic Hazard Zone Report for the Hollywood 7.5-Minute Quadrangle, Los Angeles County, California.

[83] Geobase Inc., Geotechnical Feasibility Evaluation, Kaiser Permanente – Vermont New Hampshire MOB 1321, 1329, and 1345 North Vermont Avenue and 1328 North New Hampshire Avenue, Los Angeles, California, April 2016, included as Appendix E-4 of this EIR.

Project Site, perched groundwater has been locally detected at depths of 25 to 40 feet beneath the site. Proposed excavations would be approximately 20 feet at its lowest depth, based on proposed excavations for a subterranean parking structure (i.e., two below-grade levels at 1517 North Vermont Avenue [Site 5]), assuming approximately 10 feet per parking level. As a result, it is unlikely that the excavation would extend into groundwater and necessitate groundwater dewatering. **Therefore, ground subsidence would not occur as a result of groundwater extractions, and potential impacts associated with subsidence are considered less than significant.**

(d) Collapsible Soils

Collapsible soils are unsaturated soils that can withstand relatively high pressure without showing significant change in volume. However, upon wetting, these soils are susceptible to a large and sudden reduction in volume. Based on geologic mapping and geotechnical reports for Sites 1, 4, and 5, the Project site is underlain by a variable amount of artificial fill, due to the extensive development in the area, underlain by Holocene alluvium, late Pleistocene older alluvium, and Miocene siltstone of the Puente Formation. The alluvial materials increase in thickness with increased distance from Olive Hill, towards the southwest, south, and southeast, with generally less than 5 feet of alluvium in the northern Project area (i.e., 1526 Edgemont Street [Site 4], 1549 Edgemont Street [existing parking structure], and 1517 Vermont Boulevard [Site 5], Figure II-4), to up to 47 feet in the southeast Project area (i.e., 1321, 1329, and 1345 Vermont Boulevard and 1328 New Hampshire Avenue [Site 1], Figure II-4). Alluvial materials consist primarily of silty sand, sand, clayey sand, and clay. For portions of the Project Site located on the flanks of Olive Hill (i.e., Sites 4 and 5), the potential for seismically induced soil collapse and settlement is low, due to the shallow depth to bedrock. However, the potential for such an occurrence increases in the southern portion of the Project Site (i.e., Site 1), where alluvial sediments are up to 47 feet thick, resulting in potentially significant impacts.

However, Kaiser Permanente would be required to design and construct the Project in conformance with the most recently adopted CBC design parameters, City building codes, and design parameters of the Hospital Facilities Seismic Safety Act (as established by OSHPD), which are designed to ensure safe construction and include building foundation requirements appropriate to site conditions. **Therefore, potential impacts associated with collapsible soils are considered less than significant.**

(2) Mitigation Measures

Impacts regarding on- or off-site landslides, lateral spreading, subsidence, liquefaction, or collapse were determined to be less than significant. Therefore, no mitigation measures are required.

(3) Level of Significance after Mitigation

Impacts regarding on- or off-site landslides, lateral spreading, subsidence, liquefaction, or collapse were determined to be less than significant without mitigation. Therefore, no mitigation measures were required, 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 risks to life or property?

(1) Impact Analysis

Based on geotechnical reports completed for Sites 1, 4, and 5, on-site soils locally possess a medium to high expansion potential. However, the Project would be designed and constructed in conformance with the City's current building code requirements, which include either over-excavation of expansion-prone soils and replacement with sandy, non-expansive soils, or design of a foundation system that is strong and rigid enough to withstand the anticipated soil movement. **Thus, the Project would not create a substantial risk to individuals and/or property, and Project impacts related to expansive soils are considered less than significant.**

(2) Mitigation Measures

Impacts regarding expansive soils were determined to be less than significant. Therefore, no mitigation measures are required.

(3) Level of Significance after Mitigation

Impacts regarding expansive soils were determined to be less than significant without mitigation. Therefore, no mitigation measures were required, 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 waste water disposal systems where sewers are not available for the disposal of wastewater?

As discussed in Section VI.6, Effects Not Found to Be Significant, of this Draft EIR, and in the Initial Study (Appendix A-1), the Project would not require and would not have septic tanks or other alternative wastewater disposal systems. **Thus, no impacts related to septic tanks or alternative wastewater disposal systems would occur, and no further analysis is required.**

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

(1) Impact Analysis

No paleontological resources were identified within the Project Site as a result of the institutional records search or desktop geological review. In addition, the Project Site is not anticipated to be underlain by unique geologic features. The Project Site is underlain by artificial fill, Holocene alluvium, Pleistocene older alluvium, and the Puente Formation, Artificial fill has no paleontological sensitivity; Holocene alluvium has low paleontological sensitivity increasing to moderate or high with depth; Pleistocene older alluvium has moderate to high paleontological sensitivity; and the Puente Formation has high paleontological sensitivity. During construction, if intact paleontological resources are located on site, ground-disturbing activities associated with construction of the Project, such as grading during site preparation and trenching for utilities, have the potential to destroy a unique paleontological resource or site. As such, the Project Site is considered to be potentially sensitive for paleontological resources, and without mitigation, the potential damage to paleontological resources during construction associated with the Project is considered a potentially significant impact. Given the proximity of past fossil discoveries in the surrounding area within Pleistocene alluvial deposits and the Miocene Puente Formation, the Project site is highly sensitive for supporting paleontological resources below the depth of fill and Holocene alluvial deposits. **As such, impacts related to paleontological resources would be potentially significant during construction-related ground-disturbing activities. No paleontological resource impacts would occur during operations since no ground disturbance would occur.**

(2) Mitigation Measures

In order to ensure the protection of any unique paleontological resources and geologic features during construction, Mitigation Measure **MM-GEO-1** would be required.

> **MM-GEO-1: Paleontological Monitoring and Resource Treatment.** Prior to commencement of any grading activity on site, the Project Applicant shall retain a Qualified Paleontologist meeting the Society of Vertebrate Paleontology (SVP) Standards,[84] subject to the review and approval of the Department of City Planning. The Qualified Paleontologist shall prepare a Paleontological Resources Impact Mitigation Program (PRIMP) for the Project that is consistent with the SVP guidelines and attend the pre-construction meeting. The Qualified Paleontologist or an SVP qualified Paleontological Resource Monitor shall be on site during all rough grading and other significant ground-disturbing activities in depths greater than 5 feet below ground surface. In the event that paleontological resources (e.g., fossils) are unearthed during grading, the Qualified Paleontologist shall temporarily halt and/or divert grading activity to allow recovery of paleontological resources.

[84] Society of Vertebrate Paleontology (SVP), Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources, 2010.

The area of discovery shall be roped off with a 50-foot radius buffer. Once documentation and collection of the find is completed, the monitor shall remove the rope and allow grading to recommence in the area of the find.[85]

(3) Level of Significance after Mitigation

Project impacts to paleontological resources would be less than significant with the implementation of Mitigation Measure **MM-GEO-1**.

e) Cumulative Impacts

(1) Impact Analysis

Geotechnical impacts related to future development in the City involve hazards related to site-specific soil conditions, erosion, and ground shaking during earthquakes. As listed in **Table II-2,** Related Projects of Chapter II Environmental Setting, and illustrated in **Figure II-10**, Location of Related Projects, there are 85 related projects located within proximity to the Project Site. With the exception of soil erosion, which is addressed cumulatively through implementation of site-specific National Pollutant Discharge Elimination System permits, the geology and soils impacts on each site are specific to that site, and its users and would not be in common or contribute to (or shared with, in an additive sense) the geology or soils impacts on other sites. In addition, development on each site is subject to uniform site development and construction standards, including those contained in the CBC and City building codes, which are designed to protect public safety. Similar to the proposed project, these standards include requirements for completion of site-specific geotechnical reports, which would address potential geologic hazards, such as seismically induced ground shaking, surface fault rupture, liquefaction, collapsible soils, and seismically induced settlement. Each geotechnical investigation would include recommendations that would mitigate any potential effects related to geologic hazards in accordance with the CBC and City building codes. Therefore, the Project's contribution to cumulative impacts would not be cumulatively considerable. As such, cumulative impacts on geology and soils would be less than significant.

Potential cumulative impacts to paleontological resources would result from projects that combine to create an environment where fossils, exposed on the surface, are vulnerable to destruction by earthmoving equipment, looting by the public, and natural causes such as weathering and erosion. The majority of impacts to paleontological resources are site-specific and are therefore generally mitigated on a project-by-project basis. Cumulative projects would be required to assess impacts to paleontological resources. Additionally,

[85] SVP, Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources.

as needed, projects would incorporate individual mitigation for site-specific geological units present on each individual project site. Furthermore, the Project does not propose construction (including grading/excavation) or design features that could directly or indirectly contribute to an increase in a cumulative impact to paleontological resources, as the mitigation measure provided in this analysis ensures any significant paleontological resources uncovered during Project excavations would be properly analyzed and salvaged by the on-site paleontological monitor. Therefore, the Project, in combination with the past, present, and reasonably foreseeable future projects in the Project vicinity, would result in less-than-significant cumulative impacts to paleontological resources, and no further mitigation measures are required. Moreover, impacts to paleontological resources would be avoided and/or mitigated with implementation of a paleontological mitigation program during excavations into paleontologically sensitive geological units. Therefore, the Project's contribution to cumulative impacts would not be cumulatively considerable. **As such, cumulative impacts on paleontological resources would be less than significant.**

(2) Mitigation Measures

Cumulative impacts regarding geology and soils were determined to be less than significant without mitigation. Therefore, no mitigation measures are required.

(3) Level of Significance after Mitigation

Cumulative impacts related to geology and soils would be less than significant without mitigation. Therefore, no mitigation measures were required, and the cumulative impact level remains less than significant.

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