IV. Environmental Impact Analysis
E. Geology and Soils

1. Introduction

This section of the Draft EIR 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, soil stability, and paleontological resources. The analysis is based on the *Geotechnical Feasibility Report, Proposed High-Rise Hotel Development, 1718 Vine Street, Hollywood District, Los Angeles, California* (Geotechnical Investigation) dated July 28, 2016, and the *Surface Fault Rupture Evaluation Report, Central Hollywood Tract, No. 2, Lots 1, 2, 3, and 5, 1718 Vine Street, Los Angeles, California* (Fault Investigation) dated July 28, 2016. These reports were prepared by Group Delta Consultants, Inc. (Group Delta), and are included as Appendix E of this Draft EIR. The Los Angeles Department of Building and Safety (LADBS), Grading Division, has approved the Geotechnical Investigation and Fault Investigation, per a letter dated August 23, 2016. Group Delta prepared the *Supplemental Geotechnical Recommendations for the Revised Conceptual Design, Proposed Mid-Rise Hotel Development EIR Preparation, 1718 Vine Street, Hollywood District, Los Angeles, California* (Supplemental Geotechnical Recommendations), dated March 28, 2018, to confirm that the recommendations contained in the Geotechnical Investigations remain valid for the Project as currently proposed. The LADBS approval letter and the Supplemental Geotechnical Recommendations are also included in Appendix E. The analysis of potential impacts to paleontological resources is based on a records search included as Appendix E of this Draft EIR, as well as a review of previous, existing, and proposed on-site conditions.

2. Environmental Setting

a. Regulatory Framework

(1) State of California

(a) Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act (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 enacted in response to the 1971 San Fernando Earthquake, 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 address 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 increase the safety of citizens and minimize the loss of life during and immediately following earthquakes by facilitating seismic retrofitting to strengthen buildings against ground shaking.

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 control 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 located within an 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. Although setback distances may vary, a minimum 50-foot setback is required. 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 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. The Commission's mission is to

[1] *The Alquist-Priolo Earthquake Fault Zoning Act was originally entitled the Alquist-Priolo Geologic Hazard Zones Act. California Geological Survey, Fault-Rupture Hazard Zones in California, Special Publication 42, Interim Revision 2007.*

provide decision makers and the general public with cost-effective recommendations to reduce earthquake losses and speed recovery.[2]

(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 legislature enacted the Seismic Hazards Mapping Act of 1990 (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 to ensure that the geologic and soil conditions of the project site are investigated and appropriate mitigation measures, if required, are incorporated into development plans. The State Mining and Geology Board has promulgated additional regulations and policies to assist municipalities in preparing the Safety Element of their General Plans, and to encourage land use management policies and regulations to reduce and mitigate those hazards to protect public health and safety. Under 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. PRCSection 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 CGS Special Publication 117, *Guidelines for Evaluating and Mitigating Seismic Hazards in California,* and CGS Special Publication 118, *Recommended Criteria for Delineating Seismic Hazard Zones in California*. The objectives of Special Publication 117 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 California Building Code (California Code of Regulations, Title 24) is a compilation of building standards, including seismic safety standards for new buildings. California Building Code standards are based on the following: (i) building standards that

[2] *Alfred E. Alquist Seismic Safety Commission, "Welcome to the Seismic Safety Commission," https://ssc.ca.gov/, accessed June 4, 2019.*

have been adopted by state agencies without change from a national model code; (ii) building standards based on a national model code that have been changed to address particular California conditions, and (iii) building standards authorized by the California legislature but not covered by the national model code. Given the State's susceptibility to seismic events, the seismic standards within the California Building Code are among the strictest in the world. The California Building Code includes provisions for demolition and construction, as well as regulations regarding building foundations and soil types. The California Building Code applies to all building occupancies in California, except where stricter standards have been adopted by local agencies.

The California Building Code is published on a triennial basis, and supplements and errata can be issued throughout this three-year cycle. The 2016 edition of the California Building Code became effective on January 1, 2017, and incorporates by adoption the 2015 edition of the International Building Code of the International Code Council, with California amendments.[3] The 2016 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 provide for the latest in earthquake safety. The current California Building Code has been adopted by the City of Los Angeles as the Los Angeles Building Code, with local amendments. As such, the California Building Code forms the basis of the Los Angeles Building Code.

(e) Paleontological Resources

Paleontological resources are afforded protection under the California Environmental Quality Act (CEQA). Appendix G of the CEQA Guidelines provides guidance relative to significant impacts on paleontological resources, which states that a project could have a potentially significant impact on the environment if it could directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

(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

[3] *California Building Code, Title 24, Part 2.*

within the City that are considered susceptible to earthquake-induced hazards such as fault rupture and liquefaction.

Regarding assessment of seismic hazards, the Safety Element acknowledges that PRC Section 2699 requires that a General Plan's Safety Element take into account available seismic hazard maps prepared by the State Geologist pursuant to the Alquist-Priolo Earthquake Fault Zoning Act to assess seismic hazards. The PRC also requires that the State Geologist map active faults throughout the state. The Safety Element states that those maps, which 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 necessitate additional studies and impose appropriate mitigation measures for development projects in the areas identified as potential hazard areas by the State's seismic hazard maps. In addition, the Safety Element states that as maps are released for Los Angeles, they will be utilized by the Los Angeles Department of Building and Safety (LADBS) in helping to 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.

The Safety Element was approved in 1996 during an ongoing mapping effort by the state. Therefore, it contemplated that, once the entire set of maps for Los Angeles was complete, it would be used to revise the soils and geology exhibits of the Safety Element. The Safety Element acknowledged that it was based on available official maps at the time, and that exhibits in the Safety Element would be revised following receipt of reliable new information. It is important to note that CGS released an updated Earthquake Zones of Required Investigation Map for the Hollywood Quadrangle (which encompasses the Project Site) on November 6, 2014 (Hollywood Fault Zone Map).[4] The Hollywood Fault Zone Map is the State of California's official earthquake fault zone map for the Hollywood area, and is the most current and accurate map available to delineate the boundaries of earthquake fault zones and seismic hazard zones in the Hollywood area.[5] This official state map is the type of information that the Safety Element contemplated using (once available) to revise and update the seismic hazard zone exhibits therein. Accordingly, the seismic hazards analysis in this Draft EIR relies primarily on the Hollywood Fault Zone Map to determine the location of the Project Site in relation to the nearest officially mapped earthquake fault zone and other seismic hazard zones.

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[4] *State of California, California Geologic Survey, Hollywood Quadrangle, Earthquake Fault Zones (November 6, 2014), and Seismic Hazard Zones (March 25, 1999) Map.*

[5] *State of California, California Geologic Survey, Hollywood Quadrangle, Earthquake Fault Zones (November 6, 2014), and Seismic Hazard Zones (March 25, 1999) Map.*

(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, which is contained in Los Angeles Municipal Code (LAMC), Chapter IX, Article 1. Specifically: Section 91.7006.7 includes requirements regarding import and export of earth material; Section 91.7010 includes regulations pertaining to excavations; Section 91.7011 includes requirements for fill materials; Section 91.7013 includes regulations pertaining to erosion control and drainage devices; Section 91.7014 includes general construction requirements, as well as requirements regarding flood and mudflow protection; and Section 91.7016 includes regulations for areas that are subject to slides and unstable soils. In addition, Section 91.1803 includes specific requirements addressing seismic design, grading, foundation design, geologic investigations and reports, soil and rock testing, and groundwater. As noted above, the Los Angeles Building Code incorporates the California Building Code, with City amendments. LADBS is responsible for implementing the provisions of the Los Angeles Building Code.

b. Existing Conditions

(1) Regional Geology

According to the Geotechnical Investigation, the Project Site is located within the seismically active Los Angeles Basin (Basin) area of southern California. The Basin underwent transtensional stresses with subsidence between north-west and east-west trending fault systems and began opening up over 7 million years ago. Today, the Basin is undergoing transpressional stress bound by surrounding uplifting thrust blocks including the Santa Monica–Hollywood–Raymond fault system locally. Internally, the Basin is filled with sedimentation thousands of feet thick, structurally influenced by thrusting fault blocks and strike-slip faults dividing the basin into northwest trending valleys and ridges. The Project Site is located near the northern boundary of the Basin, within the Hollywood Fault Zone, as mapped by CGS.

(2) Regional Faulting and Seismicity

The numerous faults in Southern California include active, potentially active, and inactive faults. Based on criteria established by CGS, active faults are those that have shown evidence of surface displacement within the past 11,000 years (i.e., Holocene-age). Potentially active faults are those that have shown evidence of surface displacement within the last 1.6 million years (i.e., Quaternary-age). Inactive faults are those that have not shown evidence of surface displacement within the last 1.6 million years. The Southern California region also includes blind thrust faults, which are faults without a surface expression. Due to the buried nature of these blind thrust faults, their existence is usually not known until they produce an earthquake. Since the seismic risk of these blind thrust faults in terms of recurrence and maximum potential magnitude is not well established, the potential for earthquakes with magnitude higher than 6.0 occurring on buried thrust faults cannot be precluded. The locations of significant active and potentially active faults in the Los Angeles region are shown in Figure IV.E-1 on page IV.E-8. In addition, Table IV.E-1 on page IV.E-9 lists significant historical earthquakes with epicenters in the vicinity of the Project Site.

The Alquist-Priolo Earthquake Fault Zoning Act defines “active” and “potentially active” faults utilizing the same aging criteria as those used by CGS, as described above. Therefore, the Alquist-Priolo Earthquake Fault Zoning Act identifies zones that include faults, which have direct evidence of movement within the last 11,000 years. CGS considers fault movement within this period a characteristic of faults that have a relatively high potential for ground rupture in the future. As discussed in the Regulatory Framework 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 generally extend from 200 to 500 feet on each side of a known active fault. Based on the location precision, complexity, and regional significance of the fault, the zones identify areas where potential surface fault rupture along an active fault could prove hazardous, and also identify where special studies are required to characterize potential hazards to habitable structures. If a site lies within a designated Earthquake Fault Zone on an official CGS map, then 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.

According to the Geotechnical Investigation, there are no known active faults that cross the Project Site. As shown in Figure IV.E-1, seismically active faults in the vicinity of the Project Site include the Hollywood Fault, the Upper Elysian Park Blind Thrust Fault, the Puente Hills Blind Thrust Fault, the Newport–Inglewood Fault, the Verdugo Fault, and the Sierra Madre Fault. The closest significant fault to the Project Site is the Hollywood Fault. The Hollywood Fault is a reverse strike-slip fault that trends east-west over 10 miles in

REFERENCE: USGS QUATERNARY FAULTS IN GOOGLE EARTH,
LAST MODIFIED APRIL 6, 2016 21:12:09 UTC.
USGS EARTHQUAKE ARCHIVES,
LAST UPDATED APRIL 8, 2016 23:45:09 UTC.

Figure IV.E-1
Regional Fault Map

Source: Group Delta Consultants, Inc., July 11, 2016.

Table IV.E-1
Significant Historic Earthquakes Near the Project Site

Fault Name/Zone	Approximate Location of Earthquake	Date of Occurrence	Maximum Earthquake Magnitude[a] (M_w)
Elsinore Fault Zone	Rosemead	1987	5.3 and 5.9
Newport–Inglewood Fault Zone	Newport Beach	1933	6.4
Raymond Fault Zone	Pasadena	1988	5.0
Northridge Blind Thrust Fault	Northridge	1994	6.7

[a] *Moment magnitude scale (denoted as M_w) is a logarithmic scale of 1 to 10 that enables seismologists to compare the energy released by different earthquakes on the basis of the area of the geological fault that ruptured in the quake. Developed after the commonly known Richter scale, the moment magnitude scale retains the familiar continuum of magnitude values defined by the Richter scale, and is the scale used to estimate magnitudes for all modern large earthquakes by the United States Geological Survey.*

Source: Eyestone Environmental, Group Delta, July 2016.

length and is considered a segment within the Santa Monica–Hollywood–Raymond Fault Zone which extends over 30 miles across the southern limb of the Santa Monica Mountains. This fault is capable of producing a 6.7 maximum magnitude (Mw) earthquake. According to the current Hollywood Fault Zone Map, the nearest trace of this fault is approximately 100 feet north of the Project Site.

The Upper Elysian Park and Puente Hills Blind Thrust Faults are estimated to be within 2 and 3 miles east and south of the Project Site, respectively. These blind thrust faults trend northwest, dip northeast, have the potential for surface deflection or folding during earthquakes, and are capable of producing 6.7 Mw earthquakes. The Newport–Inglewood Fault zone, located approximately 5.6 miles east of the Project Site, is a right lateral strike-slip fault that trends northwest over 40 miles in length and is capable of producing a 7.5 Mw earthquake. The Verdugo Fault, located approximately 6.1 miles east of the Project Site, is a reverse fault that trends northwest over 13 miles in length and capable of producing a 6.9 Mw earthquake. The Sierra Madre Fault, located about 10.6 miles northeast of the Project Site, is a reverse fault that trends northwest over 47 miles in length and capable of producing a 7.3 Mw earthquake.

As discussed above, CGS released the current official Hollywood Fault Zone Map on November 6, 2014. This map is the State of California's most current and accurate map available to delineate the boundaries of earthquake fault zones in the Hollywood area. As illustrated in Figure IV.E-2 on page IV.E-10, based on the Hollywood Fault Zone Map, the Project Site is within the Alquist-Priolo Earthquake Fault Zone for the Hollywood Fault, which requires a geologic investigation to demonstrate that the Project would not construct any buildings across the surface traces of any active faults. The City of Los Angeles has also established a Fault Rupture Hazard Study Zone for the Hollywood Fault Zone.

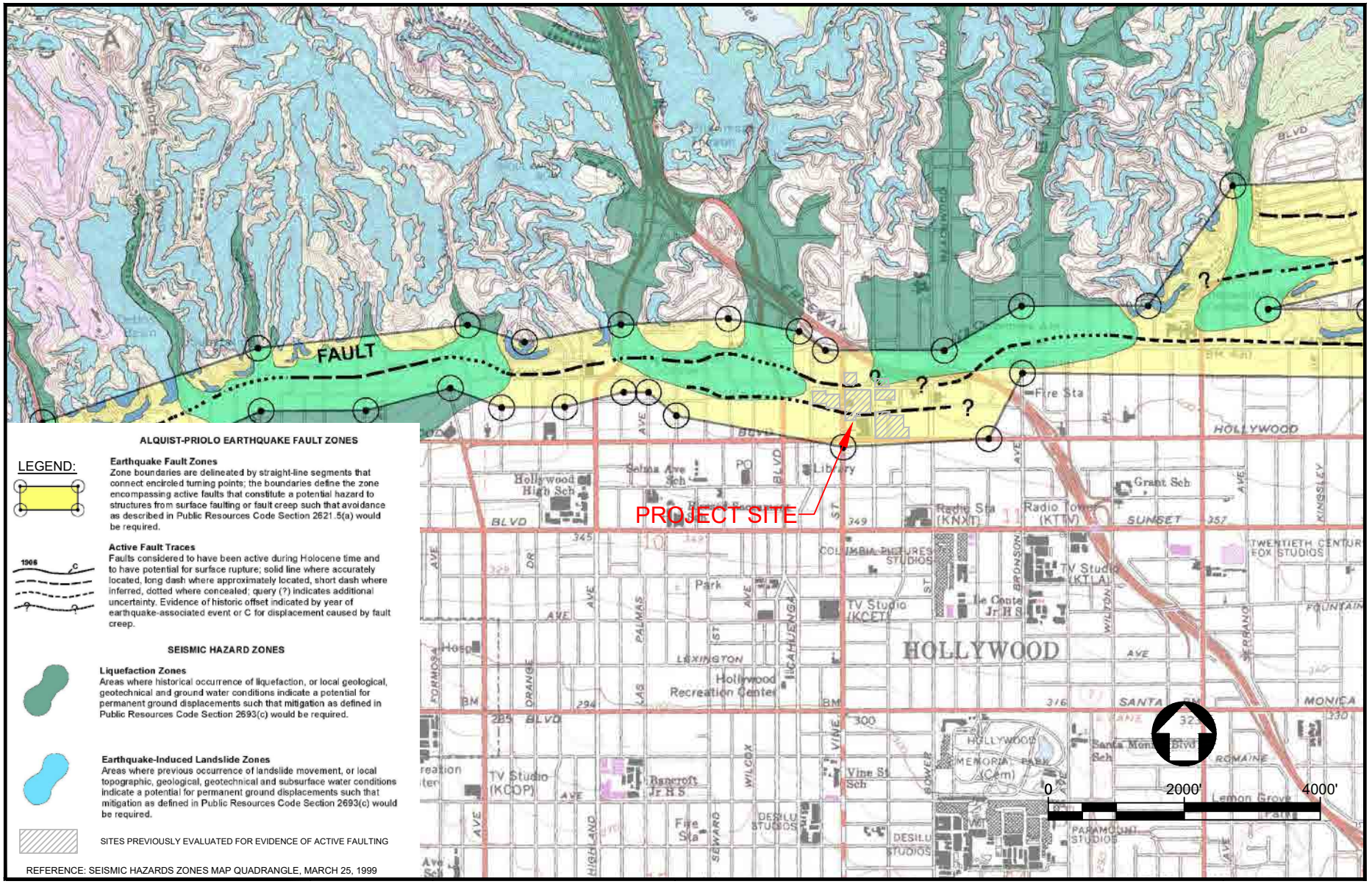

Figure IV.E-2
Hollywood Quadrangle Earthquake Hazard Zones Map

Source: Group Delta Consultants, Inc., July 28, 2016.

According to LADBS, a fault rupture hazard investigation must be conducted with respect to development sites identified within this zone prior to the issuance of building permits. The criteria for these fault rupture hazard investigations are the same as those established by CGS for the Alquist–Priolo Earthquake Fault Zoning program. Therefore, pursuant to the regulations and requirements of both CGS and LADBS, a fault rupture hazard evaluation was conducted for the Project by Group Delta. The results are contained in the Fault Investigation, which is included as Appendix E of this Draft EIR.

As described in the Fault Investigation, Group Delta evaluated the accessible areas of the Project Site utilizing cone penetration tests (CPTs) and core transects to collect data for evidence of active faulting on the Project Site. Exploration along Vine Street was used to extend the evaluation 50 feet south of the Project Site's southern property line, and prior investigations conducted by Group Delta in 2015 were used to extend the evaluation 50 feet north of the Project Site's northern property line. CPTs and borings were explored to a maximum depth of 75 feet. Detailed descriptions and Group Delta's interpretations of the CPTs and borings are provided in the Fault Investigation, included as Appendix E of this Draft EIR. Following analysis of the investigations and subsurface data collected by Group Delta, the Fault Investigation concluded that there is no evidence of active faulting within the Project Site or within 50 feet of the Project Site's northern and southern property lines. In a letter dated August 23, 2016, the LADBS grading division approved the Fault Investigation and concurred with its conclusion that no active faults existed on or within 50 feet of the Project Site. A copy of this approval letter is included in Appendix E of this Draft EIR. Therefore, the potential for surface fault rupture at the Project Site is considered low. However, the Project Site is located in the seismically active Southern California region, and could be subjected to moderate to strong ground shaking in the event of an earthquake on one of the many active Southern California faults.

(3) Local Geology

(a) Soil Conditions

The soils underlying the Project Site consist of artificial fill materials up to about 6 feet thick in the rear-paved area along the eastern portion of the Project Site. Deeper fill associated with the retaining walls along the east and west boundaries of the Project Site and the existing restaurant's grease trap interceptors is anticipated locally. The fill material consists of clayey sand and poorly graded sand with silt. Underlying the fill material is variably interbedded loose silty sand, poorly graded sand with clay, and a few thin layers of stiff silty clay to depth of approximately 22 feet. At approximately 22 feet depth, the native material encountered is massive clayey sand and sandy clay. At a depth of approximately 53 feet, the material becomes dense and hard to the maximum depth explored by Group Delta of 65 feet. Detailed logs of the soil borings conducted as part of the Geotechnical Investigation are contained in Appendix E of this Draft EIR.

(b) Groundwater

As indicated in the Geotechnical Investigation, the Project Site is located within the Hollywood Groundwater subbasin of the Los Angeles County Coastal Plain Basin. The subbasin is approximately 660 feet in depth and contains three water bearing units, the Fernando Formation, Lakewood Formation, and upper alluvial soils. Based on the Fault Investigation, groundwater was not encountered during exploration conducted to a maximum depth of 75 feet below the ground surface. In addition, CGS data indicates that the historically highest groundwater level within the vicinity of the Project Site is deeper than 50 feet. However, shallower perched groundwater may be present seasonally following rains and could be encountered during basement excavation.

(c) Liquefaction

Liquefaction involves sudden loss in strength of a saturated, cohesionless soil caused by the buildup of pore water pressure during cyclic loading, such as that produced by an earthquake. This increase in pore water pressure can temporarily transform the soil into a fluid mass, resulting in differential settlements and ground deformations. Typically, liquefaction occurs in areas where there are loose soils and the depth to groundwater is less than 50 feet from the surface.

The Safety Element of the City of Los Angeles General Plan classifies the Project Site as part of an area that is susceptible to liquefaction.[6] However, the City's Zoning Information and Map Access System (ZIMAS) indicates that the Project Site is not located in an area that has been identified by the State as being potentially susceptible to liquefaction.[7] In addition, according to the CGS Seismic Hazard Zones map for the Hollywood Quadrangle, the Project Site is not located within a liquefaction zone.[8] Moreover, groundwater was not encountered during exploration conducted to a maximum depth of 75 feet below ground surface at the Project Site. Therefore, the Geotechnical Investigation concluded that the potential for liquefaction to occur on the Project Site is considered low.

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[6] *Los Angeles General Plan Safety Element, Exhibit B, Areas Susceptible to Liquefaction (November 1996), p. 49.*

[7] *City of Los Angeles Department of City Planning, ZIMAS, Parcel Profile Report for 1718 N. Vine Street, http://zimas.lacity.org/, accessed February 28, 2019.*

[8] *State of California, California Geologic Survey, Hollywood Quadrangle, Earthquake Fault Zones (November 6, 2014) and Seismic Hazard Zones (March 25, 1999) Map.*

(d) Seismically Induced Settlement

Seismic shaking can also cause soil compaction of dry or moist cohesionless soils and ground settlement without liquefaction occurring, including settlement of dry sands above the water table. The likelihood of seismic compaction at the Project Site was evaluated using CPT data, which indicated that seismic compaction of less than 0.25 inch could potentially occur below the proposed Project. In general, the maximum allowable settlement is 1.5 inches for conventional foundations or 4 inches for mat foundations. Seismically-induced settlement of 0.25 inch could therefore be tolerated by the structure. In addition, the Project will be constructed in accordance with all current seismic design criteria. Therefore, according to the Geotechnical Investigation, the possibility of significant seismic settlement at the Project Site is considered low.

(e) Soil Stability

As described in the Geotechnical Investigation, the soils encountered during the subsurface exploration of the Project Site are characterized as stiff clayey sand and sandy clay soils that have a low potential for compressibility. Therefore, the Project Site is not susceptible to collapse.

(f) Subsidence

Subsidence generally occurs when a large portion of land is displaced vertically, usually due to the rapid and intensive withdrawal of subterranean fluids such as groundwater, or oil. Soils that are particularly subject to subsidence include those with high silt or clay content. Subsidence may have occurred in the Hollywood area north of the Salt Lake Oil field during the 1950s through the 1970s from withdrawal of groundwater. Today, the potential for ground subsidence in the area of this Project is not known to be present. Moreover, no large-scale extraction of groundwater, gas, oil, or geothermal energy would occur on the Project Site. Therefore, the potential for ground subsidence within the Project Site is considered low.

(g) Expansive and Corrosive Soils

Expansive soils are soils that swell when subjected to moisture and shrink when dried. Expansive soils are typically associated with clayey soils. According to the Geotechnical Investigation, soils within the Project Site generally have a low expansion potential; however, some of the thin clayey layers encountered may have a low to moderate expansion potential, which may be minimized through remedial grading. Furthermore, the Geotechnical Investigation indicated that the soils are potentially corrosive to ferrous metals.

(h) Other Geologic Conditions

According to the City of Los Angeles Methane and Buffer Zone Map, the Project Site is not located within a City of Los Angeles Methane Zone or Methane Buffer Zone.[9] Additionally, according to the State Division of Oil, Gas, and Geothermal Resources Regional Wildcat Map, the Project Site is not located within the limits of an oil field, and no oil wells have been drilled on the Project Site.[10] Finally, no distinct or prominent geologic or topographic features such as hilltops, ridges, hillslopes, canyons, ravines, rock outcrops, water bodies, streambeds, or wetlands are located at the Project Site.

(4) Paleontological Resources

Paleontology is the study of fossils, which are the remains of ancient life forms. On June 16, 2016, a Project-specific paleontological records search was conducted through the Natural History Museum of Los Angeles County to determine the potential impacts of the Project on paleontological resources. The results of the paleontological records search, which are included in Appendix E of this Draft EIR, indicate there are no previously encountered fossil vertebrate localities located within the Project Site. However, the records search indicates that there are nearby fossil localities from sedimentary deposits that are similar to those that occur within the Project Site. The closest identified localities in proximity to the Project Site are LACM 6297–6300, collected at depths between 47 and 80 feet below the surface area along Hollywood Boulevard between the US-101 Freeway and Western Avenue, approximately 0.6 mile from the Project Site. These localities produced horse (*Equus)*, bison *(Bison)*, camel *(Camelops),* and mastodon *(Mammut americanum)* fossil specimens. Additional identified fossil localities, all of which are over 2 miles distant from the Project Site, include: LACM 5845, located southeast of the Project Site near the intersection of Western Avenue and Council Street, which produced a fossil specimen of mastodon *(Mammutidae)* at a depth of only 5 to 6 feet below the surface; LACM 3250, located southeast of the Project Site and east-northeast of LACM 5845, near the intersection of Madison Avenue and Middlebury Street, which produced a fossil specimen of mammoth (*Mammuthus)* at a depth of approximately eight feet below street level; and LACM 3371, located southwest of the Project Site near the intersection of Sierra Bonita Avenue and Oakwood Avenue, which produced specimens of bison *(Bison antiques)* at a depth of 12 feet below the surface.

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[9] *City of Los Angeles Department of City Planning, ZIMAS, Parcel Profile Report, http://zimas.lacity.org/, accessed February 28, 2019.*

[10] *Division of Oil, Gas, and Geothermal Resources, Regional Wildcat Map W1-2.*

3. Project Impacts

a. Thresholds of Significance

In accordance with Appendix G of the CEQA Guidelines decision, the Project would have a significant impact related to geology and soils if it would:

Threshold (a): Expose people or structures to 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 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.

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.

For this analysis, the Appendix G Thresholds are relied upon. The analysis utilizes factors and considerations identified in the 2006 *L.A. CEQA Thresholds Guide*, as appropriate, to assist in answering the Appendix G Threshold questions.

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

(1) 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.

(2) Sedimentation and Erosion

- Constitute a geologic hazard to other properties by causing or accelerating instability from erosion.
- 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.

(3) 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 hazardous geology and soils in this section, the City will use Appendix G as the thresholds of significance. The criteria identified above from the *L.A. CEQA Thresholds Guide* will be used where applicable and relevant to assist in analyzing the Appendix G thresholds.

b. Methodology

To evaluate potential impacts relative to geology and soils, the Geotechnical Investigation and Fault Investigation were prepared for the Project Site. The Geotechnical Investigation included a review of published geologic data relevant to the Project Site, as well as the results of subsurface exploration, sampling and logging of the subsurface soils, laboratory testing, and engineering analysis. Preliminary recommendations regarding the design and construction of the Project are based on these results. The Geotechnical Investigation is provided in Appendix E of this Draft EIR. The Fault Investigation also included a review of published geologic data relevant to the Project Site, as well as the results of subsurface exploration, sampling and logging of the subsurface soils, laboratory testing, and engineering analysis, and assessed the potential for surface fault rupture to occur at the Project Site. The Fault Investigation is provided in Appendix E of this Draft EIR.

To address potential impacts associated with paleontological resources, a formal records search was conducted to assess the paleontological sensitivity of the Project Site

and vicinity. In addition, an evaluation of existing conditions and previous disturbances within the Project Site, the geology of the Project Site, and the anticipated depths of grading were evaluated to determine the potential for uncovering paleontological resources.

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 expose people or structures to 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 Special Publication 42;

Ground rupture is defined as surface displacement which occurs along the surface trace of the causative fault during an earthquake. As discussed above, there are no known active faults that cross the Project Site. The closest significant fault to the Project Site is the Hollywood Fault, located approximately 100 feet north of the Project Site as mapped on the official Hollywood Fault Zone Map.[11] While this map does not show an active fault crossing the Project Site, it does indicate that the Project Site is located within the Alquist-Priolo Earthquake Fault Zone for the Hollywood Fault. Therefore, as required by the Alquist-Priolo Act, CGS, and LADBS, a surface fault rupture hazard evaluation, including subsurface exploration, was performed by Group Delta to determine the presence or absence of active faulting beneath the Project Site. The results of the evaluation are documented in the Fault Investigation, which is included as Appendix E of this Draft EIR. The Fault Investigation concluded that there is no active faulting directly beneath the Project Site or within 50 feet to the north and south of the Project Site. LADBS has reviewed the Fault Investigation, and issued an approval letter on August 23, 2016, concurring with the Fault Investigation's conclusions regarding the absence of any active faults beneath or within 50 feet of the Project Site. This letter is included as Appendix E of this Draft EIR. Therefore, the potential for surface fault rupture hazard at the Project Site is considered low. **Thus, impacts associated with surface rupture from a known**

[11] *California Geological Survey, Earthquake Zones of Required Investigation, Hollywood Quadrangle, Official Map, Released November 6, 2014.*

earthquake fault would be less than significant. No mitigation measures are required.

Threshold (a): Would the project expose people or structures to potential substantial adverse effects including the risk of loss, injury, or death involving:

ii. Strong seismic ground shaking;

As previously discussed, the Project Site is located within the seismically active region of Southern California and would potentially be subject to strong ground motion if a moderate to strong earthquake occurs on a local or regional fault. However, impacts related to seismic ground shaking at the Project Site would not be exacerbated by the Project because the Project would not involve mining operations, deep excavation into the earth, or boring of large areas creating unstable seismic conditions that would exacerbate ground shaking. **Therefore, impacts associated with seismic ground shaking would be less than significant. No mitigation measures are required.**

The following discussion about building and seismic codes is provided for informational purposes. State and local code requirements ensure that buildings are designed and constructed in a manner that, although the buildings may sustain damage during a major earthquake, would reduce the substantial risk that buildings would collapse. Based on the Geotechnical Investigation, the Project Site is suitable for development of the Project, and the Project may be constructed using standard, accepted, and proven engineering practices considering the seismic shaking potential and geologic conditions at the Project Site. As with other development projects in the Southern California region, the Project would comply with the Los Angeles Building Code, which incorporates current seismic design provisions of the 2016 California Building Code, with City amendments, to minimize seismic impacts. The 2016 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, which requires the submittal of soils and engineering reports in connection with grading in excess of 5,000 cubic yards. The Project would also be required to comply with the permitting requirements of LADBS. Pursuant to LAMC Section 91.7006, the Project would be required to provide a final design-level geotechnical report, subject to LADBS review and approval prior to the issuance of grading permits for the Project. The final geotechnical report would include the primary recommendations of the Geotechnical Investigation, included as Appendix E of this Draft EIR, and the final design-level recommendations from that report would be enforced by LADBS for the construction of the Project.

Threshold (a): Would the project expose people or structures to potential substantial adverse effects including the risk of loss, injury, or death involving:

iii. Seismic-related ground failure, including liquefaction;

The Safety Element of the City of Los Angeles General Plan locates the Project Site within an area that is susceptible to liquefaction.[12] However, as previously discussed, the CGS Seismic Hazards Zone map for the Hollywood area shows that the Project Site is not located within a liquefiable area.[13] This determination by CGS is based on groundwater depth records, soil type, and distance to a fault capable of producing a substantial earthquake. Furthermore, ZIMAS indicates that the Project Site is not located in an area that has been identified by the State as being potentially susceptible to liquefaction.[14] Typically, liquefaction occurs in shallow groundwater areas where there are loose, cohesionless, fine-grained soils. According to the Geotechnical Investigation, historical high groundwater at the Project Site is reported to be greater than 50 feet in depth below ground surface. Moreover, groundwater was not encountered by Group Delta in the borings advanced up to a depth of 75 feet below ground surface during the subsurface investigation performed as part of the Geotechnical Investigation and Fault Investigation. Based on these considerations, the Geotechnical Investigation concluded that the potential for liquefaction to occur beneath the Project Site is low.

In addition, seismically induced settlement or compaction of dry or moist cohesionless soils can be an effect related to earthquake ground motion. Such settlements are typically most damaging when the settlements are differential in nature across the length of structures. As previously discussed, based on the stiff clayey sand and sandy clay encountered on the Project Site, the Geotechnical Investigation determined that the potential for seismic settlement and collapse would be low. The Project would also be required to comply with the plan review and permitting requirements of LADBS to ensure appropriate seismic design requirements are complied with. **As such, impacts associated with seismic-related ground failure, including liquefaction would be less than significant, and no mitigation measures are required.**

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[12] *Los Angeles General Plan Safety Element, Exhibit B, Areas Susceptible to Liquefaction (November 1996), p. 49.*

[13] *State of California, California Geologic Survey, Hollywood Quadrangle, Earthquake Fault Zones (November 6, 2014) and Seismic Hazard Zones (March 25, 1999) Map.*

[14] *City of Los Angeles Department of City Planning, ZIMAS, Parcel Profile Report for 1718 N. Vine Street, http://zimas.lacity.org/, accessed February 28, 2019.*

Threshold (a): Would the project expose people or structures to potential substantial adverse effects including the risk of loss, injury, or death involving:

iv. Landslides.

As discussed in Section VI, Other CEQA Considerations (Subsection IV.6.f), of this Draft EIR and in the Initial Study (Appendix A of this Draft EIR), the Project Site and surrounding area are fully developed and generally characterized by flat topography. The Project Site is not located in a landslide area as mapped by the City of Los Angeles, or within a landslide zone as mapped by CGS.[15,16] The probability of seismically induced landslides occurring at the Project Site would be considered low. Furthermore, development of the Project would not substantially alter the existing topography of the site. Specifically, the Project Site would remain flat and would not cause landslides. **As a result, the Project would not expose people or structures to potential substantial adverse effects including the risk of loss, injury, or death involving landslides. As such, no impact would occur, and no mitigation measures are required.**

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

As discussed in Section VI, Other CEQA Considerations (Subsection IV.6.f.), of this Draft EIR and in the Initial Study (Appendix A of this Draft EIR), the Project would require grading, excavation, and other construction activities that have the potential to disturb existing soils and expose soils to rainfall and wind, thereby potentially resulting in soil erosion. However, construction activities would occur in accordance with erosion control requirements, including grading and dust control measures, imposed by the City pursuant to grading permit regulations. Specifically, Project construction would comply with the Los Angeles Building Code, which requires necessary permits, plans, plan checks, and inspections to ensure that the Project would reduce any potential sedimentation and erosion effects. In addition, the Project would be required to have an erosion control plan approved by LADBS, as well as a Storm Water Pollution Prevention Plan (SWPPP) pursuant to the National Pollutant Discharge Elimination System (NPDES) permit requirements. As part of the SWPPP, Best Management Practices (BMPs) would be implemented during construction to reduce sedimentation and erosion levels to the maximum extent possible. In addition, Project construction contractors would be required to comply with City grading permit regulations, which require necessary measures, plans,

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[15] *Los Angeles General Plan Safety Element, Exhibit C, Landslide Inventory & Hillside Areas, November 1996, p. 51.*

[16] *California Geological Survey. Earthquake Zones of Required Investigation, Hollywood Quadrangle, released November 6, 2014.*

and inspections to reduce sedimentation and erosion. **With compliance with these regulatory requirements that include the implementation of BMPs, the Project would not result in substantial soil erosion or the loss of topsoil, and impacts would be less than significant. As such, no mitigation measures are required.**

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?

According to the Geotechnical Investigation and Fault Investigation, the soils underlying the Project Site consist of artificial fill materials comprised of clayey sand and poorly graded sand with silt. Variably interbedded loose silty sand, poorly graded sand with clay, and a few thin layers of stiff silty clay underlie the fill material to depth of approximately 22 feet. At approximately 22 feet depth, the native material encountered is massive clayey sand and sandy clay. At approximately 53 feet, the material becomes dense and hard to the maximum depth explored of 75 feet. The anticipated maximum depth of excavation for Project development is approximately 55 feet below ground surface. The excavation would occur primarily in old alluvial soils consisting of silty sand and clayey sand, and mud flow deposits consisting of sandy clay and clayey sand. As discussed in the Geotechnical Investigation, all required excavations would be sloped, or properly shored, in accordance with the provisions of the California Building Code and additional Los Angeles Building Code requirements, as applicable. The Project would also be required to comply with the permitting requirements of LADBS. Pursuant to LAMC Section 91.7006, the Project would be required to provide a final design-level geotechnical report, subject to LADBS review and approval prior to the issuance of grading permits for the Project. The final geotechnical report would include the primary recommendations of the Geotechnical Investigation, included as Appendix E of this Draft EIR, and the final design-level recommendations from that report would be incorporated in the Project and enforced by LADBS. Recommendations in the Geotechnical Investigation that would be included in the final geotechnical report include the requirement for all surface drainage to be controlled and prevented from running down into the excavation and the implementation of a survey-monitoring program to monitor shoring displacements during construction.

In addition, the Project Site is not located within an area of known ground subsidence. No large-scale extraction of groundwater, gas, oil, or geothermal energy is occurring or is planned at the Project Site. Historically high groundwater is reported to be greater than 50 feet below grade. However, according to the Geotechnical Investigation and Fault Investigation, subsurface investigation was conducted to a maximum depth of 75 feet below the ground surface and groundwater was not encountered. As such, this depth is greater than the maximum excavation depth of 55 feet below ground surface anticipated for the Project Site. Therefore, based on the level of groundwater and the

absence of any large-scale extraction of groundwater, gas, oil, or geothermal energy at the Project Site, the Project would not exacerbate existing environmental conditions related to subsidence, which could result in substantial damage to structures or infrastructure, nor expose people to substantial risk of injury. However, according to the Geotechnical Investigation, shallower perched groundwater may be present following seasonal rain and could be encountered during basement excavation. Los Angeles Building Code provisions and LADBS regulations require the preparation of a final geotechnical report containing provisions for the collection of runoff, which would ensure that the collection and discharge of any perched groundwater that is encountered meets water quality standards. With conformance to existing regulations, the Project would not exacerbate existing environmental conditions that would result in subsidence.

As described under Threshold (a), the Project Site and surrounding area are fully developed and generally characterized by flat topography. The Project Site is not located in a landslide area as mapped by the City of Los Angeles, or within a landslide zone as mapped by CGS.[17,18] Thus, the probability of seismically induced landslides occurring at the Project Site would be considered low. Furthermore, although the Safety Element of the City of Los Angeles General Plan locates the Project Site within an area that is susceptible to liquefaction,[19] the CGS Seismic Hazards Zone map for the Hollywood area shows that the Project Site is not located within a liquefiable area.[20] ZIMAS also indicates that the Project Site is not located in an area that has been identified by the State as being potentially susceptible to liquefaction.[21] Based on these considerations, the Geotechnical Investigation concluded that the potential for liquefaction to occur beneath the Project Site is low.

Based on the above, 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 would not result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse. Impacts would be less than significant and no mitigation measures are required.

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[17] *Los Angeles General Plan Safety Element, Exhibit C, Landslide Inventory & Hillside Areas, November 1996, p. 51.*

[18] *California Geological Survey. Earthquake Zones of Required Investigation, Hollywood Quadrangle, released November 6, 2014.*

[19] *Los Angeles General Plan Safety Element, Exhibit B, Areas Susceptible to Liquefaction (November 1996), p. 49.*

[20] *State of California, California Geologic Survey, Hollywood Quadrangle, Earthquake Fault Zones (November 6, 2014) and Seismic Hazard Zones (March 25, 1999) Map.*

[21] *City of Los Angeles Department of City Planning, ZIMAS, Parcel Profile Report for 1718 N. Vine Street, http://zimas.lacity.org/, accessed February 28, 2019.*

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?

According to the Geotechnical Investigation, the existing near-surface sandy soils have very low expansion potential. However, the clayey soils at the depth of the planned excavation of 55 feet below ground surface are anticipated to have low to moderate expansion potential. Furthermore, the soils underlying the Project Site were found to be potentially corrosive to buried metals. Thus, the Geotechnical Investigation recommended that measures be included to address expansion and corrosion potential. The recommended measures include the removal and replacement of expansive soils, if encountered, with granular non-expansive soil; and consultation with a corrosion expert to identify appropriate protection measures, such as the use of protective coatings for ferrous materials that may come into contact with soil to minimize the potential hazard of corrosion to the Project. Los Angeles Building Code provisions and LADBS regulations require the preparation of a final geotechnical report that addresses the recommendations contained in the Geotechnical Investigation and provide final recommendations that would be incorporated in the Project design. **With implementation of the geotechnical report recommendations, as required by LADBS regulations and LAMC Section 91.7006, the Project would not create substantial risks to life or property, and impacts would be less than significant. No mitigation measures are required.**

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, Other CEQA Considerations (Subsection IV.6.f.), and in the Initial Study (Appendix A of this Draft EIR), the Project Site is located within an area served by existing sewage infrastructure, and the Project's wastewater demand would be accommodated by connections to the existing wastewater infrastructure. As such, the Project would not require the use of septic tanks or alternative wastewater disposal systems. **Therefore, the Project would have no impact related to the ability of soils to support septic tanks or alternative wastewater disposal systems. No impacts would occur, and no mitigation measures are required.**

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

As previously discussed, a records search conducted for the Project Site indicates there are no previously encountered fossil vertebrate localities located within the Project Site. The closest identified localities in proximity to the Project Site are LACM 6297–6300, collected at depths between 47 and 80 feet below the surface area. While the Project Site

has been subject to grading and development in the past, grading for the subterranean parking garage and building foundation would consist of excavation to a maximum depth of approximately 55 feet below the existing ground surface. Thus, the possibility exists that paleontological artifacts that were not recovered during prior construction or other human activity may be present, which could result in significant impacts. As set forth in Mitigation Measure GEO-MM-1, a qualified paleontologist shall be retained to perform periodic inspections of excavation and grading activities of the Project Site. In the event paleontological materials are encountered, the paleontologist shall be allowed to temporarily divert or redirect grading and excavation activities in the area of the exposed material to facilitate evaluation and, if necessary, salvage. Therefore, implementation of Mitigation Measure GEO-MM-1 would ensure that any potential impacts related to paleontological resources would be less than significant.

Therefore, the Project would not directly or indirectly destroy a unique paleontological resource or site or unique geologic feature, and any potential impacts related to paleontological resources would be less than significant with mitigation.

4. Cumulative Impacts

Due to the site-specific nature of geological conditions (i.e., soils, geological features, subsurface features, seismic features, etc.), geology impacts are typically assessed on a project-by-project basis, rather than on a cumulative basis. Nonetheless, cumulative growth through the Project's earliest build out year of 2022 (inclusive of the 106 related projects, as well as the Hollywood Community Plan Update, identified in Section III, Environmental Setting, of this Draft EIR), would expose a greater number of people to seismic hazards. 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 the Los Angeles Building Code.

With regard to potential cumulative impacts related to paleontological resources, the Project and the related projects are located within an urbanized area that has been disturbed and developed over time. In the event that paleontological resources are uncovered, each related project would be required to comply with applicable regulatory requirements. In addition, as part of the environmental review processes for the related projects, it is expected that mitigation measures would be established as necessary to address the potential for uncovering paleontological resources.

Therefore, with adherence to applicable regulations, Project impacts related to geology and soils would not be cumulatively considerable and cumulative impacts would be less than significant.

5. Mitigation Measures

GEO-MM-1: A qualified paleontologist shall be retained to perform periodic inspections of excavation and grading activities at the Project Site. The frequency of inspections shall be determined by the paleontologist and shall depend on the rate of excavation and grading activities and the materials being excavated. If paleontological materials are encountered, the paleontologist shall temporarily divert or redirect grading and excavation activities in the area of the exposed material to facilitate evaluation and, if necessary, salvage. The paleontologist shall then assess the discovered material(s) and prepare a survey, study or report evaluating the impact. The Project Applicant shall then comply with the recommendations of the evaluating paleontologist, and a copy of the paleontological survey report shall be submitted to the Los Angeles County Natural History Museum.

6. Level of Significance After Mitigation

Considering the rigorous investigation process required under the engineering standard of care, compliance with state laws and City regulatory requirements, technical review and approval by LADBS of a design-level geotechnical engineering report as required by the Los Angeles Building Code and LADBS regulations, **Project-level impacts related to geology and soils would be less than significant without mitigation, with the exception of paleontological resources. Mitigation Measure GEO-MM-1 would reduce potential Project-level impacts associated with paleontological resources to a less-than-significant level. In addition, cumulative impacts related to geology and soils would be less than significant.**