4. ENVIRONMENTAL IMPACT ANALYSIS
D. GEOLOGY AND SOILS

1. INTRODUCTION

This section evaluates potential geologic and soils hazards associated with the Project including fault rupture, ground shaking, liquefaction, expansive soils, and landform/landslide. This section is largely based on information and findings gathered as part of a Geotechnical Exploration and Recommendations Report ("Geotechnical Report") and a subsequent Surface Fault Rupture Hazard Assessment ("Fault Study"), prepared by Golder Associates, Inc. (Golder) in October 2014 and January 2014, respectively, both of which are included in Appendix D to this Draft EIR.[1,2]

2. ENVIRONMENTAL SETTING

a. Existing Conditions

(1) Regional Geologic and Tectonic Setting

The history of seismic activity in Southern California and the greater Los Angeles area includes several major phases of deformation that have resulted in its complex surficial geology. The Los Angeles Basin, within which the Project Site is located, comprises a deep structural depression located at the northern end of the Peninsular Ranges geomorphic province at the boundary of the Transverse Ranges geomorphic province. Portions of the Los Angeles Basin have been the site of depositional pulses and continuous subsidence, folding, and faulting since the middle-Miocene Period (about the last 15 million years), and resulted in the basement rock surface being about 4.5 miles beneath the deepest part of the basin. The present form and geometry of the Los Angeles Basin was largely developed during the phase of accelerated subsidence and deposition that began in late-Miocene time and continued through to the early Pleistocene Epoch (about 1 million years ago).

Critical to the understanding of faulting in the region is the nature of the pattern of deformation that developed after the late Miocene and through the Quaternary Period (about the last 1.8 million years) to the present day. Regionally, crustal deformation that includes repeated moderate to large earthquakes and the formation and movement along faults, is driven by the relative motions and interactions of structures along the boundary of the lithospheric Pacific and North American plates—two of the 15 or so large plates that make up the surface of the Earth. These interactions along the Pacific-North America plate boundary have resulted in the formation of wide zones (more than 300 miles) of faults and associated earthquakes. In Southern California, deformation zone extends from the off-shore Continental Borderland into southern Nevada.

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[1] *Golder Associates. Inc. Geotechnical Exploration and Recommendations Report – Proposed Residential Development, 8150 Sunset Blvd., Los Angeles, California. October 3, 2014.*

[2] *Golder Associates. Inc. Surface Fault Rupture Hazard Assessment – Proposed Residential and Commercial Development, 8150 Sunset Boulevard, City of Los Angeles, California. January 27, 2014.*

Major northwest-southeast striking faults within the Peninsular Ranges province recognized in the Los Angeles Basin include the Newport-Inglewood fault, the Whittier fault and the Palos Verdes and Cabrillo faults. Other more east-west striking faults that are part of the Transverse Ranges province include the Malibu Coast-Santa Monica-Hollywood-Raymond fault system. Within the Los Angeles Basin, the Newport-Inglewood Fault zone and Raymond Fault zone are east-west striking. Within the Hollywood Quadrangle (1:24,000 scale), a section of the Newport-Inglewood fault has a mapped earthquake fault zone. Refer to **Figure 4.D-1**, *Regional Faults and Historic Earthquakes*, below.

(2) Santa Monica Mountains

The Santa Monica Mountains are on the northern and upthrown side of the Hollywood Fault, and include the Hollywood Hills to the north of the Project Site. Rocks exposed in the Santa Monica Mountains are layered sequences of sedimentary rocks that are mostly conglomerate, sandstone, and silt/claystone. The Santa Monica Mountains also contain outcrops of granitic rocks such as those immediately north of the Project Site. The granitic rocks are typically of quartz diorite composition. Locally, the Nichols Canyon Diorite Pluton forms a 4.5-mile-long by 2.3-mile-wide block that is mantled by younger sedimentary rocks. This granitic rock mass extends along the Santa Monica Mountains south-facing front for more than 1.5 miles either side of the Project Site (see **Figure 4.D-2**, *Project Area Soils, Faults, and Historic Earthquakes*, below).

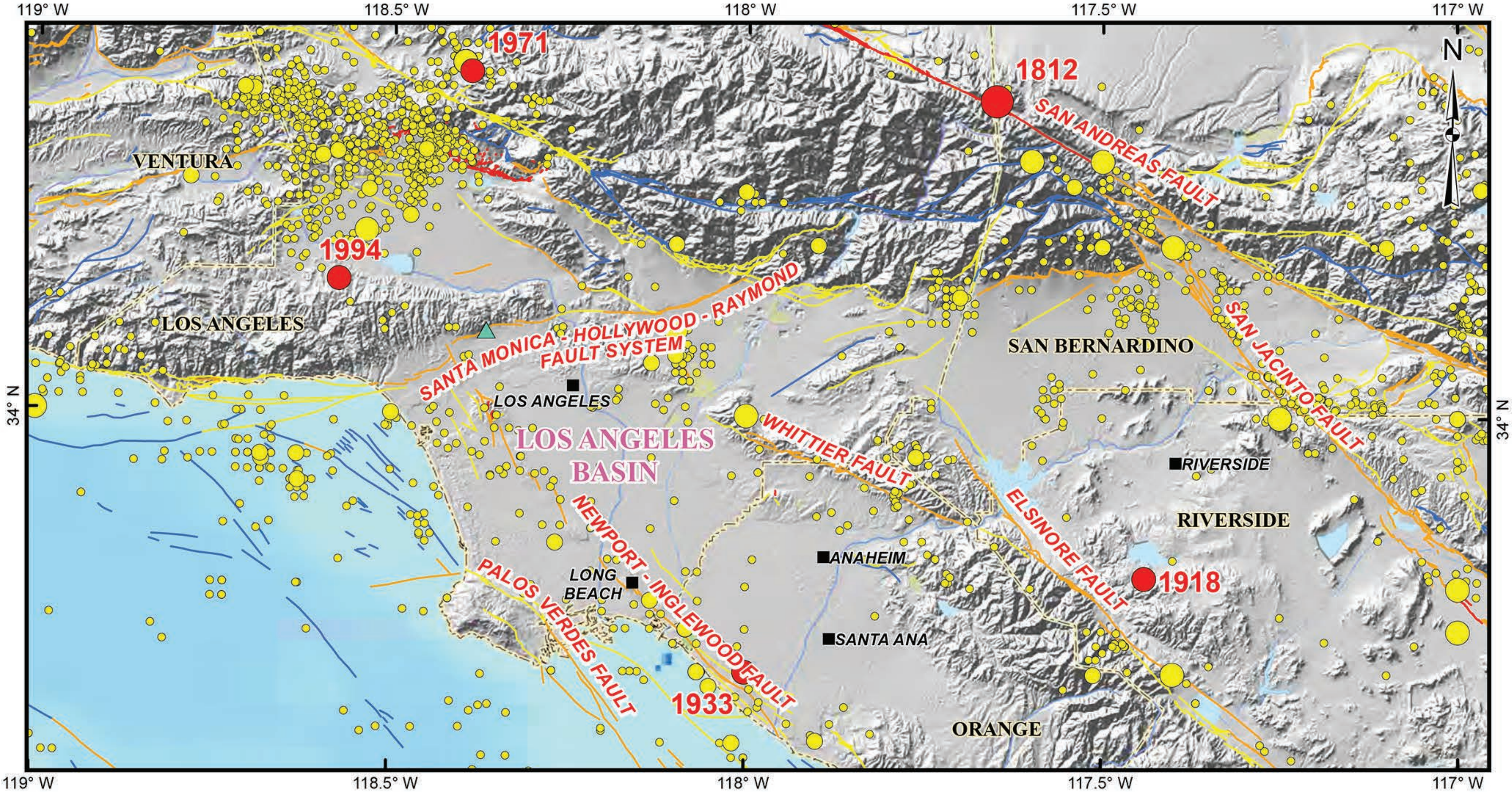
(3) Site Geology and Generalized Subsurface Conditions

A majority of the City is located on alluvial soils derived from the adjacent Santa Monica Mountain range. The alluvial sediments occur in deposits that are vertically and horizontally cut into each other as a result of periods of stream erosion and subsequent alluvial deposition. The alluvial soils are punctuated with a series of buried and stacked relic soils. The buried soils are generally conspicuous as reddish brown in color and typically are clay-enriched due to extended exposure at the ground surface. The alluvium and sequences of stacked and buried soils are thickest along the southern City boundary and gradually thin toward the north. The alluvial soils are typically coarser-grained (sandier) near the base of the hills and become finer-grained (silty and clayey) in the southern portion of the City.

The Hollywood area of the City is situated at the northern extent of the Los Angeles Basin. The Los Angeles Basin was a deep marine trough at the beginning of the Pliocene Epoch (5.3 to 1.8 million years ago), and was filled successively with marine sediments until the early Pleistocene Epoch (1.8 to 0.01 million years ago). During the Pleistocene, continental (non-marine) clastic sediments were the major sediments filling the Basin. The Los Angeles Basin contains more than 20,000 feet of Miocene Epoch (23.0 to 5.3 million years ago) and younger sediments above the basement rocks. South of the Santa Monica Mountains, the Los Angeles Basin sedimentary sequence includes more than 13,000 feet of mostly marine sediments with less than 1,000 feet of non-marine alluvial deposits. The relatively thin non-marine alluvium was deposited in the Pleistocene Epoch.

The near-surface, Pleistocene Epoch sediments of the Los Angeles Basin are composed of three principal stratigraphic units, including the following:

- Older Alluvium – sediments or soils that are relatively loose or unconsolidated (not cemented into a solid rock mass). The sediments have been transported, deposited, eroded, and, in some cases, modified by water and re-deposited in a non-marine setting.



LEGEND

- SITE (8150 SUNSET BLVD.)
- HISTORIC FAULTS
- HOLOCENE FAULTS
- LATE QUATERNARY FAULTS
- MID-LATE QUATERNARY FAULTS
- QUATERNARY FAULTS

EPICENTER MAGNITUDE

- < 5.0
- 5.0 - 5.9
- 6.0 - 6.9
- > 7.0

1994 MAJOR HISTORIC EARTHQUAKE AND DATE

10 0 10 Miles

20 0 20 Kilometers

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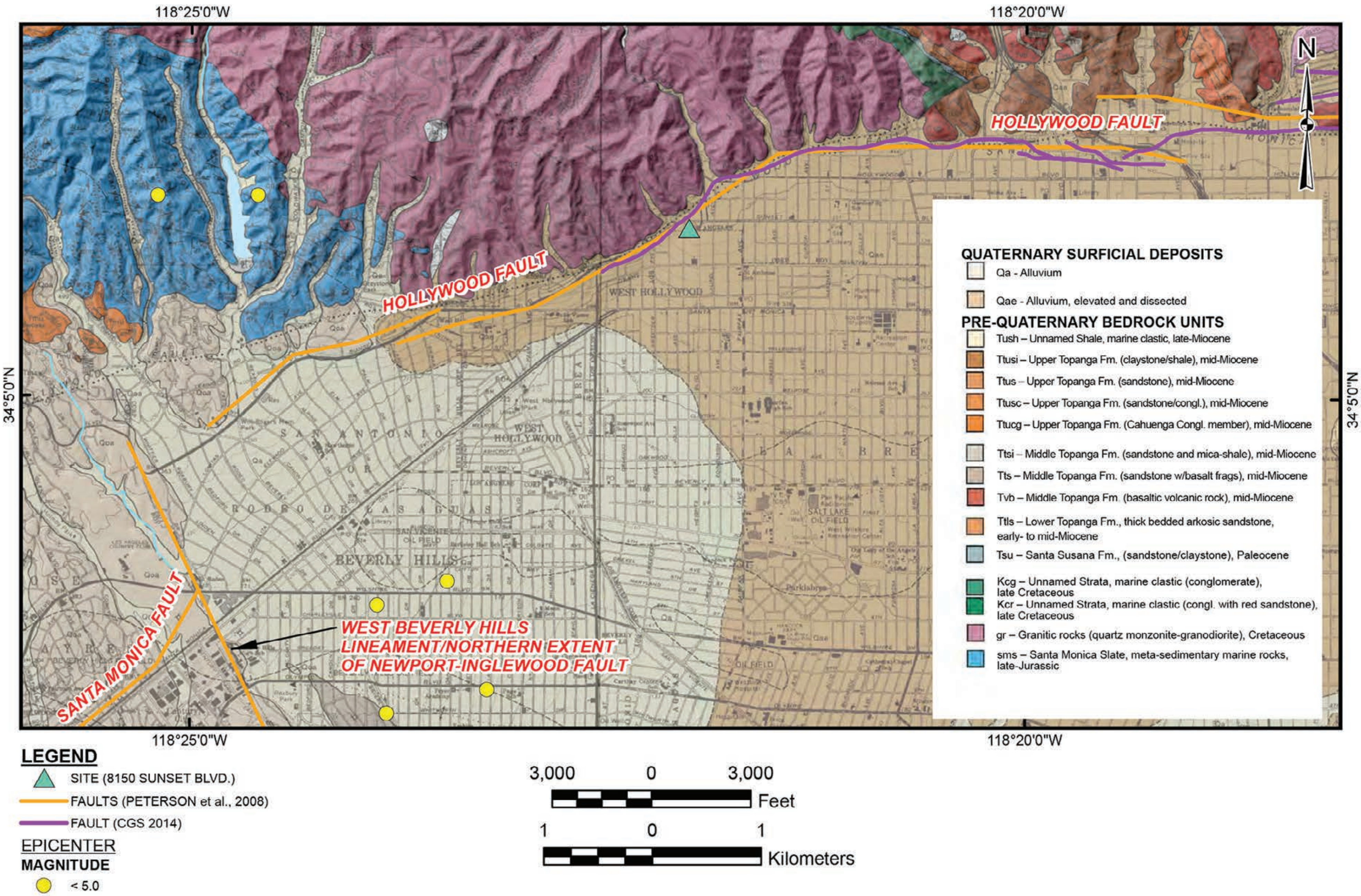
Regional Faults and Historic Earthquakes

8150 Sunset Boulevard Mixed-Use Project

Source: Golder Associates, 2014.

FIGURE **4.D-1**



Project Area Soils, Faults, and Historic Earthquakes

8150 Sunset Boulevard Mixed-Use Project

Source: Golder Associates, 2014.

FIGURE

4.D-2

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- Younger Alluvium – sediments that have been deposited within or adjacent to a river, stream, creek, or other natural drainage. A presently active alluvial fan is considered young alluvium.
- Alluvial Fan Deposits - a fan- or cone-shaped deposit usually occurring where a canyon drains from a mountain and emerges out onto a flatter plain. These deposits are common along fault-bounded mountain fronts. The deposits are derived from a single origin located at the apex of the fan. Over time the active deposition drainage course moves to occupy many positions on the fan surface.

Geologic maps and Golder's investigations indicate that the Project Site is located on the Laurel Canyon alluvial fan that overlies Older Alluvium. At depth, the alluvial sediments overlie pre-Quaternary bedrock and basement rocks. In the vicinity of the Project Site, the total thickness of alluvial sediments is unknown, but may be up to 300 feet.

(4) Historical Earthquakes

Figures 4.D-1 and 4.D-2 above illustrate historical earthquake epicenters recorded and located over about the last 100 years in and around the Los Angeles Basin. **Table 4.D-1**, *Earthquakes of Magnitude 6.0 or Greater Within 62 Miles of the Project Site*, below, lists the major parameters for earthquakes with a magnitude ("M") of 6.0 or greater within about 62 miles of the Project Site.

Table 4.D-1

Earthquakes of Magnitude 6.0 or Greater Within 62 Miles of the Project Site [a]

Year	Month	Day	Latitude (°N)	Longitude (°W)	Magnitude	Distance from Project Site (Miles) [b,c]
1812	12	8	34.4	117.7	7.5	45
1994	1	17	34.2	118.6	6.7	12
1918	4	21	33.8	117.4	6.6	57
1971	2	9	34.4	118.4	6.5	21
1933	3	11	33.7	118.0	6.4	35
1899	7	22	34.3	117.5	6.4	52
1857	1	16	34.5	118.0	6.3	35
1894	7	30	34.3	117.6	6.2	46
1855	7	11	34.1	118.1	6.0	16
1769	7	28	34.0	118.0	6.0	22
1827	9	24	34.0	119.0	6.0	37
1858	12	16	34.2	117.4	6.0	56
1910	5	15	33.7	117.4	6.0	62

[a] *Epicenter locations and dates from NEIC PDE and California earthquake catalogs*
[b] *Distances to site are approximate only.*
[c] *Distance to Project Site based on its location at 34.098N 118.367W.*

Source: Golder Associates, Inc., 2014

The earthquake epicenters listed in Table 4.D-1 indicate a relatively high level of historical earthquake activity in this part of Southern California. While an alignment of earthquake epicenters is apparent for some faults in the Los Angeles Basin (e.g. the Newport-Inglewood fault), few if any of the recorded earthquakes, and none of the major historic earthquakes, are associated with the mapped trace of the Hollywood Fault. No historic earthquakes are known to have been associated with surface rupture or ground deformation along the Hollywood Fault.

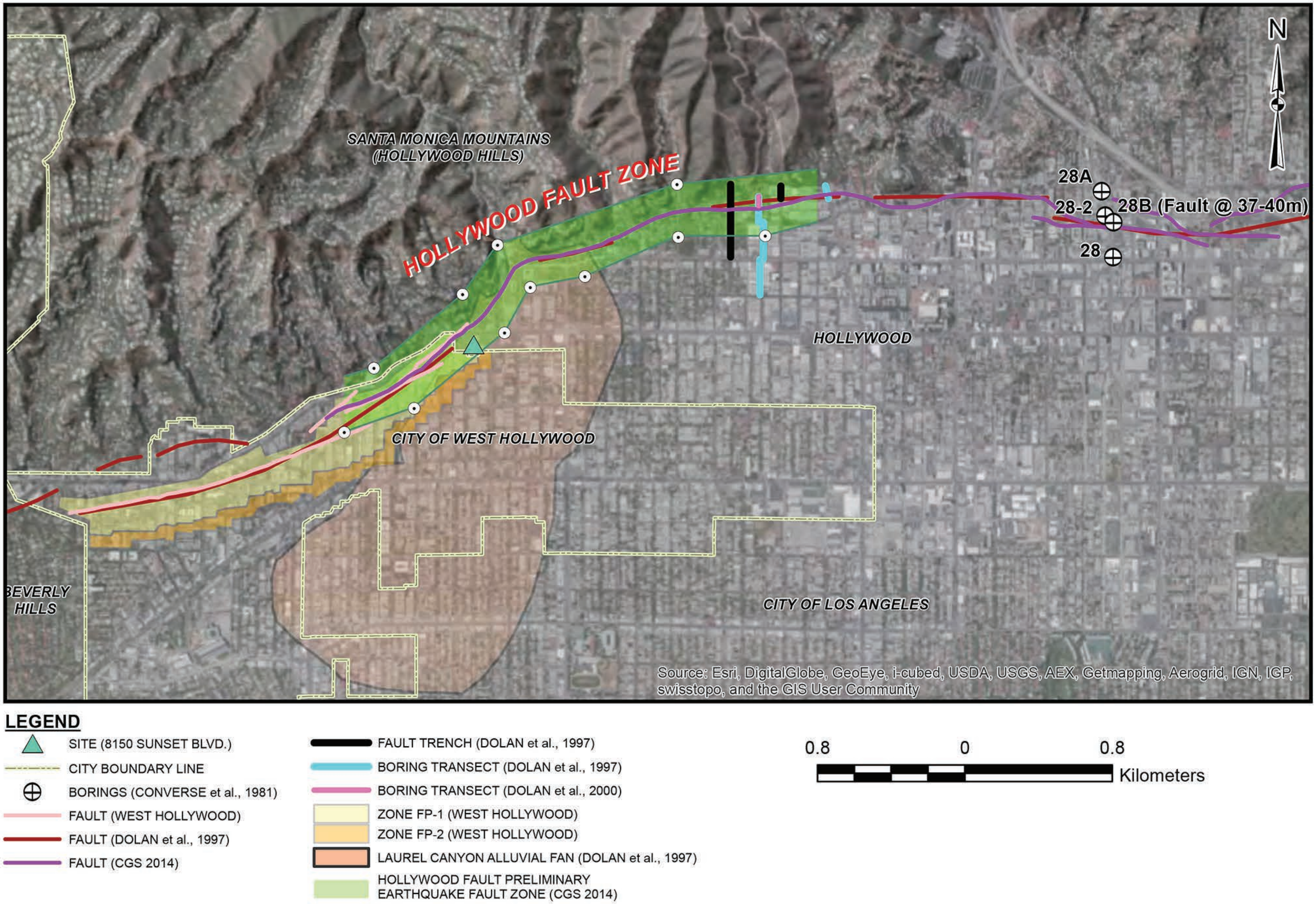
(5) The Hollywood Fault

The Hollywood Fault is a reverse, left-lateral, oblique-slip fault that extends for about 9 miles along the southern edge of the eastern portion of the Santa Monica Mountains. Available geologic data indicate that the Hollywood Fault dips steeply north and separates Mesozoic plutonic rocks and Miocene sedimentary and volcanic rocks of the Santa Monica Mountains from Pleistocene-Holocene alluvial deposits and deeper Neogene-age sedimentary rocks to the south. The fault trace generally extends eastward from the West Beverly Hills Lineament ("WBHL", or the northern extent of the Newport-Inglewood fault), along the northern boundaries of Beverly Hills, through the City of West Hollywood and Hollywood to the Los Angeles River where it flows from the Santa Monica Mountains. Tectonic geomorphology suggests that the fault trace steps about one mile southward along the WBHL to the Santa Monica fault (refer to Figure 4.D-1 above). However, given uncertainties regarding the presence and specific location of the Hollywood Fault trace in the Project area, a site-specific Fault Study was prepared by Golder in January 2014 consistent with the requirements of the Alquist-Priolo Earthquake Fault Zoning Act (see discussion below under Regulatory Framework) and the City of Los Angeles. The Fault Study is discussed in greater detail below.

(a) Hollywood Fault Study

(i) Existing Information and Previous Studies

Several sources for information on the nature and location of the Hollywood Fault were acquired and reviewed for the Fault Study investigation. Golder reviewed historical aerial photographs, historical geologic and topographic maps, published research studies, and site-specific fault and geotechnical reports by local engineering consultants available from the Cities of West Hollywood and Los Angeles. Previous investigations and fault mapping for the Hollywood Fault are illustrated below in **Figure 4.D-3**, *Previous Hollywood Fault Studies*. The existence of the Hollywood Fault at or near the base of the Santa Monica Mountains has been well known for more than 50 years. However, an Alquist-Priolo Earthquake Fault Zone has not yet been officially designated by the State of California for the Hollywood Fault. On January 8, 2014, the California Geological Survey ("CGS") released a preliminary review map for the Hollywood Fault Earthquake Fault Zone for a 90-day public comment period. CGS will publish a final map after it considers comments from the lead agencies, the public, and the State Mining and Geology Board. According to the preliminary review map, however, the Hollywood Fault trace is located at least 100 feet from the Project Site boundary at the closest point. Interest in the fault's precise location increased following the 1971 San Fernando Earthquake and the active fault mapping program authorized by the Alquist-Priolo Earthquake Fault Zoning Act (see discussion below under Regulatory Framework). For example, Crook et al. (1983), under contract with the U.S. Geological Survey as part of the National Earthquake Hazards Reduction Program, identified six locations in the Cities of Los Angeles and Beverly Hills where they investigated the location, characteristics, and age of the most surface ruptures of the Santa Monica and Hollywood Faults. Their investigations included the excavation and logging of soils exposed in 11 backhoe trenches at sites selected based on the geomorphic evidence for faulting and site accessibility. They found evidence for the Hollywood Fault in trenches located in Wattles Park (about 0.8 miles northeast of the Project Site) and Greystone Park (about two miles west-southwest of the Project Site).



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Previous Hollywood Fault Studies

8150 Sunset Boulevard Mixed-Use Project

Source: Golder Associates, 2014.

FIGURE

4.D-3

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Dolan et al. (1997) published the first comprehensive synthesis of the known locations, tectonic geomorphology, and ages of past surface rupture events on the Hollywood Fault. They compiled information from geotechnical boreholes and trenches, tectonic geomorphic mapping, groundwater measurements, and radiocarbon dating of offset soils to show that the Hollywood Fault has an oblique slip sense (reverse–left-lateral) with at least one surface rupturing earthquake in latest Pleistocene to middle or late Holocene time. Tectonic geomorphology indicates that the Hollywood Fault extends for at least 9 miles (14 km) along the southern edge of the eastern Santa Monica Mountains, from the Los Angeles River area westward through downtown Hollywood to northwestern Beverly Hills. To the west, the surface fault trace steps about one mile (1.2 km) southward along the West Beverly Hills lineament to the Santa Monica Fault. Dolan et al. (1997) provide an estimate for an earthquake magnitude of about M 6.6, a minimum average slip rate of about 0.35 millimeters per year, and an average recurrence interval range of 4,000 years or less for the Hollywood Fault.

A key indicator for the presence of the fault west of downtown Hollywood adopted by Dolan et al. (1997) was the presence of shallow groundwater within foundation excavations, trenches, and boreholes. They argued that the presence of shallow groundwater (depth less than about 30 feet [10 meters]) at a site close to the fault probably indicates its location on the upthrown side of the fault. Deep, or typically an absence of groundwater in boreholes deeper than about 100 feet probably indicates that a site is located on the downthrown side of the fault. For example, Dolan et al. (1997) argue that the presence of shallow ground water in an excavation about 1000 feet (300 meters) east of La Cienega Boulevard and just south of Sunset Boulevard at the Kings Road intersection indicates a location very near the fault because a site about 500 feet (160 meters) south had no groundwater.

Dolan et al. (1997) report no groundwater data or tectonic geomorphic evidence for the Hollywood Fault trace at or close to the Project Site. They do note, however, that shallow groundwater associated with very steep slopes to the west of the Havenhurst-Sunset Boulevard intersection between Doheny Drive and La Cienega Boulevard probably mark the Hollywood Fault location on the south side of this part of Sunset Boulevard. Their fault illustration does not show a trace mapped from just west of the Havenhurst-Sunset Boulevard intersection to east of Laurel Canyon at Hollywood Boulevard. The lack of a mapped trace reflects the lack of any fault tectonic geomorphology and/or because the more recent sediments from Laurel Canyon bury the fault scarp and post-date the last movement.

Dolan et al. (2000) report the results of a very detailed study of the recent paleoseismology of the Hollywood Fault. To more accurately date the location and age of the last surface fault displacement, they excavated nine, 30- to 50-foot-deep (9- to 15-meter), large-diameter bucket-auger borings (24-inch) in a 12-meter-long transect along Franklin Avenue. They found evidence for one, and possibly two, surface rupture events on the Hollywood Fault as judged by offset soil layers and steps in local ground water levels at the fault. Groundwater was a relatively uniform 30.5 feet (9.3 meters) below ground surface up to the fault zone, while to the south (downthrown side) ground water was not encountered. At this location, the fault was acting as a groundwater barrier with at least a four-foot (1.1-meter) step in groundwater level occurring across the fault.

Radiocarbon dates from ten charcoal and buried soil samples indicated that at least one surface rupture has occurred within the past 22,000 years. A faulted, buried soil located between 23 and 26 feet below ground surface (seven and eight meters) indicated that the last surface rupture occurred during the early to mid-Holocene with a preferred time range from about 7,000 to 9,500 years ago.

The Dolan et al. (2000) study established the Holocene age of the last surface rupture along this part of the Hollywood Fault and that it can be considered an active fault as defined in the Alquist-Priolo Earthquake Fault Zoning Act.

(ii) Project Site Field Investigations

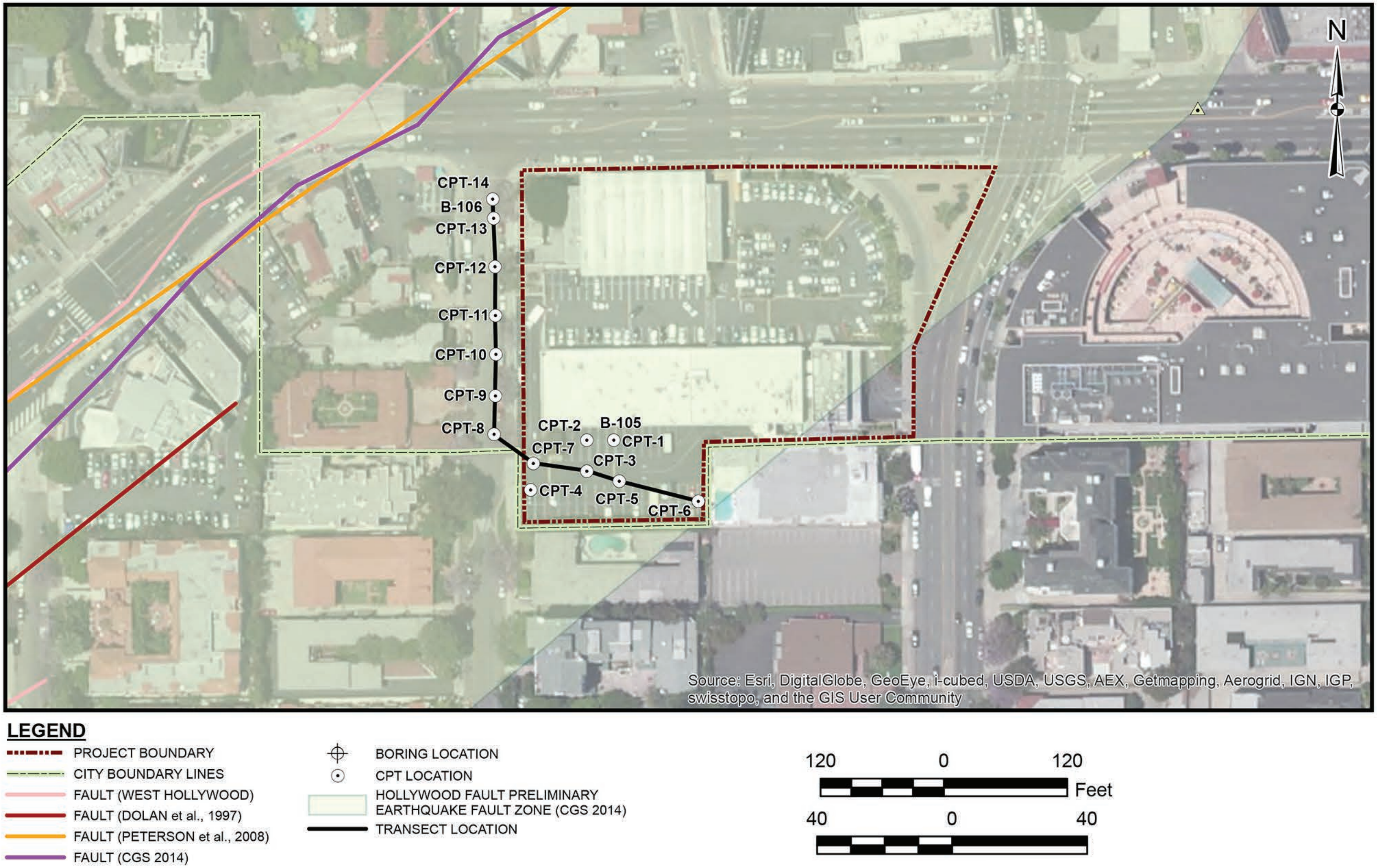
The following describes the details of Golder's field investigations that were undertaken to evaluate whether the active trace of the Hollywood Fault is located on the Project Site and within the footprint of the proposed structures. Golder's field investigations were developed in consultation with the City of Los Angeles Department of Building and Safety Grading Division and in general accordance with the California Geological Survey's *Guidelines for Evaluating Surface Fault Rupture Hazard* (2002). Site subsurface conditions were evaluated using geologic data obtained from the advancement of two hollow stem auger (HSA) boreholes and 14 cone penetrometer test (CPT) soundings. The locations of Project Site field investigation activities are illustrated below in **Figure 4.D-4**, *Project Site Geologic Exploration Plan*.

Subsurface explorations at the Project Site and within the public right-of-way along Havenhurst Drive were undertaken during October and November 2013. The purposes of the subsurface exploration were to:

- Establish the thicknesses and lateral variations of the shallow subsurface sedimentary layers beneath the Project Site. Stratigraphic layers were traced across the Project Site as a way to indicate any rapid lateral changes that may indicate the presence of near surface fault traces.
- Establish the depth to groundwater, if present. The presence of shallow groundwater of major changes in groundwater level across the Project Site may indicate the location of a shallow-subsurface fault.
- Obtain samples for radiocarbon dating. Because only faults with proven Holocene surface rupture are subject to the Alquist-Priolo Act, dated soil layers were required to establish the age of faulting, if present (e.g. Dolan et al. 2000).

The field investigation was undertaken in two phases. The first phase consisted of advancing one continuous core HSA boring and three CPT soundings within the Project Site. The objective for the first phase was to:

- Describe the Project Site stratigraphy and to develop correlate the HSA borehole samples with the CPT soundings.
- Confirm that the CPT soundings could be advanced to the required depths. In order to meet the project objectives, the borehole and CPT soundings needed to extend below the Holocene deposits on the Project Site.
- Evaluate the appropriate spacing of CPT soundings to establish the continuity of different soil layers.



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Project Site Geologic Exploration Plan

8150 Sunset Boulevard Mixed-Use Project

Source: Golder Associates, 2014.

FIGURE

4.D-4

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- The second field investigation phase consisted of advancing one continuous core HSA boring and 11 CPT soundings to complete the subsurface field investigation program.

(iii) Evaluation of Surface Fault Rupture Potential

The following describes the evidence for the presence (or absence) of an active trace of the Hollywood Fault within the Project Site. Golder analyzed evidence from the review of existing reports, maps, and aerial photographs, as well as the results of Project Site subsurface investigations conducted by Golder.

(a) Tectonic Geomorphology

None of the existing information acquired and reviewed for this study found evidence for a surface trace of the Hollywood Fault at the Project Site. While published geologic maps, consultant reports, and fault maps developed by the City of West Hollywood and the state of California established that there are several traces of the Hollywood Fault to the east and west of the Project Site, and that at least one of them is active, none of these studies have mapped an active trace within the Project Site.

Based on these past studies and Golder's review of historical stereoscopic aerial photographs and topographic maps, Golder considers that the active Hollywood Fault trace is located northwest of the Project Site and not within it.

(b) Subsurface Soil Stratigraphy

The analysis of the results from two HSA boreholes and 14 CPT soundings indicates generally distinct and continuous subsurface soil layers beneath the Project Site. Based on the 14 CPT soundings and the soils found within the two continuous HSA borings, Golder recognizes the following major geologic units underlying the Project Site:

- Upper Laurel Canyon Fan (ULC_f): The upper 40 to 70 feet is composed of tan to yellow-gray colored silty to gravelly sands with both laterally continuous and discontinuous layers. Many of the discontinuous layers are sub-horizontal, although major laterally traceable layers and contacts have a gentle southward gradient between CPT-14 through CPT-8. This unit probably formed from deposition in the Laurel Canyon fan caused by rapid erosion of the slopes within the Laurel Canyon fan catchment. Based on the radiocarbon dates (refer to Table 4.1 of the Fault Study contained in Appendix D of this Draft EIR), deposition of this unit all occurred less than 7,000 years ago.
- Lower Laurel Canyon Fan (LLC_f): Below the ULC_f and to a depth of about 60 to 80+ feet below existing grades, the sedimentary layers are dark reddish brown clayey, sandy gravel, and some laterally discontinuous silty clay interbeds. Radiocarbon dates from this unit in boreholes B-105 and B-106 have ages of about 9,000 to 13,000 years ago for deposition of this latest Pleistocene to earliest Holocene-age unit.
- Older Alluvium (al_o): Below the LLC_f, the soils are finer-grained with laterally discontinuous sandy interbeds. In some locations the finer grained soils become reddish suggesting a longer period of non-deposition, weathering and soil development (paleosol). A bulk soil sample from a paleosol (B-105 at 119 feet below ground surface [bgs]) was radiocarbon dated at 30,000 to 31,000 years ago indicating that this older alluvial unit is from the late Pleistocene Epoch. This sample is located about 40 feet below the presumed contact with the LLCf.

The stratigraphy of the soils is characteristic of an alluvial fan marked by periods of deposition with beds of variable grain sizes, periods of weathering marked by the increase in clay content and paleosols, and rapid lateral pinching out of minor sand and silt beds. The primary contacts indicate a consistent gradient toward the south, sub-parallel to the present-day ground surface. In places these contacts become sub-horizontal or, in some cases, change in elevation as across the fan parallel to the east-west orientation of the Santa Monica Mountain front. The pattern of deposition and stratigraphy are consistent with the overall geometry of 1) the Laurel Canyon fan and 2) the older and more wide-spread older alluvium deposition (al_o) that extends from the mountain front into the Los Angeles Basin.

The general continuity of the subsurface stratigraphy beneath the Project Site suggests that there has been no major disruption to the stratigraphy beneath the Project Site over about the last 30,000 years. If an active trace was present at this location, then disruption of the stratigraphy should be present; particularly as at least two Hollywood Fault surface rupturing events have been inferred by Dolan et al. (2000). Golder recognizes, however, that any minor disruption of the stratigraphy may not be able to be detected because of the limits for correlation between CPT soundings and HSA borings.

(c) Groundwater

Golder did not observe groundwater beneath the Project Site in the two HSA boreholes that extended up to 155 feet. In B-106 (the 97-foot-deep borehole at the northwestern edge of the Project Site) Golder found groundwater neither immediately following completion of the borehole nor three days later. Past studies of the Hollywood Fault have observed relatively shallow (less than 30 feet bgs) ground water on the northern, upthrown side of the fault or within the fault zone (e.g. Dolan et al. 1997; 2000) and deep (greater than 100 feet) groundwater on the downthrown side of the fault. Golder interprets, therefore, that the lack of groundwater at depths of up to 155 feet beneath the Project Site indicates that the Project Site is south of the active trace of the Hollywood Fault.

(iv) Fault Study Summary of Conclusions

Golder's opinion is that the active trace of the Hollywood Fault is not present at the Project Site. Golder's opinion is based on the following:

- Analysis and review of readily available maps, aerial photographs, published academic papers, and consultant reports that describe the location and activity of the Hollywood Fault surrounding the Project Site. The data review indicates that an active fault tectonic geomorphology is not present at the Project Site.
- The subsurface stratigraphy shows general continuity across the Project Site and lacks major discontinuities between geological units beneath the Project Site. Results from the radiocarbon dating of four bulk soil samples at depths from 45 to 119 feet below the present-day ground surface confirm that the soils beneath the Project Site extend through the Holocene and latest Pleistocene Epochs.
- An absence of groundwater to depths of at least 97 feet at the NW end and 155 feet at the southern end of the Project Site observed from HSA borings.
- The January 8, 2014 preliminary Alquist-Priolo Earthquake Fault Zone Map released by the State of California indicates that the Project Site is located within the Hollywood Fault earthquake fault zone,

but the trace of the fault, as mapped by the State of California, is located northwest of, and not within, the Project Site.

(6) Groundwater

The Project Site lies in the Hollywood Hydrologic subarea of the Coastal Plain of Los Angeles County. According to the groundwater level contour map prepared by the California Division of Mines and Geology (now the California Geological Survey ["CGS"]) and presented in the Seismic Hazard Zone Report for the Hollywood 7.5–minute Quadrangle, the historical groundwater level at the Project Site is approximately 150 feet below ground surface. Reviews of previous exploration programs show that groundwater has not been encountered in the area at shallow depths; however, perched or isolated zones of groundwater may be present in the Project area. As discussed above, no groundwater was encountered in connection with the recent preparation of the Fault Study.

(7) Geologic Hazards

(a) Fault Rupture

Active faults are defined as demonstrating displacement of Holocene-age materials (i.e. less than 11,000 years old) and/or documented historic seismicity. Potentially active faults are defined as demonstrating displacement of Pleistocene-age materials (i.e. 11,000 to 1.6 million years ago). Both active and potentially active faults are located within or in close proximity to the Project Site. Major faults that are considered to most influence the seismic exposure of the Project Site include the Hollywood Fault, Santa Monica Fault, Newport-Inglewood Fault, and the Upper Elysian Blind Thrust faults. As noted above, the Hollywood Fault is the most proximate to the Project Site, with the fault trace located to the northwest of the Project Site boundary, but has been determined not to extend beneath the Project Site itself. As such, no surface fault rupture hazard exists at the Project Site.

(b) Ground Shaking

The Project Site is located in Seismic Zone 4 according to the California Seismic Safety Commission ("CSSC"), which corresponds to sites located near active earthquake zones.

(c) Landslides and Liquefaction

According to the CGS, landslides have not been mapped in or around the vicinity of the Project Site, and no evidence of landsliding has been observed in this area. However, since the Project Site is located at the base of the Santa Monica Mountains, under the right geological, geotechnical, and saturation conditions, landslides in the vicinity of the Project Site are possible. Liquefaction potential has been thought to be the greatest where the groundwater level is shallow and submerged loose, fine sands occur within a depth of about 50 feet or less. The Project Site is not located within an area mapped as a liquefaction hazard zone by the CGS.

(d) Expansive Soils

Expansive soils are typically associated with fine-grained clayey soils that have the potential to shrink and swell with repeated cycles of wetting and drying. Changes in soil moisture content can result from rainfall, landscape irrigation, utility leakage, roof drainage, perched groundwater, drought, or other factors and may cause unacceptable settlement or heave of structures, concrete slabs-on-grade, or pavements supported over these materials. Depending on the extent and location below finished subgrade, expansive soils could have a detrimental effect on proposed construction. Expansive or collapsible soils were not encountered during on-site field explorations. Although not encountered in exploratory borings of the Project Site, the existence of such soils cannot be ruled out. However, the lack of shallow groundwater conditions at the Project Site would generally preclude the potential for soil expansion or collapse.

b. Regulatory Setting

(1) State of California

(a) Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act (Public Resources Code Section 2621) was enacted by the State of California in 1972 to address the hazard of surface faulting to structures for human occupancy.[3] The Alquist-Priolo Earthquake Fault Zoning Act was a direct result of 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 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 the citizens with increased safety and to 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 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 that is 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, Special Publications (SP) 42, Fault-rupture Hazard Zones in California.

As discussed previously, an Alquist-Priolo Earthquake Fault Zone has not yet been officially designated by the State of California for the Hollywood Fault. On January 8, 2014, the CGS released a preliminary review map for the Hollywood Fault Earthquake Fault Zone for a 90-day public comment period. CGS will publish a final map after it considers comments from the lead agencies, the public, and the State Mining and Geology Board. For the purposes of this EIR, however, the Fault Study was prepared following the protocols used assuming the Project Site is located within a designated Earthquake Fault Zone.

[3] *The Act was originally entitled the Alquist-Priolo Geologic Hazards Zone Act.*

(b) Seismic Hazards Mapping Act

In order to address the effects of strong ground shaking, liquefaction, landslides, and other ground failures due to seismic events, the State of California passed the Seismic Hazards Mapping Act of 1990 (Public Resources Code Section 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 Public Resources Code 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. Under Public Resources Code Section 2698, nothing is intended to prevent cities and counties from establishing policies and criteria which are stricter than those established by the Mining and Geology Board.

State publications supporting the requirements of the Seismic Hazards Mapping Act include the California Geological Survey SP 117, Guidelines for Evaluating and Mitigating Seismic Hazards in California and SP 118, Recommended Criteria for Delineating Seismic Hazard Zones in California. The objectives of SP 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. SP 118 implements the requirements of the Seismic Hazards Mapping Act in the production of Probabilistic Seismic Hazard Maps for the State.

(c) California Building Code

The California Building Code, Title 24 of the California Code of Regulations, is a compilation of building standards, including seismic safety standards for new buildings. California Building Code standards are based on building standards that have been adopted by state agencies without change from a national model code; building standards based on a national model code that have been changed to address particular California conditions; and 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 CBC applies to all occupancies in California, except where stricter standards have been adopted by local agencies. California adopted the 2010 California Building Code, which became effective on January 1, 2011. Specific California Building Code building and seismic safety regulations have been incorporated by reference in the Los Angeles Municipal Code with local amendments.

(2) City of Los Angeles

(a) Los Angeles General Plan Safety Element

The City's General Plan Safety Element, which was adopted in 1996, addresses public safety risks due to natural disasters including seismic events and geologic conditions, as well as sets forth guidance for emergency response during such disasters. The Safety Element also provides maps of designated areas within the City that are considered susceptible to earthquake-induced hazards, such as fault rupture and liquefaction. Notwithstanding, the Department of Building and Safety maintains more detailed mapping than the generalized maps in the Safety Element; and provides information regarding designations for site parcels within the City's Zone Information and Map Access System (ZIMAS).

(b) Los Angeles Municipal Code

(i) Earthwork and Seismic Safety

Earthwork activities, including grading, are governed by the Los Angeles Building Code, which is contained in the Los Angeles Municipal Code, Chapter IX, Article 1. Specifically, Section 91.7006.7 includes requirements regarding import and export of 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. Additionally, the Los Angeles Building Code includes specific requirements addressing seismic design, grading, foundation design, geologic investigations and reports, soil and rock testing, and groundwater. The Los Angeles Building Code incorporates by reference the California Building Code, with City amendments for additional requirements. The City Department of Building and Safety is responsible for implementing the provisions of the Los Angeles Building Code.

(ii) Erosion and Sedimentation

(a) Municipal Code Section 64.70.01, Stormwater and Urban Runoff Pollution Control Ordinance

Municipal Code Section 64.70.01, the Stormwater and Urban Runoff Pollution Control Ordinance, was added by Ordinance No. 172,176 in 1998 and prohibits the discharge of unauthorized pollutants in the City, including eroded soil materials. The Ordinance applies to all dischargers and places of discharge that discharge stormwater or non-stormwater into any storm drain system or receiving waters. While this practice is prohibited under the County's Municipal National Pollutant Discharge Elimination System Permit ("NPDES Permit"), adoption of the Ordinance allows enforcement by the Department of Public Works as well as the levy of fines for violations. The Ordinance prohibits the discharge of pollutants by persons operating or performing industrial or commercial activities into the storm drain system and receiving waters, except as authorized by a general or separate NPDES permit; defines illicit, exempt, and conditionally exempt discharges; prohibits the placement or discharge of trash, sewage, hazardous materials, and other waste in storm drains or receiving waters, or the accumulation, storage, or disposal of these materials in such a way as to contaminate runoff discharged to these facilities; requires control of pollutants from parking lots; and prohibits the creation or use of illicit connections to municipal storm drain facilities.

(b) Municipal Code Section 64.72, Stormwater Pollution Control Measures for Development Planning and Construction Activities

Municipal Code Section 64.72, Stormwater Pollution Control Measures For Development Planning and Construction Activities, was added by Ordinance 173,494 in 2000 and sets forth requirements for construction activities and facility operations of development and redevelopment projects to comply with the requirements of the NPDES permit Standard Urban Stormwater Mitigation Plan ("SUSMP") requirements. Such NPDES permit SUSMP requirements address erosion and sedimentation, as well as other pollutants.

3. ENVIRONMENTAL IMPACTS

a. Methodology

This analysis of impacts associated with geology and soils is based on the preliminary Geotechnical Report and Fault Study that have been prepared for the Project by Golder. The Geotechnical Report and Fault Study included field exploration (i.e., exploratory soil borings) and laboratory testing to determine the characteristics of the subsurface conditions at the Project Site, including the absence of the Hollywood Fault trace beneath the property. The borings varied from approximately 90 feet to 155 feet in depth below the existing site grade. These subsurface conditions were then analyzed to determine their ability to support excavation and project development.

b. Threshold of Significance

Appendix G of the CEQA Guidelines provides a set of screening questions that address impacts with regard to geology and soils. These questions are as follows:

Would the project:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
  - Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area based on other substantial evidence of a known fault;
  - Strong seismic ground shaking;
  - Seismic-related ground failure, including liquefaction; or
  - Landslides?
- Result in substantial soil erosion or the loss of topsoil?
- 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?
- Be located on expansive soils, as defined by Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?
- Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?

In the context of these questions from the CEQA Guidelines, the City of Los Angeles' CEQA Thresholds Guide (2006) states that a project would normally have a significant geologic hazard impact if it would:

(1) Geologic Hazards

GS-1 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

GS-2 Constitute a geologic hazard to other properties by causing or accelerating instability from erosion; or

GS-3 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) Landform Alteration

GS-4 Cause one or more distinct and prominent geologic or topographic features to be destroyed, permanently covered, or materially and adversely modified as a result of the project. Such features may include, but are not limited to, hilltops, ridges, hillslopes, canyons, ravines, rock outcrops, water bodies, streambeds, and wetlands.

c. Project Design Features

Construction activities would consist of excavation for the Project's subterranean parking levels, and the provision of appropriate foundations for the Project buildings. Approximately 61,000 cubic yards of soil would be excavated during the shoring and excavation phase of Project construction, with 2,500 cubic yards reprocessed and used for on-site fill material, thus requiring that approximately 58,500 cubic yards of soil material be exported from the Project Site for off-site disposal. Activities associated with the grading and export of soil would occur in accordance with City requirements, as specified in the Los Angeles Municipal Code and through the grading plan review and the approval process.

The Project would consist of approximately 333,872 square feet of floor area within two buildings over a single podium structure with various elements ranging in height from two stories to 16 stories in height as measured from the intersection of Sunset and Crescent Heights Boulevards.[4] All development would be provided pursuant to appropriate codes and regulations, including the City of Los Angeles Building Code as well as regulations of the Department of Building and Safety and the Bureau of Engineering.

d. Project Impacts

(1) Geologic Hazards

Threshold GS-1 The Project would cause or accelerate geologic hazards, which would result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury.

Impact Statement GS-1: *Implementation of the Project could result in significant risks to life or property given the seismic conditions at the Project Site. While impacts regarding surface fault rupture, liquefaction, landslides, and expansive soils would be less than significant given compliance with applicable building codes and seismic design standards, impacts associated with seismic ground shaking and temporary excavations and site stability would be potentially significant.*

[4] *Due to the sloping nature of the Project Site, the 16-story portion of the South Building would appear to be 20 stories in height at the southwest area of the Project Site along Havenhurst Drive.*

(a) Fault Rupture

Although the Project Site is located within a proposed State-designated Alquist-Priolo earthquake fault zone (the Hollywood Fault Zone), as discussed previously, no known active or potentially active faults underlie the Project Site. Thus, the potential for surface ground rupture at the Project Site is considered low. Based on current information, development of the Project would not result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury involving rupture of a known earthquake fault. Nonetheless, given the proximity of the Project Site to the Hollywood Fault Zone, all Project-related habitable structures are required to be set back from the fault trace by a minimum of 50 feet. Given compliance with this fault setback requirement, impacts regarding surface fault rupture would be less than significant, and no mitigation measures would be necessary.

(b) Ground Shaking/Seismicity

The Project Site is located within the seismically active region of southern California. The level of ground shaking that would be experienced at the Project Site from active, potentially active, or blind thrust faults in the region, including, but not limited to, the adjacent Hollywood Fault and nearby Newport-Inglewood, Santa Monica, and Raymond Faults, would be a function of several factors including earthquake magnitude, type of faulting, rupture propagation path, distance from the epicenter, earthquake depth, duration of shaking, site topography, and site geology.

Moderate to strong ground motion (acceleration) could be caused by an earthquake on any of the local or regional faults. As with any new project development in the State of California, building design and construction would conform to the current seismic design provisions of the City of Los Angeles Building Code, which incorporates relevant provision of the California Building Code. The Los Angeles Building Code incorporates the latest seismic design standards for structural loads and materials.

The Geotechnical Report performed for the project indicated that development of the Project is feasible from a geotechnical perspective provided that the applicable regulations are met and construction and design are performed in a manner that mitigates potential impacts arising from the Project Site's geologic conditions. Prior to issuance of a grading permit, a final Geotechnical Report with final design recommendations would be prepared and reviewed by the Department of Building and Safety, and would be subject to modification as/if necessary to meet all regulatory requirements. This design-specific report would identify seismic considerations to be addressed in the site design and include recommendations for foundations, retaining walls/shoring, and excavation. Mitigation Measure GS-1 is recommended below to assure proper implementation of the regulatory protections for public safety and compliance with the California Building Code and Los Angeles Municipal Code, as applicable. Impacts related to seismic ground shaking, however, are considered potentially significant.

(c) Liquefaction

The Project Site is not included in within a State of California Seismic Hazard Zone for earthquake liquefaction or seismic ground deformation. Further site-specific liquefaction analysis indicates that the soils underlying the site would not be capable of liquefaction during the design based earthquake given the depth to groundwater (i.e., a minimum of 100 feet below ground surface across the Project Site based on recent site investigations). As such, impacts regarding liquefaction on-site would be less than significant, and no mitigation measures would be necessary.

(d) Landslides

The Project Site is relatively flat with a gentle slope from northeast to southwest, ranging from approximately 408 feet above sea level at the northeast corner to approximately 382 feet above sea level at the southwest corner, for a total grade change of about 26 feet across the property. The Project Site includes the existing commercial buildings with adjacent paved parking areas, and is surrounded by urban development. Although the Hollywood Hills are located to the north of the Project Site, where there exists the potential for landslides to occur, it is anticipated that any landslides in this area would be limited to steeper slopes and would not physically affect the Project Site given the distance of the steeper hillsides from the Project Site and the presence of intervening structures and major roadways. Therefore, landslides are not expected to pose a risk to people or structures on the Project Site, and impacts associated with landslides or other forms of natural slope instability would be less than significant.

(e) Expansive Soils – Settlement and Expansive Soils

Expansive or collapsible soils were not encountered during on-site field explorations, as noted above. Although not encountered in exploratory borings of the Project Site, the existence of such soils cannot be ruled out. However, the lack of shallow groundwater conditions at the Project Site (i.e., greater than 100 feet below ground surface in recent field explorations) would generally preclude the potential for soil expansion or collapse. Due to this very low potential for expansion, no design recommendations regarding expansive soils beyond the minimum required by the California Building Code would be required. With adherence to the City's minimum standards, and compliance with the building code provisions, potential impacts regarding expansive soils would be less than significant.

(f) Temporary Excavations Site Stability

Project excavation would cause disturbance of existing soil conditions and result in a Project Site that is prone to local raveling or caving; as such, impacts in this regard are considered potentially significant. However, the proposed final Geotechnical Report recommended for the Project in Mitigation Measure GS-1 would include design recommendations with regard to slope stability and shoring, such as the use of retaining walls.

(2) Sedimentation and Erosion

Threshold GS-2 The Project would constitute a geologic hazard to other properties by causing or accelerating instability from erosion; or

Threshold GS-3 The Project would 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.

Impact Statement GS-2: *Implementation of the Project would not result in substantial erosion or sedimentation given compliance with applicable regulations. Therefore, impacts regarding geologic hazards would be less than significant.*

The Project Site is located in an urbanized area and as such the proposed development would be infill development. Project construction would require grading, including excavation of up to a minimum of 33 feet in depth and would result in approximately 61,000 cubic yards of cut and 2,500 cubic yards of fill on the Project Site. Some of the cut materials (2,500 cubic yards) would be reused on the Project Site as fill. The Project, therefore, would result in the export of approximately 58,500 cubic yards of soil.

Construction activities would be required to comply with Municipal Code Sections 64.70.01 and 64.72, which would ensure implementation of appropriate measures, or Best Management Practices ("BMPs"), during Project grading activities to reduce soil erosion. Following construction of proposed structures, driveways, and hardscape areas, all remaining non-paved, exposed areas would be landscaped. The installation of landscaping would serve to protect the soil and preclude potential erosion and sedimentation. Therefore, given compliance with applicable regulations during construction and operation, impacts regarding soil erosion or the loss of topsoil would be less than significant.

(3) Landform Alteration

Threshold GS-4 The Project would cause one or more distinct and prominent geologic or topographic features to be destroyed, permanently covered, or materially and adversely modified as a result of the Project. Such features may include, but are not limited to, hilltops, ridges, hillslopes, canyons, ravines, rock outcrops, water bodies, streambeds, and wetlands.

Impact Statement GS-3: *The Project Site is currently completely developed with urban uses and does not contain any distinct or prominent geologic or topographic features that could be destroyed, permanently covered, or materially and adversely modified as a result of the Project. Therefore, no impacts regarding landform alteration would result from Project implementation.*

As noted previously, the Project Site is relatively flat with a gentle slope from northeast to southwest, ranging from approximately 408 feet above sea level at the northeast corner to approximately 382 feet above sea level at the southwest corner, for a total grade change of about 26 feet across the property. The Project Site includes the existing commercial buildings with adjacent paved parking areas, and is surrounded by urban development. No distinct or prominent geologic or topographic features are located on the Project Site such as hilltops, ridges, hillslopes, canyons, ravines, rock outcrops, water bodies, streambeds, or wetlands. Therefore, no impact from landslides or other forms of natural slope instability, or landform alteration would occur on the Project Site.

(4) Consistency with Applicable Regulations

(a) Alquist-Priolo Earthquake Fault Zoning Act

As noted previously, according to the preliminary review map for the Hollywood Fault Earthquake Fault Zone prepared by CGS, the fault trace of the active, east-west trending Hollywood Fault is located at least 100 feet northwest of the Project Site. However, pending the issuance of a final fault map for the Hollywood Fault Earthquake Fault Zone by CGS, the Project could be subject to special design requirements (i.e., setbacks) and additional studies as required by the Alquist-Priolo Earthquake Fault Zoning Act. Regardless of the timing of final fault map issuance by CGS, a site-specific Fault Study has been prepared for the Project and all Project-related habitable structures would be located a minimum of 50 feet from the fault trace, as required by the Alquist-Priolo Earthquake Fault Zoning Act. As such, the Project would not conflict with this regulation.

(b) Seismic Hazards Mapping Act

In accordance with the State of California Seismic Hazards Mapping Act, the Project Site is not located within an area potentially affected by earthquake-induced liquefaction. Additionally, the site-specific investigation included in the Geotechnical Report has determined that the site soils would not be prone to liquefaction given the depth to groundwater at this location (i.e., over 100 feet below ground surface). Therefore, the Project would be in compliance with the Seismic Hazards Mapping Act.

(c) Los Angeles General Plan Safety Element

The Safety Element of the General Plan shows the Project Site as being outside any Fault Rupture Study area but located within an area potentially susceptible to liquefaction. However, site-specific analysis has confirmed that the Project Site does not overlie an active fault trace and the measured depth to groundwater at this location precludes the potential for liquefaction effects. Therefore, the issues noted in the Safety Element have been addressed and the Project would be in compliance with the Los Angeles General Plan Safety Element.

(d) Los Angeles Municipal Code

The Project would be designed and constructed in accordance with all Los Angeles Municipal Code requirements, including those set forth regarding building safety and seismic risks and erosion and sedimentation. As such, the project would be in compliance with Los Angeles Municipal Code requirements.

e. Cumulative Impacts

Impacts associated with geologic and soil issues are typically confined to a Project Site or within a very localized area. Cumulative development in the area would, however, increase the overall potential for exposure to seismic hazards by potentially increasing the number of people exposed to seismic hazards. The only nearby related project in the immediate Project vicinity is Related Project No. 31, located approximately ¼-mile west of the Project Site along Sunset Boulevard, which involves the development of 12,638 square feet of restaurant uses. Related projects would be subject to established guidelines and regulations pertaining to seismic hazards, and any other nearby projects (including those located in the City of West Hollywood) would be required to implement construction procedures that would avoid adverse effects at the Project Site. As such, adherence to applicable building regulations and standard engineering practices would ensure that cumulative impacts would be less than significant.

4. MITIGATION MEASURES

Mitigation Measure GS-1: Prior to issuance of a grading permit, a qualified geotechnical engineer shall prepare and submit to the Department of Building and Safety a final Geotechnical Report that provides recommendations to address seismic safety and design requirements for foundations, retaining walls/shoring, and excavation. A qualified geotechnical engineer shall be retained by the Applicant to be present on the Project Site during excavation, grading, and general site preparation activities to monitor the implementation of the recommendations specified in the Geotechnical Report as well as other recommendations made in subsequent Geotechnical Reports prepared for the project subject to City review and approval. When/if needed, the geotechnical engineer shall provide structure-specific geologic and geotechnical recommendations which shall be documented in a report to be approved by the City and appended to the project's previous Geotechnical Reports.

5. LEVEL OF SIGNIFICANCE AFTER MITIGATION

Impact related to surface fault rupture, liquefaction, landslides, expansive soils, sedimentation/erosion, landform alteration, and consistency with applicable regulations would be less than significant. With implementation of Mitigation Measure GS-1 above, potential impacts of the Project associated with seismic ground shaking and temporary excavations site stability would be reduced to less than significant levels.

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