IV. ENVIRONMENTAL IMPACT ANALYSIS
D. GEOLOGY AND SOILS

INTRODUCTION

As a result of the Initial Study (Appendix B), the City of Los Angeles determined that the proposed project has the potential to cause impacts related to geology and soils. Therefore, this issue has been carried forward for detailed analysis in this environmental impact report (EIR). Potential impacts related to geology and soils at the proposed project site were evaluated with regard to the Conservation and Open Space Element of the existing adopted City of Los Angeles General Plan[1] and the Mulholland Scenic Parkway Specific Plan (MSPSP).[2] The analysis draws on the Geotechnical Investigation undertaken for the proposed project, which was Appendix IS-2 to the Initial Study (Appendix B to the EIR).

Definitions

Alquist-Priolo Earthquake Fault Zone. The California Geological Survey (CGS) designates zones of required investigation along known active faults. Before cities and counties can permit development within Alquist-Priolo Earthquake Fault Zones, geologic investigations are required to show that the sites are not threatened by surface rupture from future earthquakes. Building sites must be set back from identified active faults.

Earthquake-Induced Landslides. Landslides triggered by earthquakes historically have been a significant cause of earthquake damage. Areas that are most susceptible to earthquake-induced landslides are steep slopes in poorly cemented or highly fractured rocks; areas underlain by loose, weak soils; and areas on or adjacent to existing landslide deposits.[3]

Expansive Soils. Expansive soils contain certain types of clay minerals that shrink or swell as the moisture content changes; the shrinking or swelling can shift, crack, or break structures built on such soils. Arid or semiarid areas with seasonal changes of soil moisture experience a much higher frequency of problems from expansive soils than areas with higher rainfall and more constant soil moisture.[4]

Fault. A fault is a fracture along which the blocks of crust on either side have moved relative to one another parallel to the fracture. Faults are classified as active by the CGS if they show evidence of surface displacement within the last 11,000 years.[5]

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1 City of Los Angeles Department of City Planning, 26 September 2001. Conservation Element of the City of Los Angeles General Plan. Available at: http://planning.lacity.org/cwd/gnlpln/ConsvElt.pdf.

2 City of Los Angeles, City Planning Commission. 22 May 2003. Mulholland Scenic Parkway Specific Plan: Design and Preservation Guidelines.

3 California Geological Survey. 2001. Seismic Hazard Zone Report for the Oat Mountain 7.5-Minute Quadrangle, Los Angeles County, California. Available at: http://gmw.consrv.ca.gov/shmp/download/quad/OAT_MOUNTAIN/reports/oatm_eval.pdf

4 Colorado Geological Survey. 28 April 2011. Definition of Swelling Soils. Available at: http://geosurvey.state.co.us/hazards/Swelling%20Soils/Pages/Definition.aspx.

5 California Geological Survey. 27 August 2007. Fault-Rupture Hazards in California: Special Publication 42. Available at: ftp://ftp.consrv.ca.gov/pub/dmg/pubs/sp/Sp42.pdf.

Groundwater. Groundwater is water underneath the surface of the earth. Rock or soil yielding groundwater to wells or springs in economically usable amounts is termed an aquifer; the upper surface of an aquifer is termed the water table.[6]

Ground Motion. Motion at the ground surface during an earthquake is measured as horizontal ground acceleration in g, where g is the acceleration of gravity.

Liquefaction. Liquefaction is a process whereby strong earthquake shaking causes sediment layers that are saturated with groundwater to lose strength and behave as a fluid. This subsurface process can lead to near-surface or surface ground failure that can result in property damage and structural failure. If surface ground failure does occur, it is usually expressed as lateral spreading, flow failures, ground oscillation, and/or general loss of bearing strength. Sand boils (injections of fluidized sediment) can commonly accompany these different types of failure.

Minimum Statewide Safety Standard. The Seismic Hazards Mapping Act and related regulations establish a statewide minimum public safety standard for mitigation of earthquake hazards. This means that the minimum level of mitigation for a project should reduce the risk of ground failure during an earthquake to a level that does not cause the collapse of buildings for human occupancy, but in most cases, not to a level of no ground failure at all. More stringent requirements are prescribed by the California Building Code (CCR Title 24) for hospitals, public schools, and essential service buildings. For such structures, the requirements of the Seismic Hazards Mapping Act are intended to complement the CCR Title 24 requirements.

Seismic Hazard Zone Maps. Maps issued by the State Geologist under PRC Section 2696 that show zones of required investigation.

Subsidence. Subsidence is the sinking of the land surface. Evidence of subsidence includes ground cracking and damage to roadways, aqueducts, and structures. Subsidence caused by excessive groundwater pumping is a common occurrence in areas of California where groundwater is pumped for agricultural and municipal wells.[7] Land subsidence also occurs due to oil withdrawal; the best-known example of which is in the Wilmington Oil Field in southern Los Angeles County, where land subsidence has reached 9 meters (30 feet).[8]

Zones of Required Investigation, referred to as **Seismic Hazard Zones**. Defined in CCR Section 3722, are areas shown on Seismic Hazard Zone Maps where site investigations are required to determine the need for mitigation of potential liquefaction and/or earthquake-induced landslide ground displacements.

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6 Sharp, John M., Jr. 2007. A Glossary of Hydrogeological Terms. University of Texas, Austin. Available at: http://www.geo.utexas.edu/faculty/jmsharp/sharp-glossary.pdf.

7 Harden, Deborah. 2004. California Geology. Upper Saddle River, NJ: Pearson Education, Inc.

8 Poland, Joseph F. 1984. Guidebook to studies of land subsidence due to ground-water withdrawal. United Nations Educational, Scientific, and Cultural Organization (UNESCO). Available at: http://wwwrcamnl.wr.usgs.gov/rgws/Unesco/PDF-Chapters/Chapter3.pdf.

REGULATORY FRAMEWORK

Federal

Uniform Building Code

The Uniform Building Code (UBC) is published by the International Conference of Building Officials and forms the basis for California's building code, as well as approximately 50 percent of the state building codes in the United States. It has been adopted by the California Legislature to address the specific building conditions and structural requirements for California, and to provide guidance on foundation design and structural engineering for different soil types. The UBC defines and ranks regions of the United States according to their seismic hazard potential. There are four types of regions defined by Seismic Zones 1 through 4, with Zone 1 having the least seismic potential and Zone 4 having the highest. The subject parcels in the proposed project are located within Seismic Zone 4.

State

Alquist-Priolo Earthquake Fault Zoning Act of 1972

Formerly the Special Studies Zoning Act, the Alquist-Priolo Earthquake Fault Zoning Act of 1972 regulates development and construction of buildings intended for human occupancy to avoid the hazard of surface fault rupture. In accordance with this law, the California Geological Survey maps active faults and designates Earthquake Fault Zones along mapped faults. This Act groups faults into categories of active, potentially active, and inactive. Historic and Holocene age faults are considered active, Late Quaternary and Quaternary age faults are considered potentially active, and pre-Quaternary age faults are considered inactive. These classifications are qualified by the conditions that a fault must be shown to be "sufficiently active" and "well defined" by detailed site-specific geologic explorations in order to determine whether building setbacks should be established. Any project that involves the construction of buildings or structures for human occupancy is subject to review under the Alquist-Priolo Earthquake Fault Zoning Act, and any structures for human occupancy must be located at least 50 feet from any active fault.

Seismic Hazards Mapping Act of 1990

In accordance with Public Resources Code, Chapter 7.8, Division 2, the California Department of Conservation, Division of Mines and Geology (now the CGS) is directed to delineate Seismic Hazard Zones through the Seismic Hazards Zonation Program. The purpose of the Act is to reduce the threat to public health and safety and to minimize the loss of life and property by identifying and mitigating seismic hazards, such as those associated with strong ground shaking, liquefaction, landslides, other ground failures, or other hazards caused by earthquakes. Cities, counties, and State agencies are directed to use seismic hazard zone maps developed by CGS in their land-use planning and permitting processes. In accordance with the Seismic Hazards Mapping Act, site-specific geotechnical investigations must be performed prior to permitting most urban development projects within seismic hazard zones.

California Building Code (2013)

The State of California provides minimum standards for building design through the California Building Code (CBC). The CBC is based on the UBC, which is used widely throughout the United States (generally adopted on a state-by-state or district-by-district basis), and has been modified for conditions within California. In 2013, a revised version of the CBC took effect. In accordance with the CBC, a grading permit is required if more than 50 cubic yards of soil is moved during implementation of a

project. Chapter 16 of the CBC contains definitions of seismic sources and the procedure used to calculate seismic forces on structures.

Local

Los Angeles Building Code

The Los Angeles Building Code (LABC), a portion of the Los Angeles Municipal Code, incorporates and makes local administrative changes to the 2013 edition of the CBC, including further requirements regarding geology and soils.

Safety Element of the Los Angeles City General Plan

The Safety Element of the Los Angeles City General Plan provides goals, policies, and objectives in regards to geologic hazards. Goal 1 of the Safety Element attempts to minimize injury, loss of life, property damage and disruption of the social and economic life of the City due to fire, water related hazard, seismic event, geologic conditions or release of hazardous materials disasters through interagency coordination, facilities/systems maintenance, risk reduction, and compliance with state and federal regulations.

Conservation Element of the Los Angeles City General Plan

The Conservation Element of the Los Angeles City General Plan includes policies regarding geology and soils, specifically inland and coastal erosion. Erosion Policy 2 of the Conservation Element attempts to prevent or reduce erosion through the enforcement of permitting in hillside and coastal terrain.

Mulholland Scenic Parkway Specific Plan

The MSPSP contains measures in place for potential development projects up to one-half mile away to ensure compatibility with the environment. Objective 1.1 of Section 2, *Site Planning*, states,

> Geotechnical issues. The Department of Building and Safety is directly responsible for determinations concerning slope stability and other geotechnical issues. However, a geology and soils report may be requested of applicants and considered where such information is relevant to considering the configuration of architectural and landscape elements on the site, e.g., location of structures, retaining walls, hardscape features and plant material.

City of Los Angeles – Baseline Hillside Ordinance

The LAMC establishes regulations for the development of single-family residential properties in hillside areas and sets limits for grading and the import and export of earth.[9] The property is located in a designated Hillside Area, and is subject to the Baseline Hillside Ordinance, and is limited to a maximum of 1,600 cy of grading, maximum 500 cy of earth import, and maximum 1,000 cy of earth export. Grading or import/export amounts in excess of these limits require review and approval by a Zoning Administrator.

[9] City of Los Angeles Department of City Planning. 30 March 2011. Ordinance No. 181624. Available at: http://planning.lacity.org/Code_Studies/HillsideAreaDefinitionAmendment/AdoptedBaselineHillsideOrdinance.pdf

The estimated earth export for the proposed project is 1,203 cubic yards, which is 203 cubic yards in excess of allowable limits. In addition, as required by CEQA, the applicant has included an alternative (Reduced Project Alternative) which reduces the estimated maximum quantity of earth export to no more than 1,114 cubic yards.

ENVIRONMENTAL SETTING

Earthquake Faults

The proposed project area is located within the City Los Angeles, which is known to be a seismically active region. Potential hazards that can result from seismic activities include surface rupture of earthquake faults, seismic ground shaking, liquefaction, and landslides. Numerous faults are located within the City of Los Angeles. Of the four national earthquake zones, ranging from 1 to 4, with 4 posing the largest danger, Los Angeles is classified as a Seismic Zone 4.[10]

Although the proposed project area is not located within an Alquist-Priolo Earthquake Fault Zone (APEFZ), one APEFZ, the Hollywood Fault, is present approximately 2.5 miles south of the proposed project site (Figure IV.D-1, *Earthquake Fault Map*).[11,12,13] Other local APEFZs include the Newport-Inglewood Fault, located approximately 7 miles south of the proposed project site, and the Raymond Fault, located approximately 9 miles east of the proposed project site.[14,15,16] Both the Hollywood and Raymond faults are components of the larger Santa Monica–Hollywood–Raymond Fault system, which in turn is part of an approximately 120-mile-long west-trending system of left-lateral, oblique, and reverse faults that separate the Transverse Ranges on the north from the Peninsular Ranges to the south.[17] The Newport-Inglewood Fault zone consists of a series of northwest-trending, generally right-lateral strike-slip faults that extend for approximately 45 miles from Newport mesa northwest to the Cheviot Hills.[18] The Hollywood, Newport-Inglewood, and Raymond faults display evidence of Holocene movement and are considered active. The closest mapped fault to the proposed project area is the Benedict Canyon Fault, located approximately 1,500 feet north of the proposed project; however, the fault shows no evidence of recent movement and is considered inactive.[19,20] Previous research has estimated the most recent movement on the Benedict Canyon Fault occurred sometime in the late Pleistocene, approximately

10 California Seismic Safety Commission. 2005. Homeowner's Guide to Earthquake Safety. n.d. Sacramento, CA. Available at: http://www.seismic.ca.gov/pub/CSSC_2005-01_HOG.pdf

11 California Division of Mines and Geology. 1979. State of California Special Studies Zones, Burbank Quadrangle.

12 California Division of Mines and Geology. 1986. State of California Special Studies Zones, Beverly Hills Quadrangle.

13 California Division of Mines and Geology. 2014. California Geological Survey Fault Evaluation Report FER 253.

14 California Division of Mines and Geology. 1986. State of California Special Studies Zones, Beverly Hills Quadrangle.

15 California Division of Mines and Geology. 1977. State of California Special Studies Zones, Los Angeles Quadrangle.

16 California Institute of Technology, Southern California Earthquake Center. 2013. Raymond Fault.

17 California Division of Mines and Geology. 2014. California Geological Survey Fault Evaluation Report FER 253.

18 California Division of Mines and Geology. 1985. Fault Evaluation Report FER-173, Northern Newport-Inglewood Fault Zone, Los Angeles County, California.

19 Dibblee, Thomas. 1991. Geologic Map of the Hollywood and South ½ Burbank Quadrangles, Los Angeles County, California.

20 Jennings, C.W. 1994. Fault Activity Map of California and Adjacent Areas with Locations and Ages of Recent Volcanic Eruptions. California Geologic Data Map Series, Map No. 6.

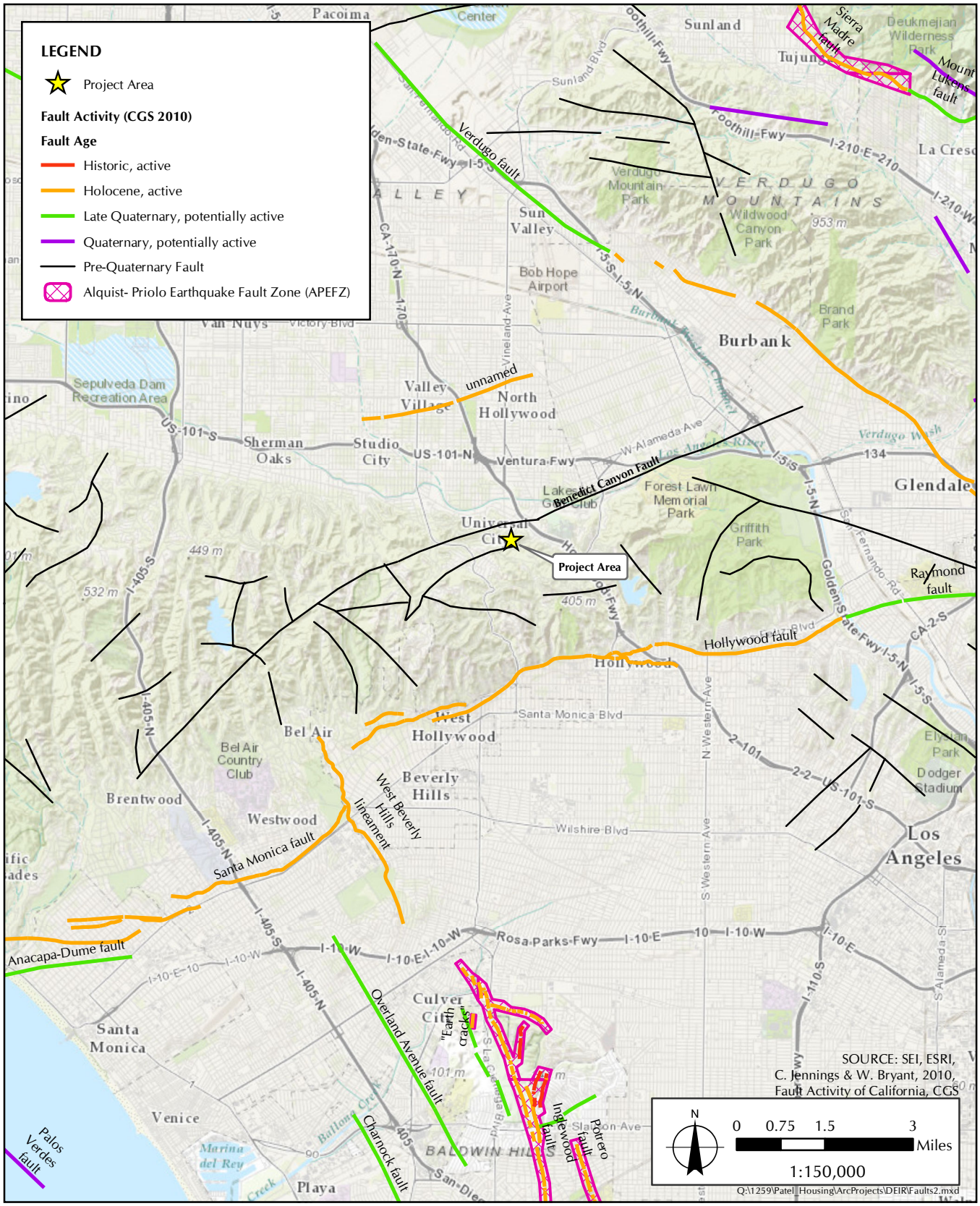

FIGURE IV.D-1

Earthquake Fault Map

100,000 to 150,000 years ago.[21] Despite the presence of faults in the region, there are no fault scarps showing signs of recent activity recorded in the proposed project area.

Seismic Ground Shaking

Seismic ground shaking is a potential seismic danger resulting from earthquakes that may occur in the region. Several factors contribute to the significance of ground shaking during an earthquake, including the proximity of the area to a fault or fault system, the depth of earthquake, the location of the epicenter, the magnitude of the earthquake, and the geologic substrate. Although no potentially active or active faults are known to exist within the site, the area will be subject to ground motion from occasional earthquakes in the region (Table IV.D-1, *Historic Earthquakes in Proposed Project Regional Vicinity*). Movement along the faults listed in Table IV.D-1 or any other known or unknown fault in the Los Angeles region could result in ground shaking within the proposed project area. Despite the presence of earthquake faults in the Los Angeles region, residences in the immediate vicinity of the proposed project have withstood seismic ground shaking from earthquakes listed in Table IV.D-2, *Residences in the Immediate Vicinity of the Proposed Project*.[22]

Table IV.D-1
Historic Earthquakes in Proposed Project Regional Vicinity

Name of Fault	Date of Activity	Earthquake Magnitude	Approximate Distance from Proposed Project
Newport-Inglewood	1933	6.3	7 miles
Northridge	1994	6.8	10 miles
Sierra Madre	1991	6.0	10 miles
San Fernando	1971	6.4	12 miles
Whittier	1987	5.9	19 miles
Norwalk	1929	4.7	24 miles
San Andreas	1857	8.0	36 miles
Big Bear	1992	6.5	92 miles
Landers	1992	7.5	96 miles
Source: Appendix B, IS-2.			

Table IV.D-2
Residences in the Immediate Vicinity of the Proposed Project

Parcel Location Relative to Proposed Project	Date of Construction
North	1955
West (vacant)	—
East (vacant)	—
Southwestern	1962
Southwestern Central	1962
Southeastern Central	1963
Southeastern	2004

[21] Weber, F.H., Jr., Bennett, J.H., Chapman, R.H., Chase, G.W., and Saul, R.B. 1980. Earthquake hazards associated with the Verdugo–Eagle Rock and Benedict Canyon fault zones, Los Angeles County, California: U.S. Geological Survey Open-File Report 81–296.

[22] ZIMAS. Accessed 17 April 2015. Property data. Available at: http://zimas.lacity.org/

Liquefaction

Liquefaction occurs when saturated, cohesionless (low relative density) materials (usually sand or silty sand) are transformed from a solid to a near liquid state due to the increase in pore water pressure that can be caused by moderate to severe seismic ground shaking. In order for liquefaction to occur, the groundwater table must be close to the surface, the soil must be loosely packed, and ground shaking needs to be powerful enough to cause the soil to liquefy.

The proposed project area is not located within a liquefaction zone, as delineated by the California Division of Mines and Geology (Figure IV.D-2, *Liquefaction Zone Map*).[23] The proposed project area is underlain by bedrock, specifically gray micaceous clay shale or claystone of the Upper Topanga Formation located approximately 6 inches below the surface, with varying topsoil thickness throughout the site.[24] Bedrock, such as the rock present beneath the proposed project area, is consolidated and not susceptible to liquefaction, which requires loose sediment in order to occur. A thin layer of artificial fill and dark brown, clayey silt containing soil abundant bedrock fragments, roots, and organic debris located above bedrock was encountered during geotechnical investigations; however, such soil is not conducive to liquefaction, unlike sand or silty sand. Springs are known to be present within the proposed project area during times of heavy rain and are usually temporary. However, no springs or seeps were observed at the site, and groundwater was not encountered in the excavated test holes (Appendix B, IS-2).

Landslides

Landslides result from unstable slopes that loose cohesion and collapse. Contributing factors to landslides include weakened bedrock, soil erosion, heavy and consistent rainfall, ground shaking from earthquake activity, and fire, as well as by human alteration of the surrounding environment. The proposed project area is located within an Earthquake-Induced Landslide Zone, as delineated by the California Division of Mines and Geology (Figure IV.D-3, *Earthquake-Induced Landslide Zone Map*).[25] Previous site geotechnical investigations identified a moderate-sized debris flow along the western portion of the property that is believed to have occurred in 1979 (Appendix B, IS-2). The debris consists of soil with scattered sandstone boulders. The proposed project is located in an Earthquake-Induced Landslide Zone, where the presence of recent landslide debris indicate landslides are of concern to the proposed project (Appendix B, IS-2).[26]

Soil Erosion

Erosion of earth materials is the process of wearing away and transport of materials due to concentrated water, wind, or gravitational forces. Harder, denser, and more cemented bedrock formations (usually older) will erode much less than softer, unconsolidated alluvium under the same forces. Erosion by water and gravity is usually more severe on steep terrain/slopes than on relatively flat ground, and in seismically active (uplifting) areas. Although consolidated rock is more resistant to erosion than unconsolidated sediment, the proposed project is located on a relatively steep area with approximately 6 inches of loose, unconsolidated top soil. The drainage of surface water at the site consists of sheet flow northeastward, downslope towards the street (Figure IV.D-4, *Existing Topography at Project Site*). In the event of substantial rain events, the proposed project site has the potential to undergo surface erosion of the

[23] California Division of Mines and Geology. 1999. Seismic Hazard Zones, Burbank Quadrangle Official Map.

[24] Dibblee, Thomas. 1991. Geologic Map of the Hollywood and South ½ Burbank Quadrangles, Los Angeles County, California.

[25] California Division of Mines and Geology. 1999. Seismic Hazard Zones, Burbank Quadrangle Official Map.

[26] California Division of Mines and Geology. 1999. Seismic Hazard Zones, Burbank Quadrangle Official Map.

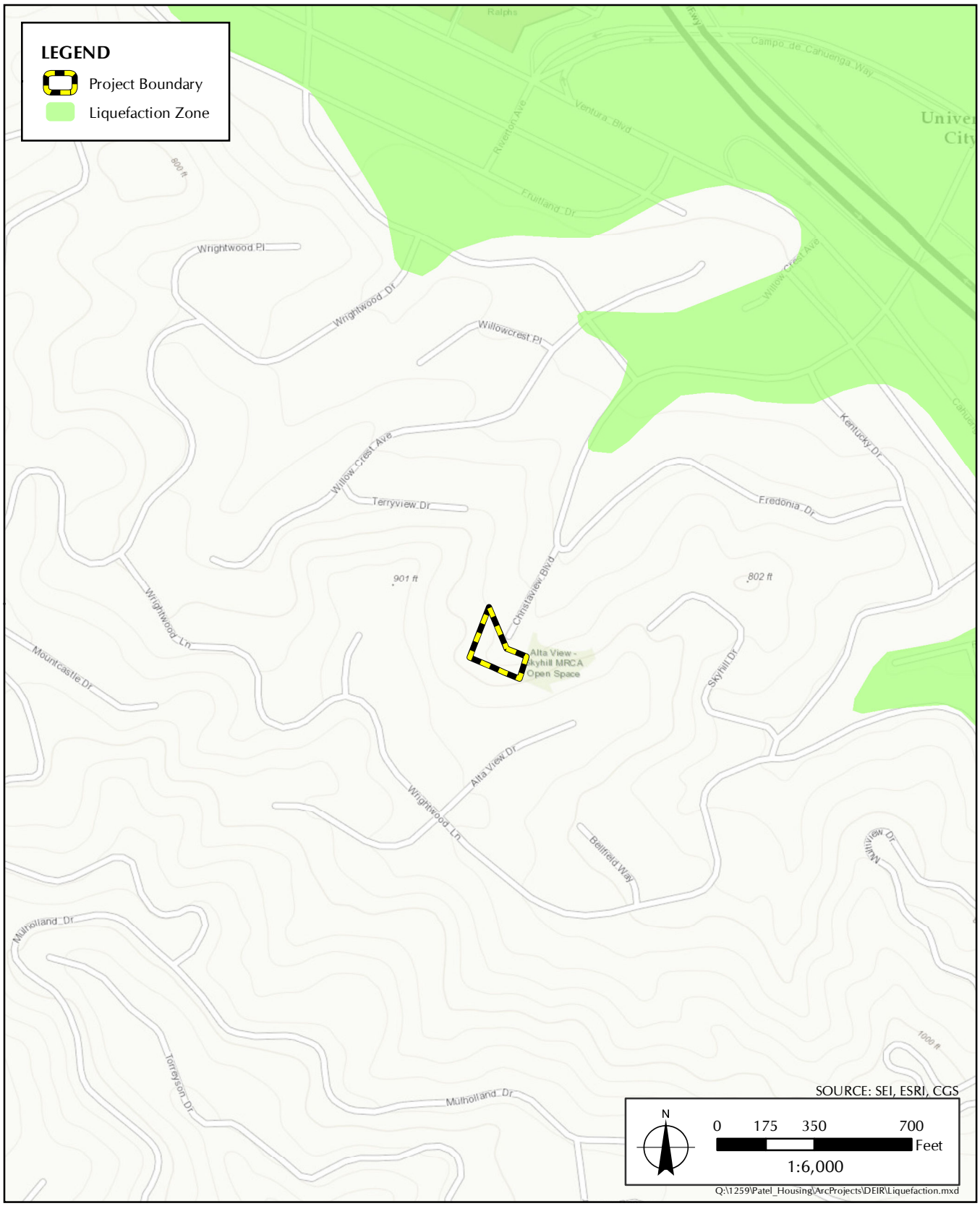

FIGURE IV.D-2

Liquefaction Zone Map

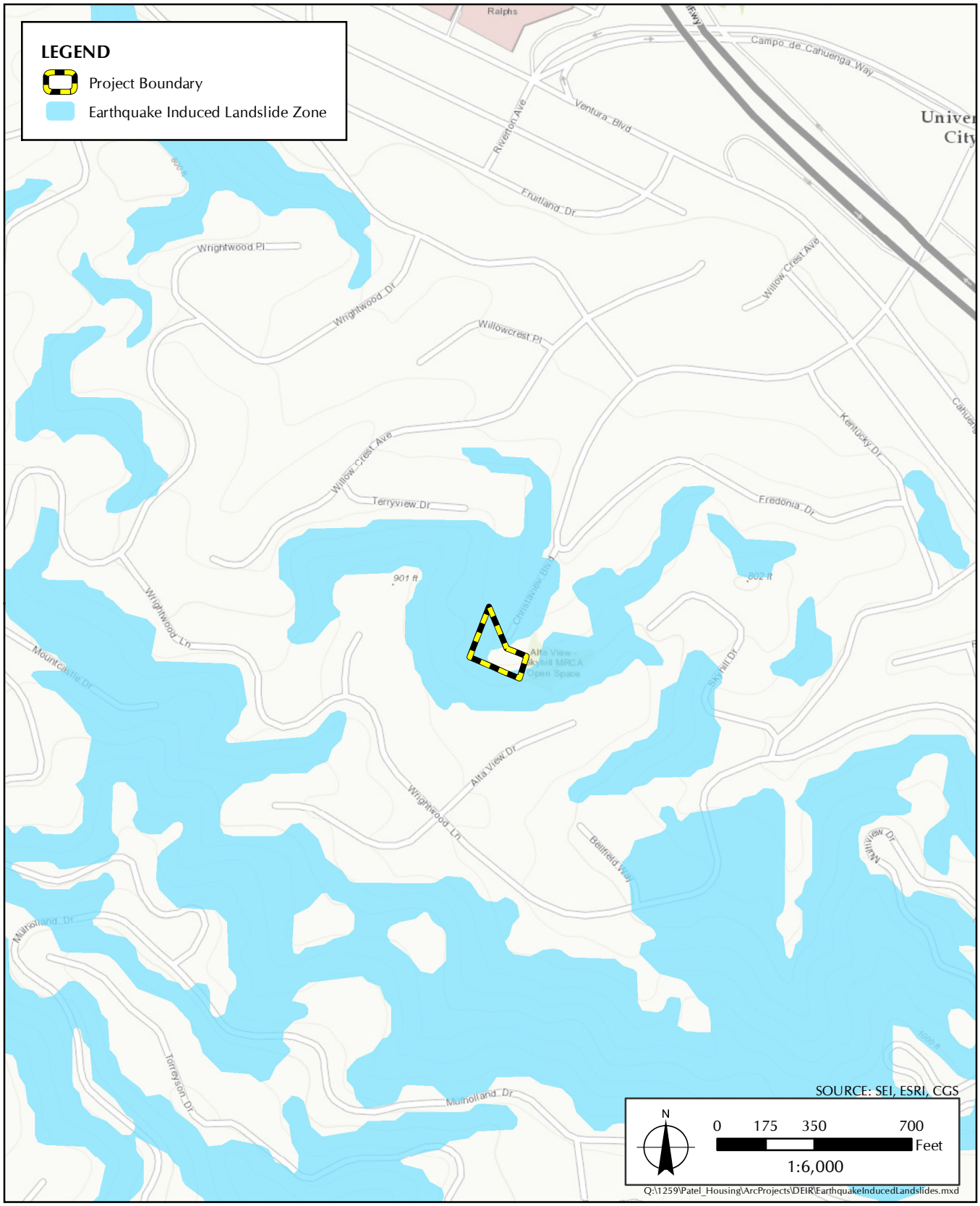

FIGURE IV.D-3

Earthquake- Induced Landslide Zone Map

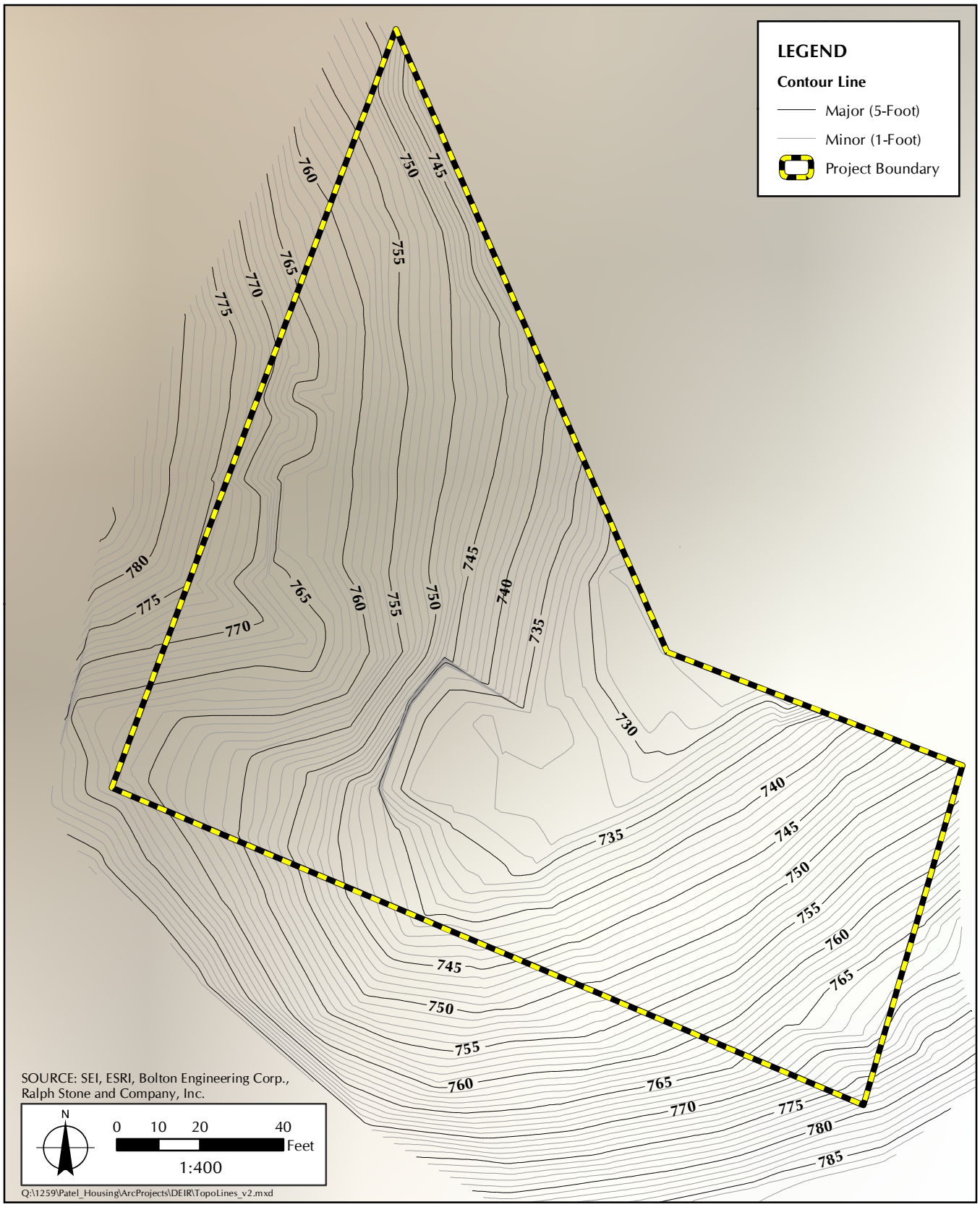

FIGURE IV.D-4

Existing Topography at Project Site

topsoil, but does not have high potential for erosion of bedrock Upper Topanga formation material (Appendix B, IS-2).

Expansive Soil

Soils that expand and contract in volume ("shrink-swell" pattern) are considered to be expansive and may cause damage to above ground structures as a result of density changes that shift overlying materials. Fine-grain clay sediments are most likely to exhibit shrink-swell patterns in response to changing moisture levels. As described above, the sediment in the proposed project area consists of clayey silt, containing abundant rock fragments, roots, and organic debris. The soil is described as having medium expansion potential (Appendix B, IS-2).

Additionally, the majority of soil at the near surface of the proposed project site is construction fill designed to resist shrink-swell patterns. The artificial fill present on the proposed project site consists of medium tan-brown sandy silt, containing abundant rock fragments, and has a medium expansion potential (Appendix B, IS-2).

ENVIRONMENTAL IMPACTS

Methodology

Geology and soils at the proposed project site were evaluated utilizing geotechnical evaluations (Appendix B, IS-2), the site soil report, the CBC, the LABC, Safety Element of the City of Los Angeles General Plan, the MSPSP, geologic maps,[27] and applicable publications of the California Division of Mines and Geology[28,29,30,31,32,33] and USGS.[34]

Thresholds of Significance

CEQA Thresholds

The State CEQA Guidelines recommend the consideration of five questions when addressing the potential for significant impact to geology and soils. Would the proposed project:

(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 or

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27 Dibblee, Thomas. 1991. Geologic Map of the Hollywood and South ½ Burbank Quadrangles, Los Angeles County, California.

28 California Division of Mines and Geology. 1979. State of California Special Studies Zones, Burbank Quadrangle.

29 California Division of Mines and Geology. 1986. State of California Special Studies Zones, Beverly Hills Quadrangle.

30 California Division of Mines and Geology. 2014. California Geological Survey Fault Evaluation Report FER 253.

31 California Division of Mines and Geology. 1977. State of California Special Studies Zones, Los Angeles Quadrangle.

32 California Division of Mines and Geology. 1985. Fault Evaluation Report FER-173, Northern Newport-Inglewood Fault Zone, Los Angeles County, California.

33 California Division of Mines and Geology. 1999. Seismic Hazard Zones, Burbank Quadrangle Official Map.

34 Weber, F.H., Jr., Bennett, J.H., Chapman, R.H., Chase, G.W., and Saul, R.B. 1980. Earthquake hazards associated with the Verdugo–Eagle Rock and Benedict Canyon fault zones, Los Angeles County, California: U.S. Geological Survey Open-File Report 81–296.

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?

(b) Result in substantial soil erosion or the loss of topsoil?
(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?
(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?
(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 waste water?

Los Angeles CEQA Thresholds[35]

The City of Los Angeles provides the following thresholds of significance relating to geology and soils in determining the significance of a project's impacts during the CEQA process in Los Angeles.

Geologic Hazards

A project would normally have a significant geologic hazard impact if it would cause or accelerate geologic hazards, which would result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury.

Sedimentation and Erosion

A project would normally have significant sedimentation or erosion impacts if it would:

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

Landform Alteration

A project would normally have a significant impact on landform alteration if one or more distinct and prominent geologic or topographic features would be destroyed, permanently covered or materially and adversely modified. Some features may include, but are not limited to, hilltops, ridges, hillslopes, canyons, ravines, rock outcrops, water bodies, streambeds, and wetlands.

[35] City of Los Angeles, 2006. L.A. CEQA Thresholds Guide. Available at: http://www.environmentla.org/programs/Thresholds/Complete%20Threshold%20Guide%202006.pdf

Project Impacts

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

The proposed project would not result in impacts from exposing people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault. The proposed project is not located in an APEFZ.[36] The closest APEFZ to the proposed project is the Hollywood Fault, located approximately 2.5 miles south of the proposed project area.[37,38,39] The closest mapped fault to the proposed project area is the Benedict Canyon Fault, located approximately 1,500 feet north of the proposed project; however, the fault shows no evidence of recent movement and is considered inactive (see Figure IV.D-1).[40,41] Despite the presence of faults in the region, there are no fault scarps showing signs of recent activity recorded in the proposed project area. Therefore, the proposed project would not result in impacts from exposing people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault. The proposed project would be in compliance with provisions of the CBC; LABC; and any other additional regional, state, and federal regulations. All activities and development on the proposed project site would be subject to uniform site development and construction standards that are designed to protect public safety. Therefore, impacts would be less than significant, and no mitigation would be required.

(ii) Strong seismic ground shaking?

The proposed project would not result in impacts from exposing people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking. The proposed project is not located in an APEFZ (see Figure IV.D-1).[42] Single-family residences in the immediate proposed project vicinity have withstood seismic ground shaking during major earthquakes in the Los Angeles area.[43] Although the proposed project is expected to experience ground shaking from fault movement along numerous faults in the Los Angeles region, the proposed project would be in compliance with provisions of the CBC; LABC; and any other additional regional, state, and federal regulations. All activities and development on the proposed project site would be subject to uniform site development and construction standards that are designed to protect public safety. These provisions are met through the creation and approval of a site-specific geotechnical evaluation. The proposed project would follow the recommendations of the approved geotechnical evaluation. Therefore,

36 California Division of Mines and Geology. 1979. State of California Special Studies Zones, Burbank Quadrangle.

37 California Division of Mines and Geology. 1979. State of California Special Studies Zones, Burbank Quadrangle.

38 California Division of Mines and Geology. 1986. State of California Special Studies Zones, Beverly Hills Quadrangle.

39 California Division of Mines and Geology. 2014. California Geological Survey Fault Evaluation Report FER 253.

40 Dibblee, Thomas. 1991. Geologic Map of the Hollywood and South ½ Burbank Quadrangles, Los Angeles County, California.

41 Weber, F.H., Jr., Bennett, J.H., Chapman, R.H., Chase, G.W., and Saul, R.B. 1980. Earthquake hazards associated with the Verdugo–Eagle Rock and Benedict Canyon fault zones, Los Angeles County, California: U.S. Geological Survey Open-File Report 81–296.

42 California Division of Mines and Geology. 1979. State of California Special Studies Zones, Burbank Quadrangle.

43 ZIMAS. Accessed 17 April 2015. Property data. Available at: http://zimas.lacity.org/

the proposed project would not result in impacts from exposing people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking, and no mitigation would be required.

(iii) Seismic-related ground failure, including liquefaction?

The proposed project would not result in impacts from exposing people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure, including liquefaction. The proposed project is not located in a Liquefaction Zone, as delineated by the California Division of Mines and Geology (see Figure IV.D-2).[44] The proposed project would be in compliance with provisions of the CBC; LABC; and any other additional regional, state, and federal regulations. All activities and development on the proposed project site would be subject to uniform site development and construction standards that are designed to protect public safety. These provisions are met through the creation and approval of a site-specific geotechnical evaluation. The proposed project would follow the recommendations of the approved geotechnical evaluation. Therefore, the proposed project would not result in impacts from exposing people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure, including liquefaction, and no mitigation would be required.

(iv) Landslides?

The proposed project would not result in impacts from exposing people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving landslides (Appendix B, IS-2). Although the proposed project area is located within an Earthquake-Induced Landslide Zone, as delineated by the California Division of Mines and Geology,[45] the proposed project would be in compliance with provisions of the CBC; LABC; and any other additional regional, state, and federal regulations (see Figure IV.D-3). All activities and development on the proposed project site would be subject to uniform site development and construction standards that are designed to protect public safety. These provisions are met through the creation and approval of a site-specific geotechnical evaluation. The proposed project would follow the recommendations of the approved geotechnical evaluation, including structural footings embedded in bedrock, retaining walls penetrating at least 36 inches below ground, and foundations set back at least 5 feet from the slope face (Appendix B, IS-2). Therefore, the proposed project would not result in impacts from exposing people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving landslides, and no mitigation would be required.

(b) Result in substantial soil erosion or the loss of topsoil?

The proposed project would not result in substantial soil erosion and loss of topsoil (Appendix B, IS-2). Erosion by water and gravity is usually more severe on steep terrain/slopes than on relatively flat ground, and in seismically active (uplifting) areas. The proposed project would be in compliance with provisions of the CBC; LABC; and any other additional regional, state, and federal regulations. All activities and development on the proposed project site would be subject to uniform site development and construction standards that are designed to protect public safety. These provisions are met through the creation and approval of a site-specific geotechnical evaluation. The proposed project would follow the recommendations of the approved geotechnical evaluation, including the restriction of water ponding during construction, plastic covered slopes secured by sandbags, and drainage control measures

[44] California Division of Mines and Geology. 1999. Seismic Hazard Zones, Burbank Quadrangle Official Map.

[45] California Division of Mines and Geology. 1999. Seismic Hazard Zones, Burbank Quadrangle Official Map.

(Appendix B, IS-2). Therefore, the proposed project would not result in substantial soil erosion and loss of topsoil, and no mitigation would be required.

(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?

The proposed 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 potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse (Appendix B, IS-2). The proposed project would be in compliance with provisions of the CBC; LABC; and any other additional regional, state, and federal regulations. All activities and development on the proposed project site would be subject to uniform site development and construction standards that are designed to protect public safety. These provisions are met through the creation and approval of a site-specific geotechnical evaluation. The proposed project would follow the recommendations of the approved geotechnical evaluation. Therefore, the proposed 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 potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse, and no mitigation would be required.

(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?

The proposed project would result in less than significant impacts to geology and soils in relation to location on expansive soil creating substantial risks to life or property (Appendix B, IS-2). Fine-grain clay sediments are most likely to exhibit shrink-swell patterns in response to changing moisture levels. The proposed project would be in compliance with provisions of the CBC; LABC; and any other additional regional, state, and federal regulations. All activities and development on the proposed project site would be subject to uniform site development and construction standards that are designed to protect public safety. These provisions are met through the creation and approval of a site-specific geotechnical evaluation. The proposed project would follow the recommendations of the approved geotechnical evaluation, including the use of soils free of organic material with a prevailing expansion index of no greater than 50, and the placement of moisture barriers to protect against moisture penetration (Appendix B, IS-2). Therefore, the proposed project would result in less than significant impacts to geology and soils in relation to location on expansive soil creating substantial risks to life or property, and no mitigation would be required.

(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 waste water?

The proposed project would not have soils that are incapable of adequately supporting the use of septic tanks or other onsite wastewater treatment systems (OWTS) or alternative wastewater disposal systems where a public sewers system is not available for the disposal of wastewater (Appendix B, IS-2). The proposed project is located in an urban area where sewers are available for the disposal of waste water. Additionally, the soils present at the proposed project area are capable of supporting the use of septic tanks or alternative waste water disposal systems, if the use of such systems is deemed necessary for the proposed project. The proposed project would be in compliance with provisions of the CBC; LABC; and any other additional regional, state, and federal regulations. All activities and development on the proposed project site would be subject to uniform site development and construction standards that are designed to protect public safety. Therefore, impacts would be less than significant, and no mitigation would be required.

CUMULATIVE IMPACTS

Although the proposed project and growth in the area will intensify residential development in a seismically active region, conformance to existing regulations and recommended measures in the submitted geotechnical reports will ensure that the project's geotechnical impacts would not be cumulatively considerable and would be less than significant.

MITIGATION MEASURES

No mitigation would be required.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

No mitigation would be required.