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File No. 21648

1237 7th Street Associates, LLC
c/o Sandstone Properties, Inc.
10877 Wilshire Boulevard, Suite 1105
Los Angeles, California 90024

Attention: Michael Moore

Subject: Preliminary Geotechnical Assessment
Proposed Mixed-Use Development
1330 West Pico Boulevard, Los Angeles, California

Ladies and Gentlemen:

1.0 INTRODUCTION

The purpose and intent of this document is to evaluate the soil and geological site characteristics associated with the proposed development including potential environmental impacts to the surrounding area, as required by the California Environmental Quality Act (CEQA) Guidelines. This report includes information from geotechnical investigations performed in near proximity to the site, engineering analysis, review of published geologic data, and review of available geotechnical engineering information.

2.0 SITE CONDITIONS

The subject site is located at 1330 West Pico Boulevard, in the City of Los Angeles, California. The site occupies a city block and is delimited by Pico Boulevard to the northeast, Highway 110 to the southeast, West 14th Street to the southwest and Albany Street to the northwest. An existing 2-story residential structure and a 4-story church are currently located at the corner of 14th Street and Albany Street and are not included within the subject site property lines. The site is shown relative to nearby topographic features in the enclosed Vicinity Map.

As indicated in the enclosed Survey Plan, the site is currently developed with an existing office building. The existing structure occupies the vast majority of the site and ranges from two stories to three stories in height with rooftop parking.

The topography observed across the site descends gently to the southwest. There is an estimated elevation difference of approximately four feet across the site for an overall site gradient of 125 to 1 (horizontal to vertical).

Vegetation at the site consists of a few mature trees, and limited amount of grass lawns, bushes and shrubs contained in small manicured landscaped areas. Drainage across the site appears to be by sheetflow to the city streets and toward the southwest.

3.0 PROJECT SCOPE

Preliminary information concerning the proposed development was obtained by review of plans prepared by Sandstone Properties, dated June 14, 2018.

The proposed development consists of a 671,300 square foot mixed-use development including a 38-story tower building. The proposed development will be constructed over four podium levels and five subterranean levels. Grading will consist of excavations between 55 and 60 feet for the proposed subterranean levels and foundation elements. The enclosed Site Plan illustrates the details of the proposed structural features anticipated for the development.

4.0 PREVIOUS LOCAL SITE INVESTIGATIONS

This firm has conducted previous geotechnical engineering investigations within the area as indicated on the enclosed Vicinity Map. The investigations in nearest proximity to the proposed development are summarized below. Pertinent results and observations from these previous investigations have been incorporated into the preparation of this report.

1. ***Geotechnologies, Inc., April 17, 2014, Geotechnical Engineering Investigation, Proposed Mixed-Use Structure, 1400 South Figueroa Street, Los Angeles, California, File Number 20732.***

   Seven exploratory excavations were drilled during preparation of this geotechnical investigation report. The excavations ranged in depth from 6 to 70 feet within the site. Minor seepage of groundwater was observed during exploration at a depth of 35 feet and was limited to Boring B5. Groundwater was not observed in any of the other borings, which were excavated to 40 and 70 feet below the ground surface. The groundwater observed during exploration was considered to be a perched water condition due to permeability variations of earth material within the site and was not concluded to be representative of the static groundwater table.

2. ***Geotechnologies, Inc., December 14, 2015, revised April 21, 2016, Geotechnical Engineering Investigation, Proposed Classroom Building, at 1633 West 11th Street, Los Angeles, California, File Number 21106.***

   Three borings were excavated within this site in preparation of the geotechnical engineering investigation. The borings ranged in depth from 10 to 50 feet. Groundwater was not observed during exploration of this site.

3. ***Geotechnologies, Inc., April 2, 2007, Geotechnical Engineering Investigation, Proposed High Density Residential and Mixed-Use Development, at 1101 South Flower, Los Angeles, California, File Number 19241.***

   The investigation included the excavation of 14 borings during site exploration. The borings ranged in depth from 70 to 100 feet. Groundwater was encountered at a depth of

30 feet. It is the assessment of this firm that the observed groundwater represented a perched water condition created by relatively impermeable clay layers underlying a sandy granular zone containing water.

4. ***Geotechnologies, Inc., May 8, 2015, revised December 17, 2015, Geotechnical Engineering Investigation, Proposed City Center Hotel and Residential Development, at 1020 South Figueroa Street, Los Angeles, California, File Number 20766.***

   Eight borings were excavated within this site during preparation of the geotechnical engineering investigation. The exploratory borings ranged in depth from 80 to 130 feet. Groundwater was not observed during exploration of this site.

5. ***Geotechnologies, Inc. including documentation from MACTEC Engineering and Consulting, Inc., May 21, 2004, Report of Geotechnical Investigation, Proposed Olympic East Entertainment District Development, 1111 South Figueroa Street, Los Angeles, California, File Number 19152.***

   The site was explored by drilling nine borings within the site to depths of 40 to 100 feet below ground surface. Groundwater was not encountered within the depths explored.

5.0 GROUNDWATER

The historically highest groundwater level was established by review of the Hollywood 7½ Minute Quadrangle Seismic Hazard Evaluation Report, Plate 1.2, Historically Highest Ground Water Contours (CDMG, 2006). Review of this plate indicates that the historically highest groundwater level at the site is estimated at 85 feet below ground surface. A copy of this plate is included in the Appendix as Historically Highest Groundwater Levels Map.

Static groundwater was not encountered during exploration of nearby sites to an explored depth of 130 feet below grade. Perched groundwater was, however, observed at depths of 30 and 35 feet at previous sites (Geotechnologies File No.'s 19241 and 20732) which are located to the east and southeast of the proposed development. The locations of nearby site investigations are indicated on the enclosed Vicinity Map.

6.0 LOCAL GEOLOGY

The subject site is located in the Los Angeles Basin. The Los Angeles Basin is located at the northern end of the Peninsular Ranges Geomorphic Province. The basin is bounded by the east and southeast by the Santa Ana Mountains and San Joaquin Hills, to the northwest by the Santa Monica Mountains. The distribution of nearby geologic materials is shown on the Local Geologic Map enclosed in the Appendix of this report.

7.0 REGIONAL GEOLOGIC SETTINGS

The subject site is located within the northern region Peninsular Ranges Geomorphic Province. The Peninsular Ranges are characterized by northwest-trending blocks of mountain ridges and sediment-floored valleys. The dominant geologic structural features are northwest trending fault zones that either die out to the northwest or terminate at east-west trending reverse faults that form the southern margin of the Transverse Ranges (Yerkes, 1965). Regional geology for the site is presented in the Regional Geologic Map in the Appendix of this report.

8.0 SOIL CONDITIONS AND GEOLOGIC HAZARDS

a) Regional Faulting

Based on criteria established by the California Division of Mines and Geology (CDMG) now called California Geologic Survey (CGS), faults may be categorized as active, potentially active, or inactive. Active faults are those which show evidence of surface displacement within the last 11,000 years (Holocene-age). Potentially-active faults are those that show evidence of most recent surface displacement within the last 1.6 million years (Quaternary-age). Faults showing no evidence of surface displacement within the last 1.6 million years are considered inactive for most purposes, with the exception of design of some critical structures.

Buried thrust faults are faults without a surface expression but are a significant source of seismic activity. They are typically broadly defined based on the analysis of seismic wave recordings of hundreds of small and large earthquakes in the Southern California area. Due to the buried nature of these thrust faults, their existence is usually not known until they produce an earthquake. The risk for surface rupture potential of these buried thrust faults is inferred to be low (Leighton, 1990). However, the seismic risk of these buried structures in terms of recurrence and maximum potential magnitude is not well established. Therefore, the potential for surface rupture on these surface-verging splays at magnitudes higher than 6.0 cannot be precluded.

A list of faults located within 60 miles (100 kilometers) from the project sites has been provided in the enclosed table entitled Seismic Source Summary Table. This table is based on information provided by the USGS in their 2008 National Seismic Hazard Maps–Source Parameters database. The distances provided in this table are measured from a point selected near the center of the subject site. A Southern California Fault Map has also been enclosed. The following sections describe some of the regional active faults, potentially active faults, blind thrust faults and unnamed faults.

i) Active Faults

Raymond Fault

The Raymond fault is located approximately 6.19 miles northeast of the subject site. Much of the geomorphic evidence for the Raymond fault has been obliterated by urbanization of the San Gabriel Valley. However, a discontinuous escarpment can be traced from Monrovia to the Arroyo Seco in South Pasadena. The very bold, "knife edge" escarpment in Monrovia parallel to Scenic Drive is believed to be a fault scarp of the Raymond fault. Trenching of the Raymond fault is reported to have revealed Holocene movement (Weaver and Dolan, 1997). The Raymond fault has been found to be an effective groundwater barrier which divides the San Gabriel Valley into groundwater sub-basins.

The recurrence interval for the Raymond fault is probably slightly less than 3,000 years, with the most recent documented event occurring approximately 1,600 years ago (Crook, et al, 1978). However, historical accounts of an earthquake that occurred in July 1855 as reported by Toppozada and others, 1981, place the epicenter of a Richter Magnitude 6 earthquake within the Raymond fault. It is believed that the Raymond fault is capable of producing a 6.8 magnitude earthquake. The Raymond Fault is considered active by the California Geological Survey.

Verdugo Fault

The Verdugo Fault runs along the southwest edge of the Verdugo Mountains and is located approximately 8.19 miles to the northwest of the site. According to Weber, et.-al., (1980) 2 to 3 meter high scarps were identified in alluvial fan deposits in the Burbank and Glendale areas. Further to the northwest, in Sun Valley, a fault was reportedly identified at a depth of 40 feet in a sand and gravel pit. Although considered active by the County of Los Angeles, Department of Public Works (Leighton, 1990), and the United States Geological Survey, the fault is not designated with an Earthquake Fault Zone by the California Geological Survey. It is estimated that the Verdugo Fault is capable of producing a maximum 6.9 magnitude earthquake.

Sierra Madre Fault System

The Sierra Madre fault alone forms the southern tectonic boundary of the San Gabriel Mountains in the northern San Fernando Valley. It consists of a system of faults approximately 75 miles in length. The individual segments of the Sierra Madre fault system range up to 16 miles in length and display a reverse sense of displacement and dip to the north. The most recently active portions of the zone include the Mission Hills, Sylmar and Lakeview segments, which produced an earthquake in 1971 of magnitude 6.4. Tectonic rupture along the Lakeview Segment during the San Fernando Earthquake of 1971 produced displacements of approximately 2½ to 4 feet upward and southwestward.

It is believed that the Sierra Madre fault zone is capable of producing an earthquake of magnitude 7.3. The closest trace of the fault is located approximately 12.59 miles to the northeast of the subject site.

Hollywood Fault

The Hollywood fault is part of the Transverse Ranges Southern Boundary fault system. The Hollywood fault is located approximately 4.98 miles northwest of site. This fault trends east-west along the base of the Santa Monica Mountains from the West Beverly Hills Lineament in the West Hollywood–Beverly Hills area to the Los Feliz area of Los Angeles. The Hollywood fault is the eastern segment of the reverse oblique Santa Monica–Hollywood fault. Based on geomorphic evidence, stratigraphic correlation between exploratory borings, and fault trenching studies, this fault is classified as active.

Until recently, the approximately 9.3-mile long Hollywood fault was considered to be expressed as a series of linear ground-surface geomorphic expressions and south-facing ridges along the south margin of the eastern Santa Monica Mountains and the Hollywood Hills. Multiple recent fault rupture hazard investigations have shown that the Hollywood fault is located south of the ridges and bedrock outcroppings along portions of Sunset Boulevard. The Hollywood fault has not produced any damaging earthquakes during the historical period and has had relatively minor micro-seismic activity. It is estimated that the Hollywood fault is capable of producing a maximum 6.7 magnitude earthquake. In 2014, the California Geological Survey established an Earthquake Fault Zone for the Hollywood Fault.

Whittier-Elsinore Fault System

The Whittier fault is located approximately 13.33 miles southeast of the site. The Whittier fault together with the Chino fault comprises the northernmost extension of the northwest trending Elsinore fault system. The mapped surface of the Whittier fault extends in a west-northwest direction for a distance of 20 miles from the Santa Ana River to the terminus of the Puente Hills. The Whittier fault is essentially a strike-slip, northeast dipping fault zone which also exhibits evidence of reverse movement along with en echelon[a] fault segments, en echelon folds and anatomizing (braided) fault segments. Right lateral offsets of stream drainages of up to 8800 feet (Durham and Yerkes, 1964) and vertical separation of the basement complex of 6,000 to 12,000 feet (Yerkes, 1972), have been documented. It is believed that the Whittier fault is capable of producing a 7.8 magnitude earthquake.

The Whittier Narrows earthquakes of October 1, 1987, and October 4, 1987, occurred in the area between the westernmost terminus of the mapped trace of the Whittier fault and the frontal fault system. The main 5.9 magnitude shock of October 1, 1987 was not caused by slip on the Whittier fault. The quake ruptured a gently dipping thrust fault with an east-west strike (Haukson, Jones, Davis and others, 1988). In contrast, the earthquake of October 4, 1987, is assumed to have

[a] *En echelon refers to closely-spaced, parallel or subparallel, overlapping or step-like minor structural features*

occurred on the Whittier fault as focal mechanisms show mostly strike-slip movement with a small reverse component on a steeply dipping northwest striking plane (Haukson, Jones, Davis and others, 1988).

San Gabriel Fault System

The San Gabriel fault system is located approximately 19.01 miles north of the site. The San Gabriel fault system comprises a series of subparallel, steeply north-dipping faults trending approximately north 40 degrees west with a right-lateral sense of displacement. There is also a small component of vertical dip-slip separation. The fault system exhibits a strong topographic expression and extends approximately 90 miles from San Antonio Canyon on the southeast to Frazier Mountain on the northwest. The estimated right lateral displacement on the fault varies from 34 miles (Crowell, 1982) to 40 miles (Ehlig, 1986), to 10 miles (Weber, 1982). Most scholars accept the larger displacement values and place the majority of activity between the Late Miocene and Late Pliocene Epochs of the Tertiary Era (65 to 1.8 million years before present).

Portions of the San Gabriel fault system are considered active by California Geological Survey. Recent seismic exploration in the Valencia area (Cotton and others, 1983; Cotton, 1985) has established Holocene offset. Radiocarbon data acquired by Cotton (1985) indicate that faulting in the Valencia area occurred between 3,500 and 1,500 years before present.

It is hypothesized by Ehlig (1986) and Stitt (1986) that the Holocene offset on the San Gabriel fault system is due to sympathetic (passive) movement as a result of north-south compression of the upper Santa Susana thrust sheet. Seismic evidence indicates that the San Gabriel fault system is truncated at depth by the younger, north-dipping Santa Susana-Sierra Madre faults (Oakeshott, 1975; Namson and Davis, 1988).

Newport-Inglewood Fault System

The Newport-Inglewood fault system is located 5.80 miles to the southwest of the subject site. The Newport-Inglewood fault zone is a broad zone of discontinuous north to northwestern echelon faults and northwest to west trending folds. The fault zone extends southeastward from West Los Angeles, across the Los Angeles Basin, to Newport Beach and possibly offshore beyond San Diego (Barrows, 1974; Weber, 1982; Ziony, 1985).

The onshore segment of the Newport-Inglewood fault zone extends for about 37 miles from the Santa Ana River to the Santa Monica Mountains. Here it is overridden by, or merges with, the east-west trending Santa Monica zone of reverse faults.

The surface expression of the Newport-Inglewood fault zone is made up of a strikingly linear alignment of domal hills and mesas that rise on the order of 400 feet above the surrounding plains. From the northern end to its southernmost onshore expression, the Newport-Inglewood fault zone is made up of: Cheviot Hills, Baldwin Hills, Rosecrans Hills, Dominguez Hills, Signal Hill-Reservoir Hill, Alamitos Heights, Landing Hill, Bolsa Chica Mesa, Huntington Beach Mesa, and Newport Mesa. Several single and multiple fault strands, arranged in a roughly left stepping en echelon arrangement, make up the fault zone and account for the uplifted mesas.

The most significant earthquake associated with the Newport-Inglewood fault system was the Long Beach earthquake of 1933 with a magnitude of 6.3 on the Richter scale. It is believed that the Newport-Inglewood fault zone is capable of producing a 7.5 magnitude earthquake.

Santa Susana Fault

The Santa Susana fault extends approximately 17 miles west-northwest from the northwest edge of the San Fernando Valley into Ventura County and is at the surface high on the south flank of the Santa Susana Mountains. The fault ends near the point where it overrides the south-side-up South strand of the Oak Ridge fault. The Santa Susana fault strikes northeast at the Fernando lateral ramp and turns east at the northern margin of the Sylmar Basin to become the Sierra Madre fault. This fault is exposed near the base of the San Gabriel Mountains for approximately 46 miles from the San Fernando Pass at the Fernando lateral ramp east to its intersection with the San Antonio Canyon fault in the eastern San Gabriel Mountains, east of which the range front is formed by the Cucamonga fault. The Santa Susana fault has not experienced any recent major ruptures except for a slight rupture during the 6.5 magnitude 1971 Sylmar earthquake.[b] The Santa Susana Fault is considered to be active by the County of Los Angeles. It is believed that the Santa Susana fault has the potential to produce a 6.9 magnitude earthquake. The closest trace of the fault is located approximately 23.11 miles northwest of the site.

Malibu Coast Fault

The Malibu Coast fault is part of the Transverse Ranges Southern Boundary fault system, a west-trending system of reverse, oblique-slip, and strike-slip faults that extends for more than approximately 124 miles along the southern edge of the Transverse Ranges and includes the Hollywood, Raymond, Anacapa–Dume, Malibu Coast, Santa Cruz Island, and Santa Rosa Island faults.

[b] *California Institute of Technology, Southern California Data Center. Chronological Earthquake Index, www.data.scec.org/significant/santasusana.html; accessed May 24, 2012.*

The Malibu Coast fault zone runs in an east-west orientation onshore subparallel to and along the shoreline for a linear distance of about 17 miles through the Malibu City limits, but also extends offshore to the east and west for a total length of approximately 37.5 miles. The onshore Malibu Coast fault zone involves a broad, wide zone of faulting and shearing as much as 1 mile in width. While the Malibu Coast Fault Zone has not been officially designated as an active fault zone by the State of California and no Special Studies Zones have been delineated along any part of the fault zone under the Alquist-Priolo Act of 1972, evidence for Holocene activity (movement in the last 11,000 years) has been established in several locations along individual fault splays within the fault zone. Due to such evidence, several fault splays within the onshore portion of the fault zone are identified as active.[c]

Large historic earthquakes along the Malibu Coast fault include the 1979, 5.2 magnitude earthquake and the 1989, 5.0 magnitude earthquake.[d] The Malibu Coast fault zone is approximately 14.49 miles to the west of the site. This fault is believed to be capable of producing a maximum 7.0 magnitude earthquake.

Palos Verdes Fault

Studies indicate that there are several active on-shore extensions of the strike-slip Palos Verdes fault, which is located approximately 15.56 miles southwest of site. Geophysical data also indicate the off-shore extensions of the fault are active, offsetting Holocene age deposits. No historic large magnitude earthquakes are associated with this fault. However, the fault is considered active by the California Geological Survey. It is estimated that the Palos Verdes fault is capable of producing a maximum 7.7 magnitude earthquake.

San Andreas Fault System

The San Andreas Fault system forms a major plate tectonic boundary along the western portion of North America. The system is predominantly a series of northwest trending faults characterized by a predominant right lateral sense of movement. At its closest point the San Andreas Fault system is located approximately 35.53 miles to the northeast of the site.

The San Andreas and associated faults have had a long history of inferred and historic earthquakes. Cumulative displacement along the system exceeds 150 miles in the past 25 million years (Jahns, 1973). Large historic earthquakes have occurred at Fort Tejon in 1857, at Point Reyes in 1906, and at Loma Prieta in 1989. Based on single-event rupture length, the maximum Richter magnitude

[c] *City of Malibu Planning Department, Malibu General Plan, Chapter 5.0, Safety and Health Element, http://qcode.us/codes/malibu-general-plan/; accessed October 25, 2012.*
[d] *California Institute of Technology, Southern California Data Center. Chronological Earthquake Index, www.data.scec.org/significant/malibu1979.html; accessed October 25, 2012.*

earthquake is expected to be approximately 8.25 (Allen, 1968). The recurrence interval for large earthquakes on the southern portion of the fault system is on the order of 100 to 200 years.

ii) Potentially Active Faults

Santa Monica Fault

The Santa Monica fault, located approximately 4.51 miles to the northwest of the site, is also part of the Transverse Ranges Southern Boundary fault system. The Santa Monica fault extends east from the coastline in Pacific Palisades through Santa Monica and West Los Angeles and merges with the Hollywood fault at the West Beverly Hills Lineament in Beverly Hills where its strike is northeast. It is believed that at least six surface ruptures have occurred in the past 50 thousand years. In addition, a well-documented surface rupture occurred between 10 and 17 thousand years ago, although a more recent earthquake probably occurred 1 to 3 thousand years ago. This leads to an average earthquake recurrence interval of 7 to 8 thousand years.[e] It is thought that the Santa Monica fault system may produce earthquakes with a maximum magnitude of 7.4.

Anacapa-Dume Fault

The Anacapa–Dume fault, located approximately 16.08 miles to the west of the subject site, is a near-vertical offshore escarpment exceeding 600 meters locally, with a total length exceeding 62 miles. This fault is also part of the Transverse Ranges Southern Boundary fault system. It occurs as close as 3.6 miles offshore south of Malibu at its western end, but trends northeast where it merges with the offshore segments of the Santa Monica Fault Zone. It is believed that the Anacapa–Dume fault is responsible for generating the historic 1930 magnitude 5.2 Santa Monica earthquake, the 1973 magnitude 5.3 Point Mugu earthquake, and the 1979 and 1989 Malibu earthquakes, each of which possessed a magnitude of 5.0.[f] The Anacapa–Dume fault is thought to be capable of producing a maximum magnitude 7.2 earthquake.

iii) Blind Thrusts Faults and Unnamed Faults

Blind or buried thrust faults are faults without a surface expression but are a significant source of seismic activity. By definition, these faults have no surface trace, therefore the potential for ground surface rupture is considered remote. They are typically broadly defined based on the analysis of seismic wave

[e] *Southern California Earthquake Center, a National Science Foundation and U.S. Geological Survey Center. Active Faults in the Los Angeles Metropolitan Region, www.scec.org/research/special/SCEC001activefaultsLA.pdf; accessed May 24, 2012.*
[f] *City of Malibu Planning Department. Malibu General Plan, Chapter 5.0, Safety and Health Element, http://qcode.us/codes/malibu-general-plan/; accessed May 24, 2012.*

recordings of hundreds of small and large earthquakes in the Southern California area. Due to the buried nature of these thrust faults, their existence is sometimes not known until they produce an earthquake. Two blind thrust faults in the Los Angeles metropolitan area are the Puente Hills blind thrust and the Elysian Park blind thrust. Another blind thrust fault of note is the Northridge fault located in the northwestern portion of the San Fernando Valley.

The Elysian Park anticline is thought to overlie the Elysian Park blind thrust. This fault has been estimated to cause an earthquake every 500 to 1,300 years in the magnitude range 6.2 to 6.7. The Elysian Park thrust fault is located approximately 2.76 miles to the north of the site. According to the Bureau of Engineering Department of Public Works NavigateLA website, the Upper Elysian Park fault is located 1.88 miles northeast of the site and the Lower Elysian Park fault is located 0.53 miles southwest of the site as indicated on the attached Earthquake Fault Map.

The Puente Hills blind thrust fault extends eastward from Downtown Los Angeles to the City of Brea in northern Orange County. The Puente Hills blind thrust fault includes three north-dipping segments, named from east to west as the Coyote Hills segment, the Santa Fe Springs segment, and the Los Angeles segment. These segments are overlain by folds expressed at the surface as the Coyote Hills, Santa Fe Springs Anticline, and the Montebello Hills. The closest segment of the Puente Hills Blind Thrust is located approximately 2.51 miles to the south of the site.

The Santa Fe Springs segment of the Puente Hills blind thrust fault is believed to be the cause of the October 1, 1987, Whittier Narrows Earthquake. The epicenter of this seismic event is located approximately ten miles east of the subject site. Based on deformation of late Quaternary age sediments above this fault system and the occurrence of the Whittier Narrows earthquake, the Puente Hills blind thrust fault is considered an active fault capable of generating future earthquakes beneath the Los Angeles Basin. A maximum moment magnitude of 7.0 is estimated by researchers for the Puente Hills blind thrust fault.

The Mw 6.7 Northridge earthquake was caused by the sudden rupture of a previously unknown, blind thrust fault. This fault has since been named the Northridge Thrust; however it is also known in some of the literature as the Pico Thrust. It has been assigned a maximum magnitude of 6.9 and a 1,500 to 1,800 year recurrence interval. The Northridge thrust is located 19.39 miles to the northwest of the site.

According to the Website NavigateLA, established by the City of Los Angeles, Bureau of Engineering, Department of Public Works, an unnamed northwest-southeast trending fault is located approximately 0.82 miles to the northeast of the site as indicated by the attached Earthquake Fault Map. The fault source is listed as the California Geological Survey (CGS) digital database of Fault Activity Map of California. However, after reviewing the CGS website, the Fault Activity Map does not show this unnamed fault. Geologic maps by Lamar (1970), Dibblee (1989), Yerkes, et al, (1977), and the Department of Water Resources (1961) do not indicate this fault. The fault does not have a designated Fault rupture Hazard Zone (Bryant, W.A. and Hart, E.W. 2007). Based on the research by this firm, the presence of the fault as shown on the NavigateLA Website could not be corroborated or verified with other references. Additionally, surface manifestation of fault activity in that region could not be ascertained by the geologist representing the Los Angeles, Department of Building and Safety. Therefore, in the assessment of this firm, the designated fault need not be considered in the design of structures within the proposed development.

b) Surface Ground Rupture

In 1972, the Alquist-Priolo Special Studies Zones Act (now known as the Alquist-Priolo Earthquake Fault Zoning Act) was passed into law. The Act defines “active” and “potentially active” faults utilizing the same aging criteria as that used by California Geological Survey (CGS). However, established state policy has been to zone only those faults which have direct evidence of movement within the last 11,000 years. It is this recency of fault movement that the CGS considers as a characteristic for faults that have a relatively high potential for ground rupture in the future.

CGS policy is to delineate a boundary from 200 to 500 feet wide on each side of the known fault trace based on the location precision, the complexity, or the regional significance of the fault. If a site lies within an Earthquake Fault Zone, a geologic fault rupture investigation must be performed that demonstrates that the proposed building site is not threatened by surface displacement from the fault before development permits may be issued.

Surface rupture is defined as surface displacement which occurs along the surface trace of the causative fault during an earthquake. Based on review of the Earthquake Fault Map for the City of Los Angeles (Bureau of Engineering, Department of Public Works, http://navigatela.lacity.org/navigatela/), the nearest earthquake fault zone is located approximately 4.5 miles to the north of the site, for the Hollywood fault. A copy of this map may be found in the Appendix of this report.

c) Seismicity

As with all of Southern California, the project site is subject to potential strong ground motion, should a moderate to strong earthquake occur on a local or regional fault. Design of any proposed structures on the site in accordance with the provisions of the applicable California Building Code will mitigate the potential effects of strong ground shaking.

d) Deaggregated Seismic Source Parameters

The peak ground acceleration (PGA_M) and modal magnitude for the site was obtained from the USGS Probabilistic Seismic Hazard Deaggregation program (USGS, 2008). The parameters are based on a 2 percent in 50 years ground motion (2475 year return period). A shear wave velocity (Vs30) of 259 meters per second was utilized in the computation. The USGS program indicates a PGA_M of 0.78g and a modal magnitude of 6.51 for the site.

e) 2016 California Building Code Seismic Parameters

Based on information derived from nearby subsurface investigations, the subject site is classified as Site Class D, which corresponds to a "Stiff Soil" Profile, according to Table 20.3-1 of ASCE 7-10. This information and the site coordinates were input into the USGS U.S. Seismic Design Maps tool (Version 3.1.0) to calculate the ground motions for the site.

2016 CALIFORNIA BUILDING CODE SEISMIC PARAMETERS	
Site Class	D
Mapped Spectral Acceleration at Short Periods (S_S)	2.269g
Site Coefficient (F_a)	1.0
Maximum Considered Earthquake Spectral Response for Short Periods (S_{MS})	2.269g
Five-Percent Damped Design Spectral Response Acceleration at Short Periods (S_{DS})	1.513g
Mapped Spectral Acceleration at One-Second Period (S_1)	0.799g
Site Coefficient (F_v)	1.5
Maximum Considered Earthquake Spectral Response for One-Second Period (S_{M1})	1.198g
Five-Percent Damped Design Spectral Response Acceleration for One-Second Period (S_{D1})	0.799g

f) Liquefaction

Liquefaction is a phenomenon in which saturated silty to cohesionless soils below the groundwater table are subject to a temporary loss of strength due to the buildup of excess pore pressure during cyclic loading conditions such as those induced by an earthquake. Liquefaction-related effects include loss of bearing strength, amplified ground oscillations, lateral spreading, and flow failures.

Based on review of the Seismic Hazards Maps of the State of California (CDMG, 1999), the site is not located within a "Liquefiable" area. This determination is based on groundwater depth records, soil type and distance to a fault capable of producing a substantial earthquake. A copy of this map is included in the Appendix.

g) Dynamic Settlement

Seismically-induced settlement or compaction of dry or moist, cohesionless soils can be an effect related to earthquake ground motion. Such settlements are typically most damaging when the settlements are differential in nature across the length of structures.

Some seismically-induced settlement of the proposed structure should be expected as a result of strong ground-shaking, however, due to the uniform nature of the underlying geologic materials, excessive differential settlements are not expected to occur.

h) Regional Subsidence

The site is not located within a zone of known subsidence due to oil or other fluid withdrawal.

i) Landsliding

The probability of seismically-induced landslides occurring on the site is considered to be negligible due to the general lack of substantive elevation difference across or adjacent to the site. Therefore, potential impacts related to landsliding would be less than significant.

j) Collapsible Soils

Based on previous geotechnical investigations conducted within the vicinity of the site, the soils underlying the area would not be considered prone to hydroconsolidation.

k) Expansive Soils

The geologic materials previously tested by this firm for nearby sites ranged from the very low to moderate expansion range. Accordingly, the geologic materials are anticipated to be in the low to moderate expansion range within the subject site. Special design considerations for mitigation of highly expansive soils will not likely be required. Design of the proposed structure in accordance with the California Building Code is anticipated to fully mitigate the potential effects of moderately expansive soils.

l) Tsunamis, Seiches and Flooding

Tsunamis are large ocean waves generated by sudden water displacement caused by a submarine earthquake, landslide, or volcanic eruption. The site is high enough and far enough from the ocean to preclude being prone to hazards of a tsunami.

Review of the County of Los Angeles Flood and Inundation Hazards Map (Leighton, 1990), indicates the site does not lie within an inundation boundary due to a seiche or a breached upgradient reservoir.

Review of the applicable Flood Insurance Rate Map indicates the site lies within an area of minimal flood hazard. A copy of this map is enclosed herein.

m) Methane Zone

According to the City of Los Angeles Methane Hazards Assessment Map, the site address is located within a methane zone as designated by the City of Los Angeles. A copy of this map is included herein entitled "Methane Zone Risk Map".

n) Oil Fields and Oil Wells

Based on review of the City of Los Angeles online mapping resource (Bureau of Engineering, Department of Public Works, http://navigatela.lacity.org/navigatela/), the site is partially located within the limits of an oil field. No evidence of an oil or gas well has been drilled within the site. The nearest well was drilled approximately 1,380 feet to the east of the site. A copy of the Oil Field & Oil Well Location Map is included in the Appendix of this report.

o) Temporary Excavations

All required excavations are expected to be sloped, or properly shored, in accordance with the provisions of the applicable building code. Therefore, the project would not result in any on-site or off-site landslide. Shoring systems may include soldier piles with rakers and/or tiebacks. Tiebacks would likely extend below adjacent properties and public right of ways. Appropriate notifications and agreements should be obtained by the development team prior to tieback installations.

p) Septic Tanks

It is the understanding of this firm that sewers are available at the site for wastewater disposal. No septic tanks or alternative disposal systems are necessary or anticipated for the proposed site project.

q) Ground Failure

The proposed construction is not anticipated to cause, or increase the potential for any seismic related ground failure on the project site or adjacent sites. The project site is not located within an Earthquake Fault Zone, a Liquefaction Zone, or a Seismically Induced Landslide Zone. The proposed shoring system and the proposed structures will be designed in accordance with the Los Angeles Building Code and will mitigate the potential effects of ground failure.

r) Erosion

The project would not result in substantial off site soil erosion or the loss of topsoil due to the paved nature of the surrounding sites, and the lack of elevation difference slope geometry across or adjacent to the site. In addition, earthwork activities associated with the grading and export of soil would occur in accordance with the city requirements as specified in the Los Angeles Building Code and through the grading plan review and approval process. Grading and erosion control measures would be implemented during site grading to reduce erosion impacts as part of the regulatory requirements.

s) Landform Alterations

There are no significant hills, canyons, ravines, outcrops or other geologic or topographic features on the site. Therefore, any proposed project would not adversely affect any prominent geologic or topographic features.

9.0 PRELIMINARY RECOMMENDATIONS

Based upon near proximity exploration, laboratory testing, and research, it is the preliminary finding of Geotechnologies, Inc. that development of the site in accordance with the currently proposed project is considered feasible from a geotechnical engineering standpoint. These recommendations are preliminary in nature because they are based on information obtained from previous nearby site projects.

The project site is not located within an earthquake fault zone, a liquefaction zone, or a seismically-induced landslide zone. The conditions identified in this report are typical of sites within this area of Los Angeles, and of a type that are routinely addressed through regulatory measures.

A site-specific subsurface geotechnical exploration program, with laboratory testing and engineering analyses, will be required to prepare a geotechnical engineering investigation for the project site. A comprehensive geotechnical report with design recommendations and parameters will be prepared and submitted to the local governing agency for approval prior to construction. The proposed project shall be completed in accordance with the provisions of the most current applicable building code and requirements of the local building official.

Excavations on the order of 55 to 60 feet in depth will be required for the proposed subterranean levels and foundation elements. The excavations are expected to remove the existing fill soils and expose the underlying dense native soils. Preliminarily, it is anticipated that the development will be supported on conventional spread footings and/or mat foundation.

As with all of Southern California, the site is subject to potential strong ground motion should a moderate to strong earthquake occur on a local or regional fault. Design of the project in accordance with the provisions of the applicable California Building Code will be required to mitigate the potential effects of strong ground shaking.

Stormwater Infiltration

Compliance to LID requirements and the City of Los Angeles Building and Safety Guidelines regarding stormwater management within the site is viable based on current development plans and favorable geologic conditions encountered on nearby sites. Stormwater infiltration into onsite soils will likely be feasible based on preliminary geologic assessment. Note: Onsite percolation testing and evaluation will be necessary to determine actual infiltration performance including site specific design values.

10.0 CLOSURE

This report is general in nature and does not present geotechnical design criteria sufficient for use during design phase of the development. A comprehensive geotechnical investigation including subsurface exploration and laboratory testing should be prepared for design input, when necessary.

Geotechnologies, Inc. appreciates the opportunity to provide our services on this project. Should you have any questions, please contact this office.

Respectfully submitted,
GEOTECHNOLOGIES, INC.

REGISTERED PROFESSIONAL ENGINEER
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No. 83961
Exp. 9/30/19
CIVIL
STATE OF CALIFORNIA

SCOTT T. PRINCE
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R.C.E. 56178

STP/SST: nk

Enclosures: References
Vicinity Map
Local Geologic Map
Regional Geologic Map
Historically Highest Groundwater Levels
Seismic Source Summary Table
Southern California Fault Map
Earthquake Fault Map
Oil Field & Oil Well Location Map
Methane Zone Risk Map
Flood Insurance Rate Map
Seismic Hazard Zone Map
Survey Plan
Site Plan

Distribution: (3) Addressee

E-mail to: [michael@sandstoneproperties.com], Attn: Michael Moore

<u>**REFERENCES**</u>

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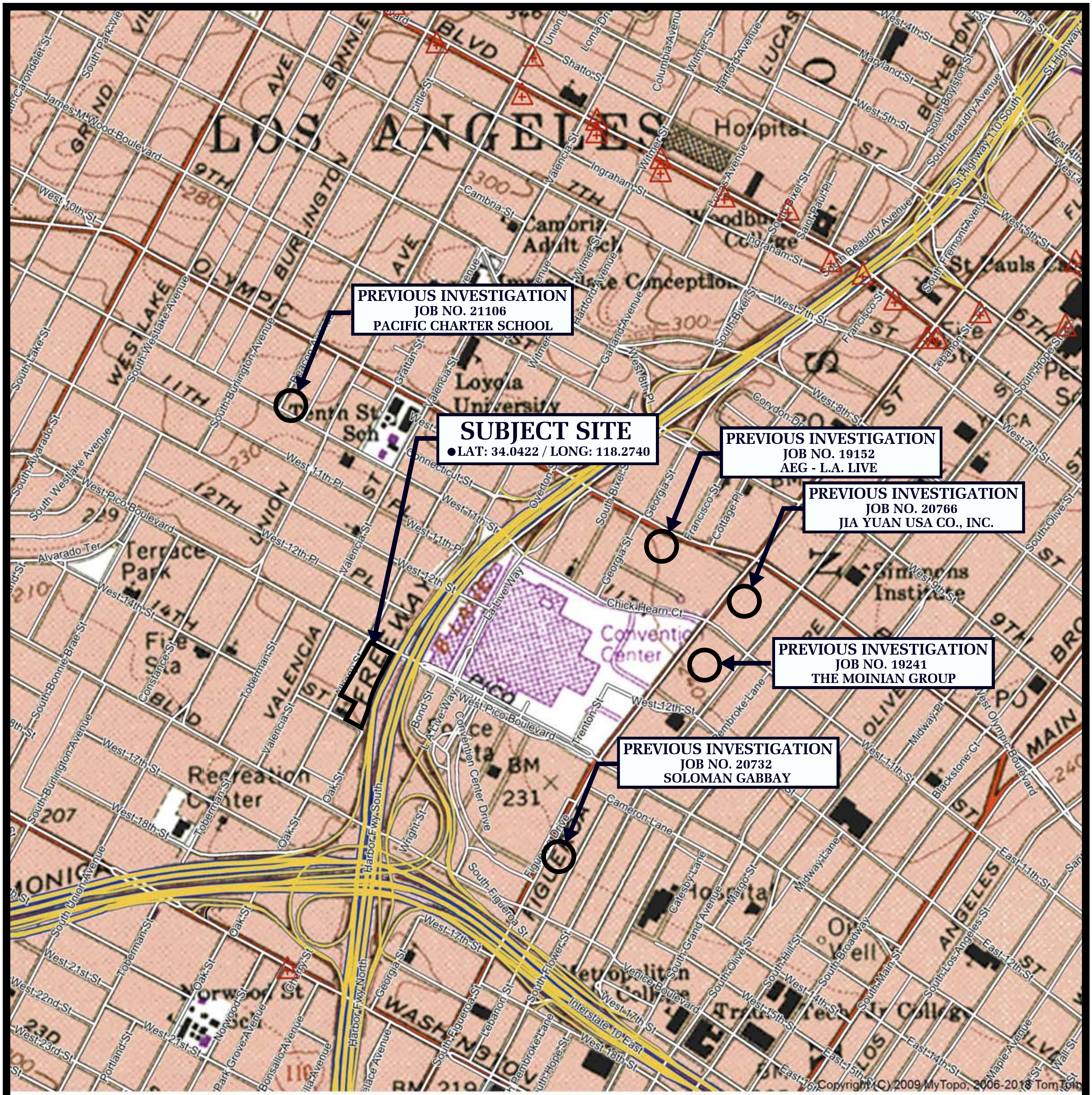


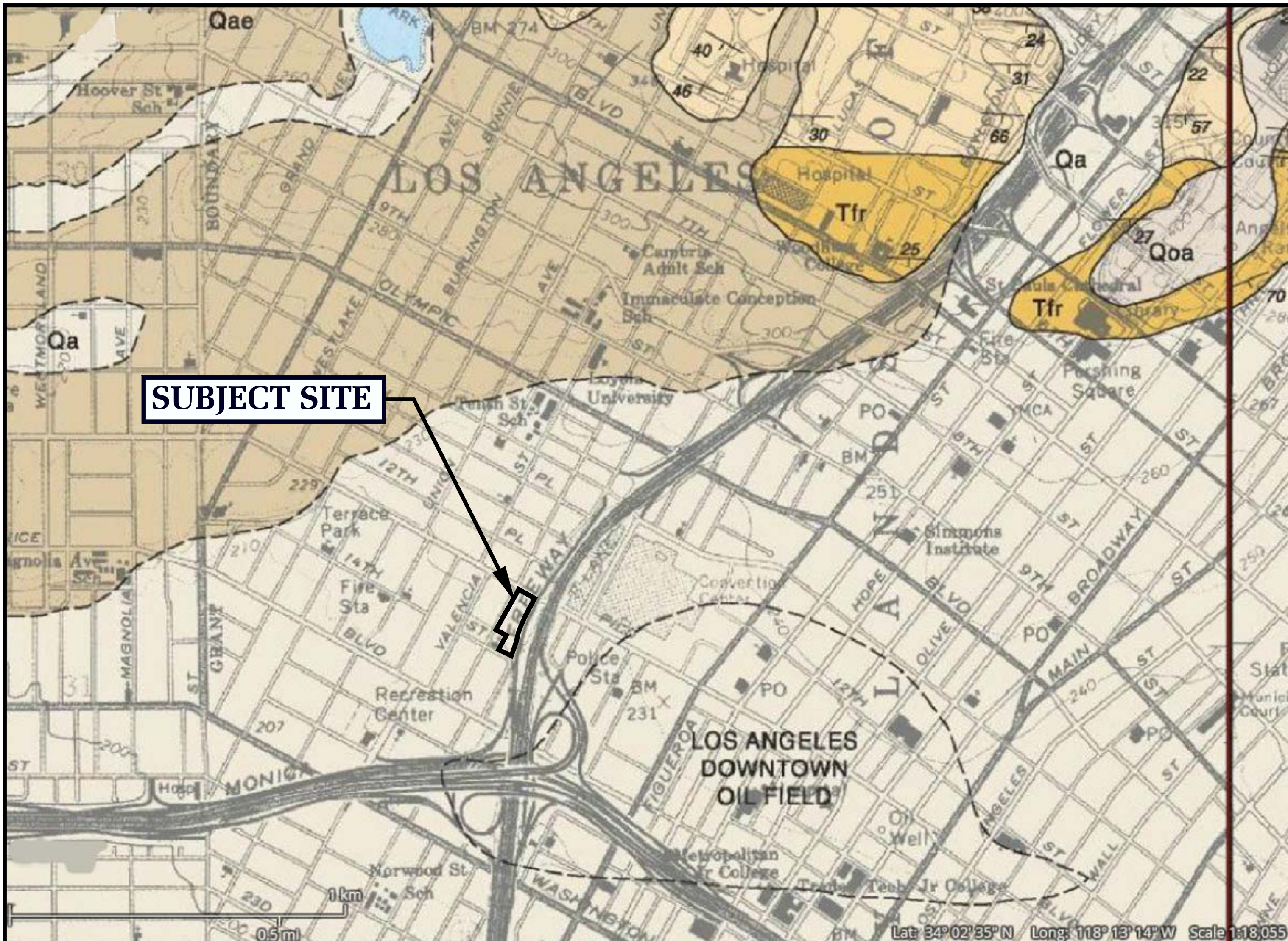
REFERENCE: U.S.G.S. TOPOGRAPHIC MAPS, 7.5 MINUTE SERIES, HOLLYWOOD, CA QUADRANGLE

VICINITY MAP

Geotechnologies, Inc.
Consulting Geotechnical Engineers

1237 7TH STREET ASSOCIATES, LLC
1330 W. PICO BLVD., LOS ANGELES

FILE NO. 21648



LEGEND

Qa: Surficial Sediments - alluvium: gravel, sand and clay
Qae: Older Surficial Sediments - similar to Qa, but slightly elevated and dissected

Folds - arrow on axial trace of fold indicates direction of plunge
Fault - dashed where indefinite or inferred, dotted where concealed, queried where existence is doubtful

REFERENCE: DIBBLEE, T.W., (1991) GEOLOGIC MAP OF THE HOLLYWOOD AND BURBANK (SOUTH HALF) QUADRANGLES (#DF-30)

N

LOCAL GEOLOGIC MAP - DIBBLEE

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Consulting Geotechnical Engineers

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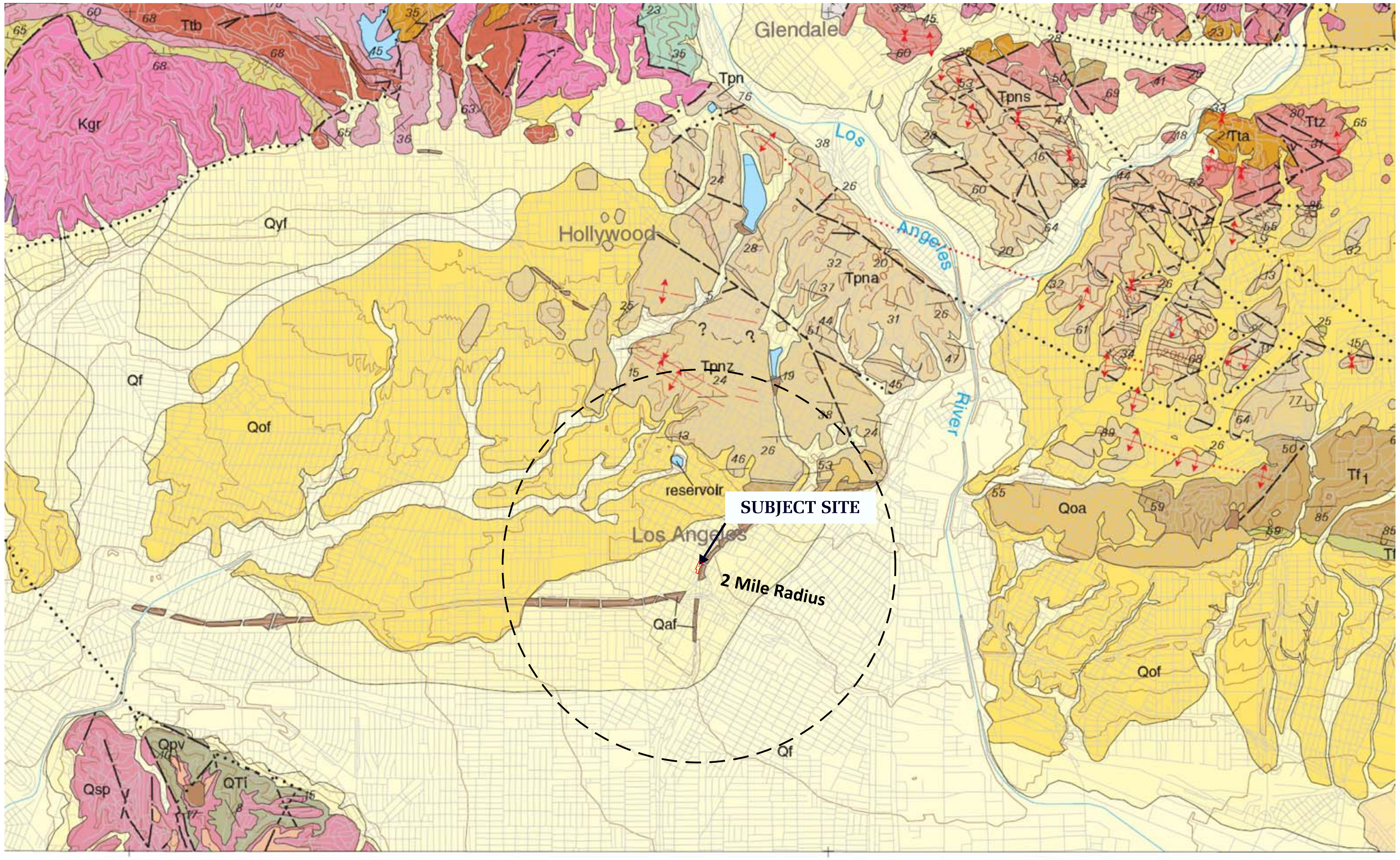

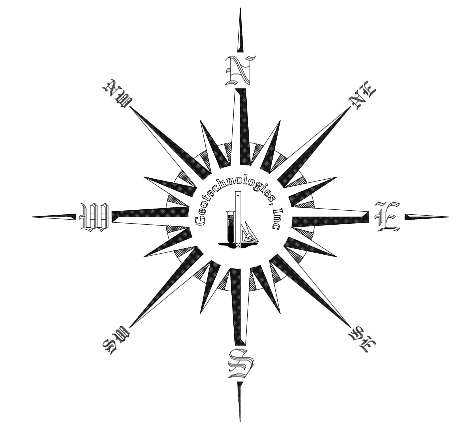

LEGEND

Qaf: Artificial Fill
Qf: Alluvial-Fan Deposits
Qof: Old Alluvial-Fan Deposits
Qoa: Old Alluvium
Tpnz: Puente Formation, siltstone (early Pliocene)—Well-bedded, light gray siltstone
Tf: Fernando Formation, member 1—Massive siltstone

Fault - Solid where accurately located, dashed where approximately located, dotted where concealed, quieried where location or existence uncertain. includes strike slip, normal, reverse, oblique, and unspecified slip.

Scale 1:100,000

1 .5 0 1 2 3 4 5 6 7 MILES

1 .5 0 1 2 3 4 5 6 7 KILOMETERS

Contour Interval 40m

REFERENCE: U.S. DEPARTMENT OF THE INTERIOR, U.S. GEOLOGICAL SURVEY, PRELIMINARY GEOLOGIC MAP OF THE LOS ANGELES 30' X 60' QUADRANGLE, SOUTHERN CALIFORNIA, VERSION 1.0, 2005, COMPILED BY ROBERT F. YERKES AND RUSSELL H. CAMPBELL.

REGIONAL GEOLOGIC MAP

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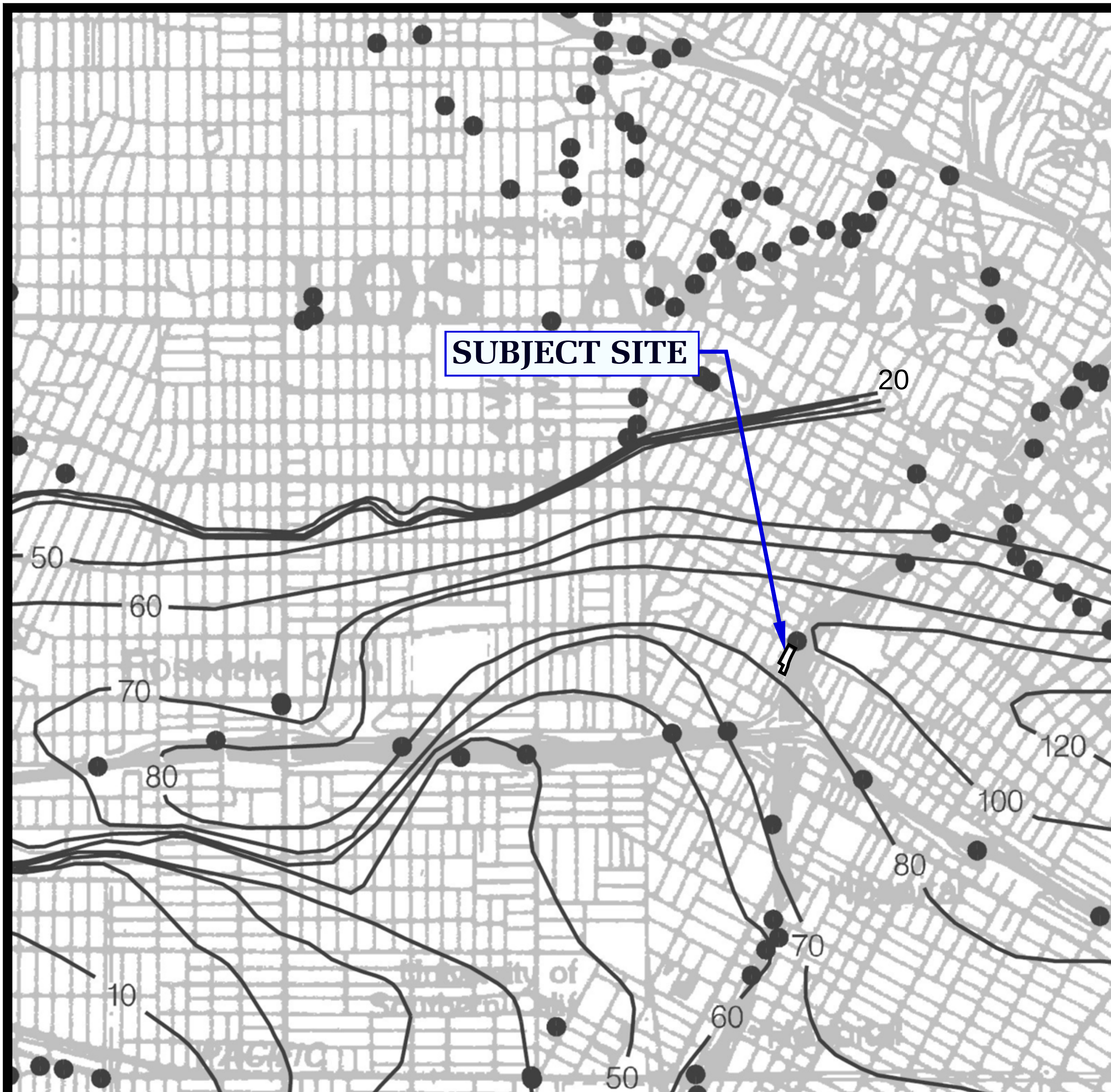
FILE No. 21648



20 Depth to groundwater in feet

REFERENCE: CDMG, SEISMIC HAZARD ZONE REPORT, 026
HOLLYWOOD 7.5 - MINUTE QUADRANGLE, LOS ANGELES COUNTY, CALIFORNIA (1998, REVISED 2006)

HISTORICALLY HIGHEST GROUNDWATER LEVELS

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1330 W. PICO BLVD., LOS ANGELES

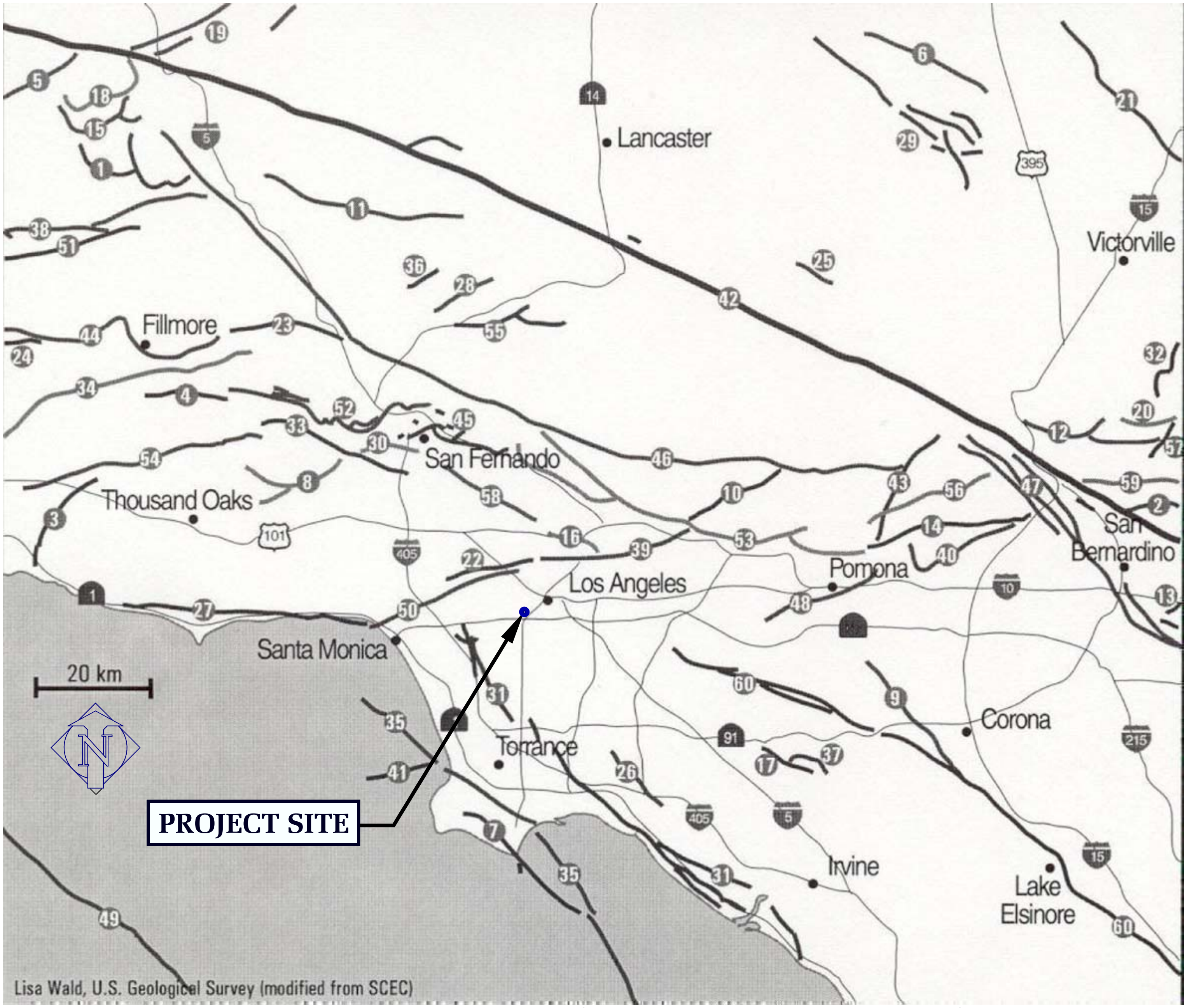
FILE NO. 21648

Seismic Source Summary Table

1237 7th Street Associates, LLC
File No. 21648

Name	Distance in Miles	Pref Slip Rate (mm/yr)	Dip (degrees)	Dip Dir	Slip Sense	Rupture Top (km)	Rupture Bottom (km)	Length (km)
Puente Hills (LA)	2.51	0.7	27	N	thrust	2.1	15	22
Elysian Park (Upper)	2.76	1.3	50	NE	reverse	3	15	20
Santa Monica Connected alt 2	4.51	2.4	44		strike slip	0.8	11	93
Hollywood	4.98	1	70	N	strike slip	0	17	17
Newport Inglewood Connected alt 2	5.8	1.3	90	V	strike slip	0	11	208
Newport Inglewood Connected alt 1	6.05	1.3	89		strike slip	0	11	208
Raymond	6.19	1.5	79	N	strike slip	0	16	22
Santa Monica Connected alt 1	8.16	2.6	51		strike slip	0	16	79
Verdugo	8.19	0.5	55	NE	reverse	0	15	29
Puente Hills (Santa Fe Springs)	12.11	0.7	29	N	thrust	2.8	15	11
Sierra Madre	12.59	2	53	N	reverse	0	14	57
Elsinore	13.33	n/a	81	NE	strike slip	0	14	83
Malibu Coast	14.49	0.3	75	N	strike slip	0	8	38
Palos Verdes	15.56	3	90	V	strike slip	0	14	99
Anacapa-Dume	16.08	3	41	N	thrust	1.2	12	65
Sierra Madre (San Fernando)	16.23	2	45	N	thrust	0	13	18
Puente Hills (Coyote Hills)	16.72	0.7	26	N	thrust	2.8	15	17
Clamshell-Sawpit	18.28	0.5	50	NW	reverse	0	14	16
San Gabriel	19.01	1	61	N	strike slip	0	15	71
Northridge	19.39	1.5	35	S	thrust	7.4	17	33
San Jose	22.62	0.5	74	NW	strike slip	0	15	20
Santa Susana, alt 1	23.11	5	55	N	reverse	0	16	27
Simi-Santa Rosa	30.2	1	60		strike slip	1	12	39
Holser	30.28	0.4	58	S	reverse	0	19	20
Chino	30.28	1	65	SW	strike slip	0	14	29
San Joaquin Hills	30.9	0.5	23	SW	thrust	2	13	27
Cucamonga	31.74	5	45	N	thrust	0	8	28
S. San Andreas	35.53	n/a	86		strike slip	0	14	442
Oak Ridge Connected	35.55	3.6	53		reverse	0.6	15	94
Newport-Inglewood (Offshore)	37.31	1.5	90	V	strike slip	0	10	66
San Cayetano	38.99	6	42	N	thrust	0	16	42
San Jacinto	44.12	n/a	90	V	strike slip	0	16	88
Cleghorn	49.9	3	90	V	strike slip	0	16	25
Santa Ynez Connected	51.93	2	70		strike slip	0	11	132
Ventura-Pitas Point	53.87	1	64	N	reverse	1	15	44
Pitas Point Connected	53.87	1	55		reverse	1.2	13	78
Coronado Bank	56.4	3	90	V	strike slip	0	9	186
Santa Cruz Island	56.79	1	90	V	strike slip	0	13	69
Channel Islands Thrust	56.82	1.5	20	N	thrust	5	12	59
Mission Ridge-Arroyo Parida-Santa Ana	58.99	0.4	70	S	reverse	0	8	69
Oak Ridge (Offshore)	59.09	3	32	S	thrust	0	8	38

Reference: Based on USGS National Seismic Hazard Maps - Source Parameters



1 Alamo thrust
2 Arrowhead fault
3 Bailey fault
4 Big Mountain fault
5 Big Pine fault
6 Blake Ranch fault
7 Cabrillo fault
8 Chatsworth fault
9 Chino fault
10 Clamshell-Sawpit fault
11 Clearwater fault
12 Cleghorn fault
13 Crafton Hills fault zone
14 Cucamonga fault zone
15 Dry Creek fault
16 Eagle Rock fault
17 El Modeno fault
18 Frazier Mountain thrust
19 Garlock fault zone
20 Grass Valley fault
21 Helendale fault
22 Hollywood fault
23 Holser fault
24 Lion Canyon fault
25 Llano fault
26 Los Alamitos fault
27 Malibu Coast fault
28 Mint Canyon fault
29 Mirage Valley fault zone
30 Mission Hills fault
31 Newport Inglewood fault zone
32 North Frontal fault zone
33 Northridge Hills fault
34 Oak Ridge fault
35 Palos Verdes fault zone
36 Pelona fault
37 Peralta Hills fault
38 Pine Mountain fault
39 Raymond fault
40 Red Hill (Etiwanda Ave) fault
41 Redondo Canyon fault
42 San Andreas Fault
43 San Antonio fault
44 San Cayetano fault
45 San Fernando fault zone
46 San Gabriel fault zone
47 San Jacinto fault
48 San Jose fault
49 Santa Cruz-Santa Catalina Ridge f.z.
50 Santa Monica fault
51 Santa Ynez fault
52 Santa Susana fault zone
53 Sierra Madre fault zone
54 Simi fault
55 Soledad Canyon fault
56 Stoddard Canyon fault
57 Tunnel Ridge fault
58 Verdugo fault
59 Waterman Canyon fault
60 Whittier fault

REFERENCE: http://pasadena.wr.usgs.gov/info/images/LA%20Faults.pdf

SOUTHERN CALIFORNIA FAULT MAP

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Consulting Geotechnical Engineers

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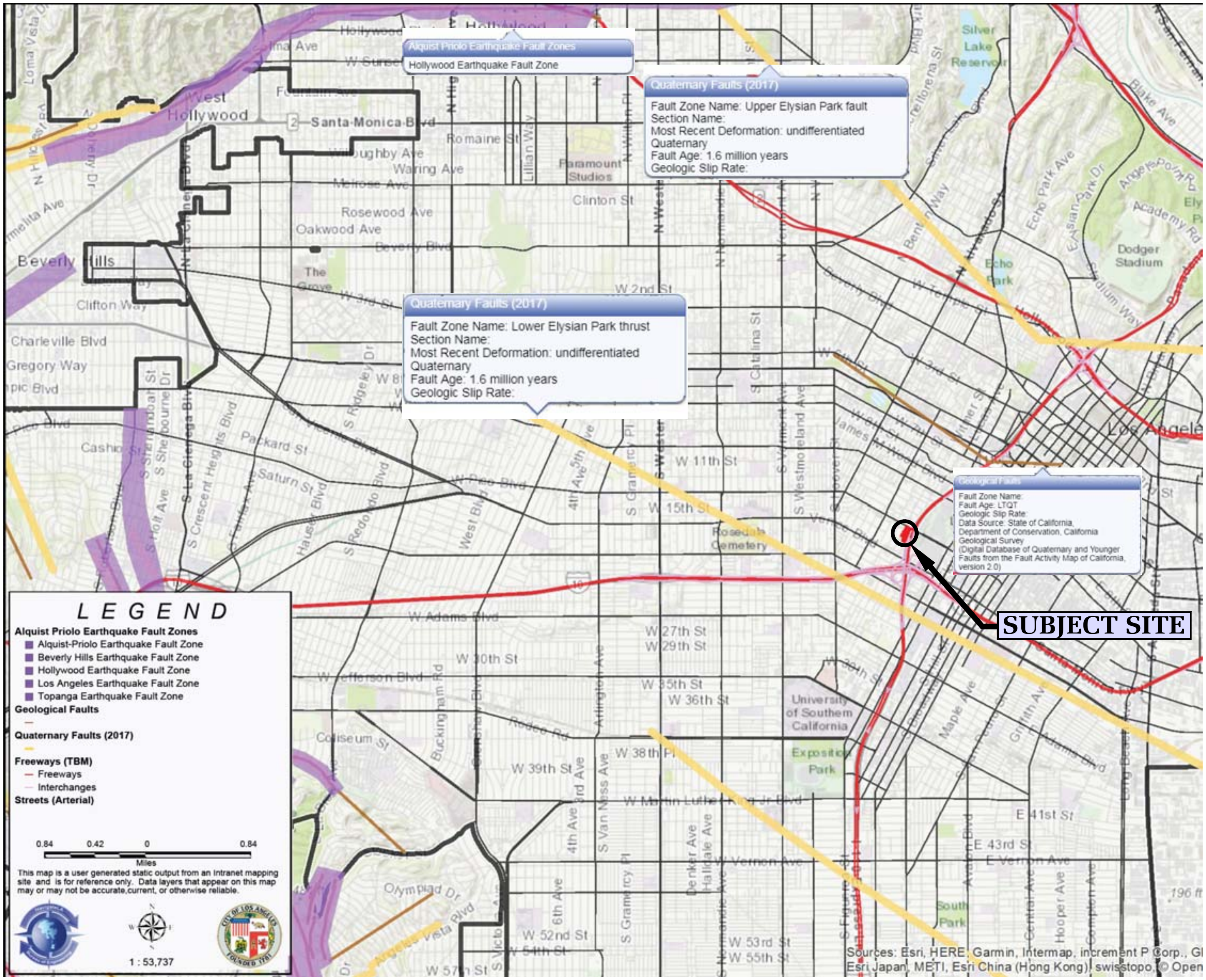

REFERENCE: CITY OF LOS ANGELES, BUREAU OF ENGINEERING, DEPT. OF PUBLIC WORKS (http://navigatela.lacity.org/navigatela/)

EARTHQUAKE FAULT MAP

Geotechnologies, Inc.
Consulting Geotechnical Engineers

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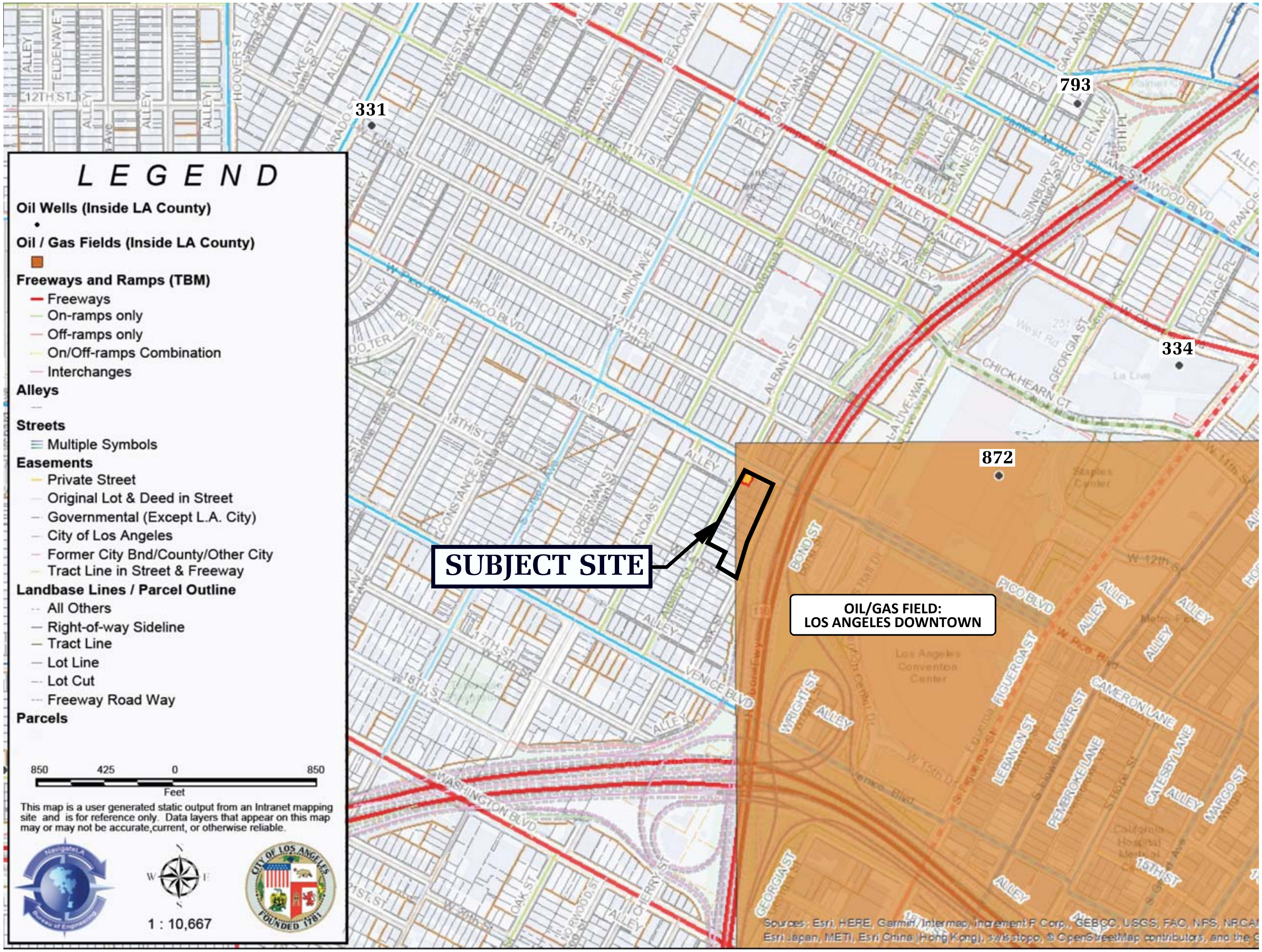

OIL WELL LEGEND

API NO.	OPERATOR, WELL NO.
331	Chevron U.S.A. Inc., #1
793	Chevron U.S.A. Inc., #1
872	Chevron U.S.A. Inc., #1
334	Chevron U.S.A. Inc., #1

REFERENCE: CITY OF LOS ANGELES, BUREAU OF ENGINEERING, DEPT. OF PUBLIC WORKS (http://navigatela.lacity.org/navigatela/)

OIL FIELD & OIL WELL LOCATION MAP

Geotechnologies, Inc.
Consulting Geotechnical Engineers

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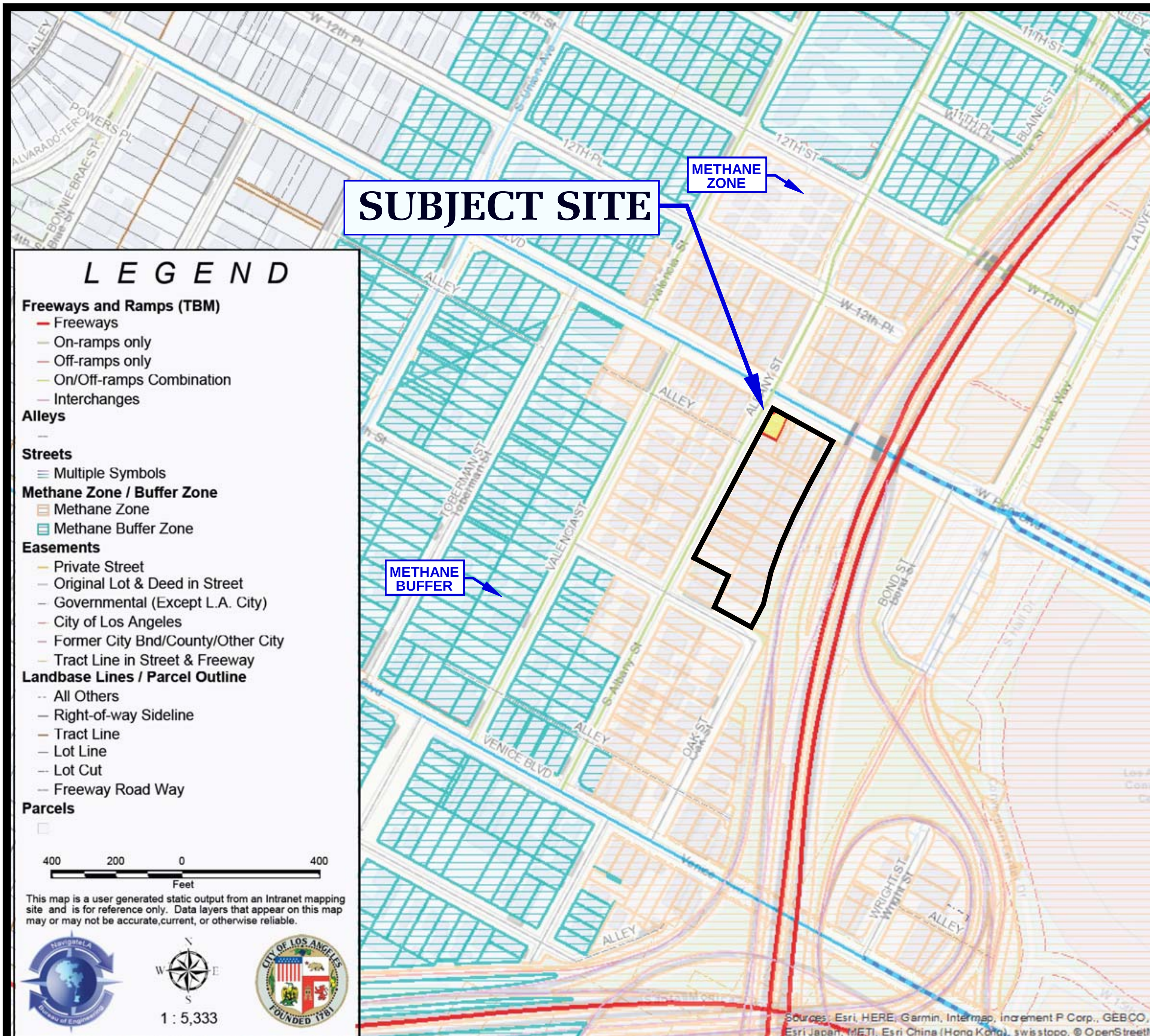

REFERENCE: http://navigatela.lacity.org/NavigateLA/

METHANE ZONE RISK MAP

Geotechnologies, Inc.
Consulting Geotechnical Engineers

1237 7TH STREET ASSOCIATES, LLC
1330 W. PICO BLVD., LOS ANGELES

FILE NO. 21648

FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) *Zone A, V, A99*
	With BFE or Depth *Zone AE, AO, AH, VE, AR*
	Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
	Future Conditions 1% Annual Chance Flood Hazard *Zone X*
	Area with Reduced Flood Risk due to Levee See Notes. *Zone X*
	Area with Flood Risk due to Levee *Zone D*
OTHER AREAS	NO SCREEN Area of Minimal Flood Hazard *Zone X*
	Effective LOMRs
	Area of Undetermined Flood Hazard *Zone D*
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer
	Levee, Dike, or Floodwall
OTHER FEATURES	(B) 20.2 Cross Sections with 1% Annual Chance
	17.5 Water Surface Elevation
	(8) Coastal Transect
	Coastal Transect Baseline
	Profile Baseline
	Hydrographic Feature
	513 Base Flood Elevation Line (BFE)
	Limit of Study
	Jurisdiction Boundary

SCALE

N

Map Projection:
GCS, Geodetic Reference System 1980;
Vertical Datum: NAVD88
For information about the specific vertical datum for elevation features, datum conversions, or vertical monuments used to create this map please see the Flood Insurance Study(FIS) Report for your community at https://msc.fema.gov

1 inch = 1,000 feet 1:12,000

0 500 1,000 2,000 3,000 4,000 Feet

0 105 210 420 630 840 Meters

FEMA National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

LOS ANGELES COUNTY
TRIUNFO CREEK PMR
CALIFORNIA
AND INCORPORATED AREAS

PANEL 1620 OF 2204

Panel Contains:

COMMUNITY	NUMBER	PANEL
CITY OF LOS ANGELES CALIFORNIA	060137	1620

FLOOD INSURANCE RATE MAP

1237 7TH STREET ASSOCIATES, LLC
1330 W. PICO BLVD., LOS ANGELES

Geotechnologies, Inc.
Consulting Geotechnical Engineers

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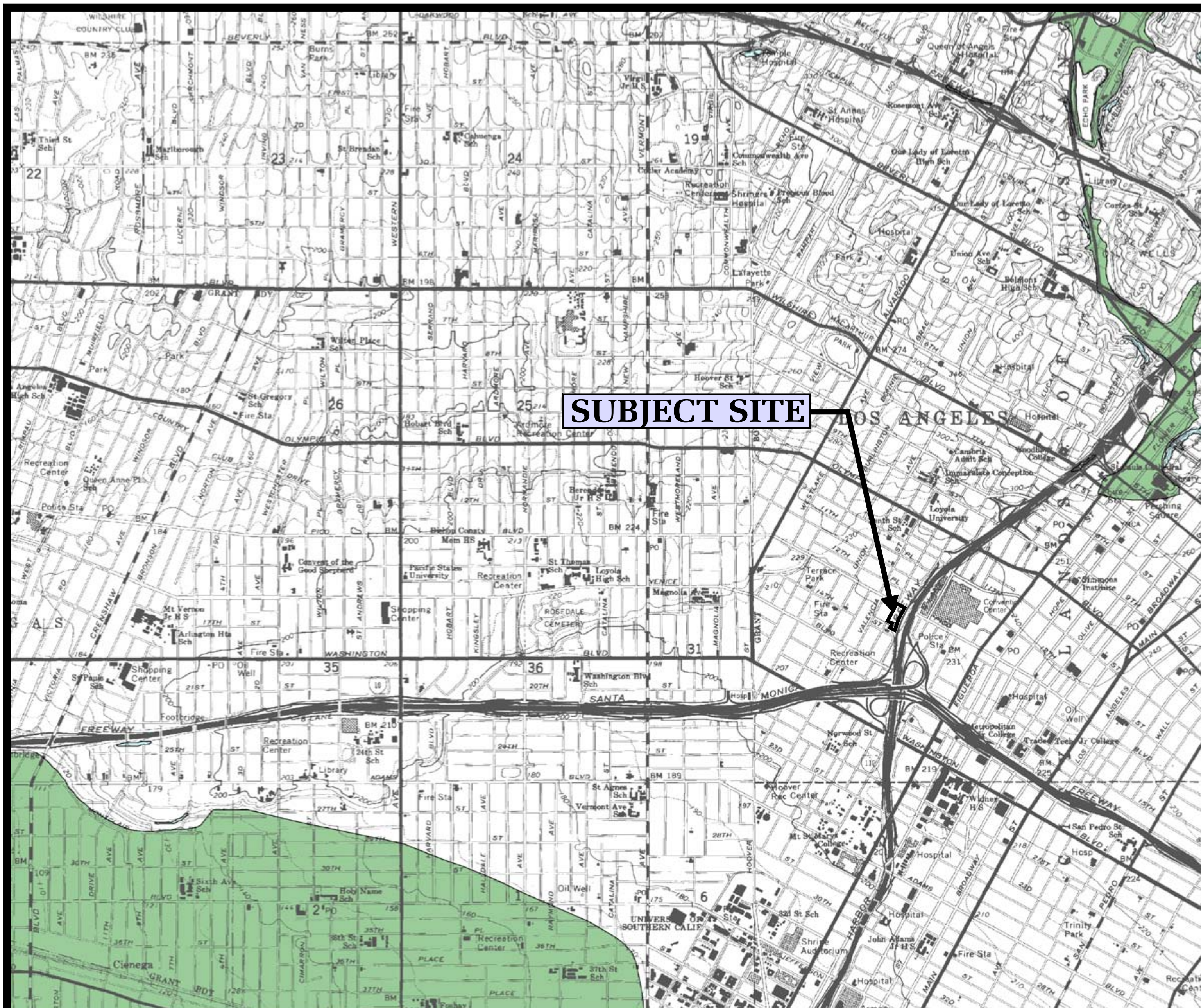
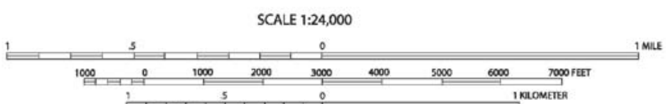
DATE: July 2018	





LIQUEFACTION AREA

REFERENCE: SEISMIC HAZARD ZONES, HOLLYWOOD QUADRANGLE OFFICIAL MAP (CDMG, 1999)

SEISMIC HAZARD ZONE MAP

Geotechnologies, Inc.
Consulting Geotechnical Engineers

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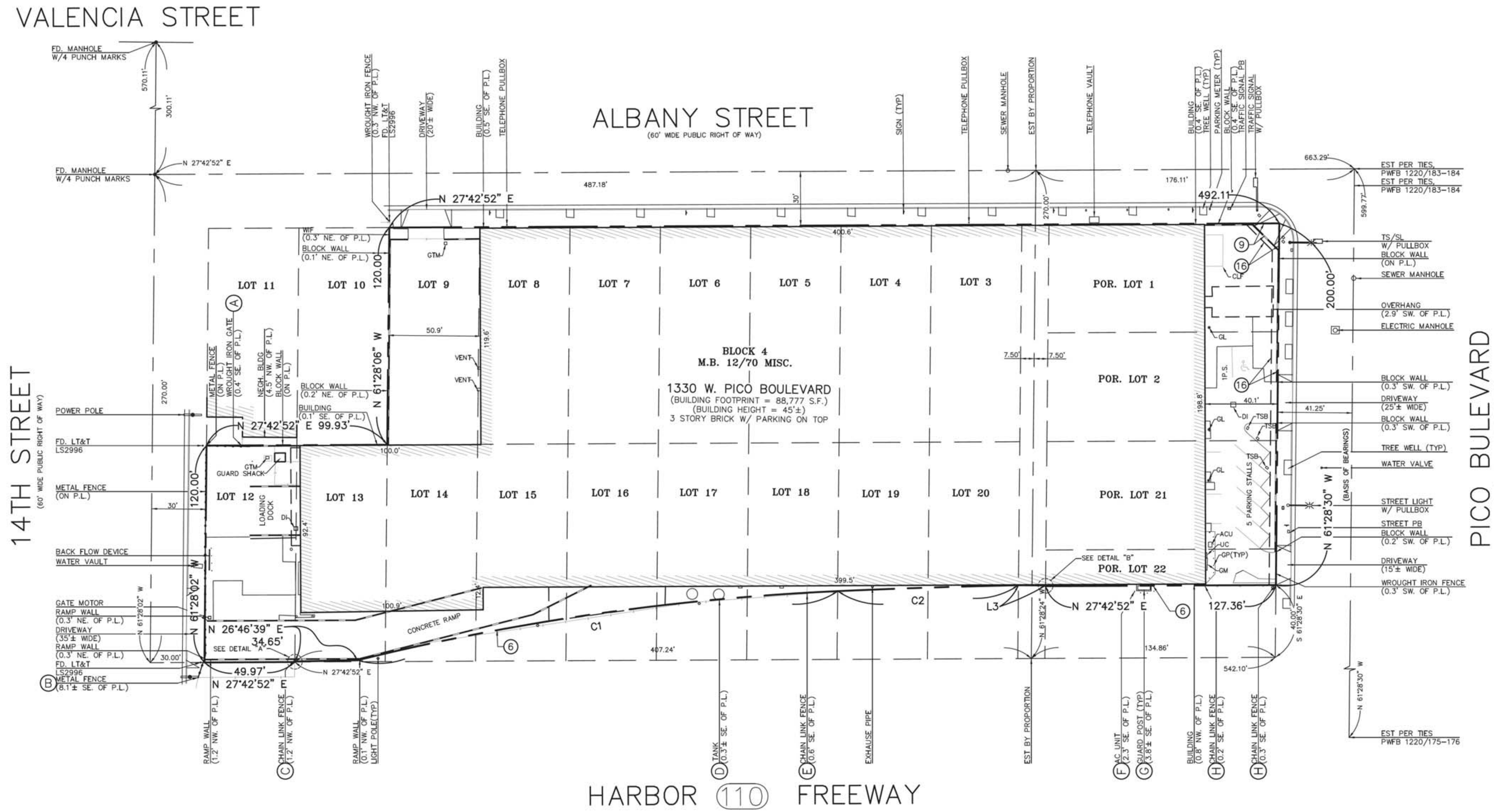
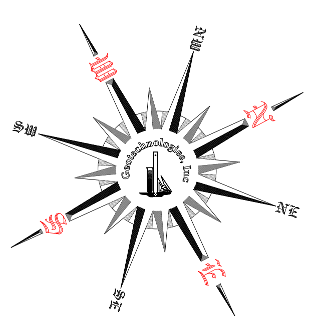
1330 W. PICO BLVD., LOS ANGELES

FILE NO. 21648





SCALE IN FEET

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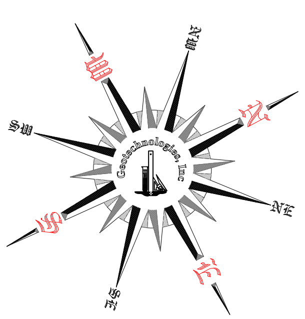
REFERENCE: ALTA/NSPS LAND TITLE SURVEY PROVIDED BY JRN CIVIL ENGINEERS DATED MAY 24, 2017

SURVEY PLAN

Geotechnologies, Inc.
Consulting Geotechnical Engineers

1237 7TH STREET ASSOCIATES, LLC
1330 W. PICO BLVD., LOS ANGELES

FILE No. 21648	DRAWN BY: TC
DATE: July 2018	



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REFERENCE: SITE PLAN PROVIDED BY HOK
DATED JUNE 14, 2018

SITE PLAN

Geotechnologies, Inc.
Consulting Geotechnical Engineers

1237 7TH STREET ASSOCIATES, LLC
1330 W. PICO BLVD., LOS ANGELES

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DATE: July 2018