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March 7, 2018
File No. 21542

The Ratkovich Company
1000 South Fremont Avenue, Unit 1
Building A1, Suite 1150
Alhambra, California 91803

Attention: Megan Moloughney

Subject: Preliminary Geotechnical Assessment
Proposed Residential Structures, Townhomes and Parking Structure
1000 South Fremont Avenue, Alhambra, California

Ladies and Gentlemen:

1.0 INTRODUCTION

The intent of this document is to evaluate 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 near and within 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 1000 South Fremont Avenue, in the City of Alhambra, California. The site occupies a city block and is delimited by Orange Street to the north, South Date Avenue to the east, West Mission Road to the south and South Fremont Avenue to the west. The site is shown relative to nearby topographic features in the enclosed Vicinity Map.

As indicated in the enclosed Existing Site Plan, the site is currently developed with office buildings, miscellaneous commercial buildings, parking structures and paved parking lots. The existing structures are predominantly concentrated in the central to western regions of the site and range from a single story to seven stories in height.

The topography observed across the site descends gently to the southwest. There is an estimated elevation difference of approximately 15 feet across the site for an overall site gradient of 130 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 toward the southwest.

3.0 PROJECT SCOPE

Preliminary information concerning the proposed development was obtained by review of the Entitlement Application Design Set prepared by The Ratkovich Company, dated May 25, 2017.

The proposed development consists of the construction of three podium designed residential complexes consisting of a total of seven, five-story residential buildings constructed alongside an estimated 36 townhomes ranging from two to three stories in height which are proposed within the northeast quadrant of the site. Additionally, a six-story parking structure is anticipated to be constructed near the eastern perimeter of the site, and three residential structures extending to a height of five stories in the southern region of the site. The enclosed Proposed Site Plan illustrates the location of the proposed structures anticipated for the development.

The structures are anticipated to be constructed at or near existing site grades. Based on the experience of this firm, excavations on the order of five to eight feet below grade are anticipated for removal and recompaction of existing site soils.

4.0 PREVIOUS SITE INVESTIGATIONS

This firm has conducted previous geotechnical engineering investigations within the area. These investigations are summarized below. Pertinent results and observations from these previous investigations have been incorporated into the preparation of this report.

1. ***Geotechnologies, Inc., June 13, 2006, Geotechnical Engineering Investigation, Proposed Elevator Tower and Bridge, Sierra Park School at 3170 Budau Avenue, Los Angeles, California, File Number 19120.***

   Three geotechnical excavations were conducted within the school site during the preparation of this report. One boring was excavated to a depth of 50 feet, while the two test pits were advanced to a depth 20 feet. Groundwater was not observed during the site investigation to an explored depth of 50 feet below the existing grade.

2. ***Geotechnologies, Inc., January 2, 2007, Geotechnical Engineering Investigation, Proposed Mixed-Use Development, Southeast Corner of Main Street and Fifth Street, Alhambra, California, File Number 19338.***

   Six borings were excavated within a nearby site during preparation of this geotechnical engineering investigation. The borings ranged in depth from 30 to 60 feet. Groundwater was not observed during exploration of this site.

3. ***Geotechnologies, Inc., August 23, 2007, Geotechnical Engineering Investigation, Proposed Retail Center, Northwest Corner of Main Street and East Raymond Avenue, Alhambra, California, File Number 19504.***

Thirteen exploratory borings were excavated during the preparation of this geotechnical investigation report. The borings ranged in depth from 6 to 50 feet within the nearby site. Groundwater was not observed during exploration to a maximum explored depth of 50 feet.

5.0 FIELD EXPLORATION AND GEOLOGIC MATERIALS

An exploratory excavation, Boring B1, was conducted within the site for the purpose of site assessment and percolation feasibility. Due to the geologic uniformity of the subsurface materials anticipated within the site, it is the opinion of this firm that the geologic characterization indicated by Boring B1 is sufficiently representative of the overall site conditions for the purpose and intent of this document.

Field Exploration

The site was explored on January 10, 2018 by prosecuting one exploratory excavation. The excavation depth was estimated at 50 feet below the existing site grade, and was performed with the aid of a truck-mounted drilling machine using 8-inch diameter hollowstem augers and hand labor. The exploration location is shown on the Existing and Proposed Site Plans. The geologic materials encountered are logged on Plate A-1.

The location of the exploratory excavation was determined by measurements from hardscape features shown on the attached Existing and Proposed Site Plan. The location of the exploratory excavation should be considered accurate only to the degree implied by the method used. More detailed descriptions of the geologic materials encountered may be obtained from the individual log of the subsurface excavation and the Local/Regional Geologic Maps included in the Appendix of this report.

Fill

Fill materials observed within the exploratory excavation consists of sandy silt to silty sand, is medium brown in color, slightly moist, stiff, and fine grained. A fill thickness of five feet was encountered in the exploratory excavation.

Alluvium

The existing fill materials are underlain by alluvial deposits. The native alluvial soils consists of sandy silts, and silty sands to sands, which are medium orange brown to yellowish or olive brown in color, slightly moist, stiff to very stiff, dense to very dense, and fine to medium grained.

More detailed descriptions of the earth materials encountered may be obtained from the enclosed Plate A-1 which illustrates the subsurface excavation log data observed within the site.

6.0 GROUNDWATER

The historically highest groundwater level was established by review of the Los Angeles 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 200 feet below ground surface. A copy of this plate is included in the Appendix as Historically Highest Groundwater Levels Map.

Groundwater was not encountered during site exploration to an explored depth of 50 feet below grade. The location of boring excavation is shown in the enclosed Existing and Proposed Site Plans, and the corresponding excavation log is included in the Appendix of this report.

7.0 EXPANSIVE SOILS

The onsite geologic materials are anticipated to be in the low to moderate expansion range. Special design considerations for mitigation of highly expansive soils will not likely be required.

8.0 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.

9.0 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.

10.0 PRELIMINARY RECOMMENDATIONS

Based upon the 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 limited subsurface exploration conducted within the site and previous nearby site projects. Additional subsurface geotechnical exploration, laboratory testing and engineering analysis will be required to prepare a geotechnical investigation prior to issuance of building permits.

At this time, it is feasible for the development to be supported on conventional spread footings. For shallow foundations and slabs, some remedial grading, including removal and recompaction of existing fill soils, should be expected. Depending on the height of the proposed development, and the anticipated structural loading conditions, it may be necessary to utilize alternative foundation designs should heavy structural loads be anticipated. This may or may not include the use of mat foundation system. Additionally, a deepened foundation system consisting of drilled friction piles may be required in order to mitigate the possible surcharge of subsurface utilities that may underlie the site.

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. The proposed project should be completed in accordance with the provisions of the most current applicable building code and requirements of the local building official. Design of the project in accordance with the current building code provisions will be intended to mitigate the potential effects of strong ground shaking.

11.0 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, and blind thrust faults.

i) Active Faults

Raymond Fault

The Raymond fault is located approximately 2.64 miles north 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 3.5 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 8.08 miles to the north 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 5.29 miles southwest 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 8.33 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.

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

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 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 17.95 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 13.24 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 25.93 miles northwest of the site.

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

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.

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 21.79 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 22.32 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

[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.*

movement. At its closest point the San Andreas Fault system is located approximately 30.02 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 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) <u>Potentially Active Faults</u>

<u>Santa Monica Fault</u>

The Santa Monica fault, located approximately 7.91 miles to the southwest 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.

<u>Anacapa-Dume Fault</u>

The Anacapa–Dume fault, located approximately 23.41 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.

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[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,*

iii) Blind Thrusts 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 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 1.25 miles to the west of the site.

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 7.83 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 2.5 miles southeast 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 20.47 miles to the northwest of the site.

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http://qcode.us/codes/malibu-general-plan/; accessed May 24, 2012.

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 Zone Map for Los Angeles Quadrangle (CGS, 2017), the nearest Earthquake Fault Zone is located approximately 2.6 miles to the north of the site, for the Raymond 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 1.034g and a modal magnitude of 6.9 for the site.

e) 2016 California Building Code Seismic Parameters

Based on information derived from the subsurface investigation, 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)	2.710g
Site Coefficient (F_a)	1.0
Maximum Considered Earthquake Spectral Response for Short Periods (S_{MS})	2.710g
Five-Percent Damped Design Spectral Response Acceleration at Short Periods (S_{DS})	1.807g
Mapped Spectral Acceleration at One-Second Period (S_1)	0.937g
Site Coefficient (F_v)	1.5
Maximum Considered Earthquake Spectral Response for One-Second Period (S_{M1})	1.406g
Five-Percent Damped Design Spectral Response Acceleration for One-Second Period (S_{D1})	0.937g

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 on 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) 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.

l) Methane Zone

According to the County of Los Angeles Methane Hazards Assessment Map, the site address is not located within 300 feet of an oil or gas well or 1,000 feet of a methane producing site.

m) Oil Fields and Oil Wells

Based on review of the California State Division of Oil, Gas and Geothermal Resources (DOGGR) On-line Mapping System, the site is not located within the limits of an oil field. In addition, no oil or gas wells have been drilled at the site. The nearest well was drilled approximately 1.3 miles to the southeast of the site. A copy of the Oil Well Location Map is included in the Appendix of this report.

n) 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 extend below adjacent properties and public right of ways. Appropriate notifications and agreements should be obtained by the development team prior to tieback installations.

o) Ground Failure

The proposed construction will not cause, or increase the potential for any seismic related ground failure on the project site or adjacent sites.

p) Expansive Soils

The geologic materials previously tested by this firm for nearby sites ranged from the very low to high expansion range. The Expansion Index was found to be between 10 and 115 for representative samples tested. The onsite geologic materials are anticipated to be in the low to moderate expansion range. Special design considerations for mitigation of highly expansive soils will not likely be required.

q) Sedimentation and Erosion

Grading, excavation and other earth moving activities could potentially result in erosion and sedimentation. Compliance with minimum code requirements will render project impacts related to sedimentation and erosion less than significant.

r) 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.

s) 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 any future site projects.

12.0 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.

SCOTT T. PRINCE
R.C.E. 83961

STP:km

Enclosures:	References
	Vicinity Map
	Local Geologic Map
	Regional Geologic Map
	Historically Highest Groundwater Levels
	Southern California Fault Map
	Seismic Source Summary Table
	Earthquake Fault Zone Map
	Oil Well Location Map
	Flood Insurance Rate Map
	Seismic Hazard Zone Map
	Site Plan – Existing
	Site Plan – Proposed
	Plate A-1
	Logs from Previous nearby Site Explorations (25 pages)
Distribution:	(3) Addressee
E-mail to:	[mmoloughney@ratkovich.com], Attn: Megan Moloughney

REFERENCES

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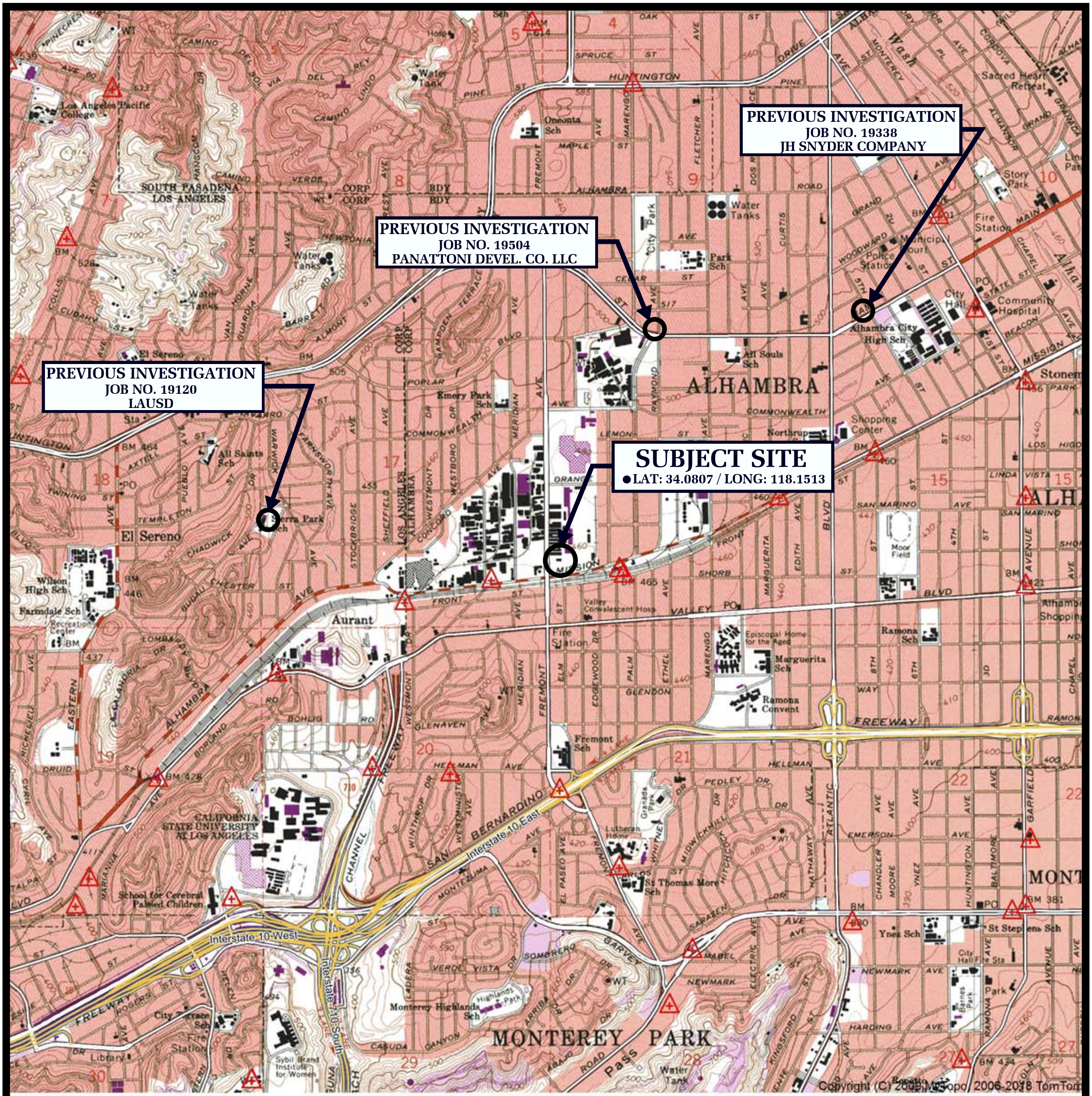

SCALE 1:28000

0 — 1 MILE

0 1000 2000 3000 4000 5000 6000 7000 FFFT

N

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

VICINITY MAP

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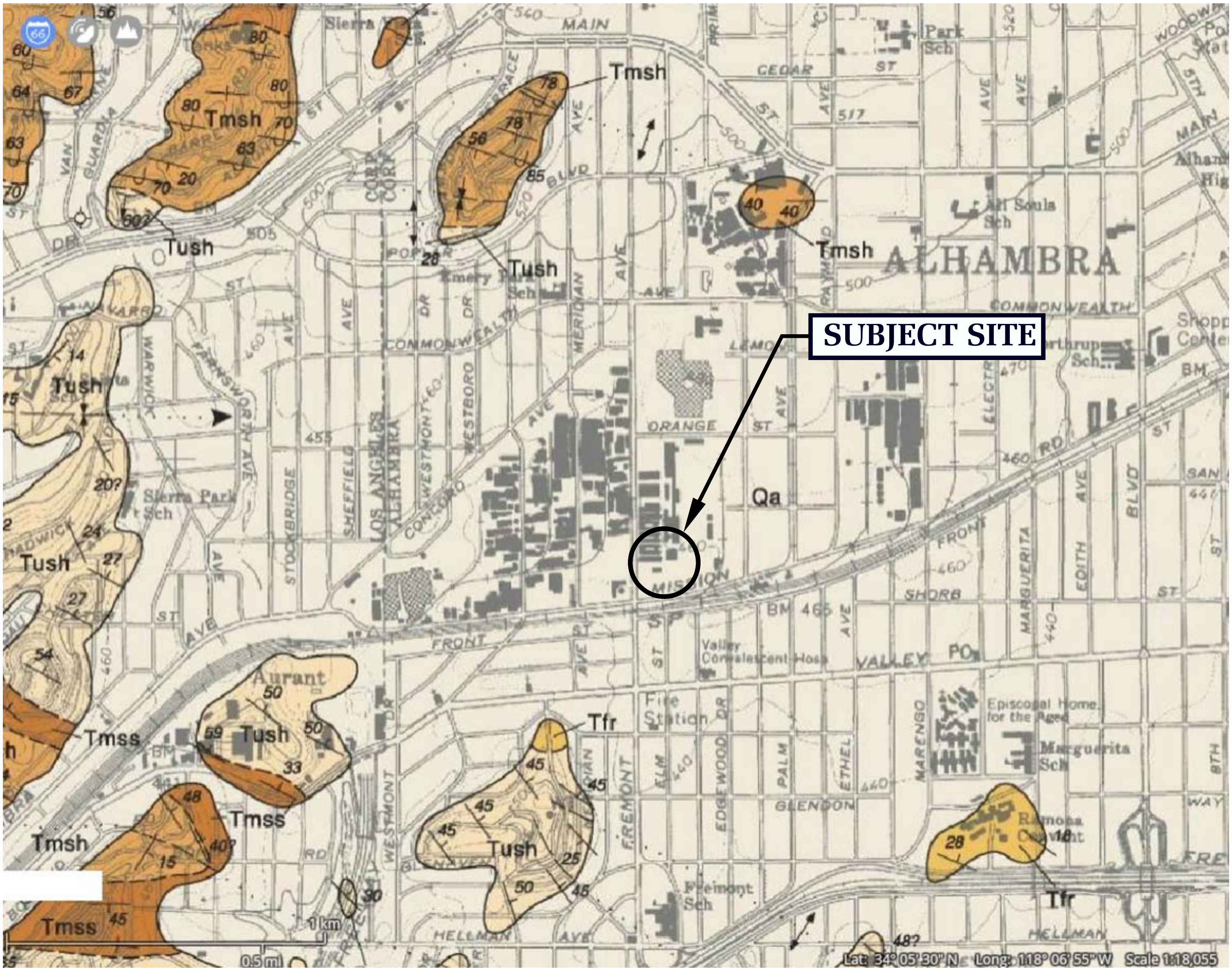
1000 S. FREMONT AVE., ALHAMBRA

FILE NO. 21542



LEGEND

Qa: Surficial Sediments - alluvium: unconsolidated floodplain deposits of gravel, sand and silt

Tush: Unnamed Shale - gray to light brown, thin bedded, silty clay shale

Tmsh: Monterey Formation - white-weathering, thin bedded, platy, silieous shale

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., (1989) GEOLOGIC MAP OF THE LOS ANGELES QUADRANGLE (#DF-22)

LOCAL GEOLOGIC MAP - DIBBLEE

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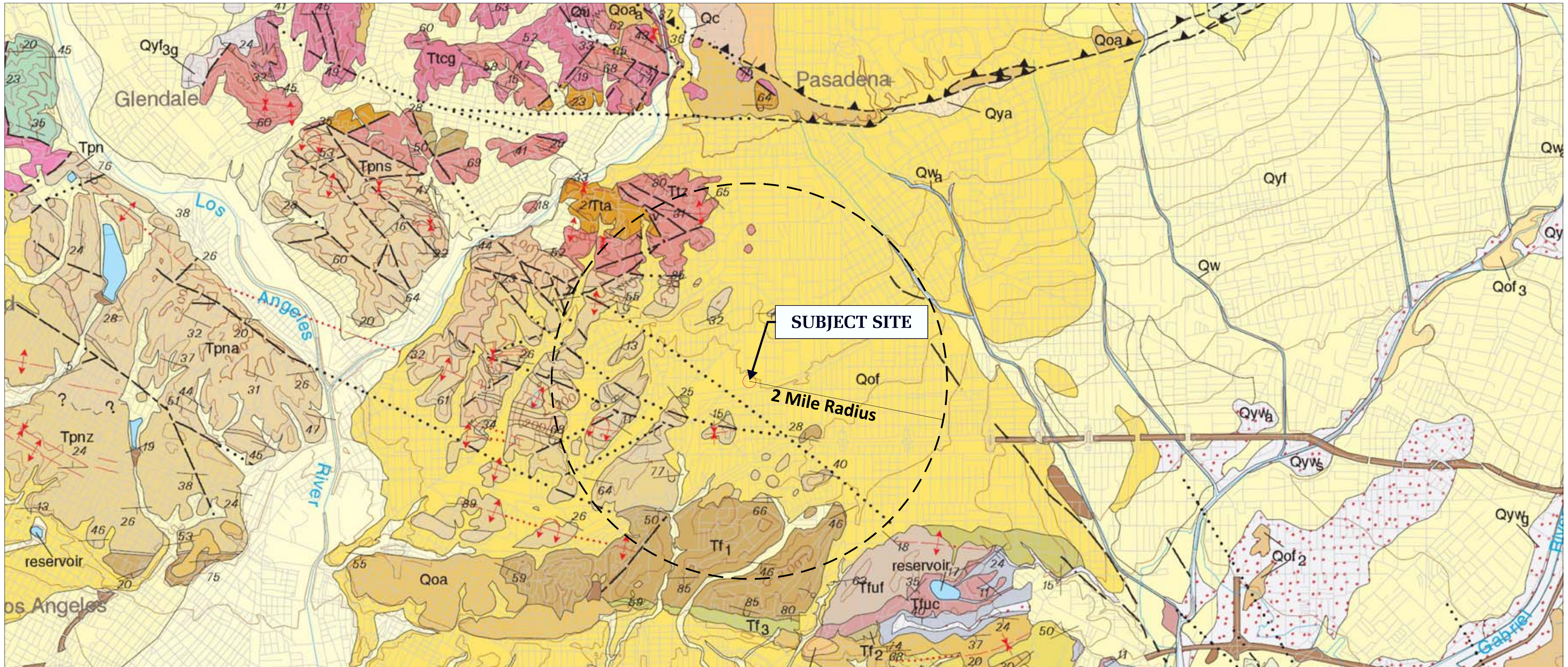
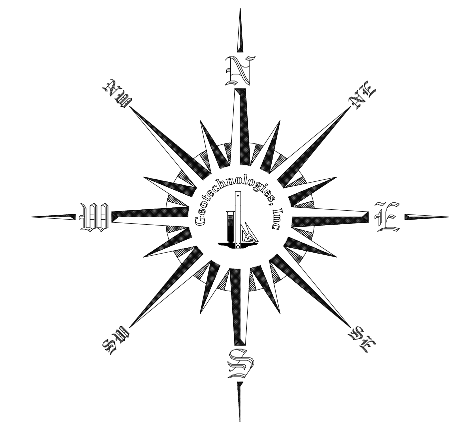


Scale 1:100,000

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



LEGEND

- Qaf: Artificial Fill
- Qa: Alluvium
- Qf: Alluvial-Fan Deposits
- Qof: Old Alluvial-Fan Deposits
- Qoa: Old Alluvium
- Tm: Modelo Formation
- Tt: Topanga Group
- TKb: Sedimentary Rock in the Beverly Hills Area
- Tpna: Puente Formation, sandstone (late Miocene)
- Kt: Tuna Canyon Formation
- Jsm: Santa Monica Slate

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.

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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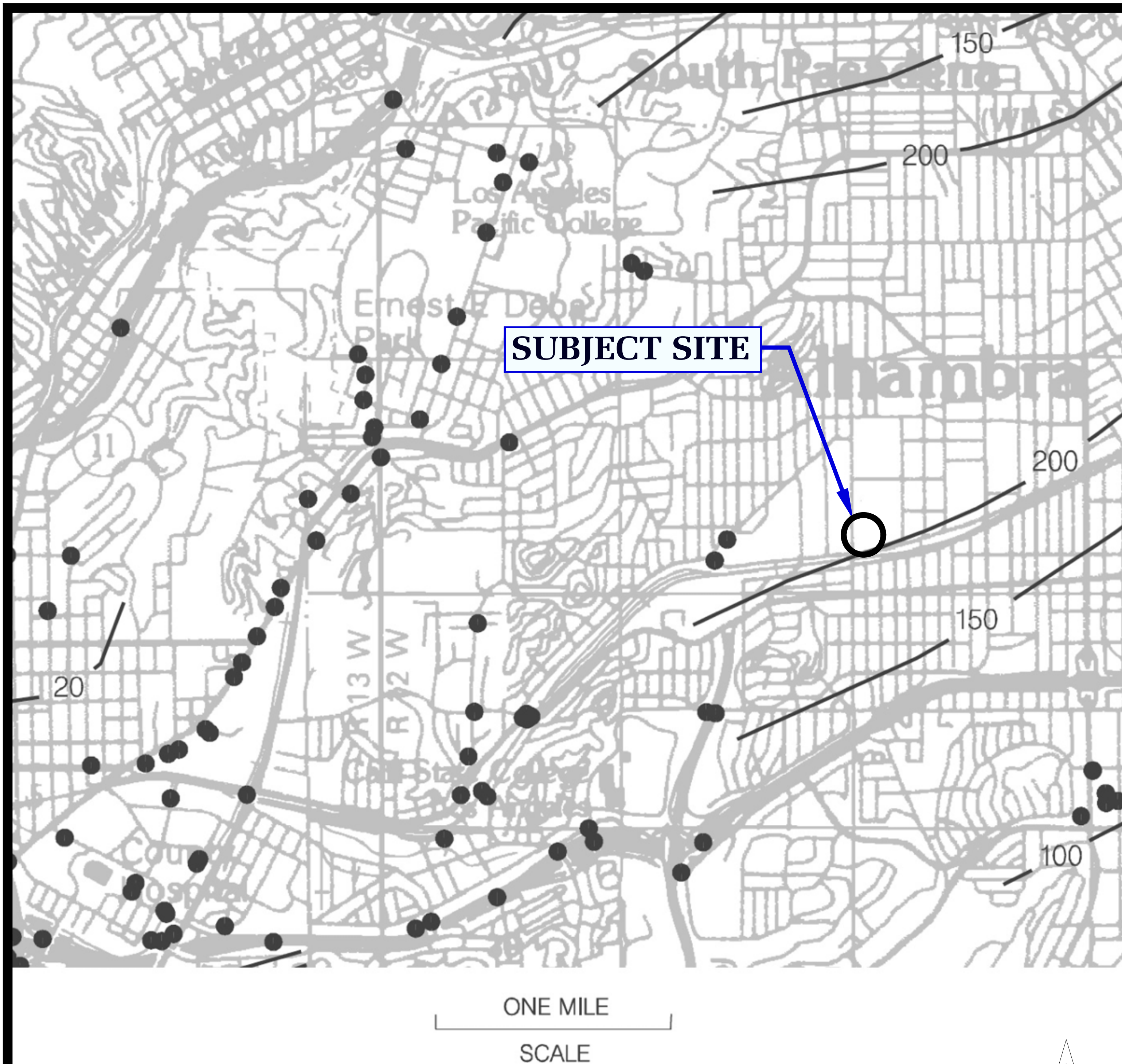

20 Depth to groundwater in feet

REFERENCE: CDMG, SEISMIC HAZARD ZONE REPORT, 029
LOS ANGELES 7.5 - MINUTE QUADRANGLE, LOS ANGELES COUNTY, CALIFORNIA (1998, REVISED 2006)

HISTORICALLY HIGHEST GROUNDWATER LEVELS

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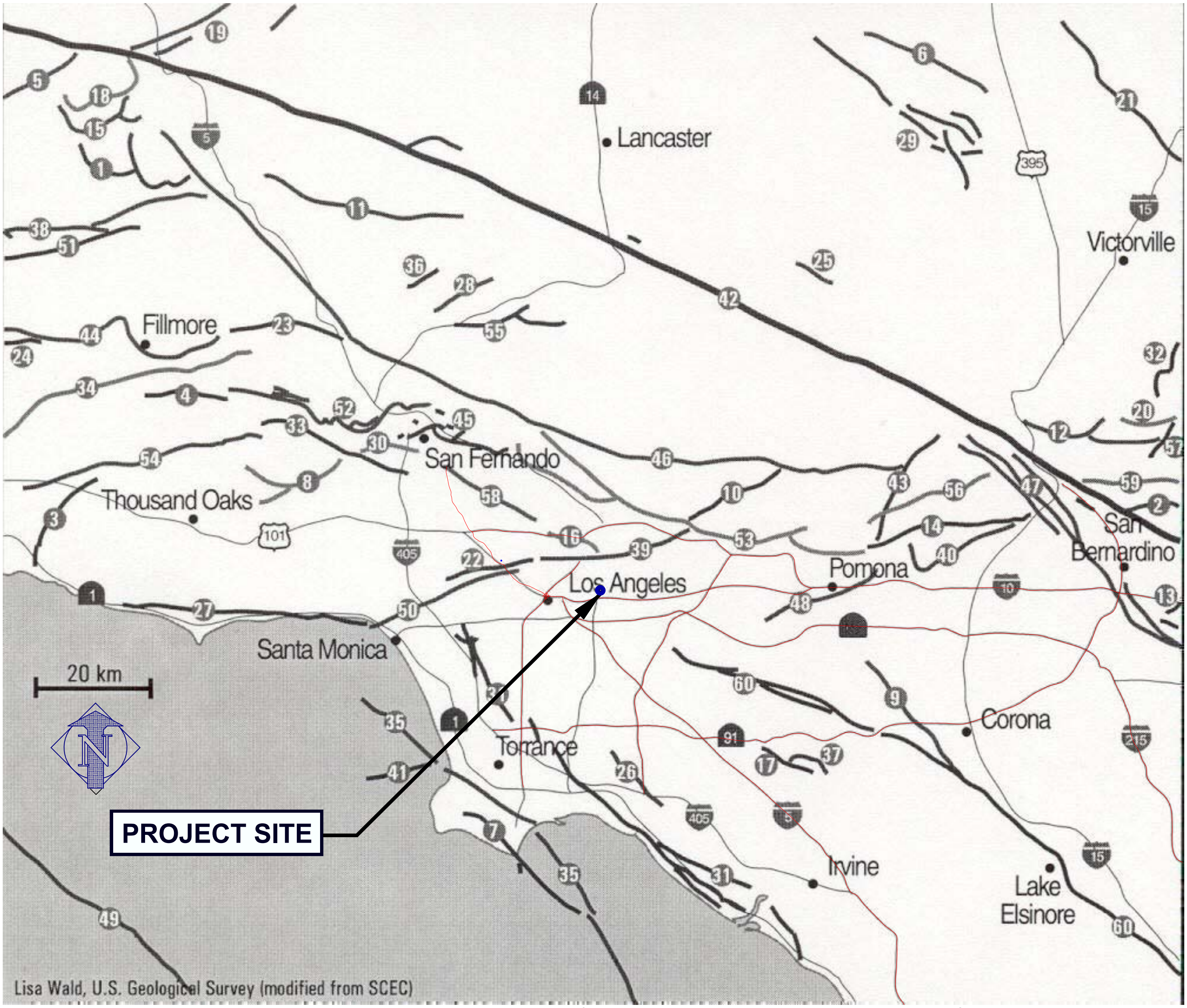

1 Alamo thrust
2 Arrowhead fault
3 Bailey fault
4 Big Mountain fault
5 Big Pine fault
6 Blake Ranch fault
7 Cabrillo fault
8 Chatsworth fault
9 Chino fault
10 Clamshell-Sawpit fault
11 Clearwater fault
12 Cleghorn fault
13 Crafton Hills fault zone
14 Cucamonga fault zone
15 Dry Creek fault
16 Eagle Rock 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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THE RATKOVICH COMPANY
1000 S. FREMONT AVE., ALHAMBRA

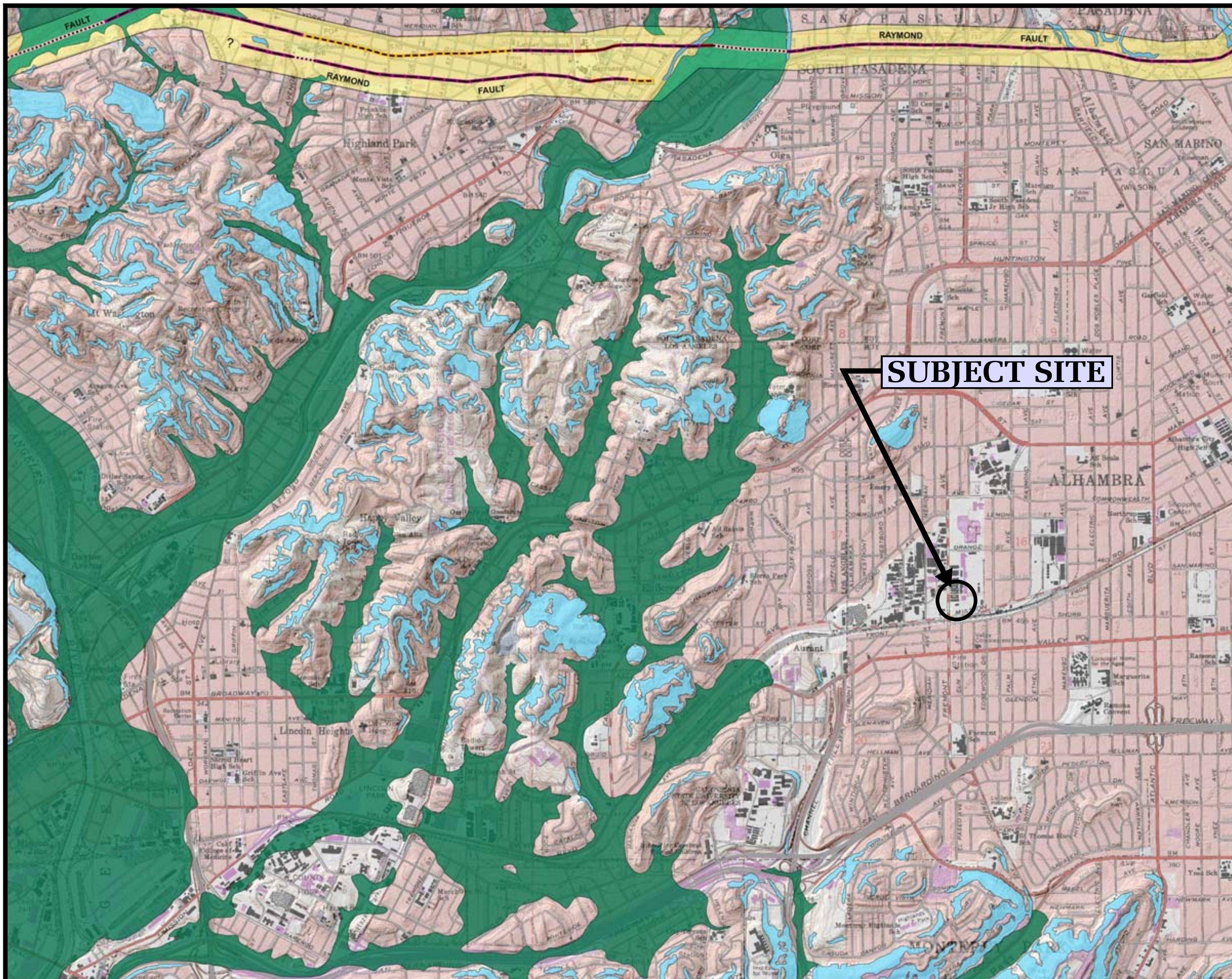
FILE NO. 21542

Seismic Source Summary Table

The Ratkovich Company
File No. 21542

Name	Distance in Miles	Pref Slip Rate (mm/yr)	Dip (degrees)	Dip Dir	Slip Sense	Rupture Top (km)	Rupture Bottom (km)	Length (km)
Elysian Park (Upper)	1.25	1.3	50	NE	reverse	3	15	20
Raymond	2.64	1.5	79	N	strike slip	0	16	22
Verdugo	3.49	0.5	55	NE	reverse	0	15	29
Hollywood	5.29	1	70	N	strike slip	0	17	17
Puente Hills (LA)	7.83	0.7	27	N	thrust	2.1	15	22
Santa Monica Connected	7.91	2.4	44		strike slip	0.8	11	93
Sierra Madre	8.08	2	53	N	reverse	0	14	57
Elsinore	8.33	2.5	75	NE	strike slip	0	14	46
Clamshell-Sawpit	10.95	0.5	50	NW	reverse	0	14	16
Newport Inglewood	13.24	1.3	90	V	strike slip	0	11	208
San Jose	15.83	0.5	74	NW	strike slip	0	15	20
San Gabriel	17.95	1	61	N	strike slip	0	15	71
Northridge	20.47	1.5	35	S	thrust	7.4	17	33
Malibu Coast	21.79	0.3	74	N	strike slip	0	16	38
Palos Verdes	22.32	3	90	V	strike slip	0	14	99
Anacapa-Dume	23.41	3	41	N	thrust	1.2	12	65
Chino	23.46	1	65	SW	strike slip	0	14	29
Cucamonga	24.37	5	45	N	thrust	0	8	28
Santa Susana	25.93	5	55	N	reverse	0	16	27
San Joaquin Hills	29.37	0.5	23	SW	thrust	2	13	27
S. San Andreas	30.02	n/a	90	V	strike slip	0	14	306
Anacapa-Dume	31.97	3	45	N	thrust	0	16	51
Holser	32.51	0.4	58	S	reverse	0	19	20
Simi-Santa Rosa	34.83	1	60		strike slip	1	12	39
Newport-Inglewood (Offshore)	36.37	1.5	90	V	strike slip	0	10	66
Elsinore	36.57	5	90	V	strike slip	0	13	37
San Jacinto	36.6	n/a	90	V	strike slip	0	16	88
Oak Ridge (Onshore)	39.39	4	65	S	reverse	1	19	49
Cleghorn	42.38	3	90	V	strike slip	0	16	25
San Cayetano	42.72	6	42	N	thrust	0	16	42
North Frontal (West)	53.05	1	49	S	reverse	0	16	50
Santa Ynez	55.32	2	70	S	strike slip	0	13	68
Coronado Bank	56.8	3	90	V	strike slip	0	9	186
Ventura-Pitas Point	59.55	1	64	N	reverse	1	15	44

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



Scale 1: 24000

Contour Interval 20 Feet

Earthquake Fault Zones
Alquist-Priolo Earthquake Fault Zone

REFERENCE: EARTHQUAKE FAULT ZONES, LOS ANGELES QUADRANGLE, CALIFORNIA GEOLOGICAL SURVEY, JUNE 2017

EARTHQUAKE FAULT ZONE

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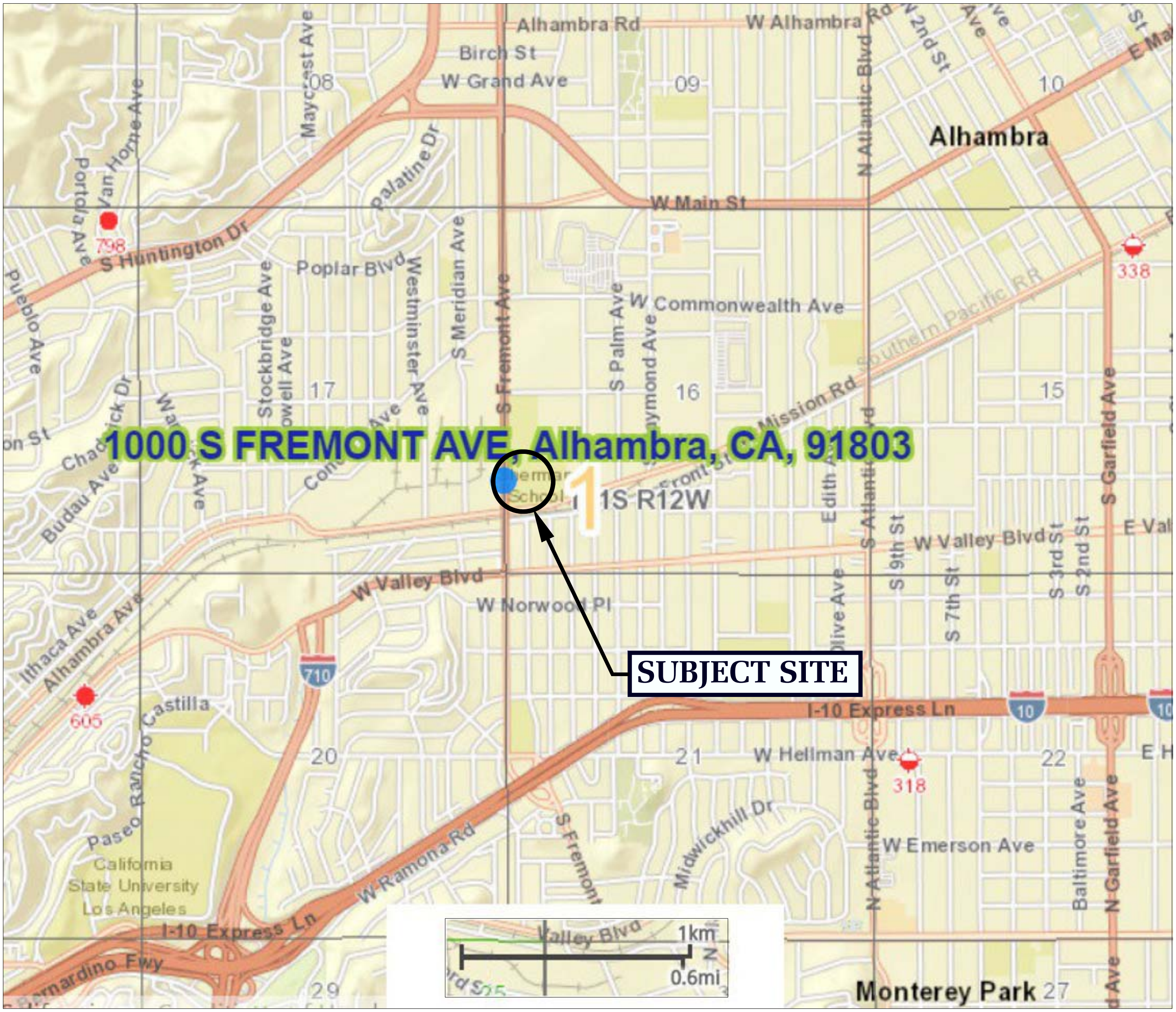
FILE NO. 21542



OIL WELL LEGEND

API NO.	OPERATOR, WELL NO.
798	J.J. Rekar, #1
605	Norman MacDonald, #1
318	Conoco Inc., #1
338	Chevron USA Inc., #1

N

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REFERENCE: DIVISION OF OIL, GAS & GEOTHERMAL RESOURCES WELL FINDER, STATE OF CALIFORNIA, 2014

OIL WELL LOCATION MAP

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Consulting Geotechnical Engineers

THE RATKOVICH COMPANY
1000 S. FREMONT AVE., ALHAMBRA

FILE NO. 21542

Legend

NFHL (click to expand)

LOMRs
- Effective

LOMAs

FIRM Panels

PLSS

River Mile Markers

Cross-Sections

Coastal Transects

Base Flood Elevations

Profile Baselines

Transect Baselines

Limit of Moderate Wave Action

Levees

General Structures
- Flood Structure
- Bridge
- Dam, Weir, Jetty
- Other Structure

Primary Frontal Dunes

Flood Hazard Boundaries
- Limit Lines
- SFHA / Flood Zone Boundary
- Other Boundaries

Flood Hazard Zones
- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Special Floodway
- Area of Undetermined Flood Hazard
- 0.2% Annual Chance Flood Hazard
- Future Conditions 1% Annual Chance Flood Hazard
- Area with Reduced Risk Due to Levee

FEDERAL EMERGENCY MANAGEMENT AGENCY, FLOOD MAP SERVICE CENTER (https://msc.fema.gov/)

FLOOD INSURANCE RATE MAP

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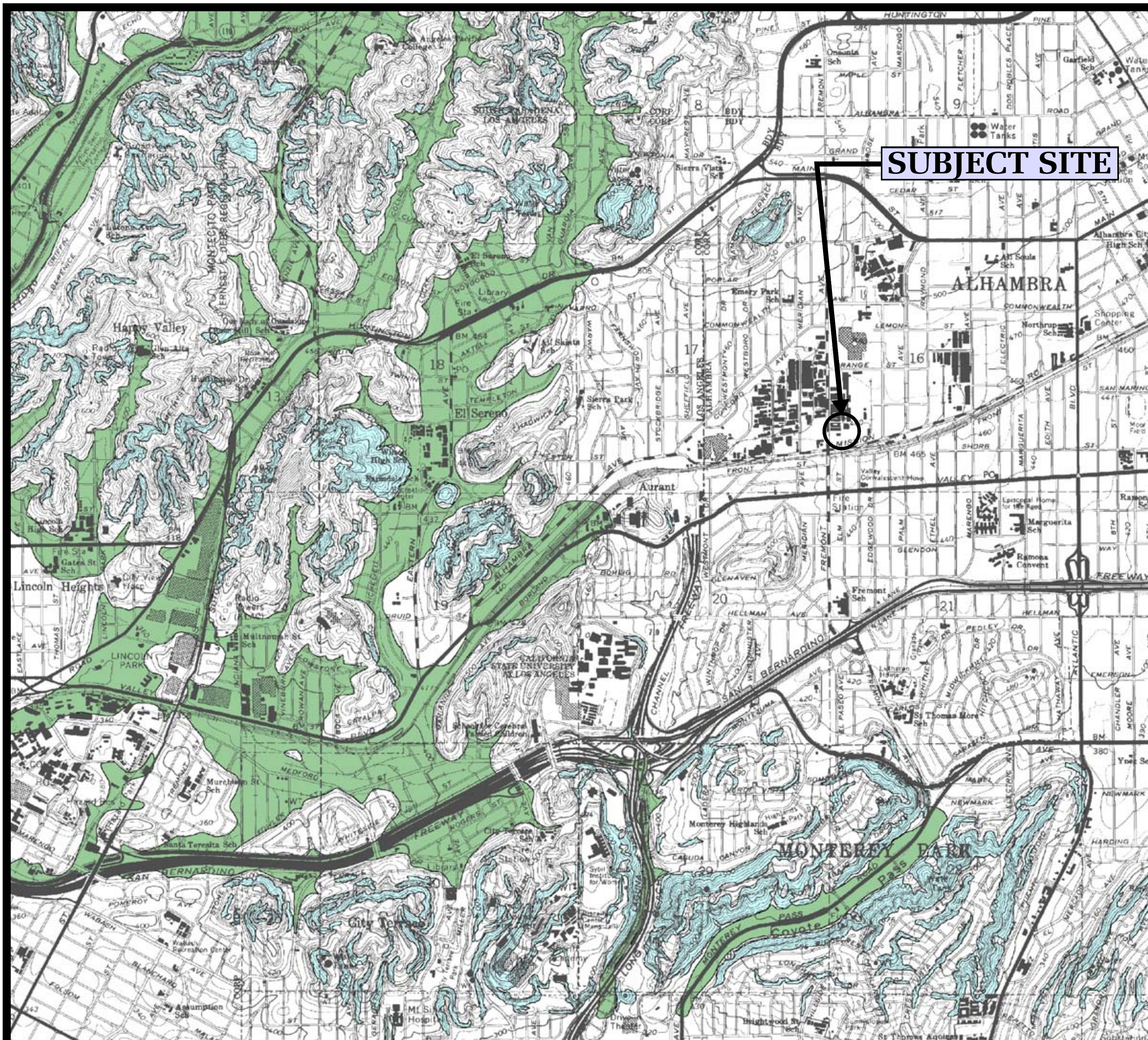
Consulting Geotechnical Engineers

THE RATKOVICH COMPANY
1000 SOUTH FREMONT AVENUE, ALHAMBRA

FILE No. 21542 | DRAWN BY: TC

DATE: January 2018



SCALE 1:24,000

1 .5 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

LIQUEFACTION AREA

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

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SEISMIC HAZARD ZONE MAP

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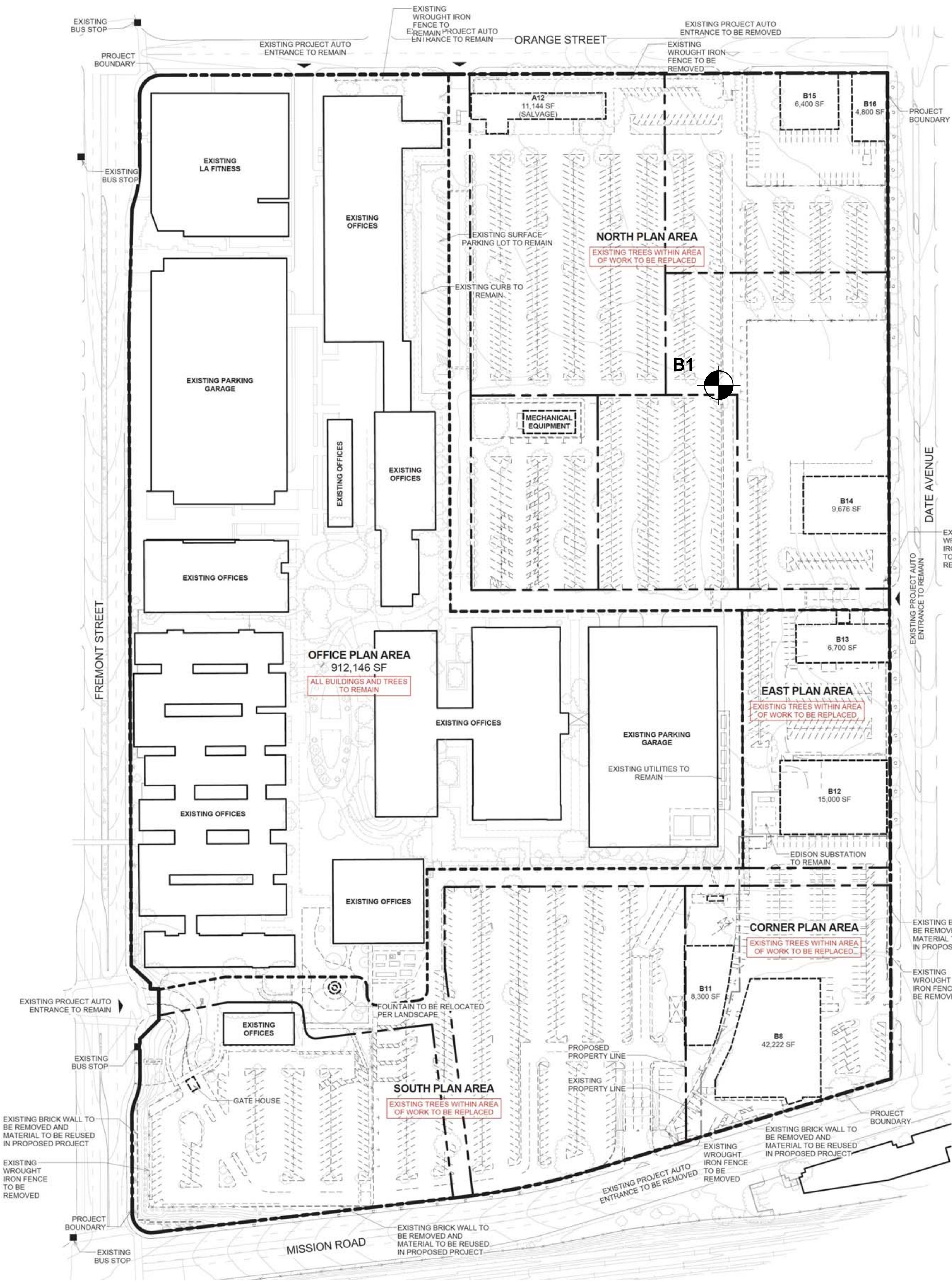
1000 S. FREMONT AVE., ALHAMBRA

FILE NO. 21542



REFERENCE: OVERALL DEMOLITION PLAN PROVIDED BY TCA ARCHITECTS DATED MAY 25, 2017

LEGEND

B1 — LOCATION & NUMBER OF BORING

SCALE IN FEET

0 150 300

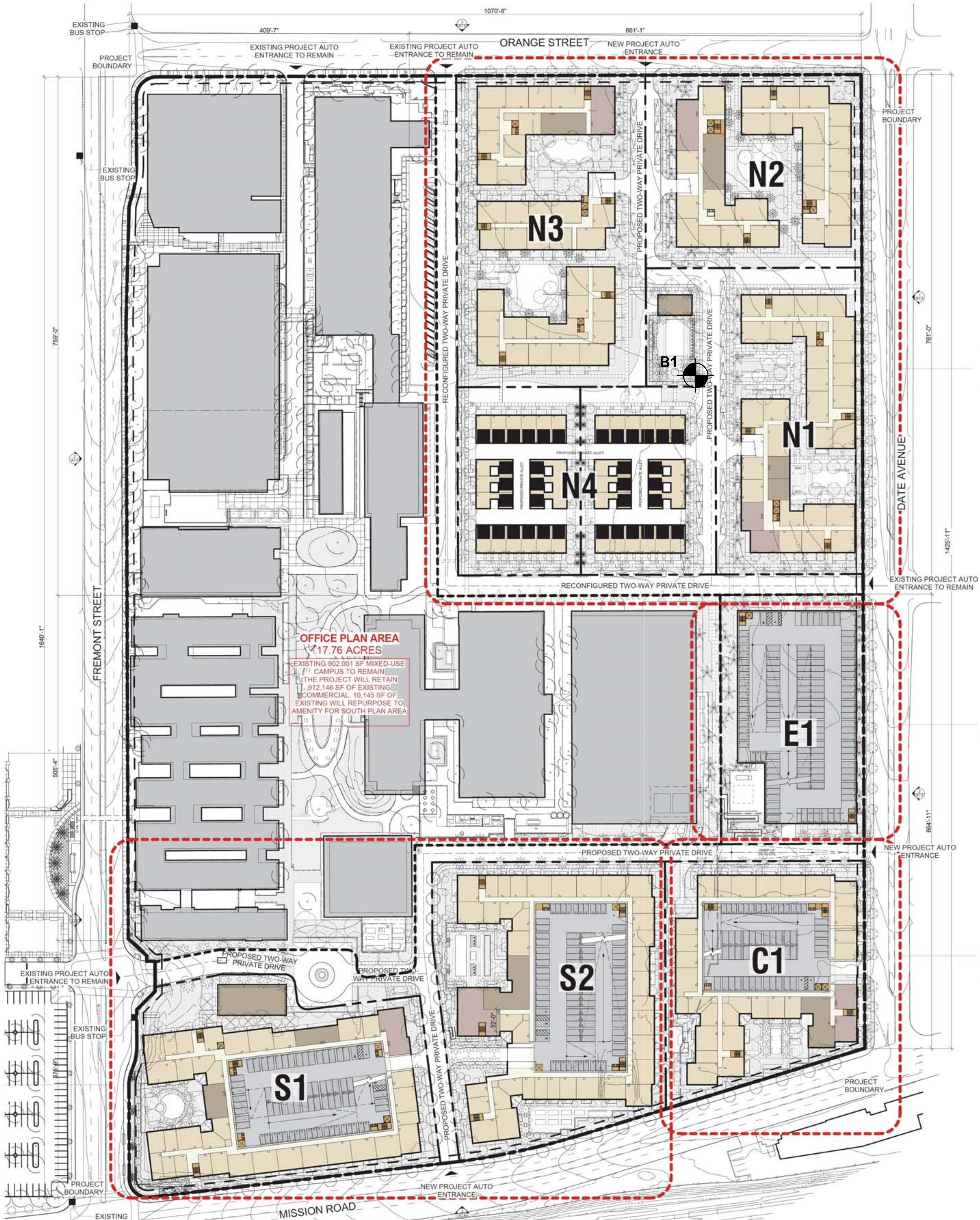
Geotechnologies, Inc.
Consulting Geotechnical Engineers

SITE PLAN - EXISTING

THE RATKOVICH COMPANY

File No.: 21542

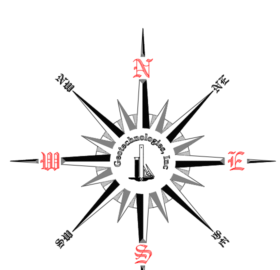
Date: January '18



REFERENCE: OVERALL PLOT PLAN / SITE PLAN PROVIDED BY TCA ARCHITECTS DATED MAY 25, 2017

LEGEND

B1 — LOCATION & NUMBER OF BORING



SCALE IN FEET

0 150 300

Geotechnologies, Inc.
Consulting Geotechnical Engineers

SITE PLAN - PROPOSED

THE RATKOVICH COMPANY

File No.: 21542

Date: January '18

BORING LOG NUMBER 1

The Ratkovich Company — **Date: 01/10/18**

File No. 21542 — **Method: 8-inch Diameter Hollow Stem Auger**

ae

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Asphalt
				0 --		4-inch Asphalt over 3-inch Base
				-		
				1 --		FILL: Sandy Silt to Silty Sand, medium brown, slightly moist,
				-		dense, stiff, fine grained
				2 --		
				-		
				3 --		
				-		
				4 --		
				-		
5	13	11.8	SPT	5 --		
				-	ML	ALLUVIUM: Sandy Silt to Silt, medium brown, slightly moist,
				6 --		stiff
				-		
				7 --		
7.5	63	5.9	125.6	-		
				8 --	SM	Silty Sand, medium olive brown, slightly moist, dense
				-		
				9 --		
				-		
10	29	8.4	SPT	10 --		
				-		scarce gravel
				11 --		
				-		
				12 --		
12.5	59	2.5	121.1	-		
				13 --	SP	Sand with Gravel, light yellow brown, slightly moist, very
				-		dense
				14 --		
				-		
15	20	19.7	SPT	15 --		
				-	ML/SM	Silt to Silty Sand with Gravel, dark to medium olive brown,
				16 --		slightly moist, dense, stiff
				-		
				17 --		
17.5	50/5"	3.1	129.9	-		
				18 --	ML/SP	Silt with Sand, olive to yellowish brown, slightly moist, dense,
				-		stiff, some gravel
				19 --		
				-		
20	20	3.6	SPT	20 --		
				-	SP	Sand, orange brown, slightly moist, dense
				21 --		
				-		
				22 --		
22.5	50/6"	1.7	108.0	-		
				23 --		light gray to brown, cohesionless
				-		
				24 --		
				-		
25	47	18.0	SPT	25 --		
				-	ML	Silt, dark olive brown, slightly moist, very stiff

BORING LOG NUMBER 1

The Ratkovich Company

File No. 21542

ae

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				-		
				26 --		NOTE: The stratification lines represent the approximate
				-		boundary between earth types; the transition may be gradual.
				27 --		
27.5	71	14.3	122.8	-		Used 8-inch diameter Hollow-Stem Auger
				28 --		140-lb. Automatic Hammer, 30-inch drop
				-		Modified California Sampler used unless otherwise noted
				29 --		
				-		SPT=Standard Penetration Test
30	28	11.1	SPT	30 --		
				-		Sandy Silt to Silt, stiff
				31 --		
				-		
				32 --		
32.5	74	9.0	130.6	-		
				33 --		Sandy Silt, medium olive brown
				-		
				34 --		
				-		
35	26	6.8	SPT	35 --		
				-	SM	Silty Sand, very fine grained, light olive brown, slightly moist,
				36 --		dense
				-		
				37 --		
37.5	60	19.7	107.7	-		
				38 --	ML	Silt, medium olive brown, slightly moist, stiff
				-		
				39 --		
				-		
40	21	16.9	SPT	40 --		
				-		
				41 --		
				-		
				42 --		
42.5	77	11.3	129.2	-		
				43 --		Sandy Silt, medium reddish brown, slightly moist, very stiff
				-		
				44 --		
				-		
45	46	7.1	SPT	45 --		
				-	SM	Silty Sand, very fine grained, medium orangeish brown,
				46 --		slightly moist, dense
				-		
				47 --		
47.5	50/6"	3.8	105.8	-		
				48 --	SP	Sand, medium yellowish brown, slightly moist, very dense
				-		
				49 --	SP/ML	Sand (fine grained) to Silt, light to dark brown, slightly moist,
				-		medium dense, stiff
50	27	11.1	SPT	50 --		
				-		Total Depth 50 feet
						No Water
						Fill to 5 feet

BORING LOG NUMBER 1

Drilling Date: 02/22/06

Project: File No. 19120 **LAUSD (Sierra Park)**

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: 3-inch Asphalt - Good Condition, No Base
				0 --		FILL: Clayey Sand, brownish-gray, moist, medium dense, fine grained, some gravel
				-		
				1 --		
				-		
2	65	14.1	118.7	2 --		
				-		grayish-brown and yellowish-brown mottling, moist, very dense, fine grained, no gravel
				3 --		
				-		
				4 --		Clayey Sand to Sand with Gravel, fine to medium grained
				-		
5	45	14.6	SPT	5 --		
				-	CL	Silty Clay, dark brownish-gray, moist, hard, some caliche
				6 --		
				-		
				7 --		
7½	75	17.4	112.9	-		
				8 --		orange-brown and dark gray mottling, some caliche
				-		
				9 --		
				-		
10	23	14.5	SPT	10 --		
				-		orange brown, moist, stiff
				11 --		
				-		
				12 --		
12½	60	20.3	107.4	-		
				13 --		orange brown, moist, stiff
				-		
				14 --		
				-		
15	45	19.7	SPT	15 --		
				-	CL/ML	Silty Clay to Clayey Silt, yellowish-brown, moist, hard
				16 --		
				-		
				17 --		
17½	67	17.2	111.9	-		
				18 --	CL	Silty Clay, yellowish-brown, moist, hard
				-		
				19 --		
				-		
20	35	18.3	SPT	20 --		
				-		yellowish-brown, very moist
				21 --		
				-		
				22 --		
22½	69	20.3	107.9	-		
				23 --		orange-brown
				-		
				24 --		
				-		
25	60	17.4	SPT	25 --		
				-	SC	Clayey Sand, yellowish-brown, moist, dense, fine grained, some caliche
				26 --		
				-		
				27 --	CL	Silty Clay, yellowish-brown, moist, stiff
27½	25 50/5"	15.8	113.0	-		
				28 --		
				-		
				29 --		
				-		
30	55	17.7	SPT	30 --		
				-		grayish-brown

BORING LOG NUMBER 1

Project: File No. 19120 **LAUSD (Sierra Park)**

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				31 --		
				32 --		
32½	25 50/3"	22.7	99.9			
				33 --		BEDROCK (PUENTE FORMATION): Siltstone to Claystone, orange-brown and gray mottling, moist, hard
				34 --		
35	60	19.3	SPT	35 --		
				36 --		
				37 --		
37½	75/7"	27.2	98.9			
				38 --		Siltstone, gray and olive-brown mottling
				39 --		
40	75/6"	29.3	93.8	40 --		Siltstone to Claystone, olive-brown
				41 --		
				42 --		
				43 --		
				44 --		
45	80/6"	23.5	100.0	45 --		olive-brown and orange-brown mottling
				46 --		
				47 --		
				48 --		
				49 --		
50	100/6"	28.8	93.7	50 --		Total depth: 50 feet No Water Fill to 5 feet
				51 --		
				52 --		
				53 --		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual
				54 --		
				55 --		Used 8-inch diameter Hollow-Stem Auger 140-lb. Slide Hammer, 30-inch drop Modified California Sampler used unless otherwise noted
				56 --		SPT=Standard Penetration Test
				57 --		
				58 --		
				59 --		
				60 --		

BORING LOG NUMBER 2

Drilling Date: 02/22/06

Project: File No. 19120 **LAUSD (Sierra Park)**

km

Sample Depth ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: 5-inch Concrete - Good Condition, No Base
			0		FILL: Clayey Sand, brownish-gray, moist, medium dense, fine grained
			1		
2	19.5	103.9	2		Silty Clay, yellowish-gray, moist, hard, porous
			3		
4	19.5	114.2	4	CL	Sandy Clay, orange-brown, moist, stiff
			5		
			6		
7	16.9	114.0	7		orange brown, moist, stiff
			8		
			9		
10	18.0	109.8	10	CL	Silty Clay, yellowish-brown, moist, hard
			11		
			12		
			13		
			14		
15	18.5	110.1	15		
			16		
			17		
			18		
			19		
20	23.3	95.7	20		BEDROCK (PUENTE FORMATION): Siltstone to Claystone, orange-brown and brownish-gray mottling, moist, hard
			21		Total depth: 20 feet No Water Fill to 4 feet
			22		
			23		
			24		NOTE: Used 5-inch diameter Hand-Auger; Hand-Sampler
			25		
			26		
			27		
			28		
			29		
			30		

BORING LOG NUMBER 3

Drilling Date: 02/22/06

Project: File No. 19120 **LAUSD (Sierra Park)**

km

Sample Depth ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: 5-inch Concrete - Good Condition, No Base
			0 --		FILL: Clayey Sand, grayish-brown, moist, medium dense, fine grained
1	16.2	108.4	1 --		
			2 --	CL	Sandy Clay, grayish-brown, moist, stiff, fine grained, slightly porous
3	15.0	115.2	3 --		orange-brown, moist, hard
			4 --		
5	18.7	109.9	5 --		orange-brown, moist, stiff
			6 --		
7	16.4	111.6	7 --		orange-brown
			8 --		
			9 --		
10	19.2	99.9	10 --	CL	Silty Clay, orange-brown, moist, hard
			11 --		
			12 --		
			13 --		
			14 --		
15	23.3	97.2	15 --		BEDROCK (PUENTE FORMATION): Siltstone to Claystone, orange-brown to olive-brown mottling, very moist, hard
			16 --		
			17 --		
			18 --		
			19 --		
20	25.2	98.8	20 --		Total depth: 20 feet No Water Fill to 1 foot NOTE: Used 5-inch diameter Hand-Auger; Hand-Sampler
			21 --		
			22 --		
			23 --		
			24 --		
			25 --		
			26 --		
			27 --		
			28 --		
			29 --		
			30 --		

BORING LOG NUMBER 1

Drilling Date: 12/11/06

Project: File No. 19338 **J.H. Snyder Company**

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Lawn Area
				0 --		FILL: Silty Sand, brown, moist, medium dense, fine grained
				1 --		
				2 --		
2½	10	14.8	116.7	3 --	SM	Silty Sand, brown, moist, medium dense, fine grained
				4 --		
5	9	13.7	SPT	5 --		medium brown, moist, medium dense, fine grained
				6 --		
				7 --		
7½	48	15.6	114.1	8 --		yellowish-brown, moist, medium dense, fine grained
				9 --		
10	20	11.0	SPT	10 --		moist
				11 --		
				12 --		
12½	39 50/3"	14.4	118.0	13 --		medium brown, moist
				14 --		
15	35 50/6"	4.3	SPT	15 --		moist, very dense, well graded, minor gravel
				16 --		
				17 --		
17½	38 50/4"	3.8	119.3	18 --	SP/SM	Sand to Silty Sand with cobble, yellowish-brown to light brown, moist, very dense, well graded
				19 --		
20	50/6"	4.3	SPT	20 --	SP	Sand with minor Gravel, yellowish-brown, moist, dense, well graded grains
				21 --		
				22 --		
22½	100/7"	14.9	106.3	23 --	SP/SM	Sand with minor Gravel to Silty Sand, yellowish-brown, moist, very dense, fine to medium grained
				24 --		
25	40	4.1	SPT	25 --	SM/SP	Silty Sand with Sand, yellowish-brown, moist, medium dense, fine to medium grained
				26 --		
				27 --		
27½	70	16.6	111.3	28 --	ML/SM	Sandy Silt to Silty Sand, yellowish-brown, moist, dense, fine grained
				29 --		
30	43	6.6	SPT	30 --	SM/ML	Silty Sand to Sandy Silt, yellowish-brown, moist, medium dense, fine grained

GEOTECHNOLOGIES, INC.

BORING LOG NUMBER 1

Project: File No. 19338 **J.H. Snyder Company**

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				31		
				32		
32½	25 50/5"	15.4	103.0	33	SM	Silty Sand, yellowish-brown, moist, very dense, fine grained
				34		
35	40	12.0	SPT	35		
				36	SM/ML	Silty Sand to Sandy Silt, yellowish-brown, moist, medium dense, fine grained
				37		
37½	75/6"	10.4	112.7	38	SM	Silty Sand, yellowish-brown, moist, very dense, fine grained
				39		
40	50/6"	11.9	SPT	40		
				41		moist
				42		
42½	35 50/6"	17.2	103.3	43		moist, very dense, fine grained
				44		
45	50/6"	13.2	SPT	45		
				46		moist
				47		
47½	32 50/6"	10.2	117.8	48		moist
				49		
50	58	14.2	SPT	50		
				51		moist
				52		
52½	38 50/6"	8.7	122.2	53		moist
				54		moist
55	59	9.3	SPT	55		moist
				56		
				57		
57½	43 50/6"	7.6	109.9	58		
				59		
				60		Total depth: 60 feet; No Water; Fill to 2 feet

NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual

Used 8-inch diameter Hollow-Stem Auger
140-lb. Slide Hammer, 30-inch drop
Modified California Sampler used unless otherwise noted

SPT=Standard Penetration Test

BORING LOG NUMBER 2

Drilling Date: 12/11/06

Project: File No. 19338 **J.H. Snyder Company**

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Lawn Area
				0 --		FILL: Silty Sand, medium brown, moist, medium dense, fine grained
				1 --		
2	11	11.1	110.5	2 --	SM	Silty Sand, brown, moist, medium dense, fine grained
				3 --		
4	14	14.1	112.4	4 --		light brown, moist, medium dense, fine grained
				5 --		
				6 --		
7	47	15.2	117.8	7 --		yellowish-brown, moist, medium dense, fine grained
				8 --		
				9 --		
10	25 50/6"	16.0	117.9	10 --		yellowish-brown, moist, very dense, fine grained
				11 --		
				12 --		
				13 --		
				14 --		
15	30 50/6"	3.9	121.5	15 --	SP/SM	Sand with minor Gravel to Silty Sand, yellowish-brown, very dense, well graded
				16 --		
				17 --		
				18 --		
				19 --		
20	28 50/6"	4.1	117.7	20 --	SM/SP	Silty Sand to Sand with minor Gravel, yellowish-brown, moist, very dense, fine to medium grained
				21 --		
				22 --		
				23 --		
				24 --		
25	38 50/6"	17.9	109.2	25 --	SM	Silty Sand, yellowish-brown, moist, very dense, fine grained
				26 --		
				27 --		
				28 --		
				29 --		moist
30	45 50/6"	12.5	107.8	30 --		Total depth: 30 feet; No Water; Fill to 2 feet

BORING LOG NUMBER 3

Drilling Date: 12/11/06

Project: File No. 19338 **J.H. Snyder Company**

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: 3-inch Asphalt - Good Condition, 3-inch Base
				0 --		FILL: Silty Sand, yellowish-brown, moist, medium dense, fine grained
1	37	6.4	113.5	1 --	SM	Silty Sand, yellowish-brown, moist, medium dense, fine grained
				2 --		
3	24	4.1	111.9	3 --		medium brown, moist, medium dense, fine grained, minor gravel
				4 --		
5	39	4.3	108.7	5 --		yellowish-brown, moist, medium dense, fine grained, minor gravel
				6 --		
7	45	6.1	112.3	7 --		light yellow, moist, medium dense, fine to medium grained
				8 --		
				9 --		
10	55	5.1	116.9	10 --		gravel, light yellow, moist, dense, fine to medium grained
				11 --		
				12 --		
				13 --		
				14 --		
15	25 50/6"	4.8	115.8	15 --	SP/SM	Sand to Silty Sand, yellowish-brown, moist, very dense, fine grained, well graded
				16 --		
				17 --		
				18 --		
				19 --		
20	75/7"	3.3	124.1	20 --	SM	Silty Sand with Gravel, yellowish-brown, moist, very dense, fine grained
				21 --		
				22 --		
				23 --		
				24 --		
25	36 50/5"	13.5	106.1	25 --		yellowish-brown, moist, very dense, fine grained, minor gravel
				26 --		
				27 --		
				28 --		
				29 --	SP	Sand, yellowish-brown, moist, very dense, fine grained
30	30 50/6"	5.4	108.3	30 --		Total depth: 30 feet; No Water; Fill to 1 foot

BORING LOG NUMBER 4

Drilling Date: 12/11/06

Project: File No. 19338 **J.H. Snyder Company**

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: 4-inch Asphalt - Good Condition, 6-inch Base
				0 --		FILL: Silty Sand, yellowish-brown, moist, medium dense, fine grained
				1 --	SM	Silty Sand, yellowish-brown, moist, medium dense, fine grained
2	20 50/6"	5.0	103.6	2 --		moist
				3 --		
4	28 50/6"	6.4	121.6	4 --		yellowish-brown, moist, very dense, fine grained, slightly porous
				5 --		
				6 --		
7	35 50/6"	7.0	104.1	7 --		light brown, moist, very dense, fine grained
				8 --		
				9 --		
10	35 50/6"	7.7	104.0	10 --		yellowish-brown, moist, very dense, fine grained
				11 --		
				12 --		
				13 --		
				14 --		
15	40 50/6"	9.1	111.5	15 --	SM/ML	Silty Sand to Sandy Silt, yellowish-brown, moist, very dense, fine grained
				16 --		
				17 --		
				18 --		
				19 --		
20	29 50/5"	5.1	102.2	20 --	SM	Silty Sand, yellowish-brown, moist, very dense, fine grained
				21 --		
				22 --		
				23 --		
				24 --		
25	25 50/6"	8.1	107.9	25 --		moist
				26 --		
				27 --		
				28 --		
				29 --	SM/SP	Silty Sand to Sand, yellowish-brown, moist, very dense, fine to medium grained
30	30 50/6"	6.0	99.9	30 --		Total depth: 30 feet; No Water; Fill to 1 foot

BORING LOG NUMBER 5

Drilling Date: 12/11/06

Project: File No. 19338 **J.H. Snyder Company**

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: 4-inch Asphalt - Good Condition, 7-inch Base
				0		FILL: Silty Sand, yellowish-brown, moist, medium dense, fine grained
1	31	6.5	105.7	1	SM	Silty Sand, yellowish-brown, moist, medium dense, fine grained
3	24 50/6"	6.7	109.7	3		yellowish-brown, moist, very dense, fine grained, minor porous
5	30 50/6"	6.8	124.9	5		yellowish-brown, moist, very dense, fine grained, minor gravel, slightly porous
7	40 50/5"	6.1	122.1	7		yellowish-brown, moist, very dense, fine grained
10	29 50/5"	10.1	122.7	10		light brown with yellowish-brown mottling, moist, very dense, fine grained
15	40 50/6"	5.3	139.2	15		yellowish-brown, moist, very dense, fine grained
20	39 50/5"	6.6	99.8	20		moist
25	27 50/6"	7.0	114.3	25		yellowish-brown, moist, very dense, fine to medium grained
				29	SM/ML	Silty Sand to Sandy Silt, yellowish-brown, moist, very dense, fine grained
30	39 50/5"	7.9	99.0	30		Total depth: 30 feet; No Water; Fill to 1 foot

BORING LOG NUMBER 6

Drilling Date: 12/11/06

Project: File No. 19338 **J.H. Snyder Company**

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: 3-inch Asphalt - Good Condition, 2-inch Base
				0 --		FILL: Silty Sand, medium brown, moist, medium dense, fine grained
				-		
				1 --		
				-		
2	60	6.4	131.2	2 --		
				-	SM	Silty Sand, medium brown, moist, dense, fine grained
				3 --		
				-		
4	72	7.3	112.0	4 --		- - - - - - - - - - - - -
				-		moist, dense, fine grained, gravel
				5 --		
				-		
				6 --		
				-		
7	25 50/6"	3.2	115.0	7 --		- - - - - - - - - - - - -
				-		yellowish-brown, moist, very dense, fine to medium grained, minor gravel
				8 --		
				-		
				9 --		
				-		
10	58	6.9	104.9	10 --		- - - - - - - - - - - - -
				-		light yellow, moist, dense, fine to medium grained, gravel
				11 --		
				-		
				12 --		
				-		
				13 --		
				-		
				14 --		
				-		
15	56	3.0	109.6	15 --		
				-	SP	Sand, light yellow, moist, dense, fine to medium grained, minor gravel
				16 --		
				-		
				17 --		
				-		
				18 --		
				-		
				19 --		
				-		
20	20 50/6"	4.5	99.8	20 --		- - - - - - - - - - - - -
				-		yellowish-brown, moist, dense, fine grained
				21 --		
				-		
				22 --		
				-		
				23 --		
				-		
				24 --		
				-		
25	62	4.6	106.1	25 --		
				-	SP/SM	Sand to Silty Sand, light yellowish-brown to yellowish-brown, moist, dense, fine to medium grained
				26 --		
				-		
				27 --		
				-		
				28 --		
				-		
				29 --		
				-	SM	Silty Sand, yellowish-brown, moist, very dense, fine grained
30	30 50/6"	7.3	97.2	30 --		
				-		Total depth: 30 feet; No Water; Fill to 2 feet

BORING LOG NUMBER 1

Drilling Date: 07/16/07

Project: File No. 19504 **Panattoni Development Company**

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: 2-½ inch Asphalt over 5-inch Base
				0		FILL: Silty Sand, medium brown, moist, medium dense, fine to medium grained
				1		
2	28	8.5	113.2	2		moist, medium dense, fine to medium grained, some gravel
				3	SM	Silty Sand, medium brown, moist, medium dense, fine grained
4	15	10.0	125.0	4		moist, medium dense, fine to medium grained, some gravel
				5		
				6		
7	30 50/6"	3.0	122.9	7		
				8	SW	Sand with Gravel, yellowish-brown, moist, very dense, fine to medium grained
				9		
10	53 50/3"	9.0	109.5	10		yellowish-brown, moist, very dense, fine to medium grained
				11		
				12		
				13		
				14		
15	75/7"	5.3	112.2	15		yellowish-brown, moist, dense, fine to coarse grained
				16		
				17		
				18		
				19		
20	75/7"	5.4	106.8	20	SM/SP	Silty Sand to Sand, yellowish-brown, moist, dense, fine to medium grained
				21		Total depth: 20 feet No Water Fill to 2-½ feet
				22		
				23		
				24		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual
				25		Used 8-inch diameter Hollow-Stem Auger 140-lb. Slide Hammer, 30-inch drop Modified California Sampler used unless otherwise noted
				26		
				27		SPT=Standard Penetration Test
				28		
				29		
				30		

BORING LOG NUMBER 2

Drilling Date: 07/16/07

Project: File No. 19504 **Panattoni Development Company**

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: 3-inch Asphalt over 2-½ inch Base
				0		FILL: Silty Sand, yellowish-brown, moist, medium dense, fine to medium grained, some gravel
1	27 50/6"	8.3	116.6	1		light grayish-brown, moist, dense, fine to medium grained, some gravel
				2	SM	
3	25	8.6	119.5	3		Silty Sand, medium brown, moist, dense, fine to medium grained
				4		medium brown, moist, medium dense, fine grained, some gravel
5	68	8.9	120.9	5		slightly Clayey, moist, medium dense, fine to medium grained, some gravel
				6		
7	32	6.2	108.3	7	SW	Sand with Gravel, yellowish-brown, moist, medium dense, fine to medium grained, some gravel
				8		
				9		
10	75/7"	4.2	116.2	10		moist, dense, fine to medium grained
				11		
				12		
				13		
				14		
15	30 50/6"	4.7	113.1	15		moist, very dense, fine to coarse grained
				16		
				17		
				18		
				19		
20	27 50/5"	4.2	104.6	20	SP	Sand, yellowish-brown, moist, very dense, fine to medium grained
				21		Total depth: 20 feet No Water Fill to 1-½ feet
				22		
				23		
				24		
				25		
				26		
				27		
				28		
				29		
				30		

BORING LOG NUMBER 3

Drilling Date: 07/16/07

Project: File No. 19504 **Panattoni Development Company**

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: 3-inch Asphalt over 4-inch Base
				0		FILL: Silty Sand, medium brown, moist, medium dense, fine to medium grained
1	30	9.6	124.2	1	SM	Silty Sand, medium brown, moist, medium dense, fine grained, some gravel
3	38	12.0	116.9	3	SM/SW	Silty Sand to Sand with Gravel, yellowish-brown, moist, medium dense, fine to medium grained
5	20 50/5"	10.3	111.8	5	SW	Sand with Gravel, yellowish-brown, moist, very dense, fine to medium grained
7	75/7"	4.6	109.3	7		moist, dense, fine to medium grained
10	75/7"	4.0	117.2	10		moist
15	100/6"	11.9	104.6	15	SP/SM	Sand to Silty Sand, yellowish-brown, moist, very dense, fine grained
				16		medium brown, moist, very dense, fine grained
20	25	11.3	SPT	20		medium brown to yellowish-brown, moist, medium dense, fine grained, some gravel
22.5	25 50/6"	5.2	110.4	23	SP	Sand, yellowish-brown, moist, dense, fine grained
25	25	10.9	SPT	25	SP/SM	Sand to Clayey Sand to Silty Sand, yellowish-brown, moist, medium dense, fine grained, stiff
27.5	28 50/6"	18.4	104.9	28	SM	Silty Sand, yellowish-brown, moist, dense, fine grained
30	20 50/6"	24.2	SPT	30		moist

BORING LOG NUMBER 3

Project: File No. 19504 **Panattoni Development Company**

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				31		
				32		
32.5	42	23.2	97.5	33		yellowish-brown to medium brown, moist, medium dense, fine grained
				34		
35	37	15.7	SPT	35		medium brown, moist, medium dense, fine grained
				36		
				37		
37.5	30 50/5"	17.6	112.6	38		yellowish-brown to medium brown, moist, very dense, fine grained
				39		
40	40	10.0	SPT	40		medium brown to yellowish-brown, moist, medium dense, fine grained
				41		
				42		
42.5	29 50/5"	21.0	108.1	43		yellowish-brown to medium brown, moist, very dense, fine grained
				44		
45	50/6"	23.4	SPT	45	SM/CL	Silty Sand to Clayey Sand to Sandy Clay, yellowish-brown to medium brown
				46		
				47		
47.5	30 50/6"	26.4	92.4	48	CL	Sandy Clay, grayish-brown, moist, very stiff
				49		
50	69	25.8	SPT	50	CL/SC	Sandy Clay to Silty Sand to Clayey Sand, yellowish-brown to medium brown, moist, dense, fine grained, stiff
				51		Total depth: 50 feet No Water Fill to 1 foot
				52		
				53		
				54		
				55		
				56		
				57		
				58		
				59		
				60		

BORING LOG NUMBER 4

Drilling Date: 07/16/07

Project: File No. 19504 **Panattoni Development Company**

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: 3-inch Asphalt over 4-inch Base
				0 --		FILL: Silty Sand, medium brown, moist, medium dense, fine to medium grained, some gravel
				-		
				1 --		
				-		medium brown to yellowish-brown, moist, medium dense, fine to medium grained, some gravel, glass fragments
2	25	11.4	121.5	2 --		
				-		
				3 --	SM	Silty Sand, yellowish-brown, moist, medium dense, fine to medium grained, some gravel
				-		
4	20 50/6"	9.5	108.9	4 --		
				-	SM/SW	Silty Sand to Sand with Gravel, yellowish-brown, moist, dense, fine to medium grained
				5 --		
				-		
				6 --		
				-		
7	35 50/5"	3.9	121.6	7 --		
				-	SW	Sand with Gravel, yellowish-brown, moist, very dense, fine to medium grained
				8 --		
				-		
				9 --		
				-		
10	75/7"	4.1	112.6	10 --		
				-	SP/SW	Sand to Sand with Gravel, yellowish-brown, moist, dense, fine to medium grained
				11 --		
				-		
				12 --		
				-		
				13 --		
				-		
				14 --		
				-		
15	21 50/6"	12.0	97.7	15 --		
				-	SM	Silty Sand, yellowish-brown, moist, dense, fine grained
				16 --		
				-		
				17 --		
				-		
				18 --		
				-		
				19 --		
				-		
20	43	No Recovery		20 --		moist, medium dense, fine grained
				-		
				21 --		Total depth: 20 feet No Water Fill to 2-½ feet
				-		
				22 --		
				-		
				23 --		
				-		
				24 --		
				-		
				25 --		
				-		
				26 --		
				-		
				27 --		
				-		
				28 --		
				-		
				29 --		
				-		
				30 --		
				-		

BORING LOG NUMBER 5

Drilling Date: 07/16/07

Project: File No. 19504 **Panattoni Development Company**

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: 3-inch Asphalt over 3-inch Base
				0 --		FILL: Silty Sand, medium brown, moist, medium dense, fine to medium grained, some gravel
				-		
				1 --		
				-		
2	30 50/6"	6.9	127.9	2 --	SM	Silty Sand, yellowish-brown, moist, medium dense, fine to medium grained, some gravel
				-		
				3 --		
				-		medium brown, moist, very dense, fine grained
4	32 50/6"	10.2	121.3	4 --		
				-		moist, very dense, fine grained, some gravel
				5 --		
				-		
				6 --		
				-		
7	35	13.8	119.0	7 --		medium brown to yellowish-brown, moist, medium dense, fine grained, some gravel
				-		
				8 --		
				-	SP	Sand, yellowish-brown, moist, medium dense, fine grained
				9 --		
				-		
10	21 50/6"	10.4	104.5	10 --		
				-	SP/SM	Sand to Silty Sand, yellowish-brown to medium brown, moist, fine grained
				11 --		
				-		
				12 --		
				-		
				13 --		
				-		
				14 --		
				-		
15	45	15.9	110.8	15 --		
				-	SM	Silty Sand, yellowish-brown, moist, medium dense, fine grained
				16 --		
				-		
				17 --		
				-		
				18 --		
				-		
				19 --		
				-		
20	20 50/5"	15.8	110.8	20 --		yellowish-brown, moist, very dense, fine grained
				-		
				21 --		Total depth: 20 feet No Water Fill to 1-½ feet
				-		
				22 --		
				-		
				23 --		
				-		
				24 --		
				-		
				25 --		
				-		
				26 --		
				-		
				27 --		
				-		
				28 --		
				-		
				29 --		
				-		
				30 --		
				-		

BORING LOG NUMBER 6

Drilling Date: 07/16/07

Project: File No. 19504 **Panattoni Development Company**

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: 2-inch Asphalt over 3-inch Base
				0 --		FILL: Silty Sand with Gravel, medium brown, moist, medium dense fine to medium grained
				-		
1	23	6.1	118.9	1 --		
				-		minor asphalt fragments, moist, medium dense, fine to medium grained
				2 --		
				-		
3	71	13.5	117.7	3 --	SM	Silty Sand, medium brown, moist, medium dense, fine grained
				-		
				4 --		moist
				-		
5	55	12.8	119.0	5 --		
				-		medium brown to yellowish-brown, moist, dense, fine grained, some gravel
				6 --		
				-		
8	30 50/5"	11.9	117.0	7 --		
				-	SW	Sand with gravel, yellowish-brown, moist, very dense, fine grained
				8 --		
				-		
				9 --		
				-		
10	65 50/5"	9.3	99.5	10 --		
				-	SP	Sand, yellowish-brown to medium brown, moist, very dense, fine grained
				11 --		
				-		
				12 --		
				-		
				13 --		
				-		
				14 --		
				-		
15	52 50/6"	12.5	116.5	15 --		
				-	SM	Silty Sand, yellowish-brown to medium brown, moist, very dense, fine grained
				16 --		
				-		
				17 --		
				-		
				18 --		
				-		
				19 --		
				-		yellowish-brown, moist, very dense, fine grained
20	68 50/5"	13.6	103.6	20 --		
				-		Total depth: 20 feet No Water Fill to 2 feet
				21 --		
				-		
				22 --		
				-		
				23 --		
				-		
				24 --		
				-		
				25 --		
				-		
				26 --		
				-		
				27 --		
				-		
				28 --		
				-		
				29 --		
				-		
				30 --		
				-		

BORING LOG NUMBER 7

Drilling Date: 07/16/07

Project: File No. 19504 **Panattoni Development Company**

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: 2-inch Asphalt over 3-inch Base
				0 --		FILL: Silty Sand, yellowish-brown, moist, medium dense, fine to medium grained, some gravel
				-		
				1 --		
				-		
2	22	12.5	118.9	2 --		
				-		
				3 --	SM	Silty Sand, medium brown, moist, medium dense, fine grained
				-		
4	71	12.2	126.2	4 --		
				-		medium brown, moist, dense, fine grained
				5 --		
				-		
				6 --		
				-		
7	28	5.3	127.5	7 --		
	50/6"			-	SW	Sand with Gravel, yellowish-brown, moist, dense, fine grained
				8 --		
				-		
				9 --		
				-		
10	59	13.5	116.1	10 --		
	50/5"			-	SP/SM	Sand to Silty Sand, yellowish-brown to medium brown, moist, very dense, fine grained
				11 --		
				-		
				12 --		
				-		
				13 --		
				-		
				14 --		
				-		
15	52	13.9	106.0	15 --		
	50/6"			-	SM	Silty Sand, yellowish-brown, moist, very dense, fine grained
				16 --		
				-		
				17 --		
				-		
				18 --		
				-		
				19 --		
				-		moist, very dense, fine grained
20	75	20.9	96.3	20 --		
	50/5"			-		Total depth: 20 feet
				21 --		No Water
				-		Fill to 2 feet
				22 --		
				-		
				23 --		
				-		
				24 --		
				-		
				25 --		
				-		
				26 --		
				-		
				27 --		
				-		
				28 --		
				-		
				29 --		
				-		
				30 --		
				-		

BORING LOG NUMBER 8

Drilling Date: 07/16/07

Project: File No. 19504 **Panattoni Development Company**

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: 3-inch Asphalt over 2-inch Base
				0 --		FILL: Silty Sand, medium brown, moist, medium dense, fine grained
				1 --		
2	56	12.9	118.6	2 --	SM	Silty Sand, yellowish-brown, moist, dense, fine to medium grained some gravel
				3 --		
4	56	12.4	121.1	4 --		moist, dense, fine grained, some gravel
				5 --		
				6 --		
7	42	13.4	115.9	7 --	SM/SP	Silty Sand to Sand, yellowish-brown to medium brown, moist, medium dense, fine grained, some gravel
				8 --		
				9 --		
10	75/7"	9.5	111.8	10 --	SW/SP	Sand with Gravel to Sand, medium brown to yellowish-brown, moist dense, fine to coarse grained
				11 --		
				12 --		
				13 --		
				14 --		
15	55	12.2	101.6	15 --	SP/SM	Sand to Silty Sand, yellowish-brown, moist, dense, fine grained
				16 --		
				17 --		
				18 --		
				19 --		
20	35	11.5	116.2	20 --	SM	Silty Sands, medium brown, moist, medium dense, fine grained
				21 --		Total depth: 20 feet No Water Fill to 2 feet
				22 --		
				23 --		
				24 --		
				25 --		
				26 --		
				27 --		
				28 --		
				29 --		
				30 --		

BORING LOG NUMBER 9

Drilling Date: 07/16/07

Project: File No. 19504 **Panattoni Development Company**

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: 3-inch Asphalt over 4-inch Base
				0 --		FILL: Silty Sand, yellowish-brown, moist, medium dense, fine to medium grained, some gravel
				1 --		
2	30	10.7	108.4	2 --	SM	Silty Sand, slightly Clayey, moist, medium dense, fine to medium grained, some gravel
				3 --		moist, medium dense, fine to medium grained, slightly Clayey, some gravel
4	40	9.8	122.0	4 --		
				5 --		slightly Clayey, moist, medium dense, fine to medium grained
				6 --		
7	45	5.1	120.8	7 --	SW	Sand with Gravel, yellowish-brown, moist, medium dense, fine to coarse grained
				8 --		
				9 --		
10	45	5.9	114.9	10 --		moist, medium dense, fine to medium grained
				11 --		
				12 --		
				13 --		
				14 --		
15	75/7"	5.4	104.5	15 --		moist, fine to coarse grained
				16 --		
				17 --		
				18 --		
				19 --		moist, dense, fine to medium grained
20	75/6"	3.7	108.3	20 --		Total depth: 20 feet No Water Fill to 1-½ feet
				21 --		
				22 --		
				23 --		
				24 --		
				25 --		
				26 --		
				27 --		
				28 --		
				29 --		
				30 --		

BORING LOG NUMBER 10

Drilling Date: 07/16/07

Project: File No. 19504 **Panattoni Development Company**

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: 2-inch Asphalt over 4-inch Base
				0		FILL: Silty Sand, medium brown, moist, medium dense, fine to medium grained
2	27	15.9	107.1	2		medium brown to light gray, moist, medium dense, fine grained, minor bedrock fragments
4	39	13.4	120.1	4	SM	Silty Sand, slightly Clayey, medium brown to dark gray, moist, medium dense, fine grained
				5	SC/SM	Clayey to Silty Sand, medium brown to gray, moist, medium dense, fine grained
7	25 50/6"	27.0	91.8	7		medium brown, moist
				8	SC	Clayey Sand, yellowish-brown, moist, dense, fine grained
10	47	24.9	93.0	10		BEDROCK (MONTEREY FORMATION): Siltstone, light grayish-brown, moist, medium hard, well bedded
15	35 50/2"	22.9	96.9	15		Sandstone, light yellowish-brown to light gray, moist, very hard
20	30 50/4"	22.8	96.6	20		moist, very hard
				21		Total depth: 20 feet No Water Fill to 3 feet
				22–30		

BORING LOG NUMBER 11

Drilling Date: 07/16/07

Project: File No. 19504 **Panattoni Development Company**

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: 2-inch Asphalt over 4-½-inch Base
				0		FILL: Silty Sand, medium brown, moist, medium dense, fine to medium grained, some gravel
1	32	10.1	121.6	1		moist, medium dense, fine to medium grained, some gravel
				2		
3	37	11.6	120.2	3	SM	Silty Sand, medium brown, moist, medium dense, fine to medium grained
				4		moist, medium dense, fine to coarse grained
5	25	12.4	121.5	5		moist, medium dense, fine grained
				6		
7	21 50/5"	7.0	122.2	7	SW	Sand with Gravel, yellowish-brown to yellowish-reddish brown, moist, very dense, fine to medium grained
				8		
				9		
10	75/7"	10.4	125.1	10		yellowish-brown, moist, dense, fine to medium grained
				11		
				12		
				13		
				14		
15	75/7"	4.5	120.9	15		moist, dense, coarse grained
				16		
				17		
				18		
				19		
20	47	10.2	111.4	20	SW/SM	Sand with Gravel to Silty Sand, yellowish-brown, moist, medium dense, fine to coarse grained
				21		Total depth: 20 feet No Water Fill to 2 feet
				22		
				23		
				24		
				25		
				26		
				27		
				28		
				29		
				30		

BORING LOG NUMBER 12

Drilling Date: 07/16/07

Project: File No. 19504 **Panattoni Development Company**

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: 3-inch Asphalt over 4-inch Base
				0		FILL: Silty Sand, medium brown, moist, medium dense, fine to medium grained, some gravel
1	30 50/6"	8.7	120.3	1		Clayey Sand to Silty Sand with Clay, yellowish-brown, moist, very dense, fine to medium grained, very stiff, some gravel
				2		
3	17	10.3	121.7	3	SM	Silty Sand, medium brown, slightly porous, moist, medium dense, fine to medium grained
				4		
5	25	9.8	125.4	5		moist, slightly Clayey, medium dense, fine to medium grained
				6		
7	22	5.2	111.3	7	SW	Sand with Gravel, yellowish-brown, moist, medium dense, fine to medium grained
				8		
				9		
10	40	3.8	118.8	10		moist
				11		
				12		
				13		
				14		
15	54	6.3	103.8	15		moist
				16		
				17		
				18		
				19		
20	22 50/6"	8.0	95.9	20	SW/SM	Sand with Gravel to Silty Sand, yellowish brown, moist, dense, fine to medium grained
				21		Total depth: 20 feet No Water Fill to 3 feet
				22		
				23		
				24		
				25		
				26		
				27		
				28		
				29		
				30		

LOG OF TEST PIT NUMBER 1

Drilling Date: 08/07/07

Project: File No. 19504 **Panattoni Development Company**

km

Sample Depth ft.	Moisture Content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Planter Area
			0 --		FILL: Silty Sand, yellowish-brown, slightly porous, slightly moist, medium dense, fine to medium grained, minor concrete and asphalt fragments
			1 --		
			2 --		moist, medium dense, fine to medium grained
			3 --		slightly Clayey, dark gray, moist, medium dense, fine grained
			4 --	SM	Silty Sand, medium brown, moist, medium dense, fine grained
			5 --		slightly Clayey, yellowish-brown, slightly porous, moist, medium dense, fine grained
			6 --		
			7 --		Total depth: 6 feet No Water Fill to 2-½ feet
			8 --		
			9 --		
			10 --		
			11 --		
			12 --		
			13 --		
			14 --		
			15 --		
			16 --		
			17 --		
			18 --		
			19 --		
			20 --		
			21 --		
			22 --		
			23 --		
			24 --		
			25 --		