Appendix E

Geotech

E-1 Geotechnical Report, Kaiser Permanente – Vermont Parking Structure Replacement, 1517 North Vermont Avenue, Los Angeles, California

GEOTECHNICAL REPORT

KAISER PERMANENTE - VERMONT PARKING STRUCTURE REPLACEMENT
1517 NORTH VERMONT AVENUE

LOS ANGELES, CALIFORNIA

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I. INTRODUCTION

1.1 General

Kaiser Foundation Health Plan, Inc. is planning the construction of the Kaiser Permanente - Vermont Parking Structure Replacement, located at 1517 North Vermont Avenue, in the City of Los Angeles, California. The site location is shown on the Site Location Map, Figure A-1, Appendix A. GEOBASE, INC. (GEOBASE) was retained by Kaiser Foundation Health Plan, Inc. to complete a geotechnical investigation for the proposed Vermont Parking Structure Replacement.

For this geotechnical investigation report, we were provided with:

- An architectural site plan prepared by Perkins + Will and this investigation report was directed toward this plan.
- Building Section (Alternate No.2) Sheet 19, prepared by InterPark, latest revision dated August 04, 1989.
- Architectural Survey Showing Kaiser LAMC, prepared by Mollenhauer Group for Perkins + Will, Job No. LA20864, Survey dated December 09, 2014.
- Geologic and Geotechnical Investigation Report, Rebuild Sunset Hospital Project, Kaiser Permanente Los Angeles Medical Center, Los Angeles, California, prepared by Geomatrix Consultants, report number 005931.000.0, dated April 10, 2010.

This report describes the site investigation and subsurface conditions, and summarizes the results of both field and laboratory testing. These results are discussed with reference to the proposed development. Both general and specific recommendations pertinent to suitable site development and foundation design, respectively, are provided. Construction guidelines related to the geotechnical aspects of the project are also addressed.

1.2 Objectives of the Geotechnical Investigation

The objectives of the geotechnical investigation are to obtain soil parameters and evaluate the subsoils conditions in order to provide recommendations pertinent to suitable site development and foundation design. These recommendations will assist with final design and construction of the project as planned.

1.3 Scope of Services

To achieve the objectives of the geotechnical investigation, stated above, the services provided during the course of this investigation included:

- Review of available published and unpublished geotechnical, geological, and seismological reports and maps pertinent to the site;

- Review of previous soil reports and related documents (see Section III and references);

- Field exploration program consisting of hand-excavating four (4) test pits (these test pits were logged and samples representative of the materials encountered were selected for laboratory testing);

- Selection of an appropriate laboratory testing program and performing laboratory tests on selected samples;

- Evaluation of data obtained from the above, and engineering analyses; and,

- Preparation of this report describing the field investigation, summarizing the results of field testing and laboratory testing, engineering analyses, and providing appropriate recommendations for site development and foundation design.

II. SITE AND PROJECT DESCRIPTIONS

2.1 Site Description

The site layout is shown on the Site and Boring Locations Plan, Figure A-2, Appendix A. The project site is part of Parcel 2 within Parcel D, Lot 2, Tract 14811, in the City of Los Angeles. It is located at 1517 North Vermont Avenue, at the southwest corner of North Vermont Avenue and East Barnsdall Avenue, and north of Sunset Boulevard.

Currently, the site is occupied by a parking structure consisting of two (2) levels below grade and one (1) level above grade. It is bounded by: East Barnsdall Avenue to the north; North Vermont Avenue to the east; an MOB with two (2) levels of parking below grade to the south; and, a parking structure with two (2) levels below grade to the west.

Surface drainage appears to sheet flow from northwest to southeast with spot elevations of approximately 404 to 390 feet, respectively.

2.2 Project Description

The proposed development is planned to consist of demolition of the existing parking structure and construction of a new parking structure which will include two (2) levels of parking below grade and eight (8) levels above grade. In addition, associated support facilities and driveway entrance will be developed. Based on the Existing Building Section Plan, Figure A-3, Appendix A, the finish basement level of the existing parking structure is at elevation 380 feet and adjacent 4715 Sunset (previously 4733 Sunset) Parking Structure had deepened foundation extended below to the west of the current parking structure. In addition, the new parking structure will also match the MOB basement level to the south. Column loads were not available at the time of this report.

III. SITE INVESTIGATIONS

3.1 Previous Investigations

As part of this investigation, information from numerous previous investigations at the site and vicinity was evaluated and implemented into our conclusions and recommendations. These previous investigations for the existing LAMC complex and Barnsdall Park are outlined below:

- Geotechnical Investigation for Improvements to the South Edge of Barnsdall Park (BP2A), 4800 West Hollywood Boulevard, Los Angeles, California, Rebuild LAMC Sunset Hospital Project, Kaiser Permanente Los Angeles Medical Center", prepared for Kaiser Foundation Health Plan, Inc., California by GEOBASE, INC., project number C.222.64.04, dated June 2002.

- Geologic and Geotechnical Investigation Report, Rebuild Sunset Hospital Project, Kaiser Permanente Los Angeles Medical Center, Los Angeles, California, a report prepared by Geomatrix Consultants, Inc. dated April 10, 2000.

- Report of Geotechnical Investigation, Proposed Parking Structure, 4733 Sunset Boulevard, Los Angeles, California, a report prepared by LeRoy Crandall and Associates dated June 28, 1988.

- Report for Geotechnical Investigation, Proposed Medical Office Building and Parking Structure, Sunset Boulevard and Vermont Avenue, Los Angeles, California, prepared by LeRoy Crandall and Associates, report number AD-85003, dated January 31, 1985.

- Geotechnical Investigation, Proposed Satellite Dish, Los Angeles Medical Center, Los Angeles, California, a report prepared by Law Crandall, Inc., dated August 13, 1993. City of Los Angeles Log Number 34210.

Data from the field boring logs and laboratory test results of the above listed reports have been reviewed and evaluated. Based on our evaluation including our own data, we concur with the aforementioned laboratory test results and field data, and they are incorporated in our study, as supplemental data. The locations of the pertinent borings are shown on Figure A-2, Appendix A. Relevant boring logs and laboratory test data are presented in Appendices B and C, respectively.

3.2 Field Program

The field investigation was carried out on December 15, 2016, and consisted of excavating four (4) test pits, at the approximate locations shown on the Site and Boring Locations Plan, Figure A-2, Appendix A. The test pits were advanced to a maximum depth of four and one-half (4.5) feet. The test pits were located and surveyed by Kaiser Construction. Therefore, the test pit locations are approximate and should be considered accurate only to the degree implied by the method used.

The Log of Test Pits, together with an Explanation of Terms and Symbols used, are given in Appendix B, Figures B-1 thru B-5, inclusive. In addition, the log of borings from previous site investigations performed by LeRoy Crandall and Associates (1985) and Geomatrix (2000) are included in Appendix B. The locations of these borings are also shown on Figure A-2, Appendix A.

Sampling consisted of:

- Collection of disturbed samples at selected locations retrieved from test pits.

- Collection of soil samples at selected locations using a Modified California Sampler (MCS). The soil samples were retained in a series of brass rings, each having an inside diameter of 2.41 inches and a height of one (1) inch. These ring samples were placed in close-fitting, moisture-tight containers for shipment to the laboratory.

3.3 Laboratory Testing

The samples obtained during the field program were returned to the laboratory for visual examination and testing. The soils were classified in accordance with ASTM D 2487 and D 2488. The laboratory testing program consisted of the following:

- Laboratory determination of water (moisture) content of soils, rock, and soil aggregate mixtures (ASTM D 2216) and dry density (ASTM D 2937);

- Liquid limit, plastic limit and plasticity index of soils (ASTM D 4318);

- Direct shear test of soils (ASTM D 3080);

- Expansion potential of soils (ASTM D 4829); and,

- Water soluble sulfates content of soils (CT 417), pH and electrical resistivity (CT 643) and water soluble chlorides (CT 422); and,

- Maximum density and Optimum moisture test (ASTM D1557).

The laboratory test results are presented on the Log of Test Pits, Figures B-1 thru B-5, inclusive, Appendix B, where applicable, and in Appendix C.

IV. GEOLOGY AND SEISMOLOGY

The engineering geologic report is provided in Appendix D.

V. SUBSURFACE CONDITIONS

5.1 Subsoil Conditions

The generalized stratigraphic profile at the site and vicinity consists of about two (2) to ten (10) of fill soils and native alluvium consisting of clay, silt and sand underlain by shale and siltstone bedrock; however, on the east side of the proposed parking structure, the geologic interpretation indicates that the alluvium is significantly deeper, as shown on Figure 3 of the Engineering Geologic Report in Appendix D.

At the test pit locations, the generalized stratigraphic profile consists of six (6) inches of concrete floor slab over approximately one (1) to four and one-half (4.5) feet of fill underlain by bedrock and alluvium, within the western and eastern portions of the site, respectively. It should be noted that observation of fill was limited due to excavation depth safety requirements at test pit locations T-2 and T-3; it is possible that fill depth could extend to greater depths. At test pit T-1 and T-4 locations, siltstone and shale bedrock was observed at shallow depths.

The bedrock is thinly bedded, slightly diatomaceous, and highly fractured. Bedding orientation is generally northwest to northeast and dip five (5) to thirty-five (35) degrees to the north.

5.2 Site Groundwater Conditions

Test pits excavated by GEOBASE and boreholes previously drilled by LeRoy Crandall and Associates in the vicinity did not encounter groundwater to a total depth of exploration. However, water seepage was measured at depths greater than forty (40) feet at 4715 Sunset parking structure to the west and greater than thirty (30) feet at 4700 Sunset to the south. Based on Seismic Hazard Zone Report 026, Plate 1.2, the historical highest groundwater level at the site was approximately thirty-five (35) feet below existing grade. This plate is reproduced herein as Figure A-4, Appendix A.

Notwithstanding the above, it is not uncommon for groundwater or seepage conditions to develop where none previously existed. In this respect, groundwater conditions may be altered by geologic detail between borings, by seasonal and meteorological variations, and by construction activity.

VI. SEISMICITY

6.1 Site Coordinates

The site latitude and longitude are 34.0988 degrees north and 118.2922 degrees west, respectively.

6.2 Site Classification

The soil classification procedure recommended by CBC 2016, subsection 1613.3.2, which references ASCE 7-10, Chapter 20, was adhered to.

The generalized subsoil data, based on numerous geotechnical boreholes and geophysical shearwave survey measurements, performed by others, is presented in Figure A-5, Appendix A. In this respect, the shearwave velocity was estimated to be 330 m/s for the upper 100 feet. To develop seismic design criteria, the subsurface materials within the top 100 feet at the site are judged to be Site Class D.

6.3 Seismic Design Criteria

Based on CBC 2016, subsection 1616.10.2, which references and modifies ASCE 7-10, subsection 11.4.7:

1. Site specific, site response analysis will be required if the structure is located in Site Class F soils, unless the exception to Section 20.3.1 of ASCE 7-10 is applicable.

2. Site-specific Ground-Motion Hazard Analysis (GMHA) will be required for: Seismically isolated structures and structures with damping systems on sites with S_1 greater than or equal to 0.6g; and, time-history analysis of the structure's being performed.

3. For buildings assigned to Seismic Design Category E or F, or when required by the building official, a GMHA shall be performed in accordance with ASCE 7, Chapter 21, as modified by Section 1803A.6 of the CBC 2016.

Based on the above criteria, since the structure is assigned to Seismic Design Category E (see subsection 6.3.1.2), a site-specific GMHA was completed. The following subsections present the seismic design parameters based on the mapped parameters and the site specific GMHA.

6.3.1 Mapped Seismic Design Parameters

6.3.1.1 Mapped Accelerations Response Spectra

Mapped, risk-targeted maximum considered earthquake, MCE_R, spectral response accelerations for 0.2 and 1.0 second periods are provided in maps published in the ASCE 7-10, which is the reference used in the CBC 2016. These maps are prepared by the USGS and the California portion of the map was prepared jointly with the CGS. These maps use results of seismic hazard analyses from both probabilistic and deterministic procedures, and are applicable to Site Class B and five (5) percent of critical damping. The mapped site accelerations are adjusted for site class effects using parameters Fa and Fv, which are functions of site class and mapped site spectral accelerations.

The mapped design horizontal spectral accelerations were evaluated in accordance with ASCE 7-10, using the US Seismic Design Maps Application (USGS, 2016) available at the USGS website: http://geohazards.gov/designmaps/us/application.php. This web application requires the inputs of site location (coordinates) and site soil classification.

The project site is Site Class D with coefficient values Fa and Fv of 1.0 and 1.5, respectively. Mapped MCE_R accelerations obtained for the project site are summarized in Table I, below.

TABLE I
MCE_R MAPPED ACCELERATIONS

		Site Class D	
PERIOD (SECONDS)	MAPPED ACCELERATION PARAMETERS (g)	MCE_R ACCELERATIONS ADJUSTED FOR SITE CLASS EFFECTS (g)	RISK COEFFICIENTS
0.2	S_s: 2.745	2.745	C_{RS} = 0.936
1.0	S_1: 0.967	1.451	C_{R1} = 0.933

Based on Table I, the mapped spectral response accelerations, adjusted for Site Class D, S_{MS} and S_{M1} are 2.745 and 1.451, respectively.

6.3.1.2 Seismic Design Category

The mapped spectral response acceleration parameter at one (1) second period (S_1) is 0.996g which is greater than 0.75g and the building is not considered to be Risk Category IV. Therefore, a Seismic Design Category E should be used for the design of the proposed structure per Section 1613.3.5 of CBC 2016.

6.3.2 Site Specific Ground Motion Procedures Ground Motion Hazard Analysis (Site Specific GMHA Parameters)

6.3.2.1 General

As part of the GMHA, probabilistic and deterministic spectral response accelerations corresponding to the risk-targeted Maximum Considered Earthquake (MCE_R) are determined. The MCE_R ground motions are defined as the maximum level of earthquake ground shaking that is considered as reasonable to design normal structures against collapse.

The site specific MCE_R spectral response acceleration at any period is taken as the lesser of the spectral response accelerations obtained using the probabilistic and deterministic methods of GMHA. The design spectral response acceleration at any period is then determined as two thirds (2/3) of the site specific MCE_R spectral response acceleration; however, the site specific design response spectrum should not be taken less than eighty (80) percent of the design spectral response acceleration determined from the general procedure (ASCE 7-10, Figure 11.4-1), which is based on the mapped spectral response accelerations.

The CBC 2016 (reference ASCE 7-10) procedure for the determination of the site-specific GMHA includes:

- Determination of mapped MCE_R parameters.
- Use of the Next Generation Attenuation (NGA) relationships in the calculation of the probabilistic and deterministic response spectra.
- Use of the 2008 USGS fault model in the seismic hazard evaluations.
- Use of the risk coefficient of earthquake loading in the calculation of probabilistic response spectra.
- Use of the eighty-four (84) percentile values in the determination of the characteristic earthquakes corresponding to the faults in the calculation of deterministic response spectra.
- Use of the maximum rotated horizontal component in the determination of the probabilistic and deterministic response spectra.

6.3.2.2 Probabilistic MCE_R Ground Motions

The probabilistic spectral response accelerations shall be taken as the spectral response accelerations in direction of maximum horizontal response represented by a five (5) percent damped acceleration response spectrum that is expected to achieve one (1) percent probability of collapse within a fifty (50) year period. Method 1 or Method 2 may be used to determine the ordinates of the probabilistic ground-motion response spectrum per ASCE 7-10, Section 21.2.1; in the current analysis, Method 1 was used.

The probabilistic seismic risk analysis is based on the premise that moderate to large earthquakes occur on mappable Quaternary faults and that the occurrence rate of earthquakes on each fault is proportional to the Quaternary fault slip rate. This analysis assumes that earthquakes are distributed uniformly and therefore does not consider when the last earthquake occurred on the fault. The length of rupture of the fault as a function of earthquake magnitude is accounted for, and ground motion estimates at a site are made using the magnitude of the earthquake and the closest distance from the site to the rupture zone. The probabilistic risk analysis has explicitly taken into account uncertainties associated with:

- The earthquake magnitude;
- The rupture length given magnitude;
- The location of rupture zone on the fault;
- The maximum possible magnitude of earthquakes; and,
- The acceleration at the site given magnitude of earthquake and distance from the rupture zone to the site.

Probabilistic seismic hazard analyses were performed using the computer program "2008 Interactive Deaggregations" available on the USGS website. The 2008 updates of the source and attenuation models of the NSHMP (Petersen and others, 2008) are used for the determination of the response spectra in this program. The program provides seismic hazard deaggregations for the response spectra at periods: 0.0 s; 0.1 s; 0.2 s; 0.3 s; 0.5 s; 1.0 s; 2.0 s; 3.0 s; 4.0 s; and, 5.0 s.

For each of these periods, the program provides the average of response spectra obtained from the three NGA attenuation relationships recommended to be used by the CBC 2016 to evaluate the attenuation of earthquake energy with distance from the source. These NGA attenuation relationships are proposed by Boore and Atkinson (2008), Campbell and Bozorgnia (2008) and Chiou and Youngs (2008). Method 1, as described in ASCE 7-10, Section 21.2.1.1, was used to determine the probabilistic (MCE_R) ground-motion response spectrum by multiplying risk coefficients to the USGS NSHMP NGA probabilistic results. The value of risk coefficients, C_R, was determined at 0.2 second period, $C_{RS} = 0.936$ and at one (1) second period, $C_{R1} = 0.933$, from Figures 22-17 and 22-18 of ASCE 7-10, respectively. The risk coefficients for the various periods were determined as shown in Table II:

TABLE II

SEISMIC RISK COEFFICIENTS (C_R)

Periods	C_R
$T \leq 0.2s$	$C_{RS} = 0.936$
$T \geq 1.0s$	$C_{R1} = 0.933$
$0.2s < T < 1.0s$	Linear Interpolation

In order to convert the spectral response obtained from the program on the USGS website to their maximum horizontal component, the result obtained for each period from the aforementioned software was multiplied by the appropriate factor to convert it to that corresponding to the maximum rotated component. Table III presents the conversion factors used for the various periods as suggested by proposal SDPRG-1R4 (2009), Table I, page 35.

TABLE III

FACTORS USED TO CONVERT SPECTRAL ACCELERATIONS OBTAINED FROM THE NGA RELATIONSHIPS TO THOSE CORRESPONDING TO MAXIMUM ROTATED COMPONENT

Period (Seconds)	Factor
PGA	1.1
0.1	1.1
0.2	1.1
0.3	1.1
0.5	1.2
1.0	1.3
2.0	1.3
4.0+	1.4

The probabilistic spectral response accelerations corresponding to the average spectra obtained from the aforementioned three (3) attenuation relationships, and used for the determination of the site-specific MCE_R response spectra at the project site are shown in Figure A-6, Appendix A and an estimated shear-wave velocity of 330 m/s was used in the probabilistic seismic hazard analyses.

6.3.2.3 Deterministic MCE_R Spectra

The CBC 2016 specifies the deterministic MCE_R response acceleration at each period as the eighty fourth (84) percentile of the largest five (5) percent damped spectral response acceleration computed at that period for characteristic earthquakes on all known active faults within the region. The spectral accelerations should correspond to the maximum rotated component of ground motion; however, the ordinate of the deterministic MCE_R ground motion response spectrum should not be taken less than the corresponding ordinate of a lower limit MCE_R response spectrum curve determined as a function of the coefficients F_a and F_v, assuming that the values of S_s and S_1 are 1.5 and 0.6, respectively.

For the project site coordinates, provided in Figure A-1, Appendix A, a search was carried out using the USGS/CGS 2008 National Seismic Hazard Maps (NSHM) Source Parameters, and faults with characteristics that produce the strongest earthquakes at the project site were selected. Based on these results, the faults that have the largest influence on the site seismicity are the Santa Monica, Elysian Park and Hollywood faults. These faults and their corresponding parameters are provided in Table IV.

TABLE IV

FAULT PARAMETERS USED FOR THE DETERMINISTIC ANALYSIS

Fault Name	Distance from Site (Km)	Hanks Magnitude (M)	Fault Type	Preferred Dip (Degree)	Rupture Top (Km)
Santa Monica Connected alt 2	0.81	7.30	SS	44	0.8
Elysian Park (Upper)	0.83	6.50	Reverse	50	3.0
Hollywood	1.57	6.50	SS	70	0

Peak ground accelerations and response spectra corresponding to the characteristic earthquake for each of the aforementioned faults were determined using the average of the three (3) attenuation relationships discussed in subsection 6.3.2.2 and recommended by the CBC 2016. The Microsoft Excel spreadsheet prepared by L. Atiq and available at the website: http://peer.berkeley.edu/products/rep_nga_models.htm was used to obtain the response spectra corresponding to the characteristic earthquakes. Using this spreadsheet, the eighty four (84) percentile (sigma plus one standard deviation) values of the spectral responses were selected. Since the CBC 2016 requires use of the maximum rotated horizontal component to be used in the analysis, the result obtained for each period from the aforementioned software was multiplied by the appropriate factor to convert it to that corresponding to the maximum rotated component. Table III, subsection 6.3.2.2, presents the conversion factors used for the various periods as suggested by proposal SDPRG-1R4 (2009), Table I, page 35. As noted previously, a shear wave velocity of 330 m/s was used in the determination of characteristic earthquakes for each of the faults.

Figure A-7, Appendix A, shows spectral response accelerations of the characteristic earthquakes, which correspond to the specified MCE_R accelerations. This figure also shows the specified lower limits of the MCE_R spectral accelerations, obtained as described in the ASCE 7-10 standard.

By comparing the ordinates of the specified MCE_R spectral response accelerations from the faults governing maximum ground motions at the site with the corresponding ordinates from the specified lower limits of the acceleration response spectra curve, the response spectra from the deterministic method were obtained and are shown in Figure A-7, Appendix A.

6.3.2.4 Site-Specific MCE_R Spectra

The site specific MCE_R spectral response acceleration at any period, S_{AM}, is taken as the lesser of the spectral response accelerations obtained from the probabilistic and deterministic methods. The MCE_R probabilistic and deterministic spectra obtained as described in subsections 6.3.2.2 and 6.3.2.3, respectively, are presented in Figure A-8, Appendix A. The site specific MCE_R spectra defined as the lesser of the probabilistic and deterministic spectra is also shown in Figure A-8, Appendix A.

6.3.2.5 Site-Specific Design Spectra

The ASCE 7-10 specifies the design spectral response acceleration at any period as two thirds (2/3) of the site specific MCE_R spectral response acceleration; however, the design spectral response acceleration at any period should not be taken less than eighty (80) percent of the design spectral response acceleration determined using the mapped parameters for the site (see subsection 6.3.1).

The site specific design response spectrum based on two thirds (2/3) of site specific MCE_R spectral response accelerations, together with the response spectra curve obtained as eighty (80) percent of the spectra based on mapped parameters for the project site are shown in Figure A-9, Appendix A. The site specific design response spectra curve for the project site is also shown in Figure A-9, Appendix A, as the greater of the two spectra curves. Numerical values of the site specific design spectral response accelerations for the project site are provided in Table V.

TABLE V
SITE-SPECIFIC DESIGN RESPONSE SPECTRA

Period (Seconds)	Site-specific Design Spectral Response Acceleration (g)
0.00	0.684
0.01	0.686
0.02	0.752
0.03	0.835
0.05	1.001
0.075	1.209
0.100	1.417
0.20	1.464
0.30	1.501
0.50	1.573
0.75	1.339
1.00	1.104
1.50	0.803
2.00	0.501
3.00	0.313
4.00	0.214
5.00	0.172

6.3.2.6 Design Acceleration Parameters

The CBC 2016/ASCE 7-10 specifies the design response spectrum at short period, S_{DS}, as the design spectrum at the period of 0.2 second; however, this value should not be less than ninety (90) percent of the design spectra obtained at any period larger than 0.2 second. Also, the CBC 2016/ASCE 7-10 specifies S_{D1} as the greater of the design response spectrum at one (1) second or twice the spectrum at two (2) seconds. The parameters S_{MS} and S_{M1} can be taken as 1.5 times S_{DS} and S_{D1}, respectively. These values shall not be less than eighty (80) percent of values determined in mapped parameters, subsection 6.31.

Based on the above, and the values of site-specific design response spectra provided in Table V, the design acceleration parameters are obtained as follows:

- S_{DS} = 1.46g
- S_{D1} = 1.10g

6.3.2.7 Maximum Considered Earthquake Geometric Mean (MCE_G) Peak Ground Accelerations

From Figure 22-7 of ASCE 7-10, PGA = 1.062g is multiplied by the site coefficient F_{PGA} = 1.0 (Table 11.8-1) to obtain the mapped MCE Geometric Mean Peak Ground Acceleration (PGA_M). For Site Class D, PGA_M = F_{PGA} x PGA. Therefore, PGA_M = 1.062g may be used for evaluation of liquefaction, lateral spreading, seismic settlement and soil-related issues.

6.4 Earthquake Effects

6.4.1 Liquefaction

Liquefaction occurs when the pore pressures generated within a soil mass equals the overburden pressure. This results in a loss of strength and the soil then possesses a certain degree of mobility.

Factors considered to evaluate liquefaction potential include groundwater conditions, soil type, particle size distribution, earthquake magnitude and acceleration, and soil density obtained through the Standard Penetration Test (SPT) and Cone Penetration Test (CPT). Soils subject to liquefaction comprise saturated fine grained sands to coarse silts. Coarser-grained soils are considered free-draining and therefore dissipate excess pore pressures, while fine-grained soils posses undrained shear strength.

The Seismic Hazard Zones Map indicates that the project site is not located in an area subject to liquefaction, Figure A-10, Appendix A. Furthermore, the subsoils consist primarily of “very stiff” to “hard” cohesive siltstones and shale bedrock; therefore, the subsoils at the site possess a very low potential for liquefaction.

6.4.2 Seismically Induced Settlements

The proposed structure will be underlain primarily by siltstones and shale; therefore, seismically induced settlements are anticipated to be negligible.

6.4.3 Tsunamis, Inundation, Seiche and Flooding

A tsunami is a sea wave generated by a submarine earthquake, landslide, or volcanic event. The site is not located within a coastal area. Therefore, a tsunami hazard at the site is considered very low.

A seiche is an earthquake induced wave in a confined body of water, such as a lake, reservoir, or bay. Resulting oscillations could cause waves up to tens of feet high, which in turn could cause extensive damage along the shoreline. The most serious consequence of a seiche would be the overtopping and failure of a dam. The site is not located downstream of any large bodies of water that could adversely affect the property in the event of earthquake failures or seiches.

According to the Federal Emergency Management Agency (FEMA), map number 06037C1610F, September 26, 2008, Flood Insurance Rate Map, Los Angeles County and Incorporated Areas, California, the proposed project site is located in Zone X, areas determined to be outside of the 0.2% annual chance of floodplain (Figure A-11, Appendix A).

6.4.4 Surface Rupture

Ground surface displacement along a fault, although more limited in area than the ground shaking associated with it, can have disastrous consequences when structures are located straddling a fault or near a fault zone. Fault displacement involves forces so great that in most cases it is not practically feasible (structurally or economically) to design and build structures to accommodate rapid displacement and remain intact. Amounts of movement during a single earthquake can range from several inches to tens of feet. Another aspect of fault displacement comes not from the violent movement associated with earthquakes, but the barely perceptible movement along a fault called "fault creep". Damage by fault creep is usually expressed by the rupture or bending of buildings, fences, railroad tracks, streets, pipelines, curbs, and other linear features.

No faulting was observed during our field reconnaissance. In addition, active, potentially active, and other major inactive faults, noted on fault maps, do not cross nor project toward the site. Furthermore, the site is not located within any Alquist-Priolo Earthquake Fault zone (APEQFZ) Map as designated by the California Geological Survey (CGS), Figure A-10, Appendix A. The closest active (APEQFZ) fault to the site is the Hollywood fault located approximately 1.57 km to the north. Therefore, the possibility of any hazard due to ground surface rupture or fault offset at the property is considered low; however, cracking due to shaking from distant events is not considered a significant hazard, although it is a possibility at any site.

6.4.5 Seismically Induced Landsliding

The site area is relatively flat and the site is not located within a designated area where previous occurrence of landslide movement, or local topographic, geological, geotechnical and subsurface water conditions indicate a potential for permanent ground displacement such that mitigation would be required (CDMG, 1999 and City of Los Angeles, 1996).

6.4.6 Lateral Spreading

Seismically induced lateral spreading involves primarily movement of earth materials due to ground shaking. Lateral spreading is demonstrated by near vertical cracks with predominantly horizontal movement of the soil mass involved. The potential for liquefaction at the site is considered very low and the topography of the project site and the immediate vicinity is relatively flat. Therefore, the potential for lateral spreading at the subject site is considered very low.

6.4.7 Subsidence

Subsidence refers to the sudden sinking or gradual downward settling and compaction of soils and other surface material with little or no horizontal motion. It may be caused by a variety of human and natural activities, including earthquakes. Since the site is underlain by shale and siltstones bedrock, it is our opinion that the potential hazard associated with subsidence at the site is very low.

VII. CONCLUSIONS

It is our opinion that the site is geotechnically suitable for the proposed development provided that the geotechnical recommendations presented herein are incorporated in the plans and specifications, and properly carried out in the field during construction. The following presents a summary of the findings:

- The western portion of the site is underlain by fill soils to depths in the order of one

(1) to one and one-half (1.5) feet below existing slab subgrade. These fill soils are underlain by bedrock. The geologic interpretation indicates the eastern portion of the site is underlain by alluvium. The depth of alluvium extends to up to approximately forty (40) feet below the eastern wall of the proposed parking structure. The alluvium is in turn underlain by bedrock.

- Groundwater was not encountered at the site to the total depth of exploration and is judged to be in excess of forty (40) feet at this time. Published historic highest groundwater level is thirty-five (35) feet below existing grade.

- The project site is classified as Site Class D per CBC 2016.

- The project site is not mapped in an area susceptible to subsidence, landslides, liquefaction, or current City of Los Angeles/ State of California APEQFZ.

- On site soils possess a “medium” to “high” expansion potential.

- On site soils, have a “moderate” sulfate concentration and are “severely corrosive” to metals.

- The flood insurance rate map (FIRM) prepared by the Federal Emergency Management Agency (FEMA), map number 06037C1610F, effective date September 26, 2008 shows the site to be in Zone X. Zone X is an area determined to be outside of 0.2 percent annual chance of floodplain.

VIII. SITE DEVELOPMENT RECOMMENDATIONS

8.1 General

The proposed development as described in subsection 2.2, is feasible from a geotechnical engineering standpoint, provided project plans and specifications should take into account the appropriate geotechnical features of the site and conform to the geotechnical recommendations.

8.2 Clearing

All surface vegetation, asphaltic concrete, trash, debris, underground pipes, and concrete pieces after demolishing the existing structures should be cleared and removed from the proposed site. Topsoil and soils with organic inclusions are not considered suitable for reuse as structural fill, but may be stockpiled for future use in landscape areas.

Underground facilities such as utilities, pipes or underground storage tanks may exist at the site. Removal of underground tanks is subject to state law as regulated by County or City Health and/or Fire Department agencies. If storage tanks containing hazardous or unknown substances are encountered, the proper authorities must be notified prior to any attempts at removing such objects.

Septic tanks should be removed in their entirety. Cesspools or seepage pits should be pumped of their contents and backfilled with a two-sack sand-cement slurry. Any water wells, if encountered during construction, should be exposed and capped in accordance with the requirements of the regulating agencies.

Depressions resulting from the removal of buried obstructions, existing building foundations and pipes should be backfilled with properly compacted material.

8.3 Subgrade Preparation

8.3.1 Below Grade Building Pad

Below existing grade excavation depths for building pad are anticipated to be in the order of twenty (20) feet. The building pad should be excavated to the subgrade and/or foundation level in bedrock or firm to dense alluvium. If undocumented fills and/or loose alluvium were observed to extend deeper at some locations, they should be removed, replaced and recompacted to achieve a minimum density of ninety-five (95) percent relative compaction per ASTM D-1557. Backfill requirements below footing bottoms, where required, are outlined in subsection 9.2.1 herein. The exposed bedrock subgrade should be observed to verify the removal of all unsuitable materials to competent bedrock or firm to dense alluvium. To alleviate bedrock/soil transition, the bedrock portion of subgrade shall be overexcavated a minimum of three (3) feet, moisture conditioned to approximately two (2) percent over optimum moisture content and recompacted to at least ninety-five (95) percent relative compaction per ASTM D 1557.

8.3.2 Minor Structures, Walkways, Flatwork and Pavement Areas

In order to minimize the potential for excessive settlement of minor structures which are structurally separated from the building structure, the footing subgrade areas should be overexcavated to provide a uniform compacted fill blanket a minimum three (3) feet in thickness below adjacent grade, or at least two (2) feet below footing bottoms, whichever is greater. The lateral extent of removal beyond the footing limits should be equal to at least the depth of overexcavation. The fill should be compacted to a minimum of ninety (90) percent relative compaction (ASTM D 1557).

The subsoils within the concrete walkways, flatwork and parking areas, and within two (2) feet of their proposed limits, should be overexcavated at least two (2) feet and replaced as properly compacted fills. The lateral extent of overexcavation should be at least equal to the depth of fill.

Concrete flatwork within the site may be expected to be influenced by the on-site "medium" to "high" expansive soils. They are typically susceptible to cracking due to settlement or heave of subgrade materials upon wetting. This problem may be exaggerated when the subgrade soils are allowed to dry out after rough grading and then saturated after the exterior slabs are constructed. Design for complete mitigation of expansive soil conditions are generally considered impractical from a cost standpoint for hardscape items such as patios and walkways; however, maintaining moisture conditions with the subgrade soils to approximately two (2) to four (4) percentage points above optimum moisture content prior to placing concrete, and maintaining positive drainage away from hardscape areas will help to mitigate the effects of expansive soils to some degree.

The above subgrade preparation recommendations may only be considered if future maintenance as a result of settlement or swelling of underlying undocumented fills and alluvium can be tolerated.

Alternatively, one option to mitigate the potential adverse effect of underlying undocumented fills and alluvium is removal and replacement with properly compacted granular fills. Further, the use of a two (2) foot blanket of non-expansive "select" material beneath the concrete flatwork would also enhance their performance, but not eliminate the adverse effects of expansive soils.

8.4 Fill Placement

8.4.1 Preparation of Bottom of Excavations

Prior to placing any fill, the exposed bedrock at the bottom of excavations should be scarified to a minimum depth of six (6) inches, moisture conditioned (wetted or dried) to at least optimum moisture content and compacted to a minimum of ninety (90) percent relative compaction, based on ASTM D 1558.

Fill placement on slopes exceeding 5H:1V (Horizontal:Vertical) gradient shall be benched with a maximum height of five (5) feet.

8.4.2 Compaction

Granular fill materials should be placed in loose lifts of six (6) to eight (8) inches, moisture conditioned to near optimum, and compacted to the minimum relative compaction listed in Table VI.

Cohesive soils should be placed in loose lifts not exceeding six (6) inches, moisture conditioned to approximately two (2) to four (4) percentage points above optimum, and compacted to the minimum relative compaction listed in Table VI.

TABLE VI
COMPACTION REQUIREMENTS

TYPE OF FILL/AREA	RELATIVE COMPACTION (ASTM D 1557) MINIMUM PERCENT
Within Building Pad	95
All Other Fill	90

Construction activities and exposure to the environment can cause deterioration of the subgrade. Therefore, it is recommended that the condition of the final subgrade be observed and/or tested by GEOBASE immediately prior to slab-on-grade construction.

8.4.3 Fill Material

The on-site bedrock/soils are expected to have a “medium” to “high” expansion potential and may be reused as fill material; however, only “very low” to “low” expansive soils should be used for wall backfill. On-site bedrock/soil used as fill shall be free of roots, clay lumps, debris and rock fragments exceeding four (4) inches. Expansion index tests shall be performed at completion of rough grading to verify expansion potential. Any soils imported to the site for use as fill for subgrade materials should be predominantly granular with very low expansion potential (Expansion Index less than twenty [20]) and should contain sufficient fines (approximately twenty [20] percent passing the No. 200 sieve) so as to be relatively impermeable when compacted. The imported soils should be approved by GEOBASE prior to importing.

8.4.4 Shrinkage

The on-site soils will undergo some volume change when excavated and replaced as properly compacted fill. Since an accurate determination of in-place and compacted densities cannot be made over the entire project area, accurate earthwork shrinkage estimates cannot be provided. Based on our experience with similar soils, a shrinkage value in the order of ten (10) to fifteen (15) percent may be used as a guideline for the on-site soils.

8.5 Drainage

To enhance future site performance, it is recommended that all pad drainage be collected and directed away from proposed structures and slopes to disposal areas off site. For soil areas, we recommend that a minimum of five (5) percent gradient away from foundation elements be maintained. It is important that drainage be directed away from foundations and that proper drainage patterns be established at the time of construction and maintained through the life of the structures. Roof gutter discharge should be directed away from the building to suitable discharge points.

All excavation slopes should be properly drained and maintained to help control erosion. Care should be exercised in controlling surface runoff onto the temporary slopes. The area back of the slope crest should be graded such that water will not be allowed to flow freely onto the slope face. If excavations of temporary slopes are carried out in the rainy season, appropriate erosion protection measures may be required to minimize erosion of the slope cuts.

8.6 Temporary Excavations

The following subsections address unsupported excavations and shored excavations.

8.6.1 Unsupported Excavations

Temporary unsurcharged excavations in soils to depths of approximately four (4) feet below grade may be cut vertically without shoring. Temporary excavations in bedrock without out-of-slope bedding may be made to a height of approximately ten (10) feet. For deeper cuts, the slopes should be properly shored or sloped back at least 1H:1V (Horizontal:Vertical) or flatter. Excavations in bedrock with out-of-slope bedding should be properly shored. No surcharge loads should be permitted within a horizontal distance equal to the height of cut from toe of excavation unless the cut is properly shored. Adjacent to existing buildings, the bottom of unshored excavations should not extend below a plane drawn at 1H:1V (Horizontal:Vertical) downward from the foundations of the existing buildings and underground pipelines unless the cut is properly shored. Where space is not available, the recommendations for design of temporary shoring presented in subsection 8.6.2 should be used.

The exposed slope face should be kept moist (but not saturated) during construction to reduce local sloughing.

All excavations and shoring systems should meet, as a minimum, the requirements given in the State of California Occupational Safety and Health Standards. Stability of temporary slopes is the responsibility of the contractor.

8.6.2 Shored Excavations

In areas where stability or space considerations do not permit sloped excavations, temporary shoring may be used to support vertically cut excavations. In the following paragraphs, recommendations are provided to evaluate the feasibility of both cantilevered and braced/tied back shoring.

8.6.2.1 General

All shoring systems should meet the minimal requirements given in the State of California Occupational Safety and Health Standards.

A cantilevered shoring system using active earth pressures , may be used only in areas where lateral movement of soils behind the shoring wall and associated wall movement (at least 0.01 radian deflection) can be tolerated. Cantilevered shoring with at-rest earth pressures should be used in areas where the performance of adjacent structures are affected by wall movements.

As an alternative, consideration may be given to a braced or tie-back shoring system.

8.6.2.2 Lateral Earth Pressures

For the design of cantilevered shoring, where lateral movement of soils behind the wall can be tolerated, a triangular distribution of lateral earth pressures may be used as shown in Figure A-12, Appendix A. It may be assumed that the retained soils with a level surface behind the cantilevered shoring will exert a lateral pressure equal to that developed by a fluid with a density of forty-five (45) pounds per cubic foot . Where movements cannot be tolerated, a lateral pressure equal to that developed by a fluid with a density of sixty-five (65) pounds per cubic foot (at-rest earth pressures) may be used.

Where shoring is used to retain bedrock with unfavorable bedding, triangular distribution of lateral earth pressures equal to that developed by a fluid with a density of fifty-five (55) and seventy-five (75) pounds per cubic feet should be used for walls where lateral movement can be tolerated or cannot be tolerated, respectively.

Considering excavations needed for construction of the proposed Parking Structure unfavorable bedding is anticipated to be encountered at the excavation of the east wall of the Parking Structure.

When shoring is used to support surcharge loads, the diagram given in Figure A-13, Appendix A may be used to determine lateral pressures. It is recommended that surcharges be included in the design of shoring where loads due to normal street traffic or heavy equipment such as cranes or trucks are anticipated within fifteen (15) feet of the top of the shoring.

Where the shoring system is adjacent to any existing buildings, the lateral surcharge pressure from the building foundations should be considered in the shoring design, or the foundations should be underpinned prior to excavations.

8.6.2.3 Design of Soldier Piles

Lateral resistance for soldier piles may be assumed to be provided by passive pressures below the bottom of excavation. Allowable passive pressures equivalent to a fluid pressure of 900 pounds per cubic foot may be used for soldier piles embedded in bedrock. Where unfavorable bedding for passive loads exist in the bedrock adjacent to the soldier piles, an allowable passive pressures equivalent to a fluid pressure of 350 pounds per cubic foot may be used. Unfavorable bedding for passive loads are encountered at the west wall of the Parking Structure. The aforementioned allowable passive pressures are for soldier piles spaced not less than two (2) diameters center-to-center and includes the doubling effect for isolated piles.

Provisions should be taken to assure firm contact between the soldier piles and the undisturbed soils or bedrock such that full lateral pressures can be developed.

Soldier piles may be designed for vertical loads using an allowable unit skin friction of 600 pounds per square foot in bedrock. The unit skin friction may be applied to the full pile surface area in bedrock.

Soldier piles used for temporary excavations may not be pulled, but may be cut-off if need be.

8.6.2.4 Lagging

Spaces between the soldier piles should be covered by continuous lagging as excavation progresses. The soldier piles and anchors should be designed for the full anticipated lateral pressure; however, the pressure transferred to the lagging will be less due to arching of the soil. The lagging can be designed for the recommended earth pressures but this pressure may be limited to a maximum value of 400 pounds per square foot. Any void between the back of lagging and the excavation should be backfilled with a two-sack sand-cement slurry.

All lumber to be left in the ground should be pressure-treated in accordance with the specifications of the American Wood Preservers Association (AWPA).

8.6.2.5 Monitoring

Inspection, survey monitoring and observations of the shoring system shall be in accordance with CBC 2016, subsection 1812A.6.

Monitoring of existing structures shall be in accordance with CBC 2016, subsection 1812A.6.

It is recommended that a licensed surveyor be retained to establish monuments on the shoring, the surrounding ground and adjacent structures prior to excavations. Such monuments should be monitored for horizontal and vertical movement during construction on a daily basis. Results of the monitoring program should be provided immediately to the project structural (shoring) engineer and GEOBASE for review and evaluation.

8.7 Trench Backfill

Utility trench backfill could be placed and compacted by mechanical means.

If utility contractors indicate that it is undesirable to use compaction equipment in close proximity to a buried conduit, other methods of utility trench compaction may also be appropriate as approved by GEOBASE at the time of construction. Jetting or flooding of backfill material is not recommended.

8.8 Excavatability

Based on our experience with projects developed on similar type of natural materials and on the excavation of exploratory test borings, the siltstone and shale are expected to be rippable with conventional heavy-duty grading and/or excavation equipment in open excavation to the anticipated construction depths. Concretions, if encountered, could require special excavation equipment and very heavy effort.

IX. FOUNDATION RECOMMENDATIONS

9.1 General

Based on present plans, the proposed structure will include two (2) subterranean levels. The results of our site investigation and review of previous site investigations indicate that the foundation for the proposed building may be supported on spread footings established in bedrock and/or dense alluvium.

The following recommendations have been formulated from visual, physical and analytical considerations of the existing site conditions and are believed to be applicable for the proposed development.

The on-site soils and bedrock have a "medium" to “high” expansion potential. The recommendations presented in the following subsections are based on a "medium" to “high” expansion potential for the subgrade soils. Foundations and slab reinforcement configurations should meet, as a minimum, the requirements of the regulating agencies and/or the 2016 CBC.

9.2 Footings

Spread or continuous footings may be used for support of the proposed structure. Footings should have a minimum of width of two (2) feet and be embedded a minimum two (2) feet in bedrock or dense alluvium, and should be based a minimum of three (3) feet below adjacent grade.

9.2.1 Soil Bearing Pressures

Spread and continuous footings based on competent bedrock or firm to dense alluvium , may be designed for an allowable dead-plus-live load bearing pressure of 6,000 psf. The allowable bearing capacity is based on the assumption that the base of footing is embedded a minimum of two (2) feet into competent bedrock or firm to dense alluvium. Where competent bedrock or firm to dense alluvium is deeper than the planned bottom of footing elevation, the footing excavation shall be deepened as needed. The footing may then be placed on competent bedrock or firm to dense alluvium or the excavation may be backfilled with cement slurry with a minimum compressive strength of 500 psi to reach planned footing bottom. For the latter option, provisions of Section 1803.5.9 of 2016 CBC or Los Angeles City Building Code for use of "controlled low-strength material” (CLSM) shall be followed. The maximum edge pressures induced by eccentric loading or overturning moments should not be allowed to exceed the above-mentioned allowable bearing values.

Footings placed closer than one (1) width apart should be structurally tied.

9.2.2 Footings Adjacent to Trenches or Existing Footings

Where footings are located adjacent to utility trenches, they should extend below a one-to-one plane projected upward from the inside bottom corner of the trench. Footings excavations adjacent to the footings of existing buildings should be carried put such that the existing footings are not undermined.

9.2.3 Settlements

Total static settlement of footings supported on bedrock or firm to dense alluvium is not anticipated to exceed one (1) inch with differential settlement not exceeding one-half (½) inch over a span of forty (40) feet. In addition to static settlements, total and differential seismically induced settlements are anticipated to be negligible.

The settlement estimates outlined above are based on the bearing pressure applied at the base of the footing (includes the weight of the footing and fill placed over the footing) and a maximum footing width of twelve (12) feet. The estimated settlements should be reviewed once the foundation plans are finalized.

9.2.4 Lateral Load Resistance

Lateral loads may be resisted by friction between the bottom of footings and the subgrade soil as well as by passive earth pressure against the side of the footing. For frictional resistance, a friction coefficient of 0.35 may be used for bedrock. For passive resistance, a lateral passive pressure equivalent to a fluid pressure of 150 pounds per cubic foot may be used to a maximum of 3,000 psf. The foundations should be poured tight against bedrock or compacted fill. Lateral resistance and frictional resistance may be combined without reduction in determining the total lateral resistance.

9.2.5 Footing Observations

All foundation excavations should be observed by GEOBASE prior to the placement of forms, reinforcement, or concrete, for verification of conformance with the intent of these recommendations and confirmation of the bearing capacities. All loose or unsuitable materials should be removed prior to the placement of concrete. Materials from footing excavations should not be spread in slab-on-grade areas unless compacted.

9.3 Footings for Minor Structures

Minor structures may be designed using the presumptive load-bearing values outlined in CBC 2016, provided that the risk of future settlements and associated maintenance can be tolerated.

9.4 Basement Walls

9.4.1 Earth Pressures

The walls should be designed to resist lateral pressures imposed by the surrounding soils and surcharge loads. It is recommended that for static loading condition: walls which are away from existing adjacent improvements and that are free to rotate at the top (at least 0.01radian deflection) should be designed to resist a lateral pressure imposed by an equivalent fluid weighing forty five (45) pounds per cubic feet. For walls close to existing adjacent improvements where lateral wall movement cannot be tolerated or where the wall is structurally braced against movement the top, the wall should be designed to resist a lateral pressure equivalent to that imposed by a fluid weighing sixty-five (65) pounds per cubic foot.

In addition, a uniform pressure equal to one-third (1/3) and one-half (½) of any vertical pressure adjacent to the basement wall should be assumed to act on the free and braced walls respectively. These aforementioned pressures assume that positive drainage will be provided as recommended in subsection 9.4.2. For passive resistance, the lateral load resistance parameters outlined in subsection 9.2.4 may be used.

For seismic loading conditions, where appropriate, the dynamic loading increment of active earth pressures may be taken as thirty (30) psf per foot of wall height distributed in an inverted triangular distribution. In restrained, non-yielding walls, the seismic earth pressure increment depends on the ratio of frequency of the seismic load to the fundamental frequency of the wall/soil system, and accurate dynamic earth pressures can only be determined if these frequencies are known; in the absence of such data, for basement walls, an estimated increment of forty (40) psf per foot of wall height distributed in an inverted triangular distribution is considered appropriate.

9.4.2 Wall Backfill and Drainage

The backfill for basement walls shall be granular soils as described in subsection 8.4.3 and the walls should be provided with backdrains to relieve possible hydrostatic pressures on the walls. A pre-fabricated drainage system such as Miradrain, Eakadrain or equivalent, installed in accordance with the manufacturer's recommendations, may be used. The drainage system should meet the minimum requirements of CBC 2016 subsections 1805.4.2 and 1805.4.3. Alternatively, the walls should be designed to withstand hydrostatic pressures.

The basement walls and floor slab below existing grade should be waterproofed to prevent moisture build up on the interior sides of the walls as a result of water migration from the soils in contact with the walls. The waterproofing should be applied for the full height of the basement walls and walls below existing grade, and meet as a minimum the requirements of the CBC 2016, subsection 1805.3. Specific recommendations may be provided by a Waterproofing Consultant.

9.5 Ultimate Values

The recommended design values presented in this report are for use with loadings determined by a conventional working stress design. When considering an ultimate design approach, the recommended design values may be multiplied by the factors given in Table VII:

TABLE VII
LOAD FACTORS FOR ULTIMATE DESIGN

Foundation Loading	Ultimate Design Loading
Bearing Value	3
Passive Pressure	1.33
Coefficient of Friction	1.25

In no event, however, should the foundation sizes be reduced from those required for support of dead-plus-live loads when using working stress values.

9.6 Floor Slabs

In moisture sensitive areas, as a minimum, the floor slabs should be damproofed per CBC 2016, subsection 1805.2; specific recommendations can be provided by a Waterproofing Consultant.

Slab-on-grade floors should be designed by the Structural Engineer using applicable CBC requirements and designed for the intended use and loading. As a minimum, slabs should be reinforced with # 4 bars at twelve (12) inch spacing, located at mid-height of the slab. Actual slab reinforcement and thickness should be determined by the project Structural Engineer based on applicable method used as discussed below. Thickness of floor slabs should be at least five (5) inches actual and determined by the project Structural Engineer for the project loading and service conditions. Section 1808.6.2 of the 2016 California Building Code(CBC) specifies that foundations resting on soils with an expansion index greater than twenty (20) require special design considerations. Based on the limited available data, slab-on-grade estimates may be completed based on the procedures of WRI/CRSI Design of Slab on Ground Foundations using an effective plasticity index of thirty-three (33).

X. SOIL CORROSIVITY

Electrical conductivity, pH, chloride and water soluble sulfate tests were conducted on representative samples, and the results are provided in Appendix C. The tests results indicate that the subsoils at the site have a "moderate" corrosive potential with respect to concrete and "severely corrosive" potential with respect to steel and other metals. Therefore, Type II Portland cement, with water/cement ratio <0.5 and six (6) sacks of cement per cubic yard of concrete corresponding to a minimum compressive strength of 4000 psi, should be used for the construction of concrete structures in contact with the subgrade soils.

XI. RECOMMENDATIONS FOR ADDITIONAL INVESTIGATIONS

Boring or test pits could not be advanced within the eastern half of the proposed parking structure site due to obstructions. Therefore, the analyses and design recommendations presented herein are conservatively based on available subsoils data within the LAMC site (Figure A-2, Appendix A).

Borings, associated laboratory testing and analyses should be carried out within the eastern half of the proposed parking structure after demolition of the existing structure to verify the recommendations presented in this report and to provide additional recommendations as needed.

XII. PLAN REVIEW, OBSERVATIONS AND TESTING

Post-investigation services are an important and integrated part of this investigation and should be carried out by GEOBASE. The project foundation and grading plans, and specifications should be forwarded to GEOBASE for review for conformance with the intent of the soils recommendations.

Geotechnical observations of excavation bottoms should be carried out prior to fill placement. Observations and testing of all fill placement should be carried out on a continuous basis to verify the design assumptions and conformance with the intent of the recommendations. Observations of footing bases should be carried out prior to concrete pour.

XIII. LIMITATIONS

This investigation was performed in accordance with generally accepted geotechnical engineering principles and practices. No warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

This report is intended for use by the client and its representatives, and with regard to the specific project discussed herein. Any changes in the design or location of the proposed new structure, however slight, should be brought to our attention so that we may determine how they may affect our conclusions. The conclusions and recommendations contained in this report are based on the data relating only to the specific project and location discussed herein. This report does not relate any conclusions or recommendations about the potential for hazardous and/or contaminated materials existing at the site.

The analyses and recommendations submitted in this report are based upon the observations noted during drilling of the borings, interpretation of laboratory test results, and geological evidence. This report does not reflect any variations which may occur away from the borings and which may be encountered during construction. If conditions observed during construction are at variance with the preliminary findings, we should be notified so that we may modify our conclusions and recommendations, or provide alternate recommendations, if necessary.

The recommendations presented herein assume that the plan review, observations and testing services, outlined in Section XII of the report, will be provided by GEOBASE. During execution of the aforementioned services, GEOBASE can finalize the report recommendations based on observations of actual subsurface conditions evident during construction. GEOBASE cannot assume liability for the adequacy of the recommendations if another party is retained to observe construction.

This report is issued with the understanding that it is the responsibility of the owner, or of his representative, to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project, and incorporated into the plans and specifications. In this respect, it is recommended that we be allowed the opportunity to review the project plans and the specifications for conformance with the geotechnical recommendations.

This office does not practice or consult in the field of safety engineering. We do not direct the contractor's operations, and we cannot be responsible for other than our own personnel on the site. Therefore, the safety of others is the responsibility of the contractor. The contractor should notify the owner if he considers any of the recommended actions presented herein to be unsafe.

This report is subject to review by the appropriate regulating agencies.

Respectfully submitted
GEOBASE, INC.

JMC for:

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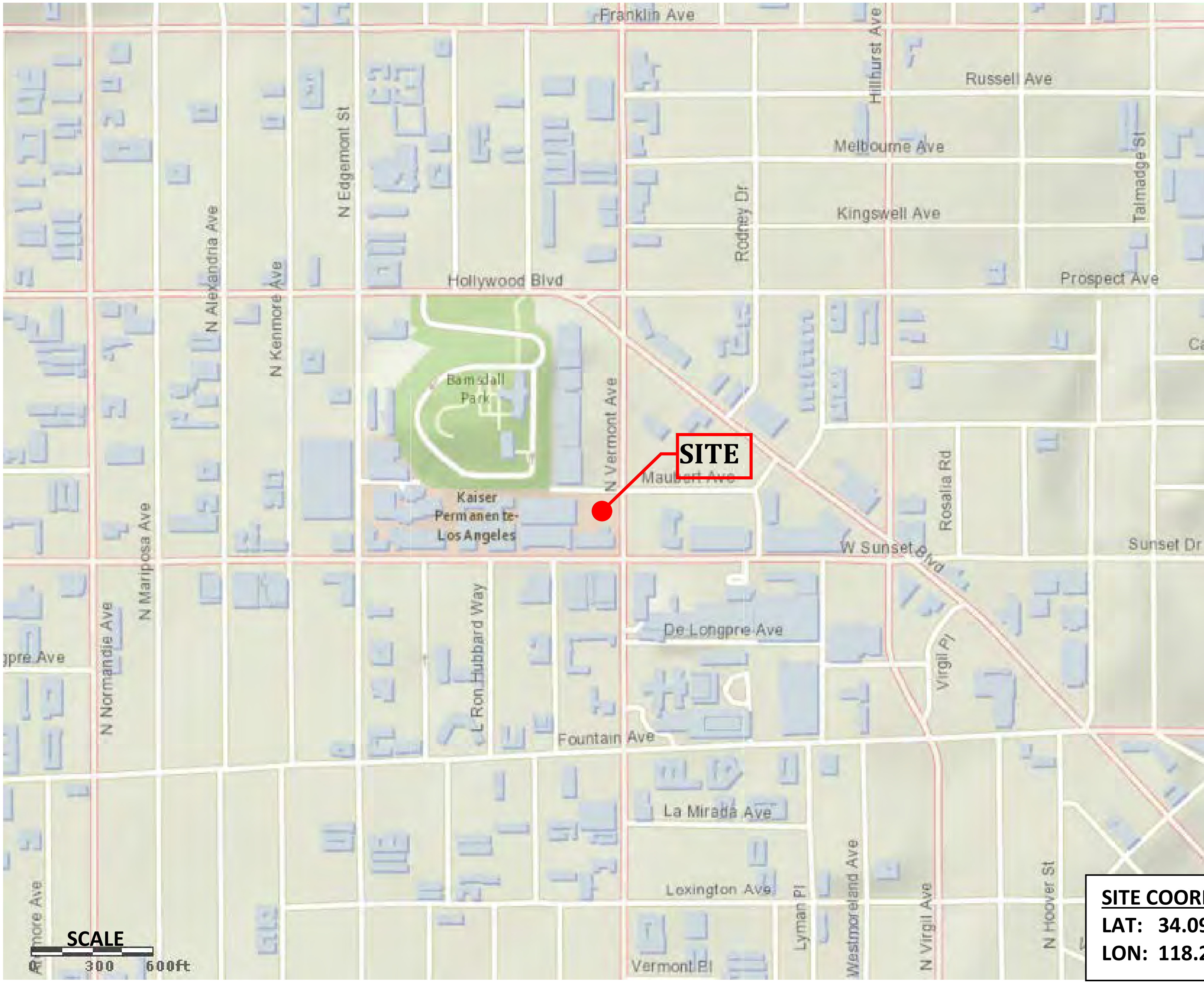
APPENDIX A



NORTH

SITE COORDINATES:
LAT: 34.0988° North
LON: 118.2922° West

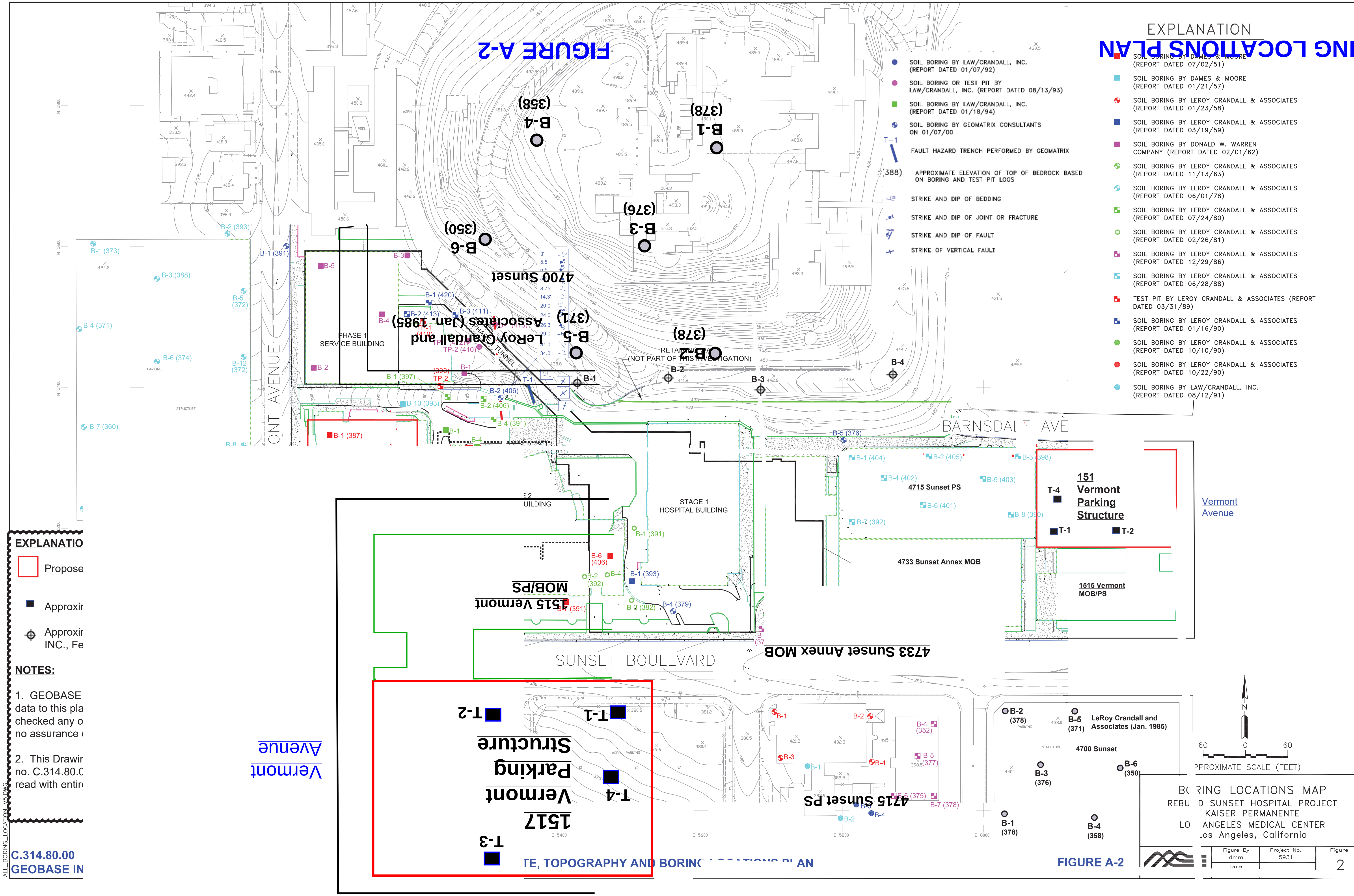
GEOBASE

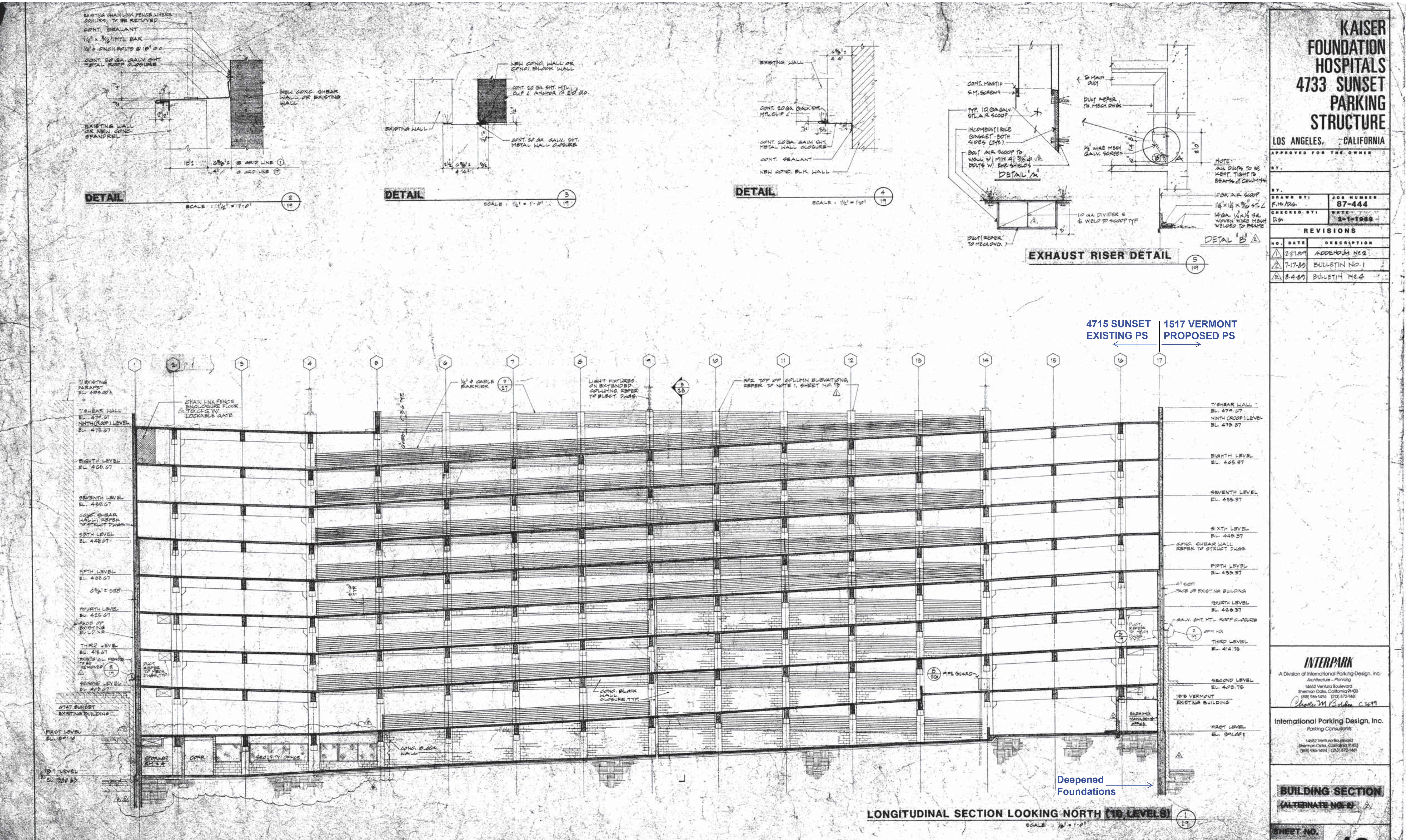
SITE LOCATION MAP

Kaiser Permanente – Vermont Parking Structure Replacement
1517 North Vermont Avenue
Los Angeles, California

C.314.80.00

FIGURE A-1

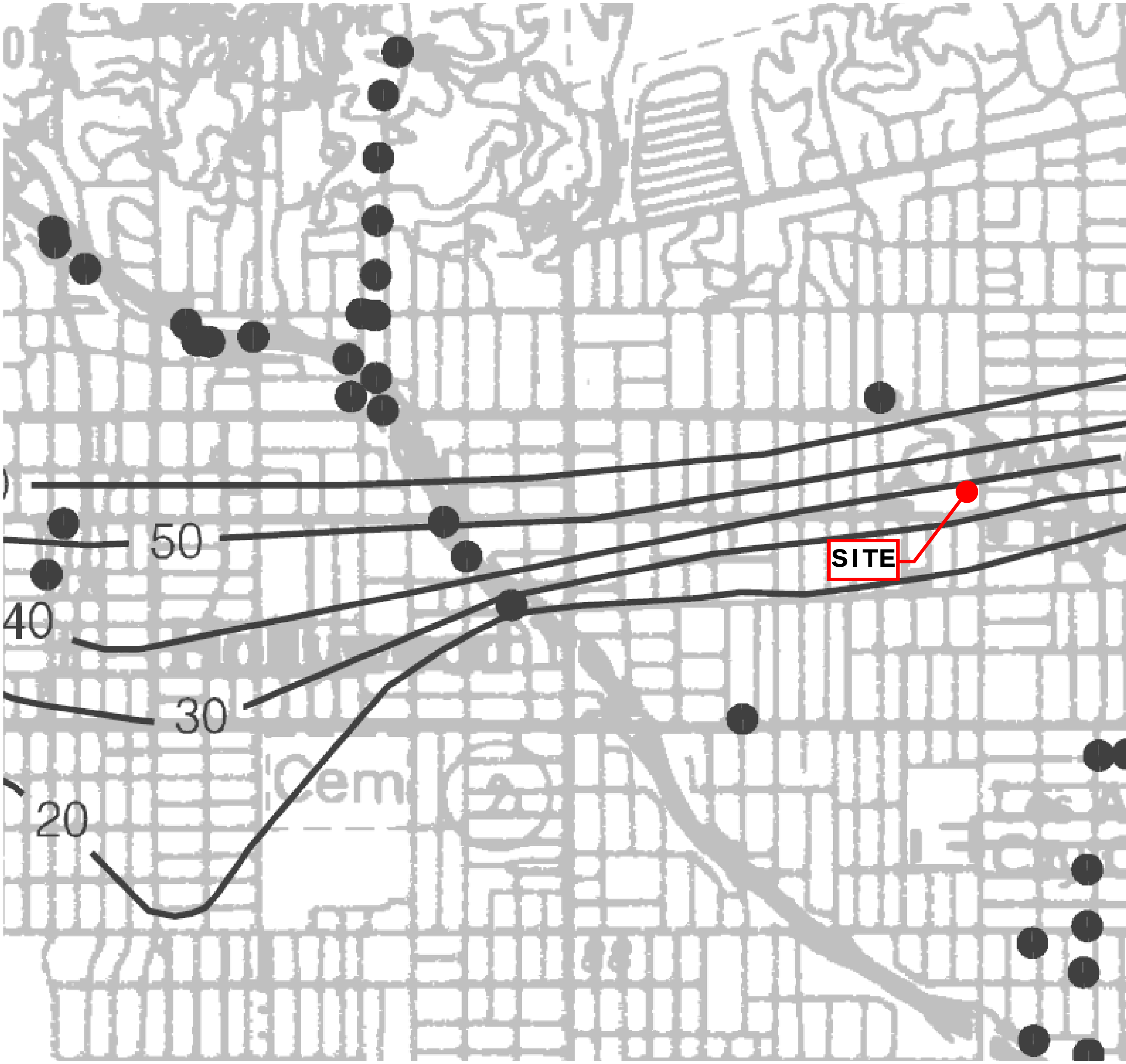

EXPLANATION
SOIL BORING BY LAW/CRANDALL, INC. (REPORT DATED 01/07/92)
SOIL BORING OR TEST PIT BY LAW/CRANDALL, INC. (REPORT DATED 08/13/93)
SOIL BORING BY LAW/CRANDALL, INC. (REPORT DATED 01/18/94)
SOIL BORING BY GEOMATRIX CONSULTANTS ON 01/07/00
T-1
FAULT HAZARD TRENCH PERFORMED BY GEOMATRIX
(388)
APPROXIMATE ELEVATION OF TOP OF BEDROCK BASED ON BORING AND TEST PIT LOGS
STRIKE AND DIP OF BEDDING
STRIKE AND DIP OF JOINT OR FRACTURE
STRIKE AND DIP OF FAULT
STRIKE OF VERTICAL FAULT
SOIL BORING BY DAMES & MOORE (REPORT DATED 07/02/51)
SOIL BORING BY DAMES & MOORE (REPORT DATED 01/21/57)
SOIL BORING BY LEROY CRANDALL & ASSOCIATES (REPORT DATED 01/23/58)
SOIL BORING BY LEROY CRANDALL & ASSOCIATES (REPORT DATED 03/19/59)
SOIL BORING BY DONALD W. WARREN COMPANY (REPORT DATED 02/01/62)
SOIL BORING BY LEROY CRANDALL & ASSOCIATES (REPORT DATED 11/13/63)
SOIL BORING BY LEROY CRANDALL & ASSOCIATES (REPORT DATED 06/01/78)
SOIL BORING BY LEROY CRANDALL & ASSOCIATES (REPORT DATED 07/24/80)
SOIL BORING BY LEROY CRANDALL & ASSOCIATES (REPORT DATED 02/26/81)
SOIL BORING BY LEROY CRANDALL & ASSOCIATES (REPORT DATED 12/29/86)
SOIL BORING BY LEROY CRANDALL & ASSOCIATES (REPORT DATED 06/28/88)
TEST PIT BY LEROY CRANDALL & ASSOCIATES (REPORT DATED 03/31/89)
SOIL BORING BY LEROY CRANDALL & ASSOCIATES (REPORT DATED 01/16/90)
SOIL BORING BY LEROY CRANDALL & ASSOCIATES (REPORT DATED 10/10/90)
SOIL BORING BY LEROY CRANDALL & ASSOCIATES (REPORT DATED 10/22/90)
SOIL BORING BY LAW/CRANDALL, INC. (REPORT DATED 08/12/91)
FIGURE A-2
ORING LOCATIONS PLAN
4700 Sunset
LeRoy Crandall and Associates (Jan. 1985)
B-1 (378)
B-2 (378)
B-3 (376)
B-4 (358)
B-5 (371)
B-6 (350)
PHASE 1 SERVICE BUILDING
RETAINING WALL (NOT PART OF THIS INVESTIGATION)
TUNNEL
BARNSDALL AVE
4715 Sunset PS
151 Vermont Parking Structure
T-1
T-2
T-4
Vermont Avenue
4733 Sunset Annex MOB
STAGE 1 HOSPITAL BUILDING
1515 Vermont MOB/PS
SUNSET BOULEVARD
1517 Vermont Parking Structure
T-3
EXPLANATIO
Propose
Approxi
Approxi INC., Fe
NOTES:
1. GEOBASE data to this pla checked any o no assurance
2. This Drawir no. C.314.80.C read with enti
C.314.80.00
GEOBASE IN
TE, TOPOGRAPHY AND BORING LOCATIONS PLAN
FIGURE A-2
60 0 60
APPROXIMATE SCALE (FEET)
BORING LOCATIONS MAP
REBUILD SUNSET HOSPITAL PROJECT
KAISER PERMANENTE
LOS ANGELES MEDICAL CENTER
Los Angeles, California
Figure By dmm
Project No. 5931
Figure 2



C.314.80.00
GEOBASE INC.

EXISTING BUILDING SECTION PLAN.

FIGURE A-3



Explanations:

30

Depth to Groundwater in feet

Borehole Site

Note:

Data obtained from Plate 1.2 Historically Highest Groundwater Contours and Borehole Log Data Locations, Hollywood Quadrangle, Los Angeles County, Seismic Hazard Zone Report 026, 1998.

NORTH

ONE MILE

SCALE

GEOBASE

HISTORIC HIGHEST GROUNDWATER LEVELS

Kaiser Permanente – Vermont Parking Structure Replacement

1517 North Vermont Avenue

Los Angeles, California

C.314.80.00

FIGURE A-4

GEOMATRIX KAISER SUNSET BOREHOLE B-4-1

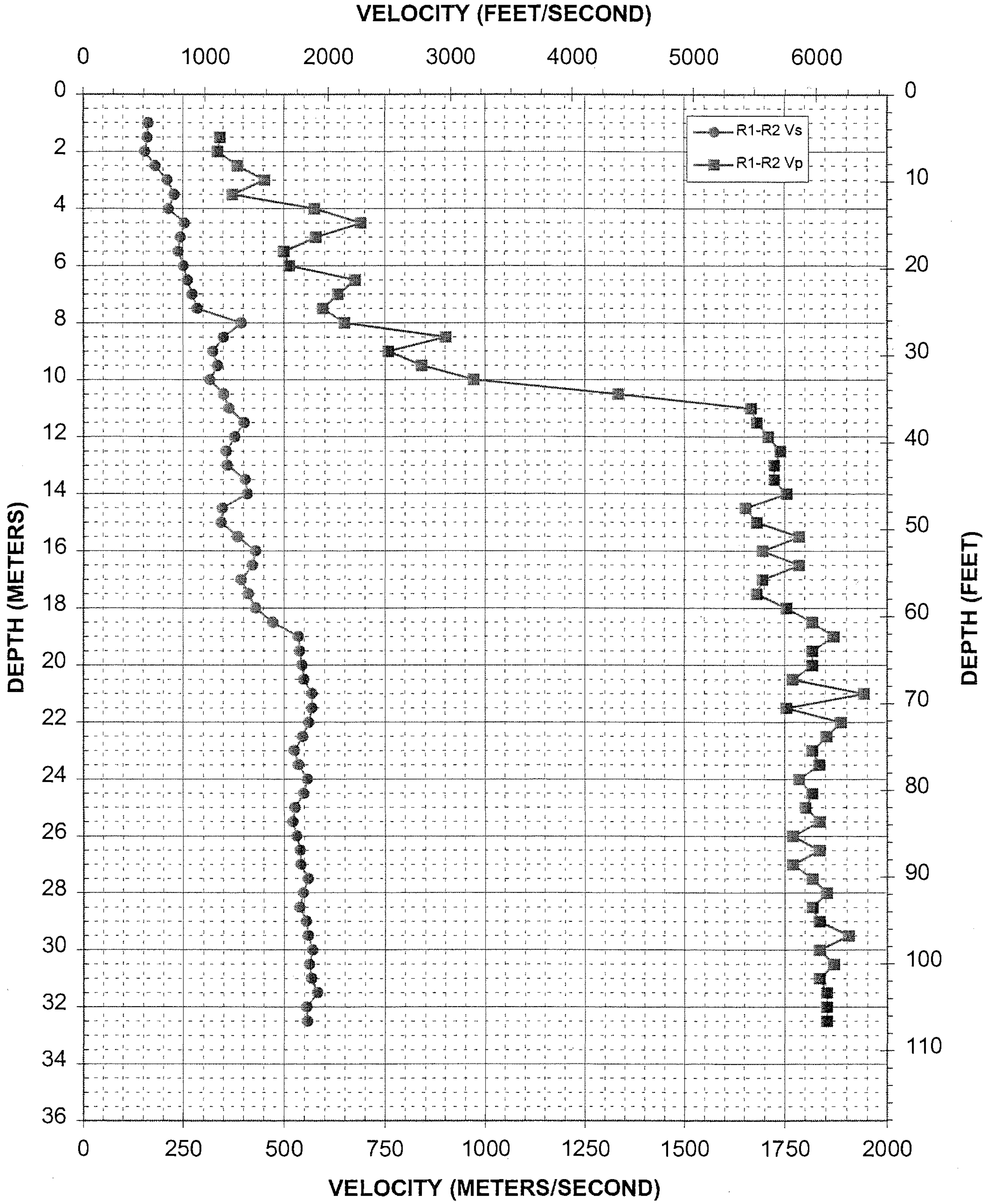


Figure 4. Borehole B-4-1, Suspension P- and S_H-wave velocities

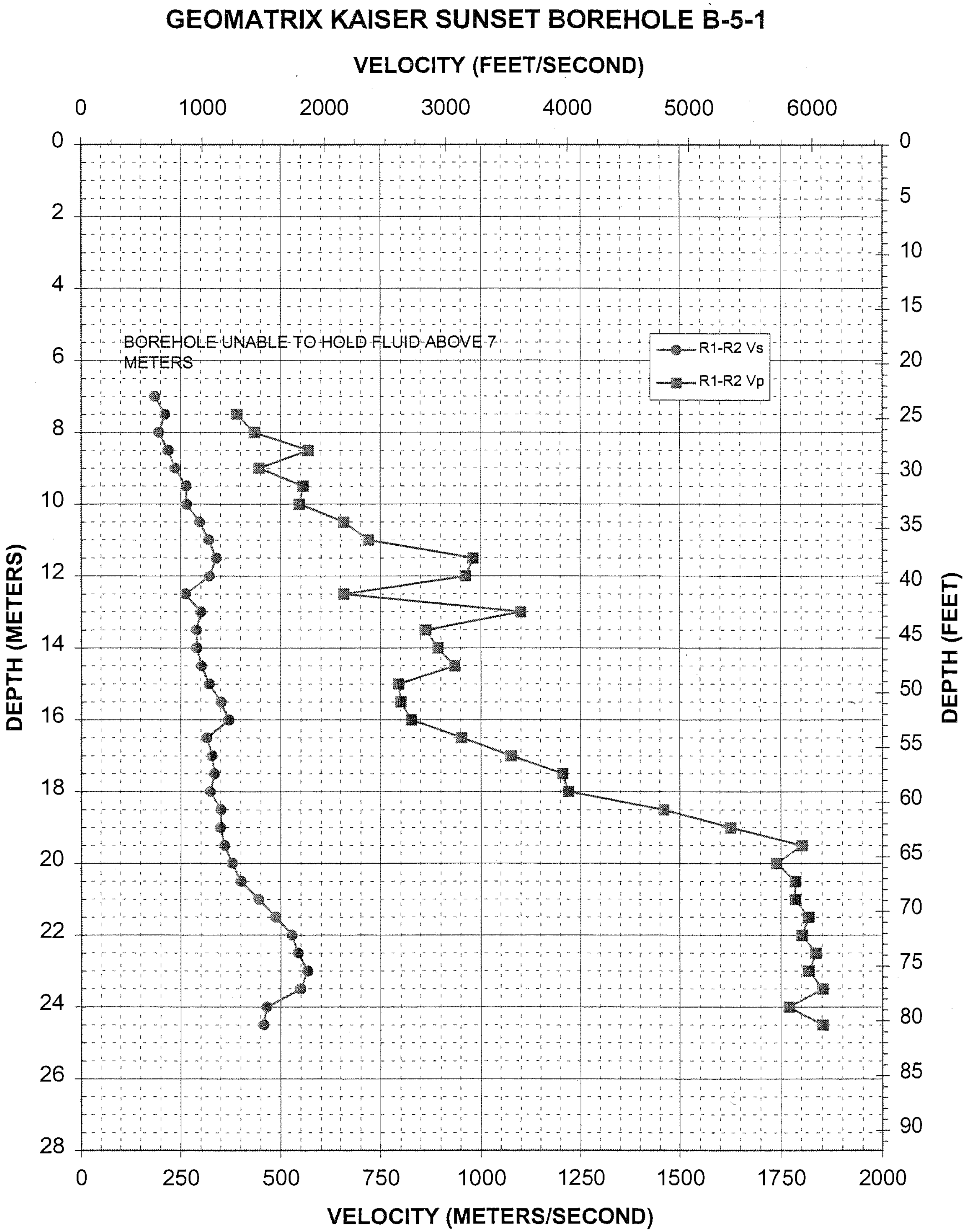
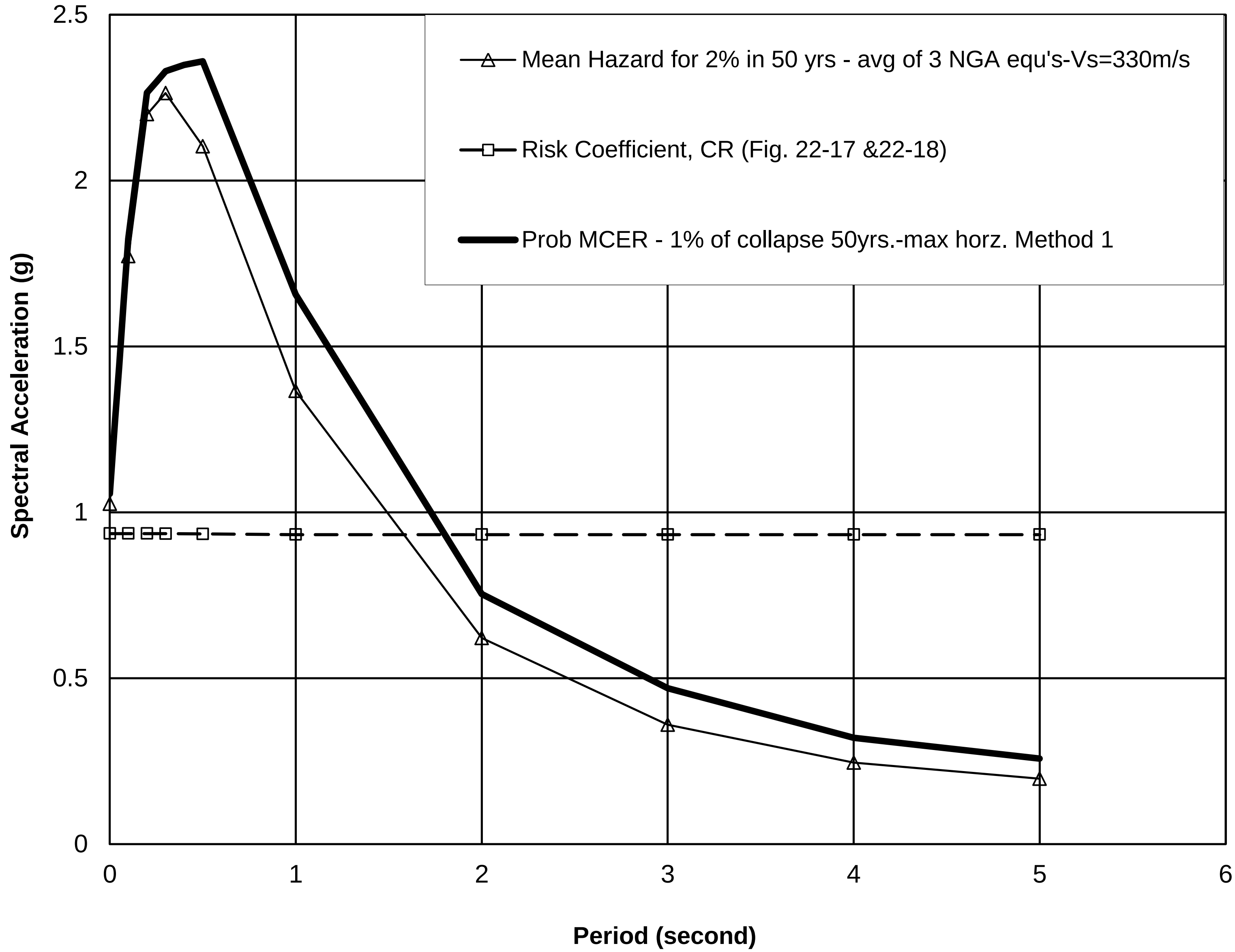


Figure 5. Borehole B-5-1, Suspension P- and S_H-wave velocities



GEOBASE

PROBABILISTIC MCE_R RESPONSE SPECTRA

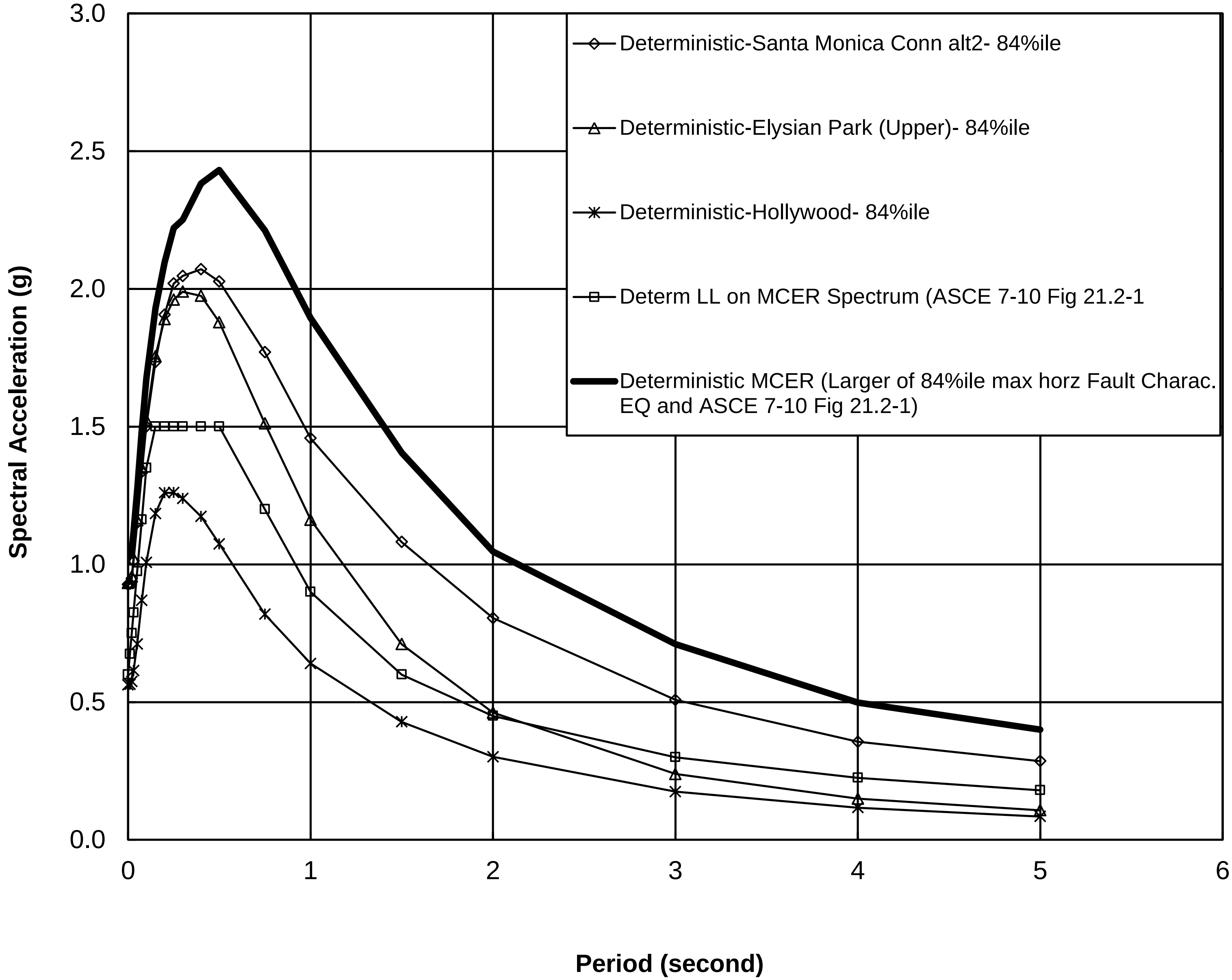
Kaiser Permanente – Vermont Parking Structure Replacement

1517 North Vermont Avenue

Los Angeles, California

C.314.80.00

FIGURE A-6



GEOBASE

DETERMINISTIC MCE$_R$ RESPONSE SPECTRA

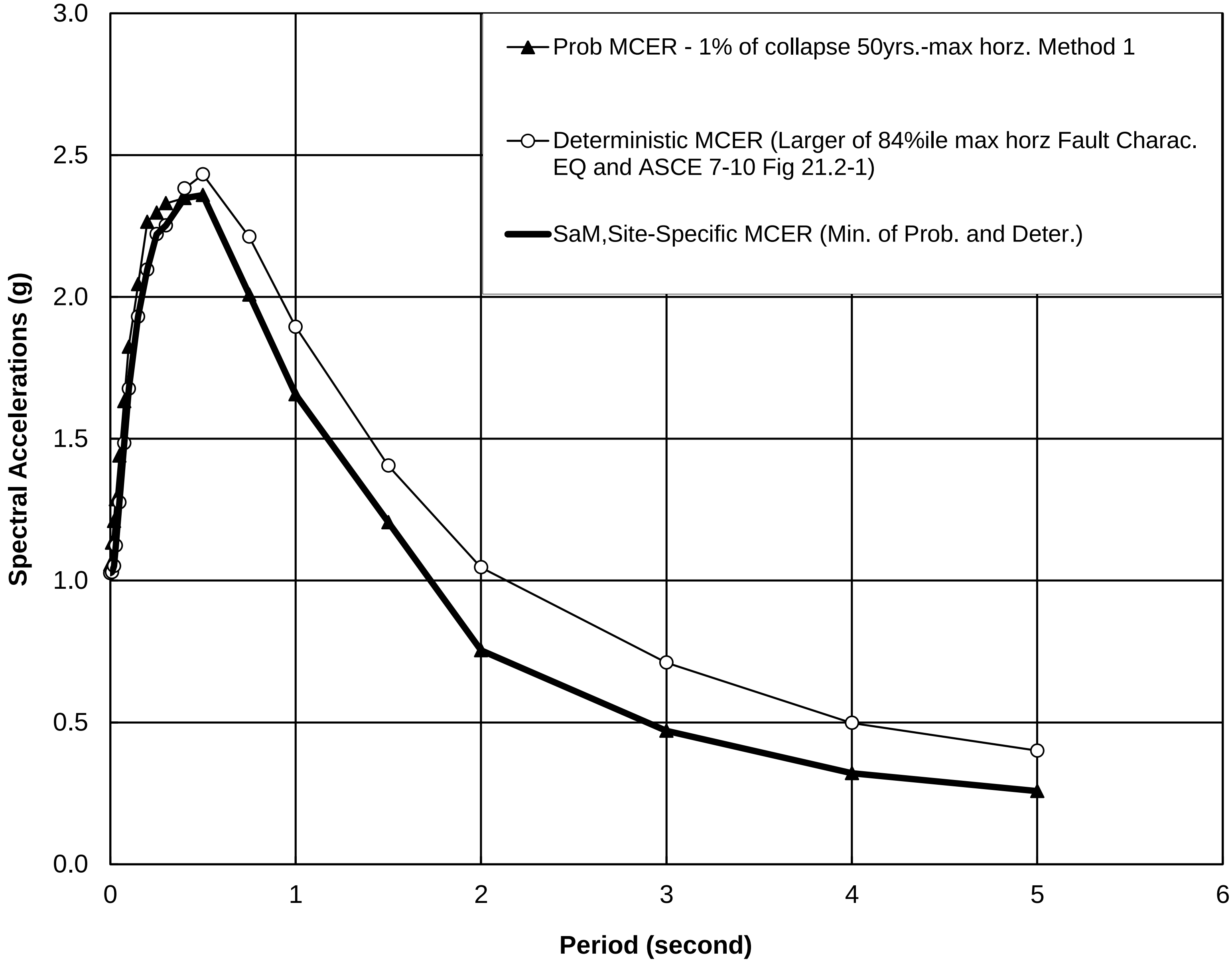
Kaiser Permanente – Vermont Parking Structure Replacement

1517 North Vermont Avenue

Los Angeles, California

C.314.80.00

FIGURE A-7

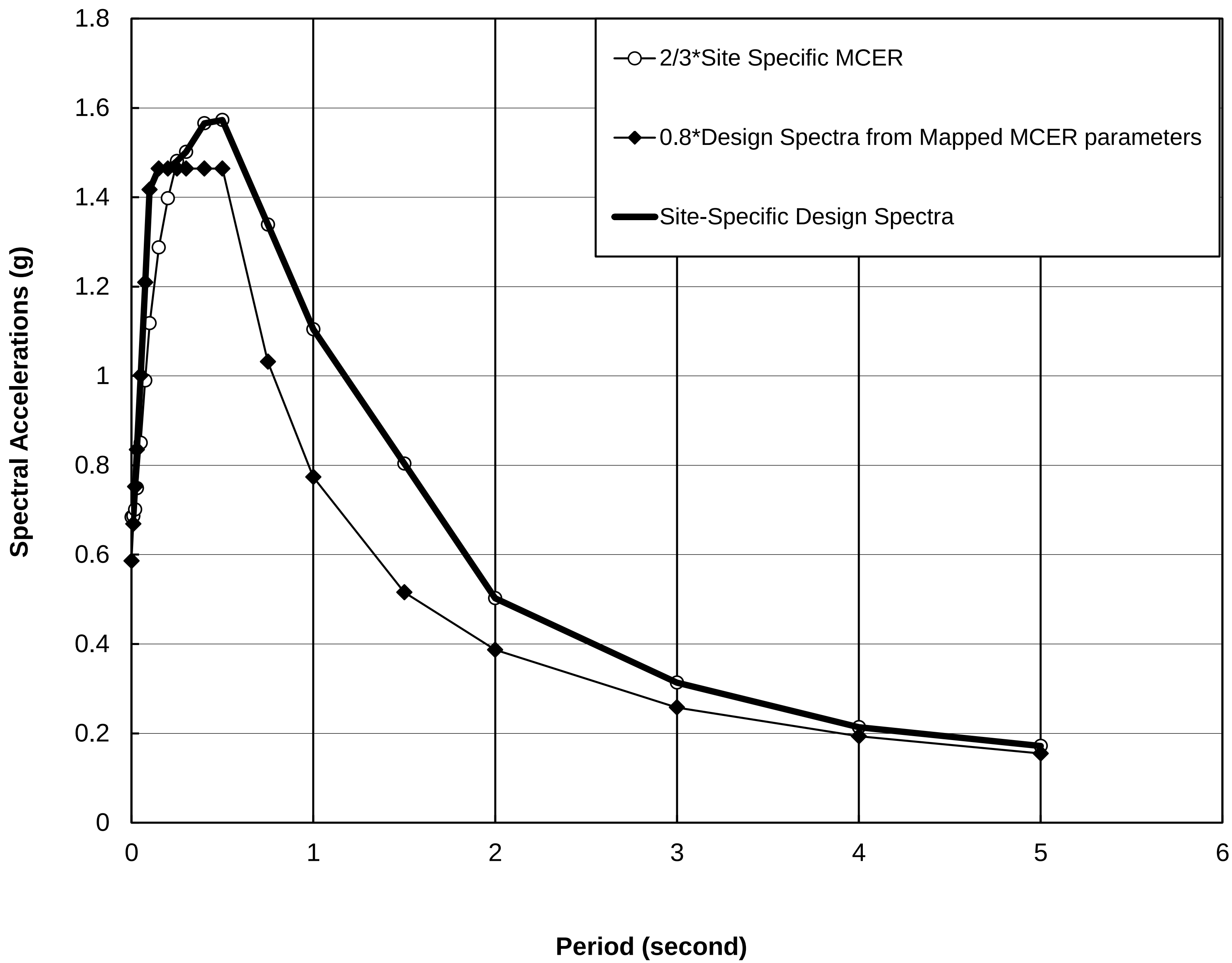


GEOBASE

SITE-SPECIFIC MCE_R RESPONSE SPECTRA
Kaiser Permanente – Vermont Parking Structure Replacement
1517 North Vermont Avenue
Los Angeles, California

C.314.80.00

FIGURE A-8



GEOBASE

SITE-SPECIFIC DESIGN RESPONSE SPECTRA

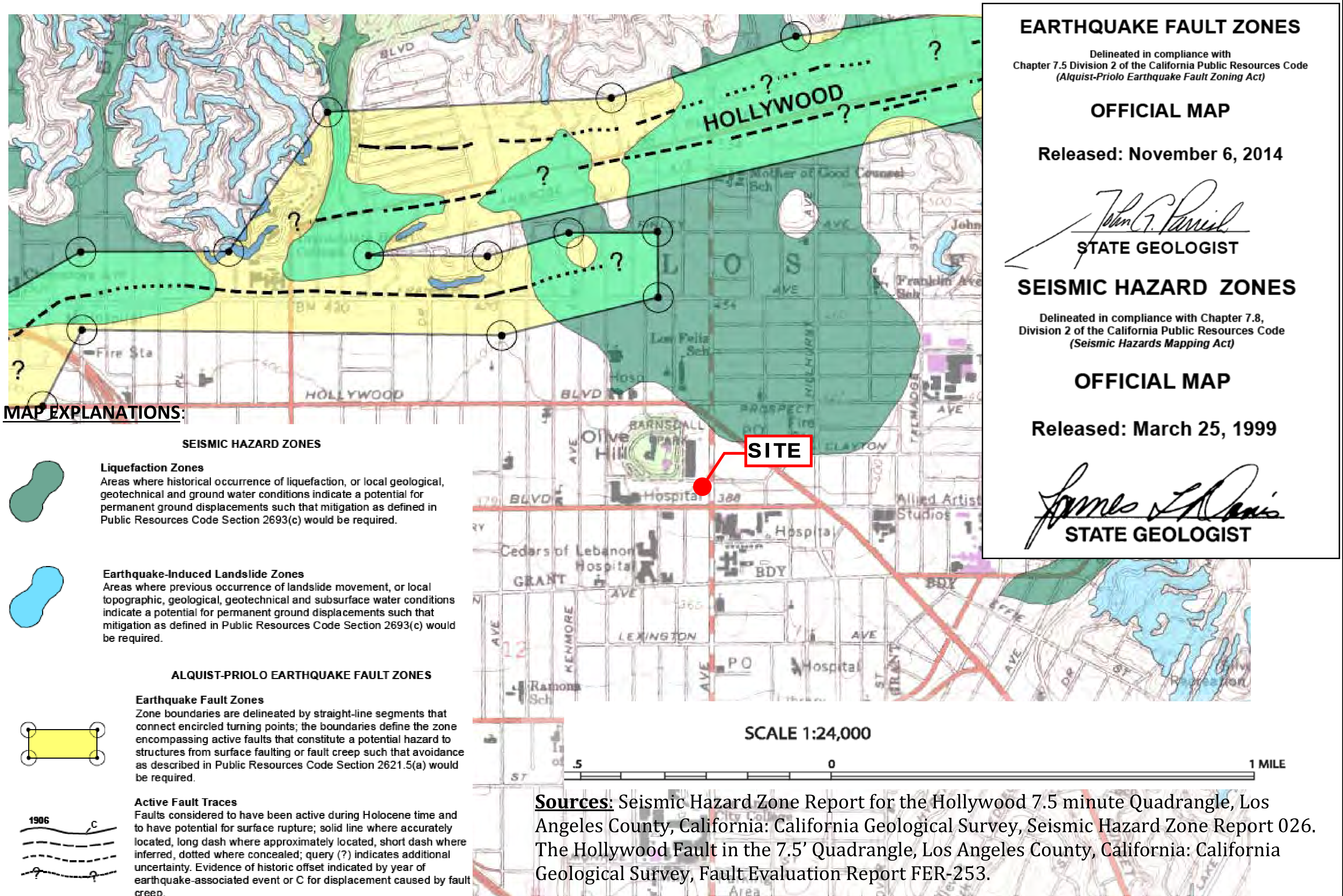
Kaiser Permanente – Vermont Parking Structure Replacement

1517 North Vermont Avenue

Los Angeles, California

C.314.80.00

FIGURE A-9



Sources: Seismic Hazard Zone Report for the Hollywood 7.5 minute Quadrangle, Los Angeles County, California: California Geological Survey, Seismic Hazard Zone Report 026. The Hollywood Fault in the 7.5' Quadrangle, Los Angeles County, California: California Geological Survey, Fault Evaluation Report FER-253.

GEOBASE

SEISMIC HAZARDS ZONES MAP

Kaiser Permanente – Vermont Parking Structure Replacement
1517 North Vermont Avenue
Los Angeles, California

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FIGURE A-10

The site is in **Zone X** – Area determined to be outside of 0.2% annual chance of floodplain.

GEOBASE

FEMA FLOOD MAP

Kaiser Permanente – Vermont Parking Structure Replacement

1517 North Vermont Avenue

Los Angeles, California

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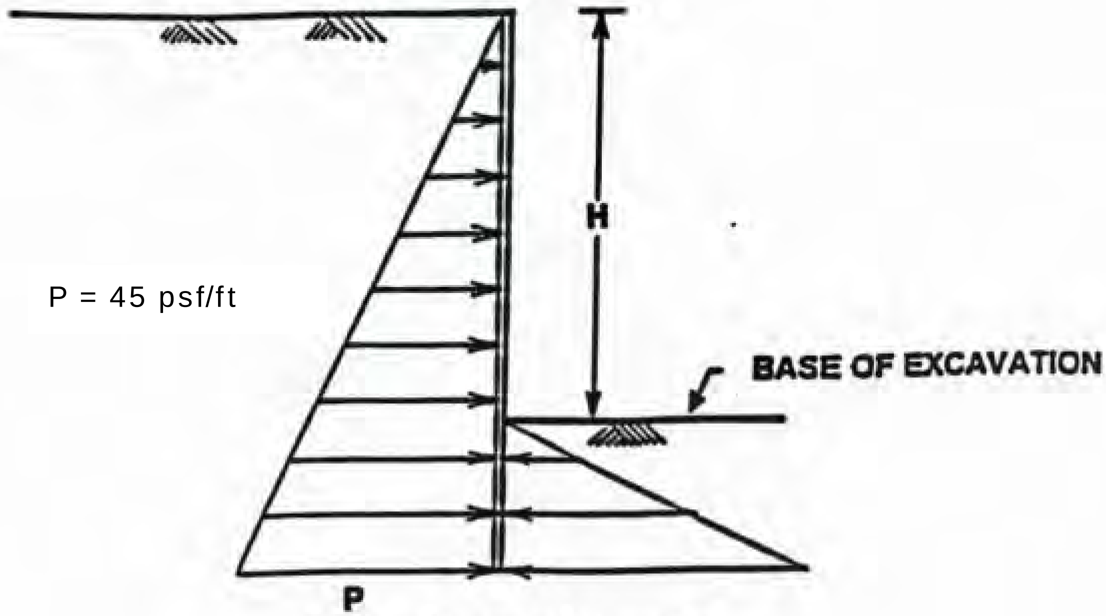
FIGURE A-11



b) Cantilevered Shoring

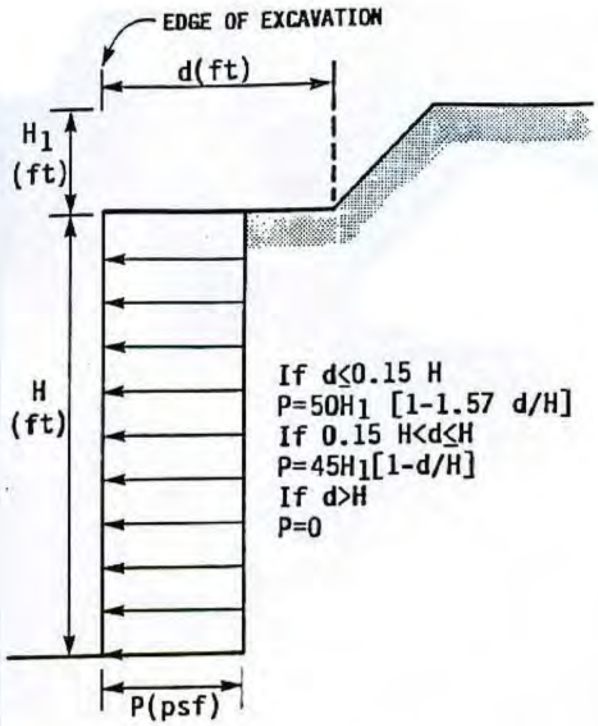
GEOBASE

Earth Pressures for Shoring

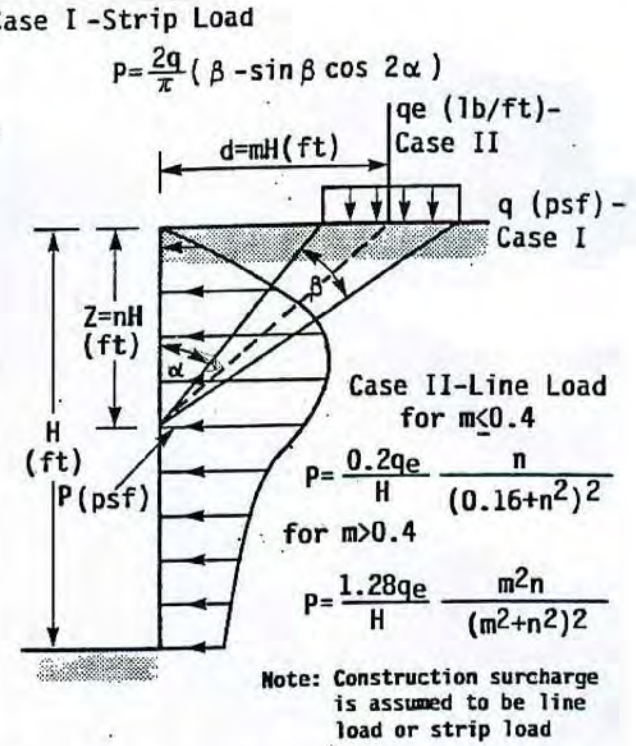
Kaiser Permanente – Vermont Parking Structure Replacement
1517 North Vermont Avenue
Los Angeles, California

C.314.80.00

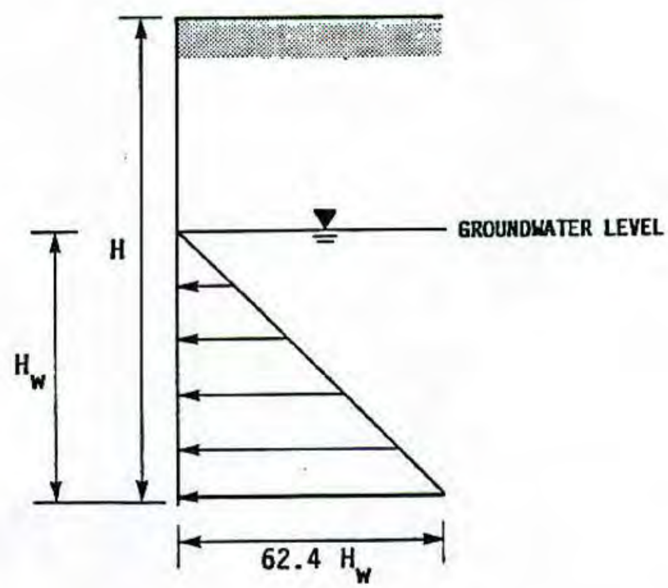
FIGURE A-12



(a) SLOPED EXCAVATION SURCHARGE



(b) CONSTRUCTION AND TRAFFIC SURCHARGE



(c) HYDROSTATIC PRESSURE

GEOBASE

ADDITIONAL LATERAL EARTH PRESSURES ON SHORING
Kaiser Permanente – Vermont Parking Structure Replacement
1517 North Vermont Avenue
Los Angeles, California

C.314.80.00

FIGURE A-13

APPENDIX B

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COARSE GRAINED SOILS (More than 50% of material is LARGER than No. 200 sieve size)	GRAVELS (More than 50% of coarse fraction is LARGER than the No. 4 sieve size)	CLEAN GRAVELS (Little or no fines)	GW	Well graded gravel, gravel-sand mixtures; little or no fines
			GP	Poorly graded gravel or gravel-sand mixtures; little or no fines
		GRAVELS WITH FINES (Appreciable amt. of fines)	GM	Silty gravels, gravel-sand-silt mixtures
			GC	Clayey gravels, gravel-sand-clay mixtures
	SANDS (More than 50% of coarse fraction is SMALLER than the No. 4 sieve size)	CLEAN SANDS (Little or no fines)	SW	Well graded sands, gravelly sands, little or no fines
			SP	Poorly graded sands or gravelly sands, little or no fines
		SANDS WITH FINES (Appreciable amount of fines)	SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures
FINE GRAINED SOILS (More than 50% of material is SMALLER than No. 200 sieve size)	SILTS AND CLAYS (Liquid limit LESS than 50)		ML	Inorganic silts and very fine sands, rock flour silty or clayey fine sands or clayey silts with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	SILTS AND CLAYS (Liquid limit GREATER than 50)		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils

BOUNDARY CLASSIFICATIONS: Soils possessing characteristics of two groups are designated by combinations of group symbols.

UNIFIED SOIL CLASSIFICATION SYSTEM

RMA Group
Every Project Matters | www.rmacompanies.com

GEOTECHNICAL CONSULTANTS

Exploratory Pit Log

Location: See Site Geologic Map
Elevation: 378'
Logged By: GW
Equipment: Hand excavation equipment
Pit No. T-1
Date Excavated: 12-15-16

Depth (ft)	Bulk Sample	Moisture Content (%)	Dry Density (pcf)		USCS	Graphic Symbol	Material Description This log contains factual information and interpretation of the subsurface conditions between the samples. The stratum lines shown on this log represent the approximate boundary between soil and rock and the transition may be gradual. The log shows subsurface conditions at the date and location indicated, and may not be representative of subsurface conditions at other locations and times.
							Concrete slab - 6" thick
	☒				CL —		Artificial fill (af): Brown silty clay with some sand, a small piece of lumber, inclusions of tan gray clay, a few small roots, and fragments of siltstone and sandstone; soft, moderately plastic, moist (extends to a depth of 15" below top of slab)
							Sedimentary bedrock (Tpsh): Brown siltstone, thinly bedded with a ½" thick limey layer along bedding at 20"; well indurated; bedding @ N87E/14NW, N85W/14NE
5							Total depth 28 inches. No groundwater
10							
15							

Exploratory Pit Log

Location: See Site Geologic Map
Elevation: 378'
Logged By: GW
Equipment: Hand excavation equipment
Pit No. T-2
Date Excavated: 12-15-16

Depth (ft)	Bulk Sample	Moisture Content (%)	Dry Density (pcf)		USCS	Graphic Symbol	Material Description This log contains factual information and interpretation of the subsurface conditions between the samples. The stratum lines shown on this log represent the approximate boundary between soil and rock and the transition may be gradual. The log shows subsurface conditions at the date and location indicated, and may not be representative of subsurface conditions at other locations and times.
							Concrete slab – 6½" thick
	☒				CL		Artificial fill (af): Brown silty clay with some sand, inclusions of tan gray clay and dark gray silty clay, and scattered siltstone and sandstone fragments; soft, moderately plastic, moist. A 3" diameter metal pipe was exposed at a depth of 18"
5							Total depth 34 inches. No groundwater
10							
15							

RMA Group
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GEOTECHNICAL CONSULTANTS

Exploratory Pit Log

Location: See Site Geologic Map
Elevation: 383'

Logged By: GW
Equipment: Hand excavation equipment

Pit No. T-3
Date Excavated: 12-15-16

Depth (ft)	Bulk Sample	Moisture Content (%)	Dry Density (pcf)		USCS	Graphic Symbol	Material Description [illegible]
							Concrete slab – 6¾" thick
					CL		Artificial fill (af): Brown silty clay with some sand, inclusions of tan gray clay and dark gray silty clay, medium stiff, moderately plastic and moist. A 30" diameter concrete pipe trending N78W crossed the center of the pit. Total depth 19 inches. No groundwater
5							
10							
15							

Exploratory Pit Log

Location: See Site Geologic Map
Elevation: 382'

Logged By: GW
Equipment: Hand excavation equipment

Pit No. T-4
Date Excavated: 12-15-16

Depth (ft)	Bulk Sample	Moisture Content (%)	Dry Density (pcf)		USCS	Graphic Symbol	Material Description [illegible]
							Concrete slab – 6½" thick
					CL		Artificial fill (af): Brown silty clay with some sand, inclusions of dark gray clay and scattered sandstone and siltstone fragments, medium stiff, moderately plastic, moist. Extends to a depth of 18 inches below top of slab.
							Sedimentary bedrock (Tpsh): Brown and orange brown siltstone, thinly bedded, well indurated, bedding @ N66E/13NW, N67E/13NW, N73E/11NW. Total depth 23 inches. No groundwater
5							
10							
15							

PROJECT: REBUILD SUNSET HOSPITAL PROJECT Kaiser Permanente Los Angeles Medical Center	**Log of Boring No. B-3**

BORING LOCATION: Sunset Blvd.

DATE STARTED: 1/7/00	DATE FINISHED: 1/7/00	NOTES: Drilling Contractor: A & R Drilling, Inc. Drilling Equipment: CME-75 HT Logged By: A. Blanc
DRILLING METHOD: Hollow-stem auger		
HAMMER WEIGHT: 140 lbs.	DROP: 30 in.	
SAMPLER: SPT & California Modified		

ELEV. (feet)	DEPTH (feet)	SAMPLES Sample No.	Sample	Blows/ Foot	MATERIAL DESCRIPTION Surface Elevation: 384.5 feet above mean sea level	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	Other Tests
	0				9 inches of asphaltic concrete			
	1				SILTY SAND with GRAVEL (SM): very dark grayish brown (10YR 3/2), moist, ~40-45% fine to coarse sand, ~25-30% fine gravel, ~30% non plastic fines [Fill]			
	2							
	3							
	3.5				SILTY CLAY (CL): olive (5Y 5/4), moist, medium plasticity			
	4							
380								
	5				WEATHERED CLAYSTONE olive (5Y 4/3), moist, low to medium plasticity, trace sandstone interbeds			
		1	X	50/4"		26	91	
	6							
	7							
	8							
	9							
375								
	10							
		2		54				
	11							
	12							
	13							
	14							
370								
	15							

GEO3

PROJECT: REBUILD SUNSET HOSPITAL PROJECT
Kaiser Permanente Los Angeles Medical Center

Log of Boring No. B-3 (cont'd)

ELEV. (feet)	DEPTH (feet)	SAMPLES: Sample No.	SAMPLES: Sample	SAMPLES: Blows/Foot	MATERIAL DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	LABORATORY TESTS: Dry Density (pcf)	LABORATORY TESTS: Other Tests
					WEATHERED CLAYSTONE: continued			
	16	3		48	laminated	24	95	
	17				sandstone lense			
	18	4		36				
365	19–20							
	21	5		33		24	91	DS
	22–23	6		50/2"	becomes hard			
360	24–25							
	26	7		62	WEATHERED SILTSTONE: pale olive (5Y 6/3), moist, low hardness, weak, laminated	25	93	
	27–28	8		50	trace fine sand seams, iron oxide staining			
355	29–30							
	31–32	9		36	Bottom of boring @ 31.5 feet. Boring backfilled with cement-bentonite grout to 2' bgs, bentonite chips to 8" bgs and capped with asphalt cold patch.	25	93	

GEO3

PROJECT: REBUILD SUNSET HOSPITAL PROJECT Kaiser Permanente Los Angeles Medical Center	**Log of Boring No. B-4**

BORING LOCATION: Front of 480 Sunset Blvd. Parking Garage		
DATE STARTED: 2/24/00	DATE FINISHED: 2/24/00	NOTES: Drilling Contractor: A & W Drill Rentals Drilling Equipment: Mayhew 1000 Logged By: A. Blanc
DRILLING METHOD: Rotary Wash		
HAMMER WEIGHT: 140 lbs.	DROP: 30 in.	
SAMPLER: 2 1/2" California Modified		

ELEV. (feet)	DEPTH (feet)	SAMPLES: Sample No.	SAMPLES: Sample	SAMPLES: Blows/Foot	MATERIAL DESCRIPTION Surface Elevation: ~390 ft.	LABORATORY TESTS: Moisture Content (%)	LABORATORY TESTS: Dry Density (pcf)	LABORATORY TESTS: Other Tests
					4' Asphalt concrete over gravelly base material			
	1							
	2				SILTY CLAY (CL): very dark grayish brown (10YR 3/2), medium plasticity fines			
	3							
	4							
	5							
	6							
	7							
	8							
	9							
	10							
	11				SILTY CLAY (CL): olive yellow (2.5Y 6/6), medium plasticity fines, [WEATHERED CLAYSTONE?]			
	12							
	13							
	14							
	15							

GEO3

Log of Boring No. B-4 (cont'd)

ELEV. (feet)	DEPTH (feet)	SAMPLES Sample No.	Sample	Blows/ Foot	MATERIAL DESCRIPTION	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	Other Tests
	16				color changes to light yellowish brown (2.5Y 6/4); streaks of brown			
	17							
	18							
	19							
	20				WEATHERED SILTSTONE: mottled light olive brown (2.5Y 5/4) and dark yellowish brown (10YR 4/4)			
	21							
	22							
	23							
	24							
	25							
	26							
	27							
	28							
	29							
	30	1		37 64/6"	olive brown, fractured, with iron oxide coated planes, streaks of gypsum, somewhat laminated, low hardness, weak, moderate to high weathering	27	95	
	31							
	32							

GEO3

PROJECT: REBUILD SUNSET HOSPITAL PROJECT
Kaiser Permanente Los Angeles Medical Center

Log of Boring No. B-4 (cont'd)

ELEV. (feet)	DEPTH (feet)	SAMPLES: Sample No.	SAMPLES: Sample	SAMPLES: Blows/ Foot	MATERIAL DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	LABORATORY TESTS: Dry Density (pcf)	LABORATORY TESTS: Other Tests
					WEATHERED SILTSTONE: continued			
	33							
	34							
	35							
	36							
	37							
	38							
	39							
	40							
	41							
	42							
	43							
	44							
	45							
	46							
	47							
	48							
	49							

GEO3

Log of Boring No. B-4 (cont'd)

ELEV. (feet)	DEPTH (feet)	SAMPLES Sample No.	Sample	Blows/ Foot	MATERIAL DESCRIPTION	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	Other Tests
					WEATHERED SILTSTONE: continued			
	50	2	X	30 70/5"	less fractured, gypsum seam and iron oxide on fractured plane, more massive structure	27	99	
	51							
	52							
	53				SILTY CLAYSTONE: very dark grayish brown (2.5Y 3/2), possibly of low hardness, weak to moderately strong			
	54							
	55							
	56							
	57							
	58							
	59							
	60							
	61							
	62							
	63							
	64							
	65							
	66							

GEO3

PROJECT: REBUILD SUNSET HOSPITAL PROJECT
Kaiser Permanente Los Angeles Medical Center

Log of Boring No. B-4 (cont'd)

ELEV. (feet)	DEPTH (feet)	SAMPLES: Sample No.	SAMPLES: Sample	SAMPLES: Blows/ Foot	MATERIAL DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	LABORATORY TESTS: Dry Density (pcf)	LABORATORY TESTS: Other Tests
					SILTY CLAYSTONE: continued			
	67							
	68							
	69							
	70							
	71							
	72							
	73							
	74							
	75							
	76							
	77							
	78							
	79							
	80							
	81							
	82							
	83							

GEO3

PROJECT: REBUILD SUNSET HOSPITAL PROJECT
Kaiser Permanente Los Angeles Medical Center

Log of Boring No. B-4 (cont'd)

ELEV. (feet)	DEPTH (feet)	SAMPLES			MATERIAL DESCRIPTION	LABORATORY TESTS		
		Sample No.	Sample	Blows/ Foot		Moisture Content (%)	Dry Density (pcf)	Other Tests
					SILTY CLAYSTONE: continued			
	84							
	85							
	86							
	87							
	88							
	89							
	90							
	91							
	92							
	93							
	94							
	95							
	96							
	97							
	98							
	99							
	100							

GEO3

Log of Boring No. B-4 (cont'd)

ELEV. (feet)	DEPTH (feet)	SAMPLES: Sample No.	SAMPLES: Sample	SAMPLES: Blows/ Foot	MATERIAL DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	LABORATORY TESTS: Dry Density (pcf)	LABORATORY TESTS: Other Tests
					SILTY CLAYSTONE: continued			
	101							
	102							
	103							
	104							
	105							
	106							
	107							
	108							
	109							
	110				possible hard lense @ 110 ft.			
	111							
	112							
	113							
	114							
	115							
	116							
	117							

GEO3

Log of Boring No. B-4 (cont'd)

ELEV. (feet)	DEPTH (feet)	SAMPLES Sample No.	Sample	Blows/ Foot	MATERIAL DESCRIPTION	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	Other Tests
					SILTY CLAYSTONE: continued			
	118							
	119							
	120				Bottom of boring @ 120 ft. Boring backfilled with cement-bentonite mixture, and capped with Rapid Set cement-grout, dyed black			
	121							
	122							
	123							
	124							
	125							
	126							
	127							
	128							
	129							
	130							
	131							
	132							
	133							
	134							

GEO3

PROJECT: REBUILD SUNSET HOSPITAL PROJECT Kaiser Permanente Los Angeles Medical Center	**Log of Boring No. B-5**

BORING LOCATION: Northeast of 4747 Sunset Bldg.

DATE STARTED: 2/24/00	DATE FINISHED: 2/25/00	NOTES: Drilling Contractor: A & W Drill Rentals Drilling Equipment: Mayhew 1000 Logged By: A. Blanc
DRILLING METHOD: Rotary Wash		
HAMMER WEIGHT: 140 lbs.	DROP: 30 in.	
SAMPLER: 2 1/2" California Modified		

ELEV. (feet)	DEPTH (feet)	SAMPLES: Sample No.	SAMPLES: Sample	SAMPLES: Blows/ Foot	MATERIAL DESCRIPTION Surface Elevation: ~416.5 ft.	LABORATORY TESTS: Moisture Content (%)	LABORATORY TESTS: Dry Density (pcf)	LABORATORY TESTS: Other Tests
					9 inches of Portland cement concrete			
	1				SILTY CLAY (CL): olive gray (5Y 4/2), medium plasticity [FILL]			
	2							
	3							
	4							
	5							
	6							
	7							
	8							
	9							
	10							
	11							
	12							
	13							
	14							
	15							

GEO3

PROJECT: REBUILD SUNSET HOSPITAL PROJECT Kaiser Permanente Los Angeles Medical Center	Log of Boring No. B-5 (cont'd)

ELEV. (feet)	DEPTH (feet)	SAMPLES: Sample No.	SAMPLES: Sample	SAMPLES: Blows/ Foot	MATERIAL DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	LABORATORY TESTS: Dry Density (pcf)	LABORATORY TESTS: Other Tests
					SILTY CLAY (CL): continued			
	16							
	17				CLAY, SAND & GRAVEL: olive gray to grayish brown with brick looking fragments, sand is fine to coarse, gravel is mainly fine, subangular to subrounded, fine to low plasticity [FILL?]			
	18							
	19							
	20							
	21							
	22							
	23							
	24							
	25							
	26							
	27							
	28							
	29							
	30							
	31							
	32							

GEO3

PROJECT: REBUILD SUNSET HOSPITAL PROJECT Kaiser Permanente Los Angeles Medical Center	**Log of Boring No. B-5 (cont'd)**

ELEV. (feet)	DEPTH (feet)	SAMPLES Sample No.	Sample	Blows/ Foot	MATERIAL DESCRIPTION	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	Other Tests
					CLAY, SAND & GRAVEL: continued			
	33							
	34							
	35							
	36							
	37							
	38							
	39							
	40							
	41				SILTY CLAYSTONE/CLAYEY SILTSTONE: light olive brown (2.5Y 5/6), low to medium plasticity fines			
	42							
	43							
	44							
	45							
	46							
	47							
	48							
	49							

GEO3

Log of Boring No. B-5 (cont'd)

ELEV. (feet)	DEPTH (feet)	SAMPLES: Sample No.	SAMPLES: Sample	SAMPLES: Blows/Foot	MATERIAL DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	LABORATORY TESTS: Dry Density (pcf)	LABORATORY TESTS: Other Tests
	50				becomes olive brown (2.5Y 4/4)			
	51							
	52							
	53							
	54							
	55							
	56							
	57							
	58							
	59							
	60				vertical fracture planes, with iron oxide coatings			
		1		83		32	92	DS
	61				mottled olive brown and light gray			
	62				SILTSTONE: mottled olive brown (2.5Y 4/4), and olive yellow (2.5Y 6/8), low hardness, weak, vertical fracture planes, iron oxide coatings			
	63							
	64							
	65							
	66							

GEO3

PROJECT: REBUILD SUNSET HOSPITAL PROJECT Kaiser Permanente Los Angeles Medical Center	**Log of Boring No. B-5 (cont'd)**

ELEV. (feet)	DEPTH (feet)	SAMPLES: Sample No.	SAMPLES: Sample	SAMPLES: Blows/ Foot	MATERIAL DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	LABORATORY TESTS: Dry Density (pcf)	LABORATORY TESTS: Other Tests
					SILTSTONE: continued			
	67							
	68							
	69							
	70							
	71							
	72							
	73							
	74							
	75				CLAYEY SILTSTONE: mottled dark olive gray (5Y 3/2) and dark gray (5Y 4/1), closely to intensely fractured, low hardness, weak, highly weathered			
	76							
	77							
	78							
	79							
	80		X	90/6"				
	81							
	82							
	83							

GEO3

ELEV. (feet)	DEPTH (feet)	SAMPLES Sample No.	Sample	Blows/ Foot	MATERIAL DESCRIPTION	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	Other Tests
					CLAYEY SILTSTONE: continued			
	84							
	85							
	86							
	87							
	88							
	89							
	90							
	91							
	92							
	93							
	94							
	95				Bottom of boring @ 95 feet bgs. Boring backfilled with cement-bentonite grout and capped with Rapid Set cement grout.			
	96							
	97							
	98							
	99							
	100							

GEO3

BORING 1

DATE DRILLED: May 25, 1988
EQUIPMENT USED: 20" - Diameter Bucket
ELEVATION 406.1 *

ELEVATION (ft.)	DEPTH (ft.)		MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.		DESCRIPTION
405								5" Asphaltic Paving
			21.3	102	3	■	SM	FILL - SILTY SAND - fine, some Gravel and pieces of asphaltic paving, brown
								PUENTE FORMATION - interbedded SILTSTONE and SHALE - occasional Sandstone interbeds, well bedded, locally jointed, some Gypsum infilling, light greyish brown
	5		30.2	90	5	■		
400								
			31.3	92	5	■		Greyish brown
395	10		35.1	91	5	■		
			30.8	91	3	■		
390	15							
			36.7	85	7	■		Grey
	20		29.9	92	7	■		Greyish brown
385								
			35.7	85	7	■		Mottled brown and light brown
380	25		35.7	85	9	■		Light greyish brown
			29.6	89	9	■		Brown
375	30							
			34.6	89	12	■		Dark greyish brown
	35		31.9	89	12	■		Greyish brown
370								
			26.4	96	10	■		
	40							Dark grey and black

* Elevations refer to datum of reference drawing; see Plate 1 for location and elevation of bench mark.

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE A - 1.1a

BORING 1 (Continued)

DATE DRILLED: May 25, 1988
EQUIPMENT USED: 20" - Diameter Bucket

ELEVATION (ft.)	DEPTH (ft.)		MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.	
365			29.9	93	10	■	
			22.4	103	15	■	Grey
	45						
360			33.9	84	8	■	Greyish brown
	50		10.4	124	13	■	Light reddish brown
355							Dark grey
	55		24.4	100	6	■	
350							
	60		20.1	111	21	■	
345							
	65		17.7	110	20	■	
340							
	70		24.1	99	15	■	

NOTE: Water seepage encountered at a depth of 49'. Raveling below 50'.

Note: [illegible] log [illegible] subsurf[illegible] conditi[illegible] show[illegible] on a[illegible] only [illegible] spe[illegible] boring [illegible] tion [illegible] the [illegible] ndica[illegible]
It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE A - 1.1b

BORING 2

DATE DRILLED: May 19, 1988
EQUIPMENT USED: 20" - Diameter Bucket
ELEVATION 406.1

ELEVATION (ft.)	DEPTH (ft.)	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.	DESCRIPTION
						5-1/2" Asphaltic Paving - 5" Base Course
						PUENTE FORMATION - interbedded SILTSTONE and SHALE - occasional Sandstone interbeds, well bedded, locally jointed, some Gypsum infilling, greyish brown
405		32.2	90	3		
	5	31.7	86	3		
400						
		36.9	85	3		
	10					
395		34.2	86	3		Highly fractured
		31.9	90	5		
	15					
390		32.3	91	5		
	20	31.2	93	3		
385						
		31.9	91	5		
	25					
380		32.2	91	5		Mottled brown and light brown
		36.4	83	5		Brownish grey
	30					Grey
375						
		27.6	95	5		
	35					
370						
		24.2	101	5		Light greyish brown and white
	40					

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE A - 1.2a

...it is not warranted to be representative of subsurface conditions at other locations and times.

BORING 2

DATE DRILLED: May 19, 1988
EQUIPMENT USED: 20" - Diameter Bucket

ELEVATION 406.1

ELEVATION (ft.)	DEPTH (ft.)	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.	
						5-1/2" Asphaltic Paving - 5" Base Course PUENTE FORMATION - interbedded SILTSTONE and SHALE - occasional Sandstone interbeds, well bedded, locally jointed, some Gypsum infilling, greyish brown
405						
		32.2	90	3	■	
		31.7	86	3	■	
	5					
400						
		36.9	85	3	■	
	10					
395		34.2	86	3	■	Highly fractured
		31.9	90	5	■	
	15					
390		32.3	91	5	■	
		31.2	93	3	■	
	20					
385						
		31.9	91	5	■	
	25					
380		32.2	91	5	■	Mottled brown and light brown
		36.4	83	5	■	Brownish grey
	30					
375						Grey
		27.6	95	5	■	
	35					
370						
		24.2	101	5	■	Light greyish brown and white
	40					

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE A - 1.2a

BORING 3

DATE DRILLED: May 20, 1988
EQUIPMENT USED: 24" - Diameter Bucket

ELEVATION 405.9

ELEVATION (ft.)	DEPTH (ft.)	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.		DESCRIPTION
405							6" Asphaltic Paving - 4" Base Course
		31.1	90	< 1	■	CL	FILL - SILTY CLAY - some Siltstone and Sandstone fragments, pieces of wood, mottled greyish brown and black
	5	31.3	90	< 1	■		Dark grey to black
400							
		29.7	91	2	■		Some Silty Sand, mottled light brown to dark grey
							PUENTE FORMATION - interbedded SILTSTONE and SHALE - occasional Sandstone interbeds, well bedded, locally jointed, some Gypsum infilling, light brown with grey
							Bedding at 8': N32E, 25NW
395	10	24.8	101	8	■		
		24.0	100	7	■		Some organic matter, greyish brown and black Bedding: N55E, 16NW
390	15						
		25.2	100	7	■		Light brown and white Bedding: N54E, 17NW
		25.1	100	8	■		Light reddish brown
385	20						
							Joint: N40E, 79SE Fault: N23W, 90; 1" offset, west side up Bedding at 22': N70E, 16NW
		23.6	102	8	■		Greyish brown and light reddish brown
380	25	25.0	100	7	■		Traces of organic matter, greyish brown and black
							Bedding: N65E, 18NW
		28.0	96	6	■		Greyish brown
375	30						
		26.3	99	6	■		Brownish grey
							Joint: N55W, 70SW
370	35	30.8	94	8	■		
							Bedding: N22E, 16NW; Fault: N42W, 90 Highly fractured, light brownish grey
	40	30.1	91	7	■		

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE A - 1.3a

BORING 3 (Continued)

DATE DRILLED: May 20, 1988
EQUIPMENT USED: 24" - Diameter Bucket

ELEVATION (ft.)	DEPTH (ft.)		MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.	
365							
	45		28.4	96	6	■	Light brownish grey and black Bedding at 45': N58E, 14NW
360							Fault: N16W, 90
	50		30.3	93	7	■	Light grey
355							
	55						

NOTE: Water seepage encountered at a depth of 41-1/2' and below 43'. No caving.

It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE A - 1.3b

BORING 4

DATE DRILLED: May 19, 1988
EQUIPMENT USED: 20" - Diameter Bucket

ELEVATION 406.3

MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)
32.4	86	< 1
29.0	96	5
33.1	90	3
27.5	98	5
34.5	87	5
29.9	95	5
28.6	94	5
27.7	95	5
33.5	89	2
28.7	95	4

ELEVATION (ft.): 405, 400, 395, 390, 385, 380

DEPTH (ft.): 5, 10, 15, 20, 25, 30

SAMPLE LOC.

5-1/2" Asphaltic Paving

FILL - SILTY CLAY - some Siltstone fragments, greyish brown

(ENCOUNTERED 8" METAL PIPE AT 3-1/2', MOVED BORING 1-1/2' SOUTH)

PUENTE FORMATION - interbedded SILTSTONE and SHALE - occasional Sandstone interbeds, well bedded, locally jointed, some Gypsum infilling, brownish grey

Greyish brown

Highly fractured

Brownish grey

NOTE: Water not encountered. No caving.

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE A - 1.4

BORING 5

DATE DRILLED: May 20, 1988
EQUIPMENT USED: 20" - Diameter Bucket

ELEVATION 406.3

ELEVATION (ft.)	DEPTH (ft.)		MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.		Description
405							SM	5-1/2" Asphaltic Paving FILL - SILTY SAND - fine, light brown
			28.9	90	<1	■	CL	FILL - SILTY CLAY - brown PUENTE FORMATION - interbedded SILTSTONE and SHALE - occasional Sandstone interbeds, well bedded, locally jointed, some Gypsum infilling, greyish brown
400	5		27.8	93	3	■		
			22.3	101	3	■		White and greyish brown
395	10		24.2	101	5	■		Traces of organic matter
	15		25.7	99	7	■		Light reddish brown
390			25.3	99	5	■		Brownish grey
385	20		24.8	98	7	■		
			26.2	98	7	■		
380	25		26.7	97	3	■		Highly fractured
	30		35.5	87	6	■		

NOTE: Water not encountered. No caving.

Note: The log of subsurface conditions shows ... only at the specific boring locations and date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE A - 1.5

BORING 6

DATE DRILLED: May 24, 1988
EQUIPMENT USED: 20" - Diameter Bucket

ELEVATION 402.0

ELEVATION (ft.)	DEPTH (ft.)		MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.	DESCRIPTION
							5" Asphaltic Paving
							PUENTE FORMATION - interbedded SILTSTONE and SHALE - occasional Sandstone interbeds, well bedded, locally jointed, some Gypsum infilling, light brown
400							
			29.0	94	3	■	
	5						
			25.5	96	2	■	Brown
395							
			27.1	97	2	■	Fractured, greyish brown
	10						
390			26.1	100	3	■	
			27.4	97	3	■	
	15						
385							
			25.8	99	7	■	Light greyish brown
	20						
			21.4	104	8	■	Brownish grey
380							
			22.1	104	7	■	
	25						
375			30.4	92	10	■	
			30.9	92	8	■	Light grey
	30						
370							
			26.2	96	4	■	Brownish grey
	35						
365							
			23.1	102	8	■	
	40						

NOTE: Water not encountered. No caving.

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE A - 1.6

BORING 7

DATE DRILLED: May 23, 1988
EQUIPMENT USED: 24" - Diameter Bucket

ELEVATION 399.4

ELEVATION (ft.)	DEPTH (ft.)		MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.		Description
								4" Asphaltic Paving - 5" Base Course
			5.9	122	10		SM	FILL - SILTY SAND - fine, about 10% Gravel, few Cobbles, brown
395	5		4.6	113	5			
			4.8	116	7			Some Clay PUENTE FORMATION - interbedded SILTSTONE and SHALE - occasional Sandstone interbeds, well bedded, locally jointed, some Gypsum infilling, dark greyish brown Bedding at 7': N32E, 36NW
390	10		34.8	89	10			(BORING TERMINATED AT 11' DUE TO CONCRETE OBSTRUCTION AND MOVED 18' NORTH EAST) Bedding at 11': N49E, 20NW Light brown
385	15		12.5	111	27			(HARD DRILLING THROUGH CEMENTED LAYER FROM 13-1/2' TO 15')
			33.8	86	13			Bedding: N45E, 17NW
380	20		34.3	87	10			
			31.8	93	8			
375	25		34.8	88	10			Light greyish brown
370	30		26.2	96	8			Grey and light brown
			27.2	97	10			Bedding: N53E, 18NW
365	35		27.5	94	6			Brown Bedding: N44E, 20NW
			27.9	95	6			Brownish grey
360	40							

(CONTINUED ON FOLLOWING PLATE)

Note: ... log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE A - 1.7a

BORING 7 (Continued)

DATE DRILLED: May 23, 1988
EQUIPMENT USED: 24" - Diameter Bucket

ELEVATION (ft.)	DEPTH (ft.)		MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.	DESCRIPTION
			25.5	97	8	■	Greyish Brown Bedding: N38E, 19NW
355	45		26.7	98	7	■	
350	50		25.0	98	10	■	Black
345	55		37.0	77	11	■	Grey and dark brown
340	60		22.2	104	17	■	(HARD DRILLING THROUGH CEMENTED LAYER FROM 58' to 59') Light grey

NOTE: Water seepage at depths of 11-1/2', 24' and 42'. Water level measured at 54' 15 minutes after completion of drilling and 49' 30 minutes later. No caving.

it is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE A - 1.7b

BORING 8

DATE DRILLED: May 24, 1988
EQUIPMENT USED: 20" - Diameter Bucket

ELEVATION 399.0

ELEVATION (ft.)	DEPTH (ft.)	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.		DESCRIPTION
							7-1/2" Asphaltic Paving - 4" Base Course
		14.6	121	< 1	■	CL	FILL - SANDY CLAY - piece of wire, reddish brown
395	5	30.8	90	< 1	■		
							Some Siltstone fragments, brown
		13.7	115	< 1	■		Grey and brown
390	10						PUENTE FORMATION - interbedded SILTSTONE and SHALE - occasional Sandstone interbeds, well bedded, locally jointed, some Gypsum infilling, light brown
		26.2	98	5	■		Fractured
385		26.7	101	5	■		Brownish grey
	15	27.8	97	7	■		
380	20	31.8	92	7	■		
		27.1	97	8	■		Grey
375	25	27.9	95	8	■		Brownish grey
370	30	29.5	94	7	■		
365	35	24.7	97	8	■		Light brownish grey
360	40	28.4	95	10	■		

(CONTINUED ON FOLLOWING PLATE)

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE A - 1.8a

BORING 8 (Continued)

DATE DRILLED: May 24, 1988
EQUIPMENT USED: 20" - Diameter Bucket

ELEVATION (ft.)	DEPTH (ft.)		MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.	
355	45		27.7	95	9	■	
350	50		25.3	99	13	■	Brownish grey
345	55						

NOTE: Slight water seepage encountered at a depth of 46-1/2'.
No caving.

Note: [illegible] log [illegible] subsurf[illegible] condit[illegible] shown [illegible] on a[illegible] only [illegible] spe[illegible] boring location and at the date indicated.
It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE A - 1.8b

BORING 2

DATE DRILLED: January 8 & 9, 1985

EQUIPMENT USED: 5"-Diameter Rotary Wash

ELEVATION 385.5

ELEVATION (ft.)	DEPTH (ft.)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.
385						
380	5		21.2	100	2	■
375	10		33.0	84	1[illegible]	■
			30.3	92	17	■
370	15		25.9	96	19	■
			26.5	95	23	■
365	20		34.0	88	22	■
360	25		24.7	99	26	■
			[illegible]	98	22	■
355			[illegible]	[illegible]	26	■
350	35		29.5	96	29	■
	40					

CL SM

2" Asphaltic Paving - 4" Base Course

FILL - SANDY CLAY and SILTY SAND - dark brown

SHALE - bedded, fractured, some Sandstone interbeds, light greyish-brown

Less fractured, grey

Greyish-brown

Grey

Light grey and brown

(CONTINUED ON FOLLOWING PLATE)

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE A-1.2a

BORING 2 (CONTINUED)

DATE DRILLED: January 8 & 9, 1985

EQUIPMENT USED: 5"-Diameter Rotary Wash

ELEVATION (ft.)	DEPTH (ft.)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.
345			29.2	93	32	■
340	45		41.1	85	32	■
335	50		30.1	90	32	■
330	55		24.7	100	43	■
325	60		25.1	95	67	■
320	65		29.6	90	81	■
315	70		26.9	100	81	■
	75					

Greyish-brown

Dark grey

NOTE: Drilling mud used in drilling process. Removed mud after completion of drilling. Water level measured at 29' on January 23, 1985.

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

Form 124 JOB AD-85003 DATE 1/11/85 DR JOHN E. BK W.P. DMC CHKD

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE A-1.2

BORING 3

DATE DRILLED: January 7, 1985

EQUIPMENT USED: 5"-Diameter Rotary Wash

ELEVATION 386.7

Elevation (ft.)	Depth (ft.)	"N" Value Std. Pen. Test	Moisture (% of dry wt.)	Dry Density (lbs./cu. ft.)	Drive Energy (ft-kips/ft.)	Sample Loc.		Description
	0							2" Asphaltic Paving - 4" Base Course
385							CL	FILL - SANDY CLAY - pieces of brick, dark brown
	5		18.4	105	3	■		
380								
	10		29.9	87	3	■		SHALE - bedded, fractured, some Sandstone interbeds, light grey and brown
375			33.7	85	11	■		Petroleum odor from 13' to [illegible]
	15		29.[illegible]	94	17	■		Less fractured, greyish-brown
370	20		[illegible]	[illegible]	[illegible]	■		
365			27.6	92	22	■		Grey
	25		[illegible]	92	29	■		
360	30		[illegible]	[illegible]	[illegible]	■		
355	35		[illegible]	85	32	■		
350	40		33.6	[illegible]	[illegible]	■		

(CONTINUED ON FOLLOWING PLATE)

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE A-1.3a

BORING 3 (CONTINUED)

DATE DRILLED: January 7, 1985

EQUIPMENT USED: 5"-Diameter Rotary Wash

ELEVATION (ft.)	DEPTH (ft.)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.
345						
	45		34.1	86	32	■
340						
	50		33.0	90	86	■
335						
	55		32.8	88	36	■
330						
	60		23.9	101	38	■
325						
	65		23.1	107	53	■
320						
	70		24.1	103	47	■

Some hard layers

Greyish-brown

Dark grey

NOTE: Drilling mud used in drilling process. Flushed mud from boring after completion of drilling. Installed 70' of 2"-diameter PVC pipe for downhole seismic survey. Annular space backfilled with pea gravel. Water level not established.

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

Form 124 JOB AD-85003 DATE 1/13/85 DR JOHN E. BK W.P. DMC TRKD

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE A-1.3b

BORING 5

DATE DRILLED: January 4 & 5, 1985

EQUIPMENT USED: 24"-Diameter Bucket

ELEVATION 387.1

ELEVATION (ft.)	DEPTH (ft.)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.
385			12.3	116	11	
	5		10.2	124	11	
380			18.9	108	10	
	10					
375			21.9	105	8	
	15		24.8	96	8	
370			32.8	89	5	
	20		30.2	94	8	
365			27.4	94	8	
	25					
360			27.0	97	11	
	30		27.9	95	5	
355			22.3	90	7	
	35					

2" Asphaltic Paving - 6" Base Course

SC CLAYEY SAND - fine to medium, brown

Fine to coarse

CL SILTY CLAY - some Sand, some gravel, brown

SHALE - bedded, fractured, some Sandstone interbeds, light greyish-brown

Less fractured

Light brown

(CONTINUED ON FOLLOWING PLATE)

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

JOB 123-85 DATE 1/85 DR N W.P.

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE A-1.5

BORING 5 (CONTINUED)

DATE DRILLED: January 4 & 5, 1985

EQUIPMENT USED: 24"-Diameter Bucket

ELEVATION (ft.)	DEPTH (ft.)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.	
			31.6	87	7		Slight petroleum odor, grey
350							
							Light grey
	40		31.0	89	6		
345							
							Greyish-brown
	45		32.7	89	11		
340							
	50		30.3	95	10		

NOTE: Slight water seepage encountered at a depth of 36½' and heavy seepage at 44½'. Water level stabilized at 44½' after drilling stopped at 45'. Drilling then continued to 50'. No caving.

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

Form 124 JOB AD-85005 DATE 1/15/85 DR JOHN W.P. mc CHKD

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE A-1.5b

BORING 6

DATE DRILLED: January 9, 1985

EQUIPMENT USED: 5"-Diameter Rotary Wash

ELEVATION 386.7

ELEVATION (ft.)	DEPTH (ft.)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.		
								2" Asphaltic Paving - 4" Base Course
385							CL	FILL - SANDY CLAY - some pieces of brick, brown
			16.3	118	7	■	CL	SANDY CLAY - dark brown
								Brown
	5		11.2	125	21	■		
							SM	SILTY SAND - fine to coarse, some gravel light brown
380			10.3	132	24	■		
	10		8.0	117	17	■		
375								Some Clay
			12.6	124	19	■		Greyish-brown
	15		18.5	112	35	■		
370							ML	CLAYEY SILT - greyish-brown
	20		19.9	109	22	■		
365							CL	SANDY CLAY - greyish-brown
	25		15.6	117	22	■		
360								
	30							
355							CL	SILTY CLAY - brown
	35		23.7	104	32	■		
350								SHALE - bedded, fractured, grey
	40		33.7	87	29	■		

(CONTINUED ON FOLLOWING PLATE)

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE A-1.4

BORING 6 (CONTINUED)

DATE DRILLED: January 9, 1985

EQUIPMENT USED: 5"-Diameter Rotary Wash

ELEVATION (ft.)	DEPTH (ft.)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.
345						
	45		30.8	92	36	
340						
	50		33.3	86	48	
335						
	55		40.9	81	43	
330						
	60		26.8	99	40	

Light grey

Greyish-brown

Grey and brown

NOTE: Drilling mud used in drilling process. Removed mud after completion of drilling. Water level not established.

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

Form 124 JOB AD-85003 DATE 1/15/85 DR JOHN BK W.P. CHKD

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE A-1.6b

APPENDIX C

Every Project Matters | www.rmacompanies.com

January 24, 2017 RMA Job No. 16-D91-01

Geobase, Inc.
23362 Peralta Dr
Laguna Hills, CA 92653

Attention: Mr. John Chevallier

Subject: **Soils Test Report**
Proposed Multi-Level Parking Structure
1517 N Vermont Ave
Los Angeles, CA

Dear Mr. Chevallier:

Soil samples were obtained from the subject project on December, 15 2016. Tests were performed under the responsible charge of a Registered Civil Engineer in conformance to the following standard test methods:

ASTM D1557 - Compaction Characteristics - Maximum Density / Optimum Moisture
ASTM D3080 - Direct Shear Test of Soils Under Consolidated Drained Conditions
ASTM D4318 - Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4829 - Expansion Index

Test results are summarized herein.

Respectfully submitted,

RMA Group

Carl Bachler
Laboratory Director
LA City Lab #TA23752

RMA Group
Every Project Matters | www.rmacompanies.com

SAMPLE INFORMATION:

Identification	Description	Location	Date
1	Light brown siltsone	T-1 @ 2 ft	12/15/2016
2	Brown silty clay	T-2 @ 4 ft	12/15/2016
3	Brown and orange-brown siltstone	T-4 @ 23 in	12/15/2016

TEST RESULTS:

COMPACTION CHARACTERISTICS – MAX DENSITY / OPTIMUM MOISTURE
Test Method: ASTM D1557 (Method A)

Sample ID	Max Density, pcf	Optimum Moisture, %
2	114.0	16.2

PLASTICITY INDEX OF SOILS
Test Method: ASTM D4318

Sample ID	Liquid Limit	Plastic Limit	Plasticity Index
1	49	32	17

EXPANSION INDEX OF SOILS
Test Method: ASTM D4829

Sample ID	Expansion Index	EI Classification
1	0	Very Low
2	38	Low

DIRECT SHEAR
Test Method: ASTM D3080

Sample ID	Peak Cohesion Intercept, psf	Ultimate Cohesion Intercept, psf	Peak Friction Angle, degrees	Ultimate Friction Angle, degrees
3	204	336	43	30

RMA Group
Every Project Matters | www.rmacompanies.com

Direct Shear

ASTM D3080: In-Place

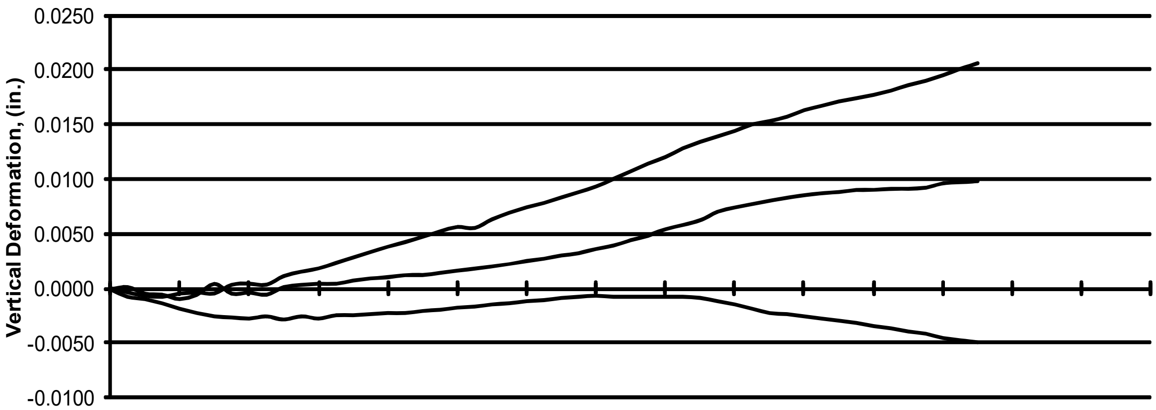
Sample: 3

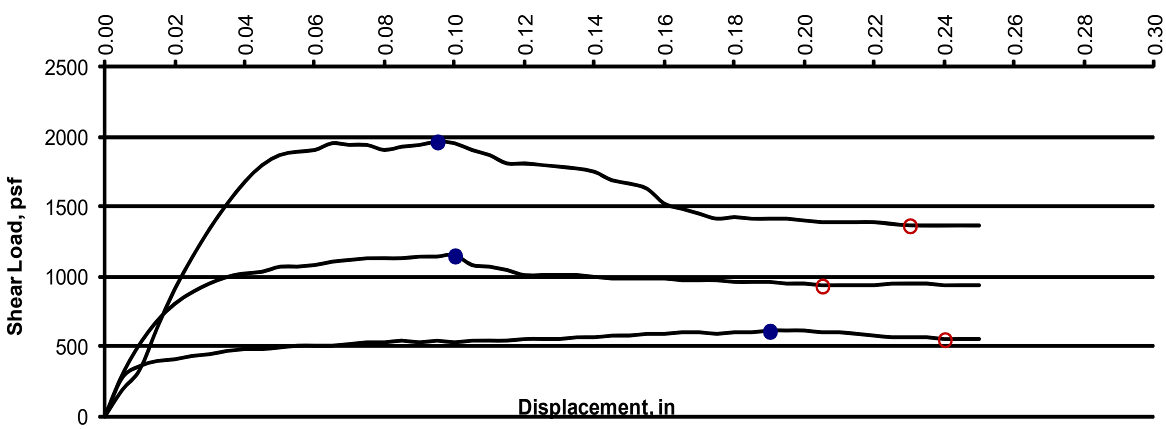
Displacement Rate: 0.01 in/min

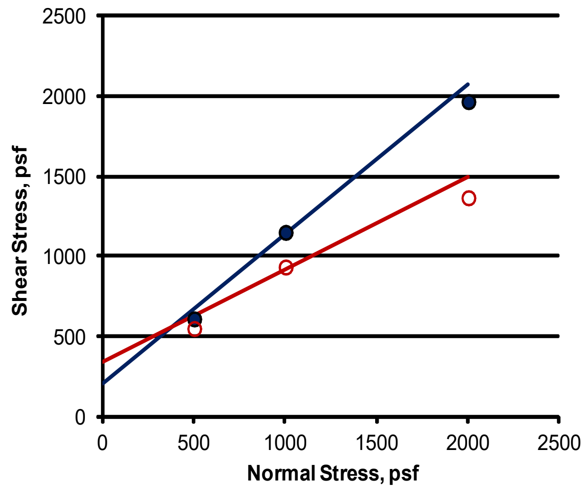
Volume: 0.002624 cf

Initial Water Content: 23%

Initial dry density: 89.6 pcf







Test Results

Normal Load, psf	**500**	**1000**	**2000**
Peak Stress, psf	**612**	**1152**	**1968**
Ultimate Stress, psf	552	936	1368
Final Wc, %	32.6	31.1	29.0
Final Height, in	1.009	1.022	0.987
Final γdry, pcf	94.2	90.0	97.7

	Peak	*Ultimate*
Cohesion Intercept	**204**	336
Friction Angle	**43**	30

EXPANSION POTENTIAL

ASTM D4829

SOIL SAMPLE LOCATION (feet)	EXPANSION INDEX	EXPANSION POTENTIAL
T-1 at 2.0	0	Very Low
T-2 at 4.0	38	Low
LeRoy Crandall and Associates (December 1986)		
B-1 at 2.0-4.0	123	High
B-6 at 4.0-6.0	100	High
B-7 at 8.0-10.0	92	High

WATER-SOLUBLE SULFATES

CT. 417

SOIL SAMPLE LOCATION (feet)	SOLUBLE SULFATES PPM	POTENTIAL FOR ATTACK ON CONCRETE
T-1 at 2.0	255	Low
T-2 at 4.0	119	Low
LeRoy Crandall and Associates (December 1988)		
B-1 at 4.5	25	Low
B-2 at 25.5	1050	Moderate
B-3 at 1.5	1450	Moderate
B-4 at 29.5	220	Low
B-5 at 5.5	35	Low
B-6 at 39.5	1650	Moderate
B-8 at 49.5	60	Low

CORROSIVITY SERIES TEST

SOIL SAMPLE LOCATION (feet)	pH (CT 747)	SOLUBLE CHLORIDE (CT.422) (PPM)	ELEC. RESISTIVITY (CT.643) (OHM-CM)	CORROSIVITY CATEGORY
T-1 at 2.0	359	9.7	1000	Severely Corrosive
T-2 at 4.0	52	8.9	1700	
LeRoy Crandall and Associates (December 1988)				
B-1 at 4.5	142	7.7	3400/840	Severely Corrosive
B-2 at 25.5	212	7.2	2800/490	Severely Corrosive
B-3 at 1.5	142	7.4	1800/560	Severely Corrosive
B-4 at 29.5	212	7.2	4300/550	Severely Corrosive
B-5 at 5.5	142	7.7	5100/770	Severely Corrosive
B-6 at 39.5	142	7.4	3300/520	Severely Corrosive
B-9 at 49.5	212	7.6	3900/910	Severely Corrosive

NOTE: * – Denotes as-received/minimum

ANAHEIM TEST LABORATORY

3008 ORANGE AVENUE
SANTA ANA, CALIFORNIA 92707
PHONE (714) 549-7267

TO:

GEOBASE
23362 PERALTA DRIVE, # 4&6
LAGUNA HILLS, CA. 92653

DATE: 12/20/16

P.O. NO: VERBAL

LAB NO: C-0078 1-2

SPECIFICATION: CA-417/422/643

ATTN: BOB PEARSON
JOHN C

MATERIAL: SOIL

PROJECT #: C.314.80.00
KP -1517 Vermont Ave.

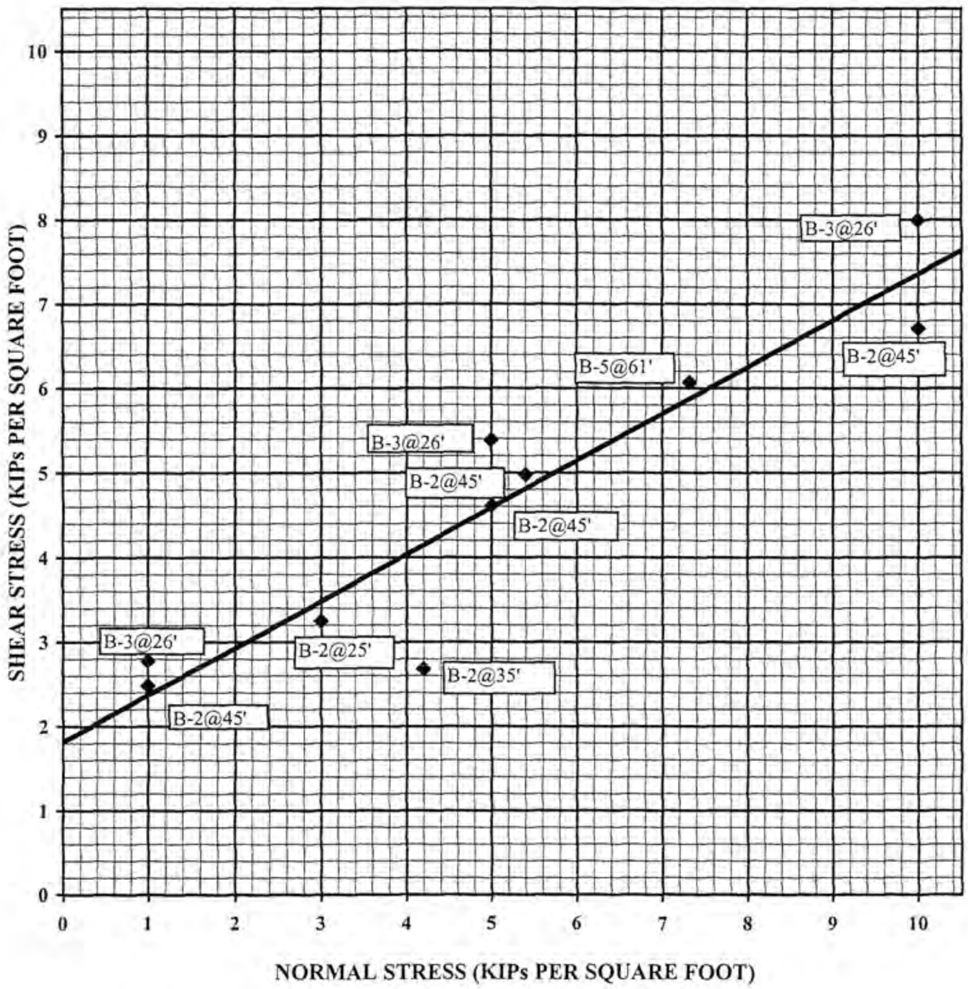
ANALYTICAL REPORT

CORROSION SERIES
SUMMARY OF DATA

	PH	SOLUBLE SULFATES per CA. 417 ppm	SOLUBLE CHLORIDES per CA. 422 ppm	MIN. RESISTIVITY per CA. 643 ohm-cm
1)T-1@2’	9.7	255	359	1,000
2)T-2@4’	8.9	119	52	1,700

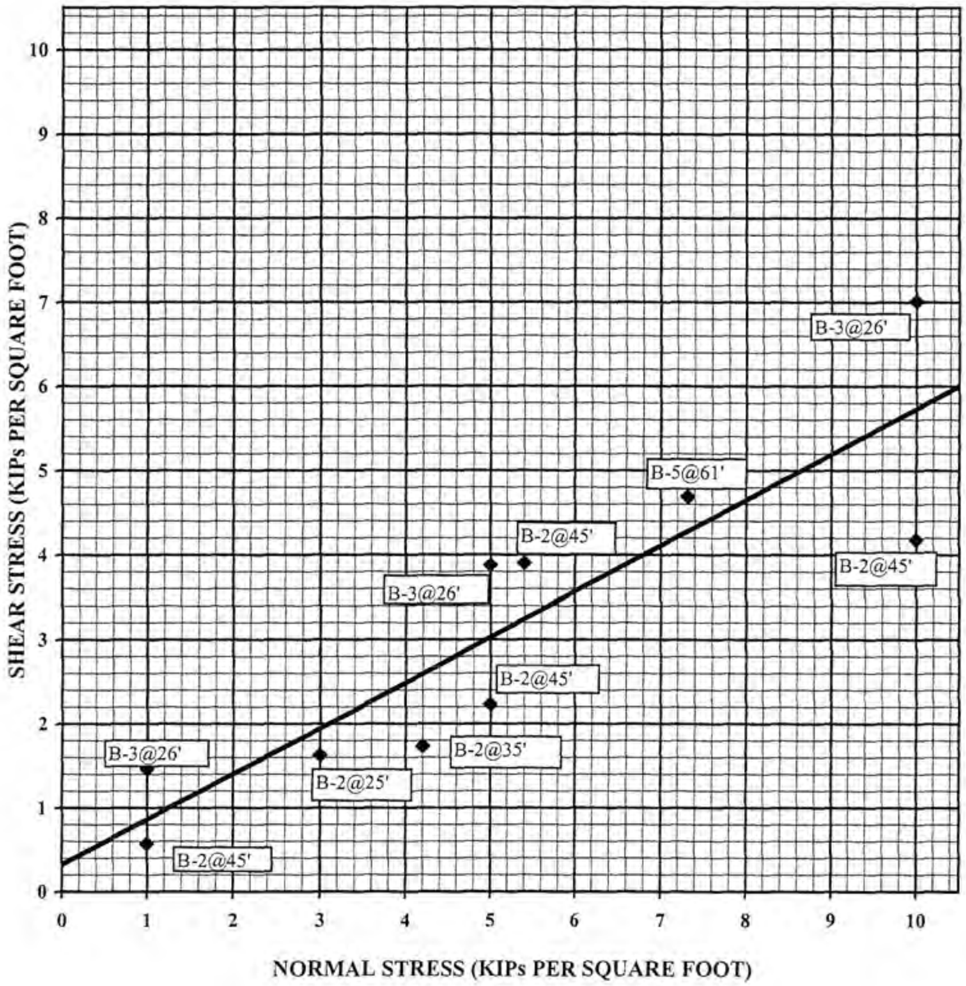
RESPECTFULLY SUBMITTED

WES BRIDGER CHEMIST



Soil Type:	MH	Maximum Shear Stress:	
Sample Condition:	Intact, Tested At Field Moisture	Cohesion (PSF):	**1817**
		Friction Angle (Degrees):	**29**

GEOMATRIX	**DIRECT SHEAR TEST** L.A.M.C. - SUNSET HOSPITAL *LOS ANGELES, CALIFORNIA*	Project No. 005931.000.0



Soil Type: MH

Sample Condition: Intact, Tested At Field Moisture

Shear Stress @ 20% Lateral Displacement:

Cohesion (PSF): **324**

Friction Angle (Degrees): **28**

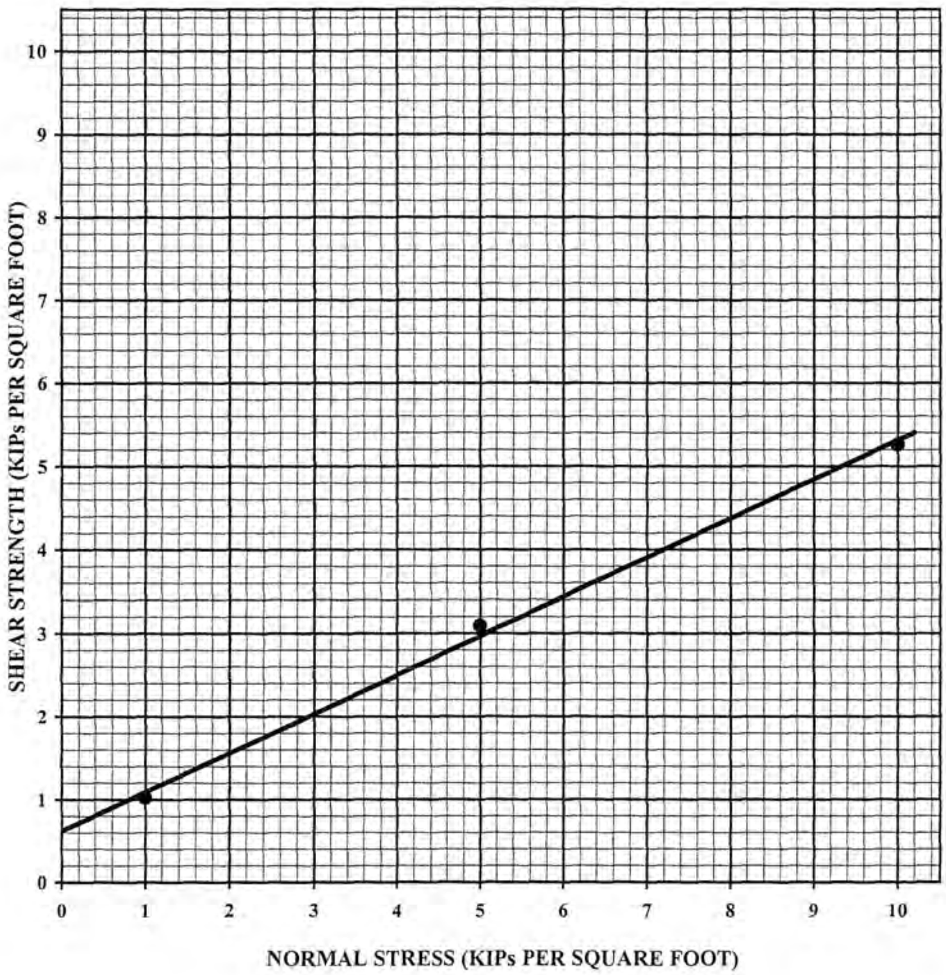
GEOMATRIX

DIRECT SHEAR TEST

L.A.M.C. - SUNSET HOSPITAL

LOS ANGELES, CALIFORNIA

Project No. 005931.000.0



Boring No.:	B-3	Cohesion (PSF):	**623**
Sample Depth :	21 ft.	Friction Angle (Degrees):	**25**
Soil Type:	MH	In-Situ Dry Density (PCF):	91.1
Sample Conditions: Intact, Saturated		In-Situ Moisture Content (%):	23.6

GEOMATRIX

DIRECT SHEAR TEST
L.A.M.C. - SUNSET HOSPITAL
LOS ANGELES, CALIFORNIA

Project No.
005931.000.0

M.J. SCHIFF & ASSOCIATES, INC.

Consulting Corrosion Engineers - Since 1959
1308 Monte Vista Avenue, Suite 6
Upland, CA 91786

Phone: (909)931-1360 / Fax: (909)931-1361
E-mail: mjsa@mjs-a.com
http://www.mjs-a.com

February 28, 2000

GEOMATRIX CONSULTANTS, INC.
330 West By Street, Suite 140
Costa Mesa CA 92627

Attention: Mr. Howard Barlow

Re: Soil Corrosivity Study
Rebuild Kaiser LAMC Hospital
Los Angeles, California
MJS&A #00-0088HQ

INTRODUCTION

This report is based on laboratory tests on three soil samples from the three current borings and existing soil corrosivity data from ten soil samples from the referenced project at the northwest corner of Sunset Boulevard and Vermont Avenue. The purpose of these tests was to determine if the soils may have deleterious effects on underground utility piping, hydraulic elevator cylinders, and concrete basements and foundations.

The scope of this study is limited to a determination of soil corrosivity and general corrosion control recommendations for materials likely to be used for construction. If the architects and/or engineers desire more specific information, designs, specifications, or review of design, we will be happy to work with them as a separate phase of this project.

TEST PROCEDURES

The electrical resistivity of each sample was measured in a soil box per ASTM G57 in its as-received condition and again after saturation with distilled water. Resistivities are at about their lowest value when the soil is saturated. The pH of the saturated samples was measured. A 5:1 water:soil extract from each sample was chemically analyzed for the major soluble salts commonly found in soils. The water extracts from the current three samples were also analyzed for ammonium and nitrate. Test results are shown on Table 1 for our jobs numbered 00-0088HQ, 91169, and 88134.

SOIL CORROSIVITY

A major factor in determining soil corrosivity is electrical resistivity. The electrical resistivity of a soil is a measure of its resistance to the flow of electrical current. Corrosion of buried metal is an electrochemical process in which the amount of metal loss due to corrosion is directly proportional to the flow of electrical current (DC) from the metal into the soil. Corrosion currents, following Ohm's Law, are inversely proportional to soil resistivity. Lower electrical resistivities result from higher moisture and chemical contents and indicate corrosive soil.

A correlation between electrical resistivity and corrosivity toward ferrous metals is:

Soil Resistivity in ohm-centimeters			Corrosivity Category
over		10,000	mildly corrosive
2,000	to	10,000	moderately corrosive
1,000	to	2,000	corrosive
below		1,000	severely corrosive

Other soil characteristics that may influence corrosivity towards metals are pH, chemical content, soil types, aeration, anaerobic conditions, and site drainage.

Electrical resistivities were in moderately through severely corrosive categories with as-received moisture. When saturated, one resistivity was in the corrosive category and the other twelve were in the severely corrosive category.

Soil pH values varied from 7.2 to 7.7. This range is neutral to mildly alkaline and does not particularly increase soil corrosivity.

The soluble salt content was very high in the samples from Job No. 00-0088 borings 1 and 3, high in the samples from Job No. 88134 borings 2, 3, and 6, and less in the others. Calcium sulfate was the predominant compound. The highest sulfate concentrations were in a range where sulfate resistant cement is advisable.

Ammonium and nitrate were detected but in low concentrations.

Tests were not made for sulfide and negative oxidation-reduction (redox) potential because these samples did not exhibit characteristics typically associated with these conditions.

This soil is classified as severely corrosive to ferrous metals and deleterious to concrete.

CORROSION CONTROL

The life of buried materials depends on thickness, strength, loads, construction details, soil moisture, etc., in addition to soil corrosivity, and is, therefore, difficult to predict. Of more practical value are corrosion control methods that will increase the life of materials that would be subject to significant corrosion.

Steel Pipe

Abrasive blast underground steel piping and apply a dielectric coating such as polyurethane, extruded polyethylene, a tape coating system, hot applied coal tar enamel, or fusion bonded epoxy intended for underground use.

Bond underground steel pipe with rubber gasketed, mechanical, grooved end, or other nonconductive type joints for electrical continuity. Electrical continuity is necessary for corrosion monitoring and cathodic protection.

Electrically insulate each buried steel pipeline from dissimilar metals, dissimilar coatings (cement-mortar vs. dielectric), and above ground steel pipe to prevent dissimilar metal corrosion cells and to facilitate the application of cathodic protection.

Apply cathodic protection to steel piping as per NACE International RP-0169-96.

Hydraulic Elevator

Coat hydraulic elevator cylinders as described above. Electrically insulate each cylinder from building metals by installing dielectric material between the piston platen and car, insulating the bolts, and installing an insulated joint in the oil line. Apply cathodic protection to hydraulic cylinders as per NACE International RP-0169-96. As an alternative to electrical insulation and cathodic protection, place each cylinder in a plastic casing with a plastic watertight seal at the bottom.

The elevator oil line should be placed above ground if possible but, if underground, should be protected as described above for steel utilities.

Iron Pipe

Encase ductile iron water piping in 8 mil thick low-density polyethylene or 4 mil thick high-density, cross-laminated polyethylene plastic tubes or wraps per AWWA Standard C105 or coat with a polyurethane intended for underground use. Bond all nonconductive type joints for electrical continuity. Electrically insulate underground iron pipe from dissimilar metals and from above ground iron pipe with insulated joints.

Encase cast iron drain lines in 8 mil thick low-density polyethylene or 4 mil thick high-density, cross-laminated polyethylene plastic tubes or wraps per AWWA Standard C105. Electrically insulate underground iron pipe from dissimilar metals and from above ground iron pipe with insulated joints.

Copper Tube

Bare copper tubing for cold water should be bedded and backfilled in sand at least 2 inches thick surrounding the tubing. Hot water tubing may be subject to a higher corrosion rate. Hot copper can be protected by applying cathodic protection or preventing soil contact. Soil contact may be prevented by placing the tubing above ground or inside a plastic pipe. The amount of cathodic protection current needed can be minimized by coating the tubing.

Plastic and Vitrified Clay Pipe

No special precautions are required for plastic and vitrified clay piping placed underground from a corrosion viewpoint. Protect any iron fittings with a double polyethylene wrap per AWWA C105. Protect any iron valves with a dielectric coating such as epoxy, polyurethane, or wax tape intended for underground use.

All Pipe

On all pipe, coat bare steel appurtenances such as bolts, joint harnesses, or flexible couplings with a coal tar or elastomer based mastic, coal tar epoxy, moldable sealant, wax tape, or equivalent after assembly.

Where metallic pipelines penetrate concrete structures such as building floors, vault walls, and thrust blocks use plastic sleeves, rubber seals, or other dielectric material to prevent pipe contact with the concrete and reinforcing steel.

Concrete

Protect concrete structures and pipe from sulfate attack in soil with a severe sulfate concentration, 0.2 to 2.0 percent, such as the soil represented by Job No. 00-0088 borings 1 and 3. Use Type V cement, a maximum water/cement ratio of 0.45, and minimum strength of 4500 psi per applicable code, such as 1997 Uniform Building Code (UBC) Table 19-A-4 or American Concrete Institute (ACI-318) Table 4.3.1.

Protect other concrete structures and pipe from sulfate attack in soil with a moderate sulfate concentration, 0.1 to 0.2 percent. Use Type II cement, a maximum water/cement ratio of 0.50, and minimum strength of 4000 psi per applicable code, such as 1997 Uniform Building Code (UBC) Table 19-A-4 or American Concrete Institute (ACI-318) Table 4.3.1.

Standard concrete cover over reinforcing steel may be used for concrete structures and pipe in contact with these soils. Use 2 inches minimum cover over embedded steel at the edges of concrete slabs and footings above grade as well as below.

Our services have been performed with the usual thoroughness and competence of the engineering profession. No other warranty or representation, either expressed or implied, is included or intended.

Please call if you have any questions.

Respectfully Submitted,
M.J. SCHIFF & ASSOCIATES, INC.

Paul R Smith

Paul R. Smith, P.E.

Paul R Smith
EXP. 6-30-01

Enc: Job #00-0088HQ Table 1
Job #91169 Table 1
Job #88134 Table 1

job folders\jobs-00\00-0088hq

M. J. Schiff & Associates, Inc.
Consulting Corrosion Engineers - Since 1959
13__ Monte Vista Avenue, Suite 6
Upland, CA 91786-8224
Phone: 909/931-1360

Table 1 - Laboratory Tests on Soil Samples

Kaiser LAMC Hospital, Los Angeles, CA
Your #005931.000.0, MJS&A #00-0088HQ
21-Feb-00

Sample ID			B-1 @ 25-30'	B-2 @ 10'	B-3 @ 1-5'
Resistivity		**Units**			
as-received		ohm-cm	740	3,400	4,500
saturated		ohm-cm	570	1,400	800
pH			7.2	7.5	7.4
Electrical Conductivity		mS/cm	3.25	0.22	2.70
Chemical Analyses					
Cations					
calcium	Ca^{2+}	mg/kg	4,269	72	3,623
magnesium	Mg^{2+}	mg/kg	411	12	27
sodium	Na^{1+}	mg/kg	92	134	ND
Anions					
carbonate	CO_3^{2-}	mg/kg	ND	ND	ND
bicarbonate	HCO_3^{1-}	mg/kg	140	506	278
chloride	Cl^{1-}	mg/kg	89	14	50
sulfate	SO_4^{2-}	mg/kg	11,815	84	8,280
Other Tests					
ammonium	NH_4^{1+}	mg/kg	8.0	2.3	6.6
nitrate	NO_3^{1-}	mg/kg	7.8	4.0	1.6
sulfide	S^{2-}	qual	na	na	na
Redox		mv	na	na	na

Electrical conductivity in millisiemens/cm and chemical analysis were made on a 1:5 soil-to-water extract.
mg/kg = milligrams per kilogram (parts per million) of dry soil.
Redox = oxidation-reduction potential in millivolts
ND = not detected
na = not analyzed

TABLE 1
LABORATORY TESTS ON SOIL SAMPLES

Location and Depth	Soil Type	Soil Resistivity ohm-centimeters As Rec'd	Sat'd	pH	Chemical Analysis in mg/kg (ppm) of dry soil: Calcium Ca	Magnesium Mg	Sodium Na	Carbonate CO3	Bicarbonate HCO3	Chloride Cl	Sulfate SO4
B1 .5-2.5'	fill-silty clay	1,900	860	7.4	160	12	81	trace	244	71	336
B1 10.5'	siltstone	2,300	780	7.4	200	24	58	0	122	106	432
B2 5.0'	fill-silty clay	1,200	560	7.3	200	48	46	0	183	106	504

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Los Angeles, California
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F16

Table 1 - LABORATORY TESTS ON SOIL SAMPLES

Location and Depth	Soil Type	Soil Resistivity ohm-centimeters		pH	----------Chemical Analysis in mg/kg (ppm) of dry soil----------					
		As Rec'd	Sat'd		Calcium Ca	Magnesium Mg	Sodium Na	Bicarbonate HC03	Chloride C1	Sulfate S04
B1 4.5'	siltstone	3,400	840	7.7	trace	trace	69	trace	142	25
B2 25.5'	siltstone	2,800	490	7.2	720	trace	58	366	212	1050
B3 1.5'	fill	1,800	560	7.4	800	24	126	488	142	1450
B4 29.5'	siltstone	4,300	550	7.2	240	trace	115	244	212	220
B5 5.5'	siltstone	5,100	770	7.7	trace	trace	80	trace	142	35
B6 39.5'	siltstone	3,300	520	7.4	960	24	34	488	142	1650
B8 49.5'	siltstone	3,900	910	7.6	40	trace	115	122	212	60

Carbonates = 0 for all samples

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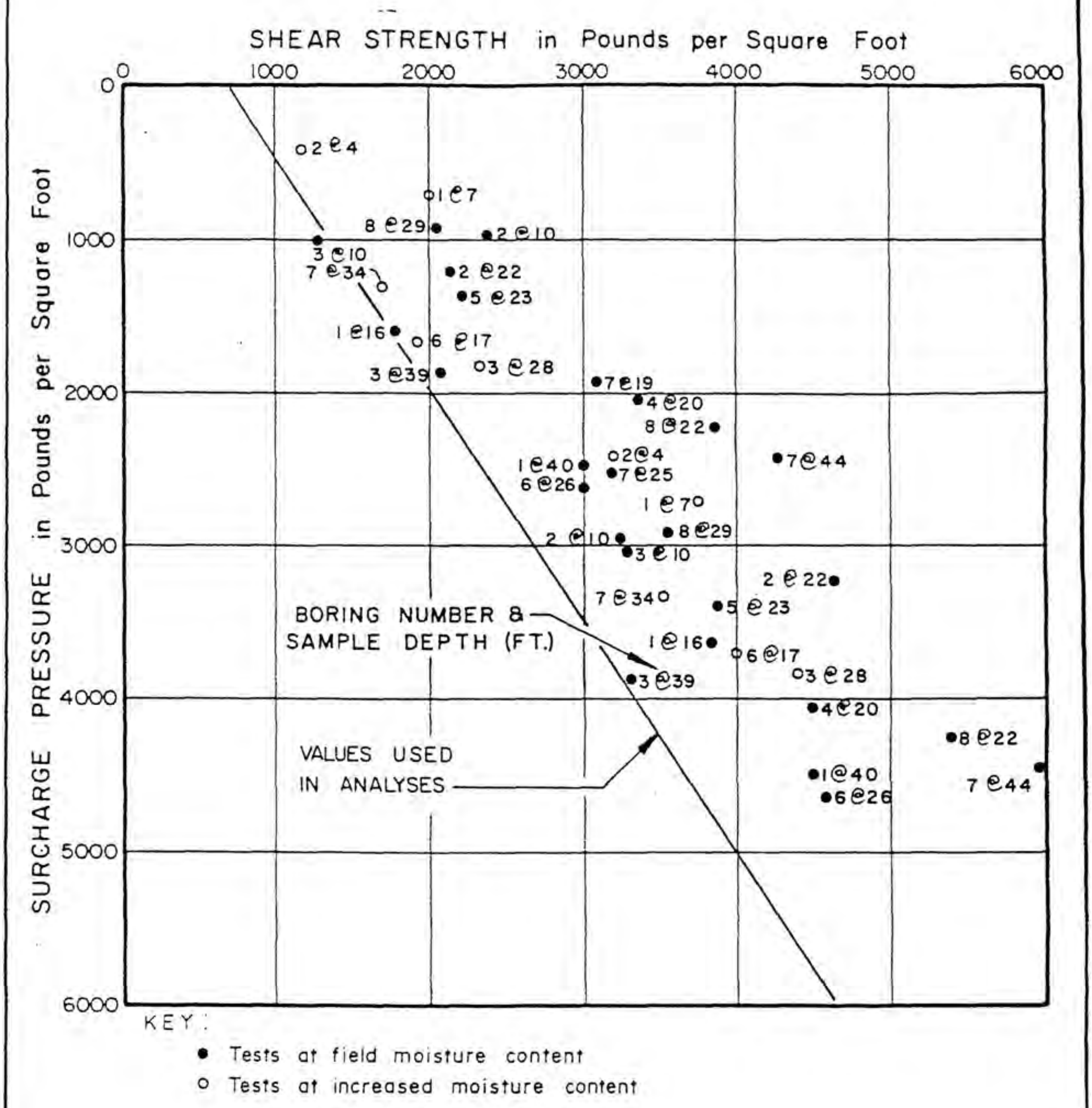
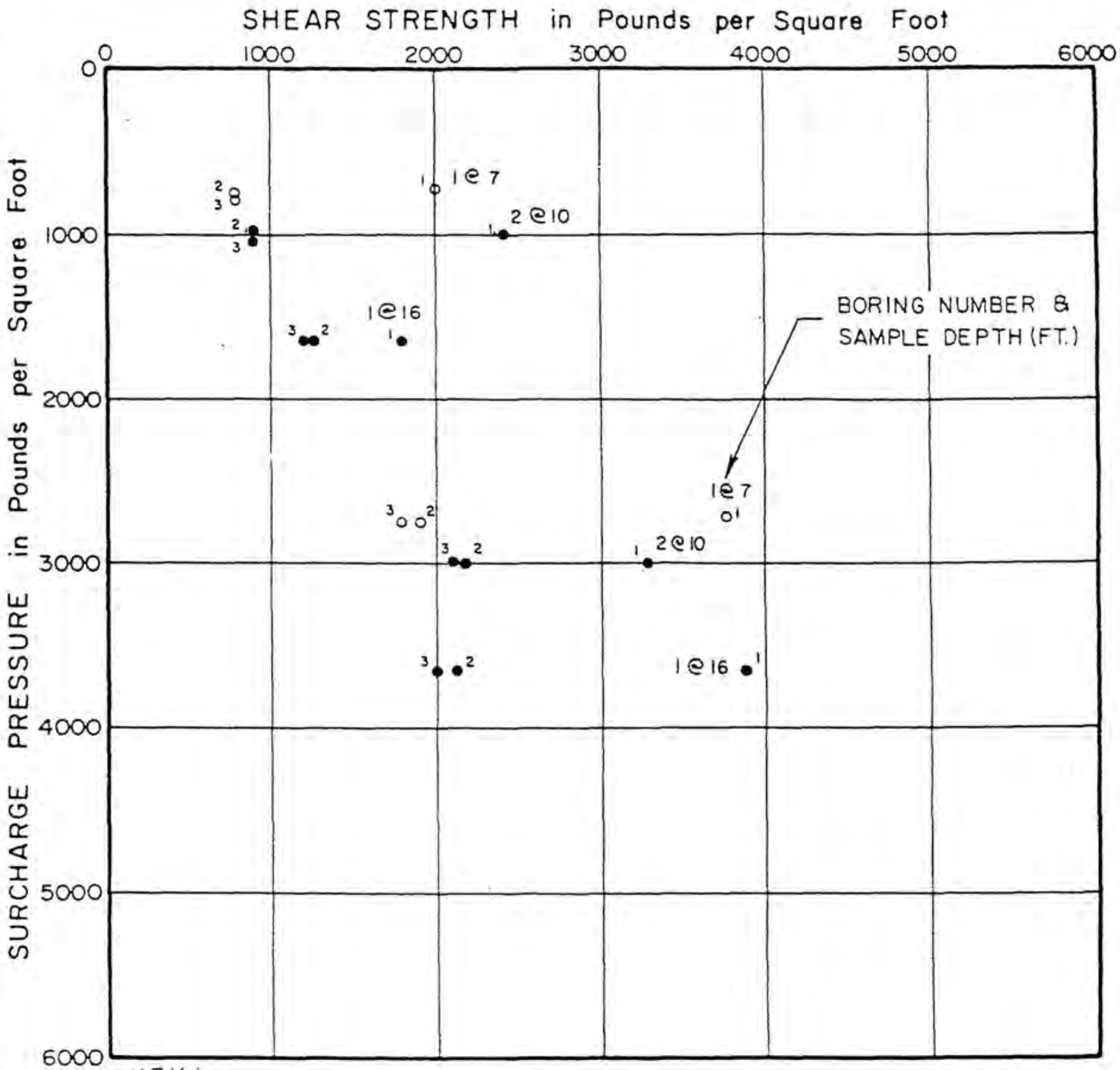
F6



DIRECT SHEAR TEST DATA

LEROY CRANDALL & ASSOCIATES

PLATE A-3.1



KEY:

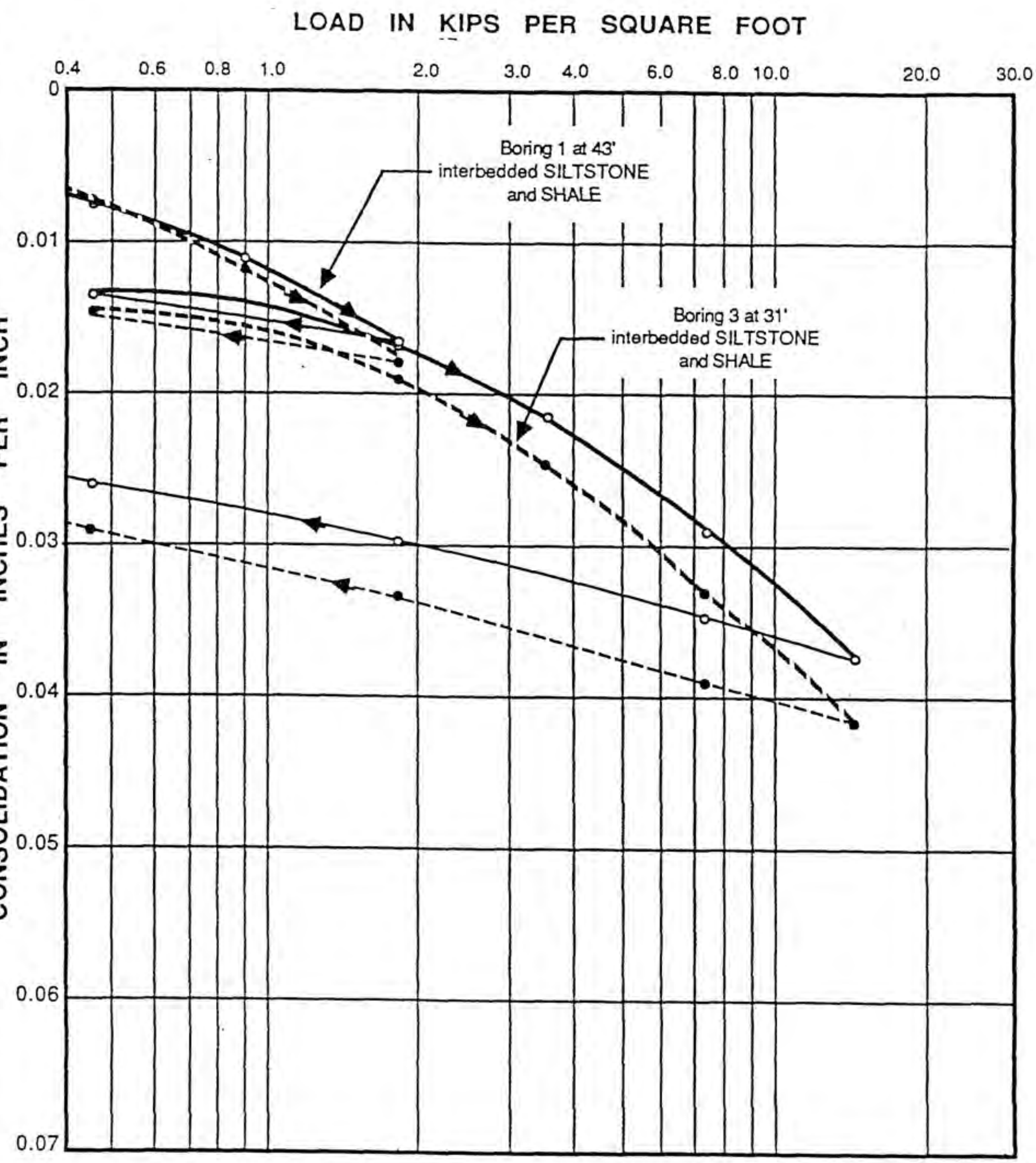
- ● Tests at field moisture content
- o Tests at increased moisture content

NOTE: Samples sheared and reset to their original position for a total of three times to simulate the strength parameters along bedding planes.

DIRECT SHEAR TEST DATA

LEROY CRANDALL & ASSOCIATES

PLATE A-3.2

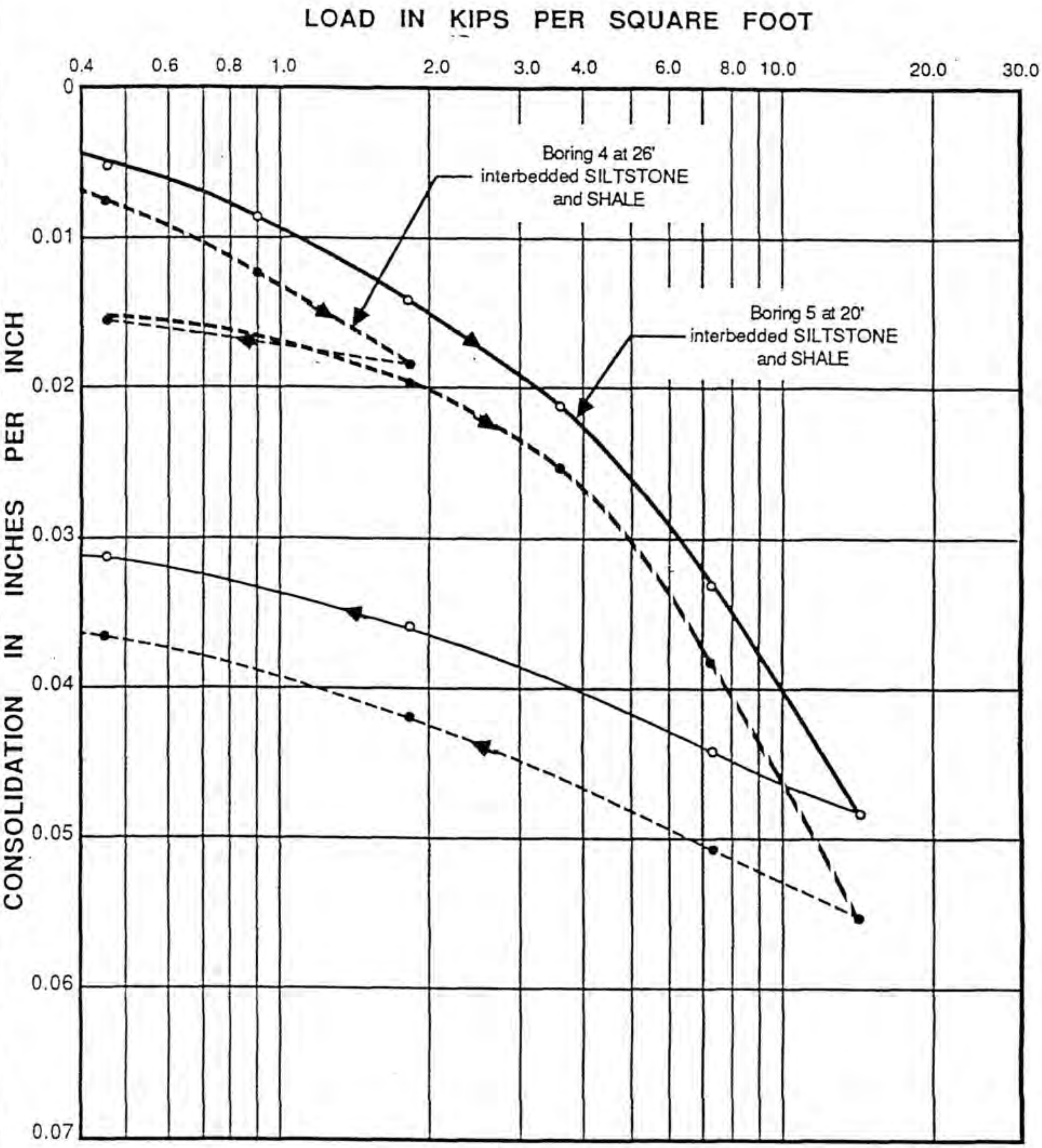


NOTE: Samples tested at field moisture content.

CONSOLIDATION TEST DATA

LeROY CRANDALL AND ASSOCIATES

PLATE A - 4.1

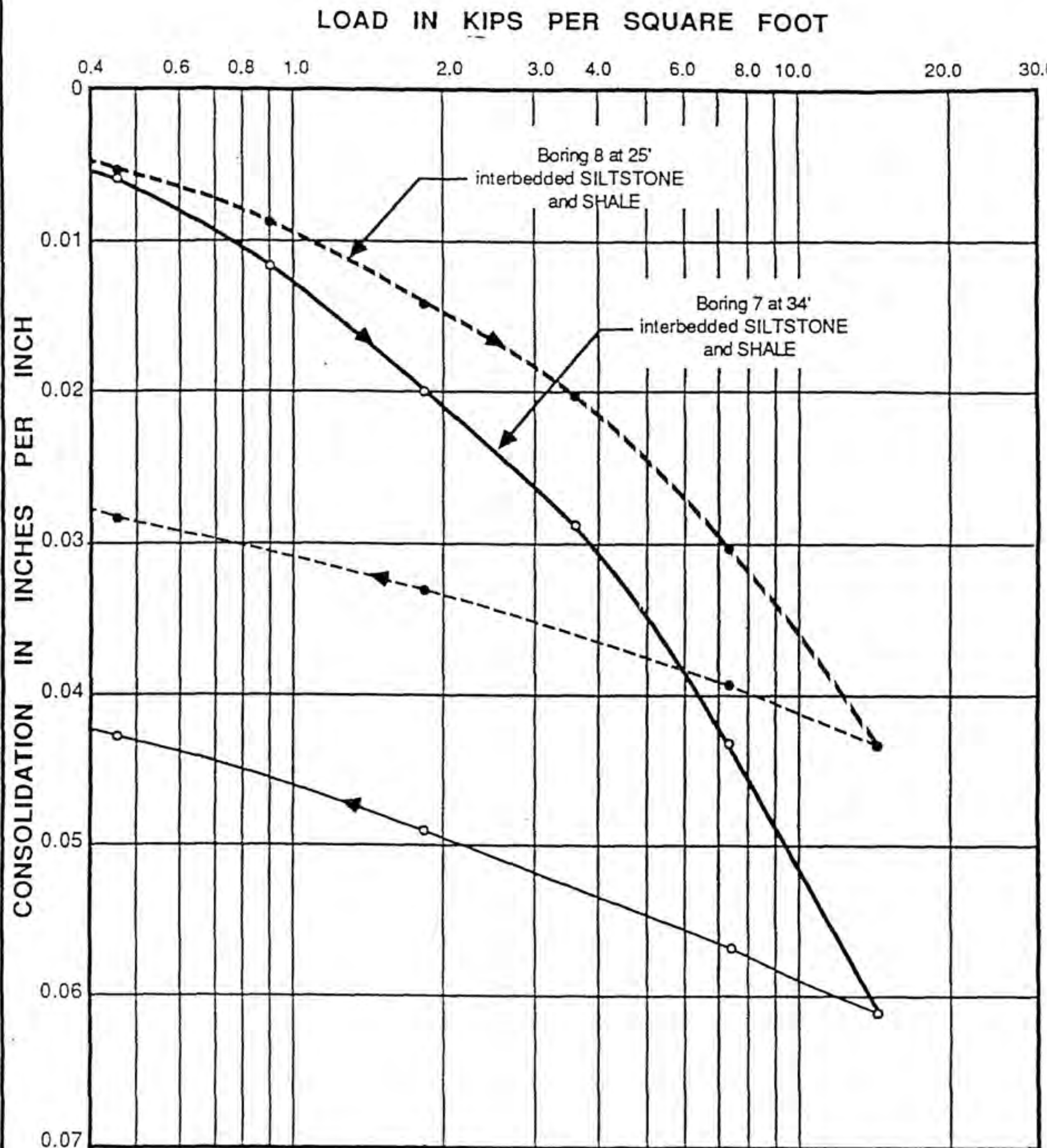


NOTE: Samples tested at field moisture content.

CONSOLIDATION TEST DATA

LeROY CRANDALL AND ASSOCIATES

PLATE A - 4.2



NOTE: Samples tested at field moisture content.

CONSOLIDATION TEST DATA

LeROY CRANDALL AND ASSOCIATES

PLATE A - 4.3

BORING NUMBER AND SAMPLE DEPTH :	5 at 20' to 26'
SOIL TYPE :	Interbedded SILTSTONE and SHALE
MAXIMUM DRY DENSITY : (lbs./cu. ft.)	110
OPTIMUM MOISTURE CONTENT : (% of dry wt.)	16

TEST METHOD : ASTM Designation D1557 - 70

COMPACTION TEST DATA

LeROY CRANDALL AND ASSOCIATES

PLATE A - 5

M. J. SCHIFF & ASSOCIATES

Consulting Corrosion Engineers

1291 NORTH INDIAN HILL BOULEVARD
CLAREMONT, CALIFORNIA 91711
(714) 626-0967

June 10, 1988

LeROY CRANDALL & ASSOCIATES
900 Grand Central Avenue
Glendale, California 91201-3009

Attention: Mr. Abe Simantob

Re: Soil Corrosivity Tests
Kaiser Permanente
Los Angles, California
Your #AE-88187, MJS&A #88134

Gentlemen:

Laboratory tests have been completed on seven soil samples we selected from your borings for the subject project at 4733 Sunset Boulevard consisting of a subterranean parking structure (3 levels), two pedestrian bridges, and an elevator tower. The purpose of these tests was to determine if these soils may have deleterious effects on underground utilities, hydraulic elevator cylinders, and concrete foundations.

The electrical resistivity of each sample was measured in its as-received condition and again with distilled water added to create the standardized condition of saturation. Resistivities are at about their lowest value when the soil is saturated. The samples were chemically analyzed for the major anions and cations, and pH was measured. Results are shown in Table 1.

One of the most useful factors in determining soil corrosivity is electrical resistivity. The electrical resistivity of a soil is a measure of its resistance to the flow of electrical current. Corrosion of buried metal is an electro-chemical process in which the amount of metal loss due to corrosion is directly proportional to the flow of electrical current (DC) through the soil. A soil's resistivity decreases and therefore its corrosivity increases primarily as its moisture and chemical contents increase.

A commonly accepted correlation between electrical resistivity and corrosivity toward ferrous metals is:

Soil Resistivity in ohm-centimeters	Corrosivity Category
0 to 1,000	severely corrosive
1,000 to 2,000	corrosive
2,000 to 10,000	moderately corrosive
over 10,000	mildly corrosive

Electrical resistivities measured in the laboratory with as-received moisture content were in moderately corrosive and corrosive categories. When saturated, they dropped into the severely corrosive category.

pH values varied from 7.2 to 7.7 which is neutral to mildly alkaline. This is not significant in evaluating corrosivity in this case.

The chemical content varied from low to high. The high concentrations were in the samples from borings 2, 3, and 6 where calcium sulfate (gypsum) was the predominant compound. The sulfate ions are in a range where moderately sulfate resistant cement should be used.

We classify this site as severely corrosive to ferrous metals and moderately deleterious to concrete. The following corrosion control measures are recommended.

Underground steel utilities should be blasted and given a high quality protective coating such as 40 mil extruded polyethylene, 20 mil plastic tape over primer, or hot applied coal tar enamel or tape.

Buried steel piping should be electrically insulated from dissimilar metals, cement-mortar or concrete coated steel, and above ground steel. Underground steel pipe must be bonded for electrical continuity if rubber gasketed, mechanical, grooved end, or other nonconductive type joints are used.

Cathodic protection is recommended for underground steel utilities.

Hydraulic elevator cylinders should be well coated as described above. Each cylinder should be isolated from building metals by installing dielectric material between the piston platen and car and also in the oil line. The oil line should be placed above ground if possible but, if underground, should be protected as described above for steel utilities. Cathodic protection is recommended for hydraulic cylinders or, as an alternate, each cylinder may be placed in a plastic casing with a plastic watertight seal at the bottom.

Cast or ductile iron pipe, valves, and fittings should be encased in an 8 mil polyethylene tube or wrap per AWWA Standard C105 or ANSI 21.5.

No special precautions are required for copper, asbestos-cement, or plastic utilities placed underground from a corrosion viewpoint. However, any iron valves or fittings should be protected as mentioned above.

Sand would be better than the existing soils for bedding and backfill of metallic piping from a corrosion standpoint.

Where metallic pipelines penetrate concrete structures such as building floors or walls, plastic sleeves, rubber seals, or other dielectric material should be used to prevent pipe contact with the concrete and reinforcing steel.

On any type of pipe, bare steel appurtenances such as bolts, joint harnesses, or flexible couplings should be coated with a coal tar or rubber based mastic after assembly.

Standard construction practices and concrete mixes may be used for concrete in contact with these soils using type 2 cement.

The scope of this study was limited to a determination of soil corrosivity and its general effects on materials likely to be used for construction. If the architect and/or engineers desire more specific information, designs, specifications, or review of design, we will be happy to work with them as a separate phase of this project.

Respectfully submitted,
M. J. SCHIFF & ASSOCIATES

Paul R. Smith

Paul R. Smith, P.E.
cb

Enc: Table 1
L21

Table 1 - LABORATORY TESTS ON SOIL SAMPLES

Location and Depth	Soil Type	Soil Resistivity ohm-centimeters As Rec'd	Sat'd	pH	Chemical Analysis in mg/kg (ppm) of dry soil: Calcium Ca	Magnesium Mg	Sodium Na	Bicarbonate HCO3	Chloride Cl	Sulfate SO4
B1 4.5'	siltstone	3,400	840	7.7	trace	trace	69	trace	142	25
B2 25.5'	siltstone	2,800	490	7.2	720	trace	58	366	212	1050
B3 1.5'	fill	1,800	560	7.4	800	24	126	488	142	1450
B4 29.5'	siltstone	4,300	550	7.2	240	trace	115	244	212	220
B5 5.5'	siltstone	5,100	770	7.7	trace	trace	80	trace	142	35
B6 39.5'	siltstone	3,300	520	7.4	960	24	34	488	142	1650
B8 49.5'	siltstone	3,900	910	7.6	40	trace	115	122	212	60

Carbonates = 0 for all samples

Kaiser Permanente
Los Angeles, California
Your #AE-88187, MJS&A #88134
F6

BORING NUMBER AND SAMPLE DEPTH:	1 at 2' to 4'	6 at 4' to 6'	7 at 8' to 10'
SOIL TYPE:	SILTY CLAY	SILTY CLAY	SILTSTONE
CONFINING PRESSURE: (LBS./SQ. FT.)	144	144	144
INITIAL MOISTURE CONTENT: (%)	15.5	20.0	17.0
FINAL MOISTURE CONTENT: (%)	38.8	42.4	40.1
DRY DENSITY: (LBS./CU. FT.)	91	79	87
EXPANSION INDEX:	123	100	92

TEST METHOD: UNIFORM BUILDING CODE STANDARD NO. 29-2, EXPANSION INDEX TEST.

EXPANSION INDEX TEST DATA

LeROY CRANDALL AND ASSOCIATES

APPENDIX D

Engineering Geologic Report

GEOTECHNICAL CONSULTANTS

ENGINEERING GEOLOGIC REPORT
FOR
PROPOSED MULTI-LEVEL PARKING STRUCTURE
1517 N. VERMONT AVENUE
LOS ANGELES, CA

for

Geobase, Inc.
13362 Peralta Drive
Laguna Hills, CA92653

January 18, 2017

16-D91-01

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GEOTECHNICAL CONSULTANTS

January 18, 2017

Geobase, Inc.
13362 Peralta Drive
Laguna Hills, CA 92653

Attention: Mr. John Chevallier

Subject: Engineering Geologic Report
Proposed Multi-Level Parking Structure
1517 N. Vermont Avenue
Los Angeles, CA

Dear Mr. Chevallier:

In accordance with your request, an engineering geologic report has been completed for the above-referenced project. The purpose of the report is to provide engineering geologic information for inclusion in a geotechnical report being prepared by Geobase, Inc. for the subject project.

We appreciate this opportunity to be of continued service to you. If you have any questions regarding this report, please do not hesitate to contact us at your convenience.

Respectfully submitted,

RMA Group

PROFESSIONAL GEOLOGIST
GARY W. WALLACE
No. 1255
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

Gary Wallace, PG | CEG
Vice President - Geology
CEG 1255

TABLE OF CONTENTS

1.00 INTRODUCTION

1.01 Purpose and Proposed Usage

This report has been prepared to provide engineering geologic information relative to a proposed multi-level parking garage planned at the southwest corner of Vermont Avenue and Barnsdall Avenue in Los Angeles, California. The construction will occur after demolition of an existing parking structure that currently occupies the site. According to Perkins and Will, the proposed structure will consist of 8 above ground levels and 2 subterranean levels.

We understand that pertinent information from this report will be incorporated into at geotechnical investigation report being prepared for the project by Geobase, Inc.

1.02 Scope of the Investigation

The general scope of this investigation included the following:

- Review of published and unpublished geologic, seismic, groundwater and geotechnical literature (Appendix B).
- Examination of aerial photographs.
- Logging and sampling of 4 exploratory pits excavated by hand equipment.
- Preparation of this report presenting our findings, conclusions and recommendations.

1.03 Site Location and Description

The proposed parking structure will be located 1517 N. Vermont Avenue in the City of Los Angeles, Los Angeles County, California (Figure 1).

The site is currently occupied by an existing multi-level parking structure that has a subterranean level. It is bounded by Vermont Avenue to the east, and existing buildings to the south and west, and Barnsdall Avenue to the north. The approximate geographic position at the center of the site is 34.099° latitude and -118.292° longitude.

The elevation of the bottom of the existing parking structure is approximately 378 to 382 feet above sea level. The elevation of the adjoining streets ranges from about 392 to 400 feet above sea level. There are no unsupported slopes within or adjacent to the site. The nearest such slope is located about 175 feet to the northwest.

The site and adjoining area is completely developed with buildings, roadways and streets. Vegetation consists minor landscaping adjacent to Vermont Avenue and Barnsdall Avenue.

1.04 Past Usage

Aerial photographs indicate that the existing parking structure dates back to the 1970s. In the 1960s and 1950s the site was occupied at various times by one or more buildings and a parking lot. In 1948 the site was vacant.

1.05 Field Investigation

The field investigation consisted of logging and sampling four exploratory holes excavated in the bottom of the existing parking structure. Four-foot by four-foot holes were saw cut through the floor slab of the parking garage and exploratory holes were excavated into the underlying soils and bedrock by hand equipment. Saw cutting of the slab, excavation of the holes, backfilling of the holes and replacement of the concrete was performed by a contractor retaining by and under the direction of Geobase. Depths of the holes were less than 5 feet deep to allow safe entry into the holes for logging and sampling per OSHA regulations. Low overhead clearance precluded use of conventional truck mounted drilling equipment. Our logs of the exploratory holes are presented in Appendix A.

2.00 FINDINGS

2.01 Geologic Setting

The site is located in the north part of the Los Angeles coastal plain within the Peninsular Ranges geomorphic province. The Los Angeles coastal plain is bounded by the Santa Monica Mountains to the north, the Puente Hills to the east, the Santa Ana Mountains and San Joaquin Hills to the south, and the Palos Verde Hills and Pacific Ocean shoreline to the west. The majority of the Los Angeles coastal plain is an alluvial filled basin that slopes that gently seaward. The sediments within the basin are as much as 30,000 feet thick and rest on granitic and metamorphic basement rocks (Yerkes and others, 1965).

Just northwest of the parking garage site a small hill rises above adjacent alluvial deposits. This knoll, known as Olive Hill, is composted of sedimentary bedrock that was classified as Tertiary Age Puente Formation siltstone by Lamar (1970) during his mapping of the Elysian Park – Repetto Hills. His mapping also shows the bedrock is folded into a syncline that generally trends in an east – west direction. Regional geologic mapping by Dibblee (1991) also shows that Olive Hill is underlain by folded sedimentary bedrock. He classified the bedrock as Tertiary age "Unnamed Shale" which includes Puente formation.

The regional geologic setting of the site, as mapped by Dibblee, is illustrated on Figure 1.

2.02 Prior Geotechnical Reports

Geomatrix (2000) compiled boring logs and laboratory test data from numerous geotechnical investigations that have been performed for an area north of Sunset Boulevard between Edgemont Street and Vermont Avenue, and south of Barnsdall Avenue. The logs provide a substantial geologic database for the area, but do not show any previously drilled borings within the parking structure site. Research performed by Geobase (personal communication) at the City of Los Angeles did not generate any prior geotechnical reports for the existing parking structure site.

Borings logs from a Leroy Crandall and Associates geotechnical investigation of the adjoining property to the west indicate that property is underlain by northeast dipping sedimentary bedrock which is consistent with the regional geologic of Lamar and Dibblee. One of borings encountered three northwest – southeast trending bedrock faults. The trend of these faults is nearly perpendicular to the trend of faults postulated by Weber along the northwest and southeast sides of Olive Hill. The log of the Crandall boring is presented in Appendix A.

The logs of four Geobase borings drilled just north of Barnsdall Avenue between Vermont Avenue and Edgemont Street were provided for our review. The borings, which extended to depths of 35 to 55 feet deep, were downhole logged by a geologist. All of the borings encountered northwest to northeast dipping siltstone which is consistent with the regional geologic mapping by Lamar and Dibblee.

2.03 Site Geology

Four exploratory pits were excavated at the site in 4-foot by 4-foot holes cut through the concrete floor of the existing parking structure. The pits exposed the concrete floor slab, artificial fill and sedimentary bedrock. The thickness concrete slab exposed by the pits ranged from 6 to 6 ¾ inches. Artificial fill consisting of brown silty clay was encountered between concrete in each pit. The fill extended to the bottom of two pits (T-2 and T-3). A 3 inch diameter metal pipe was exposed in Pit T-2 at a depth of 10 inches and a 30-inch diameter concrete pipe crossed Pit T-3, thus limiting the depth of that hole. Sedimentary bedrock consisting of well bedded siltstone was exposed beneath the fill in Pits T-1 and T-4 at depths of 15 and 18 inches, respectively. Bedding was measured to dip 11 to 14 degrees to the northwest and northeast, which is consistent with the regional mapping of Lamar and Dibblee and the logs of borings drilled into nearby properties.

Because bedrock was not encountered in exploratory pits excavated beneath the east side of the existing parking structure and no previous boring logs were available for that area, we have prepared a cross section to estimate the depth to bedrock. The profile was created using existing subsurface data, a topographic profile based on a contours depicted on a quadrangle map prepared in 1955 prior to construction of the existing parking structure, and structural geologic data from Lamar's regional geologic map. The contact between bedrock and overlying soils reported in LeRoy Crandall Boring B-3, Geobase Boring B-4 and exploratory pit T-4 was projected to the east. The cross section indicates that the depth to bedrock beneath the east side of the parking structure may be on the order of 40 feet. However, since the quadrangle map used to generate the profile is quite small, there is uncertainty how close the contacts between fill soils and bedrock are to the original depths of bedrock and we had no boring logs for the east side of the site, the depth to bedrock shown on the cross section may be different than actual conditions.

A Site Geologic Map showing the locations of the pits, LeRoy Crandall's boring and the cross section location is presented as Figure 2. The Geologic Cross Section is presented as Figure 3. Logs of the exploratory pits, LeRoy Crandall's Boring B-3 and Geobase's Boring B-4 are contained in Appendix A.

2.04 Surface and Groundwater Conditions

No areas of ponding or standing water were present at the time of our study and groundwater was not encountered in the pits we logged.

Some borings logged by others between Edgemont Street and Vermont Avenue north for Sunset Boulevard and south of Barnsdall Avenue encountered groundwater at depths of about 25 to 40 feet (Geomatrix, 200). According to the California Division of Mines and Geology (1998), the highest historic groundwater level beneath the site has been on the order of 35 feet below the ground surface.

2.05 Faults

The site is not located within the boundaries of an Earthquake Fault Zone for fault-rupture hazard as defined by the Alquist-Priolo Earthquake Fault Zoning Act. The nearest Earthquake Fault Zone is located about 2,300 feet to the northwest along the Hollywood fault (Figure 4). In addition, the site is not located in the City of Los Angeles Fault Hazard Zone. The nearest such zone is located about ¾ of a mile to the northwest (Figure 5).

Weber (1980) postulated that Olive Hill is bounded by two northeast-southwest trending concealed (buried) faults. He mapped one of the faults approximately 1,000 feet northwest of site at its nearest point. He mapped the other fault through the intersection of Sunset Boulevard and Vermont Avenue approximately 170 feet southeast of the site. These postulated faults are not shown on regional geologic maps of the Hollywood Quadrangle prepared by Lamar (1970) or Dibblee (Figure 1).

Faults within the Hollywood Quadrangle were evaluated by the California Division of Mines and Geology in 1977 as part of its 10-year state wide fault evaluation program which was performed in response to passage of the Alquist-Priolo Act of 1972. A fault evaluation report of the Hollywood Quadrangle prepared by Smith (1997) did not recommend including Weber's postulated Olive Hill faults within a Special Studies Zone (now know as Earthquake Fault Zones). Faults within the Hollywood Quadrangle were re-evaluation in 2014 by the California Geological Survey. A new fault evaluation report also did not recommend including the faults postulated by Weber in an Earthquake Fault Zone (Hernandez and Trieman, 2014). The postulated faults are not included within an Earthquake Fault Zone on the latest map of Earthquake Zones of Required Investigation map of the Hollywood Quadrangle (Figure 4).

Leroy Crandall encountered three northwest-southeast trending faults within Puente formation bedrock in a boring drilled just west of the northwest corner of the site (see Figure 2 and the boring log in Appendix A). The log indicates the offset along one fault is one inch. Displacement of the other faults was not reported. The strike of the faults is nearly perpendicular to the trend of the faults postulated by Weber and the faults are not part on any known active fault zone.

Geomatrix (2000) encountered a fault in a boring and a trench about 800 feet west-northwest of the site. They judged fault, which does not project towards or cross the site, to be inactive.

Active faults in the vicinity of the site which are significant in terms of generating earthquake ground shaking include the Santa Monica-Hollywood-Raymond fault zone, the Upper Elysian Blind Thrust, the Puente Hills Blind Thrust and the Verdugo fault zone which are all located within about 5 miles of the site. The distance these faults and other notable faults within 50 miles of the site are presented on Table 1. The accompanying Regional Fault Map (Figure 6) illustrates the location of the site with respect to these other major faults in the region.

2.06 Historic Seismicity

The nearest large historic earthquake in the vicinity of the site was the magnitude 6.0 Whittier Narrows earthquake of 1987. That event was epicentered approximately 13 miles from the site. Additionally, the 1971 San Fernando, 1991 Sierra Madre and 1994 Northridge earthquakes were all epicentered within 25 miles of the site. The magnitudes of these earthquakes ranged from 5.8 to 6.7. These events and other notable earthquakes that have occurred in the region are summarized in the Table 2.

Our research of regional geologic and seismic data did not reveal any known instances of ground failure within the site associated with regional seismic activity.

2.07 Landslides

Regional geologic maps of Lamar and Dibblee do not show any pre-existing landslides within the site. In addition, there are no unsupported slopes within 100 feet of the site.

3.00 CONCLUSIONS AND RECOMMENDATIONS

3.01 General Conclusion

Based on specific data and information contained in this report and our understanding of the project, it is our professional judgment that the proposed development is geologically feasible. This is provided that the recommendations presented herein and in geotechnical reports prepared by Geobase for the project are fully implemented during design, grading and construction.

3.02 Faulting and Secondary Earthquake Hazards

Since the site is not located within the boundaries of an Earthquake Fault Zone and no active faults are known to pass through the property, we conclude that future surface fault rupture within the site is unlikely to occur.

According to the California Geological Survey Earthquake Zones of Required Investigation Map for the Hollywood Quadrangle (2014) the site is not located within a potential liquefaction hazard zone (Figure 4). However, given the reported depths of groundwater, the potential for liquefaction at the site may need to be evaluated if relatively thick alluvium underlies the eastern side of the proposed parking structure. Likewise, seismically induced settlement may need to be evaluated if relatively thick alluvium underlies the eastern side of the proposed parking structure.

Since there are no unsupported slopes within or near the site, we conclude that seismically induced landsliding is unlikely to occur within the site. According to the California Geological Survey Earthquake Zones of Required Investigation Map for the Hollywood Quadrangle (2014), the site is not located within a seismically induced landslide hazard zone (Figure 4).

It is our understanding the seismic design parameters will be developed by Geobase.

3.03 Landslides

Based on data gathered during this study from multiple sources and our field observation, it is our opinion that the site is not impacted by landsliding. The geologic structure of the underlying bedrock should be considered in the design and excavation of any permanent or temporary cuts within the site.

3.04 Geotechnical Design Recommendations

We understand that geotechnical design recommendations for the project will be developed by Geobase. Design and construction of the proposed parking structure should be in accordance with City of Los Angeles requirements and recommendations of Geobase. Because of the proximity of existing buildings and improvements and the depth of the proposed subterranean parking structure levels, excavations may need to be shored. Design of shoring should be performed by Geobase and/or a qualified specialty contractor and should consider surcharge loading and the geologic structure of the underlying bedrock. The possibility of a transition from bedrock to alluvium beneath relatively thin fill should be considered in foundation design. Geotechnical observation and testing during earthwork and foundation construction should be performed by Geobase in accordance with City of Los Angeles requirements.

4.00 CLOSURE

The findings, conclusions and recommendations in this report were prepared in accordance with generally accepted engineering geologic principles and practices. No other warranty, either expressed or implied, is made. This report has been prepared for Geobase, Inc. for their use in geotechnical evaluation of the site. Anyone using this report for any other purpose must draw their own conclusions.

RMA Group should be consulted during plans development and earthwork if any issues require further engineering geologic evaluation. Additional or different conclusions and recommendations may need to be developed at that time.

FIGURES AND TABLES

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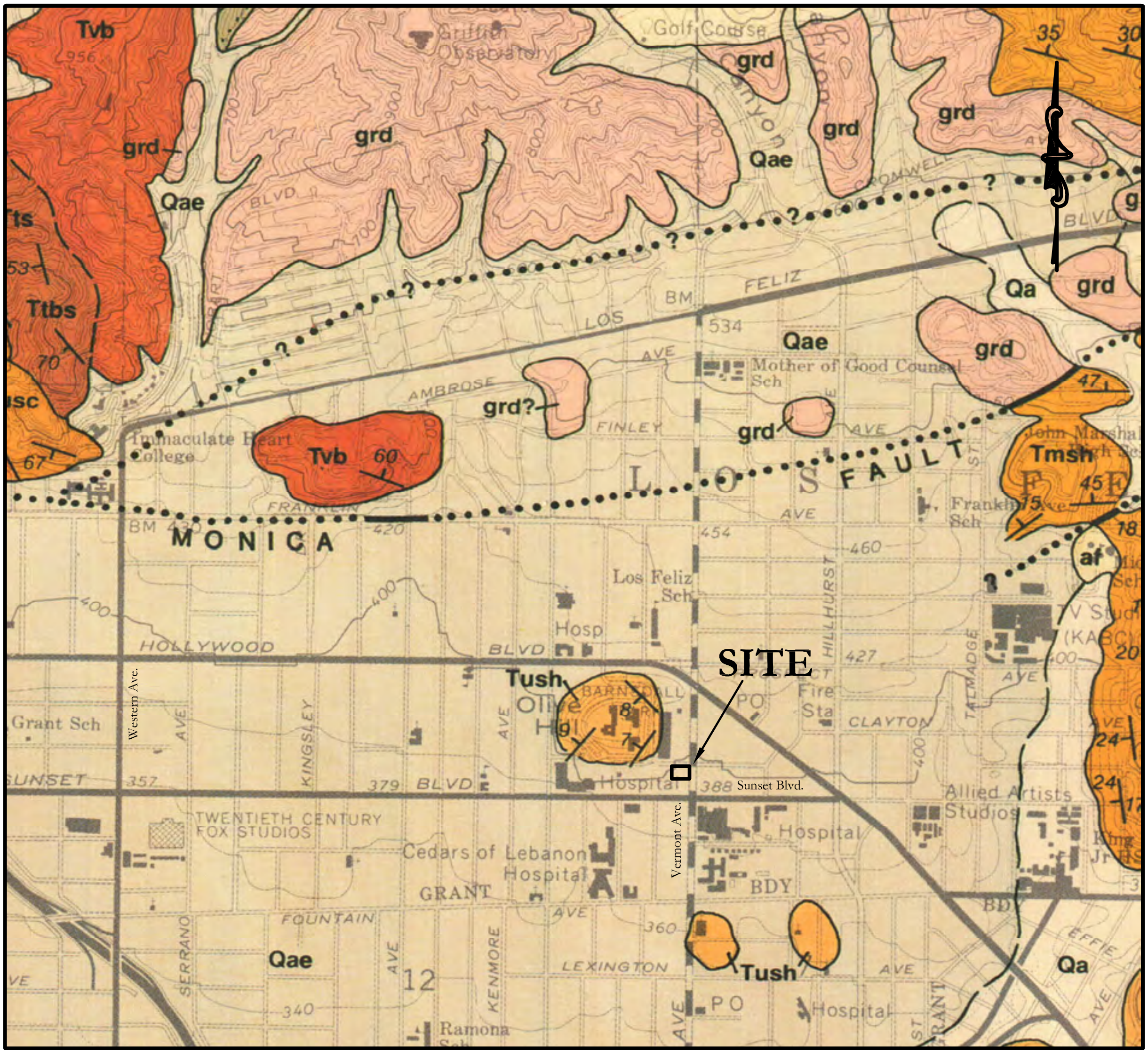
GEOTECHNICAL CONSULTANTS



SITE LOCATION AND REGIONAL GEOLOGIC MAP
Scale: 1" = 1,700'

Partial Legend

af - Artificial fill
Qa, Qae - Alluvium
Tush - Unnamed shale includes Puente formation
Tmsh, Ttbs - Sedimentary bedrock
Tvb - Basalt bedrock
grd - Granitic bedrock

Source: Dibblee, 1991

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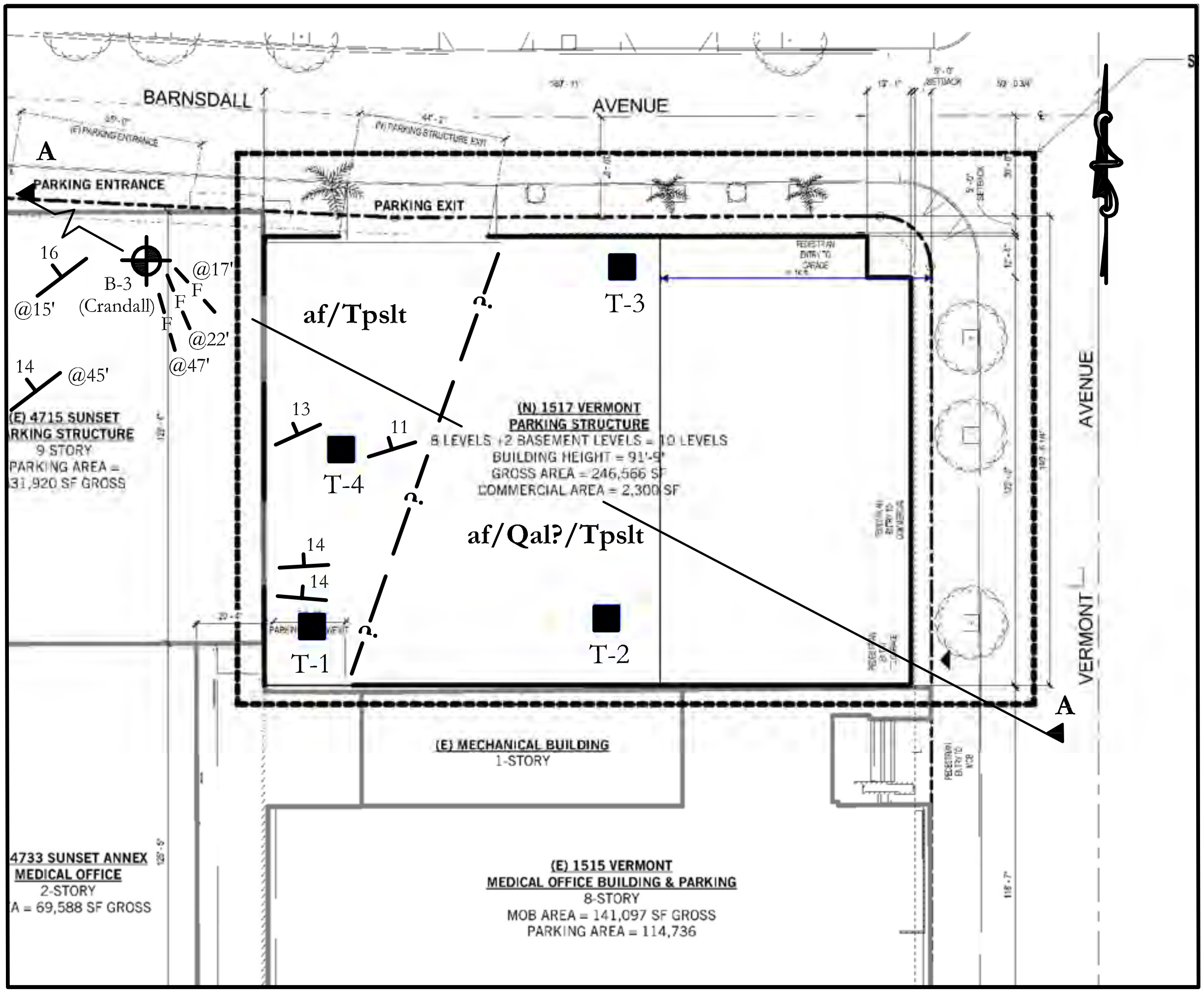
GEOTECHNICAL CONSULTANTS



SITE GEOLOGIC MAP

Scale: 1" ≈ 60'

Geologic Legend

af - Artificial fill

Qal - Alluvium

Tpslt - Puente formation siltstone

- Exploratory hole

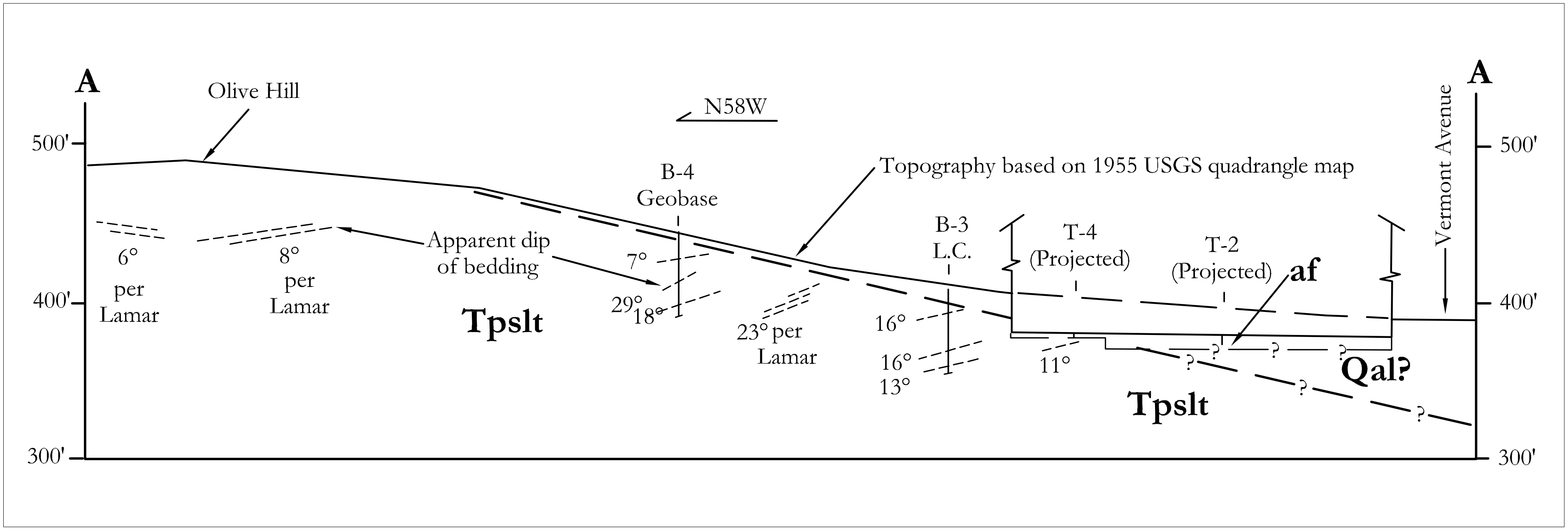
-Exploratory boring (Leroy Crandall)

- Approximate geologic contact, queried where uncertain

14 - Strike and dip of bedding

F - Vertical Fault per Leroy Crandall

Base map by Perkins and Will



GEOLOGIC CROSS SECTION

Scale: 1" ≈ 100', H=V

Geologic Legend

af - Artificial fill
Qal -Alluvium
Tpslt - Puente formation siltstone

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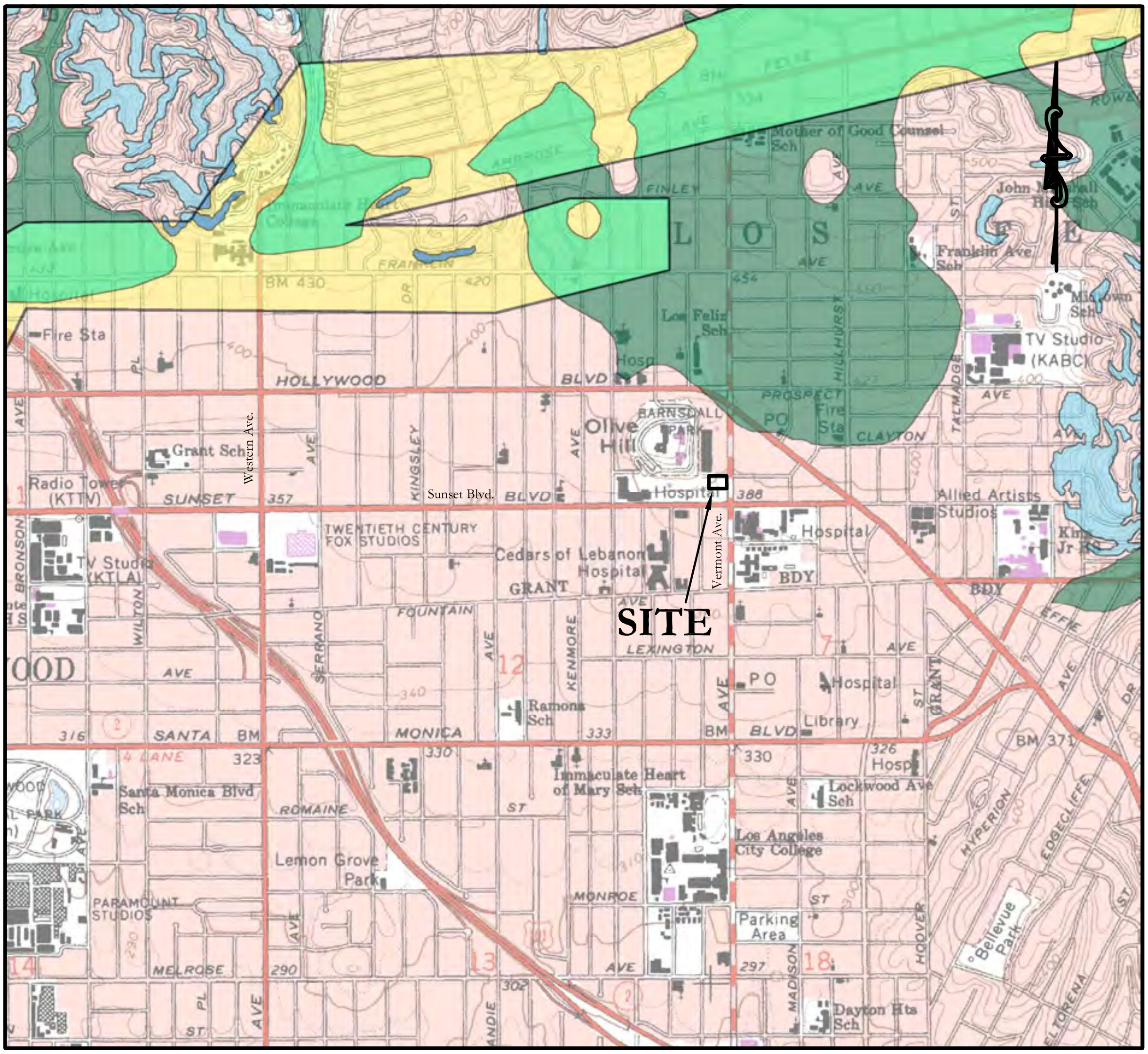


EARTHQUAKE ZONES OF REQUIRED INVESTIGTION MAP

Scale: 1" = 2,100'

Legend

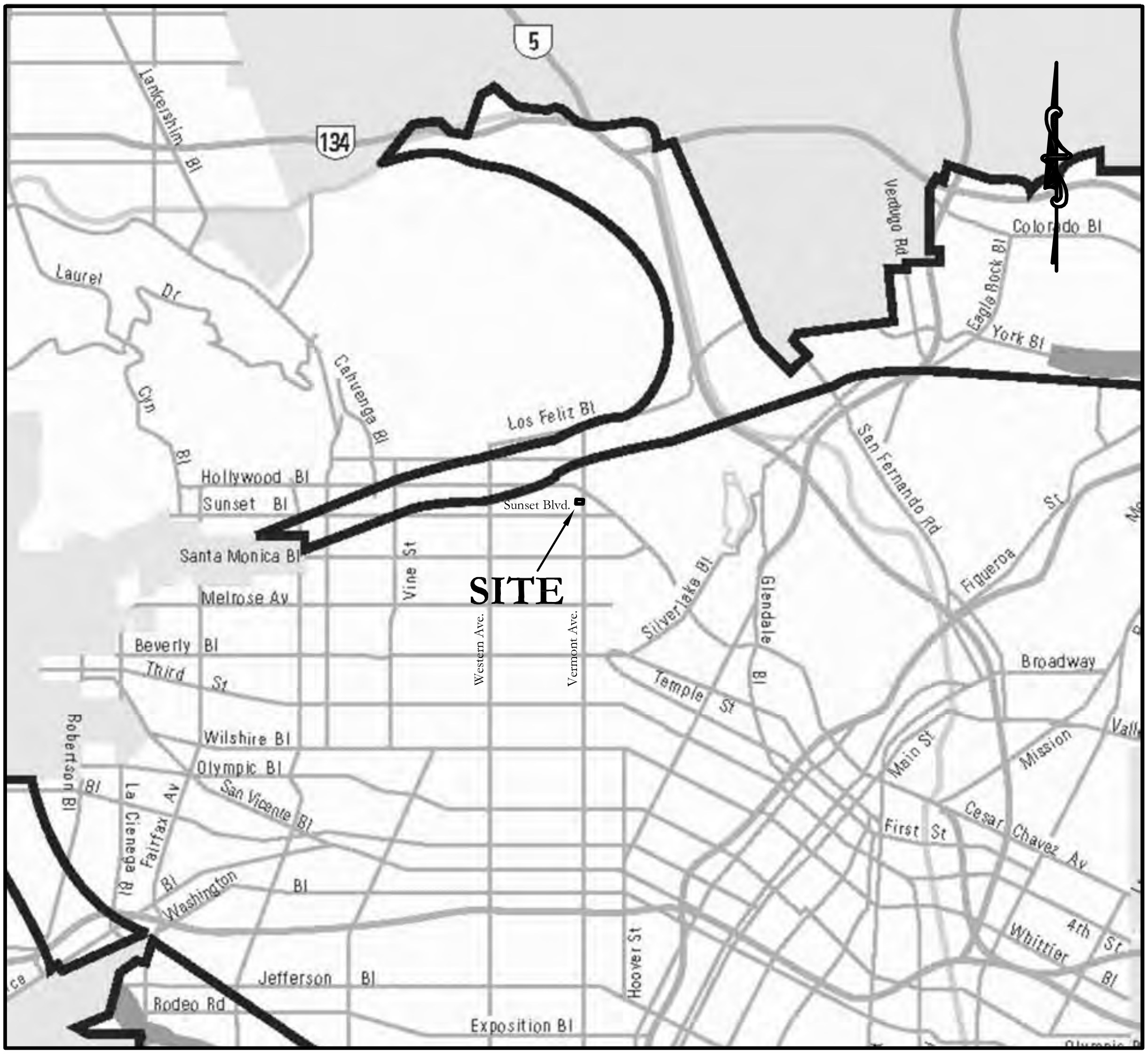
Dark green - Liquefaction Zone

Blue - Earthquake-Induced Landslide Zone

Yellow - Earthquake Fault Zone

Light green - Overlapping Earthquake Fault Zone & Liquefaction Zone

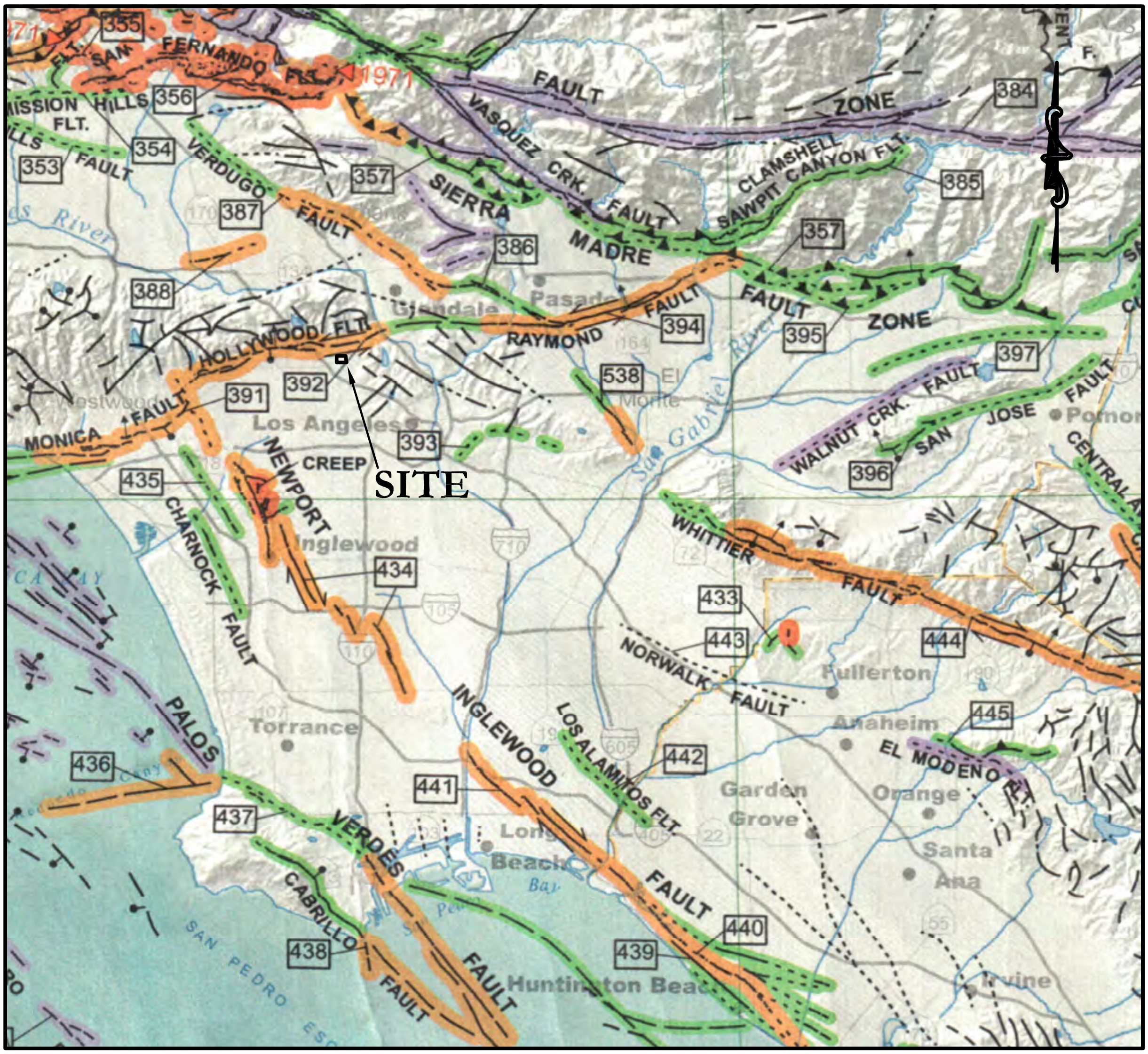
Base Map: California Geological Survey, 2014



CITY OF LOS ANGELES FAULT HAZARD ZONES MAP

Scale: 1" ≈ 2 Miles

Base Map: Safety Element of Los Angeles City General Plan, 1996



REGIONAL FAULT MAP

Scale: 1" ≈ 8.5 miles

Partial Legend

Orange - Holocene fault displacement

Green - Late Quaternary fault displacement

Purple - Quaternary fault

Black - Pre-Quaternary fault

Base Map: California Geological Survey Fault Activity Map of California, 2010

NOTABLE FAULTS WITHIN 50 MILES AND SEISMIC DATA

Fault Zone & geometry	Distance (mi.)	Maximum Moment Magnitude	Slip Rate (mm/yr)
Anacapa-Dume (r-ll-o)	16	7.5	3.0
Chino-Central Ave. (rl-r-o)	32	6.7	1.0
Clamshell-Sawpit (r)	18	6.5	0.5
Cleghorn (ll-ss)	50	6.5	3.0
Cucamonga (r)	32	6.9	5.0
Elsinore (rl-ss)	16	6.8	2.5
Upper Elysian Park (r)	1	6.4	1.3
Hollywood (ll-r-o)	1	6.4	1.0
Holser (r)	26	6.5	0.4
Malibu Coast (ll-r-o)	14	6.7	0.3
Newport-Inglewood (rl-ss)	7	6.9	1.5
Northridge (r)	15	7	1.5
Palos Verde (rl-ss)	18	7.3	3.0
Puente Hills Blind Thrust (r)	5	7.1	0.7
Raymond (ll-r-o)	4	6.5	1.5
San Andreas (rl-ss)	32	7.5	29.0
San Gabriel (rl-ss)	15	7.2	1.0
San Jacinto (rl-ss)	44	6.7	12.0
San Joaquin Hills (r)	35	6.6	0.5
San Jose (ll-r-o)	24	6.4	0.5
Santa Monica (ll-r-o)	1	6.6	2.4
Sierra Madre (r)	10	7.2	2.0
San Fernando (r)	19	6.7	2.0
Simi-Santa Rosa (ll-r-o)	27	7	1.0
Verdugo (r)	5	6.9	0.5
Whittier (rl-ss)	13	6.8	2.5

Notes:

Fault geometry - (ss) strike slip, (r) reverse, (n) normal, (rl) right lateral, (ll) left lateral, (o) ob

Fault and Seismic Data - USGS Online data and CGS (Cao, 2003)

HISTORIC STRONG EARTHQUAKES IN SOUTHERN CALIFORNIA SINCE 1812

Date	Event	Causitive Fault	Magnitude	Epicentral Distance (miles)
Dec. 12, 1812	Wrightwood	San Andreas?	7.3	32
Jan. 9, 1857	Fort Tejon	San Andreas	7.9	208
Dec. 16, 1858	San Bernardino Area	uncertain	6.0	59
Feb. 9,1890	San Jacinto	uncertain	6.3	127
May 28, 1892	San Jacinto	uncertain	6.3	127
July 30, 1894	Lytle Creek	uncertain	6.0	43
July 22, 1899	Cajon Pass	uncertain	6.4	49
Dec.25, 1899	San Jacinto	San Jacinto	6.7	79
Sept. 20, 1907	San Bernardino Area	uncertain	5.3	71
May 15, 1910	Elsinore	Elsinore	6.0	59
April 21, 1918	Hemet	San Jacinto	6.8	80
July 23, 1923	San Bernardino	San Jacinto	6.0	59
March 11, 1933	Long Beach	Newport-Inglewood	6.4	33
April 10, 1947	Manix	Manix	6.4	120
Dec. 4, 1948	Desert Hot Springs	San Andreas or Banning	6.5	113
July 21, 1952	Wheeler Ridge	White Wolf	7.3	76
Feb. 9, 1971	San Fernando	San Fernando	6.6	23
July 8, 1986	North Palm Springs	Banning or Garnet Hills	5.6	100
Oct. 1, 1987	Whittier Narrows	Puente Hills Thrust	6.0	13
Feb. 28, 1990	Upland	San Jose	5.5	35
June 28, 1991	Sierra Madre	Clamshell Sawpit	5.8	21
April 22, 1992	Joshua Tree	Eureka Peak	6.1	117
June 28, 1992	Landers	Johnson Valley & others	7.3	109
June 28, 1992	Big Bear	uncertain	6.5	86
Jan. 17, 1994	Northridge	Northridge Thrust	6.7	17
Oct. 16, 1999	Hector Mine	Lavic Lake	7.1	124

Notes:

Earthquake data: U.S. Geological Survey P.P. 1515 & online data, Southern California Earthquake Center & California Geological Survey online data

Magnitudes prior to 1932 are estimated from intensity.

Magnitudes after 1932 are moment, local or surface wave magnitudes.

Site Location:

Site Longitude: - 118.292

Site Latitude: 34.099

APPENDIX A

FIELD INVESTIGATION

APPENDIX A

FIELD INVESTIGATION

A-1.00 FIELD EXPLORATION

A-1.01 Number and Location of Pits

Our subsurface investigation consisted of logging and sampling of 4 hand excavated pits. A Site Geologic Map showing the approximate locations of the pits is presented as Figure 2.

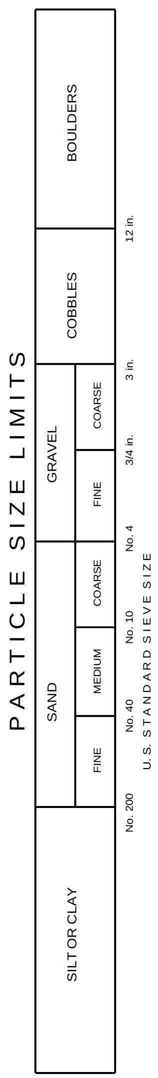
A-1.03 Pit Logging

Logs of exploratory pits were prepared by the signing geologist and are attached in this appendix. The logs contain factual information and interpretation of subsurface conditions. The strata indicated on these logs represent the approximate boundary between earth units and the transition may be gradual. The logs show subsurface conditions at the dates and locations indicated, and may not be representative of subsurface conditions at other locations and times.

Identification of the soils encountered during the subsurface exploration was made using the field identification procedure of the Unified Soils Classification System (ASTM D2488). A legend indicating the symbols and definitions used in this classification system is attached in this appendix.

A-1.03 Boring Drilled and Logged by Others

The log of a boring previously drilled on the adjoining site to the west during a prior geotechnical investigation by Leroy Crandall and Associates and another boring log from a geotechnical investigation northwest of the site by Geobase are presented in this appendix.



MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COARSE GRAINED SOILS (More than 50% of material is LARGER than No. 200 sieve size)	GRAVELS (More than 50% of coarse fraction is LARGER than the No. 4 sieve size.)	CLEAN GRAVELS (Little or no fines)	GW	Well graded gravel, gravel-sand mixtures. little or no fines.
			GP	Poorly graded gravel or gravel-sand mixtures, little or no fines.
		GRAVELS WITH FINES (Appreciable amt. of fines)	GM	Silty gravels, gravel-sand-silt mixtures.
			GC	Clayey gravels, gravel-sand-clay mixtures.
	SANDS (More than 50% of coarse fraction is SMALLER than the No. 4 sieve size)	CLEAN SANDS (Little or no fines)	SW	Well graded sands, gravelly sands, little or no fines.
			SP	Poorly graded sands or gravelly sands, little or no fines.
		SANDS WITH FINES (Appreciable amount of fines)	SM	Silty sands, sand-silt mixtures.
			SC	Clayey sands, sand-clay mixtures.
FINE GRAINED SOILS (More than 50% of material is SMALLER than No. 200 sieve size)	SILTS AND CLAYS (Liquid limit LESS than 50)		ML	Inorganic silts and very fine sands, rock flour silty or clayey fine sands or clayey silts with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
			OL	Organic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS (Liquid limit GREATER than 50)		MH	Inorganic silts, micaceous or diatamaceous fine sandy or silty soils, elastic silts.
			CH	Inorganic clays of high plasticity, fat clays.
			OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils.

BOUNDARY CLASSIFICATIONS: Soils possessing characteristics of two groups are designated by combinations of group symbols.

UNIFIED SOIL CLASSIFICATION SYSTEM

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Exploratory Pit Log

Location: See Site Geologic Map
Elevation: 378'

Logged By: GW
Equipment: Hand excavation equipment

Pit No. T-1
Date Excavated: 12-15-16

Depth (ft)	Bulk Sample	Moisture Content (%)	Dry Density (pcf)		USCS	Graphic Symbol	Material Description
							This log contains factual information and interpretation of the subsurface conditions between the samples. The stratum indicated on this log represent the approximate boundary between earth units and the transition may be gradual. The log show subsurface conditions at the date and location indicated, and may not be representative of subsurface conditions at other locations and times.
							Concrete slab - 6" thick
					CL		Artificial fill (af): Brown silty clay with some sand, a small piece of lumber, inclusions of fat gray clay, a few small roots, and fragments of siltstone and sandstone, soft, moderately plastic, moist (extends to a depth of 15" below top of slab).
					--		Sedimentary bedrock (Tpslt): Brown siltstone, thinly bedded with a ½" thick limey layer along bedding at 20", well indurated, bedding @ N87E/14NW, N85W/14NE.
5							Total depth 28 inches No groundwater
10							
15							

Exploratory Pit Log

Location: See Site Geologic Map
Elevation: 378'

Logged By: GW
Equipment: Hand excavation equipment

Pit No. T-2
Date Excavated: 12-15-16

Depth (ft)	Bulk Sample	Moisture Content (%)	Dry Density (pcf)		USCS	Graphic Symbol	Material Description
							This log contains factual information and interpretation of the subsurface conditions between the samples. The stratum indicated on this log represent the approximate boundary between earth units and the transition may be gradual. The log show subsurface conditions at the date and location indicated, and may not be representative of subsurface conditions at other locations and times.
							Concrete slab – 6 ½ " thick
					CL		Artificial fill (af): Brown silty clay with some sand, inclusions of fat gray clay and dark gray silty clay, and scattered siltstone and sandstone fragments, soft, moderately plastic, moist. A 3" diameter metal pipe was exposed at a depth of 10"
5							Total depth 54 inches No groundwater
10							
15							

Exploratory Pit Log

Location: See Site Geologic Map
Elevation: 383'
Logged By: GW
Equipment: Hand excavation equipment
Pit No. T-3
Date Excavated: 12-15-16

Depth (ft)	Bulk Sample	Moisture Content (%)	Dry Density (pcf)		USCS	Graphic Symbol	Material Description
							This log contains factual information and interpretation of the subsurface conditions between the samples. The stratum indicated on this log represent the approximate boundary between earth units and the transition may be gradual. The log show subsurface conditions at the date and location indicated, and may not be representative of subsurface conditions at other locations and times.
							Concrete slab – 6 ¾" thick
					CL		Artificial fill (af): Brown silty clay with some sand, inclusions of fat gray clay and dark gray silty clay, medium stiff, moderately plastic and moist. A 30" diameter concrete pipe trending N78W crossed the center of the pit.
							Total depth 19 inches No groundwater
5							
10							
15							

Exploratory Pit Log

Location: See Site Geologic Map
Elevation: 382'
Logged By: GW
Equipment: Hand excavation equipment
Pit No. T-4
Date Excavated: 12-15-16

Depth (ft)	Bulk Sample	Moisture Content (%)	Dry Density (pcf)		USCS	Graphic Symbol	Material Description
							This log contains factual information and interpretation of the subsurface conditions between the samples. The stratum indicated on this log represent the approximate boundary between earth units and the transition may be gradual. The log show subsurface conditions at the date and location indicated, and may not be representative of subsurface conditions at other locations and times.
							Concrete slab – 6 ½" thick
					CL		Artificial fill (af): Brown silty clay with some sand, inclusions of dark gray clay and scattered sandstone and siltstone fragments, medium stiff, moderately plastic, moist (extends to a depth of 18 inches below top of slab).
					--		Sedimentary bedrock (Tpslt): Brown and orange brown siltstone, thinly bedded, well indurated, bedding @ N66E/13NW, N67E/13NW, N73E/11NW
							Total depth 23 inches No groundwater
5							
10							
15							

BORING 3

DATE DRILLED: May 20, 1988
EQUIPMENT USED: 24" - Diameter Bucket

ELEVATION 405.9

ELEVATION (ft.)	DEPTH (ft.)	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)
405		31.1	90	< 1
400	5	31.3	90	< 1
		29.7	91	2
395	10	24.8	101	8
		24.0	100	7
390	15	25.2	100	7
385	20	25.1	100	8
		23.6	102	8
380	25	25.0	100	7
		28.0	96	6
375	30	26.3	99	6
370	35	30.8	94	8
	40	30.1	91	7

6" Asphaltic Paving - 4" Base Course

CL FILL - SILTY CLAY - some Siltstone and Sandstone fragments, pieces of wood, mottled greyish brown and black

Dark grey to black

Some Silty Sand, mottled light brown to dark grey

PUENTE FORMATION - interbedded SILTSTONE and SHALE - occasional Sandstone interbeds, well bedded, locally jointed, some Gypsum infilling, light brown with grey

Bedding at 8': N32E, 25NW

Some organic matter, greyish brown and black
Bedding: N55E, 16NW

Light brown and white
Bedding: N54E, 17NW

Light reddish brown

Joint: N40E, 79SE
Fault: N23W, 90; 1" offset, west side up
Bedding at 22': N70E, 16NW
Greyish brown and light reddish brown

Traces of organic matter, greyish brown and black

Bedding: N65E, 18NW
Greyish brown

Brownish grey

Joint: N55W, 70SW

Bedding: N22E, 16NW; Fault: N42W, 90
Highly fractured, light brownish grey

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

BORING 3 (Continued)

DATE DRILLED: May 20, 1988
EQUIPMENT USED: 24" - Diameter Bucket

ELEVATION (ft.)	DEPTH (ft.)		MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.	Description
365							
	45		28.4	96	6	■	Light brownish grey and black Bedding at 45': N58E, 14NW
360							Fault: N16W, 90
							Light grey
	50		30.3	93	7	■	
355							
	55						

NOTE: Water seepage encountered at a depth of 41-1/2' and below 43'. No caving.

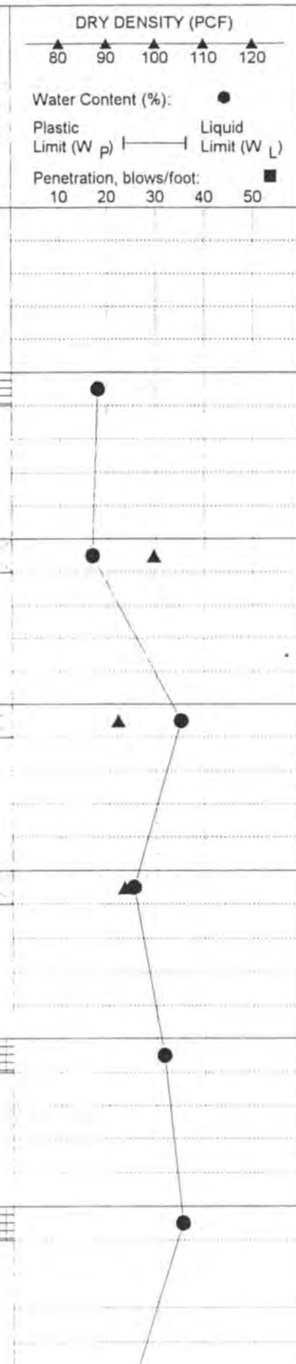
LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

LOG OF BORING

SAMPLE TYPE: THIN WALLED TUBE | SPT SPLIT SPOON | CALIFORNIA MODIFIED SAMPLER | DISTURBED | NO RECOVERY | CORE

DEPTH (feet)	SOIL DESCRIPTION	SOIL CLASSIFICATION	REMARKS/ OTHER TESTS
	CLAY(FILL), tan, moist, diatomaceous.	CL	Asphaltic Concrete = 4 inches
	CLAY(Colluvium), dark brown, little fine sand, moist.		
5			Bulk sample 5 to 6 feet
	SILTSTONE, tan, clayey, moist.	Ms	
	... light tan with white streaks, orange stained, moist.		
	... at 8 ft.; fracture N-S, 46NE.		
10	... olive grey, orange stained, moist.		
	... at 13 ft.; bedding N65E, 20NW.		
15	... hard.		Bulk sample 15 to 16 feet, EI
	... at 17 ft.; bedding N55E, 7NW.		
20	... grey and orange interbedded, moist.		DS
	... at 20 ft.; bedding N60E, 6NW.		
	... at 23 ft.; bedding N70E, 20NW.		
25	... light olive, fractured.		Bulk sample 25 to 26 feet
	... at 29 ft.; bedding N90E, 22NW, fracture: N70E, 50NW.		
30	... olive grey, orange streaks, moist.		U
35	... at 34 ft.; bedding N90E, 21N.		



GEOBASE, INC.	PROJECT	Retaining Wall- Rebuild LAMC Sunset Hospital Project Los Angeles, California		BORING NO. B-4
	DEPTH TO WATER feet	SURFACE ELEV. ± 445 feet	LOGGED BY RAP	PROJECT NO. C.222.64.00
	DEPTH TO SLOUGH	DRILL Earthdrill 150B	DATE LOGGED 1/30/01	FIGURE NO. B-5

Note: This log of should be evaluated in conjunction with the complete geotechnical report. This log of represents conditions observed at the specific location and at the date indicated.

page 1 of 2

LOG OF BORING

SAMPLE TYPE: THIN WALLED TUBE | SPT SPLIT SPOON | CALIFORNIA MODIFIED SAMPLER | DISTURBED | NO RECOVERY | CORE

DEPTH (feet)	GRAPHIC LOG	SOIL DESCRIPTION	SOIL CLASSIFICATION	SAMPLE	DRY DENSITY (PCF) 80 90 100 110 120; Water Content (%); Plastic Limit (W_P) – Liquid Limit (W_L); Penetration, blows/foot: 10 20 30 40 50	REMARKS/ OTHER TESTS
		SILTSTONE(As Above), olive grey and orange interbedded, white streaks, moist.	Ms			
40		... olive brown,				
		...at 41 ft.; bedding N90E, 15N.				
		... hard drilling.				
45		... at 45 ft.; N90E, 15N.				
50						
		* End of Boring at 50.0 feet. * Boring dry at completion of drilling. * Boring was downhole logged by geologist.				
55						
60						
65						
70						

GEOBASE, INC.				
PROJECT	Retaining Wall- Rebuild LAMC Sunset Hospital Project Los Angeles, California			BORING NO. B-4
DEPTH TO WATER feet	SURFACE ELEV. ± 445 feet	LOGGED BY RAP		PROJECT NO. C.222.64.00
DEPTH TO SLOUGH	DRILL Earthdrill 150B	DATE LOGGED 1/30/01		FIGURE NO. B-5

Note: This log of should be evaluated in conjunction with the complete geotechnical report. This log of represents conditions observed at the specific location and at the date indicated.

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APPENDIX B

REFERENCES

APPENDIX B

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E-2 Geotechnical Report, Kaiser Permanente – Medical Office Building, 1526 North Edgemont Street, Los Angeles, California

GEOTECHNICAL REPORT

KAISER PERMANENTE - MEDICAL OFFICE BUILDING
1526 NORTH EDGEMONT STREET

LOS ANGELES, CALIFORNIA

GEOBASE, INC.

GEOTECHNICAL REPORT

KAISER PERMANENTE - MEDICAL OFFICE BUILDING
1526 NORTH EDGEMONT STREET

LOS ANGELES, CALIFORNIA

Prepared for:

Kaiser Foundation Health Plan, Inc.
Los Angeles, California

By:

GEOBASE, INC.
23362 Peralta Drive, Unit 4
Laguna Hills, California 92653
(949) 588-3744

January 2017
Project No. C.314.80.01

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APPENDIX D

I. INTRODUCTION

1.1 General

Kaiser Foundation Health Plan, Inc. is planning the construction of the Kaiser Permanente - Medical Office Building, located at 1526 North Edgemont Street, in the City of Los Angeles, California. The site location is shown on the Site Location Map, Figure A-1, Appendix A. GEOBASE, INC. (GEOBASE) was retained by Kaiser Foundation Health Plan, Inc. to complete a geotechnical investigation for the proposed Medical Office Building (MOB).

For this geotechnical investigation report, we were provided with:

- An architectural site plan prepared by Perkins + Will and this investigation report was directed toward this plan.
- As-built "Basement & Foundation Plan 1S-1", prepared by Brandow and Johnston Structural Engineers, revision dated August 16, 1957 for the existing MOB.
- Architectural Survey Showing Kaiser LAMC, prepared by Mollenhauer Group for Perkins + Will, Job No. LA20864, Survey dated December 09, 2014.
- Geologic and Geotechnical Investigation Report, Rebuild Sunset Hospital Project, Kaiser Permanente Los Angeles Medical Center, Los Angeles, California, prepared by Geomatrix Consultants, report number 005931.000.0, dated April 10, 2010.

This report describes the subsurface conditions and summarizes the results of both field and laboratory testing. These results are discussed with reference to the proposed development. Both general and specific recommendations pertinent to suitable site development and foundation design, respectively, are provided. Construction guidelines related to the geotechnical aspects of the project are also addressed.

1.2 Objectives of the Geotechnical Investigation

The objectives of the geotechnical investigation are to obtain soil parameters and evaluate the subsoils conditions in order to provide recommendations pertinent to suitable site development and foundation design. These recommendations will assist with final design and construction of the project as planned.

1.3 Scope of Services

To achieve the objectives of the geotechnical investigation, stated above, the services provided during the course of this investigation included:

- Review of available published and unpublished geotechnical, geological, and seismological reports and maps pertinent to the site;

- Review of previous soil reports and related documents (see Section III and references)

- Evaluation of data obtained from the above, and engineering analyses; and,

- Preparation of this report summarizing the results of field testing and laboratory testing, engineering analyses, and providing appropriate recommendations for site development and foundation design.

II. SITE AND PROJECT DESCRIPTIONS

2.1 Site Description

The site layout is shown on the Site and Boring Locations Plan, Figure A-2, Appendix A. The project site is part of Parcel 2 within Parcel A (5542-010-014 & 015), that is a portion of Lot 49 of the west portion of the Lick Tract, in the Los Felis Tract, in the City of Los Angeles. It is located at 1526 North Edgemont Street, at the southeast corner of North Edgemont Street and East Barnsdall Avenue, and north of Sunset Boulevard.

Currently, the site is occupied by a seven (7) storey MOB with one (1) level below grade. It is bounded by East Barnsdall Avenue to the north, and the Central Plant and Telecommunications Building to the north of East Barnsdall Avenue; the medical center to the east; and by Edgemont Street to the west. An overhead pedestrian bridge connects the existing parking structure on the east side of Edgemont Street to the west side of the building.

The site is slightly elevated and surface drainage appears to sheet flow from northeast to southwest with spot elevations approximately 400 to 380 feet, respectively.

2.2 Project Description

The proposed development is planned to consist of demolition of the existing building and construction of a new MOB within the existing building footprint. The new MOB will include five (5) storeys above grade and a one (1) level basement below grade. Based on the Basement and Foundation Plan of the existing building, finished basement level is at elevation 380.23 feet and the structure is supported on footings founded in unweathered bedrock to the lower most elevation of approximately 377.0 feet (Figure A-3, Appendix A).

Column loads were not available at the time of this report. It is assumed that maximum column loads will not exceed 600 kips and should be verified by the project Structural Engineer.

III. SITE INVESTIGATIONS

No site subsurface drilling or testing was performed as part of this investigation; however, information from numerous previous investigations at the site and vicinity was evaluated and implemented into our conclusions and recommendations. These previous investigations for the existing LAMC complex and Barnsdall Park are outlined below:

- Geotechnical Investigation for Improvements to the South Edge of Barnsdall Park (BP2A), 4800 West Hollywood Boulevard, Los Angeles, California, Rebuild LAMC Sunset Hospital Project, Kaiser Permanente Los Angeles Medical Center", prepared for Kaiser Foundation Health Plan, Inc., California by GEOBASE, INC., project number C.222.64.04, dated June 2002.
- Geologic and Geotechnical Investigation Report, Rebuild Sunset Hospital Project, Kaiser Permanente Los Angeles Medical Center, Los Angeles, California, a report prepared by Geomatrix Consultants, Inc. dated April 10, 2000.
- Report of Geotechnical Investigation, Proposed Parking Structure, 4733 Sunset Boulevard, Los Angeles, California, a report prepared by LeRoy Crandall and Associates dated June 28, 1988.
- Geologic and Soils Engineering Exploration, Proposed Barnsdall Park - Phase I, Master Plan Implementation, Los Angeles, California, a report prepared by The J. Byer Group, Inc. dated February 25, 1999. City of Los Angeles, Log number 27203.
- Geotechnical Investigation, Proposed Satellite Dish, Los Angeles Medical Center, Los Angeles, California, a report prepared by Law Crandall, Inc., dated August 13, 1993. City of Los Angeles Log Number 34210.

Data from the field boring logs and laboratory test results of the above listed reports have been reviewed and evaluated. Based on our evaluation including our own data, we concur with the aforementioned laboratory test results and field data, and they are incorporated in our study. The locations of the pertinent borings are shown on Figure A-2, Appendix A. Relevant boring logs and laboratory test data are presented in Appendices B and C, respectively.

IV. GEOLOGY AND SEISMOLOGY

The engineering geologic report is provided in Appendix D.

V. SUBSURFACE CONDITIONS

5.1 Subsoil Conditions

The generalized stratigraphic profile arrived at from previous investigations at the site and vicinity consists of about two (2) to ten (10) of fill soils and native alluvium consisting of clay, silt and sand underlain by shale and siltstone bedrock as shown on the Regional Geologic Map, Figure 1 of the Engineering Geologic Report given in Appendix D. At the proposed building subgrade elevation, bedrock is anticipated.

The bedrock is thinly bedded, slightly diatomaceous, and highly fractured. Bedding orientation is generally northwest to northeast and dip five (5) to thirty-five (35) degrees to the north.

5.2 Site Groundwater Conditions

Based on Seismic Hazard Zone Report 026, Plate 1.2, the historical highest groundwater level at the site was approximately forty (40) feet below existing grade. This plate is reproduced herein as Figure A-4, Appendix A. Borings drilled by others did not encountered groundwater to a total depth of exploration of thirty-five (35) feet.

Notwithstanding the above, it is not uncommon for groundwater or seepage conditions to develop where none previously existed. In this respect, groundwater conditions may be altered by geologic detail between borings, by seasonal and meteorological variations, and by construction activity.

VI. SEISMICITY

6.1 Site Coordinates

The site latitude and longitude are 34.0988 degrees north and 118.2958 degrees west, respectively.

6.2 Site Classification

The soil classification procedure recommended by CBC 2016, subsection 1613.3.2, which references ASCE 7-10, Chapter 20, was adhered to.

The generalized subsoil data, based on numerous geotechnical boreholes and geophysical shearwave survey measurements, preformed by others, is presented in Figure A-4, Appendix A. In this respect, the shearwave velocity was estimated to be 330 m/s for the upper 100 feet. To develop seismic design criteria, the subsurface materials within the top 100 feet at the site are judged to be Site Class D.

6.3 Seismic Design Criteria

Based on CBC 2016, subsection 1616.10.2, which references and modifies ASCE 7-10, subsection 11.4.7:

1. Site specific, site response analysis will be required if the structure is located in Site Class F soils, unless the exception to Section 20.3.1 of ASCE 7-10 is applicable.

2. Site-specific Ground-Motion Hazard Analysis (GMHA) will be required for: Seismically isolated structures and structures with damping systems on sites with S_1 greater than or equal to 0.6g; and, time-history analysis of the structure's being performed.

3. For buildings assigned to Seismic Design Category E or F, or when required by the building official, a GMHA shall be performed in accordance with ASCE 7, Chapter 21, as modified by Section 1803A.6 of the CBC 2016.

Based on the above criteria, since the structure is assigned to Seismic Design Category E (see subsection 6.3.1.2), a site-specific GMHA was completed. The following subsections present the seismic design parameters based on the mapped parameters and the site specific GMHA.

6.3.1 Mapped Seismic Design Parameters

6.3.1.1 Mapped Accelerations Response Spectra

Mapped, risk-targeted maximum considered earthquake, MCE_R, spectral response accelerations for 0.2 and 1.0 second periods are provided in maps published in the ASCE 7-10, which is the reference used in the CBC 2016. These maps are prepared by the USGS and the California portion of the map was prepared jointly with the CGS. These maps use results of seismic hazard analyses from both probabilistic and deterministic procedures, and are applicable to Site Class B and five (5) percent of critical damping. The mapped site accelerations are adjusted for site class effects using parameters Fa and Fv, which are functions of site class and mapped site spectral accelerations.

The mapped design horizontal spectral accelerations were evaluated in accordance with ASCE 7-10, using the US Seismic Design Maps Application (USGS, 2016) available at the USGS website: http://geohazards.gov/designmaps/us/application.php. This web application requires the inputs of site location (coordinates) and site soil classification.

The project site is Site Class D with coefficient values Fa and Fv of 1.0 and 1.5, respectively.

Mapped MCE_R accelerations obtained for the project site are summarized in Table I, below.

TABLE I
MCE_R MAPPED ACCELERATIONS

PERIOD (SECONDS)	MAPPED ACCELERATION PARAMETERS (g)	Site Class D: MCE_R ACCELERATIONS ADJUSTED FOR SITE CLASS EFFECTS (g)	Site Class D: RISK COEFFICIENTS
0.2	S_s: 2.729	2.729	$C_{RS} = 0.936$
1.0	S_1: 0.948	1.422	$C_{R1} = 0.933$

Based on Table I, the mapped spectral response accelerations, adjusted for Site Class D, S_{MS} and S_{M1} are 2.729 g and 1.422 g, respectively.

6.3.1.2 Seismic Design Category

The mapped spectral response acceleration parameter at one (1) second period (S_1) is 0.996g which is greater than 0.75g and the building is not considered to be Risk Category IV. Therefore, a Seismic Design Category E should be used for the design of the proposed structure per Section 1613.3.5 of CBC 2016.

6.3.2 Site Specific Ground Motion Procedures Ground Motion Hazard Analysis (Site Specific GMHA Parameters)

6.3.2.1 General

As part of the GMHA, probabilistic and deterministic spectral response accelerations corresponding to the risk-targeted Maximum Considered Earthquake (MCE_R) are determined. The MCE_R ground motions are defined as the maximum level of earthquake ground shaking that is considered as reasonable to design normal structures against collapse.

The site specific MCE_R spectral response acceleration at any period is taken as the lesser of the spectral response accelerations obtained using the probabilistic and deterministic methods of GMHA. The design spectral response acceleration at any period is then determined as two thirds (2/3) of the site specific MCE_R spectral response acceleration; however, the site specific design response spectrum should not be taken less than eighty (80) percent of the design spectral response acceleration determined from the general procedure (ASCE 7-10, Figure 11.4-1), which is based on the mapped spectral response accelerations.

The CBC 2016 (reference ASCE 7-10) procedure for the determination of the site-specific GMHA includes:

- Determination of mapped MCE_R parameters.
- Use of the Next Generation Attenuation (NGA) relationships in the calculation of the probabilistic and deterministic response spectra.
- Use of the 2008 USGS fault model in the seismic hazard evaluations.
- Use of the risk coefficient of earthquake loading in the calculation of probabilistic response spectra.
- Use of the eighty-four (84) percentile values in the determination of the characteristic earthquakes corresponding to the faults in the calculation of deterministic response spectra.
- Use of the maximum rotated horizontal component in the determination of the probabilistic and deterministic response spectra.

6.3.2.2 Probabilistic MCE_R Ground Motions

The probabilistic spectral response accelerations shall be taken as the spectral response accelerations in direction of maximum horizontal response represented by a five (5) percent damped acceleration response spectrum that is expected to achieve one (1) percent probability of collapse within a fifty (50) year period. Method 1 or Method 2 may be used to determine the ordinates of the probabilistic ground-motion response spectrum per ASCE 7-10, Section 21.2.1; in the current analysis, Method 1 was used.

The probabilistic seismic risk analysis is based on the premise that moderate to large earthquakes occur on mappable Quaternary faults and that the occurrence rate of earthquakes on each fault is proportional to the Quaternary fault slip rate. This analysis assumes that earthquakes are distributed uniformly and therefore does not consider when the last earthquake occurred on the fault. The length of rupture of the fault as a function of earthquake magnitude is accounted for, and ground motion estimates at a site are made using the magnitude of the earthquake and the closest distance from the site to the rupture zone. The probabilistic risk analysis has explicitly taken into account uncertainties associated with:

- The earthquake magnitude;
- The rupture length given magnitude;
- The location of rupture zone on the fault;
- The maximum possible magnitude of earthquakes; and,
- The acceleration at the site given magnitude of earthquake and distance from the rupture zone to the site.

Probabilistic seismic hazard analyses were performed using the computer program "2008 Interactive Deaggregations" available on the USGS website. The 2008 updates of the source and attenuation models of the NSHMP (Petersen and others, 2008) are used for the determination of the response spectra in this program. The program provides seismic hazard deaggregations for the response spectra at periods: 0.0 s; 0.1 s; 0.2 s; 0.3 s; 0.5 s; 1.0 s; 2.0 s; 3.0 s; 4.0 s; and, 5.0 s.

For each of these periods, the program provides the average of response spectra obtained from the three NGA attenuation relationships recommended to be used by the CBC 2016 to evaluate the attenuation of earthquake energy with distance from the source. These NGA attenuation relationships are proposed by Boore and Atkinson (2008), Campbell and Bozorgnia (2008) and Chiou and Youngs (2008). Method 1, as described in ASCE 7-10, Section 21.2.1.1, was used to determine the probabilistic (MCE_R) ground-motion response spectrum by multiplying risk coefficients to the USGS NSHMP NGA probabilistic results. The value of risk coefficients, C_R, was determined at 0.2 second period, C_{RS} = 0.936 and at one (1) second period, C_{R1} = 0.933, from Figures 22-17 and 22-18 of ASCE 7-10, respectively. The risk coefficients for the various periods were determined as shown in Table II:

TABLE II
SEISMIC RISK COEFFICIENTS (C_R)

Periods	C_R
$T \leq 0.2s$	C_{RS} = 0.936
$T \geq 1.0s$	C_{R1} = 0.933
0.2s < T < 1.0s	Linear Interpolation

In order to convert the spectral response obtained from the program on the USGS website to their maximum horizontal component, the result obtained for each period from the aforementioned software was multiplied by the appropriate factor to convert it to that corresponding to the maximum rotated component. Table III presents the conversion factors used for the various periods as suggested by proposal SDPRG-1R4 (2009), Table I, page 35.

TABLE III
FACTORS USED TO CONVERT SPECTRAL ACCELERATIONS OBTAINED FROM THE NGA RELATIONSHIPS TO THOSE CORRESPONDING TO MAXIMUM ROTATED COMPONENT

Period (Seconds)	Factor
PGA	1.1
0.1	1.1
0.2	1.1
0.3	1.1
0.5	1.2
1.0	1.3
2.0	1.3
4.0+	1.4

The probabilistic spectral response accelerations corresponding to the average spectra obtained from the aforementioned three (3) attenuation relationships, and used for the determination of the site-specific MCE_R response spectra at the project site are shown in Figure A-6, Appendix A and an estimated shear-wave velocity of 330 m/s was used in the probabilistic seismic hazard analyses.

6.3.2.3 Deterministic MCE_R Spectra

The CBC 2016 specifies the deterministic MCE_R response acceleration at each period as the eighty fourth (84) percentile of the largest five (5) percent damped spectral response acceleration computed at that period for characteristic earthquakes on all known active faults within the region. The spectral accelerations should correspond to the maximum rotated component of ground motion; however, the ordinate of the deterministic MCE_R ground motion response spectrum should not be taken less than the corresponding ordinate of a lower limit MCE_R response spectrum curve determined as a function of the coefficients F_a and F_v, assuming that the values of S_s and S_1 are 1.5 and 0.6, respectively.

For the project site coordinates, provided in Figure A-1, Appendix A, a search was carried out using the USGS/CGS 2008 National Seismic Hazard Maps (NSHM) Source Parameters, and faults with characteristics that produce the strongest earthquakes at the project site were selected. Based on these results, the faults that have the largest influence on the site seismicity are the Santa Monica, Elysian Park and Hollywood faults. These faults and their corresponding parameters are provided in Table IV.

TABLE IV
FAULT PARAMETERS USED FOR THE DETERMINISTIC ANALYSIS

Fault Name	Distance from Site (Km)	Hanks Magnitude (M)	Fault Type	Preferred Dip (Degree)	Rupture Top (Km)
Santa Monica Connected alt 2	0.69	7.30	SS	44	0.8
Elysian Park (Upper)	1.05	6.50	Reverse	50	3.0
Hollywood	1.53	6.50	SS	70	0

Peak ground accelerations and response spectra corresponding to the characteristic earthquake for each of the aforementioned faults were determined using the average of the three (3) attenuation relationships discussed in subsection 6.3.2.2 and recommended by the CBC 2016. The Microsoft Excel spreadsheet prepared by L. Atiq and available at the website: http://peer.berkeley.edu/products/rep_nga_models.htm was used to obtain the response spectra corresponding to the characteristic earthquakes. Using this spreadsheet, the eighty four (84) percentile (sigma plus one standard deviation) values of the spectral responses were selected. Since the CBC 2016 requires use of the maximum rotated horizontal component to be used in the analysis, the result obtained for each period from the aforementioned software was multiplied by the appropriate factor to convert it to that corresponding to the maximum rotated component. Table III, subsection 6.3.2.2, presents the conversion factors used for the various periods as suggested by proposal SDPRG-1R4 (2009), Table I, page 35. As noted previously, a shear wave velocity of 330 m/s was used in the determination of characteristic earthquakes for each of the faults.

Figure A-7, Appendix A, shows spectral response accelerations of the characteristic earthquakes, which correspond to the specified MCE_R accelerations. This figure also shows the specified lower limits of the MCE_R spectral accelerations, obtained as described in the ASCE 7-10 standard.

By comparing the ordinates of the specified MCE_R spectral response accelerations from the faults governing maximum ground motions at the site with the corresponding ordinates from the specified lower limits of the acceleration response spectra curve, the response spectra from the deterministic method were obtained and are shown in Figure A-7, Appendix A.

6.3.2.4 Site-Specific MCE_R Spectra

The site specific MCE_R spectral response acceleration at any period, S_{AM}, is taken as the lesser of the spectral response accelerations obtained from the probabilistic and deterministic methods. The MCE_R probabilistic and deterministic spectra obtained as described in subsections 6.3.2.2 and 6.3.2.3, respectively, are presented in Figure A-8, Appendix A. The site specific MCE_R spectra defined as the lesser of the probabilistic and deterministic spectra is also shown in Figure A-8, Appendix A.

6.3.2.5 Site-Specific Design Spectra

The ASCE 7-10 specifies the design spectral response acceleration at any period as two thirds (2/3) of the site specific MCE_R spectral response acceleration; however, the design spectral response acceleration at any period should not be taken less than eighty (80) percent of the design spectral response acceleration determined using the mapped parameters for the site (see subsection 6.3.1).

The site specific design response spectrum based on two thirds (2/3) of site specific MCE_R spectral response accelerations, together with the response spectra curve obtained as eighty (80) percent of the spectra based on mapped parameters for the project site are shown in Figure A-9, Appendix A. The site specific design response spectra curve for the project site is also shown in Figure A-9, Appendix A, as the greater of the two spectra curves. Numerical values of the site specific design spectral response accelerations for the project site are provided in Table V.

TABLE V
SITE-SPECIFIC DESIGN RESPONSE SPECTRA

Period (Seconds)	Site-specific Design Spectral Response Acceleration (g)
0.00	0.680
0.01	0.690
0.02	0.750
0.03	0.834
0.05	1.001
0.075	1.211
0.100	1.420
0.20	1.455
0.30	1.517
0.50	1.563
0.75	1.331
1.00	1.099
1.50	0.800
2.00	0.501
3.00	0.313
4.00	0.214
5.00	0.172

6.3.2.6 Design Acceleration Parameters

The CBC 2016/ASCE 7-10 specifies the design response spectrum at short period, S_{DS}, as the design spectrum at the period of 0.2 second; however, this value should not be less than ninety (90) percent of the design spectra obtained at any period larger than 0.2 second. Also, the CBC 2016/ASCE 7-10 specifies S_{D1} as the greater of the design response spectrum at one (1) second or twice the spectrum at two (2) seconds. The parameters S_{MS} and S_{M1} can be taken as 1.5 times S_{DS} and S_{D1}, respectively. These values shall not be less than eighty (80) percent of values determined in mapped parameters, subsection 6.3.1.

Based on the above, and the values of site-specific design response spectra provided in Table V, the design acceleration parameters are obtained as follows:

- S_{DS} = 1.46g
- S_{D1} = 1.10g

6.3.2.7 Maximum Considered Earthquake Geometric Mean (MCE_G) Peak Ground Accelerations

From Figure 22-7 of ASCE 7-10, PGA = 1.062g is multiplied by the site coefficient F_{PGA} = 1.0 (Table 11.8-1) to obtain the mapped MCE Geometric Mean Peak Ground Acceleration (PGA_M). For Site Class D, $PGA_M = F_{PGA}$ x PGA. Therefore, PGA_M = 1.062g may be used for evaluation of liquefaction, lateral spreading, seismic settlement and soil-related issues.

6.4 Earthquake Effects

6.4.1 Liquefaction

Liquefaction occurs when the pore pressures generated within a soil mass equals the overburden pressure. This results in a loss of strength and the soil then possesses a certain degree of mobility.

Factors considered to evaluate liquefaction potential include groundwater conditions, soil type, particle size distribution, earthquake magnitude and acceleration, and soil density obtained through the Standard Penetration Test (SPT) and Cone Penetration Test (CPT). Soils subject to liquefaction comprise saturated fine grained sands to coarse silts. Coarser-grained soils are considered free-draining and therefore dissipate excess pore pressures, while fine-grained soils posses undrained shear strength.

The Seismic Hazard Zones Map indicates that the project site is not located in an area subject to liquefaction, Figure A-10, Appendix A. Furthermore, the subsoils consist primarily of “very stiff” to “hard” cohesive siltstones and shale bedrock; therefore, the subsoils at the site possess a very low potential for liquefaction.

6.4.2 Seismically Induced Settlements

The proposed structure will be underlain primarily by siltstones and shale; therefore, seismically induced settlements are anticipated to be negligible.

6.4.3 Tsunamis, Inundation, Seiche and Flooding

A tsunami is a sea wave generated by a submarine earthquake, landslide, or volcanic event. The site is not located within a coastal area. Therefore, a tsunami hazard at the site is considered very low.

A seiche is an earthquake induced wave in a confined body of water, such as a lake, reservoir, or bay. Resulting oscillations could cause waves up to tens of feet high, which in turn could cause extensive damage along the shoreline. The most serious consequence of a seiche would be the overtopping and failure of a dam. The site is not located downstream of any large bodies of water that could adversely affect the property in the event of earthquake failures or seiches.

According to the Federal Emergency Management Agency (FEMA), map number 06037C1610F, September 26, 2008, Flood Insurance Rate Map, Los Angeles County and Incorporated Areas, California, the proposed project site is located in Zone X, areas determined to be outside of the 0.2% annual chance of floodplain (Figure A-11, Appendix A).

6.4.4 Surface Rupture

Ground surface displacement along a fault, although more limited in area than the ground shaking associated with it, can have disastrous consequences when structures are located straddling a fault or near a fault zone. Fault displacement involves forces so great that in most cases it is not practically feasible (structurally or economically) to design and build structures to accommodate rapid displacement and remain intact. Amounts of movement during a single earthquake can range from several inches to tens of feet. Another aspect of fault displacement comes not from the violent movement associated with earthquakes, but the barely perceptible movement along a fault called "fault creep". Damage by fault creep is usually expressed by the rupture or bending of buildings, fences, railroad tracks, streets, pipelines, curbs, and other linear features.

No faulting was observed during our field reconnaissance. In addition, active, potentially active, and other major inactive faults, noted on fault maps, do not cross nor project toward the site. Furthermore, the site is not located within any Alquist-Priolo Earthquake Fault zone (APEQFZ) Map as designated by the California Geological Survey (CGS), Figure A-10, Appendix A. The closest active (APEQFZ) fault to the site is the Hollywood fault located approximately 1.53 km to the north. Therefore, the possibility of any hazard due to ground surface rupture or fault offset at the property is considered low; however, cracking due to shaking from distant events is not considered a significant hazard, although it is a possibility at any site.

6.4.5 Seismically Induced Landsliding

The site area is relatively flat and the site is not located within a designated area where previous occurrence of landslide movement, or local topographic, geological, geotechnical and subsurface water conditions indicate a potential for permanent ground displacement such that mitigation would be required (CDMG, 1999 and City of Los Angeles, 1996).

6.4.6 Lateral Spreading

Seismically induced lateral spreading involves primarily movement of earth materials due to ground shaking. Lateral spreading is demonstrated by near vertical cracks with predominantly horizontal movement of the soil mass involved. The potential for liquefaction at the site is considered very low and the topography of the project site and the immediate vicinity is relatively flat. Therefore, the potential for lateral spreading at the subject site is considered very low.

6.4.7 Subsidence

Subsidence refers to the sudden sinking or gradual downward settling and compaction of soils and other surface material with little or no horizontal motion. It may be caused by a variety of human and natural activities, including earthquakes. Since the site is underlain by shale and siltstones bedrock, it is our opinion that the potential hazard associated with subsidence at the site is very low.

VII. CONCLUSIONS

It is our opinion that the site is geotechnically suitable for the proposed development provided that the geotechnical recommendations presented herein are incorporated in the plans and specifications, and properly carried out in the field during construction. The following presents a summary of the findings:

- The site is underlain by fill soils and alluvium to a depth of about two (2) to ten (10) feet; the proposed basement excavation extends below the fill soils and alluvium. The underlying bedrock provides necessary uniform foundation support for proposed structures without remedial grading. Remedial grading will be needed for concrete slabs, walks, and paving at grade to reduce expansion potential.

- Groundwater was not encountered at the site to the total depth of exploration and is judged to be in excess of forty (40) feet at this time. Published historic highest groundwater level is forty (40) feet below existing grade.

- The project site is classified as Site Class D per CBC 2016.

- The project site is not mapped in an area susceptible to subsidence, landslides, liquefaction, or current City of Los Angeles/ State of California APEQFZ.

- On site soils possess a “medium” to “high” expansion potential.

- On site soils, have a “moderate” sulfate concentration and are “severely corrosive” to metals.

- The flood insurance rate map (FIRM) prepared by the Federal Emergency Management Agency (FEMA), map number 06037C1610F, effective date September 26, 2008 shows the site to be in Zone X. Zone X is an area determined to be outside of 0.2 percent annual chance of floodplain.

VIII. SITE DEVELOPMENT RECOMMENDATIONS

8.1 General

The proposed development as described in subsection 2.2, is feasible from a geotechnical engineering standpoint, provided project plans and specifications should take into account the appropriate geotechnical features of the site and conform to the geotechnical recommendations.

8.2 Clearing

All surface vegetation, asphaltic concrete, trash, debris, underground pipes, and concrete pieces from demolishing the existing structures should be cleared and removed from the proposed site. Topsoil and soils with organic inclusions are not considered suitable for reuse as structural fill, but may be stockpiled for future use in landscape areas.

Underground facilities such as utilities, pipes or underground storage tanks may exist at the site. Removal of underground tanks is subject to state law as regulated by County or City Health and/or Fire Department agencies. If storage tanks containing hazardous or unknown substances are encountered, the proper authorities must be notified prior to any attempts at removing such objects.

Septic tanks should be removed in their entirety. Cesspools or seepage pits should be pumped of their contents and backfilled with a two-sack sand-cement slurry. Any water wells, if encountered during construction, should be exposed and capped in accordance with the requirements of the regulating agencies.

Depressions resulting from the removal of buried obstructions, existing building foundations and pipes should be backfilled with properly compacted material.

8.3 Subgrade Preparation

8.3.1 Below Grade Building Pad

Below existing grade excavation depths for building pad are anticipated to be in the order of ten (10.0) feet. The building pad should be excavated to the subgrade and/or foundation level in siltstones and shale bedrock. If undocumented fills and/or alluvium were observed to extend deeper at some locations, they should be removed, replaced and recompacted to achieve a minimum density of ninety-five (95) percent relative compaction per ASTM D-1557. Backfill requirements below footing bottoms, where required, are outlined in subsection 9.2.1 herein. The exposed bedrock subgrade should be observed to verify the removal of all unsuitable materials to competent bedrock.

8.3.2 Minor Structures, Walkways, Flatwork and Pavement Areas

In order to minimize the potential for excessive settlement of minor structures which are structurally separated from the building structure, the footing subgrade areas should be overexcavated to provide a uniform compacted fill blanket a minimum three (3) feet in thickness below adjacent grade, or at least two (2) feet below footing bottoms, whichever is greater. The lateral extent of removal beyond the footing limits should be equal to at least the depth of overexcavation. The fill should be compacted to a minimum of ninety (90) percent relative compaction (ASTM D 1557).

The subsoils within the concrete walkways, flatwork and parking areas, and within two (2) feet of their proposed limits, should be overexcavated at least two (2) feet and replaced as properly compacted fills. The lateral extent of overexcavation should be at least equal to the depth of fill.

Concrete flatwork within the site may be expected to be influenced by the on-site "medium" to "high" expansive soils. They are typically susceptible to cracking due to settlement or heave of subgrade materials upon wetting. This problem may be exaggerated when the subgrade soils are allowed to dry out after rough grading and then saturated after the exterior slabs are constructed. Design for complete mitigation of expansive soil conditions are generally considered impractical from a cost standpoint for hardscape items such as patios and walkways; however, maintaining moisture conditions with the subgrade soils to approximately two (2) to four (4) percentage points above optimum moisture content prior to placing concrete, and maintaining positive drainage away from hardscape areas will help to mitigate the effects of expansive soils to some degree.

The above subgrade preparation recommendations may only be considered if future maintenance as a result of settlement or swelling of underlying undocumented fills and alluvium can be tolerated.

Alternatively, one option to mitigate the potential adverse effect of underlying undocumented fills and alluvium is removal and replacement with properly compacted granular fills. Further, the use of a two (2) foot blanket of non-expansive "select" material beneath the concrete flatwork would also enhance their performance, but not eliminate the adverse effects of expansive soils.

8.4 Fill Placement

8.4.1 Preparation of Bottom of Excavations

Prior to placing any fill, the exposed bedrock at the bottom of excavations should be scarified to a minimum depth of six (6) inches, moisture conditioned (wetted or dried) to at least optimum moisture content and compacted to a minimum of ninety (90) percent relative compaction, based on ASTM D 1557.

Fill placement on slopes exceeding 5H:1V (Horizontal:Vertical) gradient shall be benched with a maximum height of five (5) feet.

8.4.2 Compaction

Granular fill materials should be placed in loose lifts of six (6) to eight (8) inches, moisture conditioned to near optimum, and compacted to the minimum relative compaction listed in Table VI.

Cohesive soils should be placed in loose lifts not exceeding six (6) inches, moisture conditioned to approximately two (2) to four (4) percentage points above optimum, and compacted to the minimum relative compaction listed in Table VI.

TABLE VI
COMPACTION REQUIREMENTS

TYPE OF FILL/AREA	RELATIVE COMPACTION (ASTM D 1557) MINIMUM PERCENT
Within Building Pad	95
All Other Fill	90

Construction activities and exposure to the environment can cause deterioration of the subgrade. Therefore, it is recommended that the condition of the final subgrade be observed and/or tested by GEOBASE immediately prior to slab-on-grade construction.

8.4.3 Fill Material

The on-site bedrock/soils are expected to have a “medium” to “high” expansion potential and may be reused as fill material; however, only “very low” to “low” expansive soils should be used for wall backfill. On-site bedrock/soil used as fill shall be free of roots, clay lumps, debris and rock fragments exceeding four (4) inches. Expansion index tests shall be performed at completion of rough grading to verify expansion potential. Any soils imported to the site for use as fill for subgrade materials should be predominantly granular with very low expansion potential (Expansion Index less than twenty [20]) and should contain sufficient fines (approximately twenty [20] percent passing the No. 200 sieve) so as to be relatively impermeable when compacted. The imported soils should be approved by GEOBASE prior to importing.

8.4.4 Shrinkage

The on-site soils will undergo some volume change when excavated and replaced as properly compacted fill. Since an accurate determination of in-place and compacted densities cannot be made over the entire project area, accurate earthwork shrinkage estimates cannot be provided. Based on our experience with similar soils, a shrinkage value in the order of ten (10) to fifteen (15) percent may be used as a guideline for the on-site soils.

8.5 Drainage

To enhance future site performance, it is recommended that all pad drainage be collected and directed away from proposed structures and slopes to disposal areas off site. For soil areas, we recommend that a minimum of five (5) percent gradient away from foundation elements be maintained. It is important that drainage be directed away from foundations and that proper drainage patterns be established at the time of construction and maintained through the life of the structures. Roof gutter discharge should be directed away from the building to suitable discharge points.

All excavation slopes should be properly drained and maintained to help control erosion. Care should be exercised in controlling surface runoff onto the temporary slopes. The area back of the slope crest should be graded such that water will not be allowed to flow freely onto the slope face. If excavations of temporary slopes are carried out in the rainy season, appropriate erosion protection measures may be required to minimize erosion of the slope cuts.

8.6 Temporary Excavations

The following subsections address unsupported excavations and shored excavations.

8.6.1 Unsupported Excavations

Temporary unsurcharged excavations to depths of approximately four (4) feet below grade may be cut vertically without shoring in soils. Temporary excavations in bedrock without out-of-slope bedding may be made to a height of approximately ten (10) feet. For deeper cuts in soils, the slopes should be properly shored or sloped back at least 1H:1V (Horizontal:Vertical) or flatter. Excavations in bedrock with out-of-slope bedding should be properly shored. No surcharge loads should be permitted within a horizontal distance equal to the height of cut from toe of excavation unless the cut is properly shored. Adjacent to existing buildings, the bottom of unshored excavations should not extend below a plane drawn at 1H:1V (Horizontal:Vertical) downward from the foundations of the existing buildings and underground pipelines unless the cut is properly shored. Where space is not available, the recommendations for design of temporary shoring presented in subsection 8.6.2 should be used.

The exposed slope face should be kept moist (but not saturated) during construction to reduce local sloughing.

All excavations and shoring systems should meet, as a minimum, the requirements given in the State of California Occupational Safety and Health Standards. Stability of temporary slopes is the responsibility of the contractor.

8.6.2 Shored Excavations

In areas where stability or space considerations do not permit sloped excavations, temporary shoring may be used to support vertically cut excavations. In the following paragraphs, recommendations are provided to evaluate the feasibility of both cantilevered and braced/tied back shoring.

8.6.2.1 General

All shoring systems should meet the minimal requirements given in the State of California Occupational Safety and Health Standards.

A cantilevered shoring system using active earth pressures , may be used only in areas where lateral movement of soils behind the shoring wall and associated wall movement (at least 0.01 radian deflection) can be tolerated. Cantilevered shoring with at-rest earth pressures should be used in areas where the performance of adjacent structures are affected by wall movements.

As an alternative, consideration may be given to a braced or tie-back shoring system.

8.6.2.2 Lateral Earth Pressures

For the design of cantilevered shoring, where lateral movement of soils behind the wall can be tolerated, a triangular distribution of lateral earth pressures may be used as shown in Figure A-12, Appendix A. It may be assumed that the retained soils with a level surface behind the cantilevered shoring will exert a lateral pressure equal to that developed by a fluid with a density of forty-five (45) pounds per cubic foot . Where movements cannot be tolerated, a lateral pressure equal to that developed by a fluid with a density of sixty-five (65) pounds per cubic foot (at-rest earth pressures) may be used.

Where shoring is used to retain bedrock with unfavorable bedding, triangular distribution of lateral earth pressures equal to that developed by a fluid with a density of fifty-five (55) and seventy-five (75) pounds per cubic feet should be used for walls where lateral movement can be tolerated or cannot be tolerated, respectively.

Considering excavations needed for construction of the proposed MOB unfavorable bedding is anticipated to be encountered at the excavation of the east wall of the MOB.

When shoring is used to support surcharge loads, the diagram given in Figure A-13, Appendix A, may be used to determine lateral pressures. It is recommended that surcharges be included in the design of shoring where loads due to normal street traffic or heavy equipment such as cranes or trucks are anticipated within fifteen (15) feet of the top of the shoring.

Where the shoring system is adjacent to any existing buildings, the lateral surcharge pressure from the building foundations should be considered in the shoring design, or the foundations should be underpinned prior to excavations.

8.6.2.3 Design of Soldier Piles

Lateral resistance for soldier piles may be assumed to be provided by passive pressures below the bottom of excavation. Allowable passive pressures equivalent to a fluid pressure of 900 pounds per cubic foot may be used for soldier piles embedded in bedrock. Where unfavorable bedding for passive loads exist in the bedrock adjacent to the soldier piles, an allowable passive pressures equivalent to a fluid pressure of 350 pounds per cubic foot may be used. Unfavorable bedding for passive loads are encountered at the west wall of the MOB. The aforementioned allowable passive pressures are for soldier piles spaced not less than two (2) diameters center-to-center and includes the doubling effect for isolated piles.

Provisions should be taken to assure firm contact between the soldier piles and the undisturbed soils or bedrock such that full lateral pressures can be developed.

Soldier piles may be designed for vertical loads using an allowable unit skin friction of 600 pounds per square foot in bedrock. The unit skin friction may be applied to the full pile surface area in bedrock.

Soldier piles used for temporary excavations may not be pulled, but may be cut-off if need be.

8.6.2.4 Lagging

Spaces between the soldier piles should be covered by continuous lagging as excavation progresses. The soldier piles and anchors should be designed for the full anticipated lateral pressure; however, the pressure transferred to the lagging will be less due to arching of the soil. The lagging can be designed for the recommended earth pressures but this pressure may be limited to a maximum value of 400 pounds per square foot. Any void between the back of lagging and the excavation should be backfilled with a two-sack sand-cement slurry.

All lumber to be left in the ground should be pressure-treated in accordance with the specifications of the American Wood Preservers Association (AWPA).

8.6.2.5 Monitoring

Inspection, survey monitoring and observations of the shoring system shall be in accordance with CBC 2016, subsection 1812A.6.

Monitoring of existing structures shall be in accordance with CBC 2016, subsection 1812A.6.

It is recommended that a licensed surveyor be retained to establish monuments on the shoring, the surrounding ground and adjacent structures prior to excavations. Such monuments should be monitored for horizontal and vertical movement during construction on a daily basis. Results of the monitoring program should be provided immediately to the project structural (shoring) engineer and GEOBASE for review and evaluation.

8.7 Trench Backfill

Utility trench backfill could be placed and compacted by mechanical means.

If utility contractors indicate that it is undesirable to use compaction equipment in close proximity to a buried conduit, other methods of utility trench compaction may also be appropriate as approved by GEOBASE at the time of construction. Jetting or flooding of backfill material is not recommended.

8.8 Excavatability

Based on our experience with projects developed on similar type of natural materials and on the excavation of exploratory test borings, the siltstone and shale are expected to be rippable with conventional heavy-duty grading and/or excavation equipment in open excavation to the anticipated construction depths. Concretions, if encountered, could require special excavation equipment and very heavy effort.

IX. FOUNDATION RECOMMENDATIONS

9.1 General

Based on present plans, the proposed structure will include one (1) subterranean level underlain by bedrock. The results of our review of previous site investigations indicate that the foundation for the proposed building may be supported on spread footings established in bedrock.

The following recommendations have been formulated from visual, physical and analytical considerations of the existing site conditions and are believed to be applicable for the proposed development.

The on-site soils and bedrock have a "medium" to “high” expansion potential. The recommendations presented in the following subsections are based on a "medium" to “high” expansion potential for the subgrade soils. Foundations and slab reinforcement configurations should meet, as a minimum, the requirements of the regulating agencies and/or the 2016 CBC.

9.2 Footings

Spread or continuous footings may be used for support of the proposed structure. Footings should have a minimum of width of two (2) feet and be embedded a minimum two (2) feet in bedrock, and should be based a minimum of three (3) feet below adjacent grade.

9.2.1 Soil Bearing Pressures

Spread and continuous footings based on competent bedrock, as described in Section 9.4 may be designed for an allowable dead-plus-live load bearing pressure of 8,000 psf. The allowable bearing capacity is based on the assumption that the base of footing is embedded a minimum of two (2) feet into competent bedrock. Where competent bedrock is deeper than the planned bottom of footing elevation, the footing excavation shall be deepened as needed to reach competent bedrock. The footing may then be placed on competent bedrock or the excavation may be backfilled with cement slurry with a minimum compressive strength of 500 psi to reach planned footing bottom. For the latter option, provisions of Section 1803.5.9 of 2016 CBC or Los Angeles City Building Code for use of "controlled low-strength material” (CLSM) shall be followed. The maximum edge pressures induced by eccentric loading or overturning moments should not be allowed to exceed the above-mentioned allowable bearing values.

Footings placed closer than one (1) width apart should be structurally tied.

9.2.2 Footings Adjacent to Trenches or Existing Footings

Where footings are located adjacent to utility trenches, they should extend below a one-to-one plane projected upward from the inside bottom corner of the trench. Footings excavations adjacent to the footings of existing buildings should be carried put such that the existing footings are not undermined.

9.2.3 Settlements

Total static settlement of footings supported on bedrock is not anticipated to exceed one (1) inch with differential settlement not exceeding one-half (½) inch over a span of fifty (50) feet. Parts of the aforementioned static settlements are anticipated to occur immediately after application of loads. In addition to static settlements, total and differential seismically induced settlements are anticipated to be negligible.

The settlement estimates outlined above are based on the bearing pressure applied at the base of the footing (includes the weight of the footing and fill placed over the footing) and a maximum footing width of twelve (12) feet. The estimated settlements should be reviewed once the foundation plans are finalized.

9.2.4 Lateral Load Resistance

Lateral loads may be resisted by friction between the bottom of footings and the subgrade soil as well as by passive earth pressure against the side of the footing. For frictional resistance, a friction coefficient of 0.35 may be used for bedrock. For passive resistance, a lateral passive pressure equivalent to a fluid pressure of 175 pounds per cubic foot may be used to a maximum of 3,000 psf. The foundations should be poured tight against bedrock or compacted fill. Lateral resistance and frictional resistance may be combined without reduction in determining the total lateral resistance.

9.2.5 Footing Observations

All foundation excavations should be observed by GEOBASE prior to the placement of forms, reinforcement, or concrete, for verification of conformance with the intent of these recommendations and confirmation of the bearing capacities. All loose or unsuitable materials should be removed prior to the placement of concrete. Materials from footing excavations should not be spread in slab-on-grade areas unless compacted.

9.3 Footings for Minor Structures

Minor structures may be designed using the presumptive load-bearing values outlined in CBC

2016, provided that the risk of future settlements and associated maintenance can be tolerated.

9.4 Basement Walls

9.4.1 Earth Pressures

The walls should be designed to resist lateral pressures imposed by the surrounding soils and surcharge loads. It is recommended that for static loading condition: walls which are away from existing adjacent improvements and that are free to rotate at the top (at least 0.01radian deflection) should be designed to resist a lateral pressure imposed by an equivalent fluid weighing forty five (45) pounds per cubic feet. For walls close to existing adjacent improvements where lateral wall movement cannot be tolerated or where the wall is structurally braced against movement the top, the wall should be designed to resist a lateral pressure equivalent to that imposed by a fluid weighing sixty-five (65) pounds per cubic foot. In addition, a uniform pressure equal to one-third (1/3) and one-half (½) of any vertical pressure adjacent to the basement wall should be assumed to act on the free and braced walls respectively. These aforementioned pressures assume that positive drainage will be provided as recommended in subsection 9.4.2. For passive resistance, the lateral load resistance parameters outlined in subsection 9.2.4 may be used.

For seismic loading conditions, where appropriate, the dynamic loading increment of active earth pressures may be taken as thirty (30) psf per foot of wall height distributed in an inverted triangular distribution. In restrained, non-yielding walls, the seismic earth pressure increment depends on the ratio of frequency of the seismic load to the fundamental frequency of the wall/soil system, and accurate dynamic earth pressures can only be determined if these frequencies are known; in the absence of such data, for basement walls, an estimated increment of forty (40) psf per foot of wall height distributed in an inverted triangular distribution is considered appropriate.

9.4.2 Wall Backfill and Drainage

The backfill for basement walls shall be granular soils as described in subsection 8.4.3 and the walls should be provided with backdrains to relieve possible hydrostatic pressures on the walls. A pre-fabricated drainage system such as Miradrain, Eakadrain or equivalent, installed in accordance with the manufacturer's recommendations, may be used. The drainage system should meet the minimum requirements of CBC 2016 subsections 1805.4.2 and 1805.4.3. Alternatively, the walls should be designed to withstand hydrostatic pressures.

The basement walls and floor slab below existing grade should be waterproofed to prevent moisture build up on the interior sides of the walls as a result of water migration from the soils in contact with the walls. The waterproofing should be applied for the full height of the basement walls and walls below existing grade, and meet as a minimum the requirements of the CBC 2016, subsection 1805.3. Specific recommendations may be provided by a Waterproofing Consultant.

9.5 Ultimate Values

The recommended design values presented in this report are for use with loadings determined by a conventional working stress design. When considering an ultimate design approach, the recommended design values may be multiplied by the factors given in Table VII:

TABLE VII
LOAD FACTORS FOR ULTIMATE DESIGN

Foundation Loading	Ultimate Design Loading
Bearing Value	3
Passive Pressure	1.33
Coefficient of Friction	1.25

In no event, however, should the foundation sizes be reduced from those required for support of dead-plus-live loads when using working stress values.

9.6 Floor Slabs

In moisture sensitive areas, as a minimum, the floor slabs should be damproofed per CBC 2016, subsection 1805.2; specific recommendations can be provided by a Waterproofing Consultant.

Slab-on-grade floors should be designed by the Structural Engineer using applicable CBC requirements and designed for the intended use and loading. As a minimum, slabs should be reinforced with # 4 bars at twelve (12) inch spacing, located at mid-height of the slab. Actual slab reinforcement and thickness should be determined by the project Structural Engineer based on applicable method used as discussed below. Thickness of floor slabs should be at least five (5) inches actual and determined by the project Structural Engineer for the project loading and service conditions. Section 1808.6.2 of the 2016 California Building Code (CBC) specifies that foundations resting on soils with an expansion index greater than twenty (20) require special design considerations. Based on the limited available data, slab-on-grade estimates may be completed based on the procedures of WRI/CRSI Design of Slab on Ground Foundations using an effective plasticity index of thirty-three (33).

X. SOIL CORROSIVITY

Electrical conductivity, pH, chloride and water soluble sulfate tests were conducted on representative samples, and the results are provided in Appendix C. The tests results indicate that the subsoils at the site have a "moderate" corrosive potential with respect to concrete and "severely corrosive" potential with respect to steel and other metals. Therefore, Type II Portland cement, with water/cement ratio <0.5 and six (6) sacks of cement per cubic yard of concrete corresponding to a minimum compressive strength of 4000 psi, should be used for the construction of concrete structures in contact with the subgrade soils.

XI. PLAN REVIEW, OBSERVATIONS AND TESTING

Post-investigation services are an important and integrated part of this investigation and should be carried out by GEOBASE. The project foundation and grading plans, and specifications should be forwarded to GEOBASE for review for conformance with the intent of the soils recommendations.

Geotechnical observations of excavation bottoms should be carried out prior to fill placement. Observations and testing of all fill placement should be carried out on a continuous basis to verify the design assumptions and conformance with the intent of the recommendations. Observations of footing bases should be carried out prior to concrete pour.

XII. LIMITATIONS

This investigation was performed in accordance with generally accepted geotechnical engineering principles and practices. No warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

This report is intended for use by the client and its representatives, and with regard to the specific project discussed herein. Any changes in the design or location of the proposed new structure, however slight, should be brought to our attention so that we may determine how they may affect our conclusions. The conclusions and recommendations contained in this report are based on the data relating only to the specific project and location discussed herein. This report does not relate any conclusions or recommendations about the potential for hazardous and/or contaminated materials existing at the site.

The analyses and recommendations submitted in this report are based upon the observations noted during drilling of the borings, interpretation of laboratory test results, and geological evidence. This report does not reflect any variations which may occur away from the borings and which may be encountered during construction. If conditions observed during construction are at variance with the preliminary findings, we should be notified so that we may modify our conclusions and recommendations, or provide alternate recommendations, if necessary.

The recommendations presented herein assume that the plan review, observations and testing services, outlined in Section XI of the report, will be provided by GEOBASE. During execution of the aforementioned services, GEOBASE can finalize the report recommendations based on observations of actual subsurface conditions evident during construction. GEOBASE cannot assume liability for the adequacy of the recommendations if another party is retained to observe construction.

This report is issued with the understanding that it is the responsibility of the owner, or of his representative, to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project, and incorporated into the plans and specifications. In this respect, it is recommended that we be allowed the opportunity to review the project plans and the specifications for conformance with the geotechnical recommendations.

This office does not practice or consult in the field of safety engineering. We do not direct the contractor's operations, and we cannot be responsible for other than our own personnel on the site. Therefore, the safety of others is the responsibility of the contractor. The contractor should notify the owner if he considers any of the recommended actions presented herein to be unsafe.

This report is subject to review by the appropriate regulating agencies.

Respectfully submitted
GEOBASE, INC.

JMC for:

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R.C.E. 82460
Associate Engineer

K.H. Bagahi, Ph.D., G.E.
G.E. 108
Principal Engineer

J-M. (John) Chevallier, P.E., G.E.
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Managing Principal

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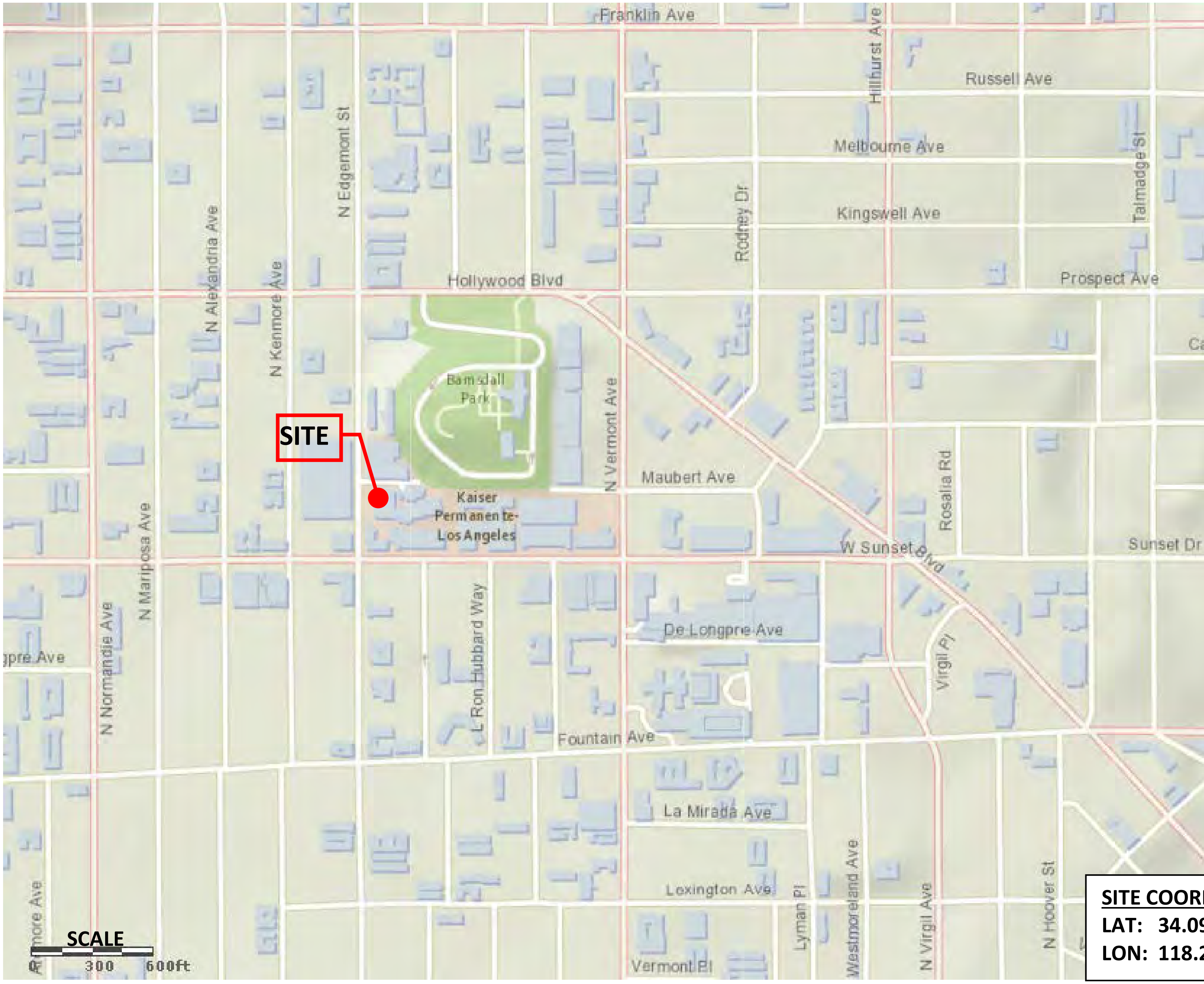
APPENDIX A



NORTH

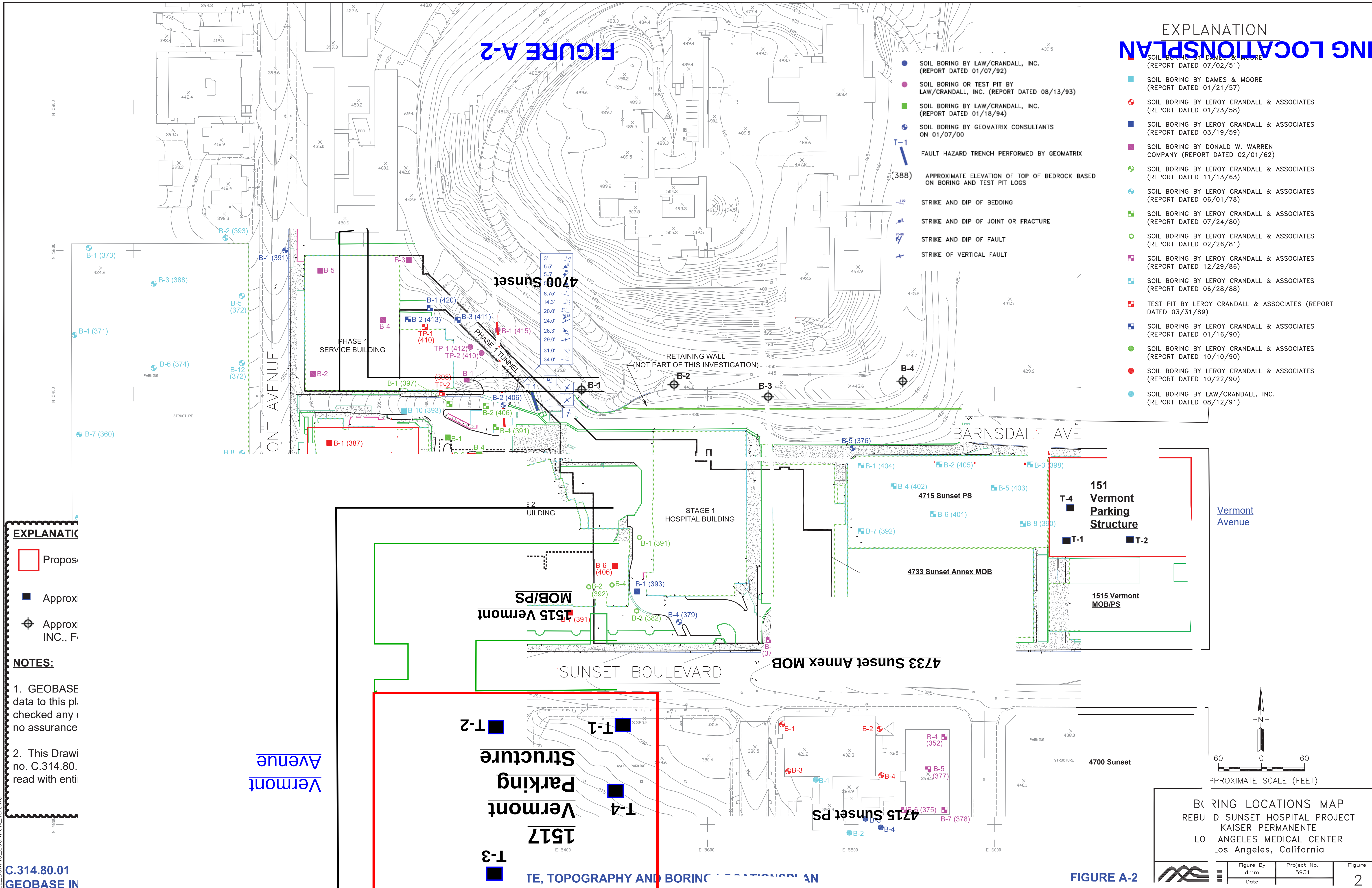
SITE COORDINATES:
LAT: 34.0988° North
LON: 118.2958° West

GEOBASE

SITE LOCATION MAP
Kaiser Permanente – Medical Office Building
1526 North Edgemont Street
Los Angeles, California

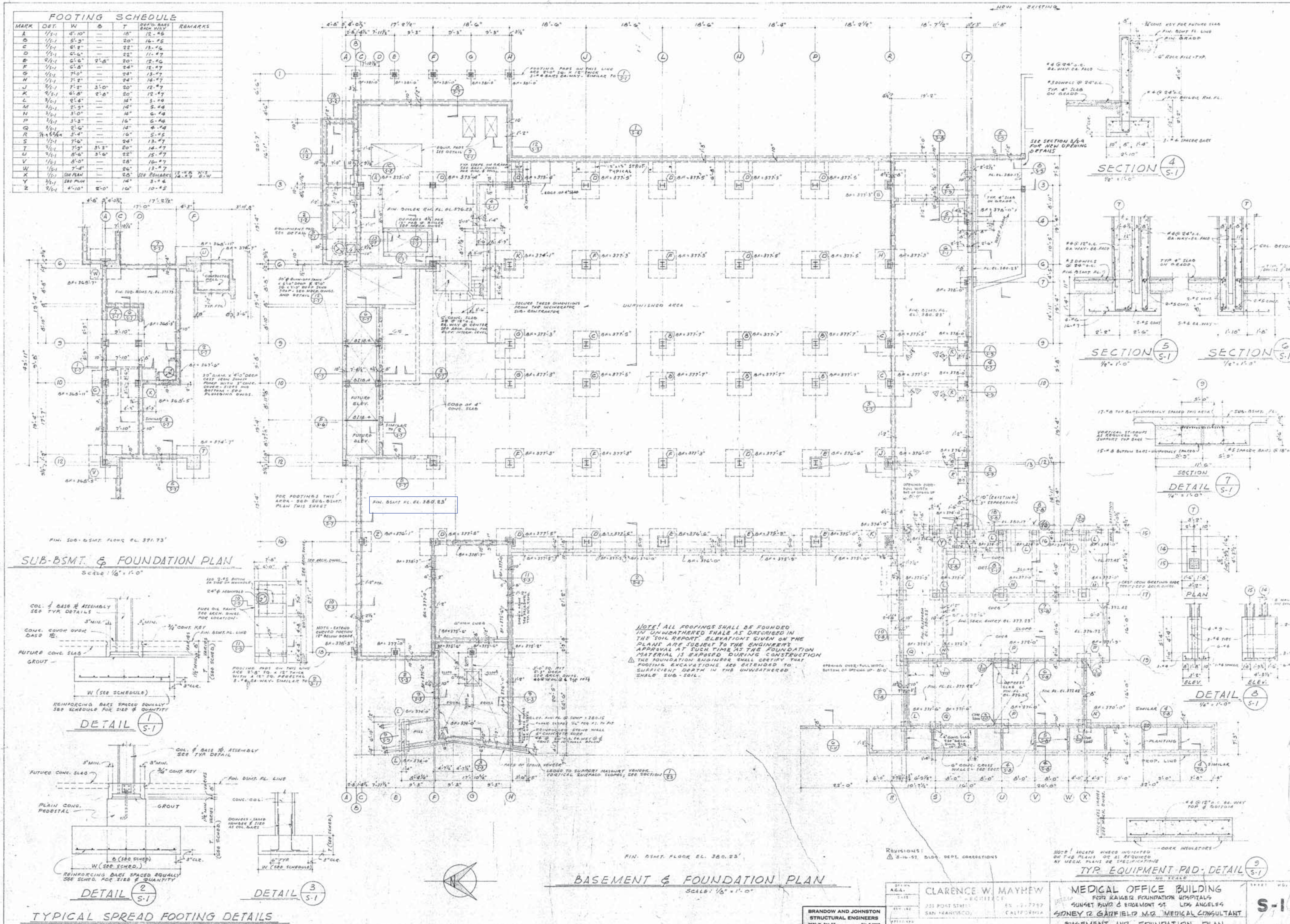
C.314.80.01

FIGURE A-1



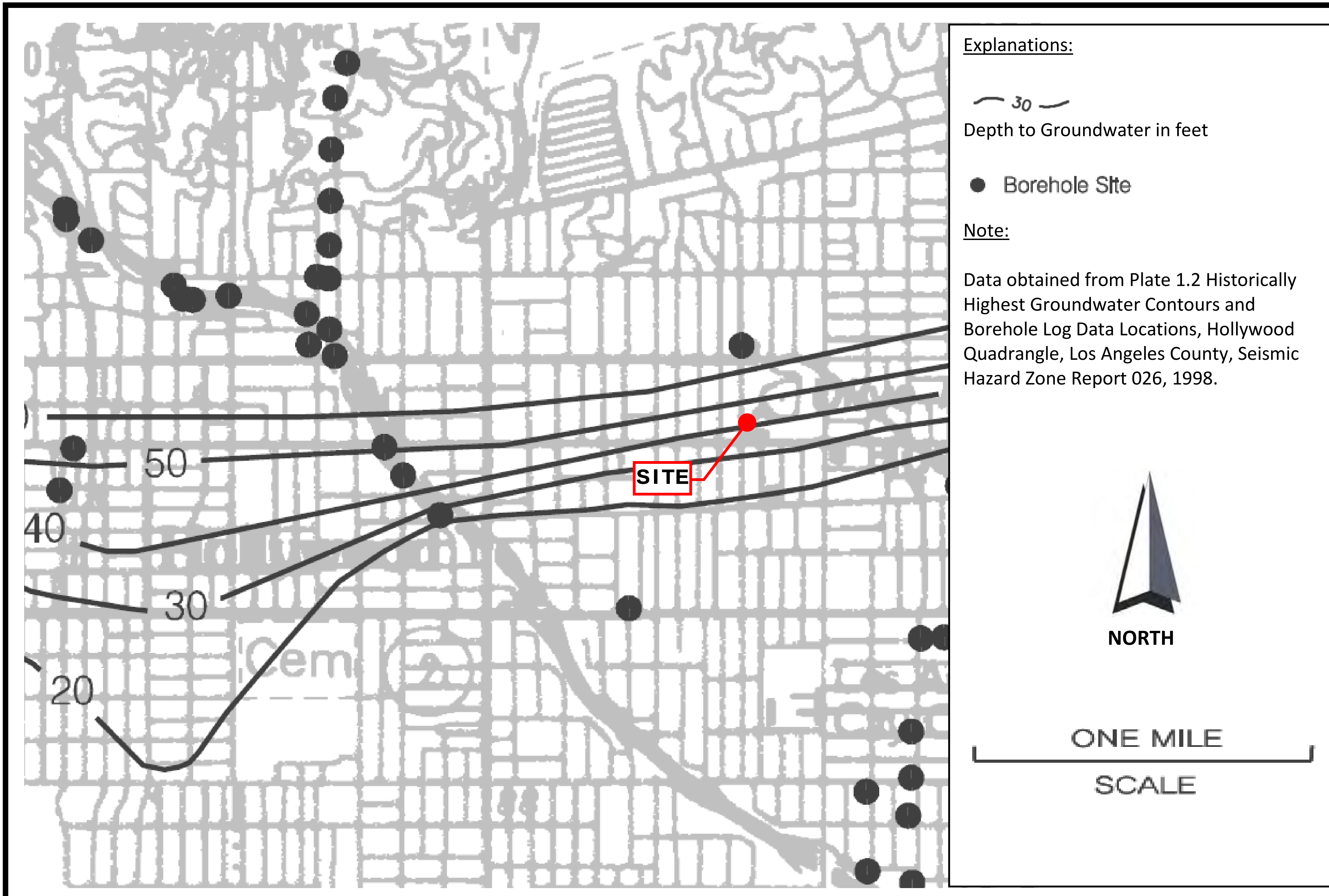
EXPLANATION
SOIL BORING BY LAW/CRANDALL, INC. (REPORT DATED 01/07/92)
SOIL BORING OR TEST PIT BY LAW/CRANDALL, INC. (REPORT DATED 08/13/93)
SOIL BORING BY LAW/CRANDALL, INC. (REPORT DATED 01/18/94)
SOIL BORING BY GEOMATRIX CONSULTANTS ON 01/07/00
FAULT HAZARD TRENCH PERFORMED BY GEOMATRIX
APPROXIMATE ELEVATION OF TOP OF BEDROCK BASED ON BORING AND TEST PIT LOGS
STRIKE AND DIP OF BEDDING
STRIKE AND DIP OF JOINT OR FRACTURE
STRIKE AND DIP OF FAULT
STRIKE OF VERTICAL FAULT
SOIL BORING BY DAMES & MOORE (REPORT DATED 07/02/51)
SOIL BORING BY DAMES & MOORE (REPORT DATED 01/21/57)
SOIL BORING BY LEROY CRANDALL & ASSOCIATES (REPORT DATED 01/23/58)
SOIL BORING BY LEROY CRANDALL & ASSOCIATES (REPORT DATED 03/19/59)
SOIL BORING BY DONALD W. WARREN COMPANY (REPORT DATED 02/01/62)
SOIL BORING BY LEROY CRANDALL & ASSOCIATES (REPORT DATED 11/13/63)
SOIL BORING BY LEROY CRANDALL & ASSOCIATES (REPORT DATED 06/01/78)
SOIL BORING BY LEROY CRANDALL & ASSOCIATES (REPORT DATED 07/24/80)
SOIL BORING BY LEROY CRANDALL & ASSOCIATES (REPORT DATED 02/26/81)
SOIL BORING BY LEROY CRANDALL & ASSOCIATES (REPORT DATED 12/29/86)
SOIL BORING BY LEROY CRANDALL & ASSOCIATES (REPORT DATED 06/28/88)
TEST PIT BY LEROY CRANDALL & ASSOCIATES (REPORT DATED 03/31/89)
SOIL BORING BY LEROY CRANDALL & ASSOCIATES (REPORT DATED 01/16/90)
SOIL BORING BY LEROY CRANDALL & ASSOCIATES (REPORT DATED 10/10/90)
SOIL BORING BY LEROY CRANDALL & ASSOCIATES (REPORT DATED 10/22/90)
SOIL BORING BY LAW/CRANDALL, INC. (REPORT DATED 08/12/91)
FIGURE A-2
ORING LOCATIONSPLAN
4700 Sunset
PHASE 1 SERVICE BUILDING
PHASE 1 TUNNEL
RETAINING WALL (NOT PART OF THIS INVESTIGATION)
BARNSDALE AVE
STAGE 1 HOSPITAL BUILDING
4715 Sunset PS
151 Vermont Parking Structure
Vermont Avenue
4733 Sunset Annex MOB
1515 Vermont MOB/PS
SUNSET BOULEVARD
1517 Vermont Parking Structure
4715 Sunset PS
4700 Sunset
VERMONT AVENUE
EXPLANATION
Propos
Approxi
Approxi INC., F
NOTES:
1. GEOBASE data to this pl checked any no assurance
2. This Drawi no. C.314.80. read with enti
C.314.80.01
GEOBASE IN
TE, TOPOGRAPHY AND BORING LOCATIONS PLAN
FIGURE A-2
APPROXIMATE SCALE (FEET)
BORING LOCATIONS MAP
REBUILD SUNSET HOSPITAL PROJECT
KAISER PERMANENTE
LOS ANGELES MEDICAL CENTER
Los Angeles, California
Figure By dmm
Project No. 5931
Figure 2
ALL_BORING_LOCATION_V5.DWG

C.314.80.01
GEOBASE INC.



EXISTING MOB FOUNDATION PLAN.

FIGURE A-3



GEOBASE

HISTORIC HIGHEST GROUNDWATER LEVELS
Kaiser Permanente – Medical Office Building
1526 North Edgemont Street
Los Angeles, California

C.314.80.01

FIGURE A-4

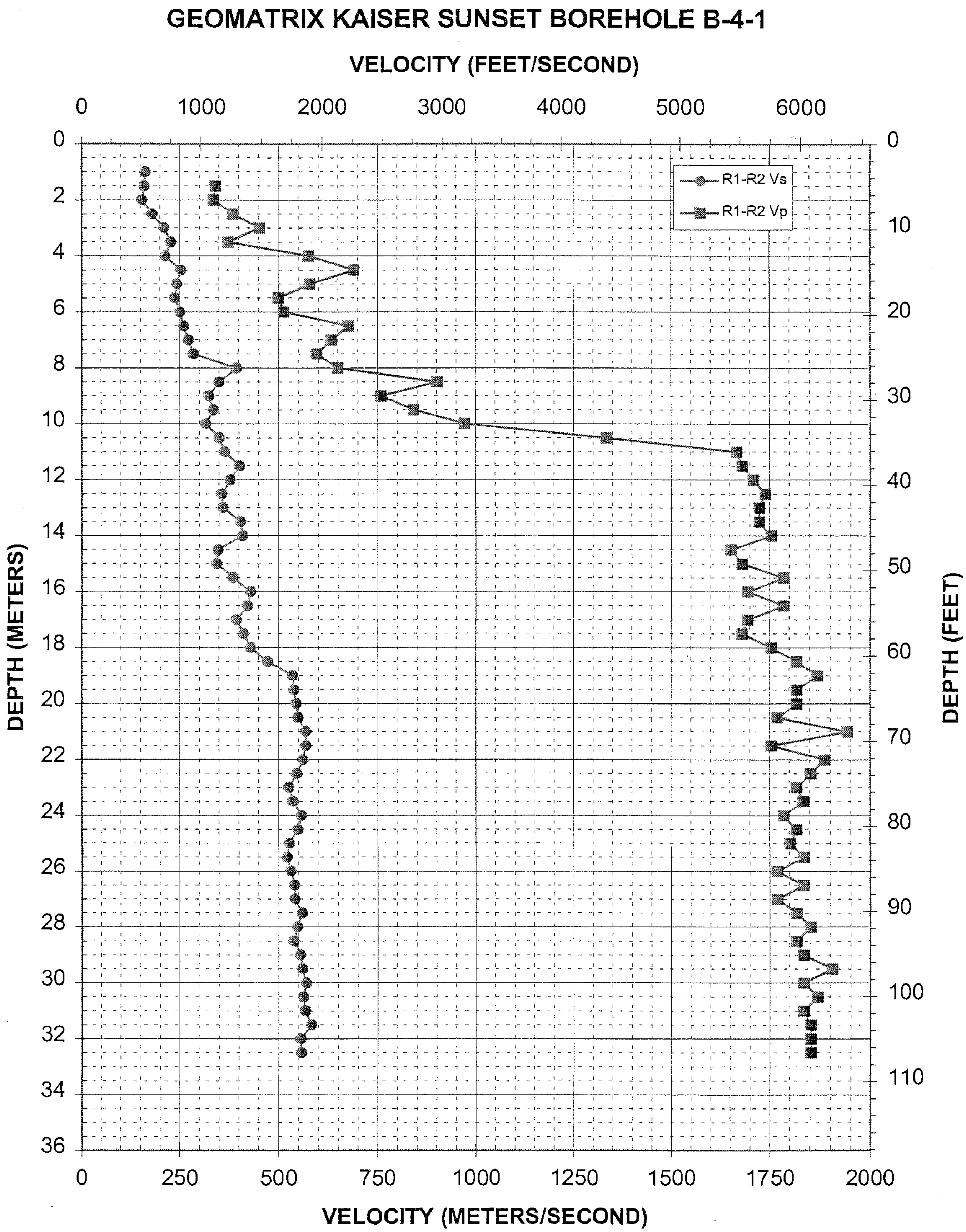


Figure 4. Borehole B-4-1, Suspension P- and S_H-wave velocities

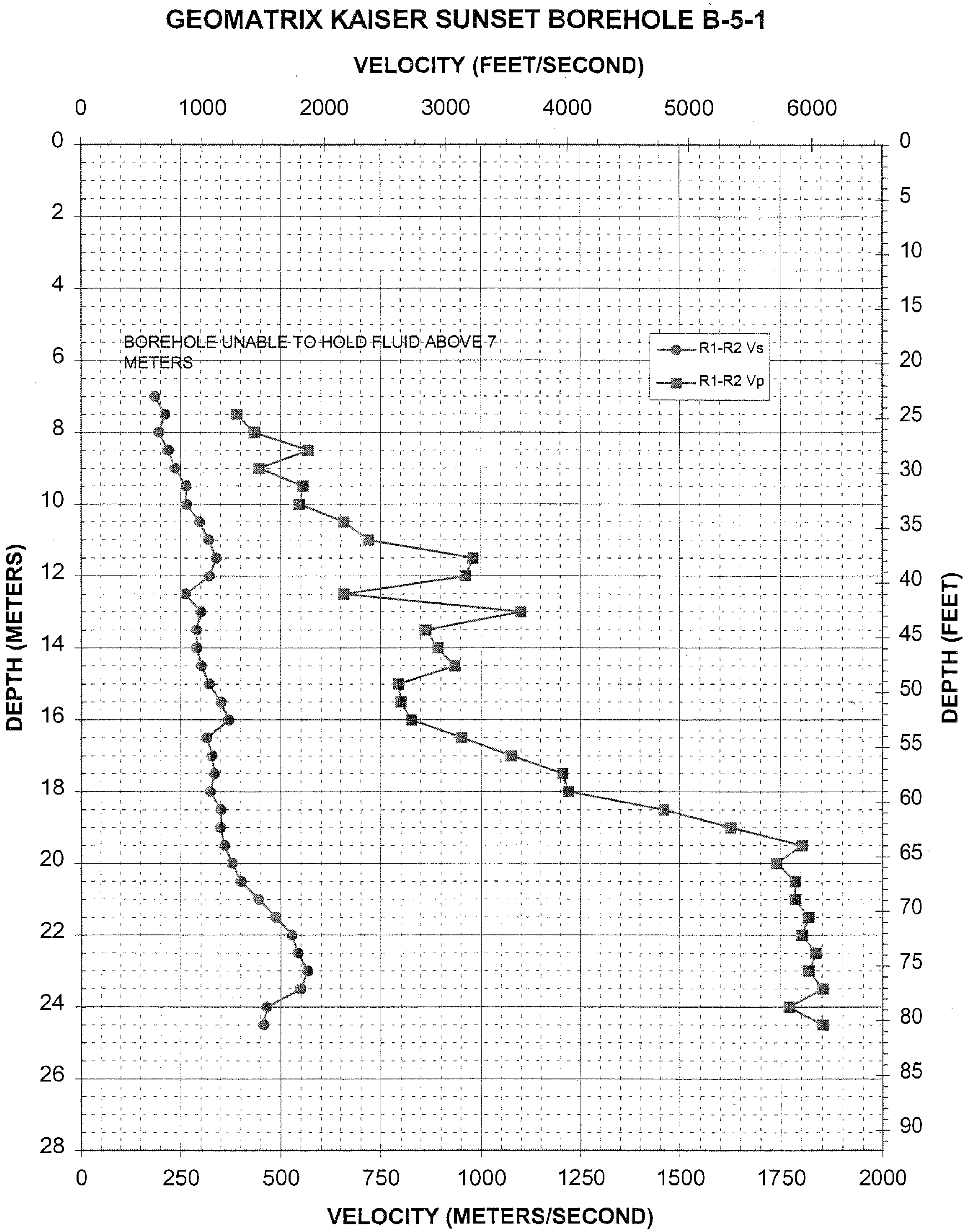
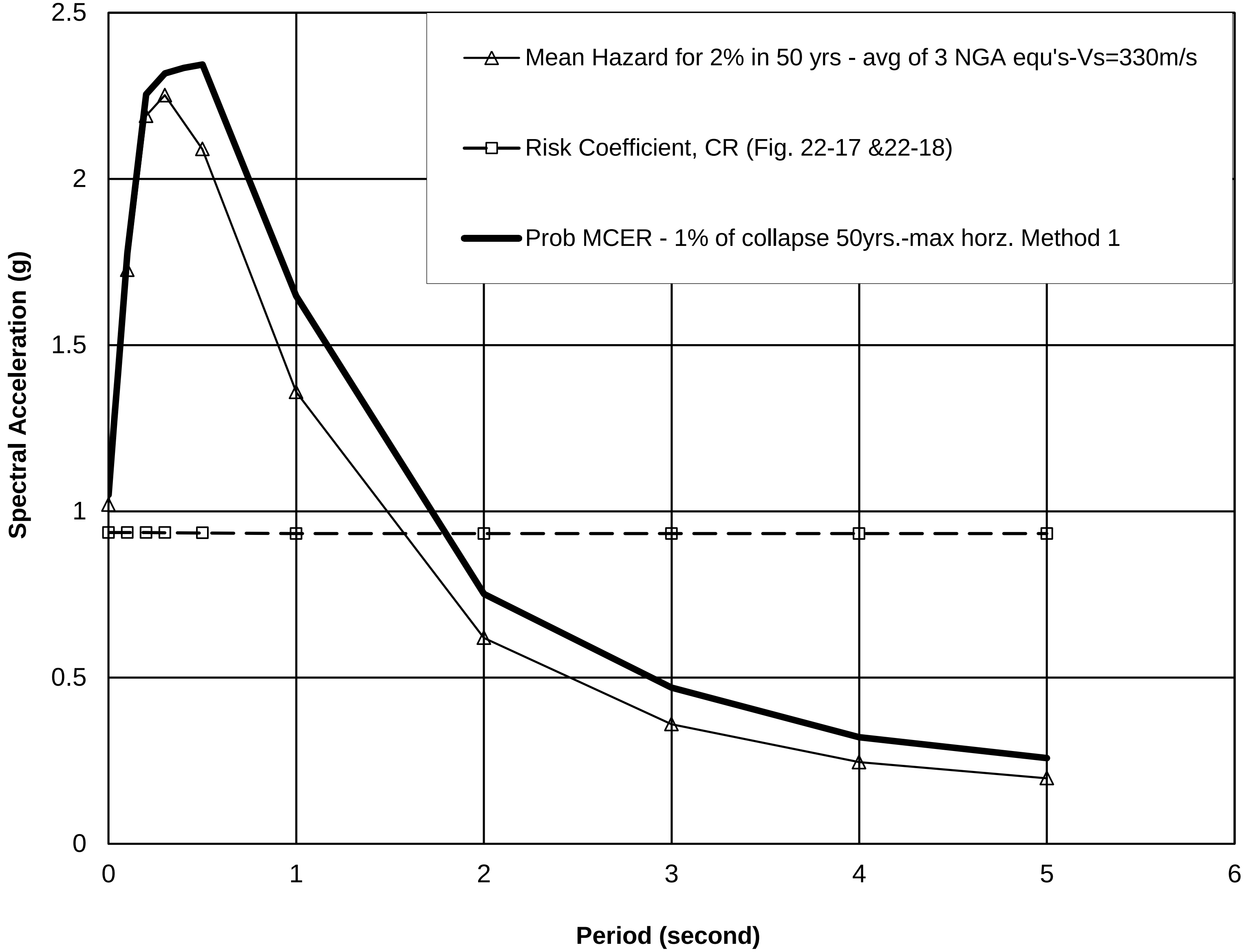


Figure 5. Borehole B-5-1, Suspension P- and S_H-wave velocities

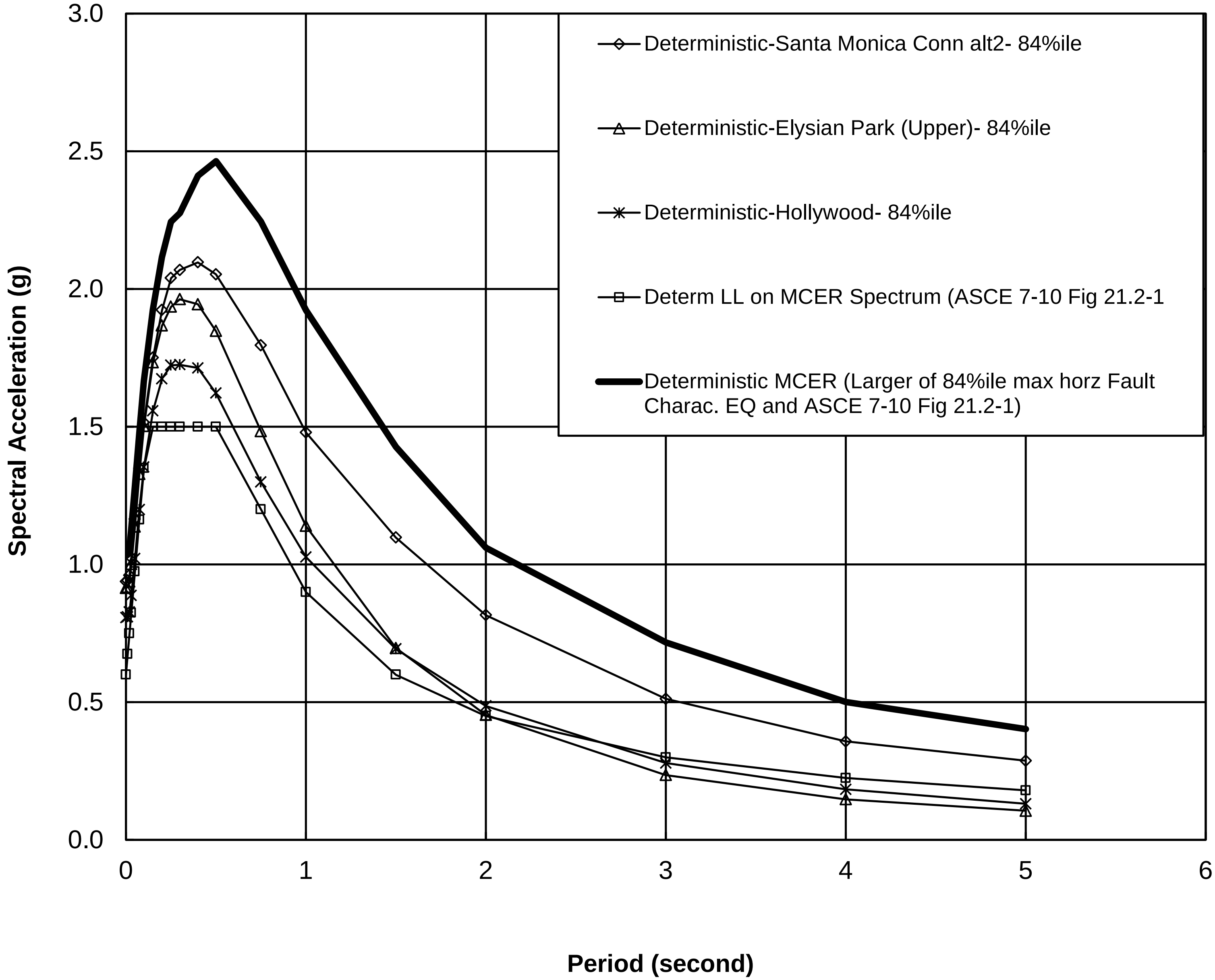


GEOBASE

PROBABILISTIC MCE_R RESPONSE SPECTRA
Kaiser Permanente – Medical Office Building
1526 North Edgemont Street
Los Angeles, California

C.314.80.01

FIGURE A-6

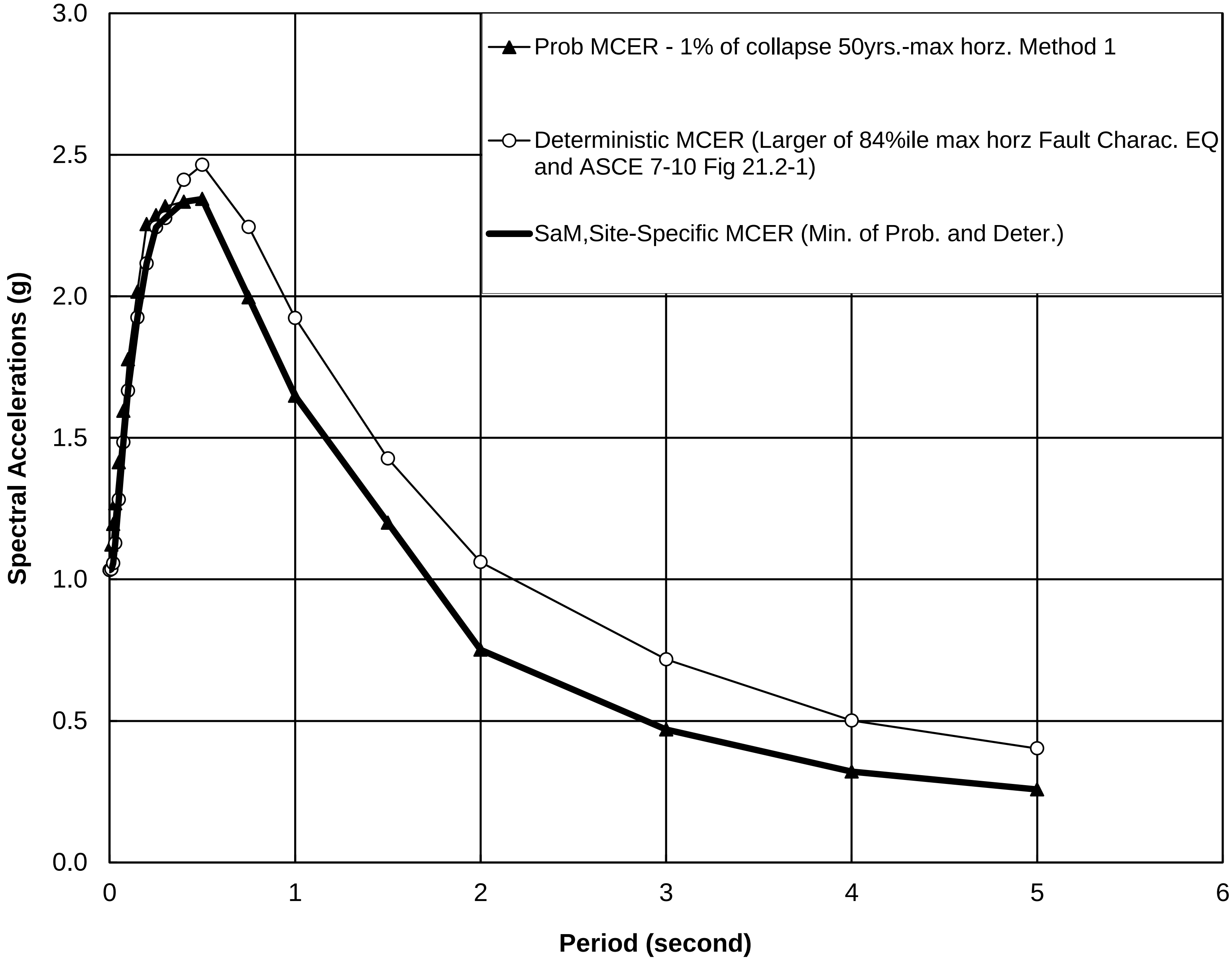


GEOBASE

DETERMINISTIC MCE$_R$ RESPONSE SPECTRA
Kaiser Permanente – Medical Office Building
1526 North Edgemont Street
Los Angeles, California

C.314.80.01

FIGURE A-7

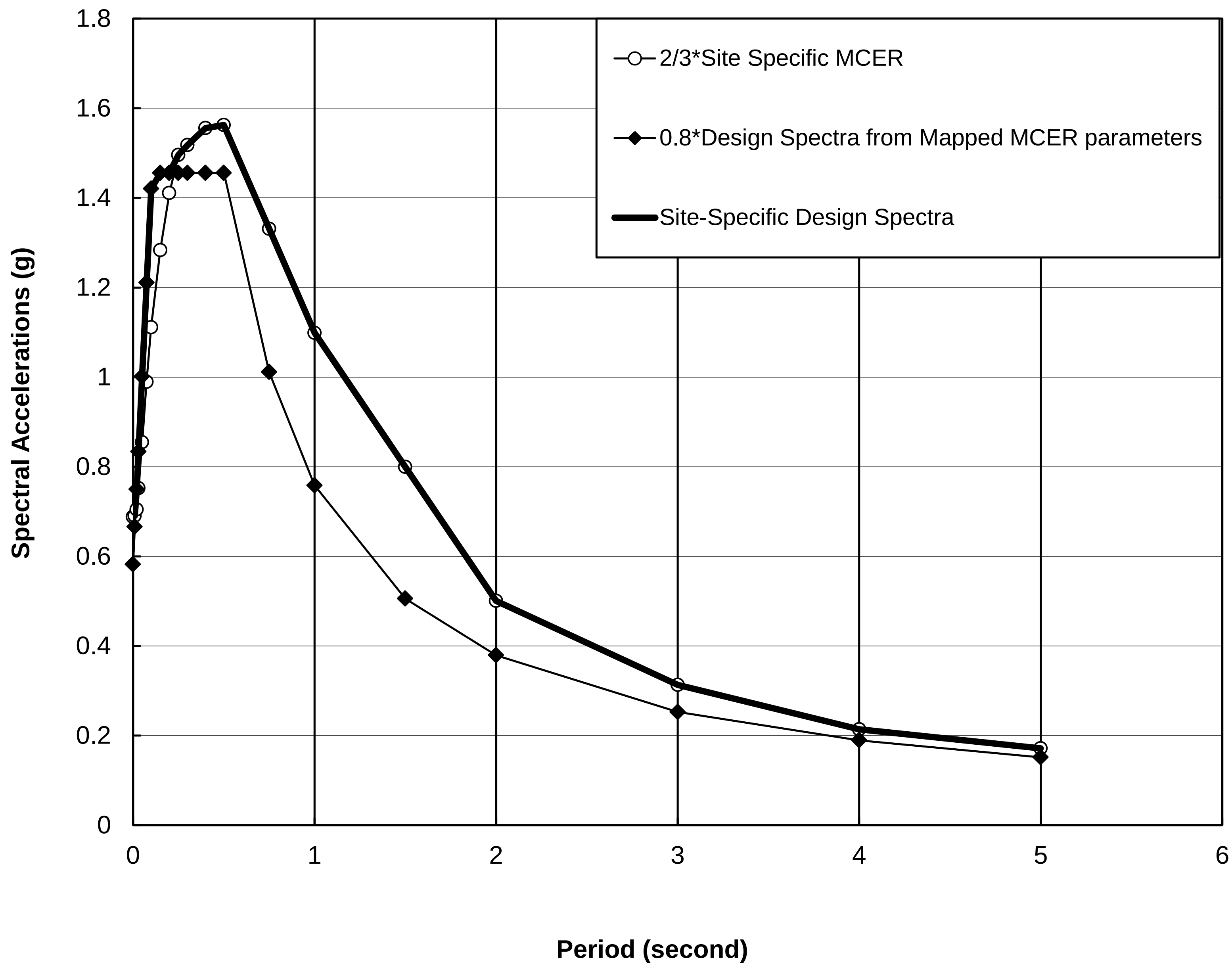


GEOBASE

SITE-SPECIFIC MCE$_R$ RESPONSE SPECTRA
Kaiser Permanente – Medical Office Building
1526 North Edgemont Street
Los Angeles, California

C.314.80.01

FIGURE A-8

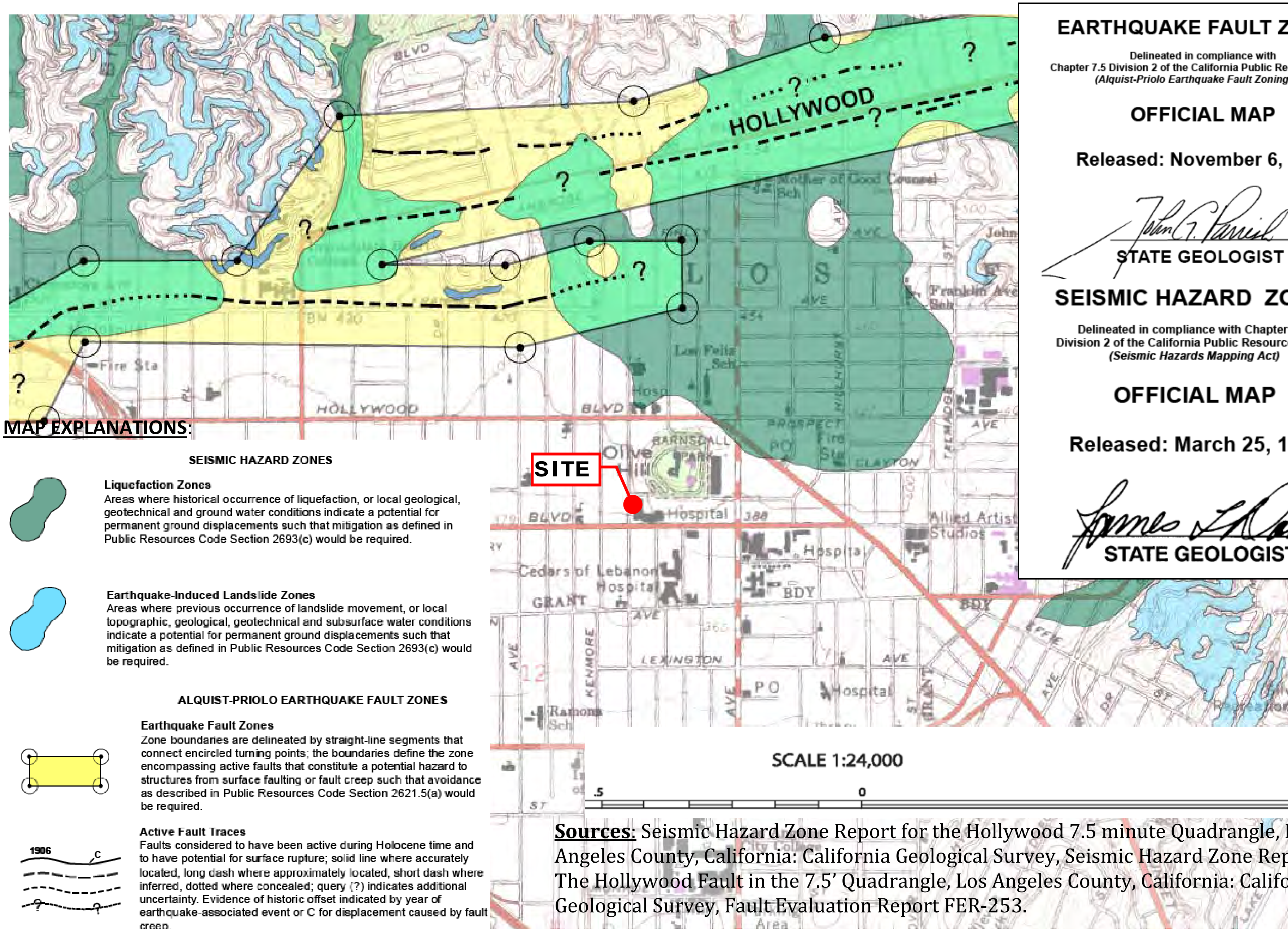


GEOBASE

SITE-SPECIFIC DESIGN RESPONSE SPECTRA
Kaiser Permanente – Medical Office Building
1526 North Edgemont Street
Los Angeles, California

C.314.80.01

FIGURE A-9



EARTHQUAKE FAULT ZONES

Delineated in compliance with
Chapter 7.5 Division 2 of the California Public Resources Code
(Alquist-Priolo Earthquake Fault Zoning Act)

OFFICIAL MAP

Released: November 6, 2014

STATE GEOLOGIST

SEISMIC HAZARD ZONES

Delineated in compliance with Chapter 7.8,
Division 2 of the California Public Resources Code
(Seismic Hazards Mapping Act)

OFFICIAL MAP

Released: March 25, 1999

STATE GEOLOGIST

MAP EXPLANATIONS:

SEISMIC HAZARD ZONES

Liquefaction Zones
Areas where historical occurrence of liquefaction, or local geological, geotechnical and ground water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

Earthquake-Induced Landslide Zones
Areas where previous occurrence of landslide movement, or local topographic, geological, geotechnical and subsurface water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

ALQUIST-PRIOLO EARTHQUAKE FAULT ZONES

Earthquake Fault Zones
Zone boundaries are delineated by straight-line segments that connect encircled turning points; the boundaries define the zone encompassing active faults that constitute a potential hazard to structures from surface faulting or fault creep such that avoidance as described in Public Resources Code Section 2621.5(a) would be required.

Active Fault Traces
1906 C
Faults considered to have been active during Holocene time and to have potential for surface rupture; solid line where accurately located, long dash where approximately located, short dash where inferred, dotted where concealed; query (?) indicates additional uncertainty. Evidence of historic offset indicated by year of earthquake-associated event or C for displacement caused by fault creep.

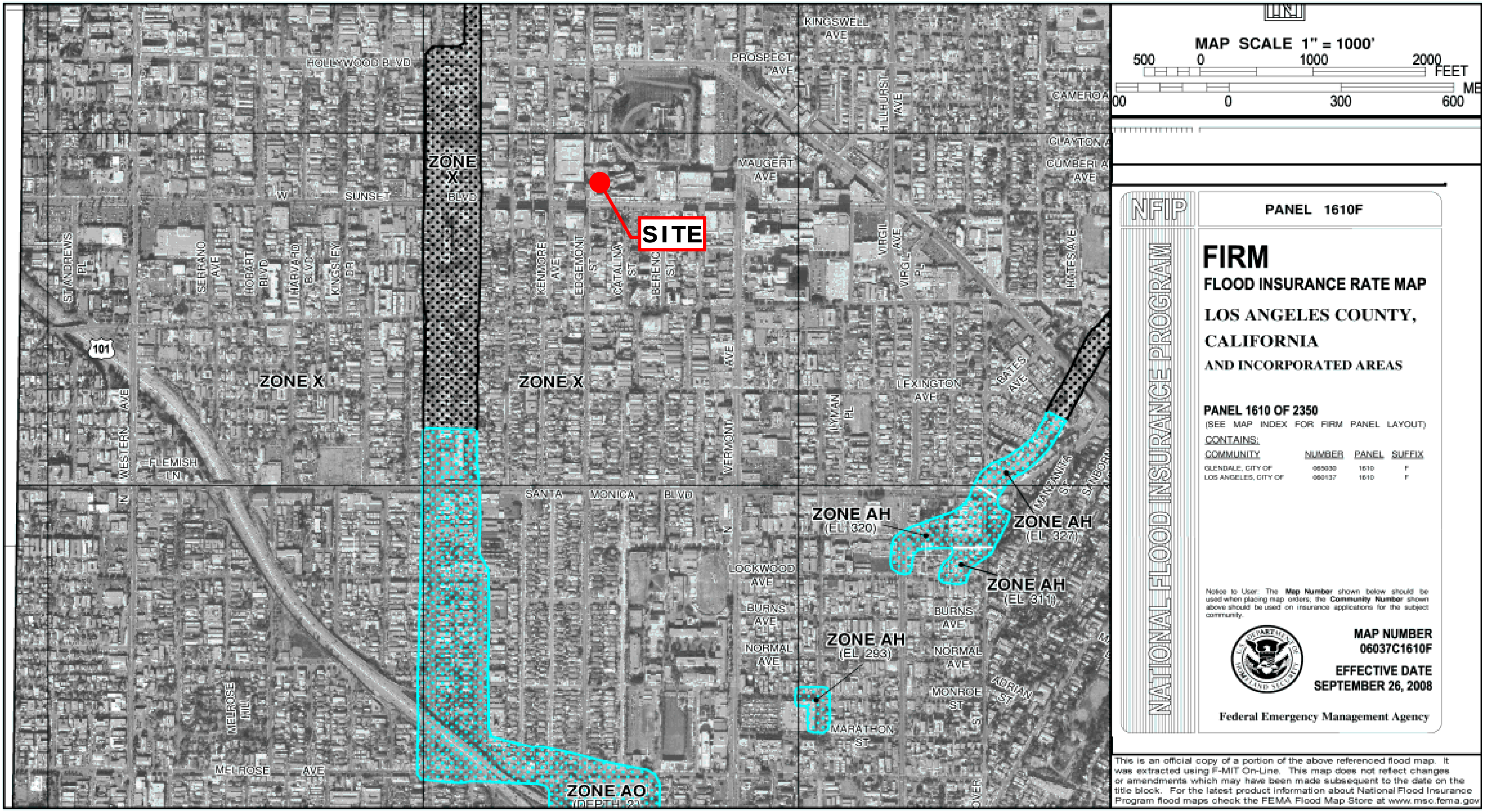
Sources: Seismic Hazard Zone Report for the Hollywood 7.5 minute Quadrangle, Los Angeles County, California: California Geological Survey, Seismic Hazard Zone Report 026. The Hollywood Fault in the 7.5' Quadrangle, Los Angeles County, California: California Geological Survey, Fault Evaluation Report FER-253.

GEOBASE

SEISMIC HAZARDS ZONES MAP
Kaiser Permanente – Medical Office Building
1526 North Edgemont Street
Los Angeles, California

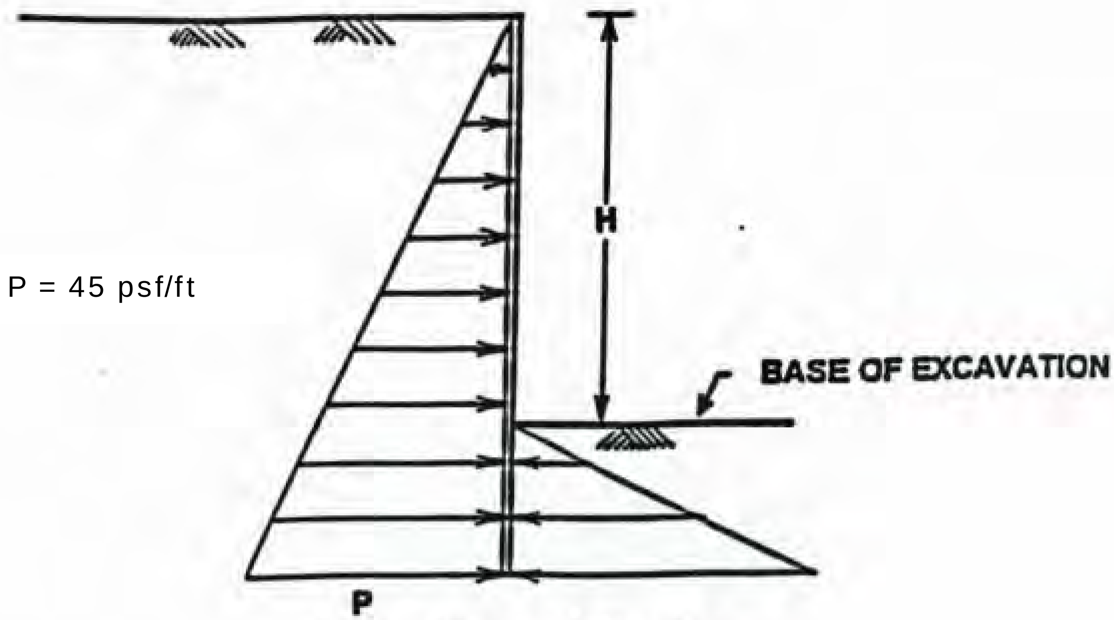
C.314.80.01

FIGURE A-10



The **SITE** is in Zone X – Area determined to be outside of 0.2% annual chance of floodplain.

GEOBASE	C.314.80.01	**FEMA FLOOD MAP** **Kaiser Permanente – Medical Office Building** **1526 North Edgemont Street** **Los Angeles, California** **FIGURE A-11**



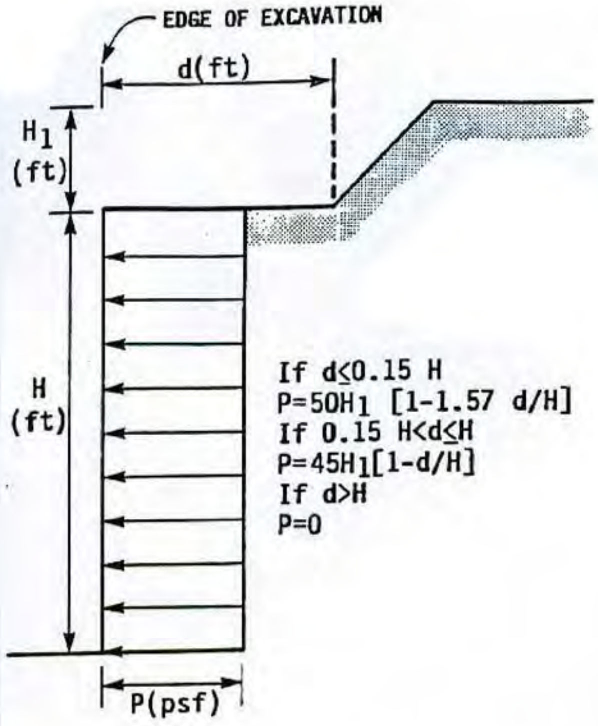
b) Cantilevered Shoring

GEOBASE

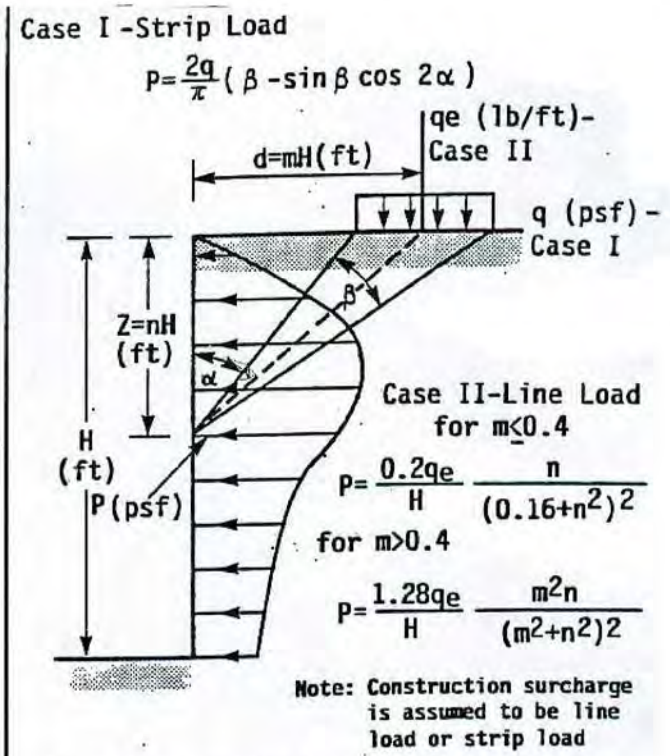
Earth Pressures for Shoring
Kaiser Permanente – Medical Office Building
1526 North Edgemont Street
Los Angeles, California

C.314.80.01

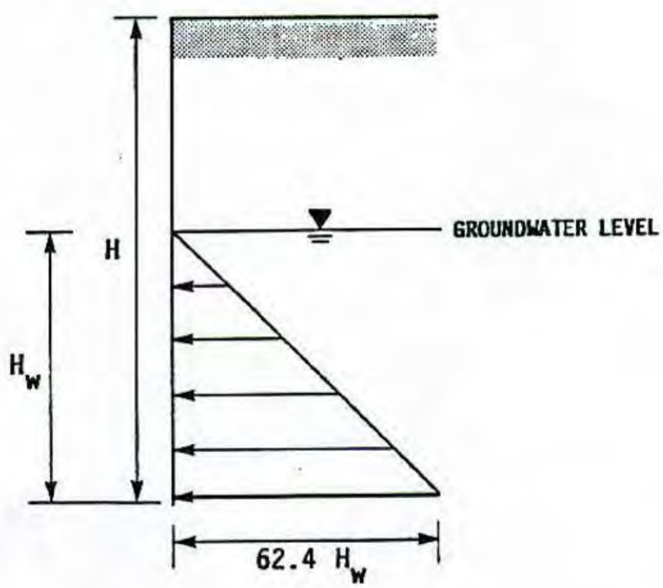
FIGURE A-12



(a) SLOPED EXCAVATION SURCHARGE



(b) CONSTRUCTION AND TRAFFIC SURCHARGE



(c) HYDROSTATIC PRESSURE

GEOBASE

ADDITIONAL LATERAL EARTH PRESSURES ON SHORING
Kaiser Permanente – Medical Office Building
1526 North Edgemont Street
Los Angeles, California

C.314.80.01

FIGURE A-13

APPENDIX B

BORING 1

DATE DRILLED: December 7, 1993
EQUIPMENT USED: 6" - Diameter Hollow Stem Auger

ELEVATION 100.8 **

ELEVATION (ft.)	DEPTH (ft.)		MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		Description
100							SM	4" Asphaltic Paving - 2" Base Course FILL - SILTY SAND - fine to coarse, some Gravel and Siltstone fragments, greyish brown
			4.2	111	9	■		Less Gravel
								SILTSTONE - light greyish brown
95	5		28.2	96	27	■		
			31.6	89	30 for 10"	■		
90	10		32.8	89	30 for 10"	■		Greyish brown
								Some Sandstone interbeds
	15		26.3	91	50 for 7"	■		Slightly cemented

NOTE: Water not encountered. No caving.

*Number of blows required to drive the Crandall sampler 12 inches using a 140 pound hammer falling 30 inches.

**Elevations refer to assumed datum; see Plate 1 for location of bench mark.

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated.
It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.1

BORING 4

DATE DRILLED: December 7, 1993
EQUIPMENT USED: 6" - Diameter Hollow Stem Auger

ELEVATION 99.4

ELEVATION (ft.)	DEPTH (ft.)		MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
			23.1	97	6	■
			26.1	87	9	■
95	5		—	—	12	■
			30.8	92	15	■
90	10		28.9	89	15	■
			29.6	85	8	■
85	15		32.8	92	8	■
80	20		32.4	85	40 for 10"	■

4" Asphaltic Paving - 2" Base Course

FILL - SILTY CLAY and CLAYEY SILT - lenses of Clayey Sand, dark brownish grey

FILL - SILTY CLAY - some Siltstone fragments, dark brown and brownish grey

Pieces of brick

(ENCOUNTERED OBSTRUCTION, POSSIBLE EXISTING FOUNDATION AT A DEPTH OF 12'. MOVED BORING 1' TO THE NORTH)

Light greyish brown

SILTSTONE - dark brownish grey

NOTE: Water not encountered. No caving.

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.4

BORING 1

DATE DRILLED: September 9, 1990
EQUIPMENT USED: 18" - Diameter Bucket

ELEVATION 87.3*

ELEVATION	DEPTH (ft.)		MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.
85			25.5	98	5	■
			24.4	99	6	■
	5		24.2	100	6	■
80			21.3	104	8	■
	10		23.2	101	6	■
75						
	15		24.0	97	7	■
70						
	20		26.6	96	6	■
65						
	25		45.8	85	7	■
60						
	30		27.5	93	8	■

9" Asphaltic Paving
ML – FILL - SILT and CLAY - some Sand, light brown
CL – SHALE (SILTSTONE) - weathered, fractured and bedded, light reddish brown

Light reddish brown with grey and white

Light reddish brown and grey

NOTE: Slight water seepage encountered at 20-1/2'. No caving.

* Elevations refer to datum of reference survey; see Plate 1 for location and elevation of bench mark.

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE A-1.1

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 2

DATE DRILLED: September 9, 1990
EQUIPMENT USED: 18" - Diameter Bucket

ELEVATION 90.6

ELEVATION	DEPTH (ft.)		MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.		DESCRIPTION
90								8" Asphaltic Paving
			24.5	95	5	■	ML CL	FILL - SILT and CLAY - few Siltstone fragments, light brown and white
			23.8	97	8	■		SHALE (SILTSTONE) - weathered, fractured and bedded, reddish brown and grey
85	5		27.0	91	8	■		
			24.9	98	8	■		
80	10		20.9	104	6	■		
			22.4	101	8	■		
75	15		27.3	94	7	■		Slightly Sandy, light brown
70	20		24.8	100	7	■		
65	25		25.6	99	6	■		Light brown and grey
								Streaks of white
60	30		23.9	101	9	■		
	35							

NOTE: Water not encountered. No caving.

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE A -1.2

BORING 1

DATE DRILLED: September 9, 1990
EQUIPMENT USED: 18" - Diameter Bucket

ELEVATION 99.1 *

ELEVATION (ft.)	DEPTH (ft.)		MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.		Description
								4" Asphaltic Paving - 6" Base Course
			25.6	99	2		ML	FILL - CLAYEY SILT - some Sand, few Gravel, brown and grey. Pieces of wire
95			29.8	88	1			Mottled brown
	5		31.9	87	3			SHALE (SILTSTONE) - weathered, fractured and bedded, grey and reddish brown
			8.6	92	16			Cemented layer (GAD USED TO PENETRATE)
90	10		26.4	96	8			
85	15		36.8	83	6			
80	20		36.8	88	7			

NOTE: Water not encountered. No caving.

* Elevations refer to datum of reference survey; see Plate 1 for location and elevation of bench mark.

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE 2.1

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 2

DATE DRILLED: September 17, 1990
EQUIPMENT USED: 4" - Diameter Auger

ELEVATION 99.1 ±

ELEVATION (ft.)	DEPTH (ft.)		MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.
			28.9	90	8	■
95			11.7	110	12	■
	5					
			—	—	18	■
			28.3	85	19	■
90						
	10					
85						
	15					

SM FILL - SILTY SAND - fine to medium, few Gravel, brown

SHALE (SILTSTONE) - weathered, fractured and bedded, grey and reddish brown

Reddish brown

Streaks of white

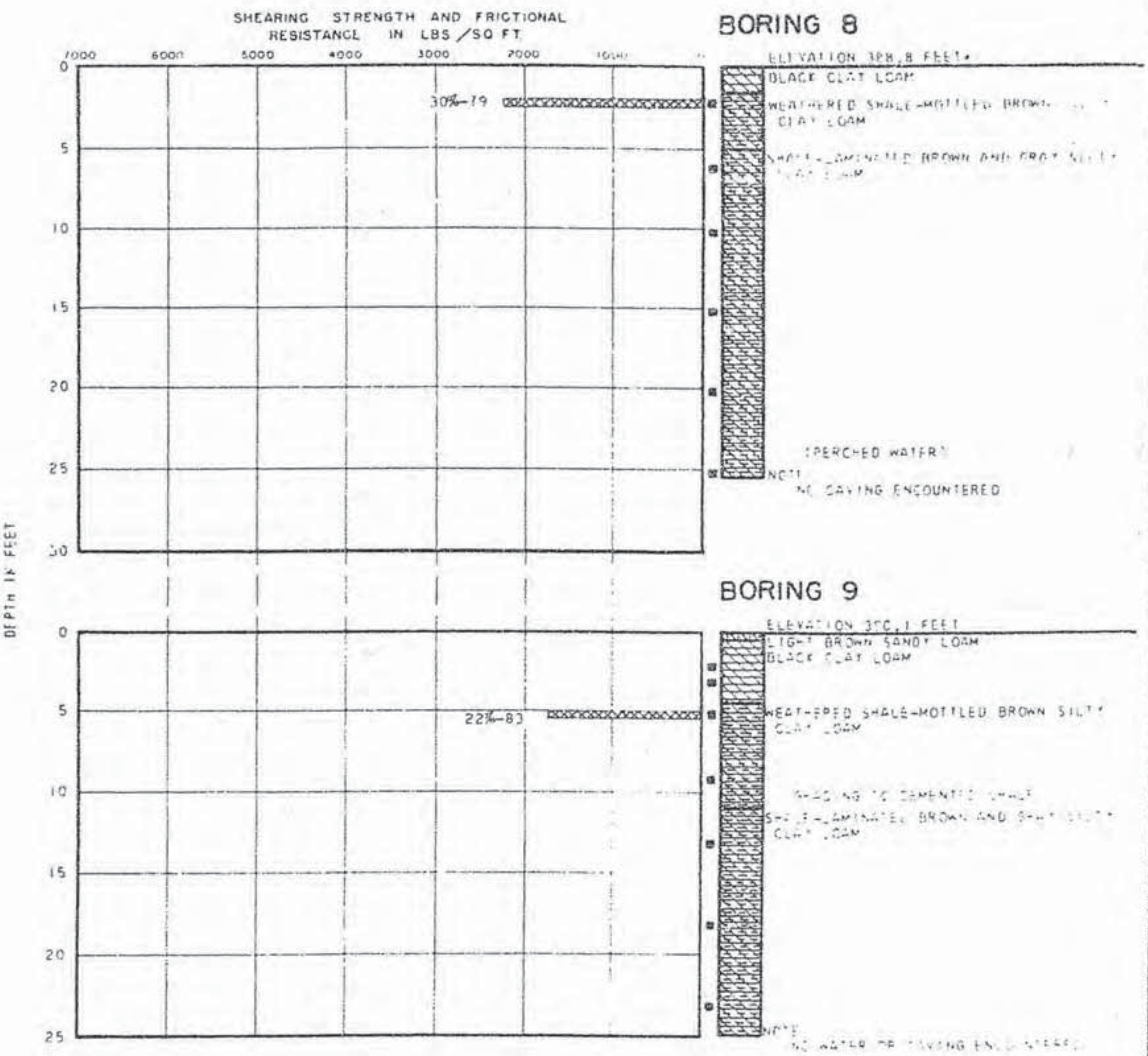
(BORING TERMINATED AT 10' DUE TO DIFFICULT DRILLING THROUGH HARD SHALE)

NOTE: Water not encountered. No caving.

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE 2.2



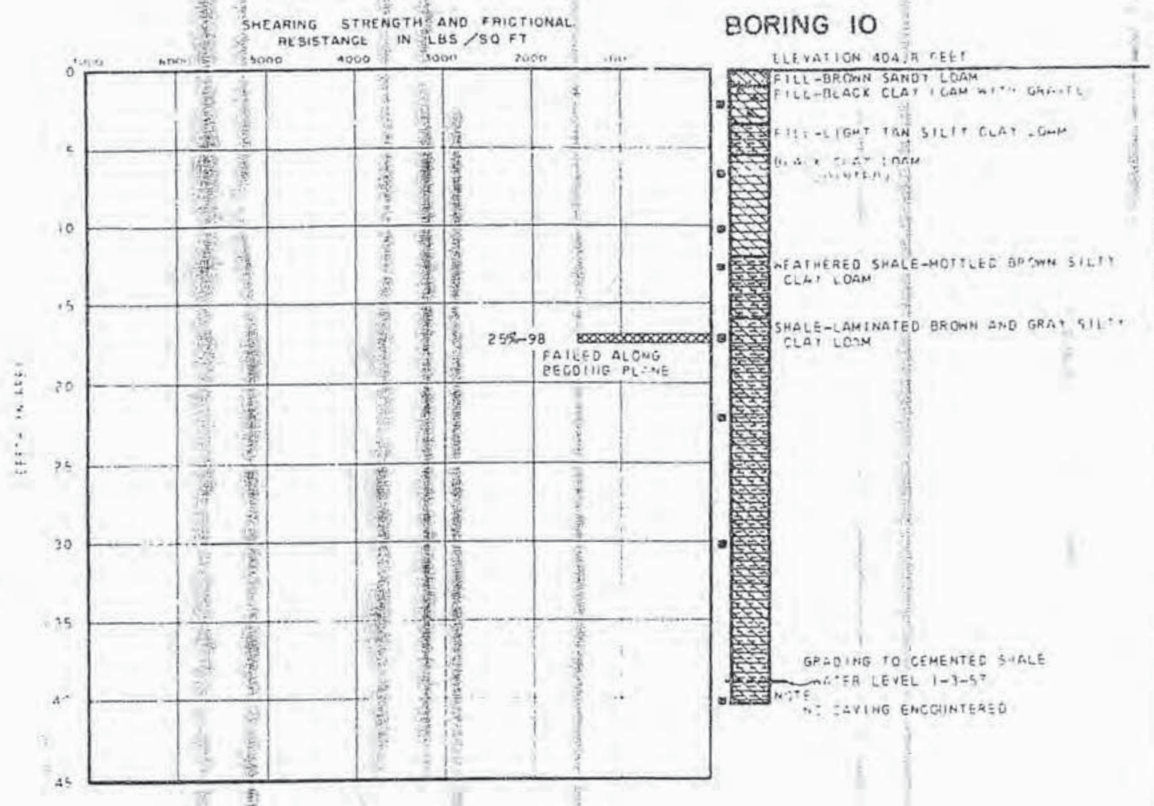
LOG OF BORINGS

*ELEVATIONS REFER TO FIRST FLOOR
EXISTING BUILDING ELEVATION 392.0'

DAMES & MOORE

PLATE 2-A

0 2 7 0 1 3 0 0 1 6 5



LOG OF BORINGS

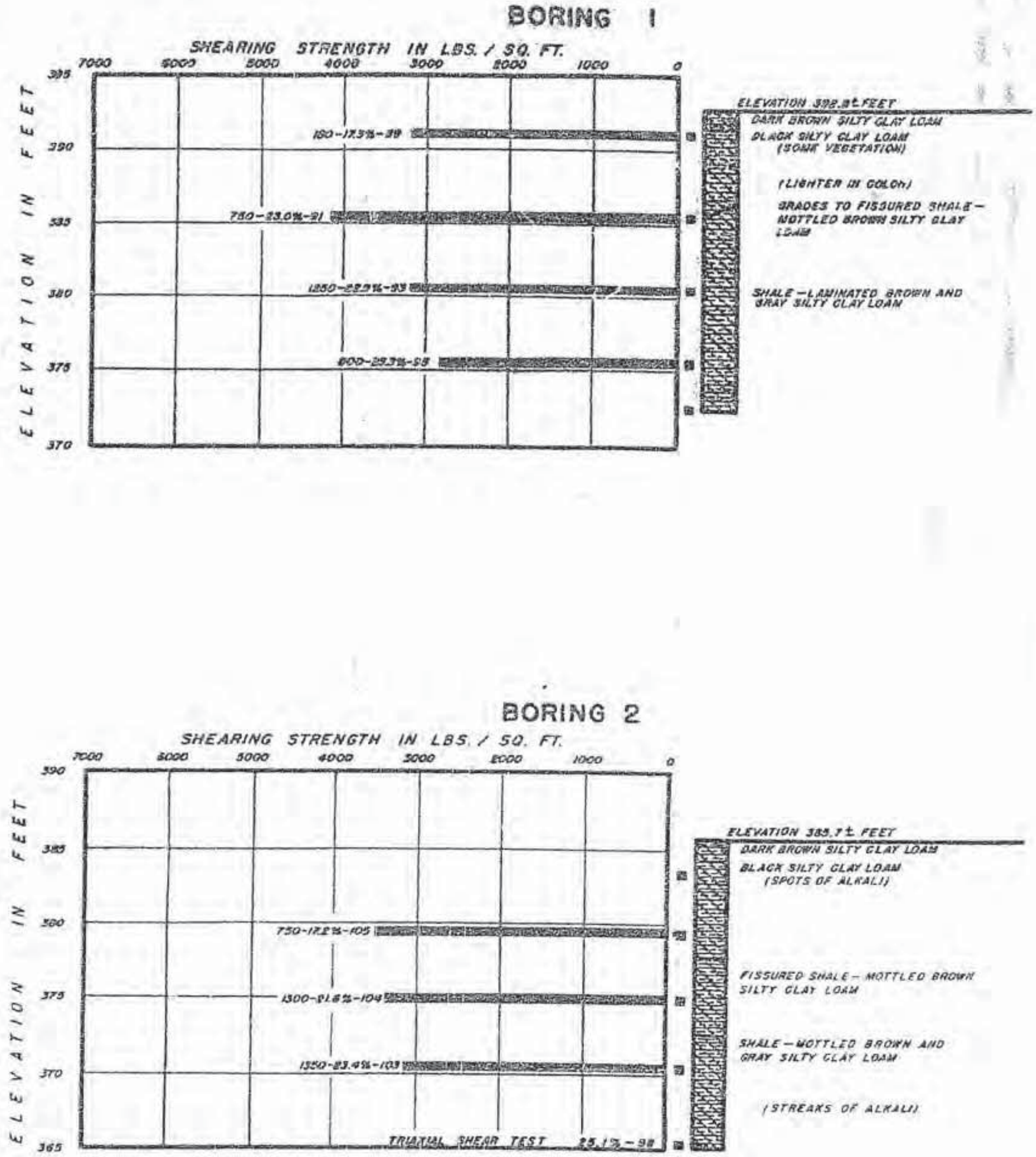
DAMES & MOORE

PLATE 2-B

0 2 7 0 1 3 0 0 1 6 6

C.314.80.01

Figure B-8



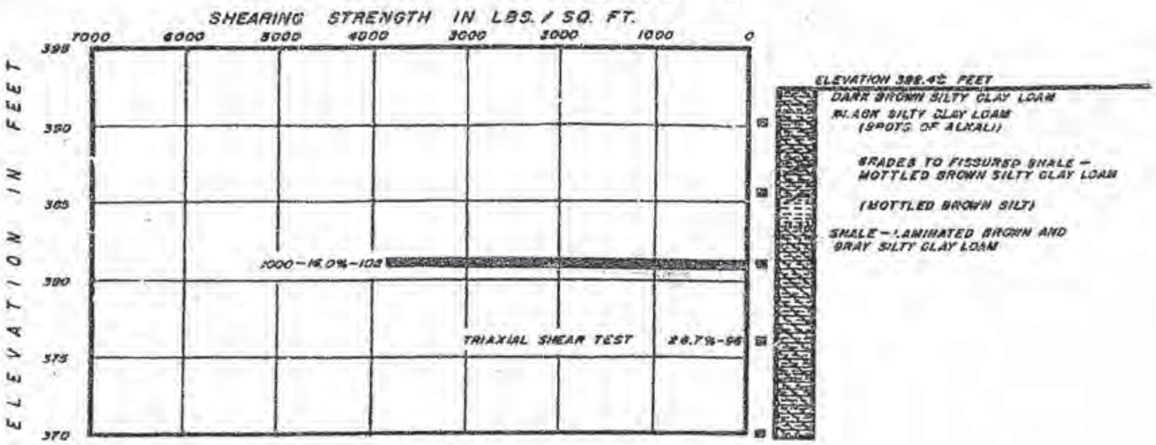
LOG OF BORINGS

NOTE:
THE ELEVATIONS REFER TO THE DATUM OF THE REFERENCE DRAWING (SEE PLOT PLAN).

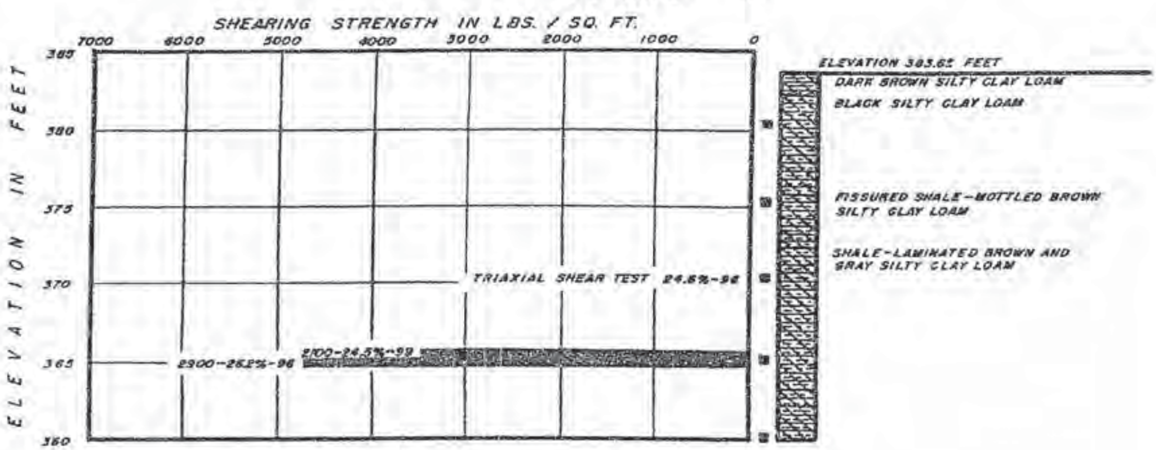
DAMES & MOORE
FOUNDATION ENGINEERS

PLATE A-1A

BORING 3



BORING 4

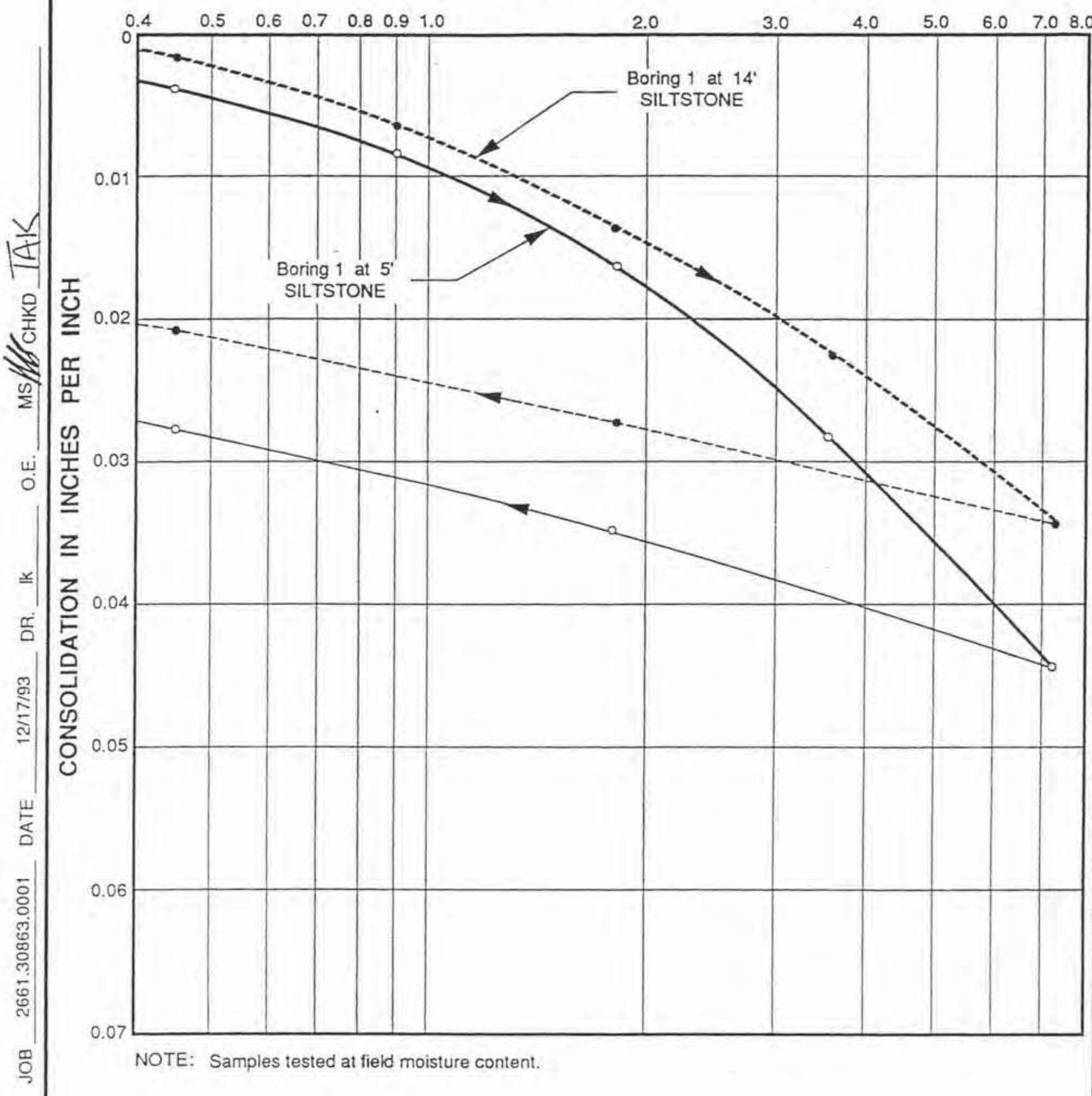


LOG OF BORINGS

DAMES & MOORE
FOUNDATION ENGINEERS

PLATE A-1B

APPENDIX C



CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE A - 4

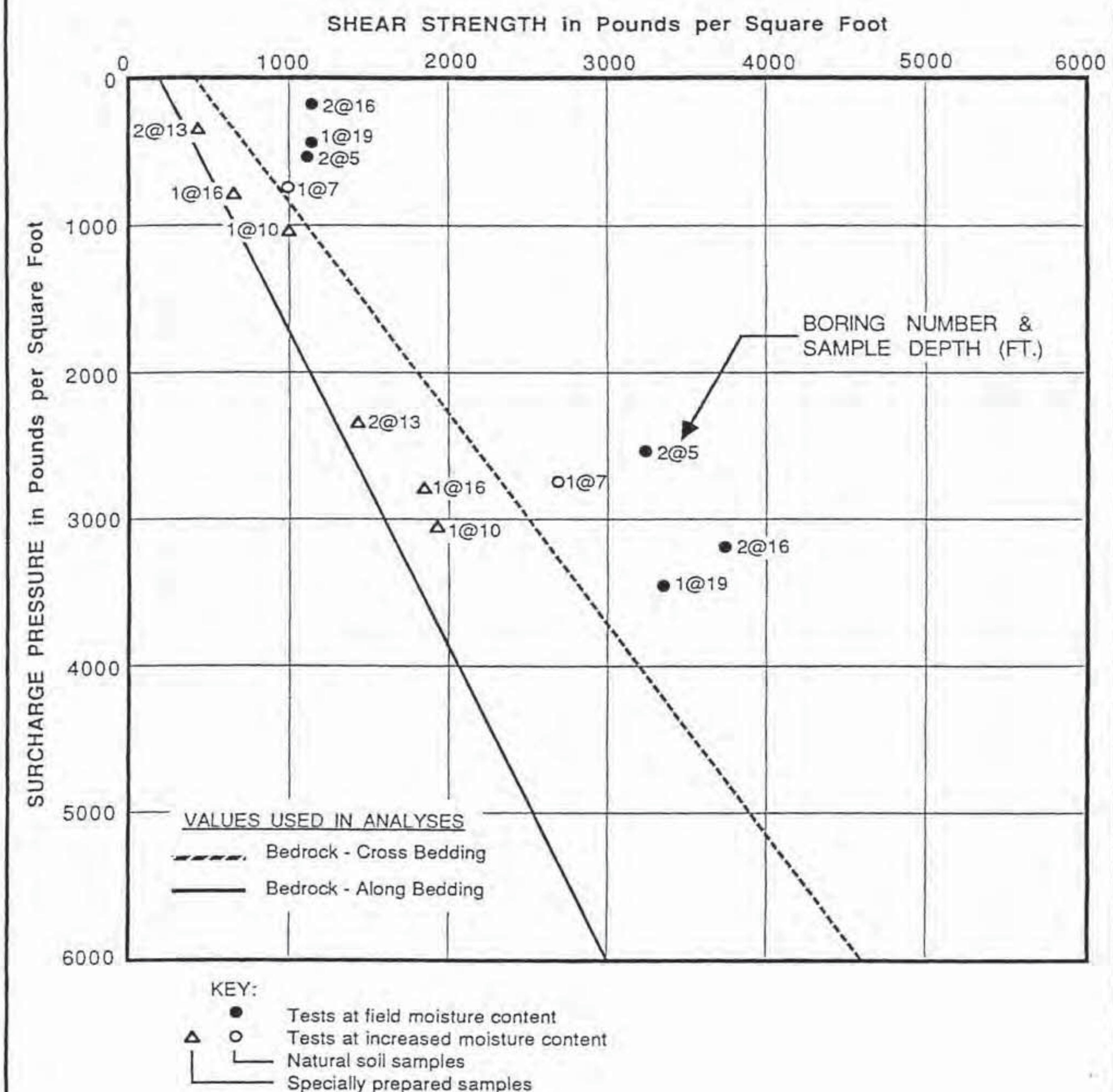
BORING NUMBER AND SAMPLE DEPTH :	4 at 5'
SOIL TYPE :	FILL - SILTY CLAY
CONFINING PRESSURE : (lbs./sq. ft.)	144
INITIAL MOISTURE CONTENT : (% of dry wt.)	15.0
FINAL MOISTURE CONTENT : (% of dry wt.)	35.1
DRY DENSITY : (lbs./cu. ft.)	93
EXPANSION INDEX :	118

TEST METHOD : Uniform Building Code Standard No. 29 - 2, Expansion Index Test

EXPANSION INDEX TEST DATA

LAW/CRANDALL, INC.

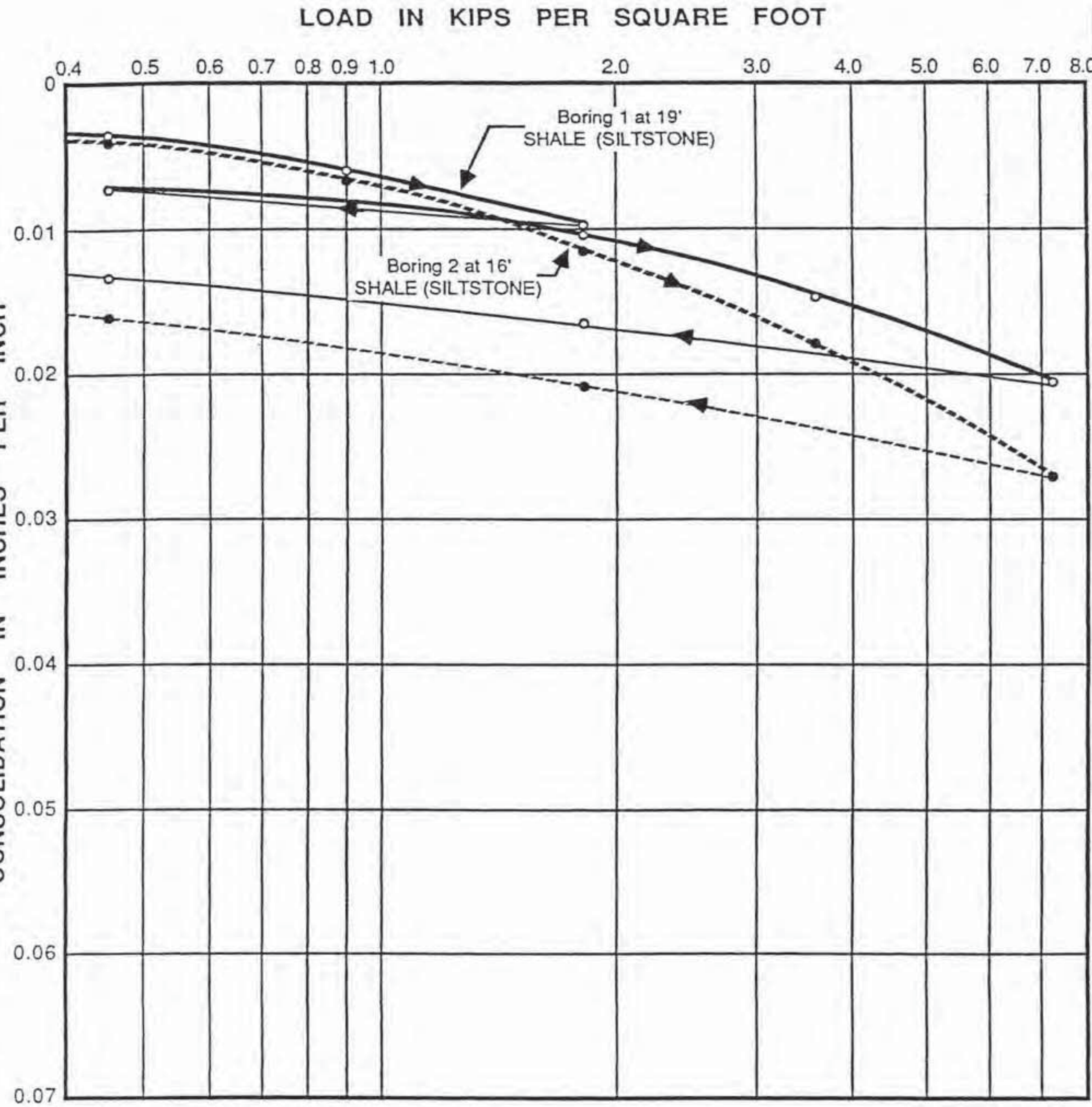
PLATE A - 5



DIRECT SHEAR TEST DATA

LeROY CRANDALL AND ASSOCIATES

PLATE A - 3

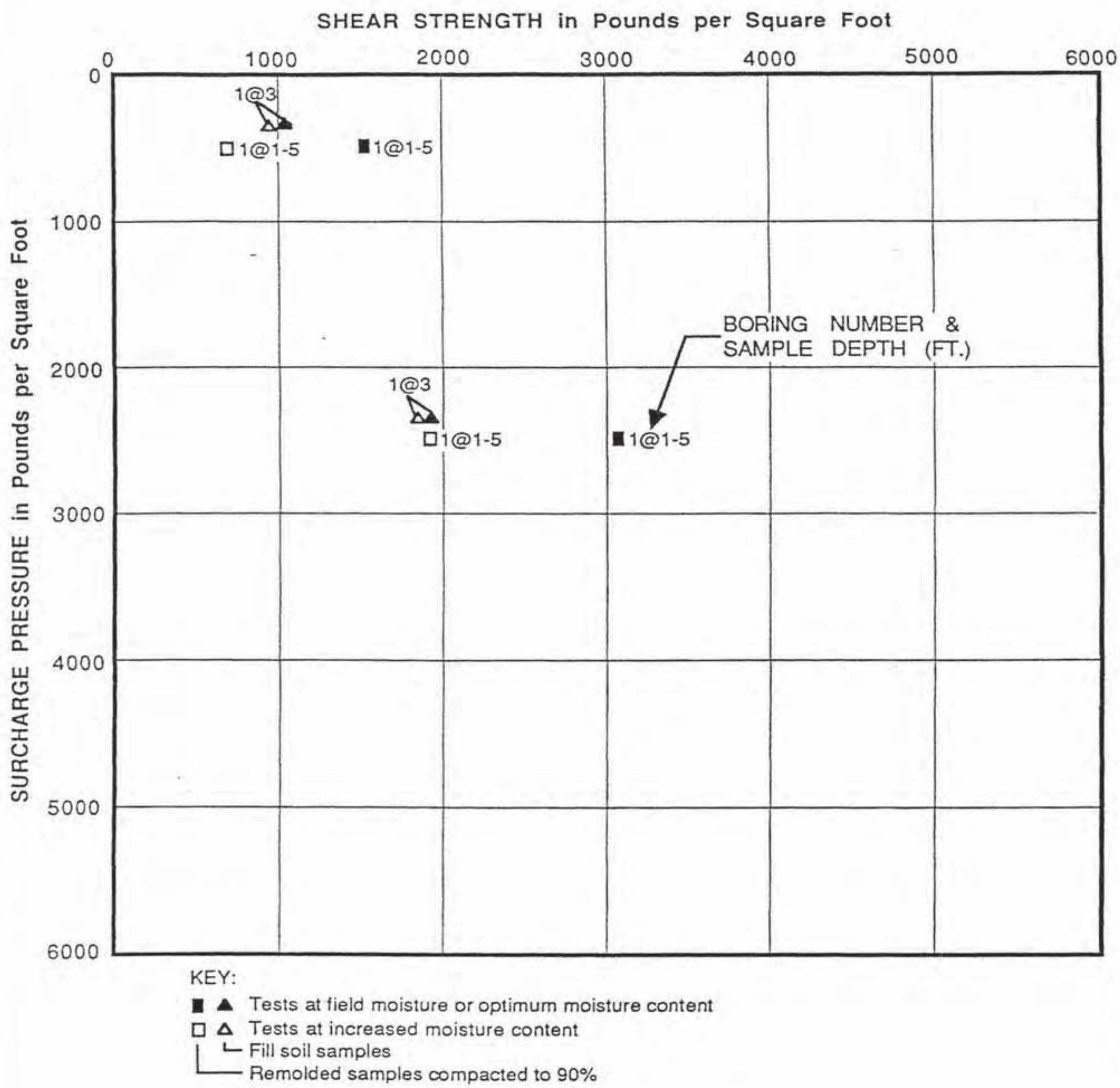


NOTE: Samples tested at field moisture content.

CONSOLIDATION TEST DATA

LeROY CRANDALL AND ASSOCIATES

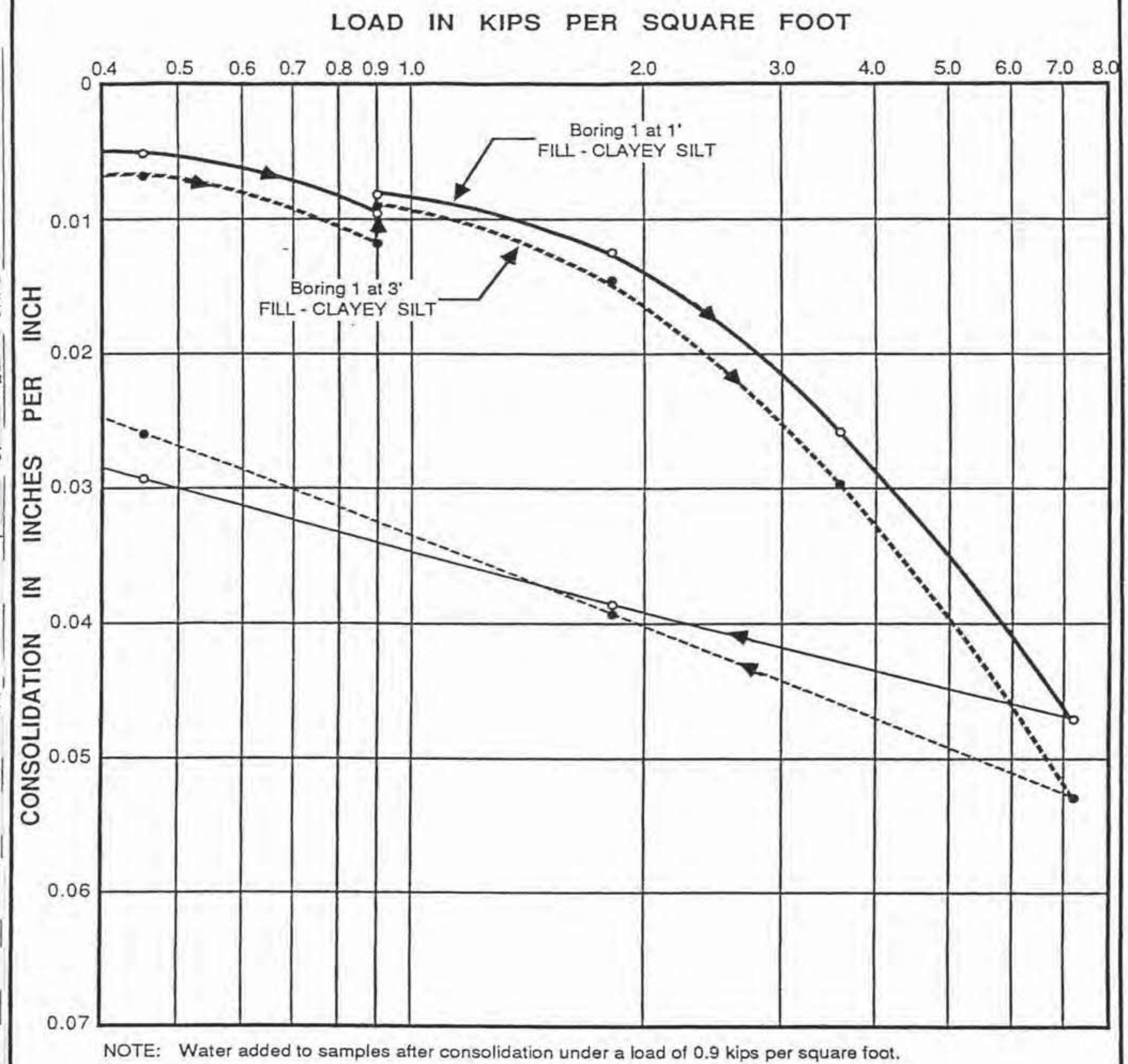
PLATE A - 4



DIRECT SHEAR TEST DATA

LeROY CRANDALL AND ASSOCIATES

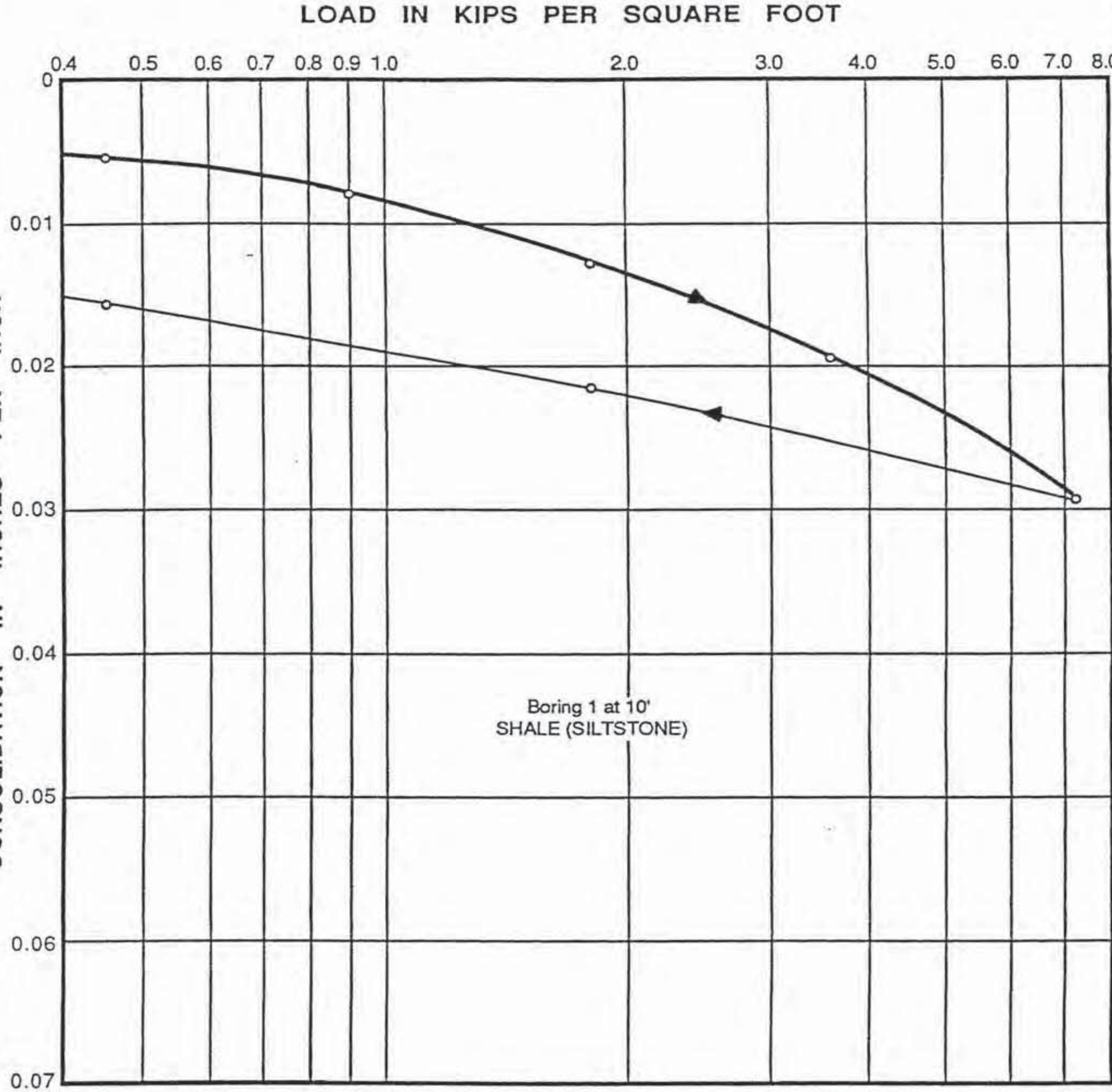
PLATE 4



CONSOLIDATION TEST DATA

LeROY CRANDALL AND ASSOCIATES

PLATE 5.1



NOTE: Sample tested at field moisture content.

CONSOLIDATION TEST DATA

LeROY CRANDALL AND ASSOCIATES
PLATE 5.2

BORING NUMBER AND SAMPLE DEPTH :	1 at 1' to 5'
SOIL TYPE :	FILL - CLAYEY SILT
MAXIMUM DRY DENSITY : (lbs./cu. ft.)	112
OPTIMUM MOISTURE CONTENT : (% of dry)	16

TEST METHOD: ASTM Designation D1557 - 78

COMPACTION TEST DATA

LeROY CRANDALL AND ASSOCIATES

PLATE 6

M.J. SCHIFF & ASSOCIATES, INC.

Consulting Corrosion Engineers - Since 1959
1308 Monte Vista Avenue, Suite 6
Upland, CA 91786

Phone: (909)931-1360 / Fax: (909)931-1361
E-mail: mjsa@mjs-a.com
http://www.mjs-a.com

February 28, 2000

GEOMATRIX CONSULTANTS, INC.
330 West By Street, Suite 140
Costa Mesa CA 92627

Attention: Mr. Howard Barlow

Re: Soil Corrosivity Study
Rebuild Kaiser LAMC Hospital
Los Angeles, California
MJS&A #00-0088HQ

INTRODUCTION

This report is based on laboratory tests on three soil samples from the three current borings and existing soil corrosivity data from ten soil samples from the referenced project at the northwest corner of Sunset Boulevard and Vermont Avenue. The purpose of these tests was to determine if the soils may have deleterious effects on underground utility piping, hydraulic elevator cylinders, and concrete basements and foundations.

The scope of this study is limited to a determination of soil corrosivity and general corrosion control recommendations for materials likely to be used for construction. If the architects and/or engineers desire more specific information, designs, specifications, or review of design, we will be happy to work with them as a separate phase of this project.

TEST PROCEDURES

The electrical resistivity of each sample was measured in a soil box per ASTM G57 in its as-received condition and again after saturation with distilled water. Resistivities are at about their lowest value when the soil is saturated. The pH of the saturated samples was measured. A 5:1 water:soil extract from each sample was chemically analyzed for the major soluble salts commonly found in soils. The water extracts from the current three samples were also analyzed for ammonium and nitrate. Test results are shown on Table 1 for our jobs numbered 00-0088HQ, 91169, and 88134.

SOIL CORROSIVITY

A major factor in determining soil corrosivity is electrical resistivity. The electrical resistivity of a soil is a measure of its resistance to the flow of electrical current. Corrosion of buried metal is an electrochemical process in which the amount of metal loss due to corrosion is directly proportional to the flow of electrical current (DC) from the metal into the soil. Corrosion currents, following Ohm's Law, are inversely proportional to soil resistivity. Lower electrical resistivities result from higher moisture and chemical contents and indicate corrosive soil.

A correlation between electrical resistivity and corrosivity toward ferrous metals is:

Soil Resistivity in ohm-centimeters			Corrosivity Category
over		10,000	mildly corrosive
2,000	to	10,000	moderately corrosive
1,000	to	2,000	corrosive
below		1,000	severely corrosive

Other soil characteristics that may influence corrosivity towards metals are pH, chemical content, soil types, aeration, anaerobic conditions, and site drainage.

Electrical resistivities were in moderately through severely corrosive categories with as-received moisture. When saturated, one resistivity was in the corrosive category and the other twelve were in the severely corrosive category.

Soil pH values varied from 7.2 to 7.7. This range is neutral to mildly alkaline and does not particularly increase soil corrosivity.

The soluble salt content was very high in the samples from Job No. 00-0088 borings 1 and 3, high in the samples from Job No. 88134 borings 2, 3, and 6, and less in the others. Calcium sulfate was the predominant compound. The highest sulfate concentrations were in a range where sulfate resistant cement is advisable.

Ammonium and nitrate were detected but in low concentrations.

Tests were not made for sulfide and negative oxidation-reduction (redox) potential because these samples did not exhibit characteristics typically associated with these conditions.

This soil is classified as severely corrosive to ferrous metals and deleterious to concrete.

CORROSION CONTROL

The life of buried materials depends on thickness, strength, loads, construction details, soil moisture, etc., in addition to soil corrosivity, and is, therefore, difficult to predict. Of more practical value are corrosion control methods that will increase the life of materials that would be subject to significant corrosion.

Steel Pipe

Abrasive blast underground steel piping and apply a dielectric coating such as polyurethane, extruded polyethylene, a tape coating system, hot applied coal tar enamel, or fusion bonded epoxy intended for underground use.

Bond underground steel pipe with rubber gasketed, mechanical, grooved end, or other nonconductive type joints for electrical continuity. Electrical continuity is necessary for corrosion monitoring and cathodic protection.

Electrically insulate each buried steel pipeline from dissimilar metals, dissimilar coatings (cement-mortar vs. dielectric), and above ground steel pipe to prevent dissimilar metal corrosion cells and to facilitate the application of cathodic protection.

Apply cathodic protection to steel piping as per NACE International RP-0169-96.

Hydraulic Elevator

Coat hydraulic elevator cylinders as described above. Electrically insulate each cylinder from building metals by installing dielectric material between the piston platen and car, insulating the bolts, and installing an insulated joint in the oil line. Apply cathodic protection to hydraulic cylinders as per NACE International RP-0169-96. As an alternative to electrical insulation and cathodic protection, place each cylinder in a plastic casing with a plastic watertight seal at the bottom.

The elevator oil line should be placed above ground if possible but, if underground, should be protected as described above for steel utilities.

Iron Pipe

Encase ductile iron water piping in 8 mil thick low-density polyethylene or 4 mil thick high-density, cross-laminated polyethylene plastic tubes or wraps per AWWA Standard C105 or coat with a polyurethane intended for underground use. Bond all nonconductive type joints for electrical continuity. Electrically insulate underground iron pipe from dissimilar metals and from above ground iron pipe with insulated joints.

Encase cast iron drain lines in 8 mil thick low-density polyethylene or 4 mil thick high-density, cross-laminated polyethylene plastic tubes or wraps per AWWA Standard C105. Electrically insulate underground iron pipe from dissimilar metals and from above ground iron pipe with insulated joints.

Copper Tube

Bare copper tubing for cold water should be bedded and backfilled in sand at least 2 inches thick surrounding the tubing. Hot water tubing may be subject to a higher corrosion rate. Hot copper can be protected by applying cathodic protection or preventing soil contact. Soil contact may be prevented by placing the tubing above ground or inside a plastic pipe. The amount of cathodic protection current needed can be minimized by coating the tubing.

Plastic and Vitrified Clay Pipe

No special precautions are required for plastic and vitrified clay piping placed underground from a corrosion viewpoint. Protect any iron fittings with a double polyethylene wrap per AWWA C105. Protect any iron valves with a dielectric coating such as epoxy, polyurethane, or wax tape intended for underground use.

All Pipe

On all pipe, coat bare steel appurtenances such as bolts, joint harnesses, or flexible couplings with a coal tar or elastomer based mastic, coal tar epoxy, moldable sealant, wax tape, or equivalent after assembly.

Where metallic pipelines penetrate concrete structures such as building floors, vault walls, and thrust blocks use plastic sleeves, rubber seals, or other dielectric material to prevent pipe contact with the concrete and reinforcing steel.

Concrete

Protect concrete structures and pipe from sulfate attack in soil with a severe sulfate concentration, 0.2 to 2.0 percent, such as the soil represented by Job No. 00-0088 borings 1 and 3. Use Type V cement, a maximum water/cement ratio of 0.45, and minimum strength of 4500 psi per applicable code, such as 1997 Uniform Building Code (UBC) Table 19-A-4 or American Concrete Institute (ACI-318) Table 4.3.1.

Protect other concrete structures and pipe from sulfate attack in soil with a moderate sulfate concentration, 0.1 to 0.2 percent. Use Type II cement, a maximum water/cement ratio of 0.50, and minimum strength of 4000 psi per applicable code, such as 1997 Uniform Building Code (UBC) Table 19-A-4 or American Concrete Institute (ACI-318) Table 4.3.1.

Standard concrete cover over reinforcing steel may be used for concrete structures and pipe in contact with these soils. Use 2 inches minimum cover over embedded steel at the edges of concrete slabs and footings above grade as well as below.

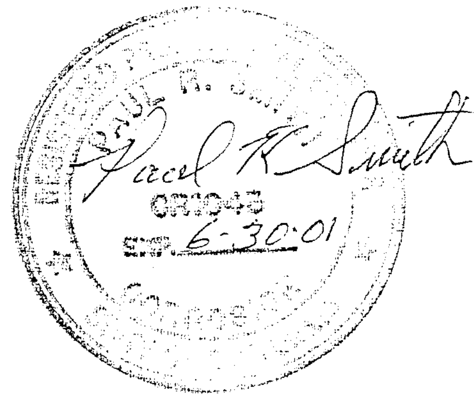
Our services have been performed with the usual thoroughness and competence of the engineering profession. No other warranty or representation, either expressed or implied, is included or intended.

Please call if you have any questions.

Respectfully Submitted,
M.J. SCHIFF & ASSOCIATES, INC.

Paul R Smith

Paul R. Smith, P.E.



Enc: Job #00-0088HQ Table 1
Job #91169 Table 1
Job #88134 Table 1

job folders\jobs-00\00-0088hq

13__ Monte Vista Avenue, Suite 6
Upland, CA 91786-8224
Phone: 909/931-1360

Table 1 - Laboratory Tests on Soil Samples

Kaiser LAMC Hospital, Los Angeles, CA
Your #005931.000.0, MJS&A #00-0088HQ
21-Feb-00

Sample ID			B-1 @ 25-30'	B-2 @ 10'	B-3 @ 1-5'
Resistivity		**Units**			
as-received		ohm-cm	740	3,400	4,500
saturated		ohm-cm	570	1,400	800
pH			7.2	7.5	7.4
Electrical Conductivity		mS/cm	3.25	0.22	2.70
Chemical Analyses					
Cations					
calcium	Ca^{2+}	mg/kg	4,269	72	3,623
magnesium	Mg^{2+}	mg/kg	411	12	27
sodium	Na^{1+}	mg/kg	92	134	ND
Anions					
carbonate	CO_3^{2-}	mg/kg	ND	ND	ND
bicarbonate	HCO_3^{1-}	mg/kg	140	506	278
chloride	Cl^{1-}	mg/kg	89	14	50
sulfate	SO_4^{2-}	mg/kg	11,815	84	8,280
Other Tests					
ammonium	NH_4^{1+}	mg/kg	8.0	2.3	6.6
nitrate	NO_3^{1-}	mg/kg	7.8	4.0	1.6
sulfide	S^{2-}	qual	na	na	na
Redox		mv	na	na	na

Electrical conductivity in millisiemens/cm and chemical analysis were made on a 1:5 soil-to-water extract.
mg/kg = milligrams per kilogram (parts per million) of dry soil.
Redox = oxidation-reduction potential in millivolts
ND = not detected
na = not analyzed

APPENDIX D

Engineering Geologic Report

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GEOTECHNICAL CONSULTANTS

REVISED ENGINEERING GEOLOGIC REPORT
FOR
PROPOSED MEDICAL OFFICE BUILDING
1526 N. EDGEMONT STREET
LOS ANGELES, CA

for

Geobase, Inc.
13362 Peralta Drive
Laguna Hills, CA92653

January 25, 2017

16-D91-01

RMA Group
Every *Project* **Matters** | www.rmacompanies.com

GEOTECHNICAL CONSULTANTS

January 25, 2017

Geobase, Inc.
13362 Peralta Drive
Laguna Hills, CA 92653

Attention: Mr. John Chevallier

Subject: Revised Engineering Geologic Report
Proposed Medical Office Building
1526 N. Edgemont Street
Los Angeles, CA

Dear Mr. Chevallier:

In accordance with your request, an engineering geologic report has been completed for the above-referenced project. The purpose of the report is to provide engineering geologic information for inclusion in a geotechnical report being prepared by Geobase, Inc. for the subject project.

We appreciate this opportunity to be of continued service to you. If you have any questions regarding this report, please do not hesitate to contact us at your convenience.

Respectfully submitted,

RMA Group

PROFESSIONAL GEOLOGIST
GARY W. WALLACE
No. 1255
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

Gary Wallace, PG | CEG
Vice President - Geology
CEG 1255

TABLE OF CONTENTS

1.00 INTRODUCTION

1.01 Purpose and Proposed Usage

This report has been prepared to provide engineering geologic information relative to a medical office building proposed at 1526 N. Edgemont Street in Los Angeles, California. According to Perkins and Will, the proposed structure will consist of 5 above ground levels and a basement.

We understand that pertinent information from this report will be incorporated into at geotechnical investigation report being prepared for the project by Geobase, Inc.

1.02 Scope of the Investigation

The general scope of this investigation included the following:

- Review of published and unpublished geologic, seismic, groundwater and geotechnical literature (Appendix B).
- Examination of aerial photographs.
- Field reconnaissance.
- Preparation of this report presenting our findings, conclusions and recommendations.

Our scope of work did not include any subsurface investigation.

1.03 Site Location and Description

The proposed medical office building will be located at 1526 N. Edgemont Street in the City of Los Angeles, Los Angeles County, California (Figure 1). The approximate geographic position at the center of the site is 34.099° latitude, -118.296° longitude.

The site is currently occupied by an existing seven story building that has a basement with an elevation of about 380 feet above sea level. It is bounded by Edgemont Street to the West, a private road to the north, a paved alley way to the east and a parking lot to the south. Elevations of the adjoining areas range from about 387 to 399 feet above sea level.

There are no slopes within or adjacent to the site. The nearest such slope is located about 175 feet to the northwest.

Vegetation consists landscaping adjacent to the southwest corner of the building that currently occupies the site.

1.04 Past Usage

Aerial photographs indicate that the existing building dates back to the mid-1950s. In the early 1950s the site was a parking lot and the site was vacant in 1948. There was also previously a building at the northeast corner of Sunset Boulevard and Edgemont Street. A portion of that building may have encroached into the proposed building site. A building to the east was formerly attached to the building that currently occupies the site.

1.05 Field Investigation

The field investigation consisted of a visual reconnaissance of the exterior of the property. No subsurface investigation was performed.

It was observed that the site is occupied by multi-story building with some landscaping in the southwest part of the site. There were no exposures of the underlying soils or bedrock.

2.00 FINDINGS

2.01 Geologic Setting

The site is located in the north part of the Los Angeles coastal plain within the Peninsular Ranges geomorphic province. The Los Angeles coastal plain is bounded by the Santa Monica Mountains to the north, the Puente Hills to the east, the Santa Ana Mountains and San Joaquin Hills to the south, and the Palos Verde Hills and Pacific Ocean shoreline to the west. The majority of the Los Angeles coastal plain is an alluvial filled basin that slopes that gently seaward. The sediments within the basin are as much as 30,000 feet thick and rest on granitic and metamorphic basement rocks (Yerkes and others, 1965).

To the northeast of the site a small hill rises above adjacent alluvial deposits. This knoll, known as Olive Hill, is composed of sedimentary bedrock that was classified as Tertiary Age Puente Formation siltstone by Lamar (1970) during his mapping of the Elysian Park – Repetto Hills. His mapping also shows the bedrock is folded into a syncline that generally trends in an east – west direction. Regional geologic mapping by Dibblee (1991) also shows that Olive Hill is underlain by folded sedimentary bedrock and that in the vicinity of the site bedrock dips approximately 9 degrees to the northwest (Figure 1). He classified the bedrock as Tertiary age "Unnamed Shale" which includes Puente formation.

2.02 Prior Geotechnical Reports

Geomatrix (2000) compiled boring logs and laboratory test data from numerous geotechnical investigation that have been performed for an area north of Sunset Boulevard between Edgemont Street and Vermont Avenue, and south of Barnsdall Avenue. In particular, the report includes logs of 10 borings drilled within and near the site by LeRoy Crandall and Associates in 1990 and Dames and Moore in 1951 and 1957. Copies of these logs are presented in Appendix A.

The Geomatrix report also contained logs of borings and a trench that were excavated during their 2000 geotechnical and geologic investigation. A boring located about 125 feet northeast of the proposed medical office building site encountered two faults and a trench was excavated adjacent to the boring to evaluate the recency of movement along the faults. A copy of the boring log, a partial copy of the trench log and written text by Geomatrix regarding the fault is presented in Appendix A. The findings of the Geomatrix study are discussed below in Section 2.05.

The approximate locations of the borings from the LeRoy Crandall and the Dames and Moore studies are shown on Figure 2.

2.03 Site Geology

The site geology is described on the logs of borings drilled during the previous geotechnical investigations performed by Leroy Crandall and Associates and Dames and Moore.

The LeRoy Crandall logs report that a few feet of fill composed of silty sand, silt and clay was encountered over weathered bedrock described as shale and siltstone. Boring depths ranged from 10 to 30 feet. Refusal to drilling occurred at a depth of 10 feet due to hard shale in a boring (B-2) drilled on September 17 of 1990. Slight groundwater seepage occurred at a depth of 20 ½ feet in a boring (B-1) drilled on September 9 of 1990. The logs indicate that bedrock was encountered at depths of approximately 1½ to 3½ feet, which corresponded to elevations of about 386 to 396½ feet above sea level. No structural geologic data was recorded on the LeRoy Crandall logs.

The quality of the Dames and Moore logs is poor and the logs are only partially legible. However, it appears that the borings encountered a few feet of surficial soils composed of silty clay loam, clay loam and sandy loam resting on gray and brown shale described as weathered, fissured and laminated. Boring depths ranged from about 20 to 40 feet. Groundwater was reportedly encountered at a depth of 39 feet in Boring B-10 which was drilled in 1957. In addition, perched groundwater was reported at a depth of about 25 feet in Boring B-8 which was also drilled in 1957. Groundwater was not reported on the logs of other borings drilled within the site. The boring logs indicated that bedrock was encountered a depths of about 2 to 8 feet which corresponded to elevations of approximately 376 to 393 feet above sea level. No structural geologic data was recorded.

A Site Geologic Map showing the locations of the borings is presented as Figure 2. Logs of the borings are contained in Appendix A.

Geomatrix (2000) reported the depth to bedrock for several borings within the site. Using these depths, basement and footing bottom elevations for the existing building as shown on a foundation plan prepared by Clarence Mayhew Architects, and existing ground surface elevations from Google Earth, a geologic cross section was created (Figure 3). The cross section shows bedrock at or near the existing basement level. None of the previous boring logs contain structural geologic data, thus none is shown on the geologic cross section. All the boring logs prepared by Leroy Crandall and Dames and Moore describe encountering siltstone and shale bedrock which is consistent with regional geologic mapping by Lamar and Dibblee. Therefore, we concur with the boring logs that the site is underlain by sedimentary bedrock. It should be noted that as-built maps and reports for the existing building site were not available; therefore the actual depth to bedrock could vary from that which is depicted on our cross section.

2.04 Surface and Groundwater Conditions

No areas of ponding or standing water were present at the time of our study.

Slight groundwater seepage was reported by LeRoy Crandall at a depth of 20½ feet in a boring (B-1) drilled on September 9 of 1990. Dames and Moore reported the presence of groundwater at a depth of 39 feet in Boring B-10 and perched groundwater in Boring B-8 at a depth of 25 feet. Both of these borings were drilled in 1957. No other borings drilled within the site during prior geotechnical investigations reported encountering groundwater. Some borings logged by others between Edgemont Street and Vermont Avenue north for Sunset Boulevard and south of Barnsdall Avenue encountered groundwater at a depth of about 40 feet (Geomatrix, 2000).

Geomatrix (2000) encountered groundwater within bedrock at a depth of 39 feet in a boring drilled approximately 125 feet east-northeast of the site (see log of Geomatrix Boring B-2 in Appendix A).

According to the California Division of Mines and Geology (1998), the highest historic groundwater level beneath the site has been on the order of 35 feet below the ground surface.

2.05 Faults

The site is not located within the boundaries of an Earthquake Fault Zone for fault-rupture hazard as defined by the Alquist-Priolo Earthquake Fault Zoning Act. The nearest Earthquake Fault Zone is located about 2,300 feet to the northwest along the Hollywood fault (Figure 4). In addition, the site is not located in the City of Los Angeles Fault Hazard Zone. The nearest such zone is located about ¼ of a mile to the northwest (Figure 5).

Weber (1980) postulated that Olive Hill is bounded by two northeast-southwest trending concealed (buried) faults. He mapped one of the faults approximately 600 feet northwest of site at its nearest point. He mapped the other fault approximately 500 feet southeast of the site. These postulated faults are not shown on regional geologic maps of the Hollywood Quadrangle prepared by Lamar (1970) or Dibblee (Figure 1).

Faults within the Hollywood Quadrangle were evaluated by the California Division of Mines and Geology in 1977 as part of its 10-year state wide fault evaluation program which was performed in response to passage of the Alquist-Priolo Act of 1972. A fault evaluation report prepared by Smith (1997) for the Hollywood Quadrangle did not recommend including Weber's postulated Olive Hill faults within a Special Studies Zone (now know as Earthquake Fault Zones). Faults within the Hollywood Quadrangle were re-evaluation in 2014 by the California Geological Survey. A new fault evaluation report also did not recommend including the faults postulated by Weber in an Earthquake Fault Zone (Hernandez and Trieman, 2014). The postulated faults are not included within an Earthquake Fault Zone on the latest map of Earthquake Zones of Required Investigation map or the Hollywood Quadrangle (Figure 4).

LeRoy Crandall encountered 3 northwest-southeast trending faults within Puente formation bedrock in a boring drilled approximately 900 feet east of the site. Those faults do not project toward the site.

Geomatrix (2000) encountered two northeast-southwest trending bedrock faults in a boring (B-2) located about 125 feet northeast of the site. The faults, which project toward the site, were encountered at depths of 7 and 24 feet (see Figure 2 and the boring log in Appendix A). To evaluate the recency of movement along these faults, Geomatrix excavated a trench perpendicular to the faults approximately 160 feet to the northeast of the site. The trench reportedly exposed surficial fill, approximately 3 to 4 feet of native soils, weathered siltstone bedrock and a zone of vertical faults trending N40˚E to N70˚E. The faults were observed to offset the bedrock no more than 6 inches and they reported the overlying native soils, which they judged to be late Pleistocene in age, were not offset. Geomatrix concluded that the faults do not pose a fault-rupture hazard due to the minimal amount of offset within the bedrock and the absence of faulting within the overlying Pleistocene age native soils. The entire text of the Geomatrix fault investigation and a partial copy of their trench log are presented in Appendix A.

Active faults in the vicinity of the site which are significant in terms of generating earthquake ground shaking include the Santa Monica-Hollywood-Raymond fault zone, the Upper Elysian Blind Thrust, the Puente Hills Blind Thrust and the Verdugo fault zone which are all located within about 5 miles of the site. The distance these faults and other notable faults within 50 miles of the site are presented on Table 1. The accompanying Regional Fault Map (Figure 5) illustrates the location of the site with respect to these other major faults in the region.

2.06 Historic Seismicity

The nearest large historic earthquake in the vicinity of the site was the magnitude 6.0 Whittier Narrows earthquake of 1987. That event was epicentered approximately 13 miles from the site. Additionally, the 1971 San Fernando, 1991 Sierra Madre and 1994 Northridge earthquakes were all epicentered within 25 miles of the site. The magnitudes of these earthquakes ranged from 5.8 to 6.7. These events and other notable earthquakes that have occurred in the region are summarized in the Table 2.

Our research of regional geologic and seismic data did not reveal any known instances of ground failure within the site associated with regional seismic activity.

2.07 Landslides

Regional geologic maps of Lamar and Dibblee do not show any pre-existing landslides within the site. In addition, there are no slopes within about 175 feet of the site.

3.00 CONCLUSIONS AND RECOMMENDATIONS

3.01 General Conclusion

Based on specific data and information contained in this report and our understanding of the project, it is our professional judgment that the proposed development is geologically feasible. This is provided that the recommendations presented herein and in geotechnical reports prepared for the project by Geobase are fully implemented during design, grading and construction.

Based on the prior boring logs prepared by LeRoy Crandall and Associates and Dames and Moore, it appears that bedrock is present at or near existing and proposed foundation grades.

3.02 Faulting and Secondary Earthquake Hazards

Since the site is not located within the boundaries of an Earthquake Fault Zone and no active faults are known to pass through the property, we conclude that future surface fault rupture within the site is unlikely to occur.

From a geologic perspective, it is our opinion that liquefaction at the site is unlikely to occur due to the presence of bedrock at or near the proposed foundation grade. Since that are no slopes within or near the site, we conclude that seismically induced landsliding is unlikely to occur within the site. According to the California Geological Survey Earthquake Zones of Required Investigation Map for the Hollywood Quadrangle (2014), the site in not within a potential liquefaction or seismically induced landslide hazard zones (Figure 4). Seismically induced settlement appears unlikely to occur at the site due to the shallow depth to bedrock and the anticipated compaction of any fill soils; however, we defer that analysis to the geotechnical engineer.

It is our understanding the seismic design parameters will be developed by Geobase.

3.03 Landslides

Based on gathered during this study from multiple sources and the distance to existing slopes, it is our opinion that the site is not impacted by landsliding. The geologic structure of the underlying bedrock should be considered in the design and excavation of any permanent or temporary cuts within the site.

3.04 Geotechnical Design Recommendations

We understand that geotechnical design recommendations for the project will be developed by Geobase. Design and construction of the proposed medical office building should be in accordance with City of Los Angeles requirements and recommendations of Geobase. Design of any shoring needed to construct the project should be performed by Geobase and/or a qualified specialty contractor and should consider surcharge loading and the geologic structure of the underlying bedrock, which might need to be determined at a later date. Geotechnical observation and testing during earthwork and foundation construction should be performed by Geobase in accordance with City of Los Angeles requirements.

4.00 CLOSURE

The findings, conclusions and recommendations in this report were prepared in accordance with generally accepted engineering geologic principles and practices. No other warranty, either expressed or implied, is made. This report has been prepared for Geobase, Inc. for their use in geotechnical evaluation of the site. Anyone using this report for any other purpose must draw their own conclusions.

RMA Group should be consulted during plan development and earthwork if any issues require further engineering geologic evaluation. Additional or different conclusions and recommendations may need to be developed at that time.

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FIGURES AND TABLES

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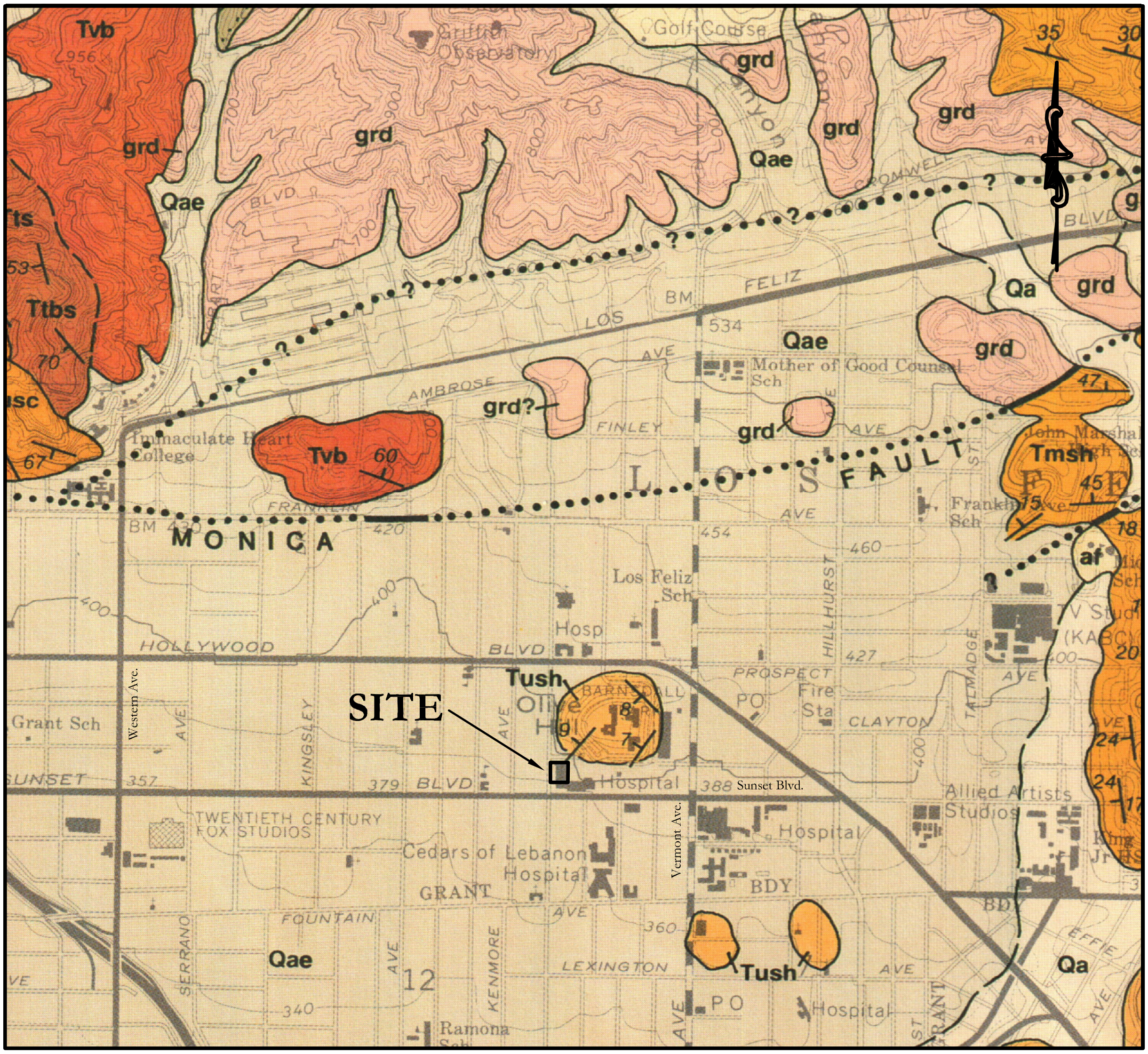

SITE LOCATION AND REGIONAL GEOLOGIC MAP
Scale: 1" = 1,700'

Partial Legend

af - Artificial fill
Qa, Qae - Alluvium
Tush - Unnamed shale includes Puente formation
Tmsh, Ttbs - Sedimentary bedrock
Tvb - Basalt bedrock
grd - Granitic bedrock

Source: Dibblee, 1991

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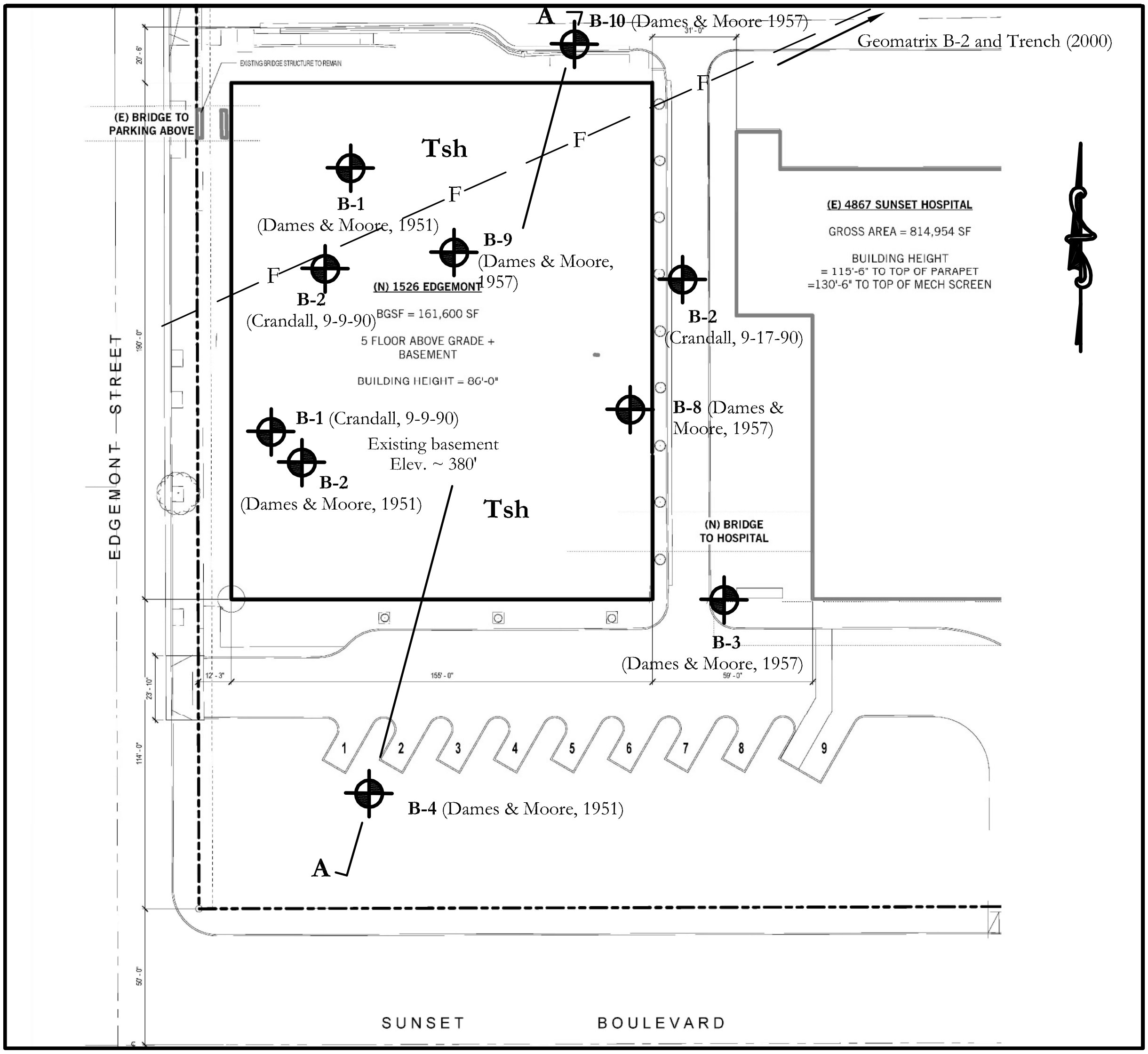


SITE GEOLOGIC MAP

Scale: 1" ≈ 60'

Legend

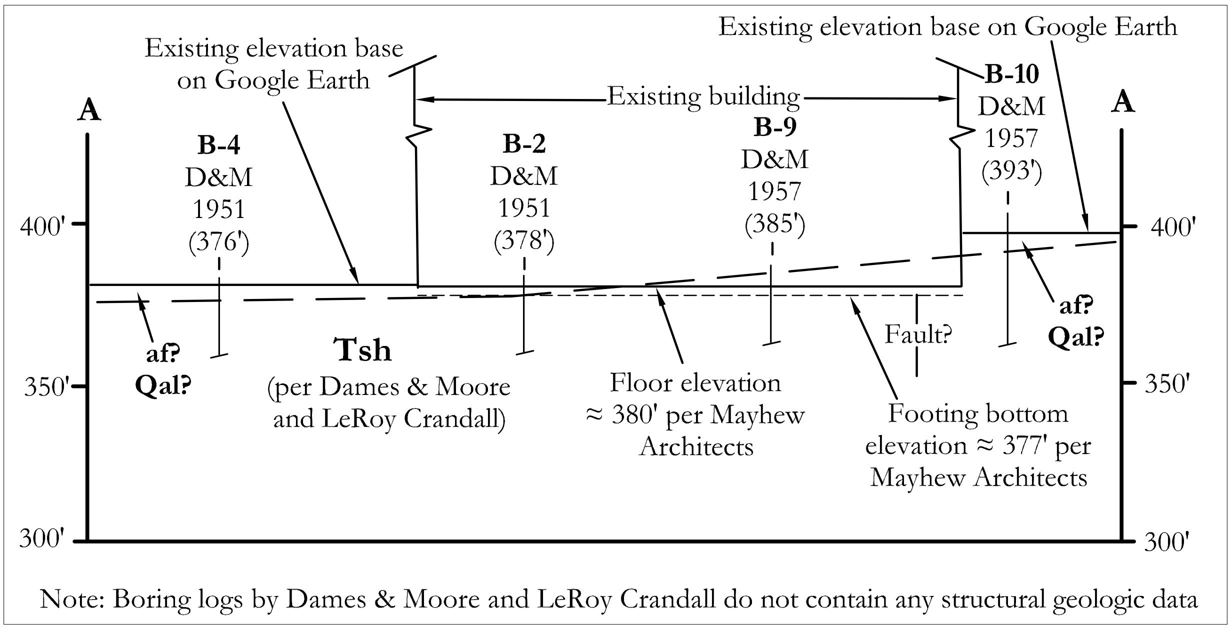
Tsh - Shale bedrock

-Exploratory boring

F - Projected trace of vertical fault based on Geomatrix report (2000)

A A - Geologic cross section

Base map by Perkins and Will



GEOLOGIC CROSS SECTION

Scale: 1" ≈ 60', H=V

Geologic Legend

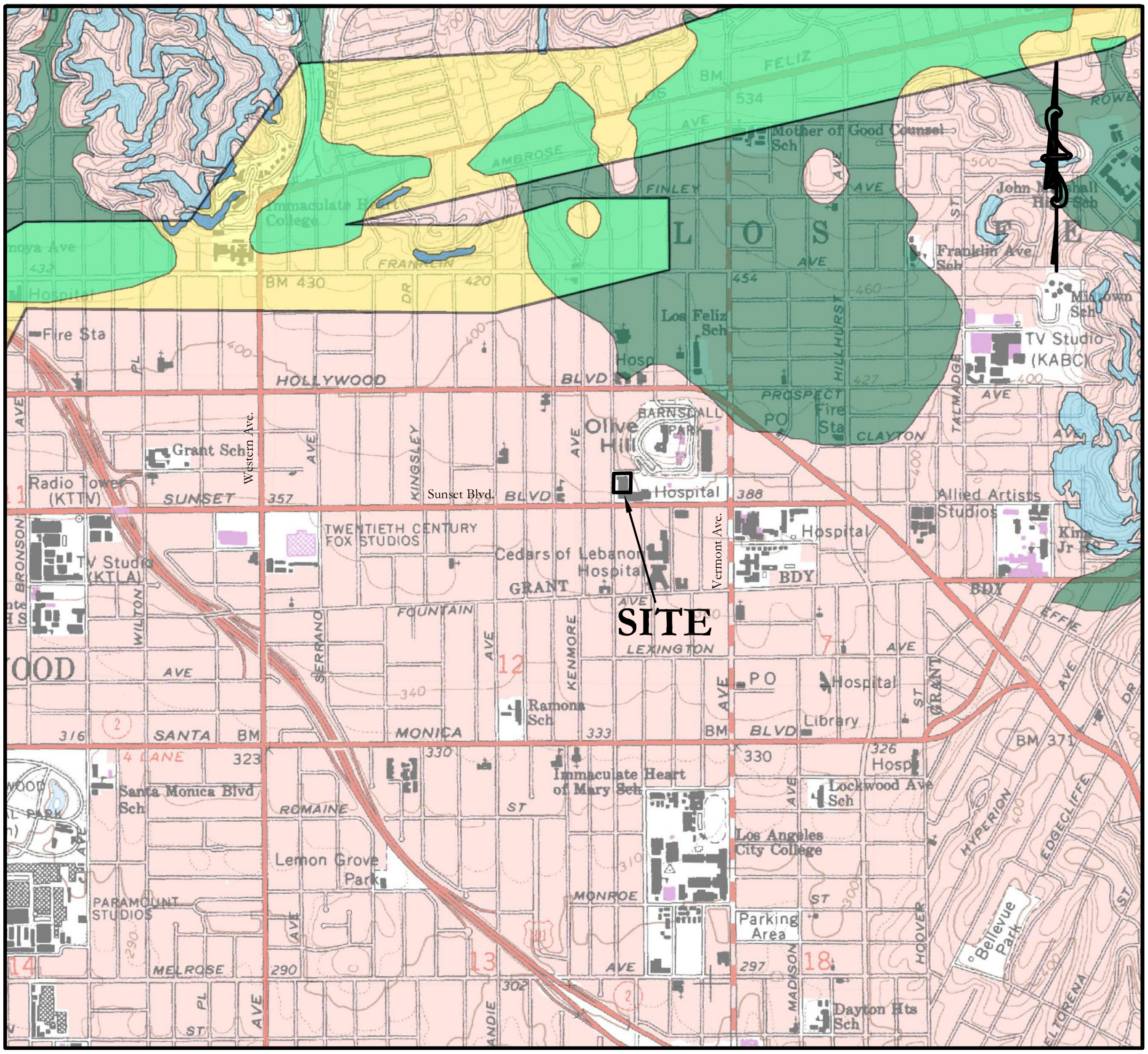
af - Artificial fill

Qal - alluvium

Tsh - Shale bedrock (per Dames & Moore and LeRoy Crandall)

(376') - Top of bedrock elevation per Dames & Moore as reported by Geomatrix (2000)

Base drawing by Perkins and Will



EARTHQUAKE ZONES OF REQUIRED INVESTIGATION MAP

Scale: 1" = 2,100'

Legend

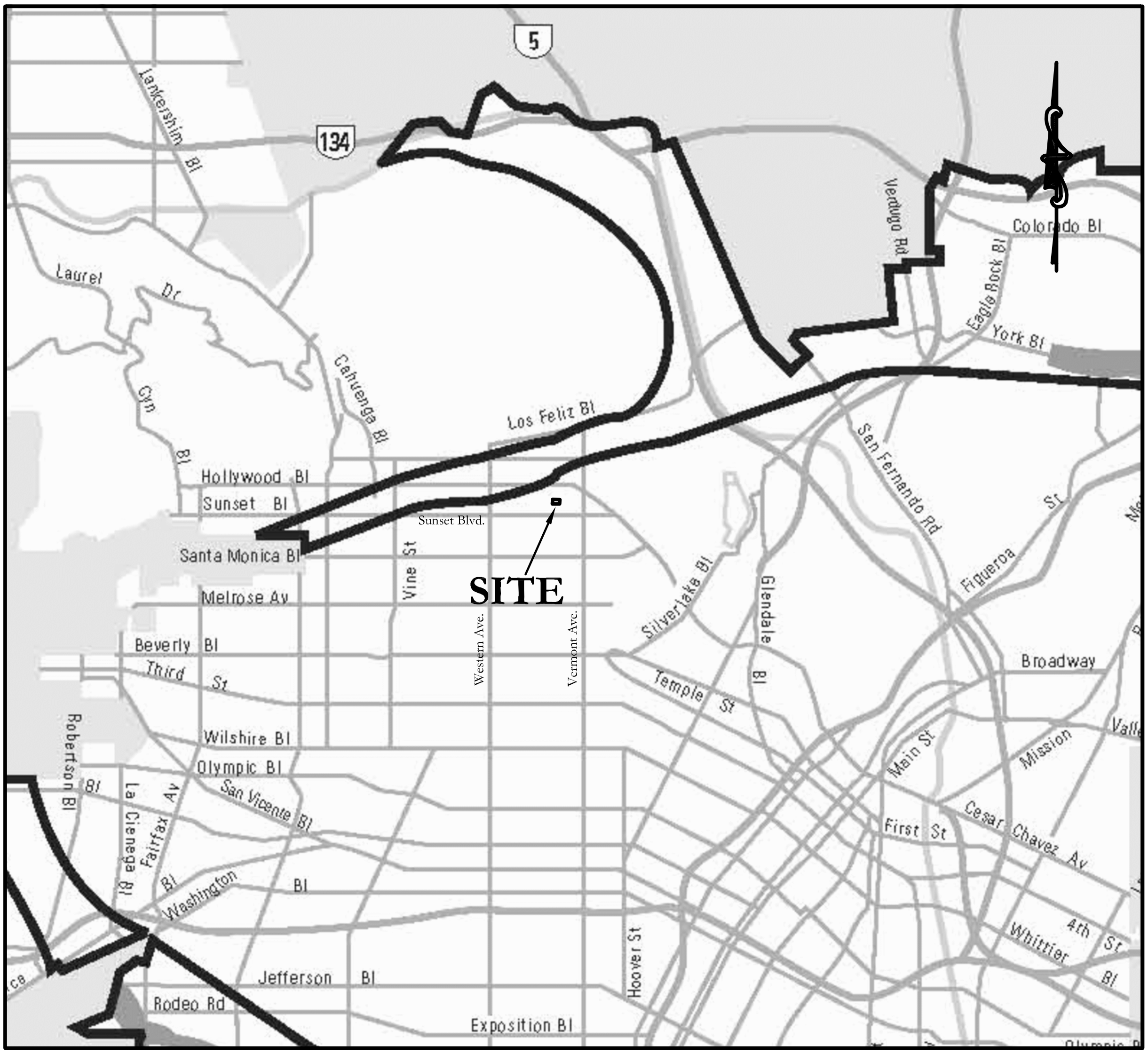
Dark green - Liquefaction Zone

Blue - Earthquake-Induced Landslide Zone

Yellow - Earthquake Fault Zone

Light green - Overlapping Earthquake Fault Zone & Liquefaction Zone

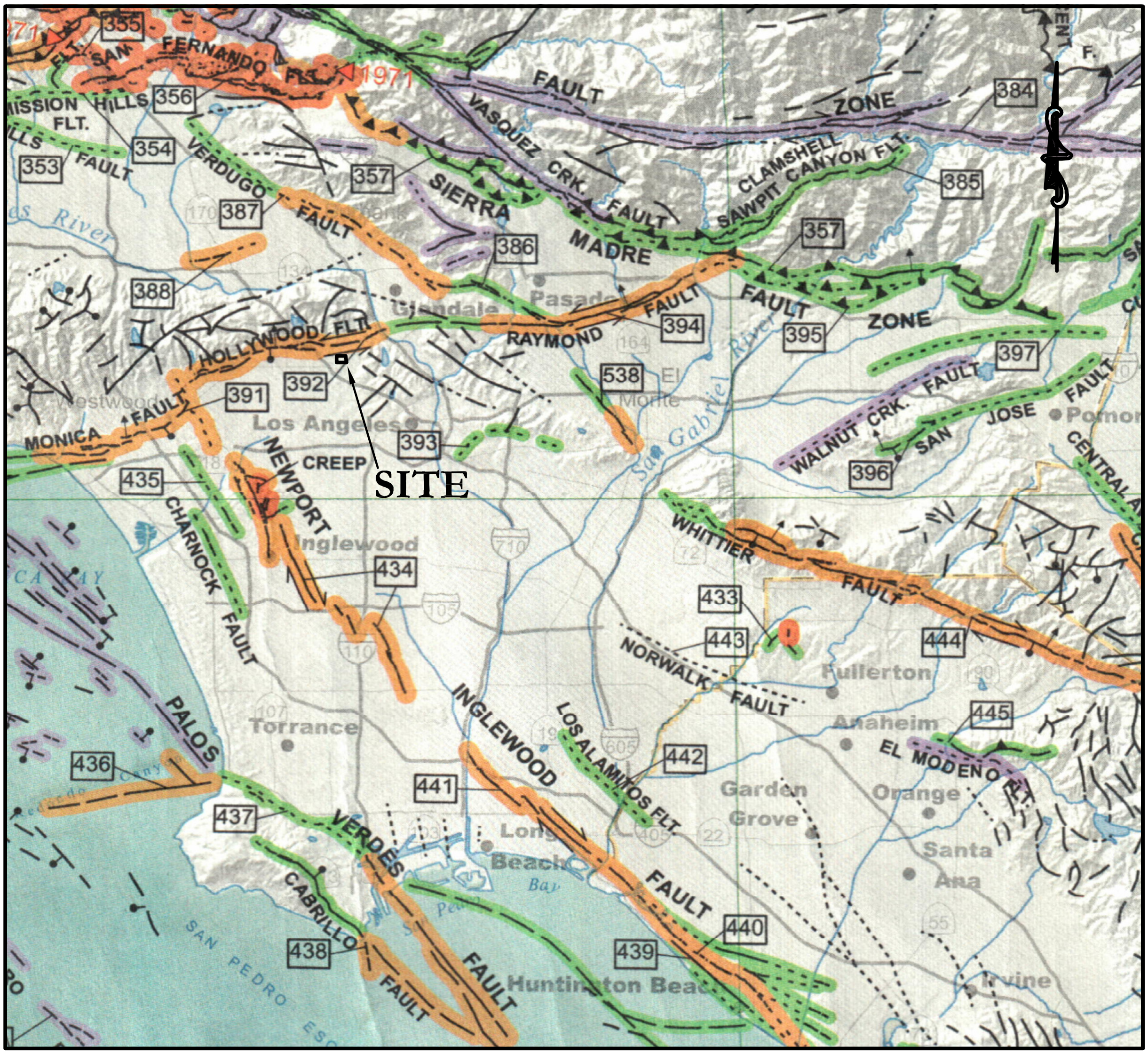
Base Map: California Geological Survey, 2014



CITY OF LOS ANGELES FAULT HAZARD ZONES MAP

Scale: 1" ≈ 2 Miles

Base Map: Safety Element of Los Angeles City General Plan, 1996



REGIONAL FAULT MAP

Scale: 1" ≈ 8.5 miles

Partial Legend

Orange - Holocene fault displacement

Green - Late Quaternary fault displacement

Purple - Quaternary fault

Black - Pre-Quaternary fault

Base Map: California Geological Survey Fault Activity Map of California, 2010

NOTABLE FAULTS WITHIN 50 MILES AND SEISMIC DATA

Fault Zone & geometry	Distance (mi.)	Maximum Moment Magnitude	Slip Rate (mm/yr)
Anacapa-Dume (r-ll-o)	16	7.5	3.0
Chino-Central Ave. (rl-r-o)	32	6.7	1.0
Clamshell-Sawpit (r)	18	6.5	0.5
Cleghorn (ll-ss)	50	6.5	3.0
Cucamonga (r)	32	6.9	5.0
Elsinore (rl-ss)	16	6.8	2.5
Upper Elysian Park (r)	1	6.4	1.3
Hollywood (ll-r-o)	1	6.4	1.0
Holser (r)	26	6.5	0.4
Malibu Coast (ll-r-o)	14	6.7	0.3
Newport-Inglewood (rl-ss)	7	6.9	1.5
Northridge (r)	15	7	1.5
Palos Verde (rl-ss)	18	7.3	3.0
Puente Hills Blind Thrust (r)	5	7.1	0.7
Raymond (ll-r-o)	4	6.5	1.5
San Andreas (rl-ss)	32	7.5	29.0
San Gabriel (rl-ss)	15	7.2	1.0
San Jacinto (rl-ss)	44	6.7	12.0
San Joaquin Hills (r)	35	6.6	0.5
San Jose (ll-r-o)	24	6.4	0.5
Santa Monica (ll-r-o)	1	6.6	2.4
Sierra Madre (r)	10	7.2	2.0
San Fernando (r)	19	6.7	2.0
Simi-Santa Rosa (ll-r-o)	27	7	1.0
Verdugo (r)	5	6.9	0.5
Whittier (rl-ss)	13	6.8	2.5

Notes:

Fault geometry - (ss) strike slip, (r) reverse, (n) normal, (rl) right lateral, (ll) left lateral, (o) ob

Fault and Seismic Data - USGS Online data and CGS (Cao, 2003)

HISTORIC STRONG EARTHQUAKES IN SOUTHERN CALIFORNIA SINCE 1812

Date	Event	Causitive Fault	Magnitude	Epicentral Distance (miles)
Dec. 12, 1812	Wrightwood	San Andreas?	7.3	32
Jan. 9, 1857	Fort Tejon	San Andreas	7.9	208
Dec. 16, 1858	San Bernardino Area	uncertain	6.0	59
Feb. 9,1890	San Jacinto	uncertain	6.3	127
May 28, 1892	San Jacinto	uncertain	6.3	127
July 30, 1894	Lytle Creek	uncertain	6.0	43
July 22, 1899	Cajon Pass	uncertain	6.4	49
Dec.25, 1899	San Jacinto	San Jacinto	6.7	79
Sept. 20, 1907	San Bernardino Area	uncertain	5.3	71
May 15, 1910	Elsinore	Elsinore	6.0	59
April 21, 1918	Hemet	San Jacinto	6.8	80
July 23, 1923	San Bernardino	San Jacinto	6.0	59
March 11, 1933	Long Beach	Newport-Inglewood	6.4	33
April 10, 1947	Manix	Manix	6.4	120
Dec. 4, 1948	Desert Hot Springs	San Andreas or Banning	6.5	113
July 21, 1952	Wheeler Ridge	White Wolf	7.3	76
Feb. 9, 1971	San Fernando	San Fernando	6.6	23
July 8, 1986	North Palm Springs	Banning or Garnet Hills	5.6	100
Oct. 1, 1987	Whittier Narrows	Puente Hills Thrust	6.0	13
Feb. 28, 1990	Upland	San Jose	5.5	35
June 28, 1991	Sierra Madre	Clamshell Sawpit	5.8	21
April 22, 1992	Joshua Tree	Eureka Peak	6.1	117
June 28, 1992	Landers	Johnson Valley & others	7.3	109
June 28, 1992	Big Bear	uncertain	6.5	86
Jan. 17, 1994	Northridge	Northridge Thrust	6.7	17
Oct. 16, 1999	Hector Mine	Lavic Lake	7.1	124

Notes:

Earthquake data: U.S. Geological Survey P.P. 1515 & online data, Southern California Earthquake Center & California Geological Survey online data

Magnitudes prior to 1932 are estimated from intensity.

Magnitudes after 1932 are moment, local or surface wave magnitudes.

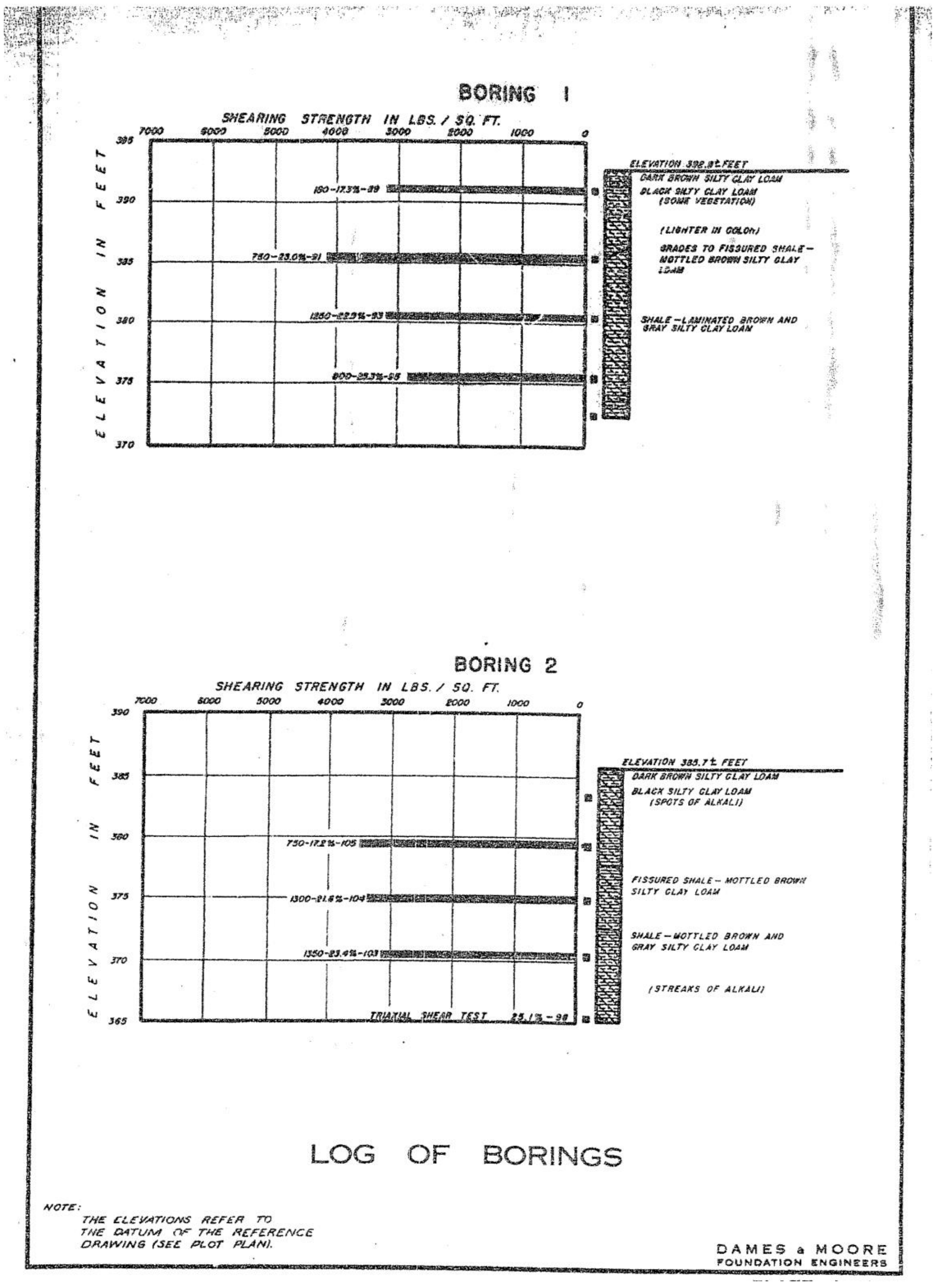
Site Location:

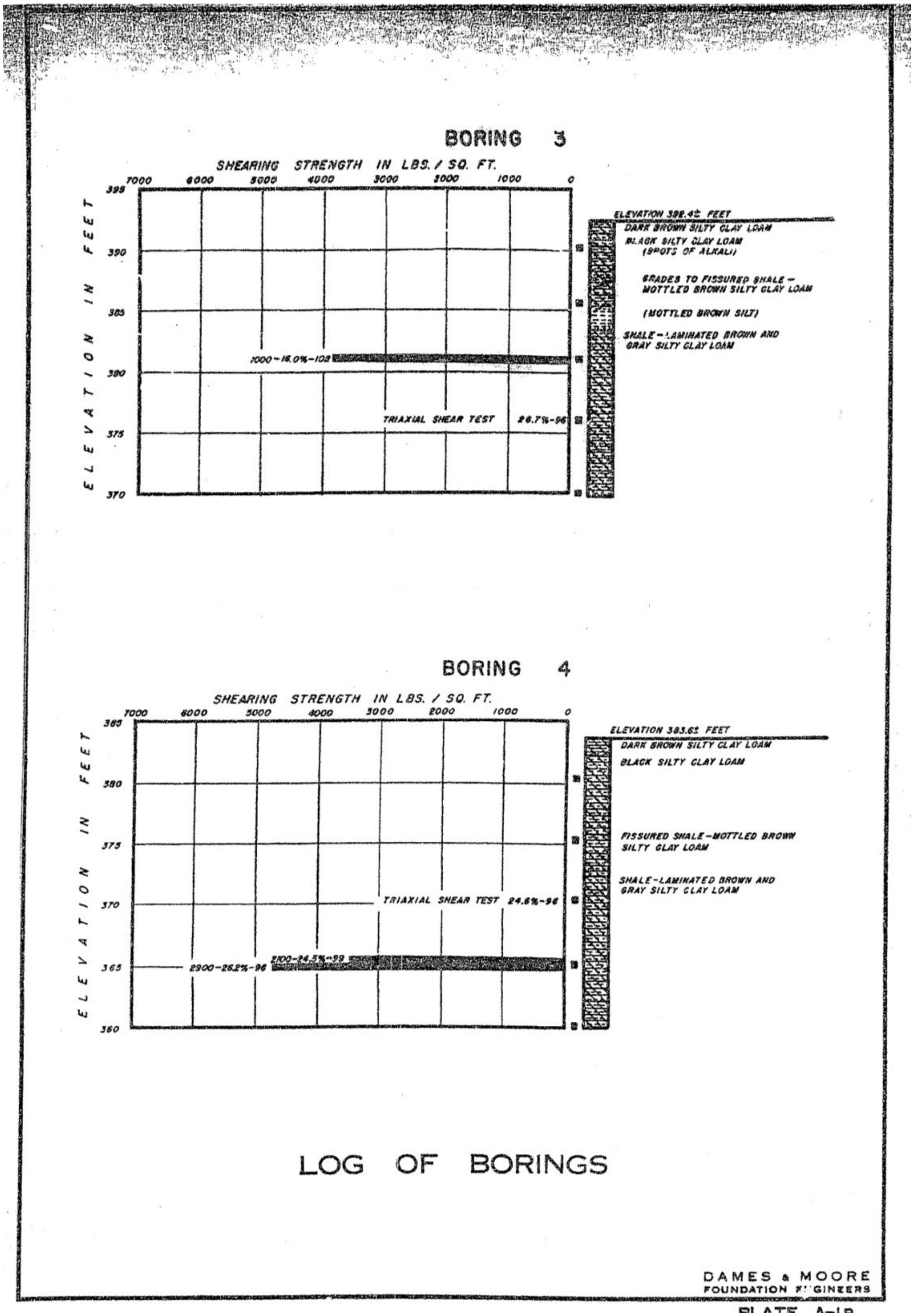
Site Longitude: - 118.292

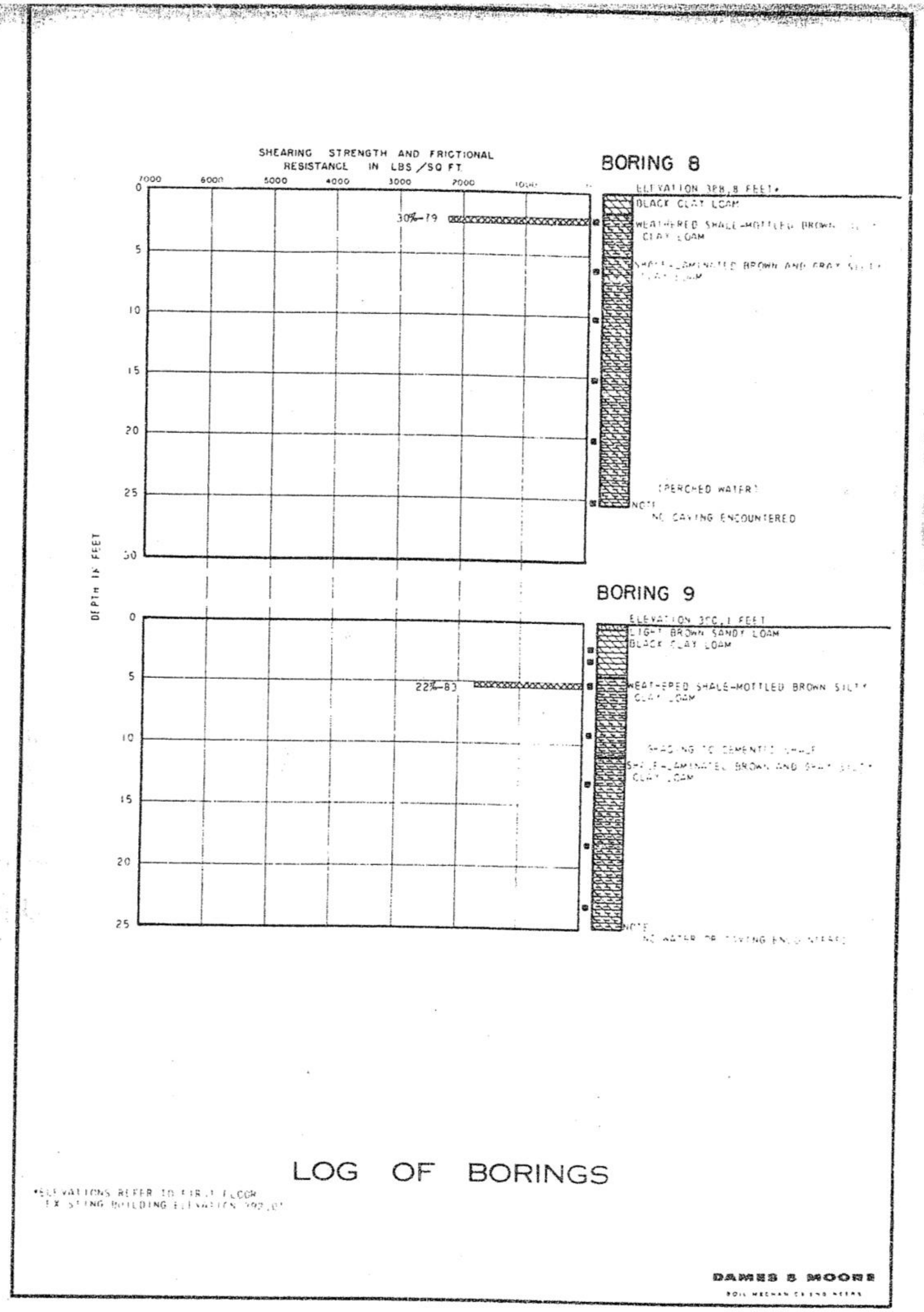
Site Latitude: 34.099

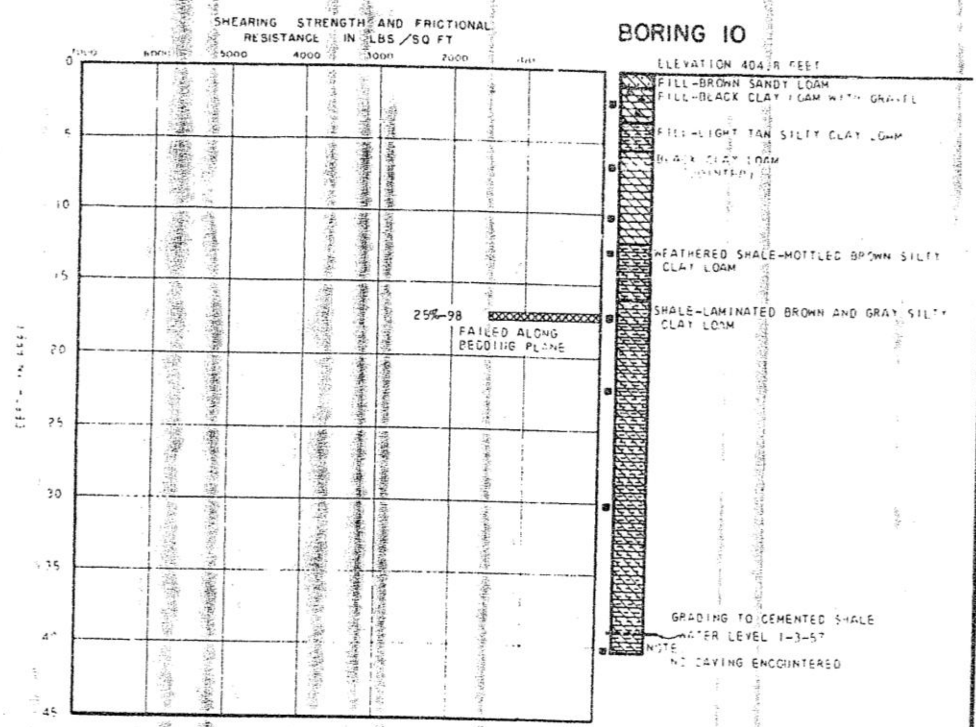
APPENDIX A

REFERENCED BORING LOGS
AND
FAULT STUDY


BORING 1
SHEARING STRENGTH IN LBS. / SQ. FT.
7000 6000 5000 4000 3000 2000 1000 0
ELEVATION IN FEET
395 390 385 380 375 370
160-17.3%-89
750-23.0%-91
1250-22.9%-93
800-25.3%-95
ELEVATION 392.8± FEET
DARK BROWN SILTY CLAY LOAM
BLACK SILTY CLAY LOAM
(SOME VEGETATION)
(LIGHTER IN COLOR)
GRADES TO FISSURED SHALE — MOTTLED BROWN SILTY CLAY LOAM
SHALE — LAMINATED BROWN AND GRAY SILTY CLAY LOAM
BORING 2
SHEARING STRENGTH IN LBS. / SQ. FT.
7000 6000 5000 4000 3000 2000 1000 0
ELEVATION IN FEET
390 385 380 375 370 365
750-17.2%-105
1300-21.6%-104
1350-23.4%-103
TRIAXIAL SHEAR TEST 25.1% - 98
ELEVATION 385.7± FEET
DARK BROWN SILTY CLAY LOAM
BLACK SILTY CLAY LOAM
(SPOTS OF ALKALI)
FISSURED SHALE — MOTTLED BROWN SILTY CLAY LOAM
SHALE — MOTTLED BROWN AND GRAY SILTY CLAY LOAM
(STREAKS OF ALKALI)
LOG OF BORINGS
NOTE:
THE ELEVATIONS REFER TO THE DATUM OF THE REFERENCE DRAWING (SEE PLOT PLAN).
DAMES & MOORE
FOUNDATION ENGINEERS


BORING 3
SHEARING STRENGTH IN LBS. / SQ. FT.
7000 6000 5000 4000 3000 2000 1000 0
ELEVATION IN FEET
395 390 385 380 375 370
1000-16.0%-102
TRIAXIAL SHEAR TEST 26.7%-96
ELEVATION 392.4± FEET
DARK BROWN SILTY CLAY LOAM
BLACK SILTY CLAY LOAM
(SPOTS OF ALKALI)
GRADES TO FISSURED SHALE - MOTTLED BROWN SILTY CLAY LOAM
(MOTTLED BROWN SILT)
SHALE - LAMINATED BROWN AND GRAY SILTY CLAY LOAM
BORING 4
SHEARING STRENGTH IN LBS. / SQ. FT.
7000 6000 5000 4000 3000 2000 1000 0
ELEVATION IN FEET
385 380 375 370 365 360
TRIAXIAL SHEAR TEST 24.6%-96
2900-26.2%-96
2100-24.5%-99
ELEVATION 383.6± FEET
DARK BROWN SILTY CLAY LOAM
BLACK SILTY CLAY LOAM
FISSURED SHALE-MOTTLED BROWN SILTY CLAY LOAM
SHALE-LAMINATED BROWN AND GRAY SILTY CLAY LOAM
LOG OF BORINGS
DAMES & MOORE
FOUNDATION ENGINEERS


SHEARING STRENGTH AND FRICTIONAL RESISTANCE IN LBS /SQ FT
7000
6000
5000
4000
3000
2000
BORING 8
BLACK CLAY LOAM
PERCHED WATER
NO CAVING ENCOUNTERED
30%-79
DEPTH IN FEET
BORING 9
LIGHT BROWN SANDY LOAM
BLACK CLAY LOAM
22%-83
LOG OF BORINGS
DAMES & MOORE



LOG OF BORINGS

DAMES & MOORE

BORING 2

DATE DRILLED: September 17, 1990
EQUIPMENT USED: 4" - Diameter Auger

ELEVATION 99.1 ±

ELEVATION (ft.)	DEPTH (ft.)		MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.		Description
							SM	FILL - SILTY SAND - fine to medium, few Gravel, brown
			28.9	90	8	■		SHALE (SILTSTONE) - weathered, fractured and bedded, grey and reddish brown
95			11.7	110	12	■		
	5							
			—	—	18	■		Reddish brown
			28.3	85	19	■		
90								Streaks of white
	10							(BORING TERMINATED AT 10' DUE TO DIFFICULT DRILLING THROUGH HARD SHALE)
85								
	15							

NOTE: Water not encountered. No caving.

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

BORING 1

DATE DRILLED: September 9, 1990
EQUIPMENT USED: 18" - Diameter Bucket

ELEVATION 87.3*

ELEVATION	DEPTH (ft.)	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	DESCRIPTION
					9" Asphaltic Paving
					ML-CL FILL - SILT and CLAY - some Sand, light brown
85		25.5	98	5	SHALE (SILTSTONE) - weathered, fractured and bedded, light reddish brown
		24.4	99	6	
	5	24.2	100	6	Light reddish brown with grey and white
80		21.3	104	8	Light reddish brown and grey
	10	23.2	101	6	
75					
	15	24.0	97	7	
70					
	20	26.6	96	6	
65					
	25	45.8	85	7	
60					
	30	27.5	93	8	

NOTE: Slight water seepage encountered at 20-1/2'. No caving.

* Elevations refer to datum of reference survey; see Plate 1 for location and elevation of bench mark.

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE A-1.1

BORING 2

DATE DRILLED: September 9, 1990
EQUIPMENT USED: 18" - Diameter Bucket
ELEVATION 90.6

ELEVATION	DEPTH (ft.)		MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.		DESCRIPTION
90								8" Asphaltic Paving
			24.5	95	5	■	ML-CL	FILL - SILT and CLAY - few Siltstone fragments, light brown and white
			23.8	97	8	■		SHALE (SILTSTONE) - weathered, fractured and bedded, reddish brown and grey
85	5		27.0	91	8	■		
			24.9	98	8	■		
80	10		20.9	104	6	■		
			22.4	101	8	■		
75	15		27.3	94	7	■		Slightly Sandy, light brown
70	20		24.8	100	7	■		
65	25		25.6	99	6	■		Light brown and grey
								Streaks of white
60	30		23.9	101	9	■		
	35							

NOTE: Water not encountered. No caving.

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

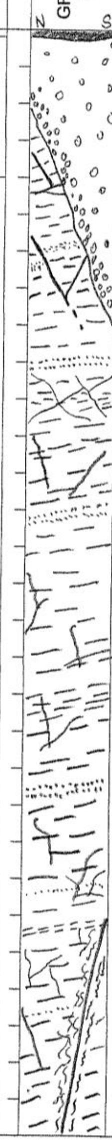
LeROY CRANDALL AND ASSOCIATES

PROJECT: REBUILD SUNSET HOSPITAL PROJECT Kaiser Permanente Los Angeles Medical Center	**Downhole Log of Boring No. B-2**
BORING LOCATION: North of Cath Lab	ELEVATION AND DATUM: 407.5 feet above mean sea level
DRILLING CONTRACTOR: Al Roy	DATE STARTED: 1/7/00 — DATE FINISHED: 1/7/00
DRILLING METHOD: 24" Bucket Auger	TOTAL DEPTH (ft.): 53.0 — MEASURING POINT: Ground Surface
DRILLING EQUIPMENT: Cal Weld	DEPTH TO WATER: 39
SAMPLING METHOD: Modified California Split Spoon	LOGGED BY: E. Bailiff
HAMMER WEIGHT: Non-standard — DROP: 12"	RESPONSIBLE PROFESSIONAL: N. Timothy Hall — REG. NO. 1422

Surface Elevation: 407.5 feet above mean sea level

DEPTH (feet)	Sample No.	Sample	Blows/6 in.	DESCRIPTION NAME (USCS): color, moist, % by wt., plast. density, structure, cementation, react. w/HCl, geo. inter.	GEOLOGIC DATA
0				2-4 inches of asphaltic concrete	
0–2				POORLY GRADED SAND WITH GRAVEL (SP): olive gray (5Y 4/2), ~80% fine to medium sand, ~20% fine gravel, poorly compacted, loose, roots growing along basal contact, 2-3" thick fine to coarse gravel (mostly fine at base) Lower contact is irregular, dips steeply to the south [FILL].	
2–4				SILTSTONE: olive gray (5Y 4/2), light olive (5Y 4/2), and dusky yellow (5Y, 6/4) with silty sandstone interbeds. Thinly bedded to laminated, moderately weathered, moderately to highly fractured. Fractures are slightly open to tight and are lined with white powdery carbonate and/or stained with iron oxide. Some iron oxide staining on bedding surfaces. Fractures are discontinuous.	@3' B: N77W/22N
5–6	1	X	4/12"	@5.5' discontinous fracture set, subvertical & subhorizontal	@5.5' Fx: N15E/08W N47E/10NW N70E/70S
7				@7' minor faulting, sub-vertical, 1-3" offset, faults are discontinous	
8				@8' base of fill contact on south wall	
9					@8.75' B: N75W/08N
10–11	2	X	7/12"	@10' 2-3" thick cemented zone, hard, highly fractured	
14–15					@14.3' B: N80W/10N

GRAPHIC LOG



GRPH3-GEODATA

Geomatrix Consultants — Project No. 005931.000.0 — Page 1 of 4

PROJECT: REBUILD SUNSET HOSPITAL PROJECT
Kaiser Permanente Los Angeles Medical Center

Downhole Log of Boring No. B-2

DEPTH (feet)	Sample No.	Sample	Blows/ 6 in.	DESCRIPTION NAME (USCS): color, moist, % by wt., plast. density, structure, cementation, react. w/HCl, geo. inter.	GRAPHIC LOG	GEOLOGIC DATA
	3	X	8/12"	SILTSTONE: (continued)	N S	
16				light olive (5Y 5/2), to dusky yellow (5Y 6/4)		
17						
18					END OF DOWNHOLE LOG	
19						
20						
	4	X	5/12"			@20' B: N80W/13 N
21						
22						
23						
24				@24' High angle fault, enters borehole on south wall, 4-6" wide shear zone. Fault is lined with olive color slickensided clay gouge. 1/4" thick sub-horizontal clay seam discontinues at fault. Clay seam is lined with gypsum on north side of borehole.		@24' F: N65E/70-88NW
25						
	5	X	5/12"			
26						@26.3 Fx: N35W/70 SW
27						
28						@28' F: N67E/85 NW
29						@29' F: N75E/V
30						
	6	X	9/12"			
31				@31' 1" thick orange brown silty sandstone bed with ~8" of displacement along fault.		@31' B: N40W/07E
32				@31.1' Bedding becomes intensely fractured. Many small discontinous fractures offset bedding up to 1". Fractures have gypsum infilling and iron oxide on fracture surfaces.		
33						

GRPH3-GEODATA

Geomatrix Consultants | Project No. 005931.000.0 | Page 2 of 4

PROJECT: REBUILD SUNSET HOSPITAL PROJECT
Kaiser Permanente Los Angeles Medical Center

Downhole Log of Boring No. B-2

DEPTH (feet)	Sample No.	Sample	Blows/ 6 in.	DESCRIPTION NAME (USCS): color, moist, % by wt., plast. density, structure, cementation, react. w/HCl, geo. inter.	GRAPHIC LOG	GEOLOGIC DATA
				SILTSTONE: (continued) @32' Water seeping from sidewalls @34' fault exits north side of borehole		
34						@34' B: N80W/5N
35	7	X	25/12"	Borehole downhole logged to 35'. The following descriptions are based on drill cuttings and samples.		
36						
37						
38						
39					∇	
40	8	X	15/2"			
41						
42						
43						
44						
45	9	X	30/12"			
46				olive gray (5Y 3/2), moderately weak		
47				olive black (5Y 2/1), less fractured		
48						
49						
50	10	X	50/12"	light olive (5Y 5/2) to olive gray (5Y 3/2), moderately to intensely fractured, fracture surfaces stained with iron oxide.		
51						

GRPH3-GEODATA

Geomatrix Consultants | Project No. 005931.000.0 | Page 3 of 4

PROJECT: REBUILD SUNSET HOSPITAL PROJECT
Kaiser Permanente Los Angeles Medical Center

Downhole Log of Boring No. B-2

DEPTH (feet)	SAMPLES: Sample No.	SAMPLES: Sample	SAMPLES: Blows/ 6 in.	DESCRIPTION NAME (USCS): color, moist, % by wt., plast. density, structure, cementation, react. w/HCl, geo. inter.	GRAPHIC LOG	GEOLOGIC DATA
52				SILTSTONE: (continued)		
53				Downhole logged to 35' Total Drilled Depth ~53' Groundwater seepage at 32'. Groundwater encountered at ~53, filled borehole to 39' after approximately one-half hour. Borehole backfilled to ground surface with drill cuttings and capped with asphalt cold patch.		

GRPH3-GEODATA

Geomatrix Consultants | Project No. 005931.000.0 | Page 4 of 4

GEOMATRIX

APPENDIX F

FAULT-RUPTURE HAZARD ASSESSMENT

INTRODUCTION

During a routine geotechnical investigation in support of redevelopment and expansion of the Kaiser Permanente Hospital complex located a 4760 Sunset Boulevard in Los Angeles, California, Geomatrix Consultants Inc., (Geomatrix) drilled and logged one 24-inch diameter bucket auger boring (B-2). This boring was located at the northeast corner of the Cath Lab building (Figure 2) and intersected a fault in the siltstone bedrock that underlies the hospital complex at a depth of 24 feet bgs. A log of this boring is presented in Appendix A. Geologic mapping by Dibblee (1991) indicates that the hospital and Olive Hill (Barnsdall Park) to the north are underlain by a formation called the "Unknown Shale" (a.k.a. Puente Formation) of Late Miocene age (≈ 7.4 to 5 Ma[1]). Lamar (1970) shows that these siltstones have been folded into an open syncline whose axis trends about east west and has an apparent gentle plunge to the west. The axis of the syncline coincides with the crest of Olive Hill.

Downhole logging of boring B-2 indicates that the fault has a strike of N65-75°E and dips steeply 70-88°N (Figure 2). In the subsurface, the fault is marked by a thin (1/16 to 1/8-inch thick) clay gouge located within a 4 to 6-inch wide zone of intensely fractured bedrock. A 1-inch thick silty sandstone bed was observed near the base of the fault with approximately 8 inches of apparent normal offset. Discontinuous fractures with minor offsets (up to 1 inch) were also observed within the borehole. Figure 2 presents the data collected from borehole B-2.

The activity of the fault could not be assessed in this boring because the fault was not observed where it would intersect the surface in undisturbed native soils. The State of California considers faults that have slipped during the Holocene (past 11,000 years) to be active. Active faults are judged to pose a fault-rupture hazard to critical structures and structures for human habitation.

[1]Ma = million years before present

Since the potential surface rupture hazard to the existing and proposed hospital facilities could not be assessed by the observations made in the borehole, Geomatrix reviewed published local and regional geologic reports and maps for the site area which showed the fault observed in borehole B-2 is on trend with, and has a similar orientation to a fault mapped by Dibblee (1991) about 1 mile to the northeast that crosses Interstate 5 near the Glendale Boulevard interchange (Figure 1). This fault may be part of a southern trace of what Dibblee (1991) calls the Santa Monica fault, but is currently known as the Hollywood fault (Dolan and others, 1997). Based on the mapping by Dibblee (1991), it is possible to project a southern trace of the Hollywood fault along the south margin of Olive Hill and separate this area of elevated topography from the gently dipping alluvial surface to the south.

GEOMATRIX

FAULT EVALUATION

Geomatrix reviewed existing scientific data and subsequently trenched the fault to evaluate its potential impact on the hospital redevelopment project. Following each task description, we summarize the principal findings.

Existing Data Review

Geomatrix reviewed and evaluated current scientific reports and opinions regarding the nature and rate of tectonic deformation occurring along the northern margin of the Los Angeles Basin. We also assessed the characteristics of the Hollywood – Santa Monica fault zone including its location, activity, slip geometry and the expected recurrence frequency and surface displacement associated with a maximum earthquake on this fault zone.

Summary of Data Review

- Regional Tectonic Setting - Recent mapping and subsurface studies along the south margin of the Santa Monica Mountains by Dolan and others (1997) indicate that a steeply dipping zone of range-bounding faults is present and has experienced surface rupture between ≈ 4000 and 20,000 years ago. These authors refer to this zone of faulting as the Hollywood fault. This fault extends from the vicinity of Interstate 5 west-southwestwards to Beverly Hills where it steps to the south and continues westward to the coastline and beyond as the Santa Monica fault. Slip along this fault has elevated crystalline basement rocks on the north side of the fault that are tens of millions of years old over geologically young alluvium in the Hollywood area.

- Current Tectonic Regime - Recent geodetic measurements indicate that the earth's crust is shortening in a north-south direction between downtown Los Angeles and the San Gabriel Mountains at a rate of about 0.25 inches per year (Argus and others, 1999). Although the Hollywood fault may be accommodating part of this ongoing crustal shortening, its currently documented paleoseismic record (Dolan and others, 1997) does not clearly establish that this fault has moved within the last 11,0000 (Holocene time). Therefore the State of California has not incorporated the Hollywood fault within a fault-rupture hazard zone at the present time.

As part of this effort, we contacted Dr. James Dolan of the University of Southern California (USC) and sought his opinion regarding the likelihood that the fault we encountered is active and possibly part of a more significant fault along the south margin of Olive Hill. In a phone interview on January 24, 2000, Dr. Dolan was of the opinion that the fault in boring B-2 was a minor inactive bedrock feature. He has completed a detailed geomorphic assessment of the northern Los Angeles basin using old aerial photographs and detailed topographic maps constructed by the U.S. Geological Survey during the mid-1920s for all of Los Angeles County. Dr. Dolan has concluded that Olive Hill is an erosional remnant of a much older landscape and not a block of bedrock that has been elevated along bounding faults.

Fault Trenching

In order to assess the activity (i.e., recency of slip) on the fault encountered in boring B-2, a trench (T-1) was excavated across the projected trace of the fault about 50 feet east-northeast of boring B-2 (Figure 2). The trenching site is located near the Cath Lab on the southwest flank of Olive Hill at about elevation 418 feet. Trench T-1 was 26 feet long and up to 7 feet deep.

Results of Trenching Study

The trench site is marked by a number of underground utilities including fiber optic cables, storm water drainage, and auxiliary power supply cables. Previous site development and construction, including installation of underground utilities, have modified the site. As a result, an unknown thickness of the uppermost native soil deposits is likely to have been removed or modified. The fault evaluation trench exposed a backfilled trench with five 3-inch-diameter emergency power supply conduits Appendix A. The trench also exposed 3 to 4 feet of native soil overlying deeply weathered siltstone bedrock. The zone of faulting was exposed near the southeast end of the trench. Three near vertical shears were observed in the trench floor and walls with strikes ranging from N40°E to N70°E. Intense fracturing of the bedrock along the fault has rendered the rock more susceptible to activities by burrowing animals than the adjacent unfaulted bedrock. Soil filled animal burrows (krotovina) are concentrated along the fault and extend at least two feet below the upper surface of the bedrock. The krotovina had to be removed by digging back into the trench wall until a continuous exposure of the rock that spanned the zone of faulting was revealed.

The apparent vertical separation of the fault was assessed by the presence of a distinctive 1- to 2-inch thick layer of siliceous siltstone that could be followed across the east wall of the trench. The siliceous layer is offset a total of no more than 6 inches vertically across the fault zone. This marker bed appeared to be continuous along the eastern wall of the trench across the backfill material for the emergency power supply trench (Appendix A). There may be additional small faults in the area obscured by the utility trench backfill. While no slickenlines were found on the fault surfaces that would indicate the geometry of the most recent slip event, the small amount of offset and the limited width (≈ 3 feet wide) of the zone of faulting clearly makes this fault a minor bedrock feature.

In the northeast wall of the trench, the fault is overlain by 3.5 to 4 feet of native soil. This soil deposit can be divided into two subunits that are separated by a gradational contact. The upper 1.5 to 2 feet of soil consists of very dark gray clayey silt that is very stiff to hard. The upper soil unit has vertical shrinkage cracks spaced every 1 to 2 feet that extend into the lower soil subunit and are open ¼ to ½ inch. The lower subunit of the soil is marked by angular, deeply weathered (oxidized) fragments of siltstone bedrock that increase in abundance (by volume) downward approximately 2 feet to the bedrock contact. The soil is of colluvial origin and has been derived from the accumulation of weathered bedrock fragments that have moved downhill by creep from Olive Hill. Filamentous soil carbonate appears in the soil section at a depth of about 1.5 feet and increases downward to the bedrock contact. The upper 1 to 1.5 feet of the siltstone bedrock is white with impregnated carbonate. The deeply oxidized nature of the siltstone clasts in the lower part of the soil and the carbonate accumulation indicate the soil is quite old, probably of late Pleistocene age (est. 11,000 to 40,000 years old or older). We estimate the youngest the soil could be is of early Holocene age (i.e., 8,000 to 10,000 years old). Unfortunately, we did not observe any carbon-bearing materials within the soil that could be used for radiocarbon analysis.

The soil/weathered bedrock contact is highly irregular with several inches of relief. As shown on the log of trench T-1 in Appendix A, there are several inches of relief where the fault crosses the soil/weathered bedrock contact although there is almost no change in elevation of the soil/weathered bedrock contact across the entire trench. The irregular soil/bedrock contact is attributed to animal burrowing which is heavily concentrated in the fractured rock within the zone of faulting. The contact between the upper and lower soil units, though gradational, does not change elevation across the trench wall and is not visibly dislocated by shearing. There is also no evidence for shearing within the lower soil unit at the zone of faulting, although the shrink-swell behavior of the expansive clays within the overlying soil subunit would probably have overprinted and obscured tectonic shears had any been present.

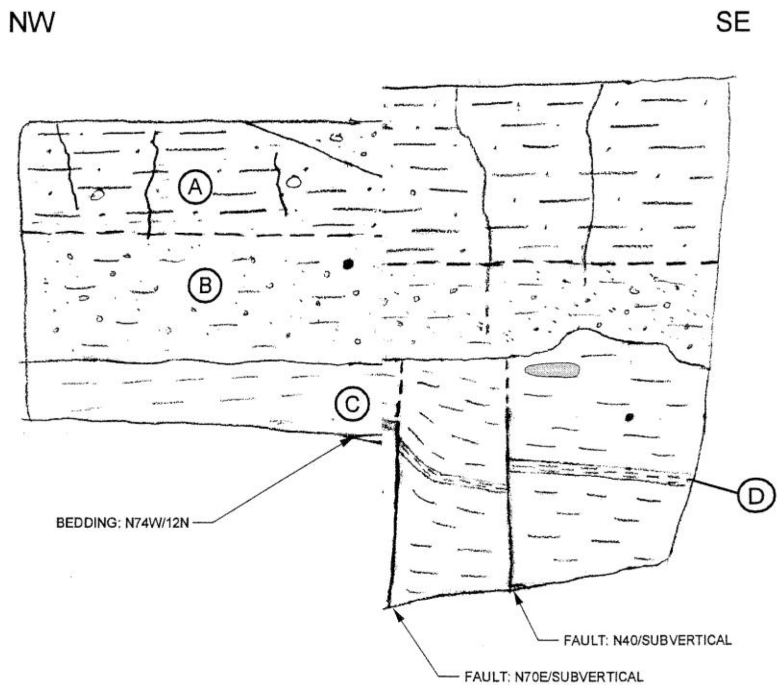
CONCLUSIONS

It is our judgment that the fault encountered in boring B-2 and exposed in trench T-1 does not pose a fault-rupture hazard to Kaiser Permanente Hospital complex for the following reasons.

- The fault does not offset a 3.5- to 4.0-foot-thick native soil that is estimated to be of late Pleistocene age (i.e., > 11,000 years old) based on the thickness, soil carbonate accumulation and the extensive oxidation of the siltstone clasts present in the lower soil subunit. Although an early Holocene age for this soil cannot be ruled out, it is our judgment that this fault is inactive.

- The total vertical separation across the fault exposed in the trench is no more than 6 inches, which indicates the fault is a minor bedrock feature with an extremely low rate of slip. This fault may have developed in Pliocene time ($\approx$5 Ma) when the northern Los Angeles basin began to experience north-south directed crustal compression (Schneider and others, 1996). It was at this time that the Unnamed Shale was uplifted above sea level and folded into the syncline that underlies Olive Hill.

- It is also our judgment that the south edge of Olive Hill is not the location of an active or potentially active fault. Borings in this area document the presence of shallow siltstone bedrock overlain by a veneer of alluvium. The geometry of the hill front geology is in marked contrast to the Hollywood fault at the base of the Santa Monica Mountains where tens to hundreds of feet of geologically young alluvium is found south of the fault trace (Dolan and others, 1997).



': N56E/SUBVERTICAL

EXPLAN

(A) CLAYEY SILT (ML), VERY DARK GRAY (10YR 3/1) TRACE SAND SIZE FRAGMENTS (<1/16") OF SILTSTONE. BEDROCK, HARD, VERTICAL DESSICATION CRACKS OPEN TO 1/2 ". SCATTERED ROOTS AND ROOTLETS. FEW ROOTLET HOLES IN UPPER ONE FOOT. FILLAGREE CARBONATE INCREASING WITH DEPTH. HIGHLY BIOTUBATED.

(B) TRANSITIONAL UNIT. PREDOMINATLY SAND SIZE WEATHERED SILTSTONE. FRAGMENTS IN CLAYEY SILT MATRIX, GRAYISH BROWN (2.5Y 5/2) CARBONATE THROUGHOUT. HIGHLY BIOTURBATED.

(C) SILTSTONE
WEATHERE
CRUSHED,
GROUND S
YELLOW (2
STRONG, L
SILICEOUS
OXIDE STA
KROTOVIN

(D) SANDY SIL
SILICEOUS

(E) FILL: SAND
TRACE GR

0 1 2
APPROXIMATE SCALE IN FEET

TRENCH LOG
REBUILD SUNSET HOSPITAL PROJECT
KAISER PERMANENTE
LOS ANGELES MEDICAL CENTER
Los Angeles, California

GEOMATRIX	Figure By: dmm	Project No.: 5931	Appendix
	Date: 02/25/00		A

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APPENDIX B

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APPENDIX B

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E-3 Additional Subsurface Assessment Report, 1321, 1329, 1345 North Vermont Ave

Additional Subsurface Assessment Report

1321, 1329, 1345 North Vermont Ave.,
1328 North New Hampshire Ave.
Los Angeles, California 90027

Ms. Teresa Wolfe
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SCAL
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Prepared by:
Stantec Consulting Services Inc.
290 Conejo Ridge Avenue
Thousand Oaks, California 91361

Stantec Project Number: 185803633

May 31, 2016

Sign-off Sheet

This document entitled Additional Subsurface Assessment Report was prepared by Stantec Consulting Services Inc. ("Stantec") for the account of Kaiser Foundation Health Plan, Inc. (the "Client"). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Author ______________________________
(signature)

Brian Goss
Project Scientist

I declare that, to the best of my professional knowledge and belief, I meet the definition of Environmental Professional as defined in § 312.10 of 40 CFR 312. I have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the Property. I have developed and performed all the appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

Quality Reviewer Thomas R. Smit
(signature)

Thomas R. Szocinski, CEP
Senior Environmental Scientist

Approved by ______________________________
(signature)

Steven Brady, C.E.G., C.HG.,
Senior Principal

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EXECUTIVE SUMMARY

On behalf of Kaiser Foundation Health Plan, Inc. (Kaiser), Stantec Consulting Services Inc. (Stantec) is pleased to submit this report documenting the results of an additional subsurface assessment conducted on the property consisting of 1321, 1329, and 1345 North Vermont Avenue and 1328 North New Hampshire Avenue, Los Angeles, California (the "Property"; Figure 1). Stantec prepared a Phase I Environmental Site Assessment (ESA) on the Property in March 2016. This Phase I ESA identified historical site operations and use as a former gasoline/fueling station. Consequently, in April 2016 Stantec conducted a Phase II ESA to evaluate the subsurface conditions at the Property. Volatile organic compounds (VOCs) were identified during this Phase II ESA which appeared to be associated with the historical gasoline/fueling operations on the Property. Therefore, Stantec recommended this additional assessment to further evaluate VOCs identified in soil and soil vapor at the Property during Stantec's April 2016 Phase II ESA.

To further investigate the VOC contamination previously identified at the Property 1) eight soil borings were advanced; 2) 13 soil vapor monitoring wells were installed (five dual nested and three shallow); and 3) soil and soil vapor samples were collected and submitted to a fixed based laboratory for chemical analysis.

Soil Boring Advancement and Soil Sampling

A total of eight soil borings were advanced throughout the Property during the additional subsurface assessment. Three borings (SV-1b, SV-3b, and SV-9) were advanced to a depth of 5.5 feet below grade surface (bgs) and five borings (SV-4 through SV-8) were advanced to depths ranging from 20 and 25 feet bgs (depths varied according to geologic conditions encountered).

Soil samples were analyzed for the presence of VOCs and gasoline range organics (GRO). Groundwater was not encountered during the assessment.

Soil Analytical Data Summary

GRO was detected in the sample collected from boring SV-6 at a concentration of 8,300 milligrams per kilogram (mg/kg), which exceeds the United States Environmental Protection Agency (USEPA) Regional Screening Levels (RSLs) for commercial and residential use properties of 420 mg/kg and 82 mg/kg, respectively.

Benzene and 1,2,4-trimethylbenzene were detected in the sample collected from boring SV-6 at a concentration of 4.8 mg/kg and 63 mg/kg, respectively, which exceeds the RSL for residential properties of 1.2 mg/kg and 58 mg/kg, respectively.

Ethylbenzene was detected in the sample collected from boring SV-6 at a concentration of 36 mg/kg, which exceeds the RSL for residential properties of 25 mg/kg.

No other soil samples collected during this additional investigation were above their respective RSLs.

Soil Vapor Probe Installation

A total of 13 soil vapor probes were installed within the eight soil borings; five dual-nested vapor probes (SV-4 through SV-8) and three shallow vapor probes (SV-1b, SV-3b, and SV-9).

Soil Vapor Analytical Data Summary

Soil vapor samples were collected from previously installed soil vapor probes SV-1 through SV-3 as well as newly installed soil vapor probes SV-1b, SV-3b, and SV-4 through SV-9. Soil vapor samples were analyzed for the presence of VOCs.

The following constituents were identified in soil vapor above California Environmental Protection Agency, Office of Environmental Health Hazard Assessment (OEHHA) residential screening level:

- Benzene was detected above OEHHA screening levels for residential and/or commercial properties (0.036 micrograms per liter (µg/L) and 0.12 µg/L, respectively) in four of the 13 soil vapor samples collected. Detected concentrations ranged from 0.039 µg/L to 390 µg/L.
- Ethylbenzene was detected in the vapor sample collected from SV-6-19 at a concentration of 310 µg/L which exceeds the OEHHA screening level for commercial properties of 1.4 µg/L.
- Xylenes were detected in the vapor sample collected from SV-6-19 at a concentration of 846 µg/L which exceeds the OEHHA screening level for residential properties of 320 µg/L.

Conclusions

GRO, benzene, ethylbenzene, and 1,2,4-trimethylbenzene were identified in soil at concentrations exceeding USEPA RSLs. These constituents appear to be from gasoline and based on this historical use at the Property, likely associated with this historical usage. Similar petroleum hydrocarbon VOCs were identified within soil during Stantec's April 2016 Phase II ESA as well as historical reports provided by the Property owner. Based on 1) the location of the historical gasoline operations and 2) the detection of petroleum hydrocarbon impacts at the Property boundary along Vermont Avenue; indicate contaminants may have migrated from the Property into the right-of-way of Vermont Avenue. However, the extent and levels of the off-site migration is unknown.

Benzene, ethylbenzene, and xylenes were identified in soil vapor above regulatory screening levels. Based on the VOC impacts observed in soil and soil vapor during this additional subsurface assessment, the potential for vapor intrusion exists.

Recommendations

Based on the results of this assessment, Stantec recommends the following:

1) It is recommended that the Property owner be provided the results of this investigation, and provide the results to the Los Angeles Regional Water Quality Control Board (LARWQCB) to determine what additional actions, if any, may be required. The Property is not listed as an open regulatory case; however, it should be noted that the Property could become an open case following communication to the LARWQCB. Kaiser should participate in any agency discussions if possible in order to understand the level of remediation that will be needed for redevelopment to occur.
2) Preparation of a Soil Management Plan (SMP) for the Property prior to excavation and redevelopment activities. The purpose of the SMP is to provide guidance to project management, site management, and field personnel on the identification and management of soil (both impacted and clean), and construction debris during excavation, grading, and construction activities to be completed at the Property. This SMP should include information associated with the possibility of

encountering/assessment USTs, piping, dispensers, and/or any other UST system component;

It should be anticipated that redevelopment will require:

1) Remediation via over-excavation; and/or
2) Installation of a vapor barrier/mitigation system beneath the proposed building(s).

Stantec continues to recommend:

1) Due to proximity to Metro tunnels, a noise and vibration study is recommended to identify potential noise and vibration mitigation measures (if necessary), dependent on the end use of the Property and equipment to be used at the Property.

1.0 INTRODUCTION

On behalf of Kaiser Foundation Health Plan, Inc. (Kaiser), Stantec Consulting Services Inc. (Stantec) is pleased to submit this report documenting the results of an additional subsurface assessment conducted on the property consisting of 1321, 1329, and 1345 North Vermont Avenue and 1328 North New Hampshire Avenue, Los Angeles, California (the "Property"; Figure 1). Stantec recommended the additional assessment to further evaluate VOCs identified in soil and soil vapor at the Property during Stantec's April 2016 Phase II ESA.

To further investigate the VOC contamination previously identified at the Property 1) eight soil borings were advanced; 2) 13 soil vapor monitoring wells were installed (five dual nested and three shallow); and 3) soil and soil vapor samples were collected and submitted to a fixed based laboratory for chemical analysis. A detailed description of assessment activities, results, and recommendations are provided in the following sections.

2.0 SITE BACKGROUND

2.1 SITE LOCATION & FACILITY DESCRIPTION

The Property consists of four parcels identified by Assessor's Parcel Numbers 5543-014-014, 5543-014-015, 5543-013-009, and 5543-013-003 with addresses of 1321, 1329, 1345 North Vermont Avenue and 1328 North New Hampshire Avenue, respectively. The portions of the Property along North Vermont Avenue are commercial with various dental practices located on 1321 North Vermont Avenue. 1328 North New Hampshire Avenue is a residential dwelling, divided into two sub-units. Surrounding properties are a mix of commercial and residential properties. A Property location map is illustrated on Figure 1.

2.2 PRIOR ENVIRONMENTAL STUDIES

Results of a Phase I ESA conducted by Stantec for the Property and documented in a report dated March 11, 2016, identified the following Recognized Environmental Conditions in connection with the Property:

1) Historical operations at the Property included a gasoline/fueling station associated with 1331 North Vermont Avenue (former Property address); the current addresses now are 1329 and 1345 North Vermont Avenue. The gasoline station was identified in Sanborn maps, aerial photographs, and city directories, and appears to have operated at the Property from at least 1929 to approximately 1960; and

2) As part of the site reconnaissance and research, several historical dry cleaning operations were identified to have operated adjacent and/or less than 100 feet south of the Property.

Based on these findings, Stantec recommended the completion of a Phase II ESA to evaluate the potential presence of impacts in subsurface soils related to the former gasoline/fueling operations at the Property and the adjacent dry cleaning operations.

A limited Phase II ESA was completed by Stantec and documented in a report dated April 19, 2016. Contamination by petroleum hydrocarbons and risk of exposure (volatilization to indoor air) was identified at the Property. Based on the results of the Phase II ESA, Stantec recommended the following:

1) Preparation of a SMP for the Property prior to excavation and redevelopment activities;
2) A noise and vibration study to identify potential noise and vibration mitigation measures (if necessary), dependent on the end use of the Property and equipment to be used at the Property; and
3) An additional subsurface assessment to further investigate impacts to soil and soil vapor and determine if remediation or mitigation is warranted.

This report presents the findings of the additional subsurface assessment completed at the Property.

3.0 SCOPE OF WORK

The following sections detail the activities completed during the additional subsurface assessment.

3.1 PRE-FIELD ACTIVITIES

3.1.1 Health & Safety Plan

An updated *Health and Safety Plan* was prepared as required by the Occupational Health and Safety Administration (OSHA) Standard "Hazardous Waste Operations and Emergency Response" guidelines (29 CFR 1910.120). The document was reviewed and signed by all on-site consulting personnel and subcontractors prior to performing work at the Property.

3.1.2 Permitting & Utility Clearance

Prior to conducting subsurface work, permits were obtained from the Los Angeles Department of Environmental Health (LACEH) for the advancement of soil borings reaching maximum depths of 25 feet bgs. Underground Service Alert (USA) was contacted (#A61160562-00A) to identify underground utilities with surface markings. In addition, Stantec contracted a private utility locating company, Southwest Geophysics of San Diego, California, to clear the areas surrounding the proposed boring/vapor well locations.

Copies of the LACEH permits are presented as Attachment B.

3.2 SOIL BORING ADVANCEMENT AND SOIL VAPOR PROBE INSTALLATION

On May 10 and 11, 2016, Stantec oversaw CoreProbe International, Inc. (CoreProbe) of San Gabriel, CA advance soil borings SV-1b, SV-3b, and SV-4 through SV-9 at the Property (Figure 2). Each boring was advanced using a 2.5-inch diameter hand auger to a depth of 5.5 feet bgs; subsequently, a Geoprobe 6610DT rig, equipped with 2.25-inch diameter rods, was utilized to additionally advance borings SV-5 and SV-8 to 20 feet bgs and borings SV-4, SV-6 and SV-7 to 25 feet bgs.

The borings were subsequently converted into soil vapor monitoring wells. A soil vapor probe was installed at five feet bgs in borings SV-1b, SV-3b and SV-4 through SV-9. An additional soil vapor probe was installed in boring SV-4 at a depth of 21 feet bgs, in boring SV-5 at a depth of 12.5 feet bgs, in boring SV-6 at a depth of 19 feet bgs, in boring SV-7 at a depth of 23.5 feet bgs, and in boring SV-8 at a depth of 18 feet bgs. The depth of each deep vapor probe was selected based on field screening with a photo-ionization detector (PID) and the lithology encountered.

All soil borings were logged by Stantec field staff using the Unified Soil Classification System, working under the supervision of a California registered Professional Geologist. Copies of Stantec boring logs are presented as Attachment A.

3.2.1 Soil Sampling

Soil samples were selected based on field screening with a PID. A soil sample was collected from boring SV-6 at a depth of 19 feet bgs and boring SV-7 at a depth of 24 feet bgs, and an additional soil sample was collected from boring SV-8 at a depth of 17 feet bgs for soil sample analysis. Samples were obtained from a continuous core using dedicated acetate liners placed within the direct push rods at five foot intervals and was performed in accordance with the

American Society for Testing and Materials Method 1586-84. Soil samples were collected for laboratory analyses using USEPA Method 5035 approved sampling equipment and laboratory supplied containers. Sampling equipment was cleaned between each sampling interval.

3.2.2 Soil Sample Analyses

Soil samples were transported under chain-of-custody documentation to American Analytics of Chatsworth California (American Analytics) and analyzed for the presences of VOCs and GRO by USEPA Method 8260B/5035. Soil analytical data is provided as Table 1. Certified laboratory reports are included as Attachment C.

3.2.3 Soil Sample Results

GRO was detected in the sample collected from SV-6-19 at a concentration of 8,300 mg/kg, which exceeds the USEPA RSL for commercial and residential use properties of 420 mg/kg and 82 mg/kg, respectively.

Benzene and 1,2,4-trimethylbenzene were detected in the sample collected from SV-6-19 at a concentration of 4.8 mg/kg and 63 mg/kg, respectively, which exceeds the RSL for residential properties of 1.2 mg/kg and 58 mg/kg, respectively.

Ethylbenzene was detected in the sample collected from SV-6-19 at a concentration of 36 mg/kg, which exceeds the RSL for commercial and residential properties of 25 mg/kg and 5.8 mg/kg, respectively.

All other constituents for each soil sample were either detected below RSLs for residential properties or were not detected at a concentration greater than the laboratory reporting limit.

3.2.4 Soil Vapor Sampling

On May 11, 2016 soil vapor samples were collected from vapor probes SV-2-5, SV-2-19, SV-3b-5, SV-3-19, SV-4-5, SV-4-21, SV-5-5, SV-5-12.5, SV-6-5, SV-6-19, SV-7-5, and SV-7-23.5. On May 12, 2016 soil vapor samples were collected from vapor probes SV-1b-5, SV-1-20, SV-8-5, and SV-8-18. Samples from recently installed vapor wells were obtained approximately 24 hours after well installation to allow for equilibration with the subsurface. All samples were collected using laboratory provided 1.6-liter Summa canisters with regulators slowing the vapor intake to below 200 milliliters per minute.

3.2.5 Soil Vapor Sample Analyses

The summa canisters were transported under chain-of-custody documentation to American Analytics and analyzed for the presence of VOCs by USEPA Method TO-15. Soil vapor analytical data is provided as Table 2. Certified laboratory reports are included as Attachment D.

3.2.6 Soil Vapor Sample Results

Benzene was detected in vapor samples collected from probes SV-4-5 and SV-8-5 at concentrations of 0.046 µg/L and 0.039 µg/L, respectively, which exceeds the OEHHA residential screening level of 0.036 µg/L. Benzene was also detected in vapor samples collected from probes SV-6-5 and SV-6-19 at concentrations of 0.2 µg/L and 390 µg/L, respectively, which exceeds the OEHHA commercial screening level of 0.12 µg/L.

Ethylbenzene was detected in the vapor sample collected from SV-6-19 at a concentration of 310 µg/L which exceeds the OEHHA commercial screening level of 1.4 µg/L.

Xylenes were detected in the vapor sample collected from SV-6-19 at a concentration of 846 µg/L which is above the OEHHA commercial screening level of 320 µg/L.

All other constituents for each soil vapor sample were either detected below RSLs for residential properties or were not detected at a concentration greater than the laboratory reporting limit.

3.2.7 Soil Vapor Monitoring Well Abandonment

Each soil vapor monitoring well was abandoned immediately following collection of soil vapor samples. Wells were abandoned by removing the vapor probe tubing and backfilling the borehole with cement (dyed black where appropriate). The surface was then completed to match the existing grade.

3.3 WASTE HANDLING & STORAGE

Hand augers, sampling tools, and down-hole equipment were cleaned prior to and in between each sampling interval. Decontamination water and soil cuttings generated during assessment activities were placed in a California Department of Transportation approved, 35-gallon drum and stored on the Property prior to transportation to an appropriate waste disposal facility on May 24, 2016. Waste disposal documentation, including manifests, will be provided by Stantec when available.

4.0 CONCLUSIONS & RECOMMENDATIONS

To further investigate VOC contamination previously identified at the Property, Stantec conducted an additional subsurface assessment between May 10 and 12, 2016. The assessment consisted of 1) advancement of eight soil borings; 2) installation of 13 soil vapor monitoring probes (five dual nested and three shallow); 3) collection of soil and soil vapor samples for fixed based laboratory analysis; and 4) soil vapor well abandonment and waste disposal.

<u>Additional Assessment Conclusions</u>

GRO, benzene, ethylbenzene, and 1,2,4-trimethylbenzene were identified in soil at concentrations exceeding USEPA RSLs. Similar petroleum hydrocarbon VOCs were identified within soil during Stantec's April 2016 Phase II ESA as well as historical reports provided by the Property owner. Detection of soil impacts at the Property boundary and Vermont Avenue indicate contaminants may have migrated from the Property into the right-of-way of Vermont Avenue.

Benzene, ethylbenzene, and xylenes were identified in soil vapor above OEHHA screening levels. Based on the VOC impacts observed in soil and soil vapor during this additional subsurface assessment, the potential for vapor intrusion exists.

<u>Additional Assessment Recommendations</u>

Based on the results of this assessment, Stantec recommends the following:

3) It is recommended that the Property owner be provided the results of this investigation, and provide the results to the Los Angeles Regional Water Quality Control Board (LARWQCB) to determine what additional actions, if any, may be required. The Property is not listed as an open regulatory case; however, it should be noted that the Property could become an open case following communication to the LARWQCB. Kaiser should participate in any agency discussions if possible in order to understand the level of remediation that will be needed for redevelopment to occur.
4) Preparation of a Soil Management Plan (SMP) for the Property prior to excavation and redevelopment activities. The purpose of the SMP is to provide guidance to project management, site management, and field personnel on the identification and management of soil (both impacted and clean), and construction debris during excavation, grading, and construction activities to be completed at the Property. This SMP should include information associated with the possibility of encountering/assessment USTs, piping, dispensers, and/or any other UST system component;

It should be anticipated that redevelopment will require:

3) Remediation via over-excavation; and/or
4) Installation of a vapor barrier/mitigation system beneath the proposed building(s).

Stantec continues to recommend:

1) Due to proximity to Metro tunnels, a noise and vibration study is recommended to identify potential noise and vibration mitigation measures (if necessary), dependent on the end use of the Property and equipment to be used at the Property.

5.0 Limitations & Certification

This report was prepared in accordance with the scope of work outlined in Stantec's contract and with generally accepted professional environmental consulting practices existing at the time this report was prepared and applicable to the location of the Property. It was prepared for the exclusive use of Kaiser, for the express purpose stated above. Any re-use of this report for a different purpose or by others not identified above shall be at the user's sole risk without liability to Stantec. To the extent that this report is based on information provided to Stantec by third parties, Stantec may have made efforts to verify this third party information, but Stantec cannot guarantee the completeness or accuracy of this information. The opinions expressed and data collected are based on the conditions of the Property existing at the time of the field investigation. No other warranties, expressed or implied are made by Stantec.

6.0 References

https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-november-2015 - Regional Screening Levels (RSLs) - Generic Tables (November 2015)

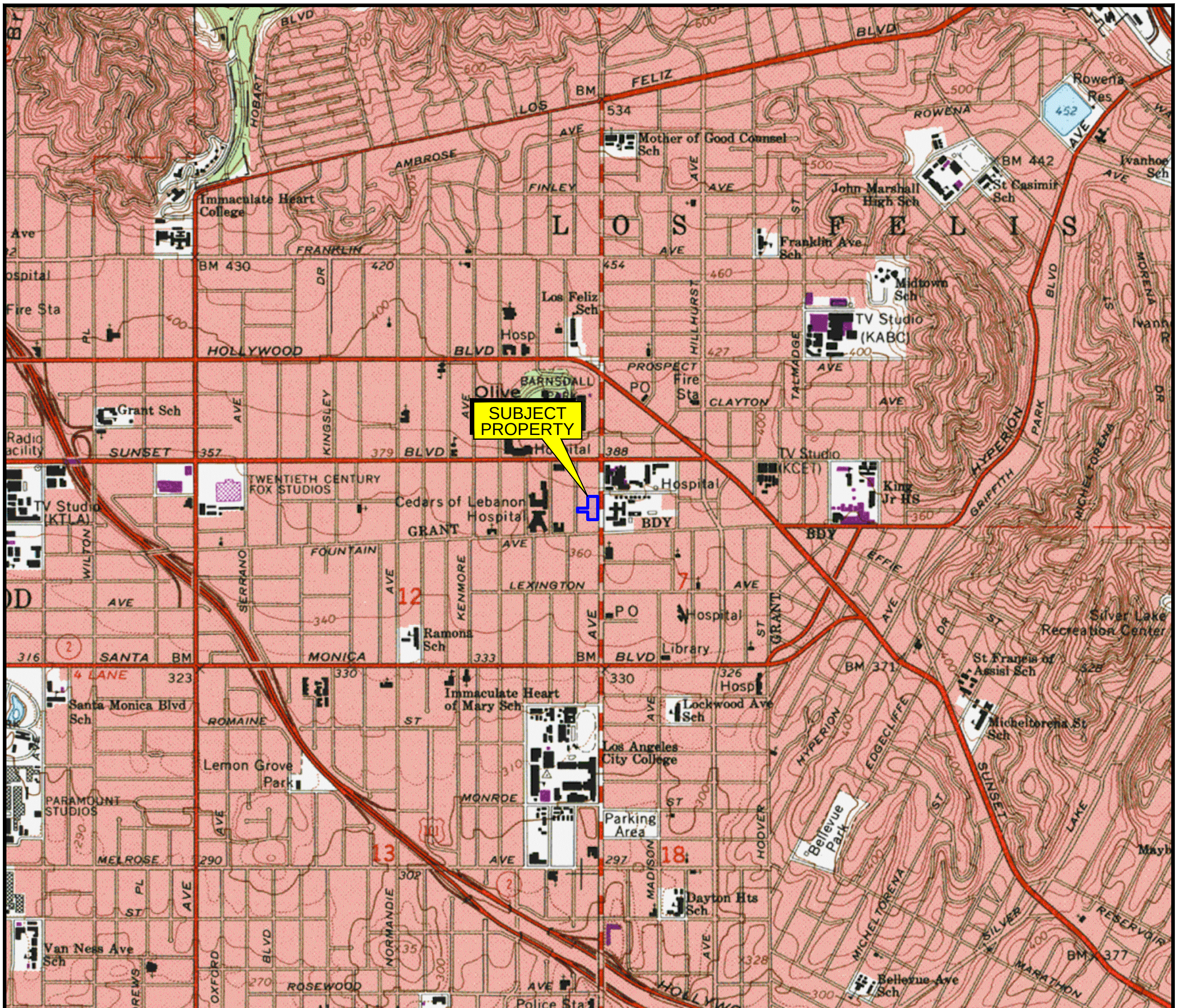
http://oehha.ca.gov/risk/chhsltable.html - Soil-Gas Screening Numbers for Volatile Chemicals below Buildings Without Engineered Fill below Sub-slab Gravel

Stantec 2016a, Phase I Environmental Site Assessment Report, March 11

Stantec 2016b, Phase II Environmental Site Assessment Report, April 19

USEPA, Region 9, 2015, Regional Screening Levels for Chemical Contaminants at Superfund Sites, January.

FIGURES



SOURCE: USGS 7.5 MINUTE TOPOGRAPHIC MAPS, HOLLYWOOD QUADRANGLE, 1966
PHOTOREVISED, 1994

N

0 2000 4000

APPROXIMATE SCALE (FEET)

Stantec

290 Conejo Ridge Avenue
Thousand Oaks, CA 91361
PHONE: (805) 230-1266 FAX: (805) 230-1277

FOR: Kaiser Foundation Health Plan, Inc. Los Angeles, CA 90006		SITE LOCATION MAP		FIGURE: 1
JOB NUMBER: 185803633	DRAWN BY: R. Roman	CHECKED BY: T. Szocinski	APPROVED BY: J. Stagno	DATE: 05/31/16

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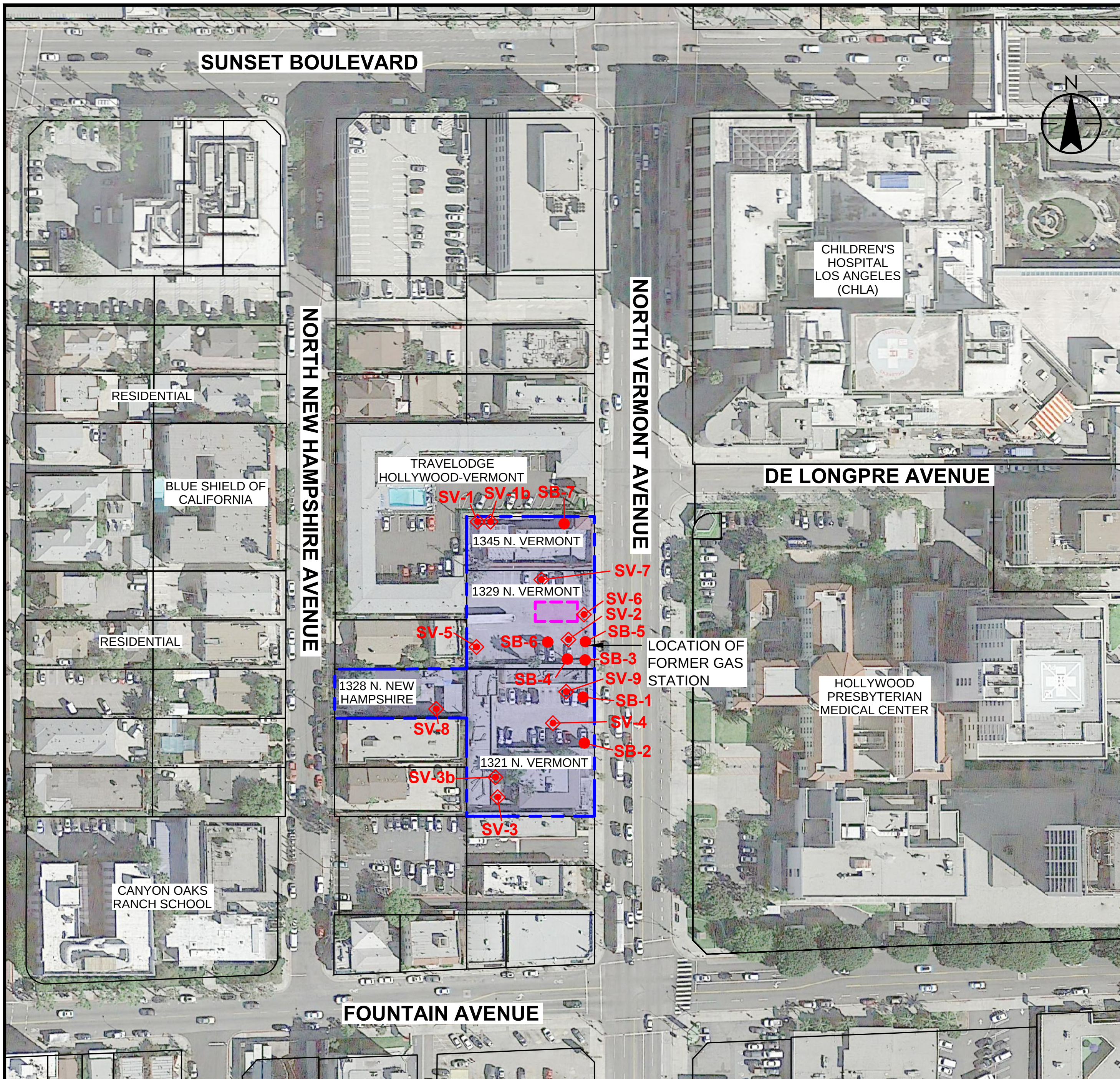

LEGEND

APPROXIMATE SITE BOUNDARY

REINFORCED CONCRETE ANOMALY

SV-1 SOIL VAPOR PROBE LOCATIONS

SB-1 SOIL BORING LOCATIONS

NOTES:

1. MAP REFERENCES; GOOGLE EARTH PRO AERIAL IMAGE, DATED MARCH 03, 2015.
2. COORDINATE SYSTEM; NAD 83 CALIFORNIA STATE PLANES, ZONE 5 (FT.). SITE FEATURES AND LOCATIONS ARE APPROXIMATE.

0 150 300

APPROXIMATE SCALE (FEET)

Stantec

290 Conejo Ridge Avenue
Thousand Oaks, CA 91361
PHONE: (805) 230-1266 FAX: (805) 230-1277

FOR:		SITE MAP SHOWING LOCATIONS OF SOIL VAPOR PROBES AND SOIL BORINGS		FIGURE: 2
Kaiser Foundation Health Plan, Inc. Los Angeles, CA 90006				
JOB NUMBER: 185803633	DRAWN BY: R. Roman	CHECKED BY: B. Goss	APPROVED BY: J. Stagno	DATE: 05/20/16

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TABLES

Table 1
Soil Analytical Data
Volatile Organic Compounds (EPA Methods 8260B/5035)
Kaiser - N. Vermont Avenue
Los Angeles, California 90027

SAMPLE I.D.	DATE	Gasoline Range Organics (GRO)	1,1,1,2-Tetrachloroethane	1,1,1-Trichloroethane	1,1,2,2-Tetrachloroethane	1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	1,1,2-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethylene	1,1-Dichloropropylene	1,2,3-Trichlorobenzene	1,2,3-Trichloropropane	1,2,4-Trichlorobenzene	1,2,4-Trimethylbenzene	1,2-Dibromo-3-chloropropane	1,2-Dibromoethane (EDB)	1,2-Dichlorobenzene	1,2-Dichloroethane (EDC)	1,2-Dichloropropane	1,3,5-Trimethylbenzene	1,3-Dichlorobenzene	1,3-Dichloropropane	1,4-Dichlorobenzene	2,2-Dichloropropane	2-Butanone (MEK)	2-Chlorotoluene	2-Hexanone (MBK)	4-Chlorotoluene	4-Isopropyltoluene	4-Methyl-2-pentanone (MIBK)	Acetone	Benzene	Bromobenzene	Bromochloromethane	Bromodichloromethane	Bromoform
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Boring Soil Samples																																				
SV-6-19	05/10/16	**8,300****	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**63***	<10	<5.0	<5.0	<5.0	<5.0	**20**	<5.0	<5.0	<5.0	<5.0	<50	<5.0	<50	<5.0	<5.0	<50	<50	**4.8***	<5.0	<5.0	<5.0	<5.0
SV-7-24	05/10/16	**13**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**0.0086**	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.0050	<0.050	<0.0050	<0.0050	<0.050	<0.050	**0.0024**	<0.0050	<0.0050	<0.0050	<0.0050
SV-8-17	05/11/16	**1.2**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**0.012**	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.0050	<0.050	<0.0050	<0.0050	<0.050	<0.050	**0.0033**	<0.0050	<0.0050	<0.0050	<0.0050
US EPA RSLs (residential in mg/kg)		82	2.0	--	0.6	--	1.1	3.6	230	--	63	0.0051	24	58	0.0053	0.036	1,800	0.46	1.0	780	--	1,600	2.6	--	--	1,600	200	1,600	--	33,000	61,000	1.2	290	150	0.29	19
US EPA RSLs (commercial in mg/kg)		420	8.8	--	2.7	--	5.0	16	1,000	--	930	0.11	110	240	0.064	0.16	9,300	2.0	4.4	12,000	--	23,000	11	--	--	23,000	1,300	23,000	--	140,000	670,000	5.1	1,800	630	1.3	86

SAMPLE I.D.	DATE	Bromomethane	Carbon Disulfide	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	cis-1,2-Dichloroethylene	cis-1,3-Dichloropropylene	Dibromochloromethane	Dibromomethane	Dichlorodifluoromethane (R12)	Diisopropyl ether (DIPE)	Ethylbenzene	Ethyl-tert-Butyl Ether (ETBE)	Hexachlorobutadiene	Isopropylbenzene	Xylenes	Methylene Chloride	Methyl-tert-Butyl Ether (MTBE)	Naphthalene	n-Butylbenzene	n-Propylbenzene	sec-Butylbenzene	Styrene	tert-Amyl Methyl Ether (TAME)	tert-Butyl alcohol (TBA)	tert-Butylbenzene	Tetrachloroethylene (PCE)	Toluene	trans-1,2-Dichloroethylene	trans-1,3-Dichloropropylene	Trichloroethylene (TCE)	Trichlorofluoromethane (R11)	Vinyl chloride
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Boring Soil Samples																																				
SV-6-19	05/10/16	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**36****	<5.0	<10	**6.4**	**58.5**	<50	<5.0	**13**	<5.0	**13**	<5.0	<5.0	<5.0	<20	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<5.0	<5.0
SV-7-24	05/10/16	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**0.0084**	<0.0050	<0.010	**0.0072**	**0.014**	<0.050	<0.0050	<0.010	<0.0050	**0.0082**	<0.0050	<0.0050	<0.0050	<0.020	<0.0050	<0.0050	<0.0020	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
SV-8-17	05/11/16	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**0.012**	<0.0050	<0.010	<0.0050	**0.020**	<0.050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.020	<0.0050	<0.0050	<0.0020	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
US EPA RSLs (residential in mg/kg)		6.8	770	0.65	280	--	0.32	110	160	--	8.3	24	87	2,200	5.8	--	1.2	--	580	57	47	2,300	3,900	3,800	7,800	6,000	--	--	7,800	24	4,900	1,600	--	0.94	23,000	0.059
US EPA RSLs (commercial in mg/kg)		30	3,500	2.9	1,300	--	1.4	460	2,300	--	39	99	370	9,400	25	--	5.3	--	2,500	1,000	210	35,000	58,000	24,000	120,000	35,000	--	--	120,000	100	47,000	23,000	--	6.0	350,000	1.7

Notes:

< = Analyte was not detected at a concentration greater than the laboratory reporting limit.

µg/kg = Micrograms per kilogram

US EPA RSLs= US Environmental Protection Agency Regional Screening Levels (November 2015)

-- = not available

63* = Concentration above the US EPA RSL for residential use.

8,300** = Concentration above the US EPA RSL for commercial use.

Table 2
Soil Vapor Analytical Data
Volatile Organic Compounds (EPA Method TO-15)
Kaiser - N. Vermont Avenue
Los Angeles, California 90027

SAMPLE I.D.	DATE	1,1,1-Trichloroethane µg/l	1,1,2,2-Tetrachloroethane µg/l	1,1,2-Trichloro-1,2,2-trifluoroethane (R113) µg/l	1,1,2-Trichloroethane µg/l	1,1-Dichloroethane µg/l	1,1-Dichloroethylene µg/l	1,2,3-Trichloropropane µg/l	1,2,4-Trichlorobenzene µg/l	1,2,4-Trimethylbenzene µg/l	1,2-Dibromoethane (EDB) µg/l	1,2-Dichlorobenzene µg/l	1,2-Dichloroethane (EDC) µg/l	1,2-Dichloropropane µg/l	1,3,5-Trimethylbenzene µg/l	1,3-Butadiene µg/l	1,3-Dichlorobenzene µg/l	1,4-Dichlorobenzene µg/l	1,4-Dioxane µg/l	2,2,4-Trimethylpentane µg/l	2-Butanone (MEK) µg/l	2-Hexanone (MBK) µg/l	4-Ethyltoluene µg/l	4-Isopropyltoluene µg/l	4-Methyl-2-pentanone (MIBK) µg/l	Acetone µg/l	Allyl chloride µg/l	Benzene µg/l	Benzyl chloride µg/l	Bromodichloromethane µg/l	Bromoform µg/l	Bromomethane µg/l	Carbon Disulfide µg/l	Carbon Tetrachloride µg/l	Chlorobenzene µg/l	Chloroethane µg/l	Chloroform µg/l	Chloromethane µg/l
Soil Vapor Samples																																						
SV-1-20	05/12/16	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	**0.21**	<0.020	<0.020	<0.020	<0.020	**0.075**	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
SV-1b-5	05/12/16	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	**0.068**	<0.010	<0.010	<0.010	<0.010	**0.019**	<0.010	<0.010	<0.010	<0.010	**0.011**	**0.030**	<0.010	**0.016**	**0.013**	<0.010	**0.19**	<0.010	**0.027**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
SV-2-5	05/11/16	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
SV-2-19	05/11/16	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SV-3-19	05/11/16	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	**0.15**	<0.010	<0.010	<0.010	<0.010	**0.79**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
SV-3b-5	05/11/16	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	**0.010**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	**0.011**	<0.010	<0.010	<0.010	<0.010	**0.039**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
SV-4-5	05/11/16	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	**0.036**	<0.010	<0.010	<0.010	<0.010	**0.018**	<0.010	<0.010	<0.010	<0.010	**0.037**	**0.048**	<0.010	**0.017**	<0.010	**0.032**	<0.010	<0.010	**0.046***	<0.010	<0.010	<0.010	<0.010	**0.040**	<0.010	<0.010	<0.010	<0.010	<0.010
SV-4-21	05/11/16	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	**0.043**	<0.010	<0.010	<0.010	<0.010	**0.013**	<0.010	<0.010	<0.010	<0.010	**0.016**	**0.026**	<0.010	<0.010	**0.012**	**0.024**	<0.010	<0.010	**0.031**	<0.010	<0.010	<0.010	<0.010	**0.025**	<0.010	<0.010	<0.010	<0.010	<0.010
SV-5-5	05/11/16	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	**0.012**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	**0.033**	<0.010	<0.010	<0.010	**0.025**	<0.010	<0.010	**0.030**	<0.010	<0.010	<0.010	<0.010	**0.013**	<0.010	<0.010	<0.010	**0.014**	<0.010
SV-5-12.5	05/11/16	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
SV-6-5	05/11/16	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	**0.21**	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	**0.20****	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
SV-6-19	05/11/16	<10	<10	<10	<10	<10	<10	<10	<10	**110**	<10	<10	<10	<10	**44**	<10	<10	<10	<10	<10	<10	<10	**55**	<10	<10	<10	<10	**390****	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SV-7-5	05/11/16	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
SV-7-23.5	05/11/16	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
SV-8-5	05/12/16	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	**0.075**	**0.034**	<0.010	<0.010	<0.010	**0.010**	**0.087**	<0.010	**0.039***	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
SV-8-18	05/12/16	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	**0.015**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	**0.042**	<0.010	<0.010	<0.010	**0.015**	<0.010	<0.010	**0.028**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
SV-9-5	05/11/16	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	**0.015**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	**0.010**	**0.013**	<0.010	<0.010	<0.010	**0.020**	**0.035**	<0.010	**0.019**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
OEHHA Soil Gas Screening Number (residential in µg/l)		990	--	--	--	--	--	--	--	--	--	--	0.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.036	--	--	--	--	--	0.025	--	--	--	--
OEHHA Soil Gas Screening Number (commercial in µg/l)		2,800	--	--	--	--	--	--	--	--	--	--	0.17	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.12	--	--	--	--	--	0.085	--	--	--	--

Notes:
< = Analyte was not detected at a concentration greater than the laboratory reporting limit.
-- = not available
µg/l = Micrograms per liter

OEHHA = California Environmental Protection Agency, Office of Environmental Health Hazard Assessment
0.046* = Concentration above OEHHA screening numbers for residential use.
0.2** = Concentration above OEHHA screening numbers for commercial use.

Table 2
Soil Vapor Analytical Data
Volatile Organic Compounds (EPA Method TO-15)
Kaiser - N. Vermont Avenue
Los Angeles, California 90027

SAMPLE I.D.	DATE	cis-1,2-Dichloroethylene µg/l	cis-1,3-Dichloropropylene µg/l	Cyclohexane µg/l	Dibromochloromethane µg/l	Dichlorodifluoromethane (R12) µg/l	Dichlorotetrafluoroethane µg/l	Diisopropyl ether (DIPE) µg/l	Ethanol µg/l	Ethyl Acetate µg/l	Ethylbenzene µg/l	Ethyl-tert-Butyl Ether (ETBE) µg/l	Heptane µg/l	Hexachlorobutadiene µg/l	Isopropanol (IPA) µg/l	Isopropylbenzene µg/l	Methylene Chloride µg/l	Methyl-tert-Butyl Ether (MTBE) µg/l	Naphthalene µg/l
Soil Vapor Samples																			
SV-1-20	05/12/16	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
SV-1b-5	05/12/16	<0.010	<0.010	**0.033**	<0.010	<0.010	<0.010	<0.010	**0.14**	<0.010	**0.050**	<0.010	**0.012**	<0.010	**0.012**	<0.010	<0.010	<0.010	<0.010
SV-2-5	05/11/16	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
SV-2-19	05/11/16	<10	<10	**250**	<10	<10	<10	<10	<10	<10	<10	<10	**210**	<10	<10	**11**	<10	<10	<10
SV-3-19	05/11/16	<0.010	<0.010	**0.031**	<0.010	<0.010	<0.010	<0.010	**0.011**	<0.010	<0.010	<0.010	**0.019**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
SV-3b-5	05/11/16	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	**0.011**	<0.010	**0.027**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
SV-4-5	05/11/16	<0.010	<0.010	**0.037**	<0.010	<0.010	<0.010	<0.010	**0.020**	<0.010	**0.043**	<0.010	**0.085**	<0.010	<0.010	<0.010	**0.022**	<0.010	<0.010
SV-4-21	05/11/16	<0.010	<0.010	**0.019**	<0.010	<0.010	<0.010	<0.010	**0.030**	<0.010	**0.026**	<0.010	**0.054**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
SV-5-5	05/11/16	<0.010	<0.010	**0.058**	<0.010	<0.010	<0.010	<0.010	**0.019**	<0.010	**0.037**	<0.010	**0.070**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
SV-5-12.5	05/11/16	<0.10	<0.10	**0.10**	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	**0.17**	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
SV-6-5	05/11/16	<0.10	<0.10	**1.3**	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	**0.18**	<0.10	**2.0**	<0.10	<0.10	**0.12**	<0.10	<0.10	<0.10
SV-6-19	05/11/16	<10	<10	**1,500**	<10	<10	<10	<10	<10	<10	**310****	<10	**4,000**	<10	<10	**34**	<10	<10	<10
SV-7-5	05/11/16	<0.10	<0.10	**0.11**	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	**0.15**	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
SV-7-23.5	05/11/16	<2.5	<2.5	**11**	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	**18**	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
SV-8-5	05/12/16	<0.010	<0.010	**0.061**	<0.010	<0.010	<0.010	<0.010	**0.014**	<0.010	**0.019**	<0.010	**0.064**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
SV-8-18	05/12/16	<0.010	<0.010	**0.013**	<0.010	<0.010	<0.010	<0.010	**0.020**	<0.010	**0.017**	<0.010	**0.045**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
SV-9-5	05/11/16	<0.010	<0.010	**0.017**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	**0.017**	<0.010	**0.022**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
OEHHA Soil Gas Screening Number (residential in µg/l)		16	--	--	--	--	--	--	--	--	0.42	--	--	--	--	--	--	4.0	0.032
OEHHA Soil Gas Screening Number (commercial in µg/l)		44	--	--	--	--	--	--	--	--	1.4	--	--	--	--	--	--	13	0.11

SAMPLE I.D.	DATE	n-Butylbenzene µg/l	n-Hexane µg/l	n-Propylbenzene µg/l	Xylenes µg/l	Propylene µg/l	sec-Butylbenzene µg/l	Styrene µg/l	tert-Amyl Methyl Ether (TAME) µg/l	tert-Butyl alcohol (TBA) µg/l	Tetrachloroethylene (PCE) µg/l	Tetrahydrofuran (THF) µg/l	Toluene µg/l	trans-1,2-Dichloroethylene µg/l	trans-1,3-Dichloropropylene µg/l	Trichloroethylene (TCE) µg/l	Trichlorofluoromethane (R11) µg/l	Vinyl acetate µg/l	Vinyl bromide µg/l	Vinyl chloride µg/l
Soil Vapor Samples																				
SV-1-20	05/12/16	<0.020	<0.020	<0.020	<0.020	**0.047**	<0.020	**0.027**	<0.020	<0.020	<0.020	**0.034**	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
SV-1b-5	05/12/16	<0.010	<0.010	**0.015**	**0.227**	<0.010	<0.010	**0.033**	<0.010	<0.010	<0.010	<0.010	**0.16**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
SV-2-5	05/11/16	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	**0.010**	<0.010	<0.010	**0.012**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
SV-2-19	05/11/16	<10	**340**	**19**	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SV-3-19	05/11/16	<0.010	**0.031**	<0.010	<0.010	**0.034**	<0.010	**0.020**	<0.010	<0.010	<0.010	**0.012**	<0.010	<0.010	<0.010	<0.010	**0.012**	<0.010	<0.010	<0.010
SV-3b-5	05/11/16	<0.010	**0.018**	<0.010	**0.033**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	**0.015**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
SV-4-5	05/11/16	<0.010	**0.12**	<0.010	**0.195**	**2.6**	<0.010	**0.015**	<0.010	<0.010	**0.020**	<0.010	**0.19**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
SV-4-21	05/11/16	<0.010	**0.11**	<0.010	**0.118**	**2.9**	<0.010	**0.019**	<0.010	<0.010	<0.010	**0.021**	**0.096**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
SV-5-5	05/11/16	<0.010	**0.083**	<0.010	**0.112**	**1.6**	<0.010	**0.021**	<0.010	<0.010	<0.010	<0.010	**0.073**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
SV-5-12.5	05/11/16	<0.10	**0.39**	<0.10	<0.10	**10**	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
SV-6-5	05/11/16	<0.10	**2.4**	**0.24**	**0.41**	**1.7**	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	**0.18**	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
SV-6-19	05/11/16	<10	**5,100**	**46**	**846***	<10	<10	<10	<10	<10	<10	<10	**37**	<10	<10	<10	<10	<10	<10	<10
SV-7-5	05/11/16	<0.10	**0.32**	<0.10	<0.10	**4.8**	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
SV-7-23.5	05/11/16	<2.5	**19**	<2.5	<2.5	**9.5**	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
SV-8-5	05/12/16	<0.010	**0.093**	<0.010	**0.066**	**0.90**	<0.010	**0.013**	<0.010	<0.010	<0.010	<0.010	**0.089**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
SV-8-18	05/12/16	<0.010	**0.13**	<0.010	**0.076**	**4.6**	<0.010	**0.010**	<0.010	<0.010	<0.010	<0.010	**0.066**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
SV-9-5	05/11/16	<0.010	**0.017**	<0.010	**0.072**	**0.075**	<0.010	**0.015**	<0.010	<0.010	<0.010	<0.010	**0.067**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
OEHHA Soil Gas Screening Number (residential in µg/l)		--	--	--	320	--	--	--	--	--	0.18	--	140	32	--	0.53	--	--	--	0.013
OEHHA Soil Gas Screening Number (commercial in µg/l)		--	--	--	880	--	--	--	--	--	0.6	--	380	89	--	1.8	--	--	--	0.045

Notes:
< = Analyte was not detected at a concentration greater than the laboratory reporting limit.
-- = not available
µg/l = Micrograms per liter

OEHHA = California Environmental Protection Agency, Office of Environmental Health Hazard Assessment
0.046* = Concentration above OEHHA screening numbers for resic
0.2** = Concentration above OEHHA screening numbers for comr

ATTACHMENT A
Soil Boring Logs

PROJECT: **Kaiser Foundation Health Plan, Inc.** LOCATION: **1321 N. Vermont Ave.** PROJECT NUMBER: **185803633**	WELL / PROBEHOLE / BOREHOLE NO: **SV-1b** PAGE 1 OF 1
DRILLING / INSTALLATION: STARTED: **5/11/2016** COMPLETED: **5/11/2016** DRILLING COMPANY: **Core Probe International Inc.** DRILLING EQUIPMENT: **Hand Auger** DRILLING METHOD: **Continuous Core** SAMPLING EQUIPMENT: **Terra Cores**	NORTHING (ft): EASTING (ft): LATITUDE: LONGITUDE: GROUND ELEV (ft): TOC ELEV (ft): INITIAL DTW (ft): **N/A** BOREHOLE DEPTH (ft): **5.5** STATIC DTW (ft): **N/A** WELL DEPTH (ft): **5.5** WELL CASING DIAM. (in): **0.25** BOREHOLE DIAM. (in):**2.25** LOGGED BY: **BG** CHECKED BY: **J. Stagno**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace PID (ppm)	Depth (feet)	Well Construction
			Tile surface; hand augered to 5.5' bgs							0.25" Valve
		SM	**SILTY SAND**; SM; light brown; dry; 75% fine-grained sand; 25% silt; crumble							0.25" Nylaflow Tubing Hydrated Bentonite Chips Dry Bentonite Chips No. 2/12 Sand Soil Vapor Probe
5									5	
			Borehole terminated at 5.5 feet bgs.							

PROJECT: **Kaiser Foundation Health Plan, Inc.** LOCATION: **1321 N. Vermont Ave.** PROJECT NUMBER: **185803633**	WELL / PROBEHOLE / BOREHOLE NO: **SV-3b** PAGE 1 OF 1
DRILLING / INSTALLATION: STARTED: **5/10/2016** COMPLETED: **5/10/2016** DRILLING COMPANY: **Core Probe International Inc.** DRILLING EQUIPMENT: **Hand Auger** DRILLING METHOD: **Continuous Core** SAMPLING EQUIPMENT: **Terra Cores**	NORTHING (ft): LATITUDE: GROUND ELEV (ft): INITIAL DTW (ft): **N/A** STATIC DTW (ft): **N/A** WELL CASING DIAM. (in): **0.25** LOGGED BY: **BG**
	EASTING (ft): LONGITUDE: TOC ELEV (ft): BOREHOLE DEPTH (ft): **5.5** WELL DEPTH (ft): **5.5** BOREHOLE DIAM. (in):**2.25** CHECKED BY: **J. Stagno**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace PID (ppm)	Depth (feet)	Well Construction
			Landscape soil; hand augered to 5.5' bgs							0.25" Valve
										0.25" Nylaflow Tubing
										Hydrated Bentonite Chips
		SP	**POORLY GRADED SAND**; SP; light brown; fine-grained sand; very loose; dry; no odor; landscape backfill					0.0		
										Dry Bentonite Chips
										No. 2/12 Sand
5									5	Soil Vapor Probe
			Borehole terminated at 5.5 feet bgs.							

PROJECT: **Kaiser Foundation Health Plan, Inc.**
LOCATION: **1321 N. Vermont Ave.**
PROJECT NUMBER: **185803633**

WELL / PROBEHOLE / BOREHOLE NO:
SV-4

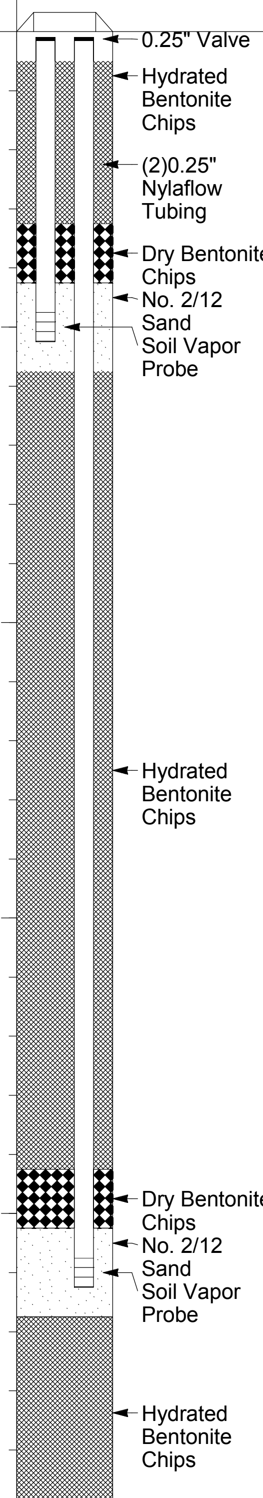
DRILLING / INSTALLATION:
STARTED: **5/10/2016** COMPLETED: **5/10/2016**
DRILLING COMPANY: **Core Probe International Inc.**
DRILLING EQUIPMENT: **Geoprobe 6610**
DRILLING METHOD: **Direct Push**
SAMPLING EQUIPMENT: **Terra Cores**

NORTHING (ft):
LATITUDE:
GROUND ELEV (ft):
INITIAL DTW (ft): **N/A**
STATIC DTW (ft): **N/A**
WELL CASING DIAM. (in): **0.25**
LOGGED BY: **BG**

EASTING (ft):
LONGITUDE:
TOC ELEV (ft):
BOREHOLE DEPTH (ft): **25.0**
WELL DEPTH (ft): **5, 21**
BOREHOLE DIAM. (in): **2.25**
CHECKED BY: **J. Stagno**

Time & Depth (feet)	USCS	Description	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace PID (ppm)
0		4" asphalt at surface; hand augered to 5' bgs				
4	SM	**SILTY SAND**; SM; dark gray; moist; no odor; poorly graded; 50% fine-grained sand; 50% silt	.			0.0
7	SP	**POORLY GRADED SAND**; SP; light brown; dry; no odor	.			0.0
10	SM	**SILTY SAND**; SM; light brown; dense; dry; no odor; poorly graded	.			0.0
14	SM	SM; increasing silt; 15% coarse-grained sand				
16	SW	**WELL GRADED SAND**; SW; light brown; moist; 50% coarse-grained sand; 25% medium-grained sand; 25% fine-grained sand to silt	.			0.0
20	SW	SW; same as above; increasing silt				
21	SM	**SILTY SAND**; SM; light brown to rust; moist; 5% coarse-grained sand; 45% medium-grained sand; 50% fine-grained sand to silt	.			0.0
23	SC	**CLAYEY SAND**; SC; light brown; 5% coarse-grained sand	.			0.0
24	CL	**CLAY**; CL; light brown to rust; hard; no gravel				
25		Borehole terminated at 25 feet bgs.				

Well Construction



PROJECT: **Kaiser Foundation Health Plan, Inc.**
LOCATION: **1329 N. Vermont Ave.**
PROJECT NUMBER: **185803633**

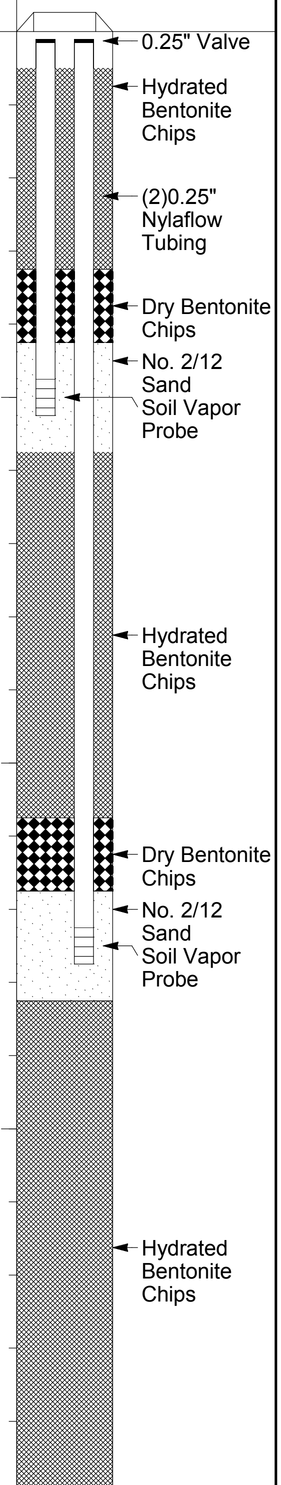
WELL / PROBEHOLE / BOREHOLE NO:

SV-5

DRILLING / INSTALLATION:	NORTHING (ft):
STARTED: **5/10/2016** COMPLETED: **5/10/2016**	EASTING (ft):
DRILLING COMPANY: **Core Probe International Inc.**	LATITUDE:
DRILLING EQUIPMENT: **Geoprobe 6610**	LONGITUDE:
DRILLING METHOD: **Direct Push**	GROUND ELEV (ft):
SAMPLING EQUIPMENT: **Terra Cores**	TOC ELEV (ft):
INITIAL DTW (ft): **N/A**	BOREHOLE DEPTH (ft): **20.0**
STATIC DTW (ft): **N/A**	WELL DEPTH (ft): **5, 12.5**
WELL CASING DIAM. (in): **0.25**	BOREHOLE DIAM. (in): **2.25**
LOGGED BY: **BG**	CHECKED BY: **J. Stagno**

Time & Depth (feet)	USCS	Description	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace PID (ppm)	Depth (feet)
		4" asphalt at surface; hand augered to 5' bgs					
	SM	**SILTY SAND**; SM; light brown; moist; 75% silt; 25% fine to medium-grained sand; crumbly	.			0.0	
5	SM	SM; light brown; fine to medium-grained sand	.			0.0	5
	SP	**POORLY GRADED SAND**; SP; yellowish orange; fine-grained sand					
	SP	SP; same as above; medium-grained sand	.			0.0	
	SP	SP; same as above; fine-grained sand	.			0.0	
10	SM	**SILTY SAND**; SM; light brown; fine-grained sand	.			0.0	10
			.			0.0	
			.			0.0	
	CL	**CLAY**; CL; dark brown	.			0.0	
15							15
	CL	CL; same as above; rust brown	.			0.0	
	CL	CL; same as above					
	CL	CL; same as above					
20		Borehole terminated at 20 feet bgs.					20

Well Construction

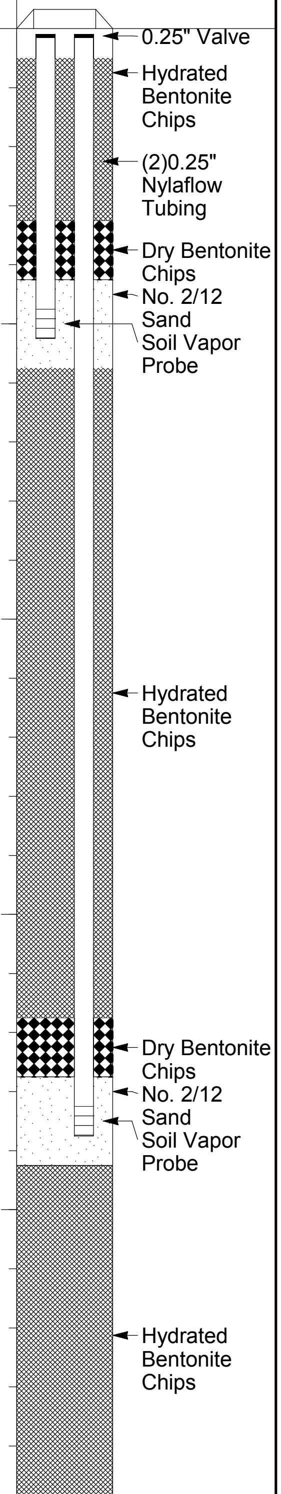


PROJECT: **Kaiser Foundation Health Plan, Inc.** LOCATION: **1329 N. Vermont Ave.** PROJECT NUMBER: **185803633**	WELL / PROBEHOLE / BOREHOLE NO: **SV-6** PAGE 1 OF 1

DRILLING / INSTALLATION:	NORTHING (ft):	EASTING (ft):
STARTED: **5/10/2016** COMPLETED: **5/10/2016**	LATITUDE:	LONGITUDE:
DRILLING COMPANY: **Core Probe International Inc.**	GROUND ELEV (ft):	TOC ELEV (ft):
DRILLING EQUIPMENT: **Geoprobe 6610**	INITIAL DTW (ft): **N/A**	BOREHOLE DEPTH (ft): **25.0**
DRILLING METHOD: **Direct Push**	STATIC DTW (ft): **N/A**	WELL DEPTH (ft): **5, 18.5**
SAMPLING EQUIPMENT: **Terra Cores**	WELL CASING DIAM. (in): **0.25**	BOREHOLE DIAM. (in): **2.25**
	LOGGED BY: **BG**	CHECKED BY: **J. Stagno**

Time & Depth (feet)	USCS	Description	Time Sample ID	Headspace PID (ppm)
0		4" asphalt at surface; hand augered to 5' bgs		
	SM	**SILTY SAND**; SM; (7.5YR 4/4) brown; moist; no odor; 75% silt; 25% fine-grained sand		0.0
5				
	SP-SM	**POORLY GRADED SAND WITH SILT**; SP-SM; yellowish orange; 75% medium-grained sand; 25% silt		0.0
10	SW	**WELL GRADED SAND**; SW; (7.5YR 6/3) light brown; fine to medium-grained sand; subrounded		
	ML	**SILT**; ML; green; soft; silt layer		
	SW	**WELL GRADED SAND**; SW; olive gray; slight odor; 70% fine-grained sand; 30% medium-grained sand		4.0
				140
15	SM	**SANDY SILT**; SM; greenish; strong odor; poorly graded; 50% silt; 50% sand; crumbly		389
	SM	SM; same as above; 75% fine-grained sand; 25% silt; sand layer from 16-17' bgs		571
	SM	SM; same as above; increasing silt; 50% sand; 50% silt; medium to coarse-grained sand; strong odor		444
				586
			08:30 SV-6-19	720
	SM	SM; same as above; 75% sand; 25% silt; very strong odor; sand layer from 18.5-19' bgs; increasing silt & clay		
20	CL	**CLAY**; CL; rust red		351
				128
				12.2
				2.3
25		Borehole terminated at 25 feet bgs.		

Well Construction



PROJECT: **Kaiser Foundation Health Plan, Inc.**
LOCATION: **1321 N. Vermont Ave.**
PROJECT NUMBER: **185803633**

WELL / PROBEHOLE / BOREHOLE NO:
SV-7

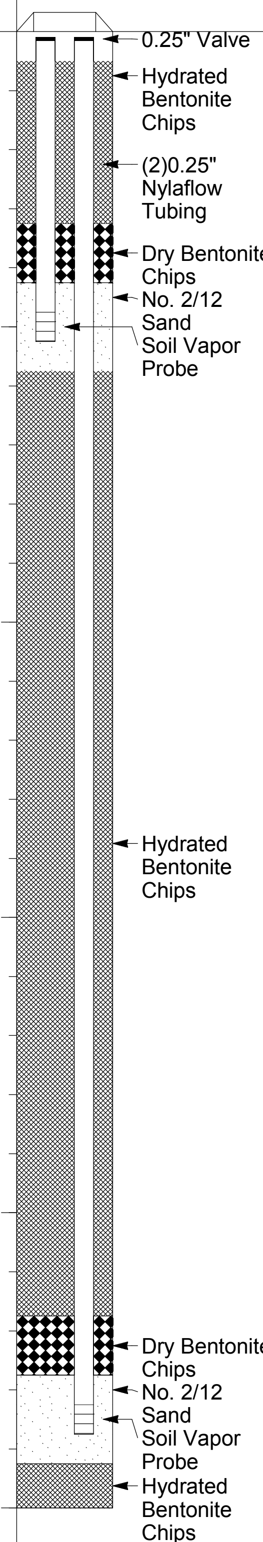
Stantec

DRILLING / INSTALLATION:	
STARTED: **5/10/2016**	COMPLETED: **5/10/2016**
DRILLING COMPANY: **Core Probe International Inc.**	
DRILLING EQUIPMENT: **Geoprobe 6610**	
DRILLING METHOD: **Direct Push**	
SAMPLING EQUIPMENT: **Terra Cores**	

NORTHING (ft):	EASTING (ft):
LATITUDE:	LONGITUDE:
GROUND ELEV (ft):	TOC ELEV (ft):
INITIAL DTW (ft): **N/A**	BOREHOLE DEPTH (ft): **25.0**
STATIC DTW (ft): **N/A**	WELL DEPTH (ft): **5, 23.5**
WELL CASING DIAM. (in): **0.25**	BOREHOLE DIAM. (in):**2.25**
LOGGED BY: **BG**	CHECKED BY: **J. Stagno**

Time & Depth (feet)	USCS	Description	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace PID (ppm)	Depth (feet)
0		4" asphalt at surface; hand augered to 5' bgs					0
	SM	**SILTY SAND**; SM; dark brown; moist; no odor; 75% silt; 25% sand; crumbly				0.0	
5	SM	SM; 80% silt; 205 sand				0.0	5
	SM	SM; same as above					
	SW	**WELL GRADED SAND**; SW; medium-grained sand; sand layer from 8-8.25' bgs				0.0	
	SM	**SILTY SAND**; SM					
	SP	**POORLY GRADED SAND**; SP; fine-grained sand; sand layer from 9.5-10' bgs				0.0	
10	SM	**SILTY SAND**; SM; light brown; fine to medium-grained sand; moist; 50% silt; 50% sand; crumbly				0.0	10
	SM	**SILTY SAND**; SM; fine-grained sand; soft; poorly graded				0.0	
	SM	SM; same as above				0.0	
15							15
	SP	**POORLY GRADED SAND**; SP; olive gray; fine-grained sand				0.0	
	SP	SP; same as above				0.0	
	SP	SP; same as above				0.0	
20							20
	SM	**SILT WITH SAND**; SM; hard				5.3	
	SM	**SAND WITH SILT**; SM; olive gray; fine to medium-grained sand; slight odor; 70% sand; 30% silt				7.8	
						65.1	
			10:05 SV-7-24			68.8	
	CL	**CLAY**; CL; gray					
25		Borehole terminated at 25 feet bgs.					25

Well Construction



PROJECT: **Kaiser Foundation Health Plan, Inc.** LOCATION: **1328 N. New Hampshire Ave.** PROJECT NUMBER: **185803633**	WELL / PROBEHOLE / BOREHOLE NO: **SV-8** PAGE 1 OF 1
DRILLING / INSTALLATION: STARTED: **5/11/2016** COMPLETED: **5/11/2016** DRILLING COMPANY: **Core Probe International Inc.** DRILLING EQUIPMENT: **Geoprobe 6610** DRILLING METHOD: **Direct Push** SAMPLING EQUIPMENT: **Terra Cores**	NORTHING (ft): EASTING (ft): LATITUDE: LONGITUDE: GROUND ELEV (ft): TOC ELEV (ft): INITIAL DTW (ft): **N/A** BOREHOLE DEPTH (ft): **20.0** STATIC DTW (ft): **N/A** WELL DEPTH (ft): **5, 17.5** WELL CASING DIAM. (in): **0.25** BOREHOLE DIAM. (in):**2.25** LOGGED BY: **BG** CHECKED BY: **J. Stagno**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace PID (ppm)	Depth (feet)	Well Construction
			Concrete slab at surface; hand augered to 5' bgs							0.25" Valve
		SM	**SILTY SAND**; SM; light brown; moist; 75% silt; 25% fine to medium-grained sand; roots							Hydrated Bentonite Chips; (2)0.25" Nylaflow Tubing; Dry Bentonite Chips; No. 2/12 Sand; Soil Vapor Probe
5		SM	**SILTY SAND**; SM; light brown; dry; poorly graded; 50% silt; 50% fine-grained sand						5	
10		SM	SM; same as above; 75% silt; 25% sand						10	Hydrated Bentonite Chips
		ML	**SILT**; ML; yellowish orange; dry; crumbly							
		ML	ML; same as above							
15		ML	ML; same as above; hard; increasing moisture		12:22 SV-8-17				15	Dry Bentonite Chips; No. 2/12 Sand; Soil Vapor Probe
		SM	**SILTY SAND**; SM; 75% silt; 25% fine to medium-grained sand							
		CL	**CLAY**; CL; hard; dry							Hydrated Bentonite Chips
20			Borehole terminated at 20 feet bgs.						20	

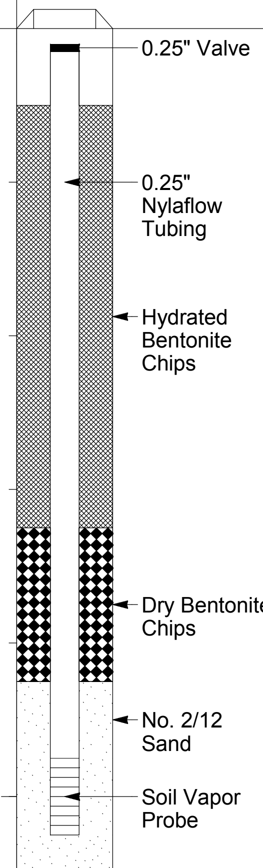
PROJECT: **Kaiser Foundation Health Plan, Inc.**	WELL / PROBEHOLE / BOREHOLE NO:
LOCATION: **1321 N. Vermont Ave.**	**SV-9**
PROJECT NUMBER: **185803633**	PAGE 1 OF 1

Stantec

DRILLING / INSTALLATION:	NORTHING (ft):
STARTED: **5/10/2016** COMPLETED: **5/10/2016**	EASTING (ft):
DRILLING COMPANY: **Core Probe International Inc.**	LATITUDE: / LONGITUDE:
DRILLING EQUIPMENT: **Hand Auger**	GROUND ELEV (ft): / TOC ELEV (ft):
DRILLING METHOD: **Continuous Core**	INITIAL DTW (ft): **N/A** / BOREHOLE DEPTH (ft): **5.5**
SAMPLING EQUIPMENT: **Terra Cores**	STATIC DTW (ft): **N/A** / WELL DEPTH (ft): **5.5**
	WELL CASING DIAM. (in): **0.25** / BOREHOLE DIAM. (in): **2.25**
	LOGGED BY: **BG** / CHECKED BY: **J. Stagno**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace PID (ppm)	Depth (feet)
			4" asphalt at surface; hand augered to 5.5' bgs						
		SM	**SILT SOME**; SM; dark gray; moist; no odor; poorly graded; 75% silt; 25% sand; crumbly		.			0.0	
5									5
			Borehole terminated at 5.5 feet bgs.						

Well Construction



ATTACHMENT B
Los Angeles County Department of Environmental Health Permit

ENVIRONMENTAL HEALTH

Drinking Water Program

5050 Commerce Drive, Baldwin Park, CA 91706
Telephone: (626) 430-5420 • Facsimile: (626) 813-3013 • Email: vgallegos@ph.lacounty.gov
http://publichealth.lacounty.gov/eh/ep/dw/dw_main.htm

County of Los Angeles
Public Health

SR0068689
1321 N Vermont Los Angeles 90027 Work Plan Approval

TO BE COMPLETED BY APPLICANT:

WORK SITE ADDRESS	CITY	ZIP	EMAIL ADDRESS FOR WELL PERMIT APPROVAL
1321 N. Vermont / New Hampshire	Los Angeles	90027	Tom.szocinski@stantec.com

NOTICE:

- WORK PLAN APPROVALS ARE VALID FOR 180 DAYS. 30 DAY EXTENSIONS OF WORK PLAN APPROVALS ARE CONSIDERED ON AN INDIVIDUAL (CASE-BY-CASE) BASIS AND MAY BE SUBJECT TO ADDITIONAL PLAN REVIEW FEES (HOURLY RATE AS APPLICABLE).
- WORK PLAN MODIFICATIONS MAY BE REQUIRED IF WELL AND GEOLOGIC CONDITIONS ENCOUNTERED AT THE SITE INSPECTION ARE FOUND TO DIFFER FROM THE SCOPE OF WORK PRESENTED TO THE DEPARTMENT OF PUBLIC HEALTH—DRINKING WATER PROGRAM.
- WORK PLAN APPROVALS ARE LIMITED TO COMPLIANCE WITH THE CALIFORNIA WELL STANDARDS AND THE LOS ANGELES COUNTY CODE AND DOES NOT GRANT ANY RIGHTS TO CONSTRUCT, RENOVATE, OR DECOMMISSION ANY WELL. THE APPLICANT IS RESPONSIBLE FOR SECURING ALL OTHER NECESSARY PERMITS SUCH AS WATER RIGHTS, PROPERTY RIGHTS, COASTAL COMMISSION APPROVALS, USE COVENANTS, ENCROACHMENT PERMISSIONS, UTILITY LINE SETBACKS, CITY/COUNTY PUBLIC WORKS RIGHTS OF WAY, ETC.
- ALL FIELD WORK MUST BE CONDUCTED UNDER THE DIRECT SUPERVISION OF A PROFESSIONAL GEOLOGIST LICENSED IN THE STATE OF CALIFORNIA.
- THIS PERMIT IS NOT COMPLETE UNTIL ALL OF THE FOLLOWING REQUIREMENTS ARE SIGNED BY THE DEPUTY HEALTH OFFICER. WORK SHALL NOT BE INITIATED WITHOUT A WORK PLAN APPROVAL STAMPED BY THE DEPARTMENT OF PUBLIC HEALTH—DRINKING WATER PROGRAM.
- ***ONCE APPROVED NOTIFY VINCENT GALLEGOS AT vgallegos@ph.lacounty.gov PREFERABLY 4 BUSINESS DAYS BEFORE WORK IS SCHEDULED TO BEGIN.***

TO BE COMPLETED BY DEPARTMENT OF PUBLIC HEALTH—DRINKING WATER PROGRAM:

X WORK PLAN APPROVED: 7 borings DATE: May 4, 2016

ADDITIONAL APPROVAL CONDITIONS:

- Please provide/ verify project dates and time via my email listed above this comment box
- Backfill: use approved materials such as Portland cement, sand cement grout, neat cement, bentonite… native material may not be utilized.
- Borings: drilled, sampled and backfilled within 72 hours

Vincent Gallegos R.E.H.S.
Drinking Water Program
vgallegos@ph.lacounty.gov

GROUT SEAL INSPECTION

DATE ACCEPTED: REHS signature	

ATTACHMENT C

Certified Analytical Laboratory Reports – Soil

9765 Eton Avenue
Chatsworth
California 91311
Tel: (818) 998-5547
Fax: (818) 998-7258

May 18, 2016

Tom Szocinski

Stantec (TO)

290 Conejo Ridge Ave. Suite #200

Thousand Oaks, CA 91361

Re : Kaiser - Vermont Ave. / 185803633

A732181 / 6E11017

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received on 05/11/16 13:59 and analyzed in accordance with the attached chain-of-custody.

Unless otherwise noted, all analytical testing was accomplished in accordance with the guidelines established in our Quality Assurance Program Manual, applicable standard operating procedures, and other related documentation. The results in this analytical report are limited to the samples tested and any reproduction thereof must be made in its entirety.

If you have any questions regarding this report or require additional information please call me at American Analytics.

Sincerely,

Viorel Vasile

Operations Manager

LABORATORY ANALYSIS RESULTS

Client: Stantec (TO)
Project No: 185803633
Project Name: Kaiser - Vermont Ave.

AA Project No: A732181
Date Received: 05/11/16
Date Reported: 05/18/16

Sample ID	Laboratory ID	Matrix	TAT	Date Sampled	Date Received
8260B/5035 +OXY+TPHG					
SV-6-19	6E11017-01	Soil	3	05/10/16 08:30	05/11/16 13:59
SV-7-24	6E11017-02	Soil	3	05/10/16 10:05	05/11/16 13:59
SV-8-17	6E11017-03	Soil	3	05/11/16 12:22	05/11/16 13:59

Viorel Vasile
Operations Manager

AMERICAN ANALYTICS

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732181
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/18/16
Method:	VOCs, OXY & TPHG by GC/MS EPA 5035	**Units:**	mg/kg

Date Sampled:	05/10/16	05/10/16	05/11/16	
Date Prepared:	05/17/16	05/17/16	05/17/16	
Date Analyzed:	05/17/16	05/17/16	05/17/16	
AA ID No:	6E11017-01	6E11017-02	6E11017-03	
Client ID No:	SV-6-19	SV-7-24	SV-8-17	
Matrix:	Soil	Soil	Soil	
Dilution Factor:	1000	1	1	MRL
8260B/5035 +OXY+TPHG (EPA 8260B/5035)				
Acetone	<50	<0.050	<0.050	0.050
tert-Amyl Methyl Ether (TAME)	<5.0	<0.0050	<0.0050	0.0050
Benzene	**4.8**	**0.0024**	**0.0033**	0.0020
Bromobenzene	<5.0	<0.0050	<0.0050	0.0050
Bromochloromethane	<5.0	<0.0050	<0.0050	0.0050
Bromodichloromethane	<5.0	<0.0050	<0.0050	0.0050
Bromoform	<5.0	<0.0050	<0.0050	0.0050
Bromomethane	<5.0	<0.0050	<0.0050	0.0050
2-Butanone (MEK)	<50	<0.050	<0.050	0.050
tert-Butyl alcohol (TBA)	<20	<0.020	<0.020	0.020
sec-Butylbenzene	<5.0	<0.0050	<0.0050	0.0050
tert-Butylbenzene	<5.0	<0.0050	<0.0050	0.0050
n-Butylbenzene	<5.0	<0.0050	<0.0050	0.0050
Carbon Disulfide	<5.0	<0.0050	<0.0050	0.0050
Carbon Tetrachloride	<5.0	<0.0050	<0.0050	0.0050
Chlorobenzene	<5.0	<0.0050	<0.0050	0.0050
Chloroethane	<5.0	<0.0050	<0.0050	0.0050
Chloroform	<5.0	<0.0050	<0.0050	0.0050
Chloromethane	<5.0	<0.0050	<0.0050	0.0050
2-Chlorotoluene	<5.0	<0.0050	<0.0050	0.0050
4-Chlorotoluene	<5.0	<0.0050	<0.0050	0.0050
1,2-Dibromo-3-chloropropane	<10	<0.010	<0.010	0.010
Dibromochloromethane	<5.0	<0.0050	<0.0050	0.0050
1,2-Dibromoethane (EDB)	<5.0	<0.0050	<0.0050	0.0050
Dibromomethane	<5.0	<0.0050	<0.0050	0.0050
1,4-Dichlorobenzene	<5.0	<0.0050	<0.0050	0.0050
1,3-Dichlorobenzene	<5.0	<0.0050	<0.0050	0.0050

Viorel Vasile
Operations Manager

AMERICAN ANALYTICS

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732181
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/18/16
Method:	VOCs, OXY & TPHG by GC/MS EPA 5035	**Units:**	mg/kg

Date Sampled:	05/10/16	05/10/16	05/11/16	
Date Prepared:	05/17/16	05/17/16	05/17/16	
Date Analyzed:	05/17/16	05/17/16	05/17/16	
AA ID No:	6E11017-01	6E11017-02	6E11017-03	
Client ID No:	SV-6-19	SV-7-24	SV-8-17	
Matrix:	Soil	Soil	Soil	
Dilution Factor:	1000	1	1	MRL

8260B/5035 +OXY+TPHG (EPA 8260B/5035) (continued)

1,2-Dichlorobenzene	<5.0	<0.0050	<0.0050	0.0050
Dichlorodifluoromethane (R12)	<5.0	<0.0050	<0.0050	0.0050
1,1-Dichloroethane	<5.0	<0.0050	<0.0050	0.0050
1,2-Dichloroethane (EDC)	<5.0	<0.0050	<0.0050	0.0050
trans-1,2-Dichloroethylene	<5.0	<0.0050	<0.0050	0.0050
cis-1,2-Dichloroethylene	<5.0	<0.0050	<0.0050	0.0050
1,1-Dichloroethylene	<5.0	<0.0050	<0.0050	0.0050
2,2-Dichloropropane	<5.0	<0.0050	<0.0050	0.0050
1,3-Dichloropropane	<5.0	<0.0050	<0.0050	0.0050
1,2-Dichloropropane	<5.0	<0.0050	<0.0050	0.0050
trans-1,3-Dichloropropylene	<5.0	<0.0050	<0.0050	0.0050
1,1-Dichloropropylene	<5.0	<0.0050	<0.0050	0.0050
cis-1,3-Dichloropropylene	<5.0	<0.0050	<0.0050	0.0050
Diisopropyl ether (DIPE)	<5.0	<0.0050	<0.0050	0.0050
Ethylbenzene	**36**	**0.0084**	**0.012**	0.0020
Ethyl-tert-Butyl Ether (ETBE)	<5.0	<0.0050	<0.0050	0.0050
Gasoline Range Organics (GRO)	**8300**	**13**	**1.2**	0.50
Hexachlorobutadiene	<10	<0.010	<0.010	0.010
2-Hexanone (MBK)	<50	<0.050	<0.050	0.050
Isopropylbenzene	**6.4**	**0.0072**	<0.0050	0.0050
4-Isopropyltoluene	<5.0	<0.0050	<0.0050	0.0050
Methyl-tert-Butyl Ether (MTBE)	<5.0	<0.0050	<0.0050	0.0050
Methylene Chloride	<50	<0.050	<0.050	0.050
4-Methyl-2-pentanone (MIBK)	<50	<0.050	<0.050	0.050
Naphthalene	**13**	<0.010	<0.010	0.010
n-Propylbenzene	**13**	**0.0082**	<0.0050	0.0050

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732181
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/18/16
Method:	VOCs, OXY & TPHG by GC/MS EPA 5035	**Units:**	mg/kg

Date Sampled:	05/10/16	05/10/16	05/11/16	
Date Prepared:	05/17/16	05/17/16	05/17/16	
Date Analyzed:	05/17/16	05/17/16	05/17/16	
AA ID No:	6E11017-01	6E11017-02	6E11017-03	
Client ID No:	SV-6-19	SV-7-24	SV-8-17	
Matrix:	Soil	Soil	Soil	
Dilution Factor:	1000	1	1	MRL
8260B/5035 +OXY+TPHG (EPA 8260B/5035) (continued)				
Styrene	<5.0	<0.0050	<0.0050	0.0050
1,1,1,2-Tetrachloroethane	<5.0	<0.0050	<0.0050	0.0050
1,1,2,2-Tetrachloroethane	<5.0	<0.0050	<0.0050	0.0050
Tetrachloroethylene (PCE)	<5.0	<0.0050	<0.0050	0.0050
Toluene	<2.0	<0.0020	<0.0020	0.0020
1,2,4-Trichlorobenzene	<5.0	<0.0050	<0.0050	0.0050
1,2,3-Trichlorobenzene	<5.0	<0.0050	<0.0050	0.0050
1,1,2-Trichloroethane	<5.0	<0.0050	<0.0050	0.0050
1,1,1-Trichloroethane	<5.0	<0.0050	<0.0050	0.0050
Trichloroethylene (TCE)	<5.0	<0.0050	<0.0050	0.0050
Trichlorofluoromethane (R11)	<5.0	<0.0050	<0.0050	0.0050
1,2,3-Trichloropropane	<5.0	<0.0050	<0.0050	0.0050
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<5.0	<0.0050	<0.0050	0.0050
1,3,5-Trimethylbenzene	**20**	<0.0050	<0.0050	0.0050
1,2,4-Trimethylbenzene	**63**	**0.0086**	**0.012**	0.0050
Vinyl chloride	<5.0	<0.0050	<0.0050	0.0050
o-Xylene	**2.5**	<0.0020	<0.0020	0.0020
m,p-Xylenes	**56**	**0.014**	**0.020**	0.0020

Surrogates				**%REC Limits**
4-Bromofluorobenzene	87%	89%	92%	70-140
Dibromofluoromethane	98%	98%	113%	70-140
Toluene-d8	106%	109%	101%	70-140

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client: Stantec (TO)
Project No: 185803633
Project Name: Kaiser - Vermont Ave.

AA Project No: A732181
Date Received: 05/11/16
Date Reported: 05/18/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs, OXY & TPHG by GC/MS EPA 5035 - Quality Control										
Batch B6E1726 - EPA 5035										
Blank (B6E1726-BLK1)				Prepared & Analyzed: 05/17/16						
Acetone	<0.050	0.050	mg/kg							
tert-Amyl Methyl Ether (TAME)	<0.0050	0.0050	mg/kg							
Benzene	<0.0020	0.0020	mg/kg							
Bromobenzene	<0.0050	0.0050	mg/kg							
Bromochloromethane	<0.0050	0.0050	mg/kg							
Bromodichloromethane	<0.0050	0.0050	mg/kg							
Bromoform	<0.0050	0.0050	mg/kg							
Bromomethane	<0.0050	0.0050	mg/kg							
2-Butanone (MEK)	<0.050	0.050	mg/kg							
tert-Butyl alcohol (TBA)	<0.020	0.020	mg/kg							
sec-Butylbenzene	<0.0050	0.0050	mg/kg							
tert-Butylbenzene	<0.0050	0.0050	mg/kg							
n-Butylbenzene	<0.0050	0.0050	mg/kg							
Carbon Disulfide	<0.0050	0.0050	mg/kg							
Carbon Tetrachloride	<0.0050	0.0050	mg/kg							
Chlorobenzene	<0.0050	0.0050	mg/kg							
Chloroethane	<0.0050	0.0050	mg/kg							
Chloroform	<0.0050	0.0050	mg/kg							
Chloromethane	<0.0050	0.0050	mg/kg							
2-Chlorotoluene	<0.0050	0.0050	mg/kg							
4-Chlorotoluene	<0.0050	0.0050	mg/kg							
1,2-Dibromo-3-chloropropane	<0.010	0.010	mg/kg							
Dibromochloromethane	<0.0050	0.0050	mg/kg							
1,2-Dibromoethane (EDB)	<0.0050	0.0050	mg/kg							
Dibromomethane	<0.0050	0.0050	mg/kg							
1,4-Dichlorobenzene	<0.0050	0.0050	mg/kg							
1,3-Dichlorobenzene	<0.0050	0.0050	mg/kg							
1,2-Dichlorobenzene	<0.0050	0.0050	mg/kg							
Dichlorodifluoromethane (R12)	<0.0050	0.0050	mg/kg							
1,1-Dichloroethane	<0.0050	0.0050	mg/kg							
1,2-Dichloroethane (EDC)	<0.0050	0.0050	mg/kg							

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client: Stantec (TO)
Project No: 185803633
Project Name: Kaiser - Vermont Ave.

AA Project No: A732181
Date Received: 05/11/16
Date Reported: 05/18/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs, OXY & TPHG by GC/MS EPA 5035 - Quality Control										
Batch B6E1726 - EPA 5035										
Blank (B6E1726-BLK1) Continued				Prepared & Analyzed: 05/17/16						
trans-1,2-Dichloroethylene	<0.0050	0.0050	mg/kg							
cis-1,2-Dichloroethylene	<0.0050	0.0050	mg/kg							
1,1-Dichloroethylene	<0.0050	0.0050	mg/kg							
2,2-Dichloropropane	<0.0050	0.0050	mg/kg							
1,3-Dichloropropane	<0.0050	0.0050	mg/kg							
1,2-Dichloropropane	<0.0050	0.0050	mg/kg							
trans-1,3-Dichloropropylene	<0.0050	0.0050	mg/kg							
1,1-Dichloropropylene	<0.0050	0.0050	mg/kg							
cis-1,3-Dichloropropylene	<0.0050	0.0050	mg/kg							
Diisopropyl ether (DIPE)	<0.0050	0.0050	mg/kg							
Ethylbenzene	<0.0020	0.0020	mg/kg							
Ethyl-tert-Butyl Ether (ETBE)	<0.0050	0.0050	mg/kg							
Gasoline Range Organics (GRO)	<0.50	0.50	mg/kg							
Hexachlorobutadiene	<0.010	0.010	mg/kg							
2-Hexanone (MBK)	<0.050	0.050	mg/kg							
Isopropylbenzene	<0.0050	0.0050	mg/kg							
4-Isopropyltoluene	<0.0050	0.0050	mg/kg							
Methyl-tert-Butyl Ether (MTBE)	<0.0050	0.0050	mg/kg							
Methylene Chloride	<0.050	0.050	mg/kg							
4-Methyl-2-pentanone (MIBK)	<0.050	0.050	mg/kg							
Naphthalene	<0.010	0.010	mg/kg							
n-Propylbenzene	<0.0050	0.0050	mg/kg							
Styrene	<0.0050	0.0050	mg/kg							
1,1,1,2-Tetrachloroethane	<0.0050	0.0050	mg/kg							
1,1,2,2-Tetrachloroethane	<0.0050	0.0050	mg/kg							
Tetrachloroethylene (PCE)	<0.0050	0.0050	mg/kg							
Toluene	<0.0020	0.0020	mg/kg							
1,2,4-Trichlorobenzene	<0.0050	0.0050	mg/kg							
1,2,3-Trichlorobenzene	<0.0050	0.0050	mg/kg							
1,1,2-Trichloroethane	<0.0050	0.0050	mg/kg							
1,1,1-Trichloroethane	<0.0050	0.0050	mg/kg							

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client: Stantec (TO)
Project No: 185803633
Project Name: Kaiser - Vermont Ave.

AA Project No: A732181
Date Received: 05/11/16
Date Reported: 05/18/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs, OXY & TPHG by GC/MS EPA 5035 - Quality Control										
Batch B6E1726 - EPA 5035										
Blank (B6E1726-BLK1) Continued				Prepared & Analyzed: 05/17/16						
Trichloroethylene (TCE)	<0.0050	0.0050	mg/kg							
Trichlorofluoromethane (R11)	<0.0050	0.0050	mg/kg							
1,2,3-Trichloropropane	<0.0050	0.0050	mg/kg							
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<0.0050	0.0050	mg/kg							
1,3,5-Trimethylbenzene	<0.0050	0.0050	mg/kg							
1,2,4-Trimethylbenzene	<0.0050	0.0050	mg/kg							
Vinyl chloride	<0.0050	0.0050	mg/kg							
o-Xylene	<0.0020	0.0020	mg/kg							
m,p-Xylenes	<0.0020	0.0020	mg/kg							
Surrogate: 4-Bromofluorobenzene	*0.104*		*mg/kg*	*0.10*		*104*	*70-140*			
Surrogate: Dibromofluoromethane	*0.113*		*mg/kg*	*0.10*		*113*	*70-140*			
Surrogate: Toluene-d8	*0.105*		*mg/kg*	*0.10*		*105*	*70-140*			
LCS (B6E1726-BS1)				Prepared & Analyzed: 05/17/16						
Acetone	**0.0781**	0.050	mg/kg	0.10		78.1	70-130			
tert-Amyl Methyl Ether (TAME)	**0.0444**	0.0050	mg/kg	0.040		111	70-130			
Benzene	**0.0438**	0.0020	mg/kg	0.040		110	75-125			
Bromobenzene	**0.0378**	0.0050	mg/kg	0.040		94.6	70-130			
Bromochloromethane	**0.0367**	0.0050	mg/kg	0.040		91.9	70-130			
Bromodichloromethane	**0.0455**	0.0050	mg/kg	0.040		114	75-125			
Bromoform	**0.0360**	0.0050	mg/kg	0.040		90.0	75-125			
Bromomethane	**0.0457**	0.0050	mg/kg	0.040		114	75-125			
2-Butanone (MEK)	**0.0971**	0.050	mg/kg	0.10		97.1	70-130			
tert-Butyl alcohol (TBA)	**0.199**	0.020	mg/kg	0.20		99.7	70-130			
sec-Butylbenzene	**0.0415**	0.0050	mg/kg	0.040		104	70-130			
tert-Butylbenzene	**0.0412**	0.0050	mg/kg	0.040		103	70-130			
n-Butylbenzene	**0.0437**	0.0050	mg/kg	0.040		109	70-130			
Carbon Disulfide	**0.0950**	0.0050	mg/kg	0.10		95.0	70-130			
Carbon Tetrachloride	**0.0487**	0.0050	mg/kg	0.040		122	75-125			
Chlorobenzene	**0.0404**	0.0050	mg/kg	0.040		101	75-125			
Chloroethane	**0.0438**	0.0050	mg/kg	0.040		110	75-125			

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client: Stantec (TO)
Project No: 185803633
Project Name: Kaiser - Vermont Ave.

AA Project No: A732181
Date Received: 05/11/16
Date Reported: 05/18/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs, OXY & TPHG by GC/MS EPA 5035 - Quality Control										
Batch B6E1726 - EPA 5035										
LCS (B6E1726-BS1) Continued				Prepared & Analyzed: 05/17/16						
Chloroform	**0.0473**	0.0050	mg/kg	0.040		118	75-125			
Chloromethane	**0.0428**	0.0050	mg/kg	0.040		107	65-125			
2-Chlorotoluene	**0.0440**	0.0050	mg/kg	0.040		110	70-130			
4-Chlorotoluene	**0.0431**	0.0050	mg/kg	0.040		108	70-130			
1,2-Dibromo-3-chloropropane	**0.0372**	0.010	mg/kg	0.040		93.1	70-130			
Dibromochloromethane	**0.0393**	0.0050	mg/kg	0.040		98.3	75-125			
1,2-Dibromoethane (EDB)	**0.0388**	0.0050	mg/kg	0.040		97.0	70-130			
Dibromomethane	**0.0401**	0.0050	mg/kg	0.040		100	70-130			
1,4-Dichlorobenzene	**0.0393**	0.0050	mg/kg	0.040		98.4	75-125			
1,3-Dichlorobenzene	**0.0385**	0.0050	mg/kg	0.040		96.2	70-130			
1,2-Dichlorobenzene	**0.0386**	0.0050	mg/kg	0.040		96.4	70-130			
Dichlorodifluoromethane (R12)	**0.0424**	0.0050	mg/kg	0.040		106	70-130			
1,1-Dichloroethane	**0.0463**	0.0050	mg/kg	0.040		116	70-125			
1,2-Dichloroethane (EDC)	**0.0478**	0.0050	mg/kg	0.040		120	75-125			
trans-1,2-Dichloroethylene	**0.0392**	0.0050	mg/kg	0.040		98.0	75-125			
cis-1,2-Dichloroethylene	**0.0404**	0.0050	mg/kg	0.040		101	75-125			
1,1-Dichloroethylene	**0.0385**	0.0050	mg/kg	0.040		96.3	70-130			
2,2-Dichloropropane	**0.0481**	0.0050	mg/kg	0.040		120	70-130			
1,3-Dichloropropane	**0.0401**	0.0050	mg/kg	0.040		100	70-130			
1,2-Dichloropropane	**0.0461**	0.0050	mg/kg	0.040		115	75-130			
trans-1,3-Dichloropropylene	**0.0431**	0.0050	mg/kg	0.040		108	70-130			
1,1-Dichloropropylene	**0.0457**	0.0050	mg/kg	0.040		114	70-130			
cis-1,3-Dichloropropylene	**0.0455**	0.0050	mg/kg	0.040		114	75-125			
Diisopropyl ether (DIPE)	**0.0464**	0.0050	mg/kg	0.040		116	70-130			
Ethylbenzene	**0.0434**	0.0020	mg/kg	0.040		108	75-125			
Ethyl-tert-Butyl Ether (ETBE)	**0.0484**	0.0050	mg/kg	0.040		121	70-130			
Gasoline Range Organics (GRO)	**1.16**	0.50	mg/kg	1.0		116	70-130			
Hexachlorobutadiene	**0.0390**	0.010	mg/kg	0.040		97.6	70-130			
2-Hexanone (MBK)	**0.114**	0.050	mg/kg	0.10		114	70-130			
Isopropylbenzene	**0.0423**	0.0050	mg/kg	0.040		106	70-130			
4-Isopropyltoluene	**0.0415**	0.0050	mg/kg	0.040		104	70-130			

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client: Stantec (TO)
Project No: 185803633
Project Name: Kaiser - Vermont Ave.

AA Project No: A732181
Date Received: 05/11/16
Date Reported: 05/18/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs, OXY & TPHG by GC/MS EPA 5035 - Quality Control										
Batch B6E1726 - EPA 5035										
LCS (B6E1726-BS1) Continued				Prepared & Analyzed: 05/17/16						
Methyl-tert-Butyl Ether (MTBE)	**0.0838**	0.0050	mg/kg	0.080		105	75-125			
Methylene Chloride	**0.0387**	0.050	mg/kg	0.040		96.6	75-130			
4-Methyl-2-pentanone (MIBK)	**0.0893**	0.050	mg/kg	0.10		89.3	70-130			
Naphthalene	**0.0366**	0.010	mg/kg	0.040		91.4	70-130			
n-Propylbenzene	**0.0450**	0.0050	mg/kg	0.040		112	70-130			
Styrene	**0.0407**	0.0050	mg/kg	0.040		102	70-130			
1,1,1,2-Tetrachloroethane	**0.0401**	0.0050	mg/kg	0.040		100	70-130			
1,1,2,2-Tetrachloroethane	**0.0389**	0.0050	mg/kg	0.040		97.2	70-135			
Tetrachloroethylene (PCE)	**0.0401**	0.0050	mg/kg	0.040		100	75-125			
Toluene	**0.0400**	0.0020	mg/kg	0.040		100	75-125			
1,2,4-Trichlorobenzene	**0.0386**	0.0050	mg/kg	0.040		96.6	70-130			
1,2,3-Trichlorobenzene	**0.0371**	0.0050	mg/kg	0.040		92.8	70-130			
1,1,2-Trichloroethane	**0.0405**	0.0050	mg/kg	0.040		101	75-125			
1,1,1-Trichloroethane	**0.0494**	0.0050	mg/kg	0.040		123	75-125			
Trichloroethylene (TCE)	**0.0438**	0.0050	mg/kg	0.040		109	75-125			
Trichlorofluoromethane (R11)	**0.0471**	0.0050	mg/kg	0.040		118	70-130			
1,2,3-Trichloropropane	**0.0399**	0.0050	mg/kg	0.040		99.8	70-130			
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	**0.101**	0.0050	mg/kg	0.080		126	70-130			
1,3,5-Trimethylbenzene	**0.0414**	0.0050	mg/kg	0.040		103	70-130			
1,2,4-Trimethylbenzene	**0.0414**	0.0050	mg/kg	0.040		103	70-130			
Vinyl chloride	**0.0462**	0.0050	mg/kg	0.040		115	75-125			
o-Xylene	**0.0404**	0.0020	mg/kg	0.040		101	75-125			
m,p-Xylenes	**0.0810**	0.0020	mg/kg	0.080		101	70-130			
Surrogate: 4-Bromofluorobenzene	*0.104*		*mg/kg*	*0.10*		*104*	*70-140*			
Surrogate: Dibromofluoromethane	*0.108*		*mg/kg*	*0.10*		*108*	*70-140*			
Surrogate: Toluene-d8	*0.104*		*mg/kg*	*0.10*		*104*	*70-140*			
LCS Dup (B6E1726-BSD1)				Prepared & Analyzed: 05/17/16						
Acetone	**0.0873**	0.050	mg/kg	0.10		87.3	70-130	11.1	30	
tert-Amyl Methyl Ether (TAME)	**0.0449**	0.0050	mg/kg	0.040		112	70-130	1.21	30	
Benzene	**0.0434**	0.0020	mg/kg	0.040		108	75-125	1.01	30	

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client: Stantec (TO)
Project No: 185803633
Project Name: Kaiser - Vermont Ave.

AA Project No: A732181
Date Received: 05/11/16
Date Reported: 05/18/16

VOCs, OXY & TPHG by GC/MS EPA 5035 - Quality Control

Batch B6E1726 - EPA 5035

LCS Dup (B6E1726-BSD1) Continued Prepared & Analyzed: 05/17/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Bromobenzene	**0.0377**	0.0050	mg/kg	0.040		94.4	70-130	0.265	30	
Bromochloromethane	**0.0364**	0.0050	mg/kg	0.040		90.9	70-130	1.04	30	
Bromodichloromethane	**0.0467**	0.0050	mg/kg	0.040		117	75-125	2.60	30	
Bromoform	**0.0349**	0.0050	mg/kg	0.040		87.2	75-125	3.16	30	
Bromomethane	**0.0420**	0.0050	mg/kg	0.040		105	75-125	8.34	30	
2-Butanone (MEK)	**0.0926**	0.050	mg/kg	0.10		92.6	70-130	4.72	30	
tert-Butyl alcohol (TBA)	**0.193**	0.020	mg/kg	0.20		96.3	70-130	3.51	30	
sec-Butylbenzene	**0.0423**	0.0050	mg/kg	0.040		106	70-130	1.77	30	
tert-Butylbenzene	**0.0422**	0.0050	mg/kg	0.040		106	70-130	2.40	30	
n-Butylbenzene	**0.0400**	0.0050	mg/kg	0.040		100	70-130	8.80	30	
Carbon Disulfide	**0.0907**	0.0050	mg/kg	0.10		90.7	70-130	4.63	30	
Carbon Tetrachloride	**0.0500**	0.0050	mg/kg	0.040		125	75-125	2.59	30	
Chlorobenzene	**0.0391**	0.0050	mg/kg	0.040		97.8	75-125	3.22	30	
Chloroethane	**0.0433**	0.0050	mg/kg	0.040		108	75-125	1.24	30	
Chloroform	**0.0471**	0.0050	mg/kg	0.040		118	75-125	0.424	30	
Chloromethane	**0.0468**	0.0050	mg/kg	0.040		117	65-125	8.93	30	
2-Chlorotoluene	**0.0446**	0.0050	mg/kg	0.040		112	70-130	1.40	30	
4-Chlorotoluene	**0.0439**	0.0050	mg/kg	0.040		110	70-130	1.70	30	
1,2-Dibromo-3-chloropropane	**0.0351**	0.010	mg/kg	0.040		87.8	70-130	5.86	30	
Dibromochloromethane	**0.0375**	0.0050	mg/kg	0.040		93.7	75-125	4.79	30	
1,2-Dibromoethane (EDB)	**0.0372**	0.0050	mg/kg	0.040		92.9	70-130	4.37	30	
Dibromomethane	**0.0403**	0.0050	mg/kg	0.040		101	70-130	0.498	30	
1,4-Dichlorobenzene	**0.0393**	0.0050	mg/kg	0.040		98.2	75-125	0.102	30	
1,3-Dichlorobenzene	**0.0390**	0.0050	mg/kg	0.040		97.6	70-130	1.44	30	
1,2-Dichlorobenzene	**0.0382**	0.0050	mg/kg	0.040		95.6	70-130	0.885	30	
Dichlorodifluoromethane (R12)	**0.0435**	0.0050	mg/kg	0.040		109	70-130	2.56	30	
1,1-Dichloroethane	**0.0471**	0.0050	mg/kg	0.040		118	70-125	1.80	30	
1,2-Dichloroethane (EDC)	**0.0495**	0.0050	mg/kg	0.040		124	75-125	3.41	30	
trans-1,2-Dichloroethylene	**0.0383**	0.0050	mg/kg	0.040		95.7	75-125	2.43	30	
cis-1,2-Dichloroethylene	**0.0408**	0.0050	mg/kg	0.040		102	75-125	1.13	30	
1,1-Dichloroethylene	**0.0343**	0.0050	mg/kg	0.040		85.7	70-130	11.6	30	

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client: Stantec (TO)
Project No: 185803633
Project Name: Kaiser - Vermont Ave.

AA Project No: A732181
Date Received: 05/11/16
Date Reported: 05/18/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs, OXY & TPHG by GC/MS EPA 5035 - Quality Control										
Batch B6E1726 - EPA 5035										
LCS Dup (B6E1726-BSD1) Continued				Prepared & Analyzed: 05/17/16						
2,2-Dichloropropane	**0.0508**	0.0050	mg/kg	0.040		127	70-130	5.50	30	
1,3-Dichloropropane	**0.0392**	0.0050	mg/kg	0.040		98.1	70-130	2.22	30	
1,2-Dichloropropane	**0.0473**	0.0050	mg/kg	0.040		118	75-130	2.44	30	
trans-1,3-Dichloropropylene	**0.0427**	0.0050	mg/kg	0.040		107	70-130	0.979	30	
1,1-Dichloropropylene	**0.0482**	0.0050	mg/kg	0.040		120	70-130	5.24	30	
cis-1,3-Dichloropropylene	**0.0460**	0.0050	mg/kg	0.040		115	75-125	1.01	30	
Diisopropyl ether (DIPE)	**0.0473**	0.0050	mg/kg	0.040		118	70-130	1.96	30	
Ethylbenzene	**0.0431**	0.0020	mg/kg	0.040		108	75-125	0.694	30	
Ethyl-tert-Butyl Ether (ETBE)	**0.0476**	0.0050	mg/kg	0.040		119	70-130	1.83	30	
Gasoline Range Organics (GRO)	**1.16**	0.50	mg/kg	1.0		116	70-130	0.181	30	
Hexachlorobutadiene	**0.0408**	0.010	mg/kg	0.040		102	70-130	4.41	30	
2-Hexanone (MBK)	**0.114**	0.050	mg/kg	0.10		114	70-130	0.596	30	
Isopropylbenzene	**0.0429**	0.0050	mg/kg	0.040		107	70-130	1.50	30	
4-Isopropyltoluene	**0.0422**	0.0050	mg/kg	0.040		106	70-130	1.82	30	
Methyl-tert-Butyl Ether (MTBE)	**0.0834**	0.0050	mg/kg	0.080		104	75-125	0.502	30	
Methylene Chloride	**0.0363**	0.050	mg/kg	0.040		90.8	75-130	6.19	30	
4-Methyl-2-pentanone (MIBK)	**0.0918**	0.050	mg/kg	0.10		91.8	70-130	2.67	30	
Naphthalene	**0.0347**	0.010	mg/kg	0.040		86.8	70-130	5.22	30	
n-Propylbenzene	**0.0462**	0.0050	mg/kg	0.040		116	70-130	2.63	30	
Styrene	**0.0401**	0.0050	mg/kg	0.040		100	70-130	1.29	30	
1,1,1,2-Tetrachloroethane	**0.0387**	0.0050	mg/kg	0.040		96.8	70-130	3.55	30	
1,1,2,2-Tetrachloroethane	**0.0380**	0.0050	mg/kg	0.040		95.0	70-135	2.29	30	
Tetrachloroethylene (PCE)	**0.0379**	0.0050	mg/kg	0.040		94.8	75-125	5.74	30	
Toluene	**0.0389**	0.0020	mg/kg	0.040		97.2	75-125	2.84	30	
1,2,4-Trichlorobenzene	**0.0381**	0.0050	mg/kg	0.040		95.3	70-130	1.35	30	
1,2,3-Trichlorobenzene	**0.0361**	0.0050	mg/kg	0.040		90.4	70-130	2.73	30	
1,1,2-Trichloroethane	**0.0380**	0.0050	mg/kg	0.040		95.1	75-125	6.36	30	
1,1,1-Trichloroethane	**0.0496**	0.0050	mg/kg	0.040		124	75-125	0.485	30	
Trichloroethylene (TCE)	**0.0454**	0.0050	mg/kg	0.040		113	75-125	3.59	30	
Trichlorofluoromethane (R11)	**0.0477**	0.0050	mg/kg	0.040		119	70-130	1.31	30	
1,2,3-Trichloropropane	**0.0396**	0.0050	mg/kg	0.040		99.0	70-130	0.905	30	

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client: Stantec (TO)
Project No: 185803633
Project Name: Kaiser - Vermont Ave.

AA Project No: A732181
Date Received: 05/11/16
Date Reported: 05/18/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs, OXY & TPHG by GC/MS EPA 5035 - Quality Control										
Batch B6E1726 - EPA 5035										
LCS Dup (B6E1726-BSD1) Continued				Prepared & Analyzed: 05/17/16						
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	**0.100**	0.0050	mg/kg	0.080		125	70-130	0.995	30	
1,3,5-Trimethylbenzene	**0.0422**	0.0050	mg/kg	0.040		106	70-130	1.96	30	
1,2,4-Trimethylbenzene	**0.0413**	0.0050	mg/kg	0.040		103	70-130	0.145	30	
Vinyl chloride	**0.0473**	0.0050	mg/kg	0.040		118	75-125	2.40	30	
o-Xylene	**0.0409**	0.0020	mg/kg	0.040		102	75-125	1.33	30	
m,p-Xylenes	**0.0800**	0.0020	mg/kg	0.080		100	70-130	1.17	30	
Surrogate: 4-Bromofluorobenzene	*0.106*		*mg/kg*	*0.10*		*106*	*70-140*			
Surrogate: Dibromofluoromethane	*0.110*		*mg/kg*	*0.10*		*110*	*70-140*			
Surrogate: Toluene-d8	*0.101*		*mg/kg*	*0.10*		*101*	*70-140*			

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732181
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/18/16

Special Notes

Viorel Vasile
Operations Manager

AMERICAN ANALYTICS CHAIN-OF-CUSTODY RECORD

9765 ETON AVE., CHATSWORTH, CA 91311
Tel: 818-998-5547 FAX: 818-998-7258

A.A. COC No.: 125099
70045738
Page 1 of 1

Client: Stantec	Project Name / No.: 185803633	Sampler's Name: Brian Goss	
Project Manager: Tom Szocinski	Site Address: N. Vermont Ave	Sampler's Signature: B	
Phone: 8057199324	City: LA	P.O. No.: 185803633	
Fax:	State & Zip: CA 90027	Quote No.:	

TAT Turnaround Codes **

① = Same Day Rush
② = 24 Hour Rush
③ = 48 Hour Rush
④ = 72 Hour Rush
⑤ = 5 Day Rush
X = 10 Working Days (Standard TAT)

ANALYSIS REQUESTED (Test Name)

Please enter the TAT Turnaround Codes ** below

Client I.D.	A.A. I.D.	Date	Time	Sample Matrix	No. of Cont	VOCs 8260B										Special Instructions
SV-6-19	6E11017-01	5/10/16	830	Soil	3	4										Email lab report to
SV-7-24	-02	5/10/16	10:05	Soil	3	4										Tom.Szocinski@stantec.com
SV-8-17	-03	5/11/16	1222	Soil	3	4										Brian.Goss@stantec.com

'16 MAY 11 13:59

For Laboratory Use

PRIORITY
Rush 72 Hrs SH
Date 5/11/16 Time 1415 Sign

A.A. Project No.: A732181 / 6E11017

Relinquished by	Date	Time	Received by
B	5/11/16	1359	
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by

Note: By relinquishing samples to American Analytics, client agrees to pay for the services requested on this chain of custody form and any additional client-requested analyses performed on this project. Payment for services is due within 30 days from the date of invoice. Sample(s) will be disposed of after 45 days following the submittal of the sample(s) to American Analytics.

ATTACHMENT D
Certified Analytical Laboratory Reports – Soil Vapor

9765 Eton Avenue
Chatsworth
California 91311
Tel: (818) 998-5547
Fax: (818) 998-7258

May 17, 2016

Tom Szocinski

Stantec (TO)

290 Conejo Ridge Ave. Suite #200

Thousand Oaks, CA 91361

Re : Kaiser - Vermont Ave. / 185803633

A732180 / 6E11016

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received on 05/11/16 13:59 and analyzed in accordance with the attached chain-of-custody.

Unless otherwise noted, all analytical testing was accomplished in accordance with the guidelines established in our Quality Assurance Program Manual, applicable standard operating procedures, and other related documentation. The results in this analytical report are limited to the samples tested and any reproduction thereof must be made in its entirety.

If you have any questions regarding this report or require additional information please call me at American Analytics.

Sincerely,

Viorel Vasile

Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16

Sample ID	Laboratory ID	Matrix	TAT	Date Sampled	Date Received
TO-15 (Mid Level)					
SV-2-5	6E11016-01	Vapor	3	05/11/16 07:50	05/11/16 13:59
SV-2-19	6E11016-02	Vapor	3	05/11/16 07:40	05/11/16 13:59
SV-3-19	6E11016-03	Vapor	3	05/11/16 08:34	05/11/16 13:59
SV-3b-5	6E11016-04	Vapor	3	05/11/16 08:39	05/11/16 13:59
SV-9-5	6E11016-05	Vapor	3	05/11/16 08:12	05/11/16 13:59
SV-4-5	6E11016-06	Vapor	3	05/11/16 08:18	05/11/16 13:59
SV-4-21	6E11016-07	Vapor	3	05/11/16 08:17	05/11/16 13:59
SV-6-5	6E11016-08	Vapor	3	05/11/16 09:04	05/11/16 13:59
SV-6-19	6E11016-09	Vapor	3	05/11/16 09:05	05/11/16 13:59
SV-7-5	6E11016-10	Vapor	3	05/11/16 09:24	05/11/16 13:59
SV-7-23.5	6E11016-11	Vapor	3	05/11/16 10:42	05/11/16 13:59
SV-5-5	6E11016-12	Vapor	3	05/11/16 10:12	05/11/16 13:59
SV-5-12.5	6E11016-13	Vapor	3	05/11/16 10:38	05/11/16 13:59

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	1	**Prepared:**	05/12/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/12/16

SV-2-5

6E11016-01 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
Acetone	<0.010	ug/L	0.010	<0.0042	ppmv	0.0042
Allyl chloride	<0.010	ug/L	0.010	<0.0032	ppmv	0.0032
tert-Amyl Methyl Ether (TAME)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
Benzene	<0.010	ug/L	0.010	<0.0031	ppmv	0.0031
Benzyl chloride	<0.010	ug/L	0.010	<0.0019	ppmv	0.0019
Bromodichloromethane	<0.010	ug/L	0.010	<0.0015	ppmv	0.0015
Bromoform	<0.010	ug/L	0.010	<0.00097	ppmv	0.00097
Bromomethane	<0.010	ug/L	0.010	<0.0026	ppmv	0.0026
1,3-Butadiene	<0.010	ug/L	0.010	<0.0045	ppmv	0.0045
2-Butanone (MEK)	<0.010	ug/L	0.010	<0.0034	ppmv	0.0034
tert-Butyl alcohol (TBA)	<0.010	ug/L	0.010	<0.0033	ppmv	0.0033
Carbon Disulfide	<0.010	ug/L	0.010	<0.0032	ppmv	0.0032
Carbon Tetrachloride	<0.010	ug/L	0.010	<0.0016	ppmv	0.0016
Chlorobenzene	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
Chloroethane	<0.010	ug/L	0.010	<0.0038	ppmv	0.0038
Chloroform	<0.010	ug/L	0.010	<0.002	ppmv	0.002
Chloromethane	<0.010	ug/L	0.010	<0.0048	ppmv	0.0048
Cyclohexane	<0.010	ug/L	0.010	<0.0029	ppmv	0.0029
Dibromochloromethane	<0.010	ug/L	0.010	<0.0012	ppmv	0.0012
1,2-Dibromoethane (EDB)	<0.010	ug/L	0.010	<0.0013	ppmv	0.0013
1,2-Dichlorobenzene	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	1	**Prepared:**	05/12/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/12/16

SV-2-5

6E11016-01 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
1,3-Dichlorobenzene	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017
1,4-Dichlorobenzene	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017
Dichlorodifluoromethane (R12)	<0.010	ug/L	0.010	<0.002	ppmv	0.002
1,1-Dichloroethane	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
1,2-Dichloroethane (EDC)	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
cis-1,2-Dichloroethylene	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
1,1-Dichloroethylene	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
trans-1,2-Dichloroethylene	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
1,2-Dichloropropane	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
trans-1,3-Dichloropropylene	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
cis-1,3-Dichloropropylene	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
Dichlorotetrafluoroethane	<0.010	ug/L	0.010	<0.0014	ppmv	0.0014
Diisopropyl ether (DIPE)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
1,4-Dioxane	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Ethanol	<0.010	ug/L	0.010	<0.0053	ppmv	0.0053
Ethyl Acetate	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Ethylbenzene	<0.010	ug/L	0.010	<0.0023	ppmv	0.0023
Ethyl-tert-Butyl Ether (ETBE)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
4-Ethyltoluene	<0.010	ug/L	0.010	<0.002	ppmv	0.002
Heptane	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
Hexachlorobutadiene	<0.010	ug/L	0.010	<0.00094	ppmv	0.00094

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	1	**Prepared:**	05/12/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/12/16

SV-2-5

6E11016-01 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
n-Hexane	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
2-Hexanone (MBK)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
Isopropanol (IPA)	<0.010	ug/L	0.010	<0.0041	ppmv	0.0041
Methyl-tert-Butyl Ether (MTBE)	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Methylene Chloride	<0.010	ug/L	0.010	<0.0029	ppmv	0.0029
4-Methyl-2-pentanone (MIBK)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
Naphthalene	<0.010	ug/L	0.010	<0.0019	ppmv	0.0019
Propylene	<0.010	ug/L	0.010	<0.0058	ppmv	0.0058
Styrene	**0.010**	ug/L	0.010	**0.0023**	ppmv	0.0023
1,1,2,2-Tetrachloroethane	<0.010	ug/L	0.010	<0.0015	ppmv	0.0015
Tetrachloroethylene (PCE)	**0.012**	ug/L	0.010	**0.0018**	ppmv	0.0015
Tetrahydrofuran (THF)	<0.010	ug/L	0.010	<0.0034	ppmv	0.0034
Toluene	<0.010	ug/L	0.010	<0.0027	ppmv	0.0027
1,2,4-Trichlorobenzene	<0.010	ug/L	0.010	<0.0013	ppmv	0.0013
1,1,2-Trichloroethane	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
1,1,1-Trichloroethane	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
Trichloroethylene (TCE)	<0.010	ug/L	0.010	<0.0019	ppmv	0.0019
Trichlorofluoromethane (R11)	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<0.010	ug/L	0.010	<0.0013	ppmv	0.0013
1,3,5-Trimethylbenzene	<0.010	ug/L	0.010	<0.002	ppmv	0.002

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	1	**Prepared:**	05/12/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/12/16

SV-2-5

6E11016-01 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
1,2,4-Trimethylbenzene	<0.010	ug/L	0.010	<0.002	ppmv	0.002
2,2,4-Trimethylpentane	<0.010	ug/L	0.010	<0.0021	ppmv	0.0021
Vinyl acetate	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Vinyl bromide	<0.010	ug/L	0.010	<0.0023	ppmv	0.0023
Vinyl chloride	<0.010	ug/L	0.010	<0.0039	ppmv	0.0039
o-Xylene	<0.010	ug/L	0.010	<0.0023	ppmv	0.0023
m,p-Xylenes	<0.010	ug/L	0.010	<0.0023	ppmv	0.0023
1,2,3-Trichloropropane	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017
sec-Butylbenzene	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
Isopropylbenzene	<0.010	ug/L	0.010	<0.002	ppmv	0.002
n-Propylbenzene	<0.010	ug/L	0.010	<0.002	ppmv	0.002
4-Isopropyltoluene	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
n-Butylbenzene	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018

Surrogates	%REC	%REC Limits
4-Bromofluorobenzene	104 %	70-130

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	1000	**Prepared:**	05/13/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/13/16

SV-2-19

6E11016-02 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
Acetone	<10	ug/L	0.010	<4.2	ppmv	0.0042
Allyl chloride	<10	ug/L	0.010	<3.2	ppmv	0.0032
tert-Amyl Methyl Ether (TAME)	<10	ug/L	0.010	<2.4	ppmv	0.0024
Benzene	<10	ug/L	0.010	<3.1	ppmv	0.0031
Benzyl chloride	<10	ug/L	0.010	<1.9	ppmv	0.0019
Bromodichloromethane	<10	ug/L	0.010	<1.5	ppmv	0.0015
Bromoform	<10	ug/L	0.010	<0.97	ppmv	0.00097
Bromomethane	<10	ug/L	0.010	<2.6	ppmv	0.0026
1,3-Butadiene	<10	ug/L	0.010	<4.5	ppmv	0.0045
2-Butanone (MEK)	<10	ug/L	0.010	<3.4	ppmv	0.0034
tert-Butyl alcohol (TBA)	<10	ug/L	0.010	<3.3	ppmv	0.0033
Carbon Disulfide	<10	ug/L	0.010	<3.2	ppmv	0.0032
Carbon Tetrachloride	<10	ug/L	0.010	<1.6	ppmv	0.0016
Chlorobenzene	<10	ug/L	0.010	<2.2	ppmv	0.0022
Chloroethane	<10	ug/L	0.010	<3.8	ppmv	0.0038
Chloroform	<10	ug/L	0.010	<2.0	ppmv	0.002
Chloromethane	<10	ug/L	0.010	<4.8	ppmv	0.0048
Cyclohexane	**250**	ug/L	0.010	**73**	ppmv	0.0029
Dibromochloromethane	<10	ug/L	0.010	<1.2	ppmv	0.0012
1,2-Dibromoethane (EDB)	<10	ug/L	0.010	<1.3	ppmv	0.0013
1,2-Dichlorobenzene	<10	ug/L	0.010	<1.7	ppmv	0.0017

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	1000	**Prepared:**	05/13/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/13/16

SV-2-19

6E11016-02 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
1,3-Dichlorobenzene	<10	ug/L	0.010	<1.7	ppmv	0.0017
1,4-Dichlorobenzene	<10	ug/L	0.010	<1.7	ppmv	0.0017
Dichlorodifluoromethane (R12)	<10	ug/L	0.010	<2.0	ppmv	0.002
1,1-Dichloroethane	<10	ug/L	0.010	<2.5	ppmv	0.0025
1,2-Dichloroethane (EDC)	<10	ug/L	0.010	<2.5	ppmv	0.0025
cis-1,2-Dichloroethylene	<10	ug/L	0.010	<2.5	ppmv	0.0025
1,1-Dichloroethylene	<10	ug/L	0.010	<2.5	ppmv	0.0025
trans-1,2-Dichloroethylene	<10	ug/L	0.010	<2.5	ppmv	0.0025
1,2-Dichloropropane	<10	ug/L	0.010	<2.2	ppmv	0.0022
trans-1,3-Dichloropropylene	<10	ug/L	0.010	<2.2	ppmv	0.0022
cis-1,3-Dichloropropylene	<10	ug/L	0.010	<2.2	ppmv	0.0022
Dichlorotetrafluoroethane	<10	ug/L	0.010	<1.4	ppmv	0.0014
Diisopropyl ether (DIPE)	<10	ug/L	0.010	<2.4	ppmv	0.0024
1,4-Dioxane	<10	ug/L	0.010	<2.8	ppmv	0.0028
Ethanol	<10	ug/L	0.010	<5.3	ppmv	0.0053
Ethyl Acetate	<10	ug/L	0.010	<2.8	ppmv	0.0028
Ethylbenzene	<10	ug/L	0.010	<2.3	ppmv	0.0023
Ethyl-tert-Butyl Ether (ETBE)	<10	ug/L	0.010	<2.4	ppmv	0.0024
4-Ethyltoluene	<10	ug/L	0.010	<2.0	ppmv	0.002
Heptane	**210**	ug/L	0.010	**51**	ppmv	0.0024
Hexachlorobutadiene	<10	ug/L	0.010	<0.94	ppmv	0.00094

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	1000	**Prepared:**	05/13/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/13/16

SV-2-19

6E11016-02 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
n-Hexane	**340**	ug/L	0.010	**96**	ppmv	0.0028
2-Hexanone (MBK)	<10	ug/L	0.010	<2.4	ppmv	0.0024
Isopropanol (IPA)	<10	ug/L	0.010	<4.1	ppmv	0.0041
Methyl-tert-Butyl Ether (MTBE)	<10	ug/L	0.010	<2.8	ppmv	0.0028
Methylene Chloride	<10	ug/L	0.010	<2.9	ppmv	0.0029
4-Methyl-2-pentanone (MIBK)	<10	ug/L	0.010	<2.4	ppmv	0.0024
Naphthalene	<10	ug/L	0.010	<1.9	ppmv	0.0019
Propylene	<10	ug/L	0.010	<5.8	ppmv	0.0058
Styrene	<10	ug/L	0.010	<2.3	ppmv	0.0023
1,1,2,2-Tetrachloroethane	<10	ug/L	0.010	<1.5	ppmv	0.0015
Tetrachloroethylene (PCE)	<10	ug/L	0.010	<1.5	ppmv	0.0015
Tetrahydrofuran (THF)	<10	ug/L	0.010	<3.4	ppmv	0.0034
Toluene	<10	ug/L	0.010	<2.7	ppmv	0.0027
1,2,4-Trichlorobenzene	<10	ug/L	0.010	<1.3	ppmv	0.0013
1,1,2-Trichloroethane	<10	ug/L	0.010	<1.8	ppmv	0.0018
1,1,1-Trichloroethane	<10	ug/L	0.010	<1.8	ppmv	0.0018
Trichloroethylene (TCE)	<10	ug/L	0.010	<1.9	ppmv	0.0019
Trichlorofluoromethane (R11)	<10	ug/L	0.010	<1.8	ppmv	0.0018
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<10	ug/L	0.010	<1.3	ppmv	0.0013
1,3,5-Trimethylbenzene	<10	ug/L	0.010	<2.0	ppmv	0.002

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	1000	**Prepared:**	05/13/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/13/16

SV-2-19

6E11016-02 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
1,2,4-Trimethylbenzene	<10	ug/L	0.010	<2.0	ppmv	0.002
2,2,4-Trimethylpentane	<10	ug/L	0.010	<2.1	ppmv	0.0021
Vinyl acetate	<10	ug/L	0.010	<2.8	ppmv	0.0028
Vinyl bromide	<10	ug/L	0.010	<2.3	ppmv	0.0023
Vinyl chloride	<10	ug/L	0.010	<3.9	ppmv	0.0039
o-Xylene	<10	ug/L	0.010	<2.3	ppmv	0.0023
m,p-Xylenes	<10	ug/L	0.010	<2.3	ppmv	0.0023
1,2,3-Trichloropropane	<10	ug/L	0.010	<1.7	ppmv	0.0017
sec-Butylbenzene	<10	ug/L	0.010	<1.8	ppmv	0.0018
Isopropylbenzene	**11**	ug/L	0.010	**2.2**	ppmv	0.002
n-Propylbenzene	**19**	ug/L	0.010	**3.9**	ppmv	0.002
4-Isopropyltoluene	<10	ug/L	0.010	<1.8	ppmv	0.0018
n-Butylbenzene	<10	ug/L	0.010	<1.8	ppmv	0.0018

Surrogates	%REC	%REC Limits
4-Bromofluorobenzene	124 %	70-130

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	1	**Prepared:**	05/13/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/13/16

SV-3-19

6E11016-03 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
Acetone	**0.079**	ug/L	0.010	**0.033**	ppmv	0.0042
Allyl chloride	<0.010	ug/L	0.010	<0.0032	ppmv	0.0032
tert-Amyl Methyl Ether (TAME)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
Benzene	<0.010	ug/L	0.010	<0.0031	ppmv	0.0031
Benzyl chloride	<0.010	ug/L	0.010	<0.0019	ppmv	0.0019
Bromodichloromethane	<0.010	ug/L	0.010	<0.0015	ppmv	0.0015
Bromoform	<0.010	ug/L	0.010	<0.00097	ppmv	0.00097
Bromomethane	<0.010	ug/L	0.010	<0.0026	ppmv	0.0026
1,3-Butadiene	<0.010	ug/L	0.010	<0.0045	ppmv	0.0045
2-Butanone (MEK)	**0.15**	ug/L	0.010	**0.051**	ppmv	0.0034
tert-Butyl alcohol (TBA)	<0.010	ug/L	0.010	<0.0033	ppmv	0.0033
Carbon Disulfide	<0.010	ug/L	0.010	<0.0032	ppmv	0.0032
Carbon Tetrachloride	<0.010	ug/L	0.010	<0.0016	ppmv	0.0016
Chlorobenzene	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
Chloroethane	<0.010	ug/L	0.010	<0.0038	ppmv	0.0038
Chloroform	<0.010	ug/L	0.010	<0.002	ppmv	0.002
Chloromethane	<0.010	ug/L	0.010	<0.0048	ppmv	0.0048
Cyclohexane	**0.031**	ug/L	0.010	**0.009**	ppmv	0.0029
Dibromochloromethane	<0.010	ug/L	0.010	<0.0012	ppmv	0.0012
1,2-Dibromoethane (EDB)	<0.010	ug/L	0.010	<0.0013	ppmv	0.0013
1,2-Dichlorobenzene	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	1	**Prepared:**	05/13/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/13/16

SV-3-19

6E11016-03 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
1,3-Dichlorobenzene	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017
1,4-Dichlorobenzene	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017
Dichlorodifluoromethane (R12)	<0.010	ug/L	0.010	<0.002	ppmv	0.002
1,1-Dichloroethane	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
1,2-Dichloroethane (EDC)	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
cis-1,2-Dichloroethylene	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
1,1-Dichloroethylene	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
trans-1,2-Dichloroethylene	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
1,2-Dichloropropane	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
trans-1,3-Dichloropropylene	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
cis-1,3-Dichloropropylene	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
Dichlorotetrafluoroethane	<0.010	ug/L	0.010	<0.0014	ppmv	0.0014
Diisopropyl ether (DIPE)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
1,4-Dioxane	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Ethanol	**0.011**	ug/L	0.010	**0.0058**	ppmv	0.0053
Ethyl Acetate	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Ethylbenzene	<0.010	ug/L	0.010	<0.0023	ppmv	0.0023
Ethyl-tert-Butyl Ether (ETBE)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
4-Ethyltoluene	<0.010	ug/L	0.010	<0.002	ppmv	0.002
Heptane	**0.019**	ug/L	0.010	**0.0046**	ppmv	0.0024
Hexachlorobutadiene	<0.010	ug/L	0.010	<0.00094	ppmv	0.00094

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	1	**Prepared:**	05/13/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/13/16

SV-3-19

6E11016-03 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
n-Hexane	**0.031**	ug/L	0.010	**0.0088**	ppmv	0.0028
2-Hexanone (MBK)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
Isopropanol (IPA)	<0.010	ug/L	0.010	<0.0041	ppmv	0.0041
Methyl-tert-Butyl Ether (MTBE)	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Methylene Chloride	<0.010	ug/L	0.010	<0.0029	ppmv	0.0029
4-Methyl-2-pentanone (MIBK)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
Naphthalene	<0.010	ug/L	0.010	<0.0019	ppmv	0.0019
Propylene	**0.034**	ug/L	0.010	**0.020**	ppmv	0.0058
Styrene	**0.020**	ug/L	0.010	**0.0047**	ppmv	0.0023
1,1,2,2-Tetrachloroethane	<0.010	ug/L	0.010	<0.0015	ppmv	0.0015
Tetrachloroethylene (PCE)	<0.010	ug/L	0.010	<0.0015	ppmv	0.0015
Tetrahydrofuran (THF)	**0.012**	ug/L	0.010	**0.0041**	ppmv	0.0034
Toluene	<0.010	ug/L	0.010	<0.0027	ppmv	0.0027
1,2,4-Trichlorobenzene	<0.010	ug/L	0.010	<0.0013	ppmv	0.0013
1,1,2-Trichloroethane	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
1,1,1-Trichloroethane	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
Trichloroethylene (TCE)	<0.010	ug/L	0.010	<0.0019	ppmv	0.0019
Trichlorofluoromethane (R11)	**0.012**	ug/L	0.010	**0.0021**	ppmv	0.0018
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<0.010	ug/L	0.010	<0.0013	ppmv	0.0013
1,3,5-Trimethylbenzene	<0.010	ug/L	0.010	<0.002	ppmv	0.002

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	1	**Prepared:**	05/13/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/13/16

SV-3-19

6E11016-03 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
1,2,4-Trimethylbenzene	<0.010	ug/L	0.010	<0.002	ppmv	0.002
2,2,4-Trimethylpentane	<0.010	ug/L	0.010	<0.0021	ppmv	0.0021
Vinyl acetate	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Vinyl bromide	<0.010	ug/L	0.010	<0.0023	ppmv	0.0023
Vinyl chloride	<0.010	ug/L	0.010	<0.0039	ppmv	0.0039
o-Xylene	<0.010	ug/L	0.010	<0.0023	ppmv	0.0023
m,p-Xylenes	<0.010	ug/L	0.010	<0.0023	ppmv	0.0023
1,2,3-Trichloropropane	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017
sec-Butylbenzene	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
Isopropylbenzene	<0.010	ug/L	0.010	<0.002	ppmv	0.002
n-Propylbenzene	<0.010	ug/L	0.010	<0.002	ppmv	0.002
4-Isopropyltoluene	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
n-Butylbenzene	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018

Surrogates	%REC	%REC Limits
4-Bromofluorobenzene	103 %	70-130

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	1	**Prepared:**	05/13/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/13/16

SV-3b-5

6E11016-04 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
Acetone	**0.039**	ug/L	0.010	**0.016**	ppmv	0.0042
Allyl chloride	<0.010	ug/L	0.010	<0.0032	ppmv	0.0032
tert-Amyl Methyl Ether (TAME)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
Benzene	<0.010	ug/L	0.010	<0.0031	ppmv	0.0031
Benzyl chloride	<0.010	ug/L	0.010	<0.0019	ppmv	0.0019
Bromodichloromethane	<0.010	ug/L	0.010	<0.0015	ppmv	0.0015
Bromoform	<0.010	ug/L	0.010	<0.00097	ppmv	0.00097
Bromomethane	<0.010	ug/L	0.010	<0.0026	ppmv	0.0026
1,3-Butadiene	<0.010	ug/L	0.010	<0.0045	ppmv	0.0045
2-Butanone (MEK)	**0.011**	ug/L	0.010	**0.0037**	ppmv	0.0034
tert-Butyl alcohol (TBA)	<0.010	ug/L	0.010	<0.0033	ppmv	0.0033
Carbon Disulfide	<0.010	ug/L	0.010	<0.0032	ppmv	0.0032
Carbon Tetrachloride	<0.010	ug/L	0.010	<0.0016	ppmv	0.0016
Chlorobenzene	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
Chloroethane	<0.010	ug/L	0.010	<0.0038	ppmv	0.0038
Chloroform	<0.010	ug/L	0.010	<0.002	ppmv	0.002
Chloromethane	<0.010	ug/L	0.010	<0.0048	ppmv	0.0048
Cyclohexane	<0.010	ug/L	0.010	<0.0029	ppmv	0.0029
Dibromochloromethane	<0.010	ug/L	0.010	<0.0012	ppmv	0.0012
1,2-Dibromoethane (EDB)	<0.010	ug/L	0.010	<0.0013	ppmv	0.0013
1,2-Dichlorobenzene	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	1	**Prepared:**	05/13/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/13/16

SV-3b-5

6E11016-04 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
1,3-Dichlorobenzene	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017
1,4-Dichlorobenzene	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017
Dichlorodifluoromethane (R12)	<0.010	ug/L	0.010	<0.002	ppmv	0.002
1,1-Dichloroethane	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
1,2-Dichloroethane (EDC)	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
cis-1,2-Dichloroethylene	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
1,1-Dichloroethylene	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
trans-1,2-Dichloroethylene	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
1,2-Dichloropropane	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
trans-1,3-Dichloropropylene	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
cis-1,3-Dichloropropylene	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
Dichlorotetrafluoroethane	<0.010	ug/L	0.010	<0.0014	ppmv	0.0014
Diisopropyl ether (DIPE)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
1,4-Dioxane	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Ethanol	<0.010	ug/L	0.010	<0.0053	ppmv	0.0053
Ethyl Acetate	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Ethylbenzene	**0.011**	ug/L	0.010	**0.0025**	ppmv	0.0023
Ethyl-tert-Butyl Ether (ETBE)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
4-Ethyltoluene	<0.010	ug/L	0.010	<0.002	ppmv	0.002
Heptane	**0.027**	ug/L	0.010	**0.0066**	ppmv	0.0024
Hexachlorobutadiene	<0.010	ug/L	0.010	<0.00094	ppmv	0.00094

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	1	**Prepared:**	05/13/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/13/16

SV-3b-5

6E11016-04 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
n-Hexane	**0.018**	ug/L	0.010	**0.0051**	ppmv	0.0028
2-Hexanone (MBK)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
Isopropanol (IPA)	<0.010	ug/L	0.010	<0.0041	ppmv	0.0041
Methyl-tert-Butyl Ether (MTBE)	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Methylene Chloride	<0.010	ug/L	0.010	<0.0029	ppmv	0.0029
4-Methyl-2-pentanone (MIBK)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
Naphthalene	<0.010	ug/L	0.010	<0.0019	ppmv	0.0019
Propylene	<0.010	ug/L	0.010	<0.0058	ppmv	0.0058
Styrene	<0.010	ug/L	0.010	<0.0023	ppmv	0.0023
1,1,2,2-Tetrachloroethane	<0.010	ug/L	0.010	<0.0015	ppmv	0.0015
Tetrachloroethylene (PCE)	<0.010	ug/L	0.010	<0.0015	ppmv	0.0015
Tetrahydrofuran (THF)	<0.010	ug/L	0.010	<0.0034	ppmv	0.0034
Toluene	**0.015**	ug/L	0.010	**0.004**	ppmv	0.0027
1,2,4-Trichlorobenzene	<0.010	ug/L	0.010	<0.0013	ppmv	0.0013
1,1,2-Trichloroethane	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
1,1,1-Trichloroethane	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
Trichloroethylene (TCE)	<0.010	ug/L	0.010	<0.0019	ppmv	0.0019
Trichlorofluoromethane (R11)	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<0.010	ug/L	0.010	<0.0013	ppmv	0.0013
1,3,5-Trimethylbenzene	<0.010	ug/L	0.010	<0.002	ppmv	0.002

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	1	**Prepared:**	05/13/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/13/16

SV-3b-5

6E11016-04 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
1,2,4-Trimethylbenzene	**0.010**	ug/L	0.010	**0.002**	ppmv	0.002
2,2,4-Trimethylpentane	<0.010	ug/L	0.010	<0.0021	ppmv	0.0021
Vinyl acetate	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Vinyl bromide	<0.010	ug/L	0.010	<0.0023	ppmv	0.0023
Vinyl chloride	<0.010	ug/L	0.010	<0.0039	ppmv	0.0039
o-Xylene	<0.010	ug/L	0.010	<0.0023	ppmv	0.0023
m,p-Xylenes	**0.033**	ug/L	0.010	**0.0076**	ppmv	0.0023
1,2,3-Trichloropropane	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017
sec-Butylbenzene	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
Isopropylbenzene	<0.010	ug/L	0.010	<0.002	ppmv	0.002
n-Propylbenzene	<0.010	ug/L	0.010	<0.002	ppmv	0.002
4-Isopropyltoluene	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
n-Butylbenzene	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018

Surrogates	%REC	%REC Limits
4-Bromofluorobenzene	102 %	70-130

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	1	**Prepared:**	05/12/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/12/16

SV-9-5

6E11016-05 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
Acetone	**0.035**	ug/L	0.010	**0.015**	ppmv	0.0042
Allyl chloride	<0.010	ug/L	0.010	<0.0032	ppmv	0.0032
tert-Amyl Methyl Ether (TAME)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
Benzene	**0.019**	ug/L	0.010	**0.0059**	ppmv	0.0031
Benzyl chloride	<0.010	ug/L	0.010	<0.0019	ppmv	0.0019
Bromodichloromethane	<0.010	ug/L	0.010	<0.0015	ppmv	0.0015
Bromoform	<0.010	ug/L	0.010	<0.00097	ppmv	0.00097
Bromomethane	<0.010	ug/L	0.010	<0.0026	ppmv	0.0026
1,3-Butadiene	<0.010	ug/L	0.010	<0.0045	ppmv	0.0045
2-Butanone (MEK)	**0.013**	ug/L	0.010	**0.0044**	ppmv	0.0034
tert-Butyl alcohol (TBA)	<0.010	ug/L	0.010	<0.0033	ppmv	0.0033
Carbon Disulfide	<0.010	ug/L	0.010	<0.0032	ppmv	0.0032
Carbon Tetrachloride	<0.010	ug/L	0.010	<0.0016	ppmv	0.0016
Chlorobenzene	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
Chloroethane	<0.010	ug/L	0.010	<0.0038	ppmv	0.0038
Chloroform	<0.010	ug/L	0.010	<0.002	ppmv	0.002
Chloromethane	<0.010	ug/L	0.010	<0.0048	ppmv	0.0048
Cyclohexane	**0.017**	ug/L	0.010	**0.0049**	ppmv	0.0029
Dibromochloromethane	<0.010	ug/L	0.010	<0.0012	ppmv	0.0012
1,2-Dibromoethane (EDB)	<0.010	ug/L	0.010	<0.0013	ppmv	0.0013
1,2-Dichlorobenzene	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	1	**Prepared:**	05/12/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/12/16

SV-9-5

6E11016-05 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
1,3-Dichlorobenzene	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017
1,4-Dichlorobenzene	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017
Dichlorodifluoromethane (R12)	<0.010	ug/L	0.010	<0.002	ppmv	0.002
1,1-Dichloroethane	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
1,2-Dichloroethane (EDC)	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
cis-1,2-Dichloroethylene	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
1,1-Dichloroethylene	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
trans-1,2-Dichloroethylene	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
1,2-Dichloropropane	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
trans-1,3-Dichloropropylene	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
cis-1,3-Dichloropropylene	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
Dichlorotetrafluoroethane	<0.010	ug/L	0.010	<0.0014	ppmv	0.0014
Diisopropyl ether (DIPE)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
1,4-Dioxane	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Ethanol	<0.010	ug/L	0.010	<0.0053	ppmv	0.0053
Ethyl Acetate	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Ethylbenzene	**0.017**	ug/L	0.010	**0.0039**	ppmv	0.0023
Ethyl-tert-Butyl Ether (ETBE)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
4-Ethyltoluene	<0.010	ug/L	0.010	<0.002	ppmv	0.002
Heptane	**0.022**	ug/L	0.010	**0.0054**	ppmv	0.0024
Hexachlorobutadiene	<0.010	ug/L	0.010	<0.00094	ppmv	0.00094

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	1	**Prepared:**	05/12/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/12/16

SV-9-5

6E11016-05 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
n-Hexane	**0.017**	ug/L	0.010	**0.0048**	ppmv	0.0028
2-Hexanone (MBK)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
Isopropanol (IPA)	<0.010	ug/L	0.010	<0.0041	ppmv	0.0041
Methyl-tert-Butyl Ether (MTBE)	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Methylene Chloride	<0.010	ug/L	0.010	<0.0029	ppmv	0.0029
4-Methyl-2-pentanone (MIBK)	**0.020**	ug/L	0.010	**0.0049**	ppmv	0.0024
Naphthalene	<0.010	ug/L	0.010	<0.0019	ppmv	0.0019
Propylene	**0.075**	ug/L	0.010	**0.044**	ppmv	0.0058
Styrene	**0.015**	ug/L	0.010	**0.0035**	ppmv	0.0023
1,1,2,2-Tetrachloroethane	<0.010	ug/L	0.010	<0.0015	ppmv	0.0015
Tetrachloroethylene (PCE)	<0.010	ug/L	0.010	<0.0015	ppmv	0.0015
Tetrahydrofuran (THF)	<0.010	ug/L	0.010	<0.0034	ppmv	0.0034
Toluene	**0.067**	ug/L	0.010	**0.018**	ppmv	0.0027
1,2,4-Trichlorobenzene	<0.010	ug/L	0.010	<0.0013	ppmv	0.0013
1,1,2-Trichloroethane	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
1,1,1-Trichloroethane	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
Trichloroethylene (TCE)	<0.010	ug/L	0.010	<0.0019	ppmv	0.0019
Trichlorofluoromethane (R11)	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<0.010	ug/L	0.010	<0.0013	ppmv	0.0013
1,3,5-Trimethylbenzene	<0.010	ug/L	0.010	<0.002	ppmv	0.002

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	1	**Prepared:**	05/12/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/12/16

SV-9-5

6E11016-05 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
1,2,4-Trimethylbenzene	**0.015**	ug/L	0.010	**0.0031**	ppmv	0.002
2,2,4-Trimethylpentane	**0.010**	ug/L	0.010	**0.0021**	ppmv	0.0021
Vinyl acetate	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Vinyl bromide	<0.010	ug/L	0.010	<0.0023	ppmv	0.0023
Vinyl chloride	<0.010	ug/L	0.010	<0.0039	ppmv	0.0039
o-Xylene	**0.017**	ug/L	0.010	**0.0039**	ppmv	0.0023
m,p-Xylenes	**0.055**	ug/L	0.010	**0.013**	ppmv	0.0023
1,2,3-Trichloropropane	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017
sec-Butylbenzene	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
Isopropylbenzene	<0.010	ug/L	0.010	<0.002	ppmv	0.002
n-Propylbenzene	<0.010	ug/L	0.010	<0.002	ppmv	0.002
4-Isopropyltoluene	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
n-Butylbenzene	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018

Surrogates	%REC	%REC Limits
4-Bromofluorobenzene	99.7 %	70-130

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	1	**Prepared:**	05/12/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/12/16

SV-4-5

6E11016-06 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
Acetone	<0.010	ug/L	0.010	<0.0042	ppmv	0.0042
Allyl chloride	<0.010	ug/L	0.010	<0.0032	ppmv	0.0032
tert-Amyl Methyl Ether (TAME)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
Benzene	**0.046**	ug/L	0.010	**0.014**	ppmv	0.0031
Benzyl chloride	<0.010	ug/L	0.010	<0.0019	ppmv	0.0019
Bromodichloromethane	<0.010	ug/L	0.010	<0.0015	ppmv	0.0015
Bromoform	<0.010	ug/L	0.010	<0.00097	ppmv	0.00097
Bromomethane	<0.010	ug/L	0.010	<0.0026	ppmv	0.0026
1,3-Butadiene	<0.010	ug/L	0.010	<0.0045	ppmv	0.0045
2-Butanone (MEK)	**0.048**	ug/L	0.010	**0.016**	ppmv	0.0034
tert-Butyl alcohol (TBA)	<0.010	ug/L	0.010	<0.0033	ppmv	0.0033
Carbon Disulfide	**0.040**	ug/L	0.010	**0.013**	ppmv	0.0032
Carbon Tetrachloride	<0.010	ug/L	0.010	<0.0016	ppmv	0.0016
Chlorobenzene	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
Chloroethane	<0.010	ug/L	0.010	<0.0038	ppmv	0.0038
Chloroform	<0.010	ug/L	0.010	<0.002	ppmv	0.002
Chloromethane	<0.010	ug/L	0.010	<0.0048	ppmv	0.0048
Cyclohexane	**0.037**	ug/L	0.010	**0.011**	ppmv	0.0029
Dibromochloromethane	<0.010	ug/L	0.010	<0.0012	ppmv	0.0012
1,2-Dibromoethane (EDB)	<0.010	ug/L	0.010	<0.0013	ppmv	0.0013
1,2-Dichlorobenzene	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client: Stantec (TO)
Project No: 185803633
Project Name: Kaiser - Vermont Ave.
Matrix: Vapor
Dilution: 1
Method: VOCs by GCMS EPA TO-15

AA Project No: A732180
Date Received: 05/11/16
Date Reported: 05/17/16
Sampled: 05/11/16
Prepared: 05/12/16
Analyzed: 05/12/16

SV-4-5

6E11016-06 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
1,3-Dichlorobenzene	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017
1,4-Dichlorobenzene	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017
Dichlorodifluoromethane (R12)	<0.010	ug/L	0.010	<0.002	ppmv	0.002
1,1-Dichloroethane	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
1,2-Dichloroethane (EDC)	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
cis-1,2-Dichloroethylene	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
1,1-Dichloroethylene	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
trans-1,2-Dichloroethylene	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
1,2-Dichloropropane	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
trans-1,3-Dichloropropylene	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
cis-1,3-Dichloropropylene	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
Dichlorotetrafluoroethane	<0.010	ug/L	0.010	<0.0014	ppmv	0.0014
Diisopropyl ether (DIPE)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
1,4-Dioxane	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Ethanol	**0.020**	ug/L	0.010	**0.011**	ppmv	0.0053
Ethyl Acetate	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Ethylbenzene	**0.043**	ug/L	0.010	**0.0099**	ppmv	0.0023
Ethyl-tert-Butyl Ether (ETBE)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
4-Ethyltoluene	**0.017**	ug/L	0.010	**0.0035**	ppmv	0.002
Heptane	**0.085**	ug/L	0.010	**0.021**	ppmv	0.0024
Hexachlorobutadiene	<0.010	ug/L	0.010	<0.00094	ppmv	0.00094

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	1	**Prepared:**	05/12/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/12/16

SV-4-5

6E11016-06 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
n-Hexane	**0.12**	ug/L	0.010	**0.034**	ppmv	0.0028
2-Hexanone (MBK)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
Isopropanol (IPA)	<0.010	ug/L	0.010	<0.0041	ppmv	0.0041
Methyl-tert-Butyl Ether (MTBE)	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Methylene Chloride	**0.022**	ug/L	0.010	**0.0063**	ppmv	0.0029
4-Methyl-2-pentanone (MIBK)	**0.032**	ug/L	0.010	**0.0078**	ppmv	0.0024
Naphthalene	<0.010	ug/L	0.010	<0.0019	ppmv	0.0019
Propylene	**2.6**	ug/L	0.010	**1.5**	ppmv	0.0058
Styrene	**0.015**	ug/L	0.010	**0.0035**	ppmv	0.0023
1,1,2,2-Tetrachloroethane	<0.010	ug/L	0.010	<0.0015	ppmv	0.0015
Tetrachloroethylene (PCE)	**0.020**	ug/L	0.010	**0.0029**	ppmv	0.0015
Tetrahydrofuran (THF)	<0.010	ug/L	0.010	<0.0034	ppmv	0.0034
Toluene	**0.19**	ug/L	0.010	**0.050**	ppmv	0.0027
1,2,4-Trichlorobenzene	<0.010	ug/L	0.010	<0.0013	ppmv	0.0013
1,1,2-Trichloroethane	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
1,1,1-Trichloroethane	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
Trichloroethylene (TCE)	<0.010	ug/L	0.010	<0.0019	ppmv	0.0019
Trichlorofluoromethane (R11)	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<0.010	ug/L	0.010	<0.0013	ppmv	0.0013
1,3,5-Trimethylbenzene	**0.018**	ug/L	0.010	**0.0037**	ppmv	0.002

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	1	**Prepared:**	05/12/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/12/16

SV-4-5

6E11016-06 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
1,2,4-Trimethylbenzene	**0.036**	ug/L	0.010	**0.0073**	ppmv	0.002
2,2,4-Trimethylpentane	**0.037**	ug/L	0.010	**0.0079**	ppmv	0.0021
Vinyl acetate	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Vinyl bromide	<0.010	ug/L	0.010	<0.0023	ppmv	0.0023
Vinyl chloride	<0.010	ug/L	0.010	<0.0039	ppmv	0.0039
o-Xylene	**0.045**	ug/L	0.010	**0.010**	ppmv	0.0023
m,p-Xylenes	**0.15**	ug/L	0.010	**0.035**	ppmv	0.0023
1,2,3-Trichloropropane	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017
sec-Butylbenzene	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
Isopropylbenzene	<0.010	ug/L	0.010	<0.002	ppmv	0.002
n-Propylbenzene	<0.010	ug/L	0.010	<0.002	ppmv	0.002
4-Isopropyltoluene	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
n-Butylbenzene	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018

Surrogates	%REC	%REC Limits
4-Bromofluorobenzene	104 %	70-130

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	1	**Prepared:**	05/12/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/12/16

SV-4-21

6E11016-07 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
Acetone	<0.010	ug/L	0.010	<0.0042	ppmv	0.0042
Allyl chloride	<0.010	ug/L	0.010	<0.0032	ppmv	0.0032
tert-Amyl Methyl Ether (TAME)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
Benzene	**0.031**	ug/L	0.010	**0.0097**	ppmv	0.0031
Benzyl chloride	<0.010	ug/L	0.010	<0.0019	ppmv	0.0019
Bromodichloromethane	<0.010	ug/L	0.010	<0.0015	ppmv	0.0015
Bromoform	<0.010	ug/L	0.010	<0.00097	ppmv	0.00097
Bromomethane	<0.010	ug/L	0.010	<0.0026	ppmv	0.0026
1,3-Butadiene	<0.010	ug/L	0.010	<0.0045	ppmv	0.0045
2-Butanone (MEK)	**0.026**	ug/L	0.010	**0.0088**	ppmv	0.0034
tert-Butyl alcohol (TBA)	<0.010	ug/L	0.010	<0.0033	ppmv	0.0033
Carbon Disulfide	**0.025**	ug/L	0.010	**0.008**	ppmv	0.0032
Carbon Tetrachloride	<0.010	ug/L	0.010	<0.0016	ppmv	0.0016
Chlorobenzene	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
Chloroethane	<0.010	ug/L	0.010	<0.0038	ppmv	0.0038
Chloroform	<0.010	ug/L	0.010	<0.002	ppmv	0.002
Chloromethane	<0.010	ug/L	0.010	<0.0048	ppmv	0.0048
Cyclohexane	**0.019**	ug/L	0.010	**0.0055**	ppmv	0.0029
Dibromochloromethane	<0.010	ug/L	0.010	<0.0012	ppmv	0.0012
1,2-Dibromoethane (EDB)	<0.010	ug/L	0.010	<0.0013	ppmv	0.0013
1,2-Dichlorobenzene	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	1	**Prepared:**	05/12/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/12/16

SV-4-21

6E11016-07 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
1,3-Dichlorobenzene	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017
1,4-Dichlorobenzene	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017
Dichlorodifluoromethane (R12)	<0.010	ug/L	0.010	<0.002	ppmv	0.002
1,1-Dichloroethane	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
1,2-Dichloroethane (EDC)	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
cis-1,2-Dichloroethylene	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
1,1-Dichloroethylene	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
trans-1,2-Dichloroethylene	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
1,2-Dichloropropane	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
trans-1,3-Dichloropropylene	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
cis-1,3-Dichloropropylene	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
Dichlorotetrafluoroethane	<0.010	ug/L	0.010	<0.0014	ppmv	0.0014
Diisopropyl ether (DIPE)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
1,4-Dioxane	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Ethanol	**0.030**	ug/L	0.010	**0.016**	ppmv	0.0053
Ethyl Acetate	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Ethylbenzene	**0.026**	ug/L	0.010	**0.006**	ppmv	0.0023
Ethyl-tert-Butyl Ether (ETBE)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
4-Ethyltoluene	<0.010	ug/L	0.010	<0.002	ppmv	0.002
Heptane	**0.054**	ug/L	0.010	**0.013**	ppmv	0.0024
Hexachlorobutadiene	<0.010	ug/L	0.010	<0.00094	ppmv	0.00094

Viorel Vasile
Operations Manager

AMERICAN ANALYTICS

LABORATORY ANALYSIS RESULTS

Client: Stantec (TO)
Project No: 185803633
Project Name: Kaiser - Vermont Ave.
Matrix: Vapor
Dilution: 1
Method: VOCs by GCMS EPA TO-15

AA Project No: A732180
Date Received: 05/11/16
Date Reported: 05/17/16
Sampled: 05/11/16
Prepared: 05/12/16
Analyzed: 05/12/16

SV-4-21

6E11016-07 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
n-Hexane	**0.11**	ug/L	0.010	**0.031**	ppmv	0.0028
2-Hexanone (MBK)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
Isopropanol (IPA)	<0.010	ug/L	0.010	<0.0041	ppmv	0.0041
Methyl-tert-Butyl Ether (MTBE)	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Methylene Chloride	<0.010	ug/L	0.010	<0.0029	ppmv	0.0029
4-Methyl-2-pentanone (MIBK)	**0.024**	ug/L	0.010	**0.0059**	ppmv	0.0024
Naphthalene	<0.010	ug/L	0.010	<0.0019	ppmv	0.0019
Propylene	**2.9**	ug/L	0.010	**1.7**	ppmv	0.0058
Styrene	**0.019**	ug/L	0.010	**0.0045**	ppmv	0.0023
1,1,2,2-Tetrachloroethane	<0.010	ug/L	0.010	<0.0015	ppmv	0.0015
Tetrachloroethylene (PCE)	<0.010	ug/L	0.010	<0.0015	ppmv	0.0015
Tetrahydrofuran (THF)	**0.021**	ug/L	0.010	**0.0071**	ppmv	0.0034
Toluene	**0.096**	ug/L	0.010	**0.025**	ppmv	0.0027
1,2,4-Trichlorobenzene	<0.010	ug/L	0.010	<0.0013	ppmv	0.0013
1,1,2-Trichloroethane	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
1,1,1-Trichloroethane	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
Trichloroethylene (TCE)	<0.010	ug/L	0.010	<0.0019	ppmv	0.0019
Trichlorofluoromethane (R11)	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<0.010	ug/L	0.010	<0.0013	ppmv	0.0013
1,3,5-Trimethylbenzene	**0.013**	ug/L	0.010	**0.0026**	ppmv	0.002

Viorel Vasile
Operations Manager

AMERICAN ANALYTICS

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	1	**Prepared:**	05/12/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/12/16

SV-4-21

6E11016-07 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
1,2,4-Trimethylbenzene	**0.043**	ug/L	0.010	**0.0087**	ppmv	0.002
2,2,4-Trimethylpentane	**0.016**	ug/L	0.010	**0.0034**	ppmv	0.0021
Vinyl acetate	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Vinyl bromide	<0.010	ug/L	0.010	<0.0023	ppmv	0.0023
Vinyl chloride	<0.010	ug/L	0.010	<0.0039	ppmv	0.0039
o-Xylene	**0.029**	ug/L	0.010	**0.0067**	ppmv	0.0023
m,p-Xylenes	**0.089**	ug/L	0.010	**0.020**	ppmv	0.0023
1,2,3-Trichloropropane	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017
sec-Butylbenzene	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
Isopropylbenzene	<0.010	ug/L	0.010	<0.002	ppmv	0.002
n-Propylbenzene	<0.010	ug/L	0.010	<0.002	ppmv	0.002
4-Isopropyltoluene	**0.012**	ug/L	0.010	**0.0022**	ppmv	0.0018
n-Butylbenzene	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018

Surrogates	%REC	%REC Limits
4-Bromofluorobenzene	103 %	70-130

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	10	**Prepared:**	05/12/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/12/16

SV-6-5

6E11016-08 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
Acetone	<0.10	ug/L	0.010	<0.042	ppmv	0.0042
Allyl chloride	<0.10	ug/L	0.010	<0.032	ppmv	0.0032
tert-Amyl Methyl Ether (TAME)	<0.10	ug/L	0.010	<0.024	ppmv	0.0024
Benzene	**0.20**	ug/L	0.010	**0.063**	ppmv	0.0031
Benzyl chloride	<0.10	ug/L	0.010	<0.019	ppmv	0.0019
Bromodichloromethane	<0.10	ug/L	0.010	<0.015	ppmv	0.0015
Bromoform	<0.10	ug/L	0.010	<0.0097	ppmv	0.00097
Bromomethane	<0.10	ug/L	0.010	<0.026	ppmv	0.0026
1,3-Butadiene	<0.10	ug/L	0.010	<0.045	ppmv	0.0045
2-Butanone (MEK)	<0.10	ug/L	0.010	<0.034	ppmv	0.0034
tert-Butyl alcohol (TBA)	<0.10	ug/L	0.010	<0.033	ppmv	0.0033
Carbon Disulfide	<0.10	ug/L	0.010	<0.032	ppmv	0.0032
Carbon Tetrachloride	<0.10	ug/L	0.010	<0.016	ppmv	0.0016
Chlorobenzene	<0.10	ug/L	0.010	<0.022	ppmv	0.0022
Chloroethane	<0.10	ug/L	0.010	<0.038	ppmv	0.0038
Chloroform	<0.10	ug/L	0.010	<0.020	ppmv	0.002
Chloromethane	<0.10	ug/L	0.010	<0.048	ppmv	0.0048
Cyclohexane	**1.3**	ug/L	0.010	**0.38**	ppmv	0.0029
Dibromochloromethane	<0.10	ug/L	0.010	<0.012	ppmv	0.0012
1,2-Dibromoethane (EDB)	<0.10	ug/L	0.010	<0.013	ppmv	0.0013
1,2-Dichlorobenzene	<0.10	ug/L	0.010	<0.017	ppmv	0.0017

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	10	**Prepared:**	05/12/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/12/16

SV-6-5

6E11016-08 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
1,3-Dichlorobenzene	<0.10	ug/L	0.010	<0.017	ppmv	0.0017
1,4-Dichlorobenzene	<0.10	ug/L	0.010	<0.017	ppmv	0.0017
Dichlorodifluoromethane (R12)	<0.10	ug/L	0.010	<0.020	ppmv	0.002
1,1-Dichloroethane	<0.10	ug/L	0.010	<0.025	ppmv	0.0025
1,2-Dichloroethane (EDC)	<0.10	ug/L	0.010	<0.025	ppmv	0.0025
cis-1,2-Dichloroethylene	<0.10	ug/L	0.010	<0.025	ppmv	0.0025
1,1-Dichloroethylene	<0.10	ug/L	0.010	<0.025	ppmv	0.0025
trans-1,2-Dichloroethylene	<0.10	ug/L	0.010	<0.025	ppmv	0.0025
1,2-Dichloropropane	<0.10	ug/L	0.010	<0.022	ppmv	0.0022
trans-1,3-Dichloropropylene	<0.10	ug/L	0.010	<0.022	ppmv	0.0022
cis-1,3-Dichloropropylene	<0.10	ug/L	0.010	<0.022	ppmv	0.0022
Dichlorotetrafluoroethane	<0.10	ug/L	0.010	<0.014	ppmv	0.0014
Diisopropyl ether (DIPE)	<0.10	ug/L	0.010	<0.024	ppmv	0.0024
1,4-Dioxane	<0.10	ug/L	0.010	<0.028	ppmv	0.0028
Ethanol	<0.10	ug/L	0.010	<0.053	ppmv	0.0053
Ethyl Acetate	<0.10	ug/L	0.010	<0.028	ppmv	0.0028
Ethylbenzene	**0.18**	ug/L	0.010	**0.041**	ppmv	0.0023
Ethyl-tert-Butyl Ether (ETBE)	<0.10	ug/L	0.010	<0.024	ppmv	0.0024
4-Ethyltoluene	<0.10	ug/L	0.010	<0.020	ppmv	0.002
Heptane	**2.0**	ug/L	0.010	**0.49**	ppmv	0.0024
Hexachlorobutadiene	<0.10	ug/L	0.010	<0.0094	ppmv	0.00094

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	10	**Prepared:**	05/12/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/12/16

SV-6-5

6E11016-08 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
n-Hexane	**2.4**	ug/L	0.010	**0.68**	ppmv	0.0028
2-Hexanone (MBK)	<0.10	ug/L	0.010	<0.024	ppmv	0.0024
Isopropanol (IPA)	<0.10	ug/L	0.010	<0.041	ppmv	0.0041
Methyl-tert-Butyl Ether (MTBE)	<0.10	ug/L	0.010	<0.028	ppmv	0.0028
Methylene Chloride	<0.10	ug/L	0.010	<0.029	ppmv	0.0029
4-Methyl-2-pentanone (MIBK)	<0.10	ug/L	0.010	<0.024	ppmv	0.0024
Naphthalene	<0.10	ug/L	0.010	<0.019	ppmv	0.0019
Propylene	**1.7**	ug/L	0.010	**0.99**	ppmv	0.0058
Styrene	<0.10	ug/L	0.010	<0.023	ppmv	0.0023
1,1,2,2-Tetrachloroethane	<0.10	ug/L	0.010	<0.015	ppmv	0.0015
Tetrachloroethylene (PCE)	<0.10	ug/L	0.010	<0.015	ppmv	0.0015
Tetrahydrofuran (THF)	<0.10	ug/L	0.010	<0.034	ppmv	0.0034
Toluene	**0.18**	ug/L	0.010	**0.048**	ppmv	0.0027
1,2,4-Trichlorobenzene	<0.10	ug/L	0.010	<0.013	ppmv	0.0013
1,1,2-Trichloroethane	<0.10	ug/L	0.010	<0.018	ppmv	0.0018
1,1,1-Trichloroethane	<0.10	ug/L	0.010	<0.018	ppmv	0.0018
Trichloroethylene (TCE)	<0.10	ug/L	0.010	<0.019	ppmv	0.0019
Trichlorofluoromethane (R11)	<0.10	ug/L	0.010	<0.018	ppmv	0.0018
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<0.10	ug/L	0.010	<0.013	ppmv	0.0013
1,3,5-Trimethylbenzene	<0.10	ug/L	0.010	<0.020	ppmv	0.002

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	10	**Prepared:**	05/12/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/12/16

SV-6-5

6E11016-08 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
1,2,4-Trimethylbenzene	**0.21**	ug/L	0.010	**0.043**	ppmv	0.002
2,2,4-Trimethylpentane	<0.10	ug/L	0.010	<0.021	ppmv	0.0021
Vinyl acetate	<0.10	ug/L	0.010	<0.028	ppmv	0.0028
Vinyl bromide	<0.10	ug/L	0.010	<0.023	ppmv	0.0023
Vinyl chloride	<0.10	ug/L	0.010	<0.039	ppmv	0.0039
o-Xylene	<0.10	ug/L	0.010	<0.023	ppmv	0.0023
m,p-Xylenes	**0.41**	ug/L	0.010	**0.094**	ppmv	0.0023
1,2,3-Trichloropropane	<0.10	ug/L	0.010	<0.017	ppmv	0.0017
sec-Butylbenzene	<0.10	ug/L	0.010	<0.018	ppmv	0.0018
Isopropylbenzene	**0.12**	ug/L	0.010	**0.024**	ppmv	0.002
n-Propylbenzene	**0.24**	ug/L	0.010	**0.049**	ppmv	0.002
4-Isopropyltoluene	<0.10	ug/L	0.010	<0.018	ppmv	0.0018
n-Butylbenzene	<0.10	ug/L	0.010	<0.018	ppmv	0.0018

Surrogates	%REC	%REC Limits
4-Bromofluorobenzene	120 %	70-130

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	1000	**Prepared:**	05/12/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/12/16

SV-6-19

6E11016-09 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
Acetone	<10	ug/L	0.010	<4.2	ppmv	0.0042
Allyl chloride	<10	ug/L	0.010	<3.2	ppmv	0.0032
tert-Amyl Methyl Ether (TAME)	<10	ug/L	0.010	<2.4	ppmv	0.0024
Benzene	**390**	ug/L	0.010	**120**	ppmv	0.0031
Benzyl chloride	<10	ug/L	0.010	<1.9	ppmv	0.0019
Bromodichloromethane	<10	ug/L	0.010	<1.5	ppmv	0.0015
Bromoform	<10	ug/L	0.010	<0.97	ppmv	0.00097
Bromomethane	<10	ug/L	0.010	<2.6	ppmv	0.0026
1,3-Butadiene	<10	ug/L	0.010	<4.5	ppmv	0.0045
2-Butanone (MEK)	<10	ug/L	0.010	<3.4	ppmv	0.0034
tert-Butyl alcohol (TBA)	<10	ug/L	0.010	<3.3	ppmv	0.0033
Carbon Disulfide	<10	ug/L	0.010	<3.2	ppmv	0.0032
Carbon Tetrachloride	<10	ug/L	0.010	<1.6	ppmv	0.0016
Chlorobenzene	<10	ug/L	0.010	<2.2	ppmv	0.0022
Chloroethane	<10	ug/L	0.010	<3.8	ppmv	0.0038
Chloroform	<10	ug/L	0.010	<2.0	ppmv	0.002
Chloromethane	<10	ug/L	0.010	<4.8	ppmv	0.0048
Cyclohexane	**1500**	ug/L	0.010	**440**	ppmv	0.0029
Dibromochloromethane	<10	ug/L	0.010	<1.2	ppmv	0.0012
1,2-Dibromoethane (EDB)	<10	ug/L	0.010	<1.3	ppmv	0.0013
1,2-Dichlorobenzene	<10	ug/L	0.010	<1.7	ppmv	0.0017

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client: Stantec (TO)
Project No: 185803633
Project Name: Kaiser - Vermont Ave.
Matrix: Vapor
Dilution: 1000
Method: VOCs by GCMS EPA TO-15

AA Project No: A732180
Date Received: 05/11/16
Date Reported: 05/17/16
Sampled: 05/11/16
Prepared: 05/12/16
Analyzed: 05/12/16

SV-6-19

6E11016-09 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
1,3-Dichlorobenzene	<10	ug/L	0.010	<1.7	ppmv	0.0017
1,4-Dichlorobenzene	<10	ug/L	0.010	<1.7	ppmv	0.0017
Dichlorodifluoromethane (R12)	<10	ug/L	0.010	<2.0	ppmv	0.002
1,1-Dichloroethane	<10	ug/L	0.010	<2.5	ppmv	0.0025
1,2-Dichloroethane (EDC)	<10	ug/L	0.010	<2.5	ppmv	0.0025
cis-1,2-Dichloroethylene	<10	ug/L	0.010	<2.5	ppmv	0.0025
1,1-Dichloroethylene	<10	ug/L	0.010	<2.5	ppmv	0.0025
trans-1,2-Dichloroethylene	<10	ug/L	0.010	<2.5	ppmv	0.0025
1,2-Dichloropropane	<10	ug/L	0.010	<2.2	ppmv	0.0022
trans-1,3-Dichloropropylene	<10	ug/L	0.010	<2.2	ppmv	0.0022
cis-1,3-Dichloropropylene	<10	ug/L	0.010	<2.2	ppmv	0.0022
Dichlorotetrafluoroethane	<10	ug/L	0.010	<1.4	ppmv	0.0014
Diisopropyl ether (DIPE)	<10	ug/L	0.010	<2.4	ppmv	0.0024
1,4-Dioxane	<10	ug/L	0.010	<2.8	ppmv	0.0028
Ethanol	<10	ug/L	0.010	<5.3	ppmv	0.0053
Ethyl Acetate	<10	ug/L	0.010	<2.8	ppmv	0.0028
Ethylbenzene	**310**	ug/L	0.010	**71**	ppmv	0.0023
Ethyl-tert-Butyl Ether (ETBE)	<10	ug/L	0.010	<2.4	ppmv	0.0024
4-Ethyltoluene	**55**	ug/L	0.010	**11**	ppmv	0.002
Heptane	**4000**	ug/L	0.010	**980**	ppmv	0.0024
Hexachlorobutadiene	<10	ug/L	0.010	<0.94	ppmv	0.00094

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	20000	**Prepared:**	05/12/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/12/16

SV-6-19

6E11016-09 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
n-Hexane	**5100**	ug/L	0.010	**1400**	ppmv	0.0028
2-Hexanone (MBK)	<10	ug/L	0.010	<2.4	ppmv	0.0024
Isopropanol (IPA)	<10	ug/L	0.010	<4.1	ppmv	0.0041
Methyl-tert-Butyl Ether (MTBE)	<10	ug/L	0.010	<2.8	ppmv	0.0028
Methylene Chloride	<10	ug/L	0.010	<2.9	ppmv	0.0029
4-Methyl-2-pentanone (MIBK)	<10	ug/L	0.010	<2.4	ppmv	0.0024
Naphthalene	<10	ug/L	0.010	<1.9	ppmv	0.0019
Propylene	<10	ug/L	0.010	<5.8	ppmv	0.0058
Styrene	<10	ug/L	0.010	<2.3	ppmv	0.0023
1,1,2,2-Tetrachloroethane	<10	ug/L	0.010	<1.5	ppmv	0.0015
Tetrachloroethylene (PCE)	<10	ug/L	0.010	<1.5	ppmv	0.0015
Tetrahydrofuran (THF)	<10	ug/L	0.010	<3.4	ppmv	0.0034
Toluene	**37**	ug/L	0.010	**9.8**	ppmv	0.0027
1,2,4-Trichlorobenzene	<10	ug/L	0.010	<1.3	ppmv	0.0013
1,1,2-Trichloroethane	<10	ug/L	0.010	<1.8	ppmv	0.0018
1,1,1-Trichloroethane	<10	ug/L	0.010	<1.8	ppmv	0.0018
Trichloroethylene (TCE)	<10	ug/L	0.010	<1.9	ppmv	0.0019
Trichlorofluoromethane (R11)	<10	ug/L	0.010	<1.8	ppmv	0.0018
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<10	ug/L	0.010	<1.3	ppmv	0.0013
1,3,5-Trimethylbenzene	**44**	ug/L	0.010	**9.0**	ppmv	0.002

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	1000	**Prepared:**	05/12/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/12/16

SV-6-19

6E11016-09 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
1,2,4-Trimethylbenzene	**110**	ug/L	0.010	**22**	ppmv	0.002
2,2,4-Trimethylpentane	<10	ug/L	0.010	<2.1	ppmv	0.0021
Vinyl acetate	<10	ug/L	0.010	<2.8	ppmv	0.0028
Vinyl bromide	<10	ug/L	0.010	<2.3	ppmv	0.0023
Vinyl chloride	<10	ug/L	0.010	<3.9	ppmv	0.0039
o-Xylene	**16**	ug/L	0.010	**3.7**	ppmv	0.0023
m,p-Xylenes	**830**	ug/L	0.010	**190**	ppmv	0.0023
1,2,3-Trichloropropane	<10	ug/L	0.010	<1.7	ppmv	0.0017
sec-Butylbenzene	<10	ug/L	0.010	<1.8	ppmv	0.0018
Isopropylbenzene	**34**	ug/L	0.010	**6.9**	ppmv	0.002
n-Propylbenzene	**46**	ug/L	0.010	**9.4**	ppmv	0.002
4-Isopropyltoluene	<10	ug/L	0.010	<1.8	ppmv	0.0018
n-Butylbenzene	<10	ug/L	0.010	<1.8	ppmv	0.0018

Surrogates	%REC	%REC Limits
4-Bromofluorobenzene	111 %	70-130

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	10	**Prepared:**	05/12/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/12/16

SV-7-5

6E11016-10 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
Acetone	<0.10	ug/L	0.010	<0.042	ppmv	0.0042
Allyl chloride	<0.10	ug/L	0.010	<0.032	ppmv	0.0032
tert-Amyl Methyl Ether (TAME)	<0.10	ug/L	0.010	<0.024	ppmv	0.0024
Benzene	<0.10	ug/L	0.010	<0.031	ppmv	0.0031
Benzyl chloride	<0.10	ug/L	0.010	<0.019	ppmv	0.0019
Bromodichloromethane	<0.10	ug/L	0.010	<0.015	ppmv	0.0015
Bromoform	<0.10	ug/L	0.010	<0.0097	ppmv	0.00097
Bromomethane	<0.10	ug/L	0.010	<0.026	ppmv	0.0026
1,3-Butadiene	<0.10	ug/L	0.010	<0.045	ppmv	0.0045
2-Butanone (MEK)	<0.10	ug/L	0.010	<0.034	ppmv	0.0034
tert-Butyl alcohol (TBA)	<0.10	ug/L	0.010	<0.033	ppmv	0.0033
Carbon Disulfide	<0.10	ug/L	0.010	<0.032	ppmv	0.0032
Carbon Tetrachloride	<0.10	ug/L	0.010	<0.016	ppmv	0.0016
Chlorobenzene	<0.10	ug/L	0.010	<0.022	ppmv	0.0022
Chloroethane	<0.10	ug/L	0.010	<0.038	ppmv	0.0038
Chloroform	<0.10	ug/L	0.010	<0.020	ppmv	0.002
Chloromethane	<0.10	ug/L	0.010	<0.048	ppmv	0.0048
Cyclohexane	**0.11**	ug/L	0.010	**0.032**	ppmv	0.0029
Dibromochloromethane	<0.10	ug/L	0.010	<0.012	ppmv	0.0012
1,2-Dibromoethane (EDB)	<0.10	ug/L	0.010	<0.013	ppmv	0.0013
1,2-Dichlorobenzene	<0.10	ug/L	0.010	<0.017	ppmv	0.0017

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	10	**Prepared:**	05/12/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/12/16

SV-7-5

6E11016-10 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
1,3-Dichlorobenzene	<0.10	ug/L	0.010	<0.017	ppmv	0.0017
1,4-Dichlorobenzene	<0.10	ug/L	0.010	<0.017	ppmv	0.0017
Dichlorodifluoromethane (R12)	<0.10	ug/L	0.010	<0.020	ppmv	0.002
1,1-Dichloroethane	<0.10	ug/L	0.010	<0.025	ppmv	0.0025
1,2-Dichloroethane (EDC)	<0.10	ug/L	0.010	<0.025	ppmv	0.0025
cis-1,2-Dichloroethylene	<0.10	ug/L	0.010	<0.025	ppmv	0.0025
1,1-Dichloroethylene	<0.10	ug/L	0.010	<0.025	ppmv	0.0025
trans-1,2-Dichloroethylene	<0.10	ug/L	0.010	<0.025	ppmv	0.0025
1,2-Dichloropropane	<0.10	ug/L	0.010	<0.022	ppmv	0.0022
trans-1,3-Dichloropropylene	<0.10	ug/L	0.010	<0.022	ppmv	0.0022
cis-1,3-Dichloropropylene	<0.10	ug/L	0.010	<0.022	ppmv	0.0022
Dichlorotetrafluoroethane	<0.10	ug/L	0.010	<0.014	ppmv	0.0014
Diisopropyl ether (DIPE)	<0.10	ug/L	0.010	<0.024	ppmv	0.0024
1,4-Dioxane	<0.10	ug/L	0.010	<0.028	ppmv	0.0028
Ethanol	<0.10	ug/L	0.010	<0.053	ppmv	0.0053
Ethyl Acetate	<0.10	ug/L	0.010	<0.028	ppmv	0.0028
Ethylbenzene	<0.10	ug/L	0.010	<0.023	ppmv	0.0023
Ethyl-tert-Butyl Ether (ETBE)	<0.10	ug/L	0.010	<0.024	ppmv	0.0024
4-Ethyltoluene	<0.10	ug/L	0.010	<0.020	ppmv	0.002
Heptane	**0.15**	ug/L	0.010	**0.037**	ppmv	0.0024
Hexachlorobutadiene	<0.10	ug/L	0.010	<0.0094	ppmv	0.00094

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	10	**Prepared:**	05/12/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/12/16

SV-7-5

6E11016-10 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
n-Hexane	**0.32**	ug/L	0.010	**0.091**	ppmv	0.0028
2-Hexanone (MBK)	<0.10	ug/L	0.010	<0.024	ppmv	0.0024
Isopropanol (IPA)	<0.10	ug/L	0.010	<0.041	ppmv	0.0041
Methyl-tert-Butyl Ether (MTBE)	<0.10	ug/L	0.010	<0.028	ppmv	0.0028
Methylene Chloride	<0.10	ug/L	0.010	<0.029	ppmv	0.0029
4-Methyl-2-pentanone (MIBK)	<0.10	ug/L	0.010	<0.024	ppmv	0.0024
Naphthalene	<0.10	ug/L	0.010	<0.019	ppmv	0.0019
Propylene	**4.8**	ug/L	0.010	**2.8**	ppmv	0.0058
Styrene	<0.10	ug/L	0.010	<0.023	ppmv	0.0023
1,1,2,2-Tetrachloroethane	<0.10	ug/L	0.010	<0.015	ppmv	0.0015
Tetrachloroethylene (PCE)	<0.10	ug/L	0.010	<0.015	ppmv	0.0015
Tetrahydrofuran (THF)	<0.10	ug/L	0.010	<0.034	ppmv	0.0034
Toluene	<0.10	ug/L	0.010	<0.027	ppmv	0.0027
1,2,4-Trichlorobenzene	<0.10	ug/L	0.010	<0.013	ppmv	0.0013
1,1,2-Trichloroethane	<0.10	ug/L	0.010	<0.018	ppmv	0.0018
1,1,1-Trichloroethane	<0.10	ug/L	0.010	<0.018	ppmv	0.0018
Trichloroethylene (TCE)	<0.10	ug/L	0.010	<0.019	ppmv	0.0019
Trichlorofluoromethane (R11)	<0.10	ug/L	0.010	<0.018	ppmv	0.0018
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<0.10	ug/L	0.010	<0.013	ppmv	0.0013
1,3,5-Trimethylbenzene	<0.10	ug/L	0.010	<0.020	ppmv	0.002

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	10	**Prepared:**	05/12/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/12/16

SV-7-5

6E11016-10 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
1,2,4-Trimethylbenzene	<0.10	ug/L	0.010	<0.020	ppmv	0.002
2,2,4-Trimethylpentane	<0.10	ug/L	0.010	<0.021	ppmv	0.0021
Vinyl acetate	<0.10	ug/L	0.010	<0.028	ppmv	0.0028
Vinyl bromide	<0.10	ug/L	0.010	<0.023	ppmv	0.0023
Vinyl chloride	<0.10	ug/L	0.010	<0.039	ppmv	0.0039
o-Xylene	<0.10	ug/L	0.010	<0.023	ppmv	0.0023
m,p-Xylenes	<0.10	ug/L	0.010	<0.023	ppmv	0.0023
1,2,3-Trichloropropane	<0.10	ug/L	0.010	<0.017	ppmv	0.0017
sec-Butylbenzene	<0.10	ug/L	0.010	<0.018	ppmv	0.0018
Isopropylbenzene	<0.10	ug/L	0.010	<0.020	ppmv	0.002
n-Propylbenzene	<0.10	ug/L	0.010	<0.020	ppmv	0.002
4-Isopropyltoluene	<0.10	ug/L	0.010	<0.018	ppmv	0.0018
n-Butylbenzene	<0.10	ug/L	0.010	<0.018	ppmv	0.0018

Surrogates	%REC	%REC Limits
4-Bromofluorobenzene	97.1 %	70-130

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	250	**Prepared:**	05/12/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/12/16

SV-7-23.5

6E11016-11 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
Acetone	<2.5	ug/L	0.010	<1.1	ppmv	0.0042
Allyl chloride	<2.5	ug/L	0.010	<0.80	ppmv	0.0032
tert-Amyl Methyl Ether (TAME)	<2.5	ug/L	0.010	<0.60	ppmv	0.0024
Benzene	<2.5	ug/L	0.010	<0.78	ppmv	0.0031
Benzyl chloride	<2.5	ug/L	0.010	<0.48	ppmv	0.0019
Bromodichloromethane	<2.5	ug/L	0.010	<0.37	ppmv	0.0015
Bromoform	<2.5	ug/L	0.010	<0.24	ppmv	0.00097
Bromomethane	<2.5	ug/L	0.010	<0.64	ppmv	0.0026
1,3-Butadiene	<2.5	ug/L	0.010	<1.1	ppmv	0.0045
2-Butanone (MEK)	<2.5	ug/L	0.010	<0.85	ppmv	0.0034
tert-Butyl alcohol (TBA)	<2.5	ug/L	0.010	<0.82	ppmv	0.0033
Carbon Disulfide	<2.5	ug/L	0.010	<0.80	ppmv	0.0032
Carbon Tetrachloride	<2.5	ug/L	0.010	<0.40	ppmv	0.0016
Chlorobenzene	<2.5	ug/L	0.010	<0.54	ppmv	0.0022
Chloroethane	<2.5	ug/L	0.010	<0.95	ppmv	0.0038
Chloroform	<2.5	ug/L	0.010	<0.51	ppmv	0.002
Chloromethane	<2.5	ug/L	0.010	<1.2	ppmv	0.0048
Cyclohexane	**11**	ug/L	0.010	**3.2**	ppmv	0.0029
Dibromochloromethane	<2.5	ug/L	0.010	<0.29	ppmv	0.0012
1,2-Dibromoethane (EDB)	<2.5	ug/L	0.010	<0.33	ppmv	0.0013
1,2-Dichlorobenzene	<2.5	ug/L	0.010	<0.42	ppmv	0.0017

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	250	**Prepared:**	05/12/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/12/16

SV-7-23.5

6E11016-11 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
1,3-Dichlorobenzene	<2.5	ug/L	0.010	<0.42	ppmv	0.0017
1,4-Dichlorobenzene	<2.5	ug/L	0.010	<0.42	ppmv	0.0017
Dichlorodifluoromethane (R12)	<2.5	ug/L	0.010	<0.51	ppmv	0.002
1,1-Dichloroethane	<2.5	ug/L	0.010	<0.62	ppmv	0.0025
1,2-Dichloroethane (EDC)	<2.5	ug/L	0.010	<0.62	ppmv	0.0025
cis-1,2-Dichloroethylene	<2.5	ug/L	0.010	<0.63	ppmv	0.0025
1,1-Dichloroethylene	<2.5	ug/L	0.010	<0.63	ppmv	0.0025
trans-1,2-Dichloroethylene	<2.5	ug/L	0.010	<0.63	ppmv	0.0025
1,2-Dichloropropane	<2.5	ug/L	0.010	<0.54	ppmv	0.0022
trans-1,3-Dichloropropylene	<2.5	ug/L	0.010	<0.55	ppmv	0.0022
cis-1,3-Dichloropropylene	<2.5	ug/L	0.010	<0.55	ppmv	0.0022
Dichlorotetrafluoroethane	<2.5	ug/L	0.010	<0.36	ppmv	0.0014
Diisopropyl ether (DIPE)	<2.5	ug/L	0.010	<0.60	ppmv	0.0024
1,4-Dioxane	<2.5	ug/L	0.010	<0.69	ppmv	0.0028
Ethanol	<2.5	ug/L	0.010	<1.3	ppmv	0.0053
Ethyl Acetate	<2.5	ug/L	0.010	<0.69	ppmv	0.0028
Ethylbenzene	<2.5	ug/L	0.010	<0.58	ppmv	0.0023
Ethyl-tert-Butyl Ether (ETBE)	<2.5	ug/L	0.010	<0.60	ppmv	0.0024
4-Ethyltoluene	<2.5	ug/L	0.010	<0.51	ppmv	0.002
Heptane	**18**	ug/L	0.010	**4.4**	ppmv	0.0024
Hexachlorobutadiene	<2.5	ug/L	0.010	<0.23	ppmv	0.00094

Viorel Vasile
Operations Manager

AMERICAN ANALYTICS

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	250	**Prepared:**	05/12/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/12/16

SV-7-23.5

6E11016-11 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
n-Hexane	**19**	ug/L	0.010	**5.4**	ppmv	0.0028
2-Hexanone (MBK)	<2.5	ug/L	0.010	<0.61	ppmv	0.0024
Isopropanol (IPA)	<2.5	ug/L	0.010	<1.0	ppmv	0.0041
Methyl-tert-Butyl Ether (MTBE)	<2.5	ug/L	0.010	<0.69	ppmv	0.0028
Methylene Chloride	<2.5	ug/L	0.010	<0.72	ppmv	0.0029
4-Methyl-2-pentanone (MIBK)	<2.5	ug/L	0.010	<0.61	ppmv	0.0024
Naphthalene	<2.5	ug/L	0.010	<0.48	ppmv	0.0019
Propylene	**9.5**	ug/L	0.010	**5.5**	ppmv	0.0058
Styrene	<2.5	ug/L	0.010	<0.59	ppmv	0.0023
1,1,2,2-Tetrachloroethane	<2.5	ug/L	0.010	<0.36	ppmv	0.0015
Tetrachloroethylene (PCE)	<2.5	ug/L	0.010	<0.37	ppmv	0.0015
Tetrahydrofuran (THF)	<2.5	ug/L	0.010	<0.85	ppmv	0.0034
Toluene	<2.5	ug/L	0.010	<0.66	ppmv	0.0027
1,2,4-Trichlorobenzene	<2.5	ug/L	0.010	<0.34	ppmv	0.0013
1,1,2-Trichloroethane	<2.5	ug/L	0.010	<0.46	ppmv	0.0018
1,1,1-Trichloroethane	<2.5	ug/L	0.010	<0.46	ppmv	0.0018
Trichloroethylene (TCE)	<2.5	ug/L	0.010	<0.47	ppmv	0.0019
Trichlorofluoromethane (R11)	<2.5	ug/L	0.010	<0.44	ppmv	0.0018
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<2.5	ug/L	0.010	<0.33	ppmv	0.0013
1,3,5-Trimethylbenzene	<2.5	ug/L	0.010	<0.51	ppmv	0.002

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	250	**Prepared:**	05/12/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/12/16

SV-7-23.5

6E11016-11 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
1,2,4-Trimethylbenzene	<2.5	ug/L	0.010	<0.51	ppmv	0.002
2,2,4-Trimethylpentane	<2.5	ug/L	0.010	<0.54	ppmv	0.0021
Vinyl acetate	<2.5	ug/L	0.010	<0.71	ppmv	0.0028
Vinyl bromide	<2.5	ug/L	0.010	<0.57	ppmv	0.0023
Vinyl chloride	<2.5	ug/L	0.010	<0.98	ppmv	0.0039
o-Xylene	<2.5	ug/L	0.010	<0.58	ppmv	0.0023
m,p-Xylenes	<2.5	ug/L	0.010	<0.58	ppmv	0.0023
1,2,3-Trichloropropane	<2.5	ug/L	0.010	<0.41	ppmv	0.0017
sec-Butylbenzene	<2.5	ug/L	0.010	<0.46	ppmv	0.0018
Isopropylbenzene	<2.5	ug/L	0.010	<0.51	ppmv	0.002
n-Propylbenzene	<2.5	ug/L	0.010	<0.51	ppmv	0.002
4-Isopropyltoluene	<2.5	ug/L	0.010	<0.46	ppmv	0.0018
n-Butylbenzene	<2.5	ug/L	0.010	<0.46	ppmv	0.0018

Surrogates	%REC	%REC Limits
4-Bromofluorobenzene	107 %	70-130

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	1	**Prepared:**	05/12/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/12/16

SV-5-5

6E11016-12 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
Acetone	<0.010	ug/L	0.010	<0.0042	ppmv	0.0042
Allyl chloride	<0.010	ug/L	0.010	<0.0032	ppmv	0.0032
tert-Amyl Methyl Ether (TAME)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
Benzene	**0.030**	ug/L	0.010	**0.0094**	ppmv	0.0031
Benzyl chloride	<0.010	ug/L	0.010	<0.0019	ppmv	0.0019
Bromodichloromethane	<0.010	ug/L	0.010	<0.0015	ppmv	0.0015
Bromoform	<0.010	ug/L	0.010	<0.00097	ppmv	0.00097
Bromomethane	<0.010	ug/L	0.010	<0.0026	ppmv	0.0026
1,3-Butadiene	<0.010	ug/L	0.010	<0.0045	ppmv	0.0045
2-Butanone (MEK)	**0.033**	ug/L	0.010	**0.011**	ppmv	0.0034
tert-Butyl alcohol (TBA)	<0.010	ug/L	0.010	<0.0033	ppmv	0.0033
Carbon Disulfide	**0.013**	ug/L	0.010	**0.0042**	ppmv	0.0032
Carbon Tetrachloride	<0.010	ug/L	0.010	<0.0016	ppmv	0.0016
Chlorobenzene	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
Chloroethane	<0.010	ug/L	0.010	<0.0038	ppmv	0.0038
Chloroform	**0.014**	ug/L	0.010	**0.0029**	ppmv	0.002
Chloromethane	<0.010	ug/L	0.010	<0.0048	ppmv	0.0048
Cyclohexane	**0.058**	ug/L	0.010	**0.017**	ppmv	0.0029
Dibromochloromethane	<0.010	ug/L	0.010	<0.0012	ppmv	0.0012
1,2-Dibromoethane (EDB)	<0.010	ug/L	0.010	<0.0013	ppmv	0.0013
1,2-Dichlorobenzene	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	1	**Prepared:**	05/12/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/12/16

SV-5-5

6E11016-12 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
1,3-Dichlorobenzene	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017
1,4-Dichlorobenzene	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017
Dichlorodifluoromethane (R12)	<0.010	ug/L	0.010	<0.002	ppmv	0.002
1,1-Dichloroethane	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
1,2-Dichloroethane (EDC)	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
cis-1,2-Dichloroethylene	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
1,1-Dichloroethylene	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
trans-1,2-Dichloroethylene	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
1,2-Dichloropropane	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
trans-1,3-Dichloropropylene	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
cis-1,3-Dichloropropylene	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
Dichlorotetrafluoroethane	<0.010	ug/L	0.010	<0.0014	ppmv	0.0014
Diisopropyl ether (DIPE)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
1,4-Dioxane	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Ethanol	**0.019**	ug/L	0.010	**0.010**	ppmv	0.0053
Ethyl Acetate	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Ethylbenzene	**0.037**	ug/L	0.010	**0.0085**	ppmv	0.0023
Ethyl-tert-Butyl Ether (ETBE)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
4-Ethyltoluene	<0.010	ug/L	0.010	<0.002	ppmv	0.002
Heptane	**0.070**	ug/L	0.010	**0.017**	ppmv	0.0024
Hexachlorobutadiene	<0.010	ug/L	0.010	<0.00094	ppmv	0.00094

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	1	**Prepared:**	05/12/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/12/16

SV-5-5

6E11016-12 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
n-Hexane	**0.083**	ug/L	0.010	**0.024**	ppmv	0.0028
2-Hexanone (MBK)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
Isopropanol (IPA)	<0.010	ug/L	0.010	<0.0041	ppmv	0.0041
Methyl-tert-Butyl Ether (MTBE)	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Methylene Chloride	<0.010	ug/L	0.010	<0.0029	ppmv	0.0029
4-Methyl-2-pentanone (MIBK)	**0.025**	ug/L	0.010	**0.0061**	ppmv	0.0024
Naphthalene	<0.010	ug/L	0.010	<0.0019	ppmv	0.0019
Propylene	**1.6**	ug/L	0.010	**0.93**	ppmv	0.0058
Styrene	**0.021**	ug/L	0.010	**0.0049**	ppmv	0.0023
1,1,2,2-Tetrachloroethane	<0.010	ug/L	0.010	<0.0015	ppmv	0.0015
Tetrachloroethylene (PCE)	<0.010	ug/L	0.010	<0.0015	ppmv	0.0015
Tetrahydrofuran (THF)	<0.010	ug/L	0.010	<0.0034	ppmv	0.0034
Toluene	**0.073**	ug/L	0.010	**0.019**	ppmv	0.0027
1,2,4-Trichlorobenzene	<0.010	ug/L	0.010	<0.0013	ppmv	0.0013
1,1,2-Trichloroethane	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
1,1,1-Trichloroethane	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
Trichloroethylene (TCE)	<0.010	ug/L	0.010	<0.0019	ppmv	0.0019
Trichlorofluoromethane (R11)	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<0.010	ug/L	0.010	<0.0013	ppmv	0.0013
1,3,5-Trimethylbenzene	<0.010	ug/L	0.010	<0.002	ppmv	0.002

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	1	**Prepared:**	05/12/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/12/16

SV-5-5

6E11016-12 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
1,2,4-Trimethylbenzene	**0.012**	ug/L	0.010	**0.0024**	ppmv	0.002
2,2,4-Trimethylpentane	<0.010	ug/L	0.010	<0.0021	ppmv	0.0021
Vinyl acetate	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Vinyl bromide	<0.010	ug/L	0.010	<0.0023	ppmv	0.0023
Vinyl chloride	<0.010	ug/L	0.010	<0.0039	ppmv	0.0039
o-Xylene	**0.026**	ug/L	0.010	**0.006**	ppmv	0.0023
m,p-Xylenes	**0.086**	ug/L	0.010	**0.020**	ppmv	0.0023
1,2,3-Trichloropropane	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017
sec-Butylbenzene	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
Isopropylbenzene	<0.010	ug/L	0.010	<0.002	ppmv	0.002
n-Propylbenzene	<0.010	ug/L	0.010	<0.002	ppmv	0.002
4-Isopropyltoluene	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
n-Butylbenzene	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018

Surrogates	%REC	%REC Limits
4-Bromofluorobenzene	112 %	70-130

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	10	**Prepared:**	05/12/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/12/16

SV-5-12.5

6E11016-13 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
Acetone	<0.10	ug/L	0.010	<0.042	ppmv	0.0042
Allyl chloride	<0.10	ug/L	0.010	<0.032	ppmv	0.0032
tert-Amyl Methyl Ether (TAME)	<0.10	ug/L	0.010	<0.024	ppmv	0.0024
Benzene	<0.10	ug/L	0.010	<0.031	ppmv	0.0031
Benzyl chloride	<0.10	ug/L	0.010	<0.019	ppmv	0.0019
Bromodichloromethane	<0.10	ug/L	0.010	<0.015	ppmv	0.0015
Bromoform	<0.10	ug/L	0.010	<0.0097	ppmv	0.00097
Bromomethane	<0.10	ug/L	0.010	<0.026	ppmv	0.0026
1,3-Butadiene	<0.10	ug/L	0.010	<0.045	ppmv	0.0045
2-Butanone (MEK)	<0.10	ug/L	0.010	<0.034	ppmv	0.0034
tert-Butyl alcohol (TBA)	<0.10	ug/L	0.010	<0.033	ppmv	0.0033
Carbon Disulfide	<0.10	ug/L	0.010	<0.032	ppmv	0.0032
Carbon Tetrachloride	<0.10	ug/L	0.010	<0.016	ppmv	0.0016
Chlorobenzene	<0.10	ug/L	0.010	<0.022	ppmv	0.0022
Chloroethane	<0.10	ug/L	0.010	<0.038	ppmv	0.0038
Chloroform	<0.10	ug/L	0.010	<0.020	ppmv	0.002
Chloromethane	<0.10	ug/L	0.010	<0.048	ppmv	0.0048
Cyclohexane	**0.10**	ug/L	0.010	**0.029**	ppmv	0.0029
Dibromochloromethane	<0.10	ug/L	0.010	<0.012	ppmv	0.0012
1,2-Dibromoethane (EDB)	<0.10	ug/L	0.010	<0.013	ppmv	0.0013
1,2-Dichlorobenzene	<0.10	ug/L	0.010	<0.017	ppmv	0.0017

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	10	**Prepared:**	05/12/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/12/16

SV-5-12.5

6E11016-13 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
1,3-Dichlorobenzene	<0.10	ug/L	0.010	<0.017	ppmv	0.0017
1,4-Dichlorobenzene	<0.10	ug/L	0.010	<0.017	ppmv	0.0017
Dichlorodifluoromethane (R12)	<0.10	ug/L	0.010	<0.020	ppmv	0.002
1,1-Dichloroethane	<0.10	ug/L	0.010	<0.025	ppmv	0.0025
1,2-Dichloroethane (EDC)	<0.10	ug/L	0.010	<0.025	ppmv	0.0025
cis-1,2-Dichloroethylene	<0.10	ug/L	0.010	<0.025	ppmv	0.0025
1,1-Dichloroethylene	<0.10	ug/L	0.010	<0.025	ppmv	0.0025
trans-1,2-Dichloroethylene	<0.10	ug/L	0.010	<0.025	ppmv	0.0025
1,2-Dichloropropane	<0.10	ug/L	0.010	<0.022	ppmv	0.0022
trans-1,3-Dichloropropylene	<0.10	ug/L	0.010	<0.022	ppmv	0.0022
cis-1,3-Dichloropropylene	<0.10	ug/L	0.010	<0.022	ppmv	0.0022
Dichlorotetrafluoroethane	<0.10	ug/L	0.010	<0.014	ppmv	0.0014
Diisopropyl ether (DIPE)	<0.10	ug/L	0.010	<0.024	ppmv	0.0024
1,4-Dioxane	<0.10	ug/L	0.010	<0.028	ppmv	0.0028
Ethanol	<0.10	ug/L	0.010	<0.053	ppmv	0.0053
Ethyl Acetate	<0.10	ug/L	0.010	<0.028	ppmv	0.0028
Ethylbenzene	<0.10	ug/L	0.010	<0.023	ppmv	0.0023
Ethyl-tert-Butyl Ether (ETBE)	<0.10	ug/L	0.010	<0.024	ppmv	0.0024
4-Ethyltoluene	<0.10	ug/L	0.010	<0.020	ppmv	0.002
Heptane	**0.17**	ug/L	0.010	**0.041**	ppmv	0.0024
Hexachlorobutadiene	<0.10	ug/L	0.010	<0.0094	ppmv	0.00094

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	10	**Prepared:**	05/12/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/12/16

SV-5-12.5

6E11016-13 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
n-Hexane	**0.39**	ug/L	0.010	**0.11**	ppmv	0.0028
2-Hexanone (MBK)	<0.10	ug/L	0.010	<0.024	ppmv	0.0024
Isopropanol (IPA)	<0.10	ug/L	0.010	<0.041	ppmv	0.0041
Methyl-tert-Butyl Ether (MTBE)	<0.10	ug/L	0.010	<0.028	ppmv	0.0028
Methylene Chloride	<0.10	ug/L	0.010	<0.029	ppmv	0.0029
4-Methyl-2-pentanone (MIBK)	<0.10	ug/L	0.010	<0.024	ppmv	0.0024
Naphthalene	<0.10	ug/L	0.010	<0.019	ppmv	0.0019
Propylene	**10**	ug/L	0.010	**5.8**	ppmv	0.0058
Styrene	<0.10	ug/L	0.010	<0.023	ppmv	0.0023
1,1,2,2-Tetrachloroethane	<0.10	ug/L	0.010	<0.015	ppmv	0.0015
Tetrachloroethylene (PCE)	<0.10	ug/L	0.010	<0.015	ppmv	0.0015
Tetrahydrofuran (THF)	<0.10	ug/L	0.010	<0.034	ppmv	0.0034
Toluene	<0.10	ug/L	0.010	<0.027	ppmv	0.0027
1,2,4-Trichlorobenzene	<0.10	ug/L	0.010	<0.013	ppmv	0.0013
1,1,2-Trichloroethane	<0.10	ug/L	0.010	<0.018	ppmv	0.0018
1,1,1-Trichloroethane	<0.10	ug/L	0.010	<0.018	ppmv	0.0018
Trichloroethylene (TCE)	<0.10	ug/L	0.010	<0.019	ppmv	0.0019
Trichlorofluoromethane (R11)	<0.10	ug/L	0.010	<0.018	ppmv	0.0018
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<0.10	ug/L	0.010	<0.013	ppmv	0.0013
1,3,5-Trimethylbenzene	<0.10	ug/L	0.010	<0.020	ppmv	0.002

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/11/16
Dilution:	10	**Prepared:**	05/12/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/12/16

SV-5-12.5

6E11016-13 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
1,2,4-Trimethylbenzene	<0.10	ug/L	0.010	<0.020	ppmv	0.002
2,2,4-Trimethylpentane	<0.10	ug/L	0.010	<0.021	ppmv	0.0021
Vinyl acetate	<0.10	ug/L	0.010	<0.028	ppmv	0.0028
Vinyl bromide	<0.10	ug/L	0.010	<0.023	ppmv	0.0023
Vinyl chloride	<0.10	ug/L	0.010	<0.039	ppmv	0.0039
o-Xylene	<0.10	ug/L	0.010	<0.023	ppmv	0.0023
m,p-Xylenes	<0.10	ug/L	0.010	<0.023	ppmv	0.0023
1,2,3-Trichloropropane	<0.10	ug/L	0.010	<0.017	ppmv	0.0017
sec-Butylbenzene	<0.10	ug/L	0.010	<0.018	ppmv	0.0018
Isopropylbenzene	<0.10	ug/L	0.010	<0.020	ppmv	0.002
n-Propylbenzene	<0.10	ug/L	0.010	<0.020	ppmv	0.002
4-Isopropyltoluene	<0.10	ug/L	0.010	<0.018	ppmv	0.0018
n-Butylbenzene	<0.10	ug/L	0.010	<0.018	ppmv	0.0018

Surrogates	%REC	%REC Limits
4-Bromofluorobenzene	98.5 %	70-130

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client: Stantec (TO)
Project No: 185803633
Project Name: Kaiser - Vermont Ave.

AA Project No: A732180
Date Received: 05/11/16
Date Reported: 05/17/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs by GCMS EPA TO-15 - Quality Control										
*Batch B6E1310 - *** DEFAULT PREP ****										
Blank (B6E1310-BLK1)				Prepared & Analyzed: 05/12/16						
Acetone	<0.010	0.010	ug/L							
Allyl chloride	<0.010	0.010	ug/L							
tert-Amyl Methyl Ether (TAME)	<0.010	0.010	ug/L							
Benzene	<0.010	0.010	ug/L							
Benzyl chloride	<0.010	0.010	ug/L							
Bromodichloromethane	<0.010	0.010	ug/L							
Bromoform	<0.010	0.010	ug/L							
Bromomethane	<0.010	0.010	ug/L							
1,3-Butadiene	<0.010	0.010	ug/L							
2-Butanone (MEK)	<0.010	0.010	ug/L							
tert-Butyl alcohol (TBA)	<0.010	0.010	ug/L							
Carbon Disulfide	<0.010	0.010	ug/L							
Carbon Tetrachloride	<0.010	0.010	ug/L							
Chlorobenzene	<0.010	0.010	ug/L							
Chloroethane	<0.010	0.010	ug/L							
Chloroform	<0.010	0.010	ug/L							
Chloromethane	<0.010	0.010	ug/L							
Cyclohexane	<0.010	0.010	ug/L							
Dibromochloromethane	<0.010	0.010	ug/L							
1,2-Dibromoethane (EDB)	<0.010	0.010	ug/L							
1,2-Dichlorobenzene	<0.010	0.010	ug/L							
1,3-Dichlorobenzene	<0.010	0.010	ug/L							
1,4-Dichlorobenzene	<0.010	0.010	ug/L							
Dichlorodifluoromethane (R12)	<0.010	0.010	ug/L							
1,1-Dichloroethane	<0.010	0.010	ug/L							
1,2-Dichloroethane (EDC)	<0.010	0.010	ug/L							
cis-1,2-Dichloroethylene	<0.010	0.010	ug/L							
1,1-Dichloroethylene	<0.010	0.010	ug/L							
trans-1,2-Dichloroethylene	<0.010	0.010	ug/L							
1,2-Dichloropropane	<0.010	0.010	ug/L							
trans-1,3-Dichloropropylene	<0.010	0.010	ug/L							

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client: Stantec (TO)
Project No: 185803633
Project Name: Kaiser - Vermont Ave.

AA Project No: A732180
Date Received: 05/11/16
Date Reported: 05/17/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs by GCMS EPA TO-15 - Quality Control										
*Batch B6E1310 - *** DEFAULT PREP ****										
Blank (B6E1310-BLK1) Continued				Prepared & Analyzed: 05/12/16						
cis-1,3-Dichloropropylene	<0.010	0.010	ug/L							
Dichlorotetrafluoroethane	<0.010	0.010	ug/L							
Diisopropyl ether (DIPE)	<0.010	0.010	ug/L							
1,4-Dioxane	<0.010	0.010	ug/L							
Ethanol	<0.010	0.010	ug/L							
Ethyl Acetate	<0.010	0.010	ug/L							
Ethylbenzene	<0.010	0.010	ug/L							
Ethyl-tert-Butyl Ether (ETBE)	<0.010	0.010	ug/L							
4-Ethyltoluene	<0.010	0.010	ug/L							
Heptane	<0.010	0.010	ug/L							
Hexachlorobutadiene	<0.010	0.010	ug/L							
n-Hexane	<0.010	0.010	ug/L							
2-Hexanone (MBK)	<0.010	0.010	ug/L							
Isopropanol (IPA)	<0.010	0.010	ug/L							
Methyl-tert-Butyl Ether (MTBE)	<0.010	0.010	ug/L							
Methylene Chloride	<0.010	0.010	ug/L							
4-Methyl-2-pentanone (MIBK)	<0.010	0.010	ug/L							
Naphthalene	<0.010	0.010	ug/L							
Propylene	<0.010	0.010	ug/L							
Styrene	<0.010	0.010	ug/L							
1,1,2,2-Tetrachloroethane	<0.010	0.010	ug/L							
Tetrachloroethylene (PCE)	<0.010	0.010	ug/L							
Tetrahydrofuran (THF)	<0.010	0.010	ug/L							
Toluene	<0.010	0.010	ug/L							
1,2,4-Trichlorobenzene	<0.010	0.010	ug/L							
1,1,2-Trichloroethane	<0.010	0.010	ug/L							
1,1,1-Trichloroethane	<0.010	0.010	ug/L							
Trichloroethylene (TCE)	<0.010	0.010	ug/L							
Trichlorofluoromethane (R11)	<0.010	0.010	ug/L							
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<0.010	0.010	ug/L							
1,3,5-Trimethylbenzene	<0.010	0.010	ug/L							

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client: Stantec (TO)
Project No: 185803633
Project Name: Kaiser - Vermont Ave.

AA Project No: A732180
Date Received: 05/11/16
Date Reported: 05/17/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs by GCMS EPA TO-15 - Quality Control										
*Batch B6E1310 - *** DEFAULT PREP ****										
Blank (B6E1310-BLK1) Continued				Prepared & Analyzed: 05/12/16						
1,2,4-Trimethylbenzene	<0.010	0.010	ug/L							
2,2,4-Trimethylpentane	<0.010	0.010	ug/L							
Vinyl acetate	<0.010	0.010	ug/L							
Vinyl bromide	<0.010	0.010	ug/L							
Vinyl chloride	<0.010	0.010	ug/L							
o-Xylene	<0.010	0.010	ug/L							
m,p-Xylenes	<0.010	0.010	ug/L							
1,2,3-Trichloropropane	<0.010	0.010	ug/L							
sec-Butylbenzene	<0.010	0.010	ug/L							
Isopropylbenzene	<0.010	0.010	ug/L							
n-Propylbenzene	<0.010	0.010	ug/L							
4-Isopropyltoluene	<0.010	0.010	ug/L							
n-Butylbenzene	<0.010	0.010	ug/L							
Surrogate: 4-Bromofluorobenzene	*0.144*		*ug/L*	*0.14*		*100*	*70-130*			
LCS (B6E1310-BS1)				Prepared & Analyzed: 05/12/16						
Acetone	**0.0190**	0.010	ug/L	0.024		80.1	70-130			
Benzene	**0.0269**	0.010	ug/L	0.032		84.1	70-130			
Benzyl chloride	**0.0566**	0.010	ug/L	0.052		109	70-130			
Bromodichloromethane	**0.0602**	0.010	ug/L	0.067		89.9	70-130			
Bromoform	**0.0950**	0.010	ug/L	0.10		91.9	70-130			
Bromomethane	**0.0454**	0.010	ug/L	0.039		117	70-130			
2-Butanone (MEK)	**0.0242**	0.010	ug/L	0.029		82.0	70-130			
Carbon Disulfide	**0.0252**	0.010	ug/L	0.031		80.9	70-130			
Carbon Tetrachloride	**0.0578**	0.010	ug/L	0.063		91.9	70-130			
Chlorobenzene	**0.0446**	0.010	ug/L	0.046		96.9	70-130			
Chloroethane	**0.0266**	0.010	ug/L	0.026		101	70-130			
Chloroform	**0.0400**	0.010	ug/L	0.049		81.9	70-130			
Chloromethane	**0.0177**	0.010	ug/L	0.021		85.6	70-130			
Dibromochloromethane	**0.0777**	0.010	ug/L	0.085		91.2	70-130			
1,2-Dibromoethane (EDB)	**0.0771**	0.010	ug/L	0.077		100	70-130			
1,2-Dichlorobenzene	**0.0664**	0.010	ug/L	0.060		110	70-130			

Viorel Vasile
Operations Manager

AMERICAN ANALYTICS

LABORATORY ANALYSIS RESULTS

Client: Stantec (TO)
Project No: 185803633
Project Name: Kaiser - Vermont Ave.

AA Project No: A732180
Date Received: 05/11/16
Date Reported: 05/17/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs by GCMS EPA TO-15 - Quality Control										
*Batch B6E1310 - *** DEFAULT PREP ****										
LCS (B6E1310-BS1) Continued				Prepared & Analyzed: 05/12/16						
1,3-Dichlorobenzene	**0.0667**	0.010	ug/L	0.060		111	70-130			
1,4-Dichlorobenzene	**0.0673**	0.010	ug/L	0.060		112	70-130			
Dichlorodifluoromethane (R12)	**0.0479**	0.010	ug/L	0.049		96.9	70-130			
1,1-Dichloroethane	**0.0364**	0.010	ug/L	0.040		90.0	70-130			
1,2-Dichloroethane (EDC)	**0.0338**	0.010	ug/L	0.040		83.6	70-130			
cis-1,2-Dichloroethylene	**0.0353**	0.010	ug/L	0.040		89.0	70-130			
1,1-Dichloroethylene	**0.0324**	0.010	ug/L	0.040		81.6	70-130			
trans-1,2-Dichloroethylene	**0.0369**	0.010	ug/L	0.040		93.1	70-130			
1,2-Dichloropropane	**0.0454**	0.010	ug/L	0.046		98.2	70-130			
trans-1,3-Dichloropropylene	**0.0474**	0.010	ug/L	0.045		104	70-130			
cis-1,3-Dichloropropylene	**0.0443**	0.010	ug/L	0.045		97.5	70-130			
Dichlorotetrafluoroethane	**0.0714**	0.010	ug/L	0.070		102	70-130			
Ethylbenzene	**0.0436**	0.010	ug/L	0.043		100	70-130			
4-Ethyltoluene	**0.0487**	0.010	ug/L	0.049		99.1	70-130			
Hexachlorobutadiene	**0.160**	0.010	ug/L	0.11		150	70-130			**
2-Hexanone (MBK)	**0.0365**	0.010	ug/L	0.041		89.0	70-130			
Isopropanol (IPA)	**0.0220**	0.010	ug/L	0.025		89.6	70-130			
Methylene Chloride	**0.0339**	0.010	ug/L	0.035		97.6	70-130			
4-Methyl-2-pentanone (MIBK)	**0.0376**	0.010	ug/L	0.041		91.8	70-130			
Styrene	**0.0421**	0.010	ug/L	0.043		98.8	70-130			
1,1,2,2-Tetrachloroethane	**0.0629**	0.010	ug/L	0.069		91.6	70-130			
Tetrachloroethylene (PCE)	**0.0665**	0.010	ug/L	0.068		98.0	70-130			
Toluene	**0.0379**	0.010	ug/L	0.038		101	70-130			
1,2,4-Trichlorobenzene	**0.164**	0.010	ug/L	0.074		220	70-130			**
1,1,2-Trichloroethane	**0.0494**	0.010	ug/L	0.055		90.5	70-130			
1,1,1-Trichloroethane	**0.0459**	0.010	ug/L	0.055		84.1	70-130			
Trichloroethylene (TCE)	**0.0504**	0.010	ug/L	0.054		93.7	70-130			
Trichlorofluoromethane (R11)	**0.0542**	0.010	ug/L	0.056		96.4	70-130			
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	**0.0692**	0.010	ug/L	0.077		90.3	70-130			
1,3,5-Trimethylbenzene	**0.0521**	0.010	ug/L	0.049		106	70-130			
1,2,4-Trimethylbenzene	**0.0541**	0.010	ug/L	0.049		110	70-130			

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client: Stantec (TO)
Project No: 185803633
Project Name: Kaiser - Vermont Ave.

AA Project No: A732180
Date Received: 05/11/16
Date Reported: 05/17/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs by GCMS EPA TO-15 - Quality Control										
*Batch B6E1310 - *** DEFAULT PREP ****										
LCS (B6E1310-BS1) Continued				Prepared & Analyzed: 05/12/16						
Vinyl acetate	**0.0299**	0.010	ug/L	0.035		84.8	70-130			
Vinyl chloride	**0.0263**	0.010	ug/L	0.026		103	70-130			
o-Xylene	**0.0422**	0.010	ug/L	0.043		97.1	70-130			
m,p-Xylenes	**0.0888**	0.010	ug/L	0.087		102	70-130			
1,2,3-Trichloropropane	**0.0473**	0.010	ug/L	0.060		78.5	70-130			
sec-Butylbenzene	**0.0449**	0.010	ug/L	0.055		81.8	70-130			
Isopropylbenzene	**0.0403**	0.010	ug/L	0.049		82.0	70-130			
n-Propylbenzene	**0.0411**	0.010	ug/L	0.049		83.6	70-130			
4-Isopropyltoluene	**0.0458**	0.010	ug/L	0.055		83.5	70-130			
Surrogate: 4-Bromofluorobenzene	*0.147*		*ug/L*	*0.14*		*102*	*70-130*			
LCS Dup (B6E1310-BSD1)				Prepared & Analyzed: 05/12/16						
Acetone	**0.0211**	0.010	ug/L	0.024		89.0	70-130	10.5	30	
Benzene	**0.0276**	0.010	ug/L	0.032		86.4	70-130	2.70	30	
Benzyl chloride	**0.0563**	0.010	ug/L	0.052		109	70-130	0.642	30	
Bromodichloromethane	**0.0586**	0.010	ug/L	0.067		87.5	70-130	2.71	30	
Bromoform	**0.0963**	0.010	ug/L	0.10		93.2	70-130	1.40	30	
Bromomethane	**0.0473**	0.010	ug/L	0.039		122	70-130	4.19	30	
2-Butanone (MEK)	**0.0242**	0.010	ug/L	0.029		81.9	70-130	0.122	30	
Carbon Disulfide	**0.0252**	0.010	ug/L	0.031		80.8	70-130	0.124	30	
Carbon Tetrachloride	**0.0569**	0.010	ug/L	0.063		90.5	70-130	1.54	30	
Chlorobenzene	**0.0438**	0.010	ug/L	0.046		95.1	70-130	1.87	30	
Chloroethane	**0.0278**	0.010	ug/L	0.026		105	70-130	4.27	30	
Chloroform	**0.0403**	0.010	ug/L	0.049		82.5	70-130	0.730	30	
Chloromethane	**0.0178**	0.010	ug/L	0.021		86.1	70-130	0.582	30	
Dibromochloromethane	**0.0765**	0.010	ug/L	0.085		89.8	70-130	1.55	30	
1,2-Dibromoethane (EDB)	**0.0758**	0.010	ug/L	0.077		98.6	70-130	1.71	30	
1,2-Dichlorobenzene	**0.0667**	0.010	ug/L	0.060		111	70-130	0.452	30	
1,3-Dichlorobenzene	**0.0672**	0.010	ug/L	0.060		112	70-130	0.629	30	
1,4-Dichlorobenzene	**0.0672**	0.010	ug/L	0.060		112	70-130	0.179	30	
Dichlorodifluoromethane (R12)	**0.0496**	0.010	ug/L	0.049		100	70-130	3.45	30	
1,1-Dichloroethane	**0.0368**	0.010	ug/L	0.040		91.0	70-130	1.10	30	

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client: Stantec (TO)
Project No: 185803633
Project Name: Kaiser - Vermont Ave.

AA Project No: A732180
Date Received: 05/11/16
Date Reported: 05/17/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs by GCMS EPA TO-15 - Quality Control										
*Batch B6E1310 - *** DEFAULT PREP ****										
LCS Dup (B6E1310-BSD1) Continued				Prepared & Analyzed: 05/12/16						
1,2-Dichloroethane (EDC)	**0.0346**	0.010	ug/L	0.040		85.4	70-130	2.13	30	
cis-1,2-Dichloroethylene	**0.0353**	0.010	ug/L	0.040		89.1	70-130	0.112	30	
1,1-Dichloroethylene	**0.0336**	0.010	ug/L	0.040		84.8	70-130	3.85	30	
trans-1,2-Dichloroethylene	**0.0370**	0.010	ug/L	0.040		93.4	70-130	0.322	30	
1,2-Dichloropropane	**0.0458**	0.010	ug/L	0.046		99.2	70-130	1.01	30	
trans-1,3-Dichloropropylene	**0.0459**	0.010	ug/L	0.045		101	70-130	3.21	30	
cis-1,3-Dichloropropylene	**0.0429**	0.010	ug/L	0.045		94.5	70-130	3.13	30	
Dichlorotetrafluoroethane	**0.0738**	0.010	ug/L	0.070		106	70-130	3.18	30	
Ethylbenzene	**0.0434**	0.010	ug/L	0.043		99.9	70-130	0.400	30	
4-Ethyltoluene	**0.0488**	0.010	ug/L	0.049		99.2	70-130	0.101	30	
Hexachlorobutadiene	**0.158**	0.010	ug/L	0.11		148	70-130	0.940	30	**
2-Hexanone (MBK)	**0.0349**	0.010	ug/L	0.041		85.1	70-130	4.48	30	
Isopropanol (IPA)	**0.0218**	0.010	ug/L	0.025		88.8	70-130	0.897	30	
Methylene Chloride	**0.0294**	0.010	ug/L	0.035		84.5	70-130	14.4	30	
4-Methyl-2-pentanone (MIBK)	**0.0363**	0.010	ug/L	0.041		88.5	70-130	3.66	30	
Styrene	**0.0417**	0.010	ug/L	0.043		98.0	70-130	0.813	30	
1,1,2,2-Tetrachloroethane	**0.0649**	0.010	ug/L	0.069		94.5	70-130	3.12	30	
Tetrachloroethylene (PCE)	**0.0663**	0.010	ug/L	0.068		97.7	70-130	0.307	30	
Toluene	**0.0370**	0.010	ug/L	0.038		98.1	70-130	2.52	30	
1,2,4-Trichlorobenzene	**0.161**	0.010	ug/L	0.074		218	70-130	1.37	30	**
1,1,2-Trichloroethane	**0.0500**	0.010	ug/L	0.055		91.6	70-130	1.21	30	
1,1,1-Trichloroethane	**0.0458**	0.010	ug/L	0.055		84.0	70-130	0.119	30	
Trichloroethylene (TCE)	**0.0512**	0.010	ug/L	0.054		95.2	70-130	1.59	30	
Trichlorofluoromethane (R11)	**0.0563**	0.010	ug/L	0.056		100	70-130	3.87	30	
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	**0.0617**	0.010	ug/L	0.077		80.5	70-130	11.5	30	
1,3,5-Trimethylbenzene	**0.0526**	0.010	ug/L	0.049		107	70-130	1.03	30	
1,2,4-Trimethylbenzene	**0.0549**	0.010	ug/L	0.049		112	70-130	1.44	30	
Vinyl acetate	**0.0308**	0.010	ug/L	0.035		87.4	70-130	3.02	30	
Vinyl chloride	**0.0262**	0.010	ug/L	0.026		102	70-130	0.584	30	
o-Xylene	**0.0431**	0.010	ug/L	0.043		99.2	70-130	2.14	30	
m,p-Xylenes	**0.0891**	0.010	ug/L	0.087		103	70-130	0.342	30	

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client: Stantec (TO)
Project No: 185803633
Project Name: Kaiser - Vermont Ave.

AA Project No: A732180
Date Received: 05/11/16
Date Reported: 05/17/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs by GCMS EPA TO-15 - Quality Control										
*Batch B6E1310 - *** DEFAULT PREP ****										
LCS Dup (B6E1310-BSD1) Continued				Prepared & Analyzed: 05/12/16						
1,2,3-Trichloropropane	**0.0472**	0.010	ug/L	0.060		78.3	70-130	0.255	30	
sec-Butylbenzene	**0.0440**	0.010	ug/L	0.055		80.2	70-130	1.98	30	
Isopropylbenzene	**0.0405**	0.010	ug/L	0.049		82.4	70-130	0.487	30	
n-Propylbenzene	**0.0412**	0.010	ug/L	0.049		83.8	70-130	0.239	30	
4-Isopropyltoluene	**0.0456**	0.010	ug/L	0.055		83.0	70-130	0.601	30	
Surrogate: 4-Bromofluorobenzene	*0.147*		*ug/L*	*0.14*		*103*	*70-130*			
Duplicate (B6E1310-DUP1)		**Source: 6E11016-09**		Prepared & Analyzed: 05/12/16						
Acetone	**<10**	10	ug/L		<10				30	
Allyl chloride	**<10**	10	ug/L		<10				30	
tert-Amyl Methyl Ether (TAME)	**<10**	10	ug/L		<10				30	
Benzene	**413**	200	ug/L		385			7.04	30	
Benzyl chloride	**<10**	10	ug/L		<10				30	
Bromodichloromethane	**<10**	10	ug/L		<10				30	
Bromoform	**<10**	10	ug/L		<10				30	
Bromomethane	**<10**	10	ug/L		<10				30	
1,3-Butadiene	**<10**	10	ug/L		<10				30	
2-Butanone (MEK)	**<10**	10	ug/L		<10				30	
tert-Butyl alcohol (TBA)	**<10**	10	ug/L		<10				30	
Carbon Disulfide	**<10**	10	ug/L		<10				30	
Carbon Tetrachloride	**<10**	10	ug/L		<10				30	
Chlorobenzene	**<10**	10	ug/L		<10				30	
Chloroethane	**<10**	10	ug/L		<10				30	
Chloroform	**<10**	10	ug/L		<10				30	
Chloromethane	**<10**	10	ug/L		<10				30	
Cyclohexane	**1640**	200	ug/L		1510			8.31	30	
Dibromochloromethane	**<10**	10	ug/L		<10				30	
1,2-Dibromoethane (EDB)	**<10**	10	ug/L		<10				30	
1,2-Dichlorobenzene	**<10**	10	ug/L		<10				30	
1,3-Dichlorobenzene	**<10**	10	ug/L		<10				30	
1,4-Dichlorobenzene	**<10**	10	ug/L		<10				30	
Dichlorodifluoromethane (R12)	**<10**	10	ug/L		<10				30	

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client: Stantec (TO)
Project No: 185803633
Project Name: Kaiser - Vermont Ave.

AA Project No: A732180
Date Received: 05/11/16
Date Reported: 05/17/16

VOCs by GCMS EPA TO-15 - Quality Control

*Batch B6E1310 - *** DEFAULT PREP ****

Duplicate (B6E1310-DUP1) Continued **Source: 6E11016-09** Prepared & Analyzed: 05/12/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1-Dichloroethane	**<10**	10	ug/L		<10				30	
1,2-Dichloroethane (EDC)	**<10**	10	ug/L		<10				30	
cis-1,2-Dichloroethylene	**<10**	10	ug/L		<10				30	
1,1-Dichloroethylene	**<10**	10	ug/L		<10				30	
trans-1,2-Dichloroethylene	**<10**	10	ug/L		<10				30	
1,2-Dichloropropane	**<10**	10	ug/L		<10				30	
trans-1,3-Dichloropropylene	**<10**	10	ug/L		<10				30	
cis-1,3-Dichloropropylene	**<10**	10	ug/L		<10				30	
Dichlorotetrafluoroethane	**<10**	10	ug/L		<10				30	
Diisopropyl ether (DIPE)	**<10**	10	ug/L		<10				30	
1,4-Dioxane	**<10**	10	ug/L		<10				30	
Ethanol	**<10**	10	ug/L		<10				30	
Ethyl Acetate	**<10**	10	ug/L		<10				30	
Ethylbenzene	**303**	10	ug/L		308			1.45	30	
Ethyl-tert-Butyl Ether (ETBE)	**<10**	10	ug/L		<10				30	
4-Ethyltoluene	**54.0**	10	ug/L		55.3			2.34	30	
Heptane	**4160**	200	ug/L		4000			3.84	30	
Hexachlorobutadiene	**<10**	10	ug/L		<10				30	
n-Hexane	**5440**	200	ug/L		5080			6.77	30	
2-Hexanone (MBK)	**<10**	10	ug/L		<10				30	
Isopropanol (IPA)	**<10**	10	ug/L		<10				30	
Methyl-tert-Butyl Ether (MTBE)	**<10**	10	ug/L		<10				30	
Methylene Chloride	**<10**	10	ug/L		<10				30	
4-Methyl-2-pentanone (MIBK)	**<10**	10	ug/L		<10				30	
Naphthalene	**<10**	10	ug/L		<10				30	
Propylene	**<10**	10	ug/L		<10				30	
Styrene	**<10**	10	ug/L		<10				30	
1,1,2,2-Tetrachloroethane	**<10**	10	ug/L		<10				30	
Tetrachloroethylene (PCE)	**<10**	10	ug/L		<10				30	
Tetrahydrofuran (THF)	**<10**	10	ug/L		<10				30	
Toluene	**37.0**	10	ug/L		36.5			1.43	30	

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client: Stantec (TO)
Project No: 185803633
Project Name: Kaiser - Vermont Ave.

AA Project No: A732180
Date Received: 05/11/16
Date Reported: 05/17/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs by GCMS EPA TO-15 - Quality Control										
*Batch B6E1310 - *** DEFAULT PREP ****										
Duplicate (B6E1310-DUP1) Continued		**Source: 6E11016-09**	Prepared & Analyzed: 05/12/16							
1,2,4-Trichlorobenzene	**<10**	10	ug/L		<10				30	
1,1,2-Trichloroethane	**<10**	10	ug/L		<10				30	
1,1,1-Trichloroethane	**<10**	10	ug/L		<10				30	
Trichloroethylene (TCE)	**<10**	10	ug/L		<10				30	
Trichlorofluoromethane (R11)	**<10**	10	ug/L		<10				30	
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	**<10**	10	ug/L		<10				30	
1,3,5-Trimethylbenzene	**43.9**	10	ug/L		43.5			0.900	30	
1,2,4-Trimethylbenzene	**111**	10	ug/L		112			0.970	30	
2,2,4-Trimethylpentane	**<10**	10	ug/L		<10				30	
Vinyl acetate	**<10**	10	ug/L		<10				30	
Vinyl bromide	**<10**	10	ug/L		<10				30	
Vinyl chloride	**<10**	10	ug/L		<10				30	
o-Xylene	**16.0**	10	ug/L		16.3			1.61	30	
m,p-Xylenes	**902**	200	ug/L		825			8.95	30	
1,2,3-Trichloropropane	**<10**	10	ug/L		<10				30	
sec-Butylbenzene	**<10**	10	ug/L		<10				30	
Isopropylbenzene	**33.9**	10	ug/L		34.4			1.30	30	
n-Propylbenzene	**46.1**	10	ug/L		46.3			0.426	30	
4-Isopropyltoluene	**<10**	10	ug/L		<10				30	
n-Butylbenzene	**<10**	10	ug/L		<10				200	
Surrogate: 4-Bromofluorobenzene	*0.163*		*ug/L*	*0.14*		*114*	*70-130*			
*Batch B6E1311 - *** DEFAULT PREP ****										
Blank (B6E1311-BLK1)				Prepared & Analyzed: 05/13/16						
Acetone	<0.010	0.010	ug/L							
Allyl chloride	<0.010	0.010	ug/L							
tert-Amyl Methyl Ether (TAME)	<0.010	0.010	ug/L							
Benzene	<0.010	0.010	ug/L							
Benzyl chloride	<0.010	0.010	ug/L							
Bromodichloromethane	<0.010	0.010	ug/L							
Bromoform	<0.010	0.010	ug/L							

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client: Stantec (TO)
Project No: 185803633
Project Name: Kaiser - Vermont Ave.

AA Project No: A732180
Date Received: 05/11/16
Date Reported: 05/17/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs by GCMS EPA TO-15 - Quality Control										
*Batch B6E1311 - *** DEFAULT PREP ****										
Blank (B6E1311-BLK1) Continued				Prepared & Analyzed: 05/13/16						
Bromomethane	<0.010	0.010	ug/L							
1,3-Butadiene	<0.010	0.010	ug/L							
2-Butanone (MEK)	<0.010	0.010	ug/L							
tert-Butyl alcohol (TBA)	<0.010	0.010	ug/L							
Carbon Disulfide	<0.010	0.010	ug/L							
Carbon Tetrachloride	<0.010	0.010	ug/L							
Chlorobenzene	<0.010	0.010	ug/L							
Chloroethane	<0.010	0.010	ug/L							
Chloroform	<0.010	0.010	ug/L							
Chloromethane	<0.010	0.010	ug/L							
Cyclohexane	<0.010	0.010	ug/L							
Dibromochloromethane	<0.010	0.010	ug/L							
1,2-Dibromoethane (EDB)	<0.010	0.010	ug/L							
1,2-Dichlorobenzene	<0.010	0.010	ug/L							
1,3-Dichlorobenzene	<0.010	0.010	ug/L							
1,4-Dichlorobenzene	<0.010	0.010	ug/L							
Dichlorodifluoromethane (R12)	<0.010	0.010	ug/L							
1,1-Dichloroethane	<0.010	0.010	ug/L							
1,2-Dichloroethane (EDC)	<0.010	0.010	ug/L							
cis-1,2-Dichloroethylene	<0.010	0.010	ug/L							
1,1-Dichloroethylene	<0.010	0.010	ug/L							
trans-1,2-Dichloroethylene	<0.010	0.010	ug/L							
1,2-Dichloropropane	<0.010	0.010	ug/L							
trans-1,3-Dichloropropylene	<0.010	0.010	ug/L							
cis-1,3-Dichloropropylene	<0.010	0.010	ug/L							
Dichlorotetrafluoroethane	<0.010	0.010	ug/L							
Diisopropyl ether (DIPE)	<0.010	0.010	ug/L							
1,4-Dioxane	<0.010	0.010	ug/L							
Ethanol	<0.010	0.010	ug/L							
Ethyl Acetate	<0.010	0.010	ug/L							
Ethylbenzene	<0.010	0.010	ug/L							

Viorel Vasile
Operations Manager

AMERICAN ANALYTICS

LABORATORY ANALYSIS RESULTS

Client: Stantec (TO)
Project No: 185803633
Project Name: Kaiser - Vermont Ave.

AA Project No: A732180
Date Received: 05/11/16
Date Reported: 05/17/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs by GCMS EPA TO-15 - Quality Control										
*Batch B6E1311 - *** DEFAULT PREP ****										
Blank (B6E1311-BLK1) Continued				Prepared & Analyzed: 05/13/16						
Ethyl-tert-Butyl Ether (ETBE)	<0.010	0.010	ug/L							
4-Ethyltoluene	<0.010	0.010	ug/L							
Heptane	<0.010	0.010	ug/L							
Hexachlorobutadiene	<0.010	0.010	ug/L							
n-Hexane	<0.010	0.010	ug/L							
2-Hexanone (MBK)	<0.010	0.010	ug/L							
Isopropanol (IPA)	<0.010	0.010	ug/L							
Methyl-tert-Butyl Ether (MTBE)	<0.010	0.010	ug/L							
Methylene Chloride	<0.010	0.010	ug/L							
4-Methyl-2-pentanone (MIBK)	<0.010	0.010	ug/L							
Naphthalene	<0.010	0.010	ug/L							
Propylene	<0.010	0.010	ug/L							
Styrene	<0.010	0.010	ug/L							
1,1,2,2-Tetrachloroethane	<0.010	0.010	ug/L							
Tetrachloroethylene (PCE)	<0.010	0.010	ug/L							
Tetrahydrofuran (THF)	<0.010	0.010	ug/L							
Toluene	<0.010	0.010	ug/L							
1,2,4-Trichlorobenzene	<0.010	0.010	ug/L							
1,1,2-Trichloroethane	<0.010	0.010	ug/L							
1,1,1-Trichloroethane	<0.010	0.010	ug/L							
Trichloroethylene (TCE)	<0.010	0.010	ug/L							
Trichlorofluoromethane (R11)	<0.010	0.010	ug/L							
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<0.010	0.010	ug/L							
1,3,5-Trimethylbenzene	<0.010	0.010	ug/L							
1,2,4-Trimethylbenzene	<0.010	0.010	ug/L							
2,2,4-Trimethylpentane	<0.010	0.010	ug/L							
Vinyl acetate	<0.010	0.010	ug/L							
Vinyl bromide	<0.010	0.010	ug/L							
Vinyl chloride	<0.010	0.010	ug/L							
o-Xylene	<0.010	0.010	ug/L							
m,p-Xylenes	<0.010	0.010	ug/L							

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client: Stantec (TO)
Project No: 185803633
Project Name: Kaiser - Vermont Ave.

AA Project No: A732180
Date Received: 05/11/16
Date Reported: 05/17/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs by GCMS EPA TO-15 - Quality Control										
*Batch B6E1311 - *** DEFAULT PREP ****										
Blank (B6E1311-BLK1) Continued				Prepared & Analyzed: 05/13/16						
1,2,3-Trichloropropane	<0.010	0.010	ug/L							
sec-Butylbenzene	<0.010	0.010	ug/L							
Isopropylbenzene	<0.010	0.010	ug/L							
n-Propylbenzene	<0.010	0.010	ug/L							
4-Isopropyltoluene	<0.010	0.010	ug/L							
n-Butylbenzene	<0.010	0.010	ug/L							
Surrogate: 4-Bromofluorobenzene	*0.143*		*ug/L*	*0.14*		*99.5*	*70-130*			
LCS (B6E1311-BS1)				Prepared & Analyzed: 05/13/16						
Acetone	**0.0221**	0.010	ug/L	0.024		93.1	70-130			
Benzene	**0.0297**	0.010	ug/L	0.032		93.1	70-130			
Benzyl chloride	**0.0718**	0.010	ug/L	0.052		139	70-130			**
Bromodichloromethane	**0.0608**	0.010	ug/L	0.067		90.7	70-130			
Bromoform	**0.106**	0.010	ug/L	0.10		102	70-130			
Bromomethane	**0.0442**	0.010	ug/L	0.039		114	70-130			
2-Butanone (MEK)	**0.0313**	0.010	ug/L	0.029		106	70-130			
Carbon Disulfide	**0.0253**	0.010	ug/L	0.031		81.1	70-130			
Carbon Tetrachloride	**0.0584**	0.010	ug/L	0.063		92.9	70-130			
Chlorobenzene	**0.0509**	0.010	ug/L	0.046		111	70-130			
Chloroethane	**0.0258**	0.010	ug/L	0.026		97.8	70-130			
Chloroform	**0.0430**	0.010	ug/L	0.049		88.1	70-130			
Chloromethane	**0.0178**	0.010	ug/L	0.021		86.0	70-130			
Dibromochloromethane	**0.0836**	0.010	ug/L	0.085		98.1	70-130			
1,2-Dibromoethane (EDB)	**0.0826**	0.010	ug/L	0.077		108	70-130			
1,2-Dichlorobenzene	**0.0841**	0.010	ug/L	0.060		140	70-130			**
1,3-Dichlorobenzene	**0.0853**	0.010	ug/L	0.060		142	70-130			**
1,4-Dichlorobenzene	**0.0825**	0.010	ug/L	0.060		137	70-130			**
Dichlorodifluoromethane (R12)	**0.0441**	0.010	ug/L	0.049		89.1	70-130			
1,1-Dichloroethane	**0.0377**	0.010	ug/L	0.040		93.1	70-130			
1,2-Dichloroethane (EDC)	**0.0356**	0.010	ug/L	0.040		87.9	70-130			
cis-1,2-Dichloroethylene	**0.0359**	0.010	ug/L	0.040		90.6	70-130			
1,1-Dichloroethylene	**0.0381**	0.010	ug/L	0.040		96.2	70-130			

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client: Stantec (TO)
Project No: 185803633
Project Name: Kaiser - Vermont Ave.

AA Project No: A732180
Date Received: 05/11/16
Date Reported: 05/17/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs by GCMS EPA TO-15 - Quality Control										
*Batch B6E1311 - *** DEFAULT PREP ****										
LCS (B6E1311-BS1) Continued				Prepared & Analyzed: 05/13/16						
trans-1,2-Dichloroethylene	**0.0377**	0.010	ug/L	0.040		95.0	70-130			
1,2-Dichloropropane	**0.0481**	0.010	ug/L	0.046		104	70-130			
trans-1,3-Dichloropropylene	**0.0492**	0.010	ug/L	0.045		108	70-130			
cis-1,3-Dichloropropylene	**0.0462**	0.010	ug/L	0.045		102	70-130			
Dichlorotetrafluoroethane	**0.0679**	0.010	ug/L	0.070		97.1	70-130			
Ethylbenzene	**0.0508**	0.010	ug/L	0.043		117	70-130			
4-Ethyltoluene	**0.0637**	0.010	ug/L	0.049		130	70-130			
Hexachlorobutadiene	**0.209**	0.010	ug/L	0.11		196	70-130			**
2-Hexanone (MBK)	**0.0449**	0.010	ug/L	0.041		110	70-130			
Isopropanol (IPA)	**0.0261**	0.010	ug/L	0.025		106	70-130			
Methylene Chloride	**0.0352**	0.010	ug/L	0.035		101	70-130			
4-Methyl-2-pentanone (MIBK)	**0.0438**	0.010	ug/L	0.041		107	70-130			
Styrene	**0.0533**	0.010	ug/L	0.043		125	70-130			
1,1,2,2-Tetrachloroethane	**0.0735**	0.010	ug/L	0.069		107	70-130			
Tetrachloroethylene (PCE)	**0.0707**	0.010	ug/L	0.068		104	70-130			
Toluene	**0.0409**	0.010	ug/L	0.038		108	70-130			
1,2,4-Trichlorobenzene	**0.205**	0.010	ug/L	0.074		276	70-130			**
1,1,2-Trichloroethane	**0.0549**	0.010	ug/L	0.055		101	70-130			
1,1,1-Trichloroethane	**0.0482**	0.010	ug/L	0.055		88.4	70-130			
Trichloroethylene (TCE)	**0.0531**	0.010	ug/L	0.054		98.8	70-130			
Trichlorofluoromethane (R11)	**0.0532**	0.010	ug/L	0.056		94.7	70-130			
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	**0.0736**	0.010	ug/L	0.077		96.0	70-130			
1,3,5-Trimethylbenzene	**0.0672**	0.010	ug/L	0.049		137	70-130			**
1,2,4-Trimethylbenzene	**0.0694**	0.010	ug/L	0.049		141	70-130			**
Vinyl acetate	**0.0383**	0.010	ug/L	0.035		109	70-130			
Vinyl chloride	**0.0246**	0.010	ug/L	0.026		96.4	70-130			
o-Xylene	**0.0523**	0.010	ug/L	0.043		120	70-130			
m,p-Xylenes	**0.105**	0.010	ug/L	0.087		121	70-130			
1,2,3-Trichloropropane	**0.0531**	0.010	ug/L	0.060		88.1	70-130			
sec-Butylbenzene	**0.0570**	0.010	ug/L	0.055		104	70-130			
Isopropylbenzene	**0.0509**	0.010	ug/L	0.049		104	70-130			

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client: Stantec (TO)
Project No: 185803633
Project Name: Kaiser - Vermont Ave.

AA Project No: A732180
Date Received: 05/11/16
Date Reported: 05/17/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs by GCMS EPA TO-15 - Quality Control										
*Batch B6E1311 - *** DEFAULT PREP ****										
LCS (B6E1311-BS1) Continued				Prepared & Analyzed: 05/13/16						
n-Propylbenzene	**0.0512**	0.010	ug/L	0.049		104	70-130			
4-Isopropyltoluene	**0.0597**	0.010	ug/L	0.055		109	70-130			
Surrogate: 4-Bromofluorobenzene	*0.142*		*ug/L*	*0.14*		*98.9*	*70-130*			
LCS Dup (B6E1311-BSD1)				Prepared: 05/13/16 Analyzed: 05/14/16						
Acetone	**0.0245**	0.010	ug/L	0.024		103	70-130	10.3	30	
Benzene	**0.0306**	0.010	ug/L	0.032		95.7	70-130	2.75	30	
Benzyl chloride	**0.0660**	0.010	ug/L	0.052		128	70-130	8.34	30	
Bromodichloromethane	**0.0636**	0.010	ug/L	0.067		94.9	70-130	4.53	30	
Bromoform	**0.0986**	0.010	ug/L	0.10		95.4	70-130	6.88	30	
Bromomethane	**0.0434**	0.010	ug/L	0.039		112	70-130	1.69	30	
2-Butanone (MEK)	**0.0301**	0.010	ug/L	0.029		102	70-130	3.94	30	
Carbon Disulfide	**0.0258**	0.010	ug/L	0.031		82.7	70-130	1.95	30	
Carbon Tetrachloride	**0.0596**	0.010	ug/L	0.063		94.8	70-130	2.02	30	
Chlorobenzene	**0.0493**	0.010	ug/L	0.046		107	70-130	3.22	30	
Chloroethane	**0.0247**	0.010	ug/L	0.026		93.6	70-130	4.39	30	
Chloroform	**0.0445**	0.010	ug/L	0.049		91.1	70-130	3.35	30	
Chloromethane	**0.0173**	0.010	ug/L	0.021		83.9	70-130	2.47	30	
Dibromochloromethane	**0.0815**	0.010	ug/L	0.085		95.7	70-130	2.48	30	
1,2-Dibromoethane (EDB)	**0.0857**	0.010	ug/L	0.077		112	70-130	3.74	30	
1,2-Dichlorobenzene	**0.0812**	0.010	ug/L	0.060		135	70-130	3.49	30	**
1,3-Dichlorobenzene	**0.0798**	0.010	ug/L	0.060		133	70-130	6.55	30	**
1,4-Dichlorobenzene	**0.0771**	0.010	ug/L	0.060		128	70-130	6.78	30	
Dichlorodifluoromethane (R12)	**0.0456**	0.010	ug/L	0.049		92.3	70-130	3.53	30	
1,1-Dichloroethane	**0.0387**	0.010	ug/L	0.040		95.6	70-130	2.65	30	
1,2-Dichloroethane (EDC)	**0.0370**	0.010	ug/L	0.040		91.3	70-130	3.79	30	
cis-1,2-Dichloroethylene	**0.0385**	0.010	ug/L	0.040		97.2	70-130	7.03	30	
1,1-Dichloroethylene	**0.0395**	0.010	ug/L	0.040		99.7	70-130	3.57	30	
trans-1,2-Dichloroethylene	**0.0385**	0.010	ug/L	0.040		97.0	70-130	2.08	30	
1,2-Dichloropropane	**0.0501**	0.010	ug/L	0.046		108	70-130	4.14	30	
trans-1,3-Dichloropropylene	**0.0484**	0.010	ug/L	0.045		107	70-130	1.67	30	
cis-1,3-Dichloropropylene	**0.0471**	0.010	ug/L	0.045		104	70-130	1.95	30	

Viorel Vasile
Operations Manager

AMERICAN ANALYTICS

LABORATORY ANALYSIS RESULTS

Client: Stantec (TO)
Project No: 185803633
Project Name: Kaiser - Vermont Ave.

AA Project No: A732180
Date Received: 05/11/16
Date Reported: 05/17/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs by GCMS EPA TO-15 - Quality Control										
*Batch B6E1311 - *** DEFAULT PREP ****										
LCS Dup (B6E1311-BSD1) Continued				Prepared: 05/13/16 Analyzed: 05/14/16						
Dichlorotetrafluoroethane	**0.0674**	0.010	ug/L	0.070		96.4	70-130	0.724	30	
Ethylbenzene	**0.0489**	0.010	ug/L	0.043		113	70-130	3.83	30	
4-Ethyltoluene	**0.0590**	0.010	ug/L	0.049		120	70-130	7.53	30	
Hexachlorobutadiene	**0.199**	0.010	ug/L	0.11		187	70-130	4.81	30	**
2-Hexanone (MBK)	**0.0421**	0.010	ug/L	0.041		103	70-130	6.50	30	
Isopropanol (IPA)	**0.0276**	0.010	ug/L	0.025		112	70-130	5.41	30	
Methylene Chloride	**0.0354**	0.010	ug/L	0.035		102	70-130	0.591	30	
4-Methyl-2-pentanone (MIBK)	**0.0426**	0.010	ug/L	0.041		104	70-130	2.75	30	
Styrene	**0.0490**	0.010	ug/L	0.043		115	70-130	8.41	30	
1,1,2,2-Tetrachloroethane	**0.0722**	0.010	ug/L	0.069		105	70-130	1.79	30	
Tetrachloroethylene (PCE)	**0.0706**	0.010	ug/L	0.068		104	70-130	0.0960	30	
Toluene	**0.0413**	0.010	ug/L	0.038		110	70-130	1.19	30	
1,2,4-Trichlorobenzene	**0.199**	0.010	ug/L	0.074		268	70-130	2.80	30	**
1,1,2-Trichloroethane	**0.0536**	0.010	ug/L	0.055		98.2	70-130	2.51	30	
1,1,1-Trichloroethane	**0.0491**	0.010	ug/L	0.055		90.0	70-130	1.79	30	
Trichloroethylene (TCE)	**0.0536**	0.010	ug/L	0.054		99.7	70-130	0.907	30	
Trichlorofluoromethane (R11)	**0.0602**	0.010	ug/L	0.056		107	70-130	12.4	30	
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	**0.0734**	0.010	ug/L	0.077		95.8	70-130	0.209	30	
1,3,5-Trimethylbenzene	**0.0648**	0.010	ug/L	0.049		132	70-130	3.72	30	**
1,2,4-Trimethylbenzene	**0.0678**	0.010	ug/L	0.049		138	70-130	2.22	30	**
Vinyl acetate	**0.0380**	0.010	ug/L	0.035		108	70-130	0.830	30	
Vinyl chloride	**0.0244**	0.010	ug/L	0.026		95.5	70-130	0.938	30	
o-Xylene	**0.0504**	0.010	ug/L	0.043		116	70-130	3.64	30	
m,p-Xylenes	**0.105**	0.010	ug/L	0.087		121	70-130	0.124	30	
1,2,3-Trichloropropane	**0.0531**	0.010	ug/L	0.060		88.0	70-130	0.114	30	
sec-Butylbenzene	**0.0549**	0.010	ug/L	0.055		100	70-130	3.73	30	
Isopropylbenzene	**0.0473**	0.010	ug/L	0.049		96.2	70-130	7.31	30	
n-Propylbenzene	**0.0495**	0.010	ug/L	0.049		101	70-130	3.52	30	
4-Isopropyltoluene	**0.0559**	0.010	ug/L	0.055		102	70-130	6.55	30	
Surrogate: 4-Bromofluorobenzene	*0.145*		*ug/L*	*0.14*		*101*	*70-130*			

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732180
Project No:	185803633	**Date Received:**	05/11/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16

Special Notes

[1] = ****** : Exceeds upper control limit

Viorel Vasile
Operations Manager

AMERICAN ANALYTICS CHAIN-OF-CUSTODY RECORD

9765 ETON AVE., CHATSWORTH, CA 91311
Tel: 818-998-5547 FAX: 818-998-7258

A.A. COC No.: 125998
70046257
Page 1 of 1

Client: Stantec | Project Name / No.: 185803633 | Sampler's Name: Brian Goss
Project Manager: Tom Szocinski | Site Address: N. Vermont Ave | Sampler's Signature:
Phone: 8057199324 | City: LA | P.O. No.: 185803633
Fax: | State & Zip: CA 90027 | Quote No.:

TAT Turnaround Codes **

1 = Same Day Rush
2 = 24 Hour Rush
3 = 48 Hour Rush
4 = 72 Hour Rush
5 = 5 Day Rush
X = 10 Working Days (Standard TAT)

ANALYSIS REQUESTED (Test Name)

Please enter the TAT Turnaround Codes ** below

Client I.D.	A.A. I.D.	Date	Time	Sample Matrix	No. of Cont	TO-15		Special Instructions
SV-2-5	2381	5/11/16	728 to 7:50	Vapor	1	4	6E11016-01	Email lab report to
SV-2-19	4584	5/11/16	728 to 740	Vapor	1	4	-02	Tom.Szocinski@stantec.com
SV-3-19	1241	5/11/16	827 to 834	Vapor	1	4	-03	brian.goss@stantec.com
SV-3b-5	4581	5/11/16	827 to 839	Vapor	1	4	-04	
SV-9-5	4325	5/11/16	801 to 812	Vapor	1	4	-05	
SV-4-5	2380	5/11/16	805 to 818	Vapor	1	4	-06	SV-7-23.5 &
SV-4-21	2359	5/11/16	805 to 817	Vapor	1	4	-07	SV-5-12.5 dead
SV-6-5	2048	5/11/16	853 to 904	Vapor	1	4	-08	headed due to
SV-6-19	2385	5/11/16	853 to 905	Vapor	1	4	-09	tight formation.
SV-7-5	1240	5/11/16	915 to 924	Vapor	1	4	-10	End VAC ~13"Hg
SV-7-23.5	2352	5/11/16	915 to 1042	Vapor	1	4	-11	'16 MAY 11 13:59
SV-5-5	4322	5/11/16	1002 to 1012	Vapor	1	4	-12	
SV-5-12.5	1873	5/11/16	1002 to 1038	Vapor	1	4	-13	

For Laboratory Use
PRIORITY
Rush 72 Hrs SH
Date 5/11/16 Time 1415 Sign

A.A. Project No.: A732180/6E11016

Relinquished by	Date	Time	Received by
	5/11/16	1359	
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by

9765 Eton Avenue
Chatsworth
California 91311
Tel: (818) 998-5547
Fax: (818) 998-7258

May 17, 2016

Tom Szocinski

Stantec (TO)

290 Conejo Ridge Ave. Suite #200

Thousand Oaks, CA 91361

Re : Kaiser - Vermont Ave. / 185803633

A732182 / 6E12012

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received on 05/12/16 14:53 and analyzed in accordance with the attached chain-of-custody.

Unless otherwise noted, all analytical testing was accomplished in accordance with the guidelines established in our Quality Assurance Program Manual, applicable standard operating procedures, and other related documentation. The results in this analytical report are limited to the samples tested and any reproduction thereof must be made in its entirety.

If you have any questions regarding this report or require additional information please call me at American Analytics.

Sincerely,

Viorel Vasile

Operations Manager

LABORATORY ANALYSIS RESULTS

Client: Stantec (TO)
Project No: 185803633
Project Name: Kaiser - Vermont Ave.

AA Project No: A732182
Date Received: 05/12/16
Date Reported: 05/17/16

Sample ID	Laboratory ID	Matrix	TAT	Date Sampled	Date Received
TO-15 (Mid Level)					
SV-1-20	6E12012-01	Vapor	3	05/12/16 11:50	05/12/16 14:53
SV-1b-5	6E12012-02	Vapor	3	05/12/16 11:20	05/12/16 14:53
SV-8-5	6E12012-03	Vapor	3	05/12/16 13:31	05/12/16 14:53
SV-8-18	6E12012-04	Vapor	3	05/12/16 12:48	05/12/16 14:53

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732182
Project No:	185803633	**Date Received:**	05/12/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/12/16
Dilution:	2	**Prepared:**	05/13/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/14/16

SV-1-20

6E12012-01 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
Acetone	**0.075**	ug/L	0.010	**0.032**	ppmv	0.0042
Allyl chloride	<0.020	ug/L	0.010	<0.0064	ppmv	0.0032
tert-Amyl Methyl Ether (TAME)	<0.020	ug/L	0.010	<0.0048	ppmv	0.0024
Benzene	<0.020	ug/L	0.010	<0.0063	ppmv	0.0031
Benzyl chloride	<0.020	ug/L	0.010	<0.0039	ppmv	0.0019
Bromodichloromethane	<0.020	ug/L	0.010	<0.003	ppmv	0.0015
Bromoform	<0.020	ug/L	0.010	<0.0019	ppmv	0.00097
Bromomethane	<0.020	ug/L	0.010	<0.0052	ppmv	0.0026
1,3-Butadiene	<0.020	ug/L	0.010	<0.009	ppmv	0.0045
2-Butanone (MEK)	**0.21**	ug/L	0.010	**0.071**	ppmv	0.0034
tert-Butyl alcohol (TBA)	<0.020	ug/L	0.010	<0.0066	ppmv	0.0033
Carbon Disulfide	<0.020	ug/L	0.010	<0.0064	ppmv	0.0032
Carbon Tetrachloride	<0.020	ug/L	0.010	<0.0032	ppmv	0.0016
Chlorobenzene	<0.020	ug/L	0.010	<0.0043	ppmv	0.0022
Chloroethane	<0.020	ug/L	0.010	<0.0076	ppmv	0.0038
Chloroform	<0.020	ug/L	0.010	<0.0041	ppmv	0.002
Chloromethane	<0.020	ug/L	0.010	<0.0097	ppmv	0.0048
Cyclohexane	<0.020	ug/L	0.010	<0.0058	ppmv	0.0029
Dibromochloromethane	<0.020	ug/L	0.010	<0.0023	ppmv	0.0012
1,2-Dibromoethane (EDB)	<0.020	ug/L	0.010	<0.0026	ppmv	0.0013
1,2-Dichlorobenzene	<0.020	ug/L	0.010	<0.0033	ppmv	0.0017

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732182
Project No:	185803633	**Date Received:**	05/12/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/12/16
Dilution:	2	**Prepared:**	05/13/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/14/16

SV-1-20

6E12012-01 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
1,3-Dichlorobenzene	<0.020	ug/L	0.010	<0.0033	ppmv	0.0017
1,4-Dichlorobenzene	<0.020	ug/L	0.010	<0.0033	ppmv	0.0017
Dichlorodifluoromethane (R12)	<0.020	ug/L	0.010	<0.004	ppmv	0.002
1,1-Dichloroethane	<0.020	ug/L	0.010	<0.0049	ppmv	0.0025
1,2-Dichloroethane (EDC)	<0.020	ug/L	0.010	<0.0049	ppmv	0.0025
cis-1,2-Dichloroethylene	<0.020	ug/L	0.010	<0.005	ppmv	0.0025
1,1-Dichloroethylene	<0.020	ug/L	0.010	<0.005	ppmv	0.0025
trans-1,2-Dichloroethylene	<0.020	ug/L	0.010	<0.005	ppmv	0.0025
1,2-Dichloropropane	<0.020	ug/L	0.010	<0.0043	ppmv	0.0022
trans-1,3-Dichloropropylene	<0.020	ug/L	0.010	<0.0044	ppmv	0.0022
cis-1,3-Dichloropropylene	<0.020	ug/L	0.010	<0.0044	ppmv	0.0022
Dichlorotetrafluoroethane	<0.020	ug/L	0.010	<0.0029	ppmv	0.0014
Diisopropyl ether (DIPE)	<0.020	ug/L	0.010	<0.0048	ppmv	0.0024
1,4-Dioxane	<0.020	ug/L	0.010	<0.0055	ppmv	0.0028
Ethanol	<0.020	ug/L	0.010	<0.011	ppmv	0.0053
Ethyl Acetate	<0.020	ug/L	0.010	<0.0055	ppmv	0.0028
Ethylbenzene	<0.020	ug/L	0.010	<0.0046	ppmv	0.0023
Ethyl-tert-Butyl Ether (ETBE)	<0.020	ug/L	0.010	<0.0048	ppmv	0.0024
4-Ethyltoluene	<0.020	ug/L	0.010	<0.0041	ppmv	0.002
Heptane	<0.020	ug/L	0.010	<0.0049	ppmv	0.0024
Hexachlorobutadiene	<0.020	ug/L	0.010	<0.0019	ppmv	0.00094

Viorel Vasile
Operations Manager

AMERICAN ANALYTICS

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732182
Project No:	185803633	**Date Received:**	05/12/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/12/16
Dilution:	2	**Prepared:**	05/13/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/14/16

SV-1-20

6E12012-01 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
n-Hexane	<0.020	ug/L	0.010	<0.0057	ppmv	0.0028
2-Hexanone (MBK)	<0.020	ug/L	0.010	<0.0049	ppmv	0.0024
Isopropanol (IPA)	<0.020	ug/L	0.010	<0.0081	ppmv	0.0041
Methyl-tert-Butyl Ether (MTBE)	<0.020	ug/L	0.010	<0.0055	ppmv	0.0028
Methylene Chloride	<0.020	ug/L	0.010	<0.0058	ppmv	0.0029
4-Methyl-2-pentanone (MIBK)	<0.020	ug/L	0.010	<0.0049	ppmv	0.0024
Naphthalene	<0.020	ug/L	0.010	<0.0038	ppmv	0.0019
Propylene	**0.047**	ug/L	0.010	**0.027**	ppmv	0.0058
Styrene	**0.027**	ug/L	0.010	**0.0063**	ppmv	0.0023
1,1,2,2-Tetrachloroethane	<0.020	ug/L	0.010	<0.0029	ppmv	0.0015
Tetrachloroethylene (PCE)	<0.020	ug/L	0.010	<0.0029	ppmv	0.0015
Tetrahydrofuran (THF)	**0.034**	ug/L	0.010	**0.012**	ppmv	0.0034
Toluene	<0.020	ug/L	0.010	<0.0053	ppmv	0.0027
1,2,4-Trichlorobenzene	<0.020	ug/L	0.010	<0.0027	ppmv	0.0013
1,1,2-Trichloroethane	<0.020	ug/L	0.010	<0.0037	ppmv	0.0018
1,1,1-Trichloroethane	<0.020	ug/L	0.010	<0.0037	ppmv	0.0018
Trichloroethylene (TCE)	<0.020	ug/L	0.010	<0.0037	ppmv	0.0019
Trichlorofluoromethane (R11)	<0.020	ug/L	0.010	<0.0036	ppmv	0.0018
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<0.020	ug/L	0.010	<0.0026	ppmv	0.0013
1,3,5-Trimethylbenzene	<0.020	ug/L	0.010	<0.0041	ppmv	0.002

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732182
Project No:	185803633	**Date Received:**	05/12/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/12/16
Dilution:	2	**Prepared:**	05/13/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/14/16

SV-1-20

6E12012-01 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
1,2,4-Trimethylbenzene	<0.020	ug/L	0.010	<0.0041	ppmv	0.002
2,2,4-Trimethylpentane	<0.020	ug/L	0.010	<0.0043	ppmv	0.0021
Vinyl acetate	<0.020	ug/L	0.010	<0.0057	ppmv	0.0028
Vinyl bromide	<0.020	ug/L	0.010	<0.0046	ppmv	0.0023
Vinyl chloride	<0.020	ug/L	0.010	<0.0078	ppmv	0.0039
o-Xylene	<0.020	ug/L	0.010	<0.0046	ppmv	0.0023
m,p-Xylenes	<0.020	ug/L	0.010	<0.0046	ppmv	0.0023
1,2,3-Trichloropropane	<0.020	ug/L	0.010	<0.0033	ppmv	0.0017
sec-Butylbenzene	<0.020	ug/L	0.010	<0.0036	ppmv	0.0018
Isopropylbenzene	<0.020	ug/L	0.010	<0.0041	ppmv	0.002
n-Propylbenzene	<0.020	ug/L	0.010	<0.0041	ppmv	0.002
4-Isopropyltoluene	<0.020	ug/L	0.010	<0.0036	ppmv	0.0018
n-Butylbenzene	<0.020	ug/L	0.010	<0.0036	ppmv	0.0018

Surrogates	%REC	%REC Limits
4-Bromofluorobenzene	105 %	70-130

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732182
Project No:	185803633	**Date Received:**	05/12/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/12/16
Dilution:	1	**Prepared:**	05/13/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/13/16

SV-1b-5

6E12012-02 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
Acetone	**0.19**	ug/L	0.010	**0.080**	ppmv	0.0042
Allyl chloride	<0.010	ug/L	0.010	<0.0032	ppmv	0.0032
tert-Amyl Methyl Ether (TAME)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
Benzene	**0.027**	ug/L	0.010	**0.0085**	ppmv	0.0031
Benzyl chloride	<0.010	ug/L	0.010	<0.0019	ppmv	0.0019
Bromodichloromethane	<0.010	ug/L	0.010	<0.0015	ppmv	0.0015
Bromoform	<0.010	ug/L	0.010	<0.00097	ppmv	0.00097
Bromomethane	<0.010	ug/L	0.010	<0.0026	ppmv	0.0026
1,3-Butadiene	<0.010	ug/L	0.010	<0.0045	ppmv	0.0045
2-Butanone (MEK)	**0.030**	ug/L	0.010	**0.010**	ppmv	0.0034
tert-Butyl alcohol (TBA)	<0.010	ug/L	0.010	<0.0033	ppmv	0.0033
Carbon Disulfide	<0.010	ug/L	0.010	<0.0032	ppmv	0.0032
Carbon Tetrachloride	<0.010	ug/L	0.010	<0.0016	ppmv	0.0016
Chlorobenzene	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
Chloroethane	<0.010	ug/L	0.010	<0.0038	ppmv	0.0038
Chloroform	<0.010	ug/L	0.010	<0.002	ppmv	0.002
Chloromethane	<0.010	ug/L	0.010	<0.0048	ppmv	0.0048
Cyclohexane	**0.033**	ug/L	0.010	**0.0096**	ppmv	0.0029
Dibromochloromethane	<0.010	ug/L	0.010	<0.0012	ppmv	0.0012
1,2-Dibromoethane (EDB)	<0.010	ug/L	0.010	<0.0013	ppmv	0.0013
1,2-Dichlorobenzene	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732182
Project No:	185803633	**Date Received:**	05/12/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/12/16
Dilution:	1	**Prepared:**	05/13/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/13/16

SV-1b-5

6E12012-02 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
1,3-Dichlorobenzene	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017
1,4-Dichlorobenzene	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017
Dichlorodifluoromethane (R12)	<0.010	ug/L	0.010	<0.002	ppmv	0.002
1,1-Dichloroethane	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
1,2-Dichloroethane (EDC)	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
cis-1,2-Dichloroethylene	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
1,1-Dichloroethylene	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
trans-1,2-Dichloroethylene	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
1,2-Dichloropropane	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
trans-1,3-Dichloropropylene	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
cis-1,3-Dichloropropylene	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
Dichlorotetrafluoroethane	<0.010	ug/L	0.010	<0.0014	ppmv	0.0014
Diisopropyl ether (DIPE)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
1,4-Dioxane	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Ethanol	**0.14**	ug/L	0.010	**0.074**	ppmv	0.0053
Ethyl Acetate	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Ethylbenzene	**0.050**	ug/L	0.010	**0.012**	ppmv	0.0023
Ethyl-tert-Butyl Ether (ETBE)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
4-Ethyltoluene	**0.016**	ug/L	0.010	**0.0033**	ppmv	0.002
Heptane	**0.012**	ug/L	0.010	**0.0029**	ppmv	0.0024
Hexachlorobutadiene	<0.010	ug/L	0.010	<0.00094	ppmv	0.00094

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732182
Project No:	185803633	**Date Received:**	05/12/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/12/16
Dilution:	1	**Prepared:**	05/13/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/13/16

SV-1b-5

6E12012-02 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
n-Hexane	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
2-Hexanone (MBK)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
Isopropanol (IPA)	**0.012**	ug/L	0.010	**0.0049**	ppmv	0.0041
Methyl-tert-Butyl Ether (MTBE)	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Methylene Chloride	<0.010	ug/L	0.010	<0.0029	ppmv	0.0029
4-Methyl-2-pentanone (MIBK)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
Naphthalene	<0.010	ug/L	0.010	<0.0019	ppmv	0.0019
Propylene	<0.010	ug/L	0.010	<0.0058	ppmv	0.0058
Styrene	**0.033**	ug/L	0.010	**0.0077**	ppmv	0.0023
1,1,2,2-Tetrachloroethane	<0.010	ug/L	0.010	<0.0015	ppmv	0.0015
Tetrachloroethylene (PCE)	<0.010	ug/L	0.010	<0.0015	ppmv	0.0015
Tetrahydrofuran (THF)	<0.010	ug/L	0.010	<0.0034	ppmv	0.0034
Toluene	**0.16**	ug/L	0.010	**0.042**	ppmv	0.0027
1,2,4-Trichlorobenzene	<0.010	ug/L	0.010	<0.0013	ppmv	0.0013
1,1,2-Trichloroethane	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
1,1,1-Trichloroethane	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
Trichloroethylene (TCE)	<0.010	ug/L	0.010	<0.0019	ppmv	0.0019
Trichlorofluoromethane (R11)	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<0.010	ug/L	0.010	<0.0013	ppmv	0.0013
1,3,5-Trimethylbenzene	**0.019**	ug/L	0.010	**0.0039**	ppmv	0.002

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732182
Project No:	185803633	**Date Received:**	05/12/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/12/16
Dilution:	1	**Prepared:**	05/13/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/13/16

SV-1b-5

6E12012-02 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
1,2,4-Trimethylbenzene	**0.068**	ug/L	0.010	**0.014**	ppmv	0.002
2,2,4-Trimethylpentane	**0.011**	ug/L	0.010	**0.0024**	ppmv	0.0021
Vinyl acetate	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Vinyl bromide	<0.010	ug/L	0.010	<0.0023	ppmv	0.0023
Vinyl chloride	<0.010	ug/L	0.010	<0.0039	ppmv	0.0039
o-Xylene	**0.057**	ug/L	0.010	**0.013**	ppmv	0.0023
m,p-Xylenes	**0.17**	ug/L	0.010	**0.039**	ppmv	0.0023
1,2,3-Trichloropropane	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017
sec-Butylbenzene	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
Isopropylbenzene	<0.010	ug/L	0.010	<0.002	ppmv	0.002
n-Propylbenzene	**0.015**	ug/L	0.010	**0.0031**	ppmv	0.002
4-Isopropyltoluene	**0.013**	ug/L	0.010	**0.0024**	ppmv	0.0018
n-Butylbenzene	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018

Surrogates	%REC	%REC Limits
4-Bromofluorobenzene	103 %	70-130

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732182
Project No:	185803633	**Date Received:**	05/12/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/12/16
Dilution:	1	**Prepared:**	05/13/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/13/16

SV-8-5

6E12012-03 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
Acetone	**0.087**	ug/L	0.010	**0.037**	ppmv	0.0042
Allyl chloride	<0.010	ug/L	0.010	<0.0032	ppmv	0.0032
tert-Amyl Methyl Ether (TAME)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
Benzene	**0.039**	ug/L	0.010	**0.012**	ppmv	0.0031
Benzyl chloride	<0.010	ug/L	0.010	<0.0019	ppmv	0.0019
Bromodichloromethane	<0.010	ug/L	0.010	<0.0015	ppmv	0.0015
Bromoform	<0.010	ug/L	0.010	<0.00097	ppmv	0.00097
Bromomethane	<0.010	ug/L	0.010	<0.0026	ppmv	0.0026
1,3-Butadiene	<0.010	ug/L	0.010	<0.0045	ppmv	0.0045
2-Butanone (MEK)	**0.034**	ug/L	0.010	**0.012**	ppmv	0.0034
tert-Butyl alcohol (TBA)	<0.010	ug/L	0.010	<0.0033	ppmv	0.0033
Carbon Disulfide	<0.010	ug/L	0.010	<0.0032	ppmv	0.0032
Carbon Tetrachloride	<0.010	ug/L	0.010	<0.0016	ppmv	0.0016
Chlorobenzene	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
Chloroethane	<0.010	ug/L	0.010	<0.0038	ppmv	0.0038
Chloroform	<0.010	ug/L	0.010	<0.002	ppmv	0.002
Chloromethane	<0.010	ug/L	0.010	<0.0048	ppmv	0.0048
Cyclohexane	**0.061**	ug/L	0.010	**0.018**	ppmv	0.0029
Dibromochloromethane	<0.010	ug/L	0.010	<0.0012	ppmv	0.0012
1,2-Dibromoethane (EDB)	<0.010	ug/L	0.010	<0.0013	ppmv	0.0013
1,2-Dichlorobenzene	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732182
Project No:	185803633	**Date Received:**	05/12/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/12/16
Dilution:	1	**Prepared:**	05/13/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/13/16

SV-8-5

6E12012-03 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
1,3-Dichlorobenzene	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017
1,4-Dichlorobenzene	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017
Dichlorodifluoromethane (R12)	<0.010	ug/L	0.010	<0.002	ppmv	0.002
1,1-Dichloroethane	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
1,2-Dichloroethane (EDC)	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
cis-1,2-Dichloroethylene	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
1,1-Dichloroethylene	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
trans-1,2-Dichloroethylene	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
1,2-Dichloropropane	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
trans-1,3-Dichloropropylene	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
cis-1,3-Dichloropropylene	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
Dichlorotetrafluoroethane	<0.010	ug/L	0.010	<0.0014	ppmv	0.0014
Diisopropyl ether (DIPE)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
1,4-Dioxane	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Ethanol	**0.014**	ug/L	0.010	**0.0074**	ppmv	0.0053
Ethyl Acetate	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Ethylbenzene	**0.019**	ug/L	0.010	**0.0044**	ppmv	0.0023
Ethyl-tert-Butyl Ether (ETBE)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
4-Ethyltoluene	<0.010	ug/L	0.010	<0.002	ppmv	0.002
Heptane	**0.064**	ug/L	0.010	**0.016**	ppmv	0.0024
Hexachlorobutadiene	<0.010	ug/L	0.010	<0.00094	ppmv	0.00094

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732182
Project No:	185803633	**Date Received:**	05/12/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/12/16
Dilution:	1	**Prepared:**	05/13/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/13/16

SV-8-5

6E12012-03 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
n-Hexane	**0.093**	ug/L	0.010	**0.026**	ppmv	0.0028
2-Hexanone (MBK)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
Isopropanol (IPA)	<0.010	ug/L	0.010	<0.0041	ppmv	0.0041
Methyl-tert-Butyl Ether (MTBE)	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Methylene Chloride	<0.010	ug/L	0.010	<0.0029	ppmv	0.0029
4-Methyl-2-pentanone (MIBK)	**0.010**	ug/L	0.010	**0.0024**	ppmv	0.0024
Naphthalene	<0.010	ug/L	0.010	<0.0019	ppmv	0.0019
Propylene	**0.90**	ug/L	0.010	**0.52**	ppmv	0.0058
Styrene	**0.013**	ug/L	0.010	**0.0031**	ppmv	0.0023
1,1,2,2-Tetrachloroethane	<0.010	ug/L	0.010	<0.0015	ppmv	0.0015
Tetrachloroethylene (PCE)	<0.010	ug/L	0.010	<0.0015	ppmv	0.0015
Tetrahydrofuran (THF)	<0.010	ug/L	0.010	<0.0034	ppmv	0.0034
Toluene	**0.089**	ug/L	0.010	**0.024**	ppmv	0.0027
1,2,4-Trichlorobenzene	<0.010	ug/L	0.010	<0.0013	ppmv	0.0013
1,1,2-Trichloroethane	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
1,1,1-Trichloroethane	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
Trichloroethylene (TCE)	<0.010	ug/L	0.010	<0.0019	ppmv	0.0019
Trichlorofluoromethane (R11)	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<0.010	ug/L	0.010	<0.0013	ppmv	0.0013
1,3,5-Trimethylbenzene	<0.010	ug/L	0.010	<0.002	ppmv	0.002

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732182
Project No:	185803633	**Date Received:**	05/12/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/12/16
Dilution:	1	**Prepared:**	05/13/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/13/16

SV-8-5

6E12012-03 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
1,2,4-Trimethylbenzene	<0.010	ug/L	0.010	<0.002	ppmv	0.002
2,2,4-Trimethylpentane	**0.075**	ug/L	0.010	**0.016**	ppmv	0.0021
Vinyl acetate	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Vinyl bromide	<0.010	ug/L	0.010	<0.0023	ppmv	0.0023
Vinyl chloride	<0.010	ug/L	0.010	<0.0039	ppmv	0.0039
o-Xylene	**0.017**	ug/L	0.010	**0.0039**	ppmv	0.0023
m,p-Xylenes	**0.049**	ug/L	0.010	**0.011**	ppmv	0.0023
1,2,3-Trichloropropane	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017
sec-Butylbenzene	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
Isopropylbenzene	<0.010	ug/L	0.010	<0.002	ppmv	0.002
n-Propylbenzene	<0.010	ug/L	0.010	<0.002	ppmv	0.002
4-Isopropyltoluene	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
n-Butylbenzene	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018

Surrogates	%REC	%REC Limits
4-Bromofluorobenzene	105 %	70-130

Viorel Vasile
Operations Manager

AMERICAN ® ANALYTICS

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732182
Project No:	185803633	**Date Received:**	05/12/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/12/16
Dilution:	1	**Prepared:**	05/13/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/14/16

SV-8-18

6E12012-04 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
Acetone	<0.010	ug/L	0.010	<0.0042	ppmv	0.0042
Allyl chloride	<0.010	ug/L	0.010	<0.0032	ppmv	0.0032
tert-Amyl Methyl Ether (TAME)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
Benzene	**0.028**	ug/L	0.010	**0.0088**	ppmv	0.0031
Benzyl chloride	<0.010	ug/L	0.010	<0.0019	ppmv	0.0019
Bromodichloromethane	<0.010	ug/L	0.010	<0.0015	ppmv	0.0015
Bromoform	<0.010	ug/L	0.010	<0.00097	ppmv	0.00097
Bromomethane	<0.010	ug/L	0.010	<0.0026	ppmv	0.0026
1,3-Butadiene	<0.010	ug/L	0.010	<0.0045	ppmv	0.0045
2-Butanone (MEK)	**0.042**	ug/L	0.010	**0.014**	ppmv	0.0034
tert-Butyl alcohol (TBA)	<0.010	ug/L	0.010	<0.0033	ppmv	0.0033
Carbon Disulfide	<0.010	ug/L	0.010	<0.0032	ppmv	0.0032
Carbon Tetrachloride	<0.010	ug/L	0.010	<0.0016	ppmv	0.0016
Chlorobenzene	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
Chloroethane	<0.010	ug/L	0.010	<0.0038	ppmv	0.0038
Chloroform	<0.010	ug/L	0.010	<0.002	ppmv	0.002
Chloromethane	<0.010	ug/L	0.010	<0.0048	ppmv	0.0048
Cyclohexane	**0.013**	ug/L	0.010	**0.0038**	ppmv	0.0029
Dibromochloromethane	<0.010	ug/L	0.010	<0.0012	ppmv	0.0012
1,2-Dibromoethane (EDB)	<0.010	ug/L	0.010	<0.0013	ppmv	0.0013
1,2-Dichlorobenzene	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732182
Project No:	185803633	**Date Received:**	05/12/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/12/16
Dilution:	1	**Prepared:**	05/13/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/14/16

SV-8-18

6E12012-04 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
1,3-Dichlorobenzene	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017
1,4-Dichlorobenzene	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017
Dichlorodifluoromethane (R12)	<0.010	ug/L	0.010	<0.002	ppmv	0.002
1,1-Dichloroethane	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
1,2-Dichloroethane (EDC)	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
cis-1,2-Dichloroethylene	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
1,1-Dichloroethylene	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
trans-1,2-Dichloroethylene	<0.010	ug/L	0.010	<0.0025	ppmv	0.0025
1,2-Dichloropropane	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
trans-1,3-Dichloropropylene	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
cis-1,3-Dichloropropylene	<0.010	ug/L	0.010	<0.0022	ppmv	0.0022
Dichlorotetrafluoroethane	<0.010	ug/L	0.010	<0.0014	ppmv	0.0014
Diisopropyl ether (DIPE)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
1,4-Dioxane	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Ethanol	**0.020**	ug/L	0.010	**0.011**	ppmv	0.0053
Ethyl Acetate	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Ethylbenzene	**0.017**	ug/L	0.010	**0.0039**	ppmv	0.0023
Ethyl-tert-Butyl Ether (ETBE)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
4-Ethyltoluene	<0.010	ug/L	0.010	<0.002	ppmv	0.002
Heptane	**0.045**	ug/L	0.010	**0.011**	ppmv	0.0024
Hexachlorobutadiene	<0.010	ug/L	0.010	<0.00094	ppmv	0.00094

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732182
Project No:	185803633	**Date Received:**	05/12/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/12/16
Dilution:	1	**Prepared:**	05/13/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/14/16

SV-8-18

6E12012-04 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
n-Hexane	**0.13**	ug/L	0.010	**0.037**	ppmv	0.0028
2-Hexanone (MBK)	<0.010	ug/L	0.010	<0.0024	ppmv	0.0024
Isopropanol (IPA)	<0.010	ug/L	0.010	<0.0041	ppmv	0.0041
Methyl-tert-Butyl Ether (MTBE)	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Methylene Chloride	<0.010	ug/L	0.010	<0.0029	ppmv	0.0029
4-Methyl-2-pentanone (MIBK)	**0.015**	ug/L	0.010	**0.0037**	ppmv	0.0024
Naphthalene	<0.010	ug/L	0.010	<0.0019	ppmv	0.0019
Propylene	**4.6**	ug/L	0.010	**2.7**	ppmv	0.0058
Styrene	**0.010**	ug/L	0.010	**0.0023**	ppmv	0.0023
1,1,2,2-Tetrachloroethane	<0.010	ug/L	0.010	<0.0015	ppmv	0.0015
Tetrachloroethylene (PCE)	<0.010	ug/L	0.010	<0.0015	ppmv	0.0015
Tetrahydrofuran (THF)	<0.010	ug/L	0.010	<0.0034	ppmv	0.0034
Toluene	**0.066**	ug/L	0.010	**0.018**	ppmv	0.0027
1,2,4-Trichlorobenzene	<0.010	ug/L	0.010	<0.0013	ppmv	0.0013
1,1,2-Trichloroethane	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
1,1,1-Trichloroethane	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
Trichloroethylene (TCE)	<0.010	ug/L	0.010	<0.0019	ppmv	0.0019
Trichlorofluoromethane (R11)	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<0.010	ug/L	0.010	<0.0013	ppmv	0.0013
1,3,5-Trimethylbenzene	<0.010	ug/L	0.010	<0.002	ppmv	0.002

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client:	Stantec (TO)	**AA Project No:**	A732182
Project No:	185803633	**Date Received:**	05/12/16
Project Name:	Kaiser - Vermont Ave.	**Date Reported:**	05/17/16
Matrix:	Vapor	**Sampled:**	05/12/16
Dilution:	1	**Prepared:**	05/13/16
Method:	VOCs by GCMS EPA TO-15	**Analyzed:**	05/14/16

SV-8-18

6E12012-04 (Vapor)

Analyte	Result	(ug/L)	MRL	Result	(ppmv)	MRL
1,2,4-Trimethylbenzene	**0.015**	ug/L	0.010	**0.0031**	ppmv	0.002
2,2,4-Trimethylpentane	<0.010	ug/L	0.010	<0.0021	ppmv	0.0021
Vinyl acetate	<0.010	ug/L	0.010	<0.0028	ppmv	0.0028
Vinyl bromide	<0.010	ug/L	0.010	<0.0023	ppmv	0.0023
Vinyl chloride	<0.010	ug/L	0.010	<0.0039	ppmv	0.0039
o-Xylene	**0.019**	ug/L	0.010	**0.0044**	ppmv	0.0023
m,p-Xylenes	**0.057**	ug/L	0.010	**0.013**	ppmv	0.0023
1,2,3-Trichloropropane	<0.010	ug/L	0.010	<0.0017	ppmv	0.0017
sec-Butylbenzene	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
Isopropylbenzene	<0.010	ug/L	0.010	<0.002	ppmv	0.002
n-Propylbenzene	<0.010	ug/L	0.010	<0.002	ppmv	0.002
4-Isopropyltoluene	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018
n-Butylbenzene	<0.010	ug/L	0.010	<0.0018	ppmv	0.0018

Surrogates	%REC	%REC Limits
4-Bromofluorobenzene	99.7 %	70-130

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client: Stantec (TO)
Project No: 185803633
Project Name: Kaiser - Vermont Ave.

AA Project No: A732182
Date Received: 05/12/16
Date Reported: 05/17/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs by GCMS EPA TO-15 - Quality Control										
*Batch B6E1311 - *** DEFAULT PREP ****										
Blank (B6E1311-BLK1)				Prepared & Analyzed: 05/13/16						
Acetone	<0.010	0.010	ug/L							
Allyl chloride	<0.010	0.010	ug/L							
tert-Amyl Methyl Ether (TAME)	<0.010	0.010	ug/L							
Benzene	<0.010	0.010	ug/L							
Benzyl chloride	<0.010	0.010	ug/L							
Bromodichloromethane	<0.010	0.010	ug/L							
Bromoform	<0.010	0.010	ug/L							
Bromomethane	<0.010	0.010	ug/L							
1,3-Butadiene	<0.010	0.010	ug/L							
2-Butanone (MEK)	<0.010	0.010	ug/L							
tert-Butyl alcohol (TBA)	<0.010	0.010	ug/L							
Carbon Disulfide	<0.010	0.010	ug/L							
Carbon Tetrachloride	<0.010	0.010	ug/L							
Chlorobenzene	<0.010	0.010	ug/L							
Chloroethane	<0.010	0.010	ug/L							
Chloroform	<0.010	0.010	ug/L							
Chloromethane	<0.010	0.010	ug/L							
Cyclohexane	<0.010	0.010	ug/L							
Dibromochloromethane	<0.010	0.010	ug/L							
1,2-Dibromoethane (EDB)	<0.010	0.010	ug/L							
1,2-Dichlorobenzene	<0.010	0.010	ug/L							
1,3-Dichlorobenzene	<0.010	0.010	ug/L							
1,4-Dichlorobenzene	<0.010	0.010	ug/L							
Dichlorodifluoromethane (R12)	<0.010	0.010	ug/L							
1,1-Dichloroethane	<0.010	0.010	ug/L							
1,2-Dichloroethane (EDC)	<0.010	0.010	ug/L							
cis-1,2-Dichloroethylene	<0.010	0.010	ug/L							
1,1-Dichloroethylene	<0.010	0.010	ug/L							
trans-1,2-Dichloroethylene	<0.010	0.010	ug/L							
1,2-Dichloropropane	<0.010	0.010	ug/L							
trans-1,3-Dichloropropylene	<0.010	0.010	ug/L							

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client: Stantec (TO)
Project No: 185803633
Project Name: Kaiser - Vermont Ave.

AA Project No: A732182
Date Received: 05/12/16
Date Reported: 05/17/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs by GCMS EPA TO-15 - Quality Control										
*Batch B6E1311 - *** DEFAULT PREP ****										
Blank (B6E1311-BLK1) Continued				Prepared & Analyzed: 05/13/16						
cis-1,3-Dichloropropylene	<0.010	0.010	ug/L							
Dichlorotetrafluoroethane	<0.010	0.010	ug/L							
Diisopropyl ether (DIPE)	<0.010	0.010	ug/L							
1,4-Dioxane	<0.010	0.010	ug/L							
Ethanol	<0.010	0.010	ug/L							
Ethyl Acetate	<0.010	0.010	ug/L							
Ethylbenzene	<0.010	0.010	ug/L							
Ethyl-tert-Butyl Ether (ETBE)	<0.010	0.010	ug/L							
4-Ethyltoluene	<0.010	0.010	ug/L							
Heptane	<0.010	0.010	ug/L							
Hexachlorobutadiene	<0.010	0.010	ug/L							
n-Hexane	<0.010	0.010	ug/L							
2-Hexanone (MBK)	<0.010	0.010	ug/L							
Isopropanol (IPA)	<0.010	0.010	ug/L							
Methyl-tert-Butyl Ether (MTBE)	<0.010	0.010	ug/L							
Methylene Chloride	<0.010	0.010	ug/L							
4-Methyl-2-pentanone (MIBK)	<0.010	0.010	ug/L							
Naphthalene	<0.010	0.010	ug/L							
Propylene	<0.010	0.010	ug/L							
Styrene	<0.010	0.010	ug/L							
1,1,2,2-Tetrachloroethane	<0.010	0.010	ug/L							
Tetrachloroethylene (PCE)	<0.010	0.010	ug/L							
Tetrahydrofuran (THF)	<0.010	0.010	ug/L							
Toluene	<0.010	0.010	ug/L							
1,2,4-Trichlorobenzene	<0.010	0.010	ug/L							
1,1,2-Trichloroethane	<0.010	0.010	ug/L							
1,1,1-Trichloroethane	<0.010	0.010	ug/L							
Trichloroethylene (TCE)	<0.010	0.010	ug/L							
Trichlorofluoromethane (R11)	<0.010	0.010	ug/L							
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<0.010	0.010	ug/L							
1,3,5-Trimethylbenzene	<0.010	0.010	ug/L							

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client: Stantec (TO)
Project No: 185803633
Project Name: Kaiser - Vermont Ave.

AA Project No: A732182
Date Received: 05/12/16
Date Reported: 05/17/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs by GCMS EPA TO-15 - Quality Control										
*Batch B6E1311 - *** DEFAULT PREP ****										
Blank (B6E1311-BLK1) Continued				Prepared & Analyzed: 05/13/16						
1,2,4-Trimethylbenzene	<0.010	0.010	ug/L							
2,2,4-Trimethylpentane	<0.010	0.010	ug/L							
Vinyl acetate	<0.010	0.010	ug/L							
Vinyl bromide	<0.010	0.010	ug/L							
Vinyl chloride	<0.010	0.010	ug/L							
o-Xylene	<0.010	0.010	ug/L							
m,p-Xylenes	<0.010	0.010	ug/L							
1,2,3-Trichloropropane	<0.010	0.010	ug/L							
sec-Butylbenzene	<0.010	0.010	ug/L							
Isopropylbenzene	<0.010	0.010	ug/L							
n-Propylbenzene	<0.010	0.010	ug/L							
4-Isopropyltoluene	<0.010	0.010	ug/L							
n-Butylbenzene	<0.010	0.010	ug/L							
Surrogate: 4-Bromofluorobenzene	*0.143*		*ug/L*	*0.14*		*99.5*	*70-130*			
LCS (B6E1311-BS1)				Prepared & Analyzed: 05/13/16						
Acetone	**0.0221**	0.010	ug/L	0.024		93.1	70-130			
Benzene	**0.0297**	0.010	ug/L	0.032		93.1	70-130			
Benzyl chloride	**0.0718**	0.010	ug/L	0.052		139	70-130			**
Bromodichloromethane	**0.0608**	0.010	ug/L	0.067		90.7	70-130			
Bromoform	**0.106**	0.010	ug/L	0.10		102	70-130			
Bromomethane	**0.0442**	0.010	ug/L	0.039		114	70-130			
2-Butanone (MEK)	**0.0313**	0.010	ug/L	0.029		106	70-130			
Carbon Disulfide	**0.0253**	0.010	ug/L	0.031		81.1	70-130			
Carbon Tetrachloride	**0.0584**	0.010	ug/L	0.063		92.9	70-130			
Chlorobenzene	**0.0509**	0.010	ug/L	0.046		111	70-130			
Chloroethane	**0.0258**	0.010	ug/L	0.026		97.8	70-130			
Chloroform	**0.0430**	0.010	ug/L	0.049		88.1	70-130			
Chloromethane	**0.0178**	0.010	ug/L	0.021		86.0	70-130			
Dibromochloromethane	**0.0836**	0.010	ug/L	0.085		98.1	70-130			
1,2-Dibromoethane (EDB)	**0.0826**	0.010	ug/L	0.077		108	70-130			
1,2-Dichlorobenzene	**0.0841**	0.010	ug/L	0.060		140	70-130			**

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client: Stantec (TO)
Project No: 185803633
Project Name: Kaiser - Vermont Ave.

AA Project No: A732182
Date Received: 05/12/16
Date Reported: 05/17/16

VOCs by GCMS EPA TO-15 - Quality Control

*Batch B6E1311 - *** DEFAULT PREP ****

LCS (B6E1311-BS1) Continued — Prepared & Analyzed: 05/13/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,3-Dichlorobenzene	**0.0853**	0.010	ug/L	0.060		142	70-130			**
1,4-Dichlorobenzene	**0.0825**	0.010	ug/L	0.060		137	70-130			**
Dichlorodifluoromethane (R12)	**0.0441**	0.010	ug/L	0.049		89.1	70-130			
1,1-Dichloroethane	**0.0377**	0.010	ug/L	0.040		93.1	70-130			
1,2-Dichloroethane (EDC)	**0.0356**	0.010	ug/L	0.040		87.9	70-130			
cis-1,2-Dichloroethylene	**0.0359**	0.010	ug/L	0.040		90.6	70-130			
1,1-Dichloroethylene	**0.0381**	0.010	ug/L	0.040		96.2	70-130			
trans-1,2-Dichloroethylene	**0.0377**	0.010	ug/L	0.040		95.0	70-130			
1,2-Dichloropropane	**0.0481**	0.010	ug/L	0.046		104	70-130			
trans-1,3-Dichloropropylene	**0.0492**	0.010	ug/L	0.045		108	70-130			
cis-1,3-Dichloropropylene	**0.0462**	0.010	ug/L	0.045		102	70-130			
Dichlorotetrafluoroethane	**0.0679**	0.010	ug/L	0.070		97.1	70-130			
Ethylbenzene	**0.0508**	0.010	ug/L	0.043		117	70-130			
4-Ethyltoluene	**0.0637**	0.010	ug/L	0.049		130	70-130			
Hexachlorobutadiene	**0.209**	0.010	ug/L	0.11		196	70-130			**
2-Hexanone (MBK)	**0.0449**	0.010	ug/L	0.041		110	70-130			
Isopropanol (IPA)	**0.0261**	0.010	ug/L	0.025		106	70-130			
Methylene Chloride	**0.0352**	0.010	ug/L	0.035		101	70-130			
4-Methyl-2-pentanone (MIBK)	**0.0438**	0.010	ug/L	0.041		107	70-130			
Styrene	**0.0533**	0.010	ug/L	0.043		125	70-130			
1,1,2,2-Tetrachloroethane	**0.0735**	0.010	ug/L	0.069		107	70-130			
Tetrachloroethylene (PCE)	**0.0707**	0.010	ug/L	0.068		104	70-130			
Toluene	**0.0409**	0.010	ug/L	0.038		108	70-130			
1,2,4-Trichlorobenzene	**0.205**	0.010	ug/L	0.074		276	70-130			**
1,1,2-Trichloroethane	**0.0549**	0.010	ug/L	0.055		101	70-130			
1,1,1-Trichloroethane	**0.0482**	0.010	ug/L	0.055		88.4	70-130			
Trichloroethylene (TCE)	**0.0531**	0.010	ug/L	0.054		98.8	70-130			
Trichlorofluoromethane (R11)	**0.0532**	0.010	ug/L	0.056		94.7	70-130			
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	**0.0736**	0.010	ug/L	0.077		96.0	70-130			
1,3,5-Trimethylbenzene	**0.0672**	0.010	ug/L	0.049		137	70-130			**
1,2,4-Trimethylbenzene	**0.0694**	0.010	ug/L	0.049		141	70-130			**

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client: Stantec (TO)
Project No: 185803633
Project Name: Kaiser - Vermont Ave.

AA Project No: A732182
Date Received: 05/12/16
Date Reported: 05/17/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs by GCMS EPA TO-15 - Quality Control										
*Batch B6E1311 - *** DEFAULT PREP ****										
LCS (B6E1311-BS1) Continued				Prepared & Analyzed: 05/13/16						
Vinyl acetate	**0.0383**	0.010	ug/L	0.035		109	70-130			
Vinyl chloride	**0.0246**	0.010	ug/L	0.026		96.4	70-130			
o-Xylene	**0.0523**	0.010	ug/L	0.043		120	70-130			
m,p-Xylenes	**0.105**	0.010	ug/L	0.087		121	70-130			
1,2,3-Trichloropropane	**0.0531**	0.010	ug/L	0.060		88.1	70-130			
sec-Butylbenzene	**0.0570**	0.010	ug/L	0.055		104	70-130			
Isopropylbenzene	**0.0509**	0.010	ug/L	0.049		104	70-130			
n-Propylbenzene	**0.0512**	0.010	ug/L	0.049		104	70-130			
4-Isopropyltoluene	**0.0597**	0.010	ug/L	0.055		109	70-130			
Surrogate: 4-Bromofluorobenzene	*0.142*		*ug/L*	*0.14*		*98.9*	*70-130*			
LCS Dup (B6E1311-BSD1)				Prepared: 05/13/16 Analyzed: 05/14/16						
Acetone	**0.0245**	0.010	ug/L	0.024		103	70-130	10.3	30	
Benzene	**0.0306**	0.010	ug/L	0.032		95.7	70-130	2.75	30	
Benzyl chloride	**0.0660**	0.010	ug/L	0.052		128	70-130	8.34	30	
Bromodichloromethane	**0.0636**	0.010	ug/L	0.067		94.9	70-130	4.53	30	
Bromoform	**0.0986**	0.010	ug/L	0.10		95.4	70-130	6.88	30	
Bromomethane	**0.0434**	0.010	ug/L	0.039		112	70-130	1.69	30	
2-Butanone (MEK)	**0.0301**	0.010	ug/L	0.029		102	70-130	3.94	30	
Carbon Disulfide	**0.0258**	0.010	ug/L	0.031		82.7	70-130	1.95	30	
Carbon Tetrachloride	**0.0596**	0.010	ug/L	0.063		94.8	70-130	2.02	30	
Chlorobenzene	**0.0493**	0.010	ug/L	0.046		107	70-130	3.22	30	
Chloroethane	**0.0247**	0.010	ug/L	0.026		93.6	70-130	4.39	30	
Chloroform	**0.0445**	0.010	ug/L	0.049		91.1	70-130	3.35	30	
Chloromethane	**0.0173**	0.010	ug/L	0.021		83.9	70-130	2.47	30	
Dibromochloromethane	**0.0815**	0.010	ug/L	0.085		95.7	70-130	2.48	30	
1,2-Dibromoethane (EDB)	**0.0857**	0.010	ug/L	0.077		112	70-130	3.74	30	
1,2-Dichlorobenzene	**0.0812**	0.010	ug/L	0.060		135	70-130	3.49	30	**
1,3-Dichlorobenzene	**0.0798**	0.010	ug/L	0.060		133	70-130	6.55	30	**
1,4-Dichlorobenzene	**0.0771**	0.010	ug/L	0.060		128	70-130	6.78	30	
Dichlorodifluoromethane (R12)	**0.0456**	0.010	ug/L	0.049		92.3	70-130	3.53	30	
1,1-Dichloroethane	**0.0387**	0.010	ug/L	0.040		95.6	70-130	2.65	30	

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client: Stantec (TO)
Project No: 185803633
Project Name: Kaiser - Vermont Ave.

AA Project No: A732182
Date Received: 05/12/16
Date Reported: 05/17/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs by GCMS EPA TO-15 - Quality Control										
*Batch B6E1311 - *** DEFAULT PREP ****										
LCS Dup (B6E1311-BSD1) Continued				Prepared: 05/13/16 Analyzed: 05/14/16						
1,2-Dichloroethane (EDC)	**0.0370**	0.010	ug/L	0.040		91.3	70-130	3.79	30	
cis-1,2-Dichloroethylene	**0.0385**	0.010	ug/L	0.040		97.2	70-130	7.03	30	
1,1-Dichloroethylene	**0.0395**	0.010	ug/L	0.040		99.7	70-130	3.57	30	
trans-1,2-Dichloroethylene	**0.0385**	0.010	ug/L	0.040		97.0	70-130	2.08	30	
1,2-Dichloropropane	**0.0501**	0.010	ug/L	0.046		108	70-130	4.14	30	
trans-1,3-Dichloropropylene	**0.0484**	0.010	ug/L	0.045		107	70-130	1.67	30	
cis-1,3-Dichloropropylene	**0.0471**	0.010	ug/L	0.045		104	70-130	1.95	30	
Dichlorotetrafluoroethane	**0.0674**	0.010	ug/L	0.070		96.4	70-130	0.724	30	
Ethylbenzene	**0.0489**	0.010	ug/L	0.043		113	70-130	3.83	30	
4-Ethyltoluene	**0.0590**	0.010	ug/L	0.049		120	70-130	7.53	30	
Hexachlorobutadiene	**0.199**	0.010	ug/L	0.11		187	70-130	4.81	30	**
2-Hexanone (MBK)	**0.0421**	0.010	ug/L	0.041		103	70-130	6.50	30	
Isopropanol (IPA)	**0.0276**	0.010	ug/L	0.025		112	70-130	5.41	30	
Methylene Chloride	**0.0354**	0.010	ug/L	0.035		102	70-130	0.591	30	
4-Methyl-2-pentanone (MIBK)	**0.0426**	0.010	ug/L	0.041		104	70-130	2.75	30	
Styrene	**0.0490**	0.010	ug/L	0.043		115	70-130	8.41	30	
1,1,2,2-Tetrachloroethane	**0.0722**	0.010	ug/L	0.069		105	70-130	1.79	30	
Tetrachloroethylene (PCE)	**0.0706**	0.010	ug/L	0.068		104	70-130	0.0960	30	
Toluene	**0.0413**	0.010	ug/L	0.038		110	70-130	1.19	30	
1,2,4-Trichlorobenzene	**0.199**	0.010	ug/L	0.074		268	70-130	2.80	30	**
1,1,2-Trichloroethane	**0.0536**	0.010	ug/L	0.055		98.2	70-130	2.51	30	
1,1,1-Trichloroethane	**0.0491**	0.010	ug/L	0.055		90.0	70-130	1.79	30	
Trichloroethylene (TCE)	**0.0536**	0.010	ug/L	0.054		99.7	70-130	0.907	30	
Trichlorofluoromethane (R11)	**0.0602**	0.010	ug/L	0.056		107	70-130	12.4	30	
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	**0.0734**	0.010	ug/L	0.077		95.8	70-130	0.209	30	
1,3,5-Trimethylbenzene	**0.0648**	0.010	ug/L	0.049		132	70-130	3.72	30	**
1,2,4-Trimethylbenzene	**0.0678**	0.010	ug/L	0.049		138	70-130	2.22	30	**
Vinyl acetate	**0.0380**	0.010	ug/L	0.035		108	70-130	0.830	30	
Vinyl chloride	**0.0244**	0.010	ug/L	0.026		95.5	70-130	0.938	30	
o-Xylene	**0.0504**	0.010	ug/L	0.043		116	70-130	3.64	30	
m,p-Xylenes	**0.105**	0.010	ug/L	0.087		121	70-130	0.124	30	

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client: Stantec (TO)
Project No: 185803633
Project Name: Kaiser - Vermont Ave.

AA Project No: A732182
Date Received: 05/12/16
Date Reported: 05/17/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs by GCMS EPA TO-15 - Quality Control										
*Batch B6E1311 - *** DEFAULT PREP ****										
LCS Dup (B6E1311-BSD1) Continued				Prepared: 05/13/16 Analyzed: 05/14/16						
1,2,3-Trichloropropane	**0.0531**	0.010	ug/L	0.060		88.0	70-130	0.114	30	
sec-Butylbenzene	**0.0549**	0.010	ug/L	0.055		100	70-130	3.73	30	
Isopropylbenzene	**0.0473**	0.010	ug/L	0.049		96.2	70-130	7.31	30	
n-Propylbenzene	**0.0495**	0.010	ug/L	0.049		101	70-130	3.52	30	
4-Isopropyltoluene	**0.0559**	0.010	ug/L	0.055		102	70-130	6.55	30	
Surrogate: 4-Bromofluorobenzene	*0.145*		*ug/L*	*0.14*		*101*	*70-130*			
Duplicate (B6E1311-DUP1)		**Source: 6E12012-04**		Prepared: 05/13/16 Analyzed: 05/14/16						
Acetone	**<0.010**	0.010	ug/L		<0.010				30	
Allyl chloride	**<0.010**	0.010	ug/L		<0.010				30	
tert-Amyl Methyl Ether (TAME)	**<0.010**	0.010	ug/L		<0.010				30	
Benzene	**0.0270**	0.010	ug/L		0.0281			4.29	30	
Benzyl chloride	**<0.010**	0.010	ug/L		<0.010				30	
Bromodichloromethane	**<0.010**	0.010	ug/L		<0.010				30	
Bromoform	**<0.010**	0.010	ug/L		<0.010				30	
Bromomethane	**<0.010**	0.010	ug/L		<0.010				30	
1,3-Butadiene	**<0.010**	0.010	ug/L		<0.010				30	
2-Butanone (MEK)	**0.0424**	0.010	ug/L		0.0419			1.40	30	
tert-Butyl alcohol (TBA)	**<0.010**	0.010	ug/L		<0.010				30	
Carbon Disulfide	**<0.010**	0.010	ug/L		<0.010				30	
Carbon Tetrachloride	**<0.010**	0.010	ug/L		<0.010				30	
Chlorobenzene	**<0.010**	0.010	ug/L		<0.010				30	
Chloroethane	**<0.010**	0.010	ug/L		<0.010				30	
Chloroform	**<0.010**	0.010	ug/L		<0.010				30	
Chloromethane	**<0.010**	0.010	ug/L		<0.010				30	
Cyclohexane	**0.0123**	0.010	ug/L		0.0134			8.58	30	
Dibromochloromethane	**<0.010**	0.010	ug/L		<0.010				30	
1,2-Dibromoethane (EDB)	**<0.010**	0.010	ug/L		<0.010				30	
1,2-Dichlorobenzene	**<0.010**	0.010	ug/L		<0.010				30	
1,3-Dichlorobenzene	**<0.010**	0.010	ug/L		<0.010				30	
1,4-Dichlorobenzene	**<0.010**	0.010	ug/L		<0.010				30	
Dichlorodifluoromethane (R12)	**<0.010**	0.010	ug/L		<0.010				30	

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client: Stantec (TO)
Project No: 185803633
Project Name: Kaiser - Vermont Ave.

AA Project No: A732182
Date Received: 05/12/16
Date Reported: 05/17/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs by GCMS EPA TO-15 - Quality Control										
*Batch B6E1311 - *** DEFAULT PREP ****										
Duplicate (B6E1311-DUP1) Continued	**Source: 6E12012-04**	Prepared: 05/13/16	Analyzed: 05/14/16							
1,1-Dichloroethane	**<0.010**	0.010	ug/L		<0.010				30	
1,2-Dichloroethane (EDC)	**<0.010**	0.010	ug/L		<0.010				30	
cis-1,2-Dichloroethylene	**<0.010**	0.010	ug/L		<0.010				30	
1,1-Dichloroethylene	**<0.010**	0.010	ug/L		<0.010				30	
trans-1,2-Dichloroethylene	**<0.010**	0.010	ug/L		<0.010				30	
1,2-Dichloropropane	**<0.010**	0.010	ug/L		<0.010				30	
trans-1,3-Dichloropropylene	**<0.010**	0.010	ug/L		<0.010				30	
cis-1,3-Dichloropropylene	**<0.010**	0.010	ug/L		<0.010				30	
Dichlorotetrafluoroethane	**<0.010**	0.010	ug/L		<0.010				30	
Diisopropyl ether (DIPE)	**<0.010**	0.010	ug/L		<0.010				30	
1,4-Dioxane	**<0.010**	0.010	ug/L		<0.010				30	
Ethanol	**0.0214**	0.010	ug/L		0.0200			6.64	30	
Ethyl Acetate	**<0.010**	0.010	ug/L		<0.010				30	
Ethylbenzene	**0.0175**	0.010	ug/L		0.0175			0.496	30	
Ethyl-tert-Butyl Ether (ETBE)	**<0.010**	0.010	ug/L		<0.010				30	
4-Ethyltoluene	**<0.010**	0.010	ug/L		<0.010				30	
Heptane	**0.0417**	0.010	ug/L		0.0453			8.20	30	
Hexachlorobutadiene	**<0.010**	0.010	ug/L		<0.010				30	
n-Hexane	**0.126**	0.010	ug/L		0.127			1.28	30	
2-Hexanone (MBK)	**<0.010**	0.010	ug/L		<0.010				30	
Isopropanol (IPA)	**<0.010**	0.010	ug/L		<0.010				30	
Methyl-tert-Butyl Ether (MTBE)	**<0.010**	0.010	ug/L		<0.010				30	
Methylene Chloride	**<0.010**	0.010	ug/L		<0.010				30	
4-Methyl-2-pentanone (MIBK)	**0.0165**	0.010	ug/L		0.0154			6.95	30	
Naphthalene	**<0.010**	0.010	ug/L		<0.010				30	
Propylene	**4.84**	1.0	ug/L		4.63			4.47	30	
Styrene	**<0.010**	0.010	ug/L		0.0100				30	
1,1,2,2-Tetrachloroethane	**<0.010**	0.010	ug/L		<0.010				30	
Tetrachloroethylene (PCE)	**<0.010**	0.010	ug/L		<0.010				30	
Tetrahydrofuran (THF)	**<0.010**	0.010	ug/L		<0.010				30	
Toluene	**0.0633**	0.010	ug/L		0.0658			3.85	30	

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client: Stantec (TO)
Project No: 185803633
Project Name: Kaiser - Vermont Ave.

AA Project No: A732182
Date Received: 05/12/16
Date Reported: 05/17/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs by GCMS EPA TO-15 - Quality Control										
*Batch B6E1311 - *** DEFAULT PREP ****										
Duplicate (B6E1311-DUP1) Continued	**Source: 6E12012-04**	Prepared: 05/13/16	Analyzed: 05/14/16							
1,2,4-Trichlorobenzene	**<0.010**	0.010	ug/L		<0.010				30	
1,1,2-Trichloroethane	**<0.010**	0.010	ug/L		<0.010				30	
1,1,1-Trichloroethane	**<0.010**	0.010	ug/L		<0.010				30	
Trichloroethylene (TCE)	**<0.010**	0.010	ug/L		<0.010				30	
Trichlorofluoromethane (R11)	**<0.010**	0.010	ug/L		<0.010				30	
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	**<0.010**	0.010	ug/L		<0.010				30	
1,3,5-Trimethylbenzene	**<0.010**	0.010	ug/L		<0.010				30	
1,2,4-Trimethylbenzene	**0.0147**	0.010	ug/L		0.0150			2.31	30	
2,2,4-Trimethylpentane	**<0.010**	0.010	ug/L		<0.010				30	
Vinyl acetate	**<0.010**	0.010	ug/L		<0.010				30	
Vinyl bromide	**<0.010**	0.010	ug/L		<0.010				30	
Vinyl chloride	**<0.010**	0.010	ug/L		<0.010				30	
o-Xylene	**0.0198**	0.010	ug/L		0.0194			1.77	30	
m,p-Xylenes	**0.0574**	0.010	ug/L		0.0565			1.60	30	
1,2,3-Trichloropropane	**<0.010**	0.010	ug/L		<0.010				30	
sec-Butylbenzene	**<0.010**	0.010	ug/L		<0.010				30	
Isopropylbenzene	**<0.010**	0.010	ug/L		<0.010				30	
n-Propylbenzene	**<0.010**	0.010	ug/L		<0.010				30	
4-Isopropyltoluene	**<0.010**	0.010	ug/L		<0.010				30	
n-Butylbenzene	**<0.010**	0.010	ug/L		<0.010				200	
Surrogate: 4-Bromofluorobenzene	*0.147*		*ug/L*	*0.14*		*102*	*70-130*			

Viorel Vasile
Operations Manager

LABORATORY ANALYSIS RESULTS

Client: Stantec (TO)
Project No: 185803633
Project Name: Kaiser - Vermont Ave.

AA Project No: A732182
Date Received: 05/12/16
Date Reported: 05/17/16

Special Notes

[1] = ** : Exceeds upper control limit

Viorel Vasile
Operations Manager

AMERICAN ANALYTICS CHAIN-OF-CUSTODY RECORD

9765 ETON AVE., CHATSWORTH, CA 91311
Tel: 818-998-5547 FAX: 818-998-7258

A.A. COC No.: 125112
70045739
Page 1 of 1

Client: Stantec	Project Name / No.: 185803633	Sampler's Name: Brian Goss	
Project Manager: Tom Szocinski	Site Address: N. Vermont AVE / New Hampshire	Sampler's Signature:	
Phone: 8057199324	City: LA	P.O. No.: 185803633	
Fax:	State & Zip: CA 90027	Quote No.:	

TAT Turnaround Codes **

1 = Same Day Rush
2 = 24 Hour Rush
3 = 48 Hour Rush
4 = 72 Hour Rush
5 = 5 Day Rush
X = 10 Working Days (Standard TAT)

ANALYSIS REQUESTED (Test Name)

Client I.D.	A.A. I.D.	Date	Time	Sample Matrix	No. of Cont	TO-15										Special Instructions
						Please enter the TAT Turnaround Codes ** below										
SV-1-20	4333	5/12/16	1108 to 1150	Vapor	1	4				GE12012-01						SV-1-20 has
SV-16-5	1550	5/12/16	1108 to 1120	Vapor	1	4				-02						~19" END VAC.
SV-8-5	2358	5/12/16	1228 to 131	Vapor	1	4				-03						Due to tight formation
SV-8-18	1551	5/12/16	1228 to 1248	Vapor	1	4				-04						well deadhead
																Email lab Report:
																Tom.Szocinski@stantec.com
																Brian.Goss@stantec.com

For Laboratory Use

PRIORITY

Rush 72 Hrs SH
Date 5/12/16 Time 1515 Sign

A.A. Project No.: A732182 / GE12012

Relinquished by	Date	Time	Received by
	5/12/16	1453	'16 MAY 12 14:53
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by

Note: By relinquishing samples to American Analytics, client agrees to pay for the services requested on this chain of custody form and any additional client-requested analyses performed on this project. Payment for services is due within 30 days from the date of invoice. Sample(s) will be disposed of after 45 days following the submittal of the sample(s) to American Analytics.

E-4 Geotechnical Feasibility Evaluation, Kaiser Permanente – Vermont New Hampshire MOB, 1321, 1329, and 1345 North Vermont Avenue and 1328 North New Hampshire Avenue

GEOTECHNICAL FEASIBILITY EVALUATION

KAISER PERMANENTE - VERMONT NEW HAMPSHIRE MOB
1321, 1329, AND 1345 NORTH VERMONT AVENUE AND
1328 NORTH NEW HAMPSHIRE AVENUE

LOS ANGELES, CALIFORNIA

GEOBASE, INC.

GEOTECHNICAL FEASIBILITY EVALUATION

KAISER PERMANENTE - VERMONT NEW HAMPSHIRE MOB
1321, 1329, AND 1345 NORTH VERMONT AVENUE AND
1328 NORTH NEW HAMPSHIRE AVENUE

LOS ANGELES, CALIFORNIA

Prepared for:

Kaiser Foundation Health Plan, Inc.
Los Angeles, California

By:

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I. INTRODUCTION

1.1 General

Kaiser Foundation Health Plan, Inc. is planning the acquisition of the sites located at 1321, 1329 and 1345 North Vermont Avenue, and 1328 North New Hampshire Avenue, in the City of Los Angeles, California. These aforementioned sites adjoin each other and their locations are shown on the Site Location Map, Figure A-1, Appendix A. GEOBASE, INC. (GEOBASE) was retained by Kaiser Foundation Health Plan, Inc. to complete a geotechnical feasibility evaluation of the sites.

For this geotechnical feasibility evaluation, we were provided with:

- ALTA/ACSM Land Title Survey prepared by Commercial Due Diligence Services (CDS), CDS project number 16-02-00244, dated March 01, 2016.
- Limited Subsurface Investigation report, prepared by Ami Adini & Associates, Inc. dated September 23, 1994, which referenced the following two (2) reports:
    1. Smith-Emery Company, Environmental Sampling Report; report number G-93-5242, 1993.
    2. Smith-Emery Company, Site Characterization Report, report number G-93-5977, November 29, 1993.

This report describes the preliminary site investigation and summarizes the results of both field and laboratory testing. These results are discussed with reference to the proposed development. General evaluations and preliminary recommendations pertinent to suitable site development and foundation design are provided. Construction guidelines related to the geotechnical aspects of the project are also addressed.

1.2 Objectives of the Geotechnical Feasibility Evaluation

The objectives of the geotechnical feasibility evaluation are: to obtain soil parameters in order to identify the subsoils and underlying formations at the site that may have a bearing on the proposed development; provide feasibility-level geotechnical design parameters and recommendations; and, present future course of geotechnical investigations for the site.

1.3 Scope of Services

To achieve the objectives of the geotechnical feasibility evaluation, stated above, the services provided during the course of this investigation included:

- Review of available published and unpublished geotechnical, geological, and seismological reports and maps pertinent to the site;

- Field exploration program consisting of advancing three (3) borings (these borings were logged and samples representative of the materials encountered were selected for laboratory testing);

- Field testing consisting of the Standard Penetration Test (SPT);

- Selection of appropriate laboratory tests and laboratory testing;

- Evaluation of data obtained from the above, and engineering analyses; and,

- Preparation of this report describing the field investigation, summarizing the results of field, laboratory testing and engineering analyses, and presenting conclusions and preliminary, feasibility-level recommendations.

II. SITE AND PROJECT DESCRIPTIONS

2.1 Site Description

The site layout is shown on the Site and Boring Locations Plan, Figure A-2, Appendix A. The total site area is approximately one (1) acre.

The project site consists of three (3) rectangular-shaped lots, fronting the west side of North Vermont Avenue, adjoined by one (1) lot which fronts the east side of North New Hampshire Avenue. Street frontages along North Vermont Avenue and North New Hampshire Avenue are approximately 300 and fifty (50) feet, respectively. To the north and south of the subject site, surrounding developments consist of a Travelodge Motel and commercial developments, respectively. Below North Vermont Avenue, the Metro Red Line tunnel runs in the north-south direction; the depth to the tunnel crown is approximately fifty (50) feet below the street surface and its edge is approximately twenty (20) feet from the property line.

The lots along North Vermont Avenue are occupied by a closed restaurant, asphaltic concrete paved area and a structure with associated asphaltic concrete paved parking housing medical offices. The lots are relatively flat and surface drainage appears to be by sheet-flow towards the street. The lot along North New Hampshire Avenue is occupied by a residential structure.

2.2 Project Description

Proposed development is planned to consist of demolition of the existing structures and construction of a structure housing several levels of parking and medical offices. The following scenarios are being considered:

1. An at-grade structure consisting of eleven (11) levels of parking and five (5) levels of medical offices near the top.

2. Nine (9) levels of parking and five (5) levels of medical offices near the top. Four (4) to four and one-half (4.5) of the nine (9) levels of parking would be below grade; the approximate depth of excavation would in be in order of forty-five (45) feet.

3. Nine (9) levels of parking and five (5) levels of medical offices near the top. Eight (8) to eight and one-half (8.5) of the nine (9) levels of parking would be below grade resulting in an excavation depth of approximately eighty-five (85) feet.

III. SITE INVESTIGATION

3.1 Field Program

The field investigation was carried out on March 03, 2016, and consisted of advancing three (3) borings at the site, at the approximate locations shown on the Site and Boring Locations Plan, Figure A-2, Appendix A. The borings were advanced to a maximum depth of seventy (70) feet using a truck-mounted CME-75 drill rig, fitted with hollow stem augers. The borings were located in the field utilizing a Trumeter 5505E roll-a-tape. Therefore, the boring locations should be considered accurate only to the degree implied by the methods used.

The Log of Borings, together with an Explanation of Terms and Symbols used, are given in Appendix B, Figures B-1 thru B-4, inclusive. In addition, the log of borings from previous site investigations performed by Ami Adini & Associates, Inc. (1994) and Smith-Emergy Company (1993) are included in Appendix B. The locations of these borings are also shown on Figure A-2, Appendix A, Site and Boring Locations Plan.

Field testing, at the boring locations, consisted of the Standard Penetration Test (SPT). The SPT test (ASTM D 1586) involves failure of the soil around the tip of a split spoon sampler for a condition of constant energy transmittal. The split spoon, two (2) inches outside diameter and one and three-eights (1-3/8) inches inside diameter, is driven eighteen (18) inches and the number of blows required to drive the sampler the last foot is recorded as the "N" value, or SPT blow count. The driving energy is provided by a 140-pound weight dropping thirty (30) inches.

Sampling consisted of:

- Collection of disturbed samples at selected locations retrieved from the auger;

- Collection of samples retrieved from the Standard Penetration Test (SPT) split spoon sampler; and,

- Collection of soil samples at selected locations using a Modified California Sampler. The soil samples were retained in a series of brass rings, each having an inside diameter of 2.41 inches and a height of one (1) inch. These ring samples were placed in close- fitting, moisture-tight containers for shipment to the laboratory.

3.2 Laboratory Testing

The samples obtained during the field program were returned to the laboratory for visual examination and testing. The soils were classified in accordance with ASTM D 2487 and D 2488. The laboratory testing program consisted of the following:

- Laboratory determination of water (moisture) content of soils, rock, and soil-aggregate mixtures (ASTM D 2216) and dry density (ASTM D 2937);

- Liquid limit, plastic limit and plasticity index of soils (ASTM D 4318);

- Standard test methods for amount of material in soils finer than the No. 200 sieve (ASTM D 1140);

- Direct shear test of soils (ASTM D 3080);

- Consolidation tests (ASTM D 2435);

- Expansion potential of soils (ASTM D 4829); and,

- Water soluble sulfates content of soils (CT 417), pH (CT 747), electrical resistivity (CT 643) and water soluble chlorides (CT 422).

The laboratory test results are presented on the Log of Borings, Figures B-2 thru B-4, inclusive, Appendix B, where applicable, and in Appendix C.

IV. SUBSURFACE CONDITIONS

4.1 Subsoil Conditions

Surface cover at the boring locations consists of an approximately three (3) inch thick layer of asphaltic concrete. Based on observations at the boring locations, and review of available reports, the site is underlain by up to five (5) feet of fill soils overlying native soils consisting of interlayered silty clays, and clayey silts with isolated horizons of silty sands. These native soils are in turn underlain by siltstones and shale. Depth to the siltstones and shale (bedrock) ranges from thirty-three (33) to forty-seven (47) feet below existing grade at the GEOBASE boring locations.

Based on the SPT blow counts, both the native soils, and siltstones and shale are classified as “very stiff” to “hard”. Laboratory test results indicate that the subsoils at the site possess a “low” to “high” expansion potential.

4.2 Groundwater Conditions

During drilling of boring B-3, minor seepage was observed emanating from a sand seam at a depth of thirty-seven (37) feet; however, the boring was dry at completion of drilling. Other borings drilled by GEOBASE and others at the site were also dry at completion of drilling.

Notwithstanding the preceding, it is not uncommon for groundwater or seepage conditions to develop where none previously existed. In this respect, groundwater conditions may be altered by geologic detail between borings, by seasonal and meteorological variations, and by construction activity.

Published historic highest groundwater level is approximately twenty-five (25) feet below existing grade, as shown on Figure A-3, Appendix A.

V. SEISMICITY

5.1 Site Coordinates

The site latitude and longitude are 34.0964 degrees north and 118.2922 degrees west, respectively.

5.2 Site Classification

The soil classification procedure recommended by CBC 2013, subsection 1613.3.2, which references ASCE 7-10, Chapter 20, was adhered to.

The average field Standard Penetration Resistance (SPT "N" value) for the upper 100 feet of the subsoils is between fifteen (15) and fifty (50). Therefore, to develop seismic design criteria, the subsoils within the top 100 feet at the site are judged to be Site Class D.

5.3 Seismic Design Criteria

Based on CBC 2013, subsection 1616.10.2, which references and modifies ASCE 7-10, subsection 11.4.7:

1. Site-specific, site response analysis will be required if the structure is located in site Class F soils, unless the exception to Section 20.3.1 of ASCE 7-10 is applicable.

2. Site-specific Ground-Motion Hazard Analysis (GMHA) will be required, provided that: the structure is on a site with S_1 greater than or equal to 0.6g and time-history analysis of the structure is being performed; and, the structure is seismically isolated and/or uses damping systems.

3. For buildings assigned to Seismic Design Category E or F, or when required by the building official, a GMHA shall be performed in accordance with ASCE 7, Chapter 21, as modified by Section 1803A.6 of the CBC 2013.

Based on the above criteria, since the structure is assigned to Seismic Design Category E (see subsection 5.3.1.2), a site-specific GMHA was completed. The following subsections present the seismic design parameters based on the mapped parameters and the site specific GMHA.

5.3.1 *Mapped Seismic Design Parameters*

5.3.1.1 Mapped Accelerations Response Spectra

Mapped, risk-targeted maximum considered earthquake, MCE_R, spectral response accelerations for 0.2 and 1.0 second periods are provided in maps published in the ASCE 7-10, which is the reference used in the CBC 2013. These maps are prepared by the USGS and the California portion of the map was prepared jointly with the CGS. These maps use results of seismic hazard analyses from both probabilistic and deterministic procedures, and are applicable to Site Class B and five (5) percent of critical damping. The mapped site accelerations are adjusted for site class effects using parameters Fa and Fv, which are functions of site class and mapped site spectral accelerations.

The mapped design horizontal spectral accelerations were evaluated in accordance with ASCE 7-10, using the US Seismic Design Maps Application (USGS, 2016) available at the USGS website: http://geohazards.gov/designmaps/us/application.php. This web application requires the inputs of site location (coordinates) and site soil classification.

The project site is Site Class D and coefficient values Fa and Fv of 1.0 and 1.5, respectively, are obtained for the site. Mapped MCE_R accelerations obtained for the project site are summarized in Table I, below.

TABLE I
MCE_R MAPPED ACCELERATIONS

PERIOD (SECONDS)	MAPPED ACCELERATION PARAMETERS (g)	SITE CLASS D	
		MCE_R ACCELERATIONS ADJUSTED FOR SITE CLASS EFFECTS (g)	RISK COEFFICIENTS
0.2	S_s: 2.722	2.722	C_{RS} = 0.938
1.0	S_1: 0.965	1.447	C_{R1} = 0.936

Based on Table I, the mapped spectral response accelerations, adjusted for Site Class D, S_{MS} and S_{M1} are 2.722g and 1.447g, respectively.

5.3.1.2 Seismic Design Category

The mapped spectral response acceleration parameter at one (1) second period (S_1) is 0.965g which is greater than 0.75g and the building is not considered to be Risk Category IV. Therefore, a Seismic Design Category E should be used for the design of the proposed structure per Section 1613.3.5 of CBC 2013.

5.3.1.3 Design Spectra Based on Mapped Parameters

Section 11.4.5 of ASCE 7-10 describes a procedure to obtain a design response spectra curve for use in cases where a design response spectrum is required by the ASCE 7-10 standard, and site-specific ground motion procedures are not used. This procedure is based on the use of the mapped spectral response accelerations adjusted for site class effects, in the determination of the design response spectra curve. Using this procedure, numerical values of the design spectral response accelerations based on the mapped parameters for the project site are provided in Table II, below.

TABLE II
MAPPED DESIGN RESPONSE SPECTRUM

Period (Seconds)	Mapped Design Spectral Response Acceleration (g)
0.00	0.726
0.11	1.815
0.20 (S_{DS})	1.815
0.50	1.815
1.00 (S_{D1})	0.965

TABLE II

MAPPED DESIGN RESPONSE SPECTRUM

Period (Seconds)	Mapped Design Spectral Response Acceleration (g)
2.00	0.483
3.00	0.322
4.00	0.241
5.00	0.193

5.3.2 *Site-Specific Ground Motion Procedures - Ground Motion Hazard Analysis (Site-Specific GMHA Parameters)*

5.3.2.1 General

As part of the GMHA, probabilistic and deterministic spectral response accelerations corresponding to the risk-targeted Maximum Considered Earthquake (MCE_R) are determined. The MCE_R ground motions are defined as the maximum level of earthquake ground shaking that is considered as reasonable to design normal structures against collapse.

The site-specific MCE_R spectral response acceleration at any period is taken as the lesser of the spectral response accelerations obtained using the probabilistic and deterministic methods of GMHA. The design spectral response acceleration at any period is then determined as two-thirds (2/3) of the site-specific MCE_R spectral response acceleration; however, the site specific design response spectrum should not be taken less than eighty (80) percent of the design spectral response acceleration determined from the general procedure (ASCE 7-10, Figure 11.4-1), which is based on the mapped spectral response accelerations.

The CBC 2013 (reference ASCE 7-10) procedure for the determination of the site-specific GMHA includes:

- Determination of mapped MCE_R parameters.
- Use of the Next Generation Attenuation (NGA) relationships in the calculation of the probabilistic and deterministic response spectra.
- Use of the 2008 USGS fault model in the seismic hazard evaluations.
- Use of the risk coefficient of earthquake loading in the calculation of probabilistic response spectra
- Use of the eighty-four (84) percentile values in the determination of the characteristic earthquakes corresponding to the faults in the calculation of deterministic response spectra.

- Use of the maximum rotated horizontal component in the determination of the probabilistic and deterministic response spectra.

5.3.2.2 Probabilistic MCE_R Ground Motions

The probabilistic spectral response accelerations shall be taken as the spectral response accelerations in direction of maximum horizontal response represented by a five (5) percent damped acceleration response spectrum that is expected to achieve one (1) percent probability of collapse within a fifty (50) year period. Method 1 or 2 may be used to determine the ordinates of the probabilistic ground-motion response spectrum per ASCE 7-10, Section 21.2.1; in the current analysis, Method 1 was used.

The probabilistic seismic risk analysis is based on the premise that moderate to large earthquakes occur on mappable Quaternary faults and that the occurrence rate of earthquakes on each fault is proportional to the Quaternary fault-slip-rate. This analysis assumes that earthquakes are distributed uniformly and therefore does not consider when the last earthquake occurred on the fault. The length of rupture of the fault as a function of earthquake magnitude is accounted for, and ground motion estimates at a site are made using the magnitude of the earthquake and the closest distance from the site to the rupture zone. The probabilistic risk analysis has explicitly taken into account uncertainties associated with:

- The earthquake magnitude;
- The rupture length given magnitude;
- The location of rupture zone on the fault;
- The maximum possible magnitude of earthquakes; and,
- The acceleration at the site given magnitude of earthquake and distance from the rupture zone to the site.

Probabilistic seismic hazard analyses were performed using the computer program "2008 Interactive Deaggregations" available on the USGS website. The 2008-updates of the source and attenuation models of the NSHMP (Petersen and others, 2008) are used for the determination of the response spectra in this program. The program provides seismic-hazard deaggregations for the response spectra at periods: 0.0 s; 0.1 s; 0.2 s; 0.3 s; 0.5 s; 1.0 s; 2.0 s; 3.0 s; 4.0 s; and, 5.0 s.

For each of these periods, the program provides the average of response spectra obtained from the three NGA attenuation relationships recommended to be used by the CBC 2013 to evaluate the attenuation of earthquake energy with distance from the source. These NGA attenuation relationships are proposed by Boore and Atkinson (2008), Campbell and Bozorgnia (2008) and Chiou and Youngs (2008). Method 1, as described in ASCE 7-10, Section 21.2.1.1, was used to determine the probabilistic (MCE_R) ground-motion response spectrum by multiplying risk coefficients to the USGS NSHMP NGA probabilistic results. The value of risk coefficients, C_R, was determined at 0.2 second period, C_{RS} = 0.938, and at one (1) second period, C_{R1} = 0.936, from Figures 22-17 and 22-18 of ASCE 7-10, respectively. The risk coefficients for the various periods were determined as shown in Table III:

TABLE III
SEISMIC RISK COEFFICIENTS (C_R)

Periods	C_R
$T \leq 0.2s$	C_{RS} = 0.938
$T \geq 1.0s$	C_{R1} = 0.936
0.2s<T<1.0s	Linear Interpolation

In order to convert the spectral response obtained from the program on the USGS website to their maximum horizontal component, the result obtained for each period from the aforementioned software was multiplied by the appropriate factor to convert it to that corresponding to the maximum rotated component. Table IV presents the conversion factors used for the various periods as suggested by proposal SDPRG-1R4 (2009), Table I, page 35.

TABLE IV
FACTORS USED TO CONVERT SPECTRAL ACCELERATIONS OBTAINED FROM THE NGA RELATIONSHIPS TO THOSE CORRESPONDING TO MAXIMUM ROTATED COMPONENT

Period (Seconds)	Factor
PGA	1.1
0.1	1.1
0.2	1.1
0.3	1.1
0.5	1.2
1.0	1.3
2.0	1.3
4.0+	1.4

The probabilistic spectral response accelerations corresponding to the average spectra obtained from the aforementioned three attenuation relationships, and used for the determination of the site-specific MCE_R response spectra at the project site are shown in Figure A-4, Appendix A and an estimated shear-wave velocity of 250 m/s was used in the probabilistic seismic hazard analyses.

5.3.2.3 Deterministic MCE_R Spectra

The CBC 2013 specifies the deterministic MCE_R response acceleration at each period as the eighty-fourth (84) percentile of the largest five (5) percent damped spectral response acceleration computed at that period for characteristic earthquakes on all known active faults within the region. The spectral accelerations should correspond to the maximum rotated component of ground motion; however, the ordinate of the deterministic MCE_R ground motion response spectrum should not be taken less than the corresponding ordinate of a lower limit MCE_R response spectrum curve determined as a function of the coefficients F_a and F_v, assuming that the values of S_s and S_1 are 1.5 and 0.6, respectively.

For the project site coordinates, provided in Figure A-1, Appendix A, a search was carried out using the USGS/CGS 2008 National Seismic Hazard Maps (NSHM) -Source Parameters, and faults with characteristics that produce the strongest earthquakes at the project site were selected. Based on these results, the faults that have the largest influence on the site seismicity are the Elysian Park (Upper), Santa Monica Connected Alt.2 and Hollywood faults. These faults and their corresponding parameters are provided in Table V.

TABLE V

FAULT PARAMETERS USED FOR THE DETERMINISTIC ANALYSIS

Fault Name	Distance from Site (Km)	Hanks Magnitude (M)	Fault Type	Preferred Dip (Degree)	Rupture Top (Km)
Elysian Park (Upper)	1.03	6.5	Reverse	50	3.0
Santa Monica Connected Alt.2	1.06	7.3	SS	44	0.8
Hollywood	1.84	6.5	SS	70	0.0

Peak ground accelerations and response spectra corresponding to the characteristic earthquake for each of the aforementioned faults were determined using the average of the three (3) attenuation relationships discussed in subsection 5.3.2.2 and recom mended by the CBC 2013. The Microsoft Excel spreadsheet prepared by L. Atiq and available at the website: http://peer.berkeley.edu/products/rep_nga_models.htm was used to obtain the response spectra corresponding to the characteristic earthquakes. Using this spreadsheet, the eighty-four (84) percentile (sigma plus one standard deviation) values of the spectral responses were selected. Since the CBC 2013 requires use of the maximum rotated horizontal component to be used in the analysis, the result obtained for each period from the aforementioned software was multiplied by the appropriate factor to convert it to that corresponding to the maximum rotated component. Table IV, subsection 5.3.2.2, presents the conversion factors used for the various periods as suggested by proposal SDPRG-1R4 (2009), Table I, page 35. As noted previously, a shear wave velocity of 250 m/s was used in the determination of characteristic earthquakes for each of the faults.

Figure A-5, Appendix A, shows spectral response accelerations of the characteristic earthquakes, which correspond to the specified MCE_R accelerations. This figure also shows the specified lower limits of the MCE_R spectral accelerations, obtained as described in the ASCE 7-10 standard.

By comparing the ordinates of the specified MCE_R spectral response accelerations from the faults governing maximum ground motions at the site with the corresponding ordinates from the specified lower limits of the acceleration response spectra curve, the response spectra from the deterministic method were obtained and are also shown in Figure A-5, Appendix A.

5.3.2.4 Site-Specific MCE_R Spectra

The site-specific MCE_R spectral response acceleration at any period, S_{AM}, is taken as the lesser of the spectral response accelerations obtained from the probabilistic and deterministic methods. The MCE_R probabilistic and deterministic spectra obtained as described in subsections 5.3.2.2 and 5.3.2.3, respectively, are presented in Figure A-6, Appendix A. The site-specific MCE_R spectra defined as the lesser of the probabilistic and deterministic spectra is also shown in Figure A-6, Appendix A.

5.3.2.5 Site-Specific Design Spectra

The ASCE 7-10 specifies the design spectral response acceleration at any period as two-thirds (2/3) of the site specific MCE_R spectral response acceleration; however, the design spectral response acceleration at any period should not be taken less than eighty (80) percent of the design spectral response acceleration determined using the mapped parameters for the site (see subsection 5.3.1).

The site-specific design response spectrum based on two-thirds (2/3) of site-specific MCE_R spectral response accelerations, together with the response spectra curve obtained as eighty (80) percent of the spectra based on mapped parameters for the project site are shown in Figure A-7, Appendix A. The site-specific design response spectra curve for the project site is also shown in Figure A-7, Appendix A, as the greater of the two spectra curves. Numerical values of the site-specific design spectral response accelerations for the project site are provided in Table VI.

TABLE VI
SITE-SPECIFIC DESIGN RESPONSE SPECTRA

Period (Seconds)	Site-specific Design Spectral Response Acceleration (g)
0.00	0.581
0.01	0.663
0.02	0.744
0.03	0.826

TABLE VI
SITE-SPECIFIC DESIGN RESPONSE SPECTRA

Period (Seconds)	Site-specific Design Spectral Response Acceleration (g)
0.05	0.990
0.075	1.195
0.106	1.452
0.20	1.452
0.30	1.452
0.50	1.452
0.75	1.247
1.00	1.093
1.50	0.838
2.00	0.582
3.00	0.376
4.00	0.260
5.00	0.210

5.3.2.6 Design Acceleration Parameters

The CBC 2013/ASCE 7-10 specifies the design response spectrum at short period, S_{DS} as the design spectrum at the period of 0.2 second; however, this value should not be less than ninety (90) percent of the design spectra obtained at any period larger than 0.2 second. Also, the CBC 2013/ASCE 7-10 specifies S_{D1} as the greater of the design response spectrum at one (1) second or twice the spectrum at two seconds. The parameters S_{MS} and S_{M1} can be taken as 1.5 times S_{DS} and S_{D1}, respectively. These values shall not be less than eighty (80) percent of values determined in mapped parameters, subsection 5.3.1.

Based on the above, and the values of site-specific design response spectra provided in Table VI, the design acceleration parameters are obtained as follows:

- S_{DS} = 1.452g
- S_{D1} = 1.163g

5.3.2.7 Maximum Considered Earthquake Geometric Mean (MCE_G) Peak Ground Accelerations

From Figure 22-7 of ASCE 7-10, PGA = 1.051g is multiplied by the site coefficient F_{PGA} = 1.0 (Table 11.8-1) to obtain the mapped MCE Geometric Mean Peak Ground Acceleration (PGA_M). For Site Class D, $PGA_M = F_{PGA}$ x PGA. Therefore, PGA_M = 1.051g may be used for evaluation of liquefaction, lateral spreading, seismic settlement and soil-related issues.

5.4 Earthquake Effects

5.4.1 *Liquefaction*

Liquefaction occurs when the pore pressures generated within a soil mass equals the overburden pressure. This results in a loss of strength and the soil then possesses a certain degree of mobility.

Factors considered to evaluate liquefaction potential include groundwater conditions, soil type, particle size distribution, earthquake magnitude and acceleration, and soil density obtained through the Standard Penetration Test (SPT). Soils subject to liquefaction comprise saturated fine grained sands to coarse silts. Coarser-grained soils are considered free-draining and therefore dissipate excess pore pressures, while fine-grained soils posses undrained shear strength.

The Seismic Hazards Zones Map indicates that the project site is not located in an area subject to liquefaction, Figure A-8, Appendix A. Furthermore, the subsoils consist primarily of “very stiff” to “hard” cohesive, native soils underlain by siltstones and shale; therefore, the subsoils at the site possess a very low potential for liquefaction.

5.4.2 *Seismically Induced Settlements*

The proposed structures will be underlain primarily by siltstones and shale. If the at-grade scenario is selected for the proposed development, pile foundations will be used to support the building. Therefore, seismic settlements are anticipated to be negligible.

5.4.3 *Tsunamis, Inundation, Seiche and Flooding*

A tsunami is a sea wave generated by a submarine earthquake, landslide, or volcanic event. The site is not located within a coastal area. Therefore, a tsunami hazard at the site is considered very low.

A seiche is an earthquake-induced wave in a confined body of water, such as a lake, reservoir, or bay. Resulting oscillations could cause waves up to tens of feet high, which in turn could cause extensive damage along the shoreline. The most serious consequence of a seiche would be the overtopping and failure of a dam. The site is not located downstream of any large bodies of water that could adversely affect the property in the event of earthquake failures or seiches.

According to the Federal Emergency Management Agency (FEMA), map number 06037C1610F, September 26, 2008, Flood Insurance Rate Map, Los Angeles County and incorporated areas, California, the proposed project site is located in Zone X, areas determined to be outside of the 0.2% annual chance floodplain (Figure A-9, Appendix A).

5.4.4 *Surface Rupture*

Ground surface displacement along a fault, although more limited in area than the ground shaking associated with it, can have disastrous consequences when structures are located straddling a fault or near a fault zone. Fault displacement involves forces so great that in most cases it is not practically feasible (structurally or economically) to design and build structures to accommodate rapid displacement and remain intact. Amounts of movement during a single earthquake can range from several inches to tens of feet. Another aspect of fault displacement comes not from the violent movement associated with earthquakes, but the barely perceptible movement along a fault called "fault creep". Damage by fault creep is usually expressed by the rupture or bending of buildings, fences, railroad tracks, streets, pipelines, curbs, and other linear features.

No faulting was observed during our field reconnaissance. In addition, active, potentially active, and other major inactive faults noted on fault maps do not cross nor project toward the site. Furthermore, the site is not located within any Alquist-Priolo Earthquake Fault zone (APEQFZ) Map as designated by the California Geological Survey (CGS) or within the City of Los Angeles fault hazard map [City of Los Angeles, 1996; (Figure A-10, Appendix A)]. The closest active (APEQFZ) fault to the site is the Hollywood Fault located approximately 1.84 km to the north. Therefore, the possibility of any hazard due to ground surface rupture or fault offset at the property is considered low; however, cracking due to shaking from distant events is not considered a significant hazard, although it is a possibility at any site.

5.4.5 *Seismically Induced Landsliding*

The site area is relatively flat and the site is not located within a designated area where previous occurrence of landslide movement, or local topographic, geological, geotechnical and subsurface water conditions indicate a potential for permanent ground displacement such that mitigation would be required (CDMG, 1999; City of Los Angeles, 1996).

5.4.6 *Lateral Spreading*

Seismically induced lateral spreading involves primarily movement of earth materials due to ground shaking. Lateral spreading is demonstrated by near-vertical cracks with predominantly horizontal movement of the soil mass involved. The potential for liquefaction at the site is considered very low. Therefore, the potential for lateral spreading at the subject site is considered very low.

5.4.7 *Subsidence*

Subsidence refers to the sudden sinking or gradual downward settling and compaction of soil and other surface material with little or no horizontal motion. It may be caused by a variety of human and natural activities, including earthquakes. Since the property is underlain by “very stiff” to “hard” native soils, in turn underlain by siltstones and shale, it is our opinion that the potential hazard associated with subsidence at the property is very low.

VI. CONCLUSIONS

It is our opinion that the site is geotechnically suitable for the proposed development scenarios described in subsection 2.2. The following presents conclusions which may influence design and construction decisions:

- Depending on the development scenario selected for the site, footings or cast-in-place piles may be appropriate. For the at-grade structure proposed, cast-in-place piles are recommended, and, for structures extending below existing grade, footings are considered appropriate.

- Based on observations at the boring locations, and review of available reports, the site is underlain by up to five (5) feet of fill soils overlying native soils consisting of interlayered silty clays, and clayey silts with isolated horizons of silty sands. These native soils are in turn underlain by siltstones and shale. Depth to bedrock, at the boring locations drilled by GEOBASE, ranges from approximately thirty-three (33) to forty-seven (47) feet below existing grade.

- Groundwater was not encountered at the site to the depth of exploration and is judged to be in excess of fifty (50) feet at this time. Published historic highest groundwater level is twenty-five (25) feet below existing grade.

- The project site is Site Class D since the average SPT “N” value for the upper one hundred (100) feet is between fifteen (15) and fifty (50).

- The project site is not mapped in an area susceptible to subsidence, landslides, liquefaction, or current City of Los Angeles or State of California APEQFZ.

- On site soils were possess a “low” to “high” expansion potential (Expansion Index between 27 and 107). Per CBC 2013, foundations and slab-on-grade resting on soils with an expansion index greater than twenty (20) requires special design considerations.

- On site soils, have “low” sulfate concentration and are “moderately” corrosive to metals.

- The flood insurance rate map (FIRM) prepared by the Federal Emergency Management Agency (FEMA), map number 06037C1610F, effective date September 26, 2008 shows the site to be in Zone X. Zone X is an area determined to be outside of 0.2 percent annual chance of floodplain.

VII. SITE DEVELOPMENT RECOMMENDATIONS

7.1 General

The proposed development scenarios described in subsection 2.2, are feasible from a geotechnical engineering standpoint. Project plans and specifications should take into account the appropriate geotechnical features of the site and conform to the geotechnical recommendations.

7.2 Clearing

All surface vegetation, asphaltic concrete, trash, debris, underground pipes, and concrete pieces after demolishing of the existing structures should be cleared and removed from the proposed site. Topsoil is not considered suitable for reuse as structural fill, but may be stockpiled for future use.

Underground facilities such as utilities, pipes or underground storage tanks may exist at the site. Removal of underground tanks is subject to state law as regulated by County or City Health and/or Fire Department agencies. If storage tanks containing hazardous or unknown substances are encountered, the proper authorities must be notified prior to any attempts at removing such objects.

Septic tanks should be removed in their entirety. Cesspools or seepage pits should be pumped of their contents and backfilled with a two-sack sand-cement slurry.

Any water wells, if encountered during construction, should be exposed and capped in accordance with the requirements of the regulating agencies.

Depressions resulting from the removal of buried obstructions, existing building foundations, tunnels and pipes should be backfilled with properly compacted material.

7.3 Subgrade Preparation

7.3.1 *At-Grade Scenario – Building Pad*

Observations at the boring locations indicate that up to five (5) feet of fill soils are anticipated.

These fills are undocumented and are not considered suitable for the support of structures, and should be removed and replaced as properly compacted fills.

7.3.2 *Below Grade Scenarios (2 and 3) – Building Pad*

For the below grade Scenario, excavation depths are anticipated in the order of forty-five (45) and eighty-five (85) feet below existing grade.

The building pad should be excavated to the subgrade and/or foundation level. The exposed excavation bottom is anticipated to consist of siltstones and shale.

7.3.3 *Minor Structures, Walkways, Flatwork and Pavement Areas*

In order to minimize the potential for excessive settlement of minor structures which are structurally separated from the building structure, the footing subgrade areas should be overexcavated to provide a uniform compacted fill blanket a minimum three (3) feet in thickness below adjacent grade, or at least two (2) feet below footing bottoms, whichever is greater. The lateral extent of removal beyond the footing limits should be equal to at least the depth of overexcavation. The fill should be compacted to a minimum of ninety (90) percent relative compaction (ASTM D 1557).

The subsoils within the concrete walkways, flatwork and parking areas, and within two (2) feet of their proposed limits, should be over excavated at least two (2) feet and replaced as properly compacted fills.

The above subgrade preparation recommendations may only be considered if future maintenance as a result of settlement of the underlying undocumented fills can be tolerated. Alternatively, all undocumented fills should be removed and replaced as properly compacted fills.

7.4 <u>Fill Placement</u>

7.4.1 *Preparation of Bottom of Excavations*

Prior to placing any fill, the exposed soils at the bottom of excavations should be scarified to a minimum depth of six (6) to eight (8) inches, moisture conditioned (wetted or dried) to at least optimum moisture content and compacted to a minimum of ninety (90) percent relative compaction, based on ASTM D1557.

7.4.2 *Compaction*

Cohesive soils should be placed in loose lifts not exceeding six (6) inches, moisture-conditioned to approximately two (2) to four (4) percentage points above optimum, and compacted to the minimum relative compaction listed in Table VII.

TABLE VII
COMPACTION REQUIREMENTS

Type of Fill/Area	Relative Compaction (ASTM D1557) Minimum Percent
Fills beneath building pad	95
All other structural fill	90

Granular fill materials should be placed in loose lifts of six (6) to eight (8) inches, moisture-conditioned to near optimum, and compacted to the minimum relative compaction listed in Table VII.

7.4.3 *Fill Material*

The on-site soils/bedrock may be reused as compacted fill; however, only “low” expansive soils should be used for wall backfill. Any soils imported to the site for use as fill for subgrade materials should be predominantly granular and “low” expansive (Expansion Index less than thirty [30]) and should contain sufficient fines (approximately twenty [20] percent passing the No. 200 sieve) so as to be relatively impermeable when compacted. The imported soils should be approved by GEOBASE prior to importing.

7.5 Drainage

To enhance future site performance, it is recommended that all pad drainage be collected and directed away from proposed structures and slopes to disposal areas off site. For soil areas, we recommend that a minimum of five (5) percent gradient away from foundation elements be maintained. It is important that drainage be directed away from foundations and that proper drainage patterns be established at the time of construction and maintained through the life of the structures. Roof gutter discharge should be directed away from the building to suitable discharge points.

All excavation slopes should be properly drained and maintained to help control erosion. Care should be exercised in controlling surface runoff onto the temporary slopes. The area back of the slope crest should be graded such that water will not be allowed to flow freely onto the slope face. If excavations of temporary slopes are carried out in the rainy season, appropriate erosion protection measures may be required to minimize erosion of the slope cuts.

7.6 Temporary Excavations

The following subsections address unsupported excavations and shored excavations.

7.6.1 *Unsupported Excavations*

Temporary excavations to depths of approximately four (4) feet below grade may be cut vertically without shoring. Temporary unsurcharged excavations up to fifteen (15) feet high in level ground surface may be sloped back at 1H:1V (Horizontal:Vertical) or flatter without shoring where the necessary space is available. No surcharge loads should be permitted within a horizontal distance equal to the height of cut from toe of excavation unless the cut is properly shored. Adjacent to existing buildings, the bottom of unshored excavations should not extend below a plane drawn at 1H:1V (Horizontal:Vertical) downward from the foundations of the existing buildings and underground pipelines unless the cut is properly shored. Where space is not available, the recommendations for design of temporary shoring presented in subsection 7.6.2 should be used.

The exposed slope face should be kept moist (but not saturated) during construction to reduce local sloughing.

All excavations and shoring systems should meet, as a minimum, the requirements given in the State of California Occupational Safety and Health Standards. Stability of temporary slopes is the responsibility of the contractor.

7.6.2 *Shored Excavations*

In areas where stability or space considerations do not permit sloped excavations, temporary shoring may be used to support vertically cut excavations. In the following paragraphs, recommendations are provided to ***evaluate the feasibility*** of both cantilevered and braced/tied back shoring.

7.6.2.1 General

All shoring systems should meet the minimal requirements given in the State of California Occupational Safety and Health Standards.

A cantilevered shoring system, may be used only in areas where lateral movement of soils behind the wall and associated wall movement (at least 0.01 radian deflection) can be tolerated. A braced or tieback shoring system or at-rest earth pressures should be used in areas where the performance of adjacent structures are affected by wall movements.

7.6.2.2 Lateral Earth Pressures

For the design of cantilevered shoring, where lateral movement of soils behind the wall can be tolerated, a triangular distribution of lateral earth pressures may be used as shown in Figure A-11, Appendix A. It may be assumed that the retained soils with a level surface behind the cantilevered shoring will exert a lateral pressure equal to that developed by a fluid with a density of thirty-five (35) pounds per cubic foot . Where movements cannot be tolerated, a lateral pressure equal to that developed by a fluid with a density of sixty (60) pounds per cubic foot (at-rest earth pressures) may be used.

For the design of tieback or braced shoring, a rectangular distribution of earth pressures as shown in Figure A-11, Appendix A, is recommended for retained soils with a level surface. In this figure, the maximum pressure is equal to 25H in pounds per square foot, where H is the height of the shoring in feet. Where tieback or braced shoring is used to retain bedrock with unfavorable bedding (south wall below forty [40] feet below existing grade, based on regional data), a rectangular distribution equal to 35H is recommended to be used for design.

When shoring is used to support surcharge loads, the diagram given in Figure A-12 may be used to determine lateral pressures.

7.6.2.3 Design of Soldier Piles

Lateral resistance for soldier piles may be assumed to be provided by passive pressures below the bottom of excavation. Allowable passive pressures equivalent to a fluid pressure of 900 pounds per cubic foot may be used for soldier piles. Where unfavorable bedding for passive loads exist in the bedrock adjacent to the soldier piles, an allowable passive pressures equivalent to a fluid pressure of 350 pounds per cubic foot may be used. Unfavorable bedding for passive loads may be encountered at the north wall, below forty (40) feet below existing grade, based on regional data. The aforementioned allowable passive pressures are for soldier piles spaced not less than two (2) diameters center-to-center and includes the doubling effect for isolated piles.

Adequate bearing capacity should be provided for anchored soldier piles. The design vertical load will be a function of the anchor loads and their inclination. These piles may be designed for vertical loads using an allowable unit skin friction of 1000 pounds per square foot.

7.6.2.4 Anchor Design

Tieback friction anchors may be used to resist lateral loads. For estimating purposes, it may be estimated that anchors will develop an average allowable friction value of 400 psf based on anticipated location of where anchors will be used. Only the frictional resistance developed beyond the active wedge would be effective in resisting lateral loads.

A bond length sufficient to support the anticipated earth and surcharge loads should be installed behind a line rising at fifty-five (55) degrees from the horizontal starting at the base of the pile, as shown on Figure A-11, Appendix A.

7.7 Excavatability

Based on our experience with projects developed on similar type of natural materials and on the excavation of exploratory test borings, the siltstones and shale are expected to be rippable with conventional heavy-duty grading and/or excavation equipment in open excavations to the anticipated construction depths. Concretions, if encountered, could require special excavation equipment and very heavy effort.

VIII. FOUNDATION RECOMMENDATIONS

8.1 General

The following preliminary, feasibility-level recommendations have been formulated from visual, physical and analytical considerations of existing site conditions and are believed to be applicable for the proposed development.

8.2 Foundation Alternatives

The results of the geotechnical feasibility evaluation indicate that the at-grade scenario consisting of eleven (11) levels of parking and five (5) levels of medical offices will likely be founded on piles. The two (2) other scenarios involve excavations ranging from forty-five (45) to eighty-five (85) feet below existing grade; structures for these two (2) scenarios will likely be founded on footings embedded in bedrock.

8.2.1 *Drilled Cast-In-Place Concrete Piles*

Drilled, cast-in-place friction piles shall extend a minimum of fifty (50) feet below existing grade and be embedded a minimum of five (5) feet into competent bedrock depending on the magnitude of the column loads.

Based on available data and for a two (2) foot diameter pile: in computing axial capacity, an allowable side friction of 1000 pounds per square foot (psf) may be assumed; uplift capacity may be computed using an allowable side friction of 500 psf; and, lateral capacity is estimated in the order of forty (40) kips. With respect to lateral capacity, it should be noted that it is dependent on pile length, pile head fixity and pile configuration in addition to pile diameter and pile type. Further, lateral resistance may also be developed by passive resistance of the soils against pile caps.

The parameters presented above are for single piles spaced a minimum of three (3) diameters on center and may be increased on one-third (1/3) for short-term wind and seismic loads.

8.2.2 *Footings*

Spread footings embedded at least two (2) feet into competent bedrock may be used. Based on limited available data, allowable bearing pressures of 7000 psf and 12000 psf are estimated for the forty-five (45) and eighty-five (85) foot excavation scenarios, respectively. The aforementioned bearing pressures may be increased by one-third (1/3) for short-term wind or seismic loads.

Allowable lateral bearing pressures equivalent to a fluid pressure of 450 pounds per cubic foot may be used. An allowable friction coefficient of 0.4 is recommended, and lateral resistance and frictional resistance may be combined in determining total lateral resistance.

8.3 Footings for Minor Structures

Spread or continuous footings may be used for the support of minor structures (minor retaining walls, and free-standing walls) that are structurally separated from the proposed structure. These spread and/or continuous footings may be designed for an allowable dead-plus-live load bearing pressure of 1,500 psf. These bearing pressures may be increased by one-third (1/3) for short-term wind or seismic loads. The maximum edge pressures induced by eccentric loading or overturning moments should not be allowed to exceed the above-mentioned allowable bearing values.

Lateral loads against structures may be resisted by friction between the bottom of foundations and the supporting soils. For frictional resistance, a cohesion of 130 pound per square foot is recommended. An allowable lateral bearing pressure equal to an equivalent fluid weight of 150 pounds per cubic foot acting against the foundations may be used, provided the foundations are poured tight against compacted soils. The frictional resistance and lateral resistance of the soils can be combined without reduction in determining the total lateral resistance.

8.4 Basement Walls

8.4.1 *Earth Pressures*

Basement walls should be designed to resist lateral pressures imposed by the surrounding soils and surcharge loads. For static loading conditions, walls that are structurally restrained against movement at the top should be designed to resist a lateral pressure equivalent to that imposed by a fluid weighing sixty (60) pounds per cubic foot. In addition, a uniform pressure equal to one-half (½) of any vertical pressure adjacent to the basement wall should be assumed to act on the restrained walls. These aforementioned pressures assume that positive drainage will be provided as recommended in subsection 8.4.2.

For seismic loading conditions, the dynamic loading increment of active earth pressures against basement walls should be taken as thirty-one (31) psf per foot of height distributed in an inverted triangular distribution.

8.4.2 *Wall Backfill*

The wall backfill should be well drained to relieve possible hydrostatic pressures on the wall. A pre-fabricated drainage system such as Miradrain, Eakadrain or equivalent, installed in accordance with the manufacturer’s recommendations, may be used. Alternatively, the wall should be designed to withstand hydrostatic pressures.

The basement walls below existing grade should be waterproofed to prevent moisture build-up on the interior sides of the walls as a result of water migration from the soils in contact with the walls. The water proofing should be applied for the full height of the basement walls and walls below existing grade, and meet as a minimum the requirements of the CBC 2013.

8.5 Ultimate Values

The recommended design values presented in this report are for use with loadings determined by a conventional working stress design. When considering an ultimate design approach, the recommended design values may be multiplied by the factors given in Table VIII:

TABLE VIII

LOAD FACTORS FOR ULTIMATE DESIGN

Foundation Loading	Ultimate Design Loading
Axial Capacity of Piles (without increase)	2
Bearing Value (without increase)	3
Passive Pressures	1.33
Coefficient of Friction	1.25

In no event, however, should the foundation sizes be reduced from those required for the support of dead-plus-live loads when using working stress values.

8.6 Floor Slabs

In moisture-sensitive areas, the slab should be dampproofed per CBC 2013, subsection 1805.2.

Slab-on-grade floors should be designed by the Structural Engineer using applicable CBC requirements and designed for the intended use and loading. As a minimum, slabs should be reinforced with # 4 bars at twelve (12) inch spacing, located at mid-height of the slab. Actual slab reinforcement and thickness should be determined by the project Structural Engineer based on applicable method used as discussed below. Thickness of floor slabs should be at least five (5) inches actual and determined by the project Structural Engineer for the project loading and service conditions. Section 1808.6.2 of the 2013 California Building Code(CBC) specifies that foundations resting on soils with an expansion index greater than twenty (20) require special design considerations. Based on the limited available data, slab-on-grade estimates may be completed based on the procedures of WRI/CRSI Design of Slab on Ground Foundations using an effective plasticity index of thirty-three (33).

IX. SOIL CORROSIVITY -- IMPLICATIONS

Electrical conductivity, pH, chloride and water soluble sulfate tests were conducted on representative samples, and the results are provided in Appendix C. The tests results indicate that the subsoils at the site have a "low" corrosive potential with respect to concrete and "moderate" corrosive potential with respect to steel and other metals. Therefore, Type II Portland cement should be used for the construction of concrete structures in contact with the subgrade soils.

X. RECOMMENDATIONS FOR FURTHER ADDITIONAL WORK

The analyses and preliminary design recommendations provided in this report are based on the currently available limited subsoils data and feasibility-level information for the proposed development. Therefore, these recommendations need to be verified based on site-specific field investigations, laboratory testing and analyses.

Site-specific field investigations are anticipated to include additional borings and determination of shear wave velocities. For scenario 3 (eighty-five [85] foot deep excavation), determination of bedrock discontinuities should be completed.

To select an appropriate laboratory testing program, complete the analyses, and formulate design recommendations to be used for final design and construction, the following information is needed:

- maximum column loads.

- preliminary length and location of tieback anchors used for excavation support, including anchor loads and bonded lengths (scenarios 2 and 3).

- allowable lateral deflection of MTA tunnel (scenario 3).

- allowable settlement of MTA tunnel (scenario 3).

- allowable track settlement (scenario 3).

XI. LIMITATIONS

The geotechnical feasibility evaluation presented herein was performed in accordance with generally accepted geotechnical engineering principles and practice. No warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

This report is intended for use by the Client and their representatives with regard to the specific project discussed herein. This report does not relate any conclusions or recommendations about the potential for hazardous and/or contaminated materials existing at the site. The conclusions and recommendations contained in this report are based on the data relating only to the project and location discussed herein, and are intended for preliminary, feasibility-level design and planning but not for final design or construction purposes.

Respectfully submitted
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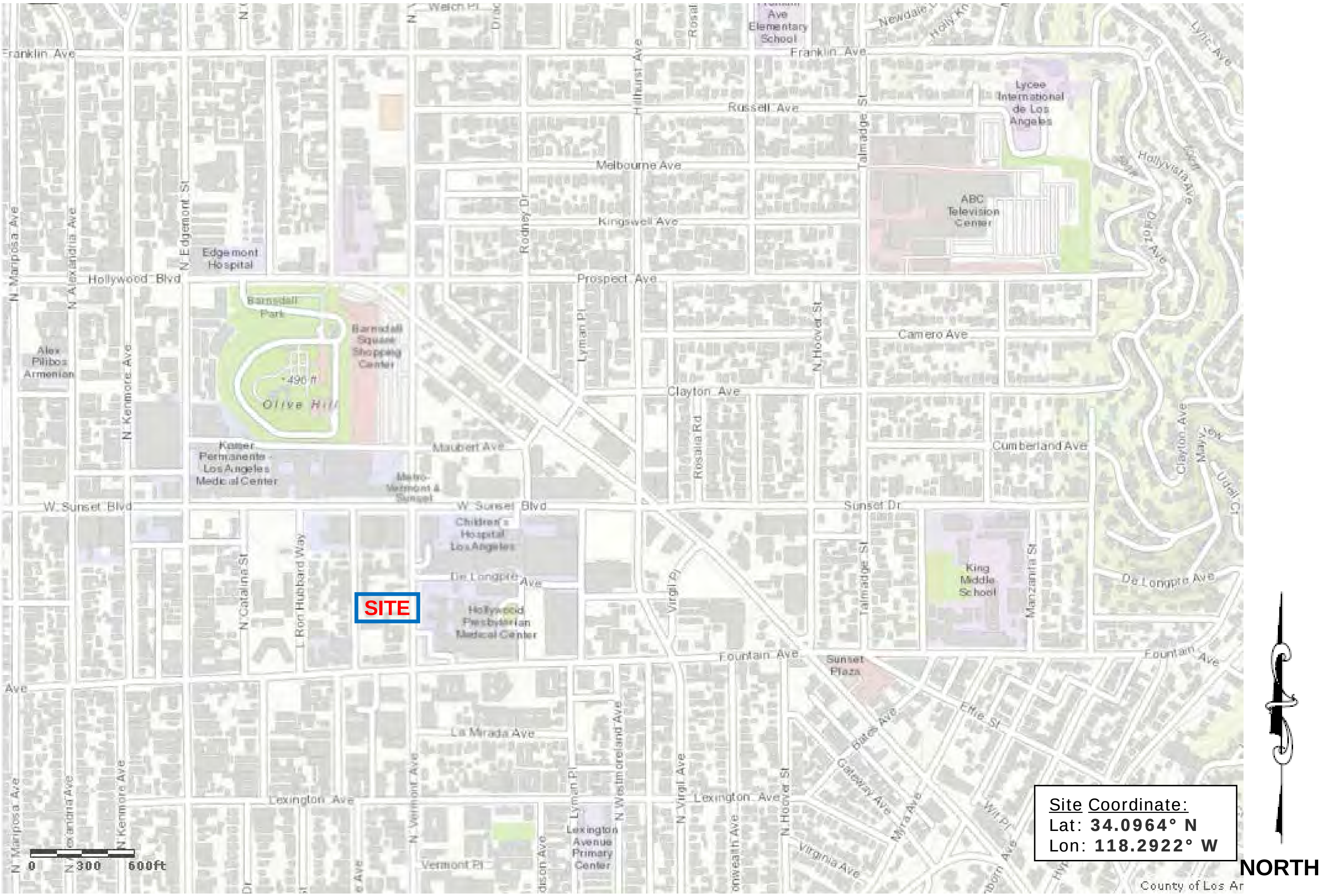
APPENDIX A



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SITE LOCATION MAP

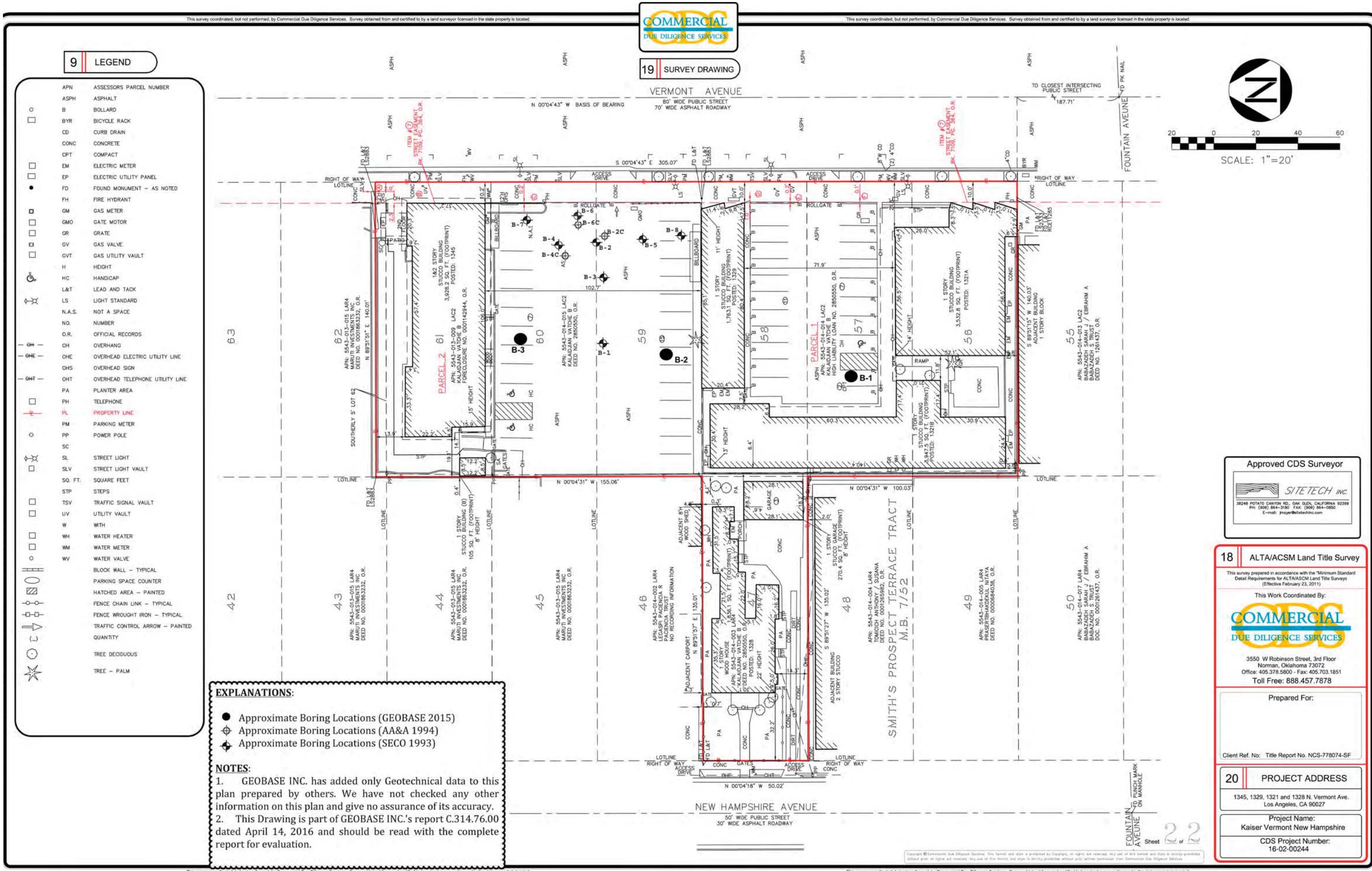
Kaiser Permanente – Vermont New Hampshire MOB

Vermont Ave and New Hampshire Ave

Los Angeles, California

C.314.76.00

FIGURE A-1



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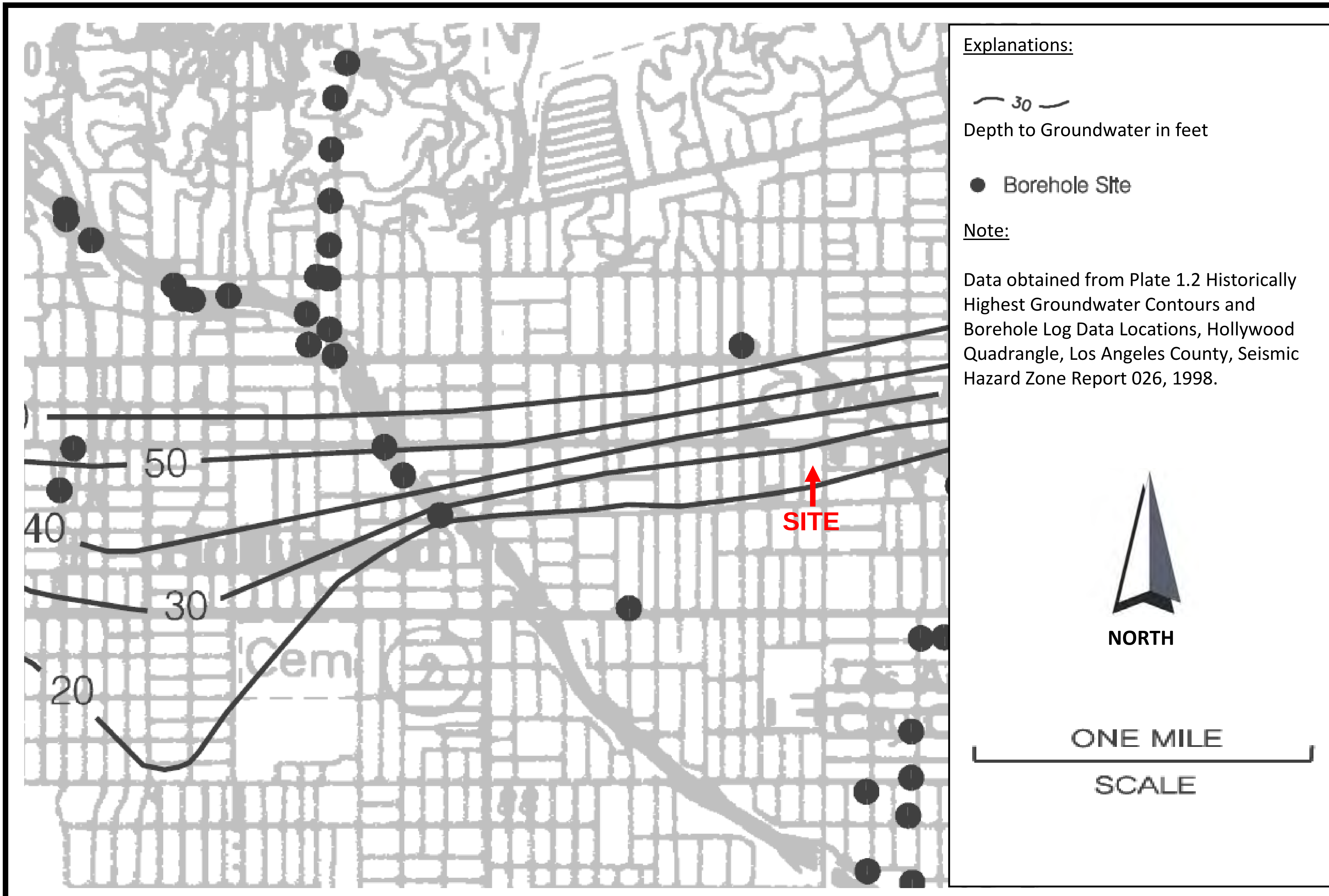
GEOBASE INC.

SITE AND BORING LOCATIONS PLAN

FIGURE A-2



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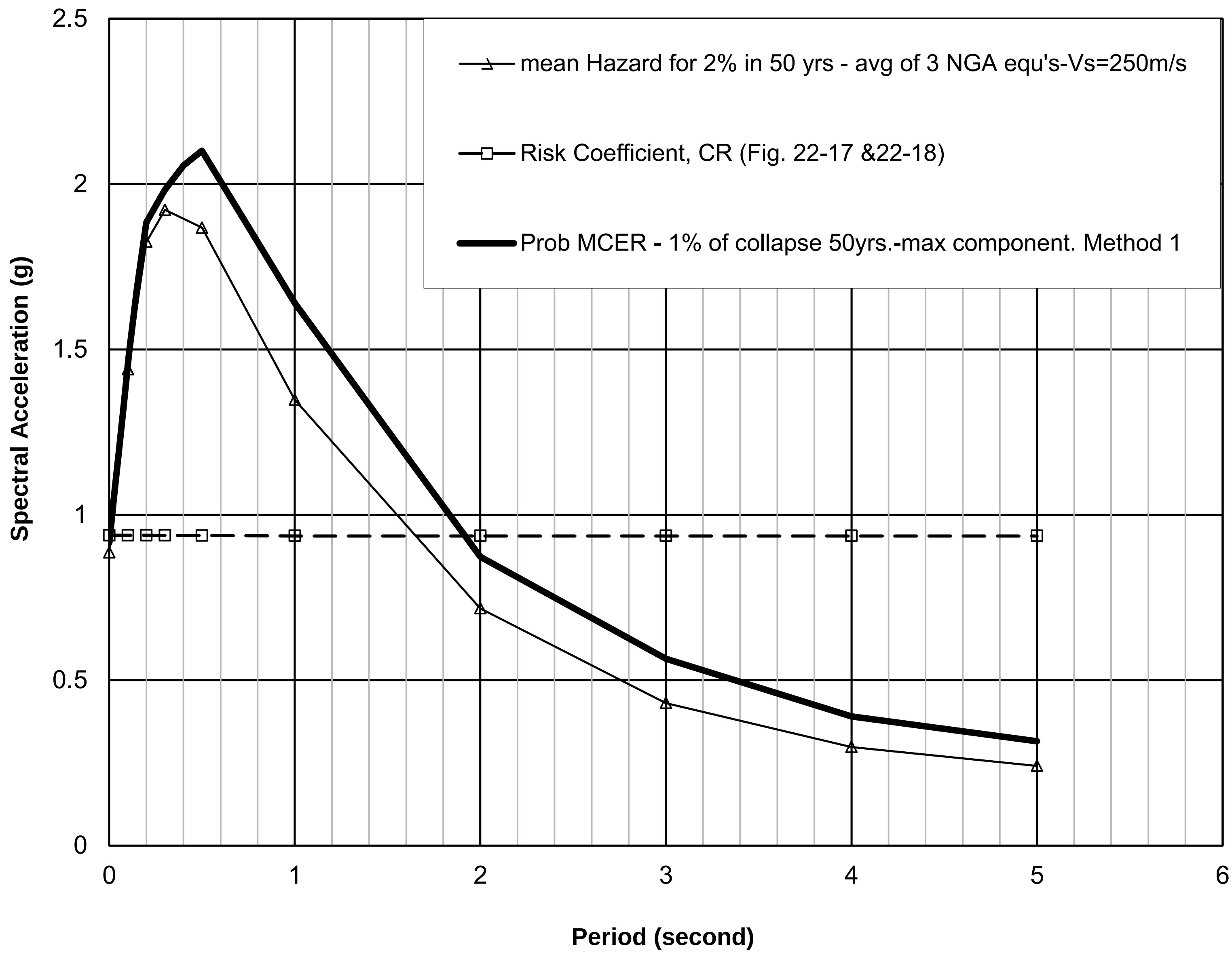
HISTORIC HIGHEST GROUNDWATER LEVELS
Kaiser Permanente – Vermont New Hampshire MOB
Vermont Ave and New Hampshire Ave
Los Angeles, California

C.314.76.00

FIGURE A-3



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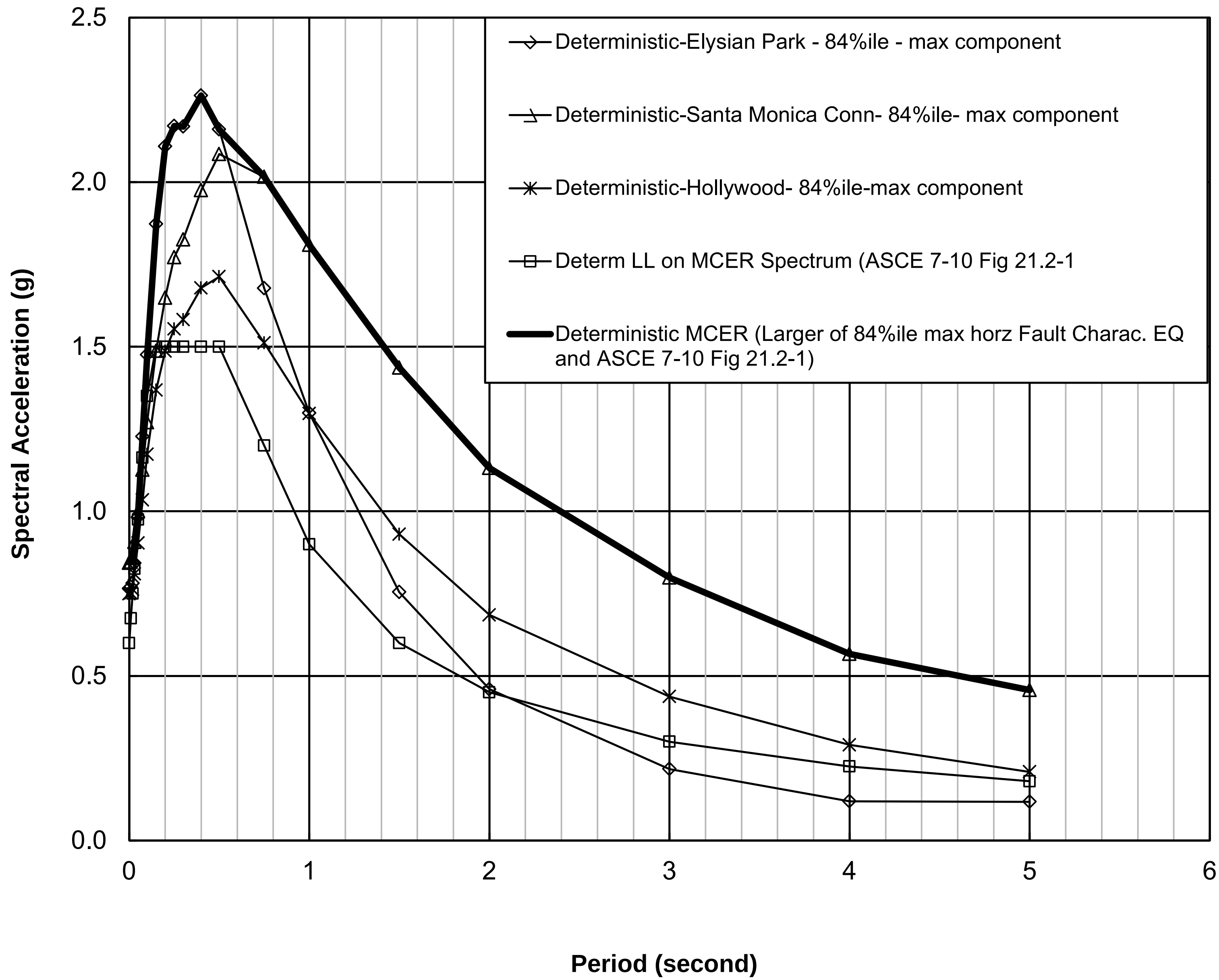
PROBABILISTIC MCER RESPONSE SPECTRA
Kaiser Permanente – Vermont New Hampshire MOB
Vermont Ave and New Hampshire Ave
Los Angeles, California

C.314.76.00

FIGURE A-4



GEOBASE

DETERMINISTIC MCER RESPONSE SPECTRA

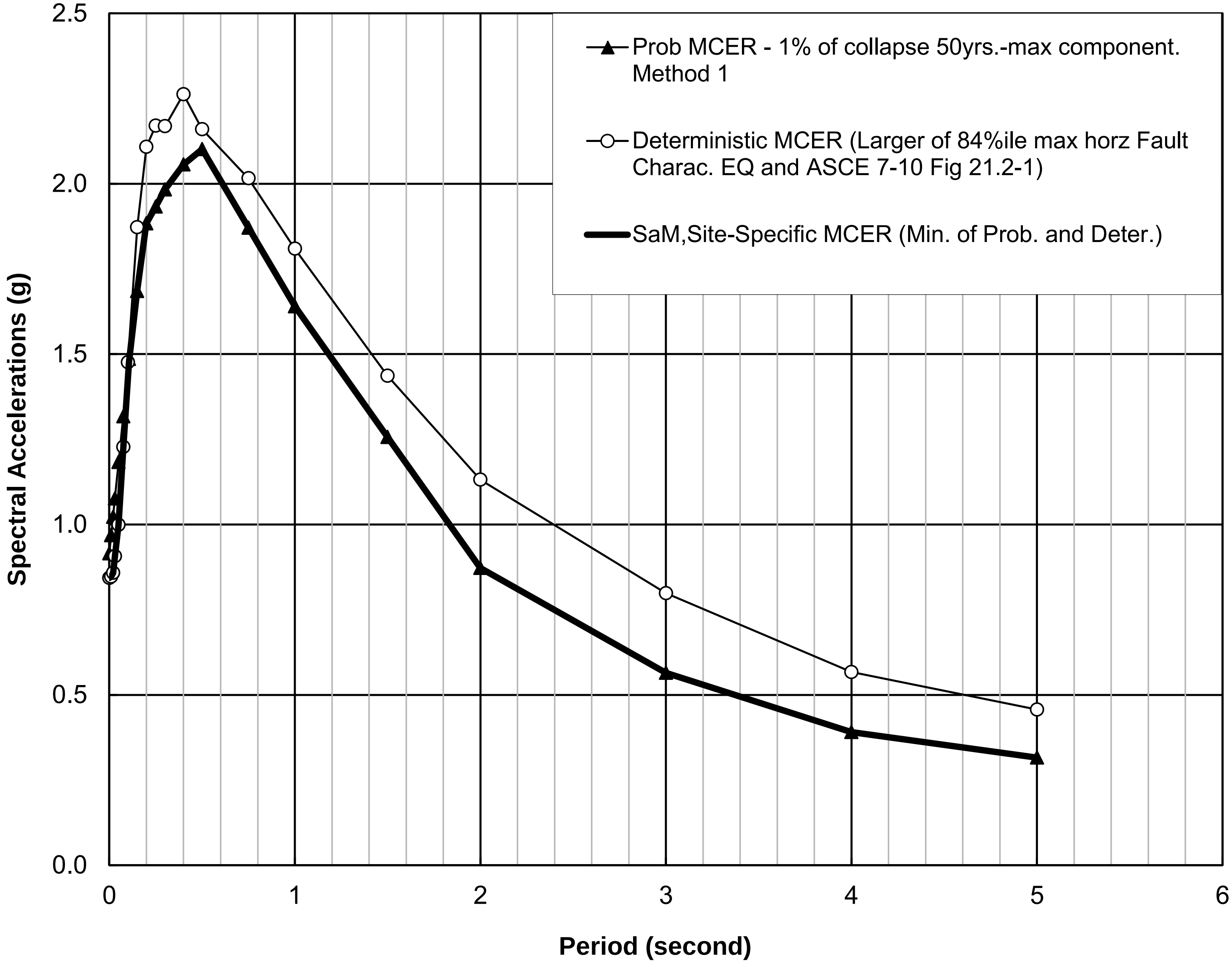
Kaiser Permanente – Vermont New Hampshire MOB

Vermont Ave and New Hampshire Ave

Los Angeles, California

C.314.76.00

FIGURE A-5



GEOBASE

SITE-SPECIFIC MCER RESPONSE SPECTRA

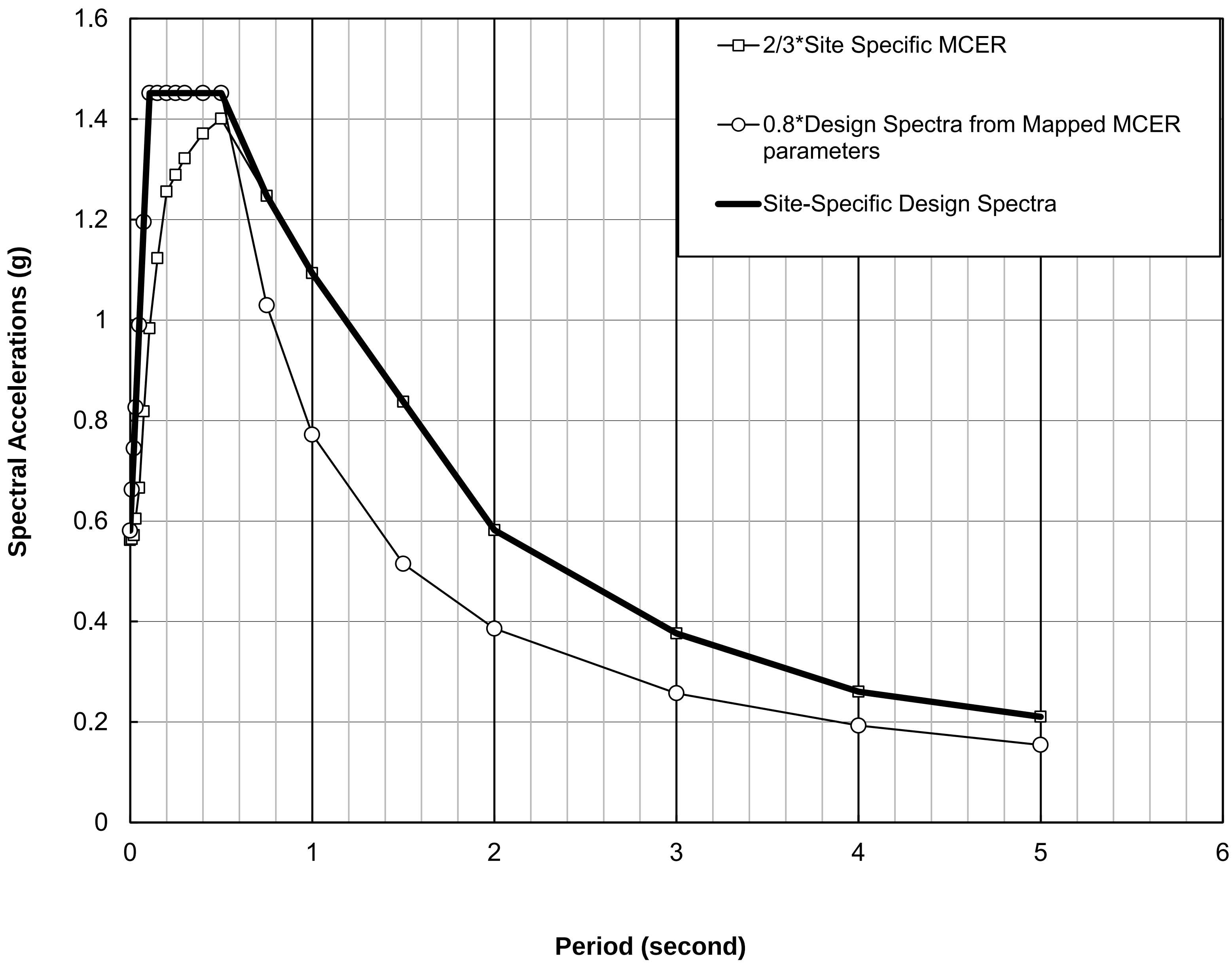
Kaiser Permanente – Vermont New Hampshire MOB

Vermont Ave and New Hampshire Ave

Los Angeles, California

C.314.76.00

FIGURE A-6

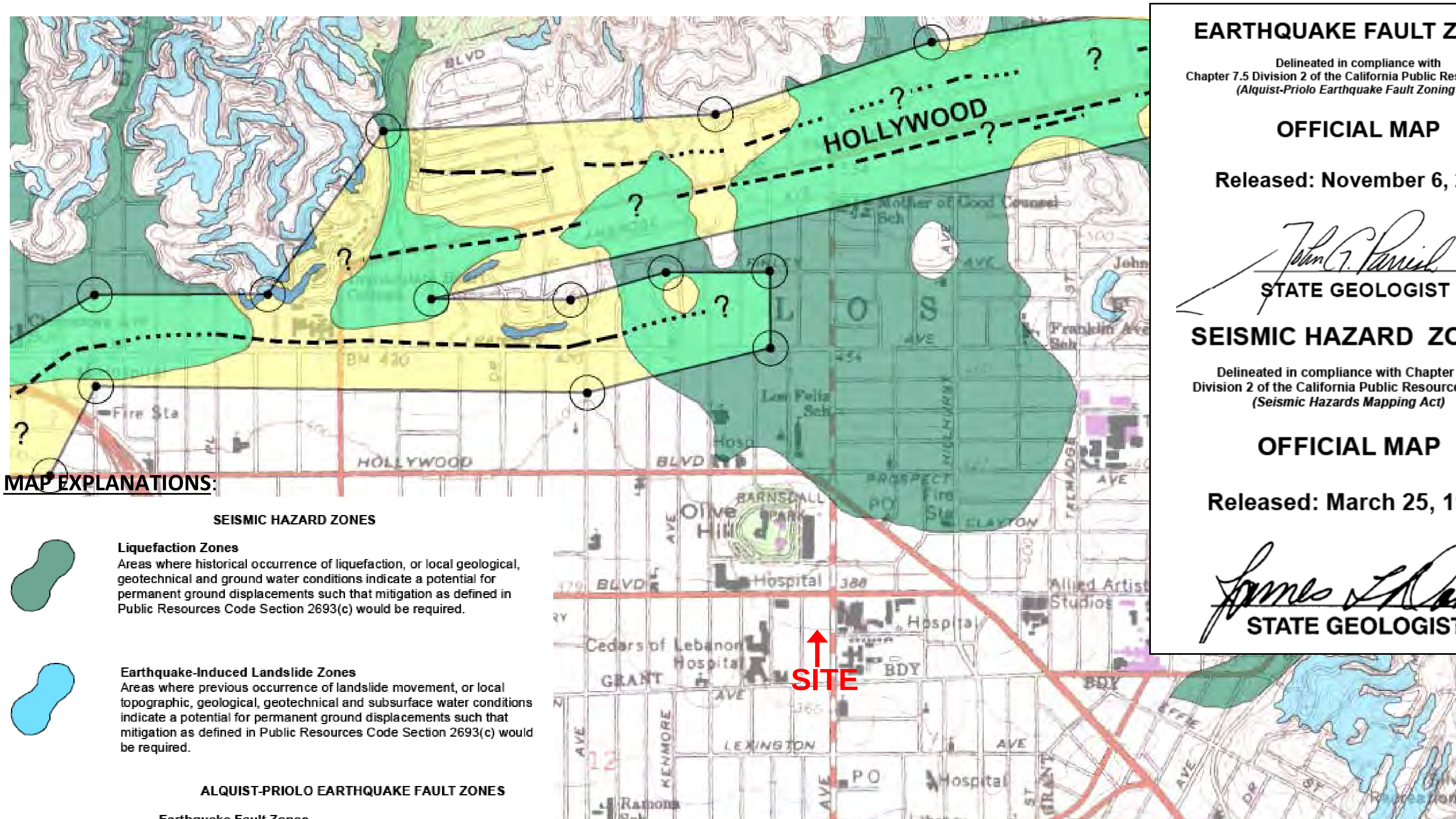


GEOBASE

SITE-SPECIFIC DESIGN RESPONSE SPECTRA
Kaiser Permanente – Vermont New Hampshire MOB
Vermont Ave and New Hampshire Ave
Los Angeles, California

C.314.76.00

FIGURE A-7



EARTHQUAKE FAULT ZONES

Delineated in compliance with
Chapter 7.5 Division 2 of the California Public Resources Code
(Alquist-Priolo Earthquake Fault Zoning Act)

OFFICIAL MAP

Released: November 6, 2014

John G. Parrish

STATE GEOLOGIST

SEISMIC HAZARD ZONES

Delineated in compliance with Chapter 7.8,
Division 2 of the California Public Resources Code
(Seismic Hazards Mapping Act)

OFFICIAL MAP

Released: March 25, 1999

James F. Davis

STATE GEOLOGIST

MAP EXPLANATIONS:

SEISMIC HAZARD ZONES

Liquefaction Zones
Areas where historical occurrence of liquefaction, or local geological, geotechnical and ground water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

Earthquake-Induced Landslide Zones
Areas where previous occurrence of landslide movement, or local topographic, geological, geotechnical and subsurface water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

ALQUIST-PRIOLO EARTHQUAKE FAULT ZONES

Earthquake Fault Zones
Zone boundaries are delineated by straight-line segments that connect encircled turning points; the boundaries define the zone encompassing active faults that constitute a potential hazard to structures from surface faulting or fault creep such that avoidance as described in Public Resources Code Section 2621.5(a) would be required.

Active Fault Traces
1906 C
Faults considered to have been active during Holocene time and to have potential for surface rupture; solid line where accurately located, long dash where approximately located, short dash where inferred, dotted where concealed; query (?) indicates additional uncertainty. Evidence of historic offset indicated by year of earthquake-associated event or C for displacement caused by fault creep.

SCALE 1:24,000

.5 0 1 MILE

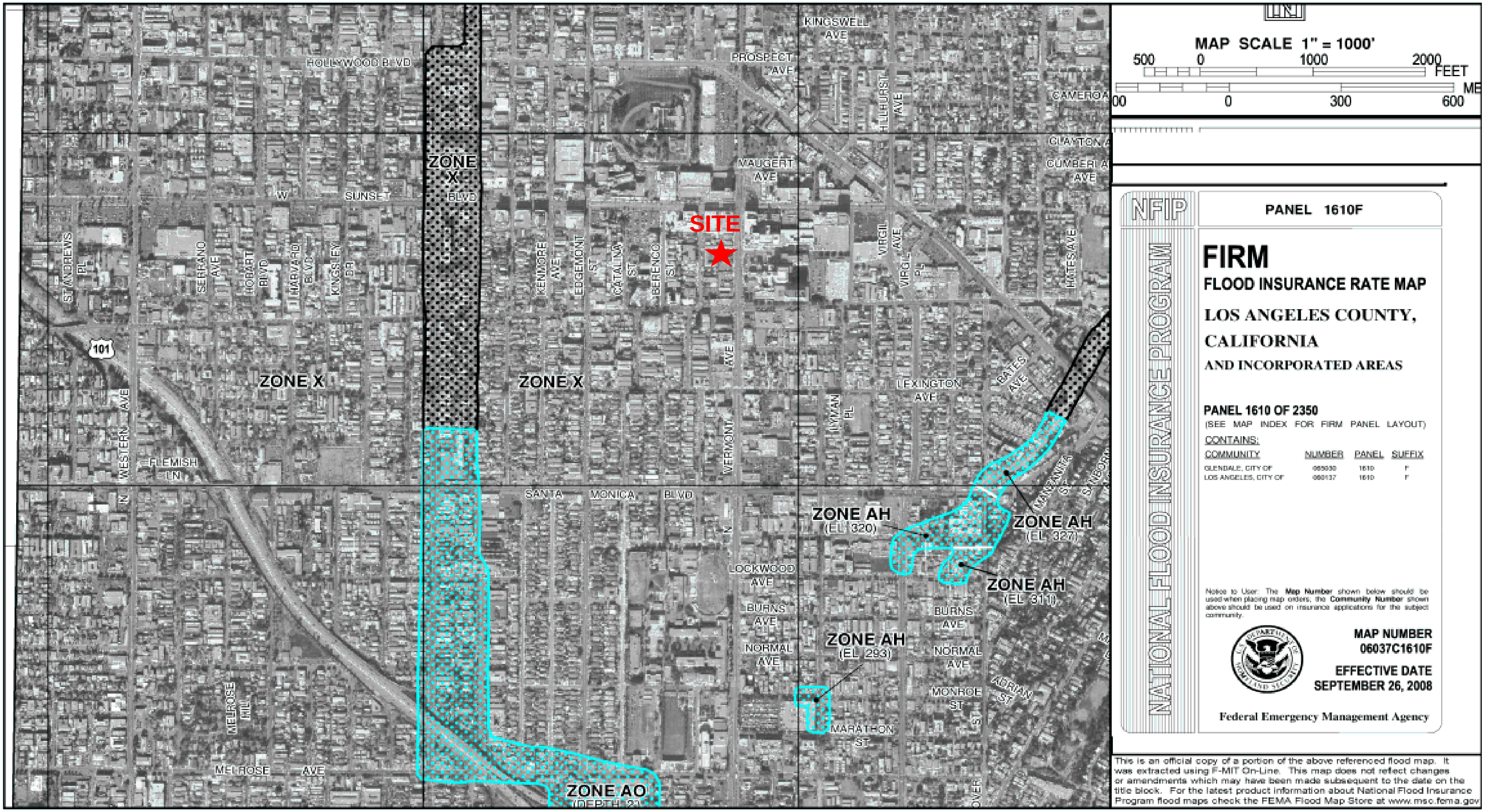
Sources: Seismic Hazard Zone Report for the Hollywood 7.5 minute Quadrangle, Los Angeles County, California: California Geological Survey, Seismic Hazard Zone Report 026.
The Hollywood Fault in the 7.5' Quadrangle, Los Angeles County, California: California Geological Survey, Fault Evaluation Report FER-253.

GEOBASE

SEISMIC HAZARDS ZONES MAP
Kaiser Permanente – Vermont New Hampshire MOB
Vermont Ave and New Hampshire Ave
Los Angeles, California

C.314.76.00

FIGURE A-8



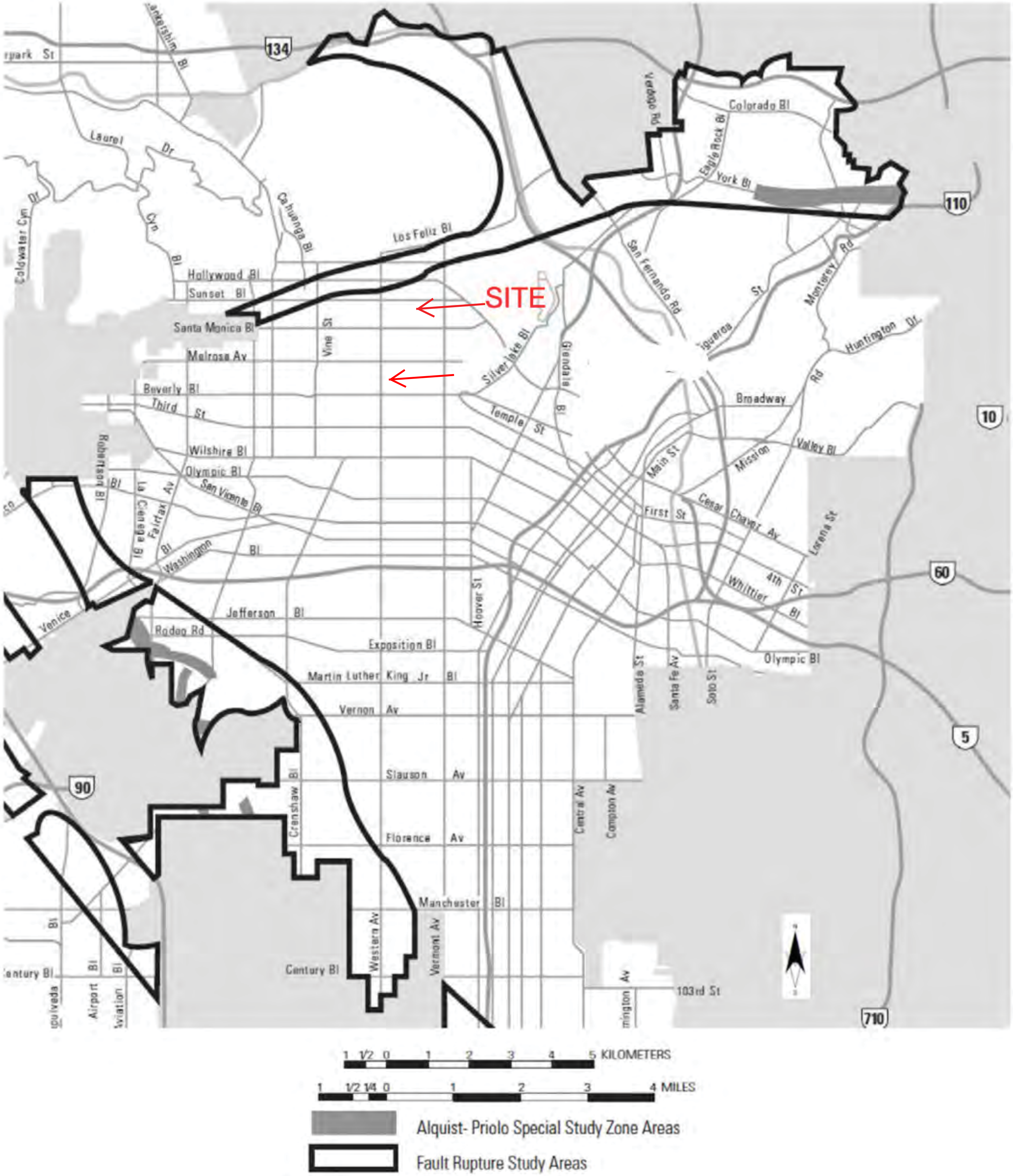
The **SITE** is in Zone X – Area determined to be outside of 0.2% annual chance floodplain.

GEOBASE

FEMA FLOOD MAP
Kaiser Permanente – Vermont New Hampshire MOB
Vermont Ave and New Hampshire Ave
Los Angeles, California

C.314.76.00

FIGURE A-9



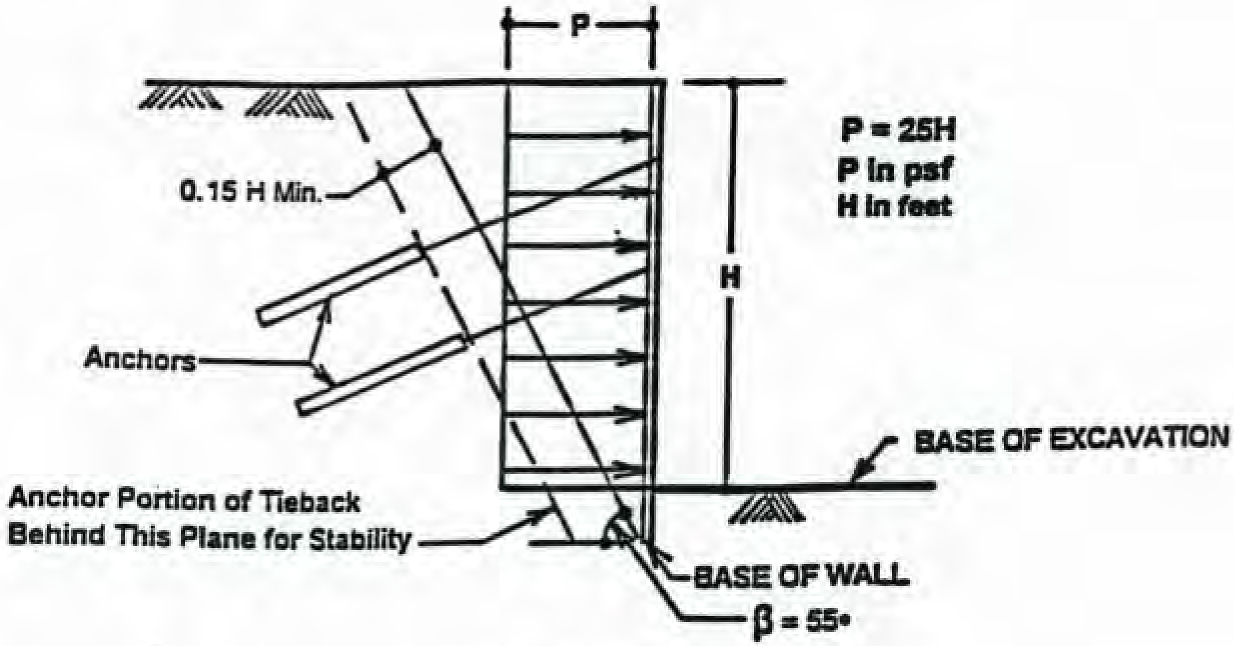
Source: City of Los Angeles. 1996. Safety Element of the Los Angeles City General Plan. Department of City Planning, Los Angeles, California. Figure A.

GEOBASE

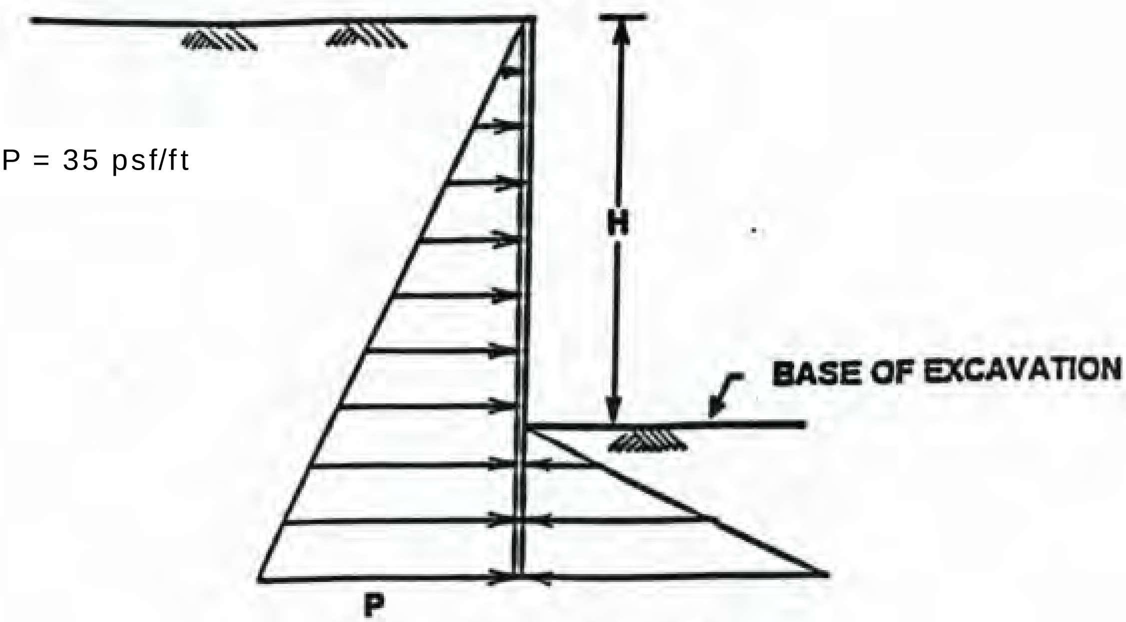
FAULT HAZARD MAP
Kaiser Permanente – Vermont New Hampshire MOB
Vermont Ave and New Hampshire Ave
Los Angeles, CA

C.314.76.00

FIGURE A-10

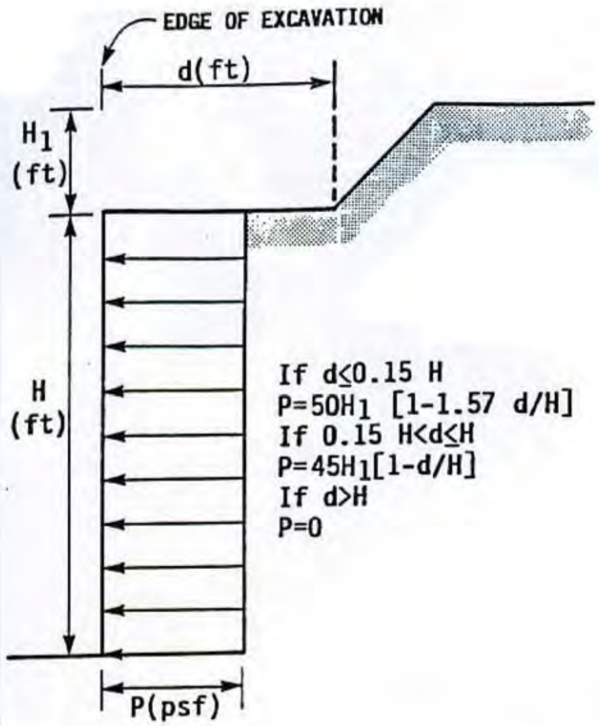


a) Tieback Shoring

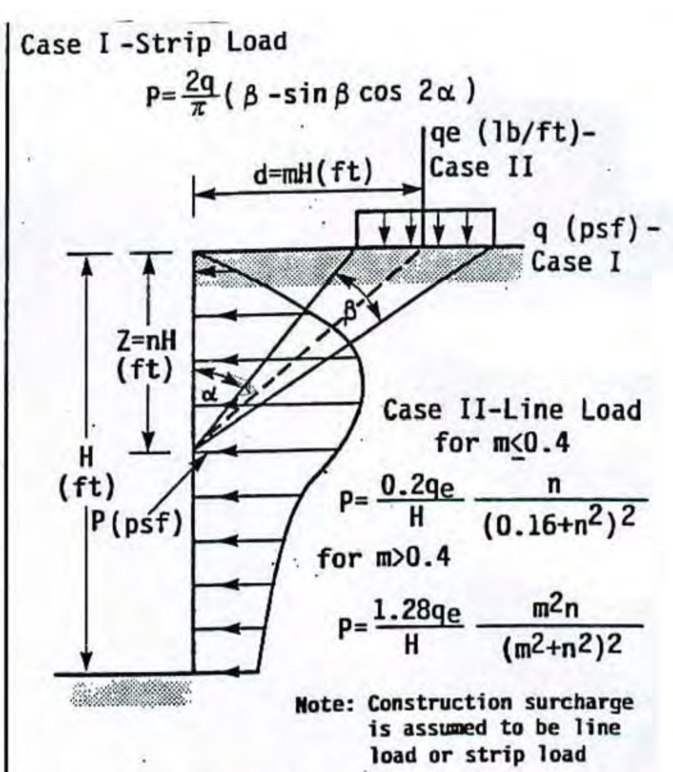


b) Cantilevered Shoring

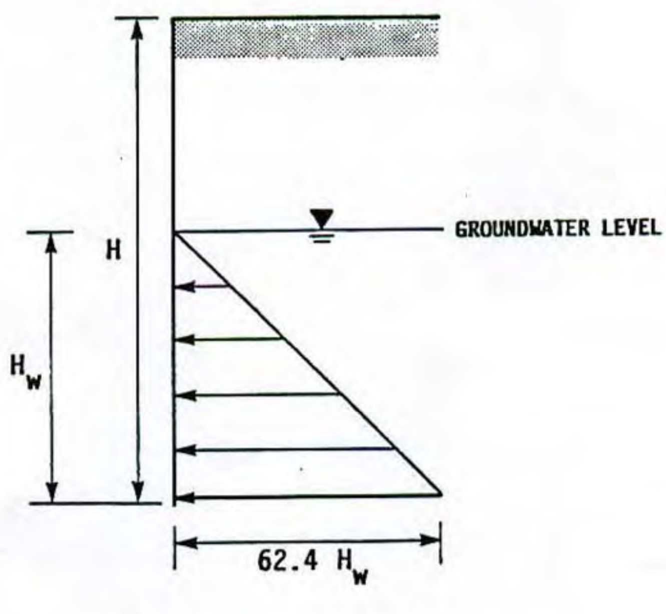
GEOBASE	Earth Pressures and Tieback Geometry for Shoring **Kaiser Permanente – Vermont New Hampshire MOB** **Vermont Ave and New Hampshire Ave** **Los Angeles, California** C.314.76.00 FIGURE A-11



(a) SLOPED EXCAVATION SURCHARGE



(b) CONSTRUCTION AND TRAFFIC SURCHARGE



(c) HYDROSTATIC PRESSURE

GEOBASE

ADDITIONAL LATERAL EARTH PRESSURES ON SHORING

Kaiser Permanente – Vermont New Hampshire MOB

Vermont Ave and New Hampshire Ave

Los Angeles, California

C.314.76.00

FIGURE A-12

APPENDIX B

The terms and symbols used on the Log of Borings to summarize the results of the field investigation and subsequent laboratory testing are described in the following:

It should be noted that materials, boundaries, and conditions have been established only at the boring locations, and are not necessarily representative of subsurface conditions elsewhere across the site.

A. PARTICLE SIZE DEFINITION (ASTM D2487 AND D422)

Boulder	-- larger than 12-inches	Sand, medium	-- No.40 to No. 10 sieves
Cobble	-- 3-inches to 12-inches	Sand, fine	-- No.200 to No. 40 sieves
Gravel, coarse	-- 3/4-inch to 3-inches	Silt	-- 5µm to No. 200 sieves
Gravel, fine	-- No.4 sieve to 3/4 -inch	Clay	-- smaller than 5 µm
Sand, coarse	-- No.10 to No.4 sieve		

B. SOIL CLASSIFICATION

Soils and bedrock are classified and described according to their engineering properties and behavioral characteristics. The soil of each stratum is described using ASTM D2487 and D2488.

The following adjectives may be employed to define percentage ranges by weight of minor components:

trace	--	1-10%	some	--	20-35%
little	--	10-20%	“and” or ”y”	--	35-50%

The following descriptive terms may be used for stratified soils:

parting	--	0 to 1/16-in. thickness;	layer	--	½-in. to 12-in. thickness;
seam	--	1/16 to ½-in. thickness;	stratum	--	greater than 12-in. thickness.

C. SOIL DENSITY AND CONSISTENCY

The density of coarse grained soils and the consistency of fine grained soils are described on the basis of the Standard Penetration Test:

COARSE GRAINED SOILS		FINE GRAINED SOILS		
DENSITY	SPT BLOWS PER FOOT	ESTIMATED CONSISTENCY	SPT BLOWS PER FOOT	ESTIMATED RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TSF)
very loose	less than 4	very soft	less than 2	less than 0.25
loose	5 to 10	soft	2 to 4	0.25 to 0.50
medium	11 to 30	firm (medium)	5 to 8	0.50 to 1.0
dense	31 to 50	stiff	9 to 15	1.0 to 2.0
very dense	over 50	very stiff	16 to 30	2.0 to 4.0
		hard	over 30	over 4.0

D. STANDARD PENETRATION TEST (SPT) -- D1586

The SPT test involves failure of the soil around the tip of a split spoon sampler for a condition of constant energy transmittal. The split spoon, 2-inches outside diameter and 1 3/8-inches inside diameter, is driven eighteen (18) inches. The sampler is seated in the first six (6) inches and the number of blows required to drive the sampler the last foot is recorded as the “N” value or SPT blow count. The driving energy is provided by a 140 pound weight dropping thirty (30) inches.

E. ABBREVIATION OF LABORATORY TEST DESIGNATIONS

C	Consolidation	pH	pH
CBR	California Bearing Ratio	pp	Pocket Penetrometer
Ch	Water Soluble Chlorides	PS	Particle Size
DS	Direct Shear	RV	R-Value
EI	Expansion Index	SE	Sand Equivalent
ER	Electrical Resistivity	SG	Specific Gravity
k	Permeability	SO_4	Water Soluble Sulfates
MD	Moisture	TX	Triaxial Compression
MP	Modified Proctor Compaction Test	TV	Torvane Shear
O	Organic Content	U	Unconfined Compression

F. STRATIFICATION LINES

The stratification lines indicated on the boring logs and profiles represent the ***approximate*** boundary between material types and the transition may be gradual.

SOIL CLASSIFICATION SYSTEM (ASTM D 2487)

MAJOR DIVISION			GROUP SYMBOL	GRAPHIC SYMBOL	TYPICAL DESCRIPTION	LABORATORY CLASSIFICATION CRITERIA
HIGHLY ORGANIC SOILS			Pt		Peat and other highly organic soils	Strong color or odor and often fibrous texture
COARSE-GRAINED SOILS (More than half by weight larger than No. 200 sieve size)	GRAVELS (More than half coarse fraction larger than No. 4 sieve size)	CLEAN GRAVELS	GW		Well-graded Gravels, Gravel-Sand mixtures (<5% fines)	$C_u = \frac{D_{60}}{D_{10}} > 4$ $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}} = 1$ to 3
			GP		Poorly-graded Gravels and Gravel-Sand mixtures (<5% fines)	Not meeting all above requirements
		DIRTY GRAVELS	GM		Silty Gravels, Gravel-Sand-Silt mixtures (>12% fines)	Atterberg limits below "A" line or $I_p < 4$
			GC		Clayey Gravels, Gravel-Sand-Clay mixtures (>12% fines)	Atterberg limits above "A" line or $I_p > 7$
	SANDS (More than half coarse fraction smaller than No. 4 sieve size)	CLEAN SANDS	SW		Well-graded Sands, Gravelly Sands (<5% fines)	$C_u = \frac{D_{60}}{D_{10}} > 6$ $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}} = 1$ to 3
			SP		Poorly-graded Sands or Gravelly Sands (<5% fines)	Not meeting all above requirements
		DIRTY SANDS	SM		Silty Sands, Sand-Silt mixtures (>12% fines)	Atterberg limits below "A" line or $I_p < 4$
			SC		Clayey Sands, Sand-Clay mixtures (>12% fines)	Atterberg limits above "A" line or $I_p > 7$
FINE-GRAINED SOILS (More than half by weight passes No. 200 sieve size)	SILTS Below "A" line on plasticity chart: negligible organic content		ML		Inorganic Silts and very fine Sands, Rock Flour, Silty Sands of slight plasticity	$W_L < 50$
			MH		Inorganic Silts micaceous or diatomaceous, fine Sandy or Silty soils	$W_L > 50$
	CLAYS Above "A" line on plasticity chart: negligible organic content		CL		Inorganic Clays of low plasticity, Gravelly, Sandy, or Silty Clays, lean Clays	$W_L < 30$
			CI		Inorganic Clays of medium plasticity, Silty Clays	$W_L > 30, < 50$
			CH		Inorganic Clays of high plasticity, fat Clays	$W_L > 50$
	ORGANIC SILTS & ORGANIC CLAYS Below "A" line on plasticity chart		OL		Organic Silts and organic Silty Clays of low plasticity	$W_L < 50$
			OH		Organic Clays of high plasticity	$W_L > 50$

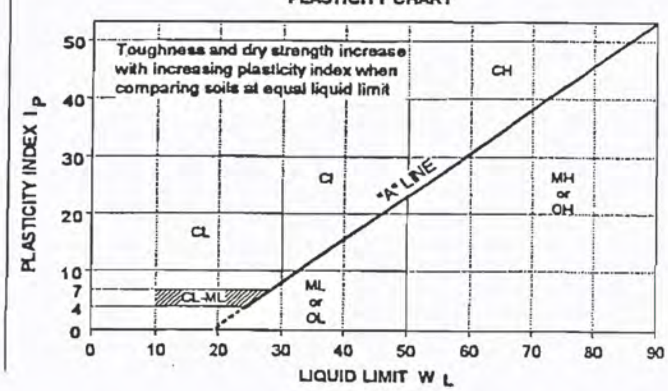
See chart below

The soil of each stratum is described using ASTM D2487 and D2488 modified slightly so that an inorganic clay of "medium plasticity" is recognized.

ADDITIONAL SOIL CLASSIFICATION

- Fill Soil
- Ss Sandstone
- Cs Claystone
- Ms Siltstone

PLASTICITY CHART



GEOBASE

EXPLANATION OF TERMS AND SYMBOLS USED

Figure B-1

LOG OF BORING

SAMPLE TYPE: THIN WALLED TUBE | SPT SPLIT SPOON | CALIFORNIA MODIFIED SAMPLER | DISTURBED | NO RECOVERY | CORE

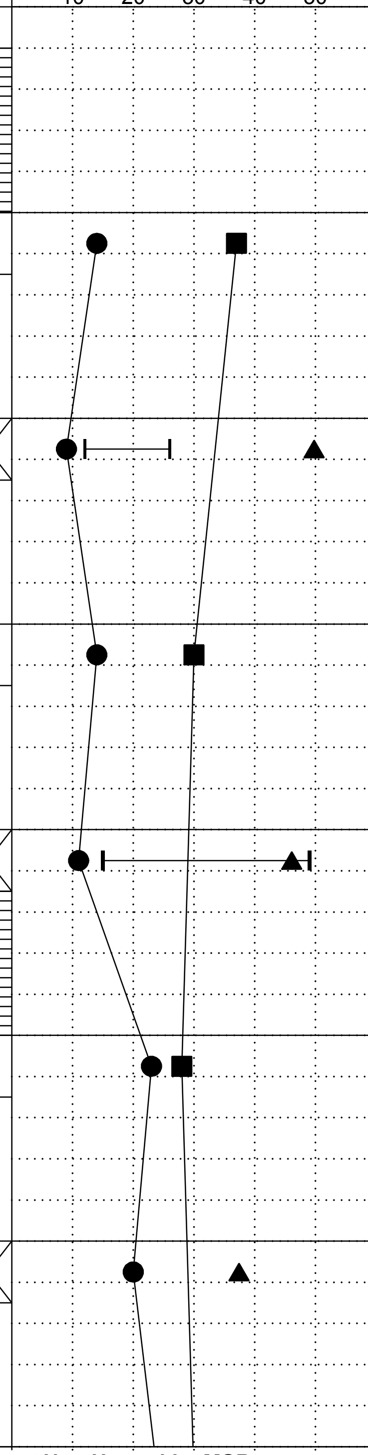
DRY DENSITY (PCF): 80 90 100 110 120

Water Content (%): ●

Plastic Limit (W_P) |——| Liquid Limit (W_L)

Penetration, blows/foot: ■ 10 20 30 40 50

DEPTH (feet)	SOIL DESCRIPTION	SOIL CLASSIFICATION	REMARKS/ OTHER TESTS
0	PAVEMENT, Asphaltic Conrete = 3 in.		
	CLAY (FILL), brown, silty and sandy.	CL	
3			EI, Bulk sample from 1-5 feet.
5	SILT, tan brown, clayey and sandy, hard.	ML	
10	...low plasticity		C, DS. Blowcount = 49/12"
15			
20	CLAY, olive to dark greenish brown, silty, very stiff.	CL	Blowcount = 35/12"
23	...high plasticity		Bulk sample from 21-25 feet. EI, Ch, ER, pH, SO_4
25	..caliche veins, sandy.		
30	...greenish and tan brown mottled, silty and sandy		Blowcount = 31/12"
35			



GEOBASE, INC.

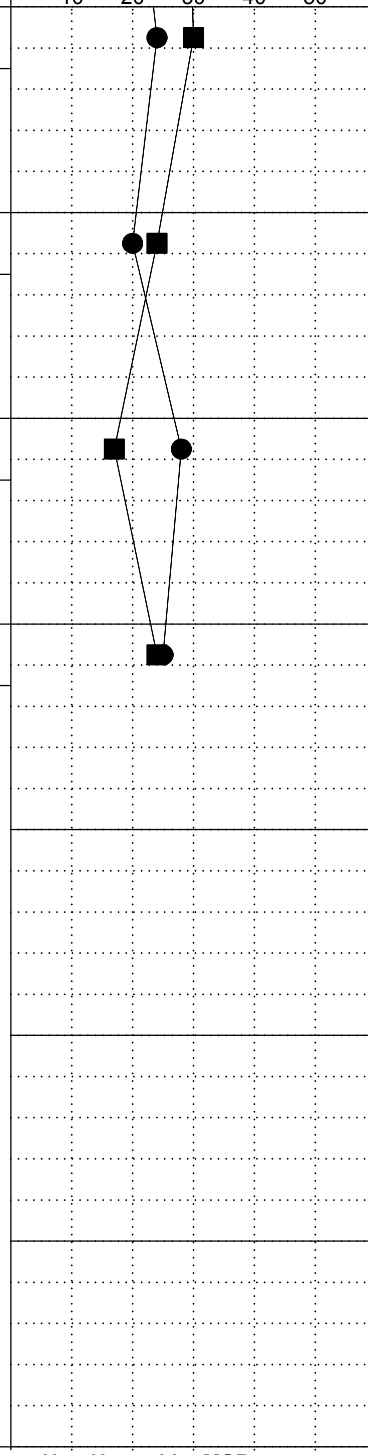
PROJECT	Kaiser Permanente -- Vermont New Hampshire MOB North Vermont and New Hampshire Ave		BORING NO. B-1
DEPTH TO WATER feet	SURFACE ELEV. 373 feet	LOGGED BY HDN	PROJECT NO. C.314.76.00
DEPTH TO SLOUGH	DRILL RIG CME-75 DRILLER Martini Drilling	DATE LOGGED 03/03/2016	FIGURE NO. B- 2

Note: This log of boring should be evaluated in conjunction with the complete geotechnical report. This log of boring represents conditions observed at the specific boring location and at the date indicated.

LOG OF BORING

SAMPLE TYPE: THIN WALLED TUBE | SPT SPLIT SPOON | CALIFORNIA MODIFIED SAMPLER | DISTURBED | NO RECOVERY | CORE

DEPTH (feet)	GRAPHIC LOG	SOIL DESCRIPTION	SOIL CLASSIFICATION	SAMPLE	DRY DENSITY (PCF) 80 90 100 110 120; Water Content (%); Plastic Limit (W_P) – Liquid Limit (W_L); Penetration, blows/foot: 10 20 30 40 50	REMARKS/ OTHER TESTS
		CLAY, greenish and tan brown mottled, silty and sandy, very stiff.	CL			
40		...sampled with tube liner.				
		SILTSTONE (BEDROCK), greenish and tan brown, mottled, clayey, mostly fine-grained siltstone, low plasticity, moderately soft.	MS			
45		...soft				
50						
55		End of Boring at 51.5 feet Boring dry at completion of drilling. Boring backfilled with soil cuttings.				
60						
65						
70						



GEOBASE, INC.	PROJECT: Kaiser Permanente -- Vermont New Hampshire MOB, North Vermont and New Hampshire Ave		BORING NO. B-1
	DEPTH TO WATER feet	SURFACE ELEV. 373 feet / LOGGED BY HDN	PROJECT NO. C.314.76.00
	DEPTH TO SLOUGH	DRILL RIG CME-75 / DRILLER Martini Drilling / DATE LOGGED 03/03/2016	FIGURE NO. B- 2

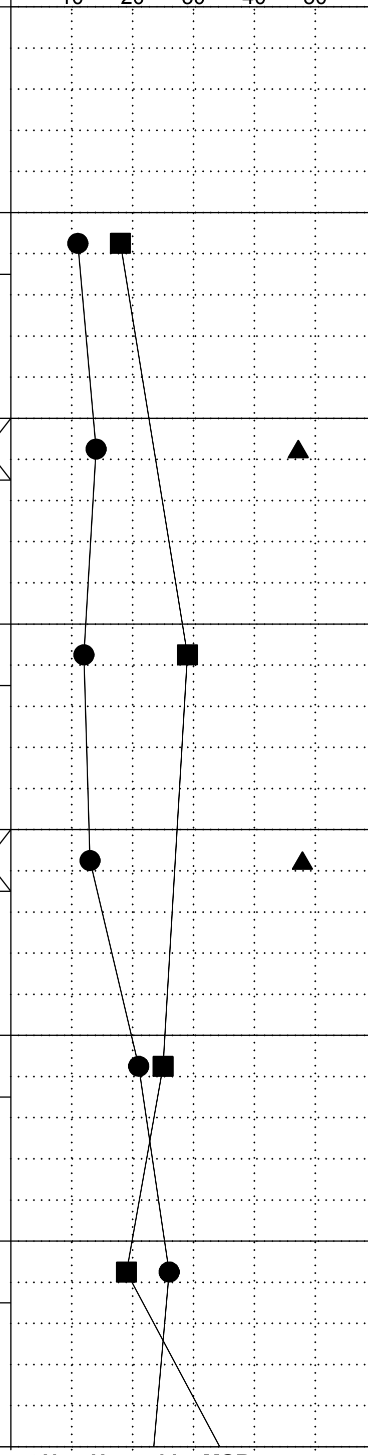
Note: This log of boring should be evaluated in conjunction with the complete geotechnical report. This log of boring represents conditions observed at the specific boring location and at the date indicated.

LOG OF BORING

SAMPLE TYPE: THIN WALLED TUBE | SPT SPLIT SPOON | CALIFORNIA MODIFIED SAMPLER | DISTURBED | NO RECOVERY | CORE

DRY DENSITY (PCF): 80, 90, 100, 110, 120
Water Content (%): ●
Plastic Limit (W_P) — Liquid Limit (W_L)
Penetration, blows/foot: ■ 10, 20, 30, 40, 50

DEPTH (feet)	SOIL DESCRIPTION	SOIL CLASSIFICATION	REMARKS/ OTHER TESTS
0	PAVEMENT, Asphaltic Conrete = 3 in.		
	SILT (FILL), orange to tan brown, little clays and sands, moist.	ML	
5	SILT, dark to grayish brown, clayey and sandy, very stiff.	ML	
10	...some clays, hard		Blowcount = 55/12"
15	...very stiff		
20	CLAY, olive to dark greenish brown, silty, some sands, very stiff.	CL	PP = >4.5 tsf. C, DS. Blowcount = 30/12"
25	...seams of tan brown silt and trace of gravels		
30			
	SILTSTONE (BEDROCK), greenish and tan brown, mottled, clayey, mostly fine-grained siltstone, low plasticity, moderately soft.	MS	
35			



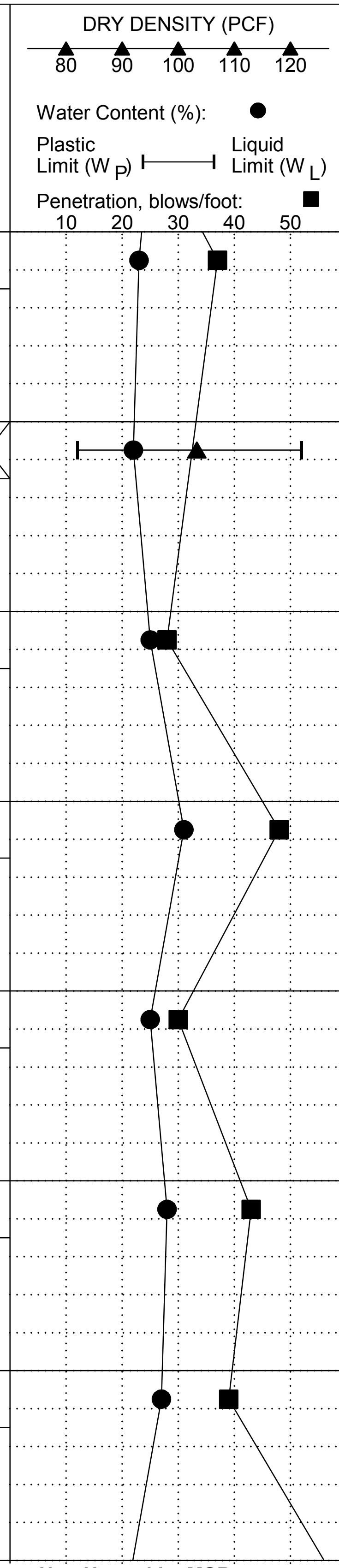
GEOBASE, INC.	PROJECT	Kaiser Permanente -- Vermont New Hampshire MOB North Vermont and New Hampshire Ave	BORING NO. **B-2**
	DEPTH TO WATER feet	SURFACE ELEV. **376 feet** / LOGGED BY **HDN**	PROJECT NO. **C.314.76.00**
	DEPTH TO SLOUGH	DRILL RIG **CME-75** DRILLER **Martini Drilling** / DATE LOGGED **03/03/2016**	FIGURE NO. B- **3**

Note: This log of boring should be evaluated in conjunction with the complete geotechnical report. This log of boring represents conditions observed at the specific boring location and at the date indicated.

LOG OF BORING

SAMPLE TYPE: THIN WALLED TUBE | SPT SPLIT SPOON | CALIFORNIA MODIFIED SAMPLER | DISTURBED | NO RECOVERY | CORE

DEPTH (feet)	GRAPHIC LOG	SOIL DESCRIPTION	SOIL CLASSIFICATION	SAMPLE	REMARKS/ OTHER TESTS
		SILTSTONE (BEDROCK), greenish and tan brown, mottled, clayey, mostly fine-grained siltstone, low plasticity, moderately soft.	MS		
40		...Shale			C, DS. Blowcount = 58/12"
45		...very stiff			
50					
55					
60		...Shale, horizontal bedding			
65					
70					



GEOBASE, INC.	PROJECT: Kaiser Permanente -- Vermont New Hampshire MOB North Vermont and New Hampshire Ave		BORING NO. B-2
	DEPTH TO WATER feet	SURFACE ELEV. 376 feet / LOGGED BY HDN	PROJECT NO. C.314.76.00
	DEPTH TO SLOUGH	DRILL RIG CME-75 DRILLER Martini Drilling / DATE LOGGED 03/03/2016	FIGURE NO. B- 3

Note: This log of boring should be evaluated in conjunction with the complete geotechnical report. This log of boring represents conditions observed at the specific boring location and at the date indicated.

LOG OF BORING

SAMPLE TYPE: THIN WALLED TUBE | SPT SPLIT SPOON | CALIFORNIA MODIFIED SAMPLER | DISTURBED | NO RECOVERY | CORE

DEPTH (feet)	GRAPHIC LOG	SOIL DESCRIPTION	SOIL CLASSIFICATION	SAMPLE	DRY DENSITY (PCF) 80 90 100 110 120 / Water Content (%): ● / Plastic Limit (W_P) ⊢—⊣ Liquid Limit (W_L) / Penetration, blows/foot: ■ 10 20 30 40 50	REMARKS/ OTHER TESTS
		SANDSTONE (BEDROCK), very dark gray, silty, some fine-grained siltstone interbed, moderately soft.	SS			
75		End of Boring at 71.5 feet Boring dry at completion of drilling. Boring backfilled with soil cuttings.				
80						
85						
90						
95						
100						
105						

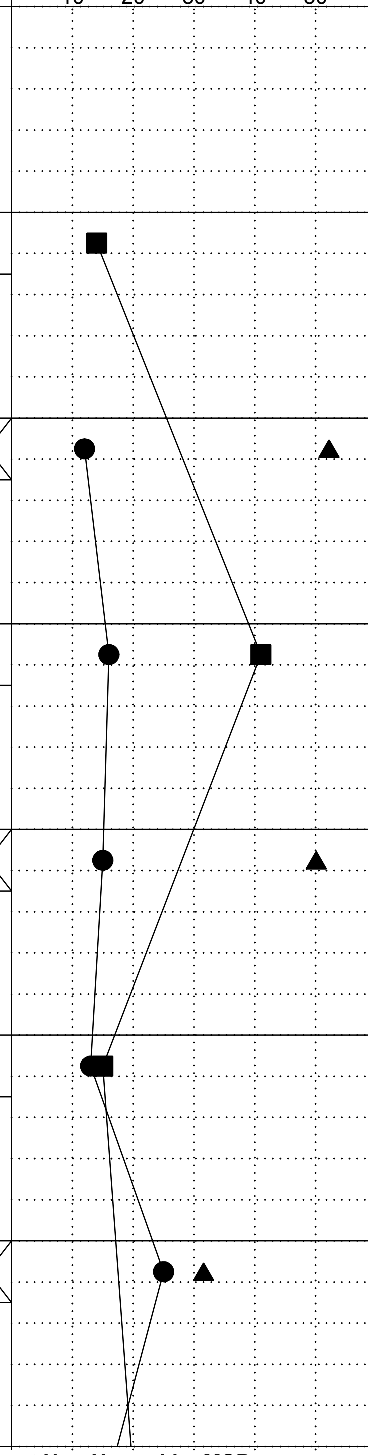
GEOBASE, INC.	PROJECT	Kaiser Permanente -- Vermont New Hampshire MOB North Vermont and New Hampshire Ave		BORING NO. B-2
	DEPTH TO WATER feet	SURFACE ELEV. 376 feet	LOGGED BY HDN	PROJECT NO. C.314.76.00
	DEPTH TO SLOUGH	DRILL RIG CME-75 DRILLER Martini Drilling	DATE LOGGED 03/03/2016	FIGURE NO. B- 3

Note: This log of boring should be evaluated in conjunction with the complete geotechnical report. This log of boring represents conditions observed at the specific boring location and at the date indicated.

LOG OF BORING

SAMPLE TYPE: THIN WALLED TUBE | SPT SPLIT SPOON | CALIFORNIA MODIFIED SAMPLER | DISTURBED | NO RECOVERY | CORE

DEPTH (feet)	GRAPHIC LOG	SOIL DESCRIPTION	SOIL CLASSIFICATION	SAMPLE	DRY DENSITY (PCF) 80 90 100 110 120; Water Content (%): ●; Plastic Limit (W_P) ├──┤ Liquid Limit (W_L); Penetration, blows/foot: ■ 10 20 30 40 50	REMARKS/ OTHER TESTS
		PAVEMENT, Asphaltic Conrete = 3 in.				
		SILT (FILL), brown, some clays and sands.	ML			
5		CLAY, tan brown, sandy, some silt, stiff.	CL	SPT		
10		SAND, brown, clayey, very stiff.	SC	California		Blowcount = 41/12"
15		CLAY, reddish brown, silty, hard.	CL	SPT		
20		...olive to dark greenish brown, little sands, very stiff.		California		Blowcount = 35/12"
25		...sandy, stiff		SPT		
30		SAND, dark greenish brown, silty and clayey, stiff.	SC	California		200 Wash. Blowcount = 18/12"
35						



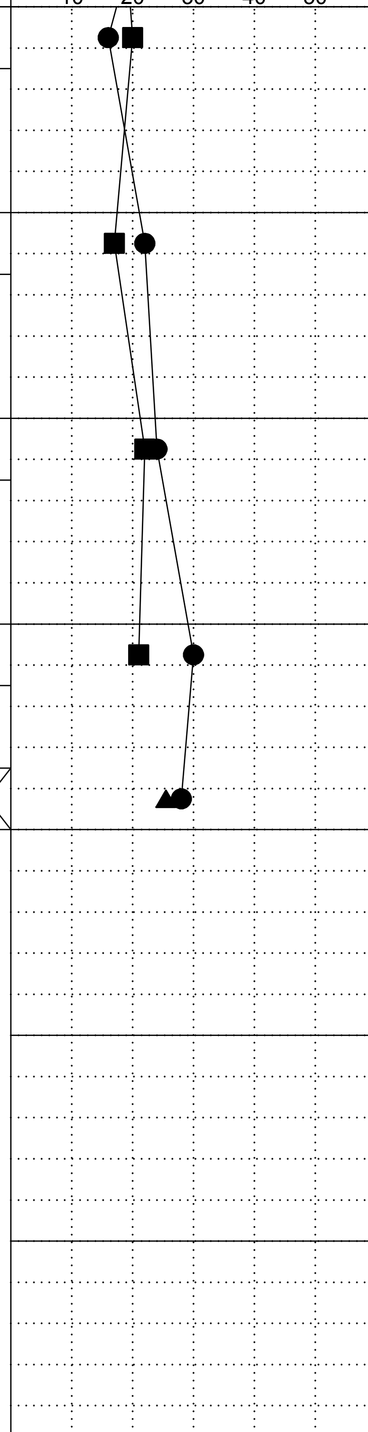
GEOBASE, INC.	PROJECT	Kaiser Permanente -- Vermont New Hampshire MOB North Vermont and New Hampshire Ave		BORING NO. B-3
	DEPTH TO WATER feet	SURFACE ELEV. 376 feet	LOGGED BY HDN	PROJECT NO. C.314.76.00
	DEPTH TO SLOUGH	DRILL RIG CME-75 DRILLER Martini Drilling	DATE LOGGED 03/03/2016	FIGURE NO. B- 4

Note: This log of boring should be evaluated in conjunction with the complete geotechnical report. This log of boring represents conditions observed at the specific boring location and at the date indicated.

LOG OF BORING

SAMPLE TYPE: THIN WALLED TUBE | SPT SPLIT SPOON | CALIFORNIA MODIFIED SAMPLER | DISTURBED | NO RECOVERY | CORE

DEPTH (feet)	GRAPHIC LOG	SOIL DESCRIPTION	SOIL CLASSIFICATION	SAMPLE	DRY DENSITY (PCF) 80 90 100 110 120; Water Content (%); Plastic Limit (W_P) – Liquid Limit (W_L); Penetration, blows/foot: 10 20 30 40 50	REMARKS/ OTHER TESTS
		SAND, dark greenish brown, silty and clayey, very stiff.	SC			200 Wash
		...observed seepage at 37 feet				
40		CLAY, tan brown, trace of sands, silty, very stiff.	CL			
		...horizon of sands layer				
45						
		SILTSTONE (BEDROCK), greenish and tan brown, mottled, clayey, mostly fine-grained siltstone, low plasticity, thinly bedded, moderately soft.	MS			
50						
		...moderately soft.				Blowcount = 38/12"
55		End of Boring at 55 feet Boring dry at completion of drilling. Boring backfilled with soil cuttings.				
60						
65						
70						



GEOBASE, INC.	PROJECT	**Kaiser Permanente -- Vermont New Hampshire MOB** **North Vermont and New Hampshire Ave**		BORING NO. **B-3**
	DEPTH TO WATER feet	SURFACE ELEV. **376 feet**	LOGGED BY **HDN**	PROJECT NO. **C.314.76.00**
	DEPTH TO SLOUGH	DRILL RIG **CME-75** DRILLER **Martini Drilling**	DATE LOGGED **03/03/2016**	FIGURE NO. B- **4**

Note: This log of boring should be evaluated in conjunction with the complete geotechnical report. This log of boring represents conditions observed at the specific boring location and at the date indicated.

Ami Adini & Associates, Inc., 1994

AMI ADINI & ASSOCIATES, INC.	BOREHOLE LOG	DATE : 8-24-94
PROJECT : KALANDJI.P04	BORING # :B2-C	PAGE 1 OF 1
DEPTH (FT)	GROUND ELEVATION : 400 FT. AMSL	Sampled by : AA
SAMPLES	BORING METHOD : HOLLOW STEM AUGER	Logged by : TS
BLOW COUNT	SAMPLE METHOD :SPLIT SPOON SAMPLER	
U.S.C.S. CLASSIFICATION	DRILLING CO.:-ABC LIOVIN	

DEPTH (FT)	SAMPLES	BLOW COUNT	U.S.C.S. CLASSIFICATION	DESCRIPTION OF LITHOLOGY
5	■	7 10 13	CL	Dark brown SANDY CLAY with low plasticity. Slightly moist. No staining. No odor.
10	■	6 11 14	CL	Brown SANDY CLAY with low plasticity. Slightly moist. No staining. No odor.
15	■	6 14 19	SC	Olive-gray SAND - CLAY mixture. Slightly moist. Dark green staining. Strong gasoline odor.
20	■	10 10 10	ML	Olive-gray CLAYEY FINE SAND. Moist. Product staining. Strong gasoline odor.
25	■	5 12 14	CL	Brown CLAY with low plasticity. Stiff. Slightly moist. No staining. No odor.
30	■	10 13 16	CL	Brown CLAY with low plasticity. Stiff. Slightly moist. No staining. No odor.
35	■	7 9 2	CL	Brown CLAY with medium plasticity. Moist. No staining. No odor.
40	■	8 13 15	CL	Brown CLAY with low plasticity. Very stiff. Slightly moist. No staining. No odor.

AMI ADINI & ASSOCIATES, INC.	BOREHOLE LOG	DATE : 8-24-94
PROJECT : KALANDJI.P04	BORING # :B4-C	PAGE 1 OF 1

DEPTH (FT)	GROUND ELEVATION : 400 FT. AMSL	Sampled by : AA
SAMPLES	BORING METHOD : HOLLOW STEM AUGER	Logged by : TS
BLOW COUNT	SAMPLE METHOD :SPLIT SPOON SAMPLER	
U.S.C.S. CLASSIFICATION	DRILLING CO.:-ABC LIOVIN	

DEPTH (FT)	BLOW COUNT	U.S.C.S. CLASSIFICATION	DESCRIPTION OF LITHOLOGY
5	6 7 11	CL	Brown SANDY CLAY with low plasticity. Slightly moist. No staining. No odor.
10	6 22 18	SC	Brown CLAYEY SAND. Slightly moist. No staining. No odor.
15	6 13 17	SC	Brown SAND - CLAY mixture with olive-gray staining. Slightly moist. Slight gasoline odor.
20	5 9 9	ML	Olive-gray CLAYEY FINE SAND. Moist. Product staining. Strong gasoline odor.
25	8 14 18	CL	Brown CLAY with low plasticity. Very stiff. Slightly moist. No staining. No odor.
30	10 18 23	CL	Brown CLAY with low plasticity. Very stiff. Slightly moist. No staining. No odor.
35	7 13 18	CL	Brown CLAY with low plasticity. Very stiff. Slightly moist. No staining. No odor.
40	9 16 21	CL	Brown CLAY with low plasticity. Very stiff. Slightly moist. No staining. No odor.

Smith-Emery Company, 1993

BORING 1

SURFACE ELEVATION: 376 FEET

ELEVATION DATUM: M.S.L.

	LABORATORY TEST DATA											
		8020										
DEPTH IN FEET	8015 GASOLINE	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES	LEAD	OVA READING (PPM)	BLOWS/FT	SAMPLE	SYMBOL	USCS	DESCRIPTION
0											ML	5 inches of ASPHALT. Brown sandy SILT with trace clay; moist.
												Brown sandy SILT with clay; moist.
5							0					
10							0	44	■			Dark brown sandy SILT with clay; moist.
15							0				CL	Olive gray sandy CLAY; moist, dense.
20	2.5	ND	ND	ND	ND		0.5	48	■			

BORING TERMINATED @ 20 FEET ON 3/26/93.
NO GROUNDWATER ENCOUNTERED.
BACKFILLED WITH BENTONITE CHIPS.

LOG OF BORING

1349 N. VERMONT AVENUE	
FILE NO.: 26409	LOGGED BY: S.P.
SMITH - EMERY COMPANY	PLATE NO.

BORING 2

SURFACE ELEVATION: 376 FEET

ELEVATION DATUM: M.S.L.

	LABORATORY TEST DATA											
		8020										
DEPTH IN FEET	8015 GASOLINE	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES	LEAD	OVA READING (PPM)	BLOWS/FT	SAMPLE	USCS	DESCRIPTION
0										CL	ASPHALT. Brown silty CLAY with trace sand; moist.
5							4				
										ML	
10							3	35	■		Dark greenish gray slightly sandy clayey SILT; moist, medium dense.
15							50				
										SM	
20	3500	4800	17000	35000	190000		>1000	24	■		Brown micaceous silty coarse SAND; moist, dense.
										BK	
25		ND	ND	3100	9700		6	42	■		Olive to brown clayey SILTSTONE; damp, dense Hydrocarbon odor.
30							3	55	■		Brown clayey SILTSTONE; damp, stiff.
35	ND						0	17	■		
40							0	31	■		
45	2.1	ND	ND	ND	ND		0		■		Brown clayey SILTSTONE with minor gravel, damp, stiff.

BORING TERMINATED @ 45 FEET ON 3/26/93.
NO GROUNDWATER ENCOUNTERED.

LOG OF BORING

1349 N. VERMONT AVENUE

FILE NO.: 26409 LOGGED BY: S.P.

SMITH - EMERY COMPANY PLATE NO. 8

BORING 3

SURFACE ELEVATION: 376 FEET

ELEVATION DATUM: M.S.L.

LABORATORY TEST DATA

DEPTH IN FEET	8015 GASOLINE	8020 BENZENE	8020 TOLUENE	8020 ETHYLBENZENE	8020 XYLENES	LEAD	OVA READING (PPM)	BLOWS/FT	SAMPLE	USCS	DESCRIPTION
0											3 inches of ASPHALT.
										ML	3 inches of CONCRETE. Brown clayey SILT; moist.
										CL	Brown silty CLAY; moist.
										ML	Brown clayey SILT with trace sand; moist.
5							0				
10							0.5	29	■		
15							0				
20	35	ND	ND	ND	200	ND	>1000	41	■	SM	Olive to green micaceous silty very fine SAND; moist. Hydrocarbon odor.
										BK	Brown clayey SILTSTONE; damp
25							90	44	■		
30	ND						1	48	■		
35							0	24	■		Olive to brown clayey SILTSTONE with chert fragments; damp, stiff.
40	0.6	ND	ND	ND	ND		0	32	■		Brown clayey SILTSTONE; damp, stiff.

BORING TERMINATED @ 40 FEET ON 3/30/93.
NO GROUNDWATER ENCOUNTERED.
BACKFILLED WITH BENTONITE CHIPS.

LOG OF BORING

1349 N. VERMONT AVENUE

FILE NO.: 26409 LOGGED BY: S.P

SMITH - EMERY COMPANY PLATE NO

BORING 4

SURFACE ELEVATION: 376 FEET

ELEVATION DATUM: M.S.L.

LABORATORY TEST DATA

DEPTH IN FEET	8015 GASOLINE	8020 BENZENE	8020 TOLUENE	8020 ETHYLBENZENE	8020 XYLENES	LEAD	OVA READING (PPM)	BLOWS/FT	SAMPLE	USCS	DESCRIPTION
0										ML	ASPHALT. Dark brown slightly sandy clayey SILT; moist.
								16	■		
5							0	17	■		
10							3	20	■		
15							15	30	■		OLive to brown clayey SILT with trace sand; medium dense.
										SM	
20	120	ND	ND	150	6400	ND	220	19	■		Olive to brown silty SAND with trace clay; moist.
										ML	Gray brown clayey SILT; damp, stiff.
25							>1000	36	■		
										BK	Gray brown clayey SILTSTONE; damp, stiff.
30	ND						300	37	■		Olive to brown clayey SILTSTONE; damp, stiff
35							20	25	■		Brown clayey SILTSTONE; damp, stiff.
40	410	ND	ND	ND	ND		0	28	■		
45											

BORING TERMINATED @ 41 FEET ON 3/30/93.
NO GROUNDWATER ENCOUNTERED

LOG OF BORING

1349 N. VERMONT AVENUE

FILE NO.: 26409 LOGGED BY: S.P.

SMITH - EMERY COMPANY PLATE NO. 10

BORING 5

SURFACE ELEVATION: 376 FEET

ELEVATION DATUM: M.S.L.

LABORATORY TEST DATA

DEPTH IN FEET	8015 GASOLINE	8020 BENZENE	8020 TOLUENE	8020 ETHYLBENZENE	8020 XYLENES	LEAD	OVA READING (PPM)	BLOWS/FT	SAMPLE	USCS	DESCRIPTION
0										ML	4 inches of ASPHALT. 2 inches of PEA GRAVEL. Brown SILT with trace sand; moist.
										CL	Brown micaceous silty CLAY with trace sand; moist.
5							0				
										ML	Dark reddish brown clayey SILT with sand; moist.
10							4	25	■	SM	Reddish brown silty SAND; damp, medium dense.
15							7	22	■		Greenish gray silty coarse SAND.
										ML	Green micaceous fine sandy SILT; moist. Odor.
20	580	ND	ND	5500	20000		10	23	■		
25											

BORING TERMINATED @ 21 FEET ON 3/30/93.
NO GROUNDWATER ENCOUNTERED.

LOG OF BORING

1349 N. VERMONT AVENUE

FILE NO.: 26409 LOGGED BY: S.P.

SMITH - EMERY COMPANY PLATE NO. 1

BORING 6 (BORING B-6)

SURFACE ELEVATION: 376 FEET

ELEVATION DATUM: M.S.L.

LABORATORY TEST DATA

DEPTH IN FEET	TESTS REPORTED ELSEWHERE	EPA 8015M (Gasoline in ppm)	EPA 8015M (C 10 - C 30 in ppm)	EPA 8020 (BTEX in ppb)	OVA READING (ppm)	BLOWS/FT	SAMPLE	SAMPLE RECOVERED (%)	USCS	DESCRIPTION
0									ML	3 inches of ASPHALT. Brown CLAYEY SILT with trace sand; moist.
5					0	55	■	100		
									SC	Dark brown CLAYEY SAND with trace silt; moist.
									SM	Brown SILTY SAND, micaceous, coarse; moist.
10		ND		ND	0	59	■	100		
					5	24	■	100	ML	Green CLAYEY SILT; moist.
15					10	19	■	100		Grades to CLAYEY SILT with trace sand.
		220		B ND T ND E 1,700 X 9,200	>1000	34	■	100	SM	Greenish brown SILTY SAND; moist.
20		ND	ND	B 82 T ND E 22 X ND	>1000	?	■	78		
					300	19	■	78	BK	Greenish brown mottled CLAYEY SILTSTONE, slightly micaceous; moist.
25					20	67	■	100		Brown CLAYEY SILTSTONE.
30		0.24		ND	8	39	■	100		
35										

BORING TERMINATED @ 31 FEET ON 10/22/93.
NO GROUNDWATER ENCOUNTERED.

LOG OF BORING

1331 N. VERMONT AVENUE

FILE NO.: 27434 LOGGED BY: S.P.

SMITH - EMERY COMPANY PLATE NO. 7

LABORATORY TEST DATA

(BORING B-7)

SURFACE ELEVATION: 376 FEET

ELEVATION DATUM: M.S.L.

DEPTH IN FEET	TESTS REPORTED ELSEWHERE	EPA 8015M (Gasoline in ppm)	EPA 8015M (C 10 - C 30 in ppm)	EPA 8020 (BTEX in ppb)	OVA READING (ppm)	BLOWS/FT	SAMPLE	SAMPLE RECOVERED (%)	USCS	DESCRIPTION
0									ML	3 inches of ASPHALT. Brown SILT with trace sand; moist.
5									CL	Brown SILTY CLAY with trace sand; moist.
									SP	Brown SAND, slightly micaceous, with trace silt; moist.
10					0	44	■	100		
									ML	Brown CLAYEY SILT with trace sand; moist.
15		ND		ND	0	41	■	100		
									SM	Greenish brown SILTY SAND; moist.
20		ND		B ND T ND E ND X 17	0	20	■	78	BK	Greenish brown CLAYEY SILTSTONE, micaceous; moist. No odor.
25		0.41		ND	0	32	■	100		Greenish brown and brown mottled CLAYEY SILTSTONE with trace sand; moist. No odor.
30		0.11		ND	0	68	■	100		Brown CLAYEY SILTSTONE; slightly moist, stiff. BORING TERMINATED @ 31 FEET ON 10/22/93. NO GROUNDWATER ENCOUNTERED.
35										

LOG OF BORING

1331 N. VERMONT AVENUE	
FILE NO.: 27434	LOGGED BY: S.P.
SMITH - EMERY COMPANY	PLATE NO.

BORING 8

SURFACE ELEVATION: 375 FEET

ELEVATION DATUM: M.S.L.

LABORATORY TEST DATA

DEPTH IN FEET	TESTS REPORTED ELSEWHERE	EPA 8015M (Gasoline in ppm)	EPA 8015M (C 10 - C 30 in ppm)	EPA 8020 (BTEX in ppb)	OVA READING (ppm)	BLOWS/FT	SAMPLE	SAMPLE RECOVERED (%)	USCS	DESCRIPTION
0									SM	2 inches of ASPHALT. Light to medium brown SILTY SAND with pebbles; damp.
									ML	8 inch CONCRETE layer. Brown SILT, slightly micaceous; moist.
5					0	54	■	100		Grades to SILT with trace sand.
10					0	48	■	100	SM	Reddish brown SILTY SAND, fine to medium, slightly micaceous; moist.
15		0.15		ND	30	74	■	100		Brown SILTY SAND, medium to coarse, micaceous; slightly moist.
20					100	82	■	78	ML	Greenish brown SILT, micaceous; slightly moist.
		64		B ND T 64 E 390 X 490	>1000	32	■	100		Grades to SILT with trace sand.
									BK	Greenish brown and brown mottled SILTSTONE; slightly moist.
25		ND		ND	250		■	100		Brown CLAYEY SILTSTONE; slightly moist to damp.
					8	50/6"	■	100		
30		1.4		ND	0	50/5"	■	100		Brown CLAYEY SILTSTONE; slightly moist, stiff. BORING TERMINATED @ 31 FEET ON 10/22/93. NO GROUNDWATER ENCOUNTERED.
35										

LOG OF BORING

1331 N. VERMONT AVENUE

FILE NO.: 27434 LOGGED BY: S.F

SMITH - EMERY COMPANY PLATE NO

APPENDIX C

GEOBASE, INC.

SUMMARY OF LABORATORY TEST RESULTS

Figure C-1

PROJECT: KAISER PERMANENTE - VERMONT NEW HAMPSHIRE MOB, 1321, 1329, AND 1345 NORTH VERMONT AVENUE AND 1328 NORTH NEW HAMPSHIRE AVENUE LOS ANGELES, CALIFORNIA

PROJECT NO: C.314.76.00

DATE: April 14, 2016

BORING	DEPTH (feet)	MOISTURE CONTENT (Percent)	DRY DENSITY (pcf)	ATTERBERG LIMITS			PARTICLE SIZE DISTRIBUTION				OTHER TESTS	DESCRIPTION AND REMARKS
				LL (%)	PL (%)	PI (%)	CLAY (%)	SILT (%)	SAND (%)	GRAVEL (%)		
B-1	1.0-5.0	---									EI = 27	Bulk Sample at 1.0-5.0 feet
	5.0-6.5	14										ML
	10.0-11.5	9	119.8	26	12	14					C, DS	ML
	15.0-16.5	14										ML
	20.0-21.5	11	116.1	49	15	34						CL
	21.0-25.0	--									EI = 107, ph, CH, ER, S04	CL
	25.0-26.5	23									C	CL
	30.0-31.5	20	107.4									CL
	35.0-36.5	24										CL
	40.0-41.5	20										CL
	45.0-45.5	28										MS
	50.0-51.5	25										MS
B-2	5.0-6.5	11										ML
	10.0-11.5	14	117.2									ML
	15.0-16.5	12										ML
	20.0-21.5	13	117.9								C, DS	CL
	25.0-26.5	21										CL
	30.0-31.5	26										CL
	35.0-36.5	23										MS
	40.0-41.5	22	103.3	52	12	40					C, DS	Shale
	45.0-46.5	25										MS
	50.0-51.5	31										MS
	55.0-56.5	25										MS

GEOBASE, INC.

SUMMARY OF LABORATORY TEST RESULTS

PROJECT:	KAISER PERMANENTE - VERMONT NEW HAMPSHIRE MOB, 1321, 1329, AND 1345 NORTH VERMONT AVENUE AND 1328 NORTH NEW HAMPSHIRE AVENUE LOS ANGELES, CALIFORNIA	PROJECT NO: C.314.76.00	DATE: April 14, 2016

BORING	DEPTH (feet)	MOISTURE CONTENT (Percent)	DRY DENSITY (pcf)	ATTERBERG LIMITS			PARTICLE SIZE DISTRIBUTION				OTHER TESTS	DESCRIPTION AND REMARKS
				LL (%)	PL (%)	PI (%)	CLAY (%)	SILT (%)	SAND (%)	GRAVEL (%)		
B-2	60.0-61.5	28										MS
	65.0-66.5	27										MS
	70.0-71.5	21										SS
B-3	5.0-6.5	--										
	10.0-11.5	12	122.2									SC
	15.0-16.5	16										SC
	20.0-21.5	15	120.1									CL
	25.0-26.5	13										SC
	30.0-31.5	25	101.6				75		25		200 Wash	CL
	35.0-36.5	16					21		79		200 Wash	SC
	40.0-41.5	22										CL
	45.0-46.5	24										CL
	50.0-51.5	30										MS
	53.5-55.0	28	95.5									MS

HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers

Hushmand Associates, Inc.
1721 E. Lambert Rd, Ste. B
La Habra, CA 90631

p. (562) 690-3737
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March 25, 2016

Geobase, Inc.
23362 Peralta Dr., Unit 4
Laguna Hills. CA 92653

Attention: Mr. Hai Nguyen, P.E.

SUBJECT: Laboratory Test Results
Geobase Project Name: Kaiser Vermont
Geobase Project No.: C.314.76.00
HAI Project No.: GBA-16-001

Dear Mr. Nguyen,

HAI is a Los Angeles Department of Building and Safety (LADBS) certified laboratory (Approval No. TA10185). Enclosed is the result of the laboratory testing program conducted on samples from the above referenced project. The testing performed for this program was conducted in general accordance with the following test procedure:

Type of Test	Test Procedure
Moisture Content & Dry Density	ASTM D2937
Moisture Content	ASTM D2216
Percentage Passing #200 Sieve	ASTM D1140
Atterberg Limits	ASTM D4318
Expansion Index	ASTM D4829
Consolidation	ASTM D2435
Direct Shear (Consolidated & Drained)	ASTM D3080

Attached are: Ten (10) Moisture Content & Dry Density test results; twenty four (24) Moisture Content test results; two (2) Percentage passing #200 Sieve; three (3) Atterberg Limits test results; two (2) Expansion Index test results; three (3) Consolidation test results; and three (3) 3-point Direct Shear test results.

We appreciate the opportunity to provide our testing services to Geobase, Inc. If you have any questions regarding the test results, please contact us.

Sincerely,

HUSHMAND ASSOCIATES, INC.

Min Zhang, Ph.D.
Senior Staff Engineer

MOISTURE CONTENT AND DRY DENSITY OF RING AND BAG SAMPLES
(ASTM D2216, 2937)

HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers

Client:	Geobase, Inc.	***HAI Project No.:***	GBA-16-001
Project Name:	Kaiser Vermont	***Performed by:***	KL/SE
Project No.:	C.314.76.00	***Checked by:***	MZ
		Date:	3/22/2016

Boring No.		**B-1**						
Sample Type		**S**	**R**	**S**	**R**	**S**	**R**	**S**
Depth (ft)		**5-6.5**	**10-11.5**	**15-16.5**	**20-21.5**	**25-26.5**	**30-31.5**	**35-36.5**
Total wt of rings and soil	gr		801.50		991.27		994.51	
Height of sample	in		4		5		5	
Diameter of sample	in		2.416		2.416		2.416	
Volume of sample	cu.ft		0.0106		0.0133		0.0133	
Weight of rings	gr		173.36		216.70		216.70	
Weight of soil	lbs.		1.385		1.708		1.715	
Wet Density	pcf		130.5		128.7		129.3	
Container No.		28	24	35	41	22	40	24
Weight of cont.+ wet soil	gr	90.21	42.08	78.92	80.59	95.98	96.35	79.94
Weight of cont.+ dry soil	gr	80.09	39.05	69.63	73.15	79.11	80.91	65.47
Weight of container	gr	4.91	5.01	4.94	4.97	4.97	5.02	5.03
Weight of water	gr	10.12	3.03	9.29	7.44	16.87	15.44	14.47
Weight of dry soil	gr	75.18	34.04	64.69	68.18	74.14	75.89	60.44
Moisture Content	**%**	**13.5**	**8.9**	**14.4**	**10.9**	**22.8**	**20.3**	**23.9**
Dry Density	**pcf**	**-**	**119.8**	**-**	**116.1**	**-**	**107.4**	**-**
Identefied Soil		**SC**	**SC**	**SC**	**CL**	**SC**	**CL**	**CL**

MOISTURE CONTENT AND DRY DENSITY OF RING AND BAG SAMPLES
(ASTM D2216, 2937)

HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers

Client:	Geobase, Inc.	***HAI Project No.:***	GBA-16-001
Project Name:	Kaiser Vermont	***Performed by:***	KL/SE
Project No.:	C.314.76.00	***Checked by:***	MZ
		Date:	3/22/2016

Boring No.		**B-1**		
Sample Type		**S**	**S**	**S**
Depth (ft)		**40-41.5**	**45-46.5**	**50-51.5**
Total wt of rings and soil	gr			
Height of sample	in			
Diameter of sample	in			
Volume of sample	cu.ft			
Weight of rings	gr			
Weight of soil	lbs.			
Wet Density	pcf			
Container No.		27	42	36
Weight of cont.+ wet soil	gr	92.75	94.01	89.70
Weight of cont.+ dry soil	gr	78.12	74.70	72.60
Weight of container	gr	5.01	4.96	5.06
Weight of water	gr	14.63	19.31	17.10
Weight of dry soil	gr	73.11	69.74	67.54
Moisture Content	**%**	**20.0**	**27.7**	**25.3**
Dry Density	**pcf**	**-**	**-**	**-**
Identefied Soil		**CL**	**CL**	**CL**

HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers

MOISTURE CONTENT AND DRY DENSITY OF RING AND BAG SAMPLES
(ASTM D2216, 2937)

Client: Geobase, Inc.
Project Name: Kaiser Vermont
Project No.: C.314.76.00

HAI Project No.: GBA-16-001
Performed by: KL/SE
Checked by: MZ
Date: 3/22/2016

Boring No.		**B-2**						
Sample Type		**S**	**R**	**S**	**R**	**S**	**S**	**S**
Depth (ft)		**5-6.5**	**10-11.5**	**15-16.5**	**20-21.5**	**25-26.5**	**30-31.5**	**35-36.5**
Total wt of rings and soil	gr		1018.33		1019.19			
Height of sample	in		5		5			
Diameter of sample	in		2.416		2.416			
Volume of sample	cu.ft		0.0133		0.0133			
Weight of rings	gr		216.70		216.70			
Weight of soil	lbs.		1.767		1.769			
Wet Density	pcf		133.2		133.4			
Container No.		51	27	40	39	200	42	32
Weight of cont.+ wet soil	gr	91.54	86.40	94.20	50.15	89.37	86.99	88.92
Weight of cont.+ dry soil	gr	82.71	76.58	84.87	44.89	75.25	70.28	73.02
Weight of container	gr	4.83	5.00	5.03	4.93	6.37	4.98	4.97
Weight of water	gr	8.83	9.82	9.33	5.26	14.12	16.71	15.90
Weight of dry soil	gr	77.88	71.58	79.84	39.96	68.88	65.30	68.05
Moisture Content	**%**	**11.3**	**13.7**	**11.7**	**13.2**	**20.5**	**25.6**	**23.4**
Dry Density	**pcf**	**-**	**117.2**	**-**	**117.9**	**-**	**-**	**-**
Identefied Soil		**SC**	**CL**	**CL**	**CL**	**CL**	**CL**	**CL**

HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers

MOISTURE CONTENT AND DRY DENSITY OF RING AND BAG SAMPLES
(ASTM D2216, 2937)

Client: Geobase, Inc.
Project Name: Kaiser Vermont
Project No.: C.314.76.00

HAI Project No.: GBA-16-001
Performed by: KL/SE
Checked by: MZ
Date: 3/22/2016

Boring No.		**B-2**						
Sample Type		**R**	**S**	**S**	**S**	**S**	**S**	**S**
Depth (ft)		**40-41.5**	**45-46.5**	**50-51.5**	**55-56.5**	**60-61.5**	**65-66.5**	**70-71.5**
Total wt of rings and soil	gr	1172.62						
Height of sample	in	6						
Diameter of sample	in	2.416						
Volume of sample	cu.ft	0.0159						
Weight of rings	gr	260.04						
Weight of soil	lbs.	2.012						
Wet Density	pcf	126.4						
Container No.		52	53	36	34	29	33	30
Weight of cont.+ wet soil	gr	56.73	87.32	81.65	79.53	66.47	84.11	71.19
Weight of cont.+ dry soil	gr	47.25	70.80	63.46	64.45	53.04	67.27	59.85
Weight of container	gr	4.89	5.26	5.07	4.98	4.96	4.93	4.97
Weight of water	gr	9.48	16.52	18.19	15.08	13.43	16.84	11.34
Weight of dry soil	gr	42.36	65.54	58.39	59.47	48.08	62.34	54.88
Moisture Content	**%**	**22.4**	**25.2**	**31.2**	**25.4**	**27.9**	**27.0**	**20.7**
Dry Density	**pcf**	**103.3**	**-**	**-**	**-**	**-**	**-**	**-**
Identefied Soil		**CH**	**CL**	**CL**	**CL**	**CL**	**CL**	**SC**

HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers

MOISTURE CONTENT AND DRY DENSITY OF RING AND BAG SAMPLES
(ASTM D2216, 2937)

Client: Geobase, Inc.
Project Name: Kaiser Vermont
Project No.: C.314.76.00

HAI Project No.: GBA-16-001
Performed by: KL/SE
Checked by: MZ
Date: 3/22/2016

Boring No.		**B-3**						
Sample Type		**R**	**S**	**R**	**S**	**R**	**S**	**S**
Depth (ft)		**10-11.5**	**15-16.5**	**20-21.5**	**25-26.5**	**30-31.5**	**35-36.5**	**40-41.5**
Total wt of rings and soil	gr	1243.88		1253.51		980.55		
Height of sample	in	6		6		5		
Diameter of sample	in	2.416		2.416		2.416		
Volume of sample	cu.ft	0.0159		0.0159		0.0133		
Weight of rings	gr	260.04		260.04		216.70		
Weight of soil	lbs.	2.169		2.190		1.684		
Wet Density	pcf	136.3		137.6		126.9		
Container No.		50	22	23	41	C13	C8	29
Weight of cont.+ wet soil	gr	44.49	98.48	66.95	101.81	422.96	360.13	97.73
Weight of cont.+ dry soil	gr	40.56	85.41	59.05	90.66	340.28	312.00	81.01
Weight of container	gr	6.30	4.97	4.97	4.96	8.36	8.25	4.96
Weight of water	gr	3.93	13.07	7.90	11.15	82.68	48.13	16.72
Weight of dry soil	gr	34.26	80.44	54.08	85.70	331.92	303.75	76.05
Moisture Content	**%**	**11.5**	**16.2**	**14.6**	**13.0**	**24.9**	**15.8**	**22.0**
Dry Density	**pcf**	**122.2**	**-**	**120.1**	**-**	**101.6**	**-**	**-**
Identefied Soil		**SC**	**SC**	**CL**	**SC**	**CL**	**SC**	**CL**

HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers

MOISTURE CONTENT AND DRY DENSITY OF RING AND BAG SAMPLES
(ASTM D2216, 2937)

Client: Geobase, Inc.
Project Name: Kaiser Vermont
Project No.: C.314.76.00

HAI Project No.: GBA-16-001
Performed by: KL/SE
Checked by: MZ
Date: 3/22/2016

Boring No.		**B-3**		
Sample Type		**S**	**S**	**S**
Depth (ft)		**45-46.5**	**50-51.5**	**53.5-55**
Total wt of rings and soil	gr			954.88
Height of sample	in			5
Diameter of sample	in			2.416
Volume of sample	cu.ft			0.0133
Weight of rings	gr			216.70
Weight of soil	lbs.			1.627
Wet Density	pcf			122.7
Container No.		32	23	111
Weight of cont.+ wet soil	gr	81.13	70.69	309.19
Weight of cont.+ dry soil	gr	66.33	55.63	242.51
Weight of container	gr	4.95	4.94	8.10
Weight of water	gr	14.80	15.06	66.68
Weight of dry soil	gr	61.38	50.69	234.41
Moisture Content	**%**	**24.1**	**29.7**	**28.4**
Dry Density	**pcf**	**-**	**-**	**95.5**
Identefied Soil		**CL**	**CL**	**CL**

PERCENT PASSING # 200 SIEVE
(ASTM D 1140)

Client: Geobase, Inc.
Project Name: Kaiser Vermont
Project No.: C.314.76.00

HAI Project No.: GBA-16-001
Performed by: SE/KL
Checked by: MZ
Date: 3/17/2016

Boring No.		**B-3**	
Sample No.		**R**	**S**
Depth	**ft**	**30-31.5**	**35-36.5**
Soil Description		Olive, Lean Clay with Sand	Reddish Brown, Clayey Sand
USCS		**CL**	**SC**
Weight of oven dry soil before wash + wt of container	gr	340.28	312.00
Weight of oven dry soil retained after # 200 wash + wt of container	gr	89.54	249.18
Weight of Container	gr	8.36	8.25
Weight of soil passing # 200 sieve	gr	250.74	62.82
Initial weight of oven dry soil	gr	331.92	303.75
Soil passing # 200 sieve	**%**	**75.5**	**20.7**

ATTERBERG LIMITS
(ASTM D 4318)

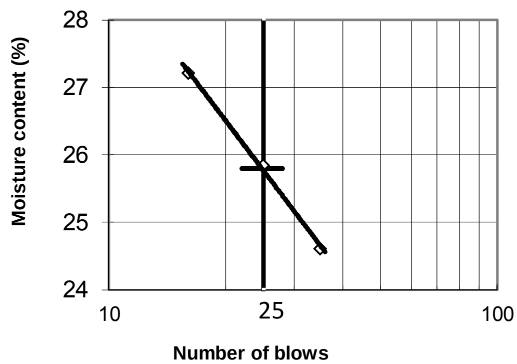
HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers

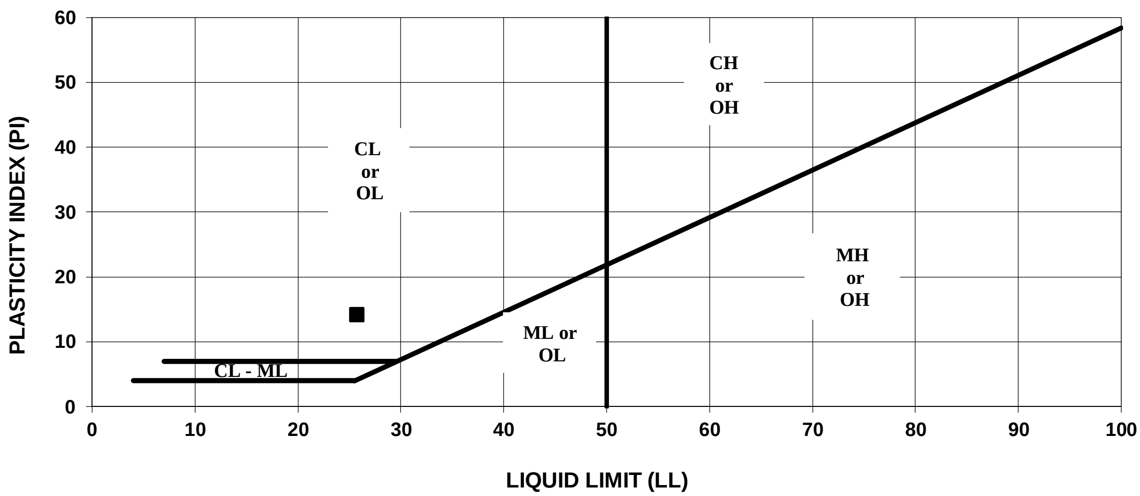
Client: Geobase, Inc.
Project Name: Kaiser Vermont
Project No.: C.314.76.00
Boring No.: B-1
Sample No.: Ring @ 10-11.5'
Soil Description: Reddish Brown, Clayey Sand (SC)

HAI Project No.: GBA-16-001
Tested by: SE/KL
Checked by: MZ
Date: 3/22/2016

Test		LL	LL	LL	PL	PL
Tare No.		5	16	27	A2	C2
No. of blows		**35**	**25**	**16**		
Wt. of wet soil + tare	(g)	23.24	24.42	24.15	10.37	9.60
Wt. of dry soil + tare	(g)	20.84	21.68	21.41	9.39	8.72
Wt. of tare	(g)	11.09	11.08	11.34	1.13	1.13
Water content	**(%)**	**24.6**	**25.8**	**27.2**	**11.9**	**11.6**

Liquid Limit	**26**
Plastic Limit	**12**
Plasticity Index	**14**
USCS	**CL**





ATTERBERG LIMITS
(ASTM D 4318)

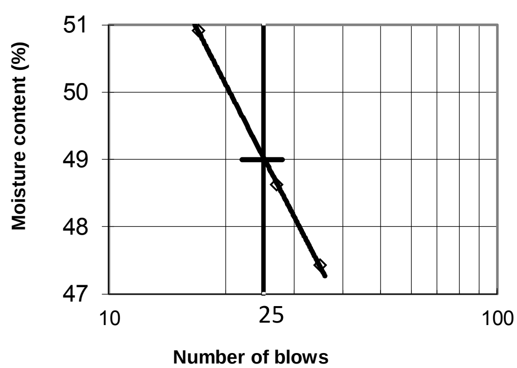
HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers

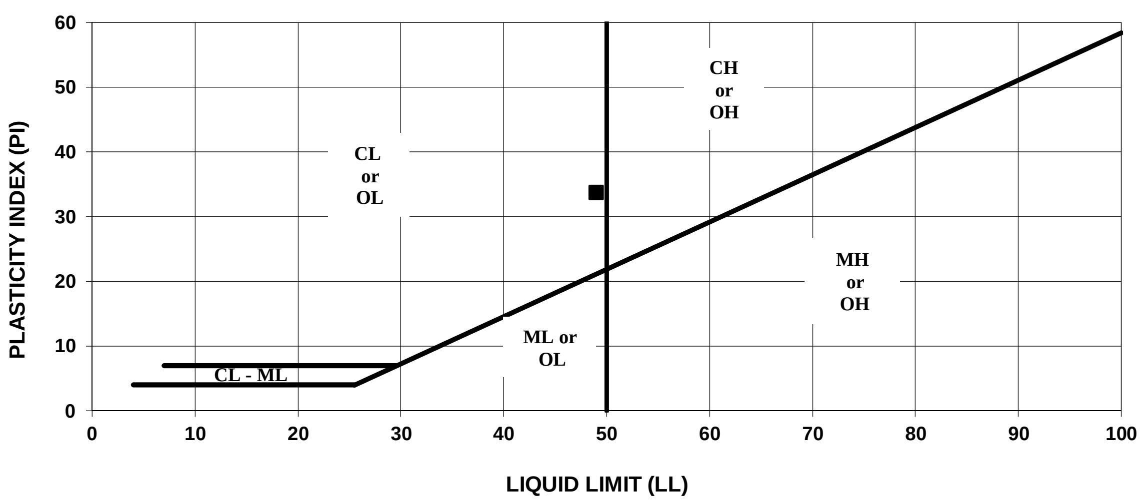
Client: Geobase, Inc.
Project Name: Kaiser Vermont
Project No.: C.314.76.00
Boring No.: B-1
Sample No.: Bulk @ 21-25'
Soil Description: Yellowish Olive Brown, Lean Clay (CL)

HAI Project No.: GBA-16-001
Tested by: SE/KL
Checked by: MZ
Date: 3/22/2016

Test		**LL**	**LL**	**LL**	**PL**	**PL**
Tare No.		8	13	29	B11	C1
No. of blows		**35**	**27**	**17**		
Wt. of wet soil + tare	(g)	22.55	22.88	22.87	9.17	10.05
Wt. of dry soil + tare	(g)	18.86	18.98	18.98	8.11	8.85
Wt. of tare	(g)	11.08	10.96	11.34	1.11	1.15
Water content	**(%)**	**47.4**	**48.6**	**50.9**	**15.1**	**15.6**

Liquid Limit	**49**
Plastic Limit	**15**
Plasticity Index	**34**
USCS	**CL**





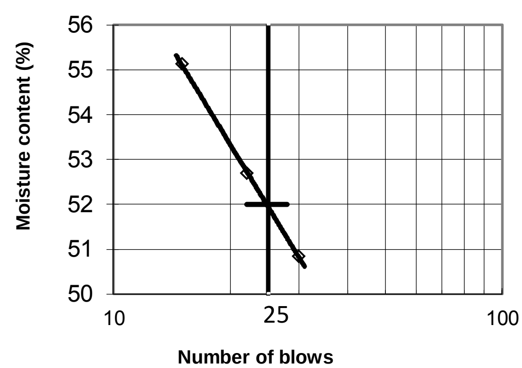
ATTERBERG LIMITS
(ASTM D 4318)

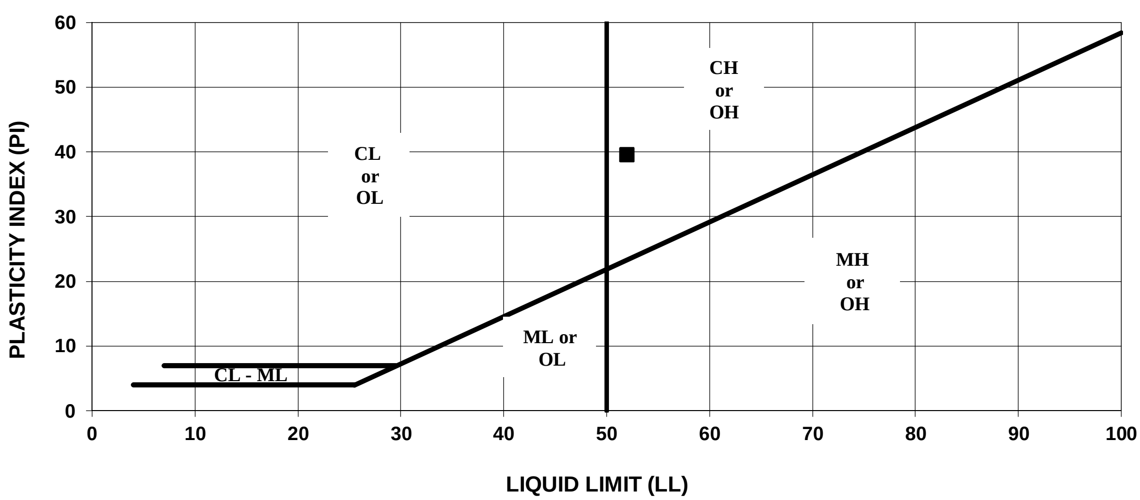
Client: Geobase, Inc.
Project Name: Kaiser Vermont
Project No.: C.314.76.00
Boring No.: B-2
Sample No.: Ring @ 40-41.5'
Soil Description: Olive Brown, Fat Clay with Sand (CH)

HAI Project No.: GBA-16-001
Tested by: SE/KL
Checked by: MZ
Date: 3/22/2016

Test		**LL**	**LL**	**LL**	**PL**	**PL**
Tare No.		18	20	22	C7	B1
No. of blows		**30**	**22**	**15**		
Wt. of wet soil + tare	(g)	22.40	22.25	23.32	8.28	8.39
Wt. of dry soil + tare	(g)	18.48	18.34	19.02	7.48	7.59
Wt. of tare	(g)	10.77	10.92	11.22	1.11	1.14
Water content	**(%)**	**50.8**	**52.7**	**55.1**	**12.6**	**12.4**

Liquid Limit	**52**
Plastic Limit	**12**
Plasticity Index	**40**
USCS	**CH**





HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers

EXPANSION INDEX
(ASTM D4829)

Client:	Geobase, Inc.			***HAI Project No.:***	GBA-16-001
Project Name:	Kaiser Vermont			***Tested by:***	SE/KL
Project No.:	C.314.76.00			***Checked by:***	MZ
Boring No.:	B-1	***Depth:***	1-5'	***Date:***	3/22/2016
Soil Description:	Reddish Brown, Clayey Sand (SC)				

MOLDED SPECIMEN		
Wt. of wet soil + cont.	**144.59**	g
Wt. of dry soil + cont.	**133.77**	g
Wt. of container **(P24)**	**11.34**	g
Wt. of water	**10.82**	g
Wt. of dry soil	**122.43**	g
Moisture Content	**8.8**	**%**
Wt. of wet soil + ring	**597.16**	g
Wt. of ring	**190.96**	g
Wt. of wet soil	**406.2**	g
Wet density of soil	**123.1**	pcf
Dry density of soil	**113.1**	pcf
Specific gravity of soil	**2.65**	pcf
Saturation	**50.7**	**%**

MOISTURE CONTENT AFTER TEST		
Wt. of wet soil + cont.	**635.34**	g
Wt. of dry soil + cont.	**560.80**	g
Wt. of container	**190.96**	g
Wt. of water	**74.54**	g
Wt. of dry soil	**369.84**	g
Moisture Content	**20.2**	**%**

Date & time	**Elapsed time (min)**	**Dial Reading**	**Δh, Expansion**
3/11 - 0956	0	0	
3/11 - 1006	10	-0.0010	
Add distilled water to sample			
3/12 - 0956	1440	0.0256	0.0266

Expansion Index = 27

EXPANSION INDEX
(ASTM D4829)

HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers

Client: Geobase, Inc.
HAI Project No.: GBA-16-001
Project Name: Kaiser Vermont
Tested by: SE/KL
Project No.: C.314.76.00
Checked by: MZ
Boring No.: B-1
Depth: 21-25'
Date: 3/22/2016
Soil Description: Olive Brown, Lean Clay (CL)

MOLDED SPECIMEN		
Wt. of wet soil + cont.	**166.76**	g
Wt. of dry soil + cont.	**150.27**	g
Wt. of container **(L19)**	**23.21**	g
Wt. of water	**16.49**	g
Wt. of dry soil	**127.06**	g
Moisture Content	**13.0**	**%**
Wt. of wet soil + ring	**580.19**	g
Wt. of ring	**207.14**	g
Wt. of wet soil	**373.05**	g
Wet density of soil	**113.0**	pcf
Dry density of soil	**100.1**	pcf
Specific gravity of soil	**2.70**	pcf
Saturation	**51.2**	**%**

MOISTURE CONTENT AFTER TEST		
Wt. of wet soil + cont.	**641.63**	g
Wt. of dry soil + cont.	**549.68**	g
Wt. of container	**207.14**	g
Wt. of water	**91.95**	g
Wt. of dry soil	**342.54**	g
Moisture Content	**26.8**	**%**

Date & time	Elapsed time (min)	Dial Reading	Δh, Expansion
3/11 - 1200	0	0	
3/11 - 1210	10	0.0000	
Add distilled water to sample			
3/12 - 1200	1440	0.1074	0.1074

Expansion Index = 107

CONSOLIDATION TEST
(ASTM D2435)

Client :	Geobase, Inc.	***HAI Project No.:***	GBA-16-001
Project Name:	Kaiser Vermont	***Tested by:***	SE/KL
Project No.:	C.314.76.00	***Checked by:***	MZ
		Date:	3/22/2016

Boring No.: B-1 ***Sample No.:*** Ring ***Depth:*** 10-11.5'
Soil Description: Reddish Brown, Clayey Sand (SC)
Type of Sample: Undisturbed ring

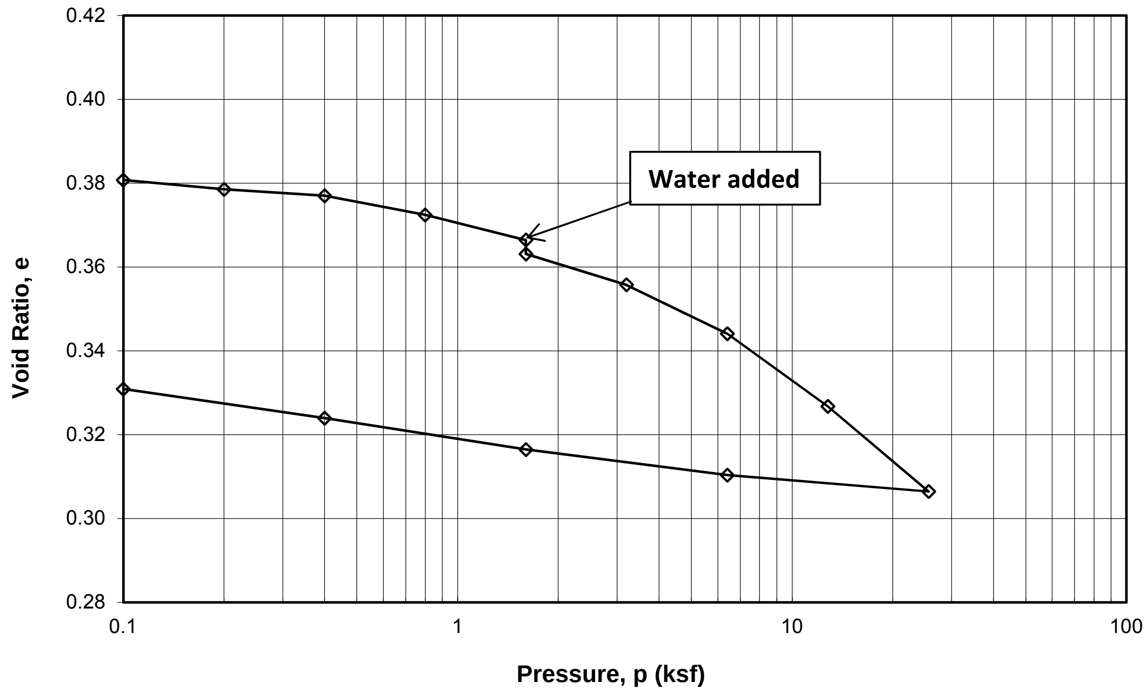
Initial Total Weight (g)	Final Total Weight (g)	Final Dry Weight (g)
155.48	160.20	142.28

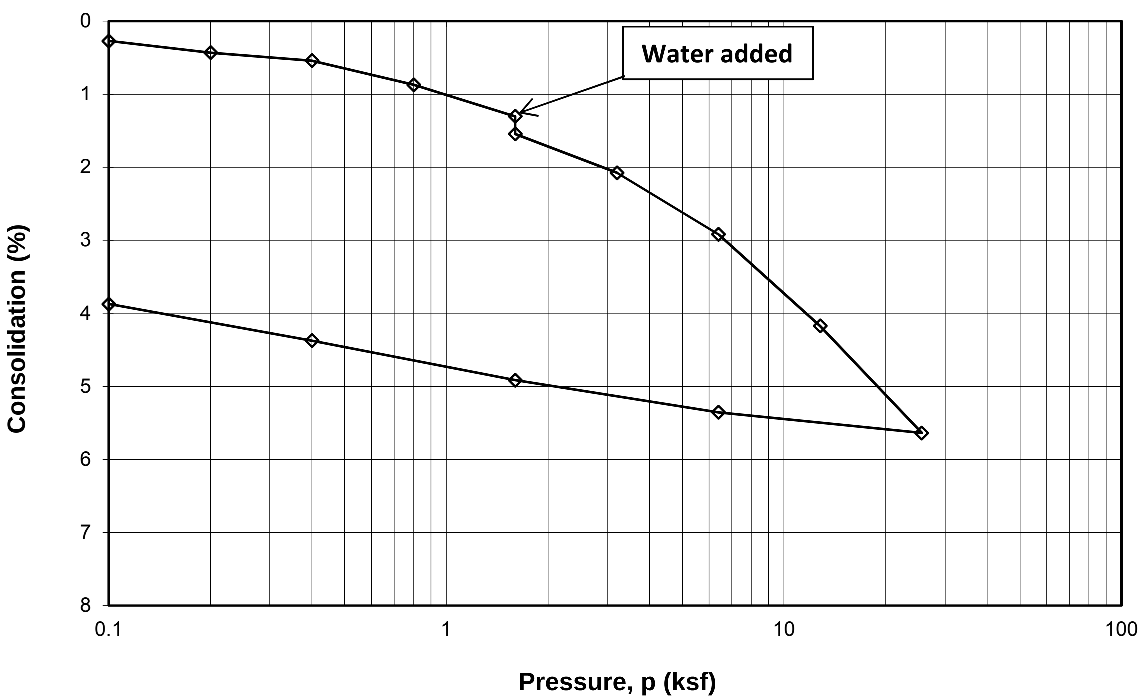
			Initial Conditions	Unload
Height	**H**	**(in)**	0.9970	0.9584
Height of Solids	**Hs**	**(in)**	0.720	0.720
Height of Water	**Hw**	**(in)**	0.176	0.239
Height of Air	**Ha**	**(in)**	0.101	0.000
Dry Density		**(pcf)**	**118.5**	**123.7**
Water Content		**(%)**	**9.3**	**12.6**
Saturation		**(%)**	**63.5**	**100.1**

Load (ksf)	δH (in)	H (in)	Voids (in)	e	Consol. (%)	t_{50} (sec)	a_v (ksf)	M_v (ksf)	
0.01	-------	0.9970	0.277	0.384	0				
0.1	0.0027	0.9943	0.274	0.381	0.3		4.2E-02	3.0E-02	
0.2	0.0043	0.9927	0.273	0.379	0.4		2.2E-02	1.6E-02	
0.4	0.0054	0.9916	0.271	0.377	0.5		7.6E-03	5.5E-03	
0.8	0.0087	0.9883	0.268	0.372	0.9		1.1E-02	8.3E-03	
1.6	0.0130	0.9840	0.264	0.366	1.3		7.5E-03	5.5E-03	
1.6	0.0154	0.9816	0.261	0.363	1.5	**Water Added**			
3.2	0.0207	0.9763	0.256	0.356	2.1		4.6E-03	3.4E-03	
6.4	0.0291	0.9679	0.248	0.344	2.9		3.6E-03	2.7E-03	
12.8	0.0416	0.9554	0.235	0.327	4.2		2.7E-03	2.0E-03	
25.6	0.0562	0.9408	0.221	0.306	5.6		1.6E-03	1.2E-03	
6.4	0.0534	0.9436	0.223	0.310	5.4	**Unload**			
1.6	0.0490	0.9480	0.228	0.316	4.9				
0.4	0.0436	0.9534	0.233	0.324	4.4				
0.1	0.0386	0.9584	0.238	0.331	3.9				

CONSOLIDATION TEST
(ASTM D2435)

Client: Geobase, Inc.
Project Name: Kaiser Vermont
Project No.: C.314.76.00
Boring No.: B-1 ***Sample No.:*** Ring ***Depth:*** 10-11.5'
Soil Description: Reddish Brown, Clayey Sand (SC)
Type of Sample: Undisturbed ring





CONSOLIDATION TEST
(ASTM D2435)

HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers

Client : Geobase, Inc.
Project Name: Kaiser Vermont
Project No.: C.314.76.00

HAI Project No.: GBA-16-001
Tested by: SE/KL
Checked by: MZ
Date: 3/22/2016

Boring No.: B-2 **Sample No.:** Ring **Depth:** 20-21.5'
Soil Description: Dark Olive Brown, Lean Clay (CL)
Type of Sample: Undisturbed ring

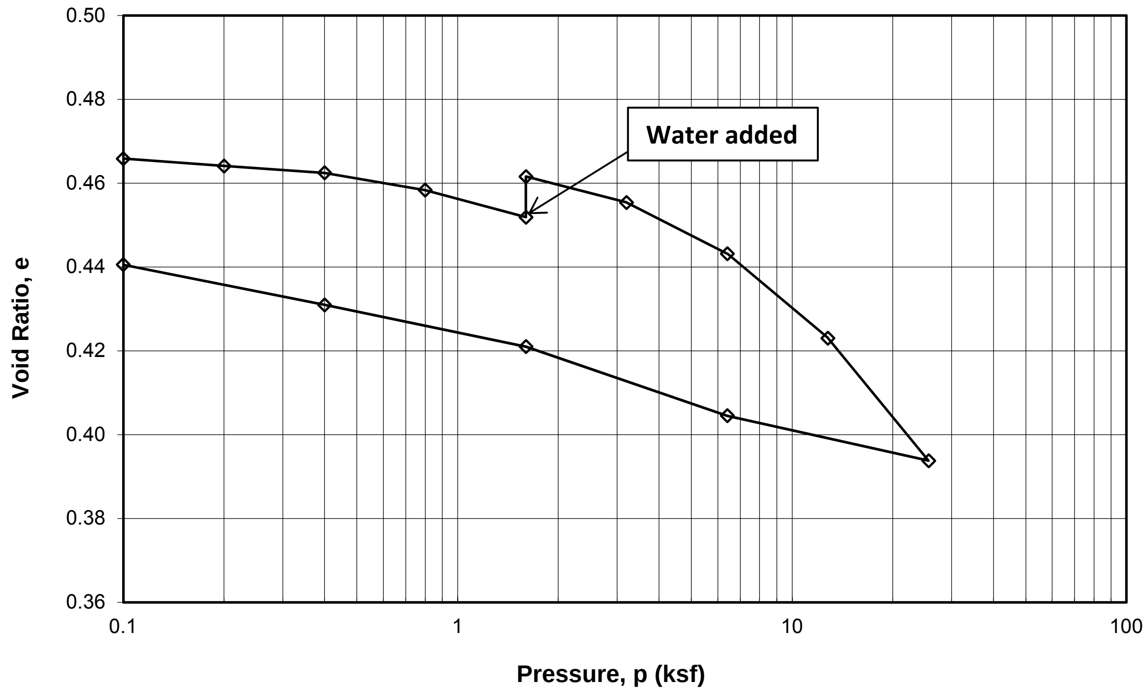
Initial Total Weight (g)	Final Total Weight (g)	Final Dry Weight (g)
161.66	162.69	140.53

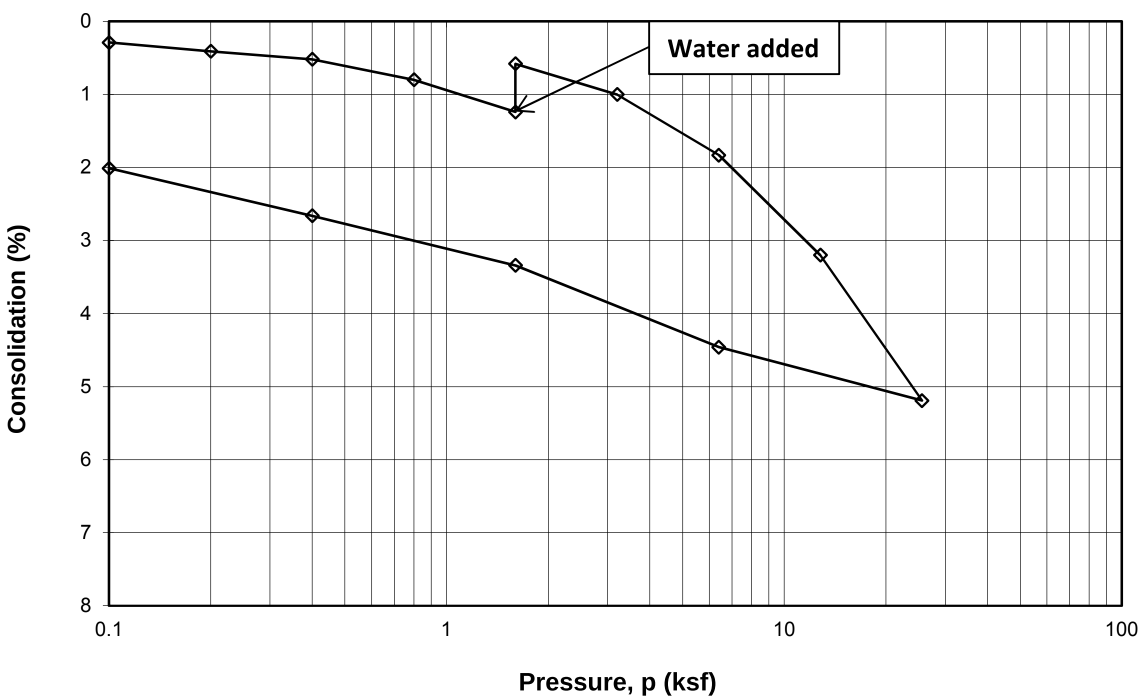
			Initial Conditions	Unload
Height	**H**	**(in)**	1.0000	0.9799
Height of Solids	**Hs**	**(in)**	0.680	0.680
Height of Water	**Hw**	**(in)**	0.281	0.295
Height of Air	**Ha**	**(in)**	0.039	0.005
Dry Density		**(pcf)**	**116.7**	**119.1**
Water Content		**(%)**	**15.0**	**15.8**
Saturation		**(%)**	**88.0**	**98.4**

Load (ksf)	δH (in)	H (in)	Voids (in)	e	Consol. (%)	t_{50} (sec)	a_v (ksf)	M_v (ksf)	
0.01	-------	1.0000	0.320	0.470	0				
0.1	0.0029	0.9971	0.317	0.466	0.3		4.7E-02	3.2E-02	
0.2	0.0041	0.9959	0.316	0.464	0.4		1.8E-02	1.2E-02	
0.4	0.0052	0.9948	0.315	0.462	0.5		8.1E-03	5.5E-03	
0.8	0.0080	0.9920	0.312	0.458	0.8		1.0E-02	7.1E-03	
1.6	0.0124	0.9876	0.307	0.452	1.2		8.1E-03	5.6E-03	
1.6	0.0058	0.9942	0.314	0.462	0.6	**Water Added**			
3.2	0.0100	0.9900	0.310	0.455	1.0		3.9E-03	2.7E-03	
6.4	0.0183	0.9817	0.301	0.443	1.8		3.8E-03	2.6E-03	
12.8	0.0320	0.9680	0.288	0.423	3.2		3.1E-03	2.2E-03	
25.6	0.0519	0.9481	0.268	0.394	5.2		2.3E-03	1.6E-03	
6.4	0.0446	0.9554	0.275	0.405	4.5	**Unload**			
1.6	0.0334	0.9666	0.286	0.421	3.3				
0.4	0.0266	0.9734	0.293	0.431	2.7				
0.1	0.0201	0.9799	0.300	0.441	2.0				

CONSOLIDATION TEST
(ASTM D2435)

Client: Geobase, Inc.
Project Name: Kaiser Vermont
Project No.: C.314.76.00
Boring No.: B-2 ***Sample No.:*** Ring ***Depth:*** 20-21.5'
Soil Description: Dark Olive Brown, Lean Clay (CL)
Type of Sample: Undisturbed ring





CONSOLIDATION TEST
(ASTM D2435)

HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers

Client : Geobase, Inc.
Project Name: Kaiser Vermont
Project No.: C.314.76.00

HAI Project No.: GBA-16-001
Tested by: SE/KL
Checked by: MZ
Date: 3/22/2016

Boring No.: B-2 ***Sample No.:*** Ring ***Depth:*** 40-41.5'
Soil Description: Olive Brown, Fat Clay with Sand (CH)
Type of Sample: Undisturbed ring

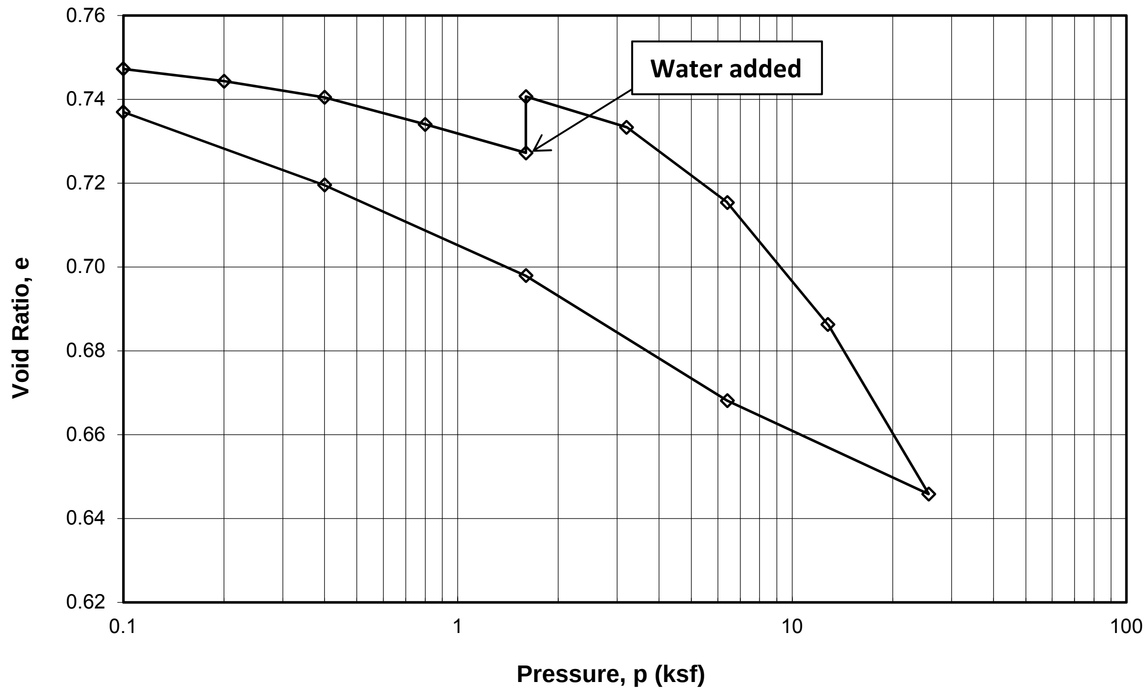
Initial Total Weight (g)	Final Total Weight (g)	Final Dry Weight (g)
149.59	152.36	119.85

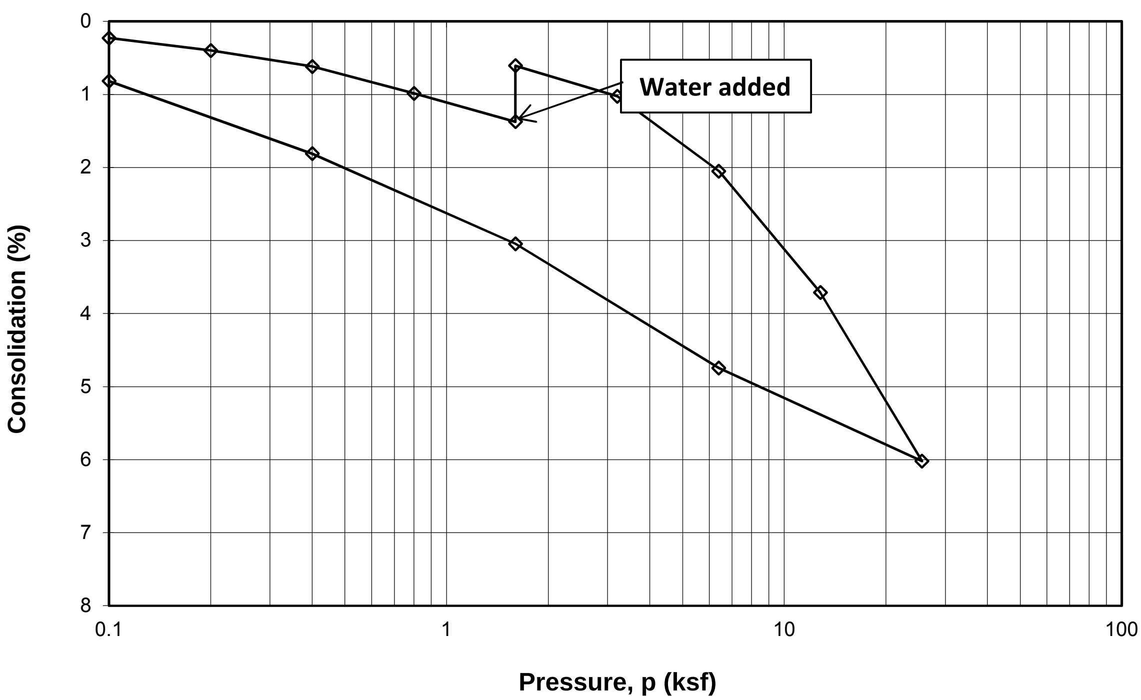
			Initial Conditions	Unload
Height	**H**	**(in)**	1.0050	0.9968
Height of Solids	**Hs**	**(in)**	0.574	0.574
Height of Water	**Hw**	**(in)**	0.396	0.433
Height of Air	**Ha**	**(in)**	0.035	-0.010
Dry Density		**(pcf)**	**99.1**	**99.4**
Water Content		**(%)**	**24.8**	**27.1**
Saturation		**(%)**	**91.8**	**102.3**

Load (ksf)	δH (in)	H (in)	Voids (in)	e	Consol. (%)	t_{50} (sec)	a_v (ksf)	M_v (ksf)	
0.01	-------	1.0050	0.431	0.751	0				
0.1	0.0023	1.0027	0.429	0.747	0.2		4.5E-02	2.5E-02	
0.2	0.0040	1.0010	0.427	0.744	0.4		3.0E-02	1.7E-02	
0.4	0.0062	0.9988	0.425	0.740	0.6		1.9E-02	1.1E-02	
0.8	0.0099	0.9951	0.421	0.734	1.0		1.6E-02	9.3E-03	
1.6	0.0138	0.9912	0.417	0.727	1.4		8.5E-03	4.9E-03	
1.6	0.0061	0.9989	0.425	0.741	0.6	**Water Added**			
3.2	0.0103	0.9947	0.421	0.733	1.0		4.6E-03	2.6E-03	
6.4	0.0206	0.9844	0.411	0.715	2.0		5.6E-03	3.3E-03	
12.8	0.0373	0.9677	0.394	0.686	3.7		4.5E-03	2.7E-03	
25.6	0.0605	0.9445	0.371	0.646	6.0		3.2E-03	1.9E-03	
6.4	0.0477	0.9573	0.383	0.668	4.7	**Unload**			
1.6	0.0306	0.9744	0.401	0.698	3.0				
0.4	0.0182	0.9868	0.413	0.720	1.8				
0.1	0.0082	0.9968	0.423	0.737	0.8				

CONSOLIDATION TEST
(ASTM D2435)

Client: Geobase, Inc.
Project Name: Kaiser Vermont
Project No.: C.314.76.00
Boring No.: B-2 ***Sample No.:*** Ring ***Depth:*** 40-41.5'
Soil Description: Olive Brown, Fat Clay with Sand (CH)
Type of Sample: Undisturbed ring





HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers

DIRECT SHEAR TEST

(ASTM D3080)

HAI Pr No.: GBA-16-001
Tested by: KL/SE
Checked by: MZ
Date: 3/22/2016

Client: Geobase Inc.
Project Name: Kaiser Vermont
Project Number: C.314.76.00

Boring No.: B-1

Sample No.: Ring

Depth (ft): 10-11.5'

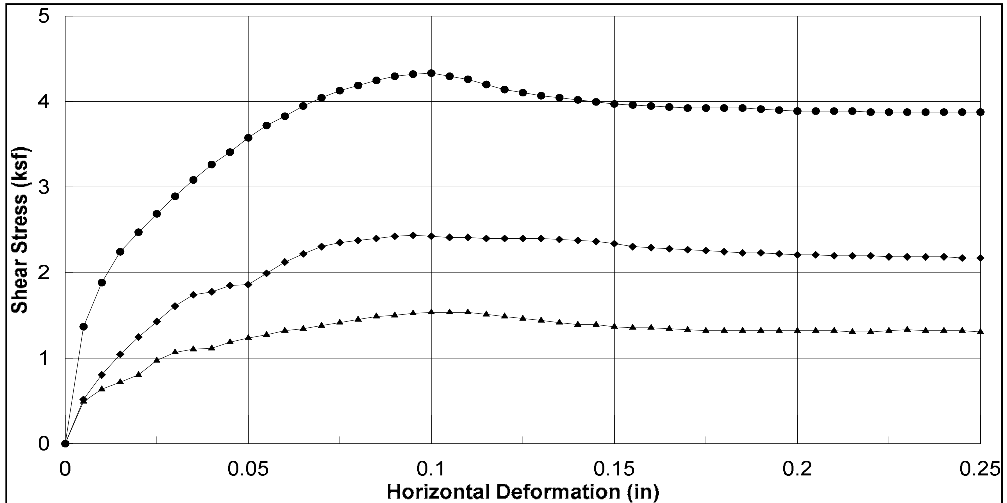
Soil description: Reddish Brown, Clayey Sand (SC)
Sample type: Undisturbed Ring

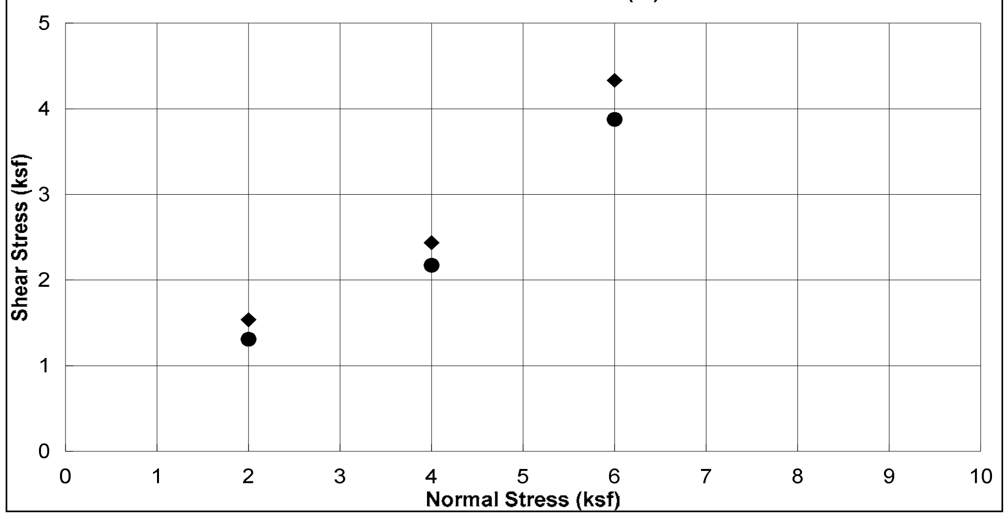
Type of test: Consolidated, Drained

	▲	◆	⬣
Normal Stress (ksf)	**2**	**4**	**6**
Deformation Rate (in/min)		**0.001**	

Peak Shear Stress (ksf) ◆	**1.54**	**2.44**	**4.33**
Shear stress @ end of test (ksf) ⬣	**1.31**	**2.17**	**3.88**

Initial height of sample (in)	**1**	**1**	**1**
Height of sample before shear (in)	**0.9615**	**0.9745**	**0.9660**
Diameter of sample (in)	**2.42**	**2.42**	**2.42**
Initial Moisture Content (%)	**8.9**	**8.9**	**8.9**
Final Moisture Content (%)	**12.4**	**12.4**	**11.0**
Dry Density (pcf)	**119.6**	**121.7**	**120.4**
Final Saturation (%)	**102.4**	**103.5**	**91.0**





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Geotechnical and Earthquake Engineers

DIRECT SHEAR TEST

(ASTM D3080)

HAI Pr No.: GBA-16-001
Tested by: KL/SE
Checked by: MZ
Date: 3/22/2016

Client: Geobase Inc.
Project Name: Kaiser Vermont
Project Number: C.314.76.00

Boring No.: B-2

Sample No.: Ring

Depth (ft): 20-21.5'

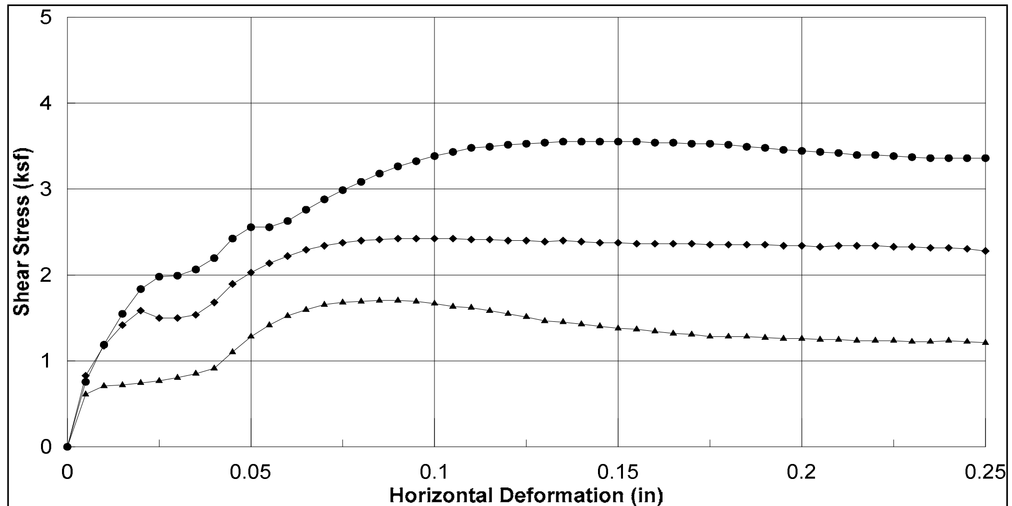
Soil description: Dark Olive Brown, Sandy Lean Clay (CL)
Sample type: Undisturbed Ring

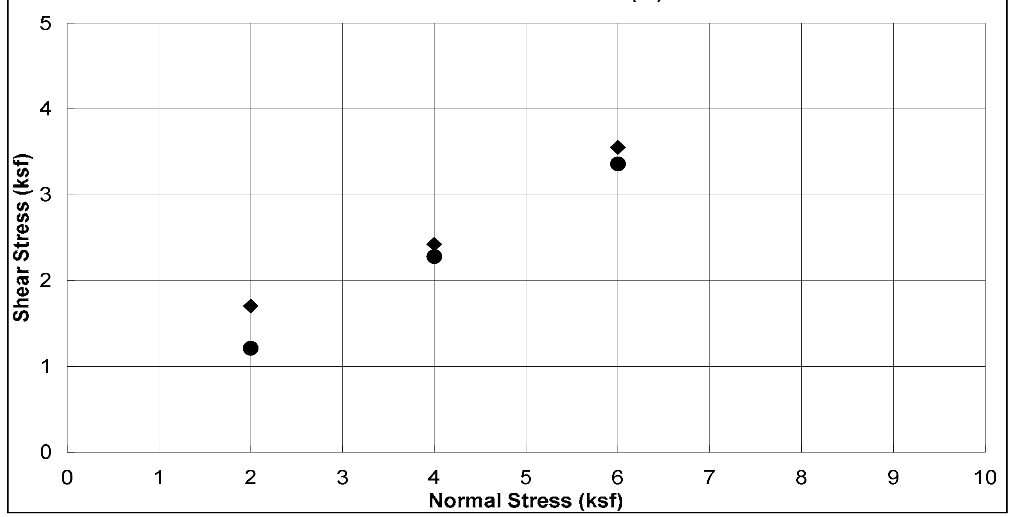
Type of test: Consolidated, Drained

	▲	◆	●
Normal Stress (ksf)	**2**	**4**	**6**
Deformation Rate (in/min)		**0.001**	

Peak Shear Stress (ksf) ◆	**1.70**	**2.42**	**3.55**
Shear stress @ end of test (ksf) ●	**1.21**	**2.28**	**3.36**

Initial height of sample (in)	**1**	**1**	**1**
Height of sample before shear (in)	**0.9893**	**0.9759**	**0.9619**
Diameter of sample (in)	**2.42**	**2.42**	**2.42**
Initial Moisture Content (%)	**13.2**	**13.2**	**13.2**
Final Moisture Content (%)	**15.7**	**14.9**	**14.3**
Dry Density (pcf)	**118.8**	**119.8**	**120.0**
Final Saturation (%)	**100.7**	**102.7**	**104.8**





HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers

DIRECT SHEAR TEST

(ASTM D3080)

HAI Pr No.: GBA-16-001
Tested by: KL/SE
Checked by: MZ
Date: 3/22/2016

Client: Geobase Inc.
Project Name: Kaiser Vermont
Project Number: C.314.76.00

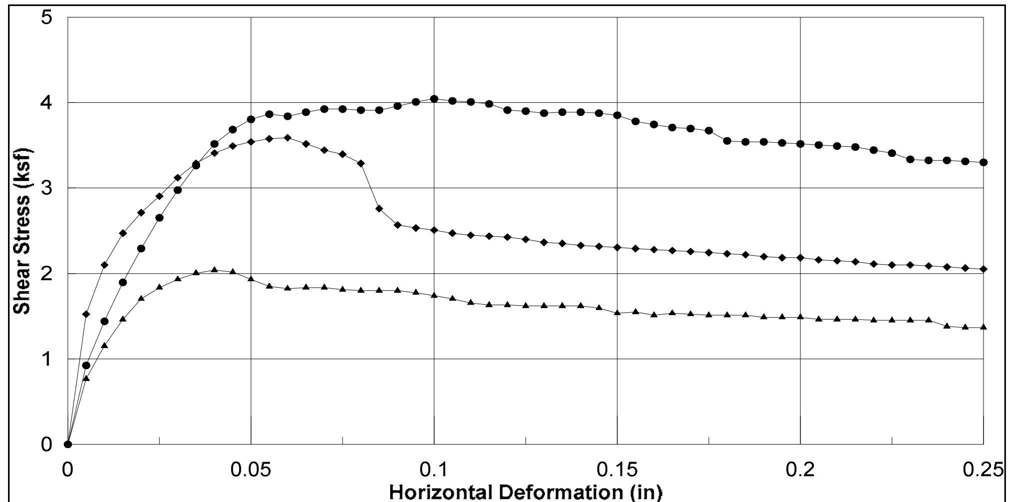
Boring No.: B-2

Sample No.: Ring

Depth (ft): 40-41.5'

Soil description: Olive Brown, Fat Clay with Sand (CH)
Sample type: Undisturbed Ring

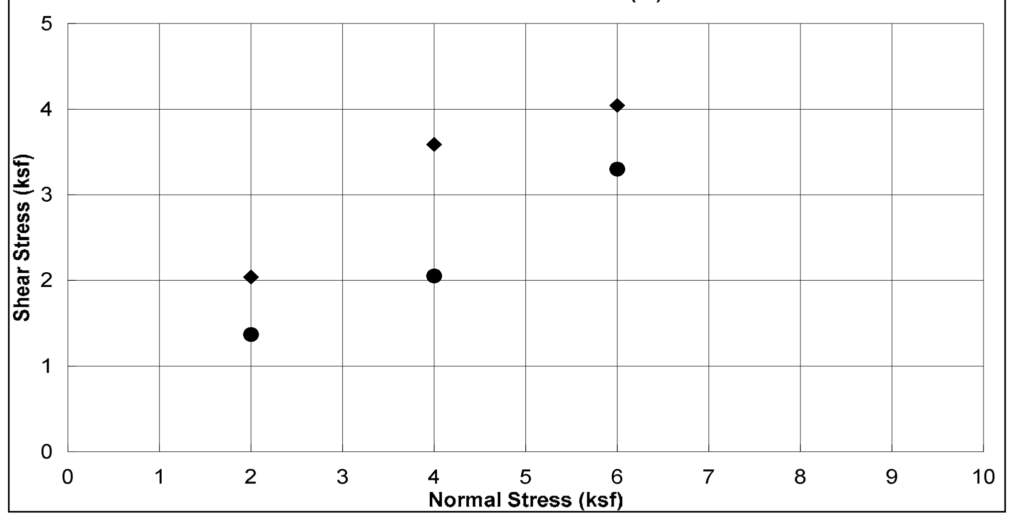
Type of test: Consolidated, Drained



	▲	◆	●
Normal Stress (ksf)	**2**	**4**	**6**
Deformation Rate (in/min)		**0.001**	

Peak Shear Stress (ksf) ◆	**2.04**	**3.59**	**4.04**
Shear stress @ end of test (ksf) ●	**1.37**	**2.05**	**3.30**

Initial height of sample (in)	**1**	**1**	**1**
Height of sample before shear (in)	**0.9931**	**0.9837**	**0.9759**
Diameter of sample (in)	**2.42**	**2.42**	**2.42**
Initial Moisture Content (%)	**22.4**	**22.4**	**22.4**
Final Moisture Content (%)	**24.0**	**24.3**	**24.3**
Dry Density (pcf)	**104.4**	**103.3**	**102.8**
Final Saturation (%)	**102.6**	**103.3**	**104.6**



EXPANSION POTENTIAL

ASTM D4829

SOIL SAMPLE LOCATION (feet)	EXPANSION INDEX	EXPANSION POTENTIAL
B-1 at 1.0-5.0	27	Low
B-1 at 20.0-25.0	107	High

WATER-SOLUBLE SULFATES

CT-417

SOIL SAMPLE LOCATION (feet)	SOLUBLE SULFATES PPM	POTENTIAL FOR ATTACK ON CONCRETE
B-1 at 20.0-25.0	136	Low

CORROSIVITY SERIES TEST

SOIL SAMPLE LOCATION (feet)	pH (CT 643)	SOLUBLE CHLORIDE (CAL.422) (PPM)	ELEC. RESISTIVITY (CAL.643) (OHM-CM)	POTENTIAL FOR ATTACK ON STEEL (SENATOROFF)
B-1 at 20.0-25.0	443	7.8	960	Severe

ANAHEIM TEST LABORATORY

3008 ORANGE AVENUE
SANTA ANA, CALIFORNIA 92707
PHONE (714) 549-7267

TO:

GEOBASE
23362 PERALTA DRIVE, # 4&6
LAGUNA HILLS, CA. 92653

DATE: 03/08/16

P.O. NO.: VERBAL

LAB NO. : B-9162

SPECIFICATION: CA-417/422/643

MATERIAL: SOIL

ATTN: BOB PEARSON
JOHN C

PROJECT #: C.314.76.00

ANALYTICAL REPORT

CORROSION SERIES
SUMMARY OF DATA

	PH	SOLUBLE SULFATES per CA. 417 ppm	SOLUBLE CHLORIDES per CA. 422 ppm	MIN. RESISTIVITY per CA. 643 ohm-cm
B-1 @ 20’-25’	7.8	136	443	960

RESPECTFULLY SUBMITTED

WES BRIDGER CHEMIST

E-5 Vertebrate Paleontological Records Check for paleontological resources for the proposed Kaiser Permanente Los Angeles Medical Center Project, in the City of Los Angeles, Los Angeles Count

Natural History Museum
of Los Angeles County
900 Exposition Boulevard
Los Angeles, CA 90007

tel 213.763.DINO
www.nhm.org

NATURAL HISTORY MUSEUM
LOS ANGELES COUNTY

Vertebrate Paleontology Section
Telephone: (213) 763-3325

e-mail: smcleod@nhm.org

6 November 2018

Dudek
605 Third Street
Encinitas, CA 92024

Attn: Sarah Siren, Senior Paleontologist

re: Vertebrate Paleontology Records Check for paleontological resources for the proposed Kaiser Permanente Los Angeles Medical Center Project, in the City of Los Angeles, Los Angeles County, project area

Dear Sarah:

I have conducted a thorough search of our paleontology collection records for the locality and specimen data for the proposed Kaiser Permanente Los Angeles Medical Center Project, in the City of Los Angeles, Los Angeles County, project area as outlined on the portion of the Hollywood USGS topographic quadrangle map that you sent to me via e- mail on 1 November 2018. We do not have any vertebrate fossil localities that occur within the boundaries of the proposed project area, but we do have a locality adjacent to the proposed project area and others nearby from the same sedimentary deposits that occur in the proposed project area, either at the surface or at depth.

Surface deposits throughout the entire proposed project area consist of soil on top of older Quaternary Alluvium, derived as alluvial fan deposits from the Hollywood Hills immediately to the north. The uppermost layers of these deposits in this area typically do not contain significant fossil vertebrate remains. Just north of west of the proposed project area, however, we have four vertebrate fossil localities, LACM 6297-6300, collected from these late Pleistocene deposits at depths between 47 and 80 feet below the surface along Hollywood Boulevard between the Hollywood Freeway (Highway 101) and Western Avenue during excavations for the MTA Metrorail Red Line tunnels and stations. Fossil horse, *Equus*, bison, *Bison*, camel, *Camelops*, and mastodon, *Mammut americanum* specimens were recovered from these localities. A little farther away though, fossil vertebrates have been recovered at shallower depths. Just east of south of the proposed project area, east of Vermont Avenue and north of the Hollywood Freeway (Highway 101) at about the intersection of Madison Avenue and Middlebury Street, our vertebrate fossil locality LACM 3250 produced a fossil specimen of mammoth, *Mammuthus*, at a depth of about eight feet below street level. South-southwest of the proposed project area near the intersection of Western Avenue and Council Street, our older Quaternary locality LACM 5845 produced a specimen of fossil mastodon, Mammutidae, at a depth of only 5-6 feet below the surface.

On Olive Hill, adjacent to the northernmost portion of the proposed project area, there are exposures of the marine late Miocene Puente Formation (portions of which have also been called the Modelo Formation, the Monterey Formation, or even an unnamed shale in this area) that probably occur at unknown depth elsewhere in the proposed project area. We have numerous localities from the Puente Formation nearby from excavations for the Metrorail Red Line stations and tunnels. Our Puente Formation locality LACM 6948, from the excavations for the Metrorail Red Line at Vermont / Sunset, is approximately adjacent to proposed project area. Just to the north around Barnsdall Park our Puente Formation localities from these Metrorail Red Line excavations are LACM 6205-6207. Further south along Vermont Avenue, at the Vermont / Santa Monica and Vermont / Beverly Metrorail Red Line stations, we have the Puente Formation localities LACM 6946-6947. These localities produced a rich suite of fossil fish as detailed in the attached appendix.

Shallow excavations in the older Quaternary Alluvium exposed throughout the proposed project area are unlikely to uncover significant vertebrate fossils. Deeper excavations that extend down into older deposits, however, however, may well encounter significant vertebrate fossil remains. Any substantial excavations in the proposed project area, therefore, should be monitored closely to quickly and professionally recover any fossil remains discovered while not impeding development. Also, sediment samples should be collected and processed to determine the small fossil potential in the proposed project area. Any fossils collected should be placed in an accredited scientific institution for the benefit of current and future generations.

This records search covers only the vertebrate paleontology records of the Natural History Museum of Los Angeles County. It is not intended to be a thorough paleontological survey of the proposed project area covering other institutional records, a literature survey, or any potential on-site survey.

Sincerely,

Samuel A. McLeod

Samuel A. McLeod, Ph.D.
Vertebrate Paleontology

enclosures: appendix, invoice

Composite fossil fish fauna from LACM localities
recovered from MTA Metrorail Red Line excavations
along Vermont Avenue from about Beverly Boulevard to Hollywood Boulevard

Osteichthyes	
Atheriniformes	
Belonidae	- needlefishes
Beryciformes	
Melamphaeidae	- bigscales
Scopelogadus	
Clupeiformes	
Clupeidae	- shads & herrings
Ganolytes cameo	
Xyne grex	
Gadiformes	
Moridae	- moras
Myctophiformes	
Myctophidae	- lanternfishes
Diaphus	
Neoscopelidae	- blackchins
Scopelengys	
Perciformes	
Carangidae	- jacks; amberjacks; pompanos
Decapterus	
Gempylidae	- snake mackerels; escolars; oilfishes
Thyrsocles	
Sciaenidae	- croakers
Genyonemus	
Lompoquia	
Scombridae	- mackerels & tunas
Sarda	
Scomber	
Serranidae	- sea basses & groupers
Paralabrax	
Sparidae	- porgies
Plectrites classeni	
Salmoniformes	
Alepocephalidae	- slickheads
Argentinidae	- smelts
Argentina	
Bathylagidae	- deep sea smelts
Bathylagus	
Stomiatiformes	
Chauliodontidae	- extinct deep-sea fishes
Chauliodus eximius	
Gonostomidae	- bristlemouths
Cyclothone	
Sternoptychidae	- hatchetfishes
Argyropelecus	
Danaphos	