GEO ENVIRON ENGINEERING CONSULTANTS, INC.
CIVIL • GEOTECHNICAL • ENVIRONMENTAL
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Job No. 22-1187P
April 7, 2022

Mr. Moti Balyan
22736 Victory Blvd.
Woodland Hills, Ca 91367

Subject: **Geotechnical Investigation Report for Foundation Design, Proposed Automatic Carwash, 22736 Victory Blvd, Woodland Hills, California**

Reference:

1) J.K. Architect, 8/5/2019, "Site Plan, Proposed Fallbrook Automatic Carwash, 22736 Victory Blvd, Woodland Hills, California

Dear Mr. Balyan :

In accordance with your request and authorization, we have performed a preliminary geotechnical engineering investigation for the subject project. The accompanying report presents the preliminary results of our field exploration work, laboratory tests, our geotechnical experience previously performed in the vicinity of the project site, as well as engineering analysis. The subsurface and foundation conditions are discussed and preliminary recommendations for the geotechnical engineering aspects of the project are presented.

This opportunity to be of service is appreciated. If you have any questions concerning our findings, please call at your convenience.

Respectfully submitted,

Geo Environ Eng. Consultants, Inc.

REGISTERED PROFESSIONAL ENGINEER
FAHAD MASUD
No.92662
Exp 9/30/23
CIVIL
STATE OF CALIFORNIA

Jabed Masud, MSCE
President

Fahad Masud, PE
Vice President

JM/FM/gm

Attachments: Appendix 'A' - Drawings
Appendix 'B' - Boring Logs
Appendix 'C' - Laboratory Test Results
Appendix 'D' -Liquefaction Analysis

SCOPE

The scope of this study designed to determine and evaluate the surface and subsurface conditions of the subject site and to present preliminary recommendations for the foundation systems and grading requirements as they relate to the planned development

The scope included the following geotechnical functions:

- Review of available literature pertaining to the site and vicinity.
- Evaluation of natural and manmade surface features at the site and contiguous areas.
- Drilling and logging of exploratory borings to determine the character and distribution of earth materials.
- Securing of bulk and undisturbed samples of earth materials from the borings for laboratory testing.
- Laboratory testing of selected samples.
- Geotechnical engineering analysis of data obtained during the study.
- Preparation of this report and the accompanying illustrations to present the findings, conclusions, and recommendations pertaining to the planned construction.

The scope of work did not include any environmental assessment of the property or opinions relating to possible soil or subsurface contamination by hazardous or toxic substances.

SITE DESCRIPTION

Location

The subject property upon which the soil exploration has been performed is located at south east corner of Victory Blvd and Fallbrook Ave, approximately 2 miles north of 405 Freeway, Woodland Hills, City of Los Angeles, California. Surrounding the site are commercial properties.

Site Conditions

The subject site is an existing self service carwash facility. The property is flat with covered with covered pavement, carwash bays and parking stall.

PROPOSED DEVELOPMENT

Preliminary details of the proposed construction and the reference drawing were provided by the client..

A service station comprised of a carwash (4072 sft), detail with a 2nd story on top (703 sft) parking and drive pavements, etc., are planned within the subject site. The height of the structures between 26 to 32 feet.

We anticipate the structures will be reinforced masonry or steel frame construction. Structures foundations are expected to consist of conventional shallow, isolated spread or continuous slab with turned down edge (grade beam) footings.

Foundation loads were not provided at this time , however, foundation loads are anticipated to exert bearing pressures ranging between 1500 and 2500 per square foot (psf).

Minor cut and fill grading are anticipated within the proposed construction areas. Should details involved in final design vary from those outlined above, this firm should be notified for review and possible revision of our recommendations.

FIELD STUDY

A field study consisting of site observations and subsurface exploration was conducted on March 28, 2022. Two exploratory borings were drilled in the vicinity of the proposed constructions to a maximum depth of 50 feet. The soils encountered in the exploratory borings were logged by our field personnel. The boring logs are included in Appendix ‘A’. The approximate location of the borings are are shown on the plot plan in Appendix ‘C’.

Disturbed and undisturbed samples of the soils encountered were obtained at frequent intervals in the borings. Undisturbed samples were obtained by driving a thin walled steel sampler with successive drops of a 140-pound weight having a free fall of 30 inches. The blow count for each one foot of penetration is shown on the boring logs. Undisturbed soils were retained in brass rings with a 1-inch height and 2.413-inch in side diameter. The ring samples were retained in close fitting moisture proof containers and transported to our laboratory for testing. The exploratory borings used for subsurface exploration were backfilled with reasonable effort to restore the area to their original condition prior to leaving the site.

LABORATORY TESTS

The results of laboratory tests performed on disturbed, undisturbed, and remolded soil samples are presented in appendix 'C'. Following is a listing and brief explanation of the laboratory tests which were performed as part of this study. The remaining soil samples are stored in our laboratory for future reference. Unless notified to the contrary, all samples will be disposed of 30 days after this report.

Classification

The field classification of the soils were verified in the laboratory in general accordance with the Unified Soil Classification System. The final classification is shown on the boring logs.

Field Moistures and Densities

The field moisture content was determined for each of the disturbed and undisturbed soil samples. The dry density was also determined for each of the undisturbed samples. The dry density is determined in pounds per cubic foot and the field moisture content is determined as a percentage of the dry weight of the soil. Both results are shown on boring logs.

Consolidation Tests

Settlement predictions of the soil's behavior under load were made on the basis of the consolidation tests which are performed in general accordance with ASTM D-2435 procedures. The Consolidation apparatus is designed to receive a one inch high ring.

Expansion Characteristics

Laboratory expansion tests were performed on a near surface soil sample in general accordance with ASTM D-4829 procedures.

Direct Shear Test

Direct Shear test was performed in the Direct Shear Test Machine which is of the strain control type in general with ASTM D-3080 procedure. Each sample was sheared under varying pressures normal to the face of the specimen to determine the shear strength (cohesion and angle of internal friction). Samples were tested in a submerged condition. The result is plotted on the "Direct Shear Test Graph."

Grain Size Distribution

Particle size analyses were performed in accordance with ASTM Test Method D422-63.

Atterberg's Limits Test

Atterberg's Limits Test was performed in general accordance with ASTM-4318 procedure. The liquid limit was determined in the laboratory with the help of the standard liquid limit apparatus. Plastic limit was determined by forming ball with about 10 gram of plastic soil mass and rolled between fingers. The moisture content for both tests were determined and plasticity index was calculated.

GEOTECHNICAL CONDITIONS

Earth Materials

The site is underlain with **sandy silt to silt** to 10 feet ; **sandy, silty clay** to 25 feet, then **clayey sand to poorly graded sand** to the end of our boring at a maximum depth of 50 feet below existing grade at the boring locations.

Detailed description of the earth materials encountered is presented on the log boring in Appendix 'A'. The soil strata as shown on the drill log represents the soil conditions in the actual boring locations and other variations may occur within the site. Lines of demarcation represent the approximate boundary between the soil types, but the transition may be gradual.

Groundwater

We drilled to a depth of 50 feet below the existing grade and groundwater was encountered at 28.5 feet below existing grade in the exploratory borings during this investigation. The historic groundwater may have existed at 20 feet below grade based on the map published by the USGS.

Seismicity

The frequency of earthquake and intensity of seismic ground shaking to be expected at the site depends upon which fault produces the earthquake, the earthquake magnitude and the distance to the epicenter.

Nearby active fault lines include the Malibu Coast, Santa Susana ; these have associated postulated, maximum probable earthquake magnitudes of 6.5. In turn, the probabilistic ground motion acceleration range upwards to $\pm$ 0.682 g. The related California Building Code factors include the type b, Malibu Coast fault the near source zone is within 1.4 kilometers toward the north and a soil profile type of alluvium or Sd.

Based on the California Building Code acceptance of some structural damage without collapse, the subject development may be designed in accordance with the seismic formulas and requirements presented in the current version of the California Building Code. It is the responsibility of the project structural engineer to utilize the critical seismic factors to be used for building design and to implement the applicable sections of the code.

Liquefaction

Liquefaction involves a sudden loss in strength of a saturated, cohesion less soil which is caused by shock or strain, and results in temporary transformation of the soil to a fluid mass. If the liquefying layer is near enough to the ground surface, the effects can be much like that of quicksand on any structure located on it. The surface effects of liquefaction, which may result in damage to structures in the vicinity, typically take the form of sand boils, ground fissures, or differential ground settlement.

The current standard of practice, as outlined in the California Building Code, requires liquefaction analysis to a depth of 50 feet, although the noticeable effects of liquefaction typically occur in areas where the groundwater is much shallower, usually much less than 30 feet from the surface. Liquefaction typically occurs in areas where the soils below water table are composed of poorly consolidated, fine to medium grained, primarily sandy soil. In addition to the necessary soil conditions, the ground acceleration of the earthquake must also be of a sufficient level to initiate liquefaction. The design ground acceleration typically utilized in liquefaction analysis is the acceleration which has a 10 percent probability of being exceeded in a 50 -year structural life.

A computer program "GEOLOGISMIKI" is used to evaluate the potential foe earthquake - induced liquefaction. The potential for liquefaction was evaluated for site peak ground acceleration and the MCEg peak ground acceleration. The PGAm was calculated to be 0.682 using Table 11.8-1 of ASCE-7-16. **The liquefaction analyses were performed using 1) full PGAm (a 2 % probability of exceedance in 50 years, 2475 -year return period), 2) 2/3 PGAm (a 10 % probability of exceedance in 50 years, 475-year return period.** The seismic induced settlements were calculated to be 0.929 inch for both full PGA and 2/3 PGA. The computer analyses and the results are attached herein (Appendix 'D').

CONCLUSIONS

1) The plan construction and development of the site is considered feasible from a geotechnical engineering point of view provided the engineering recommendations of this report are followed.

2) The surface and the subsurface soil on the site will be adequate for the support of the structure and any fill soils proposed for the site.

3) The proposed structure, grading, and development of the site will not cause adverse safety hazards or instability to the adjacent properties or their structures.

4) conversely, the adjacent properties or their structures will not cause adverse safety hazards or instability to the planned development.

5) Laboratory expansion test indicate that the soils on the site have low expansion potential.

6) The groundwater was not encountered in the soil borings.

7) The site, in general, is not designated as susceptible to liquefaction.

RECOMMENDATIONS

Site Preparation and Rough Grading

The following recommendations may need to be modified and/ or supplemented during rough grading as field conditions necessitate.

Prior to general grading operations, the existing structures including pavements on the site shall be demolished and the debris hauled off the site. All soils disturbed during site clearing should be removed and stockpiled for later use as structural fill.

The proposed building area should be overexacavated and processed 3.0 feet below the existing grade or 2.0 feet below proposed footing bottoms, whichever is greater, then replaced as a compacted fill. Wherever possible, the limits of overexcavation for building areas shall extend at least 5 feet beyond the proposed building limits or to the property line whichever is less.

The proposed parking and drive areas should be scarified and compacted 12 inches below the proposed finished grade.

The competency of the exposed overexcavation bottoms must be determined by the soil engineer or his representative at the time they are exposed and prior to scarification or placement of fill.

All overexcavation bottoms and any areas to receive fill shall be scarified a minimum of 6 inches, watered or aerated as necessary to achieve optimum moisture content, and properly compacted to at least 95% of maximum dry density prior to filling.

For the purpose of estimating earthwork quantities, a shrinkage factor of 10-15 % may be assumed for the existing near surface on-site soil to be used as fill and compacted to 95% of maximum dry density. Subsidence due to grading is estimated to be .1 feet.

Any soil to be placed as fill, whether natural or import, shall be approved by the soil engineer or his representative prior to their placement. The fill material shall be free from vegetation, organic material or debris. Import soil shall be no more expansive than the existing near surface soils on the site. Suitable fill soil shall be placed in horizontal lifts not exceeding 6 inches in thickness after compaction and uniformly watered or aerated to obtain optimum moisture content. Each layer shall be spread evenly and shall be thoroughly mixed during the spreading to ensure uniformity of the soil and optimum moisture in each layer. After each lift has been placed, it shall be thoroughly compacted to not less than 90% of maximum dry density.

The soil engineer or his representative shall observe the placement of fill and should take sufficient tests to verify the moisture content and the uniformity and degree of compaction obtained. In-place density testing should be performed in accordance with ASTM acceptable to the local building authority. The optimum moisture content and the maximum dry density for compacted soils shall be determined in accordance with ASTM D-1557 procedures.

Due to the possibility of imported fill soil in the building areas and / or variable soil strata that may be exposed in the building pad, typical soil samples should be obtained at completion of rough grading for laboratory testing to confirm the expansion characteristics of the graded site.

FOUNDATION RECOMMENDATIONS

Building Footings

- All exterior continuous footings shall be founded to a minimum depth of 18-inches below the lowest adjacent finished grade .
- Interior footings may be founded at a depths of 12-inches below the lowest adjacent finished grade.
- Column footings shall be a minimum of 18 inches by 18 inches in width and tied with grade beams.
- Continuous footings shall be a minimum width of 15 inches.
- Continuous footing shall be reinforced with at least two (2) # 4 rebars at the top and at the bottom of the footing in order to minimize the effects of any minor variations in the engineering characteristics in the supporting soils.

Canopy Footings

Canopy Structures, if planned All footings shall be penetrated into the competent native soils. The preliminary design indicates the size of the foundation to be 5.0 feet in diameter and 8.0 to 10 feet in depths.

Allowable Soil Bearing Capacities

Based on the field and laboratory test data, a safe allowable soil bearing value of 2000 psf is recommended for the design of the continuous and spread footings. A maximum allowable soil bearing value of 6000 psf is recommended for the design of canopy footings embedded into competent native soils. A 1/3 increase in the above bearing value may be used when considering short term loading from wind or seismic sources.

Settlement (Static plus Seismic)

Using the recommended bearing value and the maximum assumed wall and column loads, the proposed structure is not anticipated to exceed a maximum total settlement of 1.4 inches. Maximum differential settlement is expected to be less than 0.7 an inch over a span of 30 feet.

Lateral Bearing Pressure

Additional soil design parameters that may be pertinent to the design and development based on undisturbed natural soil or properly compacted fill are as follows:

- Allowable lateral soil pressures (Equivalent Fluid Pressure), Passive case: 300 psf, per foot of depth, to a maximum value of 4500 psf, may be used to determine lateral bearing resistance for footings.
- Allowable Coefficient of Friction between concrete and soil: .35

Seismic Design

In accordance with the ASCE 7-16, the seismic design should consider the following design parameters:

Site Latitude: 34.1860468

Site Longitude: 118.6226268

Site Class: D

Short Period Site Coefficient- **Fa: 1.0**

Long Period Site Coefficient- **Fv: 0.7**

Mapped Spectral Response Acceleration-Short Period: (0.2 sec)-**Ss: 1.5**

Mapped Spectral Response Acceleration-Short Period: (1 sec)**-S1: 0.6**

Adjusted Spectral Response Acceleration-Short Period: (0.2 sec)-**Sms: 1.8**

Adjusted Spectral Response Acceleration-Short Period: (1 sec)-**Sm1**: **1.05**

Design Spectral Response Acceleration-Short Period: (0.2 sec)-**Sds**: **1.2**

Design Spectral Response Acceleration-Short Period: (1 sec)-**Sd1**: **0.7**

FLOOR SLAB RECOMMENDATIONS

Concrete slabs should be constructed in accordance with the following section.

4-inches concrete reinforced with # 3 rebars at 18- inches O.C, over 2-inches of crushed rock or sand which shall be overlain with a vapor barrier consisting of a minimum a 10-mil polyvinyl chloride membrane with all laps sealed should be placed beneath the concrete slab. The plastic moisture barrier should be overlaid with a minimum of 2 inches of sand should be placed beneath the concrete slabs to aid in concrete curing and to minimize potential punctures.

The concrete section and/or reinforcing should be increased as necessary for excessive design floor loads or anticipated concentrated loads. In areas where moisture sensitive floor covering are anticipated over the slab, The concrete section and/ or reinforcing should be increased as necessary for excessive design floor slabs or anticipated concentrated loads.

The slab subgrade should be moisture conditioned to at least 3 percent over optimum moisture content condition to a depth of 12 inches immediately prior to placement of the moisture barrier or pouring concrete.

RETAINING WALL RECOMMENDATIONS

Retaining walls if planned should be designed to resist the active pressures summarized in the following table. The active pressure is normally calculated from the lowermost portion of the footing to the highest ground surface at the back of the wall, including necessary factors for sloping ground. The active and passive pressures indicated in the table are equivalent fluid densities. Walls that are not free to rotate or that are braced at the top should use active pressures that are 50% greater than those indicated in the table. Retaining wall design for passive resistance should neglect the top foot of earth in front of the wall.

Retaining Wall Design Parameter

Equivalent Fluid Pressures:

Cantilevered Wall

Slope of adjacent ground	Active Pressure backfill onsite silty sand with gravel
Level	30 pcf
2:1	45 pcf

2. Lateral Pressure with Seismic Forces

The proposed wall greater than 6 feet should be deigned for seismic lateral force on top of static lateral force as indicated in our report. The seismic lateral force should be designed as follows:

Fd= ½ *2/3 *PGAm *Y= 28 PCF

Drainage and Waterproofing

A subdrain system shall be constructed behind and at the base of all retaining walls to allow drainage and to prevent buildup of excessive hydrostatic pressures. Typical subdrains should consist of perforated pipe surrounded by filter rock, or other approved devices. Gravel galleries or filter material, if not properly designed and graded for the on-site soils, shall be enclosed in a geotextile fabric such as Mirafi 140N or a suitable equivalent to prevent infiltration of fines and clogging of the system. Subdrains should maintain a positive flow gradient away from the retaining walls and have outlets that drain in a non-erosive manner.

Wall Backfill

Backfill directly behind retaining walls (if backfill width is less than 2 feet) may consist of 3/8 to 3/4 inch maximum diameter rounded to subrounded gravel. If wider areas are backfilled with gravels, the gravel shall be enclosed in a geotextile filter fabric. If other types of soil or gravel are used for backfill, mechanical compacting methods will be necessary to obtain a relative compaction of at least 90% of maximum dry density. Backfill directly behind retaining walls shall not be compacted by wheel, track or other rolling by heavy construction equipment unless the wall is designed for the surcharge loading from the compaction equipment.

If gravel or other imported granular backfill is used behind the retaining wall, the upper 12 inches of backfill in unpaved areas shall consist of typical on-site soil compacted to a minimum of 90% of the laboratory maximum dry density. This will prevent the infiltration of surface runoff into the granular backfill and into the subdrain system. Maximum dry density and optimum moisture content for backfill materials shall be determined in accordance with ASTM D-1557 procedures.

BLOCK WALL/ FENCES

Footings for block walls and garden walls shall be founded a minimum 12 inches below lowest adjacent grade and shall be reinforced with a minimum two (2) No. 4 bars, one top and one bottom.

FINISH GRADING

The finished lot drainage in unpaved areas should include a minimum positive gradient of 5% away from the structure for a minimum distance of 3 feet and a minimum of 2 % pad drainage off the property in a non-erosive manner.

Any roof or canopy water and the pad drainage should be conducted to the street or off the site in an approved non-erosive manner. Drainage off the property should be accomplished in an approved manner to prevent erosion or instability.

PLANTERS

Planters around perimeters of the structures shall be designed to ensure that adequate drainage is maintained and minimal irrigation water is allowed to drain into the soil underlying the buildings. Separately constructed planters with solid bottoms, independent of the underlying soil, are recommended and should drain directly onto surrounding paved areas or into a properly designed subdrain system.

TEMPORARY CONSTRUCTION CUTS

Temporary construction cuts for retaining walls, foundations, utility trenches, etc., in excess of 5 feet in depth will have to be properly shored or cut back into an inclination not steeper than 3/4 : 1 (horizontal to vertical). Where more restrictive, the safety requirements for excavations contained in the State Construction Safety Orders enforced by the State Division of Industrial Safety (CAL-OSHA) and / or the safety codes of the local agency having jurisdiction over the project shall apply.

All excavations shall be initially observed by the geotechnical engineer or his representative to verify the recommendations presented or to make any additional recommendations necessary to maintain stability.

TRENCH BACKFILL

Trench excavations for utility lines which extend under building and paved areas are within the zone of influence of adjacent foundations shall be properly backfilled and compacted in accordance with the following recommendations.

The pipe should be bedded and backfilled with clean sand or approved granular soil (minimum Sand Equivalent Value of 30) to a depth of at least 1 foot over the pipe. This backfill should be uniformly watered and compacted to a firm condition.

The remainder of the backfill should be on-site soil or very low to low expansive import soil, which should be placed in loose lifts not exceeding 8 inches in thickness, watered or aerated to optimum moisture content, and mechanically compacted to at least 90% of maximum dry density as determined by ASTM D-1557 procedures. Water jetting of the backfill is not allowed.

CEMENT TYPE

A very low exposure to sulfate can be expected for concrete placed in contact with on site soil and native material. Therefore, based on the CBC no special cement will be required for concrete in contact with these materials.

PAVEMENT RECOMMENDATIONS

For preliminary design purposes, the typical soil anticipated in the subgrade will consist of fine silty sand. Based on this soil type, an R-Value of 40 has been estimated for preliminary design of the pavement section. The actual R- Value of the subgrade soil should be tested and verified at the time of construction. The following are our preliminary recommendations for the structural pavement section calculated in general accordance with Caltrans procedures and based on the assumed R-Value and assumed Traffic Indexes .

Site Area	Traffic Index	R-value	Pavement Section
Parking	4.5	40	3" A.C. over 4" Class II Base
Vehicle Drive Area	5.5	40	4" A.C. over 4.5" Class II Base
Heavy Truck Area	6.5	40	4" A.C. over 6" Class II Base

As an alternative to asphaltic concrete pavement, Portland Cement Concrete (PCC) pavement may be utilized. Concrete driveway and parking slabs shall be at least 5 inches thick and provided with saw cuts or expansion joints every 10 feet or less. The reinforcing shall consist with No. 3 bars spaced 24 inches on centers, both ways. Concrete pavement should be underlain by a minimum 4 inches of base course. The concrete should have a 28-day concrete strength of at least 3,000 psi. To reduce the potential of unsightly cracking concrete pavement for sidewalk and hardscape should be at least 4 inches thick and provided with saw cuts or expansion joints every 6 feet or less.

Subgrade soils shall be overexcavted, scarified and compacted to at least 90% + of laboratory maximum dry density as recommended in the previous section of rough grading. Base course shall be compacted to at least 95% + of laboratory maximum dry.

PLAN REVIEW

Subsequent to formulation of final development plans and specifications but prior to construction, grading and foundation plans should be reviewed by Geo Environ to verify compatibility with site geotechnical conditions and conformance with recommendations contained herein.

CONSTRUCTION OBSERVATIONS

All rough grading of the property shall be performed under engineering observation of Geo Environ. Rough grading includes, but is not limited to, overexcavation cuts, fill placement, and excavation of temporary and permanent cut and fill slopes.

Geo Environ should observe all foundation excavations. Observations should be made prior to installation of concrete forms and reinforcing steel in order to verify or modify, if necessary, conclusions and recommendations in this report.

CLOSURE & LIMITATIONS

The findings, conclusions, and recommendations presented reflect our best estimate of subsurface conditions based on the data obtained from a limited subsurface exploration performed during the field study. The conclusions and recommendations are based on generally accepted geotechnical engineering principles and practices. No further warranties are implied nor made.

Due to the possible variability of soil and subsurface conditions within the site, conditions may be encountered during grading and development that may differ from those presented herein. Should any variation or unusual condition become apparent during grading and development, this office should be contacted to evaluate these conditions prior to continuation of work and necessary_revisions to the recommendations.

This office should be notified if changes of ownership occur or if the final plans for the site development indicate structures areas, type of structures, or structural loading conditions differing from those presented in this report.

If the site is not developed or grading does not begin within 12 months following the date of this report, further studies may be required to ensure that the surface or subsurface conditions have not changed.

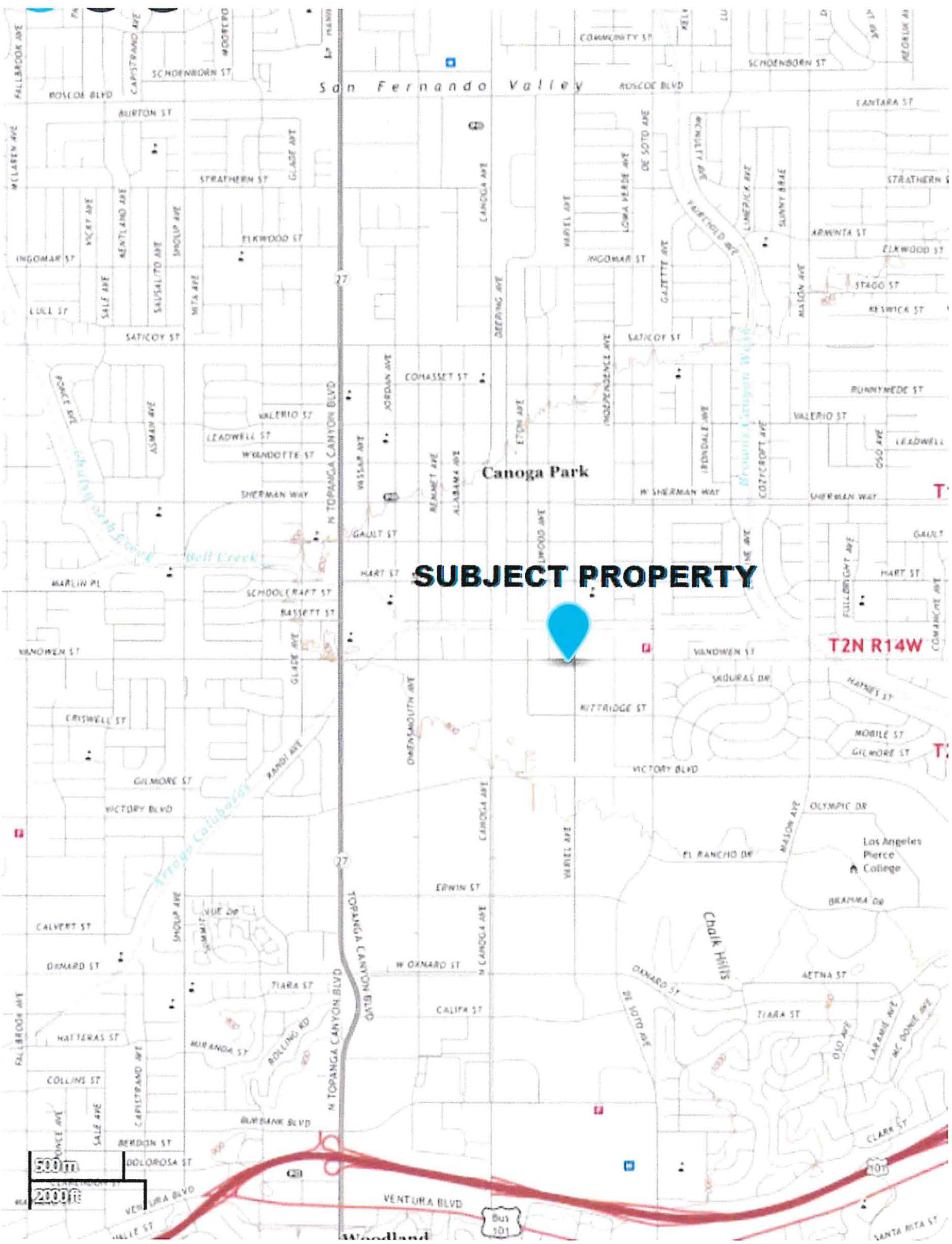
Any charges for necessary review or updates will be at the prevailing rate at the time the review work is performed.

TECHNICAL REFERENCES

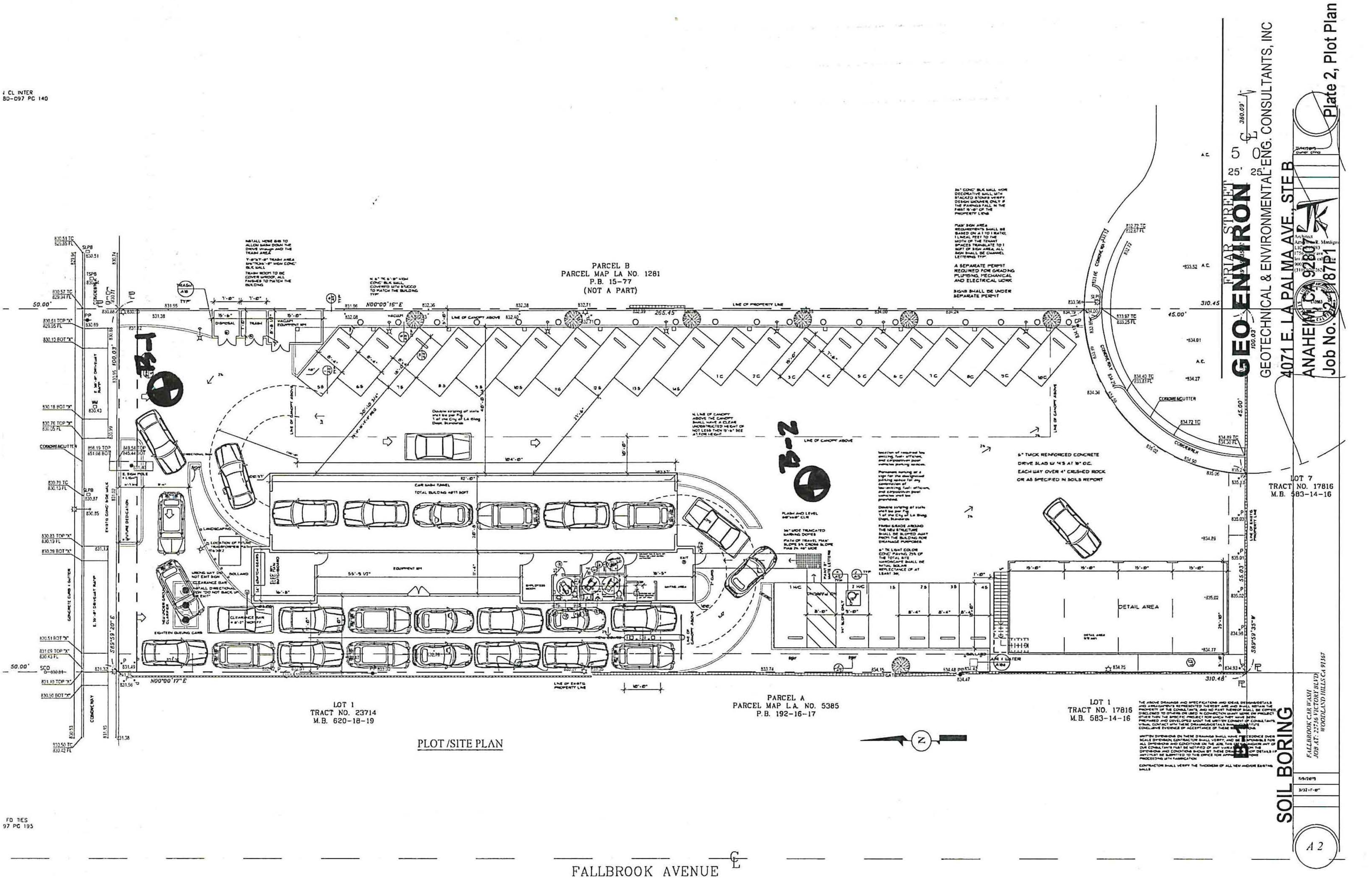
1. California Building Code (CBC 2019), *foundation design parameters.*
2. City of Los Angeles Building and Grading Code
3. USGS, *Ground Acceleration from Earthquakes.*
4. USGS, Seismic Design Values for Buildings
5. . California Division of Mines and Geology (CDMG), *Seismic Hazard Evaluation including liquefaction*
6. California Division of Mines and Geology (CDMG), *Historic Groundwater Elevations*
7. Computer Geotechnical Software, GEOLGISMIKI, SPT based liquefaction analysis

APPENDIX A

DRAWINGS



SUBJECT PROPERTY
San Fernando Valley
Canoga Park
T2N R14W
Los Angeles Pierce College
Chalk Hills
Woodland
500 m
2000 ft
VANOWEN ST
SHERMAN WAY
VICTORY BLVD
N TOPANGA CANYON BLVD
CANOGA AVE
VENTURA BLVD



PARCEL B
PARCEL MAP LA NO. 1281
P.B. 15-77
(NOT A PART)
B-1
B-2
DETAIL AREA
LOT 1
TRACT NO. 23714
M.B. 620-18-19
PARCEL A
PARCEL MAP L.A. NO. 5385
P.B. 192-16-17
LOT 1
TRACT NO. 17816
M.B. 583-14-16
LOT 7
TRACT NO. 17816
M.B. 583-14-16
PLOT/SITE PLAN
FALLBROOK AVENUE
FRIAR STREET
GEO ENVIRON
GEOTECHNICAL & ENVIRONMENTAL ENG. CONSULTANTS, INC
4071 E. LA PALMA AVE., STE B
Plate 2, Plot Plan
SOIL BORING
A 2

APPENDIX B

BORING LOGS

PROJECT NO. 22-1187P BORING LOG B-1
DATE: 3/28/22
CLIENT: Moti Balyan
PROJECT ADDRESS: 22736 Victory Blvd, Woodland Hills L
DRILLING COMPANY: Duxbury Drilling LOGGED BY: J.M.
DRILLING METHOD/ SAMPLING METHOD: H.S.A./ 140 lb 30" Drop, Automatic Trip Hammer

Depth (ft)	Samp	Blows per 12"	Mois	Dens	USCS	Symb	EARTH MATERIAL DESCRIPTION
2.5	California Ring; Bulk Sample	18	12.5	98.2	ML		Native: Lt. brown, sandy Silt, mod. moist, mod. dense
5.0	California Ring; Bulk Sample	25	17.3	110.5	ML		Olive, Silt, moist, mod. stiff
10.0	Std. Penetration Test	38	12.7		SC		Same as above
15.0	Std. Penetration Test	36	14.2		CL		Lt. olive, sandy Clay, mod. mosist, hard
20.0	Std. Penetration Test	37	12.3		CL		L.B. Clay, moist, hard
25.0	Std. Penetration Test	31	17.3		SC		Olive, Sandy clay, moist, stiff
30.0	Std. Penetration Test	21	22.6		SC		Same as above, very moist
35.0	Std. Penetration Test	38	30.2		SP		Gray, F-C grained Sand, very moist
40.0	Std. Penetration Test	34	9.8		SP		Same as above, saturated
45.0	Std. Penetration Test	37	16.3		SP		Same as above
50.0	Std. Penetration Test	35	14.3		SP		Same as above
55.0							END OF BORING @ 50'. GROUNDWATER @ 28.5

Std. Penetration Test California Ring Bulk Sample

PROJECT NO. 22-1187P BORING LOG B-2
DATE: 3/28/22
CLIENT: Moti Balyan
PROJECT ADDRESS: 22736 Victory Blvd, Woodland Hills L
DRILLING COMPANY: Duxbury Drilling LOGGED BY: J.M.
DRILLING METHOD/ SAMPLING METHOD: H.S.A./ 140 lb 30" Drop, Automatic Trip Hammer

Depth (ft)	Samp	Blows per 12"	Mois	Dens	USCS	Symb	EARTH MATERIAL DESCRIPTION
2.5		22	10.4	101.4	M		Native: Lt. brown, sandy Silt, mod. moist, mod. dense
5.0		32	14.7	112.8	ML		Olive, Silt, moist, mod. stiff
10.0		34	12.9	108.4	SC		Olive, sandy Clay, mod. moist, mod. stiff
15.0							
							END OF BORING @ 10'. NO GROUNDWATER
20.0							
25.0							
30.0							
35.0							
40.0							
45.0							
50.0							
55.0							

Std. Penetration Test California Ring Bulk Sample

EXPANSION CHARACTERISTICS
(ASTM D-4829)

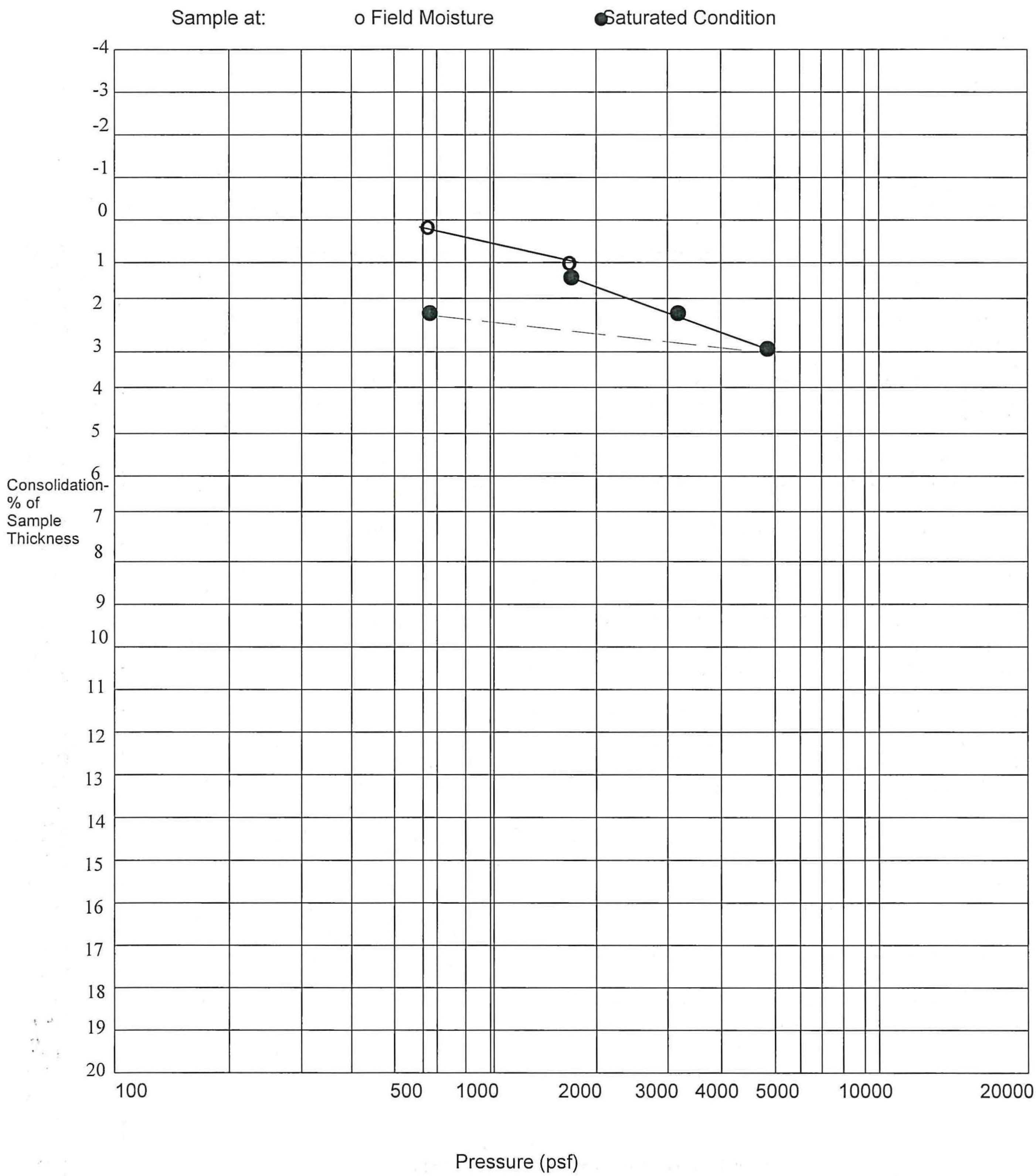
0-21	Very Low
21-50	Low
51-90	Medium
91-130	High
131+	Very High

Sample	Soil Type	Expansion Index	Expansion Classification
B-1 @ 0-5 ft	Fine Sandy Silt	12	Very Low

MAXIMUM DRY DENSITY
(ASTM D1557)

Sample	Soil Type	Max. Density (pcf)	Opt. Mois.(%)
B-1 @ 0-5'	Fine Silty Sand	110.0	12.5

CONSOLIDATION CURVE: ASTM D-2435
PROJECT NO: 22-1187P1
CLIENT: Moti Balyan
JOB ADDRESS: 22736 Victory Blvd, LA
SAMPLE ID: B-2 @ 5.0 ft
M.C: 14.7% D.D: 110.8pcf
SOIL CLASS: Clayey Silt
TECH: R.N.
DATE: 4/2/22



GEO ENVIRON

DIRECT SHEAR TEST

CLIENT: Moti Balyan PROJECT NO: 22-1187P1 DATE: 4/3/22

PROJECT ADDRESS: 22736 Victory Blvd, LA SAMPLE ID: B- 2 @ 2 ft

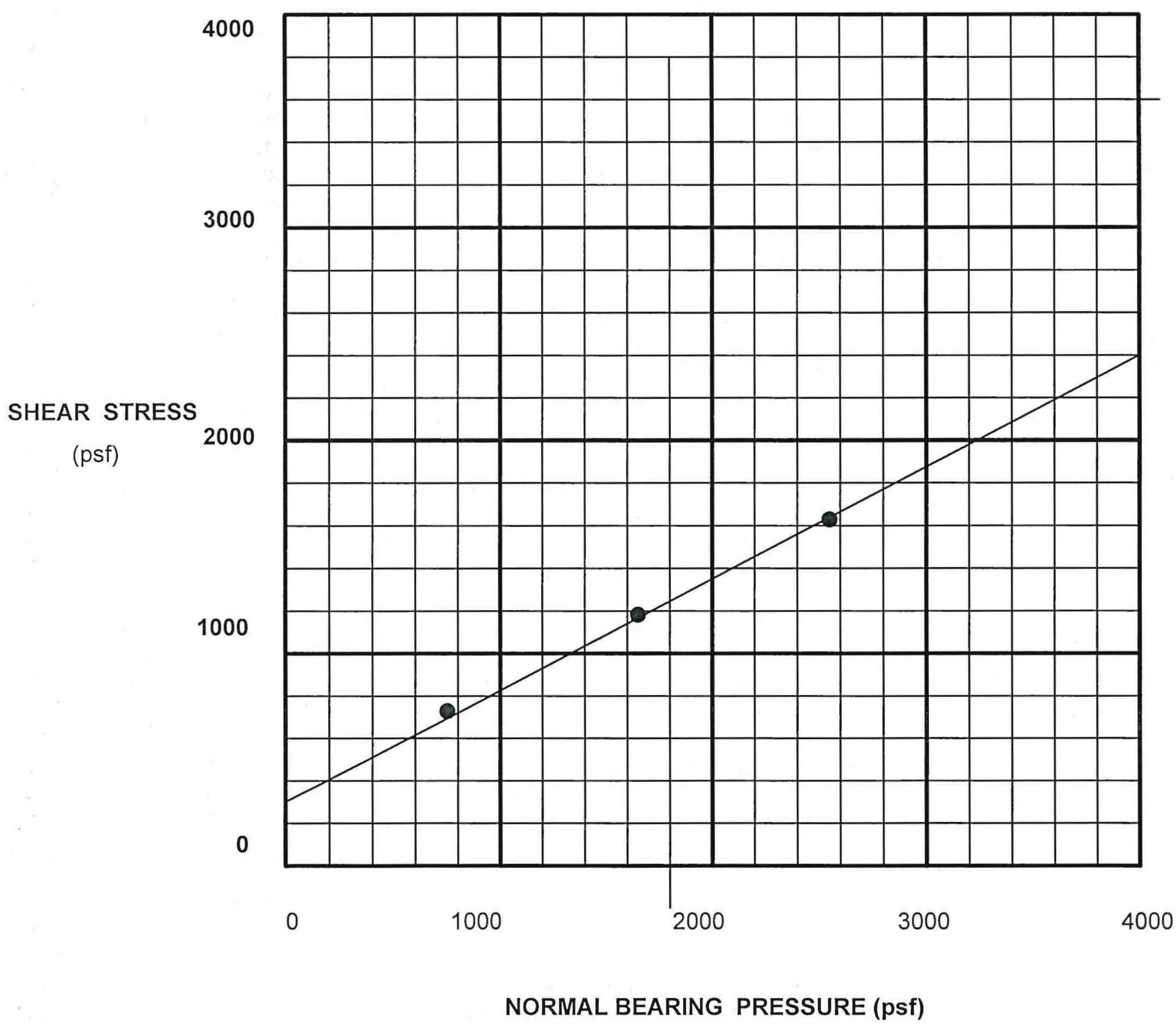
SOIL CLASS: Silty Clay DRY DENSITY: 101.4 MOIS. (Initial): 10.4 (final): 20.5

UNDISTURBED: X RE MOLDED: STRAIN RATE: 0.004 in/min

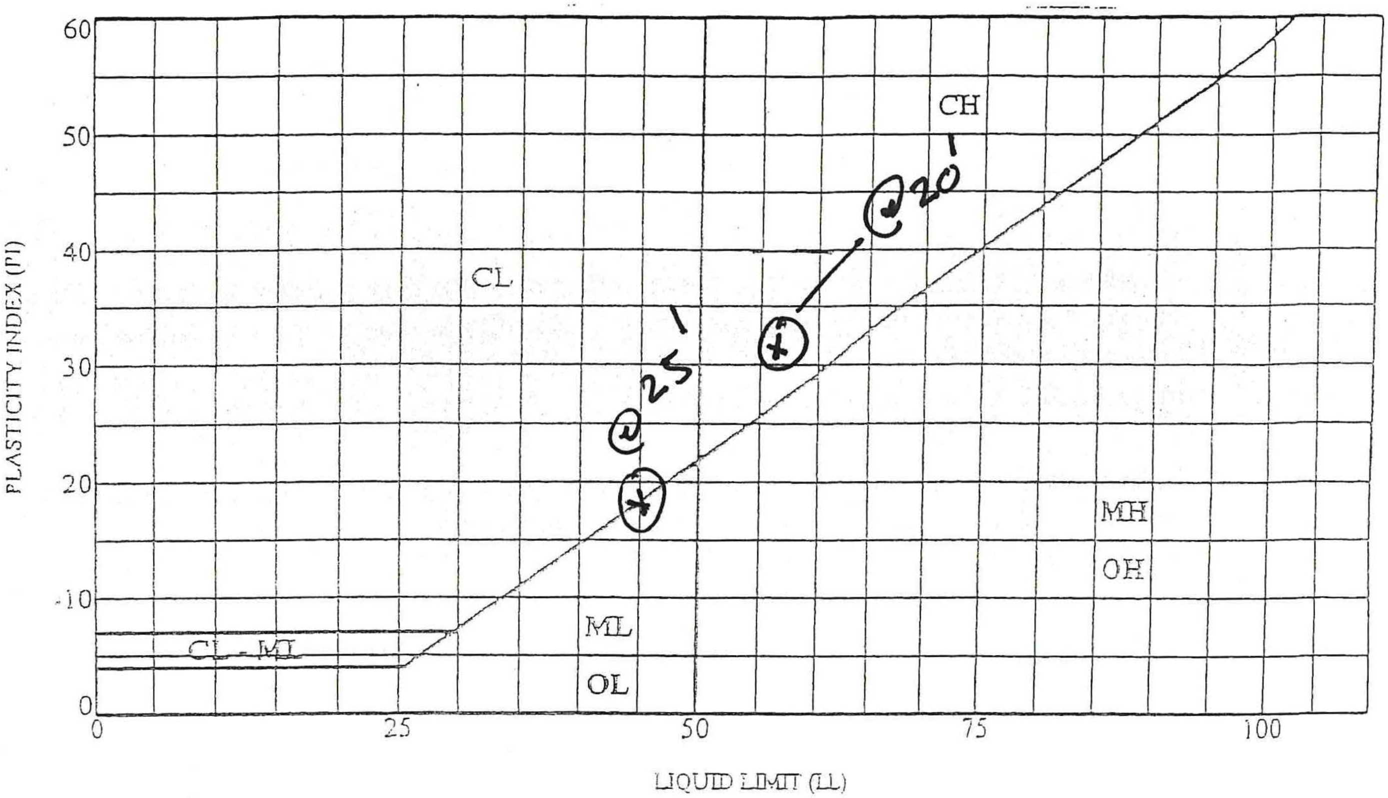
SHEAR STRENGTH: ULTIMATE RESIDUAL

PHI: 24 deg C: 300 PSF PHI: C:

SAMPLE TESTED IN SUBMERGED CONDITION



GEO ENVIRON



	Boring	Depth (ft)	LL (%)	PL (%)	PI (%)	LI	Description
●	B1	@20'	56	24	32		CLAY
		@25'	44	25	19		SANDY CLAY

LL - Liquid Limit
PL - Plasticity Limit
PI - Plasticity Index
LI - Liquidity Index

Unified Soil Classification
Fine Grained Soil Groups

	LL < 50
ML	Inorganic clayey silts to very fine sands of slight plasticity
CL	Inorganic clays of low to medium plasticity
OL	Organic silts and organic silty clays of low plasticity

	LL >= 50
MH	Inorganic silts and clayey silts of high plasticity
CH	Inorganic clays of high plasticity
OH	Organic clays of medium to high plasticity, organic silts

GEO ENVIRON
GEOTECHNICAL & ENVIRONMENTAL SERVICES
3904 E. MIRALOMA AVE # I
ANAHEIM, CA 92806

PLASTICITY CHART

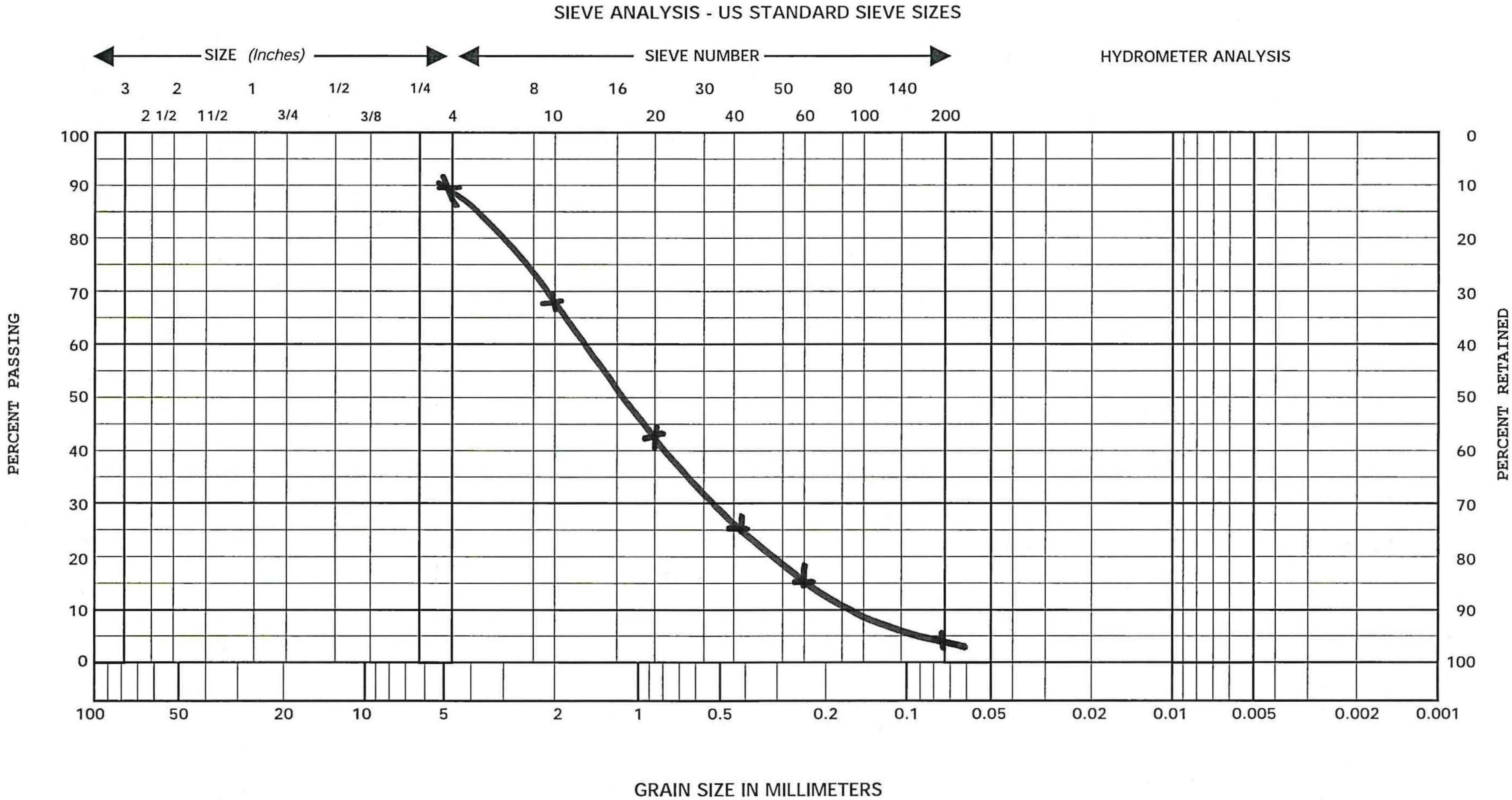
PROJECT: CARWASH

PROJECT NO: 22-1187P

PROJECT ADDRESS: 22736 VICTORY BLVD, LA

GRAIN SIZE DISTRIBUTION GRAPH - AGGREGATE GRADATION CHART

1. PROJECT	2. DATE
22736 Victory Blvd, Woodland Hills, Ca	4/1/22



EXCAVATION NUMBER	SAMPLE NUMBER	LL	PL	PI	Cu (D_{60}/D_{10})	Cc $(D_{30})^2/(D_{60} \times D_{10})$	SOIL DESCRIPTION/REMARKS	CLASSIFICATION (USCS)
B-1 @ 40 ft.							F-C SAND	SP

3. TECHNICIAN *(Signature)*	4. PLOTTED BY *(Signature)*	5. CHECKED BY *(Signature)*
R.N.	J.M.	

APPENDIX D

LIQUEFACTION ANALYSIS

GEOLOGISMIKI
Geotechnical Software

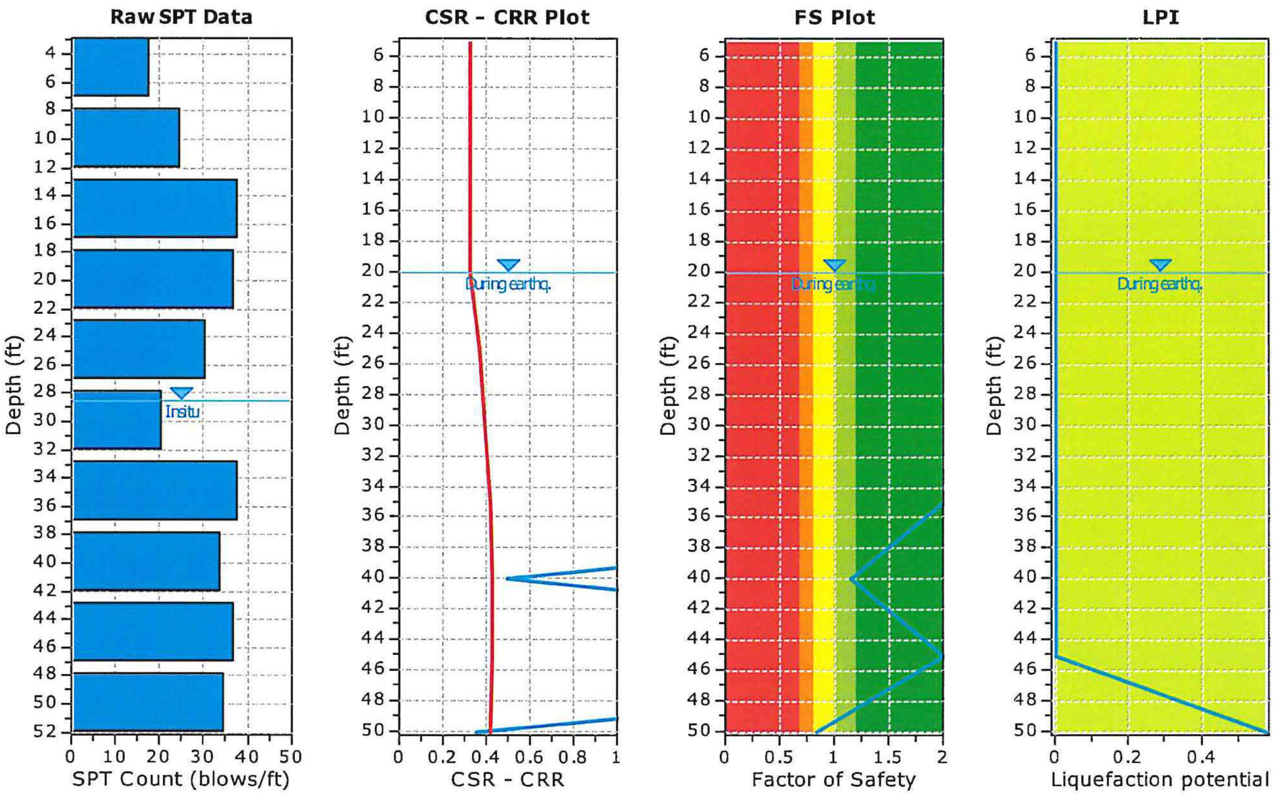
SPT BASED LIQUEFACTION ANALYSIS REPORT

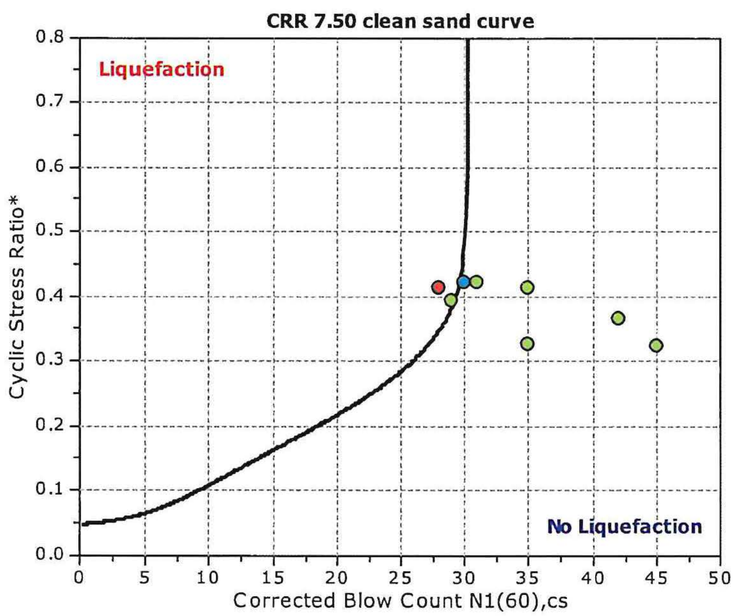
Project title : Moti Balyan-22-1187 (Full PGAm) **SPT Name: SPT #1**

Location : 22736 Victory Blvd, Woodland Hills

:: Input parameters and analysis properties ::

Analysis method:	NCEER 1998	G.W.T. (in-situ):	28.50 ft
Fines correction method:	NCEER 1998	G.W.T. (earthq.):	20.00 ft
Sampling method:	Standard Sampler	Earthquake magnitude M_w:	6.70
Borehole diameter:	150mm	Peak ground acceleration:	0.68 g
Rod length:	5.00 ft	Eq. external load:	0.00 tsf
Hammer energy ratio:	1.20		





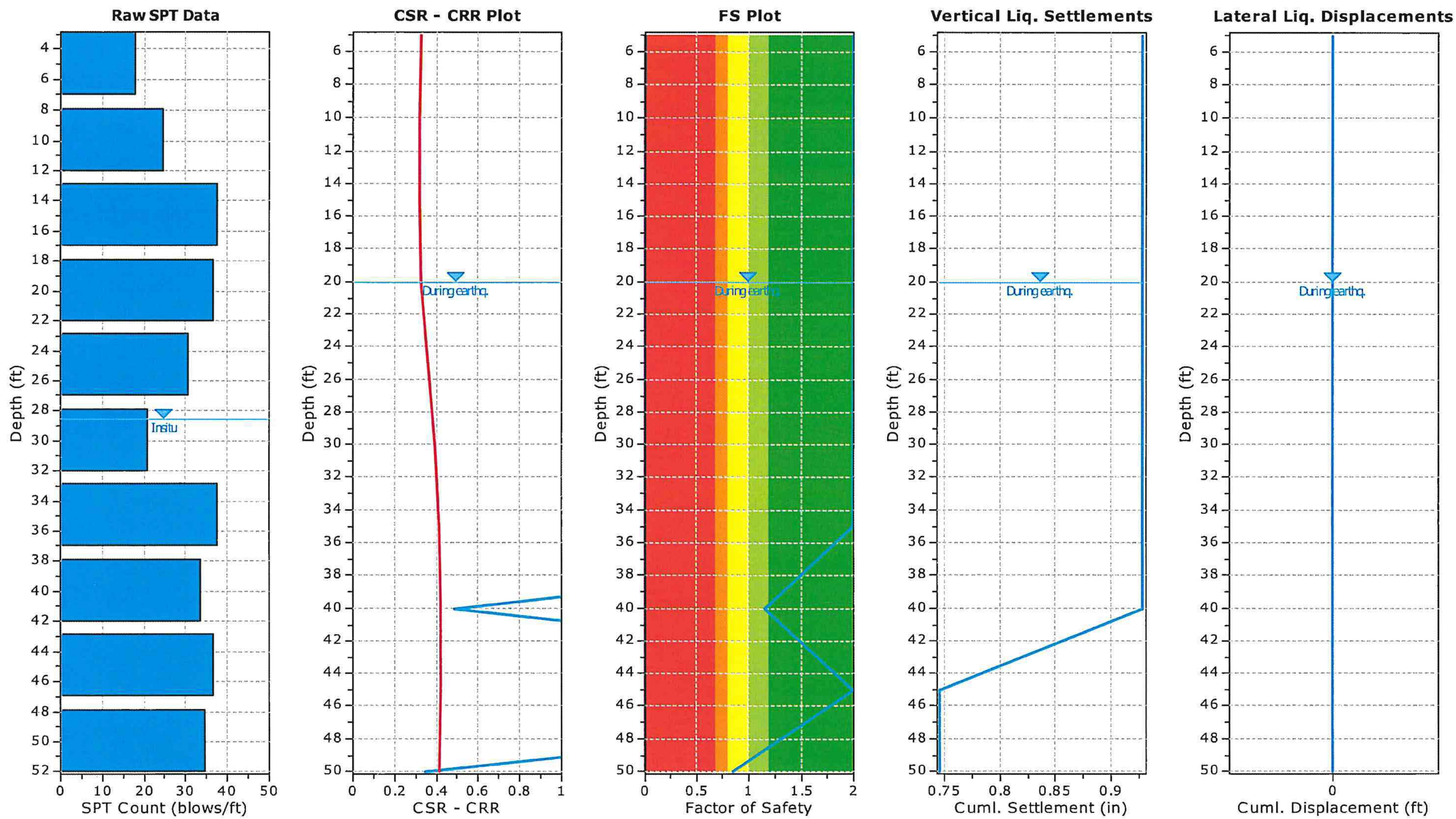
F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

:: Overall Liquefaction Assessment Analysis Plots ::



:: Field input data ::

Test Depth (ft)	SPT Field Value (blows)	Fines Content (%)	Unit Weight (pcf)	Infl. Thickness (ft)	Can Liquefy
5.00	18	55.00	120.94	5.00	Yes
10.00	25	62.00	120.94	5.00	Yes
15.00	38	65.00	120.94	5.00	No
20.00	37	65.00	120.94	5.00	No
25.00	31	65.00	120.94	5.00	No
30.00	21	60.00	120.94	5.00	No
35.00	38	4.00	120.94	5.00	Yes
40.00	34	4.00	120.94	5.00	Yes
45.00	37	4.00	120.94	5.00	Yes
50.00	35	4.00	120.94	5.00	Yes

Abbreviations

Depth:	Depth at which test was performed (ft)
SPT Field Value:	Number of blows per foot
Fines Content:	Fines content at test depth (%)
Unit Weight:	Unit weight at test depth (pcf)
Infl. Thickness:	Thickness of the soil layer to be considered in settlements analysis (ft)
Can Liquefy:	User defined switch for excluding/including test depth from the analysis procedure

:: Cyclic Resistance Ratio (CRR) calculation data ::

Depth (ft)	SPT Field Value	Unit Weight (pcf)	σ_v (tsf)	u_o (tsf)	σ'_{vo} (tsf)	C_N	C_E	C_B	C_R	C_S	$(N_1)_{60}$	Fines Content (%)	α	β	$(N_1)_{60cs}$	$CRR_{7.5}$
5.00	18	120.94	0.30	0.00	0.30	1.48	1.20	1.05	0.75	1.00	25	55.00	5.00	1.20	35	4.000
10.00	25	120.94	0.60	0.00	0.60	1.24	1.20	1.05	0.85	1.00	33	62.00	5.00	1.20	45	4.000
15.00	38	120.94	0.91	0.00	0.91	1.07	1.20	1.05	0.95	1.00	49	65.00	5.00	1.20	64	4.000
20.00	37	120.94	1.21	0.00	1.21	0.94	1.20	1.05	0.95	1.00	42	65.00	5.00	1.20	55	4.000
25.00	31	120.94	1.51	0.00	1.51	0.84	1.20	1.05	0.95	1.00	31	65.00	5.00	1.20	42	4.000
30.00	21	120.94	1.81	0.05	1.77	0.77	1.20	1.05	1.00	1.00	20	60.00	5.00	1.20	29	4.000
35.00	38	120.94	2.12	0.20	1.91	0.73	1.20	1.05	1.00	1.00	35	4.00	0.00	1.00	35	4.000
40.00	34	120.94	2.42	0.36	2.06	0.70	1.20	1.05	1.00	1.00	30	4.00	0.00	1.00	30	0.488
45.00	37	120.94	2.72	0.52	2.21	0.67	1.20	1.05	1.00	1.00	31	4.00	0.00	1.00	31	4.000
50.00	35	120.94	3.02	0.67	2.35	0.64	1.20	1.05	1.00	1.00	28	4.00	0.00	1.00	28	0.348

Abbreviations

σ_v:	Total stress during SPT test (tsf)
u_o:	Water pore pressure during SPT test (tsf)
σ'_{vo}:	Effective overburden pressure during SPT test (tsf)
C_N:	Overburden corretion factor
C_E:	Energy correction factor
C_B:	Borehole diameter correction factor
C_R:	Rod length correction factor
C_S:	Liner correction factor
$N_{1(60)}$:	Corrected N_{SPT} to a 60% energy ratio
α, β:	Clean sand equivalent clean sand formula coefficients
$N_{1(60)cs}$:	Corected $N_{1(60)}$ value for fines content
$CRR_{7.5}$:	Cyclic resistance ratio for M=7.5

:: Cyclic Stress Ratio calculation (CSR fully adjusted and normalized) ::

Depth (ft)	Unit Weight (pcf)	$\sigma_{v,eq}$ (tsf)	$u_{o,eq}$ (tsf)	$\sigma'_{vo,eq}$ (tsf)	r_d	α	CSR	MSF	$CSR_{eq,M=7.5}$	K_{sigma}	CSR^*	FS	
5.00	120.94	0.30	0.00	0.30	0.99	1.00	0.438	1.33	0.328	1.00	0.328	2.000	o
10.00	120.94	0.60	0.00	0.60	0.98	1.00	0.433	1.33	0.324	1.00	0.324	2.000	o

:: Cyclic Stress Ratio calculation (CSR fully adjusted and normalized) ::

Depth (ft)	Unit Weight (pcf)	$\sigma_{v,eq}$ (tsf)	$u_{o,eq}$ (tsf)	$\sigma'_{vo,eq}$ (tsf)	r_d	α	CSR	MSF	$CSR_{eq,M=7.5}$	K_{sigma}	CSR*	FS	
15.00	120.94	0.91	0.00	0.91	0.97	1.00	0.428	1.33	0.321	1.00	0.321	2.000	●
20.00	120.94	1.21	0.00	1.21	0.96	1.00	0.423	1.33	0.317	0.97	0.326	2.000	●
25.00	120.94	1.51	0.16	1.36	0.94	1.00	0.464	1.33	0.348	0.95	0.366	2.000	●
30.00	120.94	1.81	0.31	1.50	0.92	1.00	0.491	1.33	0.368	0.93	0.395	2.000	●
35.00	120.94	2.12	0.47	1.65	0.89	1.00	0.506	1.33	0.379	0.92	0.414	2.000	●
40.00	120.94	2.42	0.62	1.79	0.85	1.00	0.507	1.33	0.380	0.90	0.422	1.155	●
45.00	120.94	2.72	0.78	1.94	0.80	1.00	0.498	1.33	0.373	0.89	0.421	2.000	●
50.00	120.94	3.02	0.94	2.09	0.75	1.00	0.482	1.33	0.361	0.87	0.414	0.841	●

Abbreviations

$\sigma_{v,eq}$:	Total overburden pressure at test point, during earthquake (tsf)
$u_{o,eq}$:	Water pressure at test point, during earthquake (tsf)
$\sigma'_{vo,eq}$:	Effective overburden pressure, during earthquake (tsf)
r_d :	Nonlinear shear mass factor
α:	Improvement factor due to stone columns
CSR :	Cyclic Stress Ratio (adjusted for improvement)
MSF :	Magnitude Scaling Factor
$CSR_{eq,M=7.5}$:	CSR adjusted for M=7.5
K_{sigma}:	Effective overburden stress factor
CSR*:	CSR fully adjusted (user FS applied)***
FS:	Calculated factor of safety against soil liquefaction

*** User FS: 1.00

:: Liquefaction potential according to Iwasaki ::

Depth (ft)	FS	F	wz	Thickness (ft)	I_L
5.00	2.000	0.00	9.24	5.00	0.00
10.00	2.000	0.00	8.48	5.00	0.00
15.00	2.000	0.00	7.71	5.00	0.00
20.00	2.000	0.00	6.95	5.00	0.00
25.00	2.000	0.00	6.19	5.00	0.00
30.00	2.000	0.00	5.43	5.00	0.00
35.00	2.000	0.00	4.67	5.00	0.00
40.00	1.155	0.00	3.90	5.00	0.00
45.00	2.000	0.00	3.14	5.00	0.00
50.00	0.841	0.16	2.38	5.00	0.58

Overall potential I_L : 0.58

I_L = 0.00 - No liquefaction
I_L between 0.00 and 5 - Liquefaction not probable
I_L between 5 and 15 - Liquefaction probable
I_L > 15 - Liquefaction certain

:: Vertical settlements estimation for dry sands ::

Depth (ft)	$(N_1)_{60}$	τ_{av}	p	G_{max} (tsf)	α	b	γ	ε_{15}	N_c	ε_{Nc} (%)	Δh (ft)	ΔS (in)
5.00	25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.000
10.00	33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.000
15.00	49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.000

:: Vertical settlements estimation for dry sands ::

Depth (ft)	$(N_1)_{60}$	τ_{av}	p	G_{max} (tsf)	a	b	γ	ε_{15}	N_c	ε_{Nc} (%)	Δh (ft)	ΔS (in)

Cumulative settlemetns: 0.000

Abbreviations

τ_{av}: Average cyclic shear stress
p: Average stress
G_{max}: Maximum shear modulus (tsf)
a, b: Shear strain formula variables
γ: Average shear strain
ε_{15}: Volumetric strain after 15 cycles
N_c: Number of cycles
ε_{Nc}: Volumetric strain for number of cycles N_c (%)
Δh: Thickness of soil layer (in)
ΔS: Settlement of soil layer (in)

:: Vertical settlements estimation for saturated sands ::

Depth (ft)	D_{50} (in)	q_c/N	e_v (%)	Δh (ft)	s (in)
20.00	0.00	5.00	0.00	5.00	0.000
25.00	0.00	5.00	0.00	5.00	0.000
30.00	0.00	5.00	0.00	5.00	0.000
35.00	0.00	5.00	0.00	5.00	0.000
40.00	0.00	5.00	0.31	5.00	0.183
45.00	0.00	5.00	0.00	5.00	0.000
50.00	0.00	5.00	1.24	5.00	0.746

Cumulative settlements: 0.929

Abbreviations

D_{50}: Median grain size (in)
q_c/N: Ratio of cone resistance to SPT
e_v: Post liquefaction volumetric strain (%)
Δh: Thickness of soil layer to be considered (ft)
s: Estimated settlement (in)

:: Lateral displacements estimation for saturated sands ::

Depth (ft)	$(N_1)_{60}$	D_r (%)	γ_{max} (%)	d_z (ft)	LDI	LD (ft)
5.00	25	70.00	0.00	5.00	0.000	0.00
10.00	33	80.42	0.00	5.00	0.000	0.00
15.00	49	100.00	0.00	5.00	0.000	0.00
20.00	42	90.73	0.00	5.00	0.000	0.00
25.00	31	77.95	0.00	5.00	0.000	0.00
30.00	20	62.61	0.00	5.00	0.000	0.00
35.00	35	82.83	0.00	5.00	0.000	0.00
40.00	30	76.68	2.38	5.00	0.000	0.00
45.00	31	77.95	0.00	5.00	0.000	0.00
50.00	28	74.08	5.28	5.00	0.000	0.00

:: Lateral displacements estimation for saturated sands ::

Depth (ft)	$(N_1)_{60}$	D_r (%)	γ_{max} (%)	d_z (ft)	LDI	LD (ft)

Cumulative lateral displacements: 0.00

Abbreviations

D_r: Relative density (%)
γ_{max}: Maximum amplitude of cyclic shear strain (%)
d_z: Soil layer thickness (ft)
LDI: Lateral displacement index (ft)
LD: Actual estimated displacement (ft)

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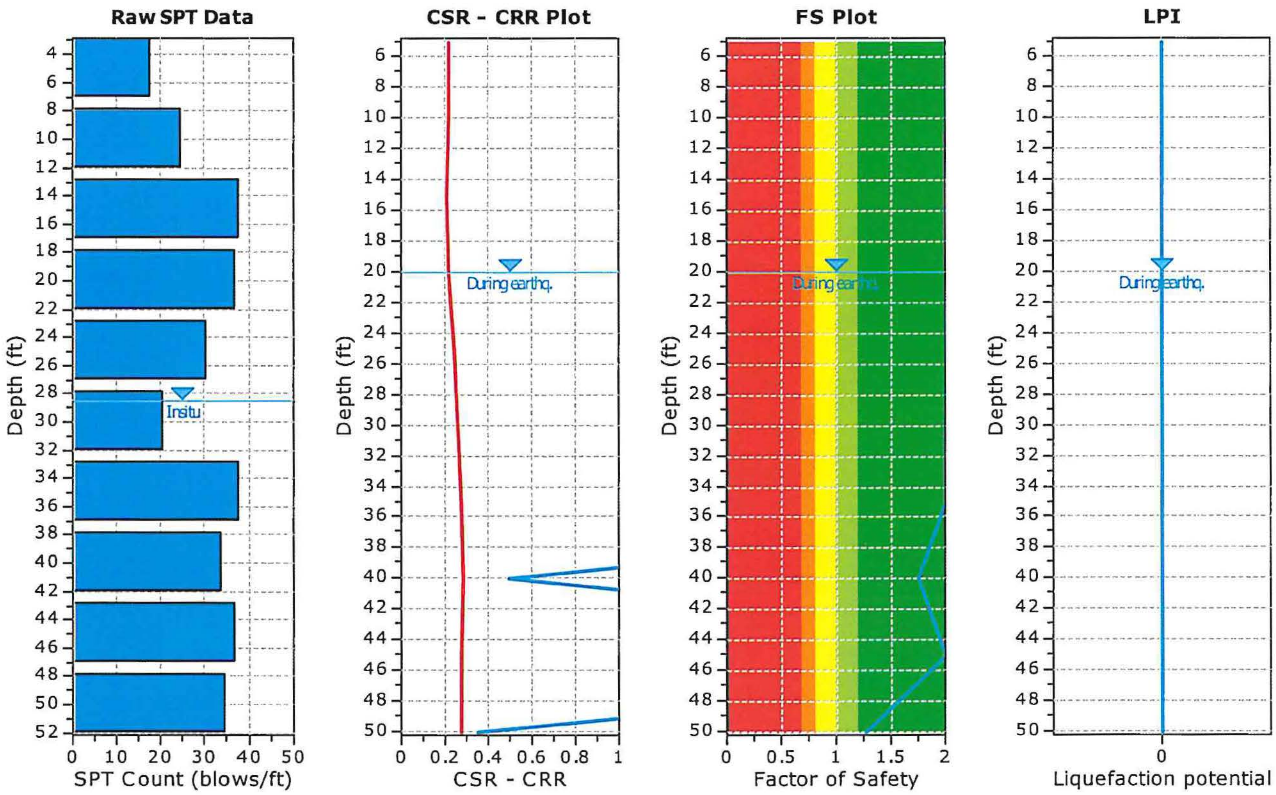
SPT BASED LIQUEFACTION ANALYSIS REPORT

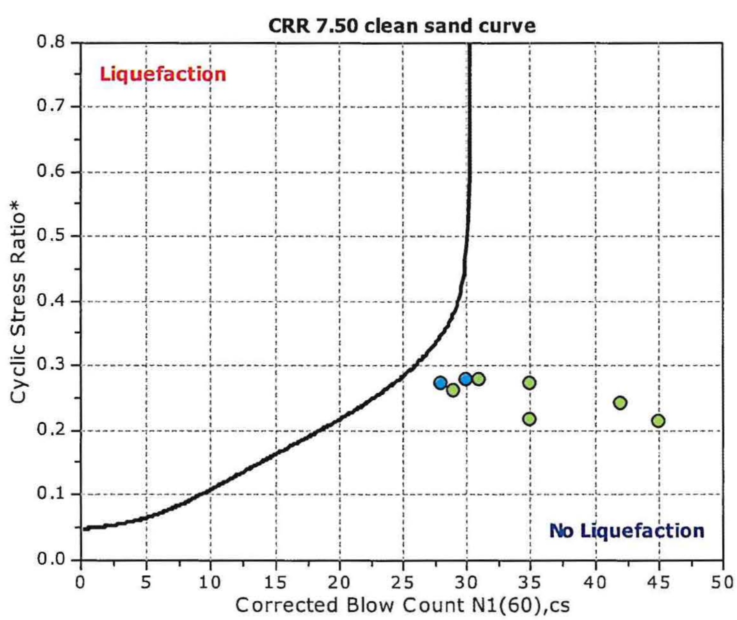
Project title : Moti Balyan-22-1187 (2/3 PGAm) **SPT Name: SPT #1**

Location : 22736 Victory Blvd, Woodland Hills

:: Input parameters and analysis properties ::

Analysis method:	NCEER 1998	G.W.T. (in-situ):	28.50 ft
Fines correction method:	NCEER 1998	G.W.T. (earthq.):	20.00 ft
Sampling method:	Standard Sampler	Earthquake magnitude M_w:	6.70
Borehole diameter:	150mm	Peak ground acceleration:	0.45 g
Rod length:	5.00 ft	Eq. external load:	0.00 tsf
Hammer energy ratio:	1.20		





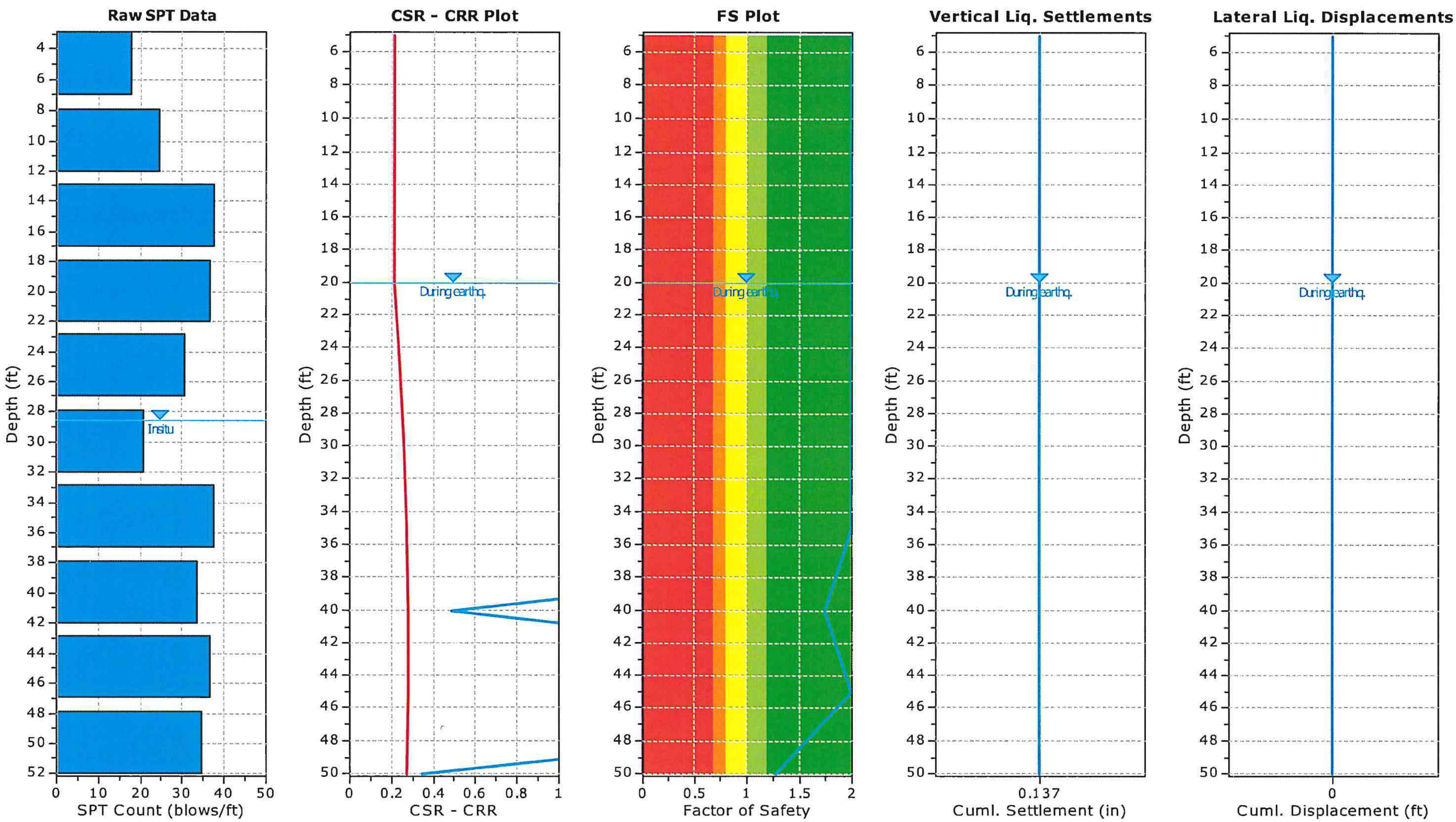
F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

:: Overall Liquefaction Assessment Analysis Plots ::



:: Field input data ::

Test Depth (ft)	SPT Field Value (blows)	Fines Content (%)	Unit Weight (pcf)	Infl. Thickness (ft)	Can Liquefy
5.00	18	55.00	120.94	5.00	Yes
10.00	25	62.00	120.94	5.00	Yes
15.00	38	65.00	120.94	5.00	No
20.00	37	65.00	120.94	5.00	No
25.00	31	65.00	120.94	5.00	No
30.00	21	60.00	120.94	5.00	No
35.00	38	4.00	120.94	5.00	Yes
40.00	34	4.00	120.94	5.00	Yes
45.00	37	4.00	120.94	5.00	Yes
50.00	35	4.00	120.94	5.00	Yes

Abbreviations

Depth:	Depth at which test was performed (ft)
SPT Field Value:	Number of blows per foot
Fines Content:	Fines content at test depth (%)
Unit Weight:	Unit weight at test depth (pcf)
Infl. Thickness:	Thickness of the soil layer to be considered in settlements analysis (ft)
Can Liquefy:	User defined switch for excluding/including test depth from the analysis procedure

:: Cyclic Resistance Ratio (CRR) calculation data ::

Depth (ft)	SPT Field Value	Unit Weight (pcf)	σ_v (tsf)	u_o (tsf)	σ'_{vo} (tsf)	C_N	C_E	C_B	C_R	C_S	$(N_1)_{60}$	Fines Content (%)	α	β	$(N_1)_{60cs}$	$CRR_{7.5}$
5.00	18	120.94	0.30	0.00	0.30	1.48	1.20	1.05	0.75	1.00	25	55.00	5.00	1.20	35	4.000
10.00	25	120.94	0.60	0.00	0.60	1.24	1.20	1.05	0.85	1.00	33	62.00	5.00	1.20	45	4.000
15.00	38	120.94	0.91	0.00	0.91	1.07	1.20	1.05	0.95	1.00	49	65.00	5.00	1.20	64	4.000
20.00	37	120.94	1.21	0.00	1.21	0.94	1.20	1.05	0.95	1.00	42	65.00	5.00	1.20	55	4.000
25.00	31	120.94	1.51	0.00	1.51	0.84	1.20	1.05	0.95	1.00	31	65.00	5.00	1.20	42	4.000
30.00	21	120.94	1.81	0.05	1.77	0.77	1.20	1.05	1.00	1.00	20	60.00	5.00	1.20	29	4.000
35.00	38	120.94	2.12	0.20	1.91	0.73	1.20	1.05	1.00	1.00	35	4.00	0.00	1.00	35	4.000
40.00	34	120.94	2.42	0.36	2.06	0.70	1.20	1.05	1.00	1.00	30	4.00	0.00	1.00	30	0.488
45.00	37	120.94	2.72	0.52	2.21	0.67	1.20	1.05	1.00	1.00	31	4.00	0.00	1.00	31	4.000
50.00	35	120.94	3.02	0.67	2.35	0.64	1.20	1.05	1.00	1.00	28	4.00	0.00	1.00	28	0.348

Abbreviations

σ_v:	Total stress during SPT test (tsf)
u_o:	Water pore pressure during SPT test (tsf)
σ'_{vo}:	Effective overburden pressure during SPT test (tsf)
C_N:	Overburden corretion factor
C_E:	Energy correction factor
C_B:	Borehole diameter correction factor
C_R:	Rod length correction factor
C_S:	Liner correction factor
$N_{1(60)}$:	Corrected N_{SPT} to a 60% energy ratio
α, β:	Clean sand equivalent clean sand formula coefficients
$N_{1(60)cs}$:	Corected $N_{1(60)}$ value for fines content
$CRR_{7.5}$:	Cyclic resistance ratio for M=7.5

:: Cyclic Stress Ratio calculation (CSR fully adjusted and normalized) ::

Depth (ft)	Unit Weight (pcf)	$\sigma_{v,eq}$ (tsf)	$u_{o,eq}$ (tsf)	$\sigma'_{vo,eq}$ (tsf)	r_d	α	CSR	MSF	$CSR_{eq,M=7.5}$	K_{sigma}	CSR^*	FS	
5.00	120.94	0.30	0.00	0.30	0.99	1.00	0.438	1.33	0.328	1.00	0.328	2.000	o
10.00	120.94	0.60	0.00	0.60	0.98	1.00	0.433	1.33	0.324	1.00	0.324	2.000	o

:: Cyclic Stress Ratio calculation (CSR fully adjusted and normalized) ::

Depth (ft)	Unit Weight (pcf)	$\sigma_{v,eq}$ (tsf)	$u_{o,eq}$ (tsf)	$\sigma'_{vo,eq}$ (tsf)	r_d	α	CSR	MSF	$CSR_{eq,M=7.5}$	K_{sigma}	CSR^*	FS	
15.00	120.94	0.91	0.00	0.91	0.97	1.00	0.428	1.33	0.321	1.00	0.321	2.000	o
20.00	120.94	1.21	0.00	1.21	0.96	1.00	0.423	1.33	0.317	0.97	0.326	2.000	o
25.00	120.94	1.51	0.16	1.36	0.94	1.00	0.464	1.33	0.348	0.95	0.366	2.000	o
30.00	120.94	1.81	0.31	1.50	0.92	1.00	0.491	1.33	0.368	0.93	0.395	2.000	o
35.00	120.94	2.12	0.47	1.65	0.89	1.00	0.506	1.33	0.379	0.92	0.414	2.000	o
40.00	120.94	2.42	0.62	1.79	0.85	1.00	0.507	1.33	0.380	0.90	0.422	1.155	o
45.00	120.94	2.72	0.78	1.94	0.80	1.00	0.498	1.33	0.373	0.89	0.421	2.000	o
50.00	120.94	3.02	0.94	2.09	0.75	1.00	0.482	1.33	0.361	0.87	0.414	0.841	o

Abbreviations

$\sigma_{v,eq}$: Total overburden pressure at test point, during earthquake (tsf)
$u_{o,eq}$: Water pressure at test point, during earthquake (tsf)
$\sigma'_{vo,eq}$: Effective overburden pressure, during earthquake (tsf)
r_d : Nonlinear shear mass factor
α: Improvement factor due to stone columns
CSR : Cyclic Stress Ratio (adjusted for improvement)
MSF : Magnitude Scaling Factor
$CSR_{eq,M=7.5}$: CSR adjusted for M=7.5
K_{sigma}: Effective overburden stress factor
CSR^*: CSR fully adjusted (user FS applied)***
FS: Calculated factor of safety against soil liquefaction

*** User FS: 1.00

:: Liquefaction potential according to Iwasaki ::

Depth (ft)	FS	F	wz	Thickness (ft)	I_L
5.00	2.000	0.00	9.24	5.00	0.00
10.00	2.000	0.00	8.48	5.00	0.00
15.00	2.000	0.00	7.71	5.00	0.00
20.00	2.000	0.00	6.95	5.00	0.00
25.00	2.000	0.00	6.19	5.00	0.00
30.00	2.000	0.00	5.43	5.00	0.00
35.00	2.000	0.00	4.67	5.00	0.00
40.00	1.155	0.00	3.90	5.00	0.00
45.00	2.000	0.00	3.14	5.00	0.00
50.00	0.841	0.16	2.38	5.00	0.58

Overall potential I_L : 0.58

I_L = 0.00 - No liquefaction
I_L between 0.00 and 5 - Liquefaction not probable
I_L between 5 and 15 - Liquefaction probable
I_L > 15 - Liquefaction certain

:: Vertical settlements estimation for dry sands ::

Depth (ft)	$(N_1)_{60}$	τ_{av}	p	G_{max} (tsf)	a	b	γ	ε_{15}	N_c	ε_{Nc} (%)	Δh (ft)	ΔS (in)
5.00	25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.000
10.00	33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.000
15.00	49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.000

:: Vertical settlements estimation for dry sands ::

Depth (ft)	$(N_1)_{60}$	τ_{av}	p	G_{max} (tsf)	a	b	γ	ε_{15}	N_c	ε_{Nc} (%)	Δh (ft)	ΔS (in)

Cumulative settlemetns: 0.000

Abbreviations

τ_{av}: Average cyclic shear stress
p: Average stress
G_{max}: Maximum shear modulus (tsf)
a, b: Shear strain formula variables
γ: Average shear strain
ε_{15}: Volumetric strain after 15 cycles
N_c: Number of cycles
ε_{Nc}: Volumetric strain for number of cycles N_c (%)
Δh: Thickness of soil layer (in)
ΔS: Settlement of soil layer (in)

:: Vertical settlements estimation for saturated sands ::

Depth (ft)	D_{50} (in)	q_c/N	e_v (%)	Δh (ft)	s (in)
20.00	0.00	5.00	0.00	5.00	0.000
25.00	0.00	5.00	0.00	5.00	0.000
30.00	0.00	5.00	0.00	5.00	0.000
35.00	0.00	5.00	0.00	5.00	0.000
40.00	0.00	5.00	0.31	5.00	0.183
45.00	0.00	5.00	0.00	5.00	0.000
50.00	0.00	5.00	1.24	5.00	0.746

Cumulative settlements: 0.929

Abbreviations

D_{50}: Median grain size (in)
q_c/N: Ratio of cone resistance to SPT
e_v: Post liquefaction volumetric strain (%)
Δh: Thickness of soil layer to be considered (ft)
s: Estimated settlement (in)

:: Lateral displacements estimation for saturated sands ::

Depth (ft)	$(N_1)_{60}$	D_r (%)	γ_{max} (%)	d_z (ft)	LDI	LD (ft)
5.00	25	70.00	0.00	5.00	0.000	0.00
10.00	33	80.42	0.00	5.00	0.000	0.00
15.00	49	100.00	0.00	5.00	0.000	0.00
20.00	42	90.73	0.00	5.00	0.000	0.00
25.00	31	77.95	0.00	5.00	0.000	0.00
30.00	20	62.61	0.00	5.00	0.000	0.00
35.00	35	82.83	0.00	5.00	0.000	0.00
40.00	30	76.68	2.38	5.00	0.000	0.00
45.00	31	77.95	0.00	5.00	0.000	0.00
50.00	28	74.08	5.28	5.00	0.000	0.00

:: Lateral displacements estimation for saturated sands ::

Depth (ft)	$(N_1)_{60}$	D_r (%)	γ_{max} (%)	d_z (ft)	LDI	LD (ft)

Cumulative lateral displacements: 0.00

Abbreviations

D_r: Relative density (%)
γ_{max}: Maximum amplitude of cyclic shear strain (%)
d_z: Soil layer thickness (ft)
LDI: Lateral displacement index (ft)
LD: Actual estimated displacement (ft)

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CITY OF LOS ANGELES

CALIFORNIA

ERIC GARCETTI
MAYOR

DEPARTMENT OF
BUILDING AND SAFETY
201 NORTH FIGUEROA STREET
LOS ANGELES, CA 90012

SOILS REPORT APPROVAL LETTER

June 17, 2022

LOG # 121766
SOILS/GEOLOGY FILE - 2
LIQ

Moti Balyan
5951 Variel Avenue
Woodland Hills, CA 91367

TRACT:	PM 1281
LOT:	A
LOCATION:	22736 W. Victory Boulevard

CURRENT REFERENCE REPORT/LETTER(S)	REPORT No.	DATE OF DOCUMENT	PREPARED BY
Soils Report	22-1187P	04/07/2022	Geo Environ

The Grading Division of the Department of Building and Safety has reviewed the referenced report that provides recommendations for the proposed 2-story service station comprised of an automatic carwash, as described on page 4 and shown on the Plot/Site Plan in the 04/07/2022 report. According to the consultants, the site is currently developed with a self-service carwash facility that will be demolished.

Two borings were drilled to depths of 10 and 50 feet. The earth materials at the subsurface exploration locations consist native soils. According to the consultants, groundwater was encountered at a depth of 28.5 feet and historically highest groundwater level is at about 20 feet below the ground surface. The site is relatively level.

The consultants recommend to support the proposed building on conventional foundations bearing on properly placed fill, a minimum of 2 feet thick below the bottom of the footings.

The consultants recommend to support the canopy structures, if planned (see pg. 10, last paragraph of the 04/07/2022 report), on foundations that are 5 feet in diameter and 8 to 10 feet in depth, and bearing into competent native undisturbed soils.

The site is located in a designated liquefaction hazard zone as shown on the Seismic Hazard Zones map issued by the State of California. The Liquefaction study included as a part of the 04/07/2022 report demonstrates that the site soils are subject to liquefaction. The earthquake induced total and differential settlements are calculated to be 0.929 and 0.6 inches, respectively. However, these settlement magnitudes are considered by the Department to be within acceptable levels. The requirements of the 2020 City of Los Angeles Building Code have been satisfied.

The referenced report is acceptable, provided the following conditions are complied with during site development:

(Note: Numbers in parenthesis ( ) refer to applicable sections of the 2020 City of LA Building Code. P/BC numbers refer the applicable Information Bulletin. Information Bulletins can be accessed on the internet at LADBS.ORG.)

1. Retaining walls are not approved in this letter (see pg. 12 of the 04/07/2022 report). If retaining walls are proposed, a supplemental report shall be submitted to the Grading Division for review. The report shall include a site plan showing the proposed heights and locations of the retaining walls, and design calculations which include all surcharge loads.

2. Approval shall be obtained from the utility company with regard to proposed construction within or adjacent to the utility easement along the western property line (7006.6).

3. The soils engineer shall review and approve the detailed plans prior to issuance of any permit. This approval shall be by signature on the plans that clearly indicates the soils engineer has reviewed the plans prepared by the design engineer; and, that the plans included the recommendations contained in their reports (7006.1).

4. All recommendations of the report(s) that are in addition to or more restrictive than the conditions contained herein shall be incorporated into the plans.

5. A copy of the subject and appropriate referenced reports and this approval letter shall be attached to the District Office and field set of plans (7006.1). Submit one copy of the above reports to the Building Department Plan Checker prior to issuance of the permit.

6. A grading permit shall be obtained for all structural fill (106.1.2).

7. All man-made fill shall be compacted to a minimum 90 percent of the maximum dry density of the fill material per the latest version of ASTM D 1557. Where cohesionless soil having less than 15 percent finer than 0.005 millimeters is used for fill, it shall be compacted to a minimum of 95 percent relative compaction based on maximum dry density. Placement of gravel in lieu of compacted fill is only allowed if complying with LAMC Section 91.7011.3.

8. If import soils are used, no footings shall be poured until the soils engineer has submitted a compaction report containing in-place shear test data and settlement data to the Grading Division of the Department; and, obtained approval (7008.2).

9. Compacted fill shall extend beyond the footings a minimum distance equal to the depth of the fill below the bottom of footings or a minimum of three feet, whichever is greater (7011.3).

10. Existing uncertified fill, if any, shall not be used for support of footings, concrete slabs or new fill (1809.2, 7011.3).

11. Drainage in conformance with the provisions of the Code shall be maintained during and subsequent to construction (7013.12).

12. Grading shall be scheduled for completion prior to the start of the rainy season, or detailed temporary erosion control plans shall be filed in a manner satisfactory to the Grading Division of the Department and the Department of Public Works, Bureau of Engineering, B-Permit Section, for any grading work in excess of 200 cubic yards (7007.1).

    6262 Van Nuys Blvd. Ste 351, Van Nuys (818) 374-4605

13. All loose foundation excavation material shall be removed prior to commencement of framing (7005.3).

14. The applicant is advised that the approval of this report does not waive the requirements for excavations contained in the General Safety Orders of the California Department of Industrial Relations (3301.1).

15. Excavations shall not remove lateral support from a public way, adjacent property or an existing structure. Note: Lateral support shall be considered to be removed when the excavation extends below a plane projected downward at an angle of 45 degrees from the bottom of a footing of an existing structure, from the edge of the public way or an adjacent property. (3307.3.1)

16. A supplemental report shall be submitted to the Grading Division of the Department containing recommendations for shoring, underpinning, and sequence of construction in the event that any excavation would remove lateral support to the public way, adjacent property, or adjacent structures (3307.3). A plot plan and cross-section(s) showing the construction type, number of stories, and location of the structures adjacent to the excavation shall be part of the excavation plans (7006.2).

17. Unsurcharged temporary excavation may be cut vertical up to 5 feet. Excavations over 5 feet shall be trimmed back at a uniform gradient <u>not exceeding 1:1, from top to bottom of excavation</u>.

18. All foundations for the <u>proposed building</u> shall derive entire support from properly placed fill, a minimum of 2 feet thick below the bottom of the footings, as recommended and approved by the soils engineer by inspection.

19. All foundations for the <u>proposed canopy (if planned)</u> shall derive entire support from competent native undisturbed soils, as recommended on page 10 of the 04/07/2022 report, and approved by the soils engineer by inspection.

20. The foundations for the canopy, if planned, shall be 5 feet in diameter and 8 to 10 feet in depth, as recommended on page 10 of the 04/07/2022 report.

21. All continuous footings shall be reinforced with a minimum of four (4), ½-inch diameter (#4) deformed reinforcing bars. Two (2) bars shall be placed near the bottom and two (2) bars placed near the top of the footing, as recommended.

22. The building design shall incorporate provisions for total anticipated differential settlements of 0.7 inches. (1808.2)

23. Special provisions such as flexible or swing joints shall be made for buried utilities and drain lines to allow for differential vertical displacement.

24. Slabs-on-grade shall be at least 4 inches thick, as recommended, and shall be reinforced with ½-inch diameter (#4) reinforcing bars spaced a maximum of 16 inches on center each way.

25. The seismic design shall be based on a Site Class D, as recommended. All other seismic design parameters shall be reviewed by LADBS building plan check.

26. The structure shall be connected to the public sewer system per P/BC 2020-027.

27. All roof, pad and deck drainage shall be conducted to the street in an acceptable manner in non-erosive devices or other approved location in a manner that is acceptable to the LADBS and the Department of Public Works (7013.10).

28. All concentrated drainage shall be conducted in an approved device and disposed of in a manner approved by the LADBS (7013.10).

29. The soils engineer shall inspect all excavations to determine that conditions anticipated in the report have been encountered and to provide recommendations for the correction of hazards found during grading (7008, 1705.6 & 1705.8).

30. All friction pile or caisson drilling and excavations shall be performed under the inspection and approval of the soils engineer. The soils engineer shall indicate the distance that friction piles or caissons penetrate into competent native soils in a written field memorandum. (1803.5.5, 1705.1.2)

31. Prior to pouring concrete, a representative of the consulting soils engineer shall inspect and approve the footing excavations. The representative shall post a notice on the job site for the LADBS Inspector and the Contractor stating that the work inspected meets the conditions of the report. No concrete shall be poured until the LADBS Inspector has also inspected and approved the footing excavations. A written certification to this effect shall be filed with the Grading Division of the Department upon completion of the work. (108.9 & 7008.2)

32. Prior to excavation an initial inspection shall be called with the LADBS Inspector. During the initial inspection, the sequence of construction; pile installation (if planned); protection fences; and, dust and traffic control will be scheduled (108.9.1).

33. Pile excavations (if planned) shall be performed under the inspection and approval of the soils engineer and deputy grading inspector (1705.6, 1705.8).

34. Prior to the placing of compacted fill, a representative of the soils engineer shall inspect and approve the bottom excavations. The representative shall post a notice on the job site for the LADBS Inspector and the Contractor stating that the soil inspected meets the conditions of the report. No fill shall be placed until the LADBS Inspector has also inspected and approved the bottom excavations. A written certification to this effect shall be included in the final compaction report filed with the Grading Division of the Department. All fill shall be placed under the inspection and approval of the soils engineer. A compaction report together with the approved soil report and Department approval letter shall be submitted to the Grading Division of the Department upon completion of the compaction. In addition, an Engineer's Certificate of Compliance with the legal description as indicated in the grading permit and the permit number shall be included (7011.3).

35. No footing/slab shall be poured until the compaction report is submitted and approved by the Grading Division of the Department.

GLEN RAAD
Geotechnical Engineer I

Log No. 121766
213-482-0480

cc: Jian Kerendian, Applicant
Geo Environ, Project Consultant
VN District Office

CITY OF LOS ANGELES
DEPARTMENT OF BUILDING AND SAFETY
Grading Division

District VN	Log No. 121766

APPLICATION FOR REVIEW OF TECHNICAL REPORTS

INSTRUCTIONS

A. Address all communications to the Grading Division, LADBS, 221 N. Figueroa St., 12th Fl., Los Angeles, CA 90012 Telephone No. (213)482-0480.

B. Submit two copies (three for subdivisions) of reports, one "pdf" copy of the report on a CD-Rom or flash drive, and one copy of application with items "1" through "10" completed.

C. Check should be made to the City of Los Angeles.

1. LEGAL DESCRIPTION
   Tract:
   Block: Lots:
2. PROJECT ADDRESS: 22736 Victory Blvd, WH 91367
3. OWNER: MOTI BALYAN
   Address: 5951 Variel Ave
   City: Woodland Hills Zip: 91367
   Phone (Daytime): 818-462-3705
4. APPLICANT JIAN Kerendian
   Address: 1756 Barry Ave
   City: LA Zip: 90025
   Phone (Daytime): 310-920-2626
   E-mail address: Jiank26@yahoo.com
5. Report(s) Prepared by: GeoEnviron
6. Report Date(s): 4-7-22
7. Status of project: ☒ Proposed ☐ Under Construction ☐ Storm Damage
8. Previous site reports? ☐ YES if yes, give date(s) of report(s) and name of company who prepared report(s)
9. Previous Department actions? ☐ YES if yes, provide dates and attach a copy to expedite processing.
   Dates:
10. Applicant Signature: [signature] Position:

(DEPARTMENT USE ONLY)

REVIEW REQUESTED	FEES	REVIEW REQUESTED		FEES
☒ Soils Engineering	363.00	No. of Lots		
☐ Geology		No. of Acres		
☐ Combined Soils Engr. & Geol.		☐ Division of Land		
☐ Supplemental		Other		
☐ Combined Supplemental		☒ Expedite		181.50
☐ Import-Export Route		☐ Response to Correction		
Cubic Yards:		☐ Expedite ONLY		
			Sub-total	544.50
			Surcharges	129.80
			TOTAL FEE	674.30

Fee Due: 674.30
Fee Verified By: Am Date: 5/19/22
(Cashier Use Only)

Receipt #
1332920

ACTION BY:

THE REPORT IS: ☐ NOT APPROVED

☐ APPROVED WITH CONDITIONS ☐ BELOW ☐ ATTACHED

For Geology Date

For Soils Date