Geotechnical Evaluation

Verdugo Woodlands Elementary School
1751 North Verdugo Road
Glendale, California

Glendale Unified School District

349 West Magnolia Avenue | Glendale, California 91204

December 6, 2018 | Project No. 208465002

Geotechnical | Environmental | Construction Inspection & Testing | Forensic Engineering & Expert Witness

Geophysics | Engineering Geology | Laboratory Testing | Industrial Hygiene | Occupational Safety | Air Quality | GIS

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

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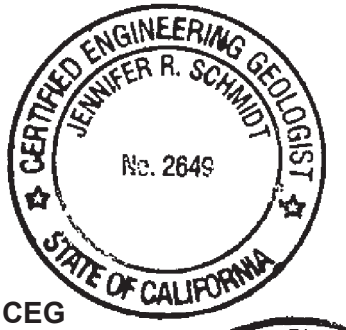

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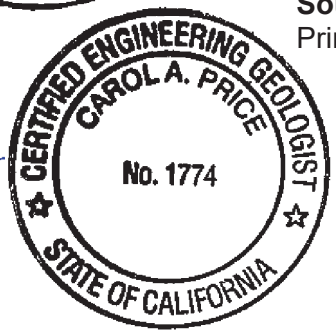

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1 INTRODUCTION

In accordance with your request, we have performed a geotechnical evaluation for the proposed new ball walls, shade structure, pedestrian bridge, and cafetorium located on the campus of Verdugo Woodlands Elementary School at 1751 North Verdugo Road in Glendale, California (Figure 1). The purpose of this study was to perform a subsurface evaluation and to provide geotechnical design recommendations for construction of the proposed new improvements. This report presents our findings, conclusions, and recommendations regarding the subject project.

Ninyo & Moore previously performed a geotechnical evaluation at the Verdugo Woodlands Elementary School campus for a new two-story classroom building. The results of our previous evaluation are presented in our referenced report dated December 23, 2011.

2 SCOPE OF SERVICES

Our scope of services included the following:

- Project planning and coordination with the Glendale Unified School District (GUSD) project manager and other GUSD personnel to perform the work.
- A site reconnaissance to locate the proposed borings and Cone Penetration Tests (CPTs), and coordination with site personnel and Underground Services Alert for underground utility location.
- Review of background data, including in-house geotechnical data, State of California Earthquake Fault Zone maps, State of California Seismic Hazards Zones Maps, topographic maps, geologic maps and literature, and stereoscopic aerial photographs.
- Permit acquisition from the County of Los Angeles Department of Environmental Health for drilling below groundwater.
- Subsurface exploration consisting of the drilling, sampling, and logging of four small-diameter borings to depths ranging from approximately 21½ to 56 feet. The borings were drilled using a truck-mounted drill rig utilizing hollow-stem augers. The materials encountered in the borings were classified and logged in accordance with the Unified Soil Classification System (USCS). Relatively undisturbed and bulk samples were obtained at selected intervals and the soil samples were transported to our laboratory for testing.
- Subsurface exploration consisting of four CPT soundings using truck-mounted CPT equipment to depths ranging from approximately 23 to 38 feet.
- Laboratory testing of representative soil samples to evaluate in-situ moisture content and dry density, percentage of particles finer than the No. 200 sieve, Atterberg limits, consolidation, direct shear strength, Proctor density, and soil corrosivity.
- Data compilation and engineering analysis of the information obtained from our background review, subsurface evaluation, and laboratory testing.
- Preparation of this geotechnical report presenting our findings, conclusions, and geotechnical recommendations for the project.

3 SITE DESCRIPTION AND BACKGROUND

The proposed improvements are located on the campus of Verdugo Woodlands Elementary School at 1751 North Verdugo Road in the city of Glendale, California (Figure 1). The rectangular-shaped campus is located in a residential neighborhood within the north-south trending Verdugo Canyon. The campus is bordered by North Verdugo Road to the east, Canada Boulevard to the west, and residential properties to the north and south. The Babe Herman little league field is also located on the southwest side of the campus.

The Verdugo Woodlands Elementary campus is divided approximately in the middle by the north to south trending Verdugo Wash. The Verdugo Wash is concrete-lined and approximately 75 feet wide with a pedestrian bridge spanning the wash on the north side of the campus. The portion of the campus located on the east side of the Verdugo Wash contains several administration and classroom buildings, including a new two-story classroom building constructed on the east side of the wash. Other improvements located on the eastern side of the campus include a new shade structure, some landscaping, and Portland Cement Concrete (PCC) paved hardscape areas. The portion of the campus located on the west side of the Verdugo Wash includes asphalt concrete (AC) paved playground areas and several temporary classroom buildings.

Topographically, the campus slopes gently to the south from an elevation of approximately 840 to 820 feet above mean sea level from the north to south, respectively (Google Earth, 2018).

4 PROPOSED CONSTRUCTION

We understand that this project will consist of the design and construction of a new approximately 20-foot-wide by 40-foot-long shade structure, concrete masonry ball walls, a new pedestrian bridge spanning the Verdugo Wash, and a new cafetorium building. The new shade structure and ball walls will be located on the west side of the Verdugo Wash near the western boundary of the campus. The new cafetorium will be located on the east side of the Verdugo wash on the north side of the recently constructed classroom building.

5 SUBSURFACE EVALUATION AND LABORATORY TESTING

Our subsurface exploration at the site was performed on August 16 and November 19, 2018, and consisted of the drilling, logging, and sampling of four small-diameter borings ranging in depths from approximately 21½ to 56 feet below the ground surface and four CPT soundings to depths ranging from approximately 23 to 38 feet below the ground surface. The borings were drilled using a truck-mounted drill rig utilizing 8-inch-diameter, hollow-stem augers. The borings were drilled to evaluate the subsurface conditions and were logged by a representative from our firm. Bulk and relatively undisturbed soil samples were obtained at selected depths for laboratory testing. The

CPT soundings were performed using a 30-ton CPT rig. Continuous soil profiles, including cone tip resistance and sleeve friction, were recorded during the soundings. The borings and CPTs were backfilled with cement-bentonite grout and the pavements were patched with rapid-set concrete. The approximate locations of the borings and CPTs are presented on Figure 2. The boring logs and the CPT sounding logs are presented in Appendices A and B, respectively.

Laboratory testing of representative soil samples included tests to evaluate in-situ moisture content and dry density, the percentage of particles finer than the No. 200 sieve, Atterberg limits, consolidation, direct shear strength, Proctor density, and soil corrosivity. The results of our in-situ moisture content and dry density tests are presented on the boring logs in Appendix A. The remaining laboratory testing results are presented in Appendix C.

6 GEOLOGIC AND SUBSURFACE CONDITIONS

6.1 Regional Geologic Setting

The project area is located within the northwestern block of the Los Angeles Basin, part of the Transverse Ranges geomorphic province of southern California (Norris and Webb, 1990). The Transverse Ranges comprise several roughly east-west trending mountain ranges with intervening valleys. The northwestern block is bounded on the south by the Santa Monica and Raymond Hill faults, on the east and northeast by the San Gabriel Mountains, and on the west and north by ranges typically included in the Ventura Basin. The site is situated in Verdugo Canyon with the Verdugo Mountains to the west and the San Rafael Hills to the east.

Based on review of regional geologic maps, the site and vicinity are generally underlain by alluvial floodplain deposits comprised of unconsolidated silt, sand, and gravel (Yerkes and Campbell, 2005) (Figure 3).

6.2 Site Geology

The materials encountered in our borings generally consisted of AC or PCC pavements and shallow fill underlain by alluvial deposits. Pavement sections encountered generally consisted of approximately 4 to 5 inches of AC in borings B-1 and B-2 and approximately 7 inches of PCC in borings B-3 and B-4. Fill soils were encountered below the pavements to a depth of up to approximately 4½ feet. The fill soils generally consisted of moist, medium dense, silty sand or poorly graded sand with silt and gravel. Alluvial soils were encountered below the fill to the total depths explored of approximately 56 feet. The alluvial soils generally consisted of very loose to very dense, poorly graded sand and silty sand with scattered gravel and cobbles. Some interbedded dense sandy silt and hard clay layers ranging in thicknesses from approximately 2 to

5 feet were encountered in borings B-3 and B-4 below a depth of approximately 23 feet. Additionally, due to the occurrence of increasingly dense soils and the presence of possible gravel and/or cobble layers, each of the four CPT soundings that were performed during our subsurface evaluation encountered refusal at depths shallower than our target exploration depths. More detailed descriptions of the subsurface materials are presented on the boring logs and CPT soundings in Appendices A and B, respectively.

6.3 Groundwater

Historic high groundwater data is not available for the project site (California Division of Mines and Geology [CDMG], 1998). However, groundwater was encountered during our subsurface exploration in boring B-4 at a depth of approximately 47 feet below the ground surface. Groundwater was also encountered during our previous geotechnical evaluation at a depth of approximately 28 feet below the ground surface (Ninyo & Moore, 2011). Published information indicates that groundwater was measured as shallow as approximately 18½ feet below the ground surface in a monitoring well located approximately 0.7 mile southwest of the site (California State Water Resources Control Board, 2018). It should be noted that fluctuations in groundwater levels may occur due to variations in ground surface topography, subsurface stratification, precipitation, irrigation practices, groundwater pumping, and other factors which may not have been evident at the time of our field evaluation.

7 FLOOD HAZARDS

Based on our review of flood insurance rate maps for the project area (Federal Emergency Management Agency [FEMA], 2008), the project site is not located in the 100-year Flood Hazard Zone, A99. Zone A99 includes areas to be protected from a 100-year flood by the Federal Flood Protection System under construction at the time of publication of the FEMA map; no base flood elevations are given. The site is located within Zone X, which includes “areas determined to be outside the 0.2 percent annual chance floodplain.”

8 FAULTING, SEISMICITY, AND GEOLOGIC HAZARDS

The subject site is not located within a State of California Earthquake Fault Zone (formerly known as Alquist-Priolo Special Studies Zone) (Hart and Bryant, 2007). However, the site is located in a seismically active area, as is the majority of southern California, and the potential for strong ground motion in the project areas is considered significant during the design life of the proposed improvements. The numerous faults in southern California include active, potentially active, and inactive faults. As defined by the California Geological Survey (CGS), active faults are faults that have ruptured within Holocene time, or within approximately the last 11,000 years. Potentially

active faults are those that show evidence of movement during Quaternary time (approximately the last 1.6 million years) but for which evidence of Holocene movement has not been established. Inactive faults have not ruptured in the last approximately 1.6 million years. The approximate locations of major faults in the site vicinity and their geographic relationship to the site are shown on Figure 4. Historical earthquakes with a magnitude of 6.5 or more, or earthquakes that have caused significant loss of life and property within approximately 62 miles (100 kilometers) of the subject site were obtained from the CGS Regional Geologic Hazards and Mapping Program website (CGS, 2015) and are presented in Table 1.

Table 1 – Historical Earthquakes

Date	Name, Location, or Region Affected	Approximate Fault to Site Distance in miles (km)	Earthquake Magnitude
October 1, 1987	Whittier Narrows	11.1 (17.8)	6.0
January 17, 1994	Northridge	18.0 (29.9)	6.7
February 9, 1971	San Fernando	19.1 (30.7)	6.6
March 11, 1933	Long Beach	35.2 (56.7)	6.4
December 8, 1812	Wrightwood	35.6 (57.4)	7.3
July 22, 1899	Wrightwood	42.5 (68.3)	6.4
December 21, 1812	Los Angeles, Ventura, Santa Barbara	45.1 (72.6)	7.1

Table 2 lists selected principal known active faults that may affect the subject site and the maximum moment magnitude (M_{max}). The approximate fault-to-site distances were calculated using the United States Geological Survey (USGS) web-based program (USGS, 2008).

Table 2 – Principal Active Faults

Fault	Approximate Fault-to-Site Distance miles (kilometers)	Maximum Moment Magnitude (Mmax)
Verdugo	1.1 (1.7)	6.9
Sierra Madre	3.3 (5.4)	7.3
Raymond	3.6 (5.8)	6.8
Hollywood	3.8 (6.1)	6.7
Santa Monica	5.5 (8.9)	7.4
Upper Elysian Park Blind Thrust	5.8 (9.4)	6.7
Sierra Madre (San Fernando)	8.2 (13.2)	6.7
San Gabriel	10.4 (16.7)	7.3
Puente Hills (LA)	11.6 (18.6)	7.0
Northridge	12.8 (20.6)	6.9
Newport-Inglewood (LA Basin)	13.0 (20.9)	7.5
San Andreas	26.2 (42.2)	8.2

In general, seismic hazards that could impact the subject site include ground surface rupture, ground motion, liquefaction, dynamic settlement, landsliding, and tsunami and seiches. A brief description of these hazards and the potential for their occurrences on site are discussed below.

8.1 Ground Surface Rupture

Based on our review of the referenced literature and our site reconnaissance, no active faults are known to cross the project site. The active Verdugo fault is located approximately 1.1 miles southwest of the site. Therefore, the probability of damage from ground surface rupture is considered to be low. However, lurching or cracking of the ground surface as a result of nearby seismic events is possible.

8.2 Ground Motion

The 2016 California Building Code (CBC) specifies that the Risk-Targeted, Maximum Considered Earthquake (MCE_R) ground motion response accelerations be used to evaluate seismic loads for design of buildings and other structures. The MCE_R ground motion response accelerations are based on the spectral response accelerations for 5 percent damping in the direction of maximum horizontal response and incorporate a target risk for structural collapse equivalent to 1 percent in 50 years with deterministic limits for near-source effects. The horizontal peak ground acceleration (PGA) that corresponds to the MCE_R for the site was calculated as 1.14g using the USGS (USGS, 2018) seismic design tool (web-based). Spectral response acceleration parameters, consistent with the 2016 CBC, are also provided in the Recommendations section for the evaluation of seismic loads on buildings and other structures.

8.2.1 Site-Specific Ground Response Analysis

A site-specific ground response analysis was performed in accordance with Section 1616A.1.3 of the CBC (CBC, 2016) and ASCE 7-10 (ASCE, 2010). The analysis consisted of the review of available seismologic information for nearby faults and performance of probabilistic seismic hazard analyses (PSHA) and deterministic seismic hazard analyses (DSHA) to develop acceleration response spectrum curves. In accordance with the recommendations of the 2016 CBC, the Next Generation Attenuation (NGA) relations were used while evaluating site-specific ground motion. The NGA relations we used for developing the deterministic and probabilistic spectra are by Chiou and Youngs (2008), Campbell and Bozorgnia (2008), and Boore and Atkinson (2008). The Open Seismic Hazard Analysis software developed by the USGS and the Southern California Earthquake Center (2010) was used for performing the PSHA and DSHA.

PSHA were performed for earthquake hazards having a 2 percent chance of being exceeded in 50 years and multiplying the accelerations by the risk coefficient. The maximum rotated components of ground motions were considered in PSHA with 5 percent damping. Deaggregation was performed on the PSHA in order to select the earthquake that is expected to produce the strongest level of shaking at the site (controlling earthquake). A magnitude 6.9 event on the Verdugo fault with a rupture distance of about 1.1 miles from the site was evaluated to be the controlling earthquake. Hence, the DSHA was performed for the site using this event and corrections were made to the spectral accelerations for the 84th percentile of the maximum rotated component of ground motion with 5 percent damping following the guidelines presented in the 2009 National Earthquake Hazards Reduction Program recommended seismic provisions (Building Seismic Safety Council, 2009). The site-specific design spectrum is the lesser of the probabilistic and deterministic ordinates evaluated for the site at each period (ASCE, 2010). The site-specific response spectra are shown on Figure 5.

8.3 Liquefaction

Liquefaction is the phenomenon in which loosely deposited granular soils and cohesionless fine-grained soils located below the water table undergo rapid loss of shear strength due to excess pore pressure generation when subjected to strong earthquake-induced ground shaking. Ground shaking of sufficient duration results in the loss of grain-to-grain contact due to a rapid rise in pore water pressure. This causes the soil to behave as a fluid for a short period of time. Liquefaction is known generally to occur in saturated or near-saturated cohesionless soils at depths shallower than 50 feet below the ground surface. Factors known to influence liquefaction potential include composition and thickness of soil layers, grain size, relative density, groundwater level, degree of saturation, and both intensity and duration of ground shaking.

The project site is located in an area mapped as potentially liquefiable on the State of California Seismic Hazards Zone map (Figure 6). Accordingly, the liquefaction potential of the subsurface soils was evaluated using our CPT soundings. The liquefaction analysis was based on the National Center for Earthquake Engineering Research (NCEER) procedure (Youd, et al., 2001) developed from the methods originally recommended by Seed and Idriss (1982) using the computer program LiquefyPro (CivilTech Software, 2008). A groundwater depth of 20 feet and a PGA_M of 0.917g was used in our analysis for a design earthquake magnitude of 6.9. Our liquefaction analysis indicates that the interbedded sandy layers between approximately 20 and 32 feet below the ground surface are susceptible to a low level of liquefaction during the design seismic event. Based on the increasing soil densities with depth and CPT sounding refusal at four

locations at the site, it is our opinion that liquefaction of the site soils below 32 feet is not a design consideration.

8.4 Liquefaction-Induced Settlement

As a result of liquefaction, the proposed project improvements may be subject to liquefaction-induced settlement. In order to estimate the amount of post-earthquake settlement, the method proposed by Tokimatsu and Seed (1987) was used in which the seismically induced cyclic stress ratios and corrected N-values are related to the volumetric strain of the soil. The amount of soil settlement during a strong seismic event depends on the thickness of the liquefiable layers and the density and/or consistency of the soils.

Our liquefaction analysis indicated that the liquefaction-induced dynamic settlement of up to about ½ inch may occur. Based on the guidelines presented in CGS Special Publication 117A (2008) and assuming relatively uniform subsurface stratigraphy across the site, we estimate differential settlement on the order of approximately ¼ inch for the project area. The results of our analysis are presented in Appendix D.

8.5 Dynamic Compaction of Dry Soils

Relatively dry soils (e.g., soils above the groundwater table) with low density or softer consistency tend to undergo dynamic compaction during a seismic event. Earthquake shaking often induces significant cyclic shear strain in a soil mass, which responds to the vibration by undergoing volumetric changes. Volumetric changes in dry soils take place primarily through changes in the void ratio (usually contraction in loose or normally consolidated, soft soils and dilation in dense or overconsolidated, stiff soils) and secondarily through particle reorientation. Such volumetric changes are generally non-recoverable.

Based on our review of the Checklist for the Review of Engineering Geology and Seismology Reports for California Public Schools (CGS, 2013) and past conversations with Mr. Brian Olsen with CGS, we are of the opinion that dynamic compaction of dry soils is not considered to be a consequence of soil liquefaction; and therefore, a peak ground acceleration equivalent to 40 percent of the site-specific design spectral acceleration at short periods (S_{DS}) can be used for the analysis of dynamic settlement of dry soils. Accordingly, a design earthquake moment magnitude of 6.9 and an associated site-specific design ground acceleration for Site Class D of 0.61g were used in our analysis. Under the current conditions a post-earthquake total settlement of up to approximately 2 inches and differential settlement of approximately 1 inch over a horizontal distance of 40 feet are calculated for the site. Our analyses are presented in Appendix D.

8.6 Landsliding

The site is located in an area of relatively flat terrain. Based on our site reconnaissance and review of published seismic hazard maps, geologic maps, and stereoscopic aerial photographs, landslides or indications of deep-seated slope instability are not considered potential hazards at the site.

8.7 Tsunamis and Seiches

Tsunamis are long wavelength, seismic sea waves (long compared to ocean depth) generated by the sudden movement of the ocean floor during submarine earthquakes, landslides, or volcanic activity. Seiches are waves generated in a large, enclosed body of water. The project area is not located within an area considered susceptible to tsunamis or seiche inundation. Therefore, damage due to tsunamis or seiches is not a design consideration.

9 CONCLUSIONS

Based on our geotechnical evaluation, it is our opinion that construction of the proposed new shade structure, ball walls, pedestrian bridge, and cafetorium are feasible from a geotechnical standpoint, provided the following recommendations are incorporated into the design and construction of the project. In general, the following findings and conclusions were made:

- The site is generally underlain by shallow fill soils over alluvium consisting of very loose to very dense, poorly graded sand and silty sand with scattered gravel and cobbles to the total depth explored of approximately 56 feet. Interbedded, hard clay and dense silt layers were also encountered in our borings below approximately 23 feet.

- Excavations during site grading should be feasible with earthmoving equipment in good working order. We anticipate that the granular near-surface soils should be generally suitable for use as compacted fill provided it is free of oversize materials, trash, rubble, roots, or other deleterious materials.

- Groundwater was encountered in boring B-4 at a depth of approximately 47 feet during drilling. Groundwater was encountered during our previous evaluation at a depth of approximately 28 feet. Fluctuations in the groundwater level will occur as a result of variations in seasonal precipitation, irrigation practices, and other factors. Seepage should be anticipated.

- The site is located within a mapped Seismic Hazards Zone area considered susceptible to seismically induced liquefaction. Based on our subsurface evaluation, the soils below the groundwater table are susceptible to liquefaction during the design seismic event. Our analysis indicates that liquefaction-induced dynamic settlement of up to approximately ½ inch may occur at the site.

- Dynamic earthquake-induced ground settlement in dry soils (above the groundwater table) is estimated to be up to approximately 2 inches.

- The subject site is not located within an Earthquake Fault Zone associated with active faulting as defined by the Alquist-Priolo Earthquake Fault Zoning Act. Accordingly, the potential for fault rupture across the site is considered low.
- The site is not located in an area considered susceptible to landsliding, tsunamis, or seiches.
- The site is not located within a designated flood inundation zone.
- Our limited laboratory corrosion testing indicates that the near-surface site soils should be considered non-corrosive based on California Department of Transportation (Caltrans, 2018) corrosion guidelines.

10 RECOMMENDATIONS

The following sections include our geotechnical recommendations for the proposed shade structure, ball walls, and pedestrian bridge. These recommendations are based on our evaluation of the site geotechnical conditions and our understanding of the planned construction, including anticipated foundation loads. The proposed site improvements should be constructed in accordance with the requirements of applicable governing agencies.

10.1 Earthwork

Earthwork at the site is anticipated to generally consist of site clearing, removal and recompaction of the existing fill below the proposed new structures, excavation for foundations, and trenching for new pipelines. Earthwork operations should be performed in accordance with the requirements of applicable governing agencies and the recommendations presented in the following sections of this report.

10.1.1 Construction Plan Review and Pre-Construction Conference

We recommend that the grading and foundation plans for the project be submitted to Ninyo & Moore for review to evaluate conformance to the geotechnical recommendations provided in this report. We further recommend that a pre-construction conference be held. The owner and/or their representative, the governing agencies' representatives, the civil engineer, Ninyo & Moore, and the contractor should be in attendance to discuss the work plan and project schedule and earthwork requirements.

10.1.2 Site Preparation

Prior to excavation and fill placement, the site should be cleared of existing site improvements, surface obstructions, other deleterious materials, and abandoned utilities, and stripped of rubble, debris, and vegetation, as well as surface soils containing organic materials. Existing utilities to remain in place should be located and protected from damage

by construction activities. Obstructions that extend below the finished grade, if any, should be removed and the resulting holes filled with compacted soil. The materials generated from the clearing operations should be removed from the site and disposed of at a legal dump site.

10.1.3 Treatment of Near-Surface Soils

In order to provide suitable support for the proposed structures, we recommend that the soil beneath the planned spread footings and mat foundations be overexcavated and recompacted to a depth that provides 3 or more feet of compacted fill beneath the bottom of the foundations, or to a depth that removes existing undocumented fill, whichever is deeper. The limits of the excavation should extend laterally so that the bottom of the excavation is approximately 5 feet beyond the outside edge of the structure footprint, or a distance equal to the depth of the overexcavation, whichever is farther. The excavation bottom should be evaluated by our representative during the excavation work. Additional overexcavation of loose, soft, and/or wet areas may be appropriate, depending on our observations during construction. Prior to placing new compacted fill, the exposed bottom should be scarified, moisture-conditioned, and recompacted to a depth of approximately 8 inches.

10.1.4 Temporary Excavations and Shoring

We anticipate that excavations within the fill and alluvial materials at the site may be accomplished with backhoes, excavators, or other earthmoving equipment in good condition. We anticipate that the fill and alluvial deposits encountered will be comprised predominantly of moist, very loose to very dense, poorly graded sand and silty sand with scattered gravel and cobbles.

Temporary near-vertical excavations not exceeding a depth of approximately 4 feet should be feasible; however, excavations that expose friable sands and gravel with a low cohesion will be subject to caving. Excavations that are unstable or deeper than 4 feet should either be sloped at an inclination no steeper than 1½:1 (horizontal to vertical) or shored. Excavations should be performed in accordance with Occupational Safety and Health Administration's (OSHA) regulations. On-site soils should be considered as Type C soils in accordance with OSHA guidelines.

Shoring systems used for site excavations should be designed for the anticipated soil conditions using the lateral earth pressure values presented on Figures 7 and 8. The recommended design pressures are based on the assumption that the shoring system is constructed without raising the ground surface elevation behind the shored sidewalls of the excavation, that there are no surcharge loads, such as soil stockpiles and construction

materials, and that no loads act above a 1:1 (horizontal to vertical) plane ascending from the base of the shoring system. For a shoring system subjected to the above-mentioned surcharge loads, the contractor should include the effect of these loads on the lateral earth pressures acting on the shored walls.

We anticipate that settlement of the ground surface will occur behind the shored excavation. The amount of settlement depends heavily on the type of shoring system, the contractor's workmanship, and soil conditions. To reduce the potential for distress to adjacent improvements, we recommend that the shoring system be designed to limit the ground settlement behind the shoring system to ½ inch or less. Possible causes of settlement that should be addressed include settlement during installation of the shoring elements, excavation for structure construction, construction vibrations, and removal of the support system. We recommend that shoring installation be evaluated carefully by the contractor prior to construction and that consideration be given to the performance of settlement monitoring during construction.

The contractor should retain a qualified and experienced engineer to design the shoring system. The shoring parameters presented in this report are minimum requirements, and the contractor should evaluate the adequacy of these parameters and make the appropriate modifications for their design. We recommend that the contractor take appropriate measures to protect workers. OSHA requirements pertaining to worker safety should be followed.

10.1.5 Fill Material

In general, the on-site soils should be suitable for re-use as fill. On-site soils to be placed as fill should be free of trash, debris, roots, vegetation, contaminated material, or deleterious materials. Fill should generally be free of rocks or hard lumps of material larger than approximately 4 inches in diameter. Rocks or hard lumps larger than about 4 inches in diameter should be broken into smaller pieces or should be removed from the site. Fill used should be comprised of granular, non-expansive soil that conforms to the latest edition of "Greenbook" Standard Specifications for Public Works Construction (Greenbook) for structural backfill. "Non-expansive" is defined as soil having an expansion index of 20 or less in accordance with ASTM International (ASTM) D 4829 (CBC, 2016).

10.1.6 Fill Placement and Compaction

Fill soils placed should be compacted in horizontal lifts to a relative compaction of 90 percent as evaluated by ASTM D 1557. The lift thickness for fill soils will vary depending on the type of compaction equipment used but should generally be placed in horizontal lifts not exceeding

8 inches in loose thickness. Fill soils should be placed at slightly above the optimum moisture content as evaluated by ASTM D 1557.

10.1.7 Pipe Bedding

We recommend that pipelines and other utilities associated with the proposed new improvements, including the cafetorium, be installed in general accordance with the latest edition of the "Greenbook" Standard Specifications for Public Works Construction and the appropriate city/agency standards. The pipelines should be supported on approximately 6 inches of granular bedding material such as sand with a sand equivalent value of 30 or more in accordance with ASTM D 2419. Bedding material should be placed and compacted around the pipe, and 12 inches or more above the top of the pipe. Special care should be taken not to allow voids beneath and around the pipe.

10.1.8 Modulus of Soil Reaction

The modulus of soil reaction is used to characterize the stiffness of soil backfill placed at the sides of buried pipelines for the purpose of evaluating deflection caused by the weight of the backfill above the pipe. For pipelines constructed in granular fill and native materials, we recommend that a modulus of soil reaction of 1,000 pounds per square inch be used for design, provided that granular bedding material is placed adjacent to the pipe, as recommended in this report.

10.1.9 Lateral Pressures for Thrust Blocks

Thrust restraint for buried pipelines may be achieved by transferring the thrust force to the soil outside the pipe through a thrust block. Thrust blocks may be designed using the lateral passive earth pressures presented on Figure 9.

10.2 Seismic Design Considerations

Design of the proposed improvements should be performed in accordance with the requirements of governing jurisdictions and applicable building codes. Table 3 presents the seismic design parameters for the site in accordance with the CBC (2016) guidelines and adjusted MCE_R spectral response acceleration parameters (USGS, 2018). The site-specific ARS curves presented on Figure 5 utilize these spectral ordinates.

Table 3 – 2016 California Building Code Seismic Design Criteria	
Seismic Design Factors	**Value**
Site Class	D
Site Coefficient, F_A	1.0
Site Coefficient, F_V	1.5
Mapped Spectral Response Acceleration at 0.2-second Period, S_s	2.848g
Mapped Spectral Response Acceleration at 1.0-second Period, S_1	0.992g
Mapped Spectral Response Acceleration at 0.2-second Period Adjusted for Site Class, S_{MS}	2.848g
Mapped Spectral Response Acceleration at 1.0-second Period Adjusted for Site Class, S_{M1}	1.488g
Mapped Design Spectral Response Acceleration at 0.2-second Period, S_{DS}	1.899g
Mapped Design Spectral Response Acceleration at 1.0-second Period, S_{D1}	0.992g
Site-Specific Design Spectral Response Acceleration at 0.2-second Period, S_{DS}	1.519g
Site-Specific Design Spectral Response Acceleration at 1.0-second Period, S_{D1}	1.104g

10.3 Foundations

Recommendations for spread footings and mat foundations are presented in the following sections. Foundations should be designed in accordance with structural considerations and the following recommendations. In addition, requirements of the appropriate governing jurisdictions and applicable building codes should be considered in the design of the structures.

10.3.1 Spread Footings

Spread footings should extend 2 feet deep or more below the adjacent finished grade and bear on compacted fill. Continuous footings should have a width of 2 feet or more. Isolated pad footings should have a width of 3 feet or more and be founded at a depth of 2 feet below the adjacent finished grade. Footings constructed near existing underground utility lines should be deepened such that the utility line is located above a 1:1 (horizontal to vertical) plane projected downward from the base of the footing. Continuous footings should be reinforced with two No. 5 steel reinforcing bars, one placed near the top and one placed near the bottom of the footings, and further detailed in accordance with the recommendations of the structural engineer.

Spread footings, as described above and bearing on compacted fill, may be designed using a net allowable bearing capacity of 2,000 per square foot (psf). The net allowable bearing capacity may be increased by 100 and 250 psf for every additional foot of width and depth, respectively, up to a value of 3,000 psf. Total and differential static settlements for footings designed in accordance with the above recommendations are estimated to be on the order of 1 inch and ½ inch over a horizontal span of 40 feet, respectively.

Footings bearing in compacted granular fill may be designed using a coefficient of friction of 0.35, where the total frictional resistance equals the coefficient of friction times the dead load. The footings may be designed using a passive resistance value of 300 psf per foot of depth up to a value of 3,000 psf. The allowable lateral resistance can be taken as the sum of the frictional resistance and passive resistance, provided the passive resistance does not exceed one-half of the total allowable resistance. The net allowable bearing capacity and passive resistance may be increased by one-third when considering loads of short duration such as wind or seismic forces.

Trenches should not be excavated adjacent to footings. If necessary, trenches can be excavated adjacent to a continuous footing, provided that the bottom of the trench is located above a 1:1 (horizontal to vertical) plane projected downward from the bottom of the adjacent footing. Utility lines that cross beneath footings should be encased in concrete below the footing.

10.3.2 Mat Foundations

Mat foundations may be designed using a net allowable bearing capacity of 2,000 pounds psf bearing on a crushed rock underlain by competent native subgrade or compacted granular fill. The total and differential settlements under static loading conditions corresponding to this allowable bearing load are estimated to be less than approximately ½ inch and ¼ inch over a horizontal span of 40 feet, respectively. Mat foundations typically experience some deflection due to loads placed on the mat and the reaction of the soils underlying the mat. A design modulus of subgrade reaction of 150 tons per cubic foot (tcf) may be used for the subgrade soils in evaluating such deflections. This value is based on a unit square foot area and should be adjusted for large mats. Adjusted values of the modulus of subgrade reaction, K, can be obtained from the following equation for mats of various widths:

$$K = 150 \left(\frac{B+1}{2B} \right)^2$$; where B is the width of the mat measured in feet

10.4 Corrosivity

The corrosion potential of the site soils was evaluated using the results of a selected, representative sample obtained from our exploratory borings. Laboratory testing was performed to evaluate pH, minimum electrical resistivity, soluble sulfate, and chloride content. Soluble sulfate content is addressed in the following section of this report. The soil pH and minimum resistivity tests were performed in accordance with California Test Method (CT) 643. The test for chloride

content of the soils was performed using CT 422. Sulfate testing was performed in general accordance with CT 417. The laboratory test results are presented in Appendix C.

The pH of the tested sample was measured at approximately 11.7, the electrical resistivity was measured at approximately 1,785 ohm-centimeters, the chloride content was measured at approximately 65 parts per million (ppm), and the sulfate content was measured at approximately 0.048 percent (i.e., 480 ppm). Based on the laboratory results and Caltrans (2018) corrosion criteria, the project site can be classified as non-corrosive, which is defined as having earth materials with less than 500 ppm chlorides, less than 0.15 percent sulfates (i.e., 1,500 ppm), a pH of 5.5 or more, or an electrical resistivity of 1,100 ohm-centimeters or more. If corrosion-susceptible improvements are planned on site, we recommend that a corrosion engineer be consulted for further evaluation and recommendations.

10.5 Concrete Placement

Concrete in contact with soil or water that contains high concentrations of soluble sulfates can be subject to chemical and/or physical deterioration. Based on the CBC criteria (2016) and American Concrete Institute (ACI) criteria (ACI, 2016), the potential for sulfate attack is considered negligible for water-soluble sulfate contents in soil less than 0.10 percent by weight (1,000 ppm). The sample tested during this evaluation indicated water-soluble sulfate contents of approximately 0.048 percent by weight (i.e., about 480 ppm). Accordingly, the on-site soils are considered to have a negligible potential for sulfate attack. However, due to the potential variability in soil conditions across the site, we recommend that Type II/V cement be used for the project.

In order to reduce the potential for shrinkage cracks in the concrete during curing, we recommend that the concrete be placed with a slump of 4 inches based on ASTM C 143. The slump should be checked periodically at the site prior to concrete placement. We further recommend that concrete cover over reinforcing steel for foundations be provided in accordance with CBC (2016). The project structural engineer should be consulted for additional concrete specifications.

10.6 Drainage

Appropriate surface drainage is imperative for satisfactory site performance. Positive drainage should be provided and maintained to direct surface water away from improvements and off of the site. Positive drainage is defined as a slope of 2 percent or more over a distance of 5 feet or more. Surface waters should not be allowed to pond adjacent to footings or pavements.

11 CONSTRUCTION OBSERVATION

The recommendations provided in this report are based on our understanding of the proposed project and on our evaluation of the data collected based on subsurface conditions disclosed by widely spaced exploratory borings. It is imperative that the interpolated subsurface conditions be checked by Ninyo & Moore during construction. Observation of foundation excavations and observation and testing of compacted fill and backfill should be performed by Ninyo & Moore during construction. In addition, the project plans and specifications should be reviewed by Ninyo & Moore to check for conformance with the recommendations of this report prior to construction. It should be noted that, upon review of these documents, some recommendations presented in this report might be revised or modified.

During construction we recommend that the duties of the geotechnical consultant include, but not be limited to:

- Observing clearing, grubbing, and removals.
- Observation of remedial grading bottoms and pipeline trench bottoms.
- Observing excavation, placement, and compaction of fill.
- Evaluating imported materials prior to their use as fill, if used.
- Performing field tests to evaluate fill compaction.
- Observing foundation excavations for bearing materials and cleaning prior to placement of reinforcing steel or concrete.
- Performing material testing services, including concrete compressive strength and steel tensile strength tests and inspections.

12 LIMITATIONS

The field evaluation, laboratory testing, and geotechnical analyses presented in this geotechnical report have been conducted in general accordance with current practice and the standard of care exercised by geotechnical consultants performing similar tasks in the project area. No warranty, expressed or implied, is made regarding the conclusions, recommendations, and opinions presented in this report. There is no evaluation detailed enough to reveal every subsurface condition. Variations may exist and conditions not observed or described in this report may be encountered during construction. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface evaluation will be performed upon request.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Ninyo & Moore should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document.

This report is intended for design purposes only. It does not provide sufficient data to prepare an accurate bid by contractors. It is suggested that the bidders and their geotechnical consultant perform an independent evaluation of the subsurface conditions in the project areas. The independent evaluations may include, but not be limited to, review of other geotechnical reports prepared for the adjacent areas, site reconnaissance, and additional exploration and laboratory testing.

Our conclusions, recommendations, and opinions are based on an analysis of the observed site conditions. If geotechnical conditions different from those described in this report are encountered, our office should be notified, and additional recommendations, if warranted, will be provided upon request. It should be understood that the conditions of a site could change with time as a result of natural processes or the activities of man at the subject site or nearby sites. In addition, changes to the applicable laws, regulations, codes, and standards of practice may occur due to government action or the broadening of knowledge. The findings of this report may, therefore, be invalidated over time, in part or in whole, by changes over which Ninyo & Moore has no control.

This report is intended exclusively for use by the client. Any use or reuse of the findings, conclusions, and/or recommendations of this report by parties other than the client is undertaken at said parties' sole risk.

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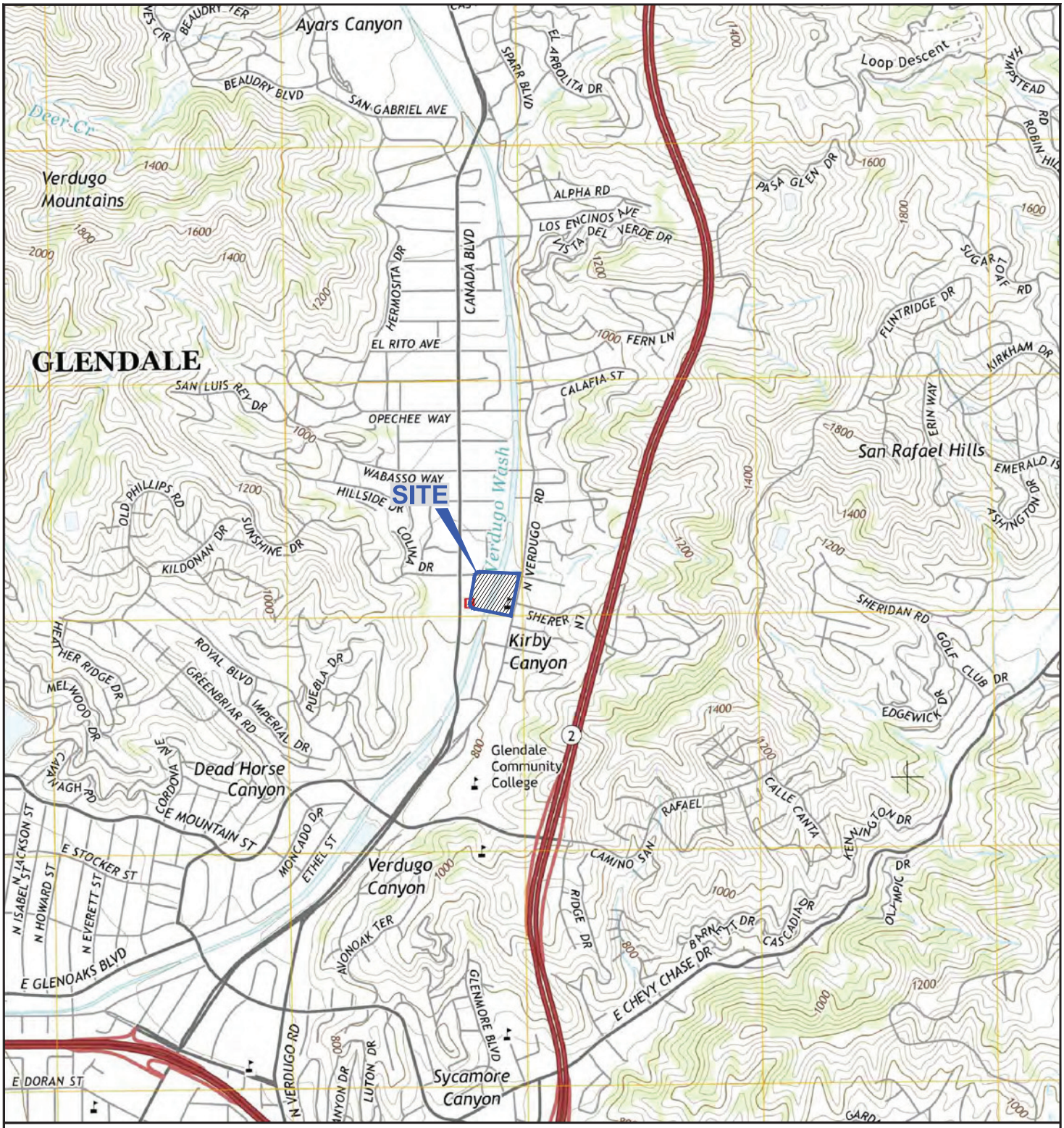
FIGURES



NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE. I REFERENCE: USGS, 2015.

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FIGURE 1

SITE LOCATION

1751 NORTH VERDUGO ROAD
GLENDALE, CALIFORNIA

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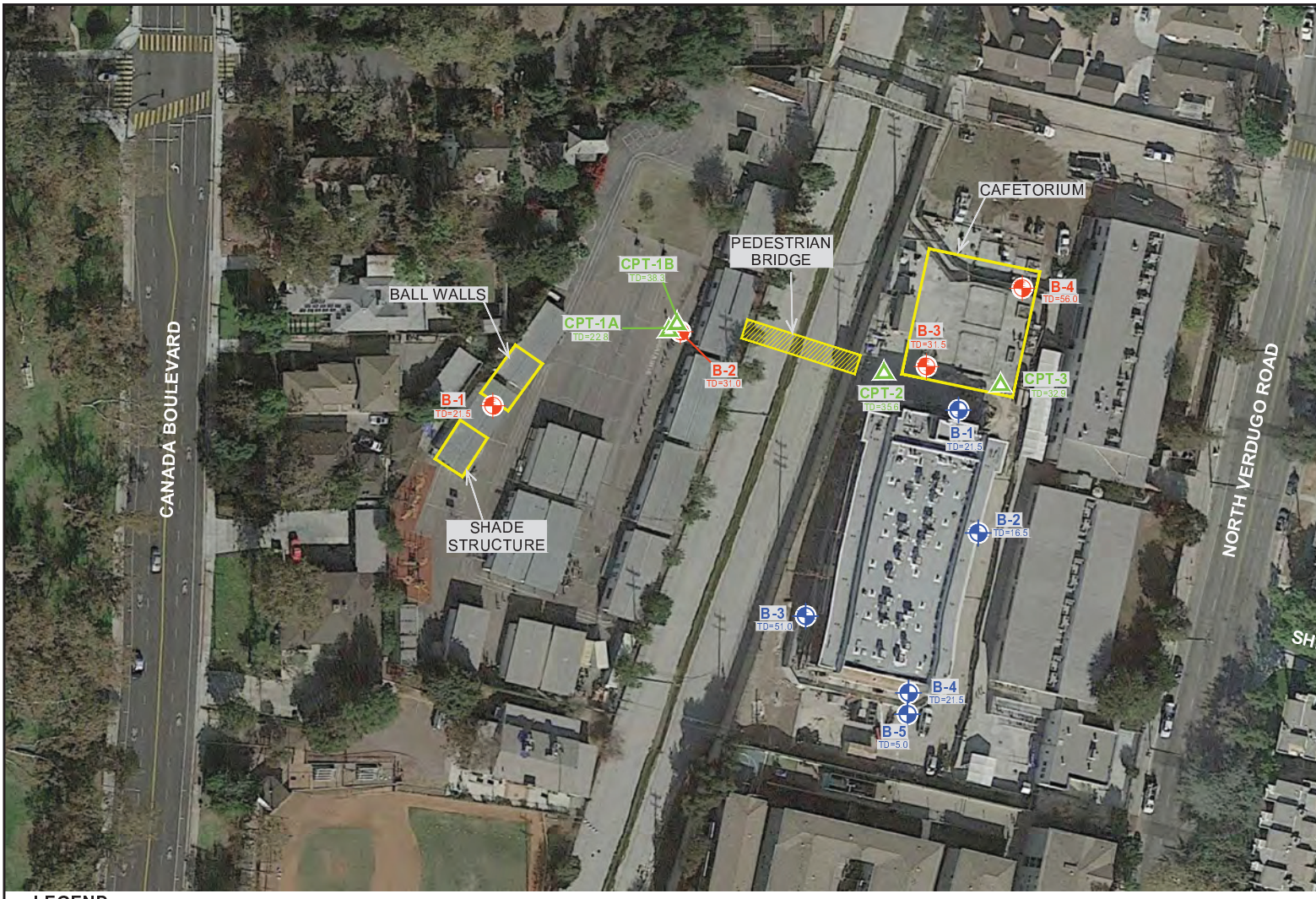

LEGEND

B-4 TD=56.0 — BORING; TD=TOTAL DEPTH IN FEET

CPT-3 TD=32.9 — CONE PENETROMETER TEST; TD=TOTAL DEPTH IN FEET

B-5 TD=5.0 — PREVIOUS BORING (NINYO & MOORE, 2011); TD=TOTAL DEPTH IN FEET

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE. | REFERENCE: GOOGLE EARTH, 2018.

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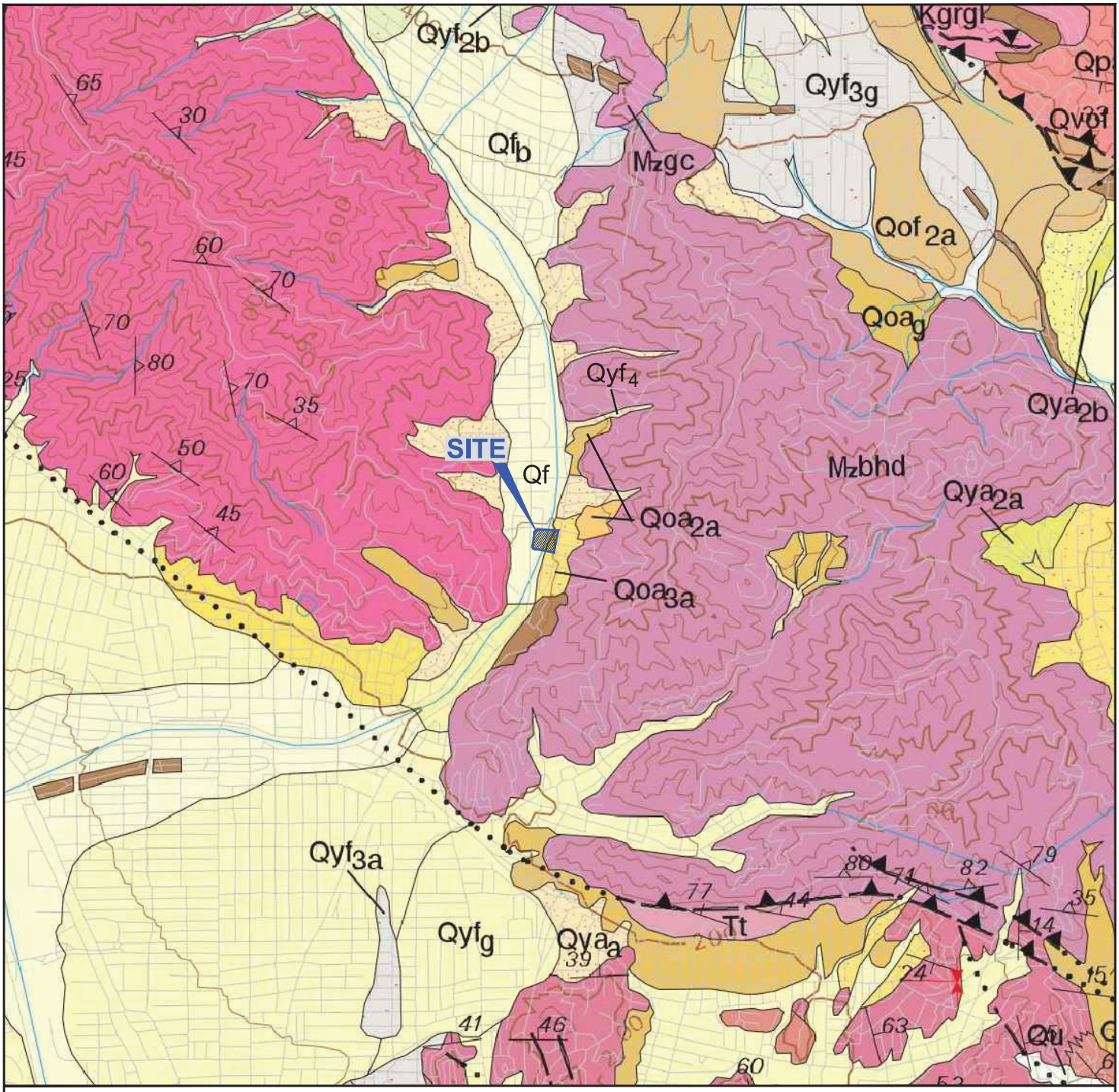

REFERENCE: YERKES AND CAMPBELL, 2005.

LEGEND

Qf	ALLUVIAL FAN DEPOSITS	Mzbhd	BIOTITE-HORNBLENDE DIORITE
Qya	YOUNG ALLUVIUM		GEOLOGIC CONTACT
Qoa	OLD ALLUVIUM		FAULT; DOTTED WHERE CONCEALED

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

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FIGURE 3

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REGIONAL GEOLOGY

1751 NORTH VERDUGO ROAD
GLENDALE, CALIFORNIA

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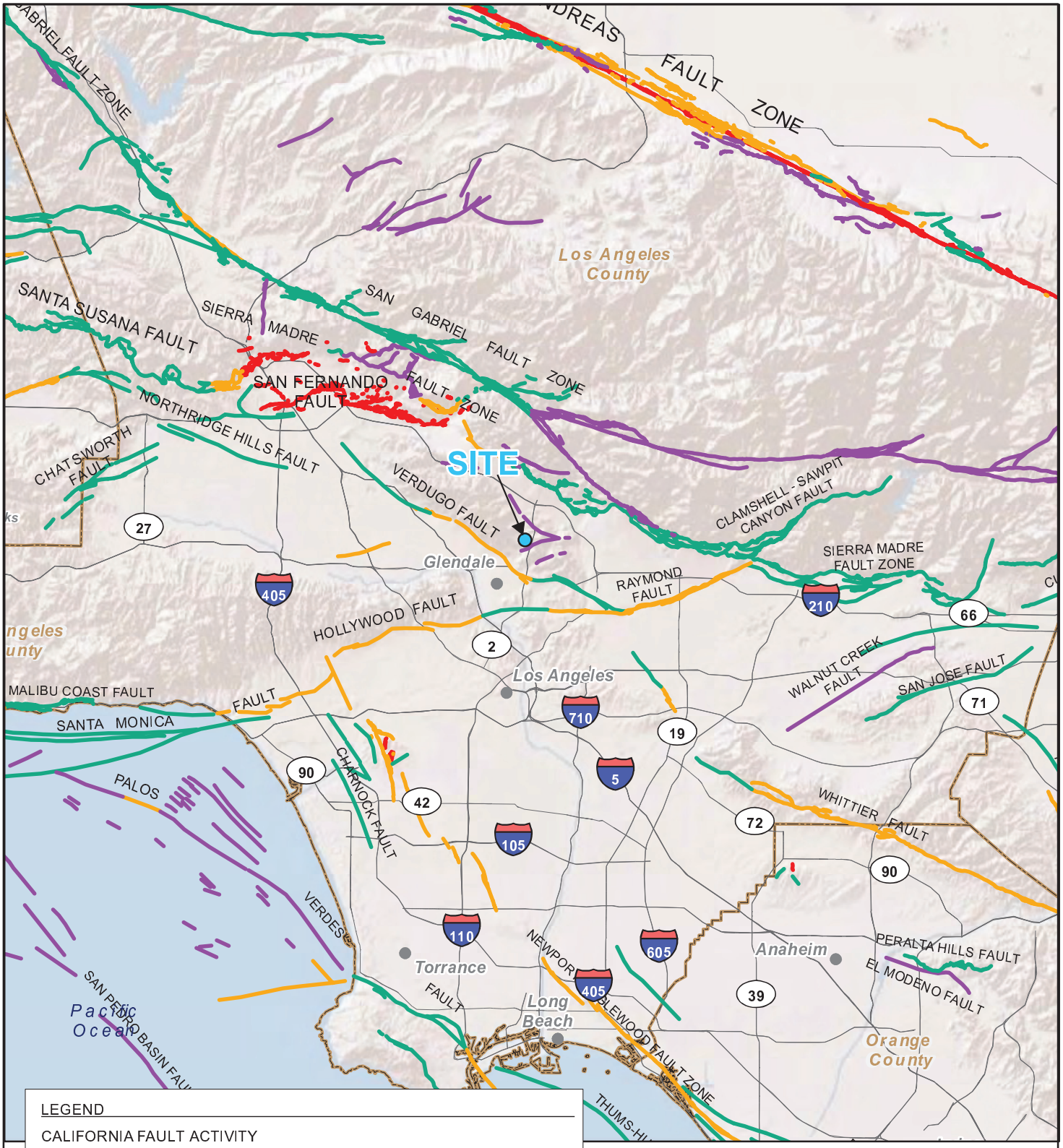

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NOTE: DIRECTIONS, DIMENSIONS AND LOCATIONS ARE APPROXIMATE.

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FIGURE 4

FAULT LOCATIONS

1751 NORTH VERDUGO ROAD
GLENDALE, CALIFORNIA

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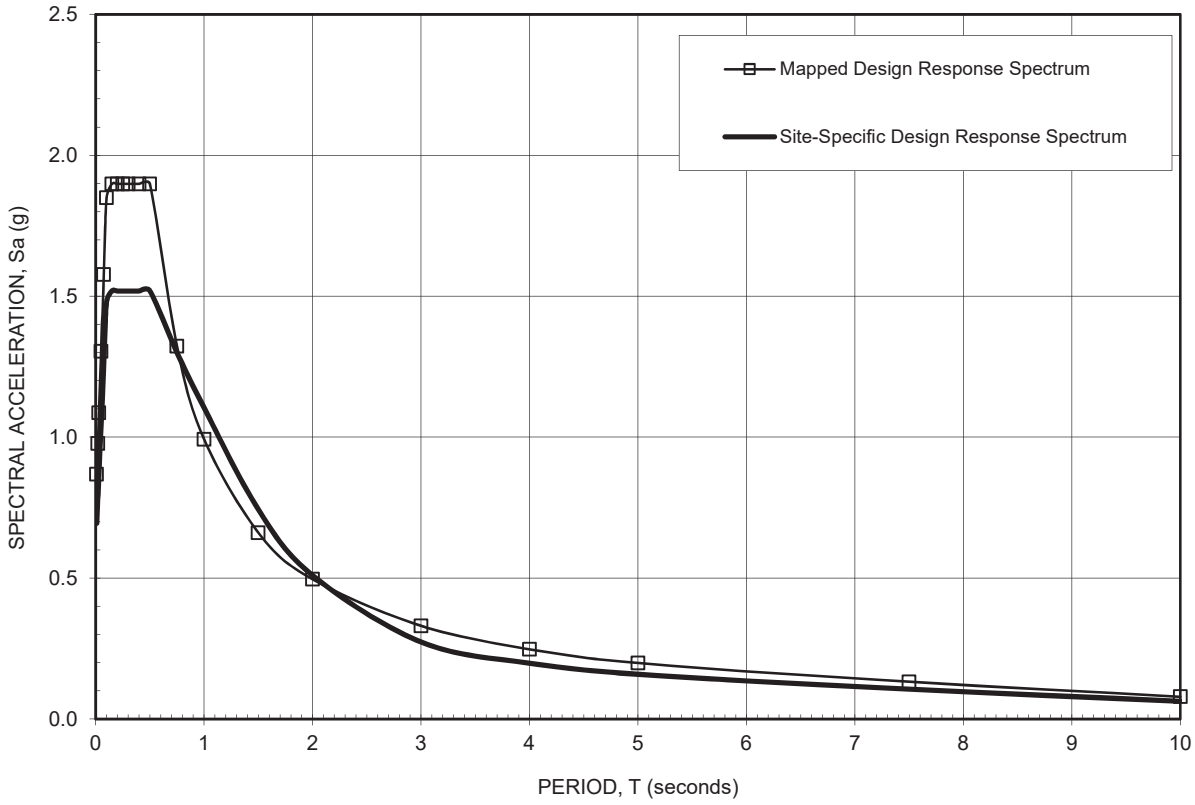
PERIOD (seconds)	SITE-SPECIFIC DESIGN RESPONSE SPECTRUM Sa, (g)
0.010	0.695
0.020	0.782
0.030	0.869
0.050	1.044
0.075	1.262
0.100	1.480
0.150	1.519
0.200	1.519
0.250	1.519
0.300	1.519
0.400	1.519

PERIOD (seconds)	SITE-SPECIFIC DESIGN RESPONSE SPECTRUM Sa, (g)
0.500	1.519
0.750	1.300
1.000	1.104
1.500	0.743
2.000	0.509
3.000	0.273
4.000	0.198
5.000	0.159
7.500	0.106
10.000	0.063

S_{DS} = 1.519 S_{D1} = 1.104 PGA_M = 0.917



NOTES:

1 Probabilistic Ground Motion is for Risk-targeted Maximum Considered Earthquake (MCE_R) with ground motion having 2% probability of exceedance In 50 years using Chiou & Youngs (2008), Campbell & Bozorgnia (2008), and Boore & Atkinson (2008) attenuation relationships andthe risk coeff.

2 Deterministic ARS is 84th percentile of the median values from attenuation relationships by Chiou & Youngs (2008), Campbell & Bozorgnia (2008), and Boore & Atkinson (2008) for deep soils considering a Mw 6.9 event on the Verdugo fault located 1.1 miles from the site. It conforms with the lower bound limit per ASCE 7-10 Section 21.2.2 as modified by 2009 NEHRP Recommended Seismic Provisions.

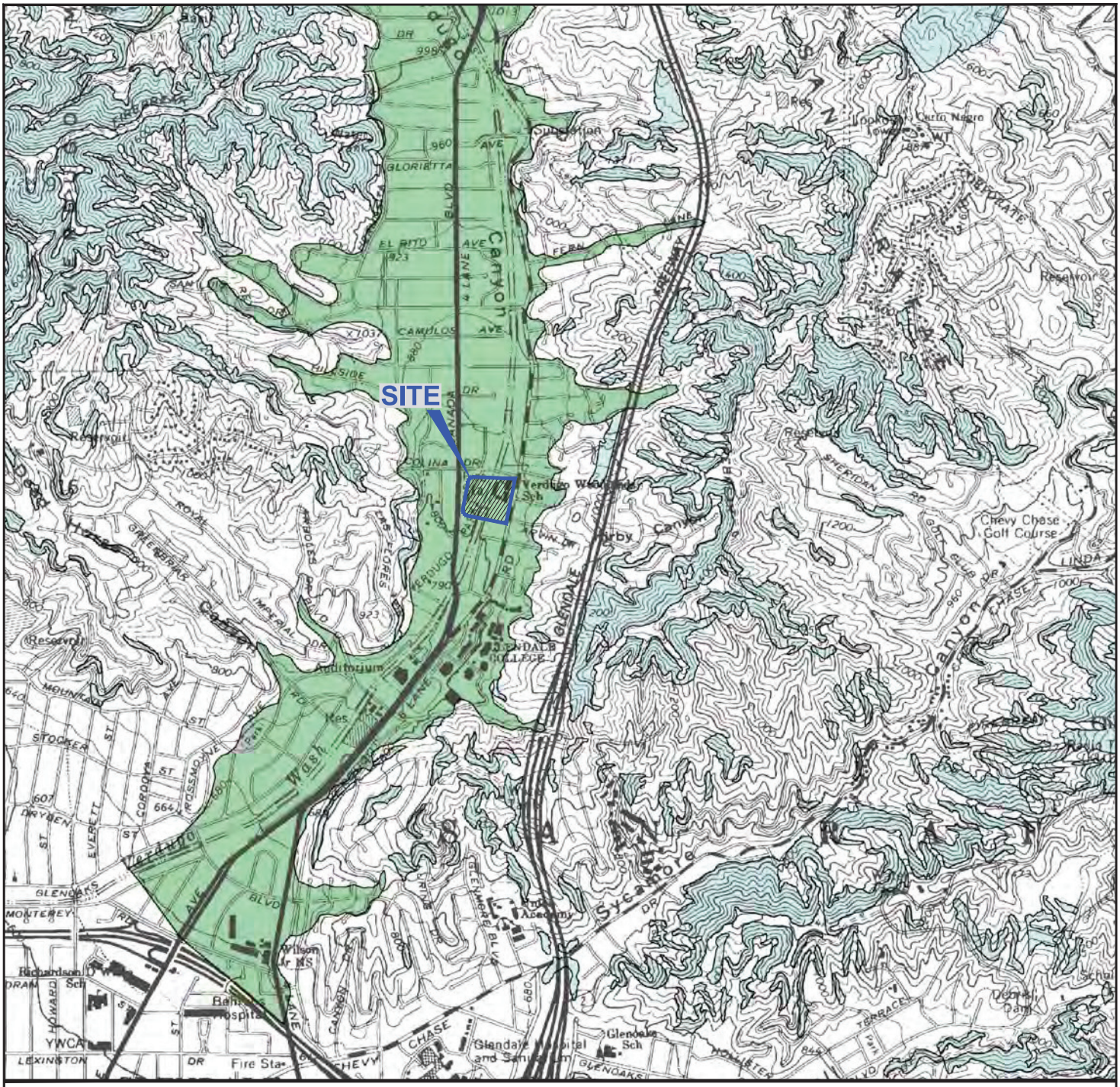
3 Site-Specific MCE_R is the lesser of spectral ordinates of deterministic and probabilistic ARS at each period per ASCE 7-10 Section 21.2.3. Site-Specific Design Response Spectrum conforms with lower bound limit per ASCE 7-10 Section 21.3.

4 Mapped Design Response Spectrum is computed from mapped spectral ordinates modified for Site Class D (stiff soil profile) per ASCE 7-10 Section 11.4. It is presented for comparison.

FIGURE 5

ACCELERATION RESPONSE SPECTRA

VERDUGO WOODLANDS ELEMENTARY SCHOOL
VERDUGO, CALIFORNIA



LEGEND

EARTHQUAKE-INDUCED LANDSLIDES

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.

LIQUEFACTION:

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

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE. I REFERENCE: CDC, 1998.

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FIGURE 6

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SEISMIC HAZARD ZONES

1751 NORTH VERDUGO ROAD
GLENDALE, CALIFORNIA

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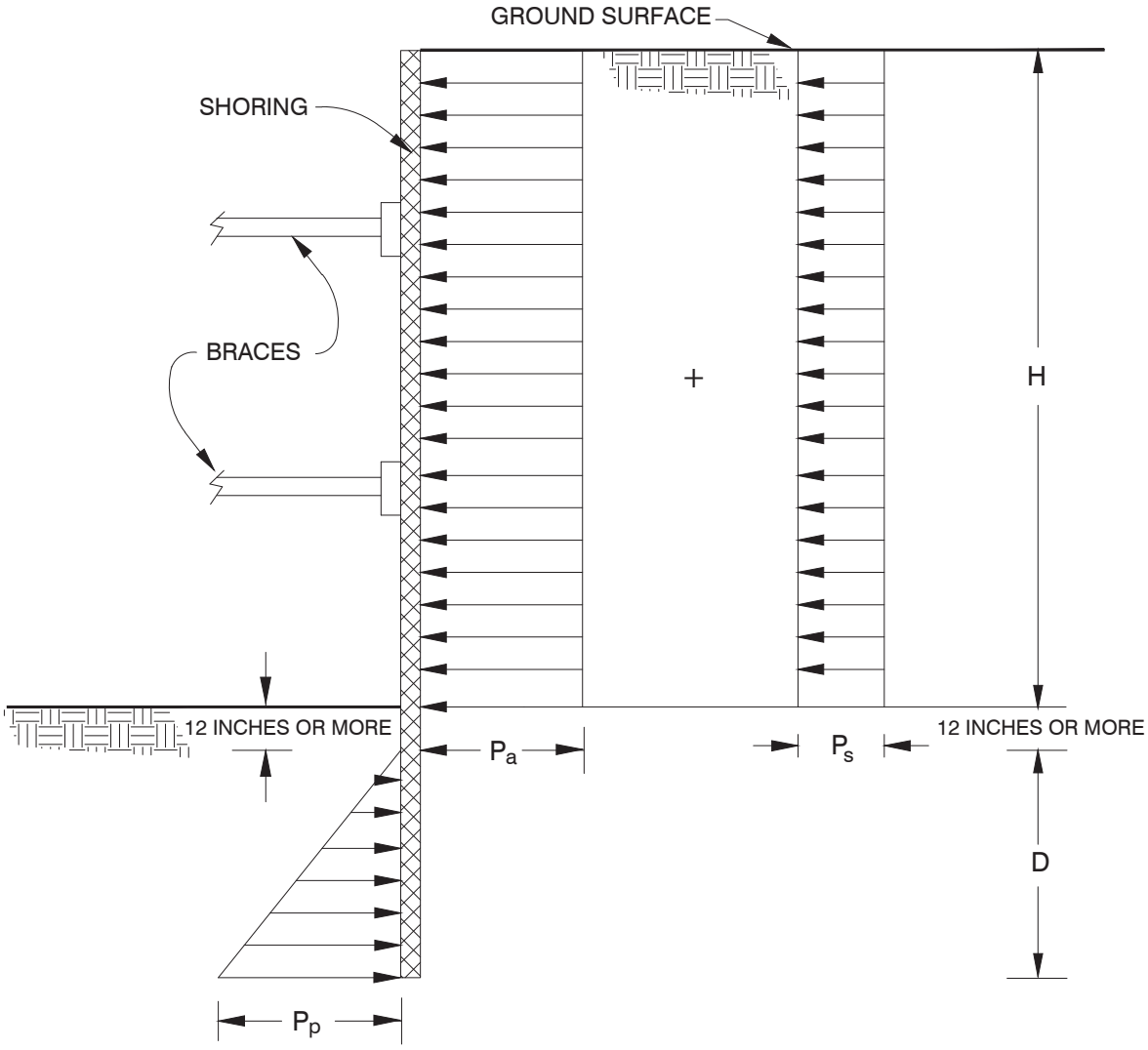

NOTES:

1. APPARENT LATERAL EARTH PRESSURE, P_a
   P_a = 31H psf
2. CONSTRUCTION TRAFFIC INDUCED SURCHARGE PRESSURE, P_s
   P_s = 120 psf
3. PASSIVE LATERAL EARTH PRESSURE, P_p
   P_p = 300D psf
4. ASSUMES GROUNDWATER IS NOT PRESENT
5. SURCHARGES FROM EXCAVATED SOIL OR CONSTRUCTION MATERIALS ARE NOT INCLUDED
6. H AND D ARE IN FEET

NOT TO SCALE

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

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FIGURE 7

LATERAL EARTH PRESSURE FOR BRACED EXCAVATION

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1751 NORTH VERDUGO ROAD
GLENDALE, CALIFORNIA

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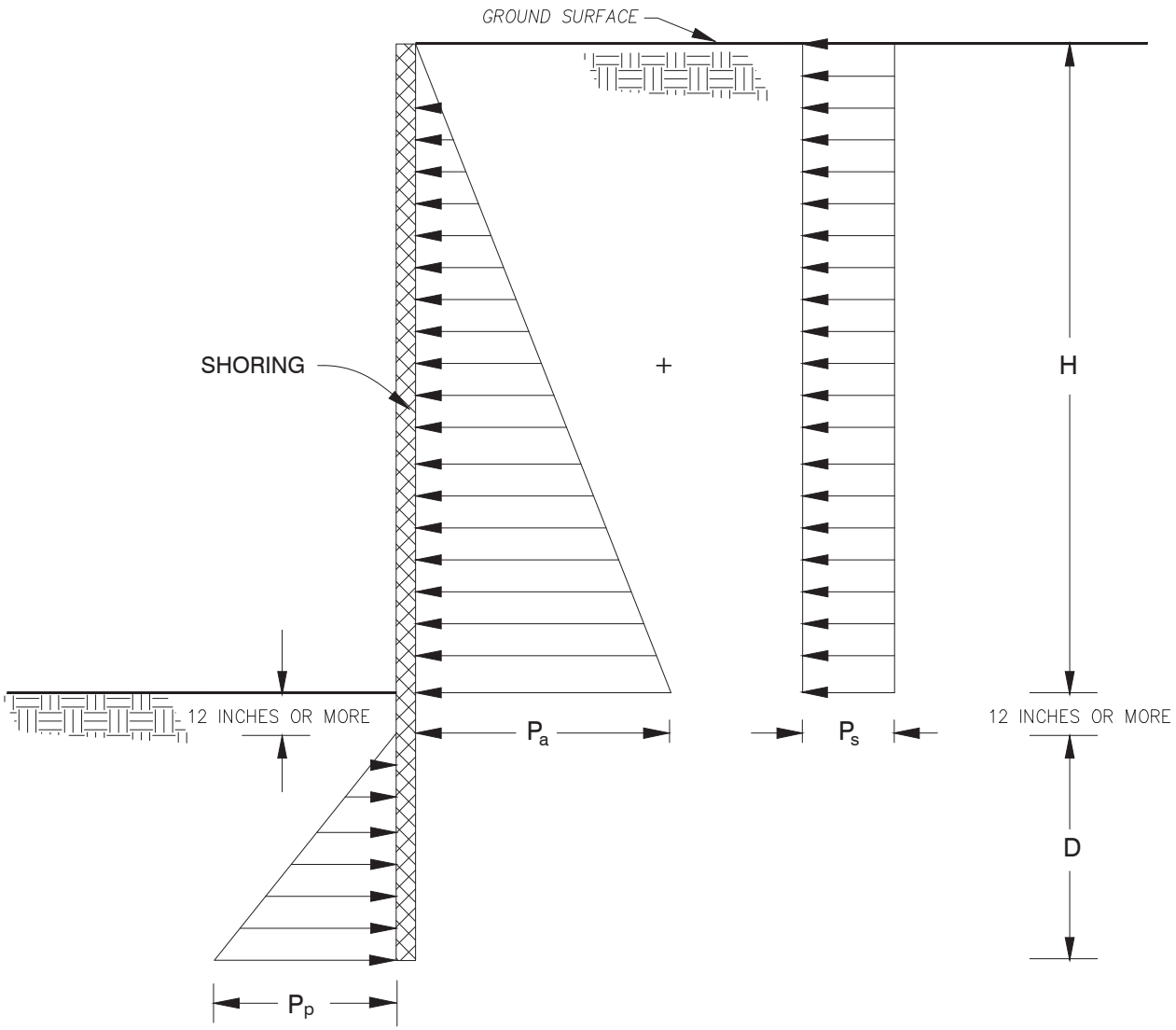

NOTES:

1. ACTIVE LATERAL EARTH PRESSURE, P_a
   P_a = 47 H psf
2. CONSTRUCTION TRAFFIC INDUCED SURCHARGE PRESSURE, P_s
   P_s = 120 psf
3. PASSIVE LATERAL EARTH PRESSURE, P_p
   P_p = 300 D psf
4. ASSUMES GROUNDWATER IS NOT PRESENT
5. H AND D ARE IN FEET

NOT TO SCALE

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

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FIGURE 8

LATERAL EARTH PRESSURES FOR TEMPORARY CANTILEVERED SHORING

1751 NORTH VERDUGO ROAD
GLENDALE, CALIFORNIA

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

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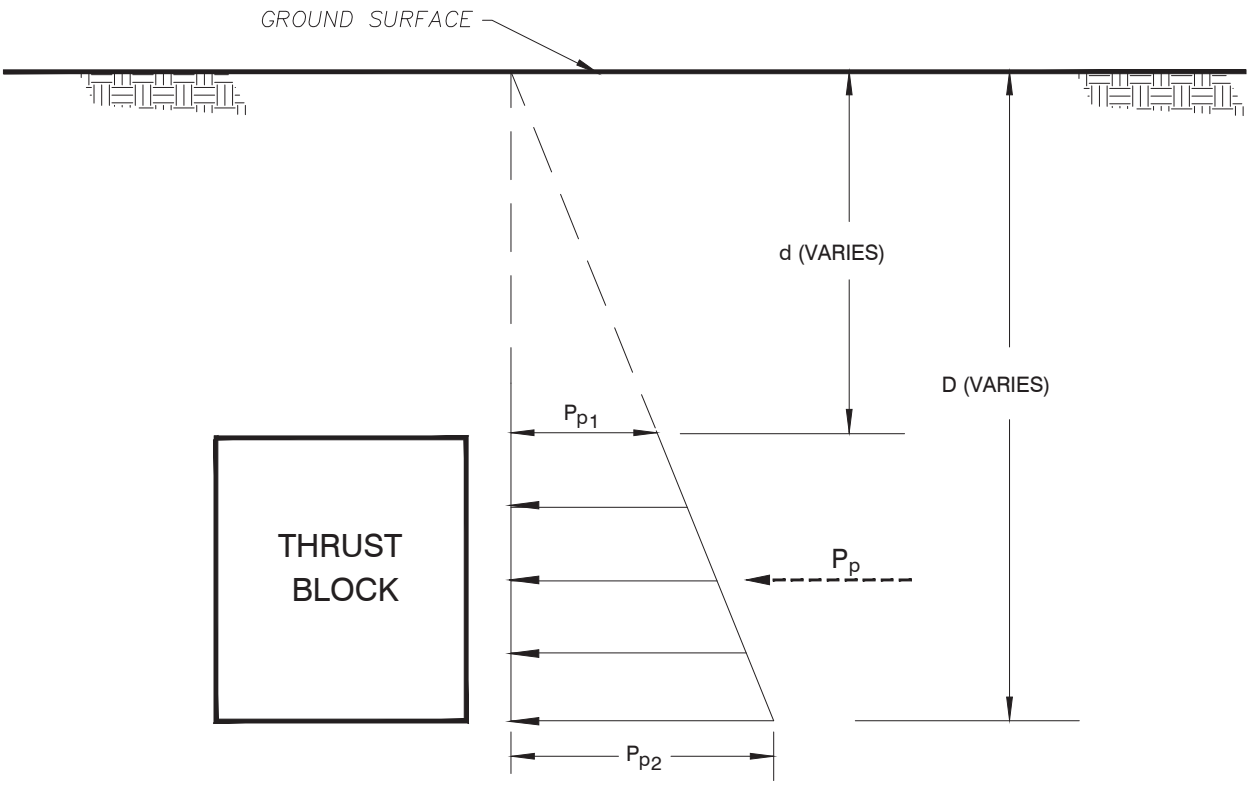

NOTES:

1. GROUNDWATER BELOW BLOCK
   $P_p = 150(D^2-d^2)$ lb/ft
2. ASSUMES BACKFILL IS GRANULAR MATERIAL
3. ASSUMES THRUST BLOCK IS ADJACENT TO COMPETENT MATERIAL
4. D, d AND h ARE IN FEET

NOT TO SCALE

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FIGURE 9

THRUST BLOCK LATERAL EARTH PRESSURE DIAGRAM

1751 NORTH VERDUGO ROAD
GLENDALE, CALIFORNIA

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APPENDIX A

Boring Logs

APPENDIX A

BORING LOGS

Field Procedure for the Collection of Disturbed Samples
Disturbed soil samples were obtained in the field using the following methods.

Bulk Samples
Bulk samples of representative earth materials were obtained from the exploratory borings. The samples were bagged and transported to the laboratory for testing.

The Standard Penetration Test (SPT) Sampler
Disturbed drive samples of earth materials were obtained by means of a Standard Penetration Test sampler. The sampler is composed of a split barrel with an external diameter of 2 inches and an unlined internal diameter of 1⅜ inches. The sampler was driven into the ground 12 to 18 inches with a 140-pound hammer falling freely from a height of 30 inches in general accordance with ASTM D 1586. The blow counts were recorded for every 6 inches of penetration; the blow counts reported on the logs are those for the last 12 inches of penetration. Soil samples were observed and removed from the sampler, bagged, sealed and transported to the laboratory for testing.

Field Procedure for the Collection of Relatively Undisturbed Samples
Relatively undisturbed soil samples were obtained in the field using the following method.

The Modified Split-Barrel Drive Sampler
The sampler, with an external diameter of 3 inches, was lined with 1-inch-long, thin brass rings with inside diameters of approximately 2.4 inches. The sample barrel was driven into the ground with the weight of a hammer in general accordance with ASTM D 3550. The driving weight was permitted to fall freely. The approximate length of the fall, the weight of the hammer, and the number of blows per foot of driving are presented on the boring logs as an index to the relative resistance of the materials sampled. The samples were removed from the sample barrel in the brass rings, sealed, and transported to the laboratory for testing.

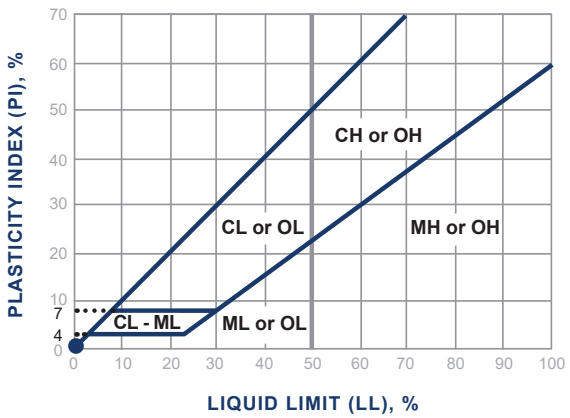
Soil Classification Chart Per ASTM D 2488

Primary Divisions			Secondary Divisions	
			Group Symbol	Group Name
COARSE-GRAINED SOILS more than 50% retained on No. 200 sieve	**GRAVEL** more than 50% of coarse fraction retained on No. 4 sieve	CLEAN GRAVEL less than 5% fines	GW	well-graded GRAVEL
			GP	poorly graded GRAVEL
		GRAVEL with DUAL CLASSIFICATIONS 5% to 12% fines	GW-GM	well-graded GRAVEL with silt
			GP-GM	poorly graded GRAVEL with silt
			GW-GC	well-graded GRAVEL with clay
			GP-GC	poorly graded GRAVEL with
		GRAVEL with FINES more than 12% fines	GM	silty GRAVEL
			GC	clayey GRAVEL
			GC-GM	silty, clayey GRAVEL
	SAND 50% or more of coarse fraction passes No. 4 sieve	CLEAN SAND less than 5% fines	SW	well-graded SAND
			SP	poorly graded SAND
		SAND with DUAL CLASSIFICATIONS 5% to 12% fines	SW-SM	well-graded SAND with silt
			SP-SM	poorly graded SAND with silt
			SW-SC	well-graded SAND with clay
			SP-SC	poorly graded SAND with clay
		SAND with FINES more than 12% fines	SM	silty SAND
			SC	clayey SAND
			SC-SM	silty, clayey SAND
FINE-GRAINED SOILS 50% or more passes No. 200 sieve	**SILT and CLAY** liquid limit less than 50%	INORGANIC	CL	lean CLAY
			ML	SILT
			CL-ML	silty CLAY
		ORGANIC	OL (PI > 4)	organic CLAY
			OL (PI < 4)	organic SILT
	SILT and CLAY liquid limit 50% or more	INORGANIC	CH	fat CLAY
			MH	elastic SILT
		ORGANIC	OH (plots on or above "A"-line)	organic CLAY
			OH (plots below "A"-line)	organic SILT
	Highly Organic Soils		PT	Peat

Grain Size

Description		Sieve Size	Grain Size	Approximate Size
Boulders		> 12"	> 12"	Larger than basketball-sized
Cobbles		3 - 12"	3 - 12"	Fist-sized to basketball-sized
Gravel	Coarse	3/4 - 3"	3/4 - 3"	Thumb-sized to fist-sized
	Fine	#4 - 3/4"	0.19 - 0.75"	Pea-sized to thumb-sized
Sand	Coarse	#10 - #4	0.079 - 0.19"	Rock-salt-sized to pea-sized
	Medium	#40 - #10	0.017 - 0.079"	Sugar-sized to rock-salt-sized
	Fine	#200 - #40	0.0029 - 0.017"	Flour-sized to sugar-sized
Fines		Passing #200	< 0.0029"	Flour-sized and smaller

Plasticity Chart



Apparent Density - Coarse-Grained Soil

Apparent Density	Spooling Cable or Cathead		Automatic Trip Hammer	
	SPT (blows/foot)	Modified Split Barrel (blows/foot)	SPT (blows/foot)	Modified Split Barrel (blows/foot)
Very Loose	≤ 4	≤ 8	≤ 3	≤ 5
Loose	5 - 10	9 - 21	4 - 7	6 - 14
Medium Dense	11 - 30	22 - 63	8 - 20	15 - 42
Dense	31 - 50	64 - 105	21 - 33	43 - 70
Very Dense	> 50	> 105	> 33	> 70

Consistency - Fine-Grained Soil

Consis-tency	Spooling Cable or Cathead		Automatic Trip Hammer	
	SPT (blows/foot)	Modified Split Barrel (blows/foot)	SPT (blows/foot)	Modified Split Barrel (blows/foot)
Very Soft	< 2	< 3	< 1	< 2
Soft	2 - 4	3 - 5	1 - 3	2 - 3
Firm	5 - 8	6 - 10	4 - 5	4 - 6
Stiff	9 - 15	11 - 20	6 - 10	7 - 13
Very Stiff	16 - 30	21 - 39	11 - 20	14 - 26
Hard	> 30	> 39	> 20	> 26

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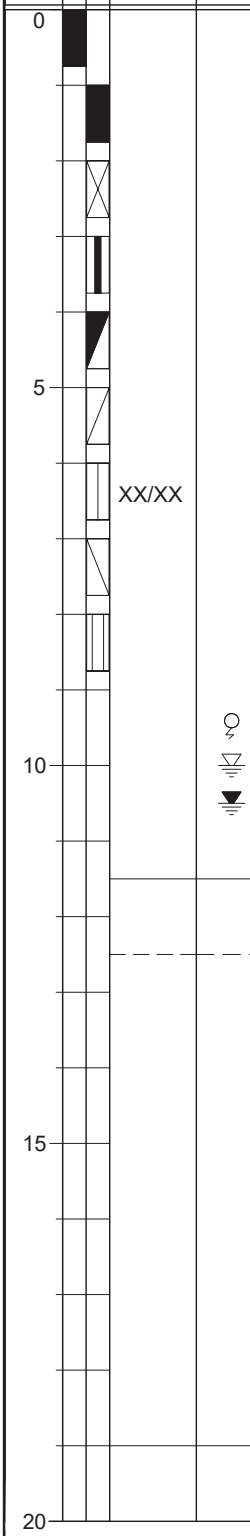
USCS METHOD OF SOIL CLASSIFICATION

BORING LOG EXPLANATION SHEET



Bulk sample.

Modified split-barrel drive sampler.

No recovery with modified split-barrel drive sampler.

Sample retained by others.

Standard Penetration Test (SPT).

No recovery with a SPT.

Shelby tube sample. Distance pushed in inches/length of sample recovered in inches.

No recovery with Shelby tube sampler.

Continuous Push Sample.

Seepage.

Groundwater encountered during drilling.

Groundwater measured after drilling.

SM

MAJOR MATERIAL TYPE (SOIL):

Solid line denotes unit change.

CL

Dashed line denotes material change.

Attitudes: Strike/Dip
b: Bedding
c: Contact
j: Joint
f: Fracture
F: Fault
cs: Clay Seam
s: Shear
bss: Basal Slide Surface
sf: Shear Fracture
sz: Shear Zone
sbs: Shear Bedding Surface

The total depth line is a solid line that is drawn at the bottom of the boring.

DATE DRILLED 8/16/18 BORING NO. B-1

GROUND ELEVATION 820' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 8" Hollow-Stem Auger (ABC Drilling)

DRIVE WEIGHT 140 lbs. (Auto. Trip Hammer) DROP 30"

SAMPLED BY ECH LOGGED BY ECH REVIEWED BY JRS

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	PID READING (PPM)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	ASPHALT CONCRETE: Approximately 5 inches thick.
							SM	FILL: Brown, moist, medium dense, silty SAND with gravel. ALLUVIUM: Brown, moist, loose, silty SAND; coarse sand; trace gravel; trace cobbles.
	Driven	12	3.3	119.3				
							SP-SM	Light brown, moist, loose, poorly graded SAND with silt; trace gravel; trace cobbles.
10	Driven	11						
								Few gravel.
	Driven	46						Dense.
							SM	Brown, moist, dense, silty SAND; trace gravel; trace cobbles.
20	Driven	59						
								Total Depth = 21.5 Feet. Groundwater not encountered during drilling. Backfilled with on-site soils and capped with rapid-set concrete on 8/16/18. Notes: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
30								
40								

FIGURE A- 1

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DATE DRILLED 8/16/18 BORING NO. B-2

GROUND ELEVATION 820' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 8" Hollow-Stem Auger (ABC Drilling)

DRIVE WEIGHT 140 lbs. (Auto. Trip Hammer) DROP 30"

SAMPLED BY ECH LOGGED BY ECH REVIEWED BY JRS

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	PID READING (PPM)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SP-SM	ASPHALT CONCRETE: Approximately 4 inches thick.
								FILL: Brown, moist, medium dense, poorly graded SAND with silt and gravel.
		5					SM	ALLUVIUM: Brown, moist, very loose, silty SAND; coarse sand; trace gravel; trace cobbles.
10		22	3.4	103.5				Medium dense.
		47						Dense.
20		74	2.4	116.6				Light brown; very dense.
		55						Dense.
30		50/6"						Very dense.
								Total Depth = 31 Feet. Groundwater not encountered during drilling. Backfilled with on-site soils and capped with rapid-set concrete on 8/16/18.
40								Notes: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.

FIGURE A- 2

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DATE DRILLED 8/16/18 BORING NO. B-3

GROUND ELEVATION 820' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 8" Hollow-Stem Auger (ABC Drilling)

DRIVE WEIGHT 140 lbs. (Auto. Trip Hammer) DROP 30"

SAMPLED BY ECH LOGGED BY ECH REVIEWED BY JRS

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	PID READING (PPM)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0								PORTLAND CEMENT CONCRETE:
							SM	Approximately 7 inches thick.
							SM	FILL: Brown, moist, medium dense, silty SAND.
								ALLUVIUM: Brown, moist, loose, silty SAND.
		13	5.4	113.1				Trace gravel.
10		13						Oxidation staining.
		48	3.7	111.6				Light brown; dense; few gravel.
							SP-SM	Grayish brown, moist, dense, poorly graded SAND with silt; few gravel; trace cobbles.
20		69						
							CL	Brown, moist, hard, lean CLAY.
		42	13.7	110.0				
							SM	Brown, moist, medium dense, silty SAND.
							ML	Brown, moist, medium dense, sandy SILT.
30		31						
								Total Depth = 31.5 Feet. Groundwater was not encountered during drilling. Backfilled with on-site soils and capped with rapid-set concrete on 8/16/18.
40								

Notes:
Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.

The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.

FIGURE A- 3

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DATE DRILLED 8/16/18 BORING NO. B-4

GROUND ELEVATION 820' ± (MSL) SHEET 1 OF 2

METHOD OF DRILLING 8" Hollow-Stem Auger (ABC Drilling)

DRIVE WEIGHT 140 lbs. (Auto. Trip Hammer) DROP 30"

SAMPLED BY ECH LOGGED BY ECH REVIEWED BY JRS

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	PID READING (PPM)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0								PORTLAND CEMENT CONCRETE:
							SP-SM	Approximately 7 inches thick.
							SP-SM	FILL: Brown, moist, medium dense, poorly graded SAND with silt and gravel.
								ALLUVIUM: Brown, moist, loose, poorly graded SAND with silt and gravel.
	Driven	10	6.1	94.4				
							SP	Brown, moist, loose, poorly graded SAND with gravel.
10		13						
							SP-SM	Light brown, moist, medium dense, poorly graded SAND with silt and gravel.
	Driven	29	2.5	118.4				
								Trace cobbles.
20		19						
		25					ML	Brown, moist, dense, sandy SILT; oxidation staining.
							SM	Brown, moist, very dense, silty SAND; fine sand.
30		56						
		54					SP-SM	Brown, moist, very dense, poorly graded SAND with silt and gravel; coarse sand.
							ML	Brown, moist, dense, sandy SILT.
40								

FIGURE A- 4

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DATE DRILLED 8/16/18 BORING NO. B-4

GROUND ELEVATION 820' ± (MSL) SHEET 2 OF 2

METHOD OF DRILLING 8" Hollow-Stem Auger (ABC Drilling)

DRIVE WEIGHT 140 lbs. (Auto. Trip Hammer) DROP 30"

SAMPLED BY ECH LOGGED BY ECH REVIEWED BY JRS

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	PID READING (PPM)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
40		34					ML	ALLUVIUM: (Continued) Brown, moist, very dense, sandy SILT.
		27	▽				SM	Brown, moist, dense, silty SAND; interbedded with layers of clay and gravel. @ 47': Groundwater measured at time of drilling.
50		52					SP-SM	Brown, wet, very dense, poorly graded SAND with silt.
		55						Difficult drilling; grinding on gravel/cobbles; refusal.
								Total Depth = 56 Feet (refusal). Groundwater encountered at approximately 47 feet during drilling. Backfilled with cement grout and capped with rapid-set concrete on 8/16/18. Notes: Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
60								
70								
80								

FIGURE A- 5

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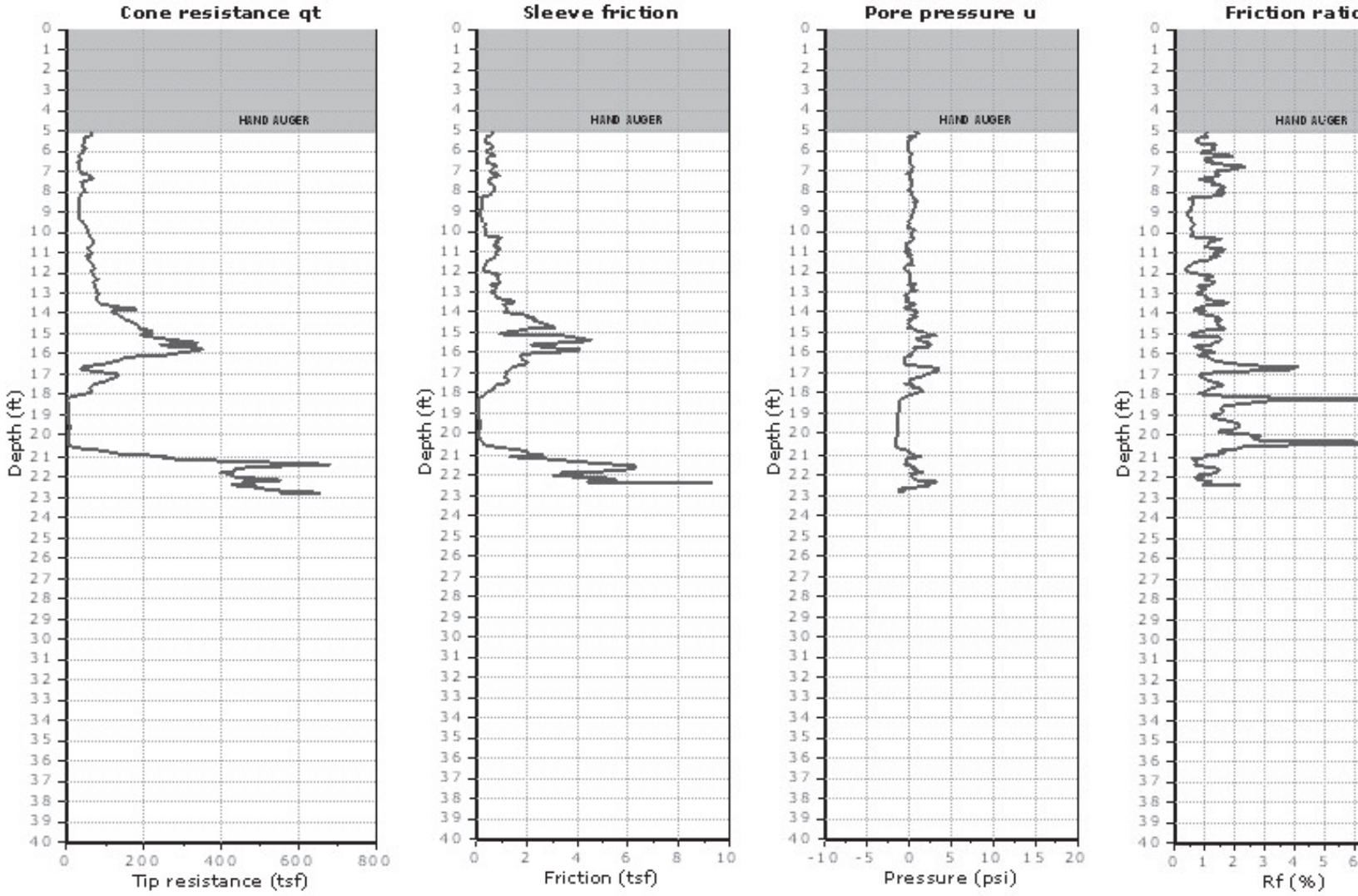
GLENDALE, CALIFORNIA

APPENDIX B

Cone Penetrometer Test Logs

Kehoe Testing and Engineering
714-901-7270
steve@kehoetesting.com
www.kehoetesting.com

Project: Ninyo & Moore / GUSD-Verdugo Woodlands
Location: Glendale, CA



Kehoe Testing and Engineering
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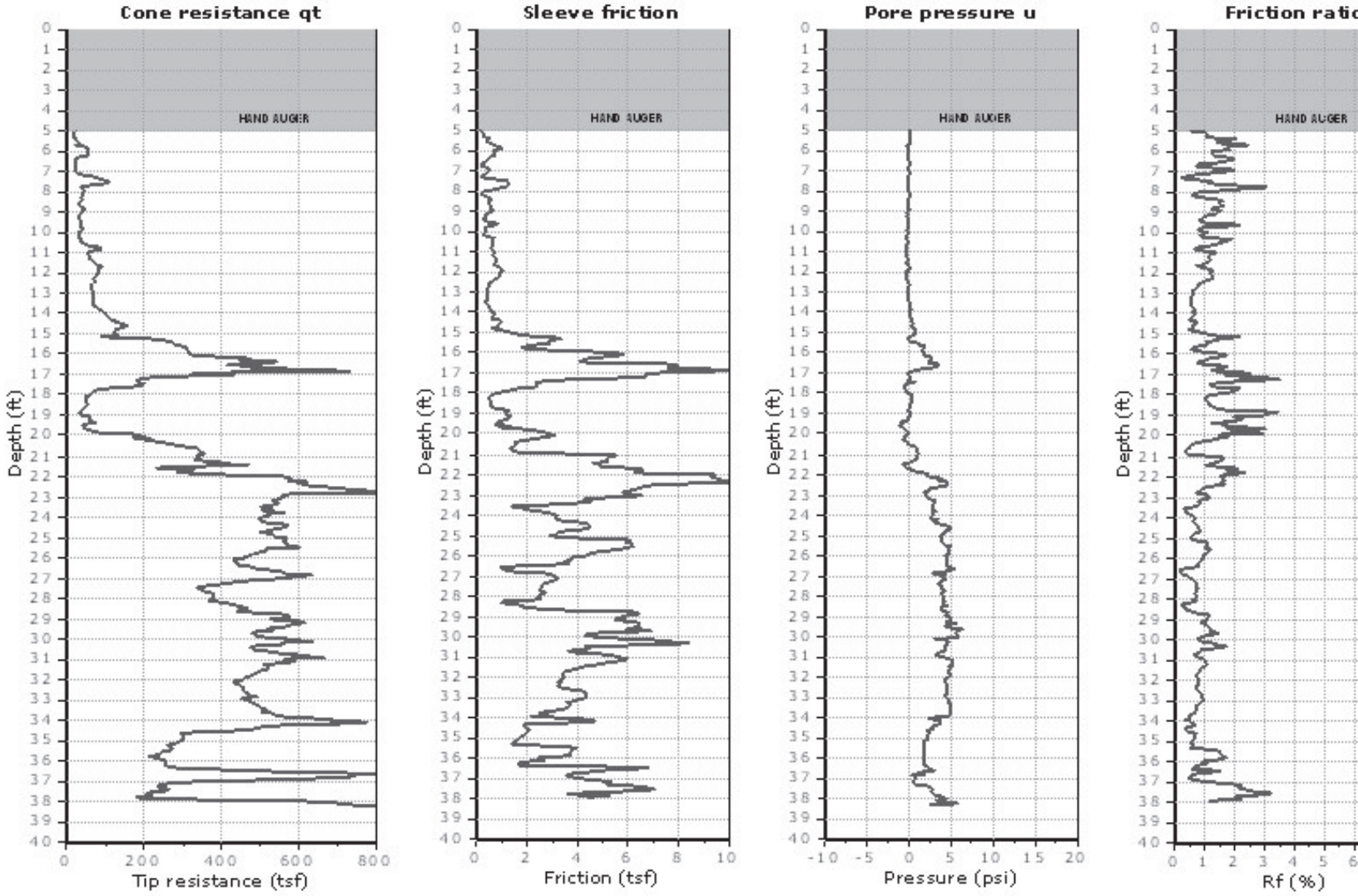
www.kehoetesting.com

Project: Ninyo & Moore / GUSD-Verdugo Woodlands
Location: Glendale, CA



Kehoe Testing and Engineering
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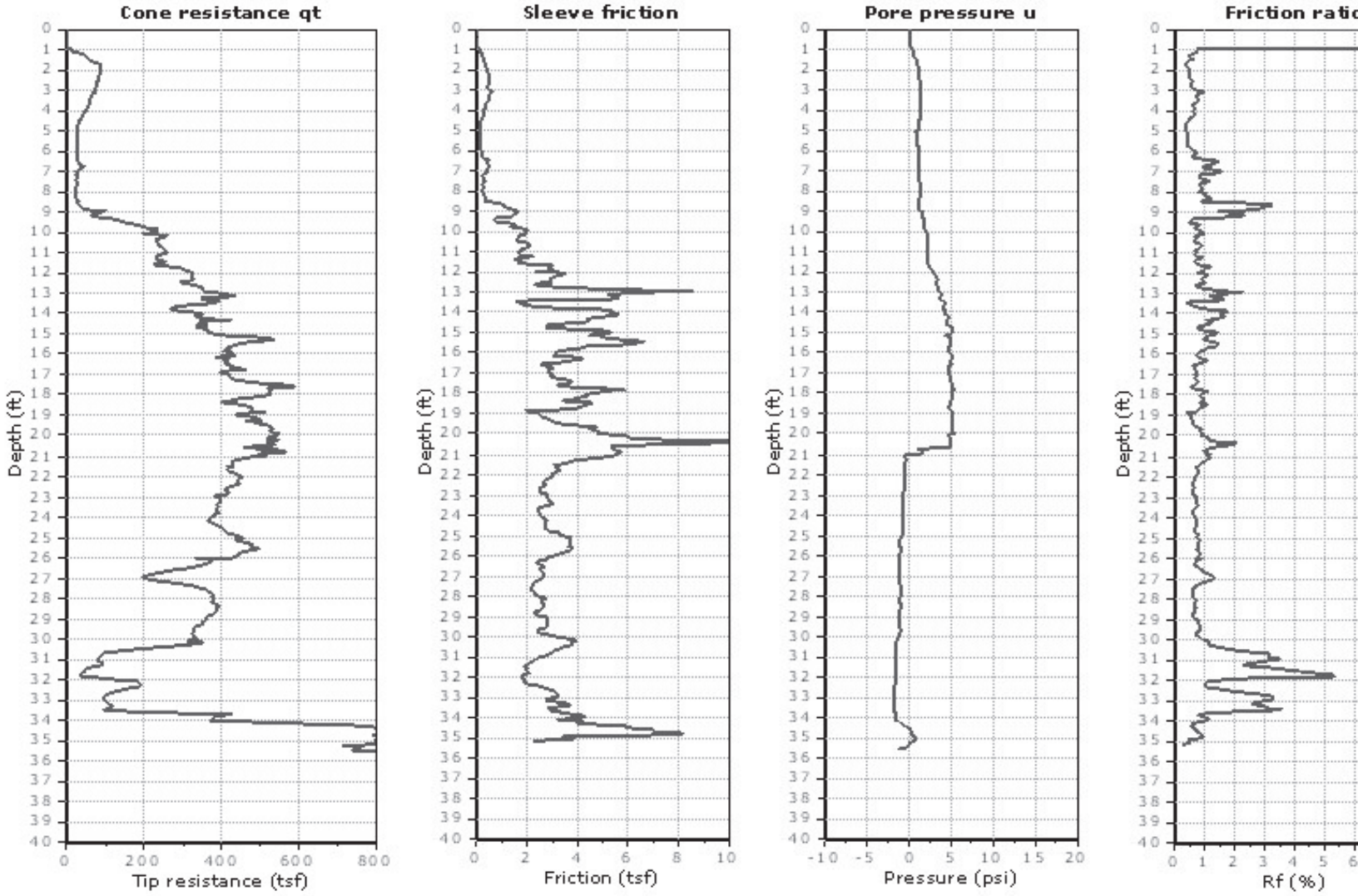
Project: Ninyo & Moore / GUSD-Verdugo Woodlands
Location: Glendale, CA



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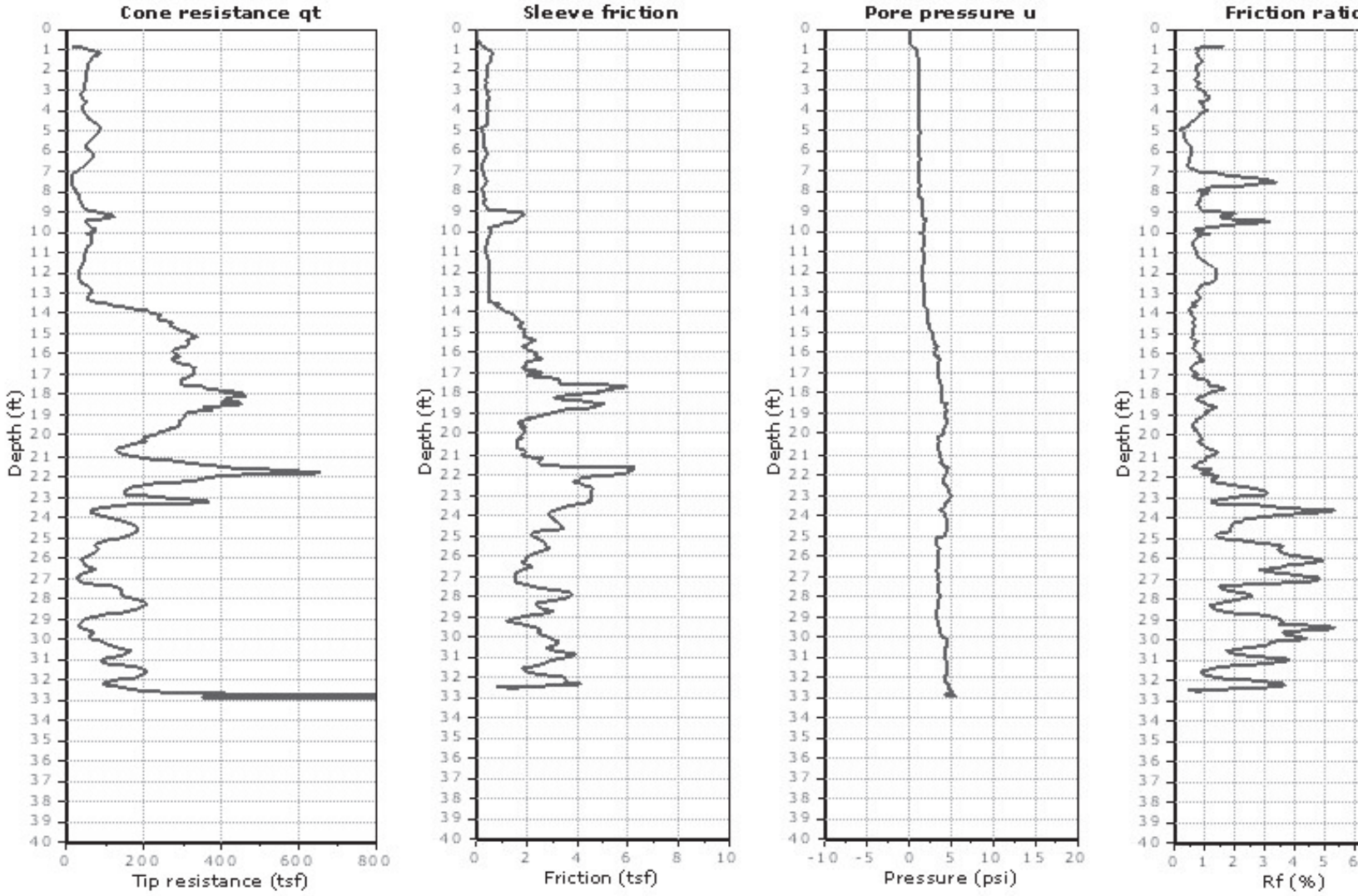
Project: Ninyo & Moore / GUSD-Verdugo Woodlands
Location: Glendale, CA



APPENDIX C

Laboratory Testing

APPENDIX C

LABORATORY TESTING

Classification
Soils were visually and texturally classified in accordance with the Unified Soil Classification System (USCS) in general accordance with ASTM D 2488. Soil classifications are indicated on the logs of the exploratory borings in Appendix A.

In-Place Moisture and Density Tests
The moisture content and dry density of relatively undisturbed samples obtained from the exploratory borings were evaluated in general accordance with ASTM D 2937. The test results are presented on the logs of the exploratory borings in Appendix A.

200 Wash
An evaluation of the percentage of particles finer than the No. 200 sieve in selected soil samples was performed in general accordance with ASTM D 1140. The results of the tests are presented on Figure C-1.

Atterberg Limits
Tests were performed on a selected representative fine-grained soil sample to evaluate the liquid limit, plastic limit, and plasticity index in general accordance with ASTM D 4318. The test results were utilized to evaluate the soil classification in accordance with the USCS. The test results and classification are shown on Figure C-2.

Consolidation Tests
Consolidation tests were performed on a selected relatively undisturbed soil sample in general accordance with ASTM D 2435. The sample was inundated during testing to represent adverse field conditions. The percent of consolidation for each load cycle was recorded as a ratio of the amount of vertical compression to the original height of the sample. The results of the test are summarized on Figure C-3.

Direct Shear Tests
Direct shear tests were performed on remolded samples in general accordance with ASTM D 3080 to evaluate the shear strength characteristics of the selected materials. The samples were inundated during shearing to represent adverse field conditions. The results are shown on Figures C-4 and C-5.

Proctor Density Tests
The maximum dry density and optimum moisture content of selected representative soil samples were evaluated using the Modified Proctor method in general accordance with ASTM D 1557. The results of these tests are summarized on Figures C-6 and C-7.

Soil Corrosivity Tests
Soil pH, and minimum resistivity tests were performed on one representative sample in general accordance with CT 643. The sulfate and chloride contents of the selected sample were evaluated in general accordance with CT 417 and 422, respectively. The test results are presented on Figure C-8.

SAMPLE LOCATION	SAMPLE DEPTH (ft)	DESCRIPTION	PERCENT PASSING NO. 4	PERCENT PASSING NO. 200	USCS (TOTAL SAMPLE)
B-2	0.5-5.0	POORLY GRADED SAND WITH SILT & GRAVEL	77	7	SP-SM
B-4	0.5-5.0	POORLY GRADED SAND WITH SILT & GRAVEL	78	8	SP-SM
B-4	10.0-11.5	POORLY GRADED SAND WITH GRAVEL	64	2	SP
B-4	20.0-21.5	POORLY GRADED SAND WITH SILT & GRAVEL	81	10	SP-SM
B-4	25.0-26.5	SANDY SILT	100	77	ML
B-4	30.0-31.5	SILTY SAND	98	44	SM
B-4	35.0-36.5	POORLY GRADED SAND WITH SILT & GRAVEL	78	9	SP-SM
B-4	45.0-46.5	SILTY SAND	100	21	SM
B-4	50.0-51.0	POORLY GRADED SAND WITH SILT	91	5	SP-SM
B-4	55.0-56.0	POORLY GRADED SAND WITH SILT	98	8	SP-SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 1140

FIGURE C-1

NO. 200 SIEVE ANALYSIS TEST RESULTS

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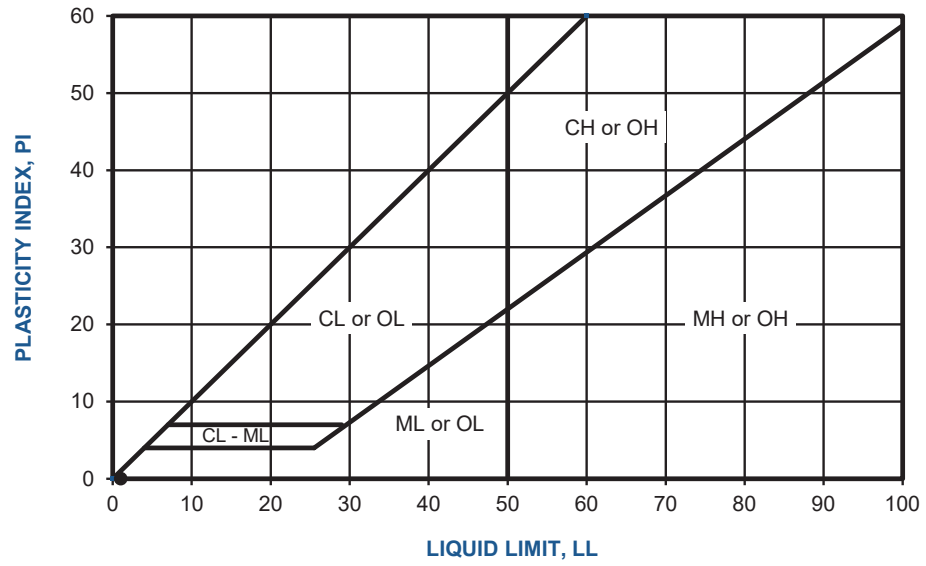
SYMBOL	LOCATION	DEPTH (ft)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	USCS CLASSIFICATION (Fraction Finer Than No. 40 Sieve)	USCS
●	B-4	40.0-41.5	NP	NP	NP	ML	ML

NP - INDICATES NON-PLASTIC



PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4318

FIGURE C-2

ATTERBERG LIMITS TEST RESULTS

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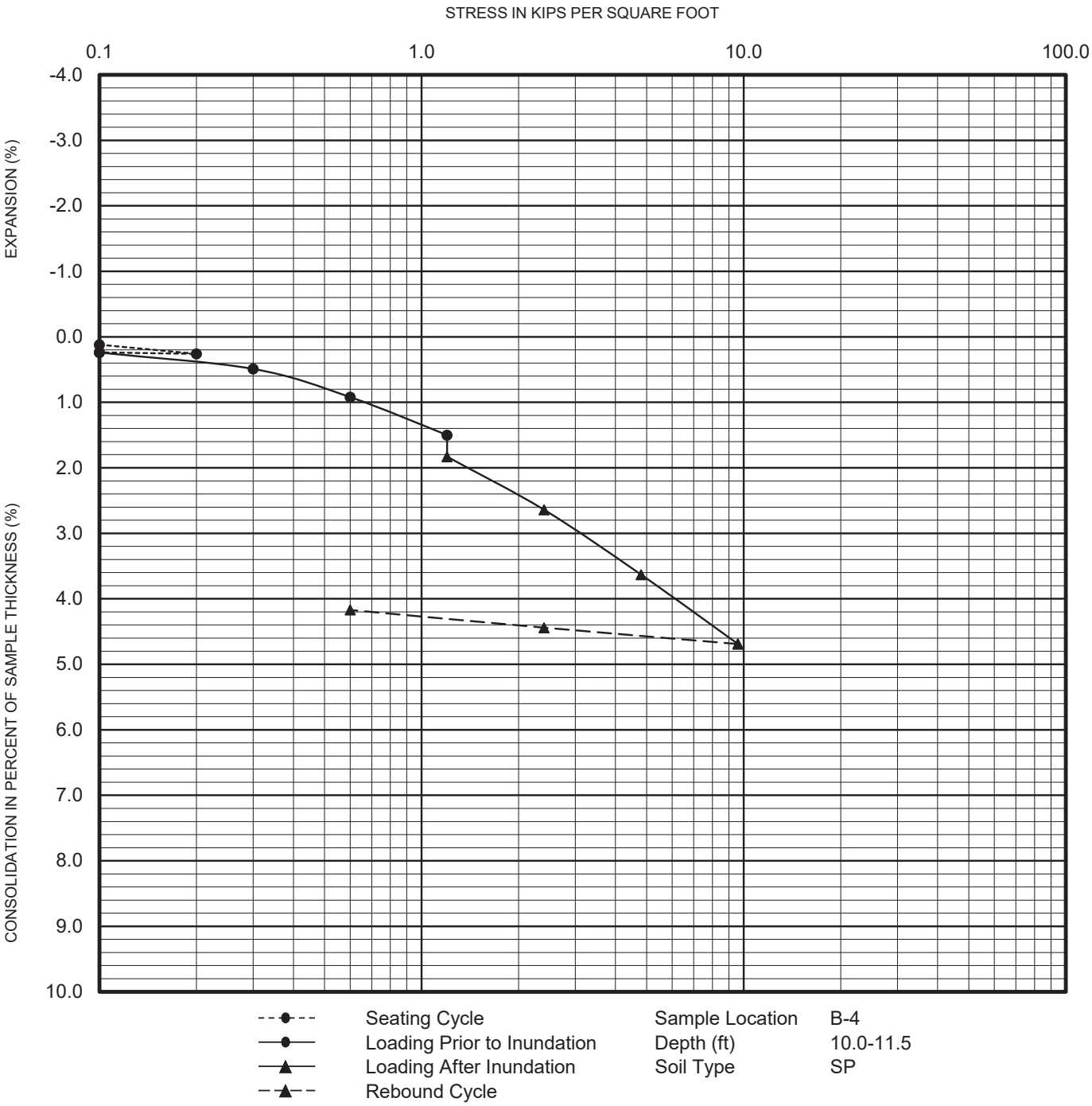

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 2435

FIGURE C-3

CONSOLIDATION TEST RESULTS

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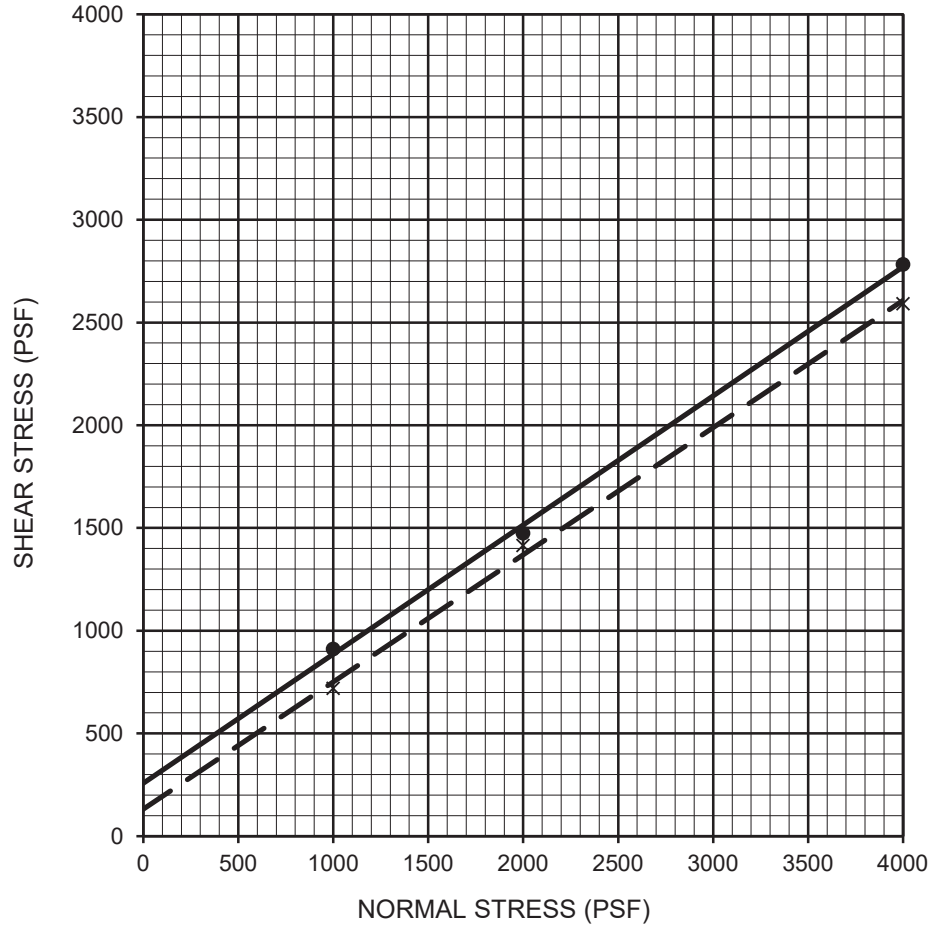

Description	Symbol	Sample Location	Depth (ft)	Shear Strength	Cohesion (psf)	Friction Angle (degrees)	Soil Type
POORLY GRADED SAND WITH SILT & GRAVEL	●—●	B-2	0.5-5.0	Peak	258	32	SP-SM
POORLY GRADED SAND WITH SILT & GRAVEL	– – X – –	B-2	0.5-5.0	Ultimate	132	32	SP-SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080 ON A SAMPLE REMOLDED TO 90% RELATIVE COMPACTION.

FIGURE C-4

DIRECT SHEAR TEST RESULTS

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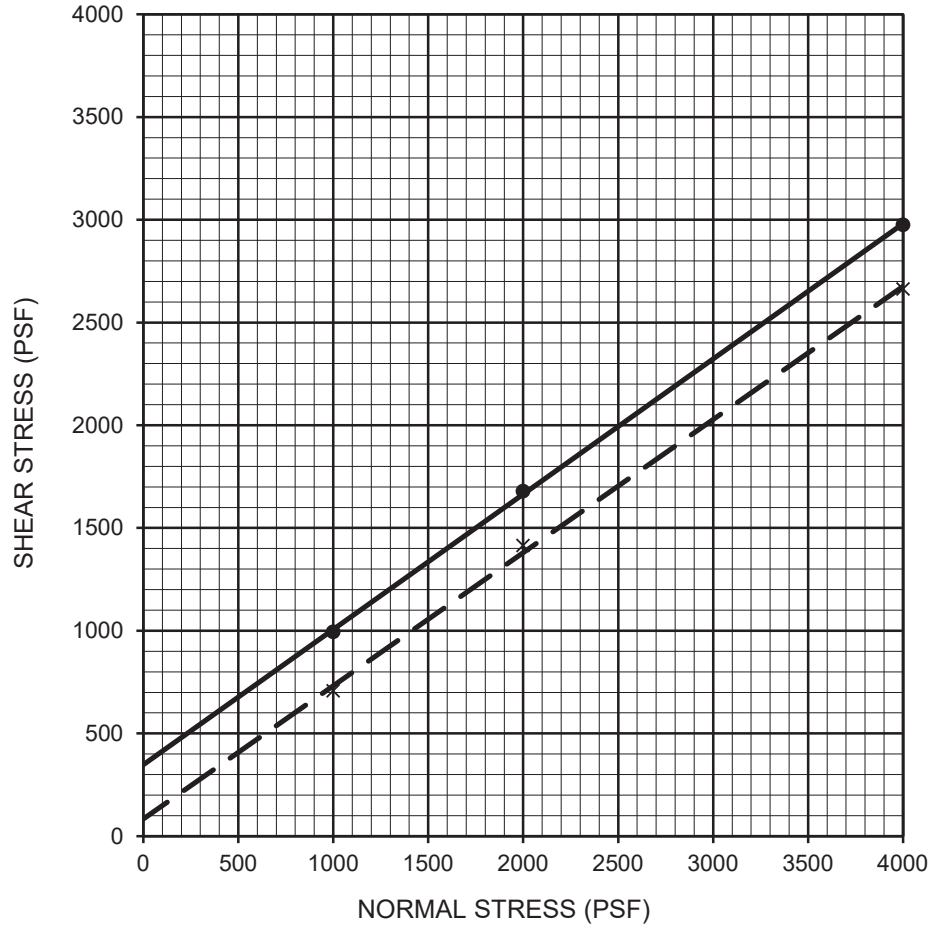
208465002 Fig C-4 DIRECT SHEAR @ B-2 0.0-5.0



Description	Symbol	Sample Location	Depth (ft)	Shear Strength	Cohesion (psf)	Friction Angle (degrees)	Soil Type
POORLY GRADED SAND WITH SILT & GRAVEL	●—●	B-4	0.5-5.0	Peak	348	33	SP-SM
POORLY GRADED SAND WITH SILT & GRAVEL	– – X – –	B-4	0.5-5.0	Ultimate	84	33	SP-SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080 ON A SAMPLE REMOLDED TO 90% RELATIVE COMPACTION.

FIGURE C-5

DIRECT SHEAR TEST RESULTS

1751 NORTH VERDUGO ROAD
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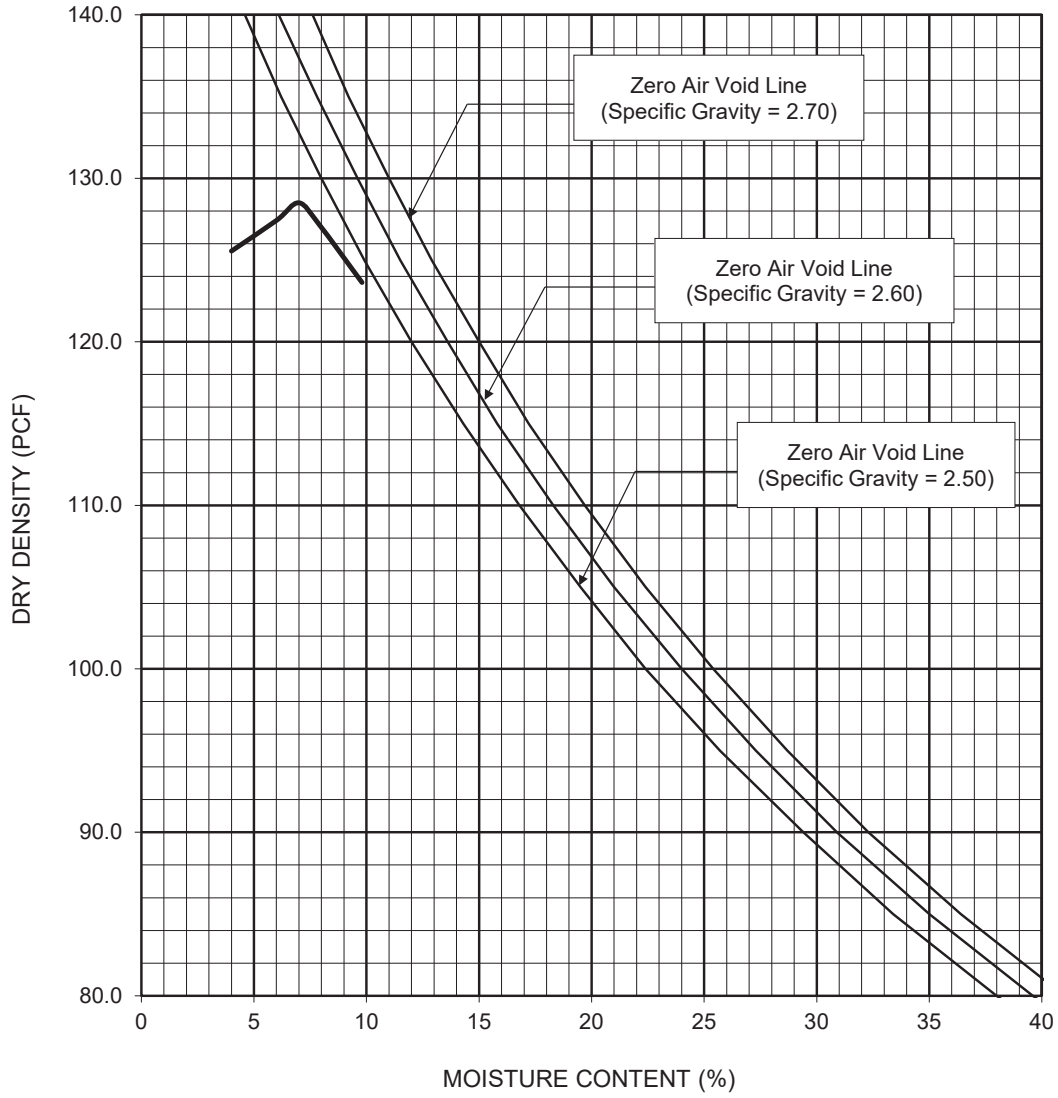

Sample Location	Depth (ft)	Soil Description	Maximum Dry Density (pcf)	Optimum Moisture Content (percent)
B-2	0.5-5.0	POORLY GRADED SAND WITH SILT AND GRAVEL	128.5	7.0
Dry Density and Moisture Content Values Corrected for Oversize (ASTM D 4718)			130.5	6.5

PERFORMED IN GENERAL ACCORDANCE WITH ☑ ASTM D 1557 ☐ ASTM D 698 METHOD ☐ A ☐ B ☑ C

FIGURE C-6

PROCTOR DENSITY TEST RESULTS

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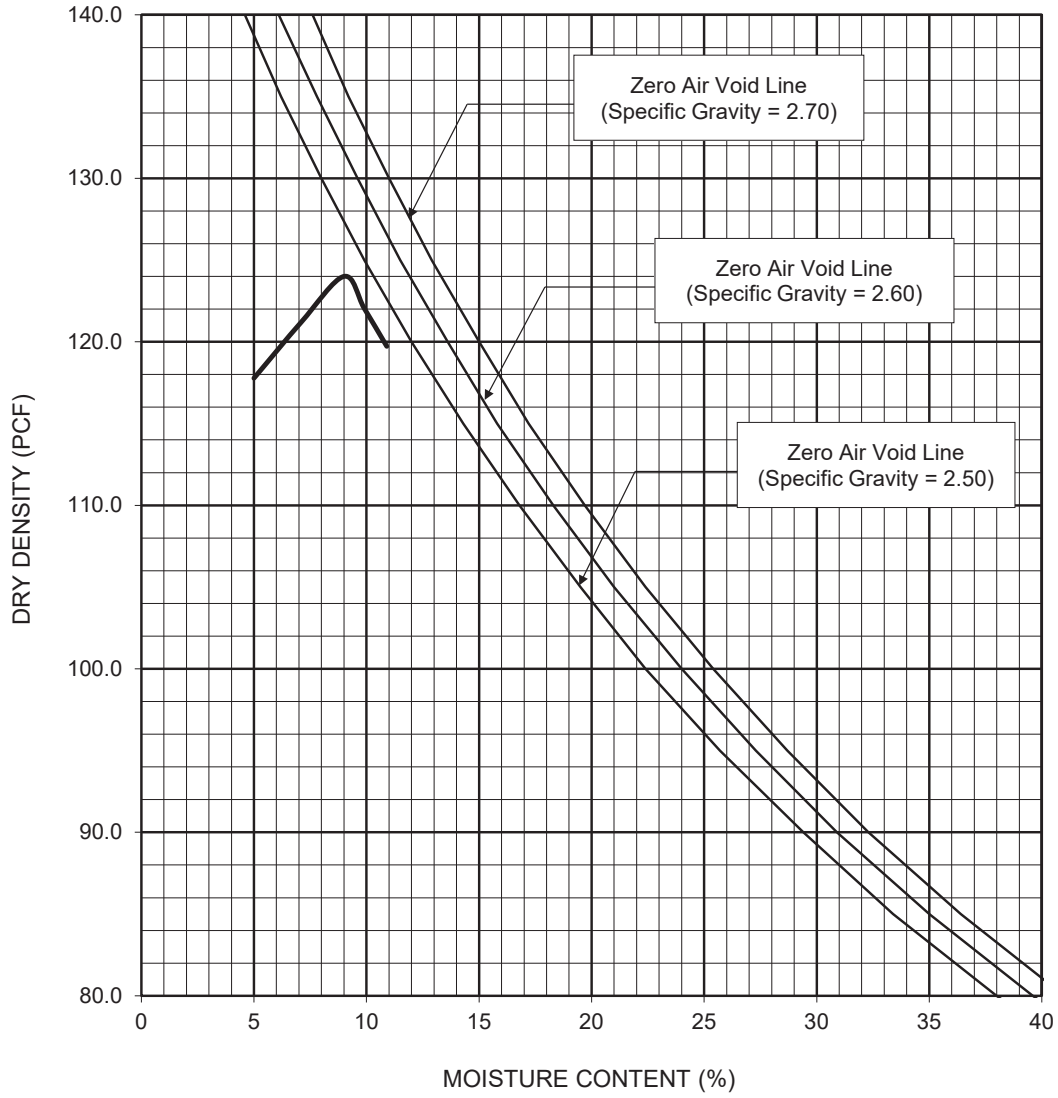
208465002 Fig C-6 MAXDENSITY @ B-2 0.0-5.0



Sample Location	Depth (ft)	Soil Description	Maximum Dry Density (pcf)	Optimum Moisture Content (percent)
B-4	0.5-5.0	POORLY GRADED SAND WITH SILT AND GRAVEL	124.0	9.0
Dry Density and Moisture Content Values Corrected for Oversize (ASTM D 4718)			N/A	N/A

PERFORMED IN GENERAL ACCORDANCE WITH ☑ ASTM D 1557 ☐ ASTM D 698 METHOD ☐ A ☐ B ☑ C

FIGURE C-7

PROCTOR DENSITY TEST RESULTS

1751 NORTH VERDUGO ROAD
GLEANDALE, CALIFORNIA

208465002 | 12/18

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

SAMPLE LOCATION	SAMPLE DEPTH (ft)	pH [1]	RESISTIVITY [1] (ohm-cm)	SULFATE CONTENT [2]		CHLORIDE CONTENT [3] (ppm)
				(ppm)	(%)	
B-3	0.5-5.0	11.7	1,785	480	0.048	65

[1] PERFORMED IN GENERAL ACCORDANCE WITH CALIFORNIA TEST METHOD 643
[2] PERFORMED IN GENERAL ACCORDANCE WITH CALIFORNIA TEST METHOD 417
[3] PERFORMED IN GENERAL ACCORDANCE WITH CALIFORNIA TEST METHOD 422

FIGURE C-8

CORROSIVITY TEST RESULTS

1751 NORTH VERDUGO ROAD
GLENDALE, CALIFORNIA

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

208465002 | 12/18

APPENDIX D

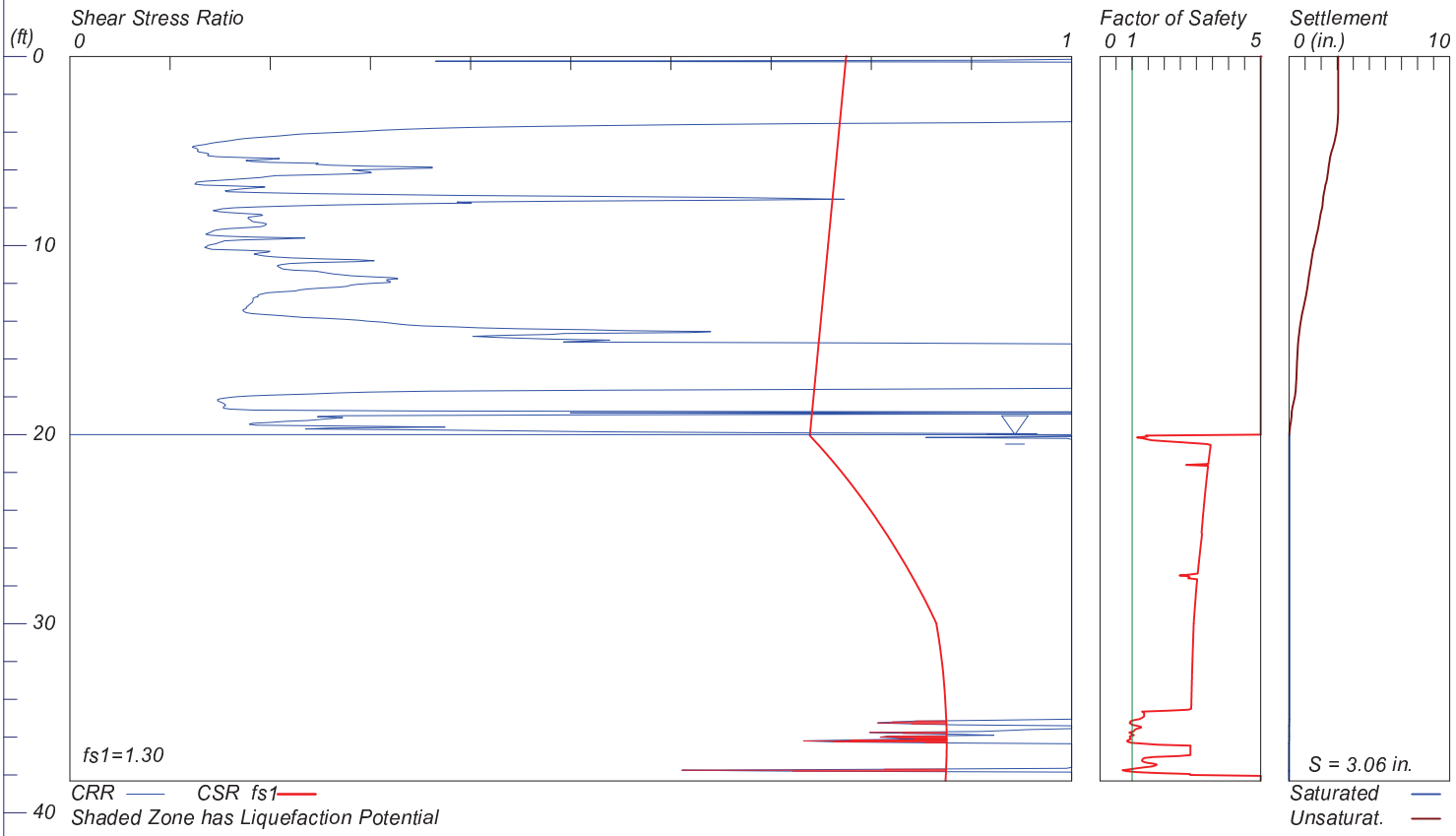
Liquefaction Analysis

LIQUEFACTION ANALYSIS

CPT-1B

Hole No.=CPT-1 Water Depth=20 ft

Magnitude=6.9
Acceleration=.917g



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LIQUEFACTION ANALYSIS SUMMARY

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Input File Name: G:\Projects\200000 - Irvine\208450 - 208499\208465\208465002\Electronic Project File\Data Analysis & Calculations\Liquefaction\CPT 11-21-18\CPT-1B.liq
Title: CPT-1B
Subtitle: 208465002

Surface Elev.=
Hole No.=CPT-1
Depth of Hole= 38.32 ft
Water Table during Earthquake= 20.00 ft
Water Table during In-Situ Testing= 28.00 ft
Max. Acceleration= 0.92 g
Earthquake Magnitude= 6.90

Input Data:
Surface Elev.=
Hole No.=CPT-1
Depth of Hole=38.32 ft
Water Table during Earthquake= 20.00 ft
Water Table during In-Situ Testing= 28.00 ft
Max. Acceleration=0.92 g
Earthquake Magnitude=6.90

1. CPT Calculation Method: Modify Robertson*
2. Settlement Analysis Method: Tokimatsu/Seed
3. Fines Correction for Liquefaction: Stark/Olson et al.*
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1
8. Sampling Method, Cs= 1
9. User request factor of safety (apply to CSR) , User= 1.3
   Plot one CSR curve (fs1=User)
10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	qc atm	fs atm	gamma pcf	Fines %	D50 mm
0.00	-0.09	0.02	94.00	0.00	0.50
0.08	-0.08	0.08	94.00	0.00	0.50
0.15	0.00	0.09	94.00	0.00	0.50
0.21	2.51	0.08	94.04	0.00	0.50
0.28	23.09	0.09	100.70	0.00	0.50
0.35	43.67	0.13	104.60	0.00	0.50
0.40	51.97	0.14	105.40	0.00	0.50
0.49	61.91	0.17	107.10	0.00	0.50
0.55	70.04	0.21	109.20	0.00	0.50

0.62	81.71	0.24	110.40	0.00	0.50
0.66	87.59	0.26	111.30	0.00	0.50
0.72	98.40	0.29	112.50	0.00	0.50
0.82	113.10	0.47	116.10	0.00	0.50
0.88	122.70	0.59	118.10	0.00	0.50
0.95	137.90	0.71	119.80	0.00	0.50
1.02	153.30	0.79	120.80	0.00	0.50
1.08	168.60	0.78	120.90	0.00	0.50
1.12	175.00	0.78	121.00	0.00	0.50
1.18	189.10	0.81	121.40	0.00	0.50
1.25	204.40	0.89	122.30	0.00	0.50
1.32	217.10	0.91	122.70	0.00	0.50
1.38	219.20	0.97	123.20	0.00	0.50
1.45	227.70	1.20	124.80	0.00	0.50
1.51	236.80	1.34	125.70	0.00	0.50
1.58	241.90	1.24	125.10	0.00	0.50
1.65	249.40	0.94	123.30	0.00	0.50
1.72	253.10	1.33	125.80	0.00	0.50
1.79	249.50	1.77	127.80	0.00	0.50
1.86	243.40	1.87	128.20	0.00	0.50
1.92	234.70	1.88	128.10	0.00	0.50
1.99	222.60	1.80	127.70	0.00	0.50
2.06	219.80	1.68	127.10	0.00	0.50
2.12	209.40	1.60	126.70	0.00	0.50
2.19	203.10	1.53	126.30	0.00	0.50
2.25	198.70	1.32	125.10	0.00	0.50
2.32	191.80	0.94	122.50	0.00	0.50
2.38	189.50	0.97	122.70	0.00	0.50
2.45	185.70	1.01	123.00	0.00	0.50
2.52	183.20	1.01	123.00	0.00	0.50
2.59	182.60	1.21	124.30	0.00	0.50
2.65	183.60	1.39	125.30	0.00	0.50
2.72	179.30	1.42	125.40	0.00	0.50
2.76	172.40	1.39	125.20	0.00	0.50
2.82	159.70	1.28	124.40	0.00	0.50
2.89	154.80	1.26	124.20	0.00	0.50
2.96	148.90	1.35	124.60	0.00	0.50
3.02	137.40	1.27	124.00	0.00	0.50
3.09	131.30	1.10	122.80	0.00	0.50
3.16	133.10	1.08	122.70	0.00	0.50
3.22	129.70	1.21	123.40	0.00	0.50
3.28	110.60	1.02	121.80	0.00	0.50
3.35	102.20	0.92	120.90	0.00	0.50
3.43	93.98	0.85	120.10	0.00	0.50
3.50	87.75	0.65	118.00	0.00	0.50
3.57	79.19	0.50	115.80	0.00	0.50
3.63	74.18	0.49	115.40	0.00	0.50
3.70	67.78	0.44	114.40	0.00	0.50
3.77	63.28	0.36	112.80	0.00	0.50
3.84	60.08	0.33	112.00	0.00	0.50
3.90	57.66	0.30	111.30	0.00	0.50
3.97	55.50	0.30	111.10	0.00	0.50
4.03	53.08	0.26	110.10	0.00	0.50
4.10	50.14	0.22	108.50	0.00	0.50
4.17	46.94	0.23	109.00	0.00	0.50
4.20	45.38	0.24	109.20	0.00	0.50
4.27	41.93	0.24	109.00	0.00	0.50
4.33	38.38	0.22	108.20	0.00	0.50
4.43	34.76	0.22	107.90	0.00	0.50
4.46	33.97	0.22	107.80	0.00	0.50
4.53	30.44	0.21	107.10	0.00	0.50
4.60	26.97	0.20	106.50	0.00	0.50
4.67	25.68	0.18	105.60	0.00	0.50

4.73	25.25	0.10	101.40	0.00	0.50
4.80	23.86	0.11	101.90	0.00	0.50
4.87	25.29	0.14	103.80	0.00	0.50
4.94	24.21	0.16	104.70	0.00	0.50
5.01	25.33	0.14	103.90	0.00	0.50
5.07	20.58	0.20	106.00	0.00	0.50
5.13	22.91	0.25	107.60	0.00	0.50
5.19	22.56	0.24	107.30	0.00	0.50
5.28	22.82	0.24	107.40	0.00	0.50
5.34	22.47	0.36	110.40	0.00	0.50
5.39	24.81	0.50	113.00	0.00	0.50
5.45	26.80	0.49	113.00	0.00	0.50
5.52	29.23	0.40	111.70	0.00	0.50
5.60	32.60	0.53	114.00	0.00	0.50
5.66	27.67	0.68	115.40	0.00	0.50
5.73	38.56	0.70	116.50	0.00	0.50
5.79	45.22	0.81	117.90	0.00	0.50
5.85	53.87	0.97	119.70	0.00	0.50
5.91	53.78	0.98	119.80	0.00	0.50
6.00	54.73	0.66	116.90	0.00	0.50
6.06	55.17	0.70	117.40	0.00	0.50
6.13	57.76	0.72	117.70	0.00	0.50
6.19	55.08	0.72	117.60	0.00	0.50
6.26	48.42	0.64	116.40	0.00	0.50
6.32	30.78	0.55	114.20	0.00	0.50
6.38	25.85	0.50	113.00	0.00	0.50
6.44	25.85	0.45	112.30	0.00	0.50
6.50	26.62	0.40	111.50	0.00	0.50
6.57	25.32	0.31	109.50	0.00	0.50
6.63	25.08	0.19	106.00	0.00	0.50
6.69	25.42	0.19	105.80	0.00	0.50
6.78	24.38	0.18	105.50	0.00	0.50
6.85	25.51	0.40	111.30	0.00	0.50
6.91	25.42	0.50	113.10	0.00	0.50
6.97	26.98	0.46	112.60	0.00	0.50
7.03	30.00	0.43	112.30	0.00	0.50
7.10	30.87	0.37	111.40	0.00	0.50
7.16	40.64	0.30	110.50	0.00	0.50
7.22	62.51	0.27	110.70	0.00	0.50
7.32	83.27	0.20	109.40	0.00	0.50
7.35	89.41	0.38	114.20	0.00	0.50
7.42	97.88	1.07	121.90	0.00	0.50
7.49	102.90	1.24	123.10	0.00	0.50
7.55	111.60	1.19	123.00	0.00	0.50
7.62	95.46	1.25	122.90	0.00	0.50
7.69	59.92	1.27	121.90	0.00	0.50
7.75	38.56	1.17	120.30	0.00	0.50
7.82	43.32	1.00	119.40	0.00	0.50
7.89	45.83	0.75	117.40	0.00	0.50
7.96	43.06	0.52	114.50	0.00	0.50
8.02	41.07	0.33	111.20	0.00	0.50
8.09	40.98	0.28	109.80	0.00	0.50
8.15	40.73	0.23	108.40	0.00	0.50
8.22	41.07	0.29	110.20	0.00	0.50
8.28	40.47	0.43	113.10	0.00	0.50
8.35	41.16	0.58	115.30	0.00	0.50
8.42	37.79	0.61	115.40	0.00	0.50
8.48	36.49	0.54	114.50	0.00	0.50
8.54	35.02	0.53	114.30	0.00	0.50
8.60	36.32	0.54	114.50	0.00	0.50
8.66	34.50	0.55	114.50	0.00	0.50
8.76	41.59	0.56	115.10	0.00	0.50
8.82	47.21	0.59	115.70	0.00	0.50

8.88	45.13	0.62	116.00	0.00	0.50
8.94	40.81	0.63	115.90	0.00	0.50
9.00	42.20	0.61	115.70	0.00	0.50
9.06	38.39	0.52	114.40	0.00	0.50
9.12	36.32	0.40	112.20	0.00	0.50
9.21	34.67	0.34	111.00	0.00	0.50
9.27	34.67	0.33	110.70	0.00	0.50
9.34	34.67	0.31	110.20	0.00	0.50
9.40	35.54	0.27	109.40	0.00	0.50
9.46	37.09	0.31	110.40	0.00	0.50
9.52	39.95	0.44	113.20	0.00	0.50
9.61	39.39	0.85	118.00	0.00	0.50
9.66	39.39	0.69	116.50	0.00	0.50
9.73	38.82	0.43	112.90	0.00	0.50
9.79	41.42	0.38	112.20	0.00	0.50
9.84	42.63	0.34	111.40	0.00	0.50
9.94	39.60	0.33	111.20	0.00	0.50
9.98	29.48	0.33	110.40	0.00	0.50
10.05	33.03	0.31	110.30	0.00	0.50
10.10	35.02	0.29	109.70	0.00	0.50
10.20	36.06	0.35	111.20	0.00	0.50
10.25	35.80	0.56	114.70	0.00	0.50
10.31	36.57	0.70	116.40	0.00	0.50
10.37	36.83	0.66	116.00	0.00	0.50
10.43	38.91	0.62	115.60	0.00	0.50
10.52	44.62	0.66	116.40	0.00	0.50
10.58	51.88	0.66	116.80	0.00	0.50
10.64	59.92	0.67	117.30	0.00	0.50
10.70	72.37	0.67	117.70	0.00	0.50
10.76	88.71	0.57	117.10	0.00	0.50
10.83	90.70	0.60	117.50	0.00	0.50
10.92	64.68	0.69	117.70	0.00	0.50
10.98	54.82	0.75	117.90	0.00	0.50
11.04	56.03	0.70	117.40	0.00	0.50
11.10	58.62	0.67	117.20	0.00	0.50
11.17	60.35	0.67	117.20	0.00	0.50
11.23	60.87	0.67	117.30	0.00	0.50
11.29	61.82	0.71	117.80	0.00	0.50
11.35	67.53	0.80	118.90	0.00	0.50
11.42	71.33	0.80	118.90	0.00	0.50
11.50	75.74	0.77	118.90	0.00	0.50
11.56	81.88	0.71	118.50	0.00	0.50
11.62	87.85	0.64	117.90	0.00	0.50
11.69	92.60	0.76	119.30	0.00	0.50
11.75	87.58	0.94	120.70	0.00	0.50
11.82	81.87	1.00	120.90	0.00	0.50
11.88	82.06	1.05	121.30	0.00	0.50
11.95	84.91	0.99	121.00	0.00	0.50
12.01	81.28	0.93	120.40	0.00	0.50
12.08	76.44	0.94	120.30	0.00	0.50
12.14	76.61	0.94	120.30	0.00	0.50
12.20	72.54	0.95	120.30	0.00	0.50
12.27	69.95	0.83	119.20	0.00	0.50
12.33	70.73	0.72	118.20	0.00	0.50
12.40	70.90	0.69	117.90	0.00	0.50
12.49	67.62	0.53	115.80	0.00	0.50
12.56	65.88	0.52	115.60	0.00	0.50
12.62	64.68	0.50	115.30	0.00	0.50
12.69	65.76	0.50	115.30	0.00	0.50
12.75	65.63	0.46	114.70	0.00	0.50
12.81	66.92	0.42	114.20	0.00	0.50
12.87	67.96	0.41	114.00	0.00	0.50
12.93	67.96	0.41	114.00	0.00	0.50

13.00	68.05	0.41	114.00	0.00	0.50
13.06	67.96	0.40	113.80	0.00	0.50
13.14	67.96	0.39	113.60	0.00	0.50
13.21	67.96	0.38	113.40	0.00	0.50
13.27	67.44	0.38	113.40	0.00	0.50
13.32	67.96	0.38	113.40	0.00	0.50
13.41	66.66	0.36	113.10	0.00	0.50
13.47	67.96	0.35	112.90	0.00	0.50
13.53	68.22	0.37	113.20	0.00	0.50
13.59	69.78	0.39	113.60	0.00	0.50
13.67	75.40	0.48	115.30	0.00	0.50
13.73	80.24	0.53	116.30	0.00	0.50
13.79	83.95	0.54	116.50	0.00	0.50
13.84	91.64	0.56	116.90	0.00	0.50
13.93	100.20	0.59	117.60	0.00	0.50
13.99	100.90	0.65	118.30	0.00	0.50
14.05	103.80	0.70	119.00	0.00	0.50
14.11	107.10	0.68	118.80	0.00	0.50
14.18	111.40	0.64	118.50	0.00	0.50
14.24	116.60	0.59	118.00	0.00	0.50
14.31	124.00	0.62	118.50	0.00	0.50
14.38	123.40	0.90	121.20	0.00	0.50
14.46	138.80	1.00	122.20	0.00	0.50
14.52	146.90	0.94	121.90	0.00	0.50
14.58	160.00	0.88	121.70	0.00	0.50
14.63	139.20	0.83	120.90	0.00	0.50
14.71	137.00	0.63	118.90	0.00	0.50
14.77	128.40	0.58	118.00	0.00	0.50
14.83	127.00	0.79	120.30	0.00	0.50
14.90	123.90	1.13	122.90	0.00	0.50
14.96	125.90	1.32	124.00	0.00	0.50
15.03	132.70	1.60	125.60	0.00	0.50
15.09	90.61	1.97	126.20	0.00	0.50
15.18	167.40	2.55	129.50	0.00	0.50
15.23	204.90	3.04	131.30	0.00	0.50
15.29	243.30	3.37	132.50	0.00	0.50
15.36	268.50	2.90	131.60	0.00	0.50
15.42	274.70	2.89	131.70	0.00	0.50
15.49	276.50	2.90	131.70	0.00	0.50
15.56	299.70	2.38	130.50	0.00	0.50
15.62	313.90	2.23	130.10	0.00	0.50
15.70	307.10	1.94	129.00	0.00	0.50
15.75	311.20	1.80	128.50	0.00	0.50
15.82	310.90	2.39	130.60	0.00	0.50
15.88	316.00	3.85	134.10	0.00	0.50
15.94	316.90	5.51	136.70	0.00	0.50
16.01	333.30	5.79	137.20	0.00	0.50
16.08	354.30	5.84	137.40	0.00	0.50
16.15	396.40	5.57	137.40	0.00	0.50
16.21	472.70	4.95	136.90	0.00	0.50
16.27	447.30	4.36	135.90	0.00	0.50
16.34	542.80	4.23	136.10	0.00	0.50
16.40	506.20	4.07	135.70	0.00	0.50
16.47	415.60	5.27	137.10	0.00	0.50
16.53	504.00	7.31	139.90	0.00	0.50
16.60	451.20	7.95	140.30	0.00	0.50
16.67	501.70	7.93	140.50	0.00	0.50
16.73	619.00	7.53	140.70	0.00	0.50
16.80	732.30	10.01	143.10	0.00	0.50
16.86	372.60	9.37	141.00	0.00	0.50
16.93	323.80	8.14	139.60	0.00	0.50
17.00	430.40	7.21	139.50	0.00	0.50
17.06	329.80	6.68	138.20	0.00	0.50

17.13	224.70	6.70	137.30	0.00	0.50
17.19	190.30	6.67	136.90	0.00	0.50
17.26	179.80	4.06	133.10	0.00	0.50
17.32	184.10	2.95	130.80	0.00	0.50
17.40	197.50	2.37	129.40	0.00	0.50
17.46	199.10	2.36	129.40	0.00	0.50
17.54	194.70	2.38	129.40	0.00	0.50
17.59	169.50	2.36	129.00	0.00	0.50
17.65	110.80	2.39	128.10	0.00	0.50
17.71	81.88	1.67	124.70	0.00	0.50
17.78	71.77	1.39	123.00	0.00	0.50
17.85	69.86	1.18	121.80	0.00	0.50
17.94	64.76	0.76	118.40	0.00	0.50
18.00	60.01	0.63	116.80	0.00	0.50
18.07	53.34	0.57	115.80	0.00	0.50
18.12	51.52	0.52	115.00	0.00	0.50
18.18	51.48	0.51	114.90	0.00	0.50
18.24	51.48	0.53	115.20	0.00	0.50
18.32	51.44	0.57	115.70	0.00	0.50
18.38	52.73	0.59	116.00	0.00	0.50
18.46	53.77	0.60	116.10	0.00	0.50
18.51	49.19	0.60	115.90	0.00	0.50
18.57	45.38	0.59	115.70	0.00	0.50
18.63	43.22	0.59	115.60	0.00	0.50
18.70	40.28	0.73	116.90	0.00	0.50
18.79	37.27	1.27	120.80	0.00	0.50
18.85	40.12	1.22	120.70	0.00	0.50
18.92	35.88	1.12	119.70	0.00	0.50
18.98	39.95	1.17	120.40	0.00	0.50
19.03	61.91	1.20	121.60	0.00	0.50
19.09	61.00	1.39	122.70	0.00	0.50
19.16	61.00	1.32	122.30	0.00	0.50
19.25	60.09	1.21	121.60	0.00	0.50
19.32	75.05	0.97	120.50	0.00	0.50
19.38	69.95	0.86	119.50	0.00	0.50
19.44	45.06	0.78	117.70	0.00	0.50
19.49	43.50	0.72	117.00	0.00	0.50
19.55	45.32	1.13	120.40	0.00	0.50
19.62	46.18	1.38	121.90	0.00	0.50
19.68	53.19	0.95	119.50	0.00	0.50
19.75	62.95	1.73	124.30	0.00	0.50
19.84	91.22	2.67	128.40	0.00	0.50
19.91	160.30	2.67	129.80	0.00	0.50
19.94	189.20	2.77	130.50	0.00	0.50
20.02	171.00	3.06	130.90	0.00	0.50
20.08	218.20	2.85	131.00	0.00	0.50
20.14	176.70	2.56	129.70	0.00	0.50
20.21	204.00	2.51	129.90	0.00	0.50
20.29	229.40	2.09	128.90	0.00	0.50
20.35	254.00	1.69	127.60	0.00	0.50
20.40	273.10	1.53	127.00	0.00	0.50
20.48	298.80	1.50	127.10	0.00	0.50
20.54	313.00	1.52	127.30	0.00	0.50
20.60	336.50	1.48	127.30	0.00	0.50
20.67	337.00	1.40	126.90	0.00	0.50
20.74	344.50	1.33	126.50	0.00	0.50
20.81	344.40	1.39	126.90	0.00	0.50
20.86	357.00	1.64	128.20	0.00	0.50
20.93	337.60	3.38	133.30	0.00	0.50
21.02	342.50	5.53	136.90	0.00	0.50
21.08	334.60	5.45	136.80	0.00	0.50
21.14	334.40	5.26	136.50	0.00	0.50
21.21	332.70	5.20	136.40	0.00	0.50

21.27	370.50	5.21	136.70	0.00	0.50
21.33	417.40	5.22	137.00	0.00	0.50
21.39	428.50	4.74	136.40	0.00	0.50
21.45	469.40	4.63	136.40	0.00	0.50
21.53	343.80	4.89	136.10	0.00	0.50
21.59	235.80	4.85	135.10	0.00	0.50
21.65	329.80	5.76	137.20	0.00	0.50
21.71	310.20	6.58	138.00	0.00	0.50
21.78	285.10	6.59	137.80	0.00	0.50
21.85	362.00	6.28	138.00	0.00	0.50
21.92	461.70	6.93	139.30	0.00	0.50
21.99	551.30	9.42	142.00	0.00	0.50
22.04	568.90	9.40	142.10	0.00	0.50
22.11	581.70	9.29	142.00	0.00	0.50
22.18	573.80	9.55	142.20	0.00	0.50
22.25	619.30	9.73	142.50	0.00	0.50
22.31	598.10	9.96	142.60	0.00	0.50
22.37	616.30	10.17	142.80	0.00	0.50
22.45	613.30	8.95	141.90	0.00	0.50
22.51	654.90	7.01	140.30	0.00	0.50
22.57	705.30	6.72	140.10	0.00	0.50
22.64	733.70	6.38	139.90	0.00	0.50
22.70	801.20	6.34	140.00	0.00	0.50
22.77	814.60	6.07	139.70	0.00	0.50
22.83	593.20	5.83	138.70	0.00	0.50
22.90	573.20	5.78	138.50	0.00	0.50
22.97	557.50	6.12	138.90	0.00	0.50
23.03	558.30	6.59	139.40	0.00	0.50
23.10	553.10	5.44	138.00	0.00	0.50
23.16	530.90	4.27	136.10	0.00	0.50
23.23	542.00	4.29	136.20	0.00	0.50
23.31	546.70	4.57	136.70	0.00	0.50
23.36	545.50	4.50	136.60	0.00	0.50
23.43	532.30	3.78	135.20	0.00	0.50
23.49	501.00	2.69	132.60	0.00	0.50
23.56	531.70	1.35	127.70	0.00	0.50
23.62	506.60	1.78	129.60	0.00	0.50
23.69	531.10	2.12	131.00	0.00	0.50
23.76	562.90	2.18	131.40	0.00	0.50
23.82	518.40	2.44	132.00	0.00	0.50
23.89	526.00	2.86	133.20	0.00	0.50
23.95	520.30	3.12	133.80	0.00	0.50
24.02	498.60	3.21	133.90	0.00	0.50
24.09	494.70	3.17	133.80	0.00	0.50
24.15	503.00	3.16	133.80	0.00	0.50
24.21	501.70	3.14	133.80	0.00	0.50
24.28	517.40	3.35	134.30	0.00	0.50
24.35	560.50	4.00	135.80	0.00	0.50
24.41	573.20	4.40	136.50	0.00	0.50
24.48	560.20	4.49	136.60	0.00	0.50
24.54	545.60	4.52	136.60	0.00	0.50
24.61	526.20	4.43	136.40	0.00	0.50
24.68	509.20	4.10	135.70	0.00	0.50
24.74	501.90	3.77	135.10	0.00	0.50
24.80	516.40	3.41	134.40	0.00	0.50
24.87	534.20	3.25	134.20	0.00	0.50
24.93	540.70	3.15	133.90	0.00	0.50
25.00	560.20	2.91	133.50	0.00	0.50
25.06	570.40	2.91	133.50	0.00	0.50
25.15	561.70	4.57	136.80	0.00	0.50
25.20	570.60	5.85	138.60	0.00	0.50
25.26	563.10	6.14	138.90	0.00	0.50
25.33	570.80	5.95	138.70	0.00	0.50

25.39	575.40	6.20	139.10	0.00	0.50
25.46	603.50	6.12	139.10	0.00	0.50
25.53	539.20	6.17	138.90	0.00	0.50
25.59	517.30	6.03	138.60	0.00	0.50
25.66	516.90	5.85	138.40	0.00	0.50
25.73	503.10	5.49	137.80	0.00	0.50
25.78	482.40	4.89	136.90	0.00	0.50
25.85	478.10	4.54	136.30	0.00	0.50
25.91	459.50	4.38	136.00	0.00	0.50
25.99	460.90	4.33	135.90	0.00	0.50
26.06	433.50	3.97	135.10	0.00	0.50
26.12	433.40	3.74	134.70	0.00	0.50
26.18	433.20	3.72	134.60	0.00	0.50
26.27	444.50	3.55	134.30	0.00	0.50
26.32	440.20	3.44	134.10	0.00	0.50
26.38	461.20	3.70	134.70	0.00	0.50
26.44	475.30	3.56	134.50	0.00	0.50
26.52	479.80	2.07	130.60	0.00	0.50
26.57	501.70	0.94	124.90	0.00	0.50
26.66	544.50	1.00	125.60	0.00	0.50
26.72	565.30	1.19	127.00	0.00	0.50
26.77	564.20	1.53	128.80	0.00	0.50
26.83	632.90	2.13	131.50	0.00	0.50
26.90	620.00	2.72	133.20	0.00	0.50
26.97	586.60	3.03	133.90	0.00	0.50
27.04	551.00	3.16	134.00	0.00	0.50
27.10	488.10	3.25	133.90	0.00	0.50
27.17	445.70	3.17	133.50	0.00	0.50
27.24	416.80	3.05	133.10	0.00	0.50
27.32	388.40	2.74	132.10	0.00	0.50
27.39	353.80	2.60	131.50	0.00	0.50
27.45	336.50	2.56	131.30	0.00	0.50
27.52	355.30	2.55	131.40	0.00	0.50
27.59	347.20	2.54	131.30	0.00	0.50
27.62	356.70	2.51	131.30	0.00	0.50
27.69	372.30	2.50	131.30	0.00	0.50
27.76	382.50	2.62	131.80	0.00	0.50
27.83	377.80	2.68	131.90	0.00	0.50
27.89	382.40	2.72	132.00	0.00	0.50
27.96	377.10	2.47	131.30	0.00	0.50
28.02	382.30	2.42	131.20	0.00	0.50
28.09	369.60	2.57	131.50	0.00	0.50
28.16	395.20	2.30	130.90	0.00	0.50
28.23	405.70	1.46	127.60	0.00	0.50
28.28	420.10	1.05	125.30	0.00	0.50
28.34	435.90	0.99	125.00	0.00	0.50
28.42	449.10	1.60	128.60	0.00	0.50
28.48	466.70	1.84	129.70	0.00	0.50
28.54	445.00	1.81	129.40	0.00	0.50
28.61	440.90	2.76	132.50	0.00	0.50
28.68	497.80	3.79	135.10	0.00	0.50
28.75	549.90	5.03	137.40	0.00	0.50
28.80	559.30	6.40	139.20	0.00	0.50
28.87	577.90	6.46	139.40	0.00	0.50
28.93	579.20	5.98	138.80	0.00	0.50
29.00	526.10	5.72	138.20	0.00	0.50
29.07	555.20	5.92	138.60	0.00	0.50
29.13	592.90	5.60	138.40	0.00	0.50
29.20	617.50	5.49	138.30	0.00	0.50
29.27	596.50	6.09	139.00	0.00	0.50
29.33	574.20	6.47	139.40	0.00	0.50
29.39	566.40	6.48	139.30	0.00	0.50
29.47	523.60	6.48	139.10	0.00	0.50

29.53	535.30	6.25	138.90	0.00	0.50
29.60	509.40	5.91	138.40	0.00	0.50
29.66	490.90	6.54	139.10	0.00	0.50
29.73	479.50	6.93	139.40	0.00	0.50
29.80	492.10	5.14	137.30	0.00	0.50
29.86	493.30	4.38	136.10	0.00	0.50
29.93	527.70	4.25	136.10	0.00	0.50
30.00	590.20	4.71	137.10	0.00	0.50
30.06	611.10	5.78	138.70	0.00	0.50
30.11	638.10	6.54	139.70	0.00	0.50
30.19	556.60	7.11	140.00	0.00	0.50
30.25	559.10	7.72	140.60	0.00	0.50
30.31	491.40	8.41	140.90	0.00	0.50
30.38	473.40	6.99	139.50	0.00	0.50
30.45	485.60	4.25	135.90	0.00	0.50
30.52	487.70	4.45	136.20	0.00	0.50
30.57	499.20	4.54	136.40	0.00	0.50
30.65	531.10	4.29	136.20	0.00	0.50
30.71	556.80	3.65	135.10	0.00	0.50
30.77	601.40	3.95	135.90	0.00	0.50
30.84	630.10	4.96	137.60	0.00	0.50
30.91	666.30	5.48	138.50	0.00	0.50
30.97	579.70	5.48	138.20	0.00	0.50
31.04	560.80	5.61	138.30	0.00	0.50
31.11	588.90	5.98	138.80	0.00	0.50
31.17	562.50	5.94	138.70	0.00	0.50
31.23	509.50	5.28	137.60	0.00	0.50
31.30	522.40	4.98	137.20	0.00	0.50
31.37	522.80	4.70	136.80	0.00	0.50
31.43	522.00	4.56	136.60	0.00	0.50
31.50	520.10	4.30	136.10	0.00	0.50
31.57	502.70	4.05	135.60	0.00	0.50
31.63	496.40	3.81	135.10	0.00	0.50
31.71	481.90	3.55	134.50	0.00	0.50
31.77	477.70	3.45	134.30	0.00	0.50
31.83	466.40	3.44	134.20	0.00	0.50
31.89	467.50	3.44	134.20	0.00	0.50
31.97	456.70	3.50	134.30	0.00	0.50
32.02	457.50	3.46	134.20	0.00	0.50
32.09	433.00	3.36	133.90	0.00	0.50
32.15	430.50	3.36	133.90	0.00	0.50
32.21	438.30	3.32	133.80	0.00	0.50
32.28	445.60	3.25	133.70	0.00	0.50
32.35	450.00	3.26	133.70	0.00	0.50
32.41	456.80	3.21	133.70	0.00	0.50
32.49	458.80	3.20	133.70	0.00	0.50
32.55	457.80	3.43	134.20	0.00	0.50
32.61	463.80	3.87	135.10	0.00	0.50
32.69	468.70	4.29	135.90	0.00	0.50
32.76	471.90	4.32	135.90	0.00	0.50
32.83	491.40	4.32	136.00	0.00	0.50
32.87	480.60	4.35	136.00	0.00	0.50
32.94	452.40	4.31	135.80	0.00	0.50
33.01	464.50	4.34	135.90	0.00	0.50
33.08	474.10	4.03	135.40	0.00	0.50
33.15	485.60	3.87	135.20	0.00	0.50
33.21	492.90	3.75	135.00	0.00	0.50
33.26	493.60	3.56	134.60	0.00	0.50
33.35	501.30	3.70	134.90	0.00	0.50
33.41	505.70	3.71	135.00	0.00	0.50
33.48	515.60	3.62	134.80	0.00	0.50
33.53	504.40	3.50	134.50	0.00	0.50
33.60	503.20	3.29	134.10	0.00	0.50

33.66	525.10	3.21	134.00	0.00	0.50
33.73	536.00	2.68	132.70	0.00	0.50
33.79	550.70	2.47	132.20	0.00	0.50
33.86	573.10	2.81	133.30	0.00	0.50
33.92	683.90	2.18	131.80	0.00	0.50
33.99	687.10	3.46	135.20	0.00	0.50
34.05	773.00	4.44	137.30	0.00	0.50
34.12	684.40	4.30	136.80	0.00	0.50
34.18	706.10	4.67	137.50	0.00	0.50
34.26	561.60	3.86	135.50	0.00	0.50
34.31	506.90	1.90	130.10	0.00	0.50
34.39	493.60	1.90	130.00	0.00	0.50
34.45	467.30	1.93	130.00	0.00	0.50
34.52	396.40	1.96	129.70	0.00	0.50
34.58	374.70	2.04	129.90	0.00	0.50
34.65	296.30	2.12	129.60	0.00	0.50
34.72	302.50	2.04	129.30	0.00	0.50
34.77	302.40	1.97	129.10	0.00	0.50
34.84	302.30	1.93	129.00	0.00	0.50
34.90	303.20	1.79	128.40	0.00	0.50
34.99	296.90	1.72	128.00	0.00	0.50
35.05	290.40	1.63	127.60	0.00	0.50
35.13	267.50	1.55	127.10	0.00	0.50
35.19	264.10	1.58	127.20	0.00	0.50
35.26	261.80	1.44	126.50	0.00	0.50
35.32	268.70	1.40	126.30	0.00	0.50
35.39	275.50	2.69	131.10	0.00	0.50
35.46	270.10	3.86	133.80	0.00	0.50
35.50	264.10	4.00	133.90	0.00	0.50
35.57	247.80	3.73	133.30	0.00	0.50
35.63	243.70	3.74	133.30	0.00	0.50
35.70	238.20	3.72	133.20	0.00	0.50
35.76	213.10	3.71	132.90	0.00	0.50
35.83	232.20	3.73	133.10	0.00	0.50
35.90	252.40	3.30	132.40	0.00	0.50
35.96	251.20	2.48	130.30	0.00	0.50
36.03	256.40	2.47	130.30	0.00	0.50
36.10	255.60	2.67	130.90	0.00	0.50
36.16	255.60	2.13	129.30	0.00	0.50
36.23	254.70	1.71	127.70	0.00	0.50
36.30	270.70	1.71	127.80	0.00	0.50
36.36	315.10	1.71	128.20	0.00	0.50
36.42	348.90	3.91	134.50	0.00	0.50
36.49	456.90	6.83	139.20	0.00	0.50
36.55	596.40	6.07	139.00	0.00	0.50
36.61	794.20	4.58	137.60	0.00	0.50
36.68	734.60	4.40	137.10	0.00	0.50
36.74	737.60	3.76	136.00	0.00	0.50
36.81	700.00	3.58	135.50	0.00	0.50
36.87	655.60	3.56	135.30	0.00	0.50
36.95	527.10	3.72	135.10	0.00	0.50
37.01	349.70	4.09	134.80	0.00	0.50
37.08	271.60	4.68	135.20	0.00	0.50
37.14	240.80	5.32	135.80	0.00	0.50
37.21	241.00	5.21	135.70	0.00	0.50
37.27	241.00	5.18	135.60	0.00	0.50
37.34	241.20	5.64	136.20	0.00	0.50
37.42	266.70	6.31	137.30	0.00	0.50
37.48	257.50	6.75	137.70	0.00	0.50
37.55	218.60	7.01	137.60	0.00	0.50
37.61	203.40	6.14	136.40	0.00	0.50
37.68	220.80	4.50	134.40	0.00	0.50
37.75	180.40	3.62	132.30	0.00	0.50

37.82	196.50	4.33	133.80	0.00	0.50
37.88	266.00	5.25	136.00	0.00	0.50
37.93	376.90	4.41	135.50	0.00	0.50
38.00	682.70	0.00	136.00	0.00	0.50
38.06	698.60	0.00	136.00	0.00	0.50
38.12	734.20	0.00	136.00	0.00	0.50
38.19	742.00	0.00	136.00	0.00	0.50
38.25	829.10	0.00	136.00	0.00	0.50
38.32	999.30	0.00	136.00	0.00	0.50

Modify Robertson method generates Fines from qc/fs. Inputted Fines are not relevant.

Output Results:

Settlement of Saturated Sands=0.02 in.
Settlement of Unsaturated Sands=3.04 in.
Total Settlement of Saturated and Unsaturated Sands=3.06 in.
Differential Settlement=1.532 to 2.022 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
0.00	2.00	0.77	5.00	0.02	3.04	3.06
1.00	2.57	0.77	5.00	0.02	3.04	3.06
2.00	2.57	0.77	5.00	0.02	3.04	3.06
3.00	2.57	0.77	5.00	0.02	3.04	3.05
4.00	0.27	0.77	5.00	0.02	2.93	2.95
5.00	0.13	0.77	5.00	0.02	2.64	2.66
6.00	0.28	0.76	5.00	0.02	2.43	2.44
7.00	0.17	0.76	5.00	0.02	2.20	2.22
8.00	0.16	0.76	5.00	0.02	2.04	2.06
9.00	0.19	0.76	5.00	0.02	1.81	1.83
10.00	0.14	0.76	5.00	0.02	1.56	1.58
11.00	0.21	0.75	5.00	0.02	1.34	1.36
12.00	0.30	0.75	5.00	0.02	1.16	1.18
13.00	0.18	0.75	5.00	0.02	0.95	0.97
14.00	0.30	0.75	5.00	0.02	0.71	0.73
15.00	0.54	0.75	5.00	0.02	0.56	0.58
16.00	2.57	0.75	5.00	0.02	0.49	0.51
17.00	2.57	0.74	5.00	0.02	0.44	0.46
18.00	0.17	0.74	5.00	0.02	0.34	0.36
19.00	0.27	0.74	5.00	0.02	0.14	0.16
20.00	0.92	0.74	5.00	0.02	0.00	0.02
21.00	2.57	0.75	3.41	0.02	0.00	0.02
22.00	2.57	0.77	3.34	0.02	0.00	0.02
23.00	2.57	0.79	3.28	0.02	0.00	0.02
24.00	2.57	0.80	3.22	0.02	0.00	0.02
25.00	2.57	0.81	3.17	0.02	0.00	0.02
26.00	2.58	0.82	3.13	0.02	0.00	0.02
27.00	2.56	0.84	3.06	0.02	0.00	0.02
28.00	2.54	0.85	3.00	0.02	0.00	0.02
29.00	2.53	0.86	2.96	0.02	0.00	0.02
30.00	2.52	0.87	2.92	0.02	0.00	0.02
31.00	2.51	0.87	2.89	0.02	0.00	0.02
32.00	2.50	0.87	2.88	0.02	0.00	0.02
33.00	2.49	0.87	2.86	0.02	0.00	0.02
34.00	2.49	0.87	2.84	0.02	0.00	0.02
35.00	1.12	0.87	1.29	0.02	0.00	0.02
36.00	0.81	0.88	0.92*	0.01	0.00	0.01
37.00	2.15	0.88	2.46	0.00	0.00	0.00
38.00	2.45	0.87	2.80	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone

(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Depth = ft, Stress or Pressure = atm (tsf), Unit Weight = pcf, Settlement = in.

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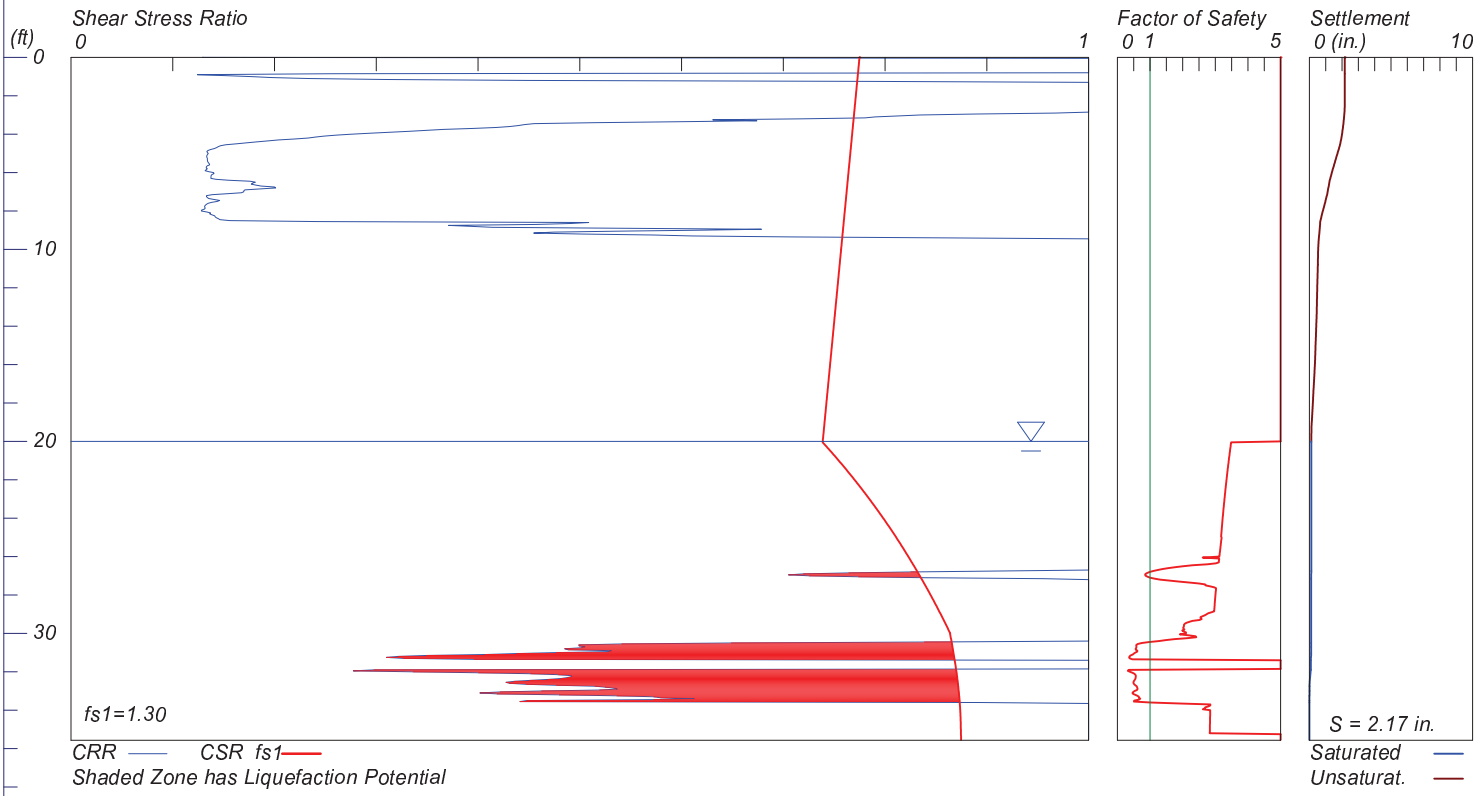
1 atm (atmosphere) = 1 tsf (ton/ft2)	
CRRm	Cyclic resistance ratio from soils
CSRsf	Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S.	Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat	Settlement from saturated sands
S_dry	Settlement from Unsaturated Sands
S_all	Total Settlement from Saturated and Unsaturated Sands
NoLiq	No-Liquefy Soils

LIQUEFACTION ANALYSIS

CPT-2

Hole No.=CPT-2 Water Depth=20 ft

Magnitude=6.9
Acceleration=.917g



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LIQUEFACTION ANALYSIS SUMMARY

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Input File Name: G:\Projects\200000 - Irvine\208450 - 208499\208465\208465002\Electronic Project File\Data Analysis & Calculations\Liquefaction\CPT 11-21-18\CPT-2.liq
Title: CPT-2
Subtitle: 208465002

Surface Elev.=
Hole No.=CPT-2
Depth of Hole= 35.57 ft
Water Table during Earthquake= 20.00 ft
Water Table during In-Situ Testing= 28.00 ft
Max. Acceleration= 0.92 g
Earthquake Magnitude= 6.90

Input Data:
Surface Elev.=
Hole No.=CPT-2
Depth of Hole=35.57 ft
Water Table during Earthquake= 20.00 ft
Water Table during In-Situ Testing= 28.00 ft
Max. Acceleration=0.92 g
Earthquake Magnitude=6.90

1. CPT Calculation Method: Modify Robertson*
2. Settlement Analysis Method: Tokimatsu/Seed
3. Fines Correction for Liquefaction: Stark/Olson et al.*
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1
8. Sampling Method, Cs= 1
9. User request factor of safety (apply to CSR) , User= 1.3
   Plot one CSR curve (fs1=User)
10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	qc atm	fs atm	gamma pcf	Fines %	D50 mm
0.00	0.09	0.00	58.37	0.00	0.50
0.08	0.00	0.00	60.00	0.00	0.50
0.15	0.00	0.00	62.00	0.00	0.50
0.22	0.00	0.00	64.00	0.00	0.50
0.27	0.00	0.00	66.00	0.00	0.50
0.33	0.00	0.00	68.00	0.00	0.50
0.42	0.00	0.00	70.00	0.00	0.50
0.49	0.00	0.00	72.00	0.00	0.50
0.55	0.00	0.01	74.00	0.00	0.50

0.62	0.00	0.01	76.00	0.00	0.50
0.69	0.00	0.02	77.00	0.00	0.50
0.75	0.09	0.03	78.03	0.00	0.50
0.81	0.09	0.03	78.96	0.00	0.50
0.88	3.63	0.04	90.35	0.00	0.50
0.95	11.06	0.08	98.05	0.00	0.50
0.99	13.23	0.10	99.68	0.00	0.50
1.05	15.99	0.12	101.40	0.00	0.50
1.12	20.32	0.14	103.40	0.00	0.50
1.19	28.54	0.18	106.00	0.00	0.50
1.25	40.99	0.22	108.30	0.00	0.50
1.32	50.60	0.22	108.50	0.00	0.50
1.39	56.04	0.28	110.80	0.00	0.50
1.45	58.89	0.35	112.60	0.00	0.50
1.51	65.64	0.29	111.30	0.00	0.50
1.58	72.99	0.28	111.50	0.00	0.50
1.65	80.43	0.33	112.70	0.00	0.50
1.72	86.92	0.32	112.70	0.00	0.50
1.78	88.39	0.31	112.60	0.00	0.50
1.85	88.82	0.33	113.00	0.00	0.50
1.92	89.43	0.38	114.10	0.00	0.50
1.99	90.90	0.43	115.10	0.00	0.50
2.05	89.26	0.42	114.90	0.00	0.50
2.11	89.08	0.44	115.10	0.00	0.50
2.18	88.04	0.46	115.40	0.00	0.50
2.25	86.49	0.44	115.10	0.00	0.50
2.31	83.11	0.44	114.90	0.00	0.50
2.38	82.77	0.44	114.90	0.00	0.50
2.45	82.77	0.47	115.50	0.00	0.50
2.51	81.90	0.48	115.60	0.00	0.50
2.57	80.60	0.44	115.00	0.00	0.50
2.64	78.53	0.44	114.80	0.00	0.50
2.71	77.40	0.43	114.60	0.00	0.50
2.78	76.71	0.43	114.70	0.00	0.50
2.84	75.85	0.42	114.40	0.00	0.50
2.91	73.94	0.46	115.00	0.00	0.50
2.97	71.87	0.51	115.70	0.00	0.50
3.04	71.09	0.57	116.50	0.00	0.50
3.11	68.58	0.66	117.50	0.00	0.50
3.17	70.70	0.60	116.80	0.00	0.50
3.24	65.64	0.51	115.50	0.00	0.50
3.31	70.31	0.48	115.20	0.00	0.50
3.38	64.26	0.46	114.60	0.00	0.50
3.44	57.85	0.46	114.50	0.00	0.50
3.51	58.03	0.45	114.20	0.00	0.50
3.57	58.37	0.44	114.10	0.00	0.50
3.64	59.06	0.40	113.50	0.00	0.50
3.70	58.72	0.35	112.40	0.00	0.50
3.76	55.78	0.35	112.40	0.00	0.50
3.82	54.05	0.37	112.60	0.00	0.50
3.89	52.49	0.34	112.00	0.00	0.50
3.96	50.59	0.32	111.40	0.00	0.50
4.02	48.68	0.29	110.70	0.00	0.50
4.09	46.87	0.29	110.40	0.00	0.50
4.15	44.96	0.30	110.70	0.00	0.50
4.22	44.01	0.29	110.50	0.00	0.50
4.29	41.24	0.25	109.20	0.00	0.50
4.36	40.29	0.21	107.90	0.00	0.50
4.42	37.87	0.20	107.30	0.00	0.50
4.49	35.79	0.17	106.20	0.00	0.50
4.55	33.29	0.14	104.60	0.00	0.50
4.62	32.59	0.12	103.10	0.00	0.50
4.68	31.90	0.13	103.60	0.00	0.50

4.75	31.21	0.12	103.20	0.00	0.50
4.82	30.60	0.10	101.80	0.00	0.50
4.89	29.22	0.11	102.10	0.00	0.50
4.95	29.13	0.12	102.80	0.00	0.50
4.99	29.57	0.12	103.00	0.00	0.50
5.05	29.18	0.12	103.20	0.00	0.50
5.14	28.79	0.13	103.40	0.00	0.50
5.20	29.05	0.13	103.50	0.00	0.50
5.26	29.31	0.13	103.60	0.00	0.50
5.34	29.65	0.13	103.70	0.00	0.50
5.40	29.91	0.13	103.70	0.00	0.50
5.47	30.43	0.13	103.80	0.00	0.50
5.53	31.04	0.13	103.90	0.00	0.50
5.59	31.81	0.13	103.90	0.00	0.50
5.65	30.52	0.13	103.90	0.00	0.50
5.74	29.65	0.14	104.00	0.00	0.50
5.79	29.74	0.15	104.80	0.00	0.50
5.86	28.87	0.16	104.90	0.00	0.50
5.91	28.27	0.16	104.90	0.00	0.50
6.00	29.13	0.22	107.30	0.00	0.50
6.05	29.31	0.22	107.50	0.00	0.50
6.11	30.00	0.20	106.70	0.00	0.50
6.17	30.34	0.19	106.50	0.00	0.50
6.26	30.69	0.19	106.50	0.00	0.50
6.32	30.73	0.19	106.50	0.00	0.50
6.38	30.73	0.28	109.20	0.00	0.50
6.44	30.78	0.43	112.40	0.00	0.50
6.50	31.73	0.46	112.90	0.00	0.50
6.59	34.50	0.42	112.60	0.00	0.50
6.65	36.05	0.44	112.90	0.00	0.50
6.71	39.69	0.44	113.10	0.00	0.50
6.77	47.04	0.44	113.60	0.00	0.50
6.83	43.23	0.43	113.30	0.00	0.50
6.89	31.81	0.43	112.40	0.00	0.50
6.98	27.32	0.43	112.00	0.00	0.50
7.05	30.26	0.42	112.30	0.00	0.50
7.11	28.61	0.34	110.50	0.00	0.50
7.17	27.06	0.23	107.60	0.00	0.50
7.23	27.58	0.23	107.40	0.00	0.50
7.29	27.92	0.23	107.60	0.00	0.50
7.38	27.49	0.25	108.30	0.00	0.50
7.43	27.66	0.32	110.00	0.00	0.50
7.49	28.79	0.31	109.80	0.00	0.50
7.55	27.49	0.27	108.80	0.00	0.50
7.61	28.61	0.24	107.90	0.00	0.50
7.71	28.01	0.23	107.60	0.00	0.50
7.77	25.93	0.23	107.60	0.00	0.50
7.82	26.54	0.24	107.70	0.00	0.50
7.89	26.45	0.24	107.80	0.00	0.50
7.95	26.62	0.22	107.00	0.00	0.50
8.01	26.88	0.21	106.90	0.00	0.50
8.08	27.14	0.28	109.00	0.00	0.50
8.15	27.10	0.28	108.80	0.00	0.50
8.20	27.06	0.29	109.30	0.00	0.50
8.27	25.07	0.31	109.60	0.00	0.50
8.34	30.52	0.31	110.00	0.00	0.50
8.43	35.19	0.31	110.20	0.00	0.50
8.49	31.04	0.35	110.90	0.00	0.50
8.54	27.14	0.54	113.80	0.00	0.50
8.60	28.79	0.93	117.90	0.00	0.50
8.69	32.42	1.05	119.10	0.00	0.50
8.75	36.66	1.06	119.40	0.00	0.50
8.81	44.53	1.27	121.20	0.00	0.50

8.87	63.48	1.45	123.00	0.00	0.50
8.93	102.40	1.51	124.50	0.00	0.50
9.00	88.38	1.62	124.70	0.00	0.50
9.06	73.76	1.61	124.20	0.00	0.50
9.13	63.81	1.48	123.20	0.00	0.50
9.19	78.35	1.44	123.50	0.00	0.50
9.26	98.59	1.29	123.30	0.00	0.50
9.32	117.40	0.80	120.20	0.00	0.50
9.38	130.10	0.69	119.40	0.00	0.50
9.45	142.70	0.73	120.00	0.00	0.50
9.52	157.80	0.79	120.80	0.00	0.50
9.60	177.40	1.45	125.60	0.00	0.50
9.66	192.10	1.53	126.20	0.00	0.50
9.71	204.40	1.34	125.30	0.00	0.50
9.79	224.00	1.70	127.30	0.00	0.50
9.85	236.10	1.76	127.70	0.00	0.50
9.91	235.80	2.04	128.70	0.00	0.50
9.99	235.50	1.96	128.40	0.00	0.50
10.04	196.50	2.00	128.20	0.00	0.50
10.13	259.30	1.90	128.50	0.00	0.50
10.19	255.70	1.66	127.50	0.00	0.50
10.26	239.50	1.68	127.40	0.00	0.50
10.32	236.60	1.69	127.40	0.00	0.50
10.38	236.10	1.56	126.80	0.00	0.50
10.45	236.30	1.55	126.80	0.00	0.50
10.51	236.40	1.88	128.20	0.00	0.50
10.58	238.30	2.09	128.90	0.00	0.50
10.64	241.30	2.10	129.00	0.00	0.50
10.70	244.70	2.11	129.10	0.00	0.50
10.77	249.00	2.10	129.10	0.00	0.50
10.83	252.40	1.88	128.30	0.00	0.50
10.89	257.10	1.71	127.70	0.00	0.50
10.96	260.20	1.81	128.10	0.00	0.50
11.02	248.10	1.66	127.40	0.00	0.50
11.12	235.80	1.69	127.40	0.00	0.50
11.18	235.80	2.03	128.70	0.00	0.50
11.24	235.80	2.23	129.40	0.00	0.50
11.31	229.90	1.80	127.80	0.00	0.50
11.37	240.70	1.54	126.80	0.00	0.50
11.44	255.40	1.74	127.80	0.00	0.50
11.50	225.80	1.68	127.20	0.00	0.50
11.56	229.20	2.01	128.60	0.00	0.50
11.62	246.70	2.74	131.00	0.00	0.50
11.69	264.20	3.05	132.00	0.00	0.50
11.75	293.90	2.88	131.80	0.00	0.50
11.81	297.40	2.82	131.70	0.00	0.50
11.88	317.50	3.01	132.30	0.00	0.50
11.94	324.70	2.35	130.50	0.00	0.50
12.00	324.80	3.03	132.40	0.00	0.50
12.07	325.30	3.55	133.60	0.00	0.50
12.13	321.70	3.38	133.20	0.00	0.50
12.23	325.70	3.07	132.50	0.00	0.50
12.30	331.00	2.98	132.40	0.00	0.50
12.36	322.10	2.99	132.30	0.00	0.50
12.42	295.20	2.99	132.10	0.00	0.50
12.49	302.20	2.94	132.00	0.00	0.50
12.55	311.50	2.60	131.20	0.00	0.50
12.61	333.80	2.30	130.50	0.00	0.50
12.68	345.40	2.45	131.00	0.00	0.50
12.74	353.00	3.50	133.70	0.00	0.50
12.80	350.90	4.72	135.80	0.00	0.50
12.86	361.20	6.86	138.70	0.00	0.50
12.92	379.20	8.55	140.40	0.00	0.50

13.01	394.70	7.01	139.00	0.00	0.50
13.05	417.10	5.81	137.80	0.00	0.50
13.12	436.70	5.20	137.10	0.00	0.50
13.19	349.00	5.56	137.00	0.00	0.50
13.25	350.50	5.58	137.10	0.00	0.50
13.32	368.80	5.12	136.60	0.00	0.50
13.39	392.00	2.85	132.40	0.00	0.50
13.45	389.10	1.57	128.10	0.00	0.50
13.51	358.30	1.70	128.40	0.00	0.50
13.58	304.60	1.85	128.70	0.00	0.50
13.66	275.80	2.16	129.50	0.00	0.50
13.73	267.40	2.87	131.50	0.00	0.50
13.78	274.50	3.43	132.90	0.00	0.50
13.84	280.00	4.83	135.50	0.00	0.50
13.91	315.10	5.35	136.50	0.00	0.50
13.99	352.60	5.27	136.70	0.00	0.50
14.05	350.20	5.59	137.10	0.00	0.50
14.12	335.40	5.58	137.00	0.00	0.50
14.18	347.80	5.02	136.30	0.00	0.50
14.25	385.70	4.47	135.70	0.00	0.50
14.31	421.30	4.41	135.80	0.00	0.50
14.37	347.70	4.42	135.40	0.00	0.50
14.44	362.30	4.43	135.50	0.00	0.50
14.51	337.10	3.91	134.40	0.00	0.50
14.57	362.80	2.82	132.20	0.00	0.50
14.64	333.30	2.77	131.80	0.00	0.50
14.71	363.30	2.78	132.10	0.00	0.50
14.77	363.20	2.85	132.30	0.00	0.50
14.84	363.20	3.84	134.40	0.00	0.50
14.91	366.40	5.27	136.80	0.00	0.50
14.96	381.60	5.32	136.90	0.00	0.50
15.03	406.10	4.67	136.10	0.00	0.50
15.09	442.40	4.50	136.10	0.00	0.50
15.15	479.90	4.98	137.00	0.00	0.50
15.23	526.30	4.94	137.20	0.00	0.50
15.29	535.50	5.38	137.80	0.00	0.50
15.35	490.30	5.99	138.40	0.00	0.50
15.43	453.50	6.65	139.00	0.00	0.50
15.49	439.10	6.34	138.60	0.00	0.50
15.55	429.60	5.71	137.70	0.00	0.50
15.62	412.90	4.86	136.50	0.00	0.50
15.69	417.70	4.31	135.60	0.00	0.50
15.77	420.80	3.91	134.90	0.00	0.50
15.84	407.80	3.64	134.30	0.00	0.50
15.90	426.90	3.36	133.80	0.00	0.50
15.96	429.00	3.08	133.20	0.00	0.50
16.03	434.90	3.13	133.40	0.00	0.50
16.09	384.70	3.03	132.80	0.00	0.50
16.15	397.10	3.08	133.00	0.00	0.50
16.22	417.40	3.97	135.00	0.00	0.50
16.28	405.10	4.22	135.40	0.00	0.50
16.34	416.70	3.84	134.80	0.00	0.50
16.41	410.30	3.46	134.00	0.00	0.50
16.47	416.00	2.89	132.70	0.00	0.50
16.54	422.40	2.63	132.00	0.00	0.50
16.60	422.90	2.58	131.90	0.00	0.50
16.67	439.30	2.90	132.80	0.00	0.50
16.74	463.90	3.05	133.30	0.00	0.50
16.80	402.50	2.85	132.50	0.00	0.50
16.86	398.00	2.87	132.50	0.00	0.50
16.93	420.80	2.90	132.70	0.00	0.50
16.99	421.10	2.93	132.80	0.00	0.50
17.06	421.10	3.05	133.10	0.00	0.50

17.13	421.30	2.92	132.80	0.00	0.50
17.20	426.90	2.94	132.90	0.00	0.50
17.26	444.10	3.36	133.90	0.00	0.50
17.33	480.40	3.76	135.00	0.00	0.50
17.39	510.80	3.78	135.10	0.00	0.50
17.46	527.20	3.76	135.20	0.00	0.50
17.52	571.70	3.50	134.90	0.00	0.50
17.58	591.50	3.25	134.40	0.00	0.50
17.65	523.00	3.63	134.90	0.00	0.50
17.72	529.20	4.98	137.20	0.00	0.50
17.78	521.30	5.87	138.40	0.00	0.50
17.85	527.00	5.55	138.00	0.00	0.50
17.91	519.70	5.04	137.30	0.00	0.50
17.98	524.80	4.67	136.80	0.00	0.50
18.05	510.80	4.27	136.00	0.00	0.50
18.12	474.20	4.39	136.10	0.00	0.50
18.17	435.90	4.10	135.40	0.00	0.50
18.24	423.80	4.04	135.20	0.00	0.50
18.31	427.60	3.80	134.80	0.00	0.50
18.38	403.00	3.43	133.90	0.00	0.50
18.44	439.50	4.52	136.10	0.00	0.50
18.51	459.40	4.53	136.20	0.00	0.50
18.57	478.30	4.21	135.80	0.00	0.50
18.63	478.50	4.11	135.60	0.00	0.50
18.71	479.40	3.85	135.10	0.00	0.50
18.77	478.20	3.06	133.40	0.00	0.50
18.83	514.90	2.00	130.50	0.00	0.50
18.90	466.20	2.03	130.40	0.00	0.50
18.96	436.70	2.42	131.50	0.00	0.50
19.04	471.80	2.53	132.00	0.00	0.50
19.10	491.40	2.56	132.20	0.00	0.50
19.16	501.50	2.72	132.70	0.00	0.50
19.24	462.30	2.88	132.90	0.00	0.50
19.29	503.30	2.86	133.10	0.00	0.50
19.35	482.80	2.95	133.20	0.00	0.50
19.43	505.10	3.14	133.80	0.00	0.50
19.49	521.70	3.40	134.40	0.00	0.50
19.55	529.60	4.07	135.80	0.00	0.50
19.62	529.70	4.73	136.90	0.00	0.50
19.68	536.40	4.76	137.00	0.00	0.50
19.76	528.10	4.49	136.50	0.00	0.50
19.82	526.40	4.65	136.70	0.00	0.50
19.89	550.20	4.84	137.10	0.00	0.50
19.95	540.60	4.78	137.00	0.00	0.50
20.01	534.40	5.59	138.10	0.00	0.50
20.08	518.70	6.08	138.70	0.00	0.50
20.14	526.20	6.07	138.70	0.00	0.50
20.21	546.70	6.03	138.70	0.00	0.50
20.28	532.90	7.37	140.10	0.00	0.50
20.34	517.20	10.75	142.80	0.00	0.50
20.41	540.60	10.08	142.50	0.00	0.50
20.47	480.20	7.05	139.60	0.00	0.50
20.54	530.60	6.10	138.70	0.00	0.50
20.60	456.30	5.36	137.40	0.00	0.50
20.67	520.50	5.39	137.80	0.00	0.50
20.74	563.40	5.41	138.00	0.00	0.50
20.80	566.20	5.52	138.20	0.00	0.50
20.87	495.90	5.71	138.10	0.00	0.50
20.93	516.20	5.58	138.00	0.00	0.50
21.01	473.50	5.48	137.70	0.00	0.50
21.08	465.60	5.37	137.50	0.00	0.50
21.14	459.10	5.17	137.20	0.00	0.50
21.20	440.10	4.64	136.30	0.00	0.50

21.27	428.90	3.99	135.10	0.00	0.50
21.33	427.30	3.76	134.70	0.00	0.50
21.40	429.00	3.53	134.20	0.00	0.50
21.46	432.60	3.28	133.70	0.00	0.50
21.52	416.50	3.07	133.10	0.00	0.50
21.59	420.90	3.15	133.30	0.00	0.50
21.66	414.70	3.15	133.30	0.00	0.50
21.73	419.30	3.26	133.60	0.00	0.50
21.78	427.70	3.29	133.70	0.00	0.50
21.86	441.00	3.13	133.40	0.00	0.50
21.92	444.90	3.00	133.10	0.00	0.50
21.99	449.50	2.94	133.00	0.00	0.50
22.04	452.30	3.02	133.20	0.00	0.50
22.11	446.60	2.98	133.10	0.00	0.50
22.18	446.60	2.85	132.80	0.00	0.50
22.25	446.50	2.70	132.40	0.00	0.50
22.31	447.90	2.64	132.20	0.00	0.50
22.39	446.10	2.61	132.10	0.00	0.50
22.44	440.40	2.66	132.20	0.00	0.50
22.51	424.70	2.74	132.30	0.00	0.50
22.58	416.30	2.62	132.00	0.00	0.50
22.63	411.90	2.50	131.60	0.00	0.50
22.70	416.30	2.49	131.60	0.00	0.50
22.76	418.70	2.49	131.60	0.00	0.50
22.85	416.30	2.51	131.70	0.00	0.50
22.91	410.20	2.65	132.00	0.00	0.50
22.97	384.40	2.78	132.20	0.00	0.50
23.03	396.90	2.79	132.30	0.00	0.50
23.09	399.00	2.79	132.30	0.00	0.50
23.19	398.30	2.82	132.40	0.00	0.50
23.25	398.60	2.87	132.50	0.00	0.50
23.31	390.80	2.92	132.60	0.00	0.50
23.38	390.70	3.00	132.80	0.00	0.50
23.44	390.50	3.03	132.90	0.00	0.50
23.51	393.00	2.87	132.50	0.00	0.50
23.57	387.70	2.61	131.80	0.00	0.50
23.64	389.70	2.41	131.20	0.00	0.50
23.70	395.50	2.40	131.20	0.00	0.50
23.76	393.80	2.44	131.30	0.00	0.50
23.82	386.60	2.44	131.30	0.00	0.50
23.91	380.50	2.47	131.30	0.00	0.50
23.97	375.80	2.52	131.40	0.00	0.50
24.04	370.40	2.56	131.50	0.00	0.50
24.10	366.90	2.65	131.70	0.00	0.50
24.16	370.00	2.75	132.00	0.00	0.50
24.23	373.20	2.77	132.10	0.00	0.50
24.29	377.40	2.70	132.00	0.00	0.50
24.36	382.30	2.71	132.00	0.00	0.50
24.42	392.50	2.74	132.20	0.00	0.50
24.49	399.20	2.70	132.10	0.00	0.50
24.55	408.50	2.72	132.20	0.00	0.50
24.60	406.40	2.71	132.10	0.00	0.50
24.67	404.40	2.71	132.10	0.00	0.50
24.76	417.50	2.91	132.70	0.00	0.50
24.83	425.30	3.22	133.50	0.00	0.50
24.89	436.10	3.29	133.70	0.00	0.50
24.96	443.70	3.29	133.80	0.00	0.50
25.02	457.50	3.46	134.20	0.00	0.50
25.08	440.00	3.70	134.60	0.00	0.50
25.14	436.30	3.75	134.70	0.00	0.50
25.20	445.60	3.66	134.60	0.00	0.50
25.26	468.40	3.67	134.70	0.00	0.50
25.33	483.70	3.68	134.80	0.00	0.50

25.40	475.30	3.75	134.90	0.00	0.50
25.46	479.50	3.71	134.90	0.00	0.50
25.53	496.00	3.62	134.70	0.00	0.50
25.59	492.30	3.75	135.00	0.00	0.50
25.68	476.10	3.79	135.00	0.00	0.50
25.74	459.50	3.74	134.80	0.00	0.50
25.80	447.00	3.63	134.50	0.00	0.50
25.87	443.50	3.37	134.00	0.00	0.50
25.93	435.30	3.13	133.40	0.00	0.50
25.99	421.90	3.06	133.10	0.00	0.50
26.05	331.80	3.03	132.50	0.00	0.50
26.11	379.60	2.78	132.20	0.00	0.50
26.18	377.00	2.77	132.10	0.00	0.50
26.27	367.80	2.43	131.10	0.00	0.50
26.33	356.00	2.38	130.90	0.00	0.50
26.40	341.80	2.53	131.20	0.00	0.50
26.46	317.30	2.66	131.40	0.00	0.50
26.53	299.60	2.71	131.40	0.00	0.50
26.59	282.20	2.64	131.10	0.00	0.50
26.65	265.60	2.49	130.50	0.00	0.50
26.72	244.70	2.49	130.30	0.00	0.50
26.78	224.70	2.58	130.30	0.00	0.50
26.84	210.40	2.64	130.40	0.00	0.50
26.91	199.30	2.65	130.30	0.00	0.50
26.97	197.90	2.65	130.20	0.00	0.50
27.03	207.10	2.65	130.40	0.00	0.50
27.10	222.80	2.65	130.50	0.00	0.50
27.19	258.80	2.51	130.50	0.00	0.50
27.25	288.20	2.38	130.40	0.00	0.50
27.32	312.80	2.28	130.30	0.00	0.50
27.38	334.10	2.24	130.30	0.00	0.50
27.44	348.00	2.26	130.40	0.00	0.50
27.51	349.20	2.20	130.30	0.00	0.50
27.57	359.20	2.15	130.10	0.00	0.50
27.64	364.60	2.15	130.20	0.00	0.50
27.70	370.60	2.20	130.40	0.00	0.50
27.76	376.40	2.28	130.70	0.00	0.50
27.83	382.20	2.32	130.90	0.00	0.50
27.89	376.40	2.32	130.80	0.00	0.50
27.95	376.40	2.32	130.80	0.00	0.50
28.02	380.30	2.55	131.60	0.00	0.50
28.08	378.60	2.73	132.10	0.00	0.50
28.15	377.70	2.59	131.70	0.00	0.50
28.24	386.00	2.54	131.50	0.00	0.50
28.30	394.20	2.59	131.80	0.00	0.50
28.37	391.80	2.65	131.90	0.00	0.50
28.42	384.80	2.67	131.90	0.00	0.50
28.48	388.00	2.64	131.80	0.00	0.50
28.56	387.40	2.62	131.80	0.00	0.50
28.62	386.40	2.56	131.60	0.00	0.50
28.68	385.90	2.47	131.30	0.00	0.50
28.75	383.00	2.38	131.10	0.00	0.50
28.81	376.00	2.32	130.80	0.00	0.50
28.87	369.30	2.33	130.80	0.00	0.50
28.94	363.10	2.37	130.90	0.00	0.50
29.00	360.60	2.78	132.10	0.00	0.50
29.06	358.20	2.79	132.10	0.00	0.50
29.16	352.10	2.78	132.00	0.00	0.50
29.22	353.00	2.74	131.90	0.00	0.50
29.28	356.60	2.76	132.00	0.00	0.50
29.35	340.90	2.83	132.00	0.00	0.50
29.41	335.20	2.82	132.00	0.00	0.50
29.47	330.10	2.79	131.90	0.00	0.50

29.54	328.20	2.71	131.60	0.00	0.50
29.60	328.20	2.53	131.10	0.00	0.50
29.67	328.20	2.43	130.80	0.00	0.50
29.73	326.80	2.44	130.90	0.00	0.50
29.79	330.90	2.44	130.90	0.00	0.50
29.86	325.50	2.68	131.50	0.00	0.50
29.93	332.10	2.94	132.30	0.00	0.50
29.99	336.70	3.20	132.90	0.00	0.50
30.06	312.80	3.60	133.60	0.00	0.50
30.12	343.20	3.90	134.40	0.00	0.50
30.19	351.80	3.96	134.60	0.00	0.50
30.25	331.00	3.75	134.00	0.00	0.50
30.31	290.50	3.78	133.80	0.00	0.50
30.41	242.50	3.81	133.40	0.00	0.50
30.47	192.50	3.57	132.30	0.00	0.50
30.53	155.00	3.34	131.30	0.00	0.50
30.60	120.30	3.24	130.50	0.00	0.50
30.66	103.90	3.16	129.90	0.00	0.50
30.73	95.70	3.05	129.50	0.00	0.50
30.79	94.66	2.95	129.20	0.00	0.50
30.86	90.07	2.88	128.90	0.00	0.50
30.92	79.43	2.77	128.30	0.00	0.50
30.98	80.30	2.64	128.00	0.00	0.50
31.04	80.30	2.51	127.60	0.00	0.50
31.11	81.16	2.39	127.30	0.00	0.50
31.17	93.53	2.28	127.30	0.00	0.50
31.23	92.50	2.12	126.70	0.00	0.50
31.30	80.39	2.10	126.30	0.00	0.50
31.39	60.06	2.05	125.40	0.00	0.50
31.46	51.58	1.88	124.40	0.00	0.50
31.52	48.20	2.01	124.80	0.00	0.50
31.59	46.04	1.95	124.40	0.00	0.50
31.65	43.36	1.96	124.30	0.00	0.50
31.71	39.21	2.07	124.50	0.00	0.50
31.77	38.90	2.08	124.50	0.00	0.50
31.82	38.60	1.99	124.10	0.00	0.50
31.89	65.16	1.85	124.90	0.00	0.50
31.98	134.00	1.81	126.50	0.00	0.50
32.05	165.90	1.85	127.20	0.00	0.50
32.11	183.20	1.90	127.60	0.00	0.50
32.18	190.10	1.93	127.80	0.00	0.50
32.24	191.30	1.91	127.80	0.00	0.50
32.30	188.60	1.97	127.90	0.00	0.50
32.37	180.40	2.16	128.50	0.00	0.50
32.43	167.50	2.35	129.00	0.00	0.50
32.50	152.10	2.54	129.30	0.00	0.50
32.56	134.50	2.79	129.70	0.00	0.50
32.62	118.30	2.97	129.80	0.00	0.50
32.69	105.10	3.08	129.80	0.00	0.50
32.75	97.96	3.14	129.80	0.00	0.50
32.81	97.78	3.18	129.90	0.00	0.50
32.88	98.00	3.23	130.00	0.00	0.50
32.94	98.00	3.20	129.90	0.00	0.50
33.00	98.22	2.96	129.30	0.00	0.50
33.07	103.80	2.79	129.00	0.00	0.50
33.13	107.00	2.73	129.00	0.00	0.50
33.23	117.30	3.42	130.80	0.00	0.50
33.29	121.10	3.67	131.40	0.00	0.50
33.36	115.80	3.67	131.30	0.00	0.50
33.42	103.50	3.66	131.00	0.00	0.50
33.48	97.87	3.13	129.70	0.00	0.50
33.55	144.10	2.80	129.90	0.00	0.50
33.61	272.70	2.88	131.60	0.00	0.50

33.66	351.00	3.17	132.90	0.00	0.50
33.73	429.70	3.32	133.80	0.00	0.50
33.79	385.30	3.37	133.60	0.00	0.50
33.86	378.70	4.18	135.10	0.00	0.50
33.93	378.70	4.30	135.40	0.00	0.50
33.99	372.10	3.78	134.40	0.00	0.50
34.06	497.90	3.44	134.40	0.00	0.50
34.12	540.80	3.20	134.10	0.00	0.50
34.19	613.00	4.20	136.40	0.00	0.50
34.25	737.30	3.94	136.30	0.00	0.50
34.32	781.60	4.33	137.20	0.00	0.50
34.39	827.20	5.93	139.60	0.00	0.50
34.45	816.40	5.93	139.60	0.00	0.50
34.52	871.20	6.35	140.20	0.00	0.50
34.58	888.10	6.99	141.00	0.00	0.50
34.65	859.80	7.02	140.90	0.00	0.50
34.71	792.50	7.05	140.80	0.00	0.50
34.78	848.30	8.17	142.00	0.00	0.50
34.84	842.10	7.14	141.00	0.00	0.50
34.91	799.90	3.40	135.50	0.00	0.50
34.98	801.00	3.83	136.30	0.00	0.50
35.05	801.00	3.80	136.30	0.00	0.50
35.10	802.20	3.12	134.80	0.00	0.50
35.17	851.30	2.24	132.60	0.00	0.50
35.24	714.20	0.00	133.00	0.00	0.50
35.31	759.50	0.00	133.00	0.00	0.50
35.37	742.30	0.00	133.00	0.00	0.50
35.43	741.40	0.00	133.00	0.00	0.50
35.50	821.50	0.00	133.00	0.00	0.50
35.57	828.50	0.00	133.00	0.00	0.50

Modify Robertson method generates Fines from qc/fs. Inputted Fines are not relevant.

Output Results:

Settlement of Saturated Sands=0.11 in.
Settlement of Unsaturated Sands=2.06 in.
Total Settlement of Saturated and Unsaturated Sands=2.17 in.
Differential Settlement=1.085 to 1.432 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
0.00	0.13	0.77	5.00	0.11	2.06	2.17
1.00	0.18	0.77	5.00	0.11	2.05	2.17
2.00	2.57	0.77	5.00	0.11	2.05	2.17
3.00	0.83	0.77	5.00	0.11	2.02	2.13
4.00	0.28	0.77	5.00	0.11	1.88	2.00
5.00	0.13	0.77	5.00	0.11	1.61	1.72
6.00	0.14	0.76	5.00	0.11	1.26	1.37
7.00	0.17	0.76	5.00	0.11	1.00	1.12
8.00	0.13	0.76	5.00	0.11	0.71	0.82
9.00	0.62	0.76	5.00	0.11	0.51	0.62
10.00	2.57	0.76	5.00	0.11	0.42	0.54
11.00	2.57	0.75	5.00	0.11	0.40	0.51
12.00	2.57	0.75	5.00	0.11	0.37	0.48
13.00	2.57	0.75	5.00	0.11	0.34	0.46
14.00	2.57	0.75	5.00	0.11	0.30	0.42
15.00	2.57	0.75	5.00	0.11	0.26	0.38
16.00	2.57	0.75	5.00	0.11	0.22	0.34
17.00	2.57	0.74	5.00	0.11	0.16	0.27
18.00	2.57	0.74	5.00	0.11	0.10	0.21
19.00	2.57	0.74	5.00	0.11	0.03	0.15

20.00	2.57	0.74	5.00	0.11	0.00	0.12
21.00	2.57	0.75	3.41	0.11	0.00	0.11
22.00	2.57	0.77	3.34	0.11	0.00	0.11
23.00	2.57	0.78	3.28	0.11	0.00	0.11
24.00	2.57	0.80	3.22	0.11	0.00	0.11
25.00	2.59	0.81	3.19	0.11	0.00	0.11
26.00	2.57	0.82	3.12	0.11	0.00	0.11
27.00	0.73	0.83	0.87*	0.11	0.00	0.11
28.00	2.54	0.84	3.00	0.11	0.00	0.11
29.00	2.34	0.85	2.73	0.11	0.00	0.11
30.00	1.81	0.86	2.09	0.11	0.00	0.11
31.00	0.48	0.87	0.55*	0.10	0.00	0.10
32.00	0.34	0.87	0.39*	0.07	0.00	0.07
33.00	0.46	0.87	0.53*	0.01	0.00	0.01
34.00	2.49	0.87	2.84	0.00	0.00	0.00
35.00	2.48	0.87	2.83	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Depth = ft, Stress or Pressure = atm (tsf), Unit Weight = pcf, Settlement = in.

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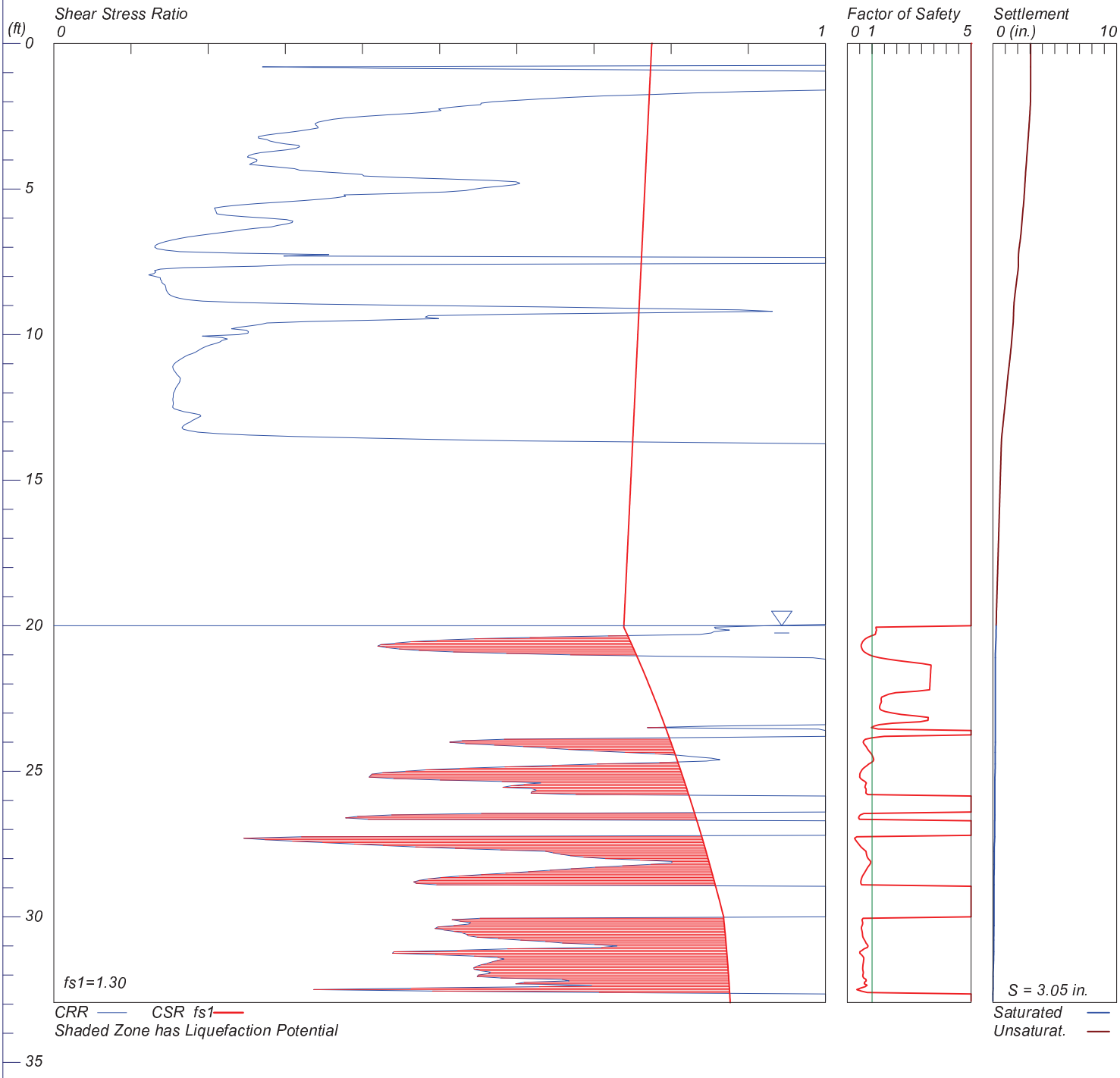
1 atm (atmosphere) = 1 tsf (ton/ft2)
CRRm Cyclic resistance ratio from soils
CSRsf Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S. Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat Settlement from saturated sands
S_dry Settlement from Unsaturated Sands
S_all Total Settlement from Saturated and Unsaturated Sands
NoLiq No-Liquefy Soils

LIQUEFACTION ANALYSIS

CPT-3

Hole No.=CPT-3 Water Depth=20 ft

Magnitude=6.9
Acceleration=.917g



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LIQUEFACTION ANALYSIS SUMMARY

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Input File Name: G:\Projects\200000 - Irvine\208450 - 208499\208465\208465002\Electronic Project File\Data Analysis & Calculations\Liquefaction\CPT 11-21-18\CPT-3.liq
Title: CPT-3
Subtitle: 208465002

Surface Elev.=
Hole No.=CPT-3
Depth of Hole= 32.94 ft
Water Table during Earthquake= 20.00 ft
Water Table during In-Situ Testing= 28.00 ft
Max. Acceleration= 0.92 g
Earthquake Magnitude= 6.90

Input Data:
Surface Elev.=
Hole No.=CPT-3
Depth of Hole=32.94 ft
Water Table during Earthquake= 20.00 ft
Water Table during In-Situ Testing= 28.00 ft
Max. Acceleration=0.92 g
Earthquake Magnitude=6.90

1. CPT Calculation Method: Modify Robertson*
2. Settlement Analysis Method: Tokimatsu/Seed
3. Fines Correction for Liquefaction: Stark/Olson et al.*
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1
8. Sampling Method, Cs= 1
9. User request factor of safety (apply to CSR) , User= 1.3
   Plot one CSR curve (fs1=User)
10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	qc atm	fs atm	gamma pcf	Fines %	D50 mm
0.00	-0.09	0.00	107.00	0.00	0.50
0.07	-0.09	0.00	107.00	0.00	0.50
0.14	-0.09	0.00	107.00	0.00	0.50
0.20	-0.09	0.00	107.00	0.00	0.50
0.27	-0.09	0.00	107.00	0.00	0.50
0.34	-0.09	0.00	107.00	0.00	0.50
0.41	-0.09	0.00	107.00	0.00	0.50
0.47	-0.09	0.01	107.00	0.00	0.50
0.54	-0.09	0.04	107.00	0.00	0.50

0.61	-0.09	0.11	107.00	0.00	0.50
0.67	-0.09	0.16	107.00	0.00	0.50
0.74	-0.09	0.21	107.00	0.00	0.50
0.81	17.38	0.28	107.90	0.00	0.50
0.87	30.19	0.33	110.40	0.00	0.50
0.93	46.37	0.35	111.80	0.00	0.50
1.00	61.42	0.45	114.40	0.00	0.50
1.07	73.53	0.59	116.80	0.00	0.50
1.14	83.83	0.60	117.20	0.00	0.50
1.21	84.26	0.64	117.70	0.00	0.50
1.27	79.59	0.62	117.40	0.00	0.50
1.34	74.39	0.60	116.90	0.00	0.50
1.40	68.68	0.59	116.70	0.00	0.50
1.47	64.70	0.58	116.40	0.00	0.50
1.53	62.02	0.57	116.10	0.00	0.50
1.60	59.17	0.51	115.30	0.00	0.50
1.67	56.83	0.46	114.40	0.00	0.50
1.73	56.74	0.43	113.90	0.00	0.50
1.80	55.27	0.40	113.20	0.00	0.50
1.86	54.58	0.38	112.90	0.00	0.50
1.93	53.89	0.38	112.80	0.00	0.50
2.00	52.68	0.38	112.80	0.00	0.50
2.04	52.42	0.38	112.70	0.00	0.50
2.10	53.28	0.38	112.90	0.00	0.50
2.18	52.03	0.40	113.00	0.00	0.50
2.24	51.64	0.40	113.10	0.00	0.50
2.30	52.68	0.40	113.20	0.00	0.50
2.37	52.76	0.38	112.90	0.00	0.50
2.44	51.55	0.35	112.20	0.00	0.50
2.50	49.30	0.36	112.20	0.00	0.50
2.57	47.05	0.37	112.30	0.00	0.50
2.64	46.10	0.38	112.40	0.00	0.50
2.70	46.01	0.36	112.20	0.00	0.50
2.77	46.79	0.35	111.80	0.00	0.50
2.84	47.92	0.35	111.90	0.00	0.50
2.90	48.00	0.37	112.40	0.00	0.50
2.97	45.67	0.41	113.00	0.00	0.50
3.03	43.68	0.43	113.20	0.00	0.50
3.10	41.77	0.42	112.90	0.00	0.50
3.16	40.48	0.40	112.60	0.00	0.50
3.23	39.61	0.40	112.40	0.00	0.50
3.30	40.04	0.46	113.50	0.00	0.50
3.36	41.17	0.47	113.70	0.00	0.50
3.43	43.59	0.47	113.90	0.00	0.50
3.50	47.92	0.46	113.90	0.00	0.50
3.57	49.91	0.42	113.50	0.00	0.50
3.63	49.56	0.41	113.30	0.00	0.50
3.69	47.14	0.41	113.10	0.00	0.50
3.76	44.28	0.41	113.00	0.00	0.50
3.83	42.90	0.41	112.90	0.00	0.50
3.89	42.47	0.42	113.00	0.00	0.50
3.96	43.24	0.46	113.60	0.00	0.50
4.03	43.50	0.48	114.10	0.00	0.50
4.09	44.97	0.43	113.30	0.00	0.50
4.16	46.27	0.39	112.60	0.00	0.50
4.22	50.69	0.42	113.40	0.00	0.50
4.29	55.36	0.42	113.60	0.00	0.50
4.36	57.09	0.42	113.70	0.00	0.50
4.43	63.23	0.41	113.80	0.00	0.50
4.49	68.34	0.40	113.80	0.00	0.50
4.56	69.55	0.39	113.70	0.00	0.50
4.62	75.26	0.38	113.80	0.00	0.50
4.69	81.23	0.39	114.10	0.00	0.50

4.75	84.52	0.37	113.70	0.00	0.50
4.82	85.30	0.21	109.80	0.00	0.50
4.89	84.86	0.14	106.60	0.00	0.50
4.92	83.91	0.15	107.10	0.00	0.50
4.99	83.31	0.19	108.80	0.00	0.50
5.06	82.87	0.22	109.80	0.00	0.50
5.12	80.88	0.23	110.30	0.00	0.50
5.20	72.06	0.25	110.40	0.00	0.50
5.26	73.10	0.25	110.40	0.00	0.50
5.32	71.54	0.25	110.40	0.00	0.50
5.38	69.55	0.25	110.30	0.00	0.50
5.47	64.70	0.23	109.80	0.00	0.50
5.53	60.38	0.23	109.60	0.00	0.50
5.59	55.44	0.25	109.70	0.00	0.50
5.65	51.64	0.26	109.90	0.00	0.50
5.71	51.85	0.27	110.30	0.00	0.50
5.81	51.85	0.29	110.80	0.00	0.50
5.86	52.07	0.30	111.00	0.00	0.50
5.93	57.43	0.31	111.50	0.00	0.50
5.99	63.49	0.35	112.70	0.00	0.50
6.05	68.08	0.38	113.50	0.00	0.50
6.12	69.64	0.40	113.80	0.00	0.50
6.18	69.20	0.39	113.70	0.00	0.50
6.24	67.73	0.38	113.30	0.00	0.50
6.30	67.13	0.35	112.90	0.00	0.50
6.37	63.06	0.33	112.10	0.00	0.50
6.46	59.60	0.29	111.10	0.00	0.50
6.53	55.96	0.27	110.40	0.00	0.50
6.58	52.76	0.25	109.60	0.00	0.50
6.64	49.30	0.21	108.30	0.00	0.50
6.70	45.58	0.19	107.50	0.00	0.50
6.77	41.25	0.19	107.00	0.00	0.50
6.82	37.19	0.19	106.80	0.00	0.50
6.91	30.87	0.20	106.70	0.00	0.50
6.97	27.15	0.22	107.00	0.00	0.50
7.03	23.52	0.24	107.50	0.00	0.50
7.10	19.71	0.27	107.90	0.00	0.50
7.16	16.59	0.27	107.50	0.00	0.50
7.22	14.52	0.29	107.70	0.00	0.50
7.29	12.96	0.34	108.50	0.00	0.50
7.38	11.92	0.36	108.70	0.00	0.50
7.44	11.40	0.37	108.80	0.00	0.50
7.50	10.97	0.37	108.80	0.00	0.50
7.55	11.49	0.37	108.80	0.00	0.50
7.64	15.04	0.34	108.90	0.00	0.50
7.70	18.67	0.31	108.70	0.00	0.50
7.76	21.35	0.26	107.80	0.00	0.50
7.82	22.74	0.23	107.00	0.00	0.50
7.88	23.08	0.27	108.20	0.00	0.50
7.94	23.52	0.18	105.30	0.00	0.50
8.04	25.94	0.29	109.20	0.00	0.50
8.07	27.76	0.29	109.30	0.00	0.50
8.16	32.86	0.29	109.60	0.00	0.50
8.21	32.43	0.29	109.60	0.00	0.50
8.29	36.06	0.29	110.00	0.00	0.50
8.35	35.62	0.31	110.30	0.00	0.50
8.41	36.83	0.30	110.20	0.00	0.50
8.48	37.87	0.29	110.10	0.00	0.50
8.53	39.08	0.29	110.20	0.00	0.50
8.63	40.98	0.29	110.30	0.00	0.50
8.69	40.90	0.34	111.30	0.00	0.50
8.75	43.32	0.38	112.30	0.00	0.50
8.81	47.82	0.41	113.00	0.00	0.50

8.87	55.26	0.49	114.70	0.00	0.50
8.94	68.67	0.82	119.10	0.00	0.50
9.00	83.12	1.28	122.80	0.00	0.50
9.06	92.04	1.83	125.60	0.00	0.50
9.15	114.90	1.90	126.50	0.00	0.50
9.21	122.20	1.81	126.30	0.00	0.50
9.27	104.50	1.72	125.50	0.00	0.50
9.33	76.46	1.64	124.40	0.00	0.50
9.39	56.29	1.63	123.60	0.00	0.50
9.45	50.75	1.61	123.20	0.00	0.50
9.52	52.93	1.40	122.40	0.00	0.50
9.58	53.53	1.01	120.00	0.00	0.50
9.67	59.16	0.89	119.30	0.00	0.50
9.74	64.00	0.67	117.50	0.00	0.50
9.80	68.93	0.49	115.30	0.00	0.50
9.86	75.68	0.50	115.70	0.00	0.50
9.93	73.43	0.53	116.00	0.00	0.50
9.99	73.78	0.56	116.50	0.00	0.50
10.04	49.56	0.57	115.60	0.00	0.50
10.12	68.24	0.55	116.10	0.00	0.50
10.18	65.73	0.52	115.60	0.00	0.50
10.24	65.73	0.51	115.50	0.00	0.50
10.31	65.73	0.46	114.70	0.00	0.50
10.37	64.69	0.42	114.00	0.00	0.50
10.43	63.74	0.40	113.60	0.00	0.50
10.52	62.01	0.39	113.30	0.00	0.50
10.58	61.41	0.38	113.20	0.00	0.50
10.64	60.02	0.37	113.00	0.00	0.50
10.70	57.60	0.36	112.70	0.00	0.50
10.76	55.78	0.36	112.50	0.00	0.50
10.85	52.84	0.37	112.50	0.00	0.50
10.92	51.11	0.36	112.30	0.00	0.50
10.98	49.81	0.36	112.20	0.00	0.50
11.04	48.69	0.36	112.10	0.00	0.50
11.11	47.91	0.36	112.20	0.00	0.50
11.17	47.65	0.37	112.40	0.00	0.50
11.23	47.21	0.39	112.80	0.00	0.50
11.29	46.87	0.42	113.20	0.00	0.50
11.35	46.70	0.44	113.50	0.00	0.50
11.44	45.66	0.48	114.10	0.00	0.50
11.49	44.79	0.50	114.40	0.00	0.50
11.55	43.49	0.51	114.50	0.00	0.50
11.61	41.94	0.52	114.50	0.00	0.50
11.68	39.95	0.52	114.40	0.00	0.50
11.77	37.35	0.51	114.10	0.00	0.50
11.83	36.05	0.50	113.80	0.00	0.50
11.89	34.84	0.49	113.60	0.00	0.50
11.95	34.24	0.48	113.50	0.00	0.50
12.01	33.89	0.47	113.30	0.00	0.50
12.07	33.89	0.47	113.30	0.00	0.50
12.16	33.89	0.47	113.30	0.00	0.50
12.22	34.49	0.47	113.40	0.00	0.50
12.28	35.45	0.48	113.50	0.00	0.50
12.34	36.83	0.49	113.70	0.00	0.50
12.42	39.51	0.49	113.90	0.00	0.50
12.48	42.11	0.47	113.80	0.00	0.50
12.54	45.92	0.46	113.80	0.00	0.50
12.60	51.37	0.47	114.20	0.00	0.50
12.67	57.77	0.47	114.50	0.00	0.50
12.73	62.79	0.53	115.70	0.00	0.50
12.79	65.47	0.51	115.50	0.00	0.50
12.88	65.13	0.47	114.80	0.00	0.50
12.95	62.88	0.46	114.70	0.00	0.50

13.01	61.66	0.46	114.60	0.00	0.50
13.07	58.81	0.46	114.50	0.00	0.50
13.13	57.25	0.46	114.40	0.00	0.50
13.19	55.95	0.46	114.40	0.00	0.50
13.25	57.51	0.46	114.40	0.00	0.50
13.34	65.73	0.46	114.70	0.00	0.50
13.40	77.85	0.48	115.50	0.00	0.50
13.46	92.21	0.53	116.60	0.00	0.50
13.52	107.60	0.68	118.80	0.00	0.50
13.58	123.30	0.92	121.40	0.00	0.50
13.67	148.90	0.79	120.70	0.00	0.50
13.72	169.80	0.89	121.90	0.00	0.50
13.78	192.10	1.07	123.50	0.00	0.50
13.84	208.90	1.02	123.40	0.00	0.50
13.93	216.80	1.20	124.70	0.00	0.50
14.00	223.00	1.21	124.80	0.00	0.50
14.06	244.20	1.41	126.20	0.00	0.50
14.13	240.00	1.52	126.70	0.00	0.50
14.20	236.70	1.55	126.80	0.00	0.50
14.26	239.40	1.54	126.70	0.00	0.50
14.32	250.70	1.51	126.70	0.00	0.50
14.39	260.50	1.64	127.40	0.00	0.50
14.45	271.90	1.73	127.90	0.00	0.50
14.50	271.20	1.82	128.30	0.00	0.50
14.59	270.50	1.78	128.10	0.00	0.50
14.65	276.50	1.65	127.60	0.00	0.50
14.72	287.70	1.71	127.90	0.00	0.50
14.78	296.70	1.89	128.70	0.00	0.50
14.85	298.70	1.88	128.70	0.00	0.50
14.91	310.60	1.91	128.90	0.00	0.50
14.97	321.20	1.93	129.10	0.00	0.50
15.03	325.70	1.93	129.10	0.00	0.50
15.10	337.40	1.93	129.20	0.00	0.50
15.17	330.20	1.86	128.90	0.00	0.50
15.23	320.50	1.92	129.10	0.00	0.50
15.29	313.20	2.17	129.90	0.00	0.50
15.38	313.30	2.39	130.60	0.00	0.50
15.43	315.00	2.17	129.90	0.00	0.50
15.49	315.20	2.10	129.70	0.00	0.50
15.55	312.50	2.06	129.50	0.00	0.50
15.64	293.10	1.86	128.60	0.00	0.50
15.70	277.00	1.81	128.30	0.00	0.50
15.76	278.20	1.89	128.60	0.00	0.50
15.82	275.50	1.95	128.80	0.00	0.50
15.88	276.40	2.11	129.40	0.00	0.50
15.97	284.00	2.35	130.20	0.00	0.50
16.03	288.70	2.39	130.40	0.00	0.50
16.09	288.60	2.31	130.20	0.00	0.50
16.15	279.90	2.27	130.00	0.00	0.50
16.21	273.50	2.42	130.40	0.00	0.50
16.29	273.50	2.59	130.90	0.00	0.50
16.35	283.30	2.27	130.00	0.00	0.50
16.41	293.40	1.97	129.00	0.00	0.50
16.47	307.40	1.92	129.00	0.00	0.50
16.53	318.80	2.01	129.40	0.00	0.50
16.62	325.80	1.88	128.90	0.00	0.50
16.68	331.80	1.87	128.90	0.00	0.50
16.74	325.00	1.81	128.70	0.00	0.50
16.80	328.60	1.92	129.10	0.00	0.50
16.88	328.90	2.46	130.90	0.00	0.50
16.94	327.50	2.57	131.20	0.00	0.50
17.00	326.40	2.15	129.90	0.00	0.50
17.06	320.60	2.03	129.50	0.00	0.50

17.12	313.90	2.05	129.50	0.00	0.50
17.21	297.20	2.79	131.60	0.00	0.50
17.27	296.90	3.27	132.80	0.00	0.50
17.33	296.90	3.27	132.80	0.00	0.50
17.39	296.50	3.28	132.80	0.00	0.50
17.46	303.20	3.30	132.90	0.00	0.50
17.54	337.30	3.99	134.50	0.00	0.50
17.59	354.50	5.33	136.80	0.00	0.50
17.65	358.90	5.94	137.60	0.00	0.50
17.72	382.20	5.55	137.30	0.00	0.50
17.78	430.50	5.25	137.10	0.00	0.50
17.86	408.80	4.83	136.40	0.00	0.50
17.92	453.90	5.05	137.00	0.00	0.50
17.98	455.70	4.74	136.50	0.00	0.50
18.04	462.40	3.84	135.00	0.00	0.50
18.11	419.70	3.33	133.70	0.00	0.50
18.18	410.60	3.06	133.10	0.00	0.50
18.24	411.20	3.39	133.80	0.00	0.50
18.31	403.40	3.99	135.00	0.00	0.50
18.37	445.30	4.14	135.50	0.00	0.50
18.44	455.30	4.47	136.10	0.00	0.50
18.50	423.50	5.10	136.90	0.00	0.50
18.57	354.70	4.89	136.10	0.00	0.50
18.64	364.70	4.61	135.80	0.00	0.50
18.70	373.50	4.38	135.50	0.00	0.50
18.76	375.90	3.98	134.80	0.00	0.50
18.84	330.70	3.38	133.30	0.00	0.50
18.90	306.10	3.15	132.60	0.00	0.50
18.97	308.20	2.96	132.10	0.00	0.50
19.03	305.80	2.70	131.40	0.00	0.50
19.10	303.70	2.46	130.70	0.00	0.50
19.16	300.20	2.17	129.80	0.00	0.50
19.22	297.20	2.01	129.20	0.00	0.50
19.29	290.10	2.10	129.40	0.00	0.50
19.37	290.40	1.72	128.00	0.00	0.50
19.42	290.40	1.65	127.70	0.00	0.50
19.49	290.60	1.83	128.50	0.00	0.50
19.55	280.90	1.68	127.80	0.00	0.50
19.62	264.60	1.98	128.80	0.00	0.50
19.69	266.40	1.79	128.10	0.00	0.50
19.75	261.50	1.76	127.90	0.00	0.50
19.82	237.60	1.88	128.20	0.00	0.50
19.88	233.80	1.92	128.30	0.00	0.50
19.94	230.60	1.86	128.00	0.00	0.50
20.02	199.60	1.78	127.30	0.00	0.50
20.10	201.30	1.74	127.20	0.00	0.50
20.16	202.10	1.84	127.60	0.00	0.50
20.22	198.60	1.81	127.50	0.00	0.50
20.29	206.30	1.61	126.70	0.00	0.50
20.35	188.80	1.55	126.20	0.00	0.50
20.42	166.70	1.56	125.90	0.00	0.50
20.48	154.20	1.55	125.70	0.00	0.50
20.54	144.70	1.56	125.60	0.00	0.50
20.61	138.40	1.56	125.50	0.00	0.50
20.67	132.40	1.58	125.50	0.00	0.50
20.73	128.00	1.76	126.20	0.00	0.50
20.83	131.20	1.93	126.90	0.00	0.50
20.89	141.10	1.98	127.30	0.00	0.50
20.95	160.00	1.93	127.40	0.00	0.50
21.02	184.40	1.80	127.20	0.00	0.50
21.08	204.70	2.02	128.30	0.00	0.50
21.15	234.10	2.52	130.30	0.00	0.50
21.21	266.10	2.64	130.90	0.00	0.50

21.27	290.70	2.47	130.70	0.00	0.50
21.34	314.70	2.49	130.90	0.00	0.50
21.40	350.60	2.45	131.00	0.00	0.50
21.46	391.70	2.50	131.50	0.00	0.50
21.53	428.30	3.36	133.80	0.00	0.50
21.60	479.50	5.12	137.20	0.00	0.50
21.66	517.10	6.22	138.80	0.00	0.50
21.73	590.90	6.24	139.20	0.00	0.50
21.79	655.60	6.00	139.10	0.00	0.50
21.85	630.20	6.04	139.10	0.00	0.50
21.91	501.80	6.06	138.60	0.00	0.50
21.99	406.60	5.86	137.80	0.00	0.50
22.05	369.40	5.23	136.70	0.00	0.50
22.11	354.80	4.32	135.20	0.00	0.50
22.18	336.50	4.07	134.70	0.00	0.50
22.24	297.00	4.05	134.30	0.00	0.50
22.31	228.40	3.83	133.30	0.00	0.50
22.39	201.40	4.05	133.40	0.00	0.50
22.45	180.40	4.16	133.30	0.00	0.50
22.50	177.30	4.17	133.30	0.00	0.50
22.60	167.20	4.45	133.60	0.00	0.50
22.66	156.20	4.61	133.70	0.00	0.50
22.72	150.50	4.58	133.60	0.00	0.50
22.79	148.00	4.57	133.50	0.00	0.50
22.85	152.80	4.56	133.60	0.00	0.50
22.92	173.30	4.51	133.80	0.00	0.50
22.98	207.80	4.52	134.30	0.00	0.50
23.05	247.70	4.52	134.70	0.00	0.50
23.11	293.40	4.51	135.10	0.00	0.50
23.17	365.20	4.50	135.60	0.00	0.50
23.23	366.50	4.58	135.70	0.00	0.50
23.30	297.20	4.51	135.10	0.00	0.50
23.37	197.00	4.35	133.80	0.00	0.50
23.43	141.30	4.32	133.00	0.00	0.50
23.49	110.30	3.79	131.40	0.00	0.50
23.55	83.08	3.53	130.20	0.00	0.50
23.62	62.40	3.34	129.10	0.00	0.50
23.70	64.32	3.14	128.70	0.00	0.50
23.76	65.61	2.99	128.40	0.00	0.50
23.83	69.33	2.94	128.40	0.00	0.50
23.89	84.47	2.92	128.90	0.00	0.50
23.95	95.20	2.89	129.10	0.00	0.50
24.02	113.10	2.89	129.50	0.00	0.50
24.08	129.50	2.96	130.00	0.00	0.50
24.15	140.10	3.09	130.50	0.00	0.50
24.21	150.40	3.10	130.70	0.00	0.50
24.28	159.50	3.12	130.90	0.00	0.50
24.37	171.80	3.21	131.30	0.00	0.50
24.43	177.10	3.32	131.60	0.00	0.50
24.50	180.50	3.38	131.80	0.00	0.50
24.56	184.20	3.42	131.90	0.00	0.50
24.63	185.00	3.47	132.00	0.00	0.50
24.69	183.30	3.18	131.40	0.00	0.50
24.75	179.70	2.73	130.20	0.00	0.50
24.82	172.90	2.46	129.30	0.00	0.50
24.88	163.30	2.24	128.50	0.00	0.50
24.94	151.70	2.16	128.10	0.00	0.50
25.01	139.80	2.21	128.10	0.00	0.50
25.08	119.30	2.33	128.10	0.00	0.50
25.14	113.00	2.41	128.20	0.00	0.50
25.20	99.62	2.46	128.00	0.00	0.50
25.26	87.33	2.56	128.00	0.00	0.50
25.33	78.42	2.68	128.00	0.00	0.50

25.39	74.70	2.71	128.00	0.00	0.50
25.46	75.31	2.67	127.90	0.00	0.50
25.55	80.15	2.77	128.40	0.00	0.50
25.61	80.41	2.88	128.60	0.00	0.50
25.68	80.33	2.87	128.60	0.00	0.50
25.74	76.78	2.73	128.10	0.00	0.50
25.80	68.30	2.52	127.30	0.00	0.50
25.86	57.74	2.30	126.20	0.00	0.50
25.93	49.43	2.17	125.40	0.00	0.50
25.99	43.98	2.07	124.80	0.00	0.50
26.05	41.04	2.01	124.40	0.00	0.50
26.12	40.00	1.98	124.20	0.00	0.50
26.18	41.91	2.00	124.40	0.00	0.50
26.25	45.19	1.95	124.40	0.00	0.50
26.31	47.44	1.79	123.90	0.00	0.50
26.37	50.13	1.85	124.30	0.00	0.50
26.47	65.27	2.17	126.10	0.00	0.50
26.53	77.38	2.24	126.70	0.00	0.50
26.60	73.40	2.09	126.10	0.00	0.50
26.66	62.07	1.89	124.90	0.00	0.50
26.72	50.65	1.75	123.90	0.00	0.50
26.79	41.73	1.62	122.80	0.00	0.50
26.85	35.85	1.54	122.10	0.00	0.50
26.91	32.99	1.52	121.80	0.00	0.50
26.98	31.78	1.52	121.70	0.00	0.50
27.05	31.44	1.51	121.60	0.00	0.50
27.11	31.00	1.49	121.50	0.00	0.50
27.17	35.59	1.49	121.80	0.00	0.50
27.24	52.03	1.50	122.80	0.00	0.50
27.30	80.33	1.55	124.10	0.00	0.50
27.36	106.80	1.67	125.40	0.00	0.50
27.43	123.90	1.85	126.50	0.00	0.50
27.49	134.10	2.08	127.50	0.00	0.50
27.56	140.00	2.38	128.60	0.00	0.50
27.62	141.80	2.72	129.60	0.00	0.50
27.69	142.40	3.24	130.90	0.00	0.50
27.75	142.40	3.63	131.70	0.00	0.50
27.82	143.40	3.69	131.90	0.00	0.50
27.88	146.20	3.73	132.00	0.00	0.50
27.98	159.40	3.74	132.20	0.00	0.50
28.04	176.50	3.70	132.40	0.00	0.50
28.11	194.50	3.55	132.30	0.00	0.50
28.17	201.70	3.24	131.80	0.00	0.50
28.23	204.90	2.86	130.90	0.00	0.50
28.30	205.40	2.52	130.00	0.00	0.50
28.36	201.90	2.39	129.50	0.00	0.50
28.42	195.50	2.40	129.50	0.00	0.50
28.49	186.80	2.40	129.40	0.00	0.50
28.55	174.40	2.51	129.50	0.00	0.50
28.62	157.80	2.68	129.80	0.00	0.50
28.68	139.60	2.89	130.00	0.00	0.50
28.74	121.30	3.00	129.90	0.00	0.50
28.81	100.40	2.91	129.30	0.00	0.50
28.87	80.76	2.61	127.90	0.00	0.50
28.96	61.89	2.13	125.80	0.00	0.50
29.03	52.03	1.81	124.20	0.00	0.50
29.09	42.77	1.55	122.60	0.00	0.50
29.15	36.80	1.30	120.90	0.00	0.50
29.22	34.12	1.17	120.00	0.00	0.50
29.28	33.34	1.29	120.60	0.00	0.50
29.35	33.51	1.59	122.20	0.00	0.50
29.41	35.42	1.89	123.50	0.00	0.50
29.47	40.87	2.13	124.80	0.00	0.50

29.53	55.66	2.35	126.20	0.00	0.50
29.60	65.36	2.50	127.10	0.00	0.50
29.65	68.11	2.48	127.10	0.00	0.50
29.75	66.47	2.47	127.10	0.00	0.50
29.81	64.13	2.46	126.90	0.00	0.50
29.88	61.02	2.53	127.00	0.00	0.50
29.94	60.93	2.68	127.50	0.00	0.50
30.00	69.15	2.83	128.20	0.00	0.50
30.07	93.63	2.99	129.30	0.00	0.50
30.14	96.92	3.09	129.60	0.00	0.50
30.20	99.95	3.20	129.90	0.00	0.50
30.27	104.50	3.26	130.20	0.00	0.50
30.33	113.50	3.20	130.30	0.00	0.50
30.39	129.10	3.11	130.40	0.00	0.50
30.46	147.40	2.98	130.40	0.00	0.50
30.52	159.30	2.85	130.20	0.00	0.50
30.58	164.60	2.79	130.20	0.00	0.50
30.65	162.70	2.87	130.30	0.00	0.50
30.71	155.50	3.13	130.90	0.00	0.50
30.77	144.60	3.55	131.60	0.00	0.50
30.84	129.20	3.85	131.90	0.00	0.50
30.91	113.80	3.86	131.60	0.00	0.50
30.97	101.50	3.79	131.20	0.00	0.50
31.04	92.60	3.54	130.50	0.00	0.50
31.10	92.90	3.21	129.80	0.00	0.50
31.17	93.20	2.96	129.20	0.00	0.50
31.23	120.80	2.81	129.50	0.00	0.50
31.32	168.70	2.69	129.90	0.00	0.50
31.39	188.10	2.49	129.70	0.00	0.50
31.45	197.90	2.25	129.00	0.00	0.50
31.51	203.00	1.99	128.20	0.00	0.50
31.58	205.40	1.85	127.70	0.00	0.50
31.64	203.40	1.85	127.70	0.00	0.50
31.71	198.90	1.95	128.00	0.00	0.50
31.78	191.80	2.16	128.70	0.00	0.50
31.84	182.50	2.53	129.70	0.00	0.50
31.90	169.60	3.01	130.80	0.00	0.50
31.96	150.60	3.38	131.30	0.00	0.50
32.03	129.60	3.48	131.20	0.00	0.50
32.09	111.20	3.51	130.90	0.00	0.50
32.15	98.92	3.56	130.70	0.00	0.50
32.22	97.36	3.55	130.60	0.00	0.50
32.28	106.10	3.43	130.60	0.00	0.50
32.35	129.40	4.17	132.50	0.00	0.50
32.41	147.10	3.79	132.10	0.00	0.50
32.51	170.80	0.77	120.80	0.00	0.50
32.54	192.80	1.66	126.80	0.00	0.50
32.64	271.10	0.00	127.00	0.00	0.50
32.70	448.50	0.00	127.00	0.00	0.50
32.74	558.10	0.00	127.00	0.00	0.50
32.81	878.40	0.00	127.00	0.00	0.50
32.87	352.30	0.00	127.00	0.00	0.50
32.94	1047.00	0.00	127.00	0.00	0.50

Modify Robertson method generates Fines from qc/fs. Inputted Fines are not relevant.

Output Results:

Settlement of Saturated Sands=0.26 in.
Settlement of Unsaturated Sands=2.79 in.
Total Settlement of Saturated and Unsaturated Sands=3.05 in.
Differential Settlement=1.523 to 2.011 in.

CPT-3.sum

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
0.00	2.00	0.77	5.00	0.26	2.79	3.05
1.00	2.23	0.77	5.00	0.26	2.78	3.05
2.00	0.57	0.77	5.00	0.26	2.77	3.04
3.00	0.32	0.77	5.00	0.26	2.63	2.89
4.00	0.26	0.77	5.00	0.26	2.46	2.72
5.00	0.55	0.77	5.00	0.26	2.30	2.56
6.00	0.28	0.76	5.00	0.26	2.11	2.37
7.00	0.13	0.76	5.00	0.26	1.87	2.13
8.00	0.13	0.76	5.00	0.26	1.70	1.96
9.00	0.48	0.76	5.00	0.26	1.43	1.69
10.00	0.24	0.76	5.00	0.26	1.30	1.56
11.00	0.16	0.75	5.00	0.26	1.07	1.33
12.00	0.16	0.75	5.00	0.26	0.82	1.08
13.00	0.18	0.75	5.00	0.26	0.58	0.84
14.00	1.91	0.75	5.00	0.26	0.40	0.66
15.00	2.57	0.75	5.00	0.26	0.33	0.60
16.00	2.57	0.75	5.00	0.26	0.27	0.53
17.00	2.57	0.74	5.00	0.26	0.20	0.46
18.00	2.57	0.74	5.00	0.26	0.13	0.39
19.00	2.57	0.74	5.00	0.26	0.06	0.32
20.00	0.92	0.74	5.00	0.26	0.00	0.27
21.00	0.67	0.75	0.89*	0.20	0.00	0.20
22.00	2.57	0.77	3.34	0.19	0.00	0.19
23.00	1.44	0.79	1.83	0.19	0.00	0.19
24.00	0.51	0.80	0.64*	0.19	0.00	0.19
25.00	0.46	0.81	0.56*	0.18	0.00	0.18
26.00	2.00	0.83	5.00	0.16	0.00	0.16
27.00	2.00	0.84	5.00	0.15	0.00	0.15
28.00	0.71	0.85	0.84*	0.11	0.00	0.11
29.00	2.00	0.86	5.00	0.08	0.00	0.08
30.00	2.00	0.87	5.00	0.08	0.00	0.08
31.00	0.73	0.87	0.84*	0.07	0.00	0.07
32.00	0.55	0.87	0.63*	0.02	0.00	0.02

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Depth = ft, Stress or Pressure = atm (tsf), Unit Weight = pcf, Settlement = in.

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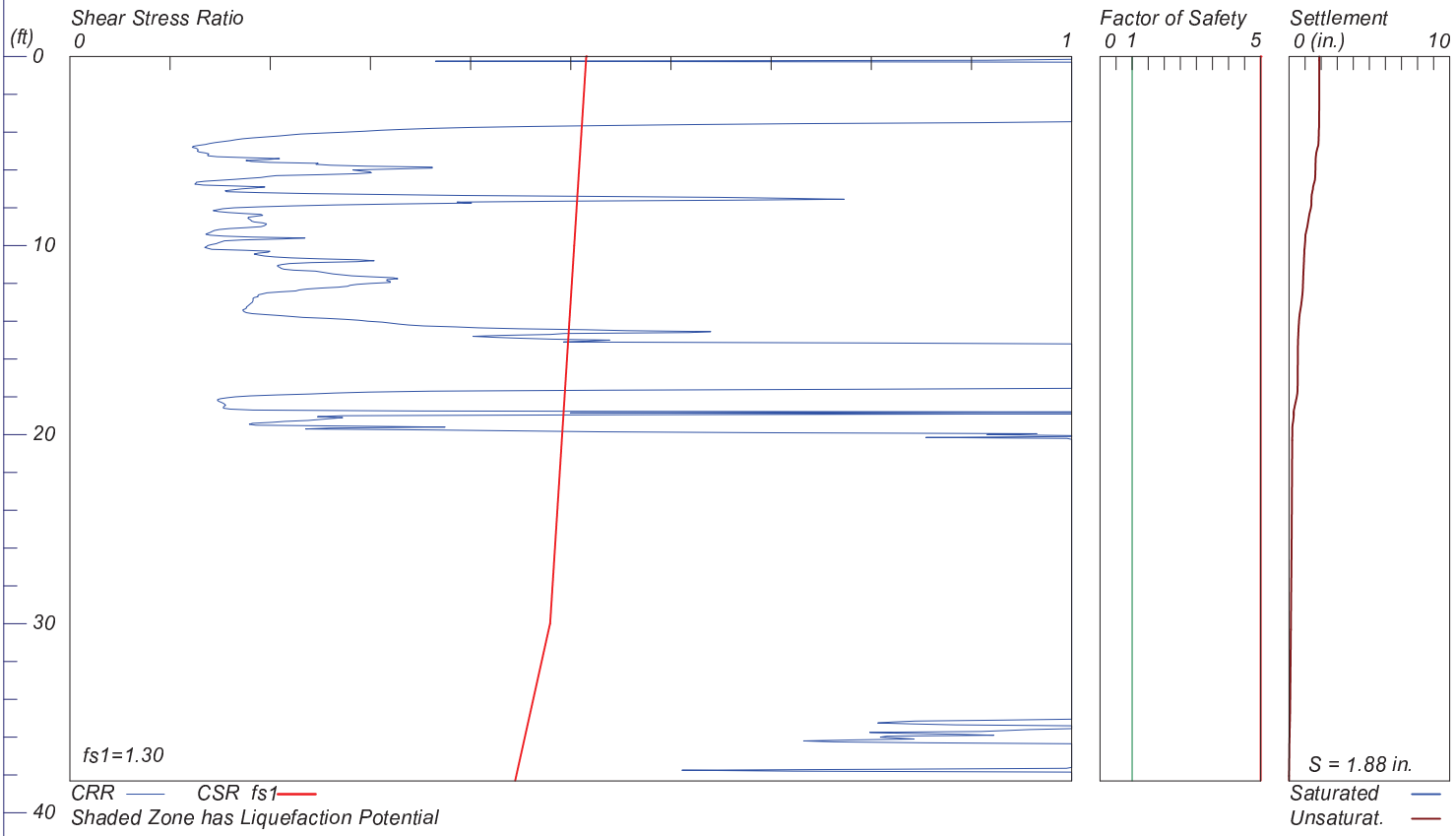
1 atm (atmosphere) = 1 tsf (ton/ft2)
CRRm Cyclic resistance ratio from soils
CSRsf Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S. Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat Settlement from saturated sands
S_dry Settlement from Unsaturated Sands
S_all Total Settlement from Saturated and Unsaturated Sands
NoLiq No-Liquefy Soils

LIQUEFACTION ANALYSIS

CPT-1B

Hole No.=CPT-1 Water Depth=100 ft

Magnitude=6.9
Acceleration=.61g



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LIQUEFACTION ANALYSIS SUMMARY

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Input File Name: G:\Projects\200000 - Irvine\208450 - 208499\208465\208465002\Electronic Project File\Data Analysis & Calculations\Liquefaction\CPT 11-21-18\CPT-1B_DRY.liq
Title: CPT-1B
Subtitle: 208465002

Surface Elev.=
Hole No.=CPT-1
Depth of Hole= 38.32 ft
Water Table during Earthquake= 100.00 ft
Water Table during In-Situ Testing= 28.00 ft
Max. Acceleration= 0.61 g
Earthquake Magnitude= 6.90

Input Data:
Surface Elev.=
Hole No.=CPT-1
Depth of Hole=38.32 ft
Water Table during Earthquake= 100.00 ft
Water Table during In-Situ Testing= 28.00 ft
Max. Acceleration=0.61 g
Earthquake Magnitude=6.90

1. CPT Calculation Method: Modify Robertson*
2. Settlement Analysis Method: Tokimatsu/Seed
3. Fines Correction for Liquefaction: Stark/Olson et al.*
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1
8. Sampling Method, Cs= 1
9. User request factor of safety (apply to CSR) , User= 1.3
   Plot one CSR curve (fs1=User)
10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	qc atm	fs atm	gamma pcf	Fines %	D50 mm
0.00	-0.09	0.02	94.00	0.00	0.50
0.08	-0.08	0.08	94.00	0.00	0.50
0.15	0.00	0.09	94.00	0.00	0.50
0.21	2.51	0.08	94.04	0.00	0.50
0.28	23.09	0.09	100.70	0.00	0.50
0.35	43.67	0.13	104.60	0.00	0.50
0.40	51.97	0.14	105.40	0.00	0.50
0.49	61.91	0.17	107.10	0.00	0.50
0.55	70.04	0.21	109.20	0.00	0.50

0.62	81.71	0.24	110.40	0.00	0.50
0.66	87.59	0.26	111.30	0.00	0.50
0.72	98.40	0.29	112.50	0.00	0.50
0.82	113.10	0.47	116.10	0.00	0.50
0.88	122.70	0.59	118.10	0.00	0.50
0.95	137.90	0.71	119.80	0.00	0.50
1.02	153.30	0.79	120.80	0.00	0.50
1.08	168.60	0.78	120.90	0.00	0.50
1.12	175.00	0.78	121.00	0.00	0.50
1.18	189.10	0.81	121.40	0.00	0.50
1.25	204.40	0.89	122.30	0.00	0.50
1.32	217.10	0.91	122.70	0.00	0.50
1.38	219.20	0.97	123.20	0.00	0.50
1.45	227.70	1.20	124.80	0.00	0.50
1.51	236.80	1.34	125.70	0.00	0.50
1.58	241.90	1.24	125.10	0.00	0.50
1.65	249.40	0.94	123.30	0.00	0.50
1.72	253.10	1.33	125.80	0.00	0.50
1.79	249.50	1.77	127.80	0.00	0.50
1.86	243.40	1.87	128.20	0.00	0.50
1.92	234.70	1.88	128.10	0.00	0.50
1.99	222.60	1.80	127.70	0.00	0.50
2.06	219.80	1.68	127.10	0.00	0.50
2.12	209.40	1.60	126.70	0.00	0.50
2.19	203.10	1.53	126.30	0.00	0.50
2.25	198.70	1.32	125.10	0.00	0.50
2.32	191.80	0.94	122.50	0.00	0.50
2.38	189.50	0.97	122.70	0.00	0.50
2.45	185.70	1.01	123.00	0.00	0.50
2.52	183.20	1.01	123.00	0.00	0.50
2.59	182.60	1.21	124.30	0.00	0.50
2.65	183.60	1.39	125.30	0.00	0.50
2.72	179.30	1.42	125.40	0.00	0.50
2.76	172.40	1.39	125.20	0.00	0.50
2.82	159.70	1.28	124.40	0.00	0.50
2.89	154.80	1.26	124.20	0.00	0.50
2.96	148.90	1.35	124.60	0.00	0.50
3.02	137.40	1.27	124.00	0.00	0.50
3.09	131.30	1.10	122.80	0.00	0.50
3.16	133.10	1.08	122.70	0.00	0.50
3.22	129.70	1.21	123.40	0.00	0.50
3.28	110.60	1.02	121.80	0.00	0.50
3.35	102.20	0.92	120.90	0.00	0.50
3.43	93.98	0.85	120.10	0.00	0.50
3.50	87.75	0.65	118.00	0.00	0.50
3.57	79.19	0.50	115.80	0.00	0.50
3.63	74.18	0.49	115.40	0.00	0.50
3.70	67.78	0.44	114.40	0.00	0.50
3.77	63.28	0.36	112.80	0.00	0.50
3.84	60.08	0.33	112.00	0.00	0.50
3.90	57.66	0.30	111.30	0.00	0.50
3.97	55.50	0.30	111.10	0.00	0.50
4.03	53.08	0.26	110.10	0.00	0.50
4.10	50.14	0.22	108.50	0.00	0.50
4.17	46.94	0.23	109.00	0.00	0.50
4.20	45.38	0.24	109.20	0.00	0.50
4.27	41.93	0.24	109.00	0.00	0.50
4.33	38.38	0.22	108.20	0.00	0.50
4.43	34.76	0.22	107.90	0.00	0.50
4.46	33.97	0.22	107.80	0.00	0.50
4.53	30.44	0.21	107.10	0.00	0.50
4.60	26.97	0.20	106.50	0.00	0.50
4.67	25.68	0.18	105.60	0.00	0.50

4.73	25.25	0.10	101.40	0.00	0.50
4.80	23.86	0.11	101.90	0.00	0.50
4.87	25.29	0.14	103.80	0.00	0.50
4.94	24.21	0.16	104.70	0.00	0.50
5.01	25.33	0.14	103.90	0.00	0.50
5.07	20.58	0.20	106.00	0.00	0.50
5.13	22.91	0.25	107.60	0.00	0.50
5.19	22.56	0.24	107.30	0.00	0.50
5.28	22.82	0.24	107.40	0.00	0.50
5.34	22.47	0.36	110.40	0.00	0.50
5.39	24.81	0.50	113.00	0.00	0.50
5.45	26.80	0.49	113.00	0.00	0.50
5.52	29.23	0.40	111.70	0.00	0.50
5.60	32.60	0.53	114.00	0.00	0.50
5.66	27.67	0.68	115.40	0.00	0.50
5.73	38.56	0.70	116.50	0.00	0.50
5.79	45.22	0.81	117.90	0.00	0.50
5.85	53.87	0.97	119.70	0.00	0.50
5.91	53.78	0.98	119.80	0.00	0.50
6.00	54.73	0.66	116.90	0.00	0.50
6.06	55.17	0.70	117.40	0.00	0.50
6.13	57.76	0.72	117.70	0.00	0.50
6.19	55.08	0.72	117.60	0.00	0.50
6.26	48.42	0.64	116.40	0.00	0.50
6.32	30.78	0.55	114.20	0.00	0.50
6.38	25.85	0.50	113.00	0.00	0.50
6.44	25.85	0.45	112.30	0.00	0.50
6.50	26.62	0.40	111.50	0.00	0.50
6.57	25.32	0.31	109.50	0.00	0.50
6.63	25.08	0.19	106.00	0.00	0.50
6.69	25.42	0.19	105.80	0.00	0.50
6.78	24.38	0.18	105.50	0.00	0.50
6.85	25.51	0.40	111.30	0.00	0.50
6.91	25.42	0.50	113.10	0.00	0.50
6.97	26.98	0.46	112.60	0.00	0.50
7.03	30.00	0.43	112.30	0.00	0.50
7.10	30.87	0.37	111.40	0.00	0.50
7.16	40.64	0.30	110.50	0.00	0.50
7.22	62.51	0.27	110.70	0.00	0.50
7.32	83.27	0.20	109.40	0.00	0.50
7.35	89.41	0.38	114.20	0.00	0.50
7.42	97.88	1.07	121.90	0.00	0.50
7.49	102.90	1.24	123.10	0.00	0.50
7.55	111.60	1.19	123.00	0.00	0.50
7.62	95.46	1.25	122.90	0.00	0.50
7.69	59.92	1.27	121.90	0.00	0.50
7.75	38.56	1.17	120.30	0.00	0.50
7.82	43.32	1.00	119.40	0.00	0.50
7.89	45.83	0.75	117.40	0.00	0.50
7.96	43.06	0.52	114.50	0.00	0.50
8.02	41.07	0.33	111.20	0.00	0.50
8.09	40.98	0.28	109.80	0.00	0.50
8.15	40.73	0.23	108.40	0.00	0.50
8.22	41.07	0.29	110.20	0.00	0.50
8.28	40.47	0.43	113.10	0.00	0.50
8.35	41.16	0.58	115.30	0.00	0.50
8.42	37.79	0.61	115.40	0.00	0.50
8.48	36.49	0.54	114.50	0.00	0.50
8.54	35.02	0.53	114.30	0.00	0.50
8.60	36.32	0.54	114.50	0.00	0.50
8.66	34.50	0.55	114.50	0.00	0.50
8.76	41.59	0.56	115.10	0.00	0.50
8.82	47.21	0.59	115.70	0.00	0.50

8.88	45.13	0.62	116.00	0.00	0.50
8.94	40.81	0.63	115.90	0.00	0.50
9.00	42.20	0.61	115.70	0.00	0.50
9.06	38.39	0.52	114.40	0.00	0.50
9.12	36.32	0.40	112.20	0.00	0.50
9.21	34.67	0.34	111.00	0.00	0.50
9.27	34.67	0.33	110.70	0.00	0.50
9.34	34.67	0.31	110.20	0.00	0.50
9.40	35.54	0.27	109.40	0.00	0.50
9.46	37.09	0.31	110.40	0.00	0.50
9.52	39.95	0.44	113.20	0.00	0.50
9.61	39.39	0.85	118.00	0.00	0.50
9.66	39.39	0.69	116.50	0.00	0.50
9.73	38.82	0.43	112.90	0.00	0.50
9.79	41.42	0.38	112.20	0.00	0.50
9.84	42.63	0.34	111.40	0.00	0.50
9.94	39.60	0.33	111.20	0.00	0.50
9.98	29.48	0.33	110.40	0.00	0.50
10.05	33.03	0.31	110.30	0.00	0.50
10.10	35.02	0.29	109.70	0.00	0.50
10.20	36.06	0.35	111.20	0.00	0.50
10.25	35.80	0.56	114.70	0.00	0.50
10.31	36.57	0.70	116.40	0.00	0.50
10.37	36.83	0.66	116.00	0.00	0.50
10.43	38.91	0.62	115.60	0.00	0.50
10.52	44.62	0.66	116.40	0.00	0.50
10.58	51.88	0.66	116.80	0.00	0.50
10.64	59.92	0.67	117.30	0.00	0.50
10.70	72.37	0.67	117.70	0.00	0.50
10.76	88.71	0.57	117.10	0.00	0.50
10.83	90.70	0.60	117.50	0.00	0.50
10.92	64.68	0.69	117.70	0.00	0.50
10.98	54.82	0.75	117.90	0.00	0.50
11.04	56.03	0.70	117.40	0.00	0.50
11.10	58.62	0.67	117.20	0.00	0.50
11.17	60.35	0.67	117.20	0.00	0.50
11.23	60.87	0.67	117.30	0.00	0.50
11.29	61.82	0.71	117.80	0.00	0.50
11.35	67.53	0.80	118.90	0.00	0.50
11.42	71.33	0.80	118.90	0.00	0.50
11.50	75.74	0.77	118.90	0.00	0.50
11.56	81.88	0.71	118.50	0.00	0.50
11.62	87.85	0.64	117.90	0.00	0.50
11.69	92.60	0.76	119.30	0.00	0.50
11.75	87.58	0.94	120.70	0.00	0.50
11.82	81.87	1.00	120.90	0.00	0.50
11.88	82.06	1.05	121.30	0.00	0.50
11.95	84.91	0.99	121.00	0.00	0.50
12.01	81.28	0.93	120.40	0.00	0.50
12.08	76.44	0.94	120.30	0.00	0.50
12.14	76.61	0.94	120.30	0.00	0.50
12.20	72.54	0.95	120.30	0.00	0.50
12.27	69.95	0.83	119.20	0.00	0.50
12.33	70.73	0.72	118.20	0.00	0.50
12.40	70.90	0.69	117.90	0.00	0.50
12.49	67.62	0.53	115.80	0.00	0.50
12.56	65.88	0.52	115.60	0.00	0.50
12.62	64.68	0.50	115.30	0.00	0.50
12.69	65.76	0.50	115.30	0.00	0.50
12.75	65.63	0.46	114.70	0.00	0.50
12.81	66.92	0.42	114.20	0.00	0.50
12.87	67.96	0.41	114.00	0.00	0.50
12.93	67.96	0.41	114.00	0.00	0.50

13.00	68.05	0.41	114.00	0.00	0.50
13.06	67.96	0.40	113.80	0.00	0.50
13.14	67.96	0.39	113.60	0.00	0.50
13.21	67.96	0.38	113.40	0.00	0.50
13.27	67.44	0.38	113.40	0.00	0.50
13.32	67.96	0.38	113.40	0.00	0.50
13.41	66.66	0.36	113.10	0.00	0.50
13.47	67.96	0.35	112.90	0.00	0.50
13.53	68.22	0.37	113.20	0.00	0.50
13.59	69.78	0.39	113.60	0.00	0.50
13.67	75.40	0.48	115.30	0.00	0.50
13.73	80.24	0.53	116.30	0.00	0.50
13.79	83.95	0.54	116.50	0.00	0.50
13.84	91.64	0.56	116.90	0.00	0.50
13.93	100.20	0.59	117.60	0.00	0.50
13.99	100.90	0.65	118.30	0.00	0.50
14.05	103.80	0.70	119.00	0.00	0.50
14.11	107.10	0.68	118.80	0.00	0.50
14.18	111.40	0.64	118.50	0.00	0.50
14.24	116.60	0.59	118.00	0.00	0.50
14.31	124.00	0.62	118.50	0.00	0.50
14.38	123.40	0.90	121.20	0.00	0.50
14.46	138.80	1.00	122.20	0.00	0.50
14.52	146.90	0.94	121.90	0.00	0.50
14.58	160.00	0.88	121.70	0.00	0.50
14.63	139.20	0.83	120.90	0.00	0.50
14.71	137.00	0.63	118.90	0.00	0.50
14.77	128.40	0.58	118.00	0.00	0.50
14.83	127.00	0.79	120.30	0.00	0.50
14.90	123.90	1.13	122.90	0.00	0.50
14.96	125.90	1.32	124.00	0.00	0.50
15.03	132.70	1.60	125.60	0.00	0.50
15.09	90.61	1.97	126.20	0.00	0.50
15.18	167.40	2.55	129.50	0.00	0.50
15.23	204.90	3.04	131.30	0.00	0.50
15.29	243.30	3.37	132.50	0.00	0.50
15.36	268.50	2.90	131.60	0.00	0.50
15.42	274.70	2.89	131.70	0.00	0.50
15.49	276.50	2.90	131.70	0.00	0.50
15.56	299.70	2.38	130.50	0.00	0.50
15.62	313.90	2.23	130.10	0.00	0.50
15.70	307.10	1.94	129.00	0.00	0.50
15.75	311.20	1.80	128.50	0.00	0.50
15.82	310.90	2.39	130.60	0.00	0.50
15.88	316.00	3.85	134.10	0.00	0.50
15.94	316.90	5.51	136.70	0.00	0.50
16.01	333.30	5.79	137.20	0.00	0.50
16.08	354.30	5.84	137.40	0.00	0.50
16.15	396.40	5.57	137.40	0.00	0.50
16.21	472.70	4.95	136.90	0.00	0.50
16.27	447.30	4.36	135.90	0.00	0.50
16.34	542.80	4.23	136.10	0.00	0.50
16.40	506.20	4.07	135.70	0.00	0.50
16.47	415.60	5.27	137.10	0.00	0.50
16.53	504.00	7.31	139.90	0.00	0.50
16.60	451.20	7.95	140.30	0.00	0.50
16.67	501.70	7.93	140.50	0.00	0.50
16.73	619.00	7.53	140.70	0.00	0.50
16.80	732.30	10.01	143.10	0.00	0.50
16.86	372.60	9.37	141.00	0.00	0.50
16.93	323.80	8.14	139.60	0.00	0.50
17.00	430.40	7.21	139.50	0.00	0.50
17.06	329.80	6.68	138.20	0.00	0.50

17.13	224.70	6.70	137.30	0.00	0.50
17.19	190.30	6.67	136.90	0.00	0.50
17.26	179.80	4.06	133.10	0.00	0.50
17.32	184.10	2.95	130.80	0.00	0.50
17.40	197.50	2.37	129.40	0.00	0.50
17.46	199.10	2.36	129.40	0.00	0.50
17.54	194.70	2.38	129.40	0.00	0.50
17.59	169.50	2.36	129.00	0.00	0.50
17.65	110.80	2.39	128.10	0.00	0.50
17.71	81.88	1.67	124.70	0.00	0.50
17.78	71.77	1.39	123.00	0.00	0.50
17.85	69.86	1.18	121.80	0.00	0.50
17.94	64.76	0.76	118.40	0.00	0.50
18.00	60.01	0.63	116.80	0.00	0.50
18.07	53.34	0.57	115.80	0.00	0.50
18.12	51.52	0.52	115.00	0.00	0.50
18.18	51.48	0.51	114.90	0.00	0.50
18.24	51.48	0.53	115.20	0.00	0.50
18.32	51.44	0.57	115.70	0.00	0.50
18.38	52.73	0.59	116.00	0.00	0.50
18.46	53.77	0.60	116.10	0.00	0.50
18.51	49.19	0.60	115.90	0.00	0.50
18.57	45.38	0.59	115.70	0.00	0.50
18.63	43.22	0.59	115.60	0.00	0.50
18.70	40.28	0.73	116.90	0.00	0.50
18.79	37.27	1.27	120.80	0.00	0.50
18.85	40.12	1.22	120.70	0.00	0.50
18.92	35.88	1.12	119.70	0.00	0.50
18.98	39.95	1.17	120.40	0.00	0.50
19.03	61.91	1.20	121.60	0.00	0.50
19.09	61.00	1.39	122.70	0.00	0.50
19.16	61.00	1.32	122.30	0.00	0.50
19.25	60.09	1.21	121.60	0.00	0.50
19.32	75.05	0.97	120.50	0.00	0.50
19.38	69.95	0.86	119.50	0.00	0.50
19.44	45.06	0.78	117.70	0.00	0.50
19.49	43.50	0.72	117.00	0.00	0.50
19.55	45.32	1.13	120.40	0.00	0.50
19.62	46.18	1.38	121.90	0.00	0.50
19.68	53.19	0.95	119.50	0.00	0.50
19.75	62.95	1.73	124.30	0.00	0.50
19.84	91.22	2.67	128.40	0.00	0.50
19.91	160.30	2.67	129.80	0.00	0.50
19.94	189.20	2.77	130.50	0.00	0.50
20.02	171.00	3.06	130.90	0.00	0.50
20.08	218.20	2.85	131.00	0.00	0.50
20.14	176.70	2.56	129.70	0.00	0.50
20.21	204.00	2.51	129.90	0.00	0.50
20.29	229.40	2.09	128.90	0.00	0.50
20.35	254.00	1.69	127.60	0.00	0.50
20.40	273.10	1.53	127.00	0.00	0.50
20.48	298.80	1.50	127.10	0.00	0.50
20.54	313.00	1.52	127.30	0.00	0.50
20.60	336.50	1.48	127.30	0.00	0.50
20.67	337.00	1.40	126.90	0.00	0.50
20.74	344.50	1.33	126.50	0.00	0.50
20.81	344.40	1.39	126.90	0.00	0.50
20.86	357.00	1.64	128.20	0.00	0.50
20.93	337.60	3.38	133.30	0.00	0.50
21.02	342.50	5.53	136.90	0.00	0.50
21.08	334.60	5.45	136.80	0.00	0.50
21.14	334.40	5.26	136.50	0.00	0.50
21.21	332.70	5.20	136.40	0.00	0.50

21.27	370.50	5.21	136.70	0.00	0.50
21.33	417.40	5.22	137.00	0.00	0.50
21.39	428.50	4.74	136.40	0.00	0.50
21.45	469.40	4.63	136.40	0.00	0.50
21.53	343.80	4.89	136.10	0.00	0.50
21.59	235.80	4.85	135.10	0.00	0.50
21.65	329.80	5.76	137.20	0.00	0.50
21.71	310.20	6.58	138.00	0.00	0.50
21.78	285.10	6.59	137.80	0.00	0.50
21.85	362.00	6.28	138.00	0.00	0.50
21.92	461.70	6.93	139.30	0.00	0.50
21.99	551.30	9.42	142.00	0.00	0.50
22.04	568.90	9.40	142.10	0.00	0.50
22.11	581.70	9.29	142.00	0.00	0.50
22.18	573.80	9.55	142.20	0.00	0.50
22.25	619.30	9.73	142.50	0.00	0.50
22.31	598.10	9.96	142.60	0.00	0.50
22.37	616.30	10.17	142.80	0.00	0.50
22.45	613.30	8.95	141.90	0.00	0.50
22.51	654.90	7.01	140.30	0.00	0.50
22.57	705.30	6.72	140.10	0.00	0.50
22.64	733.70	6.38	139.90	0.00	0.50
22.70	801.20	6.34	140.00	0.00	0.50
22.77	814.60	6.07	139.70	0.00	0.50
22.83	593.20	5.83	138.70	0.00	0.50
22.90	573.20	5.78	138.50	0.00	0.50
22.97	557.50	6.12	138.90	0.00	0.50
23.03	558.30	6.59	139.40	0.00	0.50
23.10	553.10	5.44	138.00	0.00	0.50
23.16	530.90	4.27	136.10	0.00	0.50
23.23	542.00	4.29	136.20	0.00	0.50
23.31	546.70	4.57	136.70	0.00	0.50
23.36	545.50	4.50	136.60	0.00	0.50
23.43	532.30	3.78	135.20	0.00	0.50
23.49	501.00	2.69	132.60	0.00	0.50
23.56	531.70	1.35	127.70	0.00	0.50
23.62	506.60	1.78	129.60	0.00	0.50
23.69	531.10	2.12	131.00	0.00	0.50
23.76	562.90	2.18	131.40	0.00	0.50
23.82	518.40	2.44	132.00	0.00	0.50
23.89	526.00	2.86	133.20	0.00	0.50
23.95	520.30	3.12	133.80	0.00	0.50
24.02	498.60	3.21	133.90	0.00	0.50
24.09	494.70	3.17	133.80	0.00	0.50
24.15	503.00	3.16	133.80	0.00	0.50
24.21	501.70	3.14	133.80	0.00	0.50
24.28	517.40	3.35	134.30	0.00	0.50
24.35	560.50	4.00	135.80	0.00	0.50
24.41	573.20	4.40	136.50	0.00	0.50
24.48	560.20	4.49	136.60	0.00	0.50
24.54	545.60	4.52	136.60	0.00	0.50
24.61	526.20	4.43	136.40	0.00	0.50
24.68	509.20	4.10	135.70	0.00	0.50
24.74	501.90	3.77	135.10	0.00	0.50
24.80	516.40	3.41	134.40	0.00	0.50
24.87	534.20	3.25	134.20	0.00	0.50
24.93	540.70	3.15	133.90	0.00	0.50
25.00	560.20	2.91	133.50	0.00	0.50
25.06	570.40	2.91	133.50	0.00	0.50
25.15	561.70	4.57	136.80	0.00	0.50
25.20	570.60	5.85	138.60	0.00	0.50
25.26	563.10	6.14	138.90	0.00	0.50
25.33	570.80	5.95	138.70	0.00	0.50

25.39	575.40	6.20	139.10	0.00	0.50
25.46	603.50	6.12	139.10	0.00	0.50
25.53	539.20	6.17	138.90	0.00	0.50
25.59	517.30	6.03	138.60	0.00	0.50
25.66	516.90	5.85	138.40	0.00	0.50
25.73	503.10	5.49	137.80	0.00	0.50
25.78	482.40	4.89	136.90	0.00	0.50
25.85	478.10	4.54	136.30	0.00	0.50
25.91	459.50	4.38	136.00	0.00	0.50
25.99	460.90	4.33	135.90	0.00	0.50
26.06	433.50	3.97	135.10	0.00	0.50
26.12	433.40	3.74	134.70	0.00	0.50
26.18	433.20	3.72	134.60	0.00	0.50
26.27	444.50	3.55	134.30	0.00	0.50
26.32	440.20	3.44	134.10	0.00	0.50
26.38	461.20	3.70	134.70	0.00	0.50
26.44	475.30	3.56	134.50	0.00	0.50
26.52	479.80	2.07	130.60	0.00	0.50
26.57	501.70	0.94	124.90	0.00	0.50
26.66	544.50	1.00	125.60	0.00	0.50
26.72	565.30	1.19	127.00	0.00	0.50
26.77	564.20	1.53	128.80	0.00	0.50
26.83	632.90	2.13	131.50	0.00	0.50
26.90	620.00	2.72	133.20	0.00	0.50
26.97	586.60	3.03	133.90	0.00	0.50
27.04	551.00	3.16	134.00	0.00	0.50
27.10	488.10	3.25	133.90	0.00	0.50
27.17	445.70	3.17	133.50	0.00	0.50
27.24	416.80	3.05	133.10	0.00	0.50
27.32	388.40	2.74	132.10	0.00	0.50
27.39	353.80	2.60	131.50	0.00	0.50
27.45	336.50	2.56	131.30	0.00	0.50
27.52	355.30	2.55	131.40	0.00	0.50
27.59	347.20	2.54	131.30	0.00	0.50
27.62	356.70	2.51	131.30	0.00	0.50
27.69	372.30	2.50	131.30	0.00	0.50
27.76	382.50	2.62	131.80	0.00	0.50
27.83	377.80	2.68	131.90	0.00	0.50
27.89	382.40	2.72	132.00	0.00	0.50
27.96	377.10	2.47	131.30	0.00	0.50
28.02	382.30	2.42	131.20	0.00	0.50
28.09	369.60	2.57	131.50	0.00	0.50
28.16	395.20	2.30	130.90	0.00	0.50
28.23	405.70	1.46	127.60	0.00	0.50
28.28	420.10	1.05	125.30	0.00	0.50
28.34	435.90	0.99	125.00	0.00	0.50
28.42	449.10	1.60	128.60	0.00	0.50
28.48	466.70	1.84	129.70	0.00	0.50
28.54	445.00	1.81	129.40	0.00	0.50
28.61	440.90	2.76	132.50	0.00	0.50
28.68	497.80	3.79	135.10	0.00	0.50
28.75	549.90	5.03	137.40	0.00	0.50
28.80	559.30	6.40	139.20	0.00	0.50
28.87	577.90	6.46	139.40	0.00	0.50
28.93	579.20	5.98	138.80	0.00	0.50
29.00	526.10	5.72	138.20	0.00	0.50
29.07	555.20	5.92	138.60	0.00	0.50
29.13	592.90	5.60	138.40	0.00	0.50
29.20	617.50	5.49	138.30	0.00	0.50
29.27	596.50	6.09	139.00	0.00	0.50
29.33	574.20	6.47	139.40	0.00	0.50
29.39	566.40	6.48	139.30	0.00	0.50
29.47	523.60	6.48	139.10	0.00	0.50

29.53	535.30	6.25	138.90	0.00	0.50
29.60	509.40	5.91	138.40	0.00	0.50
29.66	490.90	6.54	139.10	0.00	0.50
29.73	479.50	6.93	139.40	0.00	0.50
29.80	492.10	5.14	137.30	0.00	0.50
29.86	493.30	4.38	136.10	0.00	0.50
29.93	527.70	4.25	136.10	0.00	0.50
30.00	590.20	4.71	137.10	0.00	0.50
30.06	611.10	5.78	138.70	0.00	0.50
30.11	638.10	6.54	139.70	0.00	0.50
30.19	556.60	7.11	140.00	0.00	0.50
30.25	559.10	7.72	140.60	0.00	0.50
30.31	491.40	8.41	140.90	0.00	0.50
30.38	473.40	6.99	139.50	0.00	0.50
30.45	485.60	4.25	135.90	0.00	0.50
30.52	487.70	4.45	136.20	0.00	0.50
30.57	499.20	4.54	136.40	0.00	0.50
30.65	531.10	4.29	136.20	0.00	0.50
30.71	556.80	3.65	135.10	0.00	0.50
30.77	601.40	3.95	135.90	0.00	0.50
30.84	630.10	4.96	137.60	0.00	0.50
30.91	666.30	5.48	138.50	0.00	0.50
30.97	579.70	5.48	138.20	0.00	0.50
31.04	560.80	5.61	138.30	0.00	0.50
31.11	588.90	5.98	138.80	0.00	0.50
31.17	562.50	5.94	138.70	0.00	0.50
31.23	509.50	5.28	137.60	0.00	0.50
31.30	522.40	4.98	137.20	0.00	0.50
31.37	522.80	4.70	136.80	0.00	0.50
31.43	522.00	4.56	136.60	0.00	0.50
31.50	520.10	4.30	136.10	0.00	0.50
31.57	502.70	4.05	135.60	0.00	0.50
31.63	496.40	3.81	135.10	0.00	0.50
31.71	481.90	3.55	134.50	0.00	0.50
31.77	477.70	3.45	134.30	0.00	0.50
31.83	466.40	3.44	134.20	0.00	0.50
31.89	467.50	3.44	134.20	0.00	0.50
31.97	456.70	3.50	134.30	0.00	0.50
32.02	457.50	3.46	134.20	0.00	0.50
32.09	433.00	3.36	133.90	0.00	0.50
32.15	430.50	3.36	133.90	0.00	0.50
32.21	438.30	3.32	133.80	0.00	0.50
32.28	445.60	3.25	133.70	0.00	0.50
32.35	450.00	3.26	133.70	0.00	0.50
32.41	456.80	3.21	133.70	0.00	0.50
32.49	458.80	3.20	133.70	0.00	0.50
32.55	457.80	3.43	134.20	0.00	0.50
32.61	463.80	3.87	135.10	0.00	0.50
32.69	468.70	4.29	135.90	0.00	0.50
32.76	471.90	4.32	135.90	0.00	0.50
32.83	491.40	4.32	136.00	0.00	0.50
32.87	480.60	4.35	136.00	0.00	0.50
32.94	452.40	4.31	135.80	0.00	0.50
33.01	464.50	4.34	135.90	0.00	0.50
33.08	474.10	4.03	135.40	0.00	0.50
33.15	485.60	3.87	135.20	0.00	0.50
33.21	492.90	3.75	135.00	0.00	0.50
33.26	493.60	3.56	134.60	0.00	0.50
33.35	501.30	3.70	134.90	0.00	0.50
33.41	505.70	3.71	135.00	0.00	0.50
33.48	515.60	3.62	134.80	0.00	0.50
33.53	504.40	3.50	134.50	0.00	0.50
33.60	503.20	3.29	134.10	0.00	0.50

33.66	525.10	3.21	134.00	0.00	0.50
33.73	536.00	2.68	132.70	0.00	0.50
33.79	550.70	2.47	132.20	0.00	0.50
33.86	573.10	2.81	133.30	0.00	0.50
33.92	683.90	2.18	131.80	0.00	0.50
33.99	687.10	3.46	135.20	0.00	0.50
34.05	773.00	4.44	137.30	0.00	0.50
34.12	684.40	4.30	136.80	0.00	0.50
34.18	706.10	4.67	137.50	0.00	0.50
34.26	561.60	3.86	135.50	0.00	0.50
34.31	506.90	1.90	130.10	0.00	0.50
34.39	493.60	1.90	130.00	0.00	0.50
34.45	467.30	1.93	130.00	0.00	0.50
34.52	396.40	1.96	129.70	0.00	0.50
34.58	374.70	2.04	129.90	0.00	0.50
34.65	296.30	2.12	129.60	0.00	0.50
34.72	302.50	2.04	129.30	0.00	0.50
34.77	302.40	1.97	129.10	0.00	0.50
34.84	302.30	1.93	129.00	0.00	0.50
34.90	303.20	1.79	128.40	0.00	0.50
34.99	296.90	1.72	128.00	0.00	0.50
35.05	290.40	1.63	127.60	0.00	0.50
35.13	267.50	1.55	127.10	0.00	0.50
35.19	264.10	1.58	127.20	0.00	0.50
35.26	261.80	1.44	126.50	0.00	0.50
35.32	268.70	1.40	126.30	0.00	0.50
35.39	275.50	2.69	131.10	0.00	0.50
35.46	270.10	3.86	133.80	0.00	0.50
35.50	264.10	4.00	133.90	0.00	0.50
35.57	247.80	3.73	133.30	0.00	0.50
35.63	243.70	3.74	133.30	0.00	0.50
35.70	238.20	3.72	133.20	0.00	0.50
35.76	213.10	3.71	132.90	0.00	0.50
35.83	232.20	3.73	133.10	0.00	0.50
35.90	252.40	3.30	132.40	0.00	0.50
35.96	251.20	2.48	130.30	0.00	0.50
36.03	256.40	2.47	130.30	0.00	0.50
36.10	255.60	2.67	130.90	0.00	0.50
36.16	255.60	2.13	129.30	0.00	0.50
36.23	254.70	1.71	127.70	0.00	0.50
36.30	270.70	1.71	127.80	0.00	0.50
36.36	315.10	1.71	128.20	0.00	0.50
36.42	348.90	3.91	134.50	0.00	0.50
36.49	456.90	6.83	139.20	0.00	0.50
36.55	596.40	6.07	139.00	0.00	0.50
36.61	794.20	4.58	137.60	0.00	0.50
36.68	734.60	4.40	137.10	0.00	0.50
36.74	737.60	3.76	136.00	0.00	0.50
36.81	700.00	3.58	135.50	0.00	0.50
36.87	655.60	3.56	135.30	0.00	0.50
36.95	527.10	3.72	135.10	0.00	0.50
37.01	349.70	4.09	134.80	0.00	0.50
37.08	271.60	4.68	135.20	0.00	0.50
37.14	240.80	5.32	135.80	0.00	0.50
37.21	241.00	5.21	135.70	0.00	0.50
37.27	241.00	5.18	135.60	0.00	0.50
37.34	241.20	5.64	136.20	0.00	0.50
37.42	266.70	6.31	137.30	0.00	0.50
37.48	257.50	6.75	137.70	0.00	0.50
37.55	218.60	7.01	137.60	0.00	0.50
37.61	203.40	6.14	136.40	0.00	0.50
37.68	220.80	4.50	134.40	0.00	0.50
37.75	180.40	3.62	132.30	0.00	0.50

37.82	196.50	4.33	133.80	0.00	0.50
37.88	266.00	5.25	136.00	0.00	0.50
37.93	376.90	4.41	135.50	0.00	0.50
38.00	682.70	0.00	136.00	0.00	0.50
38.06	698.60	0.00	136.00	0.00	0.50
38.12	734.20	0.00	136.00	0.00	0.50
38.19	742.00	0.00	136.00	0.00	0.50
38.25	829.10	0.00	136.00	0.00	0.50
38.32	999.30	0.00	136.00	0.00	0.50

Modify Robertson method generates Fines from qc/fs. Inputted Fines are not relevant.

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=1.88 in.
Total Settlement of Saturated and Unsaturated Sands=1.88 in.
Differential Settlement=0.940 to 1.241 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
0.00	2.00	0.52	5.00	0.00	1.88	1.88
1.00	2.57	0.51	5.00	0.00	1.88	1.88
2.00	2.57	0.51	5.00	0.00	1.88	1.88
3.00	2.57	0.51	5.00	0.00	1.88	1.88
4.00	0.27	0.51	5.00	0.00	1.85	1.85
5.00	0.13	0.51	5.00	0.00	1.72	1.72
6.00	0.28	0.51	5.00	0.00	1.64	1.64
7.00	0.17	0.51	5.00	0.00	1.49	1.49
8.00	0.16	0.51	5.00	0.00	1.36	1.36
9.00	0.19	0.50	5.00	0.00	1.13	1.13
10.00	0.14	0.50	5.00	0.00	0.98	0.98
11.00	0.21	0.50	5.00	0.00	0.92	0.92
12.00	0.30	0.50	5.00	0.00	0.87	0.87
13.00	0.18	0.50	5.00	0.00	0.78	0.78
14.00	0.30	0.50	5.00	0.00	0.62	0.62
15.00	0.54	0.50	5.00	0.00	0.56	0.56
16.00	2.57	0.50	5.00	0.00	0.55	0.55
17.00	2.57	0.50	5.00	0.00	0.54	0.54
18.00	0.17	0.49	5.00	0.00	0.48	0.48
19.00	0.27	0.49	5.00	0.00	0.29	0.29
20.00	0.92	0.49	5.00	0.00	0.20	0.20
21.00	2.57	0.49	5.00	0.00	0.19	0.19
22.00	2.57	0.49	5.00	0.00	0.19	0.19
23.00	2.57	0.49	5.00	0.00	0.18	0.18
24.00	2.57	0.49	5.00	0.00	0.17	0.17
25.00	2.57	0.49	5.00	0.00	0.17	0.17
26.00	2.58	0.48	5.00	0.00	0.16	0.16
27.00	2.56	0.48	5.00	0.00	0.15	0.15
28.00	2.54	0.48	5.00	0.00	0.14	0.14
29.00	2.53	0.48	5.00	0.00	0.13	0.13
30.00	2.52	0.48	5.00	0.00	0.12	0.12
31.00	2.51	0.48	5.00	0.00	0.11	0.11
32.00	2.50	0.47	5.00	0.00	0.10	0.10
33.00	2.49	0.47	5.00	0.00	0.08	0.08
34.00	2.49	0.46	5.00	0.00	0.07	0.07
35.00	1.12	0.46	5.00	0.00	0.06	0.06
36.00	0.81	0.45	5.00	0.00	0.03	0.03
37.00	2.15	0.45	5.00	0.00	0.02	0.02
38.00	2.45	0.45	5.00	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone

(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Depth = ft, Stress or Pressure = atm (tsf), Unit Weight = pcf, Settlement = in.

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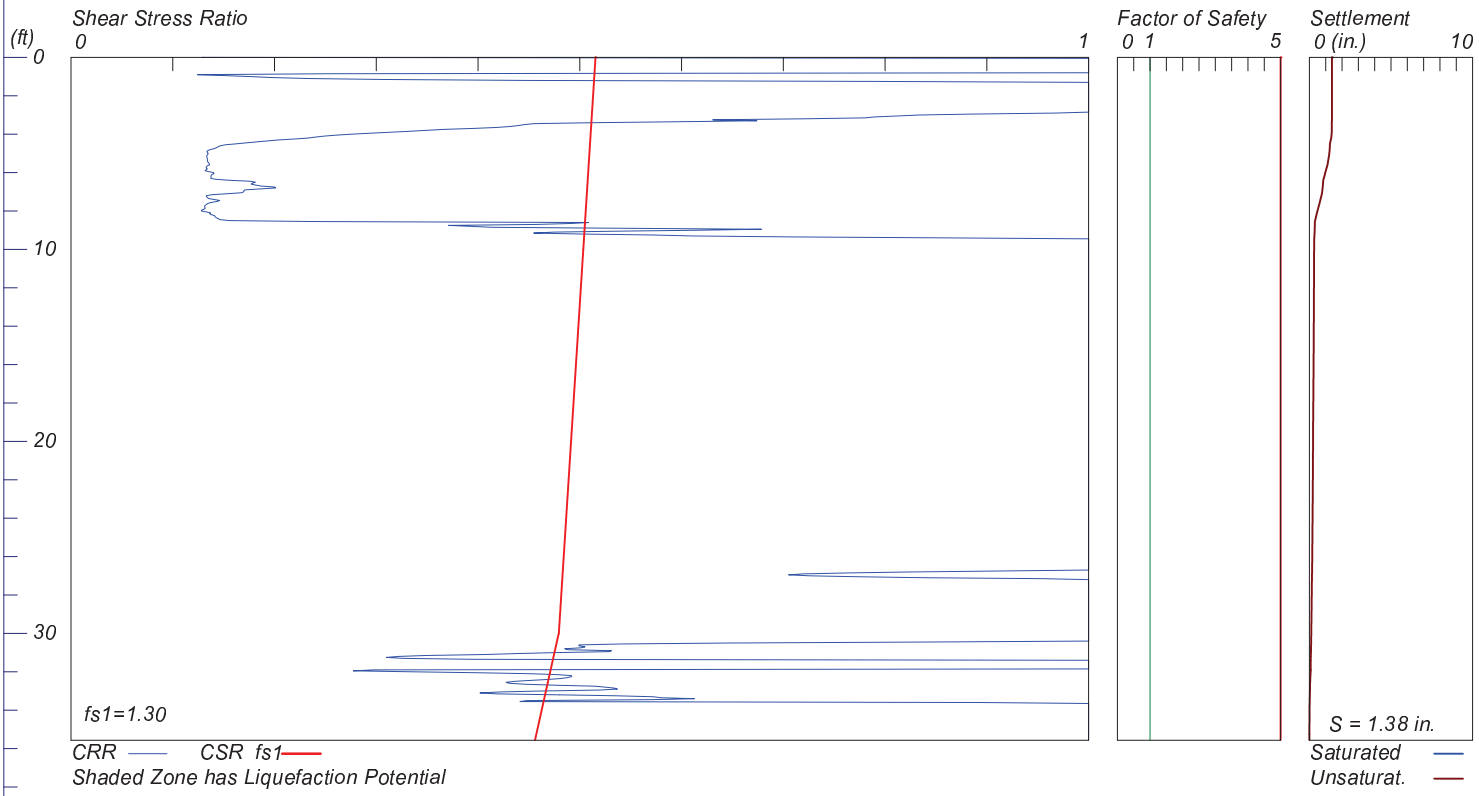
1 atm (atmosphere) = 1 tsf (ton/ft2)
CRRm Cyclic resistance ratio from soils
CSRsf Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S. Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat Settlement from saturated sands
S_dry Settlement from Unsaturated Sands
S_all Total Settlement from Saturated and Unsaturated Sands
NoLiq No-Liquefy Soils

LIQUEFACTION ANALYSIS

CPT-2

Hole No.=CPT-2 Water Depth=100 ft

Magnitude=6.9
Acceleration=.61g



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LIQUEFACTION ANALYSIS SUMMARY

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Input File Name: G:\Projects\200000 - Irvine\208450 - 208499\208465\208465002\Electronic Project File\Data Analysis & Calculations\Liquefaction\CPT 11-21-18\CPT-2_DRY.liq
Title: CPT-2
Subtitle: 208465002

Surface Elev.=
Hole No.=CPT-2
Depth of Hole= 35.57 ft
Water Table during Earthquake= 100.00 ft
Water Table during In-Situ Testing= 28.00 ft
Max. Acceleration= 0.61 g
Earthquake Magnitude= 6.90

Input Data:
Surface Elev.=
Hole No.=CPT-2
Depth of Hole=35.57 ft
Water Table during Earthquake= 100.00 ft
Water Table during In-Situ Testing= 28.00 ft
Max. Acceleration=0.61 g
Earthquake Magnitude=6.90

1. CPT Calculation Method: Modify Robertson*
2. Settlement Analysis Method: Tokimatsu/Seed
3. Fines Correction for Liquefaction: Stark/Olson et al.*
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1
8. Sampling Method, Cs= 1
9. User request factor of safety (apply to CSR) , User= 1.3
   Plot one CSR curve (fs1=User)
10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	qc atm	fs atm	gamma pcf	Fines %	D50 mm
0.00	0.09	0.00	58.37	0.00	0.50
0.08	0.00	0.00	60.00	0.00	0.50
0.15	0.00	0.00	62.00	0.00	0.50
0.22	0.00	0.00	64.00	0.00	0.50
0.27	0.00	0.00	66.00	0.00	0.50
0.33	0.00	0.00	68.00	0.00	0.50
0.42	0.00	0.00	70.00	0.00	0.50
0.49	0.00	0.00	72.00	0.00	0.50
0.55	0.00	0.01	74.00	0.00	0.50

0.62	0.00	0.01	76.00	0.00	0.50
0.69	0.00	0.02	77.00	0.00	0.50
0.75	0.09	0.03	78.03	0.00	0.50
0.81	0.09	0.03	78.96	0.00	0.50
0.88	3.63	0.04	90.35	0.00	0.50
0.95	11.06	0.08	98.05	0.00	0.50
0.99	13.23	0.10	99.68	0.00	0.50
1.05	15.99	0.12	101.40	0.00	0.50
1.12	20.32	0.14	103.40	0.00	0.50
1.19	28.54	0.18	106.00	0.00	0.50
1.25	40.99	0.22	108.30	0.00	0.50
1.32	50.60	0.22	108.50	0.00	0.50
1.39	56.04	0.28	110.80	0.00	0.50
1.45	58.89	0.35	112.60	0.00	0.50
1.51	65.64	0.29	111.30	0.00	0.50
1.58	72.99	0.28	111.50	0.00	0.50
1.65	80.43	0.33	112.70	0.00	0.50
1.72	86.92	0.32	112.70	0.00	0.50
1.78	88.39	0.31	112.60	0.00	0.50
1.85	88.82	0.33	113.00	0.00	0.50
1.92	89.43	0.38	114.10	0.00	0.50
1.99	90.90	0.43	115.10	0.00	0.50
2.05	89.26	0.42	114.90	0.00	0.50
2.11	89.08	0.44	115.10	0.00	0.50
2.18	88.04	0.46	115.40	0.00	0.50
2.25	86.49	0.44	115.10	0.00	0.50
2.31	83.11	0.44	114.90	0.00	0.50
2.38	82.77	0.44	114.90	0.00	0.50
2.45	82.77	0.47	115.50	0.00	0.50
2.51	81.90	0.48	115.60	0.00	0.50
2.57	80.60	0.44	115.00	0.00	0.50
2.64	78.53	0.44	114.80	0.00	0.50
2.71	77.40	0.43	114.60	0.00	0.50
2.78	76.71	0.43	114.70	0.00	0.50
2.84	75.85	0.42	114.40	0.00	0.50
2.91	73.94	0.46	115.00	0.00	0.50
2.97	71.87	0.51	115.70	0.00	0.50
3.04	71.09	0.57	116.50	0.00	0.50
3.11	68.58	0.66	117.50	0.00	0.50
3.17	70.70	0.60	116.80	0.00	0.50
3.24	65.64	0.51	115.50	0.00	0.50
3.31	70.31	0.48	115.20	0.00	0.50
3.38	64.26	0.46	114.60	0.00	0.50
3.44	57.85	0.46	114.50	0.00	0.50
3.51	58.03	0.45	114.20	0.00	0.50
3.57	58.37	0.44	114.10	0.00	0.50
3.64	59.06	0.40	113.50	0.00	0.50
3.70	58.72	0.35	112.40	0.00	0.50
3.76	55.78	0.35	112.40	0.00	0.50
3.82	54.05	0.37	112.60	0.00	0.50
3.89	52.49	0.34	112.00	0.00	0.50
3.96	50.59	0.32	111.40	0.00	0.50
4.02	48.68	0.29	110.70	0.00	0.50
4.09	46.87	0.29	110.40	0.00	0.50
4.15	44.96	0.30	110.70	0.00	0.50
4.22	44.01	0.29	110.50	0.00	0.50
4.29	41.24	0.25	109.20	0.00	0.50
4.36	40.29	0.21	107.90	0.00	0.50
4.42	37.87	0.20	107.30	0.00	0.50
4.49	35.79	0.17	106.20	0.00	0.50
4.55	33.29	0.14	104.60	0.00	0.50
4.62	32.59	0.12	103.10	0.00	0.50
4.68	31.90	0.13	103.60	0.00	0.50

4.75	31.21	0.12	103.20	0.00	0.50
4.82	30.60	0.10	101.80	0.00	0.50
4.89	29.22	0.11	102.10	0.00	0.50
4.95	29.13	0.12	102.80	0.00	0.50
4.99	29.57	0.12	103.00	0.00	0.50
5.05	29.18	0.12	103.20	0.00	0.50
5.14	28.79	0.13	103.40	0.00	0.50
5.20	29.05	0.13	103.50	0.00	0.50
5.26	29.31	0.13	103.60	0.00	0.50
5.34	29.65	0.13	103.70	0.00	0.50
5.40	29.91	0.13	103.70	0.00	0.50
5.47	30.43	0.13	103.80	0.00	0.50
5.53	31.04	0.13	103.90	0.00	0.50
5.59	31.81	0.13	103.90	0.00	0.50
5.65	30.52	0.13	103.90	0.00	0.50
5.74	29.65	0.14	104.00	0.00	0.50
5.79	29.74	0.15	104.80	0.00	0.50
5.86	28.87	0.16	104.90	0.00	0.50
5.91	28.27	0.16	104.90	0.00	0.50
6.00	29.13	0.22	107.30	0.00	0.50
6.05	29.31	0.22	107.50	0.00	0.50
6.11	30.00	0.20	106.70	0.00	0.50
6.17	30.34	0.19	106.50	0.00	0.50
6.26	30.69	0.19	106.50	0.00	0.50
6.32	30.73	0.19	106.50	0.00	0.50
6.38	30.73	0.28	109.20	0.00	0.50
6.44	30.78	0.43	112.40	0.00	0.50
6.50	31.73	0.46	112.90	0.00	0.50
6.59	34.50	0.42	112.60	0.00	0.50
6.65	36.05	0.44	112.90	0.00	0.50
6.71	39.69	0.44	113.10	0.00	0.50
6.77	47.04	0.44	113.60	0.00	0.50
6.83	43.23	0.43	113.30	0.00	0.50
6.89	31.81	0.43	112.40	0.00	0.50
6.98	27.32	0.43	112.00	0.00	0.50
7.05	30.26	0.42	112.30	0.00	0.50
7.11	28.61	0.34	110.50	0.00	0.50
7.17	27.06	0.23	107.60	0.00	0.50
7.23	27.58	0.23	107.40	0.00	0.50
7.29	27.92	0.23	107.60	0.00	0.50
7.38	27.49	0.25	108.30	0.00	0.50
7.43	27.66	0.32	110.00	0.00	0.50
7.49	28.79	0.31	109.80	0.00	0.50
7.55	27.49	0.27	108.80	0.00	0.50
7.61	28.61	0.24	107.90	0.00	0.50
7.71	28.01	0.23	107.60	0.00	0.50
7.77	25.93	0.23	107.60	0.00	0.50
7.82	26.54	0.24	107.70	0.00	0.50
7.89	26.45	0.24	107.80	0.00	0.50
7.95	26.62	0.22	107.00	0.00	0.50
8.01	26.88	0.21	106.90	0.00	0.50
8.08	27.14	0.28	109.00	0.00	0.50
8.15	27.10	0.28	108.80	0.00	0.50
8.20	27.06	0.29	109.30	0.00	0.50
8.27	25.07	0.31	109.60	0.00	0.50
8.34	30.52	0.31	110.00	0.00	0.50
8.43	35.19	0.31	110.20	0.00	0.50
8.49	31.04	0.35	110.90	0.00	0.50
8.54	27.14	0.54	113.80	0.00	0.50
8.60	28.79	0.93	117.90	0.00	0.50
8.69	32.42	1.05	119.10	0.00	0.50
8.75	36.66	1.06	119.40	0.00	0.50
8.81	44.53	1.27	121.20	0.00	0.50

8.87	63.48	1.45	123.00	0.00	0.50
8.93	102.40	1.51	124.50	0.00	0.50
9.00	88.38	1.62	124.70	0.00	0.50
9.06	73.76	1.61	124.20	0.00	0.50
9.13	63.81	1.48	123.20	0.00	0.50
9.19	78.35	1.44	123.50	0.00	0.50
9.26	98.59	1.29	123.30	0.00	0.50
9.32	117.40	0.80	120.20	0.00	0.50
9.38	130.10	0.69	119.40	0.00	0.50
9.45	142.70	0.73	120.00	0.00	0.50
9.52	157.80	0.79	120.80	0.00	0.50
9.60	177.40	1.45	125.60	0.00	0.50
9.66	192.10	1.53	126.20	0.00	0.50
9.71	204.40	1.34	125.30	0.00	0.50
9.79	224.00	1.70	127.30	0.00	0.50
9.85	236.10	1.76	127.70	0.00	0.50
9.91	235.80	2.04	128.70	0.00	0.50
9.99	235.50	1.96	128.40	0.00	0.50
10.04	196.50	2.00	128.20	0.00	0.50
10.13	259.30	1.90	128.50	0.00	0.50
10.19	255.70	1.66	127.50	0.00	0.50
10.26	239.50	1.68	127.40	0.00	0.50
10.32	236.60	1.69	127.40	0.00	0.50
10.38	236.10	1.56	126.80	0.00	0.50
10.45	236.30	1.55	126.80	0.00	0.50
10.51	236.40	1.88	128.20	0.00	0.50
10.58	238.30	2.09	128.90	0.00	0.50
10.64	241.30	2.10	129.00	0.00	0.50
10.70	244.70	2.11	129.10	0.00	0.50
10.77	249.00	2.10	129.10	0.00	0.50
10.83	252.40	1.88	128.30	0.00	0.50
10.89	257.10	1.71	127.70	0.00	0.50
10.96	260.20	1.81	128.10	0.00	0.50
11.02	248.10	1.66	127.40	0.00	0.50
11.12	235.80	1.69	127.40	0.00	0.50
11.18	235.80	2.03	128.70	0.00	0.50
11.24	235.80	2.23	129.40	0.00	0.50
11.31	229.90	1.80	127.80	0.00	0.50
11.37	240.70	1.54	126.80	0.00	0.50
11.44	255.40	1.74	127.80	0.00	0.50
11.50	225.80	1.68	127.20	0.00	0.50
11.56	229.20	2.01	128.60	0.00	0.50
11.62	246.70	2.74	131.00	0.00	0.50
11.69	264.20	3.05	132.00	0.00	0.50
11.75	293.90	2.88	131.80	0.00	0.50
11.81	297.40	2.82	131.70	0.00	0.50
11.88	317.50	3.01	132.30	0.00	0.50
11.94	324.70	2.35	130.50	0.00	0.50
12.00	324.80	3.03	132.40	0.00	0.50
12.07	325.30	3.55	133.60	0.00	0.50
12.13	321.70	3.38	133.20	0.00	0.50
12.23	325.70	3.07	132.50	0.00	0.50
12.30	331.00	2.98	132.40	0.00	0.50
12.36	322.10	2.99	132.30	0.00	0.50
12.42	295.20	2.99	132.10	0.00	0.50
12.49	302.20	2.94	132.00	0.00	0.50
12.55	311.50	2.60	131.20	0.00	0.50
12.61	333.80	2.30	130.50	0.00	0.50
12.68	345.40	2.45	131.00	0.00	0.50
12.74	353.00	3.50	133.70	0.00	0.50
12.80	350.90	4.72	135.80	0.00	0.50
12.86	361.20	6.86	138.70	0.00	0.50
12.92	379.20	8.55	140.40	0.00	0.50

13.01	394.70	7.01	139.00	0.00	0.50
13.05	417.10	5.81	137.80	0.00	0.50
13.12	436.70	5.20	137.10	0.00	0.50
13.19	349.00	5.56	137.00	0.00	0.50
13.25	350.50	5.58	137.10	0.00	0.50
13.32	368.80	5.12	136.60	0.00	0.50
13.39	392.00	2.85	132.40	0.00	0.50
13.45	389.10	1.57	128.10	0.00	0.50
13.51	358.30	1.70	128.40	0.00	0.50
13.58	304.60	1.85	128.70	0.00	0.50
13.66	275.80	2.16	129.50	0.00	0.50
13.73	267.40	2.87	131.50	0.00	0.50
13.78	274.50	3.43	132.90	0.00	0.50
13.84	280.00	4.83	135.50	0.00	0.50
13.91	315.10	5.35	136.50	0.00	0.50
13.99	352.60	5.27	136.70	0.00	0.50
14.05	350.20	5.59	137.10	0.00	0.50
14.12	335.40	5.58	137.00	0.00	0.50
14.18	347.80	5.02	136.30	0.00	0.50
14.25	385.70	4.47	135.70	0.00	0.50
14.31	421.30	4.41	135.80	0.00	0.50
14.37	347.70	4.42	135.40	0.00	0.50
14.44	362.30	4.43	135.50	0.00	0.50
14.51	337.10	3.91	134.40	0.00	0.50
14.57	362.80	2.82	132.20	0.00	0.50
14.64	333.30	2.77	131.80	0.00	0.50
14.71	363.30	2.78	132.10	0.00	0.50
14.77	363.20	2.85	132.30	0.00	0.50
14.84	363.20	3.84	134.40	0.00	0.50
14.91	366.40	5.27	136.80	0.00	0.50
14.96	381.60	5.32	136.90	0.00	0.50
15.03	406.10	4.67	136.10	0.00	0.50
15.09	442.40	4.50	136.10	0.00	0.50
15.15	479.90	4.98	137.00	0.00	0.50
15.23	526.30	4.94	137.20	0.00	0.50
15.29	535.50	5.38	137.80	0.00	0.50
15.35	490.30	5.99	138.40	0.00	0.50
15.43	453.50	6.65	139.00	0.00	0.50
15.49	439.10	6.34	138.60	0.00	0.50
15.55	429.60	5.71	137.70	0.00	0.50
15.62	412.90	4.86	136.50	0.00	0.50
15.69	417.70	4.31	135.60	0.00	0.50
15.77	420.80	3.91	134.90	0.00	0.50
15.84	407.80	3.64	134.30	0.00	0.50
15.90	426.90	3.36	133.80	0.00	0.50
15.96	429.00	3.08	133.20	0.00	0.50
16.03	434.90	3.13	133.40	0.00	0.50
16.09	384.70	3.03	132.80	0.00	0.50
16.15	397.10	3.08	133.00	0.00	0.50
16.22	417.40	3.97	135.00	0.00	0.50
16.28	405.10	4.22	135.40	0.00	0.50
16.34	416.70	3.84	134.80	0.00	0.50
16.41	410.30	3.46	134.00	0.00	0.50
16.47	416.00	2.89	132.70	0.00	0.50
16.54	422.40	2.63	132.00	0.00	0.50
16.60	422.90	2.58	131.90	0.00	0.50
16.67	439.30	2.90	132.80	0.00	0.50
16.74	463.90	3.05	133.30	0.00	0.50
16.80	402.50	2.85	132.50	0.00	0.50
16.86	398.00	2.87	132.50	0.00	0.50
16.93	420.80	2.90	132.70	0.00	0.50
16.99	421.10	2.93	132.80	0.00	0.50
17.06	421.10	3.05	133.10	0.00	0.50

17.13	421.30	2.92	132.80	0.00	0.50
17.20	426.90	2.94	132.90	0.00	0.50
17.26	444.10	3.36	133.90	0.00	0.50
17.33	480.40	3.76	135.00	0.00	0.50
17.39	510.80	3.78	135.10	0.00	0.50
17.46	527.20	3.76	135.20	0.00	0.50
17.52	571.70	3.50	134.90	0.00	0.50
17.58	591.50	3.25	134.40	0.00	0.50
17.65	523.00	3.63	134.90	0.00	0.50
17.72	529.20	4.98	137.20	0.00	0.50
17.78	521.30	5.87	138.40	0.00	0.50
17.85	527.00	5.55	138.00	0.00	0.50
17.91	519.70	5.04	137.30	0.00	0.50
17.98	524.80	4.67	136.80	0.00	0.50
18.05	510.80	4.27	136.00	0.00	0.50
18.12	474.20	4.39	136.10	0.00	0.50
18.17	435.90	4.10	135.40	0.00	0.50
18.24	423.80	4.04	135.20	0.00	0.50
18.31	427.60	3.80	134.80	0.00	0.50
18.38	403.00	3.43	133.90	0.00	0.50
18.44	439.50	4.52	136.10	0.00	0.50
18.51	459.40	4.53	136.20	0.00	0.50
18.57	478.30	4.21	135.80	0.00	0.50
18.63	478.50	4.11	135.60	0.00	0.50
18.71	479.40	3.85	135.10	0.00	0.50
18.77	478.20	3.06	133.40	0.00	0.50
18.83	514.90	2.00	130.50	0.00	0.50
18.90	466.20	2.03	130.40	0.00	0.50
18.96	436.70	2.42	131.50	0.00	0.50
19.04	471.80	2.53	132.00	0.00	0.50
19.10	491.40	2.56	132.20	0.00	0.50
19.16	501.50	2.72	132.70	0.00	0.50
19.24	462.30	2.88	132.90	0.00	0.50
19.29	503.30	2.86	133.10	0.00	0.50
19.35	482.80	2.95	133.20	0.00	0.50
19.43	505.10	3.14	133.80	0.00	0.50
19.49	521.70	3.40	134.40	0.00	0.50
19.55	529.60	4.07	135.80	0.00	0.50
19.62	529.70	4.73	136.90	0.00	0.50
19.68	536.40	4.76	137.00	0.00	0.50
19.76	528.10	4.49	136.50	0.00	0.50
19.82	526.40	4.65	136.70	0.00	0.50
19.89	550.20	4.84	137.10	0.00	0.50
19.95	540.60	4.78	137.00	0.00	0.50
20.01	534.40	5.59	138.10	0.00	0.50
20.08	518.70	6.08	138.70	0.00	0.50
20.14	526.20	6.07	138.70	0.00	0.50
20.21	546.70	6.03	138.70	0.00	0.50
20.28	532.90	7.37	140.10	0.00	0.50
20.34	517.20	10.75	142.80	0.00	0.50
20.41	540.60	10.08	142.50	0.00	0.50
20.47	480.20	7.05	139.60	0.00	0.50
20.54	530.60	6.10	138.70	0.00	0.50
20.60	456.30	5.36	137.40	0.00	0.50
20.67	520.50	5.39	137.80	0.00	0.50
20.74	563.40	5.41	138.00	0.00	0.50
20.80	566.20	5.52	138.20	0.00	0.50
20.87	495.90	5.71	138.10	0.00	0.50
20.93	516.20	5.58	138.00	0.00	0.50
21.01	473.50	5.48	137.70	0.00	0.50
21.08	465.60	5.37	137.50	0.00	0.50
21.14	459.10	5.17	137.20	0.00	0.50
21.20	440.10	4.64	136.30	0.00	0.50

21.27	428.90	3.99	135.10	0.00	0.50
21.33	427.30	3.76	134.70	0.00	0.50
21.40	429.00	3.53	134.20	0.00	0.50
21.46	432.60	3.28	133.70	0.00	0.50
21.52	416.50	3.07	133.10	0.00	0.50
21.59	420.90	3.15	133.30	0.00	0.50
21.66	414.70	3.15	133.30	0.00	0.50
21.73	419.30	3.26	133.60	0.00	0.50
21.78	427.70	3.29	133.70	0.00	0.50
21.86	441.00	3.13	133.40	0.00	0.50
21.92	444.90	3.00	133.10	0.00	0.50
21.99	449.50	2.94	133.00	0.00	0.50
22.04	452.30	3.02	133.20	0.00	0.50
22.11	446.60	2.98	133.10	0.00	0.50
22.18	446.60	2.85	132.80	0.00	0.50
22.25	446.50	2.70	132.40	0.00	0.50
22.31	447.90	2.64	132.20	0.00	0.50
22.39	446.10	2.61	132.10	0.00	0.50
22.44	440.40	2.66	132.20	0.00	0.50
22.51	424.70	2.74	132.30	0.00	0.50
22.58	416.30	2.62	132.00	0.00	0.50
22.63	411.90	2.50	131.60	0.00	0.50
22.70	416.30	2.49	131.60	0.00	0.50
22.76	418.70	2.49	131.60	0.00	0.50
22.85	416.30	2.51	131.70	0.00	0.50
22.91	410.20	2.65	132.00	0.00	0.50
22.97	384.40	2.78	132.20	0.00	0.50
23.03	396.90	2.79	132.30	0.00	0.50
23.09	399.00	2.79	132.30	0.00	0.50
23.19	398.30	2.82	132.40	0.00	0.50
23.25	398.60	2.87	132.50	0.00	0.50
23.31	390.80	2.92	132.60	0.00	0.50
23.38	390.70	3.00	132.80	0.00	0.50
23.44	390.50	3.03	132.90	0.00	0.50
23.51	393.00	2.87	132.50	0.00	0.50
23.57	387.70	2.61	131.80	0.00	0.50
23.64	389.70	2.41	131.20	0.00	0.50
23.70	395.50	2.40	131.20	0.00	0.50
23.76	393.80	2.44	131.30	0.00	0.50
23.82	386.60	2.44	131.30	0.00	0.50
23.91	380.50	2.47	131.30	0.00	0.50
23.97	375.80	2.52	131.40	0.00	0.50
24.04	370.40	2.56	131.50	0.00	0.50
24.10	366.90	2.65	131.70	0.00	0.50
24.16	370.00	2.75	132.00	0.00	0.50
24.23	373.20	2.77	132.10	0.00	0.50
24.29	377.40	2.70	132.00	0.00	0.50
24.36	382.30	2.71	132.00	0.00	0.50
24.42	392.50	2.74	132.20	0.00	0.50
24.49	399.20	2.70	132.10	0.00	0.50
24.55	408.50	2.72	132.20	0.00	0.50
24.60	406.40	2.71	132.10	0.00	0.50
24.67	404.40	2.71	132.10	0.00	0.50
24.76	417.50	2.91	132.70	0.00	0.50
24.83	425.30	3.22	133.50	0.00	0.50
24.89	436.10	3.29	133.70	0.00	0.50
24.96	443.70	3.29	133.80	0.00	0.50
25.02	457.50	3.46	134.20	0.00	0.50
25.08	440.00	3.70	134.60	0.00	0.50
25.14	436.30	3.75	134.70	0.00	0.50
25.20	445.60	3.66	134.60	0.00	0.50
25.26	468.40	3.67	134.70	0.00	0.50
25.33	483.70	3.68	134.80	0.00	0.50

25.40	475.30	3.75	134.90	0.00	0.50
25.46	479.50	3.71	134.90	0.00	0.50
25.53	496.00	3.62	134.70	0.00	0.50
25.59	492.30	3.75	135.00	0.00	0.50
25.68	476.10	3.79	135.00	0.00	0.50
25.74	459.50	3.74	134.80	0.00	0.50
25.80	447.00	3.63	134.50	0.00	0.50
25.87	443.50	3.37	134.00	0.00	0.50
25.93	435.30	3.13	133.40	0.00	0.50
25.99	421.90	3.06	133.10	0.00	0.50
26.05	331.80	3.03	132.50	0.00	0.50
26.11	379.60	2.78	132.20	0.00	0.50
26.18	377.00	2.77	132.10	0.00	0.50
26.27	367.80	2.43	131.10	0.00	0.50
26.33	356.00	2.38	130.90	0.00	0.50
26.40	341.80	2.53	131.20	0.00	0.50
26.46	317.30	2.66	131.40	0.00	0.50
26.53	299.60	2.71	131.40	0.00	0.50
26.59	282.20	2.64	131.10	0.00	0.50
26.65	265.60	2.49	130.50	0.00	0.50
26.72	244.70	2.49	130.30	0.00	0.50
26.78	224.70	2.58	130.30	0.00	0.50
26.84	210.40	2.64	130.40	0.00	0.50
26.91	199.30	2.65	130.30	0.00	0.50
26.97	197.90	2.65	130.20	0.00	0.50
27.03	207.10	2.65	130.40	0.00	0.50
27.10	222.80	2.65	130.50	0.00	0.50
27.19	258.80	2.51	130.50	0.00	0.50
27.25	288.20	2.38	130.40	0.00	0.50
27.32	312.80	2.28	130.30	0.00	0.50
27.38	334.10	2.24	130.30	0.00	0.50
27.44	348.00	2.26	130.40	0.00	0.50
27.51	349.20	2.20	130.30	0.00	0.50
27.57	359.20	2.15	130.10	0.00	0.50
27.64	364.60	2.15	130.20	0.00	0.50
27.70	370.60	2.20	130.40	0.00	0.50
27.76	376.40	2.28	130.70	0.00	0.50
27.83	382.20	2.32	130.90	0.00	0.50
27.89	376.40	2.32	130.80	0.00	0.50
27.95	376.40	2.32	130.80	0.00	0.50
28.02	380.30	2.55	131.60	0.00	0.50
28.08	378.60	2.73	132.10	0.00	0.50
28.15	377.70	2.59	131.70	0.00	0.50
28.24	386.00	2.54	131.50	0.00	0.50
28.30	394.20	2.59	131.80	0.00	0.50
28.37	391.80	2.65	131.90	0.00	0.50
28.42	384.80	2.67	131.90	0.00	0.50
28.48	388.00	2.64	131.80	0.00	0.50
28.56	387.40	2.62	131.80	0.00	0.50
28.62	386.40	2.56	131.60	0.00	0.50
28.68	385.90	2.47	131.30	0.00	0.50
28.75	383.00	2.38	131.10	0.00	0.50
28.81	376.00	2.32	130.80	0.00	0.50
28.87	369.30	2.33	130.80	0.00	0.50
28.94	363.10	2.37	130.90	0.00	0.50
29.00	360.60	2.78	132.10	0.00	0.50
29.06	358.20	2.79	132.10	0.00	0.50
29.16	352.10	2.78	132.00	0.00	0.50
29.22	353.00	2.74	131.90	0.00	0.50
29.28	356.60	2.76	132.00	0.00	0.50
29.35	340.90	2.83	132.00	0.00	0.50
29.41	335.20	2.82	132.00	0.00	0.50
29.47	330.10	2.79	131.90	0.00	0.50

29.54	328.20	2.71	131.60	0.00	0.50
29.60	328.20	2.53	131.10	0.00	0.50
29.67	328.20	2.43	130.80	0.00	0.50
29.73	326.80	2.44	130.90	0.00	0.50
29.79	330.90	2.44	130.90	0.00	0.50
29.86	325.50	2.68	131.50	0.00	0.50
29.93	332.10	2.94	132.30	0.00	0.50
29.99	336.70	3.20	132.90	0.00	0.50
30.06	312.80	3.60	133.60	0.00	0.50
30.12	343.20	3.90	134.40	0.00	0.50
30.19	351.80	3.96	134.60	0.00	0.50
30.25	331.00	3.75	134.00	0.00	0.50
30.31	290.50	3.78	133.80	0.00	0.50
30.41	242.50	3.81	133.40	0.00	0.50
30.47	192.50	3.57	132.30	0.00	0.50
30.53	155.00	3.34	131.30	0.00	0.50
30.60	120.30	3.24	130.50	0.00	0.50
30.66	103.90	3.16	129.90	0.00	0.50
30.73	95.70	3.05	129.50	0.00	0.50
30.79	94.66	2.95	129.20	0.00	0.50
30.86	90.07	2.88	128.90	0.00	0.50
30.92	79.43	2.77	128.30	0.00	0.50
30.98	80.30	2.64	128.00	0.00	0.50
31.04	80.30	2.51	127.60	0.00	0.50
31.11	81.16	2.39	127.30	0.00	0.50
31.17	93.53	2.28	127.30	0.00	0.50
31.23	92.50	2.12	126.70	0.00	0.50
31.30	80.39	2.10	126.30	0.00	0.50
31.39	60.06	2.05	125.40	0.00	0.50
31.46	51.58	1.88	124.40	0.00	0.50
31.52	48.20	2.01	124.80	0.00	0.50
31.59	46.04	1.95	124.40	0.00	0.50
31.65	43.36	1.96	124.30	0.00	0.50
31.71	39.21	2.07	124.50	0.00	0.50
31.77	38.90	2.08	124.50	0.00	0.50
31.82	38.60	1.99	124.10	0.00	0.50
31.89	65.16	1.85	124.90	0.00	0.50
31.98	134.00	1.81	126.50	0.00	0.50
32.05	165.90	1.85	127.20	0.00	0.50
32.11	183.20	1.90	127.60	0.00	0.50
32.18	190.10	1.93	127.80	0.00	0.50
32.24	191.30	1.91	127.80	0.00	0.50
32.30	188.60	1.97	127.90	0.00	0.50
32.37	180.40	2.16	128.50	0.00	0.50
32.43	167.50	2.35	129.00	0.00	0.50
32.50	152.10	2.54	129.30	0.00	0.50
32.56	134.50	2.79	129.70	0.00	0.50
32.62	118.30	2.97	129.80	0.00	0.50
32.69	105.10	3.08	129.80	0.00	0.50
32.75	97.96	3.14	129.80	0.00	0.50
32.81	97.78	3.18	129.90	0.00	0.50
32.88	98.00	3.23	130.00	0.00	0.50
32.94	98.00	3.20	129.90	0.00	0.50
33.00	98.22	2.96	129.30	0.00	0.50
33.07	103.80	2.79	129.00	0.00	0.50
33.13	107.00	2.73	129.00	0.00	0.50
33.23	117.30	3.42	130.80	0.00	0.50
33.29	121.10	3.67	131.40	0.00	0.50
33.36	115.80	3.67	131.30	0.00	0.50
33.42	103.50	3.66	131.00	0.00	0.50
33.48	97.87	3.13	129.70	0.00	0.50
33.55	144.10	2.80	129.90	0.00	0.50
33.61	272.70	2.88	131.60	0.00	0.50

33.66	351.00	3.17	132.90	0.00	0.50
33.73	429.70	3.32	133.80	0.00	0.50
33.79	385.30	3.37	133.60	0.00	0.50
33.86	378.70	4.18	135.10	0.00	0.50
33.93	378.70	4.30	135.40	0.00	0.50
33.99	372.10	3.78	134.40	0.00	0.50
34.06	497.90	3.44	134.40	0.00	0.50
34.12	540.80	3.20	134.10	0.00	0.50
34.19	613.00	4.20	136.40	0.00	0.50
34.25	737.30	3.94	136.30	0.00	0.50
34.32	781.60	4.33	137.20	0.00	0.50
34.39	827.20	5.93	139.60	0.00	0.50
34.45	816.40	5.93	139.60	0.00	0.50
34.52	871.20	6.35	140.20	0.00	0.50
34.58	888.10	6.99	141.00	0.00	0.50
34.65	859.80	7.02	140.90	0.00	0.50
34.71	792.50	7.05	140.80	0.00	0.50
34.78	848.30	8.17	142.00	0.00	0.50
34.84	842.10	7.14	141.00	0.00	0.50
34.91	799.90	3.40	135.50	0.00	0.50
34.98	801.00	3.83	136.30	0.00	0.50
35.05	801.00	3.80	136.30	0.00	0.50
35.10	802.20	3.12	134.80	0.00	0.50
35.17	851.30	2.24	132.60	0.00	0.50
35.24	714.20	0.00	133.00	0.00	0.50
35.31	759.50	0.00	133.00	0.00	0.50
35.37	742.30	0.00	133.00	0.00	0.50
35.43	741.40	0.00	133.00	0.00	0.50
35.50	821.50	0.00	133.00	0.00	0.50
35.57	828.50	0.00	133.00	0.00	0.50

Modify Robertson method generates Fines from qc/fs. Inputted Fines are not relevant.

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=1.38 in.
Total Settlement of Saturated and Unsaturated Sands=1.38 in.
Differential Settlement=0.692 to 0.913 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
0.00	0.13	0.52	5.00	0.00	1.38	1.38
1.00	0.18	0.51	5.00	0.00	1.38	1.38
2.00	2.57	0.51	5.00	0.00	1.38	1.38
3.00	0.83	0.51	5.00	0.00	1.38	1.38
4.00	0.28	0.51	5.00	0.00	1.36	1.36
5.00	0.13	0.51	5.00	0.00	1.22	1.22
6.00	0.14	0.51	5.00	0.00	0.97	0.97
7.00	0.17	0.51	5.00	0.00	0.78	0.78
8.00	0.13	0.51	5.00	0.00	0.49	0.49
9.00	0.62	0.50	5.00	0.00	0.32	0.32
10.00	2.57	0.50	5.00	0.00	0.29	0.29
11.00	2.57	0.50	5.00	0.00	0.28	0.28
12.00	2.57	0.50	5.00	0.00	0.28	0.28
13.00	2.57	0.50	5.00	0.00	0.27	0.27
14.00	2.57	0.50	5.00	0.00	0.27	0.27
15.00	2.57	0.50	5.00	0.00	0.26	0.26
16.00	2.57	0.50	5.00	0.00	0.26	0.26
17.00	2.57	0.50	5.00	0.00	0.25	0.25
18.00	2.57	0.49	5.00	0.00	0.24	0.24
19.00	2.57	0.49	5.00	0.00	0.23	0.23

20.00	2.57	0.49	5.00	0.00	0.22	0.22
21.00	2.57	0.49	5.00	0.00	0.22	0.22
22.00	2.57	0.49	5.00	0.00	0.21	0.21
23.00	2.57	0.49	5.00	0.00	0.20	0.20
24.00	2.57	0.49	5.00	0.00	0.19	0.19
25.00	2.59	0.49	5.00	0.00	0.18	0.18
26.00	2.57	0.48	5.00	0.00	0.18	0.18
27.00	0.73	0.48	5.00	0.00	0.16	0.16
28.00	2.54	0.48	5.00	0.00	0.14	0.14
29.00	2.34	0.48	5.00	0.00	0.13	0.13
30.00	1.81	0.48	5.00	0.00	0.11	0.11
31.00	0.48	0.48	5.00	0.00	0.09	0.09
32.00	0.34	0.47	5.00	0.00	0.07	0.07
33.00	0.46	0.47	5.00	0.00	0.03	0.03
34.00	2.49	0.46	5.00	0.00	0.01	0.01
35.00	2.48	0.46	5.00	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Depth = ft, Stress or Pressure = atm (tsf), Unit Weight = pcf, Settlement = in.

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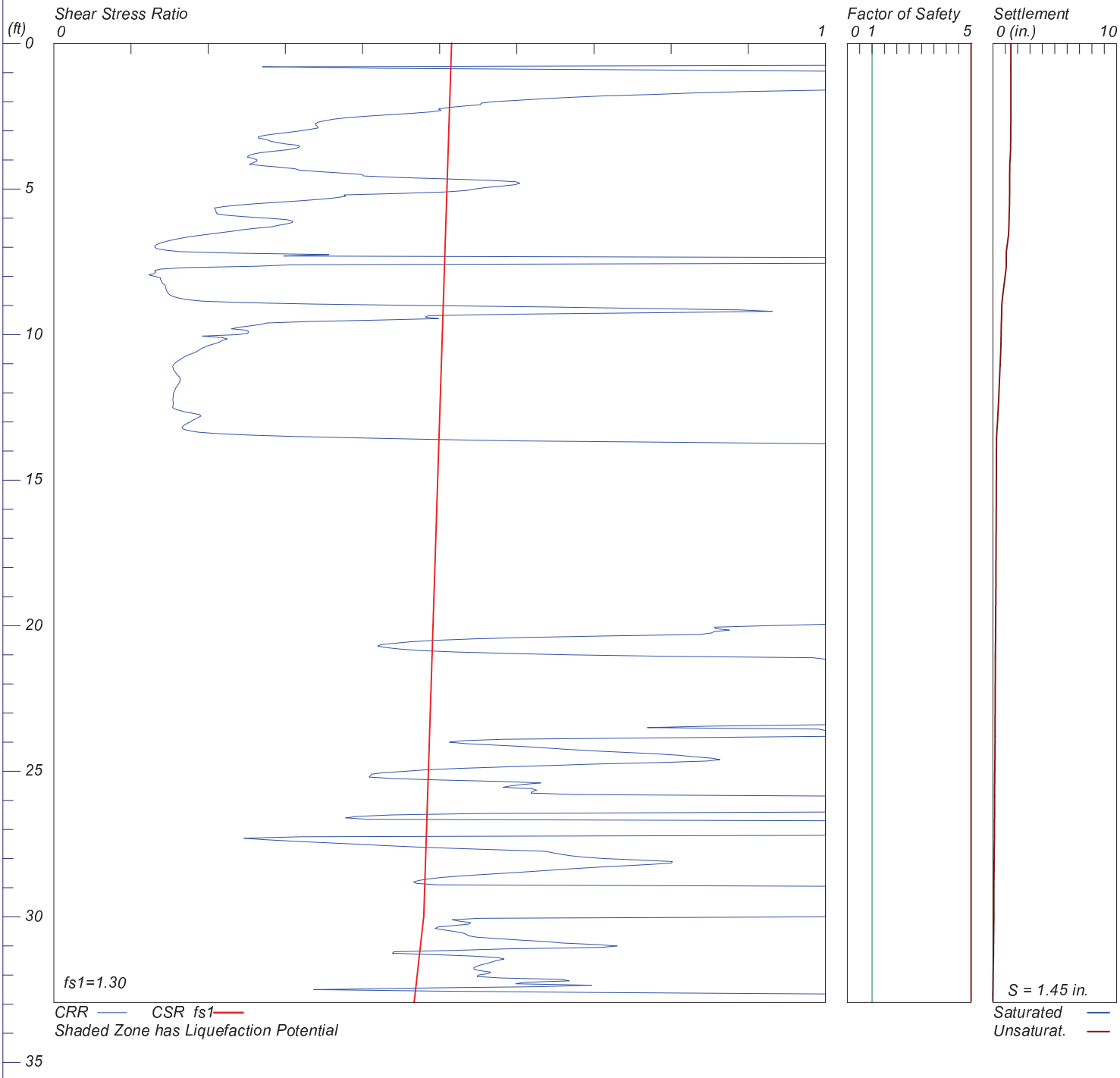
1 atm (atmosphere) = 1 tsf (ton/ft2)
CRRm Cyclic resistance ratio from soils
CSRsf Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S. Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat Settlement from saturated sands
S_dry Settlement from Unsaturated Sands
S_all Total Settlement from Saturated and Unsaturated Sands
NoLiq No-Liquefy Soils

LIQUEFACTION ANALYSIS

CPT-3

Hole No.=CPT-3 Water Depth=100 ft

Magnitude=6.9
Acceleration=.61g



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LIQUEFACTION ANALYSIS SUMMARY

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Input File Name: G:\Projects\200000 - Irvine\208450 - 208499\208465\208465002\Electronic Project File\Data Analysis & Calculations\Liquefaction\CPT 11-21-18\CPT-3_DRY.liq
Title: CPT-3
Subtitle: 208465002

Surface Elev.=
Hole No.=CPT-3
Depth of Hole= 32.94 ft
Water Table during Earthquake= 100.00 ft
Water Table during In-Situ Testing= 28.00 ft
Max. Acceleration= 0.61 g
Earthquake Magnitude= 6.90

Input Data:
Surface Elev.=
Hole No.=CPT-3
Depth of Hole=32.94 ft
Water Table during Earthquake= 100.00 ft
Water Table during In-Situ Testing= 28.00 ft
Max. Acceleration=0.61 g
Earthquake Magnitude=6.90

1. CPT Calculation Method: Modify Robertson*
2. Settlement Analysis Method: Tokimatsu/Seed
3. Fines Correction for Liquefaction: Stark/Olson et al.*
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1
8. Sampling Method, Cs= 1
9. User request factor of safety (apply to CSR) , User= 1.3
   Plot one CSR curve (fs1=User)
10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	qc atm	fs atm	gamma pcf	Fines %	D50 mm
0.00	-0.09	0.00	107.00	0.00	0.50
0.07	-0.09	0.00	107.00	0.00	0.50
0.14	-0.09	0.00	107.00	0.00	0.50
0.20	-0.09	0.00	107.00	0.00	0.50
0.27	-0.09	0.00	107.00	0.00	0.50
0.34	-0.09	0.00	107.00	0.00	0.50
0.41	-0.09	0.00	107.00	0.00	0.50
0.47	-0.09	0.01	107.00	0.00	0.50
0.54	-0.09	0.04	107.00	0.00	0.50

0.61	-0.09	0.11	107.00	0.00	0.50
0.67	-0.09	0.16	107.00	0.00	0.50
0.74	-0.09	0.21	107.00	0.00	0.50
0.81	17.38	0.28	107.90	0.00	0.50
0.87	30.19	0.33	110.40	0.00	0.50
0.93	46.37	0.35	111.80	0.00	0.50
1.00	61.42	0.45	114.40	0.00	0.50
1.07	73.53	0.59	116.80	0.00	0.50
1.14	83.83	0.60	117.20	0.00	0.50
1.21	84.26	0.64	117.70	0.00	0.50
1.27	79.59	0.62	117.40	0.00	0.50
1.34	74.39	0.60	116.90	0.00	0.50
1.40	68.68	0.59	116.70	0.00	0.50
1.47	64.70	0.58	116.40	0.00	0.50
1.53	62.02	0.57	116.10	0.00	0.50
1.60	59.17	0.51	115.30	0.00	0.50
1.67	56.83	0.46	114.40	0.00	0.50
1.73	56.74	0.43	113.90	0.00	0.50
1.80	55.27	0.40	113.20	0.00	0.50
1.86	54.58	0.38	112.90	0.00	0.50
1.93	53.89	0.38	112.80	0.00	0.50
2.00	52.68	0.38	112.80	0.00	0.50
2.04	52.42	0.38	112.70	0.00	0.50
2.10	53.28	0.38	112.90	0.00	0.50
2.18	52.03	0.40	113.00	0.00	0.50
2.24	51.64	0.40	113.10	0.00	0.50
2.30	52.68	0.40	113.20	0.00	0.50
2.37	52.76	0.38	112.90	0.00	0.50
2.44	51.55	0.35	112.20	0.00	0.50
2.50	49.30	0.36	112.20	0.00	0.50
2.57	47.05	0.37	112.30	0.00	0.50
2.64	46.10	0.38	112.40	0.00	0.50
2.70	46.01	0.36	112.20	0.00	0.50
2.77	46.79	0.35	111.80	0.00	0.50
2.84	47.92	0.35	111.90	0.00	0.50
2.90	48.00	0.37	112.40	0.00	0.50
2.97	45.67	0.41	113.00	0.00	0.50
3.03	43.68	0.43	113.20	0.00	0.50
3.10	41.77	0.42	112.90	0.00	0.50
3.16	40.48	0.40	112.60	0.00	0.50
3.23	39.61	0.40	112.40	0.00	0.50
3.30	40.04	0.46	113.50	0.00	0.50
3.36	41.17	0.47	113.70	0.00	0.50
3.43	43.59	0.47	113.90	0.00	0.50
3.50	47.92	0.46	113.90	0.00	0.50
3.57	49.91	0.42	113.50	0.00	0.50
3.63	49.56	0.41	113.30	0.00	0.50
3.69	47.14	0.41	113.10	0.00	0.50
3.76	44.28	0.41	113.00	0.00	0.50
3.83	42.90	0.41	112.90	0.00	0.50
3.89	42.47	0.42	113.00	0.00	0.50
3.96	43.24	0.46	113.60	0.00	0.50
4.03	43.50	0.48	114.10	0.00	0.50
4.09	44.97	0.43	113.30	0.00	0.50
4.16	46.27	0.39	112.60	0.00	0.50
4.22	50.69	0.42	113.40	0.00	0.50
4.29	55.36	0.42	113.60	0.00	0.50
4.36	57.09	0.42	113.70	0.00	0.50
4.43	63.23	0.41	113.80	0.00	0.50
4.49	68.34	0.40	113.80	0.00	0.50
4.56	69.55	0.39	113.70	0.00	0.50
4.62	75.26	0.38	113.80	0.00	0.50
4.69	81.23	0.39	114.10	0.00	0.50

4.75	84.52	0.37	113.70	0.00	0.50
4.82	85.30	0.21	109.80	0.00	0.50
4.89	84.86	0.14	106.60	0.00	0.50
4.92	83.91	0.15	107.10	0.00	0.50
4.99	83.31	0.19	108.80	0.00	0.50
5.06	82.87	0.22	109.80	0.00	0.50
5.12	80.88	0.23	110.30	0.00	0.50
5.20	72.06	0.25	110.40	0.00	0.50
5.26	73.10	0.25	110.40	0.00	0.50
5.32	71.54	0.25	110.40	0.00	0.50
5.38	69.55	0.25	110.30	0.00	0.50
5.47	64.70	0.23	109.80	0.00	0.50
5.53	60.38	0.23	109.60	0.00	0.50
5.59	55.44	0.25	109.70	0.00	0.50
5.65	51.64	0.26	109.90	0.00	0.50
5.71	51.85	0.27	110.30	0.00	0.50
5.81	51.85	0.29	110.80	0.00	0.50
5.86	52.07	0.30	111.00	0.00	0.50
5.93	57.43	0.31	111.50	0.00	0.50
5.99	63.49	0.35	112.70	0.00	0.50
6.05	68.08	0.38	113.50	0.00	0.50
6.12	69.64	0.40	113.80	0.00	0.50
6.18	69.20	0.39	113.70	0.00	0.50
6.24	67.73	0.38	113.30	0.00	0.50
6.30	67.13	0.35	112.90	0.00	0.50
6.37	63.06	0.33	112.10	0.00	0.50
6.46	59.60	0.29	111.10	0.00	0.50
6.53	55.96	0.27	110.40	0.00	0.50
6.58	52.76	0.25	109.60	0.00	0.50
6.64	49.30	0.21	108.30	0.00	0.50
6.70	45.58	0.19	107.50	0.00	0.50
6.77	41.25	0.19	107.00	0.00	0.50
6.82	37.19	0.19	106.80	0.00	0.50
6.91	30.87	0.20	106.70	0.00	0.50
6.97	27.15	0.22	107.00	0.00	0.50
7.03	23.52	0.24	107.50	0.00	0.50
7.10	19.71	0.27	107.90	0.00	0.50
7.16	16.59	0.27	107.50	0.00	0.50
7.22	14.52	0.29	107.70	0.00	0.50
7.29	12.96	0.34	108.50	0.00	0.50
7.38	11.92	0.36	108.70	0.00	0.50
7.44	11.40	0.37	108.80	0.00	0.50
7.50	10.97	0.37	108.80	0.00	0.50
7.55	11.49	0.37	108.80	0.00	0.50
7.64	15.04	0.34	108.90	0.00	0.50
7.70	18.67	0.31	108.70	0.00	0.50
7.76	21.35	0.26	107.80	0.00	0.50
7.82	22.74	0.23	107.00	0.00	0.50
7.88	23.08	0.27	108.20	0.00	0.50
7.94	23.52	0.18	105.30	0.00	0.50
8.04	25.94	0.29	109.20	0.00	0.50
8.07	27.76	0.29	109.30	0.00	0.50
8.16	32.86	0.29	109.60	0.00	0.50
8.21	32.43	0.29	109.60	0.00	0.50
8.29	36.06	0.29	110.00	0.00	0.50
8.35	35.62	0.31	110.30	0.00	0.50
8.41	36.83	0.30	110.20	0.00	0.50
8.48	37.87	0.29	110.10	0.00	0.50
8.53	39.08	0.29	110.20	0.00	0.50
8.63	40.98	0.29	110.30	0.00	0.50
8.69	40.90	0.34	111.30	0.00	0.50
8.75	43.32	0.38	112.30	0.00	0.50
8.81	47.82	0.41	113.00	0.00	0.50

8.87	55.26	0.49	114.70	0.00	0.50
8.94	68.67	0.82	119.10	0.00	0.50
9.00	83.12	1.28	122.80	0.00	0.50
9.06	92.04	1.83	125.60	0.00	0.50
9.15	114.90	1.90	126.50	0.00	0.50
9.21	122.20	1.81	126.30	0.00	0.50
9.27	104.50	1.72	125.50	0.00	0.50
9.33	76.46	1.64	124.40	0.00	0.50
9.39	56.29	1.63	123.60	0.00	0.50
9.45	50.75	1.61	123.20	0.00	0.50
9.52	52.93	1.40	122.40	0.00	0.50
9.58	53.53	1.01	120.00	0.00	0.50
9.67	59.16	0.89	119.30	0.00	0.50
9.74	64.00	0.67	117.50	0.00	0.50
9.80	68.93	0.49	115.30	0.00	0.50
9.86	75.68	0.50	115.70	0.00	0.50
9.93	73.43	0.53	116.00	0.00	0.50
9.99	73.78	0.56	116.50	0.00	0.50
10.04	49.56	0.57	115.60	0.00	0.50
10.12	68.24	0.55	116.10	0.00	0.50
10.18	65.73	0.52	115.60	0.00	0.50
10.24	65.73	0.51	115.50	0.00	0.50
10.31	65.73	0.46	114.70	0.00	0.50
10.37	64.69	0.42	114.00	0.00	0.50
10.43	63.74	0.40	113.60	0.00	0.50
10.52	62.01	0.39	113.30	0.00	0.50
10.58	61.41	0.38	113.20	0.00	0.50
10.64	60.02	0.37	113.00	0.00	0.50
10.70	57.60	0.36	112.70	0.00	0.50
10.76	55.78	0.36	112.50	0.00	0.50
10.85	52.84	0.37	112.50	0.00	0.50
10.92	51.11	0.36	112.30	0.00	0.50
10.98	49.81	0.36	112.20	0.00	0.50
11.04	48.69	0.36	112.10	0.00	0.50
11.11	47.91	0.36	112.20	0.00	0.50
11.17	47.65	0.37	112.40	0.00	0.50
11.23	47.21	0.39	112.80	0.00	0.50
11.29	46.87	0.42	113.20	0.00	0.50
11.35	46.70	0.44	113.50	0.00	0.50
11.44	45.66	0.48	114.10	0.00	0.50
11.49	44.79	0.50	114.40	0.00	0.50
11.55	43.49	0.51	114.50	0.00	0.50
11.61	41.94	0.52	114.50	0.00	0.50
11.68	39.95	0.52	114.40	0.00	0.50
11.77	37.35	0.51	114.10	0.00	0.50
11.83	36.05	0.50	113.80	0.00	0.50
11.89	34.84	0.49	113.60	0.00	0.50
11.95	34.24	0.48	113.50	0.00	0.50
12.01	33.89	0.47	113.30	0.00	0.50
12.07	33.89	0.47	113.30	0.00	0.50
12.16	33.89	0.47	113.30	0.00	0.50
12.22	34.49	0.47	113.40	0.00	0.50
12.28	35.45	0.48	113.50	0.00	0.50
12.34	36.83	0.49	113.70	0.00	0.50
12.42	39.51	0.49	113.90	0.00	0.50
12.48	42.11	0.47	113.80	0.00	0.50
12.54	45.92	0.46	113.80	0.00	0.50
12.60	51.37	0.47	114.20	0.00	0.50
12.67	57.77	0.47	114.50	0.00	0.50
12.73	62.79	0.53	115.70	0.00	0.50
12.79	65.47	0.51	115.50	0.00	0.50
12.88	65.13	0.47	114.80	0.00	0.50
12.95	62.88	0.46	114.70	0.00	0.50

13.01	61.66	0.46	114.60	0.00	0.50
13.07	58.81	0.46	114.50	0.00	0.50
13.13	57.25	0.46	114.40	0.00	0.50
13.19	55.95	0.46	114.40	0.00	0.50
13.25	57.51	0.46	114.40	0.00	0.50
13.34	65.73	0.46	114.70	0.00	0.50
13.40	77.85	0.48	115.50	0.00	0.50
13.46	92.21	0.53	116.60	0.00	0.50
13.52	107.60	0.68	118.80	0.00	0.50
13.58	123.30	0.92	121.40	0.00	0.50
13.67	148.90	0.79	120.70	0.00	0.50
13.72	169.80	0.89	121.90	0.00	0.50
13.78	192.10	1.07	123.50	0.00	0.50
13.84	208.90	1.02	123.40	0.00	0.50
13.93	216.80	1.20	124.70	0.00	0.50
14.00	223.00	1.21	124.80	0.00	0.50
14.06	244.20	1.41	126.20	0.00	0.50
14.13	240.00	1.52	126.70	0.00	0.50
14.20	236.70	1.55	126.80	0.00	0.50
14.26	239.40	1.54	126.70	0.00	0.50
14.32	250.70	1.51	126.70	0.00	0.50
14.39	260.50	1.64	127.40	0.00	0.50
14.45	271.90	1.73	127.90	0.00	0.50
14.50	271.20	1.82	128.30	0.00	0.50
14.59	270.50	1.78	128.10	0.00	0.50
14.65	276.50	1.65	127.60	0.00	0.50
14.72	287.70	1.71	127.90	0.00	0.50
14.78	296.70	1.89	128.70	0.00	0.50
14.85	298.70	1.88	128.70	0.00	0.50
14.91	310.60	1.91	128.90	0.00	0.50
14.97	321.20	1.93	129.10	0.00	0.50
15.03	325.70	1.93	129.10	0.00	0.50
15.10	337.40	1.93	129.20	0.00	0.50
15.17	330.20	1.86	128.90	0.00	0.50
15.23	320.50	1.92	129.10	0.00	0.50
15.29	313.20	2.17	129.90	0.00	0.50
15.38	313.30	2.39	130.60	0.00	0.50
15.43	315.00	2.17	129.90	0.00	0.50
15.49	315.20	2.10	129.70	0.00	0.50
15.55	312.50	2.06	129.50	0.00	0.50
15.64	293.10	1.86	128.60	0.00	0.50
15.70	277.00	1.81	128.30	0.00	0.50
15.76	278.20	1.89	128.60	0.00	0.50
15.82	275.50	1.95	128.80	0.00	0.50
15.88	276.40	2.11	129.40	0.00	0.50
15.97	284.00	2.35	130.20	0.00	0.50
16.03	288.70	2.39	130.40	0.00	0.50
16.09	288.60	2.31	130.20	0.00	0.50
16.15	279.90	2.27	130.00	0.00	0.50
16.21	273.50	2.42	130.40	0.00	0.50
16.29	273.50	2.59	130.90	0.00	0.50
16.35	283.30	2.27	130.00	0.00	0.50
16.41	293.40	1.97	129.00	0.00	0.50
16.47	307.40	1.92	129.00	0.00	0.50
16.53	318.80	2.01	129.40	0.00	0.50
16.62	325.80	1.88	128.90	0.00	0.50
16.68	331.80	1.87	128.90	0.00	0.50
16.74	325.00	1.81	128.70	0.00	0.50
16.80	328.60	1.92	129.10	0.00	0.50
16.88	328.90	2.46	130.90	0.00	0.50
16.94	327.50	2.57	131.20	0.00	0.50
17.00	326.40	2.15	129.90	0.00	0.50
17.06	320.60	2.03	129.50	0.00	0.50

17.12	313.90	2.05	129.50	0.00	0.50
17.21	297.20	2.79	131.60	0.00	0.50
17.27	296.90	3.27	132.80	0.00	0.50
17.33	296.90	3.27	132.80	0.00	0.50
17.39	296.50	3.28	132.80	0.00	0.50
17.46	303.20	3.30	132.90	0.00	0.50
17.54	337.30	3.99	134.50	0.00	0.50
17.59	354.50	5.33	136.80	0.00	0.50
17.65	358.90	5.94	137.60	0.00	0.50
17.72	382.20	5.55	137.30	0.00	0.50
17.78	430.50	5.25	137.10	0.00	0.50
17.86	408.80	4.83	136.40	0.00	0.50
17.92	453.90	5.05	137.00	0.00	0.50
17.98	455.70	4.74	136.50	0.00	0.50
18.04	462.40	3.84	135.00	0.00	0.50
18.11	419.70	3.33	133.70	0.00	0.50
18.18	410.60	3.06	133.10	0.00	0.50
18.24	411.20	3.39	133.80	0.00	0.50
18.31	403.40	3.99	135.00	0.00	0.50
18.37	445.30	4.14	135.50	0.00	0.50
18.44	455.30	4.47	136.10	0.00	0.50
18.50	423.50	5.10	136.90	0.00	0.50
18.57	354.70	4.89	136.10	0.00	0.50
18.64	364.70	4.61	135.80	0.00	0.50
18.70	373.50	4.38	135.50	0.00	0.50
18.76	375.90	3.98	134.80	0.00	0.50
18.84	330.70	3.38	133.30	0.00	0.50
18.90	306.10	3.15	132.60	0.00	0.50
18.97	308.20	2.96	132.10	0.00	0.50
19.03	305.80	2.70	131.40	0.00	0.50
19.10	303.70	2.46	130.70	0.00	0.50
19.16	300.20	2.17	129.80	0.00	0.50
19.22	297.20	2.01	129.20	0.00	0.50
19.29	290.10	2.10	129.40	0.00	0.50
19.37	290.40	1.72	128.00	0.00	0.50
19.42	290.40	1.65	127.70	0.00	0.50
19.49	290.60	1.83	128.50	0.00	0.50
19.55	280.90	1.68	127.80	0.00	0.50
19.62	264.60	1.98	128.80	0.00	0.50
19.69	266.40	1.79	128.10	0.00	0.50
19.75	261.50	1.76	127.90	0.00	0.50
19.82	237.60	1.88	128.20	0.00	0.50
19.88	233.80	1.92	128.30	0.00	0.50
19.94	230.60	1.86	128.00	0.00	0.50
20.02	199.60	1.78	127.30	0.00	0.50
20.10	201.30	1.74	127.20	0.00	0.50
20.16	202.10	1.84	127.60	0.00	0.50
20.22	198.60	1.81	127.50	0.00	0.50
20.29	206.30	1.61	126.70	0.00	0.50
20.35	188.80	1.55	126.20	0.00	0.50
20.42	166.70	1.56	125.90	0.00	0.50
20.48	154.20	1.55	125.70	0.00	0.50
20.54	144.70	1.56	125.60	0.00	0.50
20.61	138.40	1.56	125.50	0.00	0.50
20.67	132.40	1.58	125.50	0.00	0.50
20.73	128.00	1.76	126.20	0.00	0.50
20.83	131.20	1.93	126.90	0.00	0.50
20.89	141.10	1.98	127.30	0.00	0.50
20.95	160.00	1.93	127.40	0.00	0.50
21.02	184.40	1.80	127.20	0.00	0.50
21.08	204.70	2.02	128.30	0.00	0.50
21.15	234.10	2.52	130.30	0.00	0.50
21.21	266.10	2.64	130.90	0.00	0.50

21.27	290.70	2.47	130.70	0.00	0.50
21.34	314.70	2.49	130.90	0.00	0.50
21.40	350.60	2.45	131.00	0.00	0.50
21.46	391.70	2.50	131.50	0.00	0.50
21.53	428.30	3.36	133.80	0.00	0.50
21.60	479.50	5.12	137.20	0.00	0.50
21.66	517.10	6.22	138.80	0.00	0.50
21.73	590.90	6.24	139.20	0.00	0.50
21.79	655.60	6.00	139.10	0.00	0.50
21.85	630.20	6.04	139.10	0.00	0.50
21.91	501.80	6.06	138.60	0.00	0.50
21.99	406.60	5.86	137.80	0.00	0.50
22.05	369.40	5.23	136.70	0.00	0.50
22.11	354.80	4.32	135.20	0.00	0.50
22.18	336.50	4.07	134.70	0.00	0.50
22.24	297.00	4.05	134.30	0.00	0.50
22.31	228.40	3.83	133.30	0.00	0.50
22.39	201.40	4.05	133.40	0.00	0.50
22.45	180.40	4.16	133.30	0.00	0.50
22.50	177.30	4.17	133.30	0.00	0.50
22.60	167.20	4.45	133.60	0.00	0.50
22.66	156.20	4.61	133.70	0.00	0.50
22.72	150.50	4.58	133.60	0.00	0.50
22.79	148.00	4.57	133.50	0.00	0.50
22.85	152.80	4.56	133.60	0.00	0.50
22.92	173.30	4.51	133.80	0.00	0.50
22.98	207.80	4.52	134.30	0.00	0.50
23.05	247.70	4.52	134.70	0.00	0.50
23.11	293.40	4.51	135.10	0.00	0.50
23.17	365.20	4.50	135.60	0.00	0.50
23.23	366.50	4.58	135.70	0.00	0.50
23.30	297.20	4.51	135.10	0.00	0.50
23.37	197.00	4.35	133.80	0.00	0.50
23.43	141.30	4.32	133.00	0.00	0.50
23.49	110.30	3.79	131.40	0.00	0.50
23.55	83.08	3.53	130.20	0.00	0.50
23.62	62.40	3.34	129.10	0.00	0.50
23.70	64.32	3.14	128.70	0.00	0.50
23.76	65.61	2.99	128.40	0.00	0.50
23.83	69.33	2.94	128.40	0.00	0.50
23.89	84.47	2.92	128.90	0.00	0.50
23.95	95.20	2.89	129.10	0.00	0.50
24.02	113.10	2.89	129.50	0.00	0.50
24.08	129.50	2.96	130.00	0.00	0.50
24.15	140.10	3.09	130.50	0.00	0.50
24.21	150.40	3.10	130.70	0.00	0.50
24.28	159.50	3.12	130.90	0.00	0.50
24.37	171.80	3.21	131.30	0.00	0.50
24.43	177.10	3.32	131.60	0.00	0.50
24.50	180.50	3.38	131.80	0.00	0.50
24.56	184.20	3.42	131.90	0.00	0.50
24.63	185.00	3.47	132.00	0.00	0.50
24.69	183.30	3.18	131.40	0.00	0.50
24.75	179.70	2.73	130.20	0.00	0.50
24.82	172.90	2.46	129.30	0.00	0.50
24.88	163.30	2.24	128.50	0.00	0.50
24.94	151.70	2.16	128.10	0.00	0.50
25.01	139.80	2.21	128.10	0.00	0.50
25.08	119.30	2.33	128.10	0.00	0.50
25.14	113.00	2.41	128.20	0.00	0.50
25.20	99.62	2.46	128.00	0.00	0.50
25.26	87.33	2.56	128.00	0.00	0.50
25.33	78.42	2.68	128.00	0.00	0.50

25.39	74.70	2.71	128.00	0.00	0.50
25.46	75.31	2.67	127.90	0.00	0.50
25.55	80.15	2.77	128.40	0.00	0.50
25.61	80.41	2.88	128.60	0.00	0.50
25.68	80.33	2.87	128.60	0.00	0.50
25.74	76.78	2.73	128.10	0.00	0.50
25.80	68.30	2.52	127.30	0.00	0.50
25.86	57.74	2.30	126.20	0.00	0.50
25.93	49.43	2.17	125.40	0.00	0.50
25.99	43.98	2.07	124.80	0.00	0.50
26.05	41.04	2.01	124.40	0.00	0.50
26.12	40.00	1.98	124.20	0.00	0.50
26.18	41.91	2.00	124.40	0.00	0.50
26.25	45.19	1.95	124.40	0.00	0.50
26.31	47.44	1.79	123.90	0.00	0.50
26.37	50.13	1.85	124.30	0.00	0.50
26.47	65.27	2.17	126.10	0.00	0.50
26.53	77.38	2.24	126.70	0.00	0.50
26.60	73.40	2.09	126.10	0.00	0.50
26.66	62.07	1.89	124.90	0.00	0.50
26.72	50.65	1.75	123.90	0.00	0.50
26.79	41.73	1.62	122.80	0.00	0.50
26.85	35.85	1.54	122.10	0.00	0.50
26.91	32.99	1.52	121.80	0.00	0.50
26.98	31.78	1.52	121.70	0.00	0.50
27.05	31.44	1.51	121.60	0.00	0.50
27.11	31.00	1.49	121.50	0.00	0.50
27.17	35.59	1.49	121.80	0.00	0.50
27.24	52.03	1.50	122.80	0.00	0.50
27.30	80.33	1.55	124.10	0.00	0.50
27.36	106.80	1.67	125.40	0.00	0.50
27.43	123.90	1.85	126.50	0.00	0.50
27.49	134.10	2.08	127.50	0.00	0.50
27.56	140.00	2.38	128.60	0.00	0.50
27.62	141.80	2.72	129.60	0.00	0.50
27.69	142.40	3.24	130.90	0.00	0.50
27.75	142.40	3.63	131.70	0.00	0.50
27.82	143.40	3.69	131.90	0.00	0.50
27.88	146.20	3.73	132.00	0.00	0.50
27.98	159.40	3.74	132.20	0.00	0.50
28.04	176.50	3.70	132.40	0.00	0.50
28.11	194.50	3.55	132.30	0.00	0.50
28.17	201.70	3.24	131.80	0.00	0.50
28.23	204.90	2.86	130.90	0.00	0.50
28.30	205.40	2.52	130.00	0.00	0.50
28.36	201.90	2.39	129.50	0.00	0.50
28.42	195.50	2.40	129.50	0.00	0.50
28.49	186.80	2.40	129.40	0.00	0.50
28.55	174.40	2.51	129.50	0.00	0.50
28.62	157.80	2.68	129.80	0.00	0.50
28.68	139.60	2.89	130.00	0.00	0.50
28.74	121.30	3.00	129.90	0.00	0.50
28.81	100.40	2.91	129.30	0.00	0.50
28.87	80.76	2.61	127.90	0.00	0.50
28.96	61.89	2.13	125.80	0.00	0.50
29.03	52.03	1.81	124.20	0.00	0.50
29.09	42.77	1.55	122.60	0.00	0.50
29.15	36.80	1.30	120.90	0.00	0.50
29.22	34.12	1.17	120.00	0.00	0.50
29.28	33.34	1.29	120.60	0.00	0.50
29.35	33.51	1.59	122.20	0.00	0.50
29.41	35.42	1.89	123.50	0.00	0.50
29.47	40.87	2.13	124.80	0.00	0.50

29.53	55.66	2.35	126.20	0.00	0.50
29.60	65.36	2.50	127.10	0.00	0.50
29.65	68.11	2.48	127.10	0.00	0.50
29.75	66.47	2.47	127.10	0.00	0.50
29.81	64.13	2.46	126.90	0.00	0.50
29.88	61.02	2.53	127.00	0.00	0.50
29.94	60.93	2.68	127.50	0.00	0.50
30.00	69.15	2.83	128.20	0.00	0.50
30.07	93.63	2.99	129.30	0.00	0.50
30.14	96.92	3.09	129.60	0.00	0.50
30.20	99.95	3.20	129.90	0.00	0.50
30.27	104.50	3.26	130.20	0.00	0.50
30.33	113.50	3.20	130.30	0.00	0.50
30.39	129.10	3.11	130.40	0.00	0.50
30.46	147.40	2.98	130.40	0.00	0.50
30.52	159.30	2.85	130.20	0.00	0.50
30.58	164.60	2.79	130.20	0.00	0.50
30.65	162.70	2.87	130.30	0.00	0.50
30.71	155.50	3.13	130.90	0.00	0.50
30.77	144.60	3.55	131.60	0.00	0.50
30.84	129.20	3.85	131.90	0.00	0.50
30.91	113.80	3.86	131.60	0.00	0.50
30.97	101.50	3.79	131.20	0.00	0.50
31.04	92.60	3.54	130.50	0.00	0.50
31.10	92.90	3.21	129.80	0.00	0.50
31.17	93.20	2.96	129.20	0.00	0.50
31.23	120.80	2.81	129.50	0.00	0.50
31.32	168.70	2.69	129.90	0.00	0.50
31.39	188.10	2.49	129.70	0.00	0.50
31.45	197.90	2.25	129.00	0.00	0.50
31.51	203.00	1.99	128.20	0.00	0.50
31.58	205.40	1.85	127.70	0.00	0.50
31.64	203.40	1.85	127.70	0.00	0.50
31.71	198.90	1.95	128.00	0.00	0.50
31.78	191.80	2.16	128.70	0.00	0.50
31.84	182.50	2.53	129.70	0.00	0.50
31.90	169.60	3.01	130.80	0.00	0.50
31.96	150.60	3.38	131.30	0.00	0.50
32.03	129.60	3.48	131.20	0.00	0.50
32.09	111.20	3.51	130.90	0.00	0.50
32.15	98.92	3.56	130.70	0.00	0.50
32.22	97.36	3.55	130.60	0.00	0.50
32.28	106.10	3.43	130.60	0.00	0.50
32.35	129.40	4.17	132.50	0.00	0.50
32.41	147.10	3.79	132.10	0.00	0.50
32.51	170.80	0.77	120.80	0.00	0.50
32.54	192.80	1.66	126.80	0.00	0.50
32.64	271.10	0.00	127.00	0.00	0.50
32.70	448.50	0.00	127.00	0.00	0.50
32.74	558.10	0.00	127.00	0.00	0.50
32.81	878.40	0.00	127.00	0.00	0.50
32.87	352.30	0.00	127.00	0.00	0.50
32.94	1047.00	0.00	127.00	0.00	0.50

Modify Robertson method generates Fines from qc/fs. Inputted Fines are not relevant.

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=1.45 in.
Total Settlement of Saturated and Unsaturated Sands=1.45 in.
Differential Settlement=0.727 to 0.959 in.

CPT-3_DRY.sum

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
0.00	2.00	0.52	5.00	0.00	1.45	1.45
1.00	2.23	0.51	5.00	0.00	1.45	1.45
2.00	0.57	0.51	5.00	0.00	1.45	1.45
3.00	0.32	0.51	5.00	0.00	1.44	1.44
4.00	0.26	0.51	5.00	0.00	1.39	1.39
5.00	0.55	0.51	5.00	0.00	1.35	1.35
6.00	0.28	0.51	5.00	0.00	1.31	1.31
7.00	0.13	0.51	5.00	0.00	1.13	1.13
8.00	0.13	0.51	5.00	0.00	0.99	0.99
9.00	0.48	0.50	5.00	0.00	0.72	0.72
10.00	0.24	0.50	5.00	0.00	0.66	0.66
11.00	0.16	0.50	5.00	0.00	0.59	0.59
12.00	0.16	0.50	5.00	0.00	0.49	0.49
13.00	0.18	0.50	5.00	0.00	0.37	0.37
14.00	1.91	0.50	5.00	0.00	0.29	0.29
15.00	2.57	0.50	5.00	0.00	0.28	0.28
16.00	2.57	0.50	5.00	0.00	0.27	0.27
17.00	2.57	0.50	5.00	0.00	0.26	0.26
18.00	2.57	0.49	5.00	0.00	0.25	0.25
19.00	2.57	0.49	5.00	0.00	0.24	0.24
20.00	0.92	0.49	5.00	0.00	0.22	0.22
21.00	0.67	0.49	5.00	0.00	0.20	0.20
22.00	2.57	0.49	5.00	0.00	0.19	0.19
23.00	1.44	0.49	5.00	0.00	0.18	0.18
24.00	0.51	0.49	5.00	0.00	0.17	0.17
25.00	0.46	0.49	5.00	0.00	0.15	0.15
26.00	2.00	0.48	5.00	0.00	0.14	0.14
27.00	2.00	0.48	5.00	0.00	0.13	0.13
28.00	0.71	0.48	5.00	0.00	0.10	0.10
29.00	2.00	0.48	5.00	0.00	0.08	0.08
30.00	2.00	0.48	5.00	0.00	0.08	0.08
31.00	0.73	0.48	5.00	0.00	0.05	0.05
32.00	0.55	0.47	5.00	0.00	0.02	0.02

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Depth = ft, Stress or Pressure = atm (tsf), Unit Weight = pcf, Settlement = in.

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1 atm (atmosphere) = 1 tsf (ton/ft2)
CRRm Cyclic resistance ratio from soils
CSRsf Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S. Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat Settlement from saturated sands
S_dry Settlement from Unsaturated Sands
S_all Total Settlement from Saturated and Unsaturated Sands
NoLiq No-Liquefy Soils

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