

# Geotechnical and Infiltration Evaluation



DEPARTMENT OF PUBLIC WORKS  
SUBDIVISIONS

**APPROVED**

Aram Eftekhari, Associate Engineer

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**GEOTECHNICAL AND INFILTRATION EVALUATION  
FOR  
PROPOSED MULTI-FAMILY RESIDENTIAL DEVELOPMENT  
2323 WEST BROADWAY  
CITY OF ANAHEIM, ORANGE COUNTY, CALIFORNIA**

**PREPARED FOR**

**MELIA HOMES  
895 I RESEARCH DRIVE  
IRVINE, CALIFORNIA 92618**

**PREPARED BY**

**GEOTEK, INC.  
1548 NORTH MAPLE STREET  
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October 29, 2020  
Project No. 2496-CR

**Melia Homes**

8951 Research Drive  
Irvine, California 92618

Attention: Mr. Chad Brown

Subject: Geotechnical and Infiltration Evaluation  
Proposed Multi-Family Residential Development  
2323 West Broadway  
City of Anaheim, Orange County, California

Dear Mr. Brown:

We are pleased to provide herein the results of our geotechnical and infiltration evaluation for the subject property located in the city of Anaheim, Orange County, California. This report presents a discussion of our evaluation and provides preliminary geotechnical recommendations for earthwork, foundation design, and construction. In our opinion, site development appears feasible from a geotechnical viewpoint provided that the recommendations included herein are incorporated into the design and construction phases of site development.

The opportunity to be of service is sincerely appreciated. If you should have any questions, please do not hesitate to call our office.

Respectfully submitted,  
**GeoTek, Inc.**



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Distribution: (1) pdf file sent via email to addressee

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## **I. PURPOSE AND SCOPE OF SERVICES**

The purpose of this study was to complete a geotechnical evaluation of the existing geotechnical conditions of the project site with respect to currently anticipated site development. Services provided for this study included the following:

- Research and review of available geologic and geotechnical data, and general information pertinent to the site,
- Site reconnaissance,
- Site exploration consisting of the excavation, logging, and sampling of six exploratory hollow-stem auger borings; logging and percolation testing of three hollow-stem auger borings; and recording of penetration data of four Cone Penetration Test (CPT) soundings,
- Collection of relatively undisturbed and bulk soil samples of the onsite materials,
- Laboratory testing of the soil samples obtained from the site,
- Review and evaluation of site seismicity,
- Engineering analyses, and
- Compilation of this geotechnical and infiltration report which presents our findings, conclusions, and recommendations for site development.

The intent of this report is to aid in the assessment of the site for future proposed development from a geotechnical perspective. The professional opinions and geotechnical information contained in this report may need to be updated based upon our review of the final site development plans. These plans should be provided to GeoTek, Inc. (GeoTek) for review when available.

## **2. SITE DESCRIPTION AND PROPOSED DEVELOPMENT**

### **2.1 SITE DESCRIPTION**

The subject site is addressed 2323 West Broadway in the city of Anaheim, Orange County, California. The site is a rectangular-shaped parcel consisting of 6.5-acres and is currently

occupied by a school facility which includes various one-story buildings, tennis/basketball courts, parking/drive areas, hardscape as well as landscape improvements.

The site has generally flat topography with a gentle fall of two to three feet to the south. Surface drainage is to the south, with some local variations.

The site is bounded by single-family residences to the north and west, an apartment complex to the east, and West Broadway Street with single-family homes to the south.

The general location of the site is shown in Figure 1. The current improvements on the site are displayed on a Google Earth aerial image shown as Figure 2, Exploration Location Map.

## **2.2 PROPOSED DEVELOPMENT**

According to the Conceptual Site Plan, prepared by Summa Architects and dated April 7, 2020, the property will be developed with 112 townhomes and related improvements. The structures are anticipated to be up to three stories, of wood-framed construction, and will utilize either concrete slab-on-grade floors and shallow spread foundations or post-tensioned slabs. Cuts and fills are estimated to be less than two feet in height. In addition, we anticipate that stormwater at the site be managed via relatively shallow infiltration systems. Specific test locations for design of these systems were selected by the project civil engineer. A total of three site locations were tested.

If site development differs from the assumptions made herein, the recommendations included in this report should be subject to further review and evaluation. Site development plans should be reviewed by GeoTek when they become available. Additional geotechnical field exploration, analyses and recommendations may be necessary upon review of site development plans.

## **3. FIELD EXPLORATION, LABORATORY TESTING, AND PERCOLATION TESTING**

### **3.1 FIELD EXPLORATION**

The soils underlying the site were explored on September 21, and October 2, 2020 by means of excavating four CPT soundings to maximum depths of 50 feet below the ground surface and six exploratory borings to depths between 20 and 51.5 feet. In addition, three percolation test borings approximately 5 feet deep were advanced within the anticipated future infiltration areas. The borings were drilled with a track-mounted hollow-stem auger drill rig and the CPT soundings with a 30-ton CPT rig.

The approximate locations of our site explorations are shown on the Exploration Location Map, Figure 2. Logs of the borings and CPT soundings are provided in Appendices A and B.

### 3.2 LABORATORY TESTING

Laboratory testing was performed on selected relatively undisturbed and bulk soil samples collected during the field exploration. The purpose of the laboratory testing was to confirm the field classification of the soil materials encountered and to evaluate the soils physical properties for use in the engineering design and analysis. Results of the laboratory testing program along with a brief description and relevant information regarding testing procedures are included in Appendix C.

### 3.3 PERCOLATION TESTING

Percolation testing was performed at boring locations P-1 through P-3 to assess the infiltration characteristics of the site soils underlying future storm water system areas. Test locations were chosen by the project civil engineer. The borings were excavated to approximately five feet below the existing grade, which was assumed to be the approximate invert depth of the infiltration systems. The boring diameter was approximately eight inches. Percolation testing was performed within the lower approximately 24 inches in the borings by a representative of our firm, in general conformance with the Boring Percolation Test Procedure outlined in the *Technical Guidance Document Appendix VII* (Orange County, 2011). As required, the percolation rates were corrected to account for discharge of water from both the sides and bottom of the borings. This correction was done using the Porchet Method, obtaining the infiltration rates tabulated below:

SUMMARY OF RESULTS	
Boring	Measured Infiltration Rate (inches per hour)
P-1	1.7
P-2	2.2
P-3	0.6

A suitable factor of safety should be applied to the measured rates to design the infiltration system. Detailed percolation/infiltration test data is included in Appendix D. It also should be noted that in the area of P-3, the soils tested were very moist prior to testing. The resulting infiltration rate for this hole was relatively slow. It is our opinion that the infiltration rates measured in borings P-1 and P-2 are more representative of the site as a whole, as the near surface soil conditions are otherwise very similar.



## 4. GEOLOGIC AND SOILS CONDITIONS

### 4.1 REGIONAL SETTING

The subject property is situated in the Peninsular Ranges geomorphic province. The Peninsular Ranges province is one of the largest geomorphic units in western North America. Basically, it extends roughly 975 miles from the north and extends from the Transverse Ranges geomorphic province to the tip of Baja California, from north to south. This province varies in width from about 30 to 100 miles. It is bounded on the west by the Pacific Ocean, on the south by the Gulf of California and on the east by the Colorado Desert Province.

The Peninsular Ranges are essentially a series of northwest-southeast oriented fault blocks. Several major fault zones are found in this province. The Elsinore Fault zone and the San Jacinto Fault zone trend northwest-southeast and are found in the near the middle of the province. The San Andreas Fault zone borders the northeasterly margin of the province.

More specific to the subject property, Morton, D.M., and Miller, F.K., (2006) map the site to be underlain by Quaternary age younger alluvial fan deposits. Additionally, the nearest known active fault to the site is the Lower Elysian Park Thrust fault located approximately two miles to the northeast.

### 4.2 GENERAL SOIL/GEOLOGIC CONDITIONS

A brief description of the earth materials encountered in our explorations is presented in the following sections.

#### 4.2.1 Undocumented Fill

Undocumented fill was encountered in all exploratory borings to approximately two to three feet below the existing ground surface. The fill consisted of brown, moist silty sand, sandy clay, and sandy silt.

#### 4.2.2 Young Alluvial Fan Deposits

Young alluvial fan deposits were encountered in our borings below the fill and extended to the maximum depth explored of about 51.5 feet. The young alluvial fan deposits encountered consisted of interbedded units of silty sand, poorly graded sand, clayey sand, sandy silt, and clay. The alluvium was brown to tan in color, slightly moist to moist, and loose/soft to medium dense/stiff to the total depth explored, based on our field observations, blow counts, and in-place density determinations. Collapse tests conducted on the most unfavorable units of the

alluvium (selected based on blow counts and in-place soil density) indicated a negligible potential for collapse upon application of water and load.

The near surface site soils were found to have “low” expansion potential when tested and classified in accordance with ASTM D 4829.

### **4.3 SURFACE WATER AND GROUNDWATER**

#### **4.3.1 Surface Water**

If encountered during the earthwork construction, surface water on this site is the result of precipitation or surface run-off from surrounding sites. Overall drainage in the area is variable, and most commonly directed toward the south. Provisions for surface drainage will need to be accounted for by the project civil engineer.

#### **4.3.2 Groundwater**

Groundwater was not encountered in the deepest exploratory boring, Boring B-1, excavated at the site. Open hole measurements performed at the end of CPT soundings encountered groundwater at 46 feet in both CPT-1 and -2. CPT-3 and -4 holes collapsed, so no groundwater measurements were taken.

Our review of the *Historically Highest Groundwater Map* published within the *Seismic Hazard Zone Report for the Anaheim and Newport Beach Quadrangles* (California Department of Conservation, 1997) reveal past high groundwater levels on the order of 35 to 40 feet in the general area of the site.

The GeoTracker database shows several properties located within one-third of a mile from the site, with depth to groundwater ranging from 46 to 80 feet. This information agrees with the groundwater levels recorded during our field investigation.

Perched groundwater or localized seepage can occur due to variations in rainfall, irrigation practices, and other factors not evident at the time of this investigation.

### **4.4 FAULTING AND SEISMICITY**

The geologic structure of the entire southern California area is dominated mainly by northwest-trending faults associated with the San Andreas system. The site is in a seismically active region. No active or potentially active fault is known to exist at this site nor is the site situated within an “Alquist-Priolo” Earthquake Fault Zone (Bryant and Hart, 2007; CGS, 1986). The northern portion of the subject property is located within a State of California Seismic Hazard Zone for earthquake

induced liquefaction (CGS, 1997). The subject property is not located within a State of California Seismic Hazard Zone for earthquake induced landsliding. The nearest zoned fault is the Newport-Inglewood -Rose Canyon Fault Zone, located approximately 8.5 miles to the southwest.

#### **4.4.1 Seismic Design Parameters**

The site is located at approximately 33.8298<sup>0</sup> Latitude and -117.9639<sup>0</sup> Longitude. Based on the conditions observed in the site excavations and review of regional geologic maps, a Site Class “D” appears to be the appropriate category for the property. Site spectral accelerations ( $S_a$  and  $S_I$ ), for 0.2 and 1.0 second periods for a Class “D” site, were determined from the SEAOC/OSHPD web interface that utilizes the USGS web services and retrieves the seismic design data and presents that information in a report format. As noted using the ASCE 7-16 option on the SEAOC/OSHPD website, the values for  $S_{M1}$  and  $S_{D1}$  are reported as “null-See Section 11.4.8 (of ASCE 7-16)”. As noted in ASCE 7-16, Section 11.4.8, a site-specific ground motion procedure is recommended for Site Class D when the value  $S_I$  exceeds 0.2. The value  $S_I$  for the subject site exceeds 0.2.

For a Site Class D, an exception to performing a site-specific ground motion analysis is allowed in ASCE 7-16 where  $S_I$  exceeds 0.2 provided the value of the seismic response coefficient,  $C_s$ , is conservatively calculated by Eq 12.8-2 of ASCE 7-16 for values of  $T \leq 1.5T_L$  and taken as equal to 1.5 times the value computed in accordance with either Eq. 12.8-3 for  $T_L \geq T > 1.5T_L$  or Eq. 12.8-4 for  $T > T_L$ .

Assuming that the  $C_s$  value calculated by and used by the structural engineer allows for the exclusion per ASCE 7-16, noted above, then a site-specific ground motion analysis is not required. For this assumption and condition, the following seismic design parameters, based on the 2015 National Earthquake Hazards Reduction Program (NEHRP)/ASCE 7-16, are presented on the following table:

<b>SITE SEISMIC PARAMETERS</b>	
Mapped 0.2 sec Period Spectral Acceleration, $S_s$	1.465g
Mapped 1.0 sec Period Spectral Acceleration, $S_1$	0.517g
Site Coefficient for Site Class "D," $F_a$	1.0
Site Coefficient for Site Class "D," $F_v$	1.783
Maximum Considered Earthquake Spectral Response Acceleration for 0.2 Second, $S_{MS}$	1.465g
Maximum Considered Earthquake Spectral Response Acceleration for 1.0 Second, $S_{M1}$	0.922g
5% Damped Design Spectral Response Acceleration Parameter at 0.2 Second, $S_{DS}$	0.977g
5% Damped Design Spectral Response Acceleration Parameter at 1 second, $S_{D1}$	0.614g
Site Modified Peak Ground Acceleration, $PGA_M$	0.686g
Seismic Design Category	D

Final selection of the appropriate seismic design coefficients should be made by the project structural engineer based upon the local practices and ordinances, expected building response and desired level of conservatism.

#### **4.5 LIQUEFACTION AND SEISMICALLY INDUCED SETTLEMENT**

Liquefaction describes a phenomenon in which cyclic stresses, produced by earthquake-induced ground motion, create excess pore pressures in relatively cohesionless and low plastic soils. These soils may thereby acquire a high degree of mobility, which can lead to lateral movement, sliding, consolidation and settlement of loose sediments, sand boils and other damaging deformations. This phenomenon occurs only below the water table, but, after liquefaction has developed, the effects can propagate upward into overlying non-saturated soil as excess pore water dissipates.

The factors known to influence liquefaction potential include soil type and grain size, relative density, groundwater level, confining pressures, and both intensity and duration of ground shaking. In general, materials that are susceptible to liquefaction are loose, saturated granular soils having low fines content under low confining pressures and some low plastic silts and clays.

Based on the review of available groundwater data, a historic high groundwater depth of 35 feet was used in our liquefaction analysis. The analysis was performed with the aid of the computer program Cliq version 2.2.0.32 (Geologismiki, 2006) in conjunction with the soil profiles identified within all CPT soundings performed at the property. A mean magnitude weighted ( $M_w$ ) seismic



event of 6.67 obtained with the USGS deaggregation web application (based on a 2 percent exceedance in 50 years) and a  $PGA_M$  value of 0.686g were used in the assessment.

The results of the analyses indicated the presence of a few, deep layers of loose sands and silty sands that would be prone to liquefaction during the design-level earthquake. The following table summarizes the amount of settlement (liquefaction settlement plus settlement of dry sands) estimated at each CPT location:

<b>ESTIMATED SEISMICALLY INDUCED TOTAL SETTLEMENT</b>	
CPT Sounding	Total Settlement (in)
1	0.1
2	0.3
3	0.4
4	0.2

As noted above, the seismically induced settlements of the sandy soils at the property was estimated to be less than 0.5 inches total and 0.25 inches differential over a 30-foot span. The results of the liquefaction/settlement analysis are presented within Appendix E.

#### **4.6 OTHER SEISMIC HAZARDS**

Evidence of ancient landslides or slope instabilities at this site was not observed during our investigation. Thus, the potential for landslides is considered negligible.

The potential for secondary seismic hazards such as a seiche or tsunami is considered negligible due to site elevation and distance to an open body of water.

### **5. CONCLUSIONS AND RECOMMENDATIONS**

#### **5.1 GENERAL**

Development of the site appears feasible from a geotechnical viewpoint. The following recommendations should be incorporated into the design and construction phases of development.

#### **5.2 EARTHWORK CONSIDERATIONS**

Earthwork and grading should be performed in accordance with the applicable grading ordinances of the City of Anaheim, the 2019 California Building Code (CBC), and recommendations contained in this report. Site grading plans should be reviewed by this office



when they become available. Additional recommendations will likely be offered subsequent to review of these plans.

### **5.2.1 Site Clearing and Preparation**

Site preparation should start with demolition/razing of existing site improvements and removal of deleterious materials, and vegetation. Demolition should include removal of all pavements, floor slabs, foundations, and any other below-grade construction. These materials should be properly disposed of off-site. Voids resulting from site clearing (such as removals of underground utilities, foundations, etc.) should be replaced with engineered fill materials.

### **5.2.2 Removals**

Based on our boring data and the field observations, the upper five feet of existing site soils or three feet below footing base should be removed in order to provide a homogeneous, dense fill mat for structural support. Deeper removals may be required in some areas to eliminate all previously existing undocumented fill. As a minimum, removals should extend down and away from foundation elements at a 1:1 (h:v) projection to the recommended removal depth, or a minimum of five feet laterally.

All existing fills should be removed from surface improvement areas. A minimum of 12 inches of engineered fill should be provided below asphaltic concrete pavement and Portland cement concrete hardscape areas. The horizontal extent of removals should extend at least two feet beyond the edge. Development plans should be reviewed by this firm when available. Depending on actual field conditions encountered during grading, locally deeper areas of removal may be recommended.

A representative of this firm should observe the bottom of all excavations. Removal bottoms should be relatively uniform and expose natural alluvium that has an in-place relative compaction of at least 85 percent per ASTM D 1557.

The bottom of all removals should be scarified to a minimum depth of six inches, brought to slightly above the optimum moisture content, and then recompacted to at least 90 percent of the soil's maximum dry density (ASTM D 1557).

In some portions of the site, the bottom of removals may encounter very moist/soft soils that may require stabilization. If necessary, removal bottoms may be stabilized with a layer of gravel and/or geogrid supplemented with gravel, prior to placing engineered compacted fill. A 12-inch layer of gravel has been successfully used on similar project sites that GeoTek has provided services in the past. Specific stabilization recommendations should be provided by GeoTek based on the soil conditions encountered at the time of site grading.

### **5.2.3 Engineered Fill**

The onsite soils are considered suitable for reuse as engineered fill provided they are free from vegetation, roots, and rock/concrete or hard lumps greater than six inches in maximum dimension.

At the time of our field investigation, some of the on-site soils were very moist (up to ten percent above optimum water content). To be suitable for placement as engineered fill, these materials should be dried to approximately optimum moisture content.

Concrete generated from the demolition of existing site improvements may be incorporated into site fills provided the following guidelines are implemented: 1) concrete should be free of rebar or other deleterious materials and should be broken down to a maximum dimension of six inches; 2) concrete should not be placed within three feet of finish grade in the building pad areas or within one foot of subgrade elevations in the street/drive areas; 3) concrete should be distributed in the fill and should not be “nested” or placed in concentrated pockets.

The undercut areas should be brought to final pad elevations with fill materials that are placed and compacted in general accordance with minimum project standards. Fill materials should be placed at or above optimum moisture content and should be compacted to a minimum relative compaction of 90 percent as determined by ASTM Test Method D 1557. Additional recommendations pertaining to fill placement are presented in Appendix F.

### **5.2.4 Excavation Characteristics**

Excavation in the onsite soil materials is expected to be easy using heavy-duty grading equipment in good operating conditions.

All temporary excavations for grading purposes and installation of underground utilities should be constructed in accordance with local and Cal-OSHA guidelines. Temporary excavations within the onsite materials should be stable at 1:1 (h:v) inclinations for cuts less than ten feet in height.

### **5.2.5 Shrinkage and Subsidence**

Several factors will impact earthwork balancing on the site, including shrinkage, subsidence, trench spoil from utilities and footing excavations, as well as the accuracy of topography.

Shrinkage, bulking, and subsidence are primarily dependent upon the degree of compactive effort achieved during construction. For planning purposes, a shrinkage factor of 10 to 15 percent for both the existing fills and upper alluvium may be considered. Site balance areas should be

available in order to adjust project grades, depending on actual field conditions at the conclusion of site earthwork construction. Bulking is not considered to be a significant factor with the underlying materials within the vicinity of the anticipated construction. Subsidence on the order of up to 0.1-foot could occur.

### **5.2.6 Trench Excavations and Backfill**

Temporary excavations within the onsite materials should be stable at 1:1 (h:v) inclinations for short durations during construction, and where cuts do not exceed ten feet in height. Temporary cuts to a maximum height of four feet can be excavated vertically, but local sloughing and/or failure could occur due to the granular nature of some of the onsite units. Increased caution should be applied when working near or within any excavations at this site.

Trench excavations should conform to Cal-OSHA regulations. The contractor should have a competent person, per OSHA requirements, on site during construction to observe conditions and to make the appropriate recommendations.

Utility trench backfill should be compacted to at least 90 percent relative compaction (as determined per ASTM D 1557). Under-slab trenches should also be compacted to project specifications. Where applicable, based on jurisdictional requirements, the top 12 inches of backfill below subgrade for road pavements should be compacted to at least 95 percent relative compaction. Much of the onsite materials may not be suitable for use as bedding material but should be suitable as backfill provided particles larger than 6± inches are removed.

Compaction should be achieved with a mechanical compaction device. Ponding or jetting of trench backfill is not recommended. If backfill soils have dried out, they should be thoroughly moisture conditioned prior to placement in trenches.

## **5.3 DESIGN RECOMMENDATIONS**

### **5.3.1 Foundation Design Criteria**

The site soils were found to generally have “low” expansion potential in accordance with ASTM D 4829. The foundation elements for the proposed structures should bear entirely in engineered fill soils and should be designed in accordance with the *2019 California Building Code (CBC)*.

A summary of our design recommendations for conventionally reinforced foundations is presented in the table below.



<b>DESIGN PARAMETERS FOR CONVENTIONALLY REINFORCED SPREAD FOOTINGS</b>	
Design Parameter	“Low” Expansion Potential
Foundation Depth or Minimum Perimeter Beam Depth for Both Interior and Exterior Footings (inches below lowest adjacent finished grade)	One- and Two-Story – 12 Three-Story - 18
Minimum Foundation Width (Inches)*	One- and Two-Story – 12 Three-Story – 15
Minimum Slab Thickness (Inches)	4 (actual)
Minimum Slab Reinforcing	6” x 6” – W2.9/W2.9 welded wire fabric or No 3 rebars at 24 inches on center each way placed in the middle of the slab
Minimum Footing Reinforcement for Continuous Footings, Grade Beams, and Retaining Wall Footings	Two No. 4 reinforcing bars, one top and one bottom
Effective Plasticity Index**	17
Presaturation of Subgrade Soil (Percent of Optimum/Depth in inches)	Minimum 110% of the optimum moisture content to a depth of at least 12 inches prior to placing concrete.

\*Code minimums per Table 1809.7 of the 2019 CBC should be complied with.

\*\*Effective Plasticity Index should be verified at the completion of the rough grading

In general, an allowable bearing capacity of 2,000 pounds per square foot (psf) may be used for footings a minimum 12 inches deep and 12 inches wide and pad footings 24 inches square and 12 inches deep. This value may be increased by 400 psf for each additional 12 inches in depth and 200 psf for each additional 12 inches in width to a maximum value of 3,000 psf. Additionally, an increase of one-third may be applied when considering short-term live loads (e.g. seismic and wind loads).

For footings designed in accordance with the recommendations presented in this report, we would anticipate a maximum static settlement of less than 1-inch and a maximum differential static settlement of less than 1/2-inch in a 30-foot span. Seismically induced settlement is estimated to be about 1/2-inch total and 1/4-inch differential in a 40-foot span.

The passive earth pressure may be computed as an equivalent fluid having a density of 240 psf per foot of depth, to a maximum earth pressure of 2,500 psf for footings founded on engineered fill. A coefficient of friction between soil and concrete of 0.35 may be used with dead load forces. The upper one foot of soil below the adjacent grade should not be used in calculating passive pressure.

Presented below are post-tensioned foundation design parameters for the proposed residential structures at the site. These parameters are in general conformance with Design of Post-Tensioned Slabs-on-Ground, Third Edition with 2008 Supplement (PTI, 2008). These are minimal recommendations and are not intended to supersede the design by the project structural engineer.

<b>DESIGN PARAMETERS FOR POST-TENSIONED SLABS</b>	
Foundation Design Parameter	“Low” Expansion Potential (LL≤35; PI≤17; Passing #200 Sieve ≈ 83%; Clay fines ≈ 15%)
Edge Moisture Variation Distance, $e_m$ - Edge Lift (swelling) - Center Lift (shrinkage)	4.4 ft 8.6 ft
Soil Differential Movement, $y_m$ - Edge Lift (swelling) - Center Lift (shrinkage)	≈0.67 in ≈0.28 in
Ext. Perimeter Beam Embedment	One- and Two-Story – 12 inches* Three-Story – 18 inches*
Allowable Bearing Pressure	1,500 psf
Presaturation of Subgrade Soil (Percent of Optimum)	Minimum 110% to a depth of 12 inches

\*Required depth of perimeter beam/stiffening rib per structural calculations may govern.  
 The following assumptions were used to generate  $e_m$  and  $y_m$  values: Thornthwaite Moisture Index = -20; constant suction value = 3.9pF; post-equilibrium case assumed with wet (swelling) cycle going from 3.9pF to 3.0pF and drying (shrinking) cycle going from 3.9pF to 4.5pF.

Additional testing of the soils should be performed during construction to evaluate the as-graded conditions. Additional recommendations may be necessary based on the as-graded soils conditions.

It should be noted that the above recommendations are based on soil support characteristics only. The structural engineer should design the slab and beam reinforcement based on actual loading conditions.

A moisture and vapor retarding system should be placed below slabs-on-grade where moisture migration through the slab is undesirable. Guidelines for these systems are provided in the 2019 California Green Building Standards Code (CALGreen) Section 4.505.2, the 2019 CBC Section 1907.1, ACI 360R-10, and ACI 302.2R-06.

It should be realized that the effectiveness of the vapor retarding membrane can be adversely impacted as the result of construction related punctures (e.g. stake penetrations, tears, punctures from walking on the aggregate layer, etc.). These occurrences should be limited as much as possible during construction. Thicker membranes are generally more resistant to accidental puncture than thinner ones. Products specifically designed for use as moisture/vapor



retarders may also be more puncture resistant. It is GeoTek's opinion that a minimum ten mil thick membrane with joints properly overlapped and sealed should be considered, unless otherwise specified by the slab design professional. Moisture and vapor retarding systems are intended to provide a certain level of resistance to vapor and moisture transmission through the concrete, but do not eliminate it. The acceptable level of moisture transmission through the slab is to a large extent based on the type of flooring used and atmospheric conditions.

Ultimately, the vapor retarding system should be comprised of suitable elements to limit migration of water and reduce transmission of water vapor through the slab to acceptable levels. The selected elements should have suitable properties (i.e. thickness, composition, strength, and permeance) to achieve the desired performance level. Consideration should be given to consulting with an individual possessing specific expertise in this area for additional evaluation.

### **5.3.2 Miscellaneous Foundation Recommendations**

- To minimize moisture penetration beneath the slab on grade areas, utility trenches should be backfilled with engineered fill, lean concrete, or concrete slurry where they intercept the perimeter footing or thickened slab edge.
- Soils from the footing excavations should not be placed in the slab-on-grade areas unless properly compacted and tested. The excavations should be free of loose/sloughed materials and be neatly trimmed at the time of concrete placement.
- Under-slab utility trenches should be compacted to project specifications. Compaction should be achieved with a mechanical compaction device. If backfill soils have dried out, they should be thoroughly moisture conditioned prior to placement in trenches.

### **5.3.3 Foundation Set Backs**

Foundations should comply with the following setbacks. Improvements not conforming to these setbacks are subject to the increased likelihood of excessive lateral movements and/or differential settlements. If large enough, these movements can compromise the integrity of the improvements. The following recommendations are presented:

- The outside bottom edge of all footings should be set back a minimum of  $H/2$  (where  $H$  is the slope height) from the face of any ascending slope. The setback should be at least five feet and need not to exceed 15 feet. Where a retaining wall is constructed at the toe of the slope, the height of the slope should be measured from top of the wall to the top of the slope.

- The outside bottom edge of all footings should be set back a minimum of  $H/3$  from the face of any descending slope. The setback should be at least 5 feet and need not exceed 40 feet.
- The bottom of all footings for structures near retaining walls should be deepened so as to extend below a 1:1 (h:v) projection upward from the bottom inside edge of the wall foundation.
- The bottom of any existing foundations for structures should be deepened so as to extend below a 1:1 (h:v) projection upward from the bottom of the nearest excavation.

### **5.3.4 Retaining Wall Design and Construction**

#### **5.3.4.1 General Design Criteria**

Recommendations presented in this report apply to typical masonry or concrete walls retaining up to six feet of soils. Additional review and recommendations should be requested for higher walls. These are typical design criteria and are not intended to supersede the design by the structural engineer.

Retaining wall foundations should be embedded into engineered fill and should be designed in accordance with *Section 5.3.1* of this report. Structural needs may govern and should be evaluated by the project structural engineer.

All earth retention structure plans, as applicable, should be reviewed by this office prior to finalization. The seismic design parameters as discussed in this report remain applicable to all proposed earth retention structures at this site, and should be properly incorporated into the design and construction of the structures.

Earthwork considerations, site clearing and remedial earthwork for all earth retention structures should meet the requirements of this report, unless specifically provided otherwise, or more stringent requirements or recommendations are made by the designer. The backfill material placement for all earth retention structures should meet the requirement of *Section 5.3.4.4* in this report.

In general, cantilever earth retention structures, which are designed to yield at least  $0.001H$ , where  $H$  is equal to the height of the earth retention structure to the base of its footing, may be designed using the active condition. Rigid earth retention structures (including but not limited to rigid walls, and walls braced at top, such as typical basement walls) should be designed using the at-rest condition.

In addition to the design lateral forces due to retained earth, surcharges due to improvements, such as an adjacent building or traffic loading, should be considered in the design of the earth retention structures. Loads applied within a 1:1 (h:v) projection from the surcharge on the stem and footing of the earth retention structure should be considered in the design.

Final selection of the appropriate design parameters should be made by the designer of the earth retention structures.

### 5.3.4.2 Cantilevered Walls

The recommendations presented below are for cantilevered walls retaining up to six feet of soils. Active earth pressure may be used for retaining wall design, provided the top of the wall is not restrained from minor deflections. An equivalent fluid pressure approach may be used to compute the horizontal pressure against the wall. Appropriate fluid unit weights are given below for specific slope gradients of the retained material. These do not include other superimposed loading conditions such as traffic, structures, or adverse geologic conditions.

ACTIVE EARTH PRESSURES	
Surface Slope of Retained Materials (h:v)	Equivalent Fluid Pressure (pcf) Native Backfill*
Level	40
2:1	65

\*The design pressures assume the native backfill material has an expansion index less than or equal to 50. Backfill zone includes area between the back of the wall and footing to a plane (1:1 h:v) up from the bottom of the wall foundation to the ground surface.

### 5.3.4.3 Restrained Retaining Walls

Retaining walls that will be restrained prior to placing and compacting backfill material or that have reentrant or male corners should be designed for an at-rest equivalent fluid pressure of 60 pcf, plus any applicable surcharge loading, for native backfill and level back slope condition. For areas of male or reentrant corners, the restrained wall design should extend a minimum distance of twice the height of the wall laterally from the corner, or a distance otherwise determined by the project structural engineer.

### 5.3.4.4 Retaining Wall Backfill and Drainage

Retaining wall backfill should be free of deleterious and/or oversized materials and should have properties indicated in Section 5.3.4.2. Retaining walls should be provided with an adequate pipe

and gravel back drain system to help prevent buildup of hydrostatic pressures. Backdrains should consist of a four-inch diameter perforated collector pipe (Schedule 40, SDR 35, or approved equivalent) embedded in a minimum of one-cubic foot per linear foot of  $\frac{3}{4}$ - to 1-inch clean crushed rock or an approved equivalent, wrapped in filter fabric (Mirafi 140N or an approved equivalent). The drain system should be connected to a suitable outlet. Waterproofing of site walls should be performed where moisture migration through the wall is undesirable.

Retaining wall backfill should be placed in lifts no greater than eight inches in thickness and compacted to a minimum of 90 percent relative compaction in accordance with ASTM Test Method D 1557. The wall backfill should also include a minimum one-foot wide section of  $\frac{3}{4}$ - to 1-inch clean crushed rock (or an approved equivalent). The rock should be placed immediately adjacent to the back of the wall and extend up from a back drain to within approximately 24 inches of the finish grade. The rock should be separated from the earth with filter fabric. The upper 24 inches should consist of compacted on-site soil.

As an alternative to the drain rock and fabric, Miradrain 2000, or approved equivalent, may be used behind the retaining wall. The Miradrain 2000 should extend from the base of the wall to within two feet of the ground surface. The subdrain should be placed at the base of the wall in direct contact with the Miradrain 2000.

The presence of other materials might necessitate revision to the parameters provided and modification of the wall designs. Proper surface drainage needs to be provided and maintained.

#### **5.3.4.5 Other Design Considerations**

- Wall design should consider the additional surcharge loads from superjacent slopes and/or footings, where appropriate.
- No backfill should be placed against concrete until minimum design strengths are evident by compression tests of cylinders.
- The retaining wall footing excavations, backcuts, and backfill materials should be approved the project geotechnical engineer or their authorized representative.

#### **5.3.5 Pavement Design Considerations**

Pavement design for proposed street improvements was conducted per Caltrans *Highway Design Manual* guidelines for flexible pavements. Based on an assumed design R-value of 30 and for Traffic Indices (TIs) of 5.0 and 6.0 generally linked to roads with light vehicular traffic with occasional heavy truck traffic, the following preliminary sections were calculated:

<b>GEOTECHNICAL RECOMMENDATION FOR MINIMUM PAVEMENT SECTION</b>		
Traffic Index	Thickness of Asphalt Concrete (inches)	Thickness of Aggregate Base (inches)
5.0	4*	4*
6.0	4*	7

\*Minimum pavement sections for interior streets per City of Anaheim Standard Detail No. 160-A.

Traffic Indices (TIs) used in our pavement design are considered reasonable values for the proposed residential street areas and should provide a pavement life of approximately 20 years with a normal amount of flexible pavement maintenance. Irrigation adjacent to pavements, without a deep curb or other cutoff to separate landscaping from the paving may result in premature pavement failure. Traffic parameters used for design were selected based upon engineering judgment and not upon information furnished to us such as an equivalent wheel load analysis or a traffic study.

The recommended pavement sections provided are intended as a minimum guideline and final selection of pavement cross section parameters should be made by the project civil engineer, based upon the local laws and ordinances, expected subgrade and pavement response, and desired level of conservatism. If thinner or highly variable pavement sections are constructed, increased maintenance and repair could be expected. Final pavement design should be checked by testing of soils exposed at subgrade (the upper one foot) after final grading has been completed.

Asphalt concrete and aggregate base should conform to current Caltrans Standard Specifications Section 39 and 26-1.02, respectively. As an alternative, asphalt concrete can conform to Section 203-6 of the current Standard Specifications for Public Work (Green Book). Crushed aggregate base or crushed miscellaneous base can conform to Section 200-2.2 and 200-2.4 of the Green Book, respectively. Pavement base should be compacted to at least 95 percent of the ASTM D1557 laboratory maximum dry density (modified proctor).

All pavement installation, including preparation and compaction of subgrade, compaction of base material, placement and rolling of asphaltic concrete, should be done in accordance with the City of Anaheim specifications, and under the observation and testing of GeoTek and a City Inspector where required. Jurisdictional minimum compaction requirements in excess of the aforementioned minimums may govern.

Deleterious material, excessive wet or dry pockets, oversized rock fragments, and other unsuitable yielding materials encountered during grading should be removed. Once existing compacted fill are brought to the proposed pavement subgrade elevations, the subgrade should be proof-rolled in order to check for a uniform and unyielding surface. The upper 12 inches of



pavement subgrade soils should be scarified, moisture conditioned at or near optimum moisture content, and recompacted to at least 95 percent of the laboratory maximum dry density (ASTM D1557). If loose or yielding materials are encountered during construction, additional evaluation of these areas should be carried out by GeoTek. All pavement section changes should be properly transitioned.

### **5.3.6 Soil Corrosivity**

The soil resistivity was tested in the laboratory on two samples collected during our field exploration. The results of the testing (3,149 and 3,685 ohm-cm) indicate that the soil samples are “corrosive” to buried ferrous metals, based on the guidelines provided in *Corrosion Basics: An Introduction* (Roberge, 2005). Consideration should be given to consulting with a corrosion engineer.

### **5.3.7 Soil Sulfate Content**

The sulfate content was determined in the laboratory for two soil samples obtained during our field exploration. The results (0.0033 and 0.0044 percent) indicate that the water-soluble sulfate range is less than 0.1 percent by weight which is considered “not applicable” (i.e. negligible) as per Table 4.2.1 of ACI 318. Based upon the test results, no special concrete mix design is required by Code for sulfate attack resistance. Additional testing of soils collected near finish grade should be performed subsequent to site grading.

### **5.3.8 Import Soils**

Import soils should have an expansion index similar to the on-site soils. GeoTek also recommends that, as a minimum, proposed import soils be tested for soluble sulfate content. GeoTek should be notified a minimum of 72 hours of potential import sources so that appropriate sampling and laboratory testing can be performed.

### **5.3.9 Concrete Flatwork**

#### **5.3.9.1 Exterior Concrete Slabs, Sidewalks, and Driveways**

Exterior concrete slabs, sidewalks, and driveways should be designed using a four-inch minimum thickness. No specific reinforcement is required due to the non-structural nature. However, the use of some reinforcement should be considered. Some shrinkage and cracking of the concrete should be anticipated as a result of typical mix designs and curing practices commonly utilized in residential construction.



Sidewalks and driveways may be under the jurisdiction of the governing agency. If so, jurisdictional design and construction criteria would apply, if more restrictive than the recommendations presented herein.

Subgrade soils, classified as having “low” expansion potential, should be pre-moistened prior to placing concrete. The subgrade soils below exterior concrete flatwork should be pre-saturated to a minimum of 110 percent of optimum moisture content to a depth of 12 inches.

All concrete installation, including preparation and compaction of subgrade, should be done in accordance with the City of Anaheim specifications, and under the observation and testing of GeoTek and a City Inspector, if necessary.

### **5.3.9.2 Concrete Performance**

Concrete cracks should be expected. These cracks can vary from sizes that are essentially unnoticeable to more than 1/8 inch in width. Most cracks in concrete, while unsightly, do not significantly impact long-term performance. While it is possible to take measures (proper concrete mix, placement, curing, control joints, etc.) to reduce the extent and size of cracks that occur, some cracking will occur despite the best efforts to minimize it. Concrete can also undergo chemical processes that are dependent on a wide range of variables, which are difficult, at best, to control. Concrete, while seemingly a stable material, is also subject to internal expansion and contraction due to external changes over time.

One of the simplest means to control cracking is to provide weakened control joints for cracking to occur along. These do not prevent cracks from developing; they simply provide a relief point for the stresses that develop. These joints are a widely accepted means to control cracks but are not always effective. Control joints are more effective the more closely spaced they are. GeoTek suggests that control joints be placed in two directions and located a distance apart roughly equal to 24 to 36 times the slab thickness.

Exterior concrete flatwork (patios, walkways, driveways, etc.) is often some of the most visible aspects of site development. They are typically given the least level of quality control, being considered “non-structural” components. We suggest that the same standards of care be applied to these features as to the structure itself.

## **5.4 POST CONSTRUCTION CONSIDERATIONS**

### **5.4.1 Landscape Maintenance and Planting**

Water has been shown to weaken the inherent strength of soil, and slope stability is significantly reduced by overly wet conditions. Positive surface drainage away from graded slopes should be maintained and only the amount of irrigation necessary to sustain plant life should be provided for planted slopes. Controlling surface drainage and runoff, and maintaining a suitable vegetation cover can minimize erosion. Plants selected for landscaping should be lightweight, deep-rooted types that require little water and are capable of surviving the prevailing climate.

Overwatering should be avoided. The soils should be maintained in a solid to semi-solid state as defined by the materials Atterberg Limits. Care should be taken when adding soil amendments to avoid excessive watering. Leaching as a method of soil preparation prior to planting is not recommended. An abatement program to control ground-burrowing rodents should be implemented and maintained. This is critical as burrowing rodents can decreased the long-term performance of slopes.

It is common for planting to be placed adjacent to structures in planter or lawn areas. This will result in the introduction of water into the ground adjacent to the foundation. This type of landscaping should be avoided. If used, then extreme care should be exercised with regard to the irrigation and drainage in these areas.

### **5.4.2 Drainage**

The need to maintain proper surface drainage and subsurface systems cannot be overly emphasized. Positive site drainage should be maintained at all times. Drainage should not flow uncontrolled down any descending slope. Water should be directed away from foundations and not allowed to pond or seep into the ground. Pad drainage should be directed toward approved area(s) and not be blocked by other improvements.

It is the owner's responsibility to maintain and clean drainage devices on or contiguous to their lot. In order to be effective, maintenance should be conducted on a regular and routine schedule and necessary corrections made prior to each rainy season.

## **5.5 PLAN REVIEW AND CONSTRUCTION OBSERVATIONS**

We recommend that site grading plans, pool plans, retaining wall plans, foundation plans, and relevant project specifications be reviewed by this office prior to construction to check for conformance with the recommendations of this report. We also recommend that GeoTek representatives be present during site grading and foundation construction to check for proper

implementation of the geotechnical recommendations. The owner/developer should verify that GeoTek representatives perform at least the following duties:

- Observe site clearing and grubbing operations for proper removal of unsuitable materials.
- Observe and test bottom of removals prior to fill placement.
- Evaluate the suitability of onsite and import materials for fill placement, and collect soil samples for laboratory testing where necessary.
- Observe the fill for uniformity during placement, including utility trenches.
- Perform field density testing of the fill materials.
- Observe and probe foundation excavations to confirm suitability of bearing materials.

If requested, a construction observation and compaction report can be provided by GeoTek, which can comply with the requirements of the governmental agencies having jurisdiction over the project. We recommend that these agencies be notified prior to commencement of construction so that necessary grading permits can be obtained.

## **6. INTENT**

It is the intent of this report to aid in the design and construction of the proposed development. Implementation of the advice presented in this report is intended to reduce risk associated with construction projects. The professional opinions and geotechnical advice contained in this report are not intended to imply total performance of the project or guarantee that unusual or variable conditions will not be discovered during or after construction.

The scope of our evaluation is limited to the boundaries of the subject site. This review does not and should in no way be construed to encompass any areas beyond the specific area of the proposed construction as indicated to us by the client. Further, no evaluation of any existing site improvements is included. The scope is based on our understanding of the project and the client's needs, our fee estimate (P-0802220-CR) dated August 10, 2020 and geotechnical engineering standards normally used on similar projects in this region.

## **7. LIMITATIONS**

The materials observed on the project site appear to be representative of the area; however, soil materials vary in character between excavations or conditions exposed during site construction. Site conditions may vary due to seasonal changes or other factors. GeoTek, Inc.



assumes no responsibility or liability for work, testing or recommendations performed or provided by others.

Since our recommendations are based on the site conditions observed and encountered, and laboratory testing, our conclusion and recommendations are professional opinions that are limited to the extent of the available data. Observations during construction are important to allow for any change in recommendations found to be warranted. These opinions have been derived in accordance with current standards of practice and no warranty is expressed or implied. Standards of practice are subject to change with time.

## **8. SELECTED REFERENCES**

ASCE, 2017, “Minimum Design Loads for Buildings and Other Structures, ASCE Standard ASCE/SEI 7-16”.

ASTM, 2011, “Soil and Rock: American Society for Testing and Materials”, vol. 4.08 and 4.09.

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California Department of Conservation, 1997, “Seismic Hazard Zone Report for the Anaheim and Newport Beach 7.5-Minute Quadrangles, Orange County, California”, Report # 03.

\_\_\_\_\_, 2008, “Guidelines for Evaluating and Mitigating Seismic Hazards in California,” Special Publication 117A.

City of Anaheim, 2014, Street and Highway Sections, Standard Details No. 160-A, dated April 14.

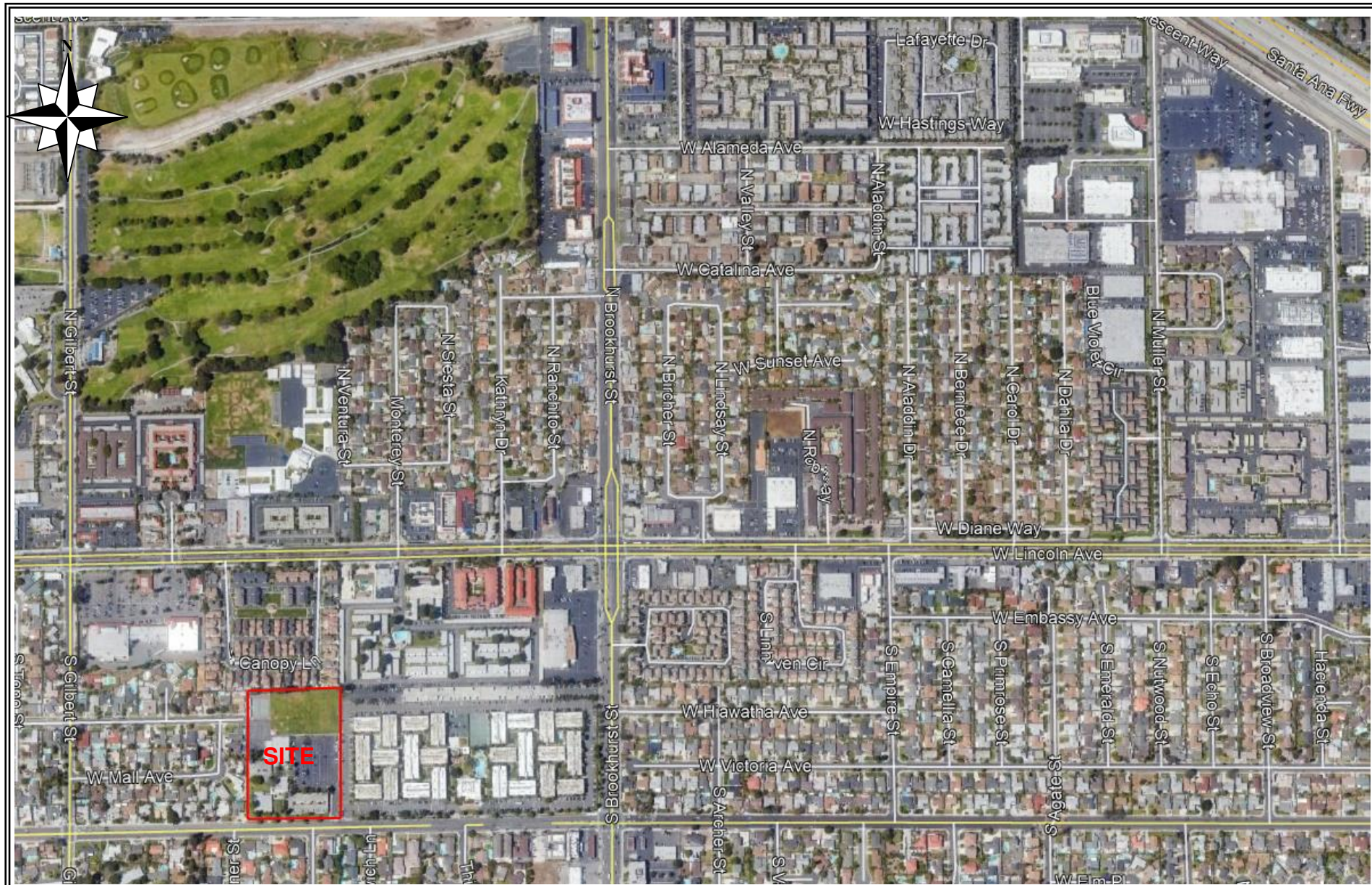
Morton, D.M. and Miller, F.K., 2006, “Geologic Map of the San Bernardino and Santa Ana 30’x 60’ Quadrangles, California”, Geological Survey OF-2006-1217, Scale 1:100,000.

Orange County, 2011, “Technical Guidance Document Appendix VII”.

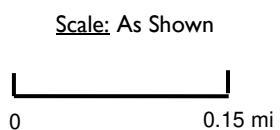
Roberge, P.R., 2005, “Corrosion Basics: An Introduction”, 2<sup>nd</sup> Edition.

Seismic Design Values for Buildings (<http://earthquake.usgs.gov/research/hazmaps/design>).

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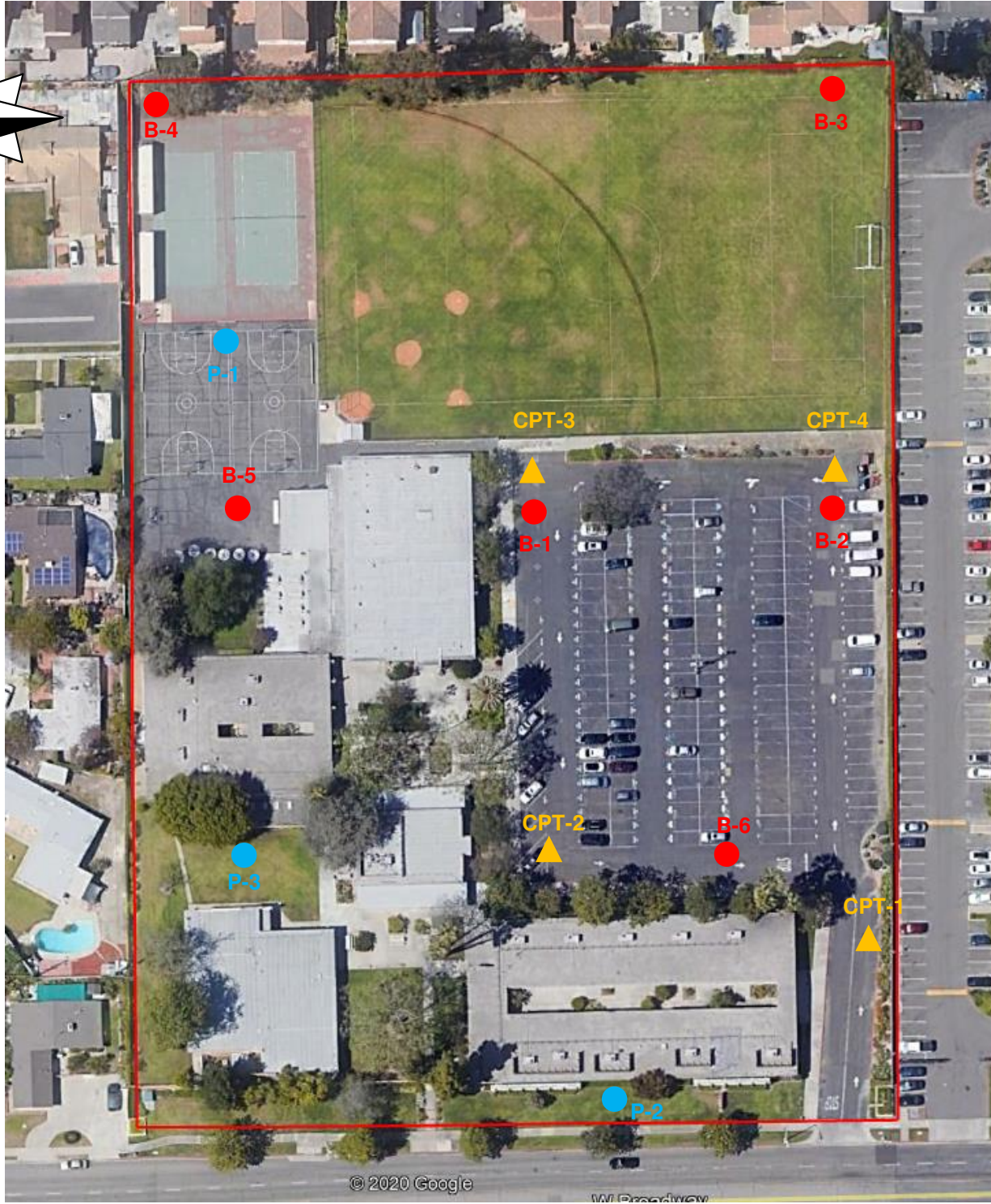


**Melia Homes**  
 Proposed Multi-Family Residential Project  
 2323 W. Broadway  
 Anaheim, Orange County, California  
 Project No. 2496-CR



**Figure 1**  
 Site Location Map



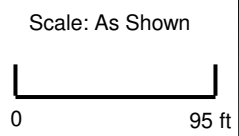


**Legend**

(Locations are Approximate)

- Exploratory Boring
- Percolation Boring
- ▲ CPT Sounding
- Site Limits

**Melia Homes**  
 Proposed Multi-Family Residential Project  
 2323 W. Broadway, Anaheim, California  
 Project No. 2496-CR



**Figure 2**  
**Exploration Location Map**



# **APPENDIX A**

## **EXPLORATORY BORING LOGS**

**Geotechnical and Infiltration Evaluation  
2323 W. Broadway, Anaheim, California  
Project No. 2496-CR**



## A - FIELD TESTING AND SAMPLING PROCEDURES

### The Modified Split-Barrel Sampler (Ring)

The ring sampler is driven into the ground in accordance with ASTM Test Method D 3550. The sampler, with an external diameter of 3.0 inches, is lined with 1-inch long, thin brass rings with inside diameters of approximately 2.4 inches. The sampler is typically driven into the ground 12 or 18 inches with a 140-pound hammer free falling from a height of 30 inches. Blow counts are recorded for every 6 inches of penetration as indicated on the logs of borings. The samples are removed from the sample barrel in the brass rings, sealed, and transported to the laboratory for testing.

### Bulk Samples (Large)

These samples are normally large bags of earth materials over 20 pounds in weight collected from the field by means of hand digging or exploratory cuttings.

### Bulk Samples (Small)

These are plastic bag samples which are normally airtight and contain less than five pounds in weight of earth materials collected from the field by means of hand digging or exploratory cuttings. These samples are primarily used for determining natural moisture content and classification indices.

## B – BORING LOG LEGEND

The following abbreviations and symbols often appear in the classification and description of soil and rock on the logs of borings:

### SOILS

USCS	Unified Soil Classification System
f-c	Fine to coarse
f-m	Fine to medium

### GEOLOGIC

B: Attitudes      Bedding: strike/dip

J: Attitudes      Joint: strike/dip

C: Contact line

.....	Dashed line denotes USCS material change
————	Solid Line denotes unit / formational change
————	Thick solid line denotes end of boring

(Additional denotations and symbols are provided on the logs of borings)



**GeoTek, Inc.**  
**LOG OF EXPLORATORY BORING**

**CLIENT:** Melia Homes  
**PROJECT NAME:** Townhouses 2323 W. Broadway  
**PROJECT NO.:** 2496-CR  
**LOCATION:** See Exploration Location Map

**DRILLER:** 2R Drilling  
**DRILL METHOD:** 8" Hollow Stem  
**HAMMER:** 140lbs/30in.

**LOGGED BY:** DA  
**OPERATOR:** Jeff  
**RIG TYPE:** CME 75  
**DATE:** 10/2/2020

Depth (ft)	SAMPLES			USCS Symbol	BORING NO.: B-1	Laboratory Testing		
	Sample Type	Blows / 6 in	Sample Number			Water Content (%)	Dry Density (pcf)	Others
<b>MATERIAL DESCRIPTION AND COMMENTS</b>								
					5" Asphalt Concrete / 4" Aggregate Base			EI, MD, SR, SH, AL
				CL	<b>Fill:</b> CLAY with sand, brown, moist, stiff			
		9 11 15		SM-ML	<b>Young alluvial fan deposits:</b> Silty f SAND to sandy SILT, light brown, moist to very moist, medium dense to	21.1	102.5	
5		6 9 9		SM	F SAND with some silt, light brown, moist to very moist, medium dense	23.3	97.3	
		6 15 16		SP	F-m SAND, tan, slightly moist, medium dense	4.0	101.7	
10		6 12 12						
		8 10 15		SC	Clayey SAND, brown, moist, medium dense	12.4	112.8	
15								
		9 12 22		SP	M SAND, tan, slightly moist, medium dense	2.9	101.3	
20								
		15 35 36			- Becomes dense @ 25.0 feet	1.8	103.3	
25								
		5 5 8			F SAND, brown, moist, medium dense			
30								

<b>LEGEND</b>	<b>Sample type:</b>	---Ring	---SPT	---Small Bulk	---Large Bulk	---No Recovery	---Water Table	
	<b>Lab testing:</b>	AL = Atterberg Limits	EI = Expansion Index	SA = Sieve Analysis	RV = R-Value Test	SR = Sulfate/Resistivity Test	SH = Shear Test	HC = Consolidation

**GeoTek, Inc.**  
**LOG OF EXPLORATORY BORING**

**CLIENT:** Melia Homes  
**PROJECT NAME:** Townhouses 2323 W. Broadway  
**PROJECT NO.:** 2496-CR  
**LOCATION:** See Exploration Location Map

**DRILLER:** 2R Drilling  
**DRILL METHOD:** 8" Hollow Stem  
**HAMMER:** 140lbs/30in.

**LOGGED BY:** DA  
**OPERATOR:** Jeff  
**RIG TYPE:** CME 75  
**DATE:** 10/2/2020

Depth (ft)	SAMPLES			USCS Symbol	BORING NO.: B-1 (cont.)	Laboratory Testing		
	Sample Type	Blows/ 6 in	Sample Number			Water Content (%)	Dry Density (pcf)	Others
MATERIAL DESCRIPTION AND COMMENTS								
35	7 12 8			SP	F SAND, brown, moist, medium dense			
40	2 5 5			CL	CLAY with some sand and silt, brown, very moist, stiff			
45	5 9 12			SM	F-m SAND with some silt, brown, moist, medium dense			
50	3 6 10			CL	CLAY with some sand and silt, brown, very moist, stiff			
<b>BORING TERMINATED AT 51.5'</b>								
55					No groundwater encountered Boring backfilled with soil cuttings			
60								

<b>LEGEND</b>	<b>Sample type:</b>	---Ring	---SPT	---Small Bulk	---Large Bulk	---No Recovery	---Water Table	
	<b>Lab testing:</b>	AL = Atterberg Limits	SR = Sulfate/Resistivity Test	EI = Expansion Index	SH = Shear Test	SA = Sieve Analysis	HC = Consolidation	RV = R-Value Test

**GeoTek, Inc.**  
**LOG OF EXPLORATORY BORING**

**CLIENT:** Melia Homes  
**PROJECT NAME:** Townhouses 2323 W. Broadway  
**PROJECT NO.:** 2496-CR  
**LOCATION:** See Exploration Location Map

**DRILLER:** 2R Drilling  
**DRILL METHOD:** 8" Hollow Stem  
**HAMMER:** 140lbs/30in.

**LOGGED BY:** DA  
**OPERATOR:** Jeff  
**RIG TYPE:** CME 75  
**DATE:** 10/2/2020

Depth (ft)	SAMPLES			USCS Symbol	BORING NO.: B-2	Laboratory Testing		
	Sample Type	Blows/ 6 in	Sample Number			Water Content (%)	Dry Density (pcf)	Others
<b>MATERIAL DESCRIPTION AND COMMENTS</b>								
8		8		SM-ML	<b>Fill:</b> Silty f SAND to sandy SILT with some clay, moderate brown, moist, medium dense	18.4	105.7	
10		10		SM	<b>Young alluvial fan deposits:</b> Silty f SAND, brown, moist, medium dense			
11		11		SM-ML	Silty f SAND to sandy SILT, light brown, moist to very moist, medium dense to	20.3	103.3	
14		14			- Becomes very moist, loose to stiff @ 6.0 feet	32.7	86.0	HC
15		15		SP	F-m SAND, tan, slightly moist, medium dense			
18		18		SM	Silty f-m SAND, brown, moist, medium dense			
20		20		SP	M SAND, tan, slightly moist, dense	3.9	98.6	
<b>BORING TERMINATED AT 21.5'</b>								
No groundwater encountered Boring backfilled with soil cuttings								

<b>LEGEND</b>	<b>Sample type:</b>	---Ring	---SPT	---Small Bulk	---Large Bulk	---No Recovery	---Water Table	
	<b>Lab testing:</b>	AL = Atterberg Limits	SR = Sulfate/Resistivity Test	EI = Expansion Index	SH = Shear Test	SA = Sieve Analysis	HC = Consolidation	RV = R-Value Test

**GeoTek, Inc.**  
**LOG OF EXPLORATORY BORING**

**CLIENT:** Melia Homes  
**PROJECT NAME:** Townhouses 2323 W. Broadway  
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**OPERATOR:** Jeff  
**RIG TYPE:** CME 75  
**DATE:** 10/2/2020

Depth (ft)	SAMPLES			USCS Symbol	BORING NO.: B-3	Laboratory Testing		
	Sample Type	Blows/ 6 in	Sample Number			Water Content (%)	Dry Density (pcf)	Others
<b>MATERIAL DESCRIPTION AND COMMENTS</b>								
				SM	<b>Fill:</b> Silty f SAND, moderate brown, slightly moist, medium dense			
5		10 8 9		SM	<b>Young alluvial fan deposits:</b> Silty f SAND, moderate brown, moist, medium dense  - Becomes light brown @ 5.0 feet	11.2	107.3	
		8 14 14				13.7	111.4	
		5 11		CL	CLAY with silt, brown, very moist, very stiff	19.2	89.7	
		17		SP	F-m SAND, tan-gray, slightly moist, medium dense			
10		4 10 12		SM	Silty f SAND, brown, moist, medium dense	8.3	105.4	
15		9 14 17		SP	M SAND, brown, slightly moist, medium dense			
20		8 15 20			F SAND, tan, slightly moist, medium dense			
					<b>BORING TERMINATED AT 21.5'</b>			
					No groundwater encountered Boring backfilled with soil cuttings			
25								
30								

<b>LEGEND</b>	<b>Sample type:</b>	---Ring	---SPT	---Small Bulk	---Large Bulk	---No Recovery	---Water Table	
	<b>Lab testing:</b>	AL = Atterberg Limits	SR = Sulfate/Resistivity Test	EI = Expansion Index	SH = Shear Test	SA = Sieve Analysis	HC = Consolidation	RV = R-Value Test

**GeoTek, Inc.**  
**LOG OF EXPLORATORY BORING**

**CLIENT:** Melia Homes  
**PROJECT NAME:** Townhouses 2323 W. Broadway  
**PROJECT NO.:** 2496-CR  
**LOCATION:** See Exploration Location Map

**DRILLER:** 2R Drilling  
**DRILL METHOD:** 8" Hollow Stem  
**HAMMER:** 140lbs/30in.

**LOGGED BY:** DA  
**OPERATOR:** Jeff  
**RIG TYPE:** CME 75  
**DATE:** 10/2/2020

Depth (ft)	SAMPLES			USCS Symbol	<b>BORING NO.: B-4</b>	Laboratory Testing		
	Sample Type	Blows/ 6 in	Sample Number			Water Content (%)	Dry Density (pcf)	Others
<b>MATERIAL DESCRIPTION AND COMMENTS</b>								
				SM	<b>Fill:</b> Silty f SAND, moderate brown, moist			
		9 10 14		SM	<b>Young alluvial fan deposits:</b> Silty f SAND, brown, moist, medium dense	12.4	115.4	
5		4 7 8		SP	F-m SAND, tan, slightly moist, loose to medium dense	1.6	93.7	HC
10		6 11 14			M SAND, brown, moist, medium dense	9.5	105.3	
15		7 10 16		SM	Silty f-m SAND, brown, moist, medium dense			
20		10 20 30			- Becomes dense @ 19.0 feet			
<b>BORING TERMINATED AT 20.5'</b>								
					No groundwater encountered Boring backfilled with soil cuttings			
25								
30								

<b>LEGEND</b>	<b>Sample type:</b>	---Ring	---SPT	---Small Bulk	---Large Bulk	---No Recovery	---Water Table	
	<b>Lab testing:</b>	AL = Atterberg Limits	SR = Sulfate/Resistivity Test	EI = Expansion Index	SH = Shear Test	SA = Sieve Analysis	HC = Consolidation	RV = R-Value Test

**GeoTek, Inc.**  
**LOG OF EXPLORATORY BORING**

**CLIENT:** Melia Homes  
**PROJECT NAME:** Townhouses 2323 W. Broadway  
**PROJECT NO.:** 2496-CR  
**LOCATION:** See Exploration Location Map

**DRILLER:** 2R Drilling  
**DRILL METHOD:** 8" Hollow Stem  
**HAMMER:** 140lbs/30in.

**LOGGED BY:** DA  
**OPERATOR:** Jeff  
**RIG TYPE:** CME 75  
**DATE:** 10/2/2020

Depth (ft)	SAMPLES			USCS Symbol	BORING NO.: B-5	Laboratory Testing		
	Sample Type	Blows/ 6 in	Sample Number			Water Content (%)	Dry Density (pcf)	Others
<b>MATERIAL DESCRIPTION AND COMMENTS</b>								
					3" Asphalt Concrete / 5" Aggregate Base			
				CL	<b>Fill:</b> CLAY with sand, light brown, moist, soft			EI, MD, AL, SR
		3 6 7		SM	<b>Young alluvial fan deposits:</b> Silty f SAND, light brown, moist to very moist, loose	23.1	102.2	
5		5 8 6		SP	F-m SAND, tan, slightly moist, loose	3.2	96.5	HC
		6 8 9			M SAND, tan-red, slightly moist, medium dense	2.9	100.7	
10		6 8 12				4.7	101.3	HC
15		4 8 9		SM	Silty f-m SAND, brown, moist, medium dense			
20		9 14 22		SP	M SAND, tan, slightly moist, medium dense	5.1	100.1	
					<b>BORING TERMINATED AT 21.5'</b>			
					No groundwater encountered Boring backfilled with soil cuttings			
25								
30								

<b>LEGEND</b>	<b>Sample type:</b>	---Ring	---SPT	---Small Bulk	---Large Bulk	---No Recovery	---Water Table	
	<b>Lab testing:</b>	AL = Atterberg Limits	SR = Sulfate/Resistivity Test	EI = Expansion Index	SH = Shear Test	SA = Sieve Analysis	HC = Consolidation	RV = R-Value Test

**GeoTek, Inc.**  
**LOG OF EXPLORATORY BORING**

**CLIENT:** Melia Homes  
**PROJECT NAME:** Townhouses 2323 W. Broadway  
**PROJECT NO.:** 2496-CR  
**LOCATION:** See Exploration Location Map

**DRILLER:** 2R Drilling  
**DRILL METHOD:** 8" Hollow Stem  
**HAMMER:** 140lbs/30in.

**LOGGED BY:** DA  
**OPERATOR:** Jeff  
**RIG TYPE:** CME 75  
**DATE:** 10/2/2020

Depth (ft)	SAMPLES			USCS Symbol	BORING NO.: B-6	Laboratory Testing		
	Sample Type	Blows/ 6 in	Sample Number			Water Content (%)	Dry Density (pcf)	Others
<b>MATERIAL DESCRIPTION AND COMMENTS</b>								
					2" Asphalt Concrete / 5" Aggregate Base			
				SM	<b>Fill:</b> Silty f SAND, brown, slightly moist, medium dense			
		5 8 8		SM	<b>Young alluvial fan deposits:</b> Silty f SAND, brown, moist to very moist, medium dense	17.3	107.3	
5		3 7 14		SP	F-m SAND, tan, moist to very moist, medium dense	18.3	103.0	
10		8 14 15			M SAND, tan, light brown, medium dense			
15		9 18 20		SM	Silty f SAND, brown, moist, medium dense	12.0	118.3	
20		9 9 10						
					<b>BORING TERMINATED AT 20.5'</b>			
					No groundwater encountered Boring backfilled with soil cuttings			
25								
30								

<b>LEGEND</b>	<b>Sample type:</b>	---Ring	---SPT	---Small Bulk	---Large Bulk	---No Recovery	---Water Table	
	<b>Lab testing:</b>	AL = Atterberg Limits	SR = Sulfate/Resistivity Test	EI = Expansion Index	SH = Shear Test	SA = Sieve Analysis	HC = Consolidation	RV = R-Value Test

**GeoTek, Inc.**  
**LOG OF EXPLORATORY BORING**

**CLIENT:** Melia Homes  
**PROJECT NAME:** Townhouses 2323 W. Broadway  
**PROJECT NO.:** 2496-CR  
**LOCATION:** See Exploration Location Map

**DRILLER:** 2R Drilling  
**DRILL METHOD:** 8" Hollow Stem  
**HAMMER:** 140lbs/30in.

**LOGGED BY:** DA  
**OPERATOR:** Jeff  
**RIG TYPE:** CME 75  
**DATE:** 10/2/2020

Depth (ft)	SAMPLES			USCS Symbol	BORING NO.: P-1  MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing		
	Sample Type	Blows / 6 in	Sample Number			Water Content (%)	Dry Density (pcf)	Others
					3" Asphalt Concrete / 5" Aggregate Base			
				SM	<b>Fill:</b> Silty f SAND, light brown, moist			
				SM	<b>Young alluvial fan deposits:</b> Silty f SAND, light brown, moist			
5					<b>BORING TERMINATED AT 5.0'</b>			
					No groundwater encountered Boring prepared for subsequent infiltration testing (pvc pipe, filter sock, gravel)			
10								
15								
20								
25								
30								

<b>LEGEND</b>	<b>Sample type:</b>	<input type="checkbox"/> ---Ring	<input type="checkbox"/> ---SPT	<input type="checkbox"/> ---Small Bulk	<input checked="" type="checkbox"/> ---Large Bulk	<input type="checkbox"/> ---No Recovery	<input type="checkbox"/> ---Water Table	
	<b>Lab testing:</b>	AL = Atterberg Limits	EI = Expansion Index	SA = Sieve Analysis	RV = R-Value Test	SR = Sulfate/Resistivity Test	SH = Shear Test	HC = Consolidation



**GeoTek, Inc.**  
**LOG OF EXPLORATORY BORING**

**CLIENT:** Melia Homes  
**PROJECT NAME:** Townhouses 2323 W. Broadway  
**PROJECT NO.:** 2496-CR  
**LOCATION:** See Exploration Location Map

**DRILLER:** 2R Drilling  
**DRILL METHOD:** 8" Hollow Stem  
**HAMMER:** 140lbs/30in.

**LOGGED BY:** DA  
**OPERATOR:** Jeff  
**RIG TYPE:** CME 75  
**DATE:** 10/2/2020

Depth (ft)	SAMPLES			USCS Symbol	BORING NO.: P-2  MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing		
	Sample Type	Blows/ 6 in	Sample Number			Water Content (%)	Dry Density (pcf)	Others
5				SM	<b>Fill:</b> Silty f SAND, brown, moist			
				SM	<b>Young alluvial fan deposits:</b> Silty f SAND, brown, moist			
5	<b>BORING TERMINATED AT 5.0'</b>							
10	No groundwater encountered Boring prepared for subsequent infiltration testing (pvc pipe, filter sock, gravel)							
15								
20								
25								
30								

<b>LEGEND</b>	<b>Sample type:</b>	<input type="checkbox"/> ---Ring	<input type="checkbox"/> ---SPT	<input type="checkbox"/> ---Small Bulk	<input checked="" type="checkbox"/> ---Large Bulk	<input type="checkbox"/> ---No Recovery	<input type="checkbox"/> ---Water Table	
	<b>Lab testing:</b>	AL = Atterberg Limits	EI = Expansion Index	SA = Sieve Analysis	RV = R-Value Test	SR = Sulfate/Resistivity Test	SH = Shear Test	HC = Consolidation

**GeoTek, Inc.**  
**LOG OF EXPLORATORY BORING**

**CLIENT:** Melia Homes  
**PROJECT NAME:** Townhouses 2323 W. Broadway  
**PROJECT NO.:** 2496-CR  
**LOCATION:** See Exploration Location Map

**DRILLER:** 2R Drilling  
**DRILL METHOD:** 8" Hollow Stem  
**HAMMER:** 140lbs/30in.

**LOGGED BY:** DA  
**OPERATOR:** Jeff  
**RIG TYPE:** CME 75  
**DATE:** 10/2/2020

Depth (ft)	SAMPLES			USCS Symbol	BORING NO.: P-3  MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing		
	Sample Type	Blows/ 6 in	Sample Number			Water Content (%)	Dry Density (pcf)	Others
5				SM	<b>Fill:</b> Silty f SAND, moderate brown, very moist			
				SM	<b>Young alluvial fan deposits:</b> Silty f SAND, moderate brown, very moist			
5	<b>BORING TERMINATED AT 5.0'</b>							
10	No groundwater encountered Boring prepared for subsequent infiltration testing (pvc pipe, filter sock, gravel)							
15								
20								
25								
30								

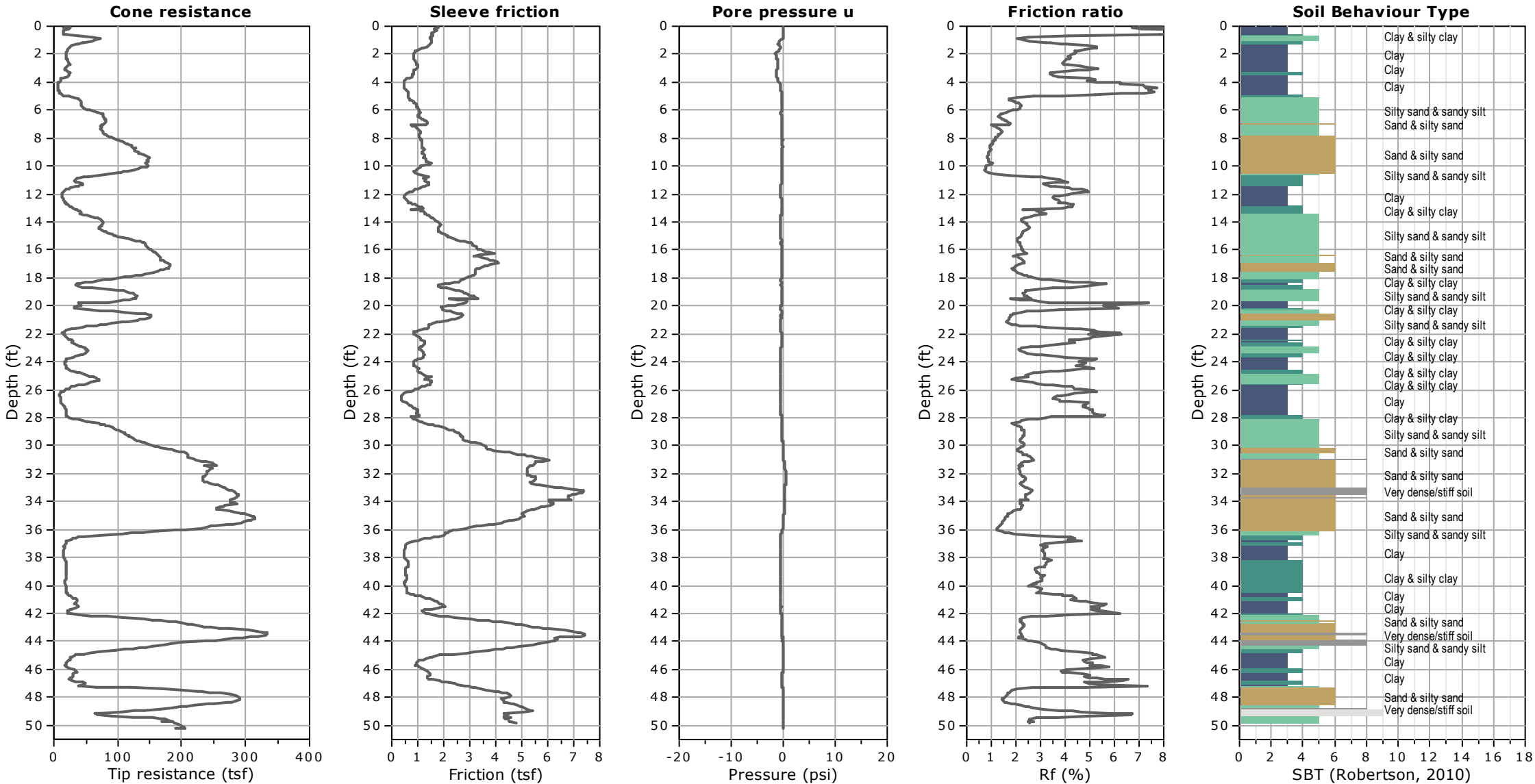
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	<b>Lab testing:</b>	AL = Atterberg Limits	EI = Expansion Index	SA = Sieve Analysis	RV = R-Value Test	SR = Sulfate/Resistivity Test	SH = Shear Test	HC= Consolidation

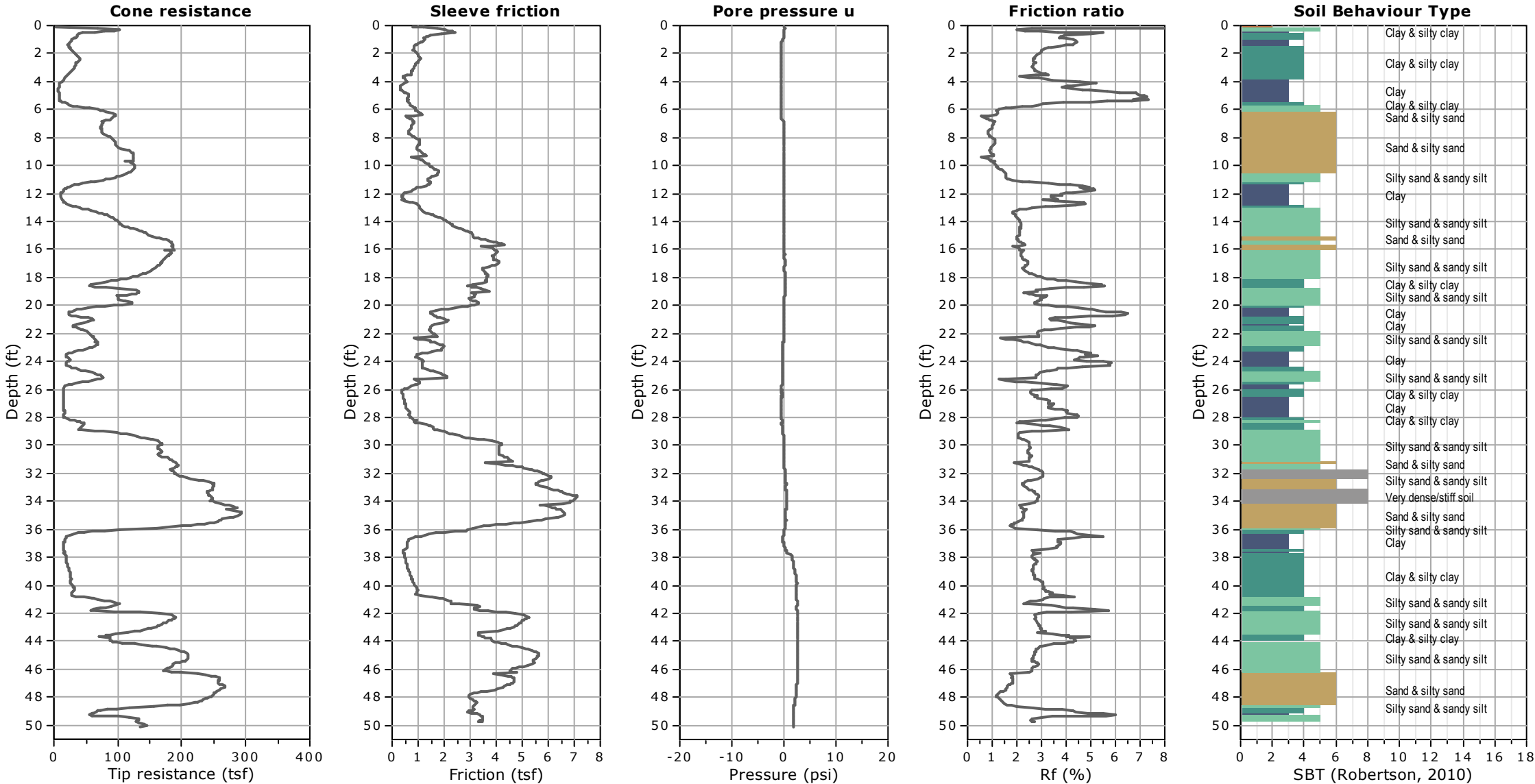
# **APPENDIX B**

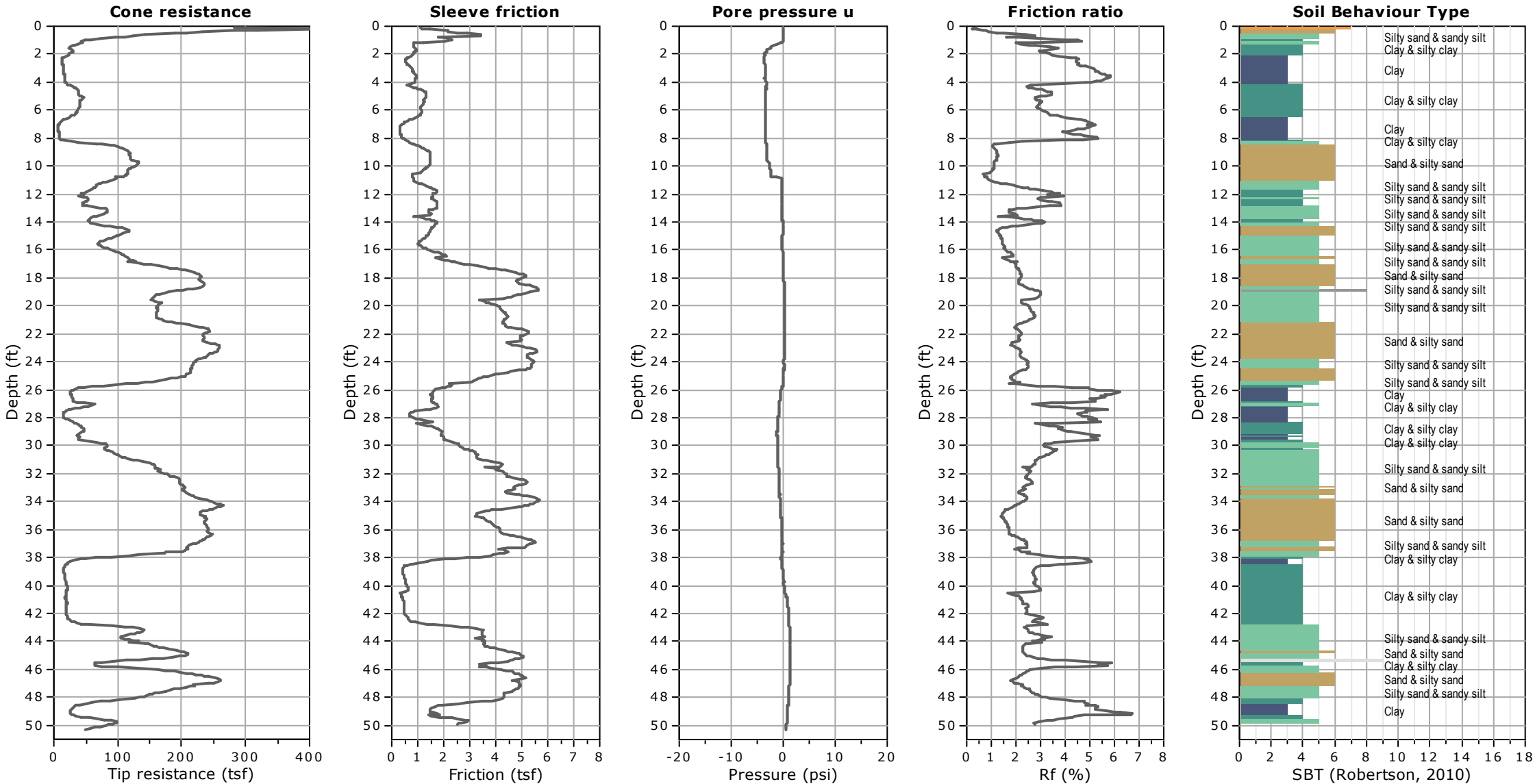
## **LOGS OF CPT SOUNDINGS**

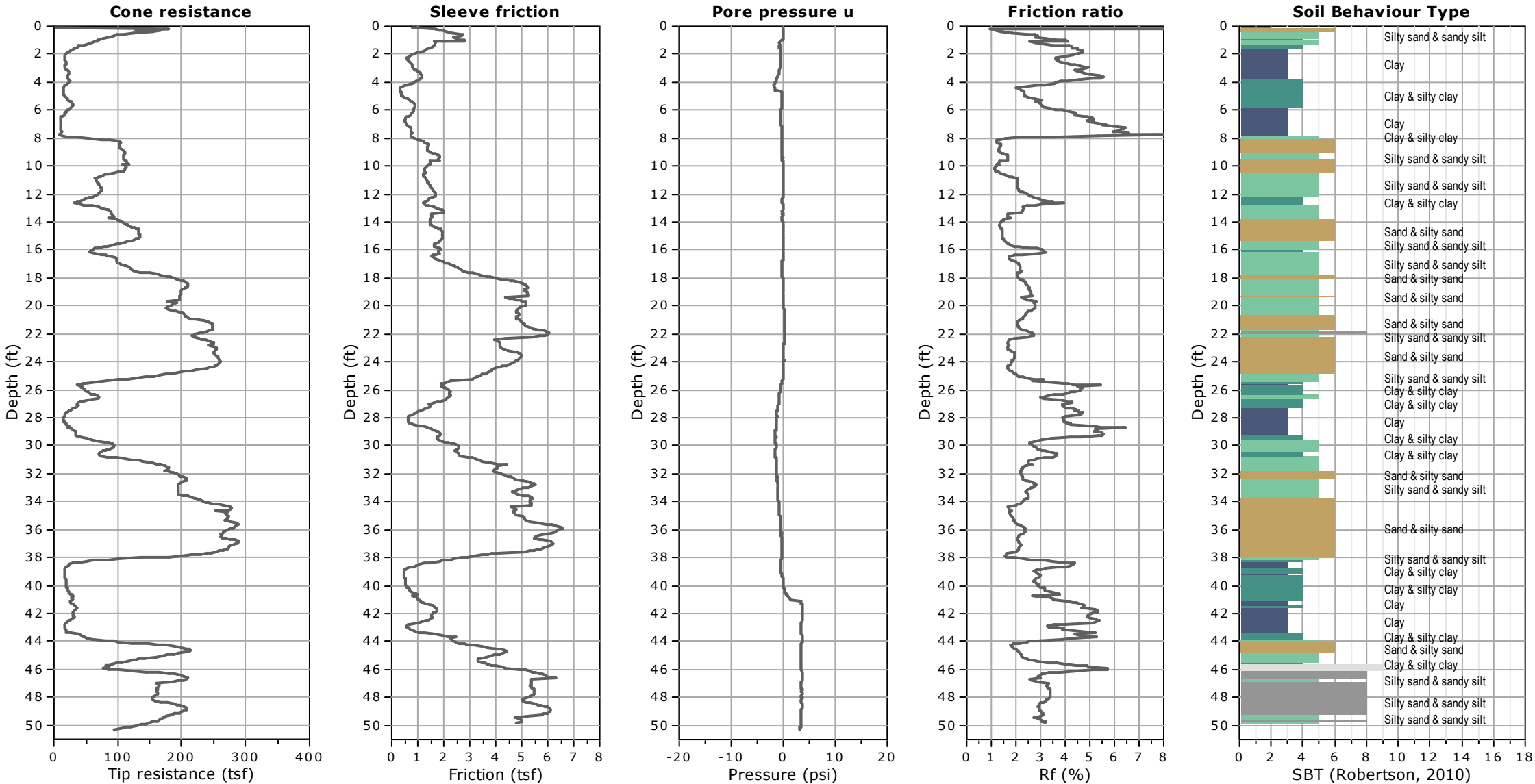
**Geotechnical and Infiltration Evaluation  
2323 W. Broadway, Anaheim, California  
Project No. 2496-CR**











# **APPENDIX C**

## **LABORATORY TEST RESULTS**

**Geotechnical and Infiltration Evaluation  
2323 W. Broadway, Anaheim, California  
Project No. 2496-CR**





## SUMMARY OF LABORATORY TESTING

### Classification

Soils were classified visually in general accordance to the Unified Soil Classification System (ASTM Test Method D 2487). The soil classifications are shown on the logs of exploratory borings in Appendix A.

### In Situ Moisture Content and Unit Weight

The field moisture content was measured in the laboratory on selected samples collected during the field investigation. The field moisture content is determined as a percentage of the dry unit weight. The dry density was measured in the laboratory on selected ring samples. The results are shown on the logs of exploratory borings in Appendix A.

### Moisture-Density Relationship

Laboratory testing was performed on two samples collected during the subsurface exploration. The laboratory maximum dry density and optimum moisture content for the soil type was determined in general accordance with test method ASTM Test Procedure D 1557. The results are presented herein.

### Direct Shear

Direct shear testing was performed on remolded samples of the surficial soils according to ASTM Test Method D 3080. The results of these tests are presented herein.

### Expansion Index

The expansion potential of the soils was determined by performing expansion index tests on two representative soil samples from the site in general accordance with ASTM D 4829. The results of these tests are presented herein.

### Collapse

Collapse tests were conducted in accordance with ASTM D4546. The results of these tests are presented herein.

### Atterberg Limits

Atterberg limits testing were performed on two fine-grained samples collected from the site. The tests were performed in general accordance with ASTM D 4318. The test results are presented herein.

### Sulfate Content, Resistivity and Chloride Content

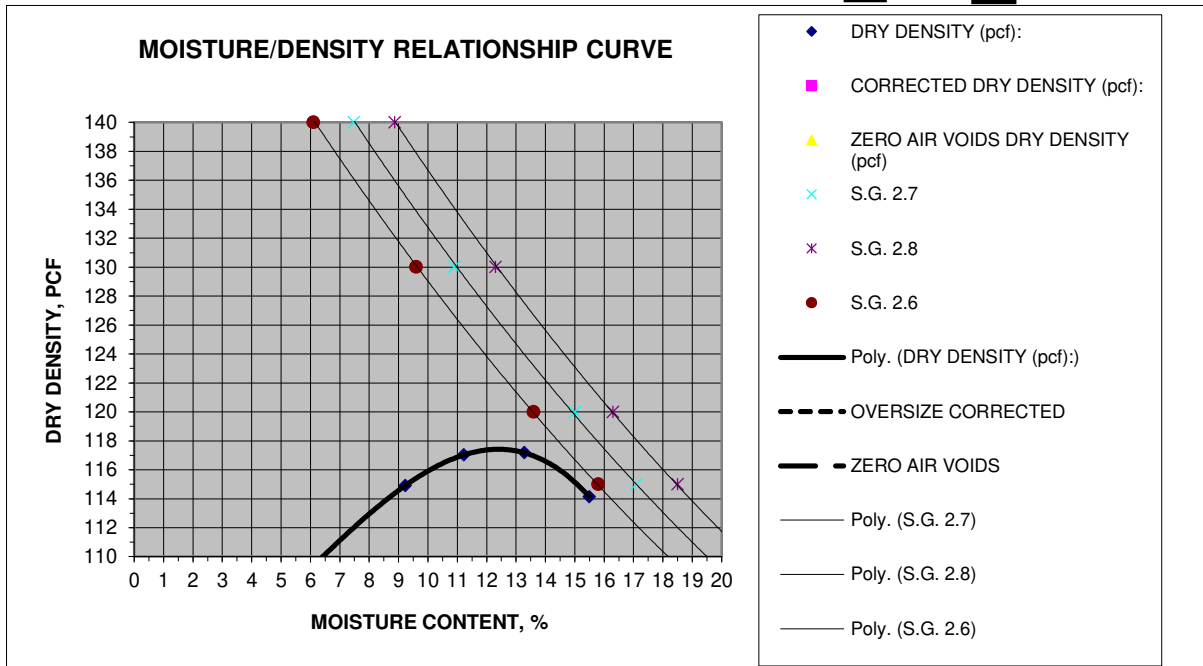
Testing to determine the water-soluble sulfate content, minimum resistivity, and chloride concentration in selected soil samples was performed by others. The results are included herein.



## MOISTURE/DENSITY RELATIONSHIP

<b>Client:</b> Melia Homes <b>Project:</b> 2323 W. Broadway <b>Location:</b> Irvine <b>Material Type:</b> Gray Clayey Silt <b>Material Supplier:</b> - <b>Material Source:</b> - <b>Sample Location:</b> B-1 @ 0 - 5 ft  <b>Sampled By:</b> DA <b>Received By:</b> DLI <b>Tested By:</b> GP <b>Reviewed By:</b> -	<b>Job No.:</b> 2496-CR <b>Lab No.:</b> Corona  <b>Date Sampled:</b> 10/6/2020 <b>Date Received:</b> 10/7/2020 <b>Date Tested:</b> 10/15/2020 <b>Date Reviewed:</b> -
--	---

**Test Procedure:** ASTM D1557      **Method:** A  
**Oversized Material (%):** 5.4      **Correction Required:**  yes  no



### MOISTURE DENSITY RELATIONSHIP VALUES

<b>Maximum Dry Density, pcf</b>	118.0	<b>@ Optimum Moisture, %</b>	12.5
<b>Corrected Maximum Dry Density, pcf</b>		<b>@ Optimum Moisture, %</b>	

### MATERIAL DESCRIPTION

#### Grain Size Distribution:

	% Gravel (retained on No. 4)
	% Sand (Passing No. 4, Retained on No. 200)
	% Silt and Clay (Passing No. 200)

#### Classification:

Unified Soils Classification: \_\_\_\_\_  
 AASHTO Soils Classification: \_\_\_\_\_

#### Atterberg Limits:

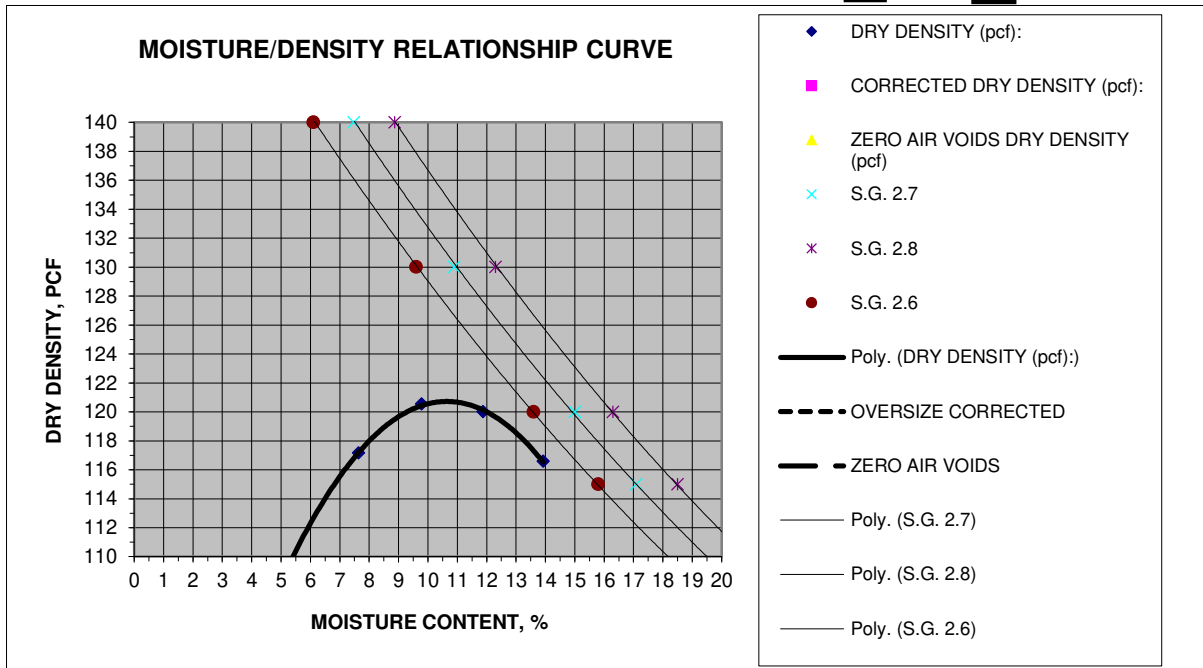
	Liquid Limit, %
	Plastic Limit, %
	Plasticity Index, %



## MOISTURE/DENSITY RELATIONSHIP

<b>Client:</b> Melia Homes <b>Project:</b> 2323 W. Broadway <b>Location:</b> Irvine <b>Material Type:</b> Gray Clayey Silt <b>Material Supplier:</b> - <b>Material Source:</b> - <b>Sample Location:</b> B-5 @ 0 - 5 ft  <b>Sampled By:</b> DA <b>Received By:</b> DLI <b>Tested By:</b> GP <b>Reviewed By:</b> -	<b>Job No.:</b> 2496-CR <b>Lab No.:</b> Corona  <b>Date Sampled:</b> 10/6/2020 <b>Date Received:</b> 10/7/2020 <b>Date Tested:</b> 10/15/2020 <b>Date Reviewed:</b> -
--	---

**Test Procedure:** ASTM D1557      **Method:** A  
**Oversized Material (%):** 2.6      **Correction Required:**  yes  no



### MOISTURE DENSITY RELATIONSHIP VALUES

<b>Maximum Dry Density, pcf</b>	121.0	<b>@ Optimum Moisture, %</b>	11.0
<b>Corrected Maximum Dry Density, pcf</b>		<b>@ Optimum Moisture, %</b>	

### MATERIAL DESCRIPTION

#### Grain Size Distribution:

	% Gravel (retained on No. 4)
	% Sand (Passing No. 4, Retained on No. 200)
	% Silt and Clay (Passing No. 200)

#### Classification:

Unified Soils Classification: \_\_\_\_\_  
 AASHTO Soils Classification: \_\_\_\_\_

#### Atterberg Limits:

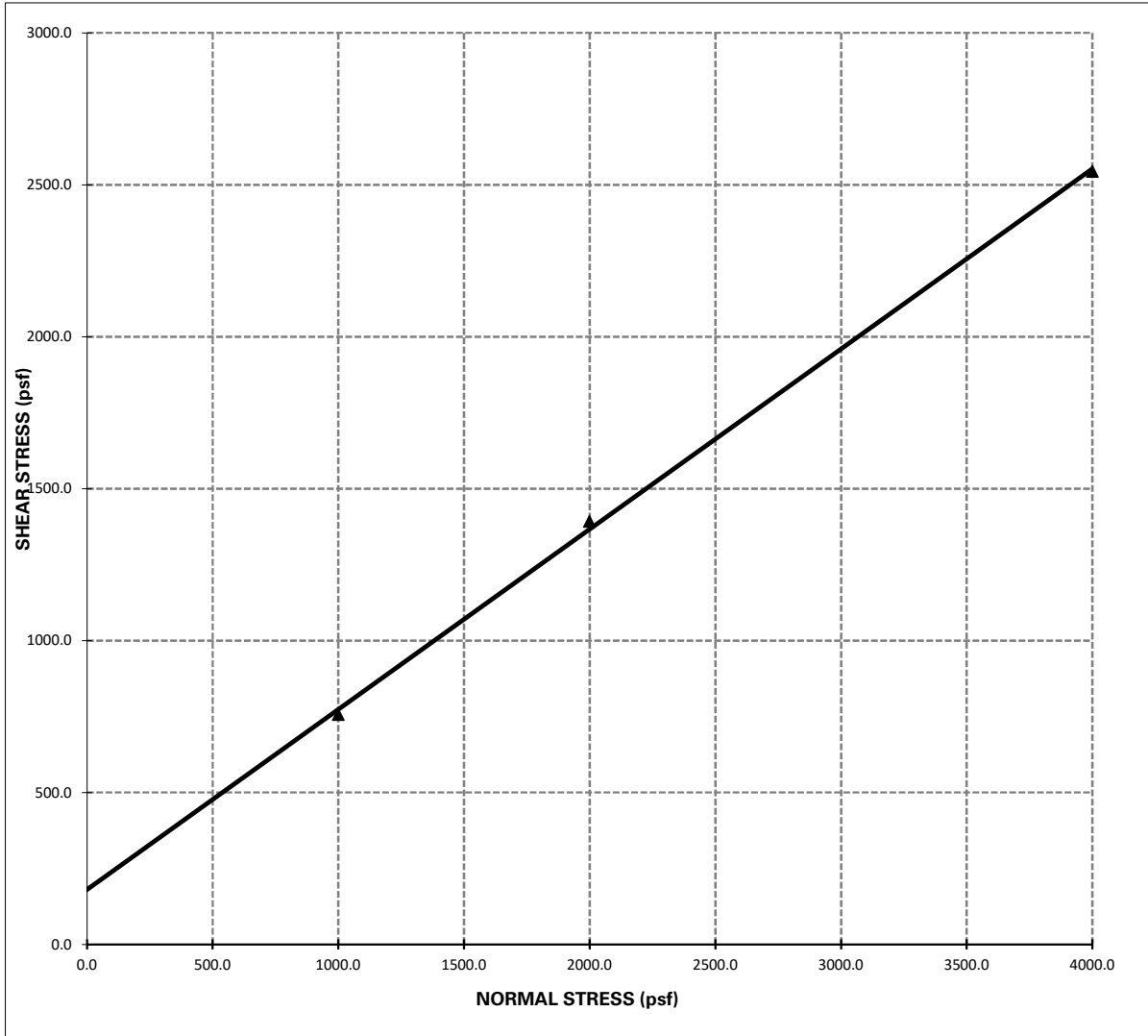
	Liquid Limit, %
	Plastic Limit, %
	Plasticity Index, %



## DIRECT SHEAR TEST

**Project Name:** 2323 W Broadway  
**Project Number:** 2496-CR

**Sample Location:** B-1 @ 0-5 feet  
**Date Tested:** 10/27/2020



**Shear Strength:**  $\Phi = 30.7^\circ$  ; **C = 180.00 psf**

- Notes:**
- 1 - The soil specimen used in the shear box was a ring sample remolded to approximately 90% relative compaction from a bulk sample collected during the field investigation.
  - 2 - The above reflect direct shear strength at saturated conditions.
  - 3 - The tests were run at a shear rate of 0.035 in/min.



## EXPANSION INDEX TEST

(ASTM D4829)

**Client:** Melia Homes  
**Project Number:** 2496-CR  
**Project Location:** 2323 W. Broadway, Irvine

**Tested/ Checked By:** GP Lab No Corona  
**Date Tested:** 10/21/2020  
**Sample Source:** B-1 @ 0 - 5 ft  
**Sample Description:** \_\_\_\_\_

Ring #: \_\_\_\_\_ Ring Dia. : 4.01" Ring Ht. .1"

### DENSITY DETERMINATION

<b>A</b>	Weight of compacted sample & ring (gm)	747.3
<b>B</b>	Weight of ring (gm)	362.4
<b>C</b>	Net weight of sample (gm)	<b>384.9</b>
<b>D</b>	Wet Density, lb / ft3 (C*0.3016)	<b>116.1</b>
<b>E</b>	Dry Density, lb / ft3 (D/1.F)	<b>104.8</b>

### SATURATION DETERMINATION

<b>F</b>	Moisture Content, %	10.8
<b>G</b>	Specific Gravity, assumed	<b>2.70</b>
<b>H</b>	Unit Wt. of Water @ 20 °C, (pcf)	<b>62.4</b>
<b>I</b>	% Saturation	<b>48.0</b>

READINGS		
DATE	TIME	READING
10/21/2020	11:26	0.0940
	11:36	0.0940
	11:36	0.1200

Initial  
10 min/Dry  
  
  
  
Final

FINAL MOISTURE	
Final Weight of wet sample & tare	% Moisture
785.9	<b>20.8</b>

**EXPANSION INDEX = 26**



## EXPANSION INDEX TEST

(ASTM D4829)

**Client:** Melia Homes  
**Project Number:** 2496-CR  
**Project Location:** 2323 W. Broadway, Irvine

**Tested/ Checked By:** GP Lab No Corona  
**Date Tested:** 10/21/2020  
**Sample Source:** B-5 @ 0 - 5 ft  
**Sample Description:** \_\_\_\_\_

Ring #: \_\_\_\_\_ Ring Dia. : 4.01" Ring Ht. .1"

### DENSITY DETERMINATION

<b>A</b>	Weight of compacted sample & ring (gm)	754.2
<b>B</b>	Weight of ring (gm)	362.5
<b>C</b>	Net weight of sample (gm)	<b>391.7</b>
<b>D</b>	Wet Density, lb / ft3 (C*0.3016)	<b>118.1</b>
<b>E</b>	Dry Density, lb / ft3 (D/1.F)	<b>106.4</b>

### SATURATION DETERMINATION

<b>F</b>	Moisture Content, %	11.0
<b>G</b>	Specific Gravity, assumed	<b>2.70</b>
<b>H</b>	Unit Wt. of Water @ 20 °C, (pcf)	<b>62.4</b>
<b>I</b>	% Saturation	<b>50.9</b>

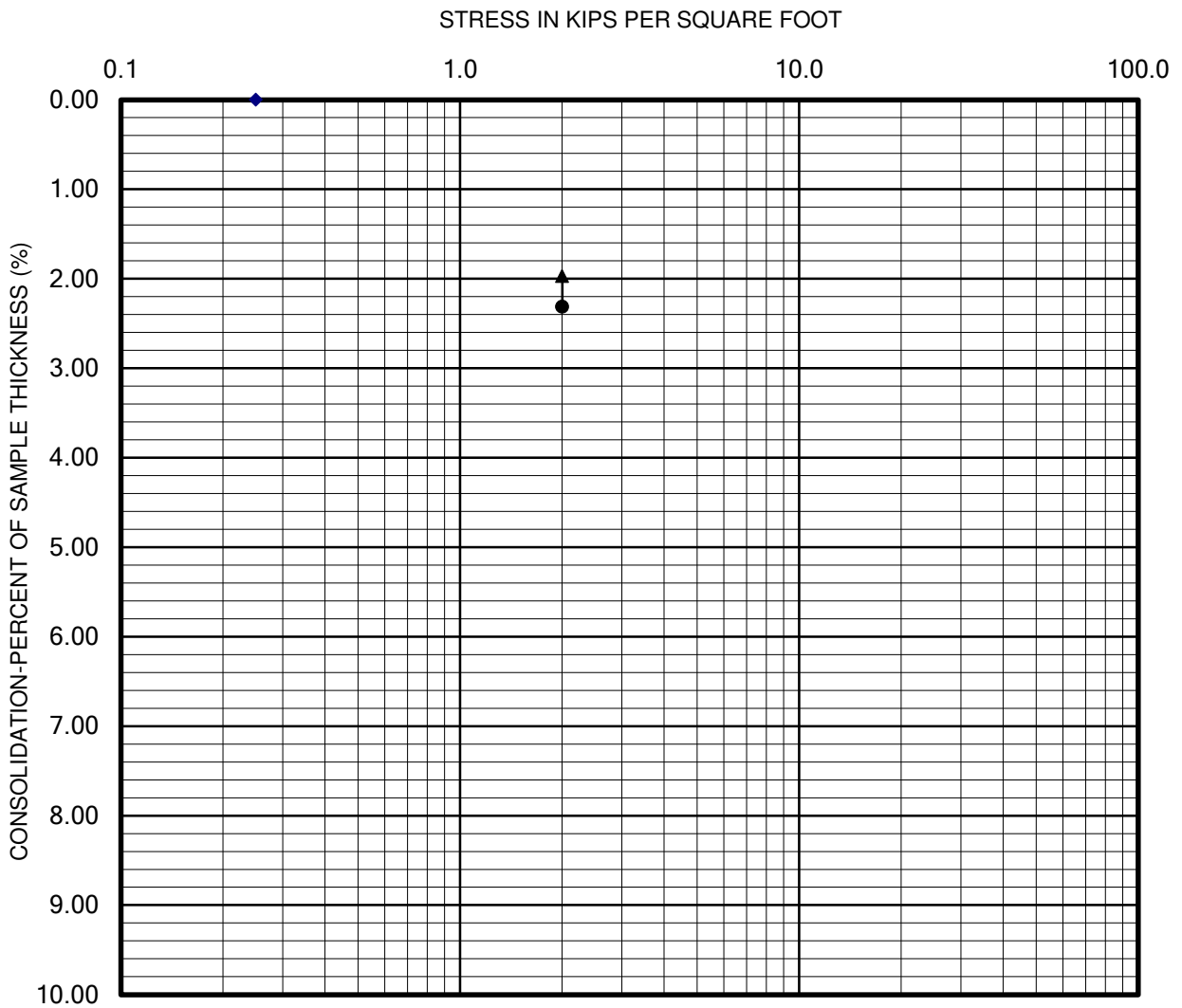
READINGS		
DATE	TIME	READING
10/21/2020	11:47	0.1080
	11:57	0.1070
	11:36	0.1350

Initial  
10 min/Dry  
  
  
  
Final

### FINAL MOISTURE

Final Weight of wet sample & tare	% Moisture
789.0	<b>19.9</b>

**EXPANSION INDEX = 28**



- Seating Cycle
- Loading Prior to Inundation
- ▲— Loading After Inundation
- ▲--- Rebound Cycle

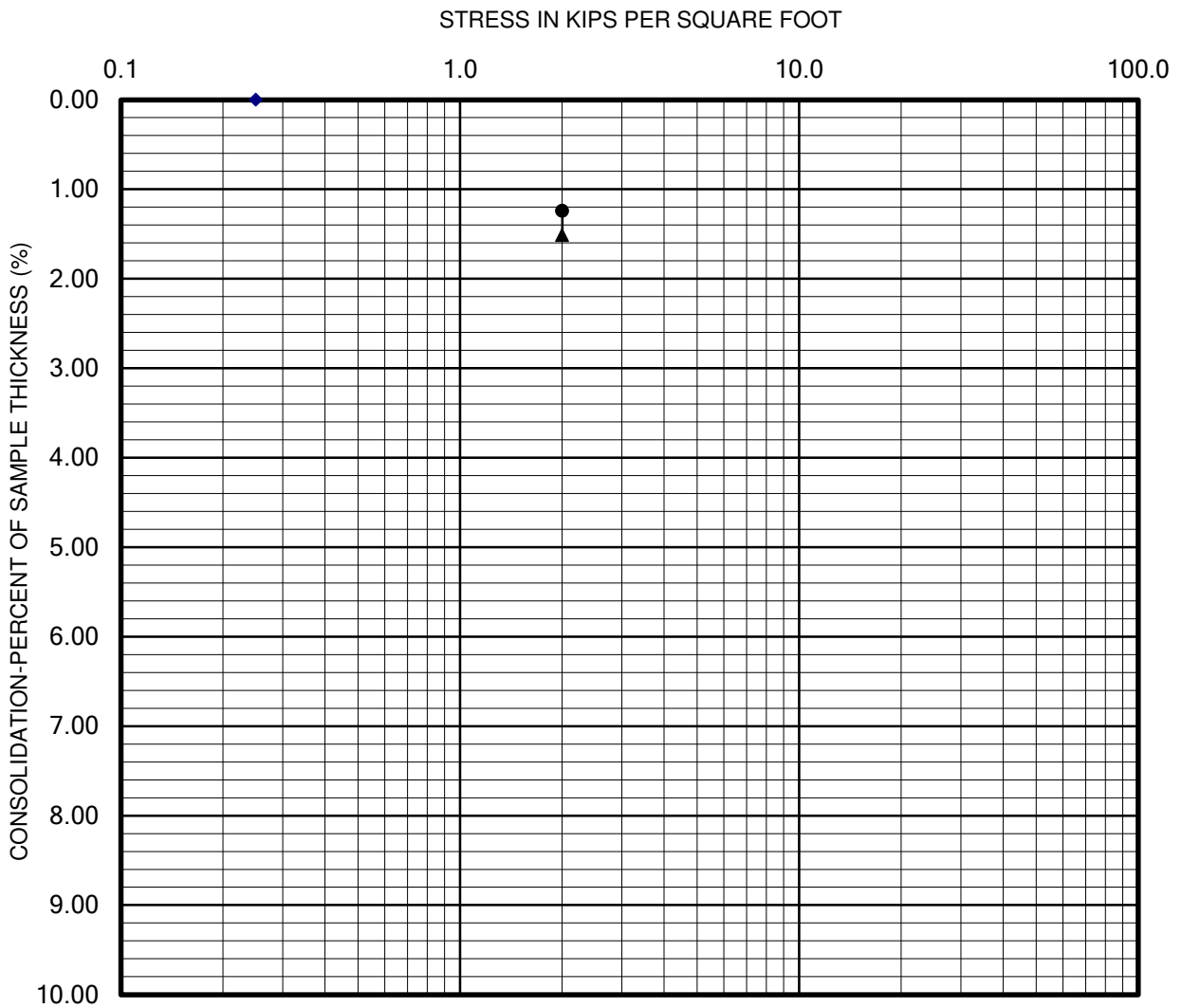
PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4546



## COLLAPSE REPORT

**Sample: B-2 @ 6 ft**

CHECKED BY:	Lab: DI
PROJECT NO.: 2496-CR	Date:



- Seating Cycle
- Loading Prior to Inundation
- ▲— Loading After Inundation
- ▲--- Rebound Cycle

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4546

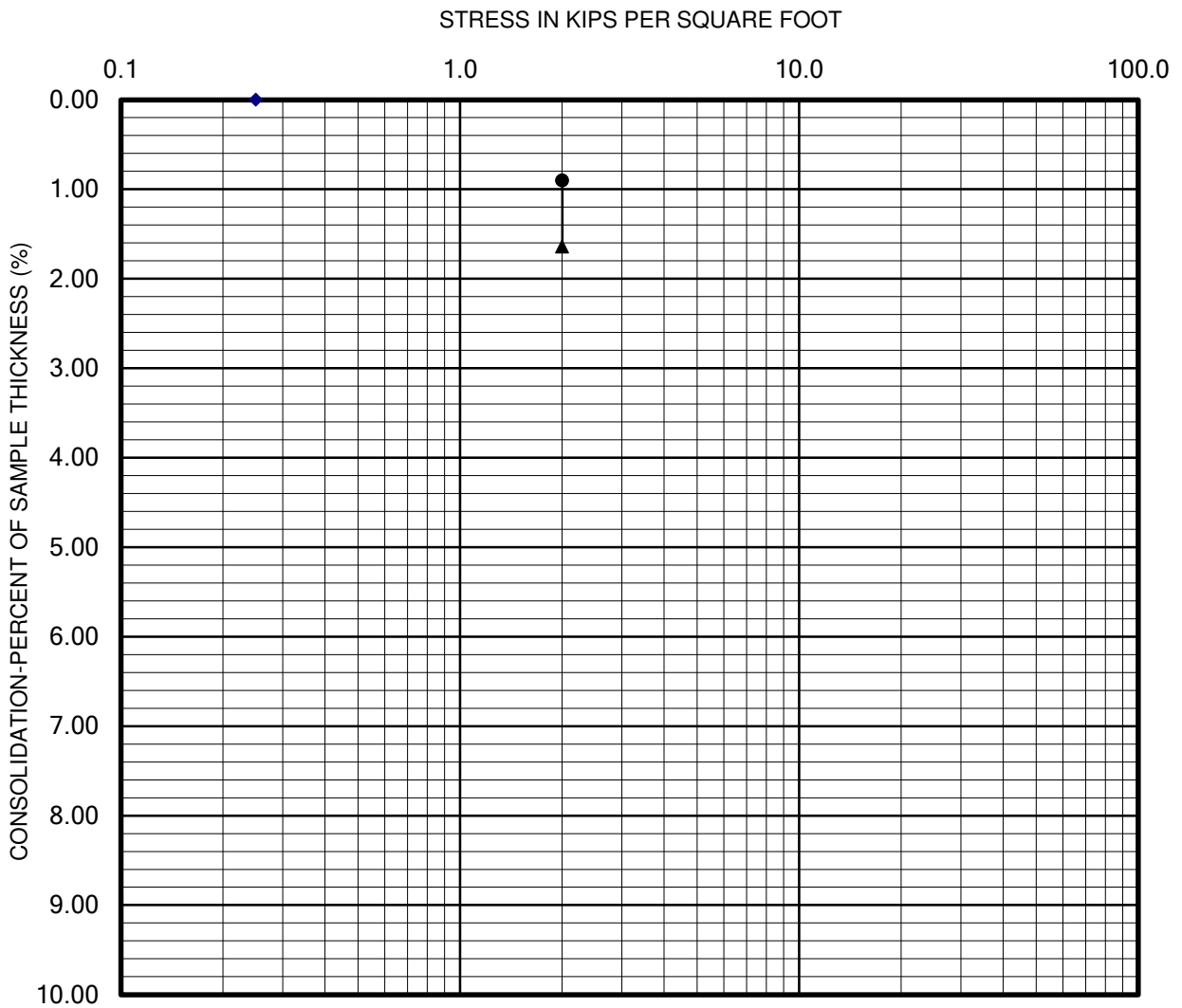


## COLLAPSE REPORT

**Sample: B-4 @ 4 ft**

CHECKED BY:	Lab: DI
PROJECT NO.: 2496-CR	Date:





- Seating Cycle
- Loading Prior to Inundation
- ▲— Loading After Inundation
- ▲--- Rebound Cycle

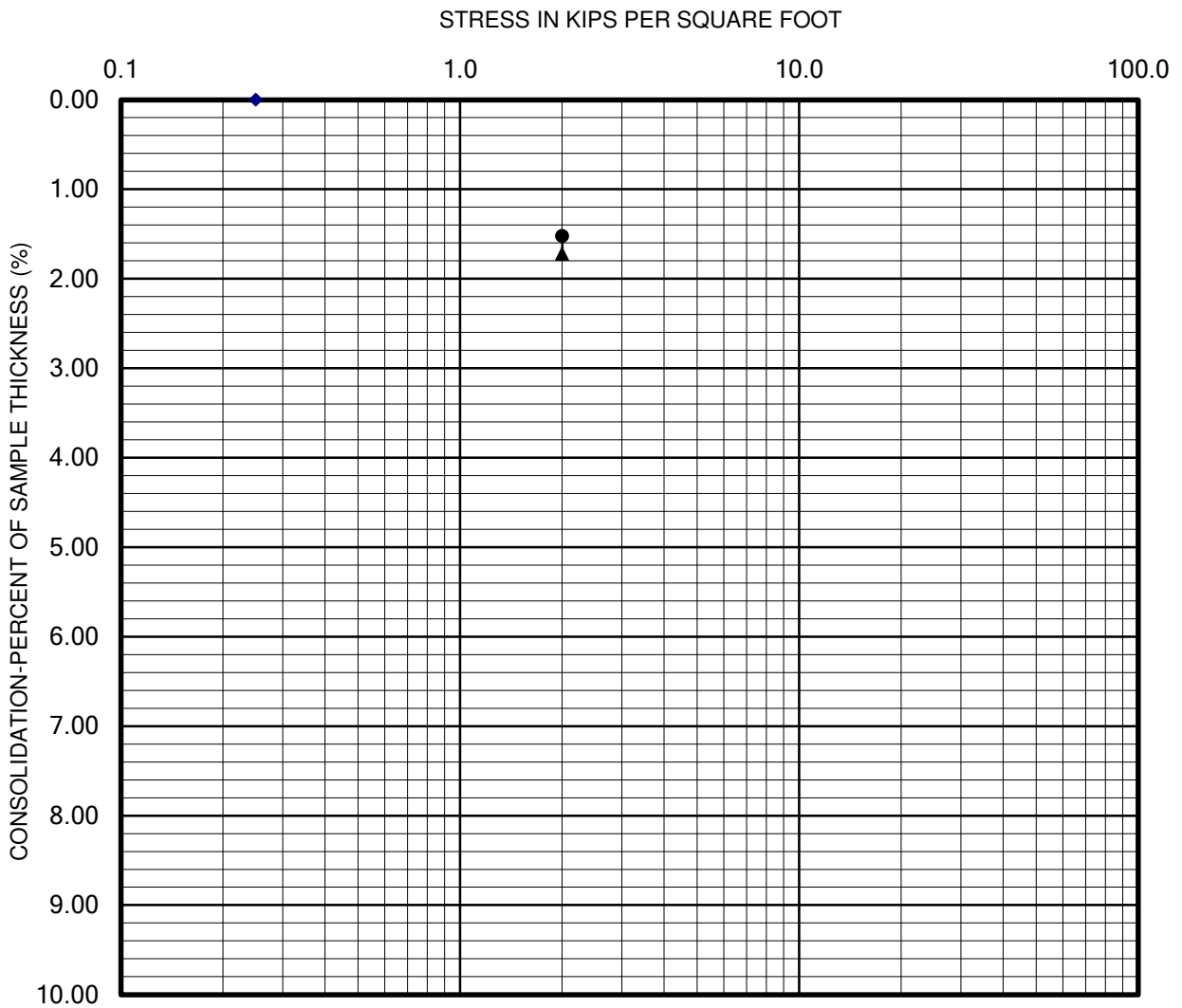
PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4546



## COLLAPSE REPORT

**Sample: B-5 @ 5 ft**

CHECKED BY:	Lab: DI
PROJECT NO.: 2496-CR	Date:



- Seating Cycle
- Loading Prior to Inundation
- ▲— Loading After Inundation
- ▲--- Rebound Cycle

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4546



## COLLAPSE REPORT

**Sample: B-5 @ 10 ft**

CHECKED BY: \_\_\_\_\_ Lab: DI

PROJECT NO.: 2496-CR \_\_\_\_\_ Date: \_\_\_\_\_

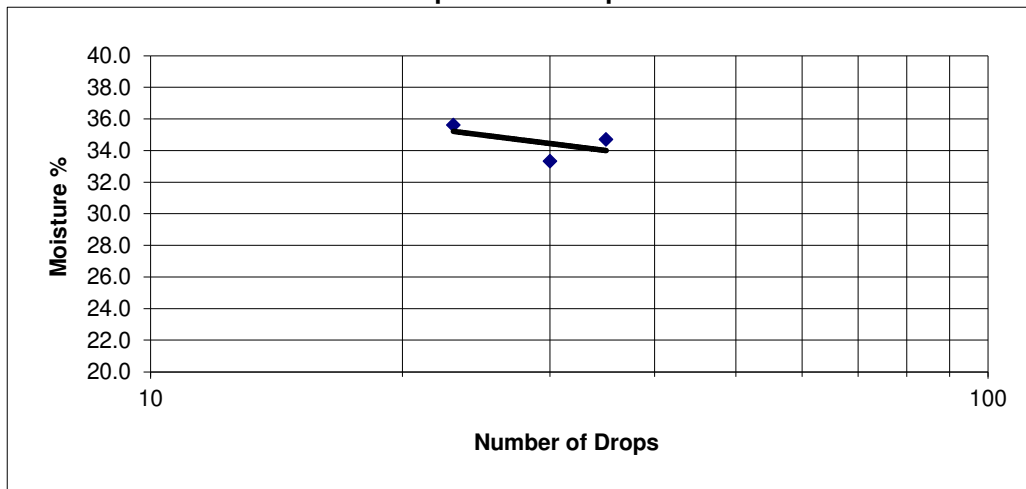


### ATTERBERG LIMITS DATA

Field Classification	_____	Job No.	2496-CR
Sample Number	_____	Client	Melia Homes
Sample Type	_____	Project	2323 W Broadway
Location	B-1 @ 0-5 feet		
Tested by:	DA		

Number of Blows	Plastic Limit		Liquid Limit		
	35	30	25	20	15
Wt. of Dish + Wet Soil	13.30	13.00	21.20	20.90	22.51
Wt. of Dish + Dry Soil	12.18	11.90	17.31	17.20	18.20
Wt. of Moisture	1.12	1.10	3.89	3.70	4.31
Wt. of Dish	6.00	6.00	6.10	6.10	6.10
Wt. of Dry Soil	6.18	5.90	11.21	11.10	12.10
Moisture Content %	18.1	18.6	34.7	33.3	35.6

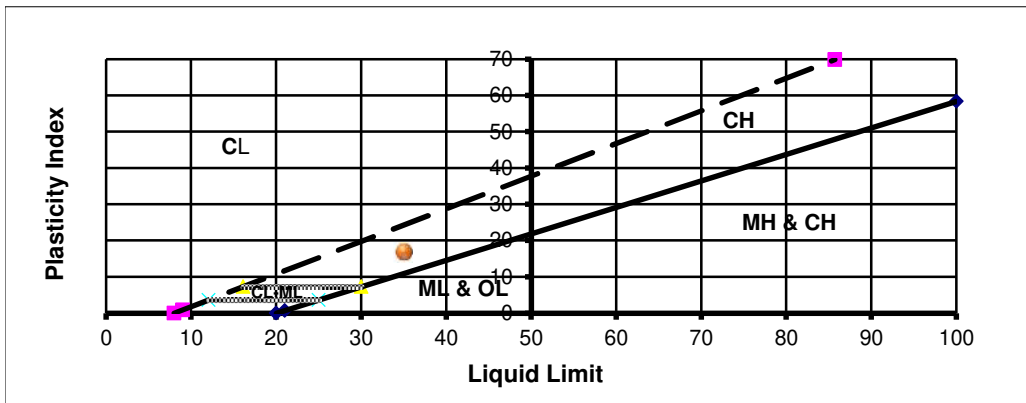
Liquid Limit Graph



Liquid Limit  
35

Plastic Limit  
18

Plasticity Index  
17



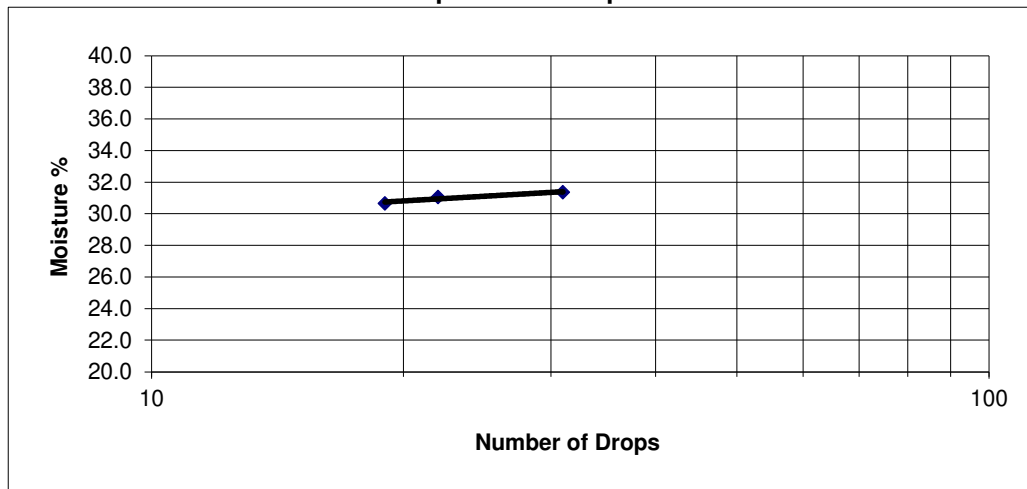


### ATTERBERG LIMITS DATA

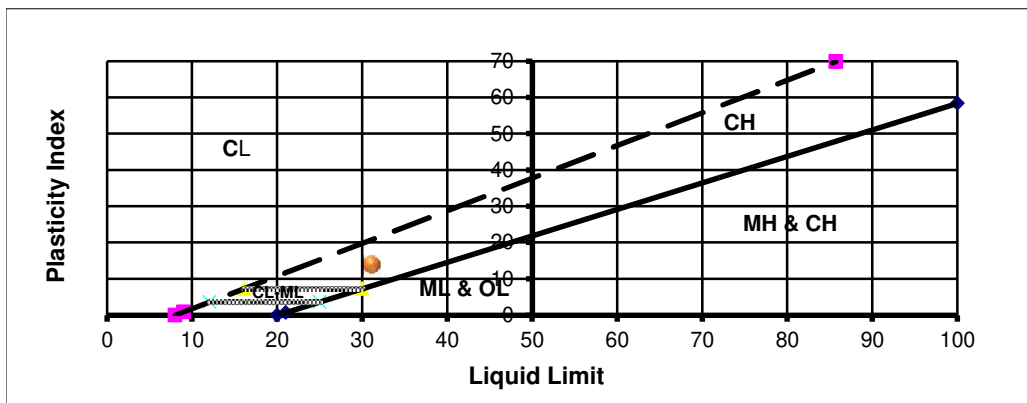
Field Classification	_____	Job No.	2496-CR
Sample Number	_____	Client	Melia Homes
Sample Type	_____	Project	2323 W Broadway
Location	B-5 @ 0-5 feet		
Tested by:	DA		

Number of Blows	Plastic Limit		Liquid Limit		
	30	25	25	20	15
Wt. of Dish + Wet Soil	13.50	13.00	25.41	22.60	21.91
Wt. of Dish + Dry Soil	12.40	11.95	20.80	18.69	18.20
Wt. of Moisture	1.10	1.05	4.61	3.91	3.71
Wt. of Dish	6.00	6.00	6.10	6.10	6.10
Wt. of Dry Soil	6.40	5.95	14.70	12.59	12.10
Moisture Content %	17.2	17.6	31.4	31.1	30.7

Liquid Limit Graph



Liquid Limit  
31  
 Plastic Limit  
17  
 Plasticity Index  
14





## Soil Analysis Lab Results

Client: GeoTek, Inc.  
 Job Name: 2323 Broadway  
 Client Job Number: 2496-CR  
 Project X Job Number: S201022D  
 October 26, 2020

Bore# / Description	Method Depth (ft)	ASTM D4327 Sulfates SO <sub>4</sub> <sup>2-</sup>		ASTM D4327 Chlorides Cl <sup>-</sup>		ASTM G187 Resistivity As Rec'd   Minimum (Ohm-cm)   (Ohm-cm)		ASTM D4972 pH	ASTM G200 Redox (mV)	SM 4500-S2-D Sulfide S <sup>2-</sup>	ASTM D4327 Nitrate NO <sub>3</sub> <sup>-</sup>	ASTM D6919 Ammonium NH <sub>4</sub> <sup>+</sup>	ASTM D6919 Lithium Li <sup>+</sup>	ASTM D6919 Sodium Na <sup>+</sup>	ASTM D6919 Potassium K <sup>+</sup>	ASTM D6919 Magnesium Mg <sup>2+</sup>	ASTM D6919 Calcium Ca <sup>2+</sup>	ASTM D4327 Fluoride F <sub>2</sub> <sup>-</sup>	ASTM D4327 Phosphate PO <sub>4</sub> <sup>3-</sup>	
		(mg/kg)	(wt%)	(mg/kg)	(wt%)															
		B-1	0-5	44.3	0.0044	7.8	0.0008	227,800	3,149	8.7	196	<0.01	15.8	8.6	ND	46.8	8.9	6.2	34.2	8.9
B-5	1-5	33.4	0.0033	5.3	0.0005	134,000	3,685	9.3	165	<0.01	5.1	19.2	ND	116.4	2.7	8.8	80.5	13.1	1.6	

Cations and Anions, except Sulfide and Bicarbonate, tested with Ion Chromatography  
 mg/kg = milligrams per kilogram (parts per million) of dry soil weight  
 ND = 0 = Not Detected | NT = Not Tested | Unk = Unknown  
 Chemical Analysis performed on 1:3 Soil-To-Water extract

# **APPENDIX D**

## **INFILTRATION TEST DATA**

**Geotechnical and Infiltration Evaluation  
2323 W. Broadway, Anaheim, California  
Project No. 2496-CR**



**Client:** Melia Homes  
**Project:** 2323 W. Broadway  
**Project No:** 2496-CR  
**Date:** 10/23/2020

**Boring No.** P-1/I-1

**Infiltration Rate (Porchet Method)**

Time Interval, $\Delta t =$	10	min
Final Depth to Water, $D_F =$	39.5	in
Test Hole Radius, $r =$	4	in
Initial Depth to Water, $D_O =$	36	in
Total Test Hole Depth, $D_T =$	60	in

Equation -  $I_t = \frac{\Delta H (60r)}{\Delta t (r+2H_{avg})}$

$H_O = D_T - D_O =$	24	in
$H_F = D_T - D_F =$	20.5	in
$\Delta H = \Delta D = H_O - H_F =$	3.5	in
$H_{avg} = (H_O + H_F) / 2 =$	22.25	in

$I_t =$  1.73 Inches per Hour



**Client:** Melia Homes  
**Project:** 2323 W. Broadway  
**Project No:** 2496-CR  
**Date:** 10/23/2020

**Boring No.** P-2/I-2

**Infiltration Rate (Porchet Method)**

Time Interval, $\Delta t =$	10	min
Final Depth to Water, $D_F =$	40.5	in
Test Hole Radius, $r =$	4	in
Initial Depth to Water, $D_O =$	36	in
Total Test Hole Depth, $D_T =$	60	in

Equation -  $I_t = \frac{\Delta H (60r)}{\Delta t (r+2H_{avg})}$

$H_O = D_T - D_O =$	24	in
$H_F = D_T - D_F =$	19.5	in
$\Delta H = \Delta D = H_O - H_F =$	4.5	in
$H_{avg} = (H_O + H_F)/2 =$	21.75	in

$I_t =$  2.27 **Inches per Hour**





**Client:** Melia Homes  
**Project:** 2323 W. Broadway  
**Project No:** 2496-CR  
**Date:** 10/23/2020

**Boring No.** P-3/I-3

**Infiltration Rate (Porchet Method)**

Time Interval, $\Delta t =$	30	min
Final Depth to Water, $D_F =$	39.75	in
Test Hole Radius, $r =$	4	in
Initial Depth to Water, $D_O =$	36	in
Total Test Hole Depth, $D_T =$	60	in

Equation -  $I_t = \frac{\Delta H (60r)}{\Delta t (r+2H_{avg})}$

$H_O = D_T - D_O =$	24	in
$H_F = D_T - D_F =$	20.25	in
$\Delta H = \Delta D = H_O - H_F =$	3.75	in
$H_{avg} = (H_O + H_F)/2 =$	22.125	in

$I_t =$  0.62 Inches per Hour



### Percolation Test Data Sheet

Project: 2323 W. Broadway      Project No: 2496-CR      Date: 10/5/2020

Test Hole No: I-1      Tested By: D. Alvarez

Depth of Test Hole,  $D_t$ : 60.0"      USCS Soil Classification:

**Test Hole Dimensions (inches)**

Diameter (if round)= 8.0"      Length

Sides (if rectangular)=      Width

**Sandy Soil Criteria Test\***

Trial No.	Start Time	Stop Time	Time Interval, (min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Greater than or Equal to 6"? (y/n)
1	7:05	7:30	25	36.0	48.5	12.5	Y
2	7:30	7:55	25	36.0	48.5	12.5	Y

\*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Other wise, pre-soak (fill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25".

Trial No.	Start Time	Stop Time	$\Delta t$ Time Interval (min.)	$D_o$ Initial Depth to Water (in.)	$D_f$ Final Depth to Water (in.)	$\Delta D$ Change in Water Level (in.)	Percolation Rate (min./in.)
1	7:55	8:05	10	36.0	39.75		
2	8:05	8:15	10	36.0	39.75		
3	8:15	8:25	10	36.0	39.5		
4	8:25	8:35	10	36.0	39.5		
5	8:35	8:45	10	36.0	39.5		
6	8:45	8:55	10	36.0	39.5		
7							
8							
9							
10							
11							
12							
13							
14							
15							

COMMENTS:

### Percolation Test Data Sheet

Project: 2323 W. Broadway      Project No: 2496-CR      Date: 10/5/2020

Test Hole No: I-2      Tested By: D. Alvarez

Depth of Test Hole,  $D_T$ : 60.0"      USCS Soil Classification:

**Test Hole Dimensions (inches)**

Diameter (if round)= 8.0"      Length

Sides (if rectangular)=      Width

**Sandy Soil Criteria Test\***

Trial No.	Start Time	Stop Time	Time Interval, (min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Greater than or Equal to 6"? (y/n)
1	14:05	14:30	25	36.0	48.75	12.75	Y
2	14:30	14:45	25	36.0	46.5	10.5	Y

\*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Other wise, pre-soak (fill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25".

Trial No.	Start Time	Stop Time	$\Delta t$ Time Interval (min.)	$D_o$ Initial Depth to Water (in.)	$D_f$ Final Depth to Water (in.)	$\Delta D$ Change in Water Level (in.)	Percolation Rate (min./in.)
1	14:45	14:55	10	36.0	42.25	6.25	
2	14:55	15:05	10	36.0	40.5	4.5	
3	15:05	15:15	10	36.0	40.5	4.5	
4	15:15	15:25	10	36.0	40.5	4.5	
5	15:25	15:35	10	36.0	40.5	4.5	
6	15:35	15:45	10	36.0	40.5	4.5	
7							
8							
9							
10							
11							
12							
13							
14							
15							

COMMENTS:

### Percolation Test Data Sheet

Project: 2323 W. Broadway      Project No: 2496-CR      Date: 10/5/2020

Test Hole No: I-3      Tested By: D. Alvarez

Depth of Test Hole,  $D_T$ : 60.0"      USCS Soil Classification:

Test Hole Dimensions (inches)

	Length	Width
--	--------	-------

Diameter (if round)= 8.0"	Sides (if rectangular)=
---------------------------	-------------------------

**Sandy Soil Criteria Test\***

Trial No.	Start Time	Stop Time	Time Interval, (min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Greater than or Equal to 6"?(y/n)
1	7:12	7:37	25	36.0	48.5	5.75	N
2	7:37	8:02	25	36.0	48.5	3.5	N

\*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Other wise, pre-soak (fill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25".

Trial No.	Start Time	Stop Time	$\Delta t$ Time Interval (min.)	$D_o$ Initial Depth to Water (in.)	$D_f$ Final Depth to Water (in.)	$\Delta D$ Change in Water Level (in.)	Percolation Rate (min./in.)
1	8:02	8:32	30	36.0	40.5	4.5	
2	8:32	9:02	30	36.0	40.0	4.0	
3	9:02	9:32	30	36.0	39.75	3.75	
4	9:32	10:02	30	36.0	39.75	3.75	
5	10:02	10:32	30	36.0	39.75	3.75	
6	10:32	11:02	30	36.0	39.75	3.75	
7	11:02	11:32	30	36.0	39.75	3.75	
8	11:32	12:02	30	36.0	39.75	3.75	
9	12:02	12:32	30	36.0	39.75	3.75	
10	12:32	13:02	30	36.0	39.75	3.75	
11	13:02	13:32	30	36.0	39.75	3.75	
12	13:32	14:02	30	36.0	39.75	3.75	
13							
14							
15							

COMMENTS:

# **APPENDIX E**

## **RESULTS OF LIQUEFACTION AND SETTLEMENT ANALYSES**

**Geotechnical and Infiltration Evaluation  
2323 W. Broadway, Anaheim, California  
Project No. 2496-CR**





**LIQUEFACTION ANALYSIS REPORT**

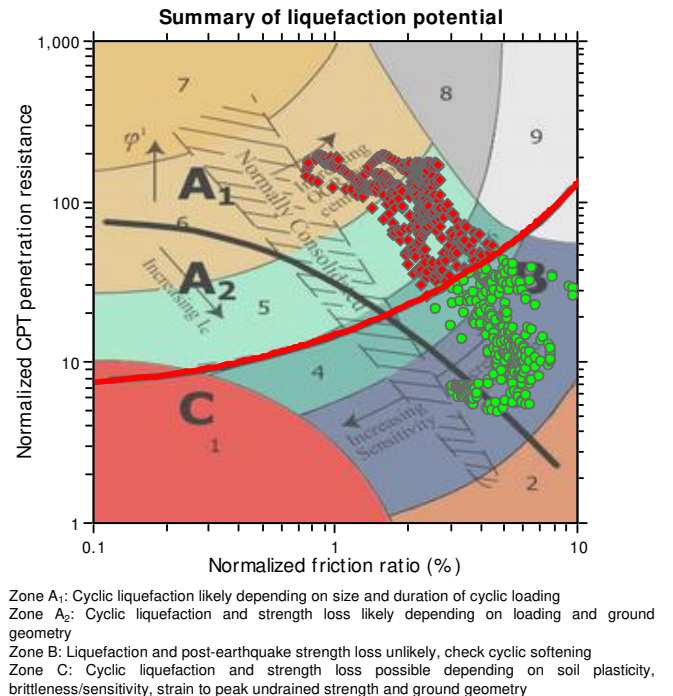
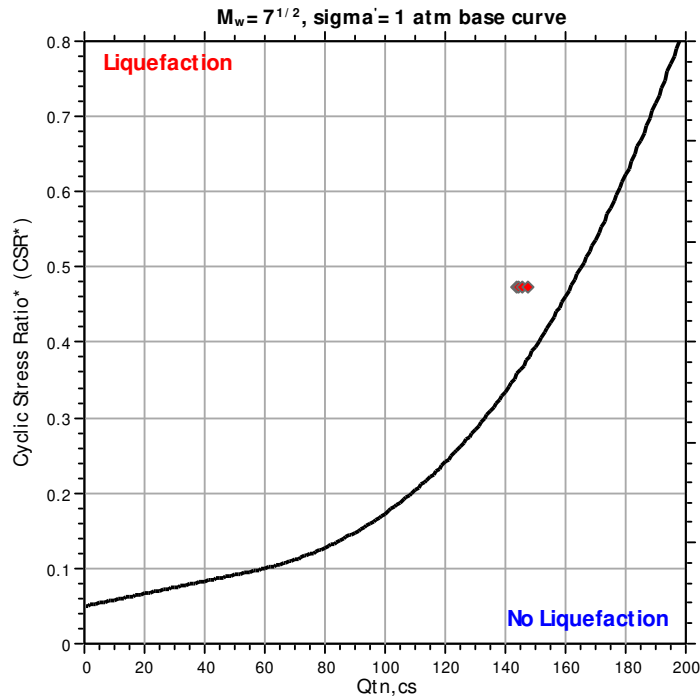
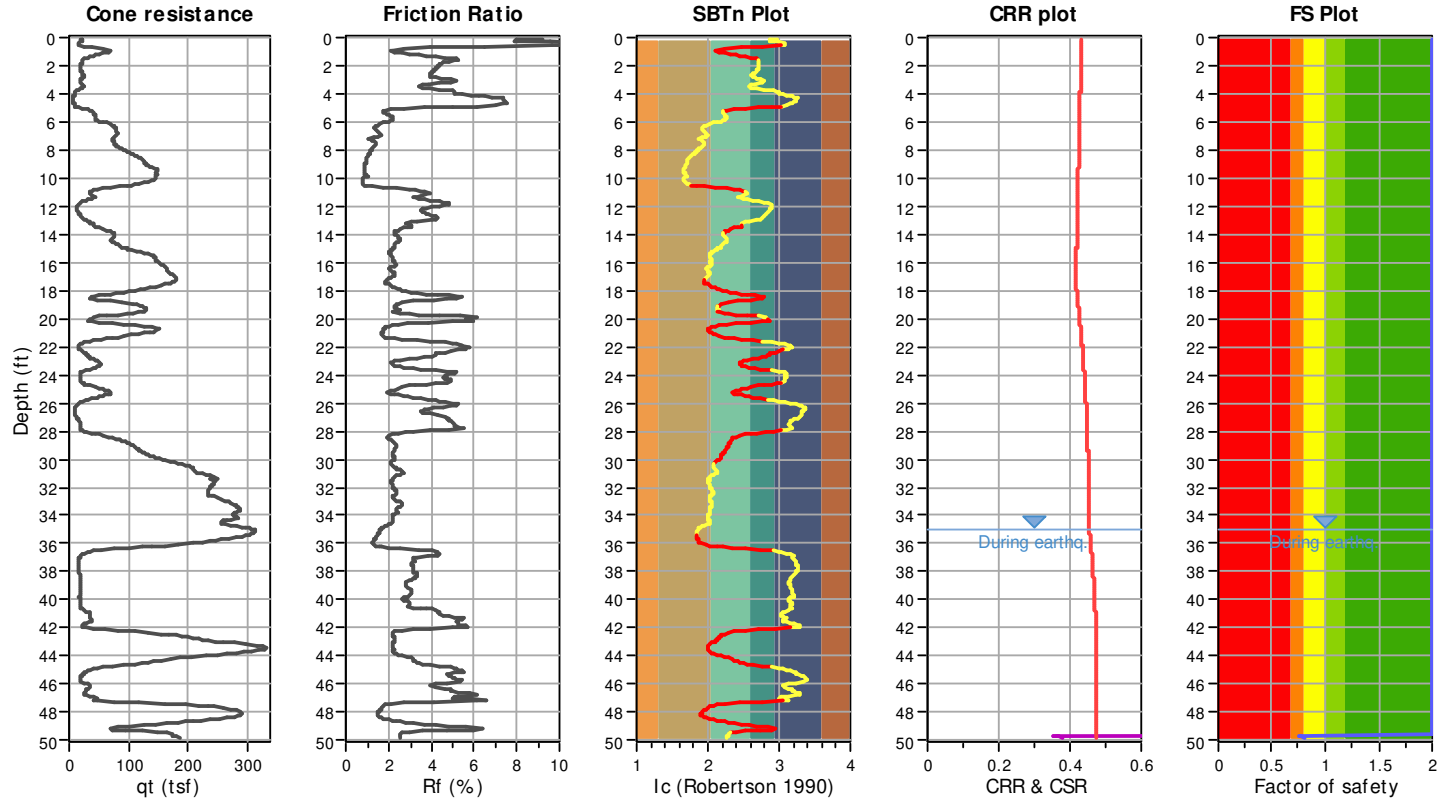
**Project title : Proposed Townhouses**

**Location : 2323 West Broadway, Anaheim, CA**

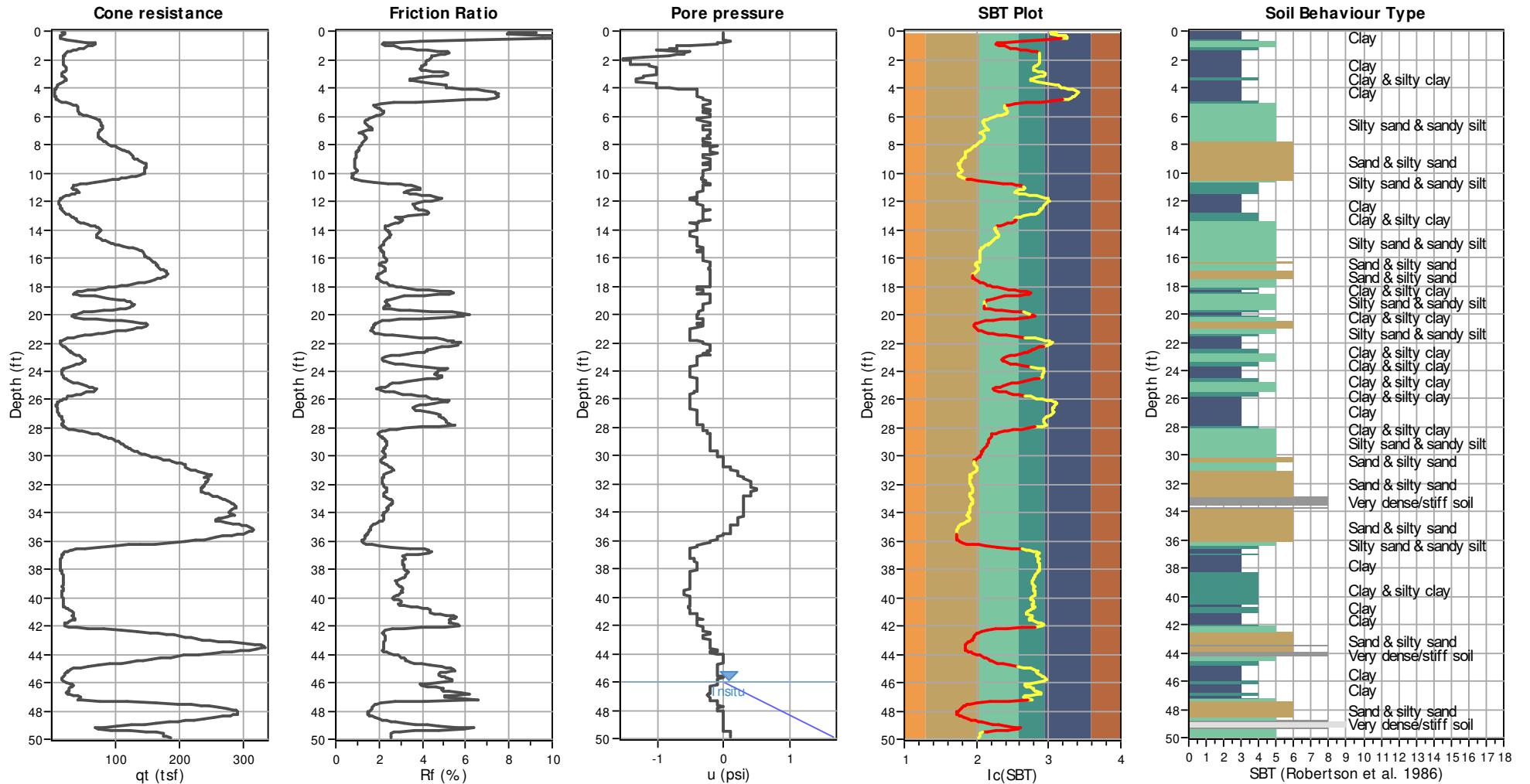
**CPT file : CPT-1**

**Input parameters and analysis data**

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	46.00 ft	Use fill:	No	Clay like behavior	
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	35.00 ft	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude $M_w$ :	6.67	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	60.00 ft
Peak ground acceleration:	0.69	Unit weight calculation:	Based on SBT	$K_v$ applied:	Yes	MSF method:	Method based



### CPT basic interpretation plots



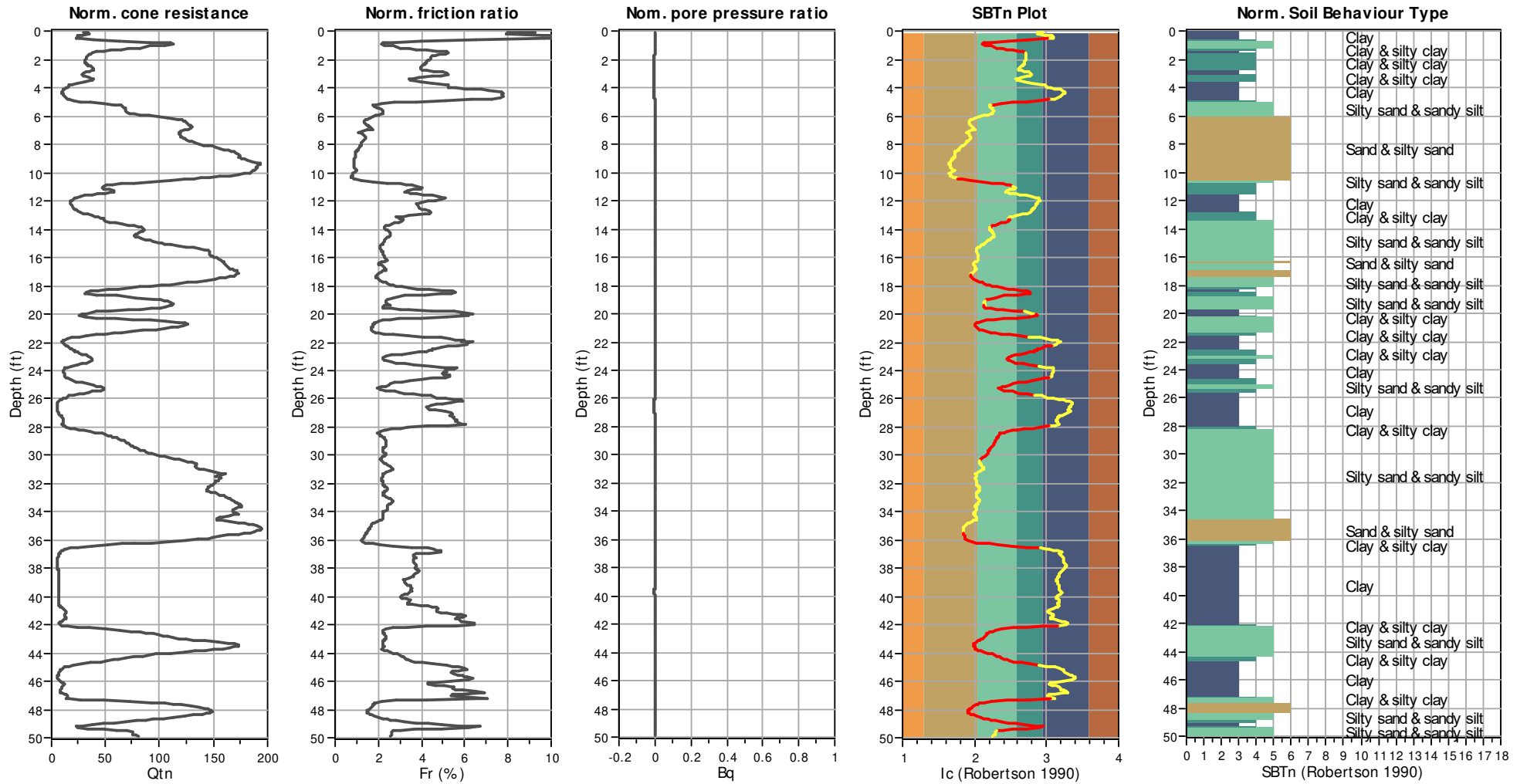
#### Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	35.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>o</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	6.67	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.69	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	46.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

#### SBT legend

1. Sensitive fine grained	4. Clayey silt to silt	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

### CPT basic interpretation plots (normalized)



#### Input parameters and analysis data

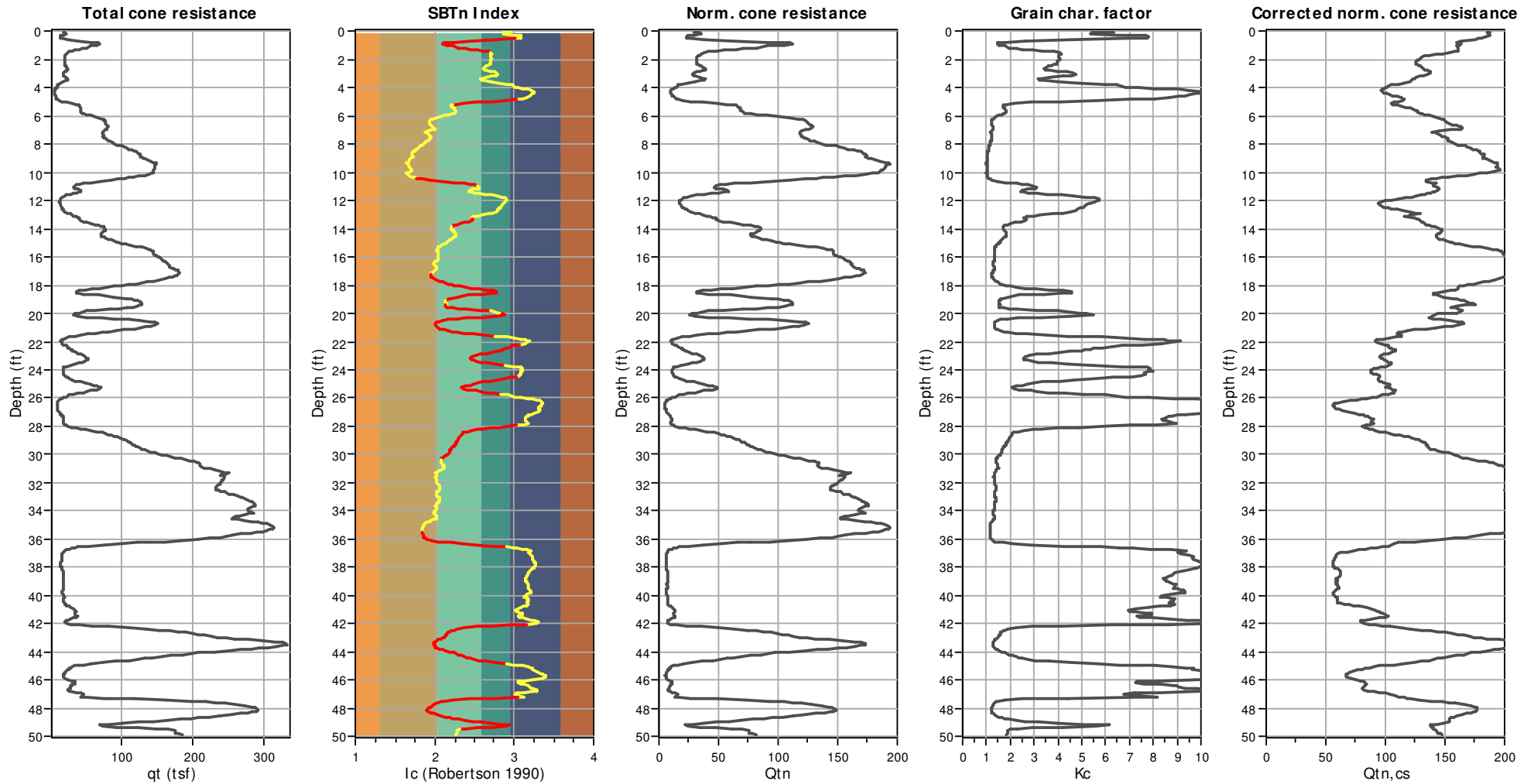
Analysis method:	NCEER (1998)	Depth to water table (erthq.):	35.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>o</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	6.67	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.69	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	46.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

#### SBTn legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained



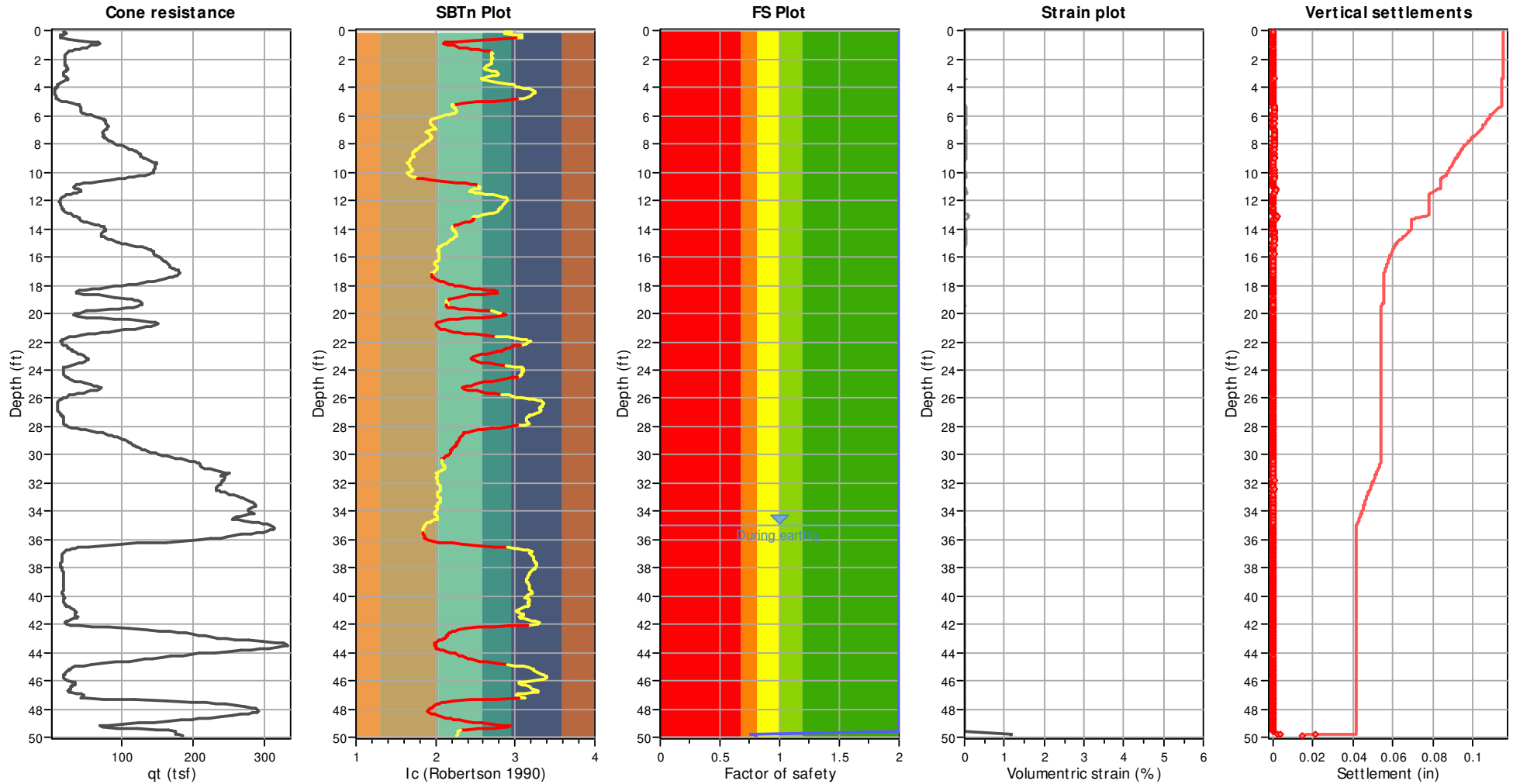
### Liquefaction analysis overall plots (intermediate results)



#### Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	35.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>c</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	6.67	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.69	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	46.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

### Estimation of post-earthquake settlements



**Abbreviations**

- qt: Total cone resistance (cone resistance  $q_c$  corrected for pore water effects)
- $I_c$ : Soil Behaviour Type Index
- FS: Calculated Factor of Safety against liquefaction
- Volumetric strain: Post-liquefaction volumetric strain

:: Post-earthquake settlement of dry sands ::												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
0.09	2.96	29.57	6.34	187.41	0	0	0.43	0.000	0.00	0.00	0.00	0.000
0.14	2.87	34.10	5.44	185.34	0	0	0.43	0.000	0.00	0.00	0.00	0.000
0.23	2.86	34.83	5.36	186.64	0	0	0.43	0.000	0.00	0.00	0.00	0.000
0.27	2.98	28.75	6.54	188.04	0	0	0.43	0.000	0.00	0.00	0.00	0.000
0.33	3.08	24.49	7.69	188.18	0	0	0.43	0.000	0.00	0.00	0.00	0.000
0.41	3.09	23.55	7.82	184.12	0	0	0.43	0.000	0.00	0.00	0.00	0.000
0.49	3.09	23.23	7.77	180.50	0	0	0.43	0.000	0.00	0.00	0.00	0.000
0.54	3.02	25.64	6.96	178.44	0	0	0.43	0.000	0.00	0.00	0.00	0.000
0.63	2.77	38.35	4.56	175.01	0	0	0.43	0.000	0.00	0.00	0.00	0.000
0.68	2.47	62.52	2.61	163.44	0	0	0.43	0.000	0.00	8.42	0.00	0.000
0.80	2.24	91.07	1.76	160.22	0	0	0.43	0.000	0.00	8.42	0.00	0.000
0.85	2.12	109.63	1.49	163.12	0	0	0.43	0.000	0.00	8.42	0.00	0.000
0.92	2.10	112.21	1.46	164.01	0	0	0.43	0.000	0.00	8.42	0.00	0.000
1.01	2.15	104.79	1.55	162.02	0	0	0.43	0.000	0.00	8.42	0.00	0.000
1.05	2.23	91.57	1.75	160.17	0	0	0.43	0.000	0.00	8.42	0.00	0.000
1.17	2.31	81.56	1.97	160.44	0	0	0.43	0.000	0.00	8.42	0.00	0.000
1.19	2.39	70.78	2.28	161.12	0	0	0.43	0.000	0.00	8.42	0.00	0.000
1.28	2.44	64.44	2.50	161.03	0	0	0.43	0.000	0.00	8.42	0.00	0.000
1.32	2.53	55.22	2.92	160.98	0	0	0.43	0.000	0.00	8.42	0.00	0.000
1.40	2.60	48.20	3.34	160.99	0	0	0.43	0.000	0.00	0.00	0.00	0.000
1.45	2.68	41.18	3.85	158.45	0	0	0.43	0.000	0.00	0.00	0.00	0.000
1.56	2.71	37.95	4.06	154.20	0	0	0.43	0.000	0.00	0.00	0.00	0.000
1.59	2.72	35.89	4.12	147.78	0	0	0.43	0.000	0.00	0.00	0.00	0.000
1.66	2.71	35.01	4.06	142.17	0	0	0.43	0.000	0.00	0.00	0.00	0.000
1.71	2.70	34.08	4.01	136.69	0	0	0.43	0.000	0.00	0.00	0.00	0.000
1.78	2.70	33.09	4.02	132.96	0	0	0.43	0.000	0.00	0.00	0.00	0.000
1.85	2.71	32.30	4.05	130.78	0	0	0.43	0.000	0.00	0.00	0.00	0.000
1.94	2.71	31.70	4.08	129.38	0	0	0.43	0.000	0.00	0.00	0.00	0.000
1.99	2.71	31.46	4.07	127.96	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.07	2.71	31.35	4.04	126.73	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.12	2.70	31.54	3.99	125.78	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.20	2.70	31.53	3.98	125.65	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.25	2.70	31.67	3.97	125.77	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.33	2.69	31.96	3.94	126.03	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.38	2.68	33.03	3.83	126.66	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.47	2.66	34.15	3.74	127.57	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.50	2.64	35.80	3.61	129.14	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.60	2.63	37.11	3.52	130.44	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.64	2.62	38.57	3.43	132.13	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.73	2.62	38.71	3.45	133.50	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.76	2.65	37.25	3.63	135.36	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.86	2.69	34.75	3.94	136.92	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.90	2.75	31.57	4.37	137.94	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.99	2.78	29.66	4.63	137.27	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.03	2.80	28.30	4.76	134.81	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.13	2.77	28.87	4.57	131.85	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.18	2.73	30.77	4.18	128.66	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.25	2.65	34.56	3.64	125.85	0	0	0.43	0.000	0.00	0.00	0.00	0.000

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
3.35	2.60	37.37	3.31	123.83	33	562	0.43	0.043	0.02	8.42	0.02	0.000
3.40	2.58	38.58	3.18	122.61	33	564	0.43	0.044	0.02	8.42	0.02	0.000
3.47	2.59	37.75	3.24	122.36	33	559	0.43	0.046	0.03	8.42	0.02	0.000
3.50	2.61	35.94	3.39	121.93	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.60	2.69	30.62	3.94	120.67	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.70	2.80	24.28	4.79	116.31	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.76	2.93	18.48	5.99	110.67	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.83	2.97	16.33	6.46	105.44	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.88	2.99	15.50	6.64	102.96	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.94	3.01	14.81	6.82	101.09	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.00	3.05	13.59	7.35	99.88	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.05	3.11	12.27	8.06	98.96	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.10	3.15	11.39	8.61	98.07	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.14	3.19	10.76	9.04	97.30	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.21	3.22	10.22	9.48	96.87	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.27	3.26	9.68	10.06	97.37	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.40	3.25	9.96	9.94	98.97	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.45	3.24	10.35	9.80	101.37	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.51	3.22	10.92	9.50	103.81	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.57	3.20	11.45	9.30	106.52	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.62	3.19	12.08	9.07	109.65	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.67	3.16	13.01	8.68	112.93	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.80	3.11	14.26	8.08	115.16	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.84	3.03	16.30	7.09	115.53	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.90	2.90	20.00	5.70	114.06	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.97	2.72	26.92	4.11	110.77	0	0	0.43	0.000	0.00	0.00	0.00	0.000
5.02	2.52	36.91	2.89	106.71	0	0	0.43	0.000	0.00	8.42	0.00	0.000
5.08	2.36	48.70	2.16	105.04	0	0	0.43	0.000	0.00	8.42	0.00	0.000
5.19	2.27	57.41	1.85	105.97	0	0	0.43	0.000	0.00	8.42	0.00	0.000
5.22	2.22	62.62	1.72	107.77	0	0	0.43	0.000	0.00	8.42	0.00	0.000
5.25	2.21	64.57	1.70	109.71	0	0	0.43	0.000	0.00	8.42	0.00	0.000
5.33	2.22	66.31	1.71	113.25	26	615	0.43	0.073	0.05	8.42	0.04	0.001
5.42	2.23	67.67	1.73	117.24	27	635	0.43	0.068	0.05	8.42	0.04	0.001
5.46	2.24	68.50	1.77	121.03	28	653	0.43	0.063	0.04	8.42	0.03	0.000
5.53	2.25	68.74	1.80	123.54	28	665	0.43	0.062	0.04	8.42	0.03	0.001
5.59	2.26	68.78	1.82	125.43	29	673	0.43	0.061	0.04	8.42	0.03	0.000
5.66	2.26	69.12	1.83	126.39	29	678	0.43	0.061	0.04	8.42	0.03	0.001
5.77	2.26	70.18	1.81	127.35	29	684	0.43	0.061	0.04	8.42	0.03	0.001
5.82	2.24	72.51	1.78	128.73	30	694	0.43	0.060	0.04	8.42	0.03	0.000
5.87	2.22	76.36	1.71	130.90	30	710	0.43	0.057	0.04	8.42	0.03	0.000
5.95	2.18	82.40	1.62	133.27	30	729	0.43	0.054	0.03	8.42	0.03	0.000
5.99	2.13	90.49	1.51	136.39	30	750	0.43	0.051	0.03	8.42	0.02	0.000
6.04	2.07	99.55	1.41	140.10	30	770	0.43	0.048	0.03	8.42	0.02	0.000
6.12	2.02	109.28	1.32	144.42	30	786	0.43	0.047	0.03	8.42	0.02	0.000
6.23	1.97	116.49	1.27	147.49	30	794	0.43	0.047	0.03	8.42	0.02	0.001
6.29	1.94	121.16	1.23	149.27	30	795	0.43	0.048	0.03	8.42	0.02	0.000
6.34	1.93	122.57	1.22	149.70	30	794	0.43	0.048	0.03	8.42	0.02	0.000
6.40	1.93	123.34	1.21	149.81	30	792	0.43	0.049	0.03	8.42	0.02	0.000

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
6.43	1.93	124.41	1.22	151.27	31	800	0.43	0.049	0.03	8.42	0.02	0.000
6.56	1.93	125.52	1.22	153.32	31	813	0.43	0.048	0.03	8.42	0.02	0.001
6.62	1.94	127.02	1.23	156.66	32	834	0.43	0.046	0.03	8.42	0.02	0.000
6.68	1.95	128.23	1.24	159.38	33	852	0.43	0.044	0.02	8.42	0.02	0.000
6.74	1.96	129.25	1.25	161.92	33	868	0.43	0.043	0.02	8.42	0.02	0.000
6.79	1.97	129.68	1.26	163.78	34	880	0.43	0.042	0.02	8.42	0.02	0.000
6.85	1.99	128.51	1.28	164.70	34	890	0.43	0.042	0.02	8.42	0.02	0.000
6.96	2.00	126.21	1.30	163.74	34	888	0.43	0.043	0.02	8.42	0.02	0.000
7.01	1.96	122.84	1.26	154.31	32	828	0.43	0.052	0.03	8.42	0.02	0.000
7.09	1.92	120.01	1.21	145.38	29	768	0.43	0.064	0.04	8.42	0.03	0.001
7.13	1.88	118.30	1.17	138.55	28	717	0.43	0.079	0.05	8.42	0.04	0.000
7.19	1.90	118.83	1.19	141.24	28	738	0.43	0.074	0.05	8.42	0.04	0.001
7.27	1.92	118.57	1.21	143.33	29	756	0.43	0.070	0.05	8.42	0.03	0.001
7.36	1.93	119.30	1.22	145.76	30	773	0.43	0.067	0.04	8.42	0.03	0.001
7.43	1.95	119.00	1.24	147.15	30	785	0.43	0.066	0.04	8.42	0.03	0.001
7.48	1.95	120.71	1.24	149.58	31	798	0.43	0.063	0.04	8.42	0.03	0.000
7.56	1.95	122.06	1.24	151.05	31	806	0.43	0.063	0.04	8.42	0.03	0.001
7.62	1.94	123.69	1.23	151.96	31	812	0.43	0.063	0.04	8.42	0.03	0.000
7.70	1.92	125.48	1.21	152.15	31	817	0.43	0.063	0.04	8.42	0.03	0.001
7.78	1.91	127.34	1.20	152.58	31	823	0.43	0.063	0.04	8.42	0.03	0.001
7.83	1.89	130.11	1.18	153.90	31	831	0.43	0.062	0.04	8.42	0.03	0.000
7.89	1.88	133.08	1.17	155.56	31	842	0.42	0.060	0.04	8.42	0.03	0.000
7.96	1.86	136.83	1.16	158.05	31	857	0.42	0.058	0.03	8.42	0.03	0.000
8.05	1.85	140.82	1.14	160.96	32	875	0.42	0.056	0.03	8.42	0.03	0.001
8.11	1.84	144.50	1.13	163.74	32	891	0.42	0.055	0.03	8.42	0.02	0.000
8.14	1.82	148.69	1.12	166.63	32	905	0.42	0.053	0.03	8.42	0.02	0.000
8.23	1.81	151.55	1.11	168.41	33	917	0.42	0.052	0.03	8.42	0.02	0.000
8.27	1.79	156.16	1.10	171.45	33	931	0.42	0.051	0.03	8.42	0.02	0.000
8.38	1.78	159.07	1.09	173.25	33	945	0.42	0.050	0.03	8.42	0.02	0.001
8.42	1.76	163.73	1.08	176.23	34	958	0.42	0.049	0.03	8.42	0.02	0.000
8.49	1.74	166.59	1.07	177.83	34	966	0.42	0.048	0.03	8.42	0.02	0.000
8.54	1.73	169.34	1.06	179.28	34	973	0.42	0.048	0.03	8.42	0.02	0.000
8.60	1.72	170.73	1.05	179.74	34	976	0.42	0.048	0.03	8.42	0.02	0.000
8.67	1.72	172.53	1.05	181.01	34	985	0.42	0.048	0.03	8.42	0.02	0.000
8.75	1.72	173.67	1.05	182.65	34	1001	0.42	0.047	0.02	8.42	0.02	0.000
8.80	1.72	174.14	1.05	183.32	34	1008	0.42	0.046	0.02	8.42	0.02	0.000
8.89	1.72	173.04	1.05	182.27	34	1008	0.42	0.047	0.02	8.42	0.02	0.000
8.93	1.71	174.33	1.04	181.68	34	1002	0.42	0.048	0.03	8.42	0.02	0.000
9.02	1.70	175.58	1.04	181.84	34	1005	0.42	0.049	0.03	8.42	0.02	0.000
9.07	1.69	178.48	1.03	183.62	34	1014	0.42	0.048	0.03	8.42	0.02	0.000
9.14	1.68	181.27	1.03	186.07	35	1031	0.42	0.047	0.02	8.42	0.02	0.000
9.20	1.67	185.77	1.02	189.38	35	1049	0.42	0.046	0.02	8.42	0.02	0.000
9.28	1.66	190.24	1.01	192.03	35	1063	0.42	0.045	0.02	8.42	0.02	0.000
9.36	1.65	192.96	1.00	193.40	35	1072	0.42	0.045	0.02	8.42	0.02	0.000
9.40	1.65	193.88	1.00	194.45	36	1081	0.42	0.044	0.02	8.42	0.02	0.000
9.46	1.66	192.09	1.01	194.17	36	1087	0.42	0.044	0.02	8.42	0.02	0.000
9.55	1.67	190.53	1.02	193.65	36	1092	0.42	0.044	0.02	8.42	0.02	0.000
9.59	1.67	189.66	1.02	193.23	36	1094	0.42	0.044	0.02	8.42	0.02	0.000

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
9.68	1.67	190.07	1.02	193.72	36	1102	0.42	0.044	0.02	8.42	0.02	0.000
9.72	1.69	188.80	1.03	195.22	36	1122	0.42	0.043	0.02	8.42	0.02	0.000
9.83	1.71	187.46	1.04	195.76	37	1139	0.42	0.042	0.02	8.42	0.02	0.000
9.88	1.72	186.04	1.05	195.37	37	1144	0.42	0.042	0.02	8.42	0.02	0.000
9.92	1.69	185.66	1.03	191.05	35	1108	0.42	0.046	0.02	8.42	0.02	0.000
10.02	1.66	183.66	1.01	185.57	34	1070	0.42	0.050	0.03	8.42	0.02	0.000
10.07	1.65	179.13	1.00	179.21	33	1032	0.42	0.055	0.03	8.42	0.02	0.000
10.12	1.66	173.07	1.01	174.64	32	1012	0.42	0.058	0.03	8.42	0.03	0.000
10.21	1.67	164.99	1.02	168.12	31	984	0.42	0.063	0.04	8.42	0.03	0.001
10.30	1.69	156.00	1.03	160.37	30	948	0.42	0.070	0.04	8.42	0.03	0.001
10.34	1.71	146.21	1.04	152.50	29	911	0.42	0.079	0.05	8.42	0.04	0.000
10.38	1.74	138.19	1.07	147.26	28	894	0.42	0.083	0.06	8.42	0.04	0.000
10.46	1.77	131.48	1.09	142.97	27	884	0.42	0.087	0.06	8.42	0.05	0.001
10.50	1.83	123.09	1.13	139.28	0	0	0.42	0.000	0.00	8.42	0.00	0.000
10.58	1.94	109.60	1.23	134.30	0	0	0.42	0.000	0.00	8.42	0.00	0.000
10.64	2.10	92.33	1.45	134.10	0	0	0.42	0.000	0.00	8.42	0.00	0.000
10.72	2.25	76.88	1.81	138.93	0	0	0.42	0.000	0.00	8.42	0.00	0.000
10.77	2.38	63.79	2.23	142.37	0	0	0.42	0.000	0.00	8.42	0.00	0.000
10.86	2.45	55.96	2.51	140.51	0	0	0.42	0.000	0.00	8.42	0.00	0.000
10.90	2.50	50.62	2.77	140.01	0	0	0.42	0.000	0.00	8.42	0.00	0.000
10.99	2.53	47.82	2.94	140.70	0	0	0.42	0.000	0.00	8.42	0.00	0.000
11.03	2.56	46.46	3.11	144.48	0	0	0.42	0.000	0.00	8.42	0.00	0.000
11.12	2.55	47.84	3.03	145.00	38	775	0.42	0.149	0.07	8.42	0.05	0.001
11.16	2.49	53.43	2.72	145.28	37	814	0.42	0.127	0.06	8.42	0.05	0.000
11.30	2.44	57.37	2.50	143.49	36	840	0.42	0.118	0.06	8.42	0.04	0.001
11.34	2.43	58.15	2.44	141.68	35	840	0.42	0.118	0.06	8.42	0.05	0.000
11.39	2.46	54.54	2.57	139.90	35	816	0.42	0.131	0.07	8.42	0.05	0.001
11.43	2.50	49.99	2.75	137.69	35	783	0.42	0.152	0.08	8.42	0.06	0.001
11.49	2.56	43.62	3.11	135.69	36	738	0.42	0.190	0.09	8.42	0.07	0.001
11.57	2.64	37.39	3.56	133.08	0	0	0.42	0.000	0.00	0.00	0.00	0.000
11.63	2.72	31.29	4.15	129.92	0	0	0.42	0.000	0.00	0.00	0.00	0.000
11.70	2.79	26.89	4.67	125.50	0	0	0.42	0.000	0.00	0.00	0.00	0.000
11.79	2.85	23.39	5.20	121.49	0	0	0.42	0.000	0.00	0.00	0.00	0.000
11.82	2.89	20.96	5.57	116.65	0	0	0.42	0.000	0.00	0.00	0.00	0.000
11.89	2.90	19.48	5.70	111.11	0	0	0.42	0.000	0.00	0.00	0.00	0.000
11.96	2.91	18.20	5.76	104.85	0	0	0.42	0.000	0.00	0.00	0.00	0.000
12.01	2.90	17.59	5.66	99.48	0	0	0.42	0.000	0.00	0.00	0.00	0.000
12.11	2.88	17.34	5.52	95.78	0	0	0.42	0.000	0.00	0.00	0.00	0.000
12.17	2.87	17.31	5.39	93.36	0	0	0.42	0.000	0.00	0.00	0.00	0.000
12.23	2.86	17.65	5.29	93.32	0	0	0.42	0.000	0.00	0.00	0.00	0.000
12.34	2.85	18.44	5.19	95.70	0	0	0.42	0.000	0.00	0.00	0.00	0.000
12.46	2.83	19.52	5.07	98.88	0	0	0.42	0.000	0.00	0.00	0.00	0.000
12.53	2.82	20.73	4.92	101.91	0	0	0.42	0.000	0.00	0.00	0.00	0.000
12.58	2.81	21.78	4.83	105.20	0	0	0.42	0.000	0.00	0.00	0.00	0.000
12.66	2.80	22.78	4.80	109.28	0	0	0.42	0.000	0.00	0.00	0.00	0.000
12.71	2.80	23.99	4.77	114.42	0	0	0.42	0.000	0.00	0.00	0.00	0.000
12.77	2.77	26.61	4.53	120.53	0	0	0.42	0.000	0.00	0.00	0.00	0.000
12.89	2.73	29.93	4.20	125.72	0	0	0.42	0.000	0.00	0.00	0.00	0.000

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
12.97	2.67	33.94	3.82	129.55	0	0	0.42	0.000	0.00	0.00	0.00	0.000
13.02	2.59	37.07	3.26	120.78	32	716	0.42	0.280	0.16	8.42	0.12	0.002
13.08	2.54	40.05	2.97	118.98	31	733	0.42	0.257	0.15	8.42	0.12	0.002
13.15	2.48	42.82	2.69	115.33	30	740	0.42	0.250	0.16	8.42	0.12	0.002
13.19	2.49	45.67	2.70	123.13	32	792	0.42	0.194	0.11	8.42	0.09	0.001
13.26	2.46	47.88	2.59	123.89	31	812	0.42	0.179	0.10	8.42	0.08	0.001
13.33	2.47	48.22	2.63	126.66	32	829	0.42	0.168	0.10	8.42	0.07	0.001
13.37	2.48	48.02	2.68	128.51	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.43	2.46	50.00	2.59	129.59	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.48	2.43	53.84	2.42	130.53	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.53	2.37	59.67	2.21	131.63	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.60	2.33	65.45	2.03	133.11	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.69	2.28	71.28	1.89	134.74	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.73	2.24	76.91	1.78	136.84	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.82	2.22	80.28	1.73	138.62	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.87	2.21	83.49	1.69	141.46	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.95	2.21	84.90	1.69	143.65	0	0	0.42	0.000	0.00	8.42	0.00	0.000
14.00	2.21	85.83	1.70	145.90	33	1137	0.42	0.073	0.04	8.42	0.03	0.000
14.05	2.22	85.52	1.72	146.99	33	1145	0.42	0.072	0.04	8.42	0.03	0.000
14.13	2.23	84.59	1.74	147.41	34	1150	0.42	0.072	0.04	8.42	0.03	0.001
14.18	2.24	83.04	1.77	147.04	34	1146	0.42	0.073	0.04	8.42	0.03	0.000
14.26	2.25	81.17	1.80	146.05	34	1139	0.42	0.075	0.04	8.42	0.03	0.001
14.31	2.26	78.98	1.83	144.70	33	1126	0.42	0.078	0.04	8.42	0.03	0.000
14.40	2.27	77.26	1.85	143.30	33	1117	0.42	0.080	0.04	8.42	0.03	0.001
14.44	2.27	76.82	1.86	142.62	33	1114	0.42	0.081	0.04	8.42	0.03	0.000
14.53	2.26	77.75	1.83	142.16	33	1120	0.42	0.081	0.04	8.42	0.03	0.001
14.58	2.24	80.64	1.77	142.60	33	1135	0.42	0.078	0.04	8.42	0.03	0.000
14.67	2.22	83.56	1.72	143.39	33	1155	0.42	0.076	0.04	8.42	0.03	0.001
14.73	2.20	86.75	1.67	145.26	33	1179	0.42	0.073	0.04	8.42	0.03	0.000
14.79	2.19	90.82	1.63	148.37	33	1213	0.42	0.068	0.04	8.42	0.03	0.000
14.91	2.17	94.59	1.60	151.25	34	1249	0.42	0.065	0.03	8.42	0.03	0.001
14.96	2.15	98.75	1.56	154.34	34	1282	0.42	0.061	0.03	8.42	0.02	0.000
15.00	2.14	101.47	1.54	156.44	34	1304	0.42	0.059	0.03	8.42	0.02	0.000
15.05	2.13	104.43	1.52	158.50	35	1326	0.42	0.058	0.03	8.42	0.02	0.000
15.10	2.11	110.36	1.47	162.40	35	1365	0.42	0.054	0.03	8.42	0.02	0.000
15.19	2.08	117.27	1.43	167.18	36	1412	0.42	0.051	0.03	8.42	0.02	0.000
15.26	2.06	125.42	1.38	173.52	37	1469	0.42	0.048	0.02	8.42	0.02	0.000
15.32	2.04	131.81	1.36	179.46	38	1522	0.42	0.045	0.02	8.42	0.02	0.000
15.38	2.04	137.48	1.35	185.55	39	1576	0.42	0.042	0.02	8.42	0.01	0.000
15.44	2.03	141.79	1.34	190.69	40	1624	0.42	0.040	0.02	8.42	0.01	0.000
15.50	2.03	144.64	1.34	194.25	41	1658	0.42	0.039	0.02	8.42	0.01	0.000
15.56	2.03	145.96	1.34	196.11	41	1679	0.42	0.038	0.02	8.42	0.01	0.000
15.63	2.04	146.54	1.35	197.64	42	1698	0.42	0.038	0.02	8.42	0.01	0.000
15.80	2.04	146.45	1.36	198.48	42	1719	0.42	0.037	0.02	8.42	0.01	0.000
15.85	2.04	147.69	1.36	200.39	42	1740	0.42	0.037	0.01	8.42	0.01	0.000
15.93	2.04	149.15	1.35	202.08	43	1760	0.42	0.036	0.01	8.42	0.01	0.000
15.98	2.04	150.89	1.35	204.30	43	1784	0.42	0.036	0.01	8.42	0.01	0.000
16.04	2.04	152.66	1.36	207.09	44	1813	0.42	0.035	0.01	8.42	0.01	0.000

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
16.11	2.04	154.36	1.36	209.73	44	1843	0.42	0.034	0.01	8.42	0.01	0.000
16.16	2.05	156.70	1.36	213.72	45	1883	0.42	0.033	0.01	8.42	0.01	0.000
16.29	2.03	158.15	1.34	212.15	45	1876	0.42	0.034	0.01	8.42	0.01	0.000
16.34	2.00	159.77	1.31	208.73	44	1840	0.42	0.035	0.01	8.42	0.01	0.000
16.41	1.98	160.37	1.28	204.80	42	1800	0.42	0.037	0.01	8.42	0.01	0.000
16.47	1.98	160.98	1.28	205.44	42	1810	0.42	0.036	0.01	8.42	0.01	0.000
16.52	2.00	161.64	1.29	209.25	43	1855	0.42	0.035	0.01	8.42	0.01	0.000
16.64	2.01	161.79	1.31	212.00	44	1895	0.42	0.034	0.01	8.42	0.01	0.000
16.72	2.02	163.17	1.32	215.48	45	1935	0.42	0.033	0.01	8.42	0.01	0.000
16.77	2.02	165.30	1.32	218.77	46	1970	0.42	0.032	0.01	8.42	0.01	0.000
16.81	2.02	168.05	1.32	222.10	47	2002	0.42	0.032	0.01	8.42	0.01	0.000
16.90	2.01	169.59	1.32	223.32	47	2020	0.42	0.032	0.01	8.42	0.01	0.000
16.94	2.00	171.59	1.30	222.64	46	2010	0.42	0.032	0.01	8.42	0.01	0.000
17.06	1.98	172.33	1.28	219.88	45	1986	0.42	0.033	0.01	8.42	0.01	0.000
17.12	1.96	172.97	1.26	217.35	45	1957	0.42	0.034	0.01	8.42	0.01	0.000
17.17	1.96	172.30	1.25	214.74	44	1931	0.42	0.035	0.01	8.42	0.01	0.000
17.25	1.95	170.79	1.24	211.82	43	1907	0.42	0.036	0.01	8.42	0.01	0.000
17.29	1.95	168.63	1.24	208.31	0	0	0.42	0.000	0.00	8.42	0.00	0.000
17.36	1.95	165.41	1.24	204.85	0	0	0.42	0.000	0.00	8.42	0.00	0.000
17.42	1.96	161.06	1.25	201.31	0	0	0.42	0.000	0.00	8.42	0.00	0.000
17.47	1.98	156.28	1.27	198.39	0	0	0.42	0.000	0.00	8.42	0.00	0.000
17.54	1.99	151.18	1.29	195.54	0	0	0.42	0.000	0.00	8.42	0.00	0.000
17.60	2.02	143.60	1.33	191.52	0	0	0.42	0.000	0.00	8.42	0.00	0.000
17.73	2.06	134.86	1.39	186.95	0	0	0.42	0.000	0.00	8.42	0.00	0.000
17.78	2.10	125.76	1.45	182.63	0	0	0.42	0.000	0.00	8.42	0.00	0.000
17.84	2.13	118.16	1.51	178.43	0	0	0.42	0.000	0.00	8.42	0.00	0.000
17.91	2.16	110.04	1.58	174.06	0	0	0.42	0.000	0.00	8.42	0.00	0.000
17.95	2.20	101.49	1.67	169.46	0	0	0.42	0.000	0.00	8.42	0.00	0.000
18.03	2.25	91.92	1.80	165.55	0	0	0.42	0.000	0.00	8.42	0.00	0.000
18.09	2.31	82.01	1.98	162.67	0	0	0.42	0.000	0.00	8.42	0.00	0.000
18.15	2.38	71.89	2.24	161.29	0	0	0.42	0.000	0.00	8.42	0.00	0.000
18.22	2.46	62.14	2.59	161.13	0	0	0.42	0.000	0.00	8.42	0.00	0.000
18.26	2.55	52.50	3.06	160.58	0	0	0.42	0.000	0.00	8.42	0.00	0.000
18.33	2.65	43.62	3.63	158.55	0	0	0.42	0.000	0.00	0.00	0.00	0.000
18.40	2.73	36.52	4.23	154.58	0	0	0.42	0.000	0.00	0.00	0.00	0.000
18.45	2.78	32.25	4.60	148.34	0	0	0.42	0.000	0.00	0.00	0.00	0.000
18.53	2.78	31.21	4.58	143.06	0	0	0.42	0.000	0.00	0.00	0.00	0.000
18.57	2.72	33.83	4.14	140.00	0	0	0.42	0.000	0.00	0.00	0.00	0.000
18.65	2.62	41.00	3.42	140.42	0	0	0.42	0.000	0.00	0.00	0.00	0.000
18.70	2.42	59.95	2.39	143.16	0	0	0.42	0.000	0.00	8.42	0.00	0.000
18.88	2.28	78.46	1.90	148.75	0	0	0.42	0.000	0.00	8.42	0.00	0.000
18.93	2.19	94.87	1.65	156.73	0	0	0.42	0.000	0.00	8.42	0.00	0.000
19.01	2.17	100.04	1.60	160.04	0	0	0.42	0.000	0.00	8.42	0.00	0.000
19.06	2.15	104.44	1.56	163.04	0	0	0.42	0.000	0.00	8.42	0.00	0.000
19.12	2.14	107.95	1.54	165.81	0	0	0.42	0.000	0.00	8.42	0.00	0.000
19.19	2.14	110.55	1.52	168.41	0	0	0.42	0.000	0.00	8.42	0.00	0.000
19.24	2.14	112.10	1.53	171.20	38	1717	0.42	0.050	0.02	8.42	0.02	0.000
19.31	2.14	112.40	1.54	173.03	38	1740	0.42	0.049	0.02	8.42	0.02	0.000



:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
19.37	2.16	111.60	1.57	175.05	39	1763	0.42	0.048	0.02	8.42	0.02	0.000
19.43	2.13	109.68	1.52	166.72	37	1685	0.42	0.052	0.03	8.42	0.02	0.000
19.50	2.13	105.99	1.51	160.09	0	0	0.43	0.000	0.00	8.42	0.00	0.000
19.55	2.15	100.25	1.55	154.91	0	0	0.43	0.000	0.00	8.42	0.00	0.000
19.62	2.22	92.05	1.73	159.00	0	0	0.43	0.000	0.00	8.42	0.00	0.000
19.67	2.30	82.30	1.95	160.86	0	0	0.43	0.000	0.00	8.42	0.00	0.000
19.73	2.39	70.52	2.28	160.59	0	0	0.43	0.000	0.00	8.42	0.00	0.000
19.80	2.56	53.13	3.09	164.10	0	0	0.43	0.000	0.00	8.42	0.00	0.000
19.82	2.70	41.22	3.98	164.03	0	0	0.43	0.000	0.00	0.00	0.00	0.000
19.95	2.82	32.24	4.94	159.29	0	0	0.43	0.000	0.00	0.00	0.00	0.000
20.00	2.80	31.14	4.79	149.24	0	0	0.43	0.000	0.00	0.00	0.00	0.000
20.04	2.85	27.66	5.19	143.53	0	0	0.43	0.000	0.00	0.00	0.00	0.000
20.09	2.88	25.80	5.48	141.31	0	0	0.43	0.000	0.00	0.00	0.00	0.000
20.19	2.77	30.70	4.54	139.39	0	0	0.43	0.000	0.00	0.00	0.00	0.000
20.28	2.59	41.96	3.28	137.64	0	0	0.43	0.000	0.00	8.42	0.00	0.000
20.33	2.40	59.10	2.31	136.52	0	0	0.43	0.000	0.00	8.42	0.00	0.000
20.37	2.27	75.09	1.87	140.33	0	0	0.43	0.000	0.00	8.42	0.00	0.000
20.43	2.17	91.81	1.60	146.78	0	0	0.43	0.000	0.00	8.42	0.00	0.000
20.52	2.10	106.33	1.45	154.49	0	0	0.43	0.000	0.00	8.42	0.00	0.000
20.60	2.05	117.70	1.37	161.38	0	0	0.43	0.000	0.00	8.42	0.00	0.000
20.65	2.03	123.73	1.34	165.19	0	0	0.43	0.000	0.00	8.42	0.00	0.000
20.70	2.01	126.08	1.32	166.28	0	0	0.43	0.000	0.00	8.42	0.00	0.000
20.74	2.01	125.95	1.31	165.27	0	0	0.43	0.000	0.00	8.42	0.00	0.000
20.83	2.01	122.49	1.32	161.32	0	0	0.43	0.000	0.00	8.42	0.00	0.000
20.92	2.02	117.31	1.33	156.01	0	0	0.43	0.000	0.00	8.42	0.00	0.000
20.96	2.03	111.86	1.34	150.31	0	0	0.43	0.000	0.00	8.42	0.00	0.000
21.01	2.05	104.72	1.37	143.00	0	0	0.43	0.000	0.00	8.42	0.00	0.000
21.10	2.07	96.39	1.40	134.71	0	0	0.43	0.000	0.00	8.42	0.00	0.000
21.15	2.11	84.67	1.48	124.99	0	0	0.43	0.000	0.00	8.42	0.00	0.000
21.24	2.16	74.47	1.58	117.99	0	0	0.43	0.000	0.00	8.42	0.00	0.000
21.30	2.23	64.65	1.75	112.86	0	0	0.43	0.000	0.00	8.42	0.00	0.000
21.35	2.29	57.90	1.91	110.61	0	0	0.43	0.000	0.00	8.42	0.00	0.000
21.39	2.38	49.56	2.23	110.36	0	0	0.43	0.000	0.00	8.42	0.00	0.000
21.48	2.48	41.59	2.68	111.46	0	0	0.43	0.000	0.00	8.42	0.00	0.000
21.54	2.63	32.27	3.52	113.58	0	0	0.43	0.000	0.00	0.00	0.00	0.000
21.62	2.76	25.56	4.43	113.28	0	0	0.43	0.000	0.00	0.00	0.00	0.000
21.67	2.91	18.98	5.77	109.44	0	0	0.43	0.000	0.00	0.00	0.00	0.000
21.76	3.00	15.30	6.76	103.41	0	0	0.43	0.000	0.00	0.00	0.00	0.000
21.81	3.08	12.72	7.64	97.15	0	0	0.43	0.000	0.00	0.00	0.00	0.000
21.85	3.14	10.97	8.50	93.21	0	0	0.43	0.000	0.00	0.00	0.00	0.000
21.94	3.15	10.61	8.58	91.03	0	0	0.43	0.000	0.00	0.00	0.00	0.000
21.99	3.19	9.96	9.17	91.28	0	0	0.43	0.000	0.00	0.00	0.00	0.000
22.07	3.16	10.70	8.71	93.21	0	0	0.43	0.000	0.00	0.00	0.00	0.000
22.13	3.14	11.52	8.37	96.49	0	0	0.43	0.000	0.00	0.00	0.00	0.000
22.22	3.06	13.28	7.50	99.58	0	0	0.44	0.000	0.00	0.00	0.00	0.000
22.28	3.00	15.14	6.74	101.98	0	0	0.44	0.000	0.00	0.00	0.00	0.000
22.37	2.96	16.36	6.29	102.86	0	0	0.44	0.000	0.00	0.00	0.00	0.000
22.41	2.91	17.70	5.83	103.28	0	0	0.44	0.000	0.00	0.00	0.00	0.000

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
22.46	2.88	19.08	5.50	105.02	0	0	0.44	0.000	0.00	0.00	0.00	0.000
22.55	2.87	19.83	5.38	106.69	0	0	0.44	0.000	0.00	0.00	0.00	0.000
22.59	2.84	21.05	5.14	108.19	0	0	0.44	0.000	0.00	0.00	0.00	0.000
22.67	2.82	21.66	4.99	108.05	0	0	0.44	0.000	0.00	0.00	0.00	0.000
22.71	2.77	23.59	4.54	107.01	0	0	0.44	0.000	0.00	0.00	0.00	0.000
22.81	2.71	25.61	4.10	104.97	0	0	0.44	0.000	0.00	0.00	0.00	0.000
22.87	2.64	28.46	3.59	102.05	0	0	0.44	0.000	0.00	0.00	0.00	0.000
22.91	2.56	31.60	3.12	98.53	0	0	0.44	0.000	0.00	8.42	0.00	0.000
23.01	2.51	34.10	2.82	96.11	0	0	0.44	0.000	0.00	8.42	0.00	0.000
23.06	2.47	36.36	2.62	95.26	0	0	0.44	0.000	0.00	8.42	0.00	0.000
23.14	2.46	37.47	2.56	96.03	0	0	0.44	0.000	0.00	8.42	0.00	0.000
23.20	2.45	38.24	2.54	97.03	0	0	0.44	0.000	0.00	8.42	0.00	0.000
23.24	2.46	37.98	2.58	98.18	0	0	0.44	0.000	0.00	8.42	0.00	0.000
23.33	2.48	37.01	2.68	99.33	0	0	0.44	0.000	0.00	8.42	0.00	0.000
23.37	2.53	34.82	2.91	101.32	0	0	0.44	0.000	0.00	8.42	0.00	0.000
23.46	2.58	32.18	3.20	102.95	0	0	0.44	0.000	0.00	8.42	0.00	0.000
23.51	2.66	27.98	3.73	104.29	0	0	0.44	0.000	0.00	0.00	0.00	0.000
23.60	2.75	23.91	4.36	104.30	0	0	0.44	0.000	0.00	0.00	0.00	0.000
23.65	2.88	18.55	5.55	102.85	0	0	0.44	0.000	0.00	0.00	0.00	0.000
23.77	3.00	14.94	6.69	99.91	0	0	0.44	0.000	0.00	0.00	0.00	0.000
23.81	3.09	12.41	7.75	96.19	0	0	0.44	0.000	0.00	0.00	0.00	0.000
23.86	3.10	11.82	7.88	93.12	0	0	0.44	0.000	0.00	0.00	0.00	0.000
23.90	3.09	11.59	7.80	90.35	0	0	0.44	0.000	0.00	0.00	0.00	0.000
23.99	3.09	11.34	7.80	88.47	0	0	0.44	0.000	0.00	0.00	0.00	0.000
24.03	3.10	11.09	7.89	87.53	0	0	0.44	0.000	0.00	0.00	0.00	0.000
24.12	3.10	10.97	7.97	87.41	0	0	0.44	0.000	0.00	0.00	0.00	0.000
24.15	3.09	11.20	7.83	87.64	0	0	0.44	0.000	0.00	0.00	0.00	0.000
24.24	3.08	11.57	7.64	88.37	0	0	0.44	0.000	0.00	0.00	0.00	0.000
24.31	3.07	11.84	7.60	89.97	0	0	0.44	0.000	0.00	0.00	0.00	0.000
24.36	3.08	12.06	7.68	92.59	0	0	0.44	0.000	0.00	0.00	0.00	0.000
24.43	3.07	12.59	7.51	94.59	0	0	0.44	0.000	0.00	0.00	0.00	0.000
24.52	3.03	13.46	7.10	95.54	0	0	0.44	0.000	0.00	0.00	0.00	0.000
24.56	2.96	14.97	6.34	94.99	0	0	0.44	0.000	0.00	0.00	0.00	0.000
24.65	2.89	16.83	5.61	94.37	0	0	0.44	0.000	0.00	0.00	0.00	0.000
24.69	2.79	20.15	4.69	94.42	0	0	0.44	0.000	0.00	0.00	0.00	0.000
24.77	2.71	23.37	4.06	94.78	0	0	0.44	0.000	0.00	0.00	0.00	0.000
24.80	2.61	28.78	3.36	96.66	0	0	0.44	0.000	0.00	0.00	0.00	0.000
24.96	2.54	33.33	2.98	99.25	0	0	0.44	0.000	0.00	8.42	0.00	0.000
25.04	2.49	38.39	2.69	103.45	0	0	0.44	0.000	0.00	8.42	0.00	0.000
25.09	2.44	41.88	2.47	103.57	0	0	0.44	0.000	0.00	8.42	0.00	0.000
25.15	2.39	45.21	2.25	101.87	0	0	0.44	0.000	0.00	8.42	0.00	0.000
25.22	2.34	47.76	2.10	100.07	0	0	0.44	0.000	0.00	8.42	0.00	0.000
25.27	2.34	48.95	2.08	101.79	0	0	0.44	0.000	0.00	8.42	0.00	0.000
25.35	2.36	48.48	2.16	104.55	0	0	0.44	0.000	0.00	8.42	0.00	0.000
25.40	2.41	45.09	2.36	106.31	0	0	0.44	0.000	0.00	8.42	0.00	0.000
25.44	2.46	41.40	2.59	107.36	0	0	0.44	0.000	0.00	8.42	0.00	0.000
25.48	2.52	37.52	2.88	107.94	0	0	0.44	0.000	0.00	8.42	0.00	0.000
25.56	2.57	34.35	3.14	107.84	0	0	0.44	0.000	0.00	8.42	0.00	0.000

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	I <sub>c</sub>	Q <sub>tn</sub>	K <sub>c</sub>	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
25.61	2.64	29.98	3.57	107.08	0	0	0.44	0.000	0.00	0.00	0.00	0.000
25.68	2.73	24.86	4.24	105.50	0	0	0.44	0.000	0.00	0.00	0.00	0.000
25.74	2.83	20.35	5.04	102.61	0	0	0.44	0.000	0.00	0.00	0.00	0.000
25.79	2.92	16.49	5.95	98.07	0	0	0.44	0.000	0.00	0.00	0.00	0.000
25.90	3.00	13.71	6.80	93.21	0	0	0.44	0.000	0.00	0.00	0.00	0.000
25.96	3.09	11.34	7.81	88.49	0	0	0.44	0.000	0.00	0.00	0.00	0.000
26.01	3.17	9.55	8.83	84.39	0	0	0.44	0.000	0.00	0.00	0.00	0.000
26.09	3.24	8.21	9.79	80.35	0	0	0.44	0.000	0.00	0.00	0.00	0.000
26.12	3.28	7.23	10.47	75.67	0	0	0.44	0.000	0.00	0.00	0.00	0.000
26.18	3.31	6.43	10.94	70.34	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.27	3.35	5.61	11.48	64.42	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.33	3.36	5.16	11.60	59.92	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.40	3.36	4.94	11.64	57.53	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.45	3.34	4.97	11.39	56.62	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.53	3.33	5.01	11.23	56.28	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.58	3.32	5.17	10.99	56.80	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.66	3.31	5.30	10.91	57.82	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.72	3.31	5.48	10.79	59.11	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.78	3.32	5.52	10.96	60.48	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.84	3.33	5.73	11.12	63.70	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.97	3.30	6.38	10.73	68.53	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.07	3.26	7.35	10.08	74.09	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.15	3.21	8.36	9.34	78.08	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.19	3.18	9.01	9.02	81.20	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.28	3.17	9.45	8.81	83.28	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.32	3.16	9.82	8.69	85.31	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.38	3.15	10.18	8.55	87.09	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.46	3.14	10.50	8.44	88.66	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.50	3.14	10.70	8.38	89.68	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.57	3.14	10.63	8.41	89.39	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.64	3.15	10.41	8.51	88.56	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.70	3.16	10.09	8.72	88.06	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.76	3.18	9.94	8.91	88.64	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.81	3.18	10.07	8.94	89.99	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.88	3.12	10.67	8.15	87.00	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.94	3.03	11.85	7.08	83.89	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.00	2.91	13.83	5.82	80.53	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.07	2.81	16.93	4.87	82.54	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.12	2.69	21.36	3.96	84.53	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.20	2.60	26.13	3.32	86.75	0	0	0.45	0.000	0.00	8.42	0.00	0.000
28.25	2.54	30.01	2.97	89.16	0	0	0.45	0.000	0.00	8.42	0.00	0.000
28.29	2.46	35.75	2.57	91.76	0	0	0.45	0.000	0.00	8.42	0.00	0.000
28.39	2.40	40.83	2.33	94.96	0	0	0.45	0.000	0.00	8.42	0.00	0.000
28.44	2.35	46.75	2.13	99.60	0	0	0.45	0.000	0.00	8.42	0.00	0.000
28.52	2.35	49.44	2.10	103.96	0	0	0.45	0.000	0.00	8.42	0.00	0.000
28.58	2.34	51.99	2.07	107.80	0	0	0.45	0.000	0.00	8.42	0.00	0.000
28.61	2.33	54.58	2.05	111.83	0	0	0.45	0.000	0.00	8.42	0.00	0.000
28.71	2.32	57.01	2.02	115.30	0	0	0.45	0.000	0.00	8.42	0.00	0.000

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
28.76	2.31	60.11	1.98	119.28	0	0	0.45	0.000	0.00	8.42	0.00	0.000
28.84	2.30	62.35	1.96	122.37	0	0	0.45	0.000	0.00	8.42	0.00	0.000
28.90	2.30	64.50	1.94	125.40	0	0	0.45	0.000	0.00	8.42	0.00	0.000
28.95	2.29	66.51	1.92	127.95	0	0	0.45	0.000	0.00	8.42	0.00	0.000
29.03	2.28	68.34	1.90	129.87	0	0	0.45	0.000	0.00	8.42	0.00	0.000
29.09	2.28	70.03	1.88	131.51	0	0	0.45	0.000	0.00	8.42	0.00	0.000
29.14	2.27	71.35	1.86	132.64	0	0	0.45	0.000	0.00	8.42	0.00	0.000
29.22	2.26	72.68	1.84	133.54	0	0	0.45	0.000	0.00	8.42	0.00	0.000
29.31	2.26	74.02	1.81	134.22	0	0	0.45	0.000	0.00	8.42	0.00	0.000
29.35	2.25	75.19	1.79	134.78	0	0	0.45	0.000	0.00	8.42	0.00	0.000
29.40	2.24	76.68	1.76	135.19	0	0	0.45	0.000	0.00	8.42	0.00	0.000
29.49	2.23	78.24	1.73	135.59	0	0	0.45	0.000	0.00	8.42	0.00	0.000
29.53	2.21	80.59	1.70	136.79	0	0	0.45	0.000	0.00	8.42	0.00	0.000
29.62	2.20	82.52	1.67	138.19	0	0	0.45	0.000	0.00	8.42	0.00	0.000
29.66	2.19	85.34	1.65	141.12	0	0	0.45	0.000	0.00	8.42	0.00	0.000
29.75	2.19	87.70	1.65	144.30	0	0	0.45	0.000	0.00	8.42	0.00	0.000
29.80	2.19	90.31	1.64	148.39	0	0	0.45	0.000	0.00	8.42	0.00	0.000
29.86	2.19	93.20	1.63	152.21	0	0	0.45	0.000	0.00	8.42	0.00	0.000
29.93	2.17	97.00	1.60	155.66	0	0	0.45	0.000	0.00	8.42	0.00	0.000
30.03	2.16	100.96	1.57	158.07	0	0	0.45	0.000	0.00	8.42	0.00	0.000
30.07	2.14	104.42	1.53	159.54	0	0	0.45	0.000	0.00	8.42	0.00	0.000
30.13	2.11	109.08	1.48	161.67	0	0	0.45	0.000	0.00	8.42	0.00	0.000
30.23	2.10	113.56	1.45	164.34	0	0	0.45	0.000	0.00	8.42	0.00	0.000
30.28	2.08	118.22	1.42	167.78	0	0	0.45	0.000	0.00	8.42	0.00	0.000
30.32	2.08	122.19	1.41	172.72	0	0	0.45	0.000	0.00	8.42	0.00	0.000
30.41	2.08	126.05	1.41	178.10	0	0	0.45	0.000	0.00	8.42	0.00	0.000
30.49	2.08	130.00	1.41	183.66	39	2496	0.45	0.046	0.02	8.42	0.02	0.000
30.54	2.08	132.46	1.41	187.23	40	2548	0.45	0.044	0.02	8.42	0.01	0.000
30.60	2.08	133.74	1.43	190.59	41	2603	0.45	0.043	0.02	8.42	0.01	0.000
30.68	2.09	133.86	1.44	193.28	42	2652	0.45	0.042	0.02	8.42	0.01	0.000
30.72	2.11	133.41	1.47	195.61	42	2695	0.45	0.041	0.02	8.42	0.01	0.000
30.78	2.12	132.91	1.48	197.15	43	2725	0.45	0.040	0.02	8.42	0.01	0.000
30.85	2.12	134.33	1.49	200.60	44	2781	0.45	0.039	0.02	8.42	0.01	0.000
30.98	2.12	136.66	1.50	204.72	45	2848	0.45	0.038	0.01	8.42	0.01	0.000
31.02	2.11	141.24	1.47	207.79	45	2886	0.45	0.037	0.01	8.42	0.01	0.000
31.09	2.08	146.02	1.43	208.31	45	2880	0.45	0.038	0.01	8.42	0.01	0.000
31.16	2.05	152.08	1.37	208.66	44	2858	0.45	0.038	0.01	8.42	0.01	0.000
31.26	2.03	157.01	1.34	209.65	44	2850	0.45	0.038	0.01	8.42	0.01	0.000
31.33	2.01	160.69	1.31	210.98	44	2853	0.45	0.038	0.01	8.42	0.01	0.000
31.38	2.02	157.50	1.32	208.53	44	2833	0.45	0.039	0.02	8.42	0.01	0.000
31.42	2.03	154.13	1.34	206.04	43	2813	0.45	0.039	0.02	8.42	0.01	0.000
31.45	2.03	151.73	1.34	203.98	43	2793	0.45	0.040	0.02	8.42	0.01	0.000
31.50	2.02	154.75	1.32	204.86	43	2790	0.45	0.040	0.02	8.42	0.01	0.000
31.59	2.01	156.67	1.31	205.37	43	2791	0.45	0.040	0.02	8.42	0.01	0.000
31.63	2.01	155.85	1.31	204.79	43	2789	0.45	0.040	0.02	8.42	0.01	0.000
31.77	2.02	153.70	1.32	203.47	43	2788	0.45	0.040	0.02	8.42	0.01	0.000
31.81	2.02	152.26	1.33	202.57	43	2784	0.45	0.041	0.02	8.42	0.01	0.000
31.87	2.02	151.74	1.33	202.11	42	2783	0.45	0.041	0.02	8.42	0.01	0.000

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
31.91	2.02	151.30	1.33	201.78	42	2783	0.45	0.041	0.02	8.42	0.01	0.000
31.99	2.03	150.39	1.34	201.29	42	2785	0.45	0.041	0.02	8.42	0.01	0.000
32.08	2.03	149.21	1.35	200.96	42	2793	0.45	0.041	0.02	8.42	0.01	0.000
32.12	2.04	147.98	1.36	200.93	42	2803	0.45	0.041	0.02	8.42	0.01	0.000
32.16	2.05	146.51	1.37	201.29	43	2823	0.45	0.040	0.02	8.42	0.01	0.000
32.25	2.06	145.27	1.39	201.61	43	2842	0.45	0.040	0.02	8.42	0.01	0.000
32.29	2.07	144.38	1.40	201.78	43	2853	0.45	0.040	0.02	8.42	0.01	0.000
32.43	2.07	143.74	1.40	201.13	43	2854	0.45	0.040	0.02	8.42	0.01	0.000
32.49	2.06	144.04	1.39	200.48	43	2844	0.45	0.040	0.02	8.42	0.01	0.000
32.55	2.05	145.57	1.38	200.29	43	2835	0.45	0.040	0.02	8.42	0.01	0.000
32.60	2.04	148.19	1.36	200.97	42	2833	0.45	0.041	0.02	8.42	0.01	0.000
32.66	2.03	151.93	1.34	203.54	43	2860	0.45	0.040	0.02	8.42	0.01	0.000
32.78	2.02	155.23	1.33	206.50	43	2900	0.45	0.039	0.02	8.42	0.01	0.000
32.82	2.03	159.16	1.33	212.38	45	2989	0.45	0.038	0.01	8.42	0.01	0.000
32.95	2.03	161.51	1.35	217.32	46	3078	0.45	0.036	0.01	8.42	0.01	0.000
32.99	2.04	163.62	1.36	222.90	47	3175	0.45	0.035	0.01	8.42	0.01	0.000
33.04	2.05	165.18	1.38	227.57	48	3258	0.45	0.034	0.01	8.42	0.01	0.000
33.17	2.06	166.66	1.39	231.43	49	3331	0.45	0.033	0.01	8.42	0.01	0.000
33.23	2.06	168.90	1.39	234.66	50	3383	0.45	0.032	0.01	8.42	0.01	0.000
33.30	2.06	170.81	1.38	235.67	50	3394	0.45	0.032	0.01	8.42	0.01	0.000
33.35	2.05	172.25	1.37	235.64	50	3388	0.45	0.032	0.01	8.42	0.01	0.000
33.39	2.04	173.54	1.35	234.89	50	3367	0.45	0.032	0.01	8.42	0.01	0.000
33.47	2.03	174.57	1.34	233.80	49	3343	0.45	0.033	0.01	8.42	0.01	0.000
33.52	2.02	175.54	1.33	232.91	49	3320	0.45	0.033	0.01	8.42	0.01	0.000
33.57	2.02	175.72	1.32	232.09	49	3306	0.45	0.033	0.01	8.42	0.01	0.000
33.62	2.01	175.30	1.32	231.25	48	3295	0.45	0.034	0.01	8.42	0.01	0.000
33.70	2.02	173.39	1.33	229.89	48	3289	0.45	0.034	0.01	8.42	0.01	0.000
33.79	2.03	170.40	1.34	228.52	48	3292	0.45	0.034	0.01	8.42	0.01	0.000
33.86	2.02	168.34	1.33	224.42	47	3229	0.45	0.035	0.01	8.42	0.01	0.000
33.92	2.01	167.56	1.32	220.99	46	3169	0.45	0.036	0.01	8.42	0.01	0.000
33.96	2.00	168.05	1.30	218.13	45	3106	0.45	0.037	0.01	8.42	0.01	0.000
34.03	2.00	169.11	1.30	219.23	46	3124	0.45	0.037	0.01	8.42	0.01	0.000
34.10	1.99	171.13	1.29	220.89	46	3144	0.45	0.037	0.01	8.42	0.01	0.000
34.14	1.99	173.25	1.28	222.40	46	3159	0.45	0.036	0.01	8.42	0.01	0.000
34.21	2.00	169.64	1.30	219.83	46	3143	0.45	0.037	0.01	8.42	0.01	0.000
34.27	2.01	164.67	1.31	215.57	45	3103	0.45	0.037	0.01	8.42	0.01	0.000
34.36	2.02	158.60	1.33	210.32	44	3052	0.45	0.038	0.01	8.42	0.01	0.000
34.41	2.02	155.64	1.33	206.89	43	3008	0.45	0.039	0.02	8.42	0.01	0.000
34.46	2.02	153.04	1.33	203.96	43	2971	0.45	0.040	0.02	8.42	0.01	0.000
34.55	2.02	152.69	1.32	202.18	42	2943	0.45	0.041	0.02	8.42	0.01	0.000
34.60	1.99	157.56	1.29	203.19	42	2921	0.45	0.041	0.02	8.42	0.01	0.000
34.68	1.96	164.58	1.25	205.96	42	2911	0.45	0.042	0.02	8.42	0.01	0.000
34.73	1.93	172.82	1.21	209.77	42	2900	0.45	0.042	0.02	8.42	0.01	0.000
34.82	1.90	178.36	1.19	212.58	43	2898	0.45	0.042	0.02	8.42	0.01	0.000
34.87	1.89	183.06	1.18	215.36	43	2902	0.45	0.042	0.02	8.42	0.01	0.000
34.91	1.88	187.01	1.17	218.25	43	2919	0.45	0.042	0.02	8.42	0.01	0.000

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)

**Total estimated settlement: 0.07**

**Abbreviations**

- Q<sub>tn</sub>: Equivalent clean sand normalized cone resistance
- K<sub>c</sub>: Fines correction factor
- Q<sub>tn,cs</sub>: Post-liquefaction volumetric strain
- G<sub>max</sub>: Small strain shear modulus
- CSR: Soil cyclic stress ratio
- γ: Cyclic shear strain
- e<sub>vol(15)</sub>: Volumetric strain after 15 cycles
- N<sub>c</sub>: Equivalent number of cycles
- e<sub>v</sub>: Volumetric strain
- Settle.: Calculated settlement

:: Post-earthquake settlement due to soil liquefaction ::											
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Depth (ft)	Q <sub>tn,cs</sub>	FS	e <sub>v</sub> (%)	DF	Settlement (in)	Depth (ft)	Q <sub>tn,cs</sub>	FS	e <sub>v</sub> (%)	DF	Settlement (in)
35.00	220.46	2.00	0.00	1.00	0.00	35.05	222.12	2.00	0.00	1.00	0.00
35.14	222.15	2.00	0.00	1.00	0.00	35.19	221.68	2.00	0.00	1.00	0.00
35.24	219.67	2.00	0.00	1.00	0.00	35.32	216.68	2.00	0.00	1.00	0.00
35.37	212.54	2.00	0.00	1.00	0.00	35.46	208.70	2.00	0.00	1.00	0.00
35.51	203.09	2.00	0.00	1.00	0.00	35.60	196.81	2.00	0.00	1.00	0.00
35.64	187.89	2.00	0.00	1.00	0.00	35.73	180.45	2.00	0.00	1.00	0.00
35.77	173.10	2.00	0.00	1.00	0.00	35.86	167.54	2.00	0.00	1.00	0.00
35.91	158.38	2.00	0.00	1.00	0.00	36.01	148.25	2.00	0.00	1.00	0.00
36.06	134.83	2.00	0.00	1.00	0.00	36.16	124.33	2.00	0.00	1.00	0.00
36.21	115.65	2.00	0.00	1.00	0.00	36.26	110.72	2.00	0.00	1.00	0.00
36.30	107.21	2.00	0.00	1.00	0.00	36.39	104.97	2.00	0.00	1.00	0.00
36.48	102.74	2.00	0.00	1.00	0.00	36.53	97.77	2.00	0.00	1.00	0.00
36.57	92.89	2.00	0.00	1.00	0.00	36.63	87.74	2.00	0.00	1.00	0.00
36.70	82.45	2.00	0.00	1.00	0.00	36.77	77.85	2.00	0.00	1.00	0.00
36.83	72.76	2.00	0.00	1.00	0.00	36.92	67.97	2.00	0.00	1.00	0.00
36.96	62.80	2.00	0.00	1.00	0.00	37.06	59.89	2.00	0.00	1.00	0.00
37.15	58.57	2.00	0.00	1.00	0.00	37.22	58.47	2.00	0.00	1.00	0.00
37.27	58.41	2.00	0.00	1.00	0.00	37.34	57.87	2.00	0.00	1.00	0.00
37.46	57.16	2.00	0.00	1.00	0.00	37.51	56.51	2.00	0.00	1.00	0.00
37.61	56.29	2.00	0.00	1.00	0.00	37.66	56.19	2.00	0.00	1.00	0.00
37.74	56.10	2.00	0.00	1.00	0.00	37.80	56.06	2.00	0.00	1.00	0.00
37.88	56.07	2.00	0.00	1.00	0.00	37.92	56.35	2.00	0.00	1.00	0.00
38.00	56.89	2.00	0.00	1.00	0.00	38.05	57.82	2.00	0.00	1.00	0.00
38.11	59.26	2.00	0.00	1.00	0.00	38.18	60.92	2.00	0.00	1.00	0.00
38.31	62.09	2.00	0.00	1.00	0.00	38.36	62.61	2.00	0.00	1.00	0.00
38.43	62.56	2.00	0.00	1.00	0.00	38.53	62.38	2.00	0.00	1.00	0.00
38.62	61.73	2.00	0.00	1.00	0.00	38.67	60.80	2.00	0.00	1.00	0.00
38.73	59.70	2.00	0.00	1.00	0.00	38.79	59.11	2.00	0.00	1.00	0.00
38.85	59.07	2.00	0.00	1.00	0.00	38.93	59.17	2.00	0.00	1.00	0.00
38.97	59.20	2.00	0.00	1.00	0.00	39.03	59.04	2.00	0.00	1.00	0.00
39.10	58.97	2.00	0.00	1.00	0.00	39.15	59.10	2.00	0.00	1.00	0.00
39.22	59.62	2.00	0.00	1.00	0.00	39.28	60.18	2.00	0.00	1.00	0.00
39.41	60.55	2.00	0.00	1.00	0.00	39.46	60.40	2.00	0.00	1.00	0.00
39.52	59.87	2.00	0.00	1.00	0.00	39.59	59.13	2.00	0.00	1.00	0.00
39.63	58.10	2.00	0.00	1.00	0.00	39.71	57.10	2.00	0.00	1.00	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)											
Depth (ft)	Q <sub>tn,cs</sub>	FS	e <sub>v</sub> (%)	DF	Settlement (in)	Depth (ft)	Q <sub>tn,cs</sub>	FS	e <sub>v</sub> (%)	DF	Settlement (in)
39.77	56.28	2.00	0.00	1.00	0.00	39.83	56.03	2.00	0.00	1.00	0.00
39.89	56.52	2.00	0.00	1.00	0.00	40.00	57.51	2.00	0.00	1.00	0.00
40.08	58.73	2.00	0.00	1.00	0.00	40.14	59.64	2.00	0.00	1.00	0.00
40.20	59.98	2.00	0.00	1.00	0.00	40.25	59.94	2.00	0.00	1.00	0.00
40.31	59.68	2.00	0.00	1.00	0.00	40.38	59.39	2.00	0.00	1.00	0.00
40.45	59.17	2.00	0.00	1.00	0.00	40.51	59.89	2.00	0.00	1.00	0.00
40.56	62.41	2.00	0.00	1.00	0.00	40.62	65.57	2.00	0.00	1.00	0.00
40.65	69.16	2.00	0.00	1.00	0.00	40.68	73.31	2.00	0.00	1.00	0.00
40.75	78.66	2.00	0.00	1.00	0.00	40.87	84.16	2.00	0.00	1.00	0.00
40.93	88.34	2.00	0.00	1.00	0.00	40.99	91.42	2.00	0.00	1.00	0.00
41.10	93.48	2.00	0.00	1.00	0.00	41.16	95.36	2.00	0.00	1.00	0.00
41.23	96.53	2.00	0.00	1.00	0.00	41.29	97.93	2.00	0.00	1.00	0.00
41.35	99.71	2.00	0.00	1.00	0.00	41.41	101.70	2.00	0.00	1.00	0.00
41.47	101.85	2.00	0.00	1.00	0.00	41.54	99.92	2.00	0.00	1.00	0.00
41.59	95.35	2.00	0.00	1.00	0.00	41.67	89.40	2.00	0.00	1.00	0.00
41.72	83.52	2.00	0.00	1.00	0.00	41.77	79.31	2.00	0.00	1.00	0.00
41.85	78.92	2.00	0.00	1.00	0.00	41.96	81.23	2.00	0.00	1.00	0.00
42.03	86.45	2.00	0.00	1.00	0.00	42.07	91.36	2.00	0.00	1.00	0.00
42.15	98.07	2.00	0.00	1.00	0.00	42.21	103.84	2.00	0.00	1.00	0.00
42.26	112.34	2.00	0.00	1.00	0.00	42.38	121.29	2.00	0.00	1.00	0.00
42.44	131.04	2.00	0.00	1.00	0.00	42.51	137.62	2.00	0.00	1.00	0.00
42.56	143.96	2.00	0.00	1.00	0.00	42.62	150.13	2.00	0.00	1.00	0.00
42.69	156.01	2.00	0.00	1.00	0.00	42.74	161.39	2.00	0.00	1.00	0.00
42.81	165.83	2.00	0.00	1.00	0.00	42.87	170.20	2.00	0.00	1.00	0.00
42.93	174.83	2.00	0.00	1.00	0.00	42.99	179.97	2.00	0.00	1.00	0.00
43.04	185.93	2.00	0.00	1.00	0.00	43.10	195.20	2.00	0.00	1.00	0.00
43.22	204.86	2.00	0.00	1.00	0.00	43.28	214.29	2.00	0.00	1.00	0.00
43.34	219.54	2.00	0.00	1.00	0.00	43.39	222.76	2.00	0.00	1.00	0.00
43.46	223.69	2.00	0.00	1.00	0.00	43.51	221.67	2.00	0.00	1.00	0.00
43.61	215.65	2.00	0.00	1.00	0.00	43.68	207.93	2.00	0.00	1.00	0.00
43.74	200.77	2.00	0.00	1.00	0.00	43.79	195.65	2.00	0.00	1.00	0.00
43.85	190.99	2.00	0.00	1.00	0.00	43.92	186.15	2.00	0.00	1.00	0.00
43.97	179.37	2.00	0.00	1.00	0.00	44.05	172.44	2.00	0.00	1.00	0.00
44.17	166.09	2.00	0.00	1.00	0.00	44.23	159.73	2.00	0.00	1.00	0.00
44.33	153.88	2.00	0.00	1.00	0.00	44.40	148.00	2.00	0.00	1.00	0.00
44.45	144.17	2.00	0.00	1.00	0.00	44.52	140.42	2.00	0.00	1.00	0.00
44.58	136.68	2.00	0.00	1.00	0.00	44.63	130.87	2.00	0.00	1.00	0.00
44.75	124.35	2.00	0.00	1.00	0.00	44.80	115.18	2.00	0.00	1.00	0.00
44.89	107.40	2.00	0.00	1.00	0.00	44.93	100.15	2.00	0.00	1.00	0.00
44.98	94.71	2.00	0.00	1.00	0.00	45.03	90.08	2.00	0.00	1.00	0.00
45.11	86.29	2.00	0.00	1.00	0.00	45.16	82.98	2.00	0.00	1.00	0.00
45.24	80.23	2.00	0.00	1.00	0.00	45.29	76.58	2.00	0.00	1.00	0.00
45.37	73.10	2.00	0.00	1.00	0.00	45.44	69.96	2.00	0.00	1.00	0.00
45.51	68.41	2.00	0.00	1.00	0.00	45.56	67.44	2.00	0.00	1.00	0.00
45.63	66.50	2.00	0.00	1.00	0.00	45.68	66.48	2.00	0.00	1.00	0.00
45.75	67.65	2.00	0.00	1.00	0.00	45.81	71.07	2.00	0.00	1.00	0.00
45.94	75.47	2.00	0.00	1.00	0.00	46.03	78.95	2.00	0.00	1.00	0.00
46.08	81.33	2.00	0.00	1.00	0.00	46.17	82.65	2.00	0.00	1.00	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)											
Depth (ft)	$Q_{tn,cs}$	FS	$e_v$ (%)	DF	Settlement (in)	Depth (ft)	$Q_{tn,cs}$	FS	$e_v$ (%)	DF	Settlement (in)
46.22	83.42	2.00	0.00	1.00	0.00	46.31	83.61	2.00	0.00	1.00	0.00
46.36	83.35	2.00	0.00	1.00	0.00	46.41	82.69	2.00	0.00	1.00	0.00
46.47	81.75	2.00	0.00	1.00	0.00	46.56	80.95	2.00	0.00	1.00	0.00
46.61	80.68	2.00	0.00	1.00	0.00	46.67	81.77	2.00	0.00	1.00	0.00
46.73	85.26	2.00	0.00	1.00	0.00	46.83	90.10	2.00	0.00	1.00	0.00
46.87	95.20	2.00	0.00	1.00	0.00	46.92	99.76	2.00	0.00	1.00	0.00
47.01	103.75	2.00	0.00	1.00	0.00	47.05	108.48	2.00	0.00	1.00	0.00
47.14	111.54	2.00	0.00	1.00	0.00	47.21	115.31	2.00	0.00	1.00	0.00
47.27	118.78	2.00	0.00	1.00	0.00	47.32	121.20	2.00	0.00	1.00	0.00
47.40	127.74	2.00	0.00	1.00	0.00	47.45	138.62	2.00	0.00	1.00	0.00
47.53	146.95	2.00	0.00	1.00	0.00	47.58	153.64	2.00	0.00	1.00	0.00
47.64	158.80	2.00	0.00	1.00	0.00	47.71	165.37	2.00	0.00	1.00	0.00
47.80	171.52	2.00	0.00	1.00	0.00	47.88	175.56	2.00	0.00	1.00	0.00
47.93	177.22	2.00	0.00	1.00	0.00	47.97	177.43	2.00	0.00	1.00	0.00
48.06	177.11	2.00	0.00	1.00	0.00	48.11	176.64	2.00	0.00	1.00	0.00
48.19	175.71	2.00	0.00	1.00	0.00	48.24	173.95	2.00	0.00	1.00	0.00
48.33	171.75	2.00	0.00	1.00	0.00	48.36	167.81	2.00	0.00	1.00	0.00
48.46	164.24	2.00	0.00	1.00	0.00	48.50	159.97	2.00	0.00	1.00	0.00
48.59	157.12	2.00	0.00	1.00	0.00	48.67	155.05	2.00	0.00	1.00	0.00
48.70	153.84	2.00	0.00	1.00	0.00	48.77	153.06	2.00	0.00	1.00	0.00
48.85	153.20	2.00	0.00	1.00	0.00	48.92	154.09	2.00	0.00	1.00	0.00
48.97	153.29	2.00	0.00	1.00	0.00	49.03	148.21	2.00	0.00	1.00	0.00
49.12	142.12	2.00	0.00	1.00	0.00	49.16	137.61	2.00	0.00	1.00	0.00
49.27	138.29	2.00	0.00	1.00	0.00	49.34	140.54	2.00	0.00	1.00	0.00
49.39	139.50	2.00	0.00	1.00	0.00	49.43	140.00	2.00	0.00	1.00	0.00
49.50	140.49	2.00	0.00	1.00	0.00	49.56	142.56	2.00	0.00	1.00	0.00
49.71	143.57	0.75	1.20	1.00	0.02	49.74	144.68	0.77	1.18	1.00	0.00
49.75	145.92	0.78	1.17	1.00	0.00	49.86	147.58	0.80	1.15	1.00	0.01

**Total estimated settlement: 0.04**

#### Abbreviations

$Q_{tn,cs}$ :	Equivalent clean sand normalized cone resistance
FS:	Factor of safety against liquefaction
$e_v$ (%):	Post-liquefaction volumetric strain
DF:	$e_v$ depth weighting factor
Settlement:	Calculated settlement





LIQUEFACTION ANALYSIS REPORT

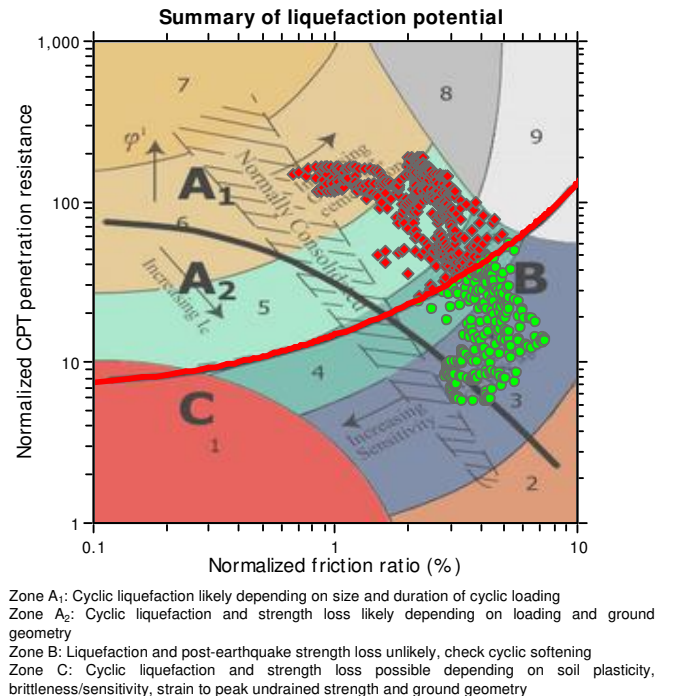
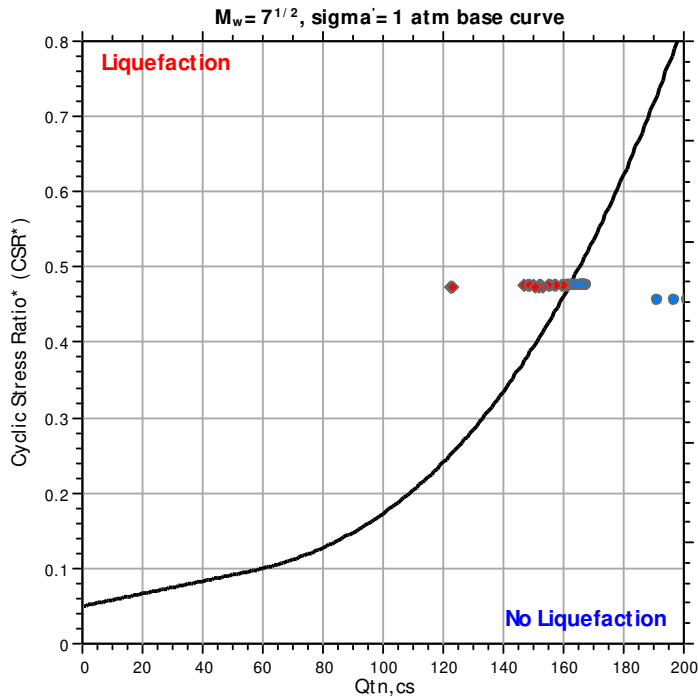
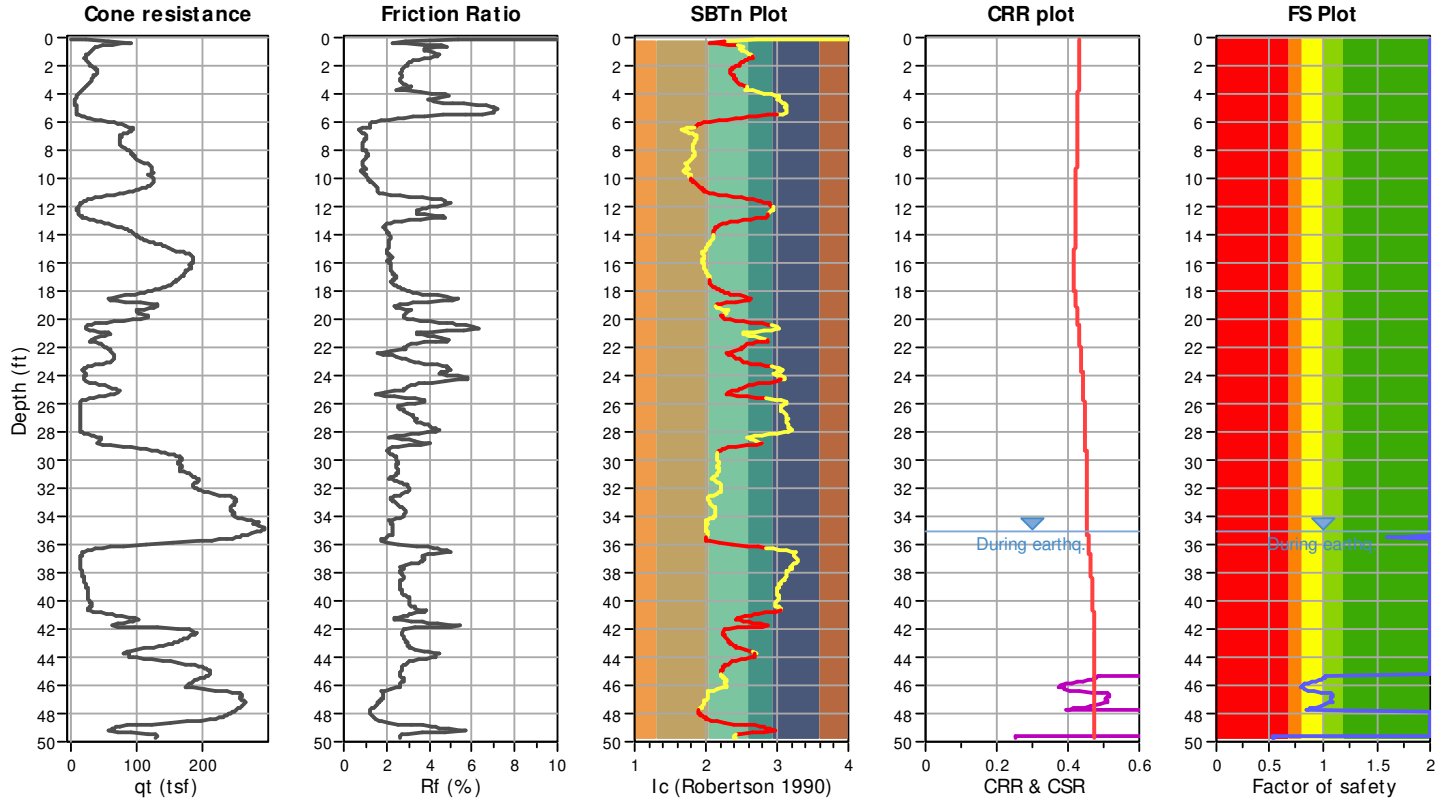
Project title : Proposed Townhouses

Location : 2323 West Broadway, Anaheim, CA

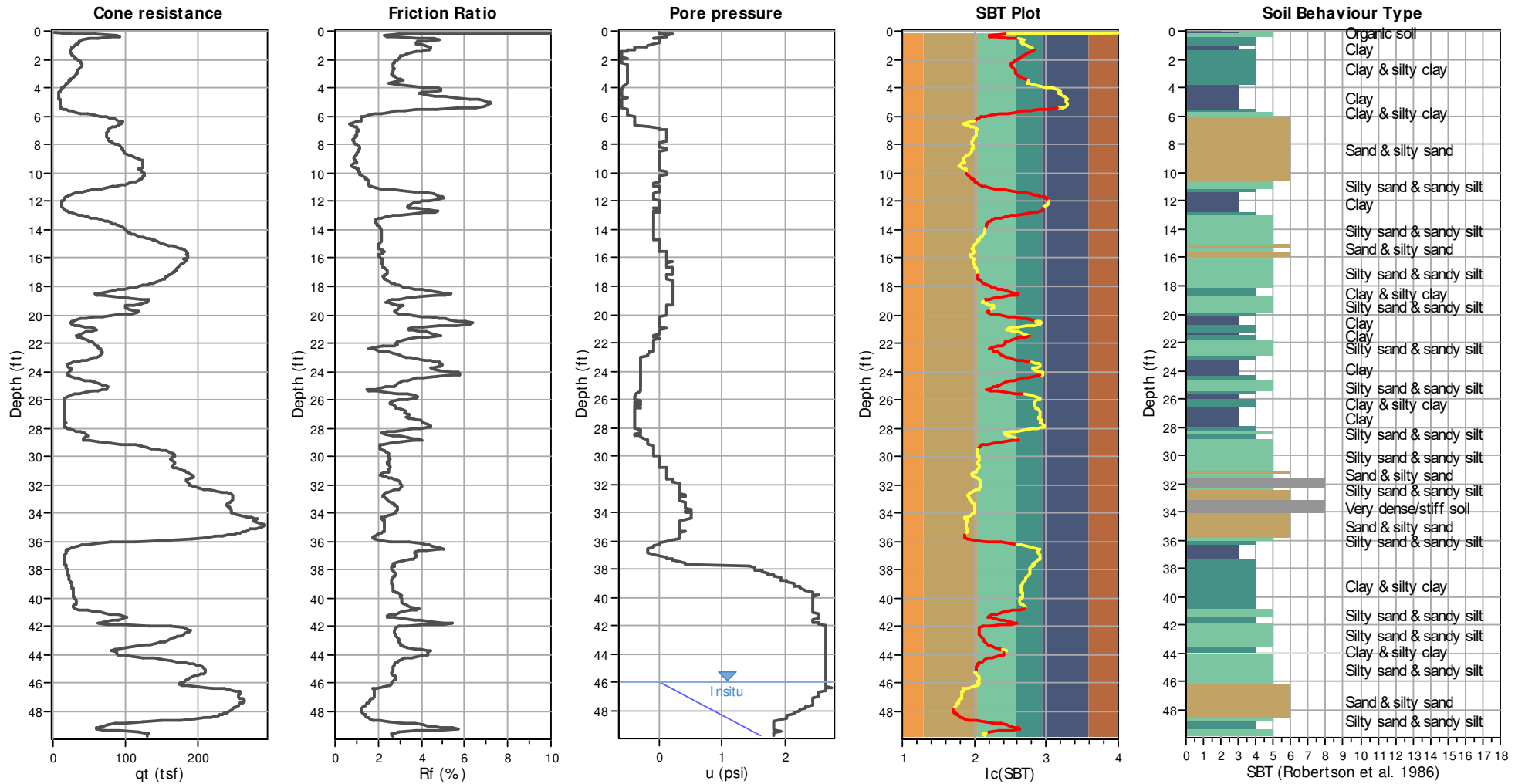
CPT file : CPT-2

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	46.00 ft	Use fill:	No	Clay like behavior	
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	35.00 ft	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude $M_w$ :	6.67	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	60.00 ft
Peak ground acceleration:	0.69	Unit weight calculation:	Based on SBT	$K_v$ applied:	Yes	MSF method:	Method based



### CPT basic interpretation plots



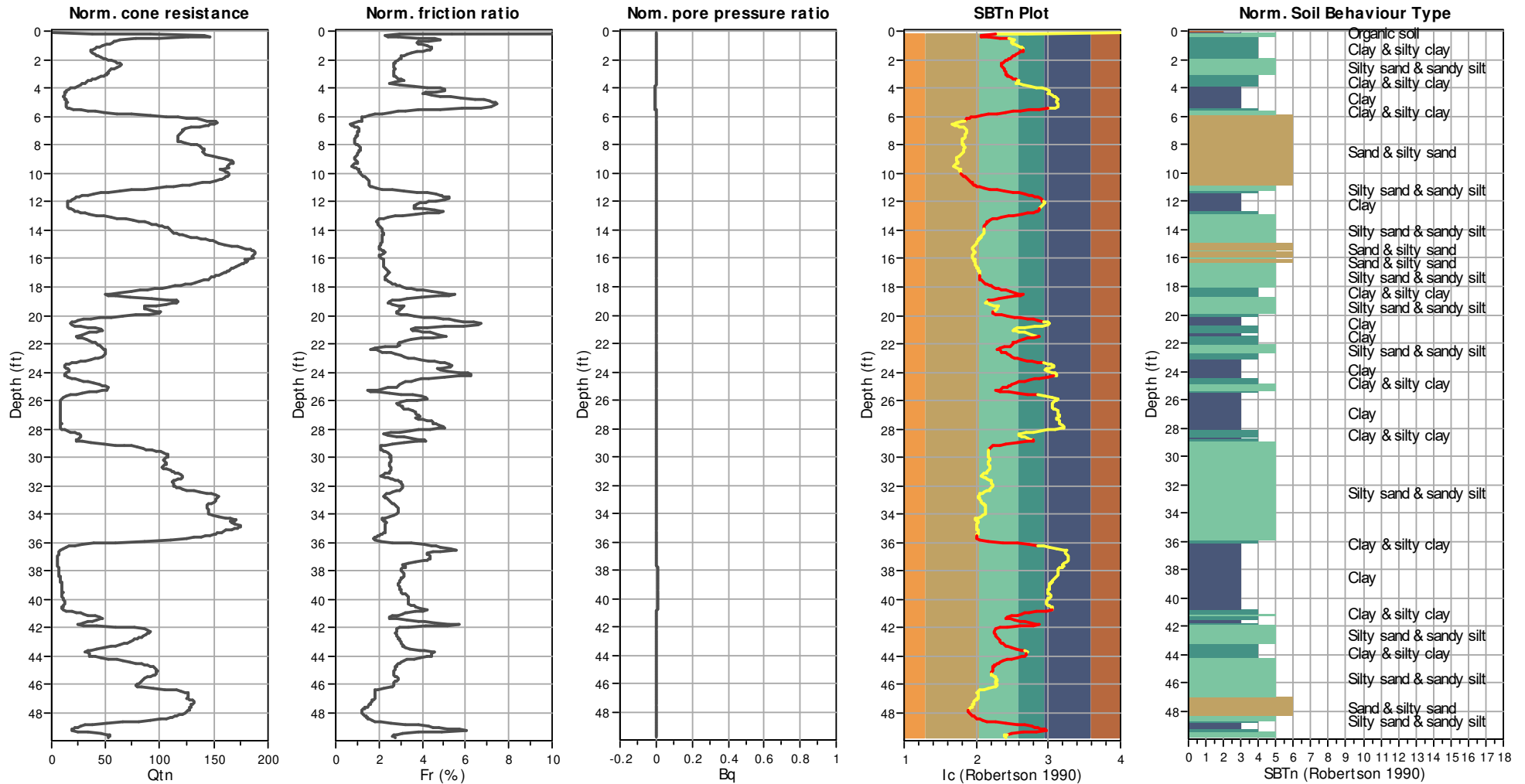
#### Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	35.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>o</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	6.67	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.69	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	46.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

#### SBT legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

### CPT basic interpretation plots (normalized)



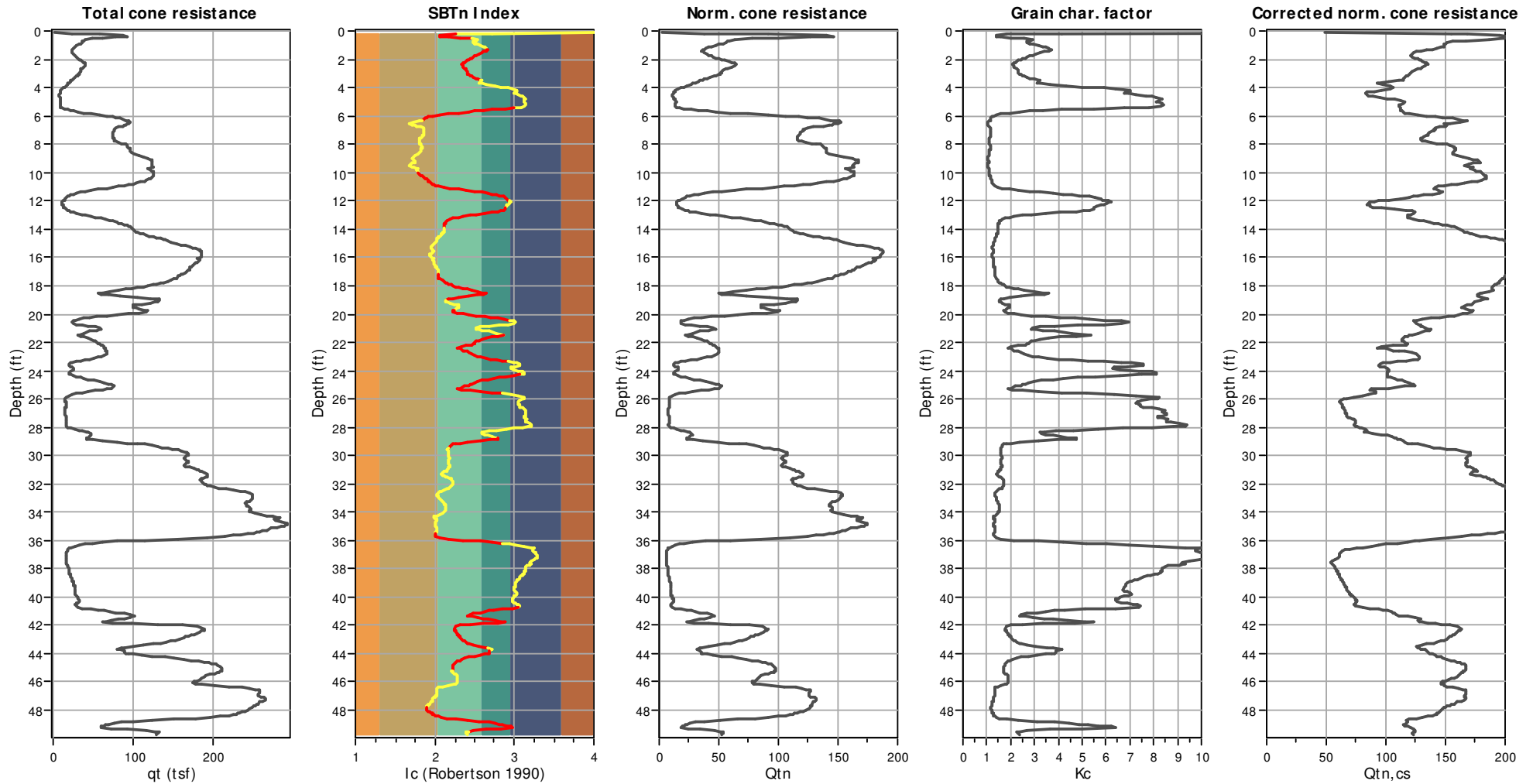
#### Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	35.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>o</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	6.67	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.69	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	46.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

#### SBTn legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

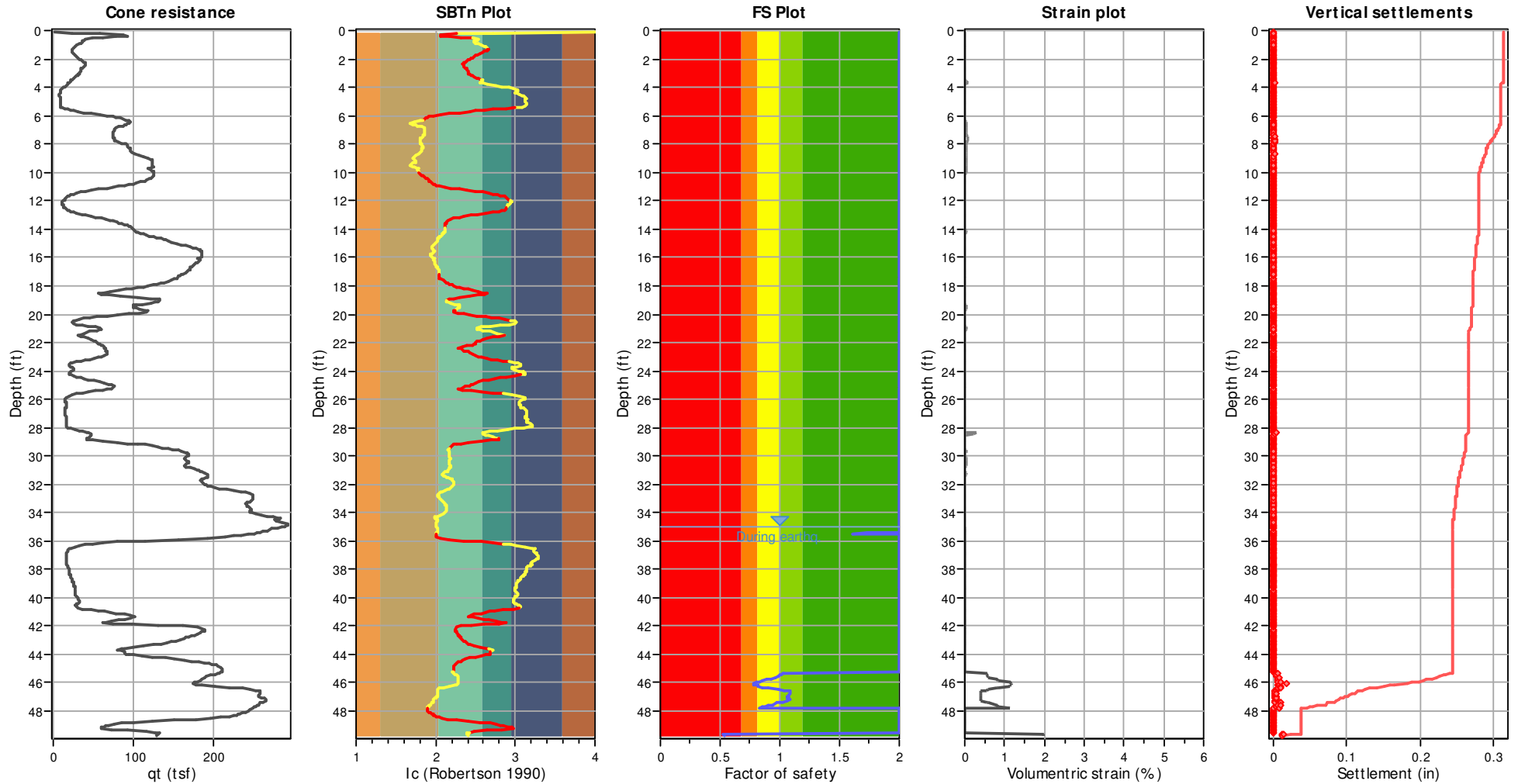
### Liquefaction analysis overall plots (intermediate results)



#### Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	35.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>v</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	6.67	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.69	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	46.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

### Estimation of post-earthquake settlements



**Abbreviations**

- q<sub>t</sub>: Total cone resistance (cone resistance q<sub>c</sub> corrected for pore water effects)
- I<sub>c</sub>: Soil Behaviour Type Index
- FS: Calculated Factor of Safety against liquefaction
- Volumetric strain: Post-liquefaction volumetric strain

:: Post-earthquake settlement of dry sands ::												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
0.09	4.06	1.84	26.61	48.96	0	0	0.43	0.000	0.00	0.00	0.00	0.000
0.14	2.72	37.34	4.15	154.86	0	0	0.43	0.000	0.00	0.00	0.00	0.000
0.22	2.26	91.29	1.84	167.89	39	899	0.43	0.001	0.00	8.42	0.00	0.000
0.31	2.06	140.72	1.38	194.64	0	0	0.43	0.000	0.00	8.42	0.00	0.000
0.35	2.06	146.80	1.39	203.91	0	0	0.43	0.000	0.00	8.42	0.00	0.000
0.39	2.17	126.24	1.59	201.09	0	0	0.43	0.000	0.00	8.42	0.00	0.000
0.47	2.32	99.83	2.03	202.54	0	0	0.43	0.000	0.00	8.42	0.00	0.000
0.53	2.46	77.86	2.55	198.87	0	0	0.43	0.000	0.00	8.42	0.00	0.000
0.62	2.53	63.59	2.94	186.92	0	0	0.43	0.000	0.00	8.42	0.00	0.000
0.66	2.51	59.11	2.83	167.14	43	797	0.43	0.003	0.00	8.42	0.00	0.000
0.75	2.49	57.78	2.70	155.89	40	754	0.43	0.003	0.00	8.42	0.00	0.000
0.79	2.49	56.07	2.71	151.80	39	733	0.43	0.004	0.00	8.42	0.00	0.000
0.88	2.50	53.87	2.78	149.67	39	717	0.43	0.004	0.00	8.42	0.00	0.000
0.93	2.54	50.36	2.96	148.82	39	700	0.43	0.005	0.00	8.42	0.00	0.000
1.01	2.57	46.99	3.17	149.17	40	686	0.43	0.005	0.00	8.42	0.00	0.000
1.10	2.61	44.01	3.38	148.70	0	0	0.43	0.000	0.00	0.00	0.00	0.000
1.14	2.63	41.91	3.50	146.69	0	0	0.43	0.000	0.00	0.00	0.00	0.000
1.19	2.64	39.62	3.60	142.81	0	0	0.43	0.000	0.00	0.00	0.00	0.000
1.28	2.66	37.66	3.68	138.62	0	0	0.43	0.000	0.00	0.00	0.00	0.000
1.32	2.66	36.14	3.70	133.56	0	0	0.43	0.000	0.00	0.00	0.00	0.000
1.41	2.65	35.79	3.63	129.79	0	0	0.43	0.000	0.00	0.00	0.00	0.000
1.45	2.62	36.66	3.43	125.88	0	0	0.43	0.000	0.00	0.00	0.00	0.000
1.54	2.58	38.17	3.24	123.47	0	0	0.43	0.000	0.00	8.42	0.00	0.000
1.59	2.55	40.16	3.03	121.67	0	0	0.43	0.000	0.00	8.42	0.00	0.000
1.67	2.53	41.66	2.90	120.83	0	0	0.43	0.000	0.00	8.42	0.00	0.000
1.72	2.50	43.46	2.78	120.77	0	0	0.43	0.000	0.00	8.42	0.00	0.000
1.81	2.48	45.45	2.69	122.17	0	0	0.43	0.000	0.00	8.42	0.00	0.000
1.90	2.47	47.72	2.61	124.40	0	0	0.43	0.000	0.00	8.42	0.00	0.000
1.95	2.45	49.96	2.53	126.39	0	0	0.43	0.000	0.00	8.42	0.00	0.000
1.99	2.43	52.53	2.43	127.92	0	0	0.43	0.000	0.00	8.42	0.00	0.000
2.08	2.41	55.20	2.34	129.38	0	0	0.43	0.000	0.00	8.42	0.00	0.000
2.14	2.38	58.51	2.24	130.93	0	0	0.43	0.000	0.00	8.42	0.00	0.000
2.21	2.36	61.04	2.17	132.58	0	0	0.43	0.000	0.00	8.42	0.00	0.000
2.28	2.35	63.13	2.12	133.89	0	0	0.43	0.000	0.00	8.42	0.00	0.000
2.31	2.34	64.15	2.10	134.80	0	0	0.43	0.000	0.00	8.42	0.00	0.000
2.37	2.34	64.58	2.08	134.62	0	0	0.43	0.000	0.00	8.42	0.00	0.000
2.47	2.35	63.26	2.11	133.17	0	0	0.43	0.000	0.00	8.42	0.00	0.000
2.59	2.36	60.76	2.16	131.08	0	0	0.43	0.000	0.00	8.42	0.00	0.000
2.65	2.38	57.74	2.23	129.01	0	0	0.43	0.000	0.00	8.42	0.00	0.000
2.69	2.39	55.59	2.28	126.74	0	0	0.43	0.000	0.00	8.42	0.00	0.000
2.77	2.40	54.17	2.30	124.56	0	0	0.43	0.000	0.00	8.42	0.00	0.000
2.82	2.40	52.94	2.31	122.31	0	0	0.43	0.000	0.00	8.42	0.00	0.000
2.90	2.40	52.16	2.32	121.21	0	0	0.43	0.000	0.00	8.42	0.00	0.000
2.95	2.41	51.37	2.34	120.47	0	0	0.43	0.000	0.00	8.42	0.00	0.000
3.01	2.41	50.64	2.37	119.93	0	0	0.43	0.000	0.00	8.42	0.00	0.000
3.08	2.42	49.51	2.41	119.28	0	0	0.43	0.000	0.00	8.42	0.00	0.000
3.13	2.44	47.85	2.47	118.19	0	0	0.43	0.000	0.00	8.42	0.00	0.000
3.20	2.46	45.75	2.56	116.98	0	0	0.43	0.000	0.00	8.42	0.00	0.000

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
3.26	2.48	43.26	2.68	115.75	0	0	0.43	0.000	0.00	8.42	0.00	0.000
3.33	2.51	40.62	2.82	114.69	0	0	0.43	0.000	0.00	8.42	0.00	0.000
3.39	2.54	38.13	3.00	114.23	0	0	0.43	0.000	0.00	8.42	0.00	0.000
3.43	2.57	36.03	3.17	114.32	0	0	0.43	0.000	0.00	8.42	0.00	0.000
3.51	2.59	34.18	3.24	110.74	0	0	0.43	0.000	0.00	8.42	0.00	0.000
3.57	2.57	32.33	3.15	101.98	27	470	0.43	0.087	0.06	8.42	0.05	0.001
3.63	2.56	30.42	3.09	94.06	25	436	0.43	0.119	0.09	8.42	0.07	0.001
3.70	2.58	28.56	3.23	92.30	25	422	0.43	0.143	0.11	8.42	0.09	0.002
3.75	2.65	26.75	3.66	97.92	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.88	2.75	23.72	4.35	103.28	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.97	2.83	21.28	5.01	106.53	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.01	2.92	17.97	5.92	106.32	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.10	2.97	16.11	6.41	103.20	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.14	3.02	13.72	7.00	96.03	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.27	3.02	12.83	7.00	89.78	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.30	3.01	12.29	6.85	84.21	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.37	3.00	12.28	6.76	83.00	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.41	3.02	11.89	6.94	82.55	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.53	3.05	11.49	7.28	83.64	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.57	3.08	11.14	7.68	85.55	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.61	3.10	11.24	7.96	89.41	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.68	3.12	11.67	8.13	94.86	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.76	3.14	12.06	8.37	100.96	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.81	3.13	12.97	8.28	107.48	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.88	3.12	13.65	8.22	112.20	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.96	3.11	14.23	8.10	115.29	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.99	3.12	14.08	8.22	115.75	0	0	0.43	0.000	0.00	0.00	0.00	0.000
5.07	3.13	13.68	8.35	114.30	0	0	0.43	0.000	0.00	0.00	0.00	0.000
5.21	3.14	13.38	8.38	112.08	0	0	0.43	0.000	0.00	0.00	0.00	0.000
5.25	3.14	13.23	8.43	111.58	0	0	0.43	0.000	0.00	0.00	0.00	0.000
5.30	3.13	13.47	8.28	111.56	0	0	0.43	0.000	0.00	0.00	0.00	0.000
5.36	3.09	14.39	7.78	112.00	0	0	0.43	0.000	0.00	0.00	0.00	0.000
5.40	3.00	16.58	6.76	112.05	0	0	0.43	0.000	0.00	0.00	0.00	0.000
5.46	2.88	20.52	5.47	112.19	0	0	0.43	0.000	0.00	0.00	0.00	0.000
5.52	2.72	26.99	4.17	112.60	0	0	0.43	0.000	0.00	0.00	0.00	0.000
5.60	2.61	33.22	3.37	111.99	0	0	0.43	0.000	0.00	0.00	0.00	0.000
5.65	2.51	40.27	2.81	113.27	0	0	0.43	0.000	0.00	8.42	0.00	0.000
5.75	2.42	47.91	2.39	114.33	0	0	0.43	0.000	0.00	8.42	0.00	0.000
5.81	2.30	59.84	1.94	116.29	0	0	0.43	0.000	0.00	8.42	0.00	0.000
5.86	2.18	74.25	1.61	119.81	0	0	0.43	0.000	0.00	8.42	0.00	0.000
5.91	2.06	91.58	1.39	126.91	0	0	0.43	0.000	0.00	8.42	0.00	0.000
6.00	1.98	105.89	1.27	134.54	0	0	0.43	0.000	0.00	8.42	0.00	0.000
6.05	1.92	117.18	1.21	141.62	0	0	0.43	0.000	0.00	8.42	0.00	0.000
6.11	1.90	124.19	1.19	147.19	0	0	0.43	0.000	0.00	8.42	0.00	0.000
6.18	1.87	134.41	1.16	156.20	0	0	0.43	0.000	0.00	8.42	0.00	0.000
6.31	1.85	144.08	1.14	164.83	0	0	0.43	0.000	0.00	8.42	0.00	0.000
6.35	1.80	151.68	1.11	168.01	0	0	0.43	0.000	0.00	8.42	0.00	0.000
6.42	1.73	152.74	1.06	162.08	31	770	0.43	0.053	0.03	8.42	0.02	0.000

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
6.49	1.67	150.49	1.02	153.57	28	704	0.43	0.069	0.05	8.42	0.03	0.001
6.53	1.67	146.50	1.02	149.04	28	685	0.43	0.076	0.05	8.42	0.04	0.000
6.61	1.71	144.64	1.04	151.06	28	706	0.43	0.071	0.05	8.42	0.04	0.001
6.66	1.74	142.30	1.07	151.78	29	724	0.43	0.067	0.04	8.42	0.03	0.000
6.73	1.77	137.52	1.09	149.68	29	729	0.43	0.067	0.04	8.42	0.03	0.001
6.77	1.82	129.44	1.12	145.17	28	727	0.43	0.068	0.04	8.42	0.03	0.000
6.83	1.85	123.83	1.15	142.03	28	724	0.43	0.070	0.05	8.42	0.04	0.001
6.90	1.87	121.25	1.16	140.70	28	724	0.43	0.071	0.05	8.42	0.04	0.001
6.97	1.86	122.22	1.16	141.17	28	724	0.43	0.073	0.05	8.42	0.04	0.001
7.05	1.86	121.24	1.16	140.07	28	718	0.43	0.076	0.05	8.42	0.04	0.001
7.10	1.86	120.16	1.15	138.49	27	709	0.43	0.080	0.06	8.42	0.04	0.000
7.18	1.86	118.83	1.15	136.70	27	699	0.43	0.086	0.06	8.42	0.05	0.001
7.25	1.85	118.36	1.15	135.76	27	692	0.43	0.090	0.06	8.42	0.05	0.001
7.33	1.85	117.40	1.15	134.91	27	691	0.43	0.092	0.07	8.42	0.05	0.001
7.36	1.85	117.44	1.14	134.10	26	687	0.43	0.095	0.07	8.42	0.05	0.000
7.46	1.84	116.33	1.13	132.03	26	681	0.43	0.100	0.07	8.42	0.06	0.001
7.51	1.82	116.13	1.12	130.35	25	672	0.43	0.106	0.08	8.42	0.06	0.001
7.55	1.81	116.23	1.12	129.76	25	670	0.43	0.109	0.08	8.42	0.06	0.001
7.63	1.81	116.27	1.12	129.72	25	673	0.43	0.109	0.08	8.42	0.06	0.001
7.71	1.81	116.77	1.12	130.28	25	680	0.43	0.107	0.08	8.42	0.06	0.001
7.75	1.81	119.40	1.11	133.03	26	696	0.43	0.100	0.07	8.42	0.06	0.000
7.84	1.81	123.54	1.11	137.25	27	722	0.42	0.091	0.06	8.42	0.05	0.001
7.92	1.81	128.33	1.11	142.58	28	755	0.42	0.081	0.06	8.42	0.04	0.001
7.97	1.81	132.19	1.11	147.18	29	782	0.42	0.074	0.05	8.42	0.04	0.000
8.02	1.82	134.88	1.12	151.34	29	810	0.42	0.068	0.04	8.42	0.03	0.000
8.11	1.83	136.38	1.13	154.09	30	832	0.42	0.064	0.04	8.42	0.03	0.001
8.16	1.84	138.41	1.13	156.96	31	853	0.42	0.061	0.04	8.42	0.03	0.000
8.27	1.84	139.30	1.13	157.86	31	865	0.42	0.060	0.04	8.42	0.03	0.001
8.31	1.83	140.64	1.13	158.93	31	872	0.42	0.059	0.03	8.42	0.03	0.000
8.37	1.83	140.75	1.13	158.90	31	876	0.42	0.059	0.03	8.42	0.03	0.000
8.42	1.83	140.52	1.13	158.33	31	874	0.42	0.060	0.04	8.42	0.03	0.000
8.47	1.82	139.93	1.12	157.14	31	870	0.42	0.061	0.04	8.42	0.03	0.000
8.54	1.81	140.77	1.11	156.49	30	866	0.42	0.063	0.04	8.42	0.03	0.000
8.69	1.79	142.45	1.10	156.49	30	870	0.42	0.064	0.04	8.42	0.03	0.001
8.77	1.76	148.83	1.08	160.14	30	885	0.42	0.062	0.04	8.42	0.03	0.001
8.89	1.73	154.86	1.06	164.28	31	907	0.42	0.060	0.04	8.42	0.03	0.001
8.95	1.72	161.74	1.05	170.12	32	938	0.42	0.056	0.03	8.42	0.02	0.000
9.07	1.73	164.46	1.06	173.56	33	967	0.42	0.053	0.03	8.42	0.02	0.001
9.12	1.73	166.77	1.06	176.90	33	991	0.42	0.050	0.03	8.42	0.02	0.000
9.19	1.74	167.29	1.07	178.62	34	1009	0.42	0.049	0.03	8.42	0.02	0.000
9.25	1.75	167.31	1.07	179.83	34	1024	0.42	0.048	0.03	8.42	0.02	0.000
9.30	1.72	165.17	1.05	173.19	32	975	0.42	0.054	0.03	8.42	0.02	0.000
9.38	1.69	163.43	1.03	169.04	31	948	0.42	0.059	0.03	8.42	0.03	0.000
9.49	1.68	161.86	1.02	165.41	31	928	0.42	0.063	0.04	8.42	0.03	0.001
9.56	1.71	163.00	1.05	170.79	32	975	0.42	0.056	0.03	8.42	0.02	0.000
9.61	1.73	163.51	1.06	172.86	33	995	0.42	0.054	0.03	8.42	0.02	0.000
9.67	1.76	158.21	1.08	170.56	32	998	0.42	0.055	0.03	8.42	0.02	0.000
9.70	1.77	157.34	1.08	170.68	33	1004	0.42	0.054	0.03	8.42	0.02	0.000



:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
9.72	1.78	155.66	1.09	170.33	33	1008	0.42	0.054	0.03	8.42	0.02	0.000
9.79	1.77	160.29	1.09	174.39	33	1033	0.42	0.051	0.03	8.42	0.02	0.000
9.89	1.78	160.72	1.10	176.06	34	1053	0.42	0.050	0.03	8.42	0.02	0.000
9.93	1.79	162.82	1.10	178.84	34	1074	0.42	0.048	0.02	8.42	0.02	0.000
9.98	1.79	163.71	1.10	180.47	35	1090	0.42	0.047	0.02	8.42	0.02	0.000
10.07	1.80	163.73	1.11	181.32	0	0	0.42	0.000	0.00	8.42	0.00	0.000
10.11	1.81	163.62	1.11	182.21	0	0	0.42	0.000	0.00	8.42	0.00	0.000
10.17	1.82	162.95	1.12	183.14	0	0	0.42	0.000	0.00	8.42	0.00	0.000
10.26	1.84	161.71	1.14	183.78	0	0	0.42	0.000	0.00	8.42	0.00	0.000
10.32	1.86	160.08	1.15	184.61	0	0	0.42	0.000	0.00	8.42	0.00	0.000
10.42	1.88	157.57	1.17	184.11	0	0	0.42	0.000	0.00	8.42	0.00	0.000
10.46	1.89	155.08	1.18	183.32	0	0	0.42	0.000	0.00	8.42	0.00	0.000
10.51	1.91	151.18	1.19	180.65	0	0	0.42	0.000	0.00	8.42	0.00	0.000
10.59	1.92	146.28	1.21	176.94	0	0	0.42	0.000	0.00	8.42	0.00	0.000
10.64	1.94	139.73	1.23	171.49	0	0	0.42	0.000	0.00	8.42	0.00	0.000
10.74	1.95	133.37	1.24	165.80	0	0	0.42	0.000	0.00	8.42	0.00	0.000
10.79	1.97	127.29	1.26	160.05	0	0	0.42	0.000	0.00	8.42	0.00	0.000
10.84	1.98	120.61	1.28	154.34	0	0	0.42	0.000	0.00	8.42	0.00	0.000
10.94	2.01	113.23	1.31	148.82	0	0	0.42	0.000	0.00	8.42	0.00	0.000
10.98	2.05	105.42	1.37	144.49	0	0	0.42	0.000	0.00	8.42	0.00	0.000
11.03	2.11	96.27	1.47	141.96	0	0	0.42	0.000	0.00	8.42	0.00	0.000
11.13	2.19	86.18	1.63	140.81	0	0	0.42	0.000	0.00	8.42	0.00	0.000
11.17	2.29	73.61	1.93	142.07	0	0	0.42	0.000	0.00	8.42	0.00	0.000
11.26	2.39	62.91	2.29	144.14	0	0	0.42	0.000	0.00	8.42	0.00	0.000
11.33	2.50	52.58	2.79	146.62	0	0	0.42	0.000	0.00	8.42	0.00	0.000
11.37	2.59	45.44	3.24	147.26	0	0	0.42	0.000	0.00	8.42	0.00	0.000
11.43	2.67	38.36	3.77	144.64	0	0	0.42	0.000	0.00	0.00	0.00	0.000
11.52	2.73	33.00	4.20	138.65	0	0	0.42	0.000	0.00	0.00	0.00	0.000
11.58	2.77	28.82	4.56	131.41	0	0	0.42	0.000	0.00	0.00	0.00	0.000
11.65	2.81	26.07	4.86	126.57	0	0	0.42	0.000	0.00	0.00	0.00	0.000
11.70	2.86	23.35	5.30	123.68	0	0	0.42	0.000	0.00	0.00	0.00	0.000
11.76	2.89	21.53	5.57	119.97	0	0	0.42	0.000	0.00	0.00	0.00	0.000
11.82	2.91	19.39	5.77	111.81	0	0	0.42	0.000	0.00	0.00	0.00	0.000
11.92	2.92	17.51	5.88	102.91	0	0	0.42	0.000	0.00	0.00	0.00	0.000
11.99	2.94	15.39	6.10	93.90	0	0	0.42	0.000	0.00	0.00	0.00	0.000
12.05	2.95	14.56	6.19	90.15	0	0	0.42	0.000	0.00	0.00	0.00	0.000
12.10	2.95	14.12	6.15	86.87	0	0	0.42	0.000	0.00	0.00	0.00	0.000
12.17	2.94	14.10	6.05	85.28	0	0	0.42	0.000	0.00	0.00	0.00	0.000
12.23	2.92	14.30	5.90	84.30	0	0	0.42	0.000	0.00	0.00	0.00	0.000
12.27	2.91	14.93	5.80	86.69	0	0	0.42	0.000	0.00	0.00	0.00	0.000
12.40	2.89	15.33	5.64	86.39	0	0	0.42	0.000	0.00	0.00	0.00	0.000
12.45	2.88	16.33	5.46	89.19	0	0	0.42	0.000	0.00	0.00	0.00	0.000
12.50	2.88	17.56	5.46	95.99	0	0	0.42	0.000	0.00	0.00	0.00	0.000
12.58	2.88	19.55	5.46	106.78	0	0	0.42	0.000	0.00	0.00	0.00	0.000
12.63	2.86	21.99	5.30	116.55	0	0	0.42	0.000	0.00	0.00	0.00	0.000
12.71	2.83	23.93	5.09	121.73	0	0	0.42	0.000	0.00	0.00	0.00	0.000
12.76	2.80	26.21	4.76	124.70	0	0	0.42	0.000	0.00	0.00	0.00	0.000
12.80	2.72	30.28	4.11	124.41	0	0	0.42	0.000	0.00	0.00	0.00	0.000

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
12.90	2.63	35.18	3.49	122.84	0	0	0.42	0.000	0.00	0.00	0.00	0.000
12.95	2.52	42.26	2.85	120.43	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.02	2.44	47.88	2.48	118.83	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.07	2.35	55.14	2.14	117.84	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.15	2.30	60.69	1.94	117.91	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.20	2.23	68.38	1.75	119.98	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.31	2.19	74.53	1.65	123.12	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.37	2.16	80.94	1.58	127.55	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.43	2.15	85.34	1.55	132.20	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.50	2.14	89.39	1.53	136.57	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.55	2.13	93.12	1.51	140.67	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.60	2.12	96.62	1.49	144.33	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.68	2.12	99.59	1.48	147.77	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.73	2.11	102.46	1.48	151.64	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.80	2.11	104.75	1.48	154.94	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.86	2.11	106.87	1.48	157.88	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.92	2.11	108.60	1.47	160.11	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.99	2.11	110.30	1.47	162.30	0	0	0.42	0.000	0.00	8.42	0.00	0.000
14.10	2.11	111.61	1.47	164.33	36	1311	0.42	0.053	0.03	8.42	0.02	0.001
14.17	2.11	113.26	1.47	166.41	36	1332	0.42	0.052	0.03	8.42	0.02	0.000
14.21	2.10	115.21	1.46	168.24	36	1350	0.42	0.050	0.02	8.42	0.02	0.000
14.27	2.10	117.70	1.45	170.22	37	1371	0.42	0.049	0.02	8.42	0.02	0.000
14.34	2.08	120.92	1.43	172.54	37	1395	0.42	0.048	0.02	8.42	0.02	0.000
14.39	2.07	124.88	1.41	175.98	38	1426	0.42	0.046	0.02	8.42	0.02	0.000
14.47	2.06	129.17	1.39	179.57	38	1461	0.42	0.044	0.02	8.42	0.02	0.000
14.52	2.05	133.87	1.37	183.88	39	1499	0.42	0.042	0.02	8.42	0.01	0.000
14.57	2.04	138.39	1.36	187.92	40	1535	0.42	0.041	0.02	8.42	0.01	0.000
14.65	2.03	142.34	1.35	191.56	40	1569	0.42	0.039	0.02	8.42	0.01	0.000
14.70	2.03	145.89	1.34	194.97	41	1600	0.42	0.038	0.02	8.42	0.01	0.000
14.77	2.02	148.43	1.33	197.44	41	1625	0.42	0.037	0.02	8.42	0.01	0.000
14.83	2.02	151.23	1.32	199.93	42	1648	0.42	0.037	0.02	8.42	0.01	0.000
14.95	2.00	155.00	1.30	202.25	42	1673	0.42	0.036	0.01	8.42	0.01	0.000
15.05	1.99	160.00	1.28	205.32	43	1701	0.42	0.036	0.01	8.42	0.01	0.000
15.13	1.97	165.84	1.26	209.58	43	1735	0.42	0.035	0.01	8.42	0.01	0.000
15.18	1.96	171.20	1.25	214.36	44	1774	0.42	0.034	0.01	8.42	0.01	0.000
15.23	1.96	176.26	1.25	219.57	45	1819	0.42	0.032	0.01	8.42	0.01	0.000
15.31	1.95	180.20	1.24	224.14	46	1862	0.42	0.031	0.01	8.42	0.01	0.000
15.35	1.96	183.54	1.25	228.86	47	1906	0.42	0.030	0.01	8.42	0.01	0.000
15.42	1.96	185.64	1.25	232.68	48	1948	0.42	0.029	0.01	8.42	0.01	0.000
15.49	1.97	186.88	1.26	235.69	48	1983	0.42	0.029	0.01	8.42	0.01	0.000
15.53	1.97	187.69	1.27	237.97	49	2009	0.42	0.028	0.01	8.42	0.01	0.000
15.59	1.98	187.92	1.28	239.64	50	2032	0.42	0.028	0.01	8.42	0.01	0.000
15.66	1.97	187.68	1.26	237.27	49	2013	0.42	0.029	0.01	8.42	0.01	0.000
15.72	1.95	187.00	1.24	231.81	47	1958	0.42	0.030	0.01	8.42	0.01	0.000
15.78	1.94	186.42	1.23	228.53	46	1927	0.42	0.031	0.01	8.42	0.01	0.000
15.89	1.94	185.63	1.23	228.47	47	1939	0.42	0.031	0.01	8.42	0.01	0.000
15.97	1.96	185.93	1.25	231.75	47	1983	0.42	0.030	0.01	8.42	0.01	0.000
16.02	1.97	181.35	1.27	229.91	47	1983	0.42	0.030	0.01	8.42	0.01	0.000

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
16.06	1.98	180.78	1.27	230.00	47	1989	0.42	0.030	0.01	8.42	0.01	0.000
16.09	1.99	179.02	1.28	229.51	48	1991	0.42	0.030	0.01	8.42	0.01	0.000
16.18	1.98	181.66	1.27	230.71	48	2005	0.42	0.030	0.01	8.42	0.01	0.000
16.23	1.98	180.41	1.27	229.69	47	2002	0.42	0.030	0.01	8.42	0.01	0.000
16.31	1.98	179.16	1.27	228.17	47	1995	0.42	0.031	0.01	8.42	0.01	0.000
16.36	1.98	177.49	1.28	226.43	47	1985	0.42	0.031	0.01	8.42	0.01	0.000
16.41	1.98	175.34	1.28	224.45	46	1974	0.42	0.031	0.01	8.42	0.01	0.000
16.48	1.99	173.14	1.29	222.73	46	1967	0.42	0.032	0.01	8.42	0.01	0.000
16.54	2.00	170.64	1.30	221.16	46	1962	0.42	0.032	0.01	8.42	0.01	0.000
16.67	2.01	167.98	1.31	219.86	46	1966	0.42	0.032	0.01	8.42	0.01	0.000
16.71	2.02	166.19	1.32	219.83	46	1973	0.42	0.032	0.01	8.42	0.01	0.000
16.78	2.03	164.90	1.34	220.60	46	1990	0.42	0.032	0.01	8.42	0.01	0.000
16.85	2.04	163.77	1.35	221.22	47	2004	0.42	0.032	0.01	8.42	0.01	0.000
16.90	2.04	162.56	1.36	221.10	47	2010	0.42	0.032	0.01	8.42	0.01	0.000
16.97	2.05	160.96	1.37	219.75	47	2004	0.42	0.032	0.01	8.42	0.01	0.000
17.02	2.05	159.08	1.37	217.67	46	1990	0.42	0.033	0.01	8.42	0.01	0.000
17.09	2.05	156.81	1.37	214.51	45	1967	0.42	0.033	0.01	8.42	0.01	0.000
17.15	2.05	154.28	1.37	210.95	45	1939	0.42	0.034	0.01	8.42	0.01	0.000
17.20	2.04	152.07	1.36	206.94	44	1905	0.42	0.035	0.01	8.42	0.01	0.000
17.28	2.04	149.98	1.36	203.26	0	0	0.42	0.000	0.00	8.42	0.00	0.000
17.33	2.04	147.67	1.36	200.35	0	0	0.42	0.000	0.00	8.42	0.00	0.000
17.46	2.05	144.68	1.37	198.50	0	0	0.42	0.000	0.00	8.42	0.00	0.000
17.51	2.07	141.02	1.40	197.59	0	0	0.42	0.000	0.00	8.42	0.00	0.000
17.64	2.09	136.92	1.44	196.50	0	0	0.42	0.000	0.00	8.42	0.00	0.000
17.69	2.11	132.62	1.48	195.73	0	0	0.42	0.000	0.00	8.42	0.00	0.000
17.76	2.13	128.27	1.52	194.77	0	0	0.42	0.000	0.00	8.42	0.00	0.000
17.82	2.16	123.81	1.57	193.86	0	0	0.42	0.000	0.00	8.42	0.00	0.000
17.87	2.18	119.10	1.62	192.67	0	0	0.42	0.000	0.00	8.42	0.00	0.000
17.94	2.20	113.96	1.68	191.24	0	0	0.42	0.000	0.00	8.42	0.00	0.000
17.99	2.23	108.44	1.75	190.08	0	0	0.42	0.000	0.00	8.42	0.00	0.000
18.06	2.27	102.12	1.85	189.23	0	0	0.42	0.000	0.00	8.42	0.00	0.000
18.12	2.31	95.51	1.97	188.44	0	0	0.42	0.000	0.00	8.42	0.00	0.000
18.19	2.35	88.56	2.13	188.57	0	0	0.42	0.000	0.00	8.42	0.00	0.000
18.25	2.40	81.46	2.32	189.18	0	0	0.42	0.000	0.00	8.42	0.00	0.000
18.30	2.46	73.31	2.59	189.71	0	0	0.42	0.000	0.00	8.42	0.00	0.000
18.37	2.54	62.69	2.98	186.74	0	0	0.42	0.000	0.00	8.42	0.00	0.000
18.48	2.60	54.31	3.33	180.78	0	0	0.42	0.000	0.00	0.00	0.00	0.000
18.55	2.64	49.57	3.61	178.80	0	0	0.42	0.000	0.00	0.00	0.00	0.000
18.61	2.62	51.84	3.42	177.34	0	0	0.42	0.000	0.00	0.00	0.00	0.000
18.67	2.54	59.49	3.00	178.51	0	0	0.42	0.000	0.00	8.42	0.00	0.000
18.74	2.43	73.10	2.42	177.05	0	0	0.42	0.000	0.00	8.42	0.00	0.000
18.79	2.30	92.27	1.95	180.05	0	0	0.42	0.000	0.00	8.42	0.00	0.000
18.91	2.22	107.02	1.73	184.76	0	0	0.42	0.000	0.00	8.42	0.00	0.000
18.97	2.16	115.91	1.58	183.03	0	0	0.42	0.000	0.00	8.42	0.00	0.000
19.04	2.14	116.40	1.54	179.08	0	0	0.42	0.000	0.00	8.42	0.00	0.000
19.09	2.13	114.77	1.52	174.08	0	0	0.42	0.000	0.00	8.42	0.00	0.000
19.16	2.16	111.06	1.57	174.13	39	1741	0.42	0.048	0.02	8.42	0.02	0.000
19.22	2.19	105.60	1.64	173.18	39	1730	0.42	0.049	0.02	8.42	0.02	0.000

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
19.30	2.24	96.29	1.78	171.43	39	1699	0.42	0.051	0.02	8.42	0.02	0.000
19.31	2.29	89.69	1.90	170.57	40	1672	0.42	0.053	0.02	8.42	0.02	0.000
19.36	2.31	85.25	1.97	168.31	40	1641	0.42	0.055	0.02	8.42	0.02	0.000
19.44	2.30	85.58	1.94	165.71	39	1627	0.43	0.056	0.03	8.42	0.02	0.000
19.50	2.29	85.27	1.92	163.92	38	1616	0.43	0.057	0.03	8.42	0.02	0.000
19.58	2.28	87.40	1.89	164.88	38	1636	0.43	0.056	0.03	8.42	0.02	0.000
19.63	2.27	90.75	1.85	167.60	39	1673	0.43	0.054	0.02	8.42	0.02	0.000
19.71	2.24	96.94	1.76	170.59	39	1722	0.43	0.051	0.02	8.42	0.02	0.000
19.77	2.22	100.78	1.72	173.02	0	0	0.43	0.000	0.00	8.42	0.00	0.000
19.84	2.23	98.90	1.74	172.13	0	0	0.43	0.000	0.00	8.42	0.00	0.000
19.93	2.27	90.27	1.87	168.71	0	0	0.43	0.000	0.00	8.42	0.00	0.000
20.00	2.35	77.89	2.11	164.36	0	0	0.43	0.000	0.00	8.42	0.00	0.000
20.06	2.43	66.08	2.43	160.87	0	0	0.43	0.000	0.00	8.42	0.00	0.000
20.11	2.52	54.48	2.88	156.80	0	0	0.43	0.000	0.00	8.42	0.00	0.000
20.18	2.62	44.02	3.45	151.95	0	0	0.43	0.000	0.00	0.00	0.00	0.000
20.24	2.71	35.66	4.07	145.02	0	0	0.43	0.000	0.00	0.00	0.00	0.000
20.30	2.79	29.40	4.69	137.78	0	0	0.43	0.000	0.00	0.00	0.00	0.000
20.37	2.86	24.60	5.30	130.41	0	0	0.43	0.000	0.00	0.00	0.00	0.000
20.42	2.93	21.00	6.00	125.94	0	0	0.43	0.000	0.00	0.00	0.00	0.000
20.48	2.99	18.66	6.63	123.70	0	0	0.43	0.000	0.00	0.00	0.00	0.000
20.59	3.02	17.93	6.93	124.22	0	0	0.43	0.000	0.00	0.00	0.00	0.000
20.65	2.99	18.86	6.67	125.83	0	0	0.43	0.000	0.00	0.00	0.00	0.000
20.72	2.92	21.66	5.89	127.61	0	0	0.43	0.000	0.00	0.00	0.00	0.000
20.77	2.80	26.77	4.81	128.70	0	0	0.43	0.000	0.00	0.00	0.00	0.000
20.84	2.68	33.55	3.85	129.07	0	0	0.43	0.000	0.00	0.00	0.00	0.000
20.90	2.58	40.64	3.21	130.43	35	1196	0.43	0.131	0.07	8.42	0.05	0.001
20.95	2.53	45.73	2.91	132.95	35	1255	0.43	0.115	0.06	8.42	0.05	0.001
21.03	2.52	47.32	2.87	135.74	35	1290	0.43	0.107	0.05	8.42	0.04	0.001
21.08	2.55	45.49	3.03	137.67	36	1292	0.43	0.107	0.05	8.42	0.04	0.000
21.15	2.60	41.20	3.33	137.16	0	0	0.43	0.000	0.00	0.00	0.00	0.000
21.21	2.68	34.67	3.84	133.18	0	0	0.43	0.000	0.00	0.00	0.00	0.000
21.34	2.77	27.86	4.57	127.43	0	0	0.43	0.000	0.00	0.00	0.00	0.000
21.45	2.86	22.99	5.30	121.93	0	0	0.43	0.000	0.00	0.00	0.00	0.000
21.52	2.86	22.33	5.34	119.30	0	0	0.43	0.000	0.00	0.00	0.00	0.000
21.57	2.80	24.80	4.75	117.73	0	0	0.43	0.000	0.00	0.00	0.00	0.000
21.63	2.71	28.34	4.10	116.15	0	0	0.43	0.000	0.00	0.00	0.00	0.000
21.69	2.65	31.69	3.62	114.58	0	0	0.43	0.000	0.00	0.00	0.00	0.000
21.76	2.59	35.00	3.25	113.75	0	0	0.43	0.000	0.00	8.42	0.00	0.000
21.87	2.55	37.66	3.02	113.63	0	0	0.43	0.000	0.00	8.42	0.00	0.000
21.94	2.52	39.98	2.86	114.36	0	0	0.43	0.000	0.00	8.42	0.00	0.000
22.00	2.50	41.42	2.79	115.42	0	0	0.43	0.000	0.00	8.42	0.00	0.000
22.06	2.49	42.72	2.74	117.01	0	0	0.43	0.000	0.00	8.42	0.00	0.000
22.13	2.49	43.89	2.70	118.52	0	0	0.43	0.000	0.00	8.42	0.00	0.000
22.18	2.47	45.05	2.60	117.26	0	0	0.44	0.000	0.00	8.42	0.00	0.000
22.24	2.40	46.29	2.30	106.49	0	0	0.44	0.000	0.00	8.42	0.00	0.000
22.31	2.33	47.53	2.04	96.80	0	0	0.44	0.000	0.00	8.42	0.00	0.000
22.37	2.28	48.68	1.89	92.23	0	0	0.44	0.000	0.00	8.42	0.00	0.000
22.45	2.32	49.59	2.02	99.97	0	0	0.44	0.000	0.00	8.42	0.00	0.000

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
22.56	2.36	49.46	2.14	106.02	0	0	0.44	0.000	0.00	8.42	0.00	0.000
22.58	2.38	49.90	2.23	111.52	0	0	0.44	0.000	0.00	8.42	0.00	0.000
22.64	2.41	49.77	2.34	116.37	0	0	0.44	0.000	0.00	8.42	0.00	0.000
22.76	2.43	50.00	2.43	121.60	0	0	0.44	0.000	0.00	8.42	0.00	0.000
22.82	2.46	48.71	2.58	125.59	0	0	0.44	0.000	0.00	8.42	0.00	0.000
22.94	2.49	46.43	2.73	126.95	0	0	0.44	0.000	0.00	8.42	0.00	0.000
22.99	2.53	43.40	2.94	127.46	0	0	0.44	0.000	0.00	8.42	0.00	0.000
23.05	2.58	39.98	3.19	127.52	0	0	0.44	0.000	0.00	8.42	0.00	0.000
23.13	2.64	35.93	3.56	128.03	0	0	0.44	0.000	0.00	0.00	0.00	0.000
23.17	2.70	31.52	4.02	126.76	0	0	0.44	0.000	0.00	0.00	0.00	0.000
23.25	2.77	26.93	4.57	123.06	0	0	0.44	0.000	0.00	0.00	0.00	0.000
23.31	2.85	22.49	5.22	117.31	0	0	0.44	0.000	0.00	0.00	0.00	0.000
23.35	2.92	18.62	5.93	110.36	0	0	0.44	0.000	0.00	0.00	0.00	0.000
23.43	2.99	15.54	6.66	103.48	0	0	0.44	0.000	0.00	0.00	0.00	0.000
23.48	3.03	13.80	7.09	97.76	0	0	0.44	0.000	0.00	0.00	0.00	0.000
23.54	3.07	12.58	7.56	95.06	0	0	0.44	0.000	0.00	0.00	0.00	0.000
23.60	3.07	12.38	7.59	93.95	0	0	0.44	0.000	0.00	0.00	0.00	0.000
23.66	3.06	12.60	7.45	93.85	0	0	0.44	0.000	0.00	0.00	0.00	0.000
23.72	3.01	13.84	6.88	95.24	0	0	0.44	0.000	0.00	0.00	0.00	0.000
23.79	2.97	15.42	6.37	98.24	0	0	0.44	0.000	0.00	0.00	0.00	0.000
23.84	2.96	16.13	6.27	101.17	0	0	0.44	0.000	0.00	0.00	0.00	0.000
23.96	2.99	15.51	6.61	102.50	0	0	0.44	0.000	0.00	0.00	0.00	0.000
24.02	3.05	13.93	7.36	102.45	0	0	0.44	0.000	0.00	0.00	0.00	0.000
24.09	3.10	12.81	7.92	101.45	0	0	0.44	0.000	0.00	0.00	0.00	0.000
24.14	3.12	12.39	8.13	100.76	0	0	0.44	0.000	0.00	0.00	0.00	0.000
24.20	3.12	12.40	8.12	100.66	0	0	0.44	0.000	0.00	0.00	0.00	0.000
24.27	3.07	13.45	7.50	100.88	0	0	0.44	0.000	0.00	0.00	0.00	0.000
24.40	2.99	15.26	6.60	100.71	0	0	0.44	0.000	0.00	0.00	0.00	0.000
24.45	2.88	18.36	5.52	101.36	0	0	0.44	0.000	0.00	0.00	0.00	0.000
24.50	2.80	21.54	4.81	103.70	0	0	0.44	0.000	0.00	0.00	0.00	0.000
24.58	2.73	25.23	4.23	106.80	0	0	0.44	0.000	0.00	0.00	0.00	0.000
24.62	2.67	29.10	3.79	110.19	0	0	0.44	0.000	0.00	0.00	0.00	0.000
24.69	2.60	34.20	3.31	113.24	0	0	0.44	0.000	0.00	8.42	0.00	0.000
24.80	2.54	39.04	2.98	116.46	0	0	0.44	0.000	0.00	8.42	0.00	0.000
24.88	2.49	43.70	2.73	119.50	0	0	0.44	0.000	0.00	8.42	0.00	0.000
24.93	2.46	46.97	2.59	121.75	0	0	0.44	0.000	0.00	8.42	0.00	0.000
24.99	2.44	49.76	2.48	123.62	0	0	0.44	0.000	0.00	8.42	0.00	0.000
25.06	2.42	51.76	2.41	124.94	0	0	0.44	0.000	0.00	8.42	0.00	0.000
25.11	2.38	52.17	2.21	115.52	0	0	0.44	0.000	0.00	8.42	0.00	0.000
25.24	2.32	50.53	2.02	101.91	0	0	0.44	0.000	0.00	8.42	0.00	0.000
25.30	2.28	46.88	1.88	87.94	0	0	0.44	0.000	0.00	8.42	0.00	0.000
25.37	2.34	41.60	2.07	86.32	0	0	0.44	0.000	0.00	8.42	0.00	0.000
25.42	2.45	35.36	2.52	89.03	0	0	0.44	0.000	0.00	8.42	0.00	0.000
25.50	2.58	28.59	3.20	91.39	0	0	0.44	0.000	0.00	8.42	0.00	0.000
25.55	2.72	22.16	4.14	91.86	0	0	0.44	0.000	0.00	0.00	0.00	0.000
25.61	2.85	17.40	5.20	90.40	0	0	0.44	0.000	0.00	0.00	0.00	0.000
25.67	2.96	13.57	6.33	85.93	0	0	0.44	0.000	0.00	0.00	0.00	0.000
25.78	3.05	10.98	7.28	79.88	0	0	0.44	0.000	0.00	0.00	0.00	0.000

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
25.90	3.13	8.86	8.25	73.04	0	0	0.44	0.000	0.00	0.00	0.00	0.000
25.95	3.12	8.25	8.20	67.58	0	0	0.44	0.000	0.00	0.00	0.00	0.000
26.02	3.10	8.15	7.86	64.07	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.08	3.07	8.22	7.52	61.80	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.14	3.06	8.24	7.39	60.92	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.21	3.05	8.37	7.29	61.07	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.26	3.05	8.47	7.28	61.65	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.32	3.05	8.55	7.32	62.55	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.39	3.06	8.58	7.39	63.39	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.44	3.06	8.60	7.42	63.78	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.52	3.06	8.56	7.47	63.88	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.57	3.07	8.41	7.56	63.54	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.63	3.10	8.11	7.90	64.04	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.75	3.12	7.83	8.24	64.53	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.81	3.14	7.72	8.46	65.28	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.88	3.14	7.75	8.43	65.40	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.93	3.14	7.79	8.38	65.34	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.00	3.14	7.79	8.47	65.97	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.06	3.15	7.79	8.53	66.50	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.10	3.15	7.87	8.52	67.03	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.18	3.13	8.03	8.35	67.01	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.24	3.12	8.21	8.18	67.22	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.30	3.12	8.32	8.19	68.16	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.36	3.13	8.36	8.34	69.70	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.41	3.15	8.40	8.53	71.59	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.47	3.15	8.50	8.60	73.10	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.54	3.15	8.66	8.54	74.02	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.59	3.15	8.76	8.51	74.54	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.67	3.16	8.51	8.73	74.33	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.77	3.19	8.14	9.09	73.93	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.85	3.21	7.84	9.40	73.76	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.89	3.21	7.97	9.35	74.54	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.97	3.17	8.56	8.84	75.69	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.03	3.10	9.82	7.90	77.56	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.08	3.00	11.90	6.71	79.85	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.16	2.89	14.70	5.64	82.90	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.20	2.78	18.04	4.64	83.76	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.26	2.69	21.23	3.91	83.09	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.33	2.61	23.98	3.41	81.76	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.38	2.58	26.03	3.22	83.91	23	993	0.45	0.421	0.36	8.42	0.28	0.003
28.42	2.59	27.32	3.28	89.59	24	1057	0.45	0.331	0.26	8.42	0.20	0.002
28.50	2.63	27.50	3.49	96.01	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.56	2.67	27.05	3.75	101.51	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.63	2.71	25.61	4.09	104.75	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.73	2.76	24.20	4.42	106.86	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.78	2.80	22.85	4.75	108.47	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.83	2.80	23.06	4.77	110.04	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.88	2.70	28.05	4.02	112.69	0	0	0.45	0.000	0.00	0.00	0.00	0.000

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
28.98	2.57	36.20	3.16	114.31	0	0	0.45	0.000	0.00	8.42	0.00	0.000
29.02	2.42	48.65	2.38	116.01	0	0	0.45	0.000	0.00	8.42	0.00	0.000
29.11	2.32	58.47	2.02	118.24	0	0	0.45	0.000	0.00	8.42	0.00	0.000
29.16	2.26	66.94	1.82	121.88	0	0	0.45	0.000	0.00	8.42	0.00	0.000
29.21	2.23	73.22	1.73	126.89	0	0	0.45	0.000	0.00	8.42	0.00	0.000
29.31	2.20	78.83	1.67	131.71	0	0	0.45	0.000	0.00	8.42	0.00	0.000
29.36	2.18	84.11	1.62	136.62	0	0	0.45	0.000	0.00	8.42	0.00	0.000
29.42	2.17	87.75	1.60	140.17	0	0	0.45	0.000	0.00	8.42	0.00	0.000
29.47	2.16	92.20	1.58	145.61	0	0	0.45	0.000	0.00	8.42	0.00	0.000
29.55	2.16	96.20	1.57	151.13	0	0	0.45	0.000	0.00	8.42	0.00	0.000
29.60	2.16	100.58	1.57	158.12	35	2136	0.45	0.058	0.03	8.42	0.02	0.000
29.69	2.16	103.22	1.58	163.41	36	2214	0.45	0.054	0.03	8.42	0.02	0.000
29.75	2.17	105.53	1.59	167.88	37	2278	0.45	0.052	0.02	8.42	0.02	0.000
29.81	2.17	106.77	1.59	170.20	38	2314	0.45	0.050	0.02	8.42	0.02	0.000
29.86	2.17	107.63	1.59	171.06	38	2328	0.45	0.050	0.02	8.42	0.02	0.000
29.95	2.17	107.47	1.59	170.88	38	2331	0.45	0.050	0.02	8.42	0.02	0.000
30.00	2.17	106.17	1.60	169.73	38	2319	0.45	0.051	0.02	8.42	0.02	0.000
30.10	2.18	104.24	1.62	168.50	38	2309	0.45	0.051	0.02	8.42	0.02	0.000
30.17	2.18	102.89	1.63	167.65	38	2302	0.45	0.052	0.02	8.42	0.02	0.000
30.21	2.18	103.10	1.63	167.66	38	2305	0.45	0.052	0.02	8.42	0.02	0.000
30.29	2.18	104.21	1.61	167.84	37	2311	0.45	0.052	0.02	8.42	0.02	0.000
30.35	2.17	105.66	1.59	168.24	37	2318	0.45	0.051	0.02	8.42	0.02	0.000
30.40	2.16	106.62	1.58	168.45	37	2323	0.45	0.051	0.02	8.42	0.02	0.000
30.47	2.16	106.41	1.58	168.21	37	2324	0.45	0.051	0.02	8.42	0.02	0.000
30.52	2.17	105.24	1.59	167.68	37	2321	0.45	0.052	0.02	8.42	0.02	0.000
30.58	2.18	103.46	1.61	167.03	37	2317	0.45	0.052	0.02	8.42	0.02	0.000
30.65	2.19	102.43	1.64	167.47	38	2328	0.45	0.052	0.02	8.42	0.02	0.000
30.77	2.19	103.15	1.64	168.82	38	2354	0.45	0.051	0.02	8.42	0.02	0.001
30.83	2.18	106.07	1.61	171.26	38	2391	0.45	0.050	0.02	8.42	0.02	0.000
30.88	2.16	109.56	1.58	173.40	39	2421	0.45	0.049	0.02	8.42	0.02	0.000
30.96	2.15	112.06	1.56	174.97	39	2445	0.45	0.048	0.02	8.42	0.02	0.000
31.01	2.15	113.36	1.55	176.12	39	2463	0.45	0.048	0.02	8.42	0.02	0.000
31.07	2.15	114.27	1.55	177.33	39	2483	0.45	0.047	0.02	8.42	0.02	0.000
31.14	2.12	116.66	1.48	173.10	38	2414	0.45	0.050	0.02	8.42	0.02	0.000
31.25	2.09	118.85	1.44	171.39	37	2384	0.45	0.051	0.02	8.42	0.02	0.000
31.32	2.08	120.90	1.41	170.76	37	2367	0.45	0.052	0.02	8.42	0.02	0.000
31.38	2.10	120.87	1.46	176.17	38	2463	0.45	0.048	0.02	8.42	0.02	0.000
31.45	2.12	120.35	1.49	179.48	39	2524	0.45	0.047	0.02	8.42	0.02	0.000
31.49	2.14	119.26	1.53	182.24	40	2574	0.45	0.045	0.02	8.42	0.02	0.000
31.56	2.16	117.18	1.57	183.67	41	2605	0.45	0.045	0.02	8.42	0.01	0.000
31.58	2.18	114.18	1.62	185.32	41	2636	0.45	0.044	0.02	8.42	0.01	0.000
31.67	2.20	112.12	1.66	186.58	42	2662	0.45	0.043	0.02	8.42	0.01	0.000
31.71	2.21	111.22	1.69	188.25	43	2689	0.45	0.043	0.02	8.42	0.01	0.000
31.77	2.21	111.77	1.70	189.84	43	2715	0.45	0.042	0.02	8.42	0.01	0.000
31.83	2.22	112.12	1.71	191.64	44	2745	0.45	0.041	0.02	8.42	0.01	0.000
31.94	2.22	112.51	1.72	193.19	44	2775	0.45	0.041	0.02	8.42	0.01	0.000
32.00	2.22	113.37	1.72	194.59	44	2800	0.45	0.040	0.02	8.42	0.01	0.000
32.05	2.22	114.26	1.71	195.81	44	2821	0.45	0.040	0.02	8.42	0.01	0.000

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	I <sub>c</sub>	Q <sub>tn</sub>	K <sub>c</sub>	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
32.13	2.22	115.70	1.71	197.46	45	2850	0.45	0.040	0.02	8.42	0.01	0.000
32.18	2.21	117.88	1.69	199.37	45	2881	0.45	0.039	0.01	8.42	0.01	0.000
32.23	2.20	120.93	1.66	200.82	45	2905	0.45	0.039	0.01	8.42	0.01	0.000
32.30	2.18	124.73	1.62	201.59	45	2918	0.45	0.038	0.01	8.42	0.01	0.000
32.36	2.15	130.91	1.54	202.06	45	2917	0.45	0.039	0.01	8.42	0.01	0.000
32.48	2.11	137.01	1.48	202.54	44	2914	0.45	0.039	0.02	8.42	0.01	0.000
32.54	2.08	143.63	1.42	203.73	44	2908	0.45	0.039	0.02	8.42	0.01	0.000
32.59	2.06	148.29	1.38	204.81	44	2905	0.45	0.039	0.02	8.42	0.01	0.000
32.65	2.04	152.04	1.35	205.64	43	2899	0.45	0.039	0.02	8.42	0.01	0.000
32.71	2.03	153.91	1.34	205.94	43	2895	0.45	0.039	0.02	8.42	0.01	0.000
32.76	2.03	154.03	1.34	206.02	43	2899	0.45	0.039	0.02	8.42	0.01	0.000
32.84	2.03	153.57	1.34	206.45	44	2915	0.45	0.039	0.02	8.42	0.01	0.000
32.89	2.04	152.71	1.36	207.65	44	2949	0.45	0.039	0.02	8.42	0.01	0.000
32.99	2.05	152.20	1.37	209.08	44	2986	0.45	0.038	0.01	8.42	0.01	0.000
33.06	2.06	151.22	1.39	210.61	45	3026	0.45	0.037	0.01	8.42	0.01	0.000
33.15	2.08	149.85	1.41	211.57	45	3059	0.45	0.037	0.01	8.42	0.01	0.000
33.22	2.09	147.60	1.44	212.25	46	3088	0.45	0.036	0.01	8.42	0.01	0.000
33.28	2.10	145.37	1.46	212.53	46	3108	0.45	0.036	0.01	8.42	0.01	0.000
33.32	2.11	143.96	1.48	212.94	46	3124	0.45	0.036	0.01	8.42	0.01	0.000
33.38	2.12	143.47	1.49	213.72	47	3143	0.45	0.036	0.01	8.42	0.01	0.000
33.46	2.12	143.23	1.50	214.67	47	3166	0.45	0.035	0.01	8.42	0.01	0.000
33.50	2.13	143.07	1.51	215.99	47	3193	0.45	0.035	0.01	8.42	0.01	0.000
33.55	2.13	143.10	1.52	217.54	48	3223	0.45	0.035	0.01	8.42	0.01	0.000
33.62	2.14	143.69	1.52	218.89	48	3249	0.45	0.034	0.01	8.42	0.01	0.000
33.68	2.13	144.76	1.52	219.59	48	3262	0.45	0.034	0.01	8.42	0.01	0.000
33.78	2.13	145.10	1.51	219.14	48	3260	0.45	0.034	0.01	8.42	0.01	0.000
33.84	2.13	145.32	1.50	218.62	48	3255	0.45	0.034	0.01	8.42	0.01	0.000
33.90	2.13	144.33	1.51	217.69	48	3247	0.45	0.035	0.01	8.42	0.01	0.000
33.94	2.12	144.61	1.50	217.06	47	3238	0.45	0.035	0.01	8.42	0.01	0.000
34.01	2.12	145.52	1.49	216.66	47	3232	0.45	0.035	0.01	8.42	0.01	0.000
34.07	2.10	149.54	1.45	216.68	47	3219	0.45	0.035	0.01	8.42	0.01	0.000
34.18	2.06	154.74	1.38	214.08	46	3146	0.45	0.037	0.01	8.42	0.01	0.000
34.25	2.02	160.67	1.33	213.18	45	3086	0.45	0.038	0.01	8.42	0.01	0.000
34.30	1.99	165.58	1.29	213.92	44	3059	0.45	0.038	0.01	8.42	0.01	0.000
34.35	1.99	168.74	1.29	217.59	45	3112	0.45	0.037	0.01	8.42	0.01	0.000
34.41	1.99	170.76	1.29	220.27	46	3154	0.45	0.037	0.01	8.42	0.01	0.000
34.47	2.00	169.05	1.30	220.19	46	3174	0.45	0.036	0.01	8.42	0.01	0.000
34.52	2.02	165.44	1.32	219.14	46	3188	0.45	0.036	0.01	8.42	0.01	0.000
34.58	2.02	166.05	1.33	220.52	46	3216	0.45	0.036	0.01	8.42	0.01	0.000
34.71	2.01	169.63	1.32	223.32	47	3252	0.45	0.035	0.01	8.42	0.01	0.000
34.80	2.00	174.57	1.30	226.59	47	3282	0.45	0.035	0.01	8.42	0.01	0.000
34.88	2.00	174.49	1.30	226.61	47	3288	0.45	0.035	0.01	8.42	0.01	0.000
34.93	2.00	173.43	1.30	226.00	47	3289	0.45	0.035	0.01	8.42	0.01	0.000
34.98	2.01	171.81	1.31	224.62	47	3278	0.45	0.035	0.01	8.42	0.01	0.000



:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	I <sub>c</sub>	Q <sub>tn</sub>	K <sub>c</sub>	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)

**Total estimated settlement: 0.07**

**Abbreviations**

- Q<sub>tn</sub>: Equivalent clean sand normalized cone resistance
- K<sub>c</sub>: Fines correction factor
- Q<sub>tn,cs</sub>: Post-liquefaction volumetric strain
- G<sub>max</sub>: Small strain shear modulus
- CSR: Soil cyclic stress ratio
- γ: Cyclic shear strain
- e<sub>vol(15)</sub>: Volumetric strain after 15 cycles
- N<sub>c</sub>: Equivalent number of cycles
- e<sub>v</sub>: Volumetric strain
- Settle.: Calculated settlement

:: Post-earthquake settlement due to soil liquefaction ::												
Depth (ft)	Q <sub>tn,cs</sub>	FS	e <sub>v</sub> (%)	DF	Settlement (in)	Depth (ft)	Q <sub>tn,cs</sub>	FS	e <sub>v</sub> (%)	DF	Settlement (in)	
35.03	222.26	2.00	0.00	1.00	0.00	35.11	219.17	2.00	0.00	1.00	0.00	
35.15	214.18	2.00	0.00	1.00	0.00	35.27	209.17	2.00	0.00	1.00	0.00	
35.33	204.47	2.00	0.00	1.00	0.00	35.37	201.09	2.00	0.00	1.00	0.00	
35.43	196.68	1.73	0.00	1.00	0.00	35.50	191.39	1.61	0.00	1.00	0.00	
35.55	185.49	2.00	0.00	1.00	0.00	35.59	178.88	2.00	0.00	1.00	0.00	
35.66	171.56	2.00	0.00	1.00	0.00	35.72	163.90	2.00	0.00	1.00	0.00	
35.77	152.29	2.00	0.00	1.00	0.00	35.90	137.55	2.00	0.00	1.00	0.00	
36.00	127.86	2.00	0.00	1.00	0.00	36.07	123.99	2.00	0.00	1.00	0.00	
36.13	118.27	2.00	0.00	1.00	0.00	36.20	109.31	2.00	0.00	1.00	0.00	
36.25	100.19	2.00	0.00	1.00	0.00	36.33	93.52	2.00	0.00	1.00	0.00	
36.43	87.45	2.00	0.00	1.00	0.00	36.50	81.00	2.00	0.00	1.00	0.00	
36.56	75.06	2.00	0.00	1.00	0.00	36.61	69.69	2.00	0.00	1.00	0.00	
36.69	66.08	2.00	0.00	1.00	0.00	36.74	63.38	2.00	0.00	1.00	0.00	
36.81	62.49	2.00	0.00	1.00	0.00	36.87	62.02	2.00	0.00	1.00	0.00	
36.92	61.57	2.00	0.00	1.00	0.00	37.05	61.15	2.00	0.00	1.00	0.00	
37.11	60.69	2.00	0.00	1.00	0.00	37.18	60.41	2.00	0.00	1.00	0.00	
37.23	60.14	2.00	0.00	1.00	0.00	37.30	59.40	2.00	0.00	1.00	0.00	
37.35	57.28	2.00	0.00	1.00	0.00	37.48	55.28	2.00	0.00	1.00	0.00	
37.53	54.20	2.00	0.00	1.00	0.00	37.62	54.73	2.00	0.00	1.00	0.00	
37.66	55.00	2.00	0.00	1.00	0.00	37.71	55.37	2.00	0.00	1.00	0.00	
37.75	55.81	2.00	0.00	1.00	0.00	37.80	56.53	2.00	0.00	1.00	0.00	
37.89	57.01	2.00	0.00	1.00	0.00	37.94	57.61	2.00	0.00	1.00	0.00	
38.04	58.08	2.00	0.00	1.00	0.00	38.10	58.59	2.00	0.00	1.00	0.00	
38.15	58.95	2.00	0.00	1.00	0.00	38.20	59.39	2.00	0.00	1.00	0.00	
38.28	59.82	2.00	0.00	1.00	0.00	38.33	60.35	2.00	0.00	1.00	0.00	
38.43	60.67	2.00	0.00	1.00	0.00	38.49	60.89	2.00	0.00	1.00	0.00	
38.53	60.97	2.00	0.00	1.00	0.00	38.59	61.35	2.00	0.00	1.00	0.00	
38.68	61.88	2.00	0.00	1.00	0.00	38.74	62.51	2.00	0.00	1.00	0.00	
38.81	62.86	2.00	0.00	1.00	0.00	38.86	63.21	2.00	0.00	1.00	0.00	
38.92	63.82	2.00	0.00	1.00	0.00	39.03	64.51	2.00	0.00	1.00	0.00	
39.10	65.24	2.00	0.00	1.00	0.00	39.17	65.59	2.00	0.00	1.00	0.00	
39.21	65.90	2.00	0.00	1.00	0.00	39.29	66.19	2.00	0.00	1.00	0.00	
39.34	66.61	2.00	0.00	1.00	0.00	39.47	66.95	2.00	0.00	1.00	0.00	
39.52	67.55	2.00	0.00	1.00	0.00	39.60	68.21	2.00	0.00	1.00	0.00	
39.65	68.89	2.00	0.00	1.00	0.00	39.71	69.33	2.00	0.00	1.00	0.00	

:: Post-earthquake settlement due to soil liquefaction :: (continued)											
Depth (ft)	Q <sub>tn,cs</sub>	FS	e <sub>v</sub> (%)	DF	Settlement (in)	Depth (ft)	Q <sub>tn,cs</sub>	FS	e <sub>v</sub> (%)	DF	Settlement (in)
39.78	69.68	2.00	0.00	1.00	0.00	39.83	70.15	2.00	0.00	1.00	0.00
39.90	70.85	2.00	0.00	1.00	0.00	39.96	71.86	2.00	0.00	1.00	0.00
40.02	73.18	2.00	0.00	1.00	0.00	40.09	74.18	2.00	0.00	1.00	0.00
40.14	74.71	2.00	0.00	1.00	0.00	40.22	74.78	2.00	0.00	1.00	0.00
40.27	75.01	2.00	0.00	1.00	0.00	40.33	75.06	2.00	0.00	1.00	0.00
40.40	74.90	2.00	0.00	1.00	0.00	40.45	74.62	2.00	0.00	1.00	0.00
40.52	73.83	2.00	0.00	1.00	0.00	40.58	73.24	2.00	0.00	1.00	0.00
40.65	74.56	2.00	0.00	1.00	0.00	40.71	80.23	2.00	0.00	1.00	0.00
40.80	86.23	2.00	0.00	1.00	0.00	40.83	93.34	2.00	0.00	1.00	0.00
40.92	97.43	2.00	0.00	1.00	0.00	40.96	101.53	2.00	0.00	1.00	0.00
41.01	104.31	2.00	0.00	1.00	0.00	41.11	106.04	2.00	0.00	1.00	0.00
41.16	107.17	2.00	0.00	1.00	0.00	41.26	108.53	2.00	0.00	1.00	0.00
41.31	110.93	2.00	0.00	1.00	0.00	41.35	117.75	2.00	0.00	1.00	0.00
41.45	124.01	2.00	0.00	1.00	0.00	41.50	128.72	2.00	0.00	1.00	0.00
41.56	128.24	2.00	0.00	1.00	0.00	41.62	127.08	2.00	0.00	1.00	0.00
41.71	127.47	2.00	0.00	1.00	0.00	41.75	130.44	2.00	0.00	1.00	0.00
41.82	135.82	2.00	0.00	1.00	0.00	41.89	141.25	2.00	0.00	1.00	0.00
41.93	146.69	2.00	0.00	1.00	0.00	42.00	153.60	2.00	0.00	1.00	0.00
42.06	160.04	2.00	0.00	1.00	0.00	42.24	163.11	2.00	0.00	1.00	0.00
42.28	163.76	2.00	0.00	1.00	0.00	42.35	162.54	2.00	0.00	1.00	0.00
42.42	161.31	2.00	0.00	1.00	0.00	42.47	160.22	2.00	0.00	1.00	0.00
42.53	158.88	2.00	0.00	1.00	0.00	42.64	157.43	2.00	0.00	1.00	0.00
42.72	155.94	2.00	0.00	1.00	0.00	42.77	154.93	2.00	0.00	1.00	0.00
42.83	153.87	2.00	0.00	1.00	0.00	42.90	152.88	2.00	0.00	1.00	0.00
42.94	150.90	2.00	0.00	1.00	0.00	43.08	148.57	2.00	0.00	1.00	0.00
43.12	145.82	2.00	0.00	1.00	0.00	43.18	143.11	2.00	0.00	1.00	0.00
43.25	140.49	2.00	0.00	1.00	0.00	43.30	134.75	2.00	0.00	1.00	0.00
43.37	130.21	2.00	0.00	1.00	0.00	43.48	126.20	2.00	0.00	1.00	0.00
43.56	126.90	2.00	0.00	1.00	0.00	43.60	127.91	2.00	0.00	1.00	0.00
43.67	129.29	2.00	0.00	1.00	0.00	43.70	130.67	2.00	0.00	1.00	0.00
43.71	132.62	2.00	0.00	1.00	0.00	43.80	134.16	2.00	0.00	1.00	0.00
43.91	135.52	2.00	0.00	1.00	0.00	43.96	136.31	2.00	0.00	1.00	0.00
44.01	137.44	2.00	0.00	1.00	0.00	44.05	139.22	2.00	0.00	1.00	0.00
44.10	141.33	2.00	0.00	1.00	0.00	44.19	143.27	2.00	0.00	1.00	0.00
44.23	145.73	2.00	0.00	1.00	0.00	44.33	147.96	2.00	0.00	1.00	0.00
44.37	151.33	2.00	0.00	1.00	0.00	44.47	154.32	2.00	0.00	1.00	0.00
44.54	157.38	2.00	0.00	1.00	0.00	44.59	159.74	2.00	0.00	1.00	0.00
44.65	161.86	2.00	0.00	1.00	0.00	44.72	163.70	2.00	0.00	1.00	0.00
44.76	165.33	2.00	0.00	1.00	0.00	44.83	166.47	2.00	0.00	1.00	0.00
44.89	167.20	2.00	0.00	1.00	0.00	45.00	167.17	2.00	0.00	1.00	0.00
45.07	166.93	2.00	0.00	1.00	0.00	45.13	166.50	2.00	0.00	1.00	0.00
45.20	165.95	2.00	0.00	1.00	0.00	45.24	165.12	2.00	0.00	1.00	0.00
45.30	164.13	1.03	0.56	1.00	0.00	45.38	163.21	1.02	0.56	1.00	0.01
45.43	162.62	1.01	0.56	1.00	0.00	45.49	162.10	1.00	0.56	1.00	0.00
45.56	161.01	0.98	0.57	1.00	0.00	45.66	159.36	0.96	0.57	1.00	0.01
45.73	157.09	0.93	0.80	1.00	0.01	45.78	154.78	0.89	0.82	1.00	0.01
45.84	152.31	0.86	0.84	1.00	0.01	45.90	150.11	0.83	1.12	1.00	0.01
45.95	147.90	0.80	1.15	1.00	0.01	46.08	146.61	0.78	1.16	1.00	0.02

:: Post-earthquake settlement due to soil liquefaction :: (continued)											
Depth (ft)	Q <sub>tn,cs</sub>	FS	e <sub>v</sub> (%)	DF	Settlement (in)	Depth (ft)	Q <sub>tn,cs</sub>	FS	e <sub>v</sub> (%)	DF	Settlement (in)
46.13	146.71	0.79	1.16	1.00	0.01	46.18	148.95	0.81	1.14	1.00	0.01
46.25	149.02	0.82	1.13	1.00	0.01	46.35	151.72	0.85	0.85	1.00	0.01
46.41	155.61	0.91	0.81	1.00	0.01	46.48	160.86	0.98	0.57	1.00	0.00
46.53	164.55	1.04	0.56	1.00	0.00	46.57	166.53	1.07	0.40	1.00	0.00
46.62	167.39	1.09	0.39	1.00	0.00	46.68	167.31	1.08	0.39	1.00	0.00
46.77	167.19	1.08	0.39	1.00	0.00	46.82	167.05	1.08	0.39	1.00	0.00
46.87	166.76	1.08	0.40	1.00	0.00	46.95	166.25	1.07	0.40	1.00	0.00
46.99	165.97	1.06	0.40	1.00	0.00	47.08	166.09	1.07	0.40	1.00	0.00
47.13	166.67	1.07	0.40	1.00	0.00	47.22	166.98	1.08	0.40	1.00	0.00
47.26	165.71	1.06	0.40	1.00	0.00	47.39	163.56	1.03	0.56	1.00	0.01
47.44	160.26	0.97	0.57	1.00	0.00	47.55	157.71	0.94	0.80	1.00	0.01
47.61	155.09	0.90	0.82	1.00	0.01	47.66	153.30	0.87	0.83	1.00	0.00
47.70	151.67	0.85	0.85	1.00	0.00	47.76	150.35	0.83	1.12	1.00	0.01
47.83	149.16	2.00	0.00	1.00	0.00	47.93	147.96	2.00	0.00	1.00	0.00
47.99	146.79	2.00	0.00	1.00	0.00	48.05	145.60	2.00	0.00	1.00	0.00
48.10	144.55	2.00	0.00	1.00	0.00	48.17	143.62	2.00	0.00	1.00	0.00
48.23	142.99	2.00	0.00	1.00	0.00	48.28	142.30	2.00	0.00	1.00	0.00
48.33	141.23	2.00	0.00	1.00	0.00	48.41	139.06	2.00	0.00	1.00	0.00
48.46	135.58	2.00	0.00	1.00	0.00	48.51	130.65	2.00	0.00	1.00	0.00
48.58	125.33	2.00	0.00	1.00	0.00	48.63	120.02	2.00	0.00	1.00	0.00
48.76	117.53	2.00	0.00	1.00	0.00	48.81	117.93	2.00	0.00	1.00	0.00
48.87	118.42	2.00	0.00	1.00	0.00	48.94	117.33	2.00	0.00	1.00	0.00
48.99	115.35	2.00	0.00	1.00	0.00	49.07	114.73	2.00	0.00	1.00	0.00
49.12	116.23	2.00	0.00	1.00	0.00	49.16	118.22	2.00	0.00	1.00	0.00
49.23	120.23	2.00	0.00	1.00	0.00	49.29	122.65	2.00	0.00	1.00	0.00
49.38	123.72	2.00	0.00	1.00	0.00	49.43	123.83	2.00	0.00	1.00	0.00
49.52	123.85	2.00	0.00	1.00	0.00	49.59	123.30	2.00	0.00	1.00	0.00
49.64	122.30	0.53	1.98	1.00	0.01	49.69	122.43	0.53	1.98	1.00	0.01
49.74	123.07	0.54	1.97	1.00	0.01						

**Total estimated settlement: 0.24**

**Abbreviations**

- Q<sub>tn,cs</sub>: Equivalent clean sand normalized cone resistance
- FS: Factor of safety against liquefaction
- e<sub>v</sub> (%): Post-liquefaction volumetric strain
- DF: e<sub>v</sub> depth weighting factor
- Settlement: Calculated settlement



LIQUEFACTION ANALYSIS REPORT

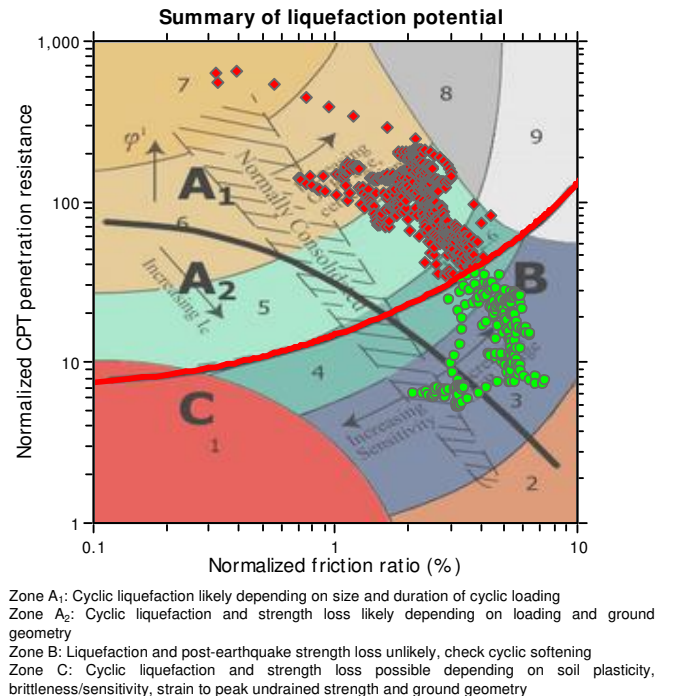
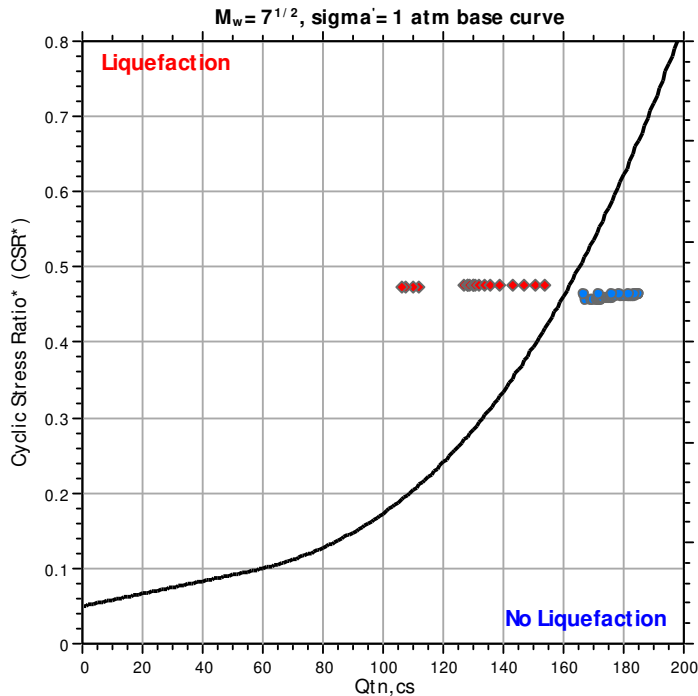
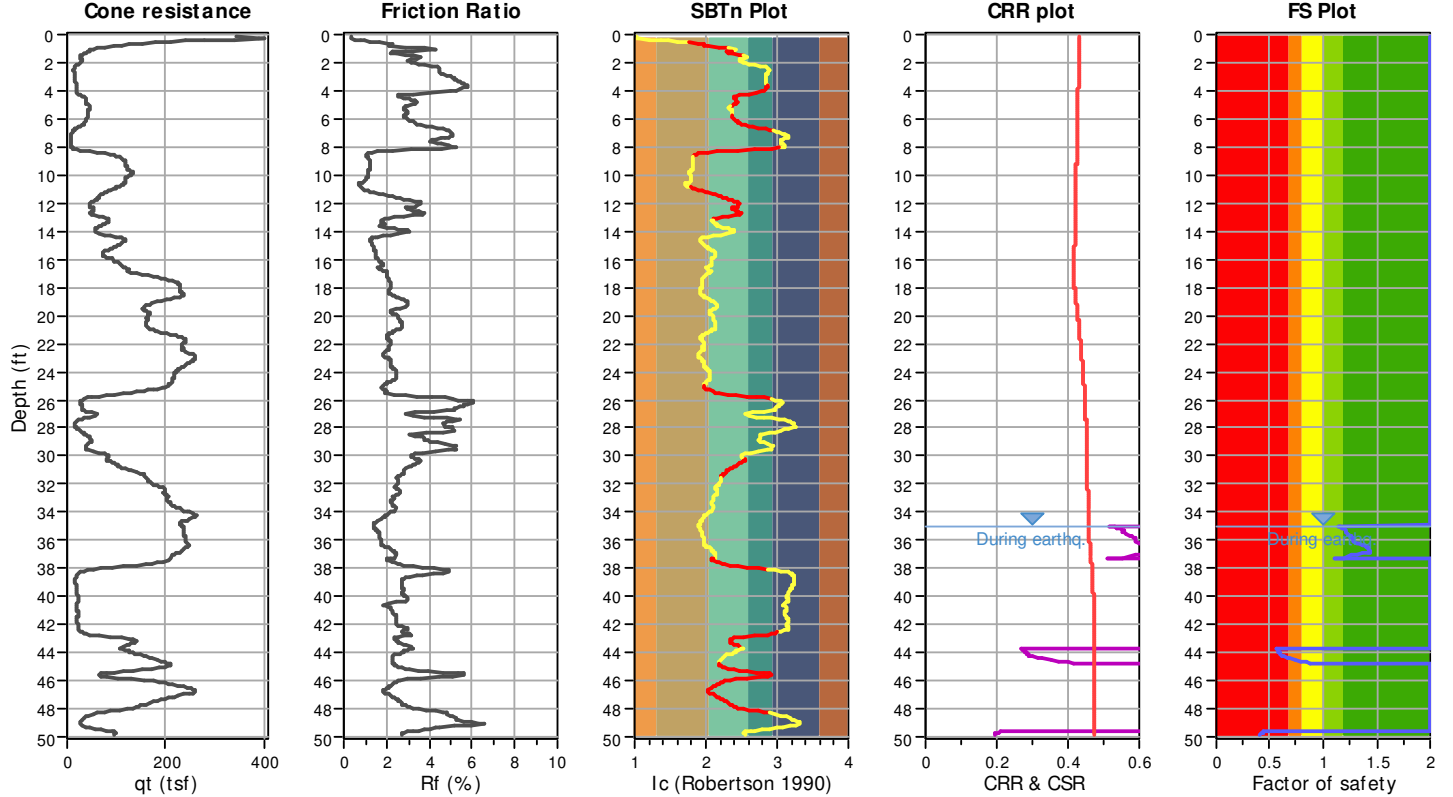
Project title : Proposed Townhouses

Location : 2323 West Broadway, Anaheim, CA

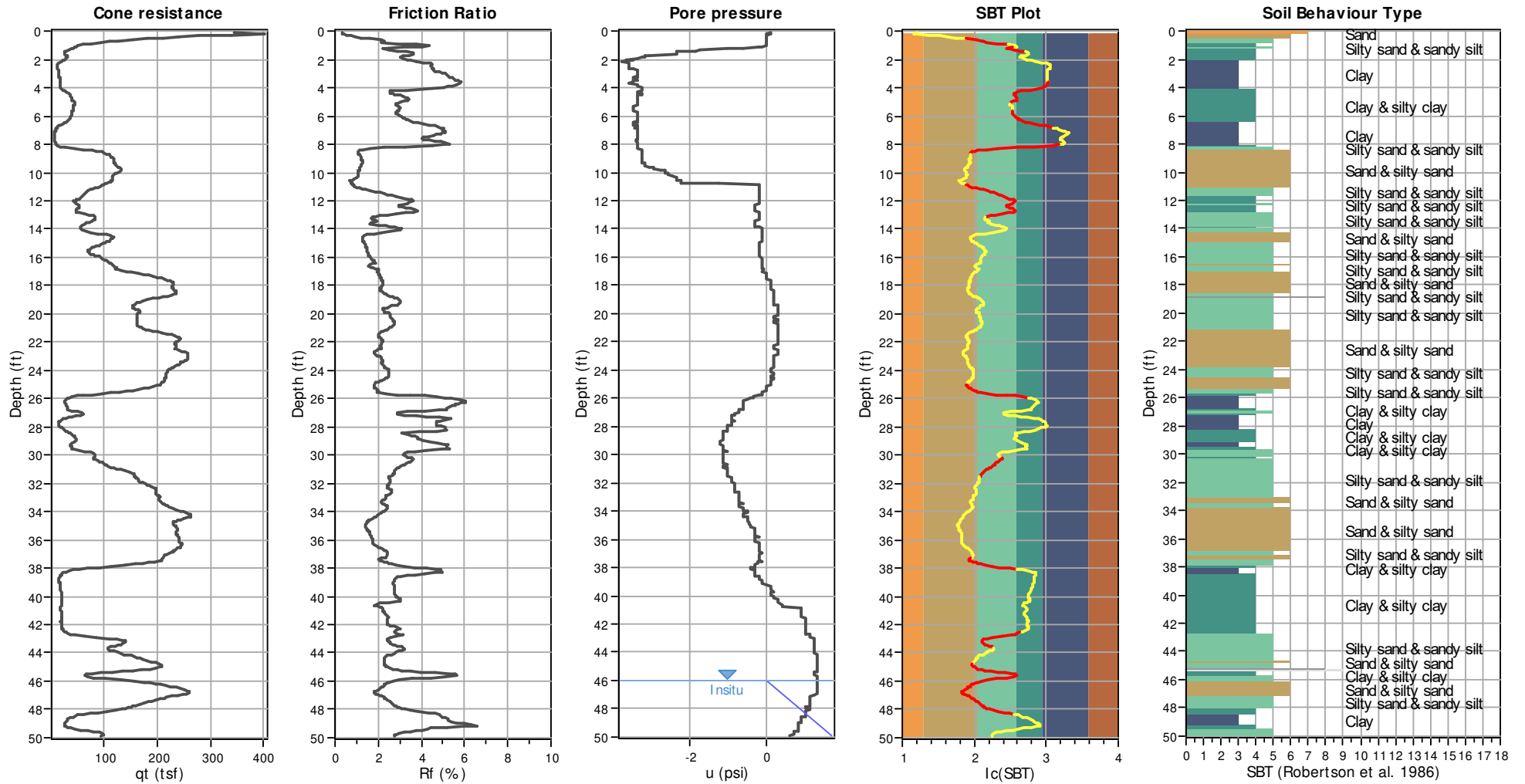
CPT file : CPT-3

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	46.00 ft	Use fill:	No	Clay like behavior	
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	35.00 ft	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude $M_w$ :	6.67	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	60.00 ft
Peak ground acceleration:	0.69	Unit weight calculation:	Based on SBT	$K_v$ applied:	Yes	MSF method:	Method based



### CPT basic interpretation plots



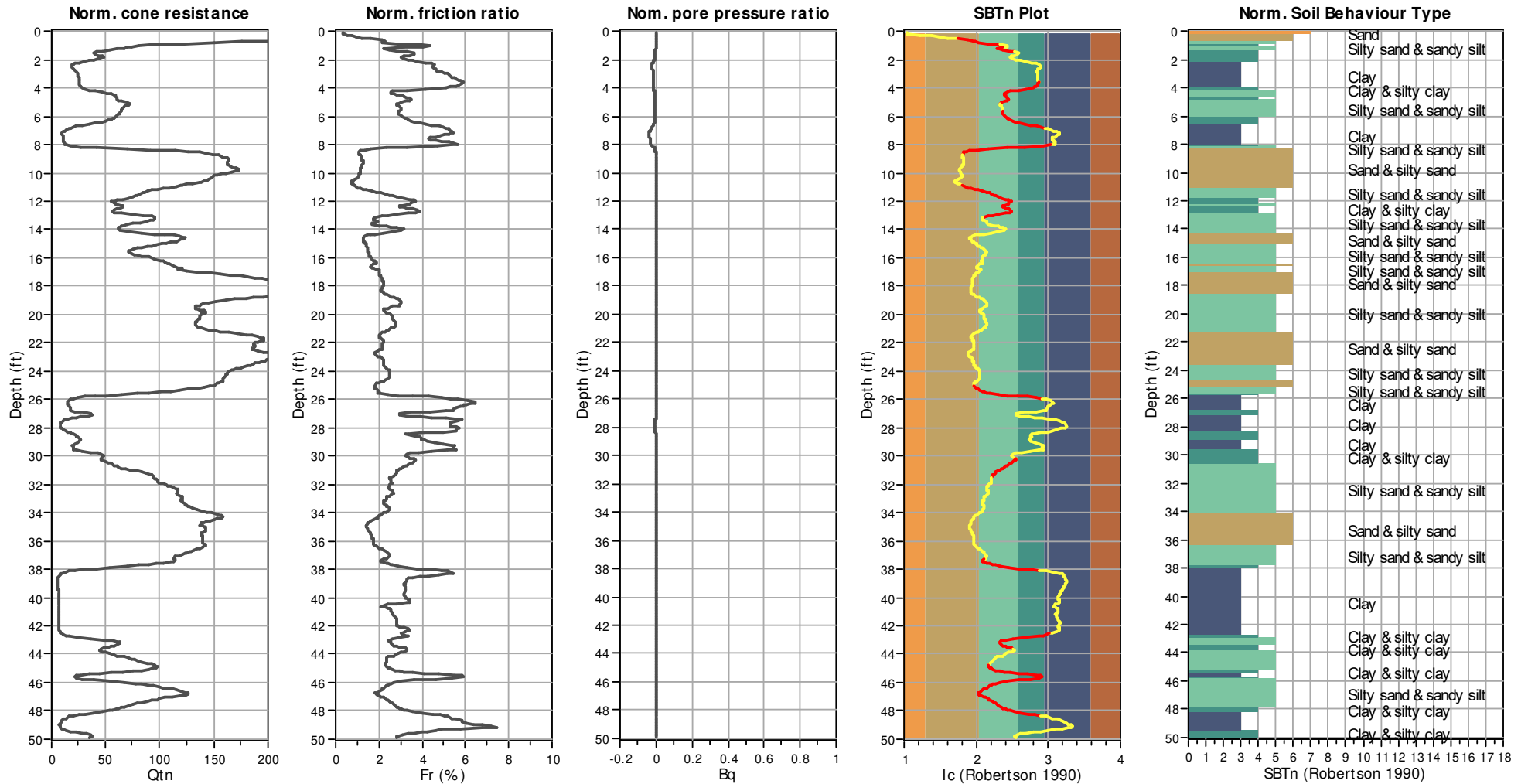
#### Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	35.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>v</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	6.67	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.69	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	46.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

#### SBT legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

### CPT basic interpretation plots (normalized)



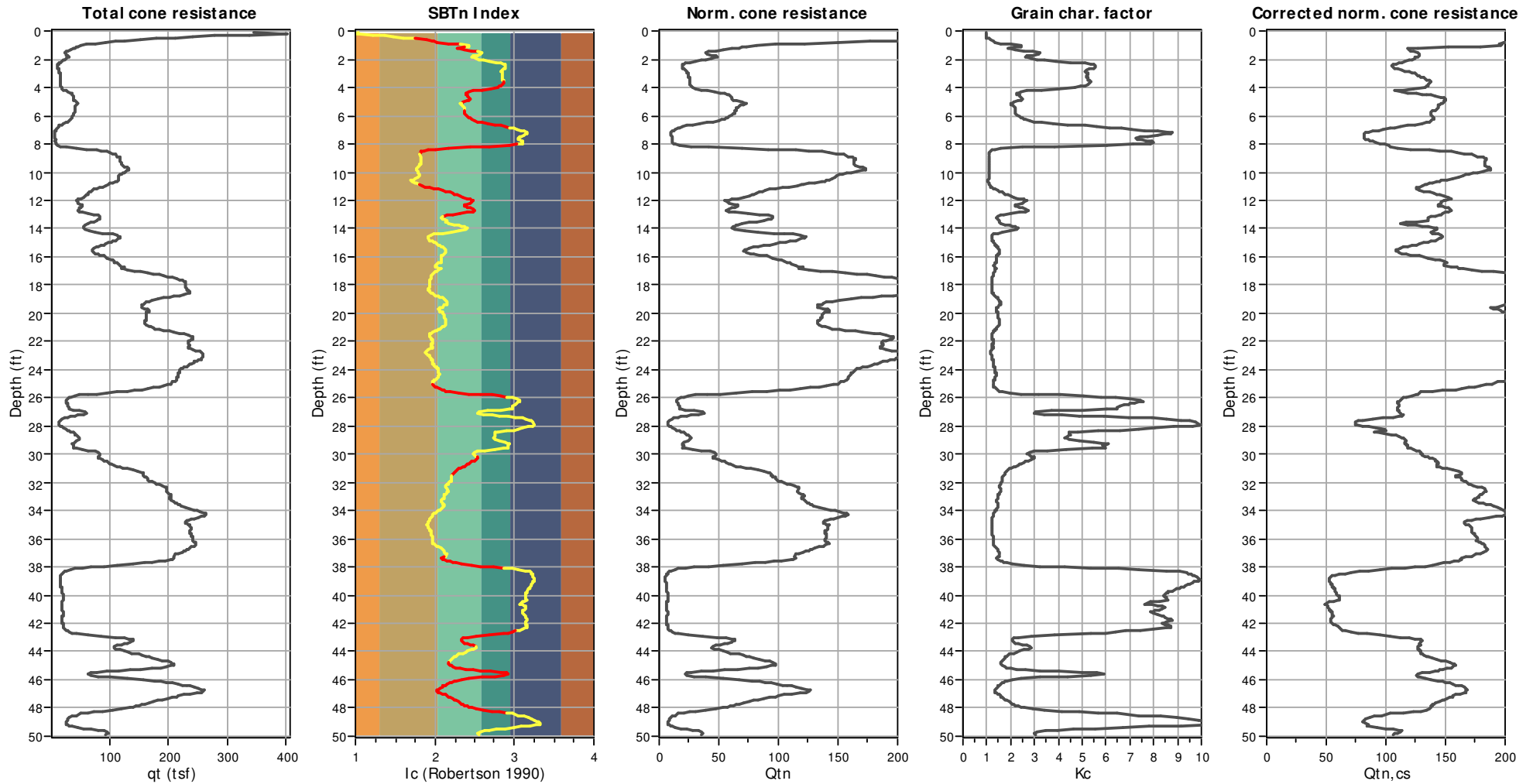
#### Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	35.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>0</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	6.67	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.69	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	46.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

#### SBTn legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

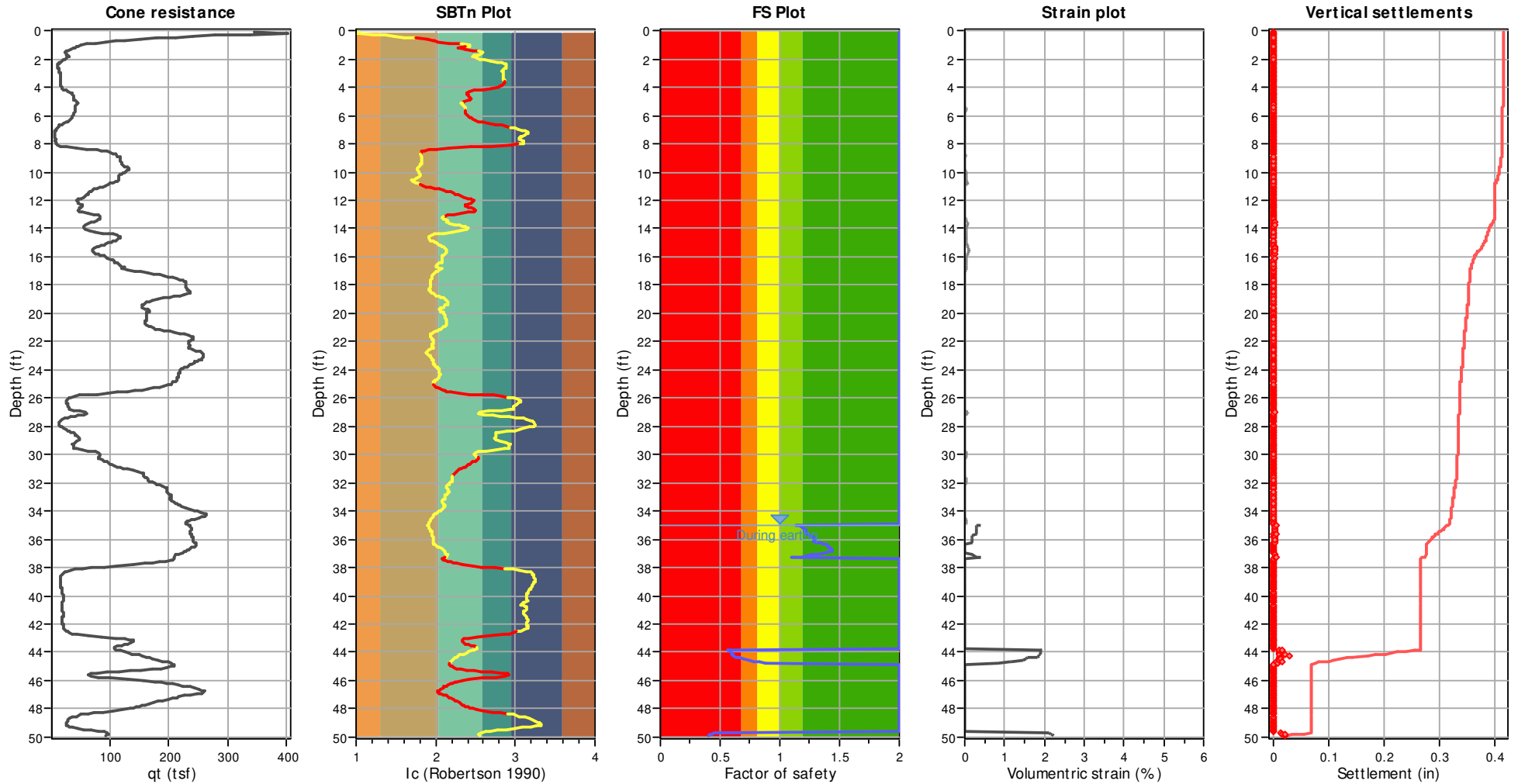
### Liquefaction analysis overall plots (intermediate results)



#### Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	35.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>v</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	6.67	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.69	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	46.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

### Estimation of post-earthquake settlements



**Abbreviations**

- qt: Total cone resistance (cone resistance  $q_c$  corrected for pore water effects)
- $I_c$ : Soil Behaviour Type Index
- FS: Calculated Factor of Safety against liquefaction
- Volumetric strain: Post-liquefaction volumetric strain



:: Post-earthquake settlement of dry sands ::												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
0.08	1.03	554.80	1.00	554.80	84	1149	0.43	0.000	0.00	8.42	0.00	0.000
0.15	0.99	625.46	1.00	625.46	94	1230	0.43	0.000	0.00	8.42	0.00	0.000
0.21	1.05	645.01	1.00	645.01	98	1358	0.43	0.000	0.00	8.42	0.00	0.000
0.29	1.22	543.49	1.00	543.49	87	1421	0.43	0.001	0.00	8.42	0.00	0.000
0.33	1.37	446.94	1.00	446.94	75	1424	0.43	0.001	0.00	8.42	0.00	0.000
0.40	1.48	387.27	1.00	387.27	67	1421	0.43	0.001	0.00	8.42	0.00	0.000
0.49	1.60	338.16	1.00	338.16	61	1441	0.43	0.001	0.00	8.42	0.00	0.000
0.53	1.75	289.59	1.07	310.61	59	1490	0.43	0.001	0.00	8.42	0.00	0.000
0.61	1.89	244.57	1.18	288.07	0	0	0.43	0.000	0.00	8.42	0.00	0.000
0.66	1.96	201.98	1.25	253.32	0	0	0.43	0.000	0.00	8.42	0.00	0.000
0.75	1.98	176.38	1.28	225.15	0	0	0.43	0.000	0.00	8.42	0.00	0.000
0.80	2.02	149.90	1.33	198.97	0	0	0.43	0.000	0.00	8.42	0.00	0.000
0.87	2.17	121.61	1.61	195.40	0	0	0.43	0.000	0.00	8.42	0.00	0.000
0.93	2.33	97.18	2.03	197.71	0	0	0.43	0.000	0.00	8.42	0.00	0.000
1.01	2.43	81.11	2.43	196.71	0	0	0.43	0.000	0.00	8.42	0.00	0.000
1.07	2.43	73.71	2.42	178.72	45	892	0.43	0.004	0.00	8.42	0.00	0.000
1.16	2.37	69.46	2.19	152.18	37	782	0.43	0.006	0.00	8.42	0.00	0.000
1.20	2.29	66.68	1.91	127.06	0	0	0.43	0.000	0.00	8.42	0.00	0.000
1.25	2.30	60.53	1.96	118.67	0	0	0.43	0.000	0.00	8.42	0.00	0.000
1.35	2.37	54.19	2.20	119.08	0	0	0.43	0.000	0.00	8.42	0.00	0.000
1.41	2.46	47.02	2.58	121.17	0	0	0.43	0.000	0.00	8.42	0.00	0.000
1.45	2.53	41.99	2.95	123.68	0	0	0.43	0.000	0.00	8.42	0.00	0.000
1.54	2.59	38.82	3.26	126.54	0	0	0.43	0.000	0.00	8.42	0.00	0.000
1.59	2.58	40.07	3.20	128.25	34	588	0.43	0.013	0.01	8.42	0.01	0.000
1.68	2.53	43.61	2.95	128.46	34	605	0.43	0.013	0.01	8.42	0.01	0.000
1.73	2.49	47.25	2.70	127.60	33	617	0.43	0.013	0.01	8.42	0.01	0.000
1.81	2.47	48.56	2.60	126.25	32	617	0.43	0.014	0.01	8.42	0.01	0.000
1.84	2.48	47.09	2.65	124.93	32	607	0.43	0.015	0.01	8.42	0.01	0.000
1.91	2.51	43.53	2.84	123.79	32	589	0.43	0.017	0.01	8.42	0.01	0.000
1.99	2.56	39.58	3.09	122.18	32	567	0.43	0.019	0.01	8.42	0.01	0.000
2.04	2.61	35.09	3.41	119.82	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.12	2.68	30.03	3.88	116.38	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.25	2.77	25.10	4.51	113.26	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.29	2.84	21.59	5.11	110.42	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.34	2.87	20.18	5.38	108.56	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.39	2.88	19.34	5.51	106.64	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.46	2.88	19.04	5.53	105.37	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.52	2.88	19.09	5.53	105.62	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.65	2.88	19.66	5.47	107.49	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.70	2.86	20.73	5.32	110.26	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.75	2.84	21.99	5.16	113.47	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.82	2.84	22.81	5.10	116.41	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.88	2.84	23.34	5.12	119.56	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.94	2.85	23.58	5.19	122.26	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.00	2.85	23.86	5.21	124.40	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.06	2.85	24.05	5.23	125.87	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.13	2.85	24.34	5.21	126.89	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.18	2.85	24.68	5.20	128.23	0	0	0.43	0.000	0.00	0.00	0.00	0.000

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
3.27	2.85	24.96	5.19	129.57	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.31	2.85	25.15	5.22	131.28	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.38	2.85	25.34	5.24	132.85	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.44	2.86	25.53	5.27	134.58	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.50	2.86	25.67	5.31	136.20	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.57	2.86	25.72	5.34	137.38	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.62	2.86	25.71	5.35	137.66	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.68	2.86	25.71	5.33	137.00	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.75	2.85	25.99	5.23	135.94	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.88	2.84	26.41	5.11	134.95	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.93	2.82	27.19	4.92	133.86	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.99	2.79	28.20	4.72	133.09	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.06	2.70	30.83	4.00	123.40	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.18	2.60	34.86	3.30	114.94	0	0	0.43	0.000	0.00	8.42	0.00	0.000
4.23	2.48	40.49	2.66	107.79	0	0	0.43	0.000	0.00	8.42	0.00	0.000
4.30	2.43	46.33	2.44	112.84	0	0	0.43	0.000	0.00	8.42	0.00	0.000
4.37	2.40	51.57	2.30	118.66	0	0	0.43	0.000	0.00	8.42	0.00	0.000
4.42	2.39	55.32	2.27	125.36	0	0	0.43	0.000	0.00	8.42	0.00	0.000
4.49	2.39	57.09	2.28	129.99	0	0	0.43	0.000	0.00	8.42	0.00	0.000
4.50	2.40	57.67	2.32	133.88	0	0	0.43	0.000	0.00	8.42	0.00	0.000
4.55	2.41	58.63	2.35	137.74	0	0	0.43	0.000	0.00	8.42	0.00	0.000
4.63	2.42	59.62	2.38	141.98	0	0	0.43	0.000	0.00	8.42	0.00	0.000
4.66	2.43	60.50	2.42	146.31	0	0	0.43	0.000	0.00	8.42	0.00	0.000
4.74	2.43	60.47	2.46	148.55	0	0	0.43	0.000	0.00	8.42	0.00	0.000
4.80	2.44	60.41	2.48	149.99	0	0	0.43	0.000	0.00	8.42	0.00	0.000
4.90	2.43	61.72	2.42	149.65	0	0	0.43	0.000	0.00	8.42	0.00	0.000
4.95	2.40	64.46	2.31	149.02	0	0	0.43	0.000	0.00	8.42	0.00	0.000
4.99	2.36	69.18	2.14	148.36	0	0	0.43	0.000	0.00	8.42	0.00	0.000
5.08	2.33	72.24	2.05	147.95	0	0	0.43	0.000	0.00	8.42	0.00	0.000
5.13	2.32	72.77	2.01	146.57	0	0	0.43	0.000	0.00	8.42	0.00	0.000
5.21	2.33	70.91	2.04	144.82	34	758	0.43	0.041	0.02	8.42	0.02	0.000
5.26	2.34	68.57	2.09	143.35	34	745	0.43	0.043	0.02	8.42	0.02	0.000
5.32	2.36	66.71	2.15	143.57	35	741	0.43	0.044	0.02	8.42	0.02	0.000
5.42	2.37	65.39	2.20	144.03	35	739	0.43	0.046	0.02	8.42	0.02	0.000
5.46	2.37	65.19	2.21	143.94	35	738	0.43	0.047	0.02	8.42	0.02	0.000
5.51	2.37	65.04	2.20	142.84	35	733	0.43	0.048	0.03	8.42	0.02	0.000
5.60	2.37	64.69	2.19	141.38	34	727	0.43	0.051	0.03	8.42	0.02	0.000
5.65	2.37	64.00	2.18	139.55	34	718	0.43	0.054	0.03	8.42	0.02	0.000
5.74	2.36	63.61	2.17	138.18	0	0	0.43	0.000	0.00	8.42	0.00	0.000
5.79	2.37	62.87	2.19	137.43	0	0	0.43	0.000	0.00	8.42	0.00	0.000
5.87	2.38	61.99	2.22	137.49	0	0	0.43	0.000	0.00	8.42	0.00	0.000
5.92	2.39	60.53	2.28	138.29	0	0	0.43	0.000	0.00	8.42	0.00	0.000
6.06	2.41	59.05	2.36	139.22	0	0	0.43	0.000	0.00	8.42	0.00	0.000
6.10	2.43	57.49	2.44	140.30	0	0	0.43	0.000	0.00	8.42	0.00	0.000
6.15	2.44	56.27	2.50	140.47	0	0	0.43	0.000	0.00	8.42	0.00	0.000
6.21	2.46	54.76	2.56	140.19	0	0	0.43	0.000	0.00	8.42	0.00	0.000
6.25	2.47	53.00	2.63	139.28	0	0	0.43	0.000	0.00	8.42	0.00	0.000
6.32	2.50	49.59	2.78	137.98	0	0	0.43	0.000	0.00	8.42	0.00	0.000

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
6.40	2.54	45.49	3.00	136.34	0	0	0.43	0.000	0.00	8.42	0.00	0.000
6.46	2.60	40.38	3.32	134.03	0	0	0.43	0.000	0.00	8.42	0.00	0.000
6.53	2.67	34.34	3.79	130.09	0	0	0.43	0.000	0.00	0.00	0.00	0.000
6.63	2.75	28.44	4.37	124.31	0	0	0.43	0.000	0.00	0.00	0.00	0.000
6.70	2.84	23.17	5.10	118.15	0	0	0.43	0.000	0.00	0.00	0.00	0.000
6.75	2.89	20.01	5.63	112.58	0	0	0.43	0.000	0.00	0.00	0.00	0.000
6.82	2.94	17.52	6.15	107.75	0	0	0.43	0.000	0.00	0.00	0.00	0.000
6.89	2.99	15.52	6.65	103.16	0	0	0.43	0.000	0.00	0.00	0.00	0.000
6.94	3.03	13.86	7.08	98.12	0	0	0.43	0.000	0.00	0.00	0.00	0.000
7.02	3.08	12.25	7.65	93.74	0	0	0.43	0.000	0.00	0.00	0.00	0.000
7.07	3.12	10.88	8.16	88.77	0	0	0.43	0.000	0.00	0.00	0.00	0.000
7.14	3.15	9.90	8.62	85.37	0	0	0.43	0.000	0.00	0.00	0.00	0.000
7.20	3.16	9.46	8.76	82.81	0	0	0.43	0.000	0.00	0.00	0.00	0.000
7.26	3.16	9.40	8.72	81.94	0	0	0.43	0.000	0.00	0.00	0.00	0.000
7.32	3.14	9.64	8.48	81.75	0	0	0.43	0.000	0.00	0.00	0.00	0.000
7.37	3.12	10.07	8.14	82.00	0	0	0.43	0.000	0.00	0.00	0.00	0.000
7.46	3.09	10.55	7.77	82.00	0	0	0.43	0.000	0.00	0.00	0.00	0.000
7.50	3.06	10.99	7.44	81.80	0	0	0.43	0.000	0.00	0.00	0.00	0.000
7.56	3.05	11.27	7.28	82.03	0	0	0.43	0.000	0.00	0.00	0.00	0.000
7.64	3.05	11.36	7.31	83.02	0	0	0.43	0.000	0.00	0.00	0.00	0.000
7.69	3.06	11.36	7.49	85.08	0	0	0.43	0.000	0.00	0.00	0.00	0.000
7.75	3.08	11.30	7.68	86.86	0	0	0.43	0.000	0.00	0.00	0.00	0.000
7.81	3.10	11.30	7.90	89.27	0	0	0.43	0.000	0.00	0.00	0.00	0.000
7.93	3.10	11.53	7.97	91.89	0	0	0.42	0.000	0.00	0.00	0.00	0.000
7.98	3.10	12.07	7.88	95.08	0	0	0.42	0.000	0.00	0.00	0.00	0.000
8.02	3.04	13.86	7.15	99.16	0	0	0.42	0.000	0.00	0.00	0.00	0.000
8.11	2.93	16.97	6.04	102.42	0	0	0.42	0.000	0.00	0.00	0.00	0.000
8.16	2.68	26.99	3.84	103.71	0	0	0.42	0.000	0.00	0.00	0.00	0.000
8.24	2.44	41.73	2.47	103.13	0	0	0.42	0.000	0.00	8.42	0.00	0.000
8.29	2.17	69.32	1.59	110.16	0	0	0.42	0.000	0.00	8.42	0.00	0.000
8.37	2.01	91.91	1.32	121.33	0	0	0.42	0.000	0.00	8.42	0.00	0.000
8.41	1.91	114.31	1.19	136.50	0	0	0.42	0.000	0.00	8.42	0.00	0.000
8.50	1.86	126.12	1.15	145.49	0	0	0.42	0.000	0.00	8.42	0.00	0.000
8.55	1.83	137.03	1.13	154.67	0	0	0.42	0.000	0.00	8.42	0.00	0.000
8.64	1.82	142.95	1.12	160.11	0	0	0.42	0.000	0.00	8.42	0.00	0.000
8.68	1.81	148.72	1.11	165.79	0	0	0.42	0.000	0.00	8.42	0.00	0.000
8.73	1.81	154.68	1.11	172.38	0	0	0.42	0.000	0.00	8.42	0.00	0.000
8.88	1.81	158.73	1.12	177.39	34	1008	0.42	0.046	0.02	8.42	0.02	0.001
8.94	1.82	162.69	1.12	182.00	35	1039	0.42	0.044	0.02	8.42	0.02	0.000
8.99	1.82	163.71	1.12	183.23	36	1050	0.42	0.043	0.02	8.42	0.02	0.000
9.03	1.82	164.38	1.12	183.82	36	1055	0.42	0.043	0.02	8.42	0.02	0.000
9.08	1.82	164.30	1.12	183.77	36	1059	0.42	0.043	0.02	8.42	0.02	0.000
9.12	1.82	163.89	1.12	183.72	36	1063	0.42	0.043	0.02	8.42	0.02	0.000
9.24	1.82	162.84	1.12	183.04	36	1068	0.42	0.043	0.02	8.42	0.02	0.000
9.29	1.82	162.88	1.12	183.19	36	1073	0.42	0.043	0.02	8.42	0.02	0.000
9.34	1.82	162.99	1.12	182.98	36	1074	0.42	0.044	0.02	8.42	0.02	0.000
9.39	1.82	163.04	1.12	182.48	35	1073	0.42	0.044	0.02	8.42	0.02	0.000
9.46	1.81	163.57	1.12	182.50	35	1076	0.42	0.044	0.02	8.42	0.02	0.000

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
9.55	1.81	164.65	1.11	182.87	35	1082	0.42	0.045	0.02	8.42	0.02	0.000
9.59	1.79	168.09	1.10	185.17	36	1093	0.42	0.044	0.02	8.42	0.02	0.000
9.67	1.78	170.87	1.09	186.70	36	1102	0.42	0.044	0.02	8.42	0.02	0.000
9.72	1.77	173.14	1.09	187.97	36	1109	0.42	0.043	0.02	8.42	0.02	0.000
9.81	1.77	172.74	1.08	187.28	36	1110	0.42	0.044	0.02	8.42	0.02	0.000
9.86	1.77	170.72	1.09	185.33	35	1102	0.42	0.045	0.02	8.42	0.02	0.000
9.95	1.78	166.39	1.09	181.58	35	1089	0.42	0.047	0.02	8.42	0.02	0.000
10.04	1.79	161.31	1.10	177.02	34	1071	0.42	0.049	0.03	8.42	0.02	0.000
10.09	1.79	156.88	1.10	172.98	33	1053	0.42	0.052	0.03	8.42	0.02	0.000
10.14	1.80	153.68	1.10	169.80	33	1037	0.42	0.054	0.03	8.42	0.02	0.000
10.18	1.80	150.86	1.11	166.80	32	1022	0.42	0.056	0.03	8.42	0.02	0.000
10.27	1.80	148.82	1.10	164.24	32	1010	0.42	0.059	0.03	8.42	0.03	0.001
10.40	1.79	147.11	1.10	161.30	31	996	0.42	0.062	0.04	8.42	0.03	0.001
10.46	1.75	145.46	1.07	156.18	30	954	0.42	0.070	0.04	8.42	0.03	0.001
10.53	1.72	143.01	1.05	150.70	28	912	0.42	0.080	0.05	8.42	0.04	0.001
10.58	1.70	140.56	1.04	145.98	27	877	0.42	0.090	0.06	8.42	0.05	0.001
10.66	1.71	138.87	1.04	144.80	27	876	0.42	0.092	0.06	8.42	0.05	0.001
10.71	1.71	136.73	1.05	143.24	27	872	0.42	0.094	0.07	8.42	0.05	0.001
10.77	1.74	130.03	1.07	138.83	26	858	0.42	0.099	0.07	8.42	0.06	0.001
10.80	1.77	125.29	1.09	136.08	26	852	0.42	0.102	0.07	8.42	0.06	0.000
10.86	1.80	121.04	1.10	133.68	26	849	0.42	0.104	0.08	8.42	0.06	0.001
10.91	1.81	119.95	1.11	133.42	0	0	0.42	0.000	0.00	8.42	0.00	0.000
10.98	1.84	115.46	1.13	130.96	0	0	0.42	0.000	0.00	8.42	0.00	0.000
11.03	1.89	109.13	1.18	128.25	0	0	0.42	0.000	0.00	8.42	0.00	0.000
11.12	1.93	103.06	1.22	126.06	0	0	0.42	0.000	0.00	8.42	0.00	0.000
11.16	1.99	97.46	1.28	125.20	0	0	0.42	0.000	0.00	8.42	0.00	0.000
11.22	2.04	93.05	1.35	125.69	0	0	0.42	0.000	0.00	8.42	0.00	0.000
11.30	2.09	88.99	1.44	128.46	0	0	0.42	0.000	0.00	8.42	0.00	0.000
11.39	2.14	86.20	1.53	132.09	0	0	0.42	0.000	0.00	8.42	0.00	0.000
11.43	2.18	84.07	1.62	136.45	0	0	0.42	0.000	0.00	8.42	0.00	0.000
11.51	2.22	81.80	1.71	139.83	0	0	0.42	0.000	0.00	8.42	0.00	0.000
11.60	2.25	79.48	1.80	142.89	0	0	0.42	0.000	0.00	8.42	0.00	0.000
11.64	2.28	77.55	1.88	145.63	0	0	0.42	0.000	0.00	8.42	0.00	0.000
11.69	2.31	75.08	1.99	149.11	0	0	0.42	0.000	0.00	8.42	0.00	0.000
11.76	2.36	70.94	2.15	152.49	0	0	0.42	0.000	0.00	8.42	0.00	0.000
11.85	2.41	66.06	2.34	154.59	0	0	0.42	0.000	0.00	8.42	0.00	0.000
11.90	2.45	60.41	2.55	153.73	0	0	0.42	0.000	0.00	8.42	0.00	0.000
11.99	2.46	58.76	2.56	150.50	0	0	0.42	0.000	0.00	8.42	0.00	0.000
12.02	2.49	55.27	2.70	149.21	0	0	0.42	0.000	0.00	8.42	0.00	0.000
12.12	2.46	57.08	2.57	146.87	0	0	0.42	0.000	0.00	8.42	0.00	0.000
12.23	2.44	58.47	2.49	145.76	0	0	0.42	0.000	0.00	8.42	0.00	0.000
12.27	2.38	63.94	2.24	143.49	0	0	0.42	0.000	0.00	8.42	0.00	0.000
12.31	2.36	66.11	2.17	143.35	0	0	0.42	0.000	0.00	8.42	0.00	0.000
12.36	2.36	66.43	2.17	144.09	0	0	0.42	0.000	0.00	8.42	0.00	0.000
12.42	2.38	65.52	2.24	147.03	0	0	0.42	0.000	0.00	8.42	0.00	0.000
12.49	2.41	63.60	2.35	149.59	0	0	0.42	0.000	0.00	8.42	0.00	0.000
12.54	2.45	60.60	2.52	152.58	0	0	0.42	0.000	0.00	8.42	0.00	0.000
12.62	2.48	58.04	2.65	153.60	0	0	0.42	0.000	0.00	8.42	0.00	0.000

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
12.67	2.49	56.49	2.74	154.54	0	0	0.42	0.000	0.00	8.42	0.00	0.000
12.80	2.47	57.94	2.63	152.66	0	0	0.42	0.000	0.00	8.42	0.00	0.000
12.84	2.41	63.90	2.35	150.28	0	0	0.42	0.000	0.00	8.42	0.00	0.000
12.92	2.32	73.93	2.00	147.77	0	0	0.42	0.000	0.00	8.42	0.00	0.000
12.98	2.23	84.62	1.73	146.53	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.03	2.16	92.00	1.57	144.71	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.09	2.12	95.25	1.48	141.23	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.15	2.09	95.54	1.44	137.86	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.21	2.09	94.84	1.43	135.67	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.28	2.10	93.38	1.45	135.07	29	1040	0.42	0.084	0.05	8.42	0.04	0.001
13.34	2.12	91.47	1.48	135.75	30	1046	0.42	0.084	0.05	8.42	0.04	0.001
13.41	2.15	87.38	1.55	135.09	30	1040	0.42	0.086	0.05	8.42	0.04	0.001
13.52	2.14	81.70	1.54	125.59	28	973	0.42	0.105	0.07	8.42	0.05	0.001
13.59	2.15	75.32	1.55	116.74	26	907	0.42	0.131	0.10	8.42	0.07	0.001
13.64	2.17	70.06	1.60	112.12	25	869	0.42	0.152	0.12	8.42	0.09	0.001
13.72	2.25	66.21	1.79	118.79	27	902	0.42	0.136	0.09	8.42	0.07	0.001
13.77	2.30	64.15	1.96	125.78	30	934	0.42	0.122	0.08	8.42	0.06	0.001
13.83	2.33	63.08	2.06	130.20	31	956	0.42	0.115	0.07	8.42	0.05	0.001
13.86	2.37	61.87	2.19	135.44	33	978	0.42	0.108	0.06	8.42	0.05	0.000
13.92	2.39	61.27	2.28	139.70	34	998	0.42	0.102	0.05	8.42	0.04	0.001
14.00	2.40	61.57	2.32	142.83	35	1019	0.42	0.098	0.05	8.42	0.04	0.001
14.08	2.38	63.64	2.25	142.99	35	1036	0.42	0.094	0.05	8.42	0.04	0.001
14.13	2.30	72.10	1.94	140.06	33	1065	0.42	0.088	0.05	8.42	0.04	0.000
14.26	2.20	82.59	1.67	138.18	31	1097	0.42	0.083	0.05	8.42	0.04	0.001
14.31	2.10	95.80	1.46	139.45	30	1130	0.42	0.077	0.05	8.42	0.04	0.000
14.36	2.04	104.82	1.35	141.71	30	1150	0.42	0.074	0.05	8.42	0.04	0.000
14.41	1.98	112.58	1.28	144.18	30	1163	0.42	0.073	0.04	8.42	0.03	0.000
14.45	1.94	118.47	1.23	146.22	30	1169	0.42	0.072	0.04	8.42	0.03	0.000
14.54	1.92	121.65	1.21	147.16	30	1173	0.42	0.072	0.04	8.42	0.03	0.001
14.61	1.91	122.94	1.20	147.38	30	1173	0.42	0.073	0.05	8.42	0.04	0.001
14.67	1.91	122.21	1.20	146.70	30	1171	0.42	0.074	0.05	8.42	0.04	0.000
14.71	1.92	119.27	1.21	144.55	29	1161	0.42	0.076	0.05	8.42	0.04	0.000
14.83	1.94	114.86	1.23	141.34	29	1148	0.42	0.079	0.05	8.42	0.04	0.001
14.89	1.96	109.92	1.25	137.90	28	1130	0.42	0.083	0.05	8.42	0.04	0.001
14.95	1.98	105.70	1.28	134.86	28	1113	0.42	0.086	0.06	8.42	0.04	0.001
15.02	2.00	101.41	1.30	131.73	27	1096	0.42	0.091	0.06	8.42	0.05	0.001
15.07	2.02	97.20	1.32	128.40	27	1074	0.42	0.097	0.07	8.42	0.05	0.001
15.15	2.04	92.71	1.35	125.06	26	1052	0.42	0.103	0.07	8.42	0.06	0.001
15.20	2.05	88.20	1.38	121.41	26	1026	0.42	0.112	0.08	8.42	0.06	0.001
15.28	2.08	83.50	1.41	117.88	25	1001	0.42	0.121	0.09	8.42	0.07	0.001
15.33	2.09	79.28	1.44	114.53	25	974	0.42	0.132	0.10	8.42	0.08	0.001
15.41	2.11	75.60	1.48	111.78	24	953	0.42	0.143	0.11	8.42	0.09	0.002
15.46	2.13	72.94	1.50	109.66	24	936	0.42	0.152	0.12	8.42	0.09	0.001
15.52	2.13	71.36	1.52	108.41	24	928	0.42	0.158	0.13	8.42	0.10	0.001
15.59	2.14	70.95	1.53	108.39	24	930	0.42	0.158	0.13	8.42	0.10	0.002
15.64	2.14	71.75	1.53	109.49	24	942	0.42	0.153	0.12	8.42	0.09	0.001
15.69	2.13	73.55	1.52	111.55	24	962	0.42	0.144	0.11	8.42	0.09	0.001
15.77	2.12	76.23	1.50	114.00	25	987	0.42	0.134	0.10	8.42	0.08	0.001

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
15.82	2.11	79.83	1.47	117.38	25	1020	0.42	0.122	0.09	8.42	0.07	0.001
15.89	2.09	83.68	1.45	120.97	26	1055	0.42	0.112	0.08	8.42	0.06	0.001
15.95	2.08	89.89	1.42	128.09	28	1119	0.42	0.095	0.06	8.42	0.05	0.001
16.12	2.08	95.15	1.42	134.77	29	1186	0.42	0.083	0.05	8.42	0.04	0.002
16.20	2.08	100.40	1.41	141.81	30	1252	0.42	0.074	0.04	8.42	0.03	0.001
16.26	2.08	102.92	1.41	145.47	31	1288	0.42	0.069	0.04	8.42	0.03	0.000
16.32	2.08	105.05	1.42	148.79	32	1321	0.42	0.066	0.04	8.42	0.03	0.000
16.39	2.08	106.86	1.42	151.44	33	1348	0.42	0.063	0.04	8.42	0.03	0.000
16.43	2.05	109.31	1.37	149.74	32	1332	0.42	0.065	0.04	8.42	0.03	0.000
16.56	2.02	111.57	1.33	148.40	31	1322	0.42	0.067	0.04	8.42	0.03	0.001
16.61	2.00	114.58	1.30	149.36	31	1328	0.42	0.067	0.04	8.42	0.03	0.000
16.70	2.01	117.20	1.32	154.59	32	1383	0.42	0.062	0.03	8.42	0.03	0.001
16.74	2.02	120.30	1.33	159.75	34	1433	0.42	0.057	0.03	8.42	0.02	0.000
16.81	2.04	118.33	1.36	161.00	34	1454	0.42	0.056	0.03	8.42	0.02	0.000
16.83	2.07	116.53	1.39	162.54	35	1473	0.42	0.055	0.03	8.42	0.02	0.000
16.87	2.07	117.66	1.40	165.13	35	1500	0.42	0.053	0.03	8.42	0.02	0.000
16.93	2.05	125.38	1.37	171.87	36	1562	0.42	0.049	0.02	8.42	0.02	0.000
17.01	2.02	135.41	1.33	180.58	38	1640	0.42	0.045	0.02	8.42	0.02	0.000
17.06	2.01	145.36	1.31	190.57	40	1728	0.42	0.041	0.02	8.42	0.01	0.000
17.15	1.99	156.17	1.29	200.94	42	1820	0.42	0.038	0.02	8.42	0.01	0.000
17.23	1.98	165.31	1.27	210.08	43	1902	0.42	0.035	0.01	8.42	0.01	0.000
17.28	1.97	173.97	1.26	219.04	45	1980	0.42	0.033	0.01	8.42	0.01	0.000
17.36	1.96	181.42	1.25	226.90	47	2053	0.42	0.032	0.01	8.42	0.01	0.000
17.42	1.95	188.52	1.24	234.43	48	2122	0.42	0.030	0.01	8.42	0.01	0.000
17.47	1.95	195.02	1.24	241.24	49	2182	0.42	0.029	0.01	8.42	0.01	0.000
17.54	1.94	200.59	1.23	247.38	50	2241	0.42	0.028	0.01	8.42	0.01	0.000
17.63	1.94	205.63	1.23	252.96	51	2297	0.42	0.027	0.01	8.42	0.01	0.000
17.67	1.94	209.54	1.23	257.58	52	2342	0.42	0.027	0.01	8.42	0.01	0.000
17.73	1.94	211.60	1.23	260.40	53	2374	0.42	0.026	0.01	8.42	0.01	0.000
17.78	1.94	213.17	1.23	262.36	53	2398	0.42	0.026	0.01	8.42	0.01	0.000
17.87	1.94	213.14	1.23	262.24	53	2404	0.42	0.026	0.01	8.42	0.01	0.000
17.94	1.94	212.63	1.23	261.08	53	2397	0.42	0.026	0.01	8.42	0.01	0.000
17.98	1.94	211.29	1.23	258.90	53	2379	0.42	0.027	0.01	8.42	0.01	0.000
18.07	1.93	210.30	1.22	256.84	52	2364	0.42	0.027	0.01	8.42	0.01	0.000
18.14	1.93	209.62	1.22	255.19	52	2352	0.42	0.027	0.01	8.42	0.01	0.000
18.21	1.93	209.85	1.21	254.63	52	2348	0.42	0.028	0.01	8.42	0.01	0.000
18.25	1.92	210.67	1.21	255.02	52	2353	0.42	0.028	0.01	8.42	0.01	0.000
18.33	1.92	211.82	1.21	256.00	52	2366	0.42	0.027	0.01	8.42	0.01	0.000
18.38	1.92	213.27	1.21	258.62	52	2399	0.42	0.027	0.01	8.42	0.01	0.000
18.49	1.93	213.14	1.22	260.60	53	2438	0.42	0.027	0.01	8.42	0.01	0.000
18.53	1.95	212.61	1.24	262.79	54	2475	0.42	0.026	0.01	8.42	0.01	0.000
18.57	1.96	210.28	1.25	263.43	54	2500	0.42	0.026	0.01	8.42	0.01	0.000
18.65	1.98	204.49	1.28	261.70	54	2510	0.42	0.026	0.01	8.42	0.01	0.000
18.75	2.01	196.25	1.32	258.22	54	2507	0.42	0.026	0.01	8.42	0.01	0.000
18.81	2.04	187.13	1.36	253.74	54	2485	0.42	0.027	0.01	8.42	0.01	0.000
18.86	2.06	179.22	1.39	249.60	53	2459	0.42	0.027	0.01	8.42	0.01	0.000
18.90	2.09	169.76	1.44	243.75	53	2412	0.42	0.028	0.01	8.42	0.01	0.000
19.01	2.11	160.53	1.48	237.02	52	2359	0.42	0.029	0.01	8.42	0.01	0.000

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
19.08	2.13	151.24	1.52	229.70	50	2292	0.42	0.030	0.01	8.42	0.01	0.000
19.17	2.15	145.19	1.54	224.01	49	2242	0.42	0.032	0.01	8.42	0.01	0.000
19.23	2.15	140.65	1.56	219.29	48	2199	0.42	0.033	0.01	8.42	0.01	0.000
19.29	2.15	138.31	1.56	215.69	48	2168	0.42	0.034	0.01	8.42	0.01	0.000
19.35	2.15	136.39	1.56	212.37	47	2140	0.42	0.034	0.01	8.42	0.01	0.000
19.39	2.15	134.85	1.55	209.04	46	2110	0.42	0.035	0.01	8.42	0.01	0.000
19.44	2.12	133.46	1.50	199.94	44	2023	0.43	0.038	0.01	8.42	0.01	0.000
19.57	2.10	132.72	1.45	192.15	42	1951	0.43	0.041	0.02	8.42	0.01	0.000
19.62	2.07	134.14	1.40	187.37	40	1900	0.43	0.043	0.02	8.42	0.01	0.000
19.69	2.06	137.30	1.39	190.42	41	1934	0.43	0.042	0.02	8.42	0.01	0.000
19.74	2.05	141.30	1.37	193.98	41	1971	0.43	0.040	0.02	8.42	0.01	0.000
19.79	2.05	142.92	1.38	196.57	42	2002	0.43	0.040	0.02	8.42	0.01	0.000
19.87	2.06	142.26	1.39	197.76	42	2022	0.43	0.039	0.02	8.42	0.01	0.000
19.89	2.08	140.27	1.42	198.79	43	2039	0.43	0.039	0.02	8.42	0.01	0.000
19.95	2.09	138.84	1.44	199.85	43	2058	0.43	0.038	0.02	8.42	0.01	0.000
20.03	2.10	137.65	1.46	200.90	44	2077	0.43	0.038	0.01	8.42	0.01	0.000
20.08	2.11	136.91	1.47	201.39	44	2087	0.43	0.038	0.01	8.42	0.01	0.000
20.17	2.11	136.39	1.47	201.08	44	2090	0.43	0.038	0.01	8.42	0.01	0.000
20.21	2.11	136.48	1.47	201.19	44	2095	0.43	0.038	0.01	8.42	0.01	0.000
20.30	2.11	136.39	1.48	201.47	44	2104	0.43	0.038	0.01	8.42	0.01	0.000
20.36	2.12	135.85	1.49	202.28	44	2118	0.43	0.037	0.01	8.42	0.01	0.000
20.46	2.13	134.80	1.50	202.61	44	2130	0.43	0.037	0.01	8.42	0.01	0.000
20.48	2.13	134.00	1.52	203.09	45	2137	0.43	0.037	0.01	8.42	0.01	0.000
20.57	2.14	133.35	1.52	203.05	45	2143	0.43	0.037	0.01	8.42	0.01	0.000
20.61	2.14	132.98	1.53	203.41	45	2150	0.43	0.037	0.01	8.42	0.01	0.000
20.70	2.14	132.41	1.54	203.43	45	2158	0.43	0.037	0.01	8.42	0.01	0.000
20.74	2.14	132.43	1.54	203.45	45	2161	0.43	0.037	0.01	8.42	0.01	0.000
20.82	2.13	133.92	1.52	203.12	45	2164	0.43	0.037	0.01	8.42	0.01	0.000
20.93	2.12	135.99	1.49	202.72	44	2167	0.43	0.038	0.01	8.42	0.01	0.000
20.97	2.10	138.90	1.46	202.92	44	2169	0.43	0.038	0.01	8.42	0.01	0.000
21.01	2.09	142.10	1.43	203.46	44	2174	0.43	0.037	0.01	8.42	0.01	0.000
21.10	2.07	145.67	1.40	204.37	44	2185	0.43	0.037	0.01	8.42	0.01	0.000
21.14	2.05	151.18	1.37	206.47	44	2200	0.43	0.037	0.01	8.42	0.01	0.000
21.23	2.03	155.98	1.34	208.63	44	2219	0.43	0.037	0.01	8.42	0.01	0.000
21.27	2.00	164.25	1.30	213.09	44	2249	0.43	0.036	0.01	8.42	0.01	0.000
21.38	1.97	171.27	1.27	217.27	45	2282	0.43	0.036	0.01	8.42	0.01	0.000
21.43	1.95	180.06	1.24	223.22	46	2322	0.43	0.035	0.01	8.42	0.01	0.000
21.49	1.94	185.21	1.23	227.21	46	2355	0.43	0.034	0.01	8.42	0.01	0.000
21.54	1.93	190.77	1.22	232.64	47	2407	0.43	0.033	0.01	8.42	0.01	0.000
21.62	1.93	193.80	1.22	236.62	48	2456	0.43	0.032	0.01	8.42	0.01	0.000
21.67	1.94	196.37	1.23	241.21	49	2516	0.43	0.031	0.01	8.42	0.01	0.000
21.80	1.95	196.21	1.24	242.80	50	2553	0.43	0.031	0.01	8.42	0.01	0.000
21.83	1.96	195.39	1.25	243.57	50	2573	0.43	0.030	0.01	8.42	0.01	0.000
21.88	1.96	193.42	1.25	242.33	50	2571	0.43	0.031	0.01	8.42	0.01	0.000
21.92	1.97	190.79	1.26	240.18	49	2557	0.44	0.031	0.01	8.42	0.01	0.000
22.01	1.97	188.28	1.26	237.46	49	2537	0.44	0.031	0.01	8.42	0.01	0.000
22.08	1.97	186.94	1.26	235.11	48	2514	0.44	0.032	0.01	8.42	0.01	0.000
22.16	1.96	186.87	1.25	234.02	48	2503	0.44	0.032	0.01	8.42	0.01	0.000

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
22.19	1.96	187.44	1.25	233.86	48	2500	0.44	0.032	0.01	8.42	0.01	0.000
22.25	1.96	187.38	1.25	233.69	48	2502	0.44	0.033	0.01	8.42	0.01	0.000
22.33	1.96	186.87	1.25	233.26	48	2505	0.44	0.033	0.01	8.42	0.01	0.000
22.38	1.96	185.87	1.25	232.81	48	2508	0.44	0.033	0.01	8.42	0.01	0.000
22.46	1.96	184.90	1.25	232.00	48	2507	0.44	0.033	0.01	8.42	0.01	0.000
22.51	1.94	186.63	1.23	230.30	47	2471	0.44	0.034	0.01	8.42	0.01	0.000
22.61	1.92	190.33	1.21	230.20	47	2448	0.44	0.034	0.01	8.42	0.01	0.000
22.68	1.90	195.62	1.19	231.82	46	2435	0.44	0.035	0.01	8.42	0.01	0.000
22.73	1.89	200.05	1.18	235.59	47	2465	0.44	0.034	0.01	8.42	0.01	0.000
22.78	1.88	202.77	1.17	238.23	47	2492	0.44	0.034	0.01	8.42	0.01	0.000
22.85	1.89	203.71	1.18	240.79	48	2536	0.44	0.033	0.01	8.42	0.01	0.000
22.95	1.91	203.16	1.19	242.64	49	2583	0.44	0.032	0.01	8.42	0.01	0.000
22.99	1.92	202.62	1.21	244.63	49	2627	0.44	0.032	0.01	8.42	0.01	0.000
23.04	1.93	201.90	1.22	246.08	50	2662	0.44	0.031	0.01	8.42	0.01	0.000
23.12	1.94	200.78	1.23	246.91	50	2692	0.44	0.031	0.01	8.42	0.01	0.000
23.17	1.95	199.23	1.24	247.04	50	2710	0.44	0.030	0.01	8.42	0.01	0.000
23.26	1.96	197.21	1.25	245.88	50	2712	0.44	0.031	0.01	8.42	0.01	0.000
23.30	1.96	194.35	1.25	243.38	50	2694	0.44	0.031	0.01	8.42	0.01	0.000
23.39	1.96	191.35	1.26	240.31	49	2671	0.44	0.031	0.01	8.42	0.01	0.000
23.43	1.97	188.29	1.26	236.85	49	2638	0.44	0.032	0.01	8.42	0.01	0.000
23.52	1.97	185.93	1.26	234.41	48	2620	0.44	0.033	0.01	8.42	0.01	0.000
23.56	1.97	183.46	1.27	232.37	48	2607	0.44	0.033	0.01	8.42	0.01	0.000
23.65	1.98	180.99	1.28	230.85	48	2605	0.44	0.033	0.01	8.42	0.01	0.000
23.70	1.99	177.56	1.29	229.24	48	2603	0.44	0.033	0.01	8.42	0.01	0.000
23.78	2.01	174.24	1.31	227.80	48	2606	0.44	0.033	0.01	8.42	0.01	0.000
23.83	2.02	170.77	1.33	226.70	48	2611	0.44	0.033	0.01	8.42	0.01	0.000
23.91	2.03	168.34	1.34	226.10	48	2620	0.44	0.033	0.01	8.42	0.01	0.000
23.96	2.04	166.16	1.36	225.71	48	2627	0.44	0.033	0.01	8.42	0.01	0.000
24.02	2.05	164.41	1.37	224.88	48	2627	0.44	0.033	0.01	8.42	0.01	0.000
24.10	2.05	162.87	1.37	223.43	47	2618	0.44	0.034	0.01	8.42	0.01	0.000
24.18	2.05	161.86	1.37	222.12	47	2610	0.44	0.034	0.01	8.42	0.01	0.000
24.22	2.05	161.45	1.37	221.47	47	2605	0.44	0.034	0.01	8.42	0.01	0.000
24.31	2.05	160.82	1.37	221.02	47	2607	0.44	0.034	0.01	8.42	0.01	0.000
24.36	2.05	160.41	1.37	220.49	47	2605	0.44	0.034	0.01	8.42	0.01	0.000
24.43	2.05	159.52	1.37	219.14	47	2594	0.44	0.035	0.01	8.42	0.01	0.000
24.51	2.05	158.69	1.37	217.44	46	2578	0.44	0.035	0.01	8.42	0.01	0.000
24.54	2.04	158.13	1.36	214.94	45	2546	0.44	0.036	0.01	8.42	0.01	0.000
24.62	2.03	158.15	1.34	211.59	45	2500	0.44	0.037	0.01	8.42	0.01	0.000
24.71	2.01	157.86	1.32	207.75	43	2447	0.44	0.038	0.02	8.42	0.01	0.000
24.75	2.00	156.97	1.30	203.34	42	2383	0.44	0.040	0.02	8.42	0.01	0.000
24.84	1.99	155.03	1.29	199.22	41	2333	0.44	0.042	0.02	8.42	0.01	0.000
24.89	1.98	152.84	1.27	194.04	40	2262	0.44	0.044	0.02	8.42	0.01	0.000
25.02	1.97	149.86	1.26	189.26	39	2208	0.45	0.046	0.02	8.42	0.02	0.001
25.10	1.97	145.97	1.26	184.17	0	0	0.45	0.000	0.00	8.42	0.00	0.000
25.15	1.98	140.67	1.28	179.71	0	0	0.45	0.000	0.00	8.42	0.00	0.000
25.20	2.00	134.17	1.30	174.66	0	0	0.45	0.000	0.00	8.42	0.00	0.000
25.28	2.03	126.41	1.34	169.06	0	0	0.45	0.000	0.00	8.42	0.00	0.000
25.33	2.05	118.29	1.38	163.03	0	0	0.45	0.000	0.00	8.42	0.00	0.000



:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
25.41	2.09	109.60	1.44	157.94	0	0	0.45	0.000	0.00	8.42	0.00	0.000
25.46	2.11	100.77	1.47	147.99	0	0	0.45	0.000	0.00	8.42	0.00	0.000
25.52	2.14	90.51	1.53	138.67	0	0	0.45	0.000	0.00	8.42	0.00	0.000
25.59	2.19	78.55	1.64	129.20	0	0	0.45	0.000	0.00	8.42	0.00	0.000
25.64	2.30	65.07	1.96	127.45	0	0	0.45	0.000	0.00	8.42	0.00	0.000
25.71	2.43	51.66	2.46	126.92	0	0	0.45	0.000	0.00	8.42	0.00	0.000
25.77	2.58	39.77	3.18	126.51	0	0	0.45	0.000	0.00	8.42	0.00	0.000
25.81	2.72	30.53	4.11	125.46	0	0	0.45	0.000	0.00	0.00	0.00	0.000
25.86	2.83	24.19	5.03	121.77	0	0	0.45	0.000	0.00	0.00	0.00	0.000
25.96	2.91	20.31	5.79	117.65	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.00	2.97	17.83	6.41	114.27	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.08	3.02	16.15	7.02	113.32	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.13	3.06	15.09	7.44	112.30	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.26	3.07	14.66	7.56	110.76	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.30	3.05	14.97	7.35	110.03	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.34	3.04	15.34	7.18	110.13	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.39	3.02	15.76	7.00	110.31	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.48	3.02	15.87	6.97	110.69	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.52	3.00	16.32	6.78	110.60	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.61	2.98	16.82	6.57	110.54	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.65	2.97	17.03	6.45	109.89	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.74	2.98	16.85	6.49	109.34	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.78	2.94	18.12	6.05	109.68	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.87	2.83	22.00	5.01	110.34	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.92	2.66	29.81	3.71	110.47	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.01	2.55	36.09	3.06	110.51	29	1298	0.45	0.165	0.10	8.42	0.08	0.002
27.05	2.54	37.32	3.00	111.90	29	1323	0.45	0.157	0.10	8.42	0.08	0.001
27.18	2.62	33.06	3.43	113.38	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.23	2.72	27.43	4.17	114.30	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.27	2.81	23.21	4.89	113.55	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.31	2.92	18.67	5.92	110.59	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.40	3.02	15.25	6.96	106.12	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.45	3.10	12.28	7.93	97.42	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.54	3.15	10.39	8.52	88.45	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.59	3.19	8.79	9.13	80.25	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.65	3.22	8.05	9.51	76.54	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.71	3.24	7.59	9.78	74.25	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.89	3.25	7.44	9.92	73.80	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.93	3.25	7.56	10.00	75.63	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.00	3.23	8.36	9.61	80.33	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.06	3.17	9.69	8.84	85.65	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.11	3.11	11.40	8.07	91.96	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.18	3.06	13.42	7.40	99.35	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.29	2.99	15.17	6.59	100.03	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.37	2.89	17.02	5.64	96.02	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.42	2.80	18.90	4.80	90.69	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.49	2.76	20.76	4.47	92.79	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.55	2.76	22.40	4.43	99.19	0	0	0.45	0.000	0.00	0.00	0.00	0.000

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
28.60	2.77	23.22	4.49	104.35	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.68	2.76	24.34	4.44	108.10	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.74	2.75	25.32	4.39	111.04	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.83	2.74	26.45	4.28	113.06	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.88	2.74	26.59	4.33	115.23	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.96	2.76	26.08	4.46	116.35	0	0	0.45	0.000	0.00	0.00	0.00	0.000
29.01	2.81	23.85	4.89	116.69	0	0	0.45	0.000	0.00	0.00	0.00	0.000
29.16	2.88	21.28	5.46	116.20	0	0	0.45	0.000	0.00	0.00	0.00	0.000
29.23	2.92	19.56	5.93	115.90	0	0	0.45	0.000	0.00	0.00	0.00	0.000
29.27	2.94	19.18	6.07	116.53	0	0	0.45	0.000	0.00	0.00	0.00	0.000
29.31	2.93	19.62	5.98	117.29	0	0	0.45	0.000	0.00	0.00	0.00	0.000
29.36	2.92	19.92	5.93	118.05	0	0	0.45	0.000	0.00	0.00	0.00	0.000
29.41	2.91	20.33	5.83	118.50	0	0	0.45	0.000	0.00	0.00	0.00	0.000
29.49	2.92	20.15	5.88	118.57	0	0	0.45	0.000	0.00	0.00	0.00	0.000
29.55	2.93	19.90	5.97	118.86	0	0	0.45	0.000	0.00	0.00	0.00	0.000
29.60	2.87	22.32	5.41	120.75	0	0	0.45	0.000	0.00	0.00	0.00	0.000
29.68	2.75	28.35	4.35	123.44	0	0	0.45	0.000	0.00	0.00	0.00	0.000
29.76	2.63	35.87	3.51	125.95	0	0	0.45	0.000	0.00	0.00	0.00	0.000
29.82	2.54	42.61	3.00	127.76	34	1636	0.45	0.104	0.06	8.42	0.04	0.001
29.90	2.51	46.05	2.80	128.85	33	1675	0.45	0.099	0.05	8.42	0.04	0.001
29.93	2.49	47.89	2.70	129.50	33	1696	0.45	0.096	0.05	8.42	0.04	0.000
30.02	2.49	47.87	2.72	129.99	33	1706	0.45	0.095	0.05	8.42	0.04	0.001
30.07	2.50	46.97	2.79	131.02	34	1713	0.45	0.095	0.05	8.42	0.04	0.000
30.16	2.52	46.02	2.88	132.44	34	1725	0.45	0.093	0.05	8.42	0.04	0.001
30.21	2.54	45.25	2.98	134.88	35	1748	0.45	0.091	0.05	8.42	0.04	0.000
30.29	2.54	45.64	3.00	137.04	0	0	0.45	0.000	0.00	8.42	0.00	0.000
30.33	2.54	46.91	2.97	139.14	0	0	0.45	0.000	0.00	8.42	0.00	0.000
30.38	2.51	49.52	2.84	140.86	0	0	0.45	0.000	0.00	8.42	0.00	0.000
30.46	2.49	52.08	2.73	142.00	0	0	0.45	0.000	0.00	8.42	0.00	0.000
30.52	2.47	54.85	2.61	143.28	0	0	0.45	0.000	0.00	8.42	0.00	0.000
30.62	2.45	56.61	2.53	143.39	0	0	0.45	0.000	0.00	8.42	0.00	0.000
30.66	2.43	58.25	2.46	143.34	0	0	0.45	0.000	0.00	8.42	0.00	0.000
30.72	2.42	59.96	2.38	142.63	0	0	0.45	0.000	0.00	8.42	0.00	0.000
30.82	2.39	62.09	2.29	142.22	0	0	0.45	0.000	0.00	8.42	0.00	0.000
30.87	2.37	65.01	2.20	142.78	0	0	0.45	0.000	0.00	8.42	0.00	0.000
30.93	2.35	68.45	2.11	144.69	0	0	0.45	0.000	0.00	8.42	0.00	0.000
30.99	2.32	72.64	2.03	147.34	0	0	0.45	0.000	0.00	8.42	0.00	0.000
31.04	2.30	77.32	1.95	151.12	0	0	0.45	0.000	0.00	8.42	0.00	0.000
31.12	2.28	82.94	1.88	155.98	0	0	0.45	0.000	0.00	8.42	0.00	0.000
31.23	2.26	87.65	1.83	160.46	0	0	0.45	0.000	0.00	8.42	0.00	0.000
31.30	2.25	91.39	1.79	163.34	0	0	0.45	0.000	0.00	8.42	0.00	0.000
31.34	2.24	92.95	1.76	163.85	0	0	0.45	0.000	0.00	8.42	0.00	0.000
31.43	2.23	93.59	1.74	163.31	0	0	0.45	0.000	0.00	8.42	0.00	0.000
31.48	2.21	94.20	1.69	159.53	0	0	0.45	0.000	0.00	8.42	0.00	0.000
31.53	2.20	94.54	1.68	158.65	0	0	0.45	0.000	0.00	8.42	0.00	0.000
31.61	2.20	95.42	1.66	158.63	0	0	0.45	0.000	0.00	8.42	0.00	0.000
31.66	2.20	96.96	1.67	161.61	36	2340	0.45	0.055	0.03	8.42	0.02	0.000
31.70	2.20	97.74	1.67	162.94	37	2362	0.45	0.054	0.03	8.42	0.02	0.000

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
31.83	2.20	98.45	1.67	163.93	37	2383	0.45	0.054	0.03	8.42	0.02	0.001
31.89	2.20	99.91	1.66	166.15	37	2419	0.45	0.052	0.02	8.42	0.02	0.000
31.98	2.19	102.70	1.63	167.59	38	2443	0.46	0.052	0.02	8.42	0.02	0.000
32.06	2.17	105.48	1.60	168.90	38	2464	0.46	0.051	0.02	8.42	0.02	0.000
32.11	2.16	107.25	1.58	169.77	38	2478	0.46	0.051	0.02	8.42	0.02	0.000
32.16	2.15	109.86	1.56	171.29	38	2499	0.46	0.050	0.02	8.42	0.02	0.000
32.24	2.14	112.80	1.54	173.51	38	2532	0.46	0.049	0.02	8.42	0.02	0.000
32.29	2.14	115.80	1.53	177.09	39	2586	0.46	0.048	0.02	8.42	0.02	0.000
32.38	2.14	117.25	1.54	180.08	40	2636	0.46	0.046	0.02	8.42	0.02	0.000
32.42	2.15	117.42	1.56	182.60	40	2679	0.46	0.045	0.02	8.42	0.01	0.000
32.49	2.16	116.74	1.57	183.53	41	2701	0.46	0.045	0.02	8.42	0.01	0.000
32.61	2.16	115.93	1.58	183.62	41	2711	0.46	0.045	0.02	8.42	0.01	0.000
32.65	2.17	115.61	1.59	183.33	41	2710	0.46	0.045	0.02	8.42	0.01	0.000
32.69	2.16	116.10	1.57	182.41	40	2696	0.46	0.045	0.02	8.42	0.01	0.000
32.77	2.15	117.02	1.55	181.27	40	2680	0.46	0.046	0.02	8.42	0.02	0.000
32.82	2.13	119.06	1.51	180.04	39	2656	0.46	0.046	0.02	8.42	0.02	0.000
32.90	2.12	120.77	1.48	179.15	39	2639	0.46	0.047	0.02	8.42	0.02	0.000
32.95	2.11	121.45	1.47	178.54	39	2628	0.46	0.047	0.02	8.42	0.02	0.000
33.06	2.11	120.43	1.48	177.93	39	2629	0.46	0.047	0.02	8.42	0.02	0.000
33.10	2.11	119.31	1.48	176.86	39	2617	0.46	0.048	0.02	8.42	0.02	0.000
33.18	2.11	118.99	1.47	175.42	38	2597	0.46	0.049	0.02	8.42	0.02	0.000
33.21	2.10	120.15	1.45	173.95	38	2567	0.46	0.050	0.02	8.42	0.02	0.000
33.30	2.09	121.40	1.43	173.61	37	2560	0.46	0.050	0.02	8.42	0.02	0.000
33.35	2.08	123.15	1.43	175.75	38	2592	0.46	0.049	0.02	8.42	0.02	0.000
33.48	2.09	124.02	1.44	178.58	39	2647	0.46	0.048	0.02	8.42	0.02	0.001
33.52	2.10	125.34	1.45	182.15	39	2708	0.46	0.046	0.02	8.42	0.02	0.000
33.56	2.10	126.38	1.46	184.55	40	2750	0.46	0.045	0.02	8.42	0.02	0.000
33.60	2.11	127.85	1.47	187.63	41	2801	0.46	0.044	0.02	8.42	0.01	0.000
33.67	2.11	129.75	1.47	190.62	41	2851	0.46	0.043	0.02	8.42	0.01	0.000
33.75	2.10	134.16	1.45	194.32	42	2902	0.46	0.042	0.02	8.42	0.01	0.000
33.91	2.08	138.63	1.42	196.79	42	2934	0.46	0.041	0.02	8.42	0.01	0.001
33.97	2.06	143.32	1.39	198.91	42	2948	0.46	0.041	0.02	8.42	0.01	0.000
34.01	2.04	147.23	1.36	199.76	42	2939	0.46	0.041	0.02	8.42	0.01	0.000
34.12	2.02	151.23	1.33	200.44	42	2926	0.46	0.042	0.02	8.42	0.01	0.000
34.18	2.00	155.36	1.30	201.37	42	2911	0.46	0.042	0.02	8.42	0.01	0.000
34.23	1.98	157.62	1.28	201.55	42	2894	0.46	0.042	0.02	8.42	0.01	0.000
34.29	1.98	158.00	1.27	200.48	41	2869	0.46	0.043	0.02	8.42	0.01	0.000
34.36	1.97	156.53	1.27	198.17	41	2836	0.46	0.044	0.02	8.42	0.01	0.000
34.40	1.96	153.48	1.26	192.77	40	2747	0.46	0.046	0.02	8.42	0.02	0.000
34.51	1.95	150.05	1.24	186.16	38	2635	0.46	0.050	0.02	8.42	0.02	0.000
34.58	1.93	146.83	1.22	179.67	36	2520	0.46	0.053	0.03	8.42	0.02	0.000
34.63	1.93	143.89	1.22	175.62	36	2461	0.46	0.056	0.03	8.42	0.02	0.000
34.68	1.93	140.64	1.22	171.93	35	2414	0.46	0.058	0.03	8.42	0.02	0.000
34.75	1.93	138.51	1.22	168.58	34	2362	0.46	0.060	0.03	8.42	0.02	0.000
34.80	1.92	137.63	1.21	166.38	34	2320	0.46	0.062	0.03	8.42	0.03	0.000
34.89	1.92	137.53	1.20	165.57	33	2304	0.46	0.063	0.03	8.42	0.03	0.001
34.92	1.91	139.15	1.20	166.42	33	2304	0.46	0.063	0.03	8.42	0.03	0.000

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	I <sub>c</sub>	Q <sub>tn</sub>	K <sub>c</sub>	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)

**Total estimated settlement: 0.10**

**Abbreviations**

- Q<sub>tn</sub>: Equivalent clean sand normalized cone resistance
- K<sub>c</sub>: Fines correction factor
- Q<sub>tn,cs</sub>: Post-liquefaction volumetric strain
- G<sub>max</sub>: Small strain shear modulus
- CSR: Soil cyclic stress ratio
- γ: Cyclic shear strain
- e<sub>vol(15)</sub>: Volumetric strain after 15 cycles
- N<sub>c</sub>: Equivalent number of cycles
- e<sub>v</sub>: Volumetric strain
- Settle.: Calculated settlement

:: Post-earthquake settlement due to soil liquefaction ::												
Depth (ft)	Q <sub>tn,cs</sub>	FS	e <sub>v</sub> (%)	DF	Settlement (in)	Depth (ft)	Q <sub>tn,cs</sub>	FS	e <sub>v</sub> (%)	DF	Settlement (in)	
35.01	167.45	1.13	0.39	1.00	0.00	35.05	169.21	1.16	0.28	1.00	0.00	
35.14	170.13	1.18	0.28	1.00	0.00	35.19	171.35	1.20	0.28	1.00	0.00	
35.27	171.96	1.21	0.28	1.00	0.00	35.32	172.34	1.22	0.28	1.00	0.00	
35.41	172.21	1.21	0.28	1.00	0.00	35.45	172.09	1.21	0.28	1.00	0.00	
35.51	172.52	1.22	0.28	1.00	0.00	35.63	173.05	1.23	0.28	1.00	0.00	
35.66	174.27	1.25	0.28	1.00	0.00	35.72	174.97	1.26	0.19	1.00	0.00	
35.81	175.48	1.27	0.19	1.00	0.00	35.85	176.15	1.28	0.19	1.00	0.00	
35.93	176.55	1.29	0.19	1.00	0.00	36.03	176.55	1.29	0.19	1.00	0.00	
36.10	176.18	1.28	0.19	1.00	0.00	36.16	176.46	1.28	0.19	1.00	0.00	
36.21	177.75	1.31	0.19	1.00	0.00	36.28	179.38	1.34	0.19	1.00	0.00	
36.34	180.83	1.37	0.00	1.00	0.00	36.39	181.84	1.39	0.00	1.00	0.00	
36.45	182.47	1.40	0.00	1.00	0.00	36.51	182.87	1.40	0.00	1.00	0.00	
36.55	183.53	1.42	0.00	1.00	0.00	36.69	184.13	1.43	0.00	1.00	0.00	
36.73	184.85	1.44	0.00	1.00	0.00	36.78	184.95	1.44	0.00	1.00	0.00	
36.85	184.74	1.44	0.00	1.00	0.00	36.91	183.69	1.42	0.00	1.00	0.00	
36.97	181.63	1.37	0.00	1.00	0.00	37.03	178.79	1.32	0.19	1.00	0.00	
37.09	176.19	1.27	0.19	1.00	0.00	37.26	171.69	1.19	0.28	1.00	0.01	
37.30	166.91	1.10	0.40	1.00	0.00	37.38	163.25	2.00	0.00	1.00	0.00	
37.43	162.26	2.00	0.00	1.00	0.00	37.48	162.84	2.00	0.00	1.00	0.00	
37.55	160.64	2.00	0.00	1.00	0.00	37.61	157.88	2.00	0.00	1.00	0.00	
37.69	154.21	2.00	0.00	1.00	0.00	37.73	149.14	2.00	0.00	1.00	0.00	
37.83	144.37	2.00	0.00	1.00	0.00	37.86	138.86	2.00	0.00	1.00	0.00	
37.95	133.09	2.00	0.00	1.00	0.00	38.02	124.83	2.00	0.00	1.00	0.00	
38.08	115.53	2.00	0.00	1.00	0.00	38.12	104.76	2.00	0.00	1.00	0.00	
38.21	95.58	2.00	0.00	1.00	0.00	38.26	85.91	2.00	0.00	1.00	0.00	
38.34	78.03	2.00	0.00	1.00	0.00	38.43	71.07	2.00	0.00	1.00	0.00	
38.46	65.25	2.00	0.00	1.00	0.00	38.53	61.08	2.00	0.00	1.00	0.00	
38.61	57.08	2.00	0.00	1.00	0.00	38.66	54.72	2.00	0.00	1.00	0.00	
38.74	53.55	2.00	0.00	1.00	0.00	38.79	52.77	2.00	0.00	1.00	0.00	
38.87	52.45	2.00	0.00	1.00	0.00	38.97	52.31	2.00	0.00	1.00	0.00	
39.01	52.40	2.00	0.00	1.00	0.00	39.05	52.76	2.00	0.00	1.00	0.00	
39.15	53.19	2.00	0.00	1.00	0.00	39.19	53.75	2.00	0.00	1.00	0.00	
39.25	54.34	2.00	0.00	1.00	0.00	39.35	54.84	2.00	0.00	1.00	0.00	
39.40	55.32	2.00	0.00	1.00	0.00	39.45	55.75	2.00	0.00	1.00	0.00	
39.52	56.18	2.00	0.00	1.00	0.00	39.58	56.85	2.00	0.00	1.00	0.00	

:: Post-earthquake settlement due to soil liquefaction :: (continued)											
Depth (ft)	Q <sub>tn,cs</sub>	FS	e <sub>v</sub> (%)	DF	Settlement (in)	Depth (ft)	Q <sub>tn,cs</sub>	FS	e <sub>v</sub> (%)	DF	Settlement (in)
39.71	57.25	2.00	0.00	1.00	0.00	39.76	57.70	2.00	0.00	1.00	0.00
39.82	57.94	2.00	0.00	1.00	0.00	39.89	58.38	2.00	0.00	1.00	0.00
39.94	59.06	2.00	0.00	1.00	0.00	40.02	59.81	2.00	0.00	1.00	0.00
40.06	60.57	2.00	0.00	1.00	0.00	40.14	61.02	2.00	0.00	1.00	0.00
40.20	61.25	2.00	0.00	1.00	0.00	40.25	61.20	2.00	0.00	1.00	0.00
40.32	61.01	2.00	0.00	1.00	0.00	40.37	59.78	2.00	0.00	1.00	0.00
40.43	55.76	2.00	0.00	1.00	0.00	40.50	51.88	2.00	0.00	1.00	0.00
40.62	49.24	2.00	0.00	1.00	0.00	40.68	50.22	2.00	0.00	1.00	0.00
40.75	50.74	2.00	0.00	1.00	0.00	40.77	51.14	2.00	0.00	1.00	0.00
40.86	51.28	2.00	0.00	1.00	0.00	40.89	51.43	2.00	0.00	1.00	0.00
40.95	51.93	2.00	0.00	1.00	0.00	41.03	52.73	2.00	0.00	1.00	0.00
41.08	53.69	2.00	0.00	1.00	0.00	41.17	54.18	2.00	0.00	1.00	0.00
41.21	54.57	2.00	0.00	1.00	0.00	41.30	54.99	2.00	0.00	1.00	0.00
41.36	55.40	2.00	0.00	1.00	0.00	41.44	55.49	2.00	0.00	1.00	0.00
41.48	54.97	2.00	0.00	1.00	0.00	41.61	54.28	2.00	0.00	1.00	0.00
41.65	53.64	2.00	0.00	1.00	0.00	41.74	53.41	2.00	0.00	1.00	0.00
41.78	53.36	2.00	0.00	1.00	0.00	41.82	53.64	2.00	0.00	1.00	0.00
41.90	54.09	2.00	0.00	1.00	0.00	41.98	54.65	2.00	0.00	1.00	0.00
42.02	55.45	2.00	0.00	1.00	0.00	42.09	56.27	2.00	0.00	1.00	0.00
42.14	57.72	2.00	0.00	1.00	0.00	42.23	59.17	2.00	0.00	1.00	0.00
42.27	60.50	2.00	0.00	1.00	0.00	42.35	61.02	2.00	0.00	1.00	0.00
42.39	61.88	2.00	0.00	1.00	0.00	42.49	63.25	2.00	0.00	1.00	0.00
42.54	66.41	2.00	0.00	1.00	0.00	42.62	70.90	2.00	0.00	1.00	0.00
42.68	77.41	2.00	0.00	1.00	0.00	42.75	84.46	2.00	0.00	1.00	0.00
42.80	94.52	2.00	0.00	1.00	0.00	42.92	103.70	2.00	0.00	1.00	0.00
42.98	112.78	2.00	0.00	1.00	0.00	43.02	119.65	2.00	0.00	1.00	0.00
43.09	124.99	2.00	0.00	1.00	0.00	43.15	128.70	2.00	0.00	1.00	0.00
43.20	129.96	2.00	0.00	1.00	0.00	43.27	129.56	2.00	0.00	1.00	0.00
43.33	128.86	2.00	0.00	1.00	0.00	43.39	128.44	2.00	0.00	1.00	0.00
43.46	128.26	2.00	0.00	1.00	0.00	43.51	128.33	2.00	0.00	1.00	0.00
43.58	128.90	2.00	0.00	1.00	0.00	43.68	127.26	2.00	0.00	1.00	0.00
43.76	127.37	2.00	0.00	1.00	0.00	43.81	126.82	0.57	1.92	1.00	0.01
43.88	128.19	0.58	1.91	1.00	0.02	43.94	128.39	0.58	1.90	1.00	0.01
43.99	128.81	0.59	1.90	1.00	0.01	44.03	129.79	0.60	1.89	1.00	0.01
44.12	129.82	0.60	1.89	1.00	0.02	44.17	130.73	0.60	1.88	1.00	0.01
44.30	131.62	0.61	1.87	1.00	0.03	44.35	133.57	0.63	1.84	1.00	0.01
44.41	135.93	0.66	1.59	1.00	0.01	44.48	138.78	0.69	1.54	1.00	0.01
44.53	142.88	0.74	1.48	1.00	0.01	44.65	146.73	0.79	1.16	1.00	0.02
44.70	150.58	0.84	1.12	1.00	0.01	44.77	153.45	0.87	0.83	1.00	0.01
44.83	155.83	2.00	0.00	1.00	0.00	44.88	157.41	2.00	0.00	1.00	0.00
44.94	157.94	2.00	0.00	1.00	0.00	45.01	157.61	2.00	0.00	1.00	0.00
45.07	156.52	2.00	0.00	1.00	0.00	45.14	154.30	2.00	0.00	1.00	0.00
45.18	151.32	2.00	0.00	1.00	0.00	45.24	148.02	2.00	0.00	1.00	0.00
45.32	145.61	2.00	0.00	1.00	0.00	45.36	144.17	2.00	0.00	1.00	0.00
45.43	141.71	2.00	0.00	1.00	0.00	45.49	137.02	2.00	0.00	1.00	0.00
45.54	130.40	2.00	0.00	1.00	0.00	45.63	127.23	2.00	0.00	1.00	0.00
45.73	125.37	2.00	0.00	1.00	0.00	45.80	127.13	2.00	0.00	1.00	0.00
45.85	127.91	2.00	0.00	1.00	0.00	45.90	132.39	2.00	0.00	1.00	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)											
Depth (ft)	Q <sub>tn,cs</sub>	FS	e <sub>v</sub> (%)	DF	Settlement (in)	Depth (ft)	Q <sub>tn,cs</sub>	FS	e <sub>v</sub> (%)	DF	Settlement (in)
46.03	137.88	2.00	0.00	1.00	0.00	46.09	143.70	2.00	0.00	1.00	0.00
46.15	147.43	2.00	0.00	1.00	0.00	46.20	150.48	2.00	0.00	1.00	0.00
46.26	153.30	2.00	0.00	1.00	0.00	46.33	156.11	2.00	0.00	1.00	0.00
46.38	158.78	2.00	0.00	1.00	0.00	46.43	161.01	2.00	0.00	1.00	0.00
46.47	163.20	2.00	0.00	1.00	0.00	46.53	165.75	2.00	0.00	1.00	0.00
46.60	167.50	2.00	0.00	1.00	0.00	46.70	167.92	2.00	0.00	1.00	0.00
46.74	167.60	2.00	0.00	1.00	0.00	46.80	167.21	2.00	0.00	1.00	0.00
46.91	166.81	2.00	0.00	1.00	0.00	46.95	165.25	2.00	0.00	1.00	0.00
47.00	161.67	2.00	0.00	1.00	0.00	47.08	158.93	2.00	0.00	1.00	0.00
47.17	156.64	2.00	0.00	1.00	0.00	47.21	155.67	2.00	0.00	1.00	0.00
47.26	153.72	2.00	0.00	1.00	0.00	47.35	151.63	2.00	0.00	1.00	0.00
47.40	149.37	2.00	0.00	1.00	0.00	47.48	147.38	2.00	0.00	1.00	0.00
47.53	144.53	2.00	0.00	1.00	0.00	47.64	141.92	2.00	0.00	1.00	0.00
47.70	139.81	2.00	0.00	1.00	0.00	47.75	139.00	2.00	0.00	1.00	0.00
47.81	138.62	2.00	0.00	1.00	0.00	47.88	138.34	2.00	0.00	1.00	0.00
47.93	138.22	2.00	0.00	1.00	0.00	48.00	137.84	2.00	0.00	1.00	0.00
48.05	136.52	2.00	0.00	1.00	0.00	48.18	134.01	2.00	0.00	1.00	0.00
48.23	129.63	2.00	0.00	1.00	0.00	48.29	122.75	2.00	0.00	1.00	0.00
48.37	114.53	2.00	0.00	1.00	0.00	48.41	104.21	2.00	0.00	1.00	0.00
48.54	96.71	2.00	0.00	1.00	0.00	48.59	90.02	2.00	0.00	1.00	0.00
48.66	86.54	2.00	0.00	1.00	0.00	48.78	83.43	2.00	0.00	1.00	0.00
48.84	81.16	2.00	0.00	1.00	0.00	48.96	80.28	2.00	0.00	1.00	0.00
49.03	80.59	2.00	0.00	1.00	0.00	49.08	82.58	2.00	0.00	1.00	0.00
49.15	85.21	2.00	0.00	1.00	0.00	49.20	85.04	2.00	0.00	1.00	0.00
49.27	84.49	2.00	0.00	1.00	0.00	49.33	85.61	2.00	0.00	1.00	0.00
49.40	92.42	2.00	0.00	1.00	0.00	49.47	99.80	2.00	0.00	1.00	0.00
49.51	106.67	2.00	0.00	1.00	0.00	49.58	110.75	2.00	0.00	1.00	0.00
49.65	113.04	2.00	0.00	1.00	0.00	49.70	112.17	0.45	2.13	1.00	0.01
49.78	109.94	0.43	2.16	1.00	0.02	49.83	107.57	0.41	2.20	1.00	0.01
49.91	106.50	0.41	2.22	1.00	0.02						

**Total estimated settlement: 0.32**

**Abbreviations**

- Q<sub>tn,cs</sub>: Equivalent clean sand normalized cone resistance
- FS: Factor of safety against liquefaction
- e<sub>v</sub> (%): Post-liquefaction volumetric strain
- DF: e<sub>v</sub> depth weighting factor
- Settlement: Calculated settlement



**LIQUEFACTION ANALYSIS REPORT**

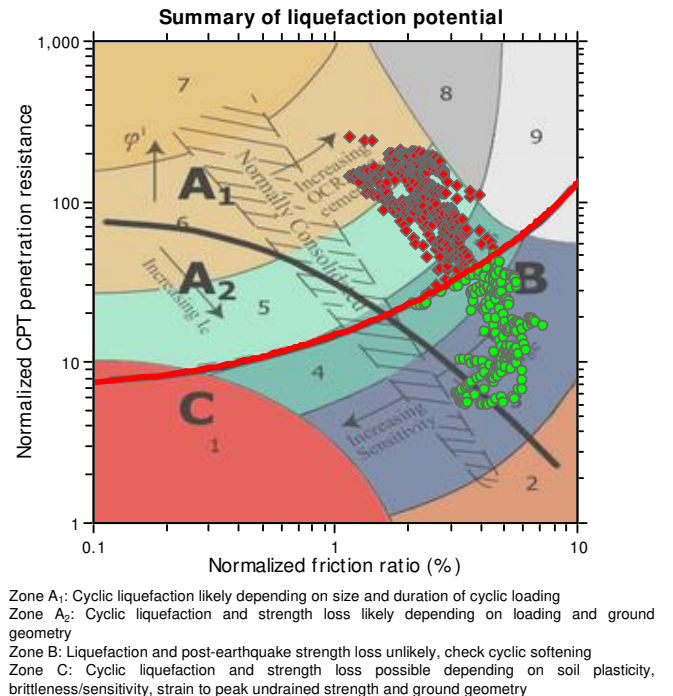
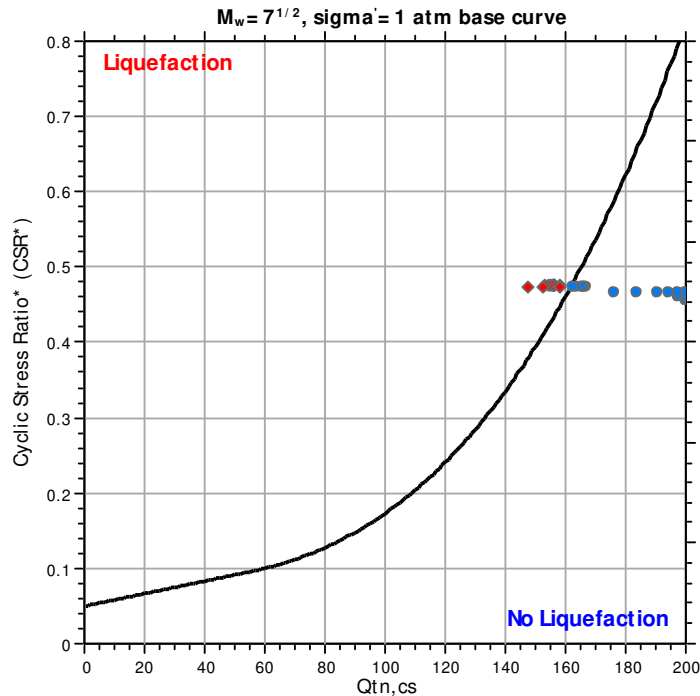
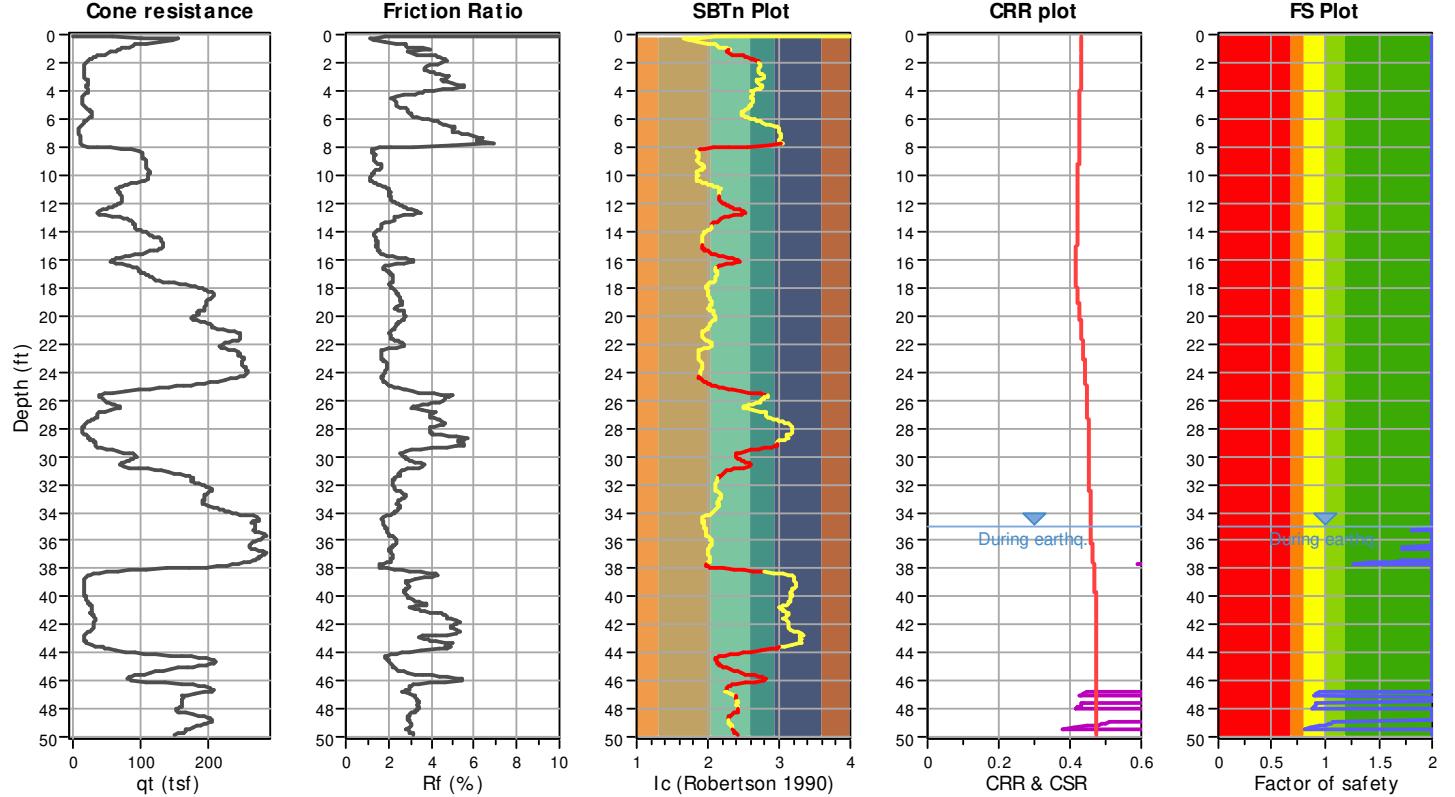
**Project title : Proposed Townhouses**

**Location : 2323 West Broadway, Anaheim, CA**

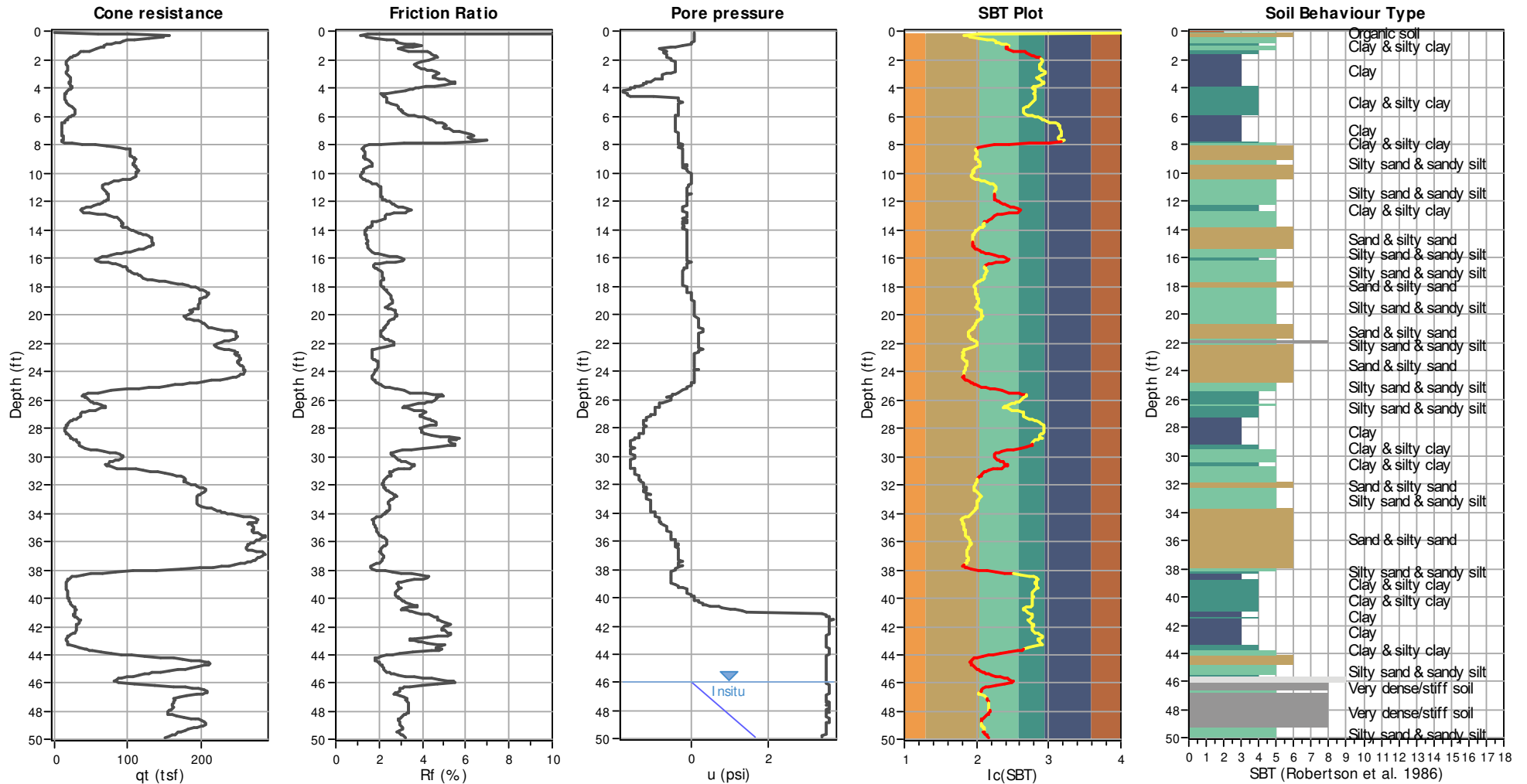
**CPT file : CPT-4**

**Input parameters and analysis data**

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	46.00 ft	Use fill:	No	Clay like behavior	
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	35.00 ft	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude $M_w$ :	6.67	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	60.00 ft
Peak ground acceleration:	0.69	Unit weight calculation:	Based on SBT	$K_v$ applied:	Yes	MSF method:	Method based



### CPT basic interpretation plots



#### Input parameters and analysis data

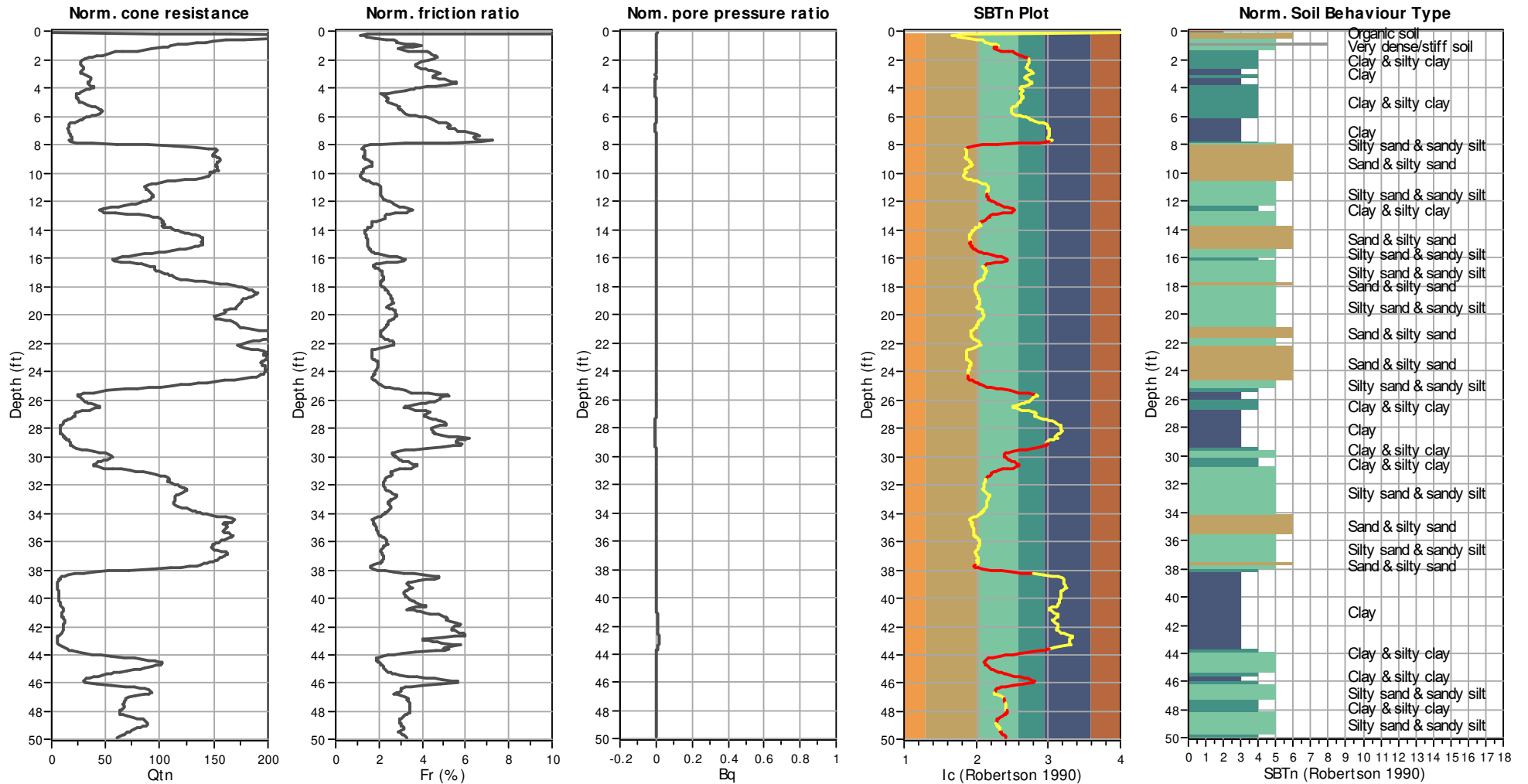
Analysis method:	NCEER (1998)	Depth to water table (erthq.):	35.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>o</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	6.67	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.69	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	46.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

#### SBT legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained



### CPT basic interpretation plots (normalized)



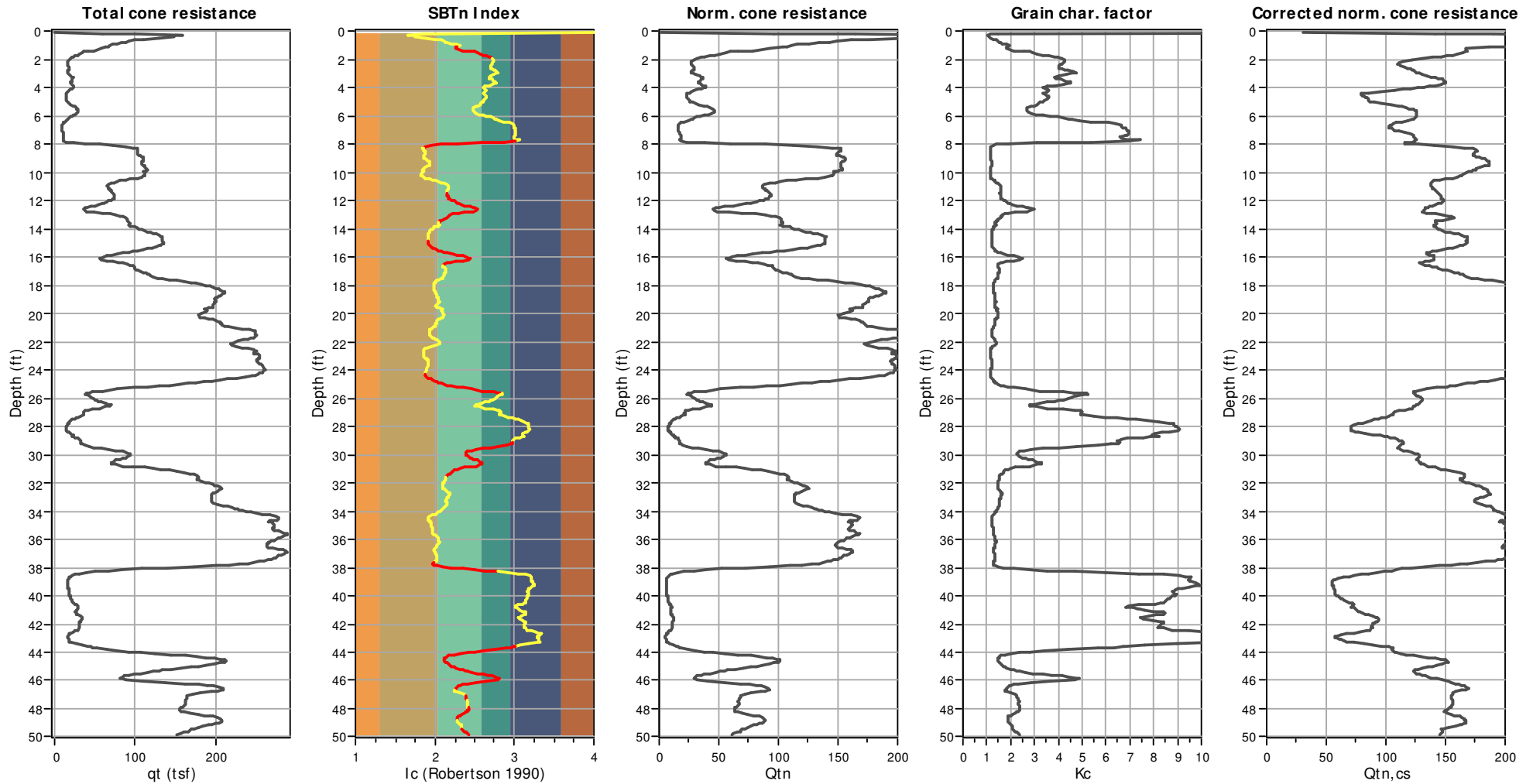
#### Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	35.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>σ</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	6.67	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.69	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	46.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

#### SBTn legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

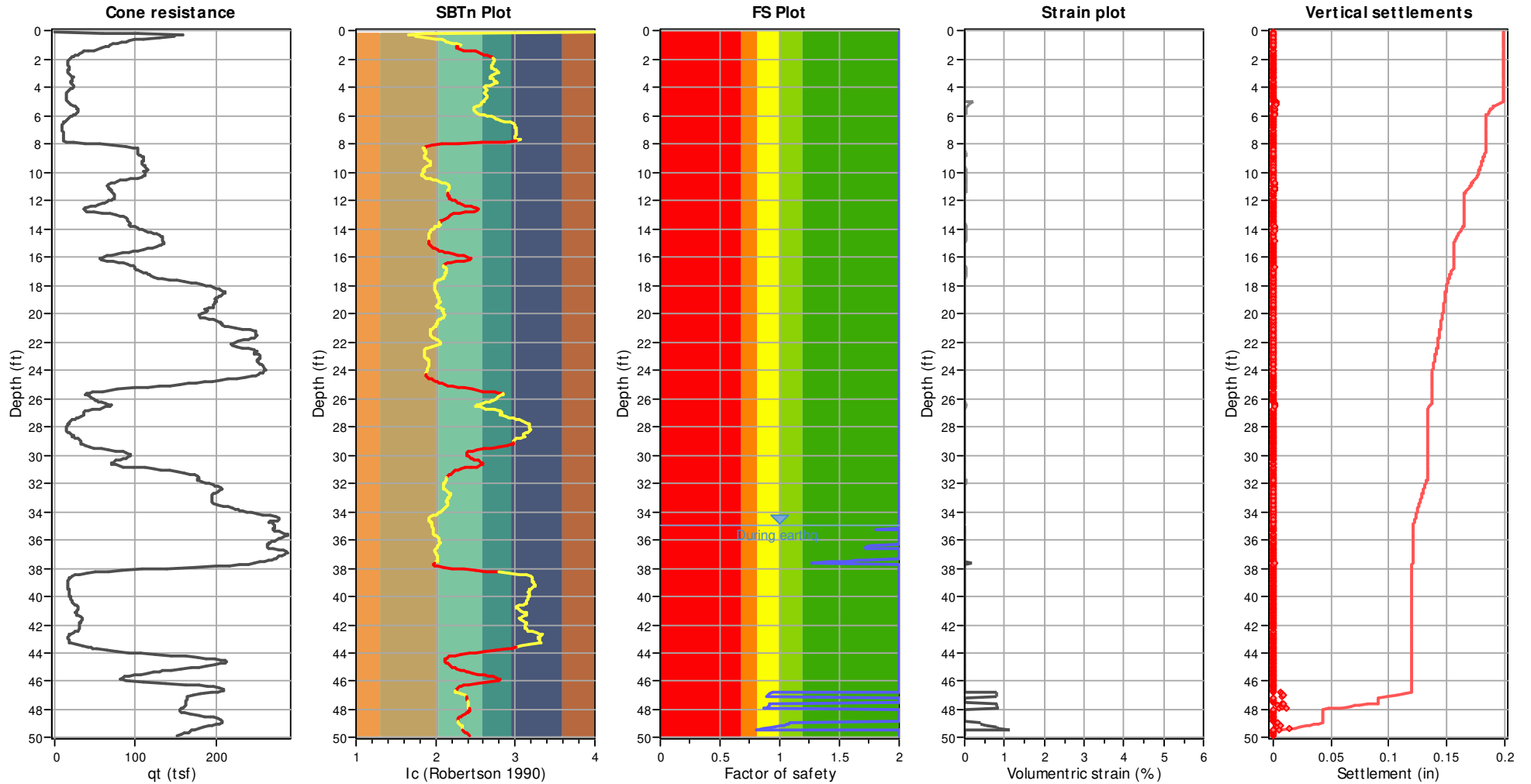
### Liquefaction analysis overall plots (intermediate results)



#### Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	35.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>v</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	6.67	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.69	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	46.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

### Estimation of post-earthquake settlements



**Abbreviations**

- qt: Total cone resistance (cone resistance  $q_c$  corrected for pore water effects)
- $I_c$ : Soil Behaviour Type Index
- FS: Calculated Factor of Safety against liquefaction
- Volumetric strain: Post-liquefaction volumetric strain

:: Post-earthquake settlement of dry sands ::												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
0.08	4.06	1.16	26.61	30.80	0	0	0.43	0.000	0.00	0.00	0.00	0.000
0.13	2.11	96.65	1.47	141.91	31	781	0.43	0.000	0.00	8.42	0.00	0.000
0.22	1.86	164.77	1.16	190.55	38	978	0.43	0.001	0.00	8.42	0.00	0.000
0.26	1.66	253.26	1.01	256.74	47	1168	0.43	0.001	0.00	8.42	0.00	0.000
0.33	1.73	240.06	1.05	253.22	48	1195	0.43	0.001	0.00	8.42	0.00	0.000
0.40	1.75	238.54	1.07	256.41	49	1233	0.43	0.001	0.00	8.42	0.00	0.000
0.52	1.88	207.55	1.17	242.89	48	1257	0.43	0.001	0.00	8.42	0.00	0.000
0.57	2.00	177.30	1.30	231.28	48	1255	0.43	0.001	0.00	8.42	0.00	0.000
0.62	2.08	160.74	1.42	228.36	49	1255	0.43	0.002	0.00	8.42	0.00	0.000
0.66	2.11	149.10	1.48	220.97	48	1216	0.43	0.002	0.00	8.42	0.00	0.000
0.76	2.13	142.80	1.50	214.61	47	1180	0.43	0.002	0.00	8.42	0.00	0.000
0.83	2.15	134.13	1.56	209.51	46	1150	0.43	0.002	0.00	8.42	0.00	0.000
0.89	2.20	125.16	1.68	209.70	47	1142	0.43	0.002	0.00	8.42	0.00	0.000
0.93	2.27	116.15	1.85	214.50	50	1148	0.43	0.003	0.00	8.42	0.00	0.000
1.01	2.31	110.68	1.98	218.73	52	1153	0.43	0.003	0.00	8.42	0.00	0.000
1.07	2.28	107.65	1.90	204.13	48	1087	0.43	0.003	0.00	8.42	0.00	0.000
1.12	2.25	103.21	1.81	186.63	0	0	0.43	0.000	0.00	8.42	0.00	0.000
1.19	2.25	92.34	1.81	167.27	0	0	0.43	0.000	0.00	8.42	0.00	0.000
1.37	2.35	78.54	2.13	167.27	0	0	0.43	0.000	0.00	8.42	0.00	0.000
1.41	2.45	66.02	2.55	168.05	0	0	0.43	0.000	0.00	8.42	0.00	0.000
1.46	2.51	59.35	2.81	166.94	0	0	0.43	0.000	0.00	8.42	0.00	0.000
1.55	2.54	55.69	2.95	164.50	0	0	0.43	0.000	0.00	8.42	0.00	0.000
1.60	2.57	51.30	3.12	160.14	0	0	0.43	0.000	0.00	8.42	0.00	0.000
1.68	2.60	46.67	3.35	156.46	0	0	0.43	0.000	0.00	0.00	0.00	0.000
1.73	2.64	42.28	3.57	150.82	0	0	0.43	0.000	0.00	0.00	0.00	0.000
1.81	2.67	38.22	3.82	145.84	0	0	0.43	0.000	0.00	0.00	0.00	0.000
1.87	2.70	34.91	3.98	138.91	0	0	0.43	0.000	0.00	0.00	0.00	0.000
1.94	2.72	31.49	4.16	131.04	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.04	2.73	28.76	4.26	122.38	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.12	2.73	26.95	4.25	114.59	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.24	2.73	26.50	4.19	110.97	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.30	2.72	26.50	4.12	109.18	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.35	2.71	27.13	4.07	110.48	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.48	2.70	27.99	4.01	112.22	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.54	2.70	28.96	4.00	115.75	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.61	2.71	29.30	4.04	118.50	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.65	2.72	29.25	4.13	120.85	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.74	2.73	28.80	4.24	122.19	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.79	2.75	27.96	4.41	123.42	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.85	2.78	27.03	4.60	124.47	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.92	2.80	26.44	4.75	125.71	0	0	0.43	0.000	0.00	0.00	0.00	0.000
2.97	2.78	27.85	4.60	128.16	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.09	2.74	30.41	4.30	130.85	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.15	2.70	33.72	3.99	134.67	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.22	2.68	35.81	3.86	138.08	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.28	2.68	36.87	3.84	141.54	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.34	2.69	36.82	3.92	144.22	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.41	2.72	35.74	4.11	146.99	0	0	0.43	0.000	0.00	0.00	0.00	0.000

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
3.53	2.74	34.51	4.32	149.23	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.58	2.76	33.52	4.49	150.50	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.64	2.77	33.22	4.52	150.14	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.71	2.76	33.60	4.43	148.70	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.76	2.72	34.91	4.18	145.84	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.83	2.68	36.80	3.85	141.75	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.90	2.64	38.45	3.56	136.87	0	0	0.43	0.000	0.00	0.00	0.00	0.000
3.95	2.61	38.73	3.40	131.55	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.02	2.61	37.51	3.37	126.36	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.07	2.62	35.12	3.45	121.02	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.13	2.63	32.34	3.54	114.58	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.20	2.64	29.80	3.60	107.27	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.25	2.63	27.12	3.51	95.23	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.38	2.62	25.01	3.43	85.82	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.43	2.61	23.35	3.38	78.85	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.51	2.63	22.76	3.50	79.59	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.56	2.64	22.57	3.56	80.45	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.60	2.64	22.63	3.61	81.66	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.68	2.64	22.97	3.61	82.81	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.73	2.64	23.50	3.58	84.05	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.81	2.63	24.18	3.51	84.84	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.86	2.62	25.05	3.42	85.70	0	0	0.43	0.000	0.00	0.00	0.00	0.000
4.99	2.60	26.06	3.34	87.03	0	0	0.43	0.000	0.00	0.00	0.00	0.000
5.04	2.59	27.62	3.26	89.94	24	410	0.43	0.344	0.27	8.42	0.21	0.002
5.11	2.57	30.68	3.15	96.69	26	446	0.43	0.239	0.18	8.42	0.14	0.002
5.22	2.57	33.34	3.13	104.37	28	482	0.43	0.177	0.12	8.42	0.09	0.002
5.30	2.54	37.33	2.96	110.66	29	520	0.43	0.134	0.09	8.42	0.07	0.001
5.35	2.52	40.01	2.85	114.00	30	542	0.43	0.116	0.07	8.42	0.06	0.001
5.40	2.49	43.12	2.71	116.95	30	565	0.43	0.102	0.06	8.42	0.05	0.001
5.48	2.49	44.52	2.70	120.00	31	580	0.43	0.096	0.06	8.42	0.04	0.001
5.52	2.48	45.59	2.69	122.72	31	594	0.43	0.090	0.05	8.42	0.04	0.000
5.58	2.48	46.31	2.68	124.33	32	602	0.43	0.087	0.05	8.42	0.04	0.001
5.66	2.48	46.55	2.69	125.20	32	606	0.43	0.088	0.05	8.42	0.04	0.001
5.71	2.49	46.01	2.73	125.40	32	604	0.43	0.090	0.05	8.42	0.04	0.001
5.79	2.52	43.86	2.85	125.14	33	595	0.43	0.098	0.05	8.42	0.04	0.001
5.89	2.55	40.92	3.06	125.28	33	583	0.43	0.109	0.06	8.42	0.05	0.001
5.96	2.60	37.46	3.35	125.56	0	0	0.43	0.000	0.00	0.00	0.00	0.000
6.01	2.65	34.53	3.64	125.65	0	0	0.43	0.000	0.00	0.00	0.00	0.000
6.08	2.69	31.60	3.96	125.11	0	0	0.43	0.000	0.00	0.00	0.00	0.000
6.15	2.73	29.36	4.23	124.21	0	0	0.43	0.000	0.00	0.00	0.00	0.000
6.19	2.76	27.65	4.45	123.11	0	0	0.43	0.000	0.00	0.00	0.00	0.000
6.24	2.77	26.86	4.54	122.05	0	0	0.43	0.000	0.00	0.00	0.00	0.000
6.32	2.81	24.18	4.90	118.44	0	0	0.43	0.000	0.00	0.00	0.00	0.000
6.42	2.86	21.30	5.35	113.95	0	0	0.43	0.000	0.00	0.00	0.00	0.000
6.49	2.94	17.94	6.07	108.82	0	0	0.43	0.000	0.00	0.00	0.00	0.000
6.54	2.97	16.56	6.43	106.47	0	0	0.43	0.000	0.00	0.00	0.00	0.000
6.61	2.99	15.82	6.62	104.83	0	0	0.43	0.000	0.00	0.00	0.00	0.000
6.67	2.99	15.52	6.65	103.28	0	0	0.43	0.000	0.00	0.00	0.00	0.000

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
6.72	2.99	15.47	6.64	102.79	0	0	0.43	0.000	0.00	0.00	0.00	0.000
6.85	2.99	15.41	6.68	102.91	0	0	0.43	0.000	0.00	0.00	0.00	0.000
6.90	3.01	15.41	6.83	105.29	0	0	0.43	0.000	0.00	0.00	0.00	0.000
7.03	3.01	15.55	6.89	107.15	0	0	0.43	0.000	0.00	0.00	0.00	0.000
7.08	3.02	15.93	6.97	111.05	0	0	0.43	0.000	0.00	0.00	0.00	0.000
7.16	3.02	16.61	6.96	115.64	0	0	0.43	0.000	0.00	0.00	0.00	0.000
7.26	3.02	17.28	6.97	120.46	0	0	0.43	0.000	0.00	0.00	0.00	0.000
7.34	3.01	17.81	6.91	123.10	0	0	0.43	0.000	0.00	0.00	0.00	0.000
7.39	3.01	18.05	6.83	123.21	0	0	0.43	0.000	0.00	0.00	0.00	0.000
7.44	2.99	18.48	6.66	123.03	0	0	0.43	0.000	0.00	0.00	0.00	0.000
7.52	2.99	18.72	6.61	123.67	0	0	0.43	0.000	0.00	0.00	0.00	0.000
7.56	2.99	18.71	6.66	124.70	0	0	0.43	0.000	0.00	0.00	0.00	0.000
7.63	3.01	18.36	6.82	125.30	0	0	0.43	0.000	0.00	0.00	0.00	0.000
7.69	3.06	16.75	7.46	124.97	0	0	0.43	0.000	0.00	0.00	0.00	0.000
7.76	3.02	17.82	6.97	124.11	0	0	0.43	0.000	0.00	0.00	0.00	0.000
7.85	2.87	22.72	5.38	122.21	0	0	0.42	0.000	0.00	0.00	0.00	0.000
7.92	2.56	37.33	3.12	116.41	0	0	0.42	0.000	0.00	8.42	0.00	0.000
7.96	2.29	60.21	1.92	115.34	0	0	0.42	0.000	0.00	8.42	0.00	0.000
8.03	2.08	88.80	1.42	126.40	0	0	0.42	0.000	0.00	8.42	0.00	0.000
8.10	1.96	112.58	1.25	140.76	0	0	0.42	0.000	0.00	8.42	0.00	0.000
8.14	1.88	132.82	1.17	156.00	0	0	0.42	0.000	0.00	8.42	0.00	0.000
8.27	1.85	144.84	1.15	166.02	0	0	0.42	0.000	0.00	8.42	0.00	0.000
8.32	1.84	152.12	1.14	173.46	0	0	0.42	0.000	0.00	8.42	0.00	0.000
8.39	1.86	152.57	1.15	175.54	35	974	0.42	0.046	0.02	8.42	0.02	0.000
8.45	1.87	152.00	1.16	176.44	35	987	0.42	0.045	0.02	8.42	0.02	0.000
8.51	1.87	151.38	1.16	176.17	35	991	0.42	0.045	0.02	8.42	0.02	0.000
8.58	1.87	150.04	1.16	174.58	35	986	0.42	0.046	0.02	8.42	0.02	0.000
8.69	1.87	149.09	1.16	173.12	34	985	0.42	0.047	0.02	8.42	0.02	0.000
8.76	1.86	149.36	1.16	172.84	34	987	0.42	0.047	0.02	8.42	0.02	0.000
8.80	1.86	151.46	1.15	174.19	34	996	0.42	0.047	0.02	8.42	0.02	0.000
8.87	1.85	153.41	1.15	175.90	35	1010	0.42	0.046	0.02	8.42	0.02	0.000
8.93	1.85	154.87	1.15	177.83	35	1026	0.42	0.045	0.02	8.42	0.02	0.000
8.99	1.86	155.87	1.16	180.33	36	1047	0.42	0.043	0.02	8.42	0.02	0.000
9.06	1.88	156.01	1.17	182.42	36	1068	0.42	0.042	0.02	8.42	0.02	0.000
9.11	1.90	155.73	1.19	184.70	37	1090	0.42	0.041	0.02	8.42	0.01	0.000
9.19	1.91	154.59	1.20	185.82	37	1107	0.42	0.040	0.02	8.42	0.01	0.000
9.24	1.93	153.56	1.22	186.67	38	1119	0.42	0.039	0.02	8.42	0.01	0.000
9.29	1.93	152.76	1.22	186.89	38	1125	0.42	0.039	0.02	8.42	0.01	0.000
9.37	1.94	151.89	1.23	186.46	38	1130	0.42	0.039	0.02	8.42	0.01	0.000
9.42	1.94	151.90	1.23	186.10	38	1131	0.42	0.040	0.02	8.42	0.01	0.000
9.50	1.93	152.29	1.22	186.18	38	1137	0.42	0.040	0.02	8.42	0.01	0.000
9.55	1.91	152.61	1.20	182.62	37	1114	0.42	0.042	0.02	8.42	0.02	0.000
9.63	1.88	152.75	1.17	179.34	36	1093	0.42	0.044	0.02	8.42	0.02	0.000
9.68	1.85	153.33	1.15	175.92	35	1066	0.42	0.047	0.02	8.42	0.02	0.000
9.81	1.85	154.10	1.14	175.92	35	1072	0.42	0.047	0.02	8.42	0.02	0.001
9.86	1.85	150.94	1.15	173.27	34	1062	0.42	0.049	0.03	8.42	0.02	0.000
9.91	1.85	149.94	1.15	171.89	34	1056	0.42	0.050	0.03	8.42	0.02	0.000
9.93	1.86	146.87	1.15	169.17	33	1043	0.42	0.051	0.03	8.42	0.02	0.000

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
9.98	1.84	148.36	1.14	168.96	33	1039	0.42	0.052	0.03	8.42	0.02	0.000
10.04	1.84	146.55	1.14	166.56	33	1028	0.42	0.054	0.03	8.42	0.02	0.000
10.11	1.83	146.34	1.13	165.21	32	1020	0.42	0.056	0.03	8.42	0.02	0.000
10.20	1.83	144.99	1.13	163.70	32	1016	0.42	0.057	0.03	8.42	0.03	0.001
10.25	1.83	143.45	1.13	162.50	32	1013	0.42	0.058	0.03	8.42	0.03	0.000
10.34	1.85	139.02	1.15	159.73	31	1008	0.42	0.060	0.03	8.42	0.03	0.001
10.41	1.88	132.83	1.17	156.08	31	999	0.42	0.062	0.04	8.42	0.03	0.001
10.46	1.93	123.15	1.22	149.97	30	974	0.42	0.066	0.04	8.42	0.03	0.000
10.54	1.97	114.55	1.26	144.65	30	950	0.42	0.072	0.04	8.42	0.03	0.001
10.60	2.01	106.87	1.31	140.26	29	928	0.42	0.077	0.05	8.42	0.04	0.001
10.64	2.04	101.78	1.36	138.65	29	920	0.42	0.079	0.05	8.42	0.04	0.000
10.73	2.08	97.27	1.42	137.80	30	917	0.42	0.081	0.05	8.42	0.04	0.001
10.77	2.12	92.22	1.49	137.49	30	911	0.42	0.083	0.05	8.42	0.04	0.000
10.86	2.15	88.37	1.55	137.30	30	908	0.42	0.086	0.05	8.42	0.04	0.001
10.91	2.17	86.06	1.60	137.53	31	906	0.42	0.087	0.05	8.42	0.04	0.000
10.96	2.17	86.04	1.60	138.03	31	912	0.42	0.086	0.05	8.42	0.04	0.001
11.04	2.17	86.95	1.60	138.79	31	923	0.42	0.084	0.05	8.42	0.04	0.001
11.13	2.17	87.46	1.59	139.48	31	933	0.42	0.083	0.05	8.42	0.04	0.001
11.17	2.17	88.51	1.59	140.32	31	943	0.42	0.081	0.05	8.42	0.04	0.000
11.22	2.16	89.40	1.58	140.97	31	951	0.42	0.080	0.05	8.42	0.04	0.000
11.30	2.16	90.32	1.57	141.71	31	962	0.42	0.078	0.05	8.42	0.04	0.001
11.37	2.15	91.28	1.56	142.40	31	972	0.42	0.077	0.04	8.42	0.03	0.001
11.44	2.15	92.18	1.56	143.38	32	984	0.42	0.075	0.04	8.42	0.03	0.001
11.52	2.15	92.81	1.55	144.21	0	0	0.42	0.000	0.00	8.42	0.00	0.000
11.57	2.15	93.43	1.56	145.47	0	0	0.42	0.000	0.00	8.42	0.00	0.000
11.66	2.16	93.38	1.56	146.02	0	0	0.42	0.000	0.00	8.42	0.00	0.000
11.71	2.16	92.93	1.58	146.74	0	0	0.42	0.000	0.00	8.42	0.00	0.000
11.83	2.17	91.67	1.60	146.60	0	0	0.42	0.000	0.00	8.42	0.00	0.000
11.84	2.18	90.78	1.62	147.09	0	0	0.42	0.000	0.00	8.42	0.00	0.000
11.88	2.19	89.44	1.65	147.61	0	0	0.42	0.000	0.00	8.42	0.00	0.000
11.96	2.21	87.35	1.70	148.26	0	0	0.42	0.000	0.00	8.42	0.00	0.000
12.02	2.24	84.38	1.76	148.58	0	0	0.42	0.000	0.00	8.42	0.00	0.000
12.10	2.26	81.22	1.82	148.10	0	0	0.42	0.000	0.00	8.42	0.00	0.000
12.14	2.28	77.31	1.89	146.38	0	0	0.42	0.000	0.00	8.42	0.00	0.000
12.23	2.30	73.50	1.96	144.08	0	0	0.42	0.000	0.00	8.42	0.00	0.000
12.27	2.34	67.61	2.09	141.04	0	0	0.42	0.000	0.00	8.42	0.00	0.000
12.37	2.38	62.02	2.24	138.68	0	0	0.42	0.000	0.00	8.42	0.00	0.000
12.41	2.44	55.33	2.47	136.68	0	0	0.42	0.000	0.00	8.42	0.00	0.000
12.50	2.49	50.10	2.70	135.24	0	0	0.42	0.000	0.00	8.42	0.00	0.000
12.54	2.50	47.85	2.77	132.54	0	0	0.42	0.000	0.00	8.42	0.00	0.000
12.60	2.54	44.89	2.96	133.00	0	0	0.42	0.000	0.00	8.42	0.00	0.000
12.67	2.51	46.52	2.82	131.20	0	0	0.42	0.000	0.00	8.42	0.00	0.000
12.76	2.49	48.57	2.70	131.24	0	0	0.42	0.000	0.00	8.42	0.00	0.000
12.80	2.38	58.70	2.22	130.43	0	0	0.42	0.000	0.00	8.42	0.00	0.000
12.87	2.29	70.12	1.92	134.65	0	0	0.42	0.000	0.00	8.42	0.00	0.000
12.94	2.23	81.00	1.74	141.07	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.01	2.19	89.45	1.65	147.78	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.11	2.18	93.99	1.62	152.10	0	0	0.42	0.000	0.00	8.42	0.00	0.000

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
13.16	2.16	98.03	1.58	155.37	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.20	2.15	100.84	1.56	157.31	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.32	2.12	102.06	1.49	152.33	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.38	2.09	102.69	1.43	147.19	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.43	2.06	102.29	1.38	141.38	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.51	2.06	102.56	1.38	141.45	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.56	2.05	103.65	1.37	142.03	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.63	2.05	104.11	1.37	142.21	0	0	0.42	0.000	0.00	8.42	0.00	0.000
13.69	2.06	101.59	1.39	140.97	30	1110	0.42	0.075	0.05	8.42	0.04	0.001
13.73	2.05	102.46	1.37	140.48	30	1108	0.42	0.076	0.05	8.42	0.04	0.000
13.82	2.03	104.00	1.35	140.13	30	1109	0.42	0.076	0.05	8.42	0.04	0.001
13.86	2.00	109.51	1.30	141.87	29	1119	0.42	0.075	0.05	8.42	0.04	0.000
13.95	1.98	111.49	1.28	142.38	29	1125	0.42	0.075	0.05	8.42	0.04	0.001
13.99	1.97	113.80	1.26	143.36	29	1131	0.42	0.074	0.05	8.42	0.04	0.000
14.04	1.95	116.84	1.24	145.14	30	1143	0.42	0.073	0.05	8.42	0.04	0.000
14.16	1.94	119.83	1.23	147.34	30	1163	0.42	0.071	0.04	8.42	0.03	0.001
14.21	1.93	123.40	1.22	150.40	30	1186	0.42	0.068	0.04	8.42	0.03	0.000
14.28	1.93	126.24	1.22	153.45	31	1212	0.42	0.065	0.04	8.42	0.03	0.000
14.34	1.92	129.61	1.21	156.85	32	1240	0.42	0.062	0.04	8.42	0.03	0.000
14.40	1.92	133.28	1.20	160.43	32	1269	0.42	0.059	0.03	8.42	0.03	0.000
14.44	1.91	136.54	1.20	163.83	33	1296	0.42	0.057	0.03	8.42	0.02	0.000
14.52	1.91	138.68	1.20	166.22	33	1319	0.42	0.055	0.03	8.42	0.02	0.000
14.57	1.91	139.74	1.20	167.76	34	1335	0.42	0.054	0.03	8.42	0.02	0.000
14.65	1.91	139.61	1.20	167.94	34	1343	0.42	0.054	0.03	8.42	0.02	0.000
14.70	1.92	139.23	1.21	167.97	34	1348	0.42	0.054	0.03	8.42	0.02	0.000
14.83	1.92	138.80	1.21	167.66	34	1354	0.42	0.054	0.03	8.42	0.02	0.001
14.88	1.92	139.33	1.21	168.00	34	1358	0.42	0.054	0.03	8.42	0.02	0.000
14.95	1.91	139.59	1.20	167.93	0	0	0.42	0.000	0.00	8.42	0.00	0.000
15.01	1.92	139.05	1.20	167.50	0	0	0.42	0.000	0.00	8.42	0.00	0.000
15.07	1.92	137.80	1.21	166.60	0	0	0.42	0.000	0.00	8.42	0.00	0.000
15.13	1.93	135.51	1.22	165.08	0	0	0.42	0.000	0.00	8.42	0.00	0.000
15.19	1.94	132.48	1.23	162.78	0	0	0.42	0.000	0.00	8.42	0.00	0.000
15.27	1.95	128.40	1.24	159.73	0	0	0.42	0.000	0.00	8.42	0.00	0.000
15.32	1.97	123.84	1.26	156.37	0	0	0.42	0.000	0.00	8.42	0.00	0.000
15.37	1.99	118.61	1.29	152.71	0	0	0.42	0.000	0.00	8.42	0.00	0.000
15.43	2.02	111.88	1.32	147.94	0	0	0.42	0.000	0.00	8.42	0.00	0.000
15.54	2.04	105.04	1.36	143.10	0	0	0.42	0.000	0.00	8.42	0.00	0.000
15.59	2.07	98.79	1.41	139.07	0	0	0.42	0.000	0.00	8.42	0.00	0.000
15.63	2.11	92.52	1.47	136.14	0	0	0.42	0.000	0.00	8.42	0.00	0.000
15.72	2.15	86.02	1.56	134.39	0	0	0.42	0.000	0.00	8.42	0.00	0.000
15.76	2.22	78.10	1.72	134.71	0	0	0.42	0.000	0.00	8.42	0.00	0.000
15.85	2.29	71.52	1.91	136.74	0	0	0.42	0.000	0.00	8.42	0.00	0.000
15.89	2.35	65.48	2.13	139.70	0	0	0.42	0.000	0.00	8.42	0.00	0.000
15.96	2.39	61.33	2.29	140.46	0	0	0.42	0.000	0.00	8.42	0.00	0.000
16.06	2.42	58.18	2.41	140.29	0	0	0.42	0.000	0.00	8.42	0.00	0.000
16.11	2.44	56.41	2.48	139.74	0	0	0.42	0.000	0.00	8.42	0.00	0.000
16.16	2.42	58.15	2.40	139.85	0	0	0.42	0.000	0.00	8.42	0.00	0.000
16.25	2.35	64.15	2.14	137.07	0	0	0.42	0.000	0.00	8.42	0.00	0.000



:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
16.33	2.27	71.81	1.86	133.26	0	0	0.42	0.000	0.00	8.42	0.00	0.000
16.38	2.19	78.55	1.65	129.95	0	0	0.42	0.000	0.00	8.42	0.00	0.000
16.43	2.15	82.56	1.56	128.59	0	0	0.42	0.000	0.00	8.42	0.00	0.000
16.47	2.12	87.33	1.49	130.34	0	0	0.42	0.000	0.00	8.42	0.00	0.000
16.57	2.10	91.52	1.45	133.01	0	0	0.42	0.000	0.00	8.42	0.00	0.000
16.62	2.10	94.72	1.45	137.09	0	0	0.42	0.000	0.00	8.42	0.00	0.000
16.72	2.10	95.33	1.46	139.33	30	1262	0.42	0.077	0.05	8.42	0.04	0.001
16.74	2.12	95.49	1.49	142.14	31	1288	0.42	0.073	0.04	8.42	0.03	0.000
16.82	2.13	95.85	1.51	144.46	32	1313	0.42	0.071	0.04	8.42	0.03	0.001
16.89	2.14	96.96	1.52	147.81	32	1346	0.42	0.067	0.04	8.42	0.03	0.000
16.95	2.14	98.72	1.53	150.76	33	1377	0.42	0.064	0.04	8.42	0.03	0.000
17.00	2.13	101.61	1.52	154.35	34	1413	0.42	0.061	0.03	8.42	0.02	0.000
17.09	2.13	104.18	1.51	157.19	34	1445	0.42	0.059	0.03	8.42	0.02	0.001
17.13	2.12	107.54	1.49	160.41	35	1478	0.42	0.056	0.03	8.42	0.02	0.000
17.22	2.11	109.38	1.48	162.02	35	1499	0.42	0.055	0.03	8.42	0.02	0.000
17.26	2.11	111.58	1.47	164.16	36	1521	0.42	0.054	0.03	8.42	0.02	0.000
17.35	2.11	112.74	1.47	165.73	36	1542	0.42	0.053	0.03	8.42	0.02	0.000
17.41	2.11	114.91	1.46	168.34	37	1570	0.42	0.051	0.02	8.42	0.02	0.000
17.49	2.09	119.60	1.44	172.47	37	1613	0.42	0.049	0.02	8.42	0.02	0.000
17.57	2.08	125.16	1.41	176.65	38	1656	0.42	0.047	0.02	8.42	0.02	0.000
17.59	2.05	132.96	1.37	182.36	39	1706	0.42	0.044	0.02	8.42	0.02	0.000
17.67	2.03	140.88	1.34	188.54	40	1762	0.42	0.042	0.02	8.42	0.01	0.000
17.75	2.01	148.32	1.32	195.12	41	1823	0.42	0.040	0.02	8.42	0.01	0.000
17.80	2.00	156.26	1.30	202.66	42	1890	0.42	0.038	0.02	8.42	0.01	0.000
17.88	1.99	162.09	1.28	208.28	43	1944	0.42	0.036	0.01	8.42	0.01	0.000
17.93	1.98	168.46	1.28	214.90	44	2004	0.42	0.034	0.01	8.42	0.01	0.000
18.01	1.98	172.64	1.28	220.15	45	2059	0.42	0.033	0.01	8.42	0.01	0.000
18.06	1.98	176.26	1.28	225.70	47	2119	0.42	0.032	0.01	8.42	0.01	0.000
18.13	1.99	179.31	1.29	230.52	48	2172	0.42	0.031	0.01	8.42	0.01	0.000
18.20	1.99	182.00	1.29	234.69	49	2219	0.42	0.030	0.01	8.42	0.01	0.000
18.24	1.99	184.71	1.29	238.74	50	2264	0.42	0.029	0.01	8.42	0.01	0.000
18.32	2.00	187.19	1.30	242.53	50	2308	0.42	0.029	0.01	8.42	0.01	0.000
18.42	2.00	188.91	1.30	245.30	51	2344	0.42	0.028	0.01	8.42	0.01	0.000
18.46	2.00	190.08	1.30	247.21	51	2367	0.42	0.028	0.01	8.42	0.01	0.000
18.51	2.00	189.89	1.31	247.98	52	2382	0.42	0.028	0.01	8.42	0.01	0.000
18.59	2.01	188.26	1.32	247.87	52	2394	0.42	0.028	0.01	8.42	0.01	0.000
18.68	2.02	186.22	1.33	246.95	52	2397	0.42	0.028	0.01	8.42	0.01	0.000
18.72	2.02	184.14	1.33	245.34	52	2388	0.42	0.028	0.01	8.42	0.01	0.000
18.77	2.03	182.06	1.34	243.20	51	2373	0.42	0.028	0.01	8.42	0.01	0.000
18.84	2.03	179.46	1.34	241.22	51	2363	0.42	0.029	0.01	8.42	0.01	0.000
18.90	2.04	177.23	1.36	240.18	51	2362	0.42	0.029	0.01	8.42	0.01	0.000
18.99	2.04	175.96	1.36	239.90	51	2370	0.42	0.029	0.01	8.42	0.01	0.000
19.03	2.05	175.75	1.37	240.35	51	2379	0.42	0.029	0.01	8.42	0.01	0.000
19.14	2.05	175.12	1.37	239.95	51	2386	0.42	0.029	0.01	8.42	0.01	0.000
19.21	2.05	174.02	1.38	239.53	51	2390	0.42	0.029	0.01	8.42	0.01	0.000
19.26	2.04	172.76	1.35	233.52	49	2326	0.42	0.030	0.01	8.42	0.01	0.000
19.39	2.02	171.30	1.33	228.41	48	2280	0.43	0.031	0.01	8.42	0.01	0.000
19.45	2.01	170.84	1.32	224.75	47	2241	0.43	0.032	0.01	8.42	0.01	0.000

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
19.52	2.02	170.88	1.33	227.14	48	2276	0.43	0.032	0.01	8.42	0.01	0.000
19.56	2.03	170.75	1.34	229.16	48	2305	0.43	0.031	0.01	8.42	0.01	0.000
19.63	2.06	164.65	1.38	227.96	49	2312	0.43	0.031	0.01	8.42	0.01	0.000
19.66	2.08	161.06	1.42	228.46	49	2326	0.43	0.031	0.01	8.42	0.01	0.000
19.72	2.09	159.17	1.44	229.07	49	2341	0.43	0.031	0.01	8.42	0.01	0.000
19.76	2.09	161.65	1.43	230.95	50	2363	0.43	0.030	0.01	8.42	0.01	0.000
19.89	2.09	159.82	1.44	229.76	50	2363	0.43	0.031	0.01	8.42	0.01	0.000
19.95	2.10	155.10	1.46	226.21	49	2334	0.43	0.031	0.01	8.42	0.01	0.000
20.07	2.11	151.08	1.47	222.51	48	2307	0.43	0.032	0.01	8.42	0.01	0.000
20.12	2.11	149.89	1.47	220.00	48	2285	0.43	0.033	0.01	8.42	0.01	0.000
20.25	2.10	151.67	1.45	219.49	47	2288	0.43	0.033	0.01	8.42	0.01	0.000
20.32	2.08	155.90	1.41	220.39	47	2298	0.43	0.033	0.01	8.42	0.01	0.000
20.38	2.06	160.49	1.38	222.00	47	2313	0.43	0.033	0.01	8.42	0.01	0.000
20.43	2.04	164.94	1.36	224.20	47	2332	0.43	0.032	0.01	8.42	0.01	0.000
20.50	2.03	168.01	1.35	225.98	48	2352	0.43	0.032	0.01	8.42	0.01	0.000
20.56	2.03	170.07	1.34	227.39	48	2367	0.43	0.032	0.01	8.42	0.01	0.000
20.61	2.02	171.05	1.33	227.76	48	2373	0.43	0.032	0.01	8.42	0.01	0.000
20.68	2.02	171.42	1.33	227.46	48	2373	0.43	0.032	0.01	8.42	0.01	0.000
20.73	2.01	171.83	1.32	226.80	47	2367	0.43	0.032	0.01	8.42	0.01	0.000
20.79	2.01	172.68	1.31	226.49	47	2364	0.43	0.033	0.01	8.42	0.01	0.000
20.86	2.00	174.43	1.30	227.05	47	2370	0.43	0.033	0.01	8.42	0.01	0.000
20.91	1.99	177.67	1.29	229.11	48	2388	0.43	0.032	0.01	8.42	0.01	0.000
20.97	1.97	184.57	1.27	233.73	48	2424	0.43	0.032	0.01	8.42	0.01	0.000
21.09	1.95	192.00	1.24	238.62	49	2462	0.43	0.031	0.01	8.42	0.01	0.000
21.14	1.93	199.44	1.22	243.69	49	2496	0.43	0.031	0.01	8.42	0.01	0.000
21.22	1.93	202.85	1.21	246.24	50	2519	0.43	0.030	0.01	8.42	0.01	0.000
21.26	1.92	204.20	1.21	247.56	50	2534	0.43	0.030	0.01	8.42	0.01	0.000
21.33	1.93	204.05	1.21	247.92	50	2546	0.43	0.030	0.01	8.42	0.01	0.000
21.40	1.93	203.82	1.22	247.96	50	2554	0.43	0.030	0.01	8.42	0.01	0.000
21.49	1.93	203.55	1.22	248.37	50	2570	0.43	0.030	0.01	8.42	0.01	0.000
21.57	1.94	203.12	1.23	249.17	51	2593	0.43	0.030	0.01	8.42	0.01	0.000
21.62	1.95	202.11	1.24	250.75	51	2629	0.43	0.029	0.01	8.42	0.01	0.000
21.70	1.97	199.84	1.26	251.87	52	2668	0.43	0.029	0.01	8.42	0.01	0.000
21.75	1.99	196.43	1.28	252.26	52	2698	0.43	0.028	0.01	8.42	0.01	0.000
21.80	2.01	191.71	1.31	251.42	53	2714	0.43	0.028	0.01	8.42	0.01	0.000
21.88	2.03	186.59	1.34	249.50	52	2716	0.44	0.028	0.01	8.42	0.01	0.000
21.93	2.04	181.34	1.36	247.19	52	2707	0.44	0.029	0.01	8.42	0.01	0.000
22.06	2.06	176.65	1.38	243.93	52	2691	0.44	0.029	0.01	8.42	0.01	0.000
22.10	2.06	173.31	1.39	240.39	51	2658	0.44	0.030	0.01	8.42	0.01	0.000
22.16	2.05	172.07	1.37	236.51	50	2616	0.44	0.030	0.01	8.42	0.01	0.000
22.24	2.01	174.27	1.32	229.41	48	2514	0.44	0.032	0.01	8.42	0.01	0.000
22.33	1.96	178.78	1.25	223.00	46	2397	0.44	0.035	0.01	8.42	0.01	0.000
22.41	1.90	184.67	1.19	219.81	44	2301	0.44	0.037	0.01	8.42	0.01	0.000
22.46	1.88	190.90	1.17	222.80	44	2300	0.44	0.038	0.01	8.42	0.01	0.000
22.58	1.87	195.65	1.16	226.58	45	2332	0.44	0.037	0.01	8.42	0.01	0.000
22.64	1.86	198.04	1.15	228.56	45	2349	0.44	0.037	0.01	8.42	0.01	0.000
22.68	1.86	198.33	1.15	228.55	45	2349	0.44	0.037	0.01	8.42	0.01	0.000
22.74	1.87	195.42	1.16	226.55	45	2344	0.44	0.037	0.01	8.42	0.01	0.000

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
22.78	1.87	195.75	1.16	226.76	45	2348	0.44	0.037	0.01	8.42	0.01	0.000
22.87	1.87	195.34	1.16	226.49	45	2353	0.44	0.037	0.01	8.42	0.01	0.000
22.91	1.86	198.30	1.15	228.77	45	2368	0.44	0.037	0.01	8.42	0.01	0.000
22.98	1.86	199.33	1.15	229.99	45	2386	0.44	0.037	0.01	8.42	0.01	0.000
23.09	1.86	199.51	1.16	230.89	46	2409	0.44	0.036	0.01	8.42	0.01	0.000
23.13	1.87	198.84	1.16	231.50	46	2430	0.44	0.036	0.01	8.42	0.01	0.000
23.18	1.89	197.45	1.18	232.42	46	2466	0.44	0.035	0.01	8.42	0.01	0.000
23.26	1.90	195.77	1.19	233.14	47	2502	0.44	0.035	0.01	8.42	0.01	0.000
23.31	1.91	194.65	1.20	234.14	47	2534	0.44	0.034	0.01	8.42	0.01	0.000
23.40	1.92	193.90	1.21	234.30	47	2550	0.44	0.034	0.01	8.42	0.01	0.000
23.43	1.92	194.56	1.21	235.34	48	2565	0.44	0.034	0.01	8.42	0.01	0.000
23.57	1.92	194.77	1.21	235.65	48	2579	0.44	0.034	0.01	8.42	0.01	0.000
23.61	1.92	195.98	1.21	236.68	48	2590	0.44	0.033	0.01	8.42	0.01	0.000
23.62	1.92	196.89	1.20	237.00	48	2589	0.44	0.033	0.01	8.42	0.01	0.000
23.71	1.91	197.57	1.20	236.56	48	2580	0.44	0.034	0.01	8.42	0.01	0.000
23.84	1.90	197.79	1.19	235.64	47	2570	0.44	0.034	0.01	8.42	0.01	0.000
23.88	1.90	198.28	1.19	235.21	47	2560	0.44	0.034	0.01	8.42	0.01	0.000
23.93	1.89	198.64	1.18	235.06	47	2557	0.44	0.035	0.01	8.42	0.01	0.000
23.97	1.89	198.96	1.18	234.89	47	2553	0.44	0.035	0.01	8.42	0.01	0.000
24.02	1.89	197.94	1.18	233.00	46	2529	0.44	0.035	0.01	8.42	0.01	0.000
24.16	1.88	195.80	1.17	229.97	46	2501	0.44	0.036	0.01	8.42	0.01	0.000
24.24	1.88	193.37	1.17	226.28	45	2459	0.44	0.037	0.01	8.42	0.01	0.000
24.29	1.88	191.45	1.17	223.62	44	2429	0.44	0.038	0.01	8.42	0.01	0.000
24.36	1.88	188.61	1.17	220.16	0	0	0.44	0.000	0.00	8.42	0.00	0.000
24.41	1.88	184.75	1.17	216.28	0	0	0.44	0.000	0.00	8.42	0.00	0.000
24.46	1.89	177.66	1.18	210.06	0	0	0.44	0.000	0.00	8.42	0.00	0.000
24.59	1.92	168.75	1.20	203.10	0	0	0.44	0.000	0.00	8.42	0.00	0.000
24.64	1.94	159.27	1.23	196.42	0	0	0.44	0.000	0.00	8.42	0.00	0.000
24.71	1.97	151.17	1.26	191.01	0	0	0.44	0.000	0.00	8.42	0.00	0.000
24.77	2.00	143.17	1.30	185.56	0	0	0.44	0.000	0.00	8.42	0.00	0.000
24.82	2.02	135.36	1.33	179.77	0	0	0.44	0.000	0.00	8.42	0.00	0.000
24.90	2.05	127.48	1.37	174.06	0	0	0.44	0.000	0.00	8.42	0.00	0.000
24.95	2.07	119.66	1.41	168.49	0	0	0.44	0.000	0.00	8.42	0.00	0.000
25.02	2.11	110.75	1.47	163.29	0	0	0.45	0.000	0.00	8.42	0.00	0.000
25.08	2.16	101.18	1.57	158.36	0	0	0.45	0.000	0.00	8.42	0.00	0.000
25.15	2.21	90.54	1.70	154.07	0	0	0.45	0.000	0.00	8.42	0.00	0.000
25.21	2.29	79.39	1.90	151.02	0	0	0.45	0.000	0.00	8.42	0.00	0.000
25.25	2.35	67.79	2.11	142.75	0	0	0.45	0.000	0.00	8.42	0.00	0.000
25.33	2.46	51.56	2.59	133.72	0	0	0.45	0.000	0.00	8.42	0.00	0.000
25.52	2.58	38.45	3.22	123.98	0	0	0.45	0.000	0.00	8.42	0.00	0.000
25.56	2.73	29.17	4.22	123.22	0	0	0.45	0.000	0.00	0.00	0.00	0.000
25.61	2.78	26.58	4.66	123.73	0	0	0.45	0.000	0.00	0.00	0.00	0.000
25.65	2.84	24.23	5.15	124.82	0	0	0.45	0.000	0.00	0.00	0.00	0.000
25.69	2.85	23.75	5.25	124.56	0	0	0.45	0.000	0.00	0.00	0.00	0.000
25.74	2.83	24.60	5.06	124.54	0	0	0.45	0.000	0.00	0.00	0.00	0.000
25.82	2.80	26.38	4.75	125.27	0	0	0.45	0.000	0.00	0.00	0.00	0.000
25.87	2.79	27.17	4.69	127.37	0	0	0.45	0.000	0.00	0.00	0.00	0.000
25.93	2.77	28.37	4.56	129.30	0	0	0.45	0.000	0.00	0.00	0.00	0.000

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
25.99	2.75	29.92	4.37	130.69	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.11	2.73	31.25	4.19	131.00	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.18	2.70	32.61	4.00	130.46	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.23	2.67	34.03	3.81	129.71	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.29	2.63	36.42	3.54	129.01	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.36	2.59	39.61	3.24	128.20	34	1460	0.45	0.116	0.06	8.42	0.05	0.001
26.42	2.54	42.63	2.97	126.82	33	1474	0.45	0.114	0.06	8.42	0.05	0.001
26.48	2.51	44.32	2.83	125.21	32	1475	0.45	0.114	0.06	8.42	0.05	0.001
26.54	2.51	44.13	2.81	123.87	32	1463	0.45	0.116	0.07	8.42	0.05	0.001
26.61	2.56	40.13	3.08	123.44	33	1433	0.45	0.123	0.07	8.42	0.05	0.001
26.71	2.64	34.41	3.55	122.13	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.79	2.73	28.26	4.24	119.73	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.84	2.79	24.68	4.68	115.64	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.90	2.82	22.51	4.94	111.23	0	0	0.45	0.000	0.00	0.00	0.00	0.000
26.97	2.82	21.53	5.00	107.60	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.02	2.82	21.25	4.97	105.57	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.09	2.81	21.52	4.91	105.68	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.15	2.82	21.47	4.93	105.83	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.21	2.83	20.61	5.08	104.71	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.29	2.88	18.77	5.46	102.48	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.33	2.93	16.66	5.97	99.55	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.40	2.97	14.98	6.43	96.39	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.46	3.01	13.60	6.86	93.38	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.51	3.05	12.44	7.26	90.28	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.59	3.09	11.34	7.75	87.89	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.64	3.12	10.25	8.23	84.38	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.77	3.16	9.35	8.65	80.81	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.82	3.17	8.69	8.82	76.62	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.90	3.17	8.30	8.86	73.49	0	0	0.45	0.000	0.00	0.00	0.00	0.000
27.95	3.17	8.02	8.88	71.22	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.00	3.18	7.86	8.96	70.47	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.08	3.18	7.81	9.02	70.43	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.20	3.19	7.77	9.07	70.52	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.26	3.18	7.88	9.00	70.86	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.31	3.18	7.98	9.00	71.85	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.39	3.16	8.54	8.67	74.04	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.44	3.13	9.30	8.33	77.43	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.49	3.11	10.32	8.05	83.09	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.57	3.10	11.22	7.94	89.12	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.62	3.10	12.04	7.90	95.14	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.69	3.13	11.90	8.25	98.20	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.70	3.10	12.88	7.88	101.56	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.79	3.07	13.80	7.53	103.99	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.84	3.01	15.57	6.86	106.83	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.88	2.99	16.42	6.65	109.17	0	0	0.45	0.000	0.00	0.00	0.00	0.000
28.97	2.98	17.05	6.52	111.17	0	0	0.45	0.000	0.00	0.00	0.00	0.000
29.01	2.97	17.58	6.44	113.27	0	0	0.45	0.000	0.00	0.00	0.00	0.000
29.10	2.98	17.52	6.53	114.44	0	0	0.45	0.000	0.00	0.00	0.00	0.000

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
29.14	2.98	17.49	6.57	115.02	0	0	0.45	0.000	0.00	0.00	0.00	0.000
29.23	2.98	17.49	6.55	114.56	0	0	0.45	0.000	0.00	0.00	0.00	0.000
29.27	2.95	18.23	6.21	113.15	0	0	0.45	0.000	0.00	0.00	0.00	0.000
29.36	2.90	19.77	5.66	112.00	0	0	0.45	0.000	0.00	0.00	0.00	0.000
29.40	2.80	23.33	4.75	110.88	0	0	0.45	0.000	0.00	0.00	0.00	0.000
29.50	2.70	27.57	4.00	110.17	0	0	0.45	0.000	0.00	0.00	0.00	0.000
29.54	2.60	32.88	3.36	110.39	0	0	0.45	0.000	0.00	0.00	0.00	0.000
29.61	2.52	39.09	2.87	112.23	0	0	0.45	0.000	0.00	8.42	0.00	0.000
29.72	2.46	44.93	2.56	114.91	0	0	0.45	0.000	0.00	8.42	0.00	0.000
29.77	2.41	50.09	2.36	118.28	0	0	0.45	0.000	0.00	8.42	0.00	0.000
29.83	2.40	52.79	2.30	121.38	0	0	0.45	0.000	0.00	8.42	0.00	0.000
29.89	2.39	54.66	2.27	124.30	0	0	0.45	0.000	0.00	8.42	0.00	0.000
29.94	2.39	55.65	2.27	126.60	0	0	0.45	0.000	0.00	8.42	0.00	0.000
30.01	2.40	55.75	2.29	127.86	0	0	0.45	0.000	0.00	8.42	0.00	0.000
30.08	2.41	54.93	2.34	128.40	0	0	0.45	0.000	0.00	8.42	0.00	0.000
30.14	2.42	53.34	2.40	128.03	0	0	0.45	0.000	0.00	8.42	0.00	0.000
30.20	2.44	51.17	2.49	127.27	0	0	0.45	0.000	0.00	8.42	0.00	0.000
30.26	2.46	48.69	2.59	126.22	0	0	0.45	0.000	0.00	8.42	0.00	0.000
30.32	2.49	46.24	2.71	125.49	0	0	0.45	0.000	0.00	8.42	0.00	0.000
30.38	2.53	43.27	2.93	126.60	0	0	0.45	0.000	0.00	8.42	0.00	0.000
30.51	2.57	40.75	3.14	127.88	0	0	0.45	0.000	0.00	8.42	0.00	0.000
30.56	2.60	39.14	3.30	129.28	0	0	0.45	0.000	0.00	8.42	0.00	0.000
30.63	2.59	39.36	3.29	129.47	0	0	0.45	0.000	0.00	8.42	0.00	0.000
30.69	2.57	42.10	3.13	131.87	0	0	0.45	0.000	0.00	8.42	0.00	0.000
30.82	2.51	47.77	2.83	135.17	0	0	0.45	0.000	0.00	8.42	0.00	0.000
30.87	2.44	56.11	2.47	138.72	0	0	0.45	0.000	0.00	8.42	0.00	0.000
30.92	2.37	64.60	2.19	141.61	0	0	0.45	0.000	0.00	8.42	0.00	0.000
31.00	2.31	71.98	2.00	143.76	0	0	0.45	0.000	0.00	8.42	0.00	0.000
31.05	2.28	78.12	1.87	146.16	0	0	0.45	0.000	0.00	8.42	0.00	0.000
31.12	2.24	84.88	1.77	150.30	0	0	0.45	0.000	0.00	8.42	0.00	0.000
31.22	2.22	90.97	1.71	155.71	0	0	0.45	0.000	0.00	8.42	0.00	0.000
31.31	2.21	96.53	1.69	162.69	0	0	0.45	0.000	0.00	8.42	0.00	0.000
31.36	2.19	100.73	1.64	165.43	0	0	0.45	0.000	0.00	8.42	0.00	0.000
31.43	2.17	104.35	1.60	166.46	0	0	0.45	0.000	0.00	8.42	0.00	0.000
31.49	2.15	107.27	1.54	165.45	0	0	0.45	0.000	0.00	8.42	0.00	0.000
31.53	2.14	108.64	1.52	165.57	0	0	0.45	0.000	0.00	8.42	0.00	0.000
31.58	2.13	109.00	1.52	165.26	0	0	0.45	0.000	0.00	8.42	0.00	0.000
31.66	2.13	108.67	1.51	164.34	0	0	0.45	0.000	0.00	8.42	0.00	0.000
31.71	2.13	107.43	1.52	162.79	36	2342	0.45	0.055	0.03	8.42	0.02	0.000
31.79	2.13	106.97	1.51	161.93	35	2334	0.45	0.055	0.03	8.42	0.02	0.000
31.83	2.13	108.07	1.50	162.48	36	2341	0.45	0.055	0.03	8.42	0.02	0.000
31.92	2.12	110.78	1.48	164.33	36	2367	0.45	0.054	0.03	8.42	0.02	0.000
31.96	2.11	113.79	1.47	167.14	36	2406	0.45	0.053	0.03	8.42	0.02	0.000
32.04	2.10	116.31	1.46	169.94	37	2448	0.46	0.052	0.02	8.42	0.02	0.000
32.11	2.10	118.38	1.46	172.78	37	2492	0.46	0.050	0.02	8.42	0.02	0.000
32.17	2.10	120.26	1.46	175.23	38	2530	0.46	0.049	0.02	8.42	0.02	0.000
32.24	2.10	122.35	1.45	177.73	38	2568	0.46	0.048	0.02	8.42	0.02	0.000
32.32	2.10	124.33	1.45	179.89	39	2602	0.46	0.047	0.02	8.42	0.02	0.000

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	Ic	Q <sub>tn</sub>	Kc	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)
32.36	2.10	125.13	1.46	182.22	39	2642	0.46	0.046	0.02	8.42	0.02	0.000
32.45	2.11	124.09	1.48	183.35	40	2672	0.46	0.045	0.02	8.42	0.02	0.000
32.50	2.13	121.73	1.52	184.99	41	2711	0.46	0.044	0.02	8.42	0.01	0.000
32.64	2.15	118.95	1.56	185.60	41	2738	0.46	0.044	0.02	8.42	0.01	0.000
32.67	2.17	116.48	1.60	186.73	42	2763	0.46	0.043	0.02	8.42	0.01	0.000
32.74	2.18	114.87	1.63	187.08	42	2776	0.46	0.043	0.02	8.42	0.01	0.000
32.77	2.19	114.03	1.64	187.29	42	2782	0.46	0.043	0.02	8.42	0.01	0.000
32.82	2.19	113.87	1.63	186.08	42	2767	0.46	0.043	0.02	8.42	0.01	0.000
32.95	2.18	113.88	1.61	183.70	41	2737	0.46	0.044	0.02	8.42	0.01	0.000
33.02	2.17	113.99	1.59	181.10	40	2699	0.46	0.045	0.02	8.42	0.02	0.000
33.06	2.16	113.78	1.57	178.97	40	2668	0.46	0.046	0.02	8.42	0.02	0.000
33.11	2.15	113.57	1.56	177.30	39	2644	0.46	0.047	0.02	8.42	0.02	0.000
33.15	2.15	113.62	1.55	175.66	39	2619	0.46	0.048	0.02	8.42	0.02	0.000
33.28	2.14	113.39	1.54	174.27	38	2603	0.46	0.049	0.02	8.42	0.02	0.001
33.33	2.14	113.27	1.54	173.88	38	2600	0.46	0.049	0.02	8.42	0.02	0.000
33.38	2.15	112.88	1.55	174.67	39	2618	0.46	0.048	0.02	8.42	0.02	0.000
33.45	2.15	114.16	1.55	177.14	39	2660	0.46	0.047	0.02	8.42	0.02	0.000
33.56	2.15	116.95	1.54	180.55	40	2716	0.46	0.046	0.02	8.42	0.02	0.000
33.62	2.14	121.21	1.52	184.53	41	2774	0.46	0.044	0.02	8.42	0.01	0.000
33.69	2.13	124.89	1.50	187.60	41	2818	0.46	0.043	0.02	8.42	0.01	0.000
33.73	2.11	127.92	1.48	189.41	41	2841	0.46	0.043	0.02	8.42	0.01	0.000
33.79	2.10	130.34	1.46	190.09	41	2845	0.46	0.043	0.02	8.42	0.01	0.000
33.86	2.09	132.31	1.44	190.26	41	2843	0.46	0.043	0.02	8.42	0.01	0.000
33.91	2.08	134.37	1.42	190.81	41	2844	0.46	0.043	0.02	8.42	0.01	0.000
33.97	2.07	136.75	1.40	191.89	41	2854	0.46	0.043	0.02	8.42	0.01	0.000
34.04	2.06	139.53	1.39	193.30	41	2867	0.46	0.043	0.02	8.42	0.01	0.000
34.08	2.04	143.22	1.36	195.21	41	2882	0.46	0.042	0.02	8.42	0.01	0.000
34.14	2.03	147.79	1.34	197.57	42	2897	0.46	0.042	0.02	8.42	0.01	0.000
34.21	2.01	153.28	1.31	200.48	42	2913	0.46	0.042	0.02	8.42	0.01	0.000
34.26	1.97	160.52	1.26	201.75	41	2868	0.46	0.043	0.02	8.42	0.01	0.000
34.38	1.93	165.80	1.22	202.74	41	2831	0.46	0.044	0.02	8.42	0.01	0.000
34.44	1.91	168.68	1.20	202.45	41	2786	0.46	0.045	0.02	8.42	0.01	0.000
34.56	1.92	167.44	1.21	202.00	41	2799	0.46	0.045	0.02	8.42	0.01	0.000
34.61	1.92	166.19	1.21	200.91	41	2792	0.46	0.045	0.02	8.42	0.01	0.000
34.66	1.94	160.72	1.23	197.06	40	2773	0.46	0.046	0.02	8.42	0.02	0.000
34.70	1.94	160.02	1.23	196.43	40	2768	0.46	0.046	0.02	8.42	0.02	0.000
34.73	1.94	158.38	1.23	195.35	40	2765	0.46	0.046	0.02	8.42	0.02	0.000
34.79	1.93	161.91	1.22	197.99	40	2787	0.46	0.046	0.02	8.42	0.02	0.000
34.91	1.94	161.35	1.23	198.93	41	2824	0.46	0.045	0.02	8.42	0.01	0.000

:: Post-earthquake settlement of dry sands :: (continued)												
Depth (ft)	I <sub>c</sub>	Q <sub>tn</sub>	K <sub>c</sub>	Q <sub>tn,cs</sub>	N <sub>1,60</sub> (blows)	G <sub>max</sub> (tsf)	CSR	Shear, γ (%)	e <sub>vol(15)</sub> (%)	N <sub>c</sub>	e <sub>v</sub> (%)	Settle. (in)

**Total estimated settlement: 0.08**

**Abbreviations**

- Q<sub>tn</sub>: Equivalent clean sand normalized cone resistance
- K<sub>c</sub>: Fines correction factor
- Q<sub>tn,cs</sub>: Post-liquefaction volumetric strain
- G<sub>max</sub>: Small strain shear modulus
- CSR: Soil cyclic stress ratio
- γ: Cyclic shear strain
- e<sub>vol(15)</sub>: Volumetric strain after 15 cycles
- N<sub>c</sub>: Equivalent number of cycles
- e<sub>v</sub>: Volumetric strain
- Settle.: Calculated settlement

:: Post-earthquake settlement due to soil liquefaction ::											
Depth (ft)	Q <sub>tn,cs</sub>	FS	e <sub>v</sub> (%)	DF	Settlement (in)	Depth (ft)	Q <sub>tn,cs</sub>	FS	e <sub>v</sub> (%)	DF	Settlement (in)
35.02	200.62	2.00	0.00	1.00	0.00	35.10	201.47	2.00	0.00	1.00	0.00
35.14	200.88	2.00	0.00	1.00	0.00	35.20	200.49	2.00	0.00	1.00	0.00
35.27	199.80	1.80	0.00	1.00	0.00	35.32	200.04	2.00	0.00	1.00	0.00
35.37	201.22	2.00	0.00	1.00	0.00	35.43	205.39	2.00	0.00	1.00	0.00
35.55	209.84	2.00	0.00	1.00	0.00	35.61	213.72	2.00	0.00	1.00	0.00
35.67	215.25	2.00	0.00	1.00	0.00	35.72	215.94	2.00	0.00	1.00	0.00
35.82	215.86	2.00	0.00	1.00	0.00	35.88	215.29	2.00	0.00	1.00	0.00
35.94	213.43	2.00	0.00	1.00	0.00	36.05	210.95	2.00	0.00	1.00	0.00
36.12	208.77	2.00	0.00	1.00	0.00	36.17	207.30	2.00	0.00	1.00	0.00
36.21	205.51	2.00	0.00	1.00	0.00	36.29	203.28	2.00	0.00	1.00	0.00
36.34	200.97	2.00	0.00	1.00	0.00	36.44	198.65	1.75	0.00	1.00	0.00
36.51	197.33	1.72	0.00	1.00	0.00	36.56	197.54	1.72	0.00	1.00	0.00
36.61	200.09	2.00	0.00	1.00	0.00	36.68	203.48	2.00	0.00	1.00	0.00
36.74	207.56	2.00	0.00	1.00	0.00	36.84	210.18	2.00	0.00	1.00	0.00
36.91	211.37	2.00	0.00	1.00	0.00	36.96	210.89	2.00	0.00	1.00	0.00
37.01	209.83	2.00	0.00	1.00	0.00	37.09	208.44	2.00	0.00	1.00	0.00
37.14	206.58	2.00	0.00	1.00	0.00	37.22	204.40	2.00	0.00	1.00	0.00
37.30	202.26	2.00	0.00	1.00	0.00	37.36	200.21	2.00	0.00	1.00	0.00
37.42	197.70	1.72	0.00	1.00	0.00	37.48	194.50	1.64	0.00	1.00	0.00
37.53	190.86	1.56	0.00	1.00	0.00	37.58	183.88	1.41	0.00	1.00	0.00
37.65	176.36	1.27	0.19	1.00	0.00	37.71	168.30	2.00	0.00	1.00	0.00
37.76	162.24	2.00	0.00	1.00	0.00	37.82	154.80	2.00	0.00	1.00	0.00
37.89	145.56	2.00	0.00	1.00	0.00	37.95	133.09	2.00	0.00	1.00	0.00
38.00	120.87	2.00	0.00	1.00	0.00	38.09	113.27	2.00	0.00	1.00	0.00
38.14	108.06	2.00	0.00	1.00	0.00	38.22	104.54	2.00	0.00	1.00	0.00
38.26	98.72	2.00	0.00	1.00	0.00	38.34	92.20	2.00	0.00	1.00	0.00
38.41	84.84	2.00	0.00	1.00	0.00	38.49	78.91	2.00	0.00	1.00	0.00
38.53	73.50	2.00	0.00	1.00	0.00	38.62	69.23	2.00	0.00	1.00	0.00
38.67	64.13	2.00	0.00	1.00	0.00	38.80	60.12	2.00	0.00	1.00	0.00
38.84	57.14	2.00	0.00	1.00	0.00	38.89	55.81	2.00	0.00	1.00	0.00
38.93	54.90	2.00	0.00	1.00	0.00	39.02	54.51	2.00	0.00	1.00	0.00
39.05	54.48	2.00	0.00	1.00	0.00	39.15	54.60	2.00	0.00	1.00	0.00
39.24	54.83	2.00	0.00	1.00	0.00	39.28	55.16	2.00	0.00	1.00	0.00
39.33	55.58	2.00	0.00	1.00	0.00	39.42	55.98	2.00	0.00	1.00	0.00
39.46	56.31	2.00	0.00	1.00	0.00	39.51	56.57	2.00	0.00	1.00	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)											
Depth (ft)	Q <sub>tn,cs</sub>	FS	e <sub>v</sub> (%)	DF	Settlement (in)	Depth (ft)	Q <sub>tn,cs</sub>	FS	e <sub>v</sub> (%)	DF	Settlement (in)
39.60	56.71	2.00	0.00	1.00	0.00	39.68	56.79	2.00	0.00	1.00	0.00
39.73	56.84	2.00	0.00	1.00	0.00	39.78	57.08	2.00	0.00	1.00	0.00
39.85	57.41	2.00	0.00	1.00	0.00	39.91	57.87	2.00	0.00	1.00	0.00
39.98	58.37	2.00	0.00	1.00	0.00	40.04	59.30	2.00	0.00	1.00	0.00
40.10	60.68	2.00	0.00	1.00	0.00	40.17	62.09	2.00	0.00	1.00	0.00
40.23	63.29	2.00	0.00	1.00	0.00	40.30	64.64	2.00	0.00	1.00	0.00
40.41	66.91	2.00	0.00	1.00	0.00	40.48	69.50	2.00	0.00	1.00	0.00
40.53	71.92	2.00	0.00	1.00	0.00	40.60	73.50	2.00	0.00	1.00	0.00
40.65	72.39	2.00	0.00	1.00	0.00	40.72	71.71	2.00	0.00	1.00	0.00
40.79	71.14	2.00	0.00	1.00	0.00	40.85	73.09	2.00	0.00	1.00	0.00
40.92	74.10	2.00	0.00	1.00	0.00	40.97	74.99	2.00	0.00	1.00	0.00
41.02	75.92	2.00	0.00	1.00	0.00	41.09	77.09	2.00	0.00	1.00	0.00
41.17	78.26	2.00	0.00	1.00	0.00	41.22	80.27	2.00	0.00	1.00	0.00
41.30	82.35	2.00	0.00	1.00	0.00	41.35	85.87	2.00	0.00	1.00	0.00
41.44	88.81	2.00	0.00	1.00	0.00	41.50	91.52	2.00	0.00	1.00	0.00
41.56	92.88	2.00	0.00	1.00	0.00	41.62	93.81	2.00	0.00	1.00	0.00
41.74	93.87	2.00	0.00	1.00	0.00	41.79	93.09	2.00	0.00	1.00	0.00
41.88	91.60	2.00	0.00	1.00	0.00	41.93	90.25	2.00	0.00	1.00	0.00
41.98	89.15	2.00	0.00	1.00	0.00	42.05	88.48	2.00	0.00	1.00	0.00
42.15	88.26	2.00	0.00	1.00	0.00	42.24	88.49	2.00	0.00	1.00	0.00
42.28	88.16	2.00	0.00	1.00	0.00	42.41	86.69	2.00	0.00	1.00	0.00
42.46	83.78	2.00	0.00	1.00	0.00	42.53	78.59	2.00	0.00	1.00	0.00
42.64	73.18	2.00	0.00	1.00	0.00	42.71	66.76	2.00	0.00	1.00	0.00
42.77	62.70	2.00	0.00	1.00	0.00	42.82	58.61	2.00	0.00	1.00	0.00
42.90	57.09	2.00	0.00	1.00	0.00	42.95	57.29	2.00	0.00	1.00	0.00
43.02	58.72	2.00	0.00	1.00	0.00	43.08	60.68	2.00	0.00	1.00	0.00
43.12	62.43	2.00	0.00	1.00	0.00	43.20	64.40	2.00	0.00	1.00	0.00
43.25	67.42	2.00	0.00	1.00	0.00	43.33	72.60	2.00	0.00	1.00	0.00
43.38	81.37	2.00	0.00	1.00	0.00	43.50	89.61	2.00	0.00	1.00	0.00
43.56	96.77	2.00	0.00	1.00	0.00	43.62	102.62	2.00	0.00	1.00	0.00
43.69	104.70	2.00	0.00	1.00	0.00	43.74	105.97	2.00	0.00	1.00	0.00
43.82	105.44	2.00	0.00	1.00	0.00	43.93	105.99	2.00	0.00	1.00	0.00
44.00	106.72	2.00	0.00	1.00	0.00	44.05	108.25	2.00	0.00	1.00	0.00
44.10	111.60	2.00	0.00	1.00	0.00	44.19	116.86	2.00	0.00	1.00	0.00
44.24	123.23	2.00	0.00	1.00	0.00	44.29	129.17	2.00	0.00	1.00	0.00
44.38	135.13	2.00	0.00	1.00	0.00	44.43	141.37	2.00	0.00	1.00	0.00
44.50	146.34	2.00	0.00	1.00	0.00	44.56	150.12	2.00	0.00	1.00	0.00
44.64	151.69	2.00	0.00	1.00	0.00	44.72	151.88	2.00	0.00	1.00	0.00
44.76	149.78	2.00	0.00	1.00	0.00	44.86	147.02	2.00	0.00	1.00	0.00
44.90	143.13	2.00	0.00	1.00	0.00	44.98	139.59	2.00	0.00	1.00	0.00
45.03	135.40	2.00	0.00	1.00	0.00	45.08	130.75	2.00	0.00	1.00	0.00
45.19	126.60	2.00	0.00	1.00	0.00	45.25	123.89	2.00	0.00	1.00	0.00
45.30	123.14	2.00	0.00	1.00	0.00	45.35	122.94	2.00	0.00	1.00	0.00
45.44	123.86	2.00	0.00	1.00	0.00	45.51	125.52	2.00	0.00	1.00	0.00
45.56	127.93	2.00	0.00	1.00	0.00	45.62	130.10	2.00	0.00	1.00	0.00
45.69	132.41	2.00	0.00	1.00	0.00	45.74	135.53	2.00	0.00	1.00	0.00
45.81	138.20	2.00	0.00	1.00	0.00	45.87	142.84	2.00	0.00	1.00	0.00
46.00	147.32	2.00	0.00	1.00	0.00	46.05	152.86	2.00	0.00	1.00	0.00



**:: Post-earthquake settlement due to soil liquefaction :: (continued)**

Depth (ft)	Q <sub>tn,cs</sub>	FS	e <sub>v</sub> (%)	DF	Settlement (in)	Depth (ft)	Q <sub>tn,cs</sub>	FS	e <sub>v</sub> (%)	DF	Settlement (in)
46.16	155.39	2.00	0.00	1.00	0.00	46.23	158.27	2.00	0.00	1.00	0.00
46.28	160.80	2.00	0.00	1.00	0.00	46.35	163.33	2.00	0.00	1.00	0.00
46.41	165.29	2.00	0.00	1.00	0.00	46.46	167.59	2.00	0.00	1.00	0.00
46.58	169.79	2.00	0.00	1.00	0.00	46.63	167.52	2.00	0.00	1.00	0.00
46.71	163.76	2.00	0.00	1.00	0.00	46.76	159.02	2.00	0.00	1.00	0.00
46.82	158.04	0.94	0.80	1.00	0.01	46.89	156.51	0.92	0.81	1.00	0.01
46.98	155.56	0.90	0.82	1.00	0.01	47.05	154.96	0.90	0.82	1.00	0.01
47.14	154.81	2.00	0.00	1.00	0.00	47.18	154.88	2.00	0.00	1.00	0.00
47.32	155.10	2.00	0.00	1.00	0.00	47.36	155.60	2.00	0.00	1.00	0.00
47.41	156.06	2.00	0.00	1.00	0.00	47.46	156.20	2.00	0.00	1.00	0.00
47.54	156.17	0.91	0.81	1.00	0.01	47.62	156.09	0.91	0.81	1.00	0.01
47.66	156.14	0.91	0.81	1.00	0.00	47.70	156.05	0.91	0.81	1.00	0.00
47.78	155.40	0.90	0.82	1.00	0.01	47.90	154.33	0.89	0.82	1.00	0.01
47.94	153.15	0.87	0.83	1.00	0.00	47.98	151.97	2.00	0.00	1.00	0.00
48.07	150.83	2.00	0.00	1.00	0.00	48.12	149.72	2.00	0.00	1.00	0.00
48.20	149.37	2.00	0.00	1.00	0.00	48.24	149.95	2.00	0.00	1.00	0.00
48.31	151.81	2.00	0.00	1.00	0.00	48.39	154.55	2.00	0.00	1.00	0.00
48.48	157.33	2.00	0.00	1.00	0.00	48.52	159.65	2.00	0.00	1.00	0.00
48.56	161.72	2.00	0.00	1.00	0.00	48.65	163.61	2.00	0.00	1.00	0.00
48.69	165.39	2.00	0.00	1.00	0.00	48.78	166.37	2.00	0.00	1.00	0.00
48.82	166.99	2.00	0.00	1.00	0.00	48.91	166.99	1.08	0.40	1.00	0.00
48.98	166.50	1.07	0.40	1.00	0.00	49.05	165.56	1.06	0.40	1.00	0.00
49.10	163.94	1.03	0.56	1.00	0.00	49.18	162.24	1.01	0.56	1.00	0.01
49.22	158.24	0.95	0.79	1.00	0.00	49.36	152.57	0.87	0.84	1.00	0.01
49.40	147.58	0.80	1.15	1.00	0.01	49.44	145.74	2.00	0.00	1.00	0.00
49.48	146.72	2.00	0.00	1.00	0.00	49.58	147.51	2.00	0.00	1.00	0.00
49.65	147.97	2.00	0.00	1.00	0.00	49.69	147.78	2.00	0.00	1.00	0.00
49.75	146.34	2.00	0.00	1.00	0.00	49.85	144.89	2.00	0.00	1.00	0.00

**Total estimated settlement: 0.12**

**Abbreviations**

- Q<sub>tn,cs</sub>: Equivalent clean sand normalized cone resistance
- FS: Factor of safety against liquefaction
- e<sub>v</sub> (%): Post-liquefaction volumetric strain
- DF: e<sub>v</sub> depth weighting factor
- Settlement: Calculated settlement

# **APPENDIX F**

## **GENERAL EARTHWORK AND GRADING GUIDELINES**

**Geotechnical and Infiltration Evaluation  
2323 W. Broadway, Anaheim, California  
Project No. 2496-CR**



## **GENERAL GRADING GUIDELINES**

Guidelines presented herein are intended to address general construction procedures for earthwork construction. Specific situations and conditions often arise which cannot reasonably be discussed in general guidelines, when anticipated these are discussed in the text of the report. Often unanticipated conditions are encountered which may necessitate modification or changes to these guidelines. It is our hope that these will assist the contractor to more efficiently complete the project by providing a reasonable understanding of the procedures that would be expected during earthwork and the testing and observation used to evaluate those procedures.

### **General**

Grading should be performed to at least the minimum requirements of governing agencies, Chapters 18 and 33 of the California Building Code, CBC (2019) and the guidelines presented below.

### **Preconstruction Meeting**

A preconstruction meeting should be held prior to site earthwork. Any questions the contractor has regarding our recommendations, general site conditions, apparent discrepancies between reported and actual conditions and/or differences in procedures the contractor intends to use should be brought up at that meeting. The contractor (including the main onsite representative) should review our report and these guidelines in advance of the meeting. Any comments the contractor may have regarding these guidelines should be brought up at that meeting.

### **Grading Observation and Testing**

1. Observation of the fill placement should be provided by our representative during grading. Verbal communication during the course of each day will be used to inform the contractor of test results. The contractor should receive a copy of the "Daily Field Report" indicating results of field density tests that day. If our representative does not provide the contractor with these reports, our office should be notified.
2. Testing and observation procedures are, by their nature, specific to the work or area observed and location of the tests taken, variability may occur in other locations. The contractor is responsible for the uniformity of the grading operations; our observations and test results are intended to evaluate the contractor's overall level of efforts during grading. The contractor's personnel are the only individuals participating in all aspect of site work. Compaction testing and observation should not be considered as relieving the contractor's responsibility to properly compact the fill.
3. Cleanouts, processed ground to receive fill, key excavations, and subdrains should be observed by our representative prior to placing any fill. It will be the contractor's responsibility to notify our representative or office when such areas are ready for observation.
4. Density tests may be made on the surface material to receive fill, as considered warranted by this firm.
5. In general, density tests would be made at maximum intervals of two feet of fill height or every 1,000 cubic yards of fill placed. Criteria will vary depending on soil conditions and size of the fill. More frequent testing may be performed. In any case, an adequate number of field density tests should be made to evaluate the required compaction and moisture content is generally being obtained.

6. Laboratory testing to support field test procedures will be performed, as considered warranted, based on conditions encountered (e.g. change of material sources, types, etc.) Every effort will be made to process samples in the laboratory as quickly as possible and in progress construction projects are our first priority. However, laboratory workloads may cause in delays and some soils may require a **minimum of 48 to 72 hours to complete test procedures**. Whenever possible, our representative(s) should be informed in advance of operational changes that might result in different source areas for materials.
7. Procedures for testing of fill slopes are as follows:
  - a) Density tests should be taken periodically during grading on the flat surface of the fill, three to five feet horizontally from the face of the slope.
  - b) If a method other than over building and cutting back to the compacted core is to be employed, slope compaction testing during construction should include testing the outer six inches to three feet in the slope face to determine if the required compaction is being achieved.
8. Finish grade testing of slopes and pad surfaces should be performed after construction is complete.

### Site Clearing

1. All vegetation, and other deleterious materials, should be removed from the site. If material is not immediately removed from the site it should be stockpiled in a designated area(s) well outside of all current work areas and delineated with flagging or other means. Site clearing should be performed in advance of any grading in a specific area.
2. Efforts should be made by the contractor to remove all organic or other deleterious material from the fill, as even the most diligent efforts may result in the incorporation of some materials. This is especially important when grading is occurring near the natural grade. All equipment operators should be aware of these efforts. Laborers may be required as root pickers.
3. Nonorganic debris or concrete may be placed in deeper fill areas provided the procedures used are observed and found acceptable by our representative.

### Treatment of Existing Ground

1. Following site clearing, all surficial deposits of alluvium and colluvium as well as weathered or creep effected bedrock, should be removed unless otherwise specifically indicated in the text of this report.
2. In some cases, removal may be recommended to a specified depth (e.g. flat sites where partial alluvial removals may be sufficient). The contractor should not exceed these depths unless directed otherwise by our representative.
3. Groundwater existing in alluvial areas may make excavation difficult. Deeper removals than indicated in the text of the report may be necessary due to saturation during winter months.
4. Subsequent to removals, the natural ground should be processed to a depth of six inches, moistened to near optimum moisture conditions and compacted to fill standards.
5. Exploratory back hoe or dozer trenches still remaining after site removal should be excavated and filled with compacted fill if they can be located.

### Fill Placement

1. Unless otherwise indicated, all site soil and bedrock may be reused for compacted fill; however, some special processing or handling may be required (see text of report).

2. Material used in the compacting process should be evenly spread, moisture conditioned, processed, and compacted in thin lifts six (6) to eight (8) inches in compacted thickness to obtain a uniformly dense layer. The fill should be placed and compacted on a nearly horizontal plane, unless otherwise found acceptable by our representative.
3. If the moisture content or relative density varies from that recommended by this firm, the contractor should rework the fill until it is in accordance with the following:
  - a) Moisture content of the fill should be at or above optimum moisture. Moisture should be evenly distributed without wet and dry pockets. Pre-watering of cut or removal areas should be considered in addition to watering during fill placement, particularly in clay or dry surficial soils. The ability of the contractor to obtain the proper moisture content will control production rates.
  - b) Each six-inch layer should be compacted to at least 90 percent of the maximum dry density in compliance with the testing method specified by the controlling governmental agency. In most cases, the testing method is ASTM Test Designation D 1557.
4. Rock fragments less than eight inches in diameter may be utilized in the fill, provided:
  - a) They are not placed in concentrated pockets;
  - b) There is a sufficient percentage of fine-grained material to surround the rocks;
  - c) The distribution of the rocks is observed by, and acceptable to, our representative.
5. Rocks exceeding eight (8) inches in diameter should be taken off site, broken into smaller fragments, or placed in accordance with recommendations of this firm in areas designated suitable for rock disposal. On projects where significant large quantities of oversized materials are anticipated, alternate guidelines for placement may be included. If significant oversize materials are encountered during construction, these guidelines should be requested.
6. In clay soil, dry or large chunks or blocks are common. If in excess of eight (8) inches minimum dimension, then they are considered as oversized. Sheepsfoot compactors or other suitable methods should be used to break up blocks. When dry, they should be moisture conditioned to provide a uniform condition with the surrounding fill.

### **Slope Construction**

1. The contractor should obtain a minimum relative compaction of 90 percent out to the finished slope face of fill slopes. This may be achieved by either overbuilding the slope and cutting back to the compacted core, or by direct compaction of the slope face with suitable equipment.
2. Slopes trimmed to the compacted core should be overbuilt by at least three (3) feet with compaction efforts out to the edge of the false slope. Failure to properly compact the outer edge results in trimming not exposing the compacted core and additional compaction after trimming may be necessary.
3. If fill slopes are built "at grade" using direct compaction methods, then the slope construction should be performed so that a constant gradient is maintained throughout construction. Soil should not be "spilled" over the slope face nor should slopes be "pushed out" to obtain grades. Compaction equipment should compact each lift along the immediate top of slope. Slopes should be back rolled or otherwise compacted at approximately every 4 feet vertically as the slope is built.
4. Corners and bends in slopes should have special attention during construction as these are the most difficult areas to obtain proper compaction.
5. Cut slopes should be cut to the finished surface. Excessive undercutting and smoothing of the face with fill may necessitate stabilization.

## **UTILITY TRENCH CONSTRUCTION AND BACKFILL**

Utility trench excavation and backfill is the contractor's responsibility. The geotechnical consultant typically provides periodic observation and testing of these operations. While efforts are made to make sufficient observations and tests to verify that the contractor's methods and procedures are adequate to achieve proper compaction, it is typically impractical to observe all backfill procedures. As such, it is critical that the contractor use consistent backfill procedures.

Compaction methods vary for trench compaction and experience indicates many methods can be successful. However, procedures that "worked" on previous projects may or may not prove effective on a given site. The contractor(s) should outline the procedures proposed, so that we may discuss them **prior** to construction. We will offer comments based on our knowledge of site conditions and experience.

1. Utility trench backfill in slopes, structural areas, in streets and beneath flat work or hardscape should be brought to at least optimum moisture and compacted to at least 90 percent of the laboratory standard. Soil should be moisture conditioned prior to placing in the trench.
2. Flooding and jetting are not typically recommended or acceptable for native soils. Flooding or jetting may be used with select sand having a Sand Equivalent (SE) of 30 or higher. This is typically limited to the following uses:
  - a) shallow (12 + inches) under slab interior trenches and,
  - b) as bedding in pipe zone.

The water should be allowed to dissipate prior to pouring slabs or completing trench compaction.

3. Care should be taken not to place soils at high moisture content within the upper three feet of the trench backfill in street areas, as overly wet soils may impact subgrade preparation. Moisture may be reduced to 2% below optimum moisture in areas to be paved within the upper three feet below sub grade.
4. Sand backfill should not be allowed in exterior trenches adjacent to and within an area extending below a 1:1 projection from the outside bottom edge of a footing, unless it is similar to the surrounding soil.
5. Trench compaction testing is generally at the discretion of the geotechnical consultant. Testing frequency will be based on trench depth and the contractor's procedures. A probing rod would be used to assess the consistency of compaction between tested areas and untested areas. If zones are found that are considered less compact than other areas, this would be brought to the contractor's attention.

## **JOB SAFETY**

### **General**

Personnel safety is a primary concern on all job sites. The following summaries are safety considerations for use by all our employees on multi-employer construction sites. On ground personnel are at highest risk of injury and possible fatality on grading construction projects. The company recognizes that construction activities will vary on each site and that job site safety is the contractor's responsibility. However, it is, imperative that all personnel be safety conscious to avoid accidents and potential injury.



In an effort to minimize risks associated with geotechnical testing and observation, the following precautions are to be implemented for the safety of our field personnel on grading and construction projects.

1. **Safety Meetings:** Our field personnel are directed to attend the contractor's regularly scheduled safety meetings.
2. **Safety Vests:** Safety vests are provided for and are to be worn by our personnel while on the job site.
3. **Safety Flags:** Safety flags are provided to our field technicians; one is to be affixed to the vehicle when on site, the other is to be placed atop the spoil pile on all test pits.

In the event that the contractor's representative observes any of our personnel not following the above, we request that it be brought to the attention of our office.

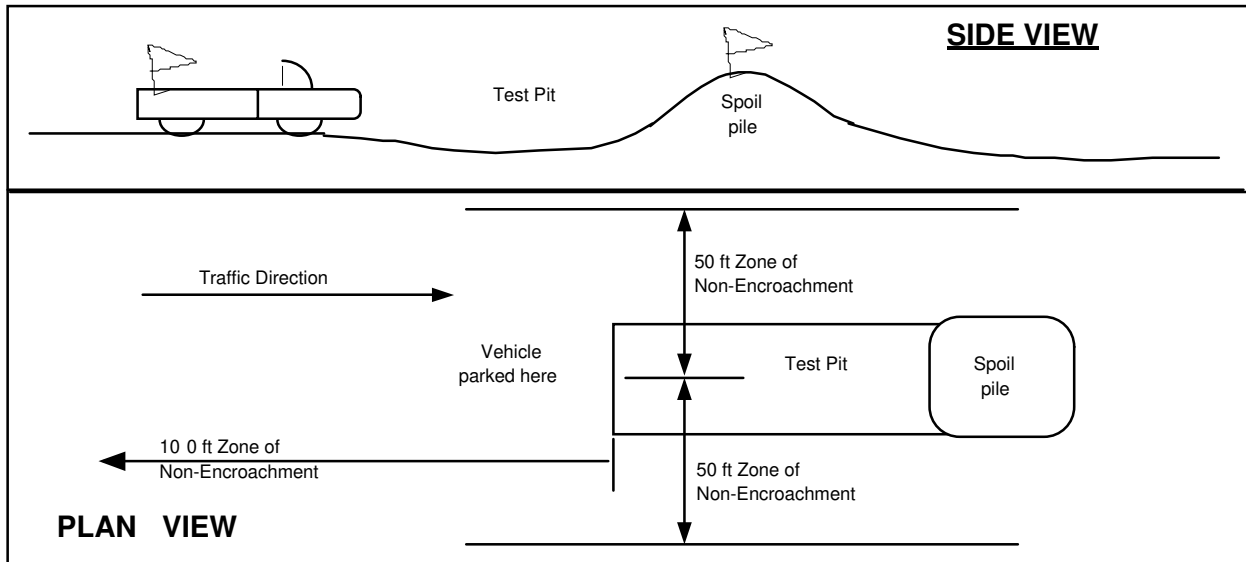
### **Test Pits Location, Orientation and Clearance**

The technician is responsible for selecting test pit locations. The primary concern is the technician's safety. However, it is necessary to take sufficient tests at various locations to obtain a representative sampling of the fill. As such, efforts will be made to coordinate locations with the grading contractors authorized representatives (e.g. dump man, operator, supervisor, grade checker, etc.), and to select locations following or behind the established traffic pattern, preferably outside of current traffic. The contractors authorized representative should direct excavation of the pit and safety during the test period. Again, safety is the paramount concern.

Test pits should be excavated so that the spoil pile is placed away from oncoming traffic. The technician's vehicle is to be placed next to the test pit, opposite the spoil pile. This necessitates that the fill be maintained in a drivable condition. Alternatively, the contractor may opt to park a piece of equipment in front of test pits, particularly in small fill areas or those with limited access.

A zone of non-encroachment should be established for all test pits (see diagram below). No grading equipment should enter this zone during the test procedure. The zone should extend outward to the sides approximately 50 feet from the center of the test pit and 100 feet in the direction of traffic flow. This zone is established both for safety and to avoid excessive ground vibration, which typically decreases test results.

### TEST PIT SAFETY PLAN



#### Slope Tests

When taking slope tests, the technician should park their vehicle directly above or below the test location on the slope. The contractor's representative should effectively keep all equipment at a safe operation distance (e.g. 50 feet) away from the slope during testing.

The technician is directed to withdraw from the active portion of the fill as soon as possible following testing. The technician's vehicle should be parked at the perimeter of the fill in a highly visible location.

#### Trench Safety

It is the contractor's responsibility to provide safe access into trenches where compaction testing is needed. Trenches for all utilities should be excavated in accordance with CAL-OSHA and any other applicable safety standards. Safe conditions will be required to enable compaction testing of the trench backfill.

All utility trench excavations in excess of 5 feet deep, which a person enters, are to be shored or laid back. Trench access should be provided in accordance with OSHA standards. Our personnel are directed not to enter any trench by being lowered or "riding down" on the equipment.

Our personnel are directed not to enter any excavation which;

1. is 5 feet or deeper unless shored or laid back,
2. exit points or ladders are not provided,
3. displays any evidence of instability, has any loose rock or other debris which could fall into the trench, or
4. displays any other evidence of any unsafe conditions regardless of depth.

If the contractor fails to provide safe access to trenches for compaction testing, our company policy requires that the soil technician withdraws and notifies their supervisor. The contractor's representative will then be contacted in an effort to effect a solution. All backfill not tested due to safety concerns or other reasons is subject to reprocessing and/or removal.



**Procedures**

In the event that the technician's safety is jeopardized or compromised as a result of the contractor's failure to comply with any of the above, the technician is directed to inform both the developer's and contractor's representatives. If the condition is not rectified, the technician is required, by company policy, to immediately withdraw and notify their supervisor. The contractor's representative will then be contacted in an effort to effect a solution. No further testing will be performed until the situation is rectified. Any fill placed in the interim can be considered unacceptable and subject to reprocessing, recompaction or removal.

In the event that the soil technician does not comply with the above or other established safety guidelines, we request that the contractor bring this to technicians attention and notify our project manager or office. Effective communication and coordination between the contractors' representative and the field technician(s) is strongly encouraged in order to implement the above safety program and safety in general.

The safety procedures outlined above should be discussed at the contractor's safety meetings. This will serve to inform and remind equipment operators of these safety procedures particularly the zone of non-encroachment.

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TREATMENT ABOVE  
NATURAL SLOPES

STANDARD GRADING  
GUIDELINES

PLATE F-1

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**COMMON FILL  
SLOPE KEYS**

**STANDARD GRADING  
GUIDELINES**

**PLATE F-2**

NOTES:

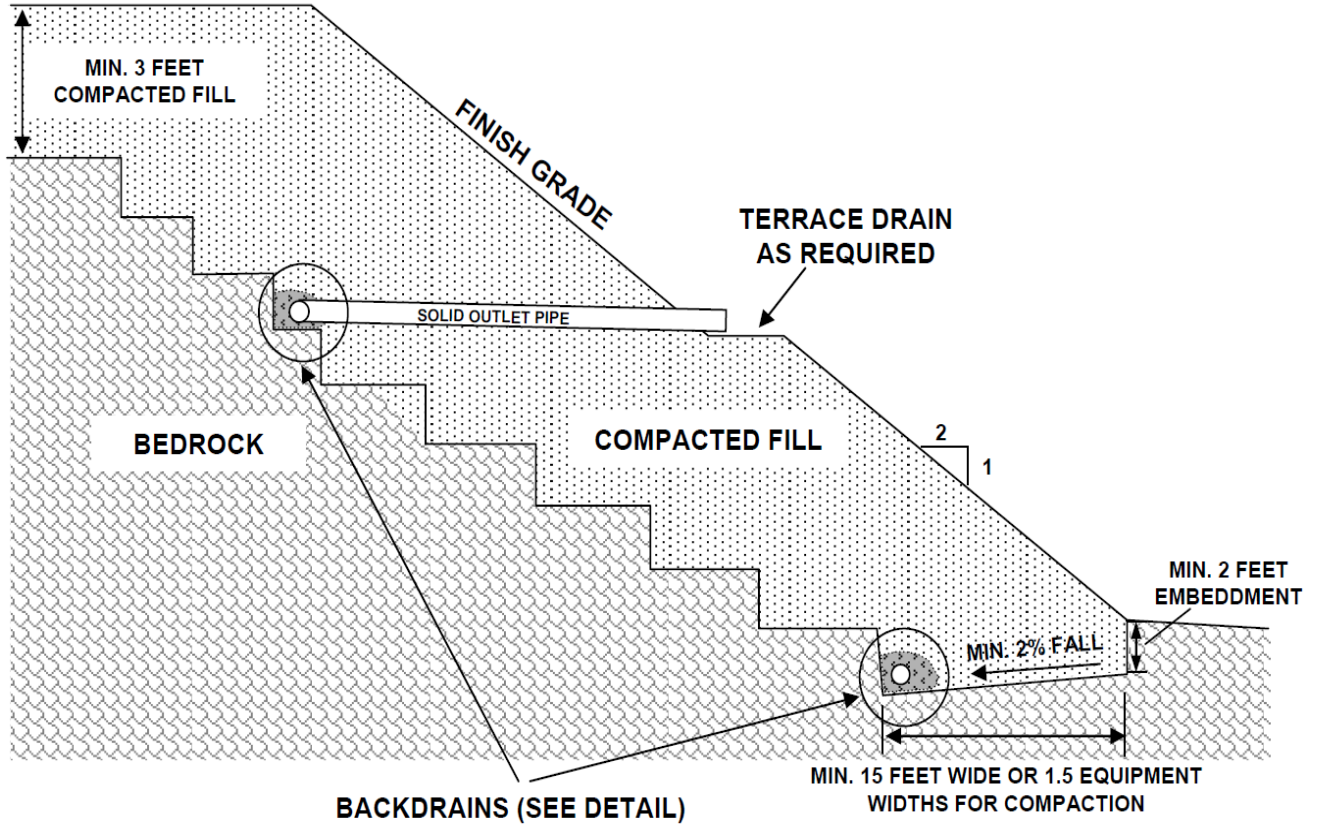
- 2) MAXIMUM ROCK SIZE IN WINDROWS IS 4 FEET IN DIAMETER
- 3) SOIL AROUND WINDROWS TO BE SANDY MATERIAL SUBJECT TO SOIL ENGINEER ACCEPTANCE
- 4) SPACING AND CLEARANCES MUST BE SUFFICIENT TO ALLOW FOR PROPER COMPACTION
- 5) INDIVIDUAL LARGE ROCKS MAY BE BURIED IN PITS.

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**ROCK BURIAL DETAILS**

**STANDARD GRADING  
GUIDELINES**

**PLATE F-3**



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TYPICAL BUTTRESS AND  
STABILIZATION FILL

STANDARD GRADING  
GUIDELINES

PLATE F-4