

## **Appendix D**

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**Updated Geotechnical and Infiltration Evaluation  
GeoTek, Inc.  
July 7, 2021, Revised September 28, 2022**

**UPDATED GEOTECHNICAL AND INFILTRATION EVALUATION  
FOR  
PROPOSED MULTI-FAMILY RESIDENTIAL DEVELOPMENT  
XENIA APARTMENT PROJECT  
EAST OF XENIA AVENUE AND ABOUT 200 FEET SOUTH OF EAST 8<sup>TH</sup> STREET  
BEAUMONT, RIVERSIDE COUNTY, CALIFORNIA**

**PREPARED FOR**

**BEAUMONT LAND PARTNERS  
556 SOUTH FAIR OAKS AVENUE  
PASADENA, CALIFORNIA 91105**

**PREPARED BY**

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**PROJECT No. 2784-CR**

**JULY 7, 2021 (REV. SEPTEMBER 28, 2022)**

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July 7, 2021  
(Revised September 28, 2022)  
Project No. 2784-CR

**Beaumont Land Partners**  
556 South Fair Oaks Avenue  
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Attention: Mr. Paul Onufer

Subject: Updated Geotechnical and Infiltration Evaluation  
Proposed Multi-Family Residential Development  
Xenia Apartment Project  
Beaumont, Riverside County, California

Dear Mr. Onufer:

We are pleased to provide our updated geotechnical and infiltration report for proposed development at the subject property located in the city of Beaumont, Riverside County, California. This report presents a discussion of our evaluation and provides updated geotechnical recommendations for earthwork, foundation design, and construction.

In our opinion, site development appears feasible from a geotechnical viewpoint provided that the recommendations presented in this report are incorporated into the design and construction phases of the project.

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

Respectfully submitted,  
**GeoTek, Inc.**

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Appendix B – Logs of Borings and Laboratory Test Results by Converse (2019)

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Appendix D – Laboratory Test Results by GeoTek

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

The purpose of this study was to evaluate the existing geotechnical conditions for the currently proposed development. Services provided for this study included the following:

- Research and review of readily available geologic data and past soil reports pertinent to the site,
- A site reconnaissance,
- Site exploration via two exploratory borings excavated to 20 feet below existing grade and four Cone Penetration Test (CPT) soundings to depths of about 50 feet each across the site,
- Testing of four percolation test borings to estimate the infiltration rate of the subsoils within a proposed site basin,
- Collection relatively undisturbed and bulk samples of the site soils for geotechnical and corrosion assessment,
- Review and evaluation of site seismicity,
- Engineering analyses, and;
- Compilation of this updated geotechnical and infiltration evaluation which presents our findings, conclusions, and recommendations for site development.

The intent of this report is to aid in the evaluation 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. Final site development plans should be provided to GeoTek for review when available.

## 2. SITE DESCRIPTION AND PROPOSED DEVELOPMENT

### 2.1 SITE DESCRIPTION

The project site comprises 10.9 acres located east of Xenia Avenue and about 200 feet south of East 8<sup>th</sup> Street in the city of Beaumont, Riverside County, California. The property consists of vacant land; however, the site was used as agricultural land in the 1990s and earlier. The property has a relatively flat terrain with elevations ranging from 2607 feet above mean sea level (amsl) toward the north portion of the site to 2600 feet amsl in the south portion. Surface drainage is generally to the south, with some minor local variations. At the time of our visit, the property had minor visible trash and was mostly void of vegetation.

The site is bounded on the north by existing single-family residences; on the west by Xenia Avenue with apartment homes beyond; on the south by commercial properties and vacant land; and on the east by an apartment complex. The general location of the site is shown in Figure 1.

### 2.2 PROPOSED DEVELOPMENT

According to the *Site Plan* prepared by SJA Design Group, Inc. and dated September 13, 2022, the site will be developed with 16 apartment buildings, a recreation building with a pool, a water quality basin, parking/drive areas, underground utilities, and other improvements. The residential structures are anticipated to be up to three stories in height, of wood-framed construction, utilizing conventional shallow foundations and slab-on-grade. A maximum wall load of about 3 kips per linear foot and a maximum column load of about 40 kips were assumed.

Proposed cuts and fills as well as slopes are anticipated to be minimal. The water quality basin is planned to be constructed near the center portion of the south property line and will be excavated to a depth of about five feet.

If site development differs from the information presented in this report, the recommendations should be subject to further review and evaluation by GeoTek. Final site development plans should be reviewed by GeoTek when they become available.

### **3. REVIEW OF PAST REPORTS**

On May 9, 2006, Earth System Southwest (ESSW) issued a *Preliminary Geotechnical Engineering Report* for the project. The study indicated that six borings were drilled on the 11-acre site to depths ranging from 14 to 21.5 feet. ESSW stated that the borings encountered “very low” expansive silty sand and clayey sand. However, no results of laboratory testing were included in the ESSW report.

ESSW stated that groundwater was not encountered in any of their exploratory borings, and depth to groundwater was on the order of 300 feet. The potential for soil liquefaction at the site was considered negligible. However, no information regarding the potential for seismically induced settlement of dry sands was furnished.

ESSW recommended that the existing soils within the building pad and foundation areas be over-excavated to a minimum of three feet below existing grade or two feet below the footing level (whichever is lower). The over-excavation was recommended to extend five feet beyond the outer edges of the exterior footings. Garden and retaining wall areas were recommended to be prepared similar to building pads, but the lateral extent of the over-excavations should be at least two feet beyond the edges of the improvements.

Foundations were suggested to be designed using an allowable bearing capacity of 1,500 pounds per square foot (psf). Total static settlement of about one-inch and differential static settlement of less than 0.5-inch in 20 feet were predicted.

On September 27, 2019, Converse Consultants (Converse) completed a *Preliminary Geotechnical Investigation Report* for the site. The evaluation included the excavation of eight exploratory borings to 16.5 to 51.5 feet below grade. The excavations encountered native alluvial materials consisting of silty sand, sand, and silt.

Groundwater was not encountered in any of the borings by Converse to a maximum depth of 51.5 feet, and the risk of liquefaction was considered low. Converse also stated that the risk of seismically induced settlement was low due to the absence of unconsolidated granular sediments at the site.

The study stated that building areas should be over-excavated to at least five feet below proposed grade or two feet below the bottom of footings, whichever is deeper. The over-excavation was recommended to extend a minimum of five feet beyond the building footprint. Pavement areas were recommended to be supported on at least 12 inches of compacted fill.

Geotechnical design parameters for conventional foundations resting on “very low” expansive soils were provided by Converse. The study recommended the use of an allowable bearing pressure of 2,000 psf. Static settlement of less than one-inch total and less than 0.5-inch differential settlement over 40 feet were also estimated.

A shrinkage factor of about 10 to 15 percent for soil excavated and replaced as compacted fill, and a subsidence of about 0.10 to 0.15 feet were estimated for the project. The study also reported that soluble sulfate contents of two surface soil samples were negligible (0.0036 and 0.0038 percent) and a minimum concrete compressive strength of 2,500 psi was recommended. The minimum resistivity for surficial soil samples was found to be about 10,158 and 6,826 ohm-cm, and the soils were considered to have a “moderate” corrosive potential with respect to ferrous metal installations.

Logs of the exploratory borings reported by ESSW (2006) and Converse (2019) are included in Appendices A and B, respectively. The locations of these explorations are shown on the Exploration Location Map presented as Figure 2.

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

### **4.1 FIELD EXPLORATION**

GeoTek conducted a field exploration at the site on June 14, 2021 which consisted of excavating two exploratory borings and four CPT soundings across the property. The explorations were excavated to depths ranging from 21.5 to 50 feet. The borings were excavated with a truck-mounted drill rig, and the CPT soundings with a 30-ton CPT rig. The approximate locations of these excavations along with the borings reported by the ESSW (2006) and Converse (2019) are shown on Figure 2, Exploration Location Map. Logs of the excavations performed by GeoTek are included in Appendix C.

### **4.2 LABORATORY TESTING**

Laboratory testing was performed on selected soil samples collected during our field exploration. The purpose of the laboratory testing was to confirm the field classification of the soil materials encountered and to evaluate the physical properties of the soils for use in the engineering design and analysis. Laboratory testing included in-situ dry density-moisture



content, proctor, remolded direct shear, collapse, expansion index, among other tests. Test results are presented in Appendix D.

### 4.3 PERCOLATION TESTING

GeoTek utilized the percolation test procedure (Riverside County, 2011) to estimate the infiltration rate of the subsurface materials encountered at the proposed site basin.

The percolation test borings (Borings I-1 through I-4) were excavated with a hollow-stem auger drill rig within the basin area as shown on the *Site Plan* (SJA Design Group, 2022). All test borings were drilled to depths of about five feet, which was the approximate depth of the proposed basin. The borings were approximately eight inches in diameter. A three-inch diameter perforated PVC pipe encapsulated in filter sock was inserted into each of the test holes. The annular space between the test hole sidewalls and PVC pipe was filled with gravel.

Native alluvial materials typically consisting of silty sand were encountered in our test holes. In addition to the test borings, Boring B-1 was drilled to 20 feet below grade within the basin area to confirm the absence of impermeable materials or groundwater. The cited boring encountered granular alluvial materials of silty sand. The logs of the borings are presented in Appendix C. The locations of the borings drilled within the basin area are shown on Figure 2.

After pre-soaking the test holes, percolation testing was performed in the lower 20 inches of each test hole by a representative from our firm. The percolation rates were converted to infiltration rates via the Porchet Method.

The infiltration rates, which do not include a factor of safety and were determined after the water levels had stabilized, are presented in the following table.

| SUMMARY OF INFILTRATION FIELD RATES |            |                                              |
|-------------------------------------|------------|----------------------------------------------|
| Basin                               | Boring No. | Infiltration Field Rate<br>(inches per hour) |
| South-Central<br>Area               | I-1        | 2.4                                          |
|                                     | I-2        | 3.3                                          |
|                                     | I-3        | 1.1                                          |
|                                     | I-4        | 1.4                                          |

Detailed infiltration/percolation test data and Porchet conversion calculations are presented in Appendix E.

Over the lifetime of the basin systems, the infiltration rates may be affected by silt build up and biological activities, as well as local variations in near surface soil conditions. A suitable factor of safety should be applied to the field rates to design the infiltration system.

It should be noted that the infiltration rates provided above were performed in relatively undisturbed native materials. Infiltration rates will vary and are mostly dependent on the underlying consistency of the site soils and relative density. Infiltration rates will be impacted by weight of equipment travelling over the soils, placement of engineered fill and other various factors. GeoTek assumes no responsibility or liability for the ultimate design or performance of the storm water management system.

## **5. GEOLOGIC AND SOILS CONDITIONS**

### **5.1 REGIONAL SETTING**

The 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 from the point of contact with the Transverse Ranges geomorphic province, southerly to the tip of Baja California. 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 near the middle of the province. The San Andreas Fault zone borders the northeasterly margin of the province.

More specific to the subject property, the site is located in an area geologically mapped to be underlain by alluvial fan deposits (Dibblee, T.W., and Minch, J.A., 2003). According the CGS 7.5-Minute Quadrangle, the nearest known active faults are the San Gorgonio Pass Fault Zone located 2.7 miles to the northeast of the site and the Banning Fault located 2.6 miles to the north of the site. No active faults are shown in the immediate site vicinity on the maps reviewed for the area.



## **5.2 SUBSURFACE SOIL CONDITIONS**

A brief description of the earth materials reported to be on the site by ESSW (2006) and Converse (2019) and encountered during our field investigation is presented in the following sections.

### **5.2.1 Topsoil/Disturbed Soil (unmapped)**

Our explorations noted that the upper one foot ( $\pm$ ) of soil is loose and disturbed due to the past agricultural activities at the site. The topsoil mostly consists of dry to slightly moist, light brown silty sand.

### **5.2.2 Alluvial Fan Deposits**

Our excavations encountered alluvial fan deposits below the topsoil. The alluvium was typically composed of silty sand and occasional gravel and was light brown to brown in color, slightly moist to moist, and medium dense to dense, as indicated by our blow counts and in-place density data. Tests performed on the most unfavorable samples of the alluvium (selected based on blow counts) suggest a slight potential for soil collapse (0.2 to 1.2 percent). This agrees with Converse's findings that the alluvium has slight to moderate potential for collapse (0.1 to 2.5 percent).

Results of expansion index tests show that the site surficial soils have a "very low" expansion potential ( $EI \approx 5$  to 10) which concurs with the findings by Converse and ESSW.

Detailed logs of the site explorations are included in Appendices A through C. The locations of the site explorations are shown on the Exploration Location Map, Figure 2.

## **5.3 SURFACE WATER AND GROUNDWATER**

### **5.3.1 Surface Water**

Surface water on this site is the result of precipitation or surface run-off from surrounding areas. Overall surface drainage is generally to the south.

### **5.3.2 Groundwater**

The exploratory boring BH-5 by Converse (2019) and all of our CPT soundings excavated to a maximum depth of 50 feet did not encounter groundwater at the property.

The California Water Data Library (<https://wdl.water.ca.gov/waterdatalibrary/>) shows a groundwater well located approximately one-quarter mile northeast from the site. Records of this well indicate that groundwater in the region is deeper than 200 feet.

## 5.4 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 presently known to exist at this site nor is the site situated within an “Alquist-Priolo” Earthquake Fault Zone. The County of Riverside (<https://countyofriverside.us/Residents/PropertyInformation.aspx>) has designated the site area as “not in fault zone”, “not in a fault line”, having a “low” potential for liquefaction, and “susceptible” to subsidence. According the CGS 7.5-Minute Quadrangle, the nearest known active faults are the San Geronio Pass Fault Zone located 2.7 miles to the northeast of the site and the Banning Fault located 2.6 miles to the north of the site.

### 5.4.1 Seismic Design Parameters

The site is located at approximately 33.9315° Latitude and -116.9527° Longitude. Site spectral accelerations ( $S_a$  and  $S_1$ ), for 0.2 and 1.0 second periods for a Class “D” site, was 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. Using the ASCE 7-16 option on the SEAOC/OSHPD website results in the values for  $S_{M1}$  and  $S_{D1}$  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  $S_1$  exceeds 0.2. The value  $S_1$  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  $S_1$  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  $T \leq 1.5T_s$  and taken as equal to 1.5 times the value computed in accordance with either Eq. 12.8-3 for  $T_L \geq T > 1.5T_s$  or Eq. 12.8-4 for  $T > T_L$ .

The results, based on the 2015 NEHRP and the 2019 CBC, are presented in the following table and we have assumed that the exception as allowed in ASCE 7-16 is applicable. If the exception is deemed not appropriate, a site-specific ground motion analysis will be required.

| <b>SITE SEISMIC PARAMETERS</b>                                                        |        |
|---------------------------------------------------------------------------------------|--------|
| Mapped 0.2 sec Period Spectral Acceleration, $S_s$                                    | 2.013g |
| Mapped 1.0 sec Period Spectral Acceleration, $S_1$                                    | 0.69g  |
| Site Coefficient for Site Class "D", $F_a$                                            | 1.0    |
| Site Coefficient for Site Class "D", $F_v$                                            | 1.7    |
| Maximum Considered Earthquake Spectral Response Acceleration for 0.2 Second, $S_{MS}$ | 2.013g |
| Maximum Considered Earthquake Spectral Response Acceleration for 1.0 Second, $S_{M1}$ | 1.173g |
| 5% Damped Design Spectral Response Acceleration Parameter at 0.2 Second, $S_{DS}$     | 1.342g |
| 5% Damped Design Spectral Response Acceleration Parameter at 1 second, $S_{D1}$       | 0.782g |
| Peak Ground Acceleration Adjusted for Site Class Effects, $PGA_M$                     | 0.903g |
| 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.

## 5.5 LIQUEFACTION AND SEISMICALLY INDUCED SETTLEMENT

Due to the anticipated depth to groundwater (greater than 200 feet), the potential for liquefaction at the site is nil.

However, loose to medium dense granular soils tend to densify during strong earthquake shaking. The potential for seismically induced settlements of the upper 50 feet of dry sandy alluvial fan sediments at the property was assessed using the data of our CPT soundings with the aid of the computer program Cliq version 3.3.1.14 (Geologismiki, 2006). A mean magnitude weighted ( $M_w$ ) seismic event of 7.13 obtained using the USGS deaggregation web application (based on a two percent exceedance in 50 years) and a  $PGA_M$  of 0.903g obtained from the USGS website were used in our assessment.

The results of the analyses indicated the presence of occasional layers of loose to medium dense sands and silty sands that would be prone to settlement. The following table summarizes the amount of total seismically induced settlement estimated at each CPT location:

| <b>ESTIMATED SEISMICALLY INDUCED TOTAL SETTLEMENT</b> |                       |
|-------------------------------------------------------|-----------------------|
| CPT Sounding                                          | Total Settlement (in) |
| 1                                                     | 1.0                   |
| 2                                                     | 0.2                   |
| 3                                                     | 0.2                   |
| 4                                                     | 1.5                   |

As noted above, a seismically induced settlement of up to about 1.5 inches total and 0.75 inches differential over a 40-foot span is estimated for the property. The results of the seismic settlement analyses are presented within Appendix F.

## **5.6 OTHER HAZARDS**

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

The potential for secondary seismic hazard such as a tsunami or a seiche is considered negligible due to site elevation and great distance to the ocean or a lake.

# **6. CONCLUSIONS AND RECOMMENDATIONS**

## **6.1 GENERAL**

The proposed development appears feasible from a geotechnical viewpoint provided that the following recommendations are incorporated into design and construction.

The site contains topsoil and loose surficial alluvium. These materials are unsuitable for foundation support and thus should be removed and replaced as engineered compacted fill.

Our analyses also indicate that site may be subject to densification of the upper dry sands during the design level earthquake. This could result in seismically induced settlement of up to about 1.5 inches total and 0.75-inch differential over a 40-foot span. Provided that the site is prepared as recommended in the following sections of this report, static settlement is estimated to be up to 0.5-inch total and up to 0.25-inch differential over a 40-foot span. The combined static plus seismic differential settlement of about 1 inch in 40 feet is anticipated to be tolerated by the residential buildings supported on conventional shallow footings.

## **6.2 EARTHWORK CONSIDERATIONS**

Earthwork and grading should be performed in accordance with the applicable grading ordinances of the City of Beaumont/County of Riverside, the 2019 California Building Code (CBC), and recommendations contained in this report. The Grading Guidelines included in Appendix G outline general procedures and do not anticipate all site-specific situations. In the



event of conflict, the recommendations presented in the text of this report should supersede those contained in Appendix G.

### **6.2.1 Site Clearing**

The site should be cleared of existing vegetation, roots, and debris. These materials should be properly disposed of off-site.

### **6.2.2 Remedial Grading**

The upper five feet of existing soil or two feet below the base of footings, whichever is deeper, should be completely over-excavated from proposed building areas and areas to receive structural fill. Additional over-excavation may be recommended if unsuitable materials are exposed. The bottom of over-excavations should expose competent native materials which are defined as relatively uniform, no visually porous soils with an in-place compaction of at least 85 percent of the soil's maximum dry density as determined per ASTM D 1557. As a minimum over-excavations should extend down and away from foundation elements at a 1:1 (h:v) projection to the recommended removal depth or a minimum of 5 feet.

The upper two feet of existing soil or one foot below the pavement/flatwork subgrade, whichever is deeper, should be removed. The horizontal extent of over-excavations should extend at least two feet beyond the edge of the improvement.

The bottom of all removals should be scarified to a minimum depth of eight inches, brought to above the optimum moisture content, and then recompact to at least 90 percent of the soil's maximum dry density per ASTM D 1557. The bottoms of remedial excavations should be observed by a GeoTek representative prior to scarification.

### **6.2.3 Excavation Characteristics**

Excavation in the on-site soils is expected to be feasible utilizing heavy-duty grading equipment in good operating condition.

All temporary excavations for grading purposes and installation of underground utilities should be constructed in accordance with local and Cal-OSHA guidelines. Temporary vertical excavations within the on-site materials should be stable up to four feet with a 1:1 (h:v) cut above. Flatter inclinations may be needed depending on the field conditions. Temporary construction slopes should be periodically examined by a competent person, per Cal-OSHA requirements, to look for evidence of instability.

#### **6.2.4 Engineered Fill**

The onsite soils are considered suitable for reuse as engineered fill provided they are free from vegetation, debris, deleterious material, and hard lumps greater than six inches in maximum dimension.

Fill materials should be placed in horizontal lifts not exceeding six inches in loose thickness, moisture conditioned to at least the optimum moisture content, and compacted to a minimum relative compaction of 90 percent (ASTM D 1557).

Detailed recommendations pertaining to the placement of engineered fill are presented in Appendix G.

#### **6.2.5 Slopes**

Fill and cut slopes constructed at gradients of 2:1 (h:v) or flatter, in accordance with industry standards, are anticipated to be both grossly and surficially stable. Fill placed on slopes should be properly benched into competent soils per the geotechnical engineer's direction. Cut slopes should be observed by a geotechnical engineer/engineering geologist to approve the exposed conditions upon excavation.

The onsite soils are mostly granular and subject to erosion. Slopes should be landscaped shortly after construction.

#### **6.2.6 Trench Excavation and Backfill**

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 (ASTM D 1557). Compaction should be achieved with a mechanical compaction device. Jetting of trench backfill is not recommended. If soils to be used as backfill have dried out, they should be thoroughly moisture conditioned prior to placement in trenches.

#### **6.2.7 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 is primarily dependent upon the degree of compactive effort achieved during construction. For planning purposes, a shrinkage factor of approximately 5 to 15 percent may

be considered for the materials requiring recompaction. Subsidence of up to 0.1 feet may occur.

## 6.3 DESIGN RECOMMENDATIONS

### 6.3.1 Foundation Design Criteria

The site surficial soils possess “very low” ( $0 \leq EI \leq 20$ ) expansion potential in accordance with ASTM D 4829, as noted by our soils data and data by past consultants. However, verification testing should be performed after site remedial grading.

The foundation elements for the proposed structures should bear entirely in engineered fill soils and should be designed in accordance with the 2019 CBC.

| <b>GEOTECHNICAL RECOMMENDATIONS FOR CONVENTIONALLY REINFORCED SHALLOW FOUNDATIONS</b> |                                                                                                            |
|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| Design Parameter                                                                      | “Very Low”<br>Expansion Potential ( $0 \leq EI \leq 20$ )                                                  |
| Foundation Depth or Minimum Perimeter Beam Depth (inches below lowest adjacent grade) | One- and Two-story – 12<br>Three-story - 18                                                                |
| Minimum Foundation Width (Inches)*                                                    | One- and Two-story – 12<br>Three-story - 15                                                                |
| Minimum Slab Thickness (actual)**                                                     | 4 – Actual                                                                                                 |
| Minimum Slab Reinforcing**                                                            | 6” x 6” – W1.4/W1.4 welded wire fabric placed in middle of slab                                            |
| Minimum Footing Reinforcement                                                         | Two No. 4 reinforcing bars,<br>one placed near the top and one near the bottom                             |
| Effective Plasticity Index***                                                         | NA                                                                                                         |
| Presaturation of Subgrade Soil (Percent of Optimum)                                   | Minimum of 100% 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.

\*\*Slab thickness and reinforcement should be determined by the structural engineer.

\*\*\*Effective plasticity index should be verified at the completion of rough grading.

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

The following criteria for design of foundations are preliminary and should be re-evaluated based on the results of additional laboratory testing of samples obtained near finish pad grade.

An allowable bearing capacity of 2,000 psf may be used for design of footings 12 inches deep and 12 inches wide. This value may be increased by 400 psf and 200 psf for each additional 12 inches in depth or width, respectively, to a maximum value of 3,000 psf. 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 0.5-inch and a maximum differential static settlement of less than 0.25-inch in a 40-foot span. Seismic settlement is anticipated to be up to 1.5-inches total and 0.75-inch differential over a 40-foot span.

The passive earth pressure may be computed as an equivalent fluid having a density of 250 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 0.40 may be used with dead load forces. When combining passive pressure and frictional resistance, the passive pressure component should be reduced by one-third.

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 environmental 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 permeability) to achieve the desired performance level. Consideration should be given to consulting with an individual possessing specific expertise in this area for additional evaluation.

Moisture retarders can reduce, but not eliminate, moisture vapor rise from the underlying soils up through the slab. Moisture retarders should be designed and constructed in accordance with applicable American Concrete Institute, Portland Cement Association, Post-Tensioning Concrete Institute, ASTM and California Building Code requirements and guidelines.

GeoTek does not practice in the field of moisture vapor transmission evaluation/mitigation, since this does not fall under the geotechnical disciplines. Therefore, we recommend that a qualified person, such as the flooring contractor, structural engineer, and/or architect be consulted to evaluate the general and specific moisture vapor transmission paths and any impact on the proposed construction. That person (or persons) should provide recommendations for mitigation of potential adverse impact of moisture vapor transmission on various components of the structures as deemed appropriate. In addition, the recommendations in this report and our services in general are not intended to address mold prevention, since we along with



geotechnical consultants in general, do not practice in areas of mold prevention. If specific recommendations are desired, a professional mold prevention consultant should be contacted.

### **6.3.2 Miscellaneous Foundation Recommendations**

- To reduce 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 soils to be used as backfill have dried out, they should be thoroughly moisture conditioned prior to placement in trenches.

### **6.3.3 Foundation Setbacks**

Minimum setbacks for all foundations should comply with the *2019 CBC* or City of Beaumont/County of Riverside requirements, whichever is more stringent. 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 5 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 7 feet and need not to exceed 40 feet.
- The bottom of any proposed foundations for structures should be deepened so as to extend below a 1:1 projection upward from the bottom of the nearest excavation.
- The bottom of all footings for new structures near retaining walls should be deepened so as to extend below a 1:1 projection upward from the bottom inside edge of the wall foundation.

### **6.3.4 Retaining Wall Design and Construction**

#### **6.3.4.1 General Design Criteria**

Recommendations presented in this report apply to typical masonry or concrete vertical walls retaining up to six feet of compacted soils. These are typical design criteria and are not intended to supersede the design by the structural engineer.

Retaining wall foundations should be designed in accordance with Section 6.3.1 of this report. A minimum embedment of 12 inches into engineered compacted fill and a minimum footing width of 12 inches is recommended. 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 backfill material placement for all earth retention structures should meet the requirement of Section 6.3.4.4 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 wall to the base of the 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 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.

#### **6.3.4.2 Cantilevered Walls**

The recommendations presented below are for cantilevered retaining walls. 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, seismic events, or adverse geologic conditions.

| ACTIVE EARTH PRESSURES                          |                                                        |
|-------------------------------------------------|--------------------------------------------------------|
| Surface Slope of Retained<br>Materials<br>(h:v) | Equivalent Fluid Pressure<br>(pcf)<br>Native Backfill* |
| Level                                           | 41                                                     |
| 2:1                                             | 64                                                     |

\* The design pressures assume the backfill material has an expansion index less than or equal to 20. 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.

### 6.3.4.3 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 62 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.

### 6.3.4.4 Retaining Wall Backfill and Drainage

Retaining wall backfill should consist of materials with expansion index (EI)  $\leq 20$  and free of deleterious and/or oversized materials. The wall backfill should also include a minimum one-foot wide section of  $\frac{3}{4}$ - to 1-inch clean crushed rock (or approved equivalent). The rock should be placed immediately adjacent to the back of wall and extend up from the back drain to within approximately 12 inches of finish grade. The upper 12 inches should consist of compacted onsite materials. Presence of other materials might necessitate revision to the parameters provided and modification of wall designs. The backfill materials should be placed in lifts no greater than 8-inches in thickness and compacted to a minimum of 90 percent relative compaction in accordance with ASTM Test Method D 1557. Proper surface drainage needs to be provided and maintained. Bracing of the walls during backfilling and compaction may also be necessary.

All earth retention structures should be provided with an adequate pipe and gravel back drain system to reduce the potential for hydrostatic pressure build up. As a minimum, 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 lineal foot of  $\frac{3}{4}$ - to 1-inch

clean crushed rock or equivalent, wrapped in filter fabric (Mirafi 140N or approved equivalent). The drain system should be connected to a suitable outlet, as determined by the civil engineer. Drain outlets should be maintained over the life of the project and should not be obstructed or plugged by adjacent improvements. Waterproofing of site walls should be performed where moisture migration through the wall is undesirable.

Proper surface drainage needs to be provided and maintained. Water should not be allowed to pond behind retaining walls. Waterproofing of site walls should be performed where moisture migration through the wall is undesirable.

#### **6.3.4.5 Other Design Considerations**

- Retaining wall foundation elements should be designed in accordance with building code setback requirements.
- 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 by the project geotechnical engineer or their authorized representative.

#### **6.3.5 Pool Design**

The proposed swimming pool should derive support entirely from engineered fill. A minimum 12 inches of fill compacted to at least 90 percent of the soil's maximum dry density per ASTM D 1557 should be provided below the pool shell.

The pool walls should be designed for at-rest soil conditions using an equivalent fluid pressure of 62 pcf for at-rest conditions. Pool walls surcharged by adjacent structures should be designed for additional pressures. Alternatively, the pool walls may be designed as freestanding walls using the active soil state conditions provided that some lateral movement of the pool walls would be acceptable. If the active state is to be used, an equivalent fluid pressure of 41 pcf is considered suitable. These recommended pressures are based on drained conditions and using granular native fills with expansion index of less than 20. If a drain system adjacent/beneath the pool is not provided, the pool walls should then be designed for an equivalent fluid pressure of 98 pcf for the at-rest condition and 85 pcf for the active condition.

As noted above, the use of the lower (drained condition) at-rest or active soil pressures will require a subdrain system beneath/adjacent to the pool. A typical subdrain system includes a series of four-inch diameter perforated drain pipes encapsulated with at least one cubic foot of

free-draining material per linear foot of pipe. The free-draining material should be encapsulated within a geotextile to prevent migration of fines into the drainage medium. The drain pipes should be routed to an acceptable discharge location, as determined by the pool designer. If desired, GeoTek can review the subdrain system once designed to determine if additional measures are warranted.

Pool decking supported on grade should be separated from the pool bond beam by a full-depth, mastic construction joint. If it is desired to extend the pool deck over the bond beam, consideration should be given to designing the deck as a structural slab supported by the pool shell. This will reduce the possibility of deck cracking occurring along the outer edge of the bond beam. We also recommend that the pool decking subgrade be “pre-saturated” prior to concrete placement. The subgrade soils should be moisture conditioned to at least 100% of the soil’s optimum moisture content to a depth of 12 inches, prior to concrete placement. Testing by the geotechnical engineer is recommended to confirm that the soils have been adequately moisture treated.

Pool decking may consist of 5-inch thick concrete and the use of reinforcement is suggested. A minimum of #3 bars spaced 24 inches or 6” x 6” – W1.4/W1.4 welded wire mesh placed on center may be used. Control joints should be placed in two directions and located a distance apart approximately equal to 24 to 36 times the slab thickness. The pool designer should provide final design recommendations.

It is our recommendation that Type V cement be used for the pool construction due to the chemicals associated with the pool water.

### **6.3.6 Soil Corrosivity**

The soil corrosivity at this site was tested in the laboratory for two representative samples collected during our field exploration. The results of the saturated resistivity testing indicate that the soil samples are “moderately corrosive” and “mildly corrosive” to buried ferrous metals, based on the guidelines provided in *Corrosion Basics: An Introduction* (Roberge, 2000). Chloride concentrations were negligible (0.0006 percent). Consideration should be given to consulting with a corrosion engineer. The laboratory test results are provided in Appendix D.

### **6.3.7 Soil Sulfate Content**

The sulfate content was determined in the laboratory for two representative soil samples collected during our field exploration. The results (0.0012 and 0.0016 percent) indicate that the water-soluble sulfate for the tested samples were negligible, per Table 4.2.1 of ACI 318. Based upon the test results, no special concrete mix design is required for sulfate attack resistance. The laboratory test results are provided in Appendix D.



### 6.3.8 Pavement Design Considerations

Pavement design for proposed on-site street improvements was conducted per Caltrans *Highway Design Manual* guidelines for flexible pavements. Based on traffic indices (TIs) of 5.0 and 6.0 generally associated with these types of projects and using a design R-value of 23 (Converse, 2019), the following preliminary sections were estimated:

| PRELIMINARY PAVEMENT SECTIONS |         |                                              |                                            |
|-------------------------------|---------|----------------------------------------------|--------------------------------------------|
| TI                            | R-Value | Thickness of<br>Asphalt Concrete<br>(inches) | Thickness of<br>Aggregate Base<br>(inches) |
| 5.0                           | 23      | 3                                            | 7                                          |
| 6.0                           | 23      | 4                                            | 8                                          |

The TIs used in our pavement design are considered reasonable values for the proposed 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 12 inches) 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 Beaumont 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 recompact 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.

### **6.3.9 Concrete Construction**

#### **6.3.9.1 General**

Concrete construction should follow the 2019 CBC and ACI guidelines regarding design, mix placement, and curing of the concrete. If desired, we could provide quality control testing of the concrete during construction.

#### **6.3.9.2 Concrete Mix Design**

As indicated in Section 6.3.6, the site will not require a particular concrete mix design to resist sulfate attack.

#### **6.3.9.3 Concrete Flatwork**

Exterior concrete flatwork (sidewalks, driveways, patios, etc.) should have a minimum thickness of four inches. 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.

“Very low” expansive subgrade soils below exterior concrete flatwork should be pre-saturated to at least 100 percent of optimum moisture content. Minimum depth of pre-saturation should be 12 inches.

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 in this report.

All concrete installation, including preparation and compaction of subgrade, should be done in accordance with the City of Beaumont/County of Riverside specifications, and under the observation and testing of GeoTek and a City/County inspector, if necessary.

#### **6.3.9.4 Concrete Performance**

Concrete cracks should be expected. These cracks can vary from sizes that are essentially unnoticeable to more than 0.125-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 upon a wide range of variables, which are difficult, at best, to control. Concrete, while seemingly a stable material, is 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 orthogonal directions and located a distance apart approximately equal to 24 to 36 times the slab thickness.

### **6.4 POST CONSTRUCTION CONSIDERATIONS**

#### **6.4.1 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. Care should be taken when adding soil amendments to avoid excessive watering. An abatement program to control ground-burrowing rodents should be implemented and maintained. This is critical as burrowing rodents can decrease 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.

#### **6.4.2 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 adjacent to the footings. Roof leaders and downspouts should discharge onto paved surfaces sloping away from the structure or into a closed pipe system which outfalls to the street gutter pan or directly to the storm drain system. Pad drainage should be directed toward approved areas 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.

### **6.5 PLAN REVIEW AND CONSTRUCTION OBSERVATIONS**

We recommend that foundation plans for the site 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 construction of foundation and other improvements to observe and document 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 on-site and import materials for fill placement and collect soil samples for laboratory testing when necessary.
- Observe the fill for uniformity during placement including utility trenches.
- Test the fill for field density and relative compaction.
- Test the near-surface soils to verify proper moisture content.
- 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.

## **7 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 report is limited to the boundaries of the subject property. This update 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 our 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 (Proposal No. P-0507021-CR) date May 24, 2021 and geotechnical engineering standards normally used on similar projects in this locality at the present.

## **8 LIMITATIONS**

Our findings are based on site conditions observed and the stated sources. Thus, our comments are professional opinions that are limited to the extent of the available data.

GeoTek has prepared this report in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering and science professions currently practicing under similar conditions in the jurisdiction in which the services are provided, subject to the time limits and physical constraints applicable to this report.

Since our recommendations are based on the site conditions observed and encountered, and laboratory testing, our conclusions 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 of any kind is expressed or implied. Standards of care/practice are subject to change with time.

## **9 SELECTED REFERENCES**

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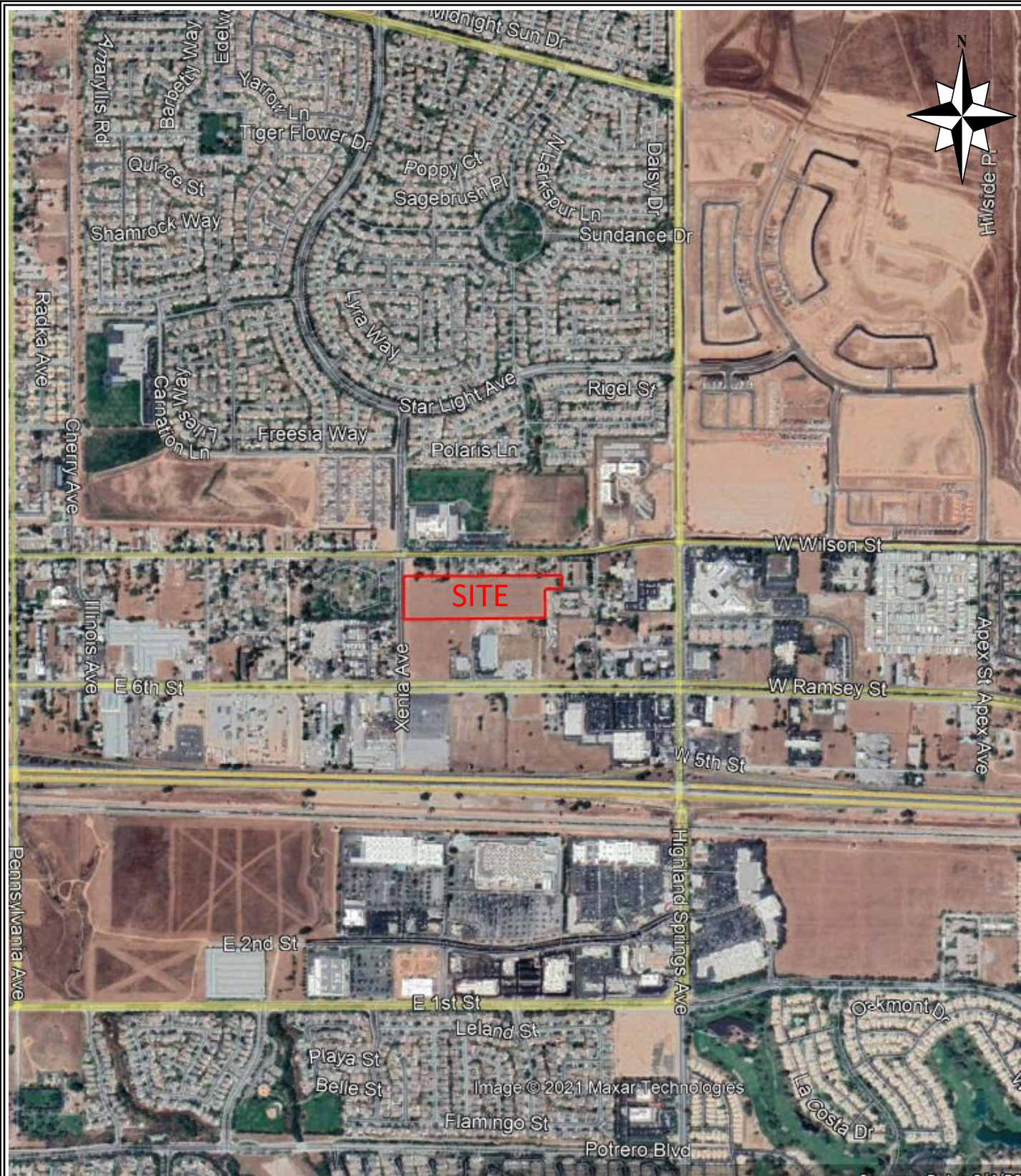
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\_\_\_\_\_, 2011, "Guidelines for Infiltration Testing".

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**Beaumont Land Partners**  
 Xenia Apartment Project  
 Beaumont, Riverside County, California

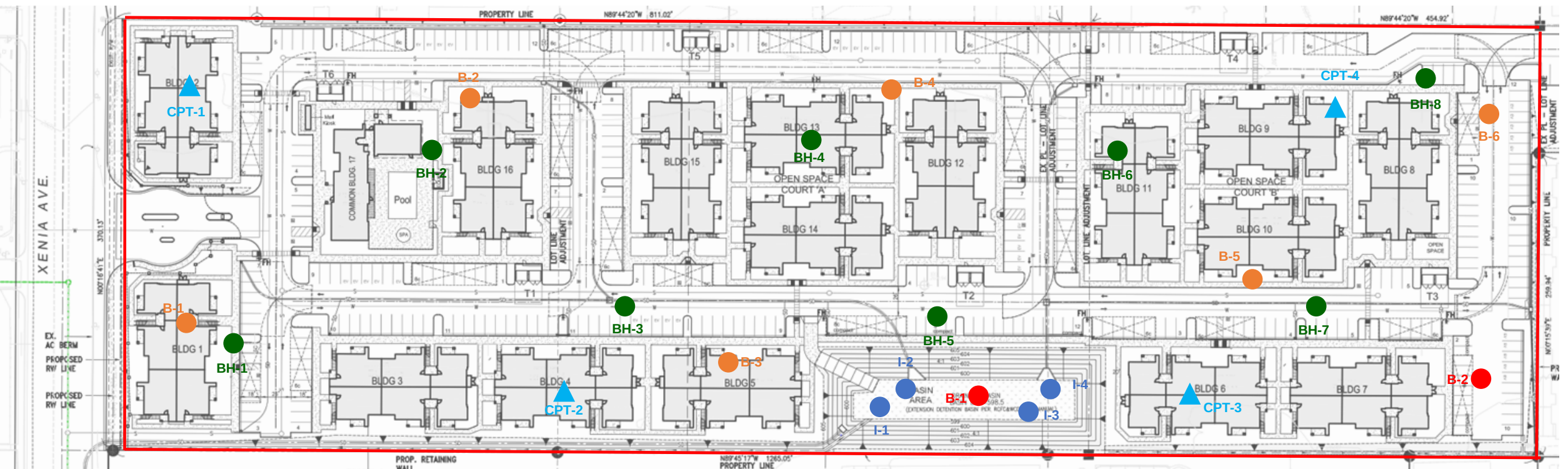
Project No. 2784-CR

Scale:

0 0.2 mi

**Figure I**  
**Site Location Map**





### LEGEND

(Locations are approximate)

- |                                           |                                       |                                         |                              |                                           |                        |
|-------------------------------------------|---------------------------------------|-----------------------------------------|------------------------------|-------------------------------------------|------------------------|
| <span style="color: orange;">●</span> B-6 | Exploratory Boring by ESSW (2006)     | <span style="color: red;">●</span> B-2  | Exploratory Boring by GeoTek | <span style="color: blue;">▲</span> CPT-4 | CPT Sounding by GeoTek |
| <span style="color: green;">●</span> BH-8 | Exploratory Boring by Converse (2019) | <span style="color: blue;">●</span> I-4 | Percolation Boring by GeoTek |                                           |                        |

**Beaumont Land Partners**  
 Xenia Apartment Project  
 Beaumont, Riverside County, California

Project No. 2784-CR

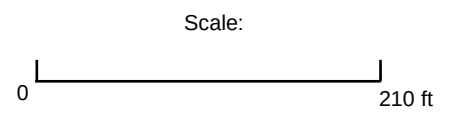


**Figure 2**  
**Exploration Location Map**



# **APPENDIX A**

## **LOGS OF BORINGS BY ESSW (2006)**

**Updated Geotechnical and Infiltration Evaluation  
Xenia Apartment Project, Beaumont, California  
Project No. 2784-CR**





79-811 B Country Club Drive, Bermuda Dunes, CA 92203  
Phone (760) 345-1588. Fax (760) 345-7315

Project Name: E. Side of Xenia Ave., Between 6th & 8th Sts., Beaumont, CA  
File Number: 10437-03  
Boring Location: See Figure 2

Drilling Date: April 21, 2006  
Drilling Method: 8" Hollow Stem Auger  
Drill Type: Williams CME 55 w/Auto Hammer  
Logged By: Dirk Wiggins

| Depth (Ft.) | Sample Type |           | Penetration Resistance<br>(Blows/6") | Symbol | USCS | Dry Density<br>(pcf) | Moisture<br>Content (%) | Description of Units                                                                             | Graphic Trend |             |
|-------------|-------------|-----------|--------------------------------------|--------|------|----------------------|-------------------------|--------------------------------------------------------------------------------------------------|---------------|-------------|
|             | Bulk<br>SPT | MOD Calif |                                      |        |      |                      |                         |                                                                                                  | Blow Count    | Dry Density |
| 0           |             |           |                                      |        | SM   |                      |                         | SILTY SAND: dark reddish brown, medium dense, damp, fine to medium grained, trace coarse grained |               |             |
| 7.6         |             |           | 7,6,7                                |        |      |                      |                         |                                                                                                  |               |             |
| 4.9         |             |           | 4,9,13                               |        | SC   |                      |                         | CLAYEY SAND: dark reddish brown, stiff, damp, fine to medium grained                             |               |             |
| 10.2        |             |           | 10,22,32                             |        |      |                      |                         | very stiff                                                                                       |               |             |
| 9.1         |             |           | 9,12,21                              |        |      |                      |                         | dark reddish brown to light brown                                                                |               |             |
| 19          |             |           |                                      |        |      |                      |                         | Total Depth 19 feet<br>No Groundwater Encountered                                                |               |             |



**Boring No: B-2**

Project Name: E. Side of Xenia Ave., Between 6th & 8th Sts., Beaumont, CA

File Number: 10437-03

Boring Location: See Figure 2

Drilling Date: April 21, 2006

Drilling Method: 8" Hollow Stem Auger

Drill Type: Williams CME 55 w/Auto Hammer

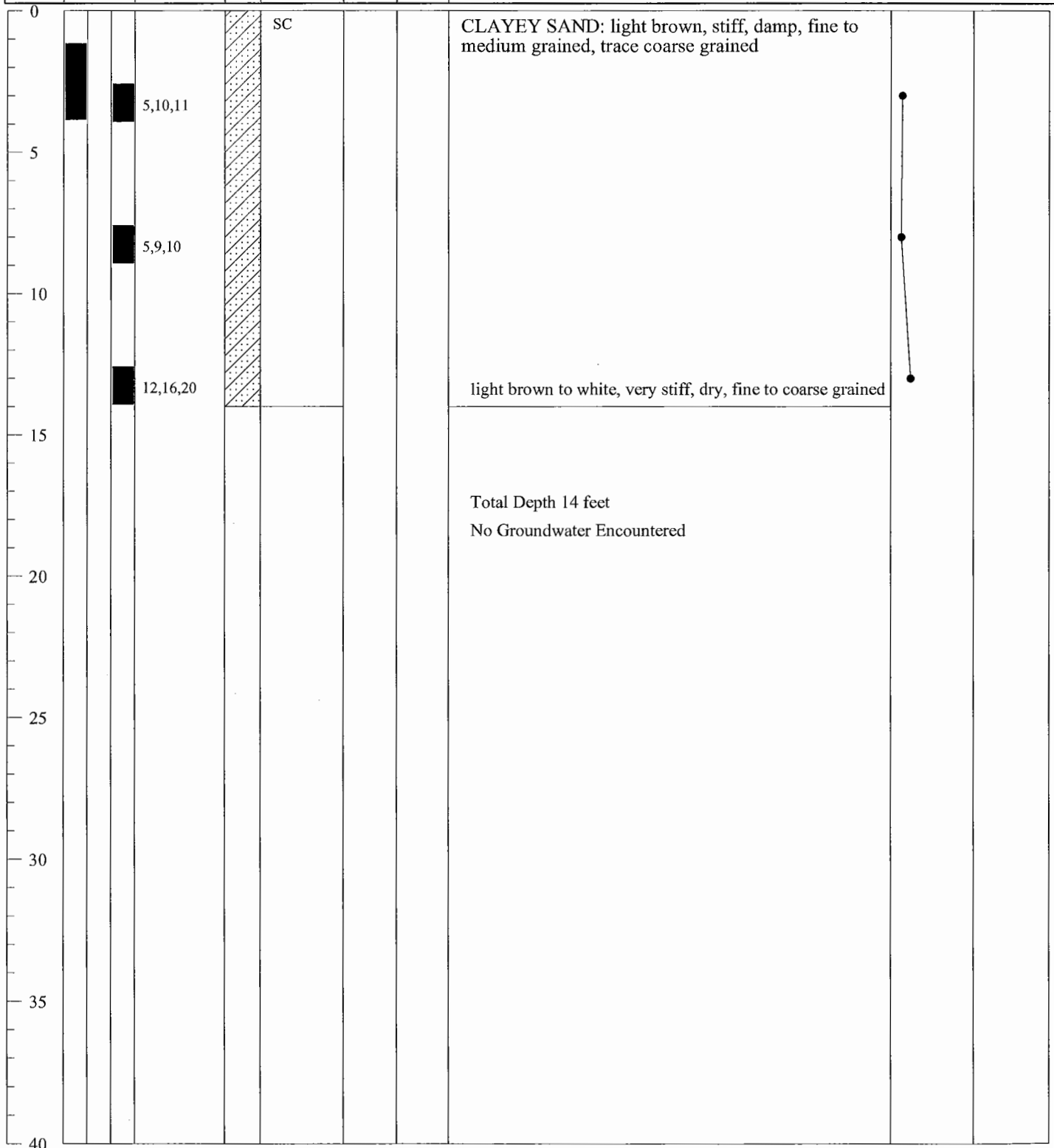
Logged By: Dirk Wiggins

Page 1 of 1

**Description of Units**

Note: The stratification lines shown represent the approximate boundary between soil and/or rock types and the transition may be gradational.

Graphic Trend  
Blow Count Dry Density





**Boring No: B-3**

Project Name: E. Side of Xenia Ave., Between 6th & 8th Sts., Beaumont, CA

File Number: 10437-03

Boring Location: See Figure 2

Drilling Date: April 21, 2006

Drilling Method: 8" Hollow Stem Auger

Drill Type: Williams CME 55 w/Auto Hammer

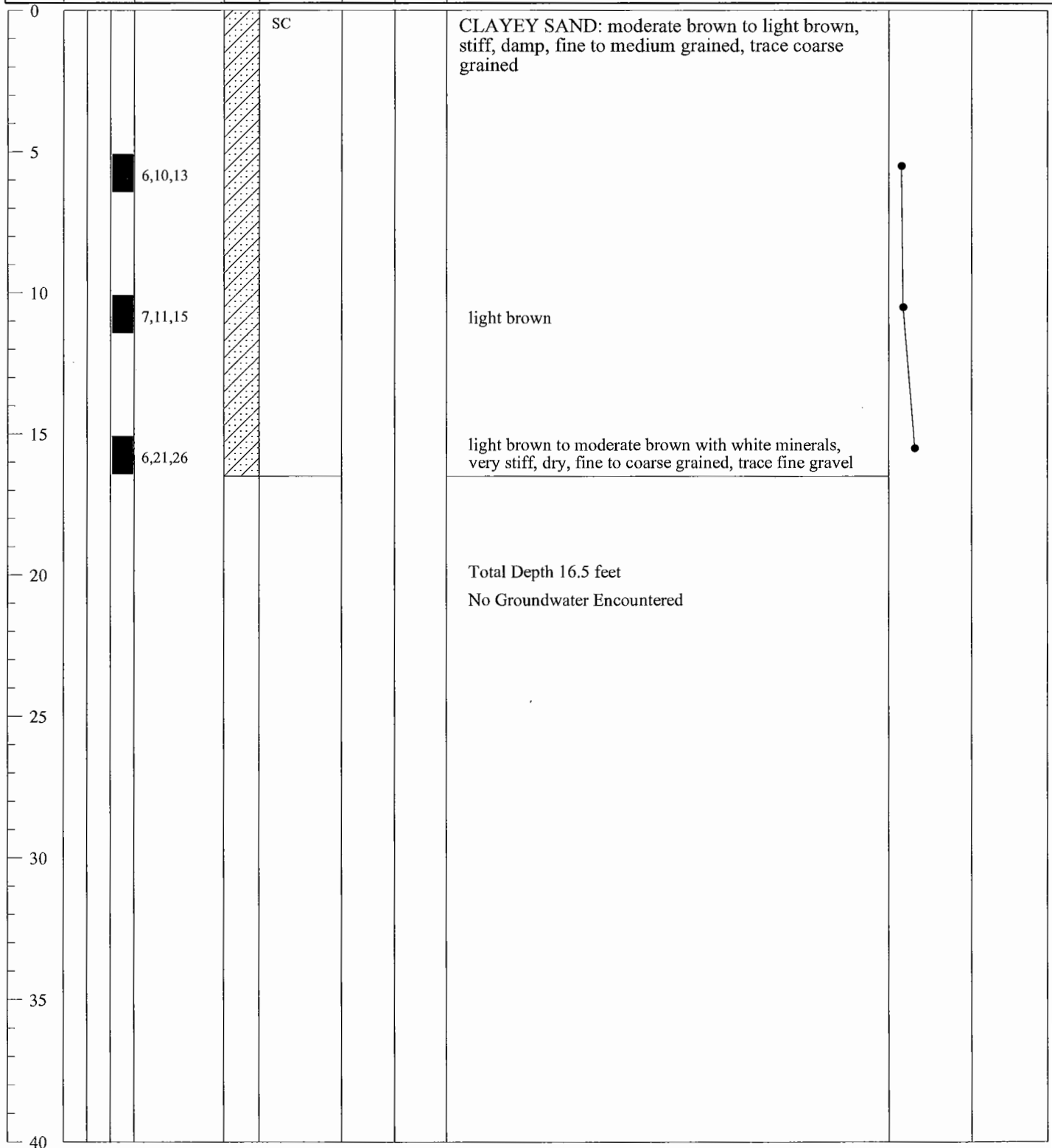
Logged By: Dirk Wiggins

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**Description of Units**

Note: The stratification lines shown represent the approximate boundary between soil and/or rock types and the transition may be gradational.

Graphic Trend  
Blow Count Dry Density





**Boring No: B-4**

Project Name: E. Side of Xenia Ave., Between 6th & 8th Sts., Beaumont, CA

File Number: 10437-03

Boring Location: See Figure 2

Drilling Date: April 21, 2006

Drilling Method: 8" Hollow Stem Auger

Drill Type: Williams CME 55 w/Auto Hammer

Logged By: Dirk Wiggins

| Depth (Ft.) | Sample Type |            | Penetration Resistance (Blows/6") | Symbol | USCS | Dry Density (pcf) | Moisture Content (%) | Description of Units                                                                        | Graphic Trend |
|-------------|-------------|------------|-----------------------------------|--------|------|-------------------|----------------------|---------------------------------------------------------------------------------------------|---------------|
|             | Bulk SPT    | MOD Calif. |                                   |        |      |                   |                      |                                                                                             |               |
| 0           |             |            | 2,2,2                             |        | SM   |                   |                      | SILTY SAND: dark reddish brown, loose, damp, fine to medium grained                         |               |
| 5           |             |            | 4,6,8                             |        | SC   |                   |                      | CLAYEY SAND: reddish light brown, stiff, damp, fine to medium grained, lenses of silty sand |               |
| 10          |             |            | 6,12,14                           |        |      |                   |                      | light brown, trace coarse grained                                                           |               |
| 15          |             |            | 6,10,12                           |        |      |                   |                      |                                                                                             |               |
| 20          |             |            | 4,5,5                             |        | SM   |                   |                      | SILTY SAND: light brown, medium dense, dry, fine to medium grained                          |               |
| 25          |             |            |                                   |        |      |                   |                      | Total Depth 21.5 feet<br>No Groundwater Encountered                                         |               |
| 30          |             |            |                                   |        |      |                   |                      |                                                                                             |               |
| 35          |             |            |                                   |        |      |                   |                      |                                                                                             |               |
| 40          |             |            |                                   |        |      |                   |                      |                                                                                             |               |



**Boring No: B-5**

Project Name: E. Side of Xenia Ave., Between 6th & 8th Sts., Beaumont, CA

File Number: 10437-03

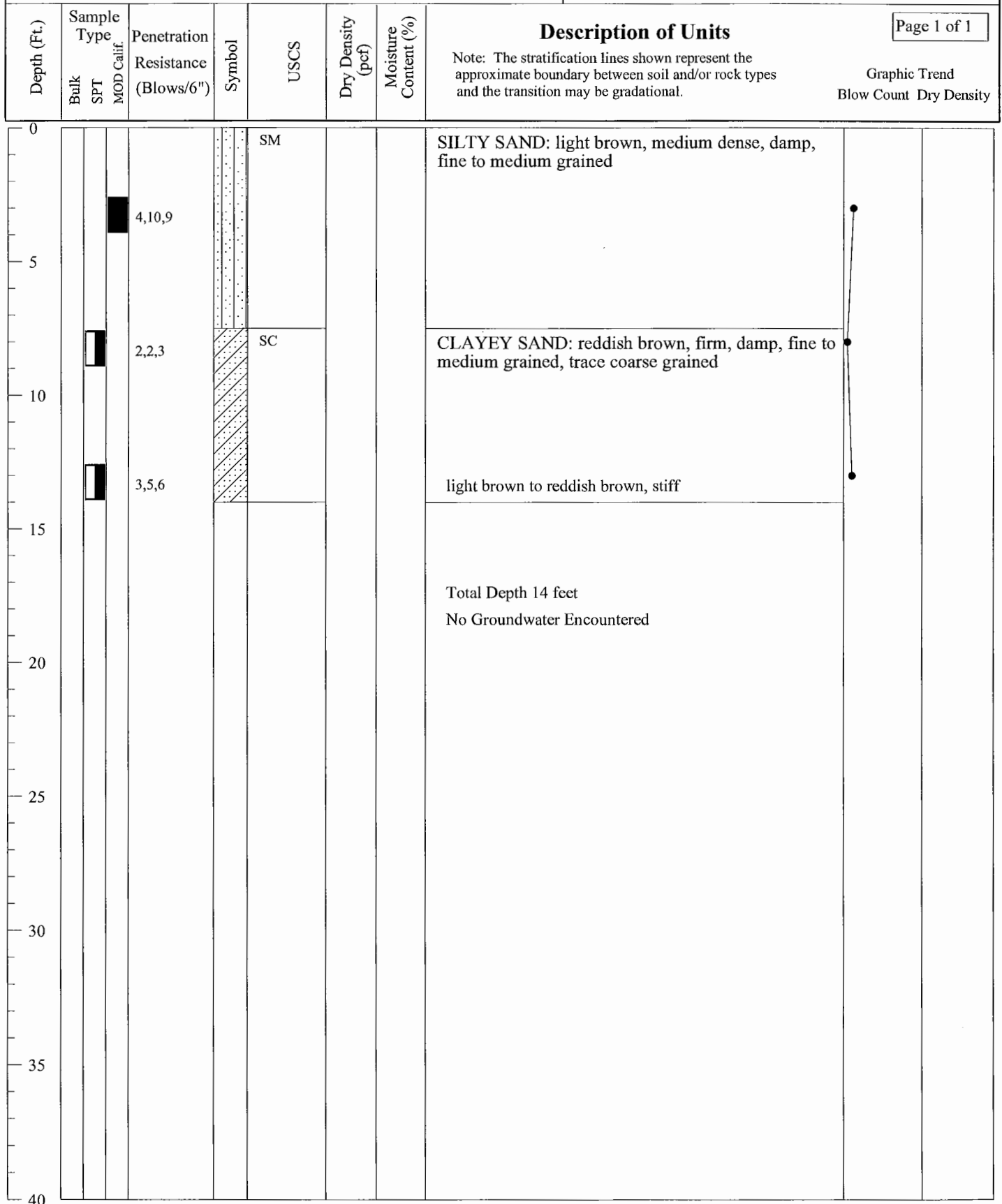
Boring Location: See Figure 2

Drilling Date: April 21, 2006

Drilling Method: 8" Hollow Stem Auger

Drill Type: Williams CME 55 w/Auto Hammer

Logged By: Dirk Wiggins





**Boring No: B-6**

Project Name: E. Side of Xenia Ave., Between 6th & 8th Sts., Beaumont, CA

File Number: 10437-03

Boring Location: See Figure 2

Drilling Date: April 21, 2006

Drilling Method: 8" Hollow Stem Auger

Drill Type: Williams CME 55 w/Auto Hammer

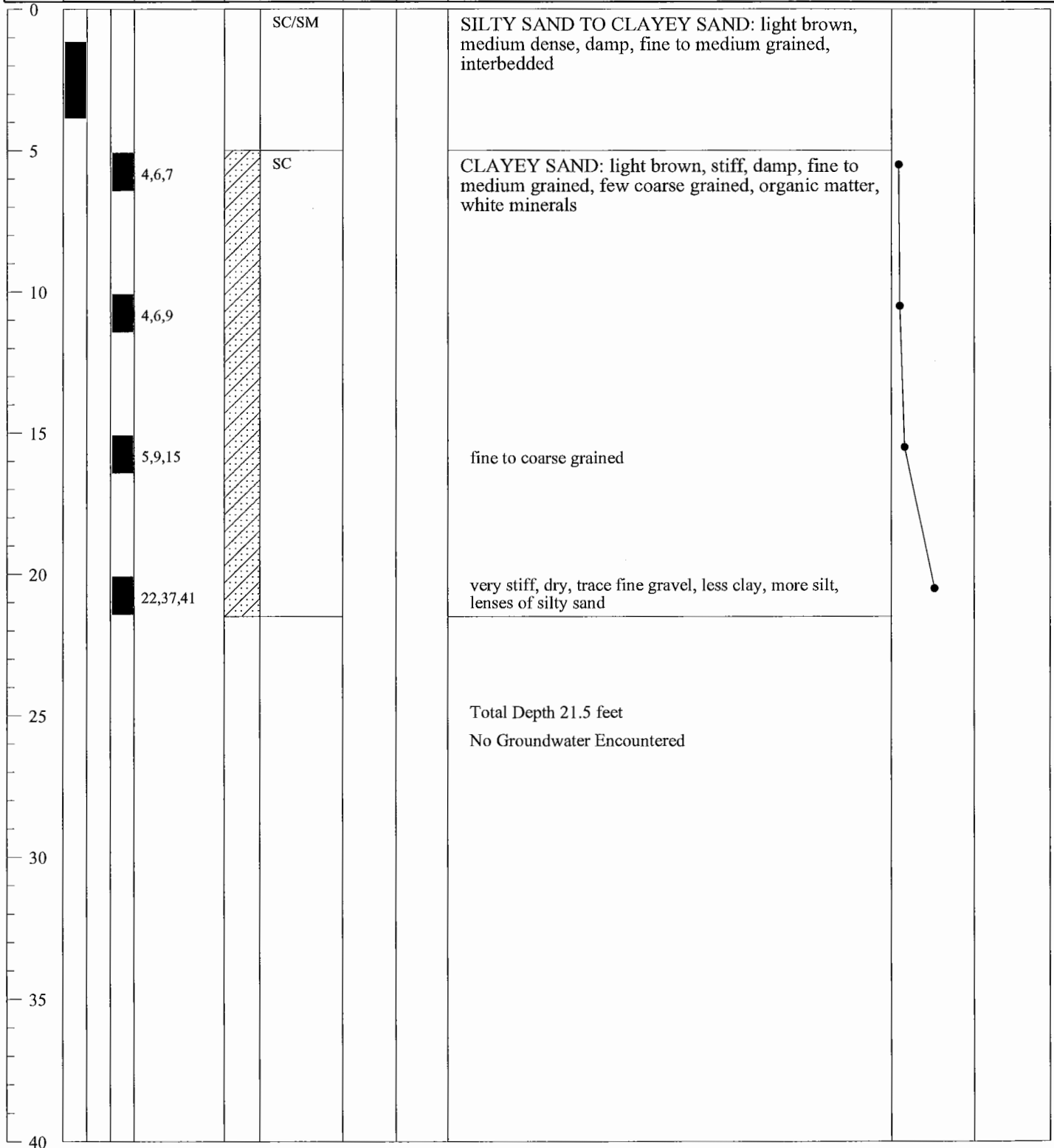
Logged By: Dirk Wiggins

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**Description of Units**

Note: The stratification lines shown represent the approximate boundary between soil and/or rock types and the transition may be gradational.

Graphic Trend  
Blow Count Dry Density



## **APPENDIX B**

### **LOGS OF BORINGS AND LABORATORY TEST RESULTS BY CONVERSE (2019)**

**Updated Geotechnical and Infiltration Evaluation  
Xenia Apartment Project, Beaumont, California  
Project No. 2784-CR**



# Log of Boring No. BH-01

Dates Drilled: 8/4/2019 Logged by: William Buckley Checked By: Mehrab Jesmani

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 2610 Depth to Water (ft): NOT ENCOUNTERED

| Depth (ft) | Graphic Log | <b>SUMMARY OF SUBSURFACE CONDITIONS</b><br>This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered. | SAMPLES |      | BLOWS    | MOISTURE | DRY UNIT WT. (pcf) | OTHER |
|------------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------|----------|----------|--------------------|-------|
|            |             |                                                                                                                                                                                                                                                                                                                                                                                                                                          | DRIVE   | BULK |          |          |                    |       |
|            |             | <b>ALLUVIUM</b><br><b>SILTY SAND (SM):</b> fine to medium-grained, brown.                                                                                                                                                                                                                                                                                                                                                                |         |      |          |          |                    | se    |
| 5          |             |                                                                                                                                                                                                                                                                                                                                                                                                                                          |         |      | 7/14/17  | 7        | 102                | col   |
|            |             |                                                                                                                                                                                                                                                                                                                                                                                                                                          |         |      | 11/15/18 | 9        | 114                |       |
| 10         |             |                                                                                                                                                                                                                                                                                                                                                                                                                                          |         |      | 10/14/16 | 13       | 112                |       |
| 15         |             |                                                                                                                                                                                                                                                                                                                                                                                                                                          |         |      | 10/20/20 | 11       | 113                |       |
|            |             | End of boring at 16.5 feet bgs.<br>No groundwater encountered.<br>Borehole backfilled with soil cuttings and compacted with an auger using the weight of the drill rig on 9/4/2019.                                                                                                                                                                                                                                                      |         |      |          |          |                    |       |



**Converse Consultants**

Approximately 10.93-Acre Site  
 Southeast of Xenia Avenue and 8th Street  
 City of Beaumont, Riverside County, California  
 For: Pardee Homes

Project No. 19-81-237-01 Drawing No. A-2

# Log of Boring No. BH-02

Dates Drilled: 8/4/2019 Logged by: William Buckley Checked By: Mehrab Jesmani

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 2612 Depth to Water (ft): NOT ENCOUNTERED

| Depth (ft) | Graphic Log | <b>SUMMARY OF SUBSURFACE CONDITIONS</b><br>This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered. | SAMPLES |      | BLOWS    | MOISTURE | DRY UNIT WT. (pcf) | OTHER |
|------------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------|----------|----------|--------------------|-------|
|            |             |                                                                                                                                                                                                                                                                                                                                                                                                                                          | DRIVE   | BULK |          |          |                    |       |
| 5          |             | <b>ALLUVIUM:</b><br><b>SILTY SAND (SM):</b> fine to medium-grained, brown.                                                                                                                                                                                                                                                                                                                                                               |         |      | 11/10/12 | 8        | 103                | ma    |
|            |             |                                                                                                                                                                                                                                                                                                                                                                                                                                          |         |      | 8/14/20  | 13       | 113                |       |
| 10         |             |                                                                                                                                                                                                                                                                                                                                                                                                                                          |         |      | 10/12/15 | 13       | 113                |       |
| 15         |             |                                                                                                                                                                                                                                                                                                                                                                                                                                          |         |      | 10/18/21 | 6        | 109                |       |
|            |             | - fine to coarse-grained                                                                                                                                                                                                                                                                                                                                                                                                                 |         |      |          |          |                    |       |
|            |             | End of boring at 16.5 feet bgs.<br>No groundwater encountered.<br>Borehole backfilled with soil cuttings and compacted with an auger using the weight of the drill rig on 9/4/2019.                                                                                                                                                                                                                                                      |         |      |          |          |                    |       |



**Converse Consultants**

Approximately 10.93-Acre Site  
 Southeast of Xenia Avenue and 8th Street  
 City of Beaumont, Riverside County, California  
 For: Pardee Homes

Project No.  
**19-81-237-01**

Drawing No.  
**A-3**

# Log of Boring No. BH-03

Dates Drilled: 8/4/2019 Logged by: William Buckley Checked By: Mehrab Jesmani

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 2609 Depth to Water (ft): NOT ENCOUNTERED

| Depth (ft) | Graphic Log | SUMMARY OF SUBSURFACE CONDITIONS<br>This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered. | SAMPLES |      | BLOWS    | MOISTURE | DRY UNIT WT. (pcf) | OTHER     |
|------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------|----------|----------|--------------------|-----------|
|            |             |                                                                                                                                                                                                                                                                                                                                                                                                                                   | DRIVE   | BULK |          |          |                    |           |
| 5          |             | <b>ALLUVIUM:</b><br><b>SILTY SAND (SM):</b> fine to medium-grained, brown.                                                                                                                                                                                                                                                                                                                                                        |         |      |          |          |                    | ca,er,max |
|            |             |                                                                                                                                                                                                                                                                                                                                                                                                                                   |         |      | 8/8/11   | 12       | 114                |           |
|            |             |                                                                                                                                                                                                                                                                                                                                                                                                                                   |         |      | 6/8/15   | 10       | 118                | ds        |
| 10         |             | - fine to coarse grained                                                                                                                                                                                                                                                                                                                                                                                                          |         |      | 8/16/19  | 12       | 119                |           |
| 15         |             | - scattered gravel up to 0.5" in largest dimension                                                                                                                                                                                                                                                                                                                                                                                |         |      | 20/20/23 | 6        | 112                |           |
|            |             | End of boring at 16.5 feet bgs.<br>No groundwater encountered.<br>Borehole backfilled with soil cuttings and compacted with an auger using the weight of the drill rig on 9/4/2019.                                                                                                                                                                                                                                               |         |      |          |          |                    |           |



**Converse Consultants**

Approximately 10.93-Acre Site  
Southeast of Xenia Avenue and 8th Street  
City of Beaumont, Riverside County, California  
For: Pardee Homes

Project No. Drawing No.  
**19-81-237-01 A-4**

# Log of Boring No. BH-04

Dates Drilled: 8/4/2019 Logged by: William Buckley Checked By: Mehrab Jesmani

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 2612 Depth to Water (ft): NOT ENCOUNTERED

| Depth (ft) | Graphic Log | SUMMARY OF SUBSURFACE CONDITIONS<br><br>This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered. | SAMPLES |      | BLOWS   | MOISTURE | DRY UNIT WT.<br>(pcf) | OTHER |
|------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------|---------|----------|-----------------------|-------|
|            |             |                                                                                                                                                                                                                                                                                                                                                                                                                                       | DRIVE   | BULK |         |          |                       |       |
| 5          |             | <u>ALLUVIUM:</u><br><b>SILTY SAND (SM):</b> fine to medium-grained, brown.                                                                                                                                                                                                                                                                                                                                                            |         |      | 8/8/12  | 11       | 117                   | ma    |
|            |             |                                                                                                                                                                                                                                                                                                                                                                                                                                       |         |      | 8/12/15 | 15       | 111                   | col   |
|            |             |                                                                                                                                                                                                                                                                                                                                                                                                                                       |         |      | 7/9/14  | 16       | 116                   |       |
|            |             |                                                                                                                                                                                                                                                                                                                                                                                                                                       |         |      |         |          |                       |       |
|            |             |                                                                                                                                                                                                                                                                                                                                                                                                                                       |         |      |         |          |                       |       |
| 15         |             |                                                                                                                                                                                                                                                                                                                                                                                                                                       |         |      | 8/9/12  | 13       | 116                   |       |
|            |             | End of boring at 16.5 feet bgs.<br>No groundwater encountered.<br>Borehole backfilled with soil cuttings and compacted with an auger using the weight of the drill rig on 9/4/2019.                                                                                                                                                                                                                                                   |         |      |         |          |                       |       |



**Converse Consultants**

Approximately 10.93-Acre Site  
 Southeast of Xenia Avenue and 8th Street  
 City of Beaumont, Riverside County, California  
 For: Pardee Homes

Project No. Drawing No.  
 19-81-237-01 A-5

# Log of Boring No. BH-05

Dates Drilled: 8/4/2019 Logged by: William Buckley Checked By: Mehrab Jesmani

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 2608 Depth to Water (ft): NOT ENCOUNTERED

| Depth (ft) | Graphic Log | <b>SUMMARY OF SUBSURFACE CONDITIONS</b><br>This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered. | SAMPLES |      | BLOWS    | MOISTURE | DRY UNIT WT. (pcf) | OTHER |
|------------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------|----------|----------|--------------------|-------|
|            |             |                                                                                                                                                                                                                                                                                                                                                                                                                                          | DRIVE   | BULK |          |          |                    |       |
|            |             | <b>ALLUVIUM:</b><br><b>SILTY SAND (SM):</b> fine to medium-grained, brown.                                                                                                                                                                                                                                                                                                                                                               |         |      |          |          |                    | r,ma  |
| 5          |             |                                                                                                                                                                                                                                                                                                                                                                                                                                          |         |      | 8/10/12  | 12       | 109                |       |
| 10         |             | - fine to coarse-grained, scattered gravel up to 0.5" in largest dimension                                                                                                                                                                                                                                                                                                                                                               |         |      | 8/12/14  | 12       | 124                |       |
| 15         |             | - scattered gravel up to 1" in largest dimension                                                                                                                                                                                                                                                                                                                                                                                         |         |      | 23/35/40 | 6        | 117                |       |
| 20         |             |                                                                                                                                                                                                                                                                                                                                                                                                                                          |         |      | 24/20/23 |          |                    |       |
| 25         |             | - few gravel up to 1" in largest dimension, orangish-brown                                                                                                                                                                                                                                                                                                                                                                               |         |      | 20/50-5" | 4        | 107                |       |
| 30         |             | - scattered gravel up to 0.5" in largest dimension                                                                                                                                                                                                                                                                                                                                                                                       |         |      | 17/18/16 |          |                    |       |



**Converse Consultants**

Approximately 10.93-Acre Site  
 Southeast of Xenia Avenue and 8th Street  
 City of Beaumont, Riverside County, California  
 For: Pardee Homes

Project No.  
**19-81-237-01**

Drawing No.  
**A-6a**

# Log of Boring No. BH-05

Dates Drilled: 8/4/2019 Logged by: William Buckley Checked By: Mehrab Jesmani

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 2608 Depth to Water (ft): NOT ENCOUNTERED

| Depth (ft) | Graphic Log | <b>SUMMARY OF SUBSURFACE CONDITIONS</b><br>This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered. | SAMPLES |      | BLOWS    | MOISTURE | DRY UNIT WT. (pcf) | OTHER |
|------------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------|----------|----------|--------------------|-------|
|            |             |                                                                                                                                                                                                                                                                                                                                                                                                                                          | DRIVE   | BULK |          |          |                    |       |
|            |             | <b>ALLUVIUM:</b><br><b>SAND with SILT (SP-SM):</b> fine to medium-grained, light brown.                                                                                                                                                                                                                                                                                                                                                  |         |      | 15/25/28 | 3        | 97                 |       |
| 40         |             |                                                                                                                                                                                                                                                                                                                                                                                                                                          | X       |      | 14/17/27 |          |                    |       |
| 45         |             |                                                                                                                                                                                                                                                                                                                                                                                                                                          |         |      | 27/35/40 | 4        | 103                |       |
| 50         |             |                                                                                                                                                                                                                                                                                                                                                                                                                                          | X       |      | 14/20/25 |          |                    |       |
|            |             | End of boring at 51.5 feet bgs.<br>No groundwater encountered.<br>Borehole backfilled with soil cuttings and compacted with an auger using the weight of the drill rig on 9/4/2019.                                                                                                                                                                                                                                                      |         |      |          |          |                    |       |



**Converse Consultants**

Approximately 10.93-Acre Site  
 Southeast of Xenia Avenue and 8th Street  
 City of Beaumont, Riverside County, California  
 For: Pardee Homes

Project No.  
**19-81-237-01**

Drawing No.  
**A-6b**

# Log of Boring No. BH-06

Dates Drilled: 8/4/2019 Logged by: William Buckley Checked By: Mehrab Jesmani

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 2611 Depth to Water (ft): NOT ENCOUNTERED

| Depth (ft) | Graphic Log | SUMMARY OF SUBSURFACE CONDITIONS<br>This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered. | SAMPLES |      | BLOWS    | MOISTURE | DRY UNIT WT. (pcf) | OTHER |
|------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------|----------|----------|--------------------|-------|
|            |             |                                                                                                                                                                                                                                                                                                                                                                                                                                   | DRIVE   | BULK |          |          |                    |       |
| 5          |             | <b>ALLUVIUM:</b><br><b>SILTY SAND (SM):</b> fine to medium-grained, brown.                                                                                                                                                                                                                                                                                                                                                        |         |      | 3/3/4    | 6        | 102                | se    |
| 10         |             |                                                                                                                                                                                                                                                                                                                                                                                                                                   |         |      | 9/12/15  | 8        | 107                | ds    |
| 15         |             |                                                                                                                                                                                                                                                                                                                                                                                                                                   |         |      | 10/10/12 | 12       | 106                |       |
|            |             | End of boring at 16.5 feet bgs.<br>No groundwater encountered.<br>Borehole backfilled with soil cuttings and compacted with an auger using the weight of the drill rig on 9/4/2019.                                                                                                                                                                                                                                               |         |      |          |          |                    |       |



**Converse Consultants**

Approximately 10.93-Acre Site  
Southeast of Xenia Avenue and 8th Street  
City of Beaumont, Riverside County, California  
For: Pardee Homes

Project No. Drawing No.  
**19-81-237-01 A-7**

# Log of Boring No. BH-07

Dates Drilled: 8/4/2019 Logged by: William Buckley Checked By: Mehrab Jesmani

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 2607 Depth to Water (ft): NOT ENCOUNTERED

| Depth (ft) | Graphic Log | <b>SUMMARY OF SUBSURFACE CONDITIONS</b><br>This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered. | SAMPLES |      | BLOWS    | MOISTURE | DRY UNIT WT. (pcf) | OTHER |
|------------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------|----------|----------|--------------------|-------|
|            |             |                                                                                                                                                                                                                                                                                                                                                                                                                                          | DRIVE   | BULK |          |          |                    |       |
| 5          |             | <b>ALLUVIUM:</b><br><b>SILTY SAND (SM):</b> fine to medium-grained, brown.                                                                                                                                                                                                                                                                                                                                                               |         |      | 3/2/3    | 7        | 100                | max   |
|            |             |                                                                                                                                                                                                                                                                                                                                                                                                                                          |         |      | 5/7/9    | 13       | 111                |       |
| 10         |             |                                                                                                                                                                                                                                                                                                                                                                                                                                          |         |      | 8/12/14  | 14       | 116                |       |
|            |             |                                                                                                                                                                                                                                                                                                                                                                                                                                          |         |      |          |          |                    |       |
| 15         |             |                                                                                                                                                                                                                                                                                                                                                                                                                                          |         |      | 10/12/18 | 11       | 114                |       |
|            |             | End of boring at 16.5 feet bgs.<br>No groundwater encountered.<br>Borehole backfilled with soil cuttings and compacted with an auger using the weight of the drill rig on 9/4/2019.                                                                                                                                                                                                                                                      |         |      |          |          |                    |       |



**Converse Consultants**

Approximately 10.93-Acre Site  
 Southeast of Xenia Avenue and 8th Street  
 City of Beaumont, Riverside County, California  
 For: Pardee Homes

Project No. Drawing No.  
 19-81-237-01 A-8

# Log of Boring No. BH-08

Dates Drilled: 8/4/2019 Logged by: William Buckley Checked By: Mehrab Jesmani

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 2609 Depth to Water (ft): NOT ENCOUNTERED

| Depth (ft) | Graphic Log | SUMMARY OF SUBSURFACE CONDITIONS<br><br>This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered. | SAMPLES |      | BLOWS   | MOISTURE | DRY UNIT WT. (pcf) | OTHER    |
|------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------|---------|----------|--------------------|----------|
|            |             |                                                                                                                                                                                                                                                                                                                                                                                                                                       | DRIVE   | BULK |         |          |                    |          |
| 5          |             | <b>ALLUVIUM:</b><br><b>SILTY SAND (SM):</b> fine to medium-grained, brown.                                                                                                                                                                                                                                                                                                                                                            |         |      | 5/6/7   | 10       | 103                | ca,er,ma |
| 10         |             |                                                                                                                                                                                                                                                                                                                                                                                                                                       |         |      | 6/10/20 | 13       | 123                |          |
| 15         |             | - fine to coarse-grained, scattered gravel up to 0.5" in largest dimension                                                                                                                                                                                                                                                                                                                                                            |         |      | 8/16/24 | 11       | 123                |          |
|            |             | End of boring at 16.5 feet bgs.<br>No groundwater encountered.<br>Borehole backfilled with soil cuttings and compacted with an auger using the weight of the drill rig on 9/4/2019.                                                                                                                                                                                                                                                   |         |      |         |          |                    |          |



**Converse Consultants**

Approximately 10.93-Acre Site  
Southeast of Xenia Avenue and 8th Street  
City of Beaumont, Riverside County, California  
For: Pardee Homes

Project No.  
**19-81-237-01**

Drawing No.  
**A-9**

## APPENDIX B

### LABORATORY TESTING PROGRAM

Tests were conducted in our laboratory on representative soil samples for the purpose of classification and evaluation of their physical properties and engineering characteristics. The amount and selection of tests were based on the geotechnical parameters required for this project. Test results are presented herein and on the Logs of Borings, in Appendix A, *Field Exploration*. The following is a summary of the various laboratory tests conducted for this project.

#### **In-Situ Moisture Content and Dry Density**

Results of these tests performed on relatively undisturbed ring samples were used to aid in the classification and to provide quantitative measure of the *in situ* dry density and moisture content, (ASTM D2216). Data obtained from this test provides qualitative information on strength and compressibility characteristics of the site soils. For test results, see the Logs of Borings in Appendix A, *Field Exploration*.

#### **Expansion Index**

One sample was tested to evaluate the expansion potential of material encountered at the site. The test was conducted in accordance with ASTM Standard D4829. Test result is presented in the following table.

**Table No. B-1, Summary of Expansion Index Test Result**

| Boring No. | Depth (feet) | Soil Description | Expansion Index | Expansion Potential |
|------------|--------------|------------------|-----------------|---------------------|
| BH-05      | 0 to 5       | Silty Sand (SM)  | 7               | Very Low            |

#### **Sand Equivalent**

Two representative soil samples were tested in accordance with the ASTM D2419 test method to determine the sand equivalent. The test results are presented in the following table.

**Table No. B-2, Sand Equivalent Test Results**

| Boring No. | Depth (feet) | Soil Description | Sand Equivalent |
|------------|--------------|------------------|-----------------|
| BH-01      | 0-5          | Silty Sand (SM)  | 11              |
| BH-06      | 0-5          | Silty Sand (SM)  | 20              |



### **R-value**

One representative bulk soil sample was tested for resistance value (R-value) in accordance with California Test Method CT301. This test is designed to provide a relative measure of soil strength for use in pavement design. The test result is shown in the following table.

**Table No. B-3, R-Value Test Result**

| Boring No. | Depth (feet) | Soil Classification | Measured R-value |
|------------|--------------|---------------------|------------------|
| BH-05      | 0-5          | Silty Sand (SM)     | 23               |

### **Soil Corrosivity Tests**

Two representative soil samples were tested to determine minimum electrical resistivity, pH, and chemical content, including soluble sulfate and chloride concentrations. The purpose of the tests was to determine the corrosion potential of sites soils when placed in contact with common construction materials. The tests were performed by AP Engineering and Testing, Inc. (Pomona, CA) in accordance to Caltrans Test Methods 643, 422 and 417. Test results are presented in the following table.

**Table No. B-4, Summary of Soil Corrosivity Test Results**

| Boring No. | Depth (feet) | pH  | Soluble Sulfates (CA 417) (% by weight) | Soluble Chlorides (CA 422) (ppm) | Min. Resistivity (CA 643) (Ohm-cm) |
|------------|--------------|-----|-----------------------------------------|----------------------------------|------------------------------------|
| BH-03      | 0-5          | 7.0 | 0.0038                                  | 35                               | 10,158                             |
| BH-08      | 0-5          | 6.9 | 0.0036                                  | 35                               | 6,826                              |

### **Collapse Tests**

To evaluate the moisture sensitivity (collapse/swell potential) of the encountered soils, two collapse tests were performed in accordance with the ASTM Standard D5333 laboratory procedure. The samples were loaded to approximately 2 kips per square foot (ksf), allowed to stabilize under load, and then submerged. The test results are presented in the following table.

**Table No. B-5, Collapse Test Results**

| Boring No. | Depth (feet) | Soil Classification | Percent Swell (+)<br>Percent Collapse (-) | Collapse Potential |
|------------|--------------|---------------------|-------------------------------------------|--------------------|
| BH-01      | 5.0-6.5      | Silty Sand (SM)     | -2.5                                      | Moderate           |
| BH-04      | 7.5-9.0      | Silty Sand (SM)     | -0.1                                      | Slight             |



### **Grain-Size Analyses**

To assist in classification of soils, mechanical grain-size analyses were performed on four select samples in accordance with the ASTM Standard D422 test method. Grain-size curves are shown in Drawing No. B-1, *Grain Size Distribution Results*.

### **Maximum Dry Density and Optimum Moisture Content Test**

Laboratory maximum dry density-optimum moisture content relationship test were performed on two representative bulk samples. These tests were conducted in accordance with the ASTM Standard D1557 test method. The test results are presented in Drawing No. B-2, *Moisture-Density Relationship Results*, and is summarized in the following table.

**Table No B-6, Summary of Moisture-Density Relationship Results**

| Boring No. | Depth (feet) | Soil Description       | Optimum Moisture (%) | Maximum Density (lb/cft) |
|------------|--------------|------------------------|----------------------|--------------------------|
| BH-03      | 0-5          | Silty Sand (SM), Brown | 7.5                  | 133.5                    |
| BH-07      | 5-10         | Silty Sand (SM), Brown | 7.8                  | 133.3                    |

### **Direct Shear Test**

Two direct shear tests were performed on relatively undisturbed samples in soaked moisture condition in accordance with ASTM D3080. For these tests, three samples contained in brass sampler rings were placed, one at a time, directly into the test apparatus and subjected to a range of normal loads appropriate for the anticipated conditions. The samples were then sheared at a constant strain rate of 0.025 inch/minute. Shear deformation was recorded until a maximum of about 0.25-inch shear displacement was achieved. Ultimate strength was selected from the shear-stress deformation data and plotted to determine the shear strength parameters. For test data, including sample density and moisture content, see Drawings No. B-3 and B-4, *Direct Shear Test Results*, and the following table.

**Table No. B-7, Summary of Direct Shear Test Results**

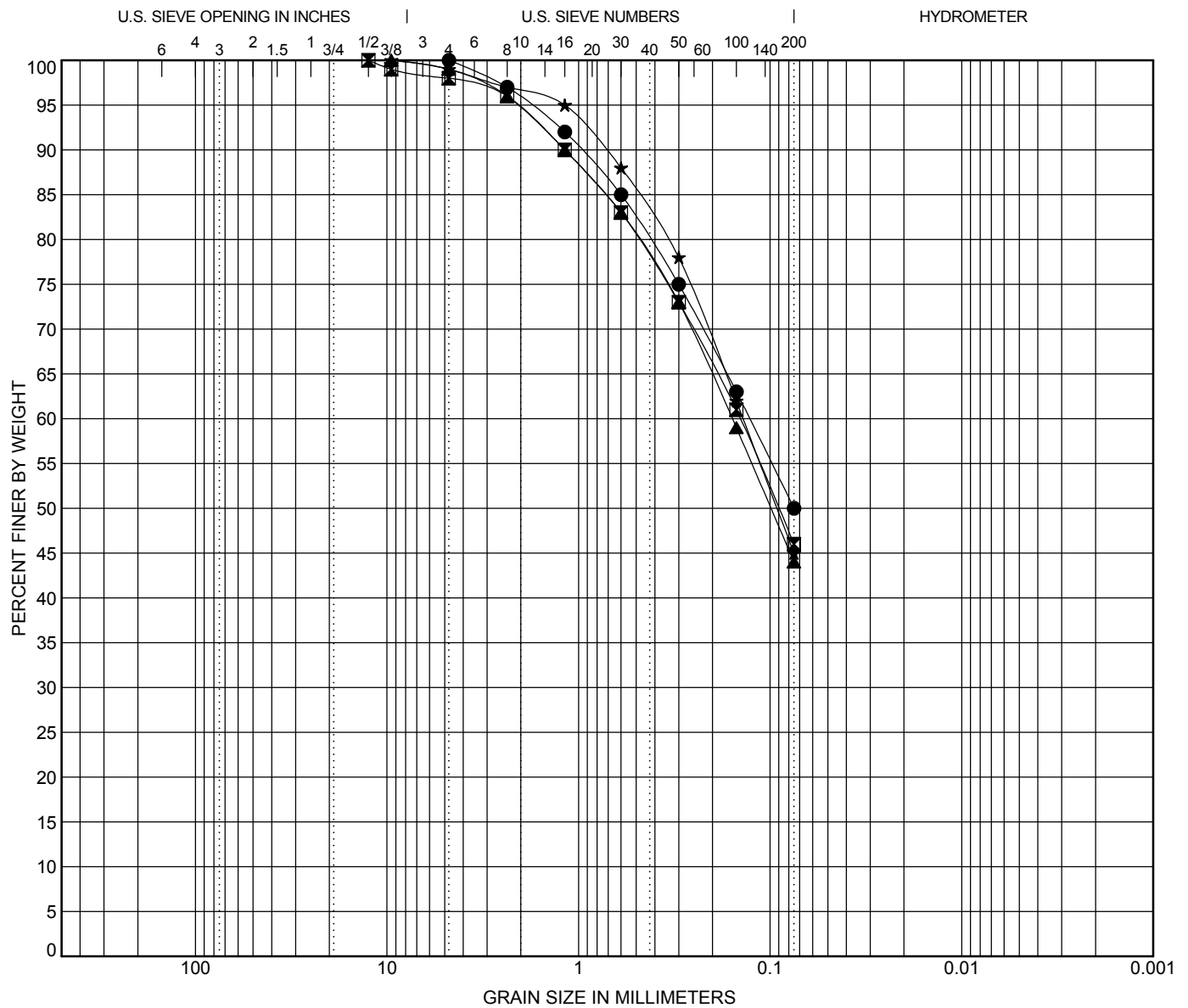
| Boring No. | Depth (feet) | Soil Description | Peak Strength Parameters |                |
|------------|--------------|------------------|--------------------------|----------------|
|            |              |                  | Friction Angle (degrees) | Cohesion (psf) |
| BH-03      | 7.5-9.0      | Silty Sand (SM)  | 35                       | 120            |
| BH-06      | 5.0-6.5      | Silty Sand (SM)  | 31                       | 60             |



### **Sample Storage**

Soil samples presently stored in our laboratory will be discarded 30 days after the date of this report, unless this office receives a specific request to retain the samples for a longer period.





| COBBLES | GRAVEL |      | SAND   |        |      | SILT OR CLAY |
|---------|--------|------|--------|--------|------|--------------|
|         | coarse | fine | coarse | medium | fine |              |

| Boring No. | Depth (ft) | Description |                 |       |     |         | LL    | PL    | PI    | Cc | Cu |
|------------|------------|-------------|-----------------|-------|-----|---------|-------|-------|-------|----|----|
| ●          | BH-02      | 5-10        | SILTY SAND (SM) |       |     |         |       |       |       |    |    |
| ☒          | BH-04      | 5-10        | SILTY SAND (SM) |       |     |         |       |       |       |    |    |
| ▲          | BH-05      | 0-5         | SILTY SAND (SM) |       |     |         |       |       |       |    |    |
| ★          | BH-08      | 0-5         | SILTY SAND (SM) |       |     |         |       |       |       |    |    |
|            |            |             |                 |       |     |         |       |       |       |    |    |
| Boring No. | Depth (ft) | D100        | D60             | D30   | D10 | %Gravel | %Sand | %Silt | %Clay |    |    |
| ●          | BH-02      | 5-10        | 4.75            | 0.128 |     | 0.0     | 50.0  | 50.0  |       |    |    |
| ☒          | BH-04      | 5-10        | 12.5            | 0.143 |     | 2.0     | 52.0  | 46.0  |       |    |    |
| ▲          | BH-05      | 0-5         | 9.5             | 0.158 |     | 1.0     | 55.0  | 44.0  |       |    |    |
| ★          | BH-08      | 0-5         | 9.5             | 0.138 |     | 1.0     | 54.0  | 45.0  |       |    |    |
|            |            |             |                 |       |     |         |       |       |       |    |    |

## GRAIN SIZE DISTRIBUTION RESULTS

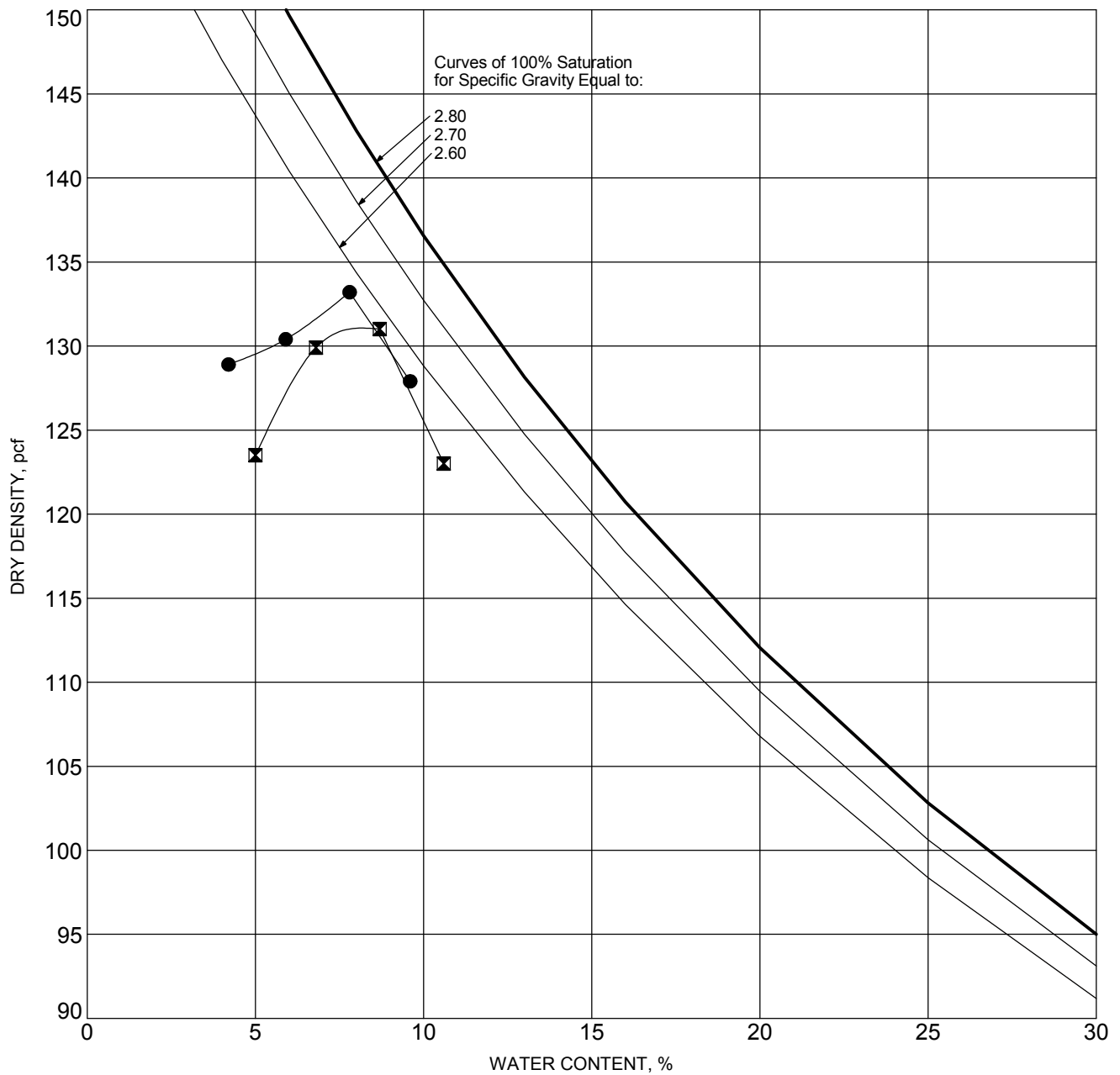


Converse Consultants

Approximately 10.93-Acre Site  
Southeast of Xenia Avenue and 8th Street  
City of Beaumont, Riverside County, California  
For: Pardee Homes

Project No.  
19-81-237-01

Drawing No.  
B-1



| SYMBOL | BORING NO. | DEPTH (ft) | DESCRIPTION            | ASTM TEST METHOD | OPTIMUM WATER, % | MAXIMUM DRY DENSITY, pcf |
|--------|------------|------------|------------------------|------------------|------------------|--------------------------|
| ●      | BH-03      | 0-5        | SILTY SAND (SM), BROWN | D1557 - A        | 7.5              | 133.5                    |
| ⊠      | BH-07      | 5-10       | SILTY SAND (SM), BROWN | D1557 - A        | 7.8              | 133.3                    |
|        |            |            |                        |                  |                  |                          |
|        |            |            |                        |                  |                  |                          |
|        |            |            |                        |                  |                  |                          |

## MOISTURE-DENSITY RELATIONSHIP RESULTS

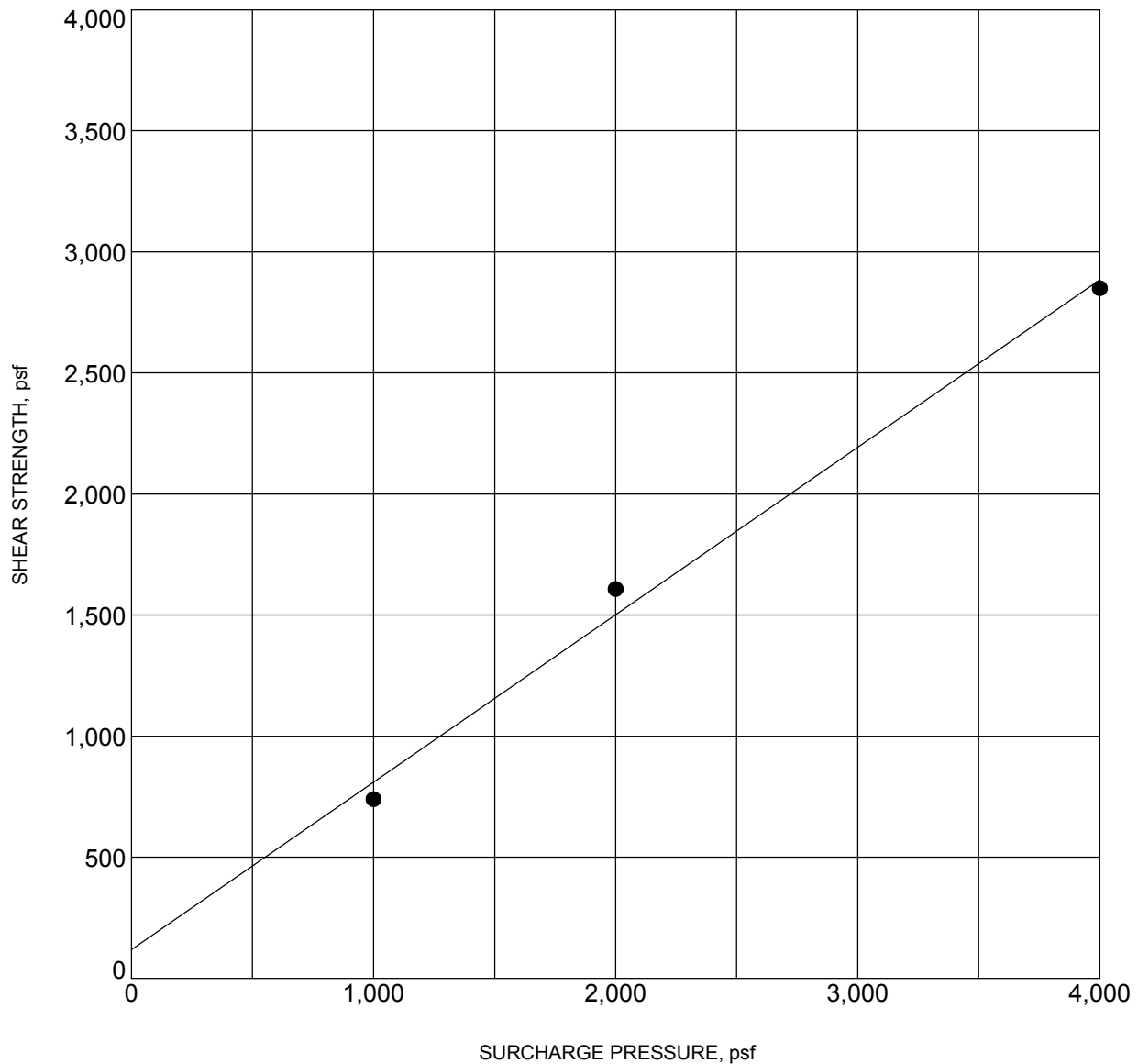


**Converse Consultants**

Approximately 10.93-Acre Site  
Southeast of Xenia Avenue and 8th Street  
City of Beaumont, Riverside County, California  
For: Pardee Homes

Project No.  
**19-81-237-01**

Drawing No.  
**B-2**



|                      |   |                        |                           |   |                |
|----------------------|---|------------------------|---------------------------|---|----------------|
| BORING NO.           | : | <b>BH-03</b>           | DEPTH (ft)                | : | <b>7.5-9.0</b> |
| DESCRIPTION          | : | <b>SILTY SAND (SM)</b> |                           |   |                |
| COHESION (psf)       | : | <b>120</b>             | FRICTION ANGLE (degrees): | : | <b>35</b>      |
| MOISTURE CONTENT (%) | : | <b>10.0</b>            | DRY DENSITY (pcf)         | : | <b>118.0</b>   |

NOTE: Ultimate Strength.

## DIRECT SHEAR TEST RESULTS

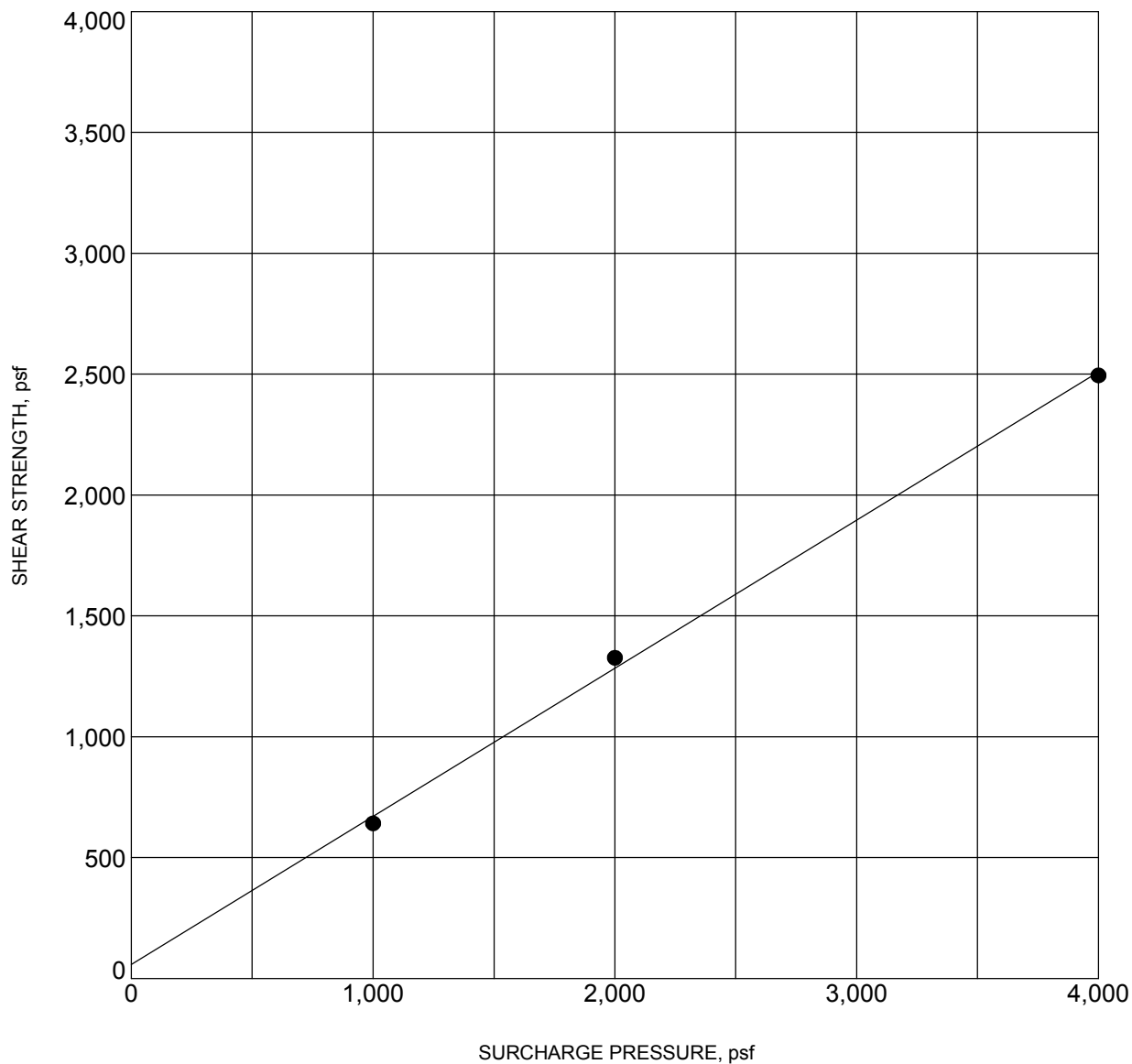


**Converse Consultants**

Approximately 10.93-Acre Site  
Southeast of Xenia Avenue and 8th Street  
City of Beaumont, Riverside County, California  
For: Pardee Homes

Project No.  
**19-81-237-01**

Drawing No.  
**B-3**



|                      |   |                        |                           |   |                |
|----------------------|---|------------------------|---------------------------|---|----------------|
| BORING NO.           | : | <b>BH-06</b>           | DEPTH (ft)                | : | <b>5.0-6.5</b> |
| DESCRIPTION          | : | <b>SILTY SAND (SM)</b> |                           |   |                |
| COHESION (psf)       | : | <b>60</b>              | FRICTION ANGLE (degrees): | : | <b>32</b>      |
| MOISTURE CONTENT (%) | : | <b>6.0</b>             | DRY DENSITY (pcf)         | : | <b>102.0</b>   |

NOTE: Ultimate Strength.

## DIRECT SHEAR TEST RESULTS



**Converse Consultants**

Approximately 10.93-Acre Site  
 Southeast of Xenia Avenue and 8th Street  
 City of Beaumont, Riverside County, California  
 For: Pardee Homes

Project No.  
**19-81-237-01**

Drawing No.  
**B-4**

## **APPENDIX C**

### **LOGS OF BORINGS AND CPT SOUNDINGS BY GEOTEK**

**Updated Geotechnical and Infiltration Evaluation  
Xenia Apartment Project, Beaumont, California  
Project No. 2784-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**

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).

|               |                        |               |             |            |                   |
|---------------|------------------------|---------------|-------------|------------|-------------------|
| CLIENT:       | Beaumont Land Partners | DRILLER:      | 2R Drilling | LOGGED BY: | Franklin Sullivan |
| PROJECT NAME: | Xenia Apt Project      | DRILL METHOD: | Hollow Stem | OPERATOR:  | Adrian            |
| PROJECT NO.:  | 2784-CR                | HAMMER:       | 140#30"     | RIG TYPE:  | CME 75            |
| LOCATION:     | Beaumont               |               |             | DATE:      | 6/14/2021         |

| Depth (ft) | SAMPLES     |             |               | USCS Symbol | Boring No.: B-I                                                    | Laboratory Testing |                   |                |
|------------|-------------|-------------|---------------|-------------|--------------------------------------------------------------------|--------------------|-------------------|----------------|
|            | Sample Type | Blows/ 6 in | Sample Number |             |                                                                    | Water Content (%)  | Dry Density (pcf) | Others         |
|            |             |             |               |             | MATERIAL DESCRIPTION AND COMMENTS                                  |                    |                   |                |
| 0          |             |             |               |             | <u>Alluvium:</u>                                                   |                    |                   | MD, EI, SH, SR |
|            |             | 7           |               | SM          | Silty f Sand, brown, slight moisture                               | 6.0                | 111.9             |                |
|            |             | 9           |               |             |                                                                    |                    |                   |                |
|            |             | 11          |               |             |                                                                    |                    |                   |                |
|            |             | 10          |               |             | becomes moist                                                      | 9.0                | 115.3             |                |
| 5          |             | 12          |               |             |                                                                    |                    |                   |                |
|            |             | 17          |               |             |                                                                    |                    |                   |                |
|            |             | 13          |               |             |                                                                    | 14.3               | 115.7             | HC             |
|            |             | 14          |               |             |                                                                    |                    |                   |                |
|            |             | 14          |               |             |                                                                    |                    |                   |                |
|            |             | 10          |               |             |                                                                    | 12.9               | 120.3             |                |
|            |             | 14          |               |             |                                                                    |                    |                   |                |
|            |             | 16          |               |             |                                                                    |                    |                   |                |
| 10         |             |             |               |             |                                                                    |                    |                   |                |
|            |             | 21          |               |             | contains trace gravel                                              | 7.2                | 126.7             |                |
|            |             | 42          |               |             |                                                                    |                    |                   |                |
|            |             | 43          |               |             |                                                                    |                    |                   |                |
|            |             |             |               |             |                                                                    |                    |                   |                |
| 15         |             | 21          |               |             |                                                                    | 7.0                | 120.7             |                |
|            |             | 24          |               |             |                                                                    |                    |                   |                |
|            |             | 32          |               |             |                                                                    |                    |                   |                |
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| 20         |             | 23          |               |             |                                                                    |                    |                   |                |
|            |             | 50/6        |               |             |                                                                    |                    |                   |                |
|            |             |             |               |             | <b>BORING TERMINATED AT 20 FEET</b>                                |                    |                   |                |
|            |             |             |               |             | No groundwater encountered<br>Boring backfilled with soil cuttings |                    |                   |                |
|            |             |             |               |             |                                                                    |                    |                   |                |
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|               |                        |               |             |            |                   |
|---------------|------------------------|---------------|-------------|------------|-------------------|
| CLIENT:       | Beaumont Land Partners | DRILLER:      | 2R Drilling | LOGGED BY: | Franklin Sullivan |
| PROJECT NAME: | Xenia Apt Project      | DRILL METHOD: | Hollow Stem | OPERATOR:  | Adrian            |
| PROJECT NO.:  | 2784-CR                | HAMMER:       | 140#/30"    | RIG TYPE:  | CME 75            |
| LOCATION:     | Beaumont               |               |             | DATE:      | 6/14/2021         |

| Depth (ft) | SAMPLES     |             |               | USCS Symbol | Boring No.: B-2                                                           | Laboratory Testing                                                                                        |                   |        |                                   |  |
|------------|-------------|-------------|---------------|-------------|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|-------------------|--------|-----------------------------------|--|
|            | Sample Type | Blows/ 6 in | Sample Number |             |                                                                           | Water Content (%)                                                                                         | Dry Density (pcf) | Others |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        | MATERIAL DESCRIPTION AND COMMENTS |  |
| 0          |             |             |               | SM          | <u>Alluvium:</u><br>Silty f-m Sand, light brown to brown, slight moisture | 6.1                                                                                                       | 115.8             | EI, SR |                                   |  |
| 25         |             |             |               |             | becomes moist, trace gravel                                               | 8.1                                                                                                       | 125.6             |        |                                   |  |
| 21         |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
| 22         |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
| 15         |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
| 23         |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
| 5          |             |             |               |             | contains trace clay                                                       | 6.8                                                                                                       | 117.7             |        |                                   |  |
| 25         |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
| 9          |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
| 11         |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
| 12         |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
| 10         |             |             |               |             | Silty f Sand with clay, dark brown, moist                                 | 16.1                                                                                                      | 114.8             | HC     |                                   |  |
| 7          |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
| 9          |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
| 12         |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
| 11         |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
| 15         |             |             |               | ML          | fine Sandy Silt, dark brown, slight moisture                              | 13.9                                                                                                      | 125.1             | HC     |                                   |  |
| 17         |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
| 22         |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
| 9          |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
| 17         |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
| 20         |             |             |               | SM          | Silty f-m Sand, medium brown, slight moisture                             |                                                                                                           |                   |        |                                   |  |
| 23         |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
| 37         |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           | <b>BORING TERMINATED AT 20 FEET</b><br>No groundwater encountered<br>Boring backfilled with soil cuttings |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |
|            |             |             |               |             |                                                                           |                                                                                                           |                   |        |                                   |  |

|                      |                        |                      |             |                   |                   |
|----------------------|------------------------|----------------------|-------------|-------------------|-------------------|
| <b>CLIENT:</b>       | Beaumont Land Partners | <b>DRILLER:</b>      | 2R Drilling | <b>LOGGED BY:</b> | Franklin Sullivan |
| <b>PROJECT NAME:</b> | Xenia Apt Project      | <b>DRILL METHOD:</b> | Hollow Stem | <b>OPERATOR:</b>  | Adrian            |
| <b>PROJECT NO.:</b>  | 2784-CR                | <b>HAMMER:</b>       | 140#/30"    | <b>RIG TYPE:</b>  | CME 75            |
| <b>LOCATION:</b>     | Beaumont               |                      |             | <b>DATE:</b>      | 6/15/2021         |

| Depth (ft) | SAMPLES                           |             |               | USCS Symbol | Boring No.: I-I                                                           | Laboratory Testing |                   |        |
|------------|-----------------------------------|-------------|---------------|-------------|---------------------------------------------------------------------------|--------------------|-------------------|--------|
|            | Sample Type                       | Blows/ 6 in | Sample Number |             |                                                                           | Water Content (%)  | Dry Density (pcf) | Others |
|            | MATERIAL DESCRIPTION AND COMMENTS |             |               |             |                                                                           |                    |                   |        |
| 0          |                                   |             |               | SM          | <u>Alluvium:</u><br>Silty f-m Sand, light brown to brown, slight moisture |                    |                   |        |
| 5          | BORING TERMINATED AT 5 FEET       |             |               |             |                                                                           |                    |                   |        |
| 10         |                                   |             |               |             |                                                                           |                    |                   |        |
| 15         |                                   |             |               |             |                                                                           |                    |                   |        |
| 20         |                                   |             |               |             |                                                                           |                    |                   |        |
| 25         |                                   |             |               |             |                                                                           |                    |                   |        |
| 30         |                                   |             |               |             |                                                                           |                    |                   |        |

LEGEND

Sample type:

---Ring
  ---SPT
  ---Small Bulk
  ---Large Bulk
  ---No Recovery
  ---Water Table

Lab testing:

AL = Atterberg Limits

SR = Sulfate/Resistivity Test

EI = Expansion Index

SH = Shear Test

SA = Sieve Analysis

HC= Consolidation

RV = R-Value Test

MD = Maximum Density

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

|                                        |                                  |                                     |
|----------------------------------------|----------------------------------|-------------------------------------|
| <b>CLIENT:</b> Beaumont Land Partners  | <b>DRILLER:</b> 2R Drilling      | <b>LOGGED BY:</b> Franklin Sullivan |
| <b>PROJECT NAME:</b> Xenia Apt Project | <b>DRILL METHOD:</b> Hollow Stem | <b>OPERATOR:</b> Adrian             |
| <b>PROJECT NO.:</b> 2784-CR            | <b>HAMMER:</b> 140#/30"          | <b>RIG TYPE:</b> CME 75             |
| <b>LOCATION:</b> Beaumont              |                                  | <b>DATE:</b> 6/15/2021              |

| Depth (ft)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | SAMPLES     |              |               | USCS Symbol                                                                            | Boring No.: I-2<br><br>MATERIAL DESCRIPTION AND COMMENTS | Laboratory Testing |                   |        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------------|---------------|----------------------------------------------------------------------------------------|----------------------------------------------------------|--------------------|-------------------|--------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Sample Type | Blows / 6 in | Sample Number |                                                                                        |                                                          | Water Content (%)  | Dry Density (pcf) | Others |
| <div style="position: relative; height: 100px;"> <div style="position: absolute; top: 0; left: 0; right: 0; border-bottom: 1px solid black;"></div> <div style="position: absolute; top: 25%; left: 0; right: 0; border-bottom: 1px solid black;"></div> <div style="position: absolute; top: 50%; left: 0; right: 0; border-bottom: 1px solid black;"></div> <div style="position: absolute; top: 75%; left: 0; right: 0; border-bottom: 1px solid black;"></div> <div style="position: absolute; top: 100%; left: 0; right: 0; border-bottom: 1px solid black;"></div> </div> |             |              |               | <b>SM</b><br><u>Alluvium:</u><br>Silty f-m Sand, light brown to brown, slight moisture |                                                          |                    |                   |        |
| <div style="position: relative; height: 150px;"> <div style="position: absolute; top: 0; left: 0; right: 0; border-bottom: 1px solid black;"></div> <div style="position: absolute; top: 25%; left: 0; right: 0; border-bottom: 1px solid black;"></div> <div style="position: absolute; top: 50%; left: 0; right: 0; border-bottom: 1px solid black;"></div> <div style="position: absolute; top: 75%; left: 0; right: 0; border-bottom: 1px solid black;"></div> <div style="position: absolute; top: 100%; left: 0; right: 0; border-bottom: 1px solid black;"></div> </div> |             |              |               | <b>BORING TERMINATED AT 5 FEET</b>                                                     |                                                          |                    |                   |        |

**LEGEND**  

|                     |                                                                                                                                |                                                                                                                               |                                                                                                                                        |                                                                                                                                                              |                                                                                                               |                                                                                                                                                                                                                                                   |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample type:</b> | <div style="display: inline-block; width: 15px; height: 15px; background-color: gray; border: 1px solid black;"></div> ---Ring | <div style="display: inline-block; width: 15px; height: 15px; background-color: #ccc; border: 1px solid black;"></div> ---SPT | <div style="display: inline-block; width: 15px; height: 15px; border: 1px solid black; transform: rotate(45deg);"></div> ---Small Bulk | <div style="display: inline-block; width: 15px; height: 15px; border: 1px solid black; transform: rotate(45deg); border-style: dashed;"></div> ---Large Bulk | <div style="display: inline-block; width: 15px; height: 15px; border: 1px solid black;"></div> ---No Recovery | <div style="display: inline-block; width: 15px; height: 15px; border: 1px solid black; position: relative;"><div style="position: absolute; top: 50%; left: 50%; transform: translate(-50%, -50%); font-size: 10px;">▽</div></div> ---Water Table |
| <b>Lab testing:</b> | AL = Atterberg Limits                                                                                                          | El = Expansion Index                                                                                                          | SA = Sieve Analysis                                                                                                                    | RV = R-Value Test                                                                                                                                            |                                                                                                               |                                                                                                                                                                                                                                                   |
|                     | SR = Sulfate/Resistivity Test                                                                                                  | SH = Shear Test                                                                                                               | HC= Consolidation                                                                                                                      | MD = Maximum Density                                                                                                                                         |                                                                                                               |                                                                                                                                                                                                                                                   |

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

**CLIENT:** Beaumont Land Partners  
**PROJECT NAME:** Xenia Apt Project  
**PROJECT NO.:** 2784-CR  
**LOCATION:** Beaumont

**DRILLER:** 2R Drilling  
**DRILL METHOD:** Hollow Stem  
**HAMMER:** 140#/30"

**LOGGED BY:** Franklin Sullivan  
**OPERATOR:** Adrian  
**RIG TYPE:** CME 75  
**DATE:** 6/15/2021

| Depth (ft) | SAMPLES                            |              |               |                                   | USCS Symbol                                                               | Boring No.: I-3 | Laboratory Testing |                   |        |
|------------|------------------------------------|--------------|---------------|-----------------------------------|---------------------------------------------------------------------------|-----------------|--------------------|-------------------|--------|
|            | Sample Type                        | Blows / 6 in | Sample Number | MATERIAL DESCRIPTION AND COMMENTS |                                                                           |                 | Water Content (%)  | Dry Density (pcf) | Others |
|            |                                    |              |               |                                   |                                                                           |                 |                    |                   |        |
| 0          |                                    |              |               | SM                                | <u>Alluvium:</u><br>Silty f-m Sand, light brown to brown, slight moisture |                 |                    |                   |        |
| 5          | <b>BORING TERMINATED AT 5 FEET</b> |              |               |                                   |                                                                           |                 |                    |                   |        |
| 10         |                                    |              |               |                                   |                                                                           |                 |                    |                   |        |
| 15         |                                    |              |               |                                   |                                                                           |                 |                    |                   |        |
| 20         |                                    |              |               |                                   |                                                                           |                 |                    |                   |        |
| 25         |                                    |              |               |                                   |                                                                           |                 |                    |                   |        |
| 30         |                                    |              |               |                                   |                                                                           |                 |                    |                   |        |

|               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |  |  |  |  |  |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|--|--|
| <b>LEGEND</b> | <b>Sample type:</b> <div style="display: inline-block; width: 15px; height: 15px; background-color: gray; margin-right: 5px;"></div> ---Ring <div style="display: inline-block; width: 15px; height: 15px; background-color: #ccc; margin-right: 5px;"></div> ---SPT <div style="display: inline-block; width: 15px; height: 15px; border: 1px solid black; margin-right: 5px;"></div> ---Small Bulk <div style="display: inline-block; width: 15px; height: 15px; border: 1px solid black; border-style: dashed; margin-right: 5px;"></div> ---Large Bulk <div style="display: inline-block; width: 15px; height: 15px; border: 1px solid black; margin-right: 5px;"></div> ---No Recovery <div style="display: inline-block; width: 15px; height: 15px; border: 1px solid black; margin-right: 5px;"></div> ---Water Table |  |  |  |  |  |  |  |
|               | <b>Lab testing:</b> <div style="display: inline-block; width: 100px; margin-right: 20px;">AL = Atterberg Limits</div> <div style="display: inline-block; width: 100px; margin-right: 20px;">EI = Expansion Index</div> <div style="display: inline-block; width: 100px; margin-right: 20px;">SA = Sieve Analysis</div> <div style="display: inline-block; width: 100px; margin-right: 20px;">RV = R-Value Test</div> <div style="display: inline-block; width: 100px; margin-right: 20px;">SR = Sulfate/Resistivity Test</div> <div style="display: inline-block; width: 100px; margin-right: 20px;">SH = Shear Test</div> <div style="display: inline-block; width: 100px; margin-right: 20px;">HC = Consolidation</div> <div style="display: inline-block; width: 100px;">MD = Maximum Density</div>                       |  |  |  |  |  |  |  |

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

|                                        |                                  |                                     |
|----------------------------------------|----------------------------------|-------------------------------------|
| <b>CLIENT:</b> Beaumont Land Partners  | <b>DRILLER:</b> 2R Drilling      | <b>LOGGED BY:</b> Franklin Sullivan |
| <b>PROJECT NAME:</b> Xenia Apt Project | <b>DRILL METHOD:</b> Hollow Stem | <b>OPERATOR:</b> Adrian             |
| <b>PROJECT NO.:</b> 2784-CR            | <b>HAMMER:</b> 140#/30"          | <b>RIG TYPE:</b> CME 75             |
| <b>LOCATION:</b> Beaumont              |                                  | <b>DATE:</b> 6/15/2021              |

| Depth (ft)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | SAMPLES     |              |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | USCS Symbol                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Boring No.: I-4<br><br>MATERIAL DESCRIPTION AND COMMENTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Laboratory Testing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Sample Type | Blows / 6 in | Sample Number | Water Content (%)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Dry Density (pcf)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Others                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| <div style="position: relative; height: 100px;"> <div style="position: absolute; top: 0; left: 0; right: 0; border-bottom: 1px solid black;"></div> <div style="position: absolute; top: 25%; left: 0; right: 0; border-bottom: 1px solid black;"></div> <div style="position: absolute; top: 50%; left: 0; right: 0; border-bottom: 1px solid black;"></div> <div style="position: absolute; top: 75%; left: 0; right: 0; border-bottom: 1px solid black;"></div> <div style="position: absolute; top: 100%; left: 0; right: 0; border-bottom: 1px solid black;"></div> </div> |             |              |               | <div style="position: relative; height: 100px;"> <div style="position: absolute; top: 0; left: 0; right: 0; border-bottom: 1px solid black;"></div> <div style="position: absolute; top: 25%; left: 0; right: 0; border-bottom: 1px solid black;"></div> <div style="position: absolute; top: 50%; left: 0; right: 0; border-bottom: 1px solid black;"></div> <div style="position: absolute; top: 75%; left: 0; right: 0; border-bottom: 1px solid black;"></div> <div style="position: absolute; top: 100%; left: 0; right: 0; border-bottom: 1px solid black;"></div> </div> | <div style="position: relative; height: 100px;"> <div style="position: absolute; top: 0; left: 0; right: 0; border-bottom: 1px solid black;"></div> <div style="position: absolute; top: 25%; left: 0; right: 0; border-bottom: 1px solid black;"></div> <div style="position: absolute; top: 50%; left: 0; right: 0; border-bottom: 1px solid black;"></div> <div style="position: absolute; top: 75%; left: 0; right: 0; border-bottom: 1px solid black;"></div> <div style="position: absolute; top: 100%; left: 0; right: 0; border-bottom: 1px solid black;"></div> </div> | <div style="position: relative; height: 100px;"> <div style="position: absolute; top: 0; left: 0; right: 0; border-bottom: 1px solid black;"></div> <div style="position: absolute; top: 25%; left: 0; right: 0; border-bottom: 1px solid black;"></div> <div style="position: absolute; top: 50%; left: 0; right: 0; border-bottom: 1px solid black;"></div> <div style="position: absolute; top: 75%; left: 0; right: 0; border-bottom: 1px solid black;"></div> <div style="position: absolute; top: 100%; left: 0; right: 0; border-bottom: 1px solid black;"></div> </div> | <div style="position: relative; height: 100px;"> <div style="position: absolute; top: 0; left: 0; right: 0; border-bottom: 1px solid black;"></div> <div style="position: absolute; top: 25%; left: 0; right: 0; border-bottom: 1px solid black;"></div> <div style="position: absolute; top: 50%; left: 0; right: 0; border-bottom: 1px solid black;"></div> <div style="position: absolute; top: 75%; left: 0; right: 0; border-bottom: 1px solid black;"></div> <div style="position: absolute; top: 100%; left: 0; right: 0; border-bottom: 1px solid black;"></div> </div> | <div style="position: relative; height: 100px;"> <div style="position: absolute; top: 0; left: 0; right: 0; border-bottom: 1px solid black;"></div> <div style="position: absolute; top: 25%; left: 0; right: 0; border-bottom: 1px solid black;"></div> <div style="position: absolute; top: 50%; left: 0; right: 0; border-bottom: 1px solid black;"></div> <div style="position: absolute; top: 75%; left: 0; right: 0; border-bottom: 1px solid black;"></div> <div style="position: absolute; top: 100%; left: 0; right: 0; border-bottom: 1px solid black;"></div> </div> |  |
| 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |              |               | SM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <u>Alluvium:</u><br>Silty f-m Sand, light brown to brown, slight moisture                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |
| 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |              |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | BORING TERMINATED AT 5 FEET                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |
| 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |             |              |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |
| 15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |             |              |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |
| 20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |             |              |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |
| 25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |             |              |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |
| 30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |             |              |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |

**LEGEND**  
**Sample type:**

---Ring
  ---SPT
  ---Small Bulk
  ---Large Bulk
  ---No Recovery
  ---Water Table

**Lab testing:**

AL = Atterberg Limits

El = Expansion Index

SA = Sieve Analysis

RV = R-Value Test

SR = Sulfate/Resistivity Test

SH = Shear Test

HC = Consolidation

MD = Maximum Density

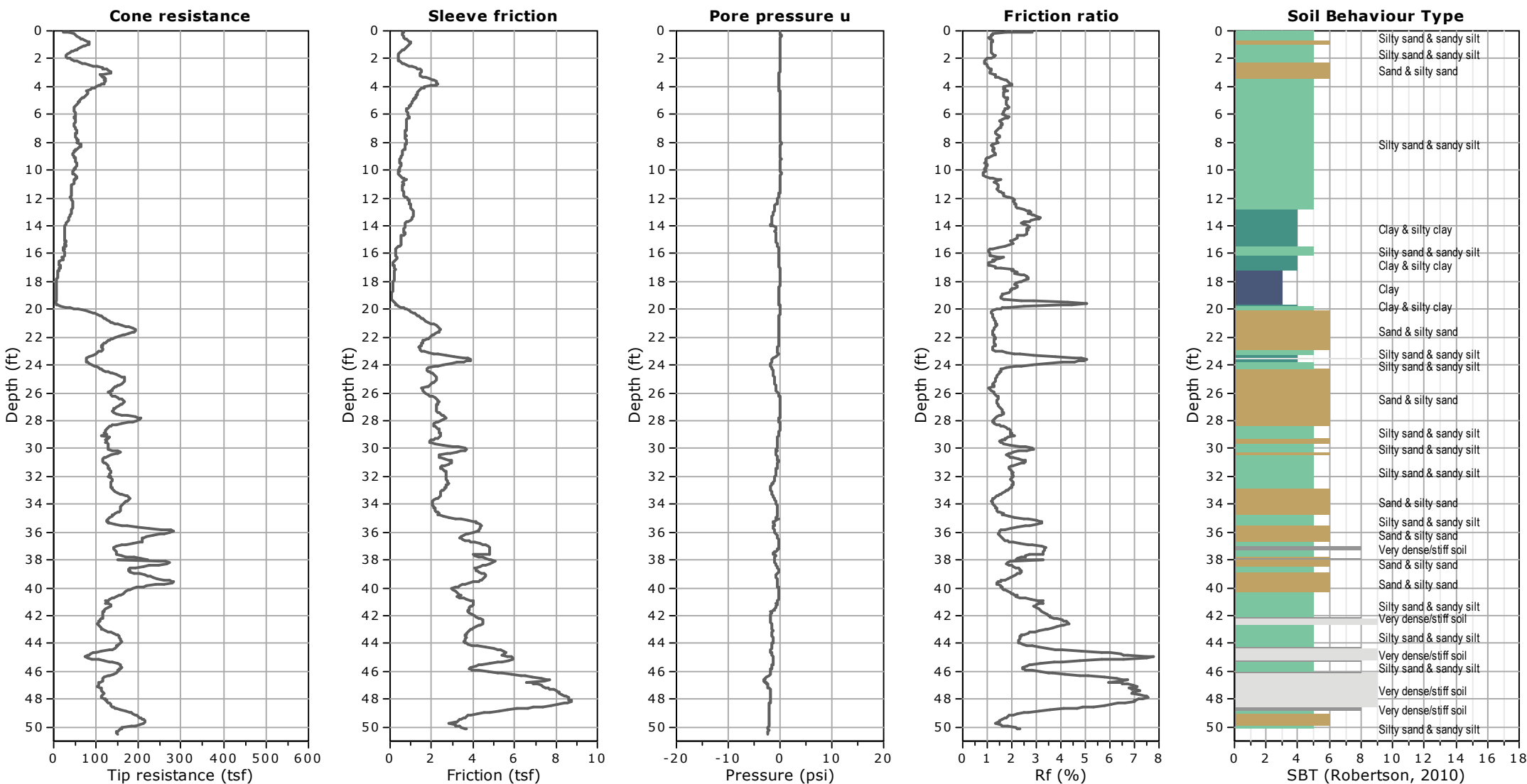


**Project:** GeoTek / Xenia Site

**Location:** Beaumont, CA

**CPT-1**

Total depth: 50.54 ft, Date: 6/15/2021



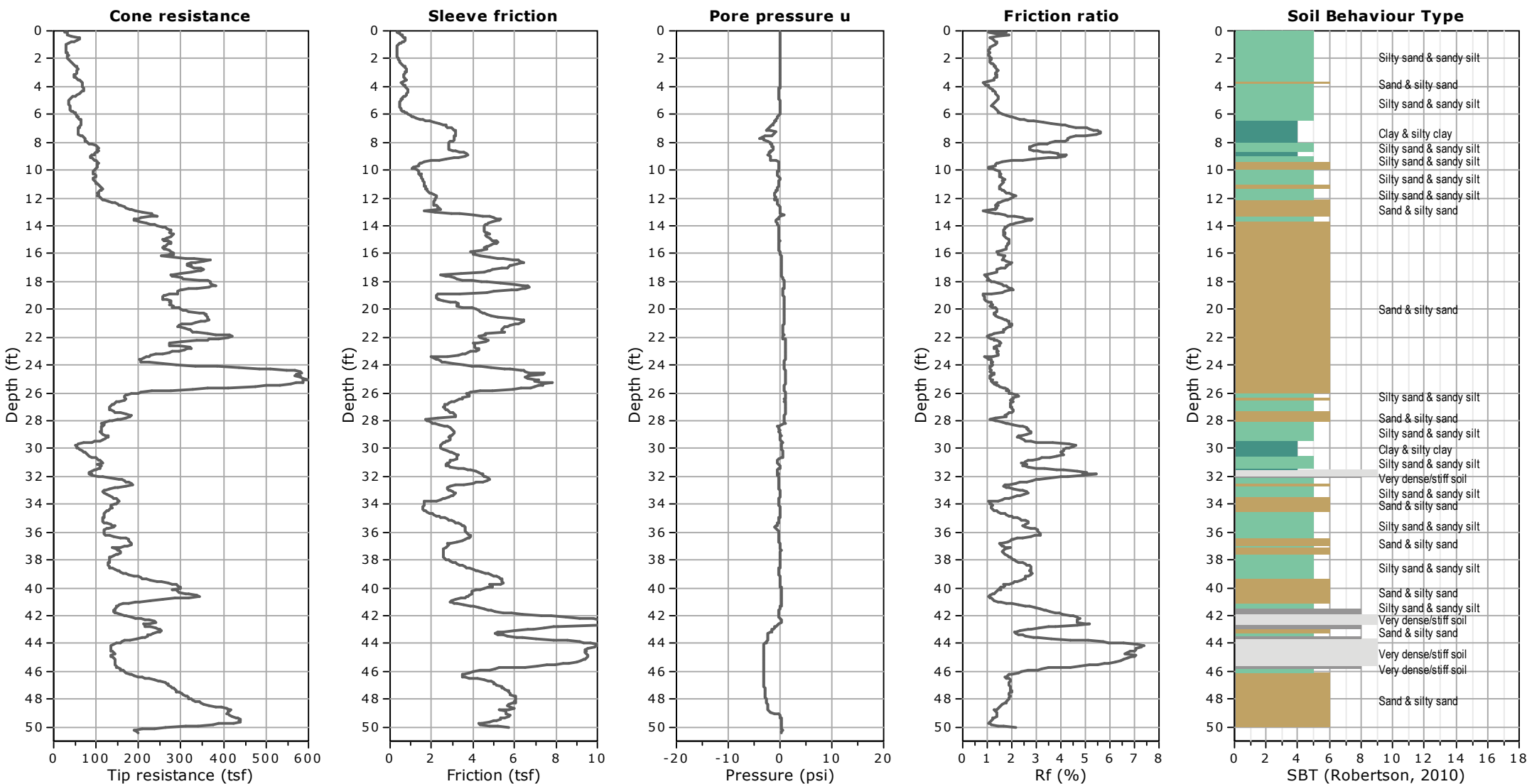


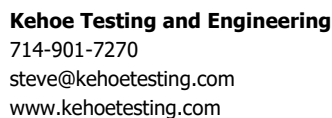
**Project:** GeoTek / Xenia Site

**Location:** Beaumont, CA

**CPT-2**

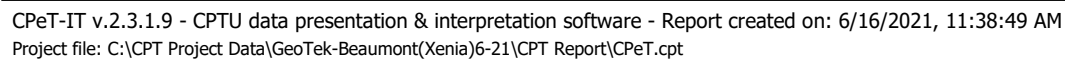
Total depth: 50.42 ft, Date: 6/15/2021





**Location:** Beaumont, CA

Total depth: 50.76 ft, Date: 6/15/2021



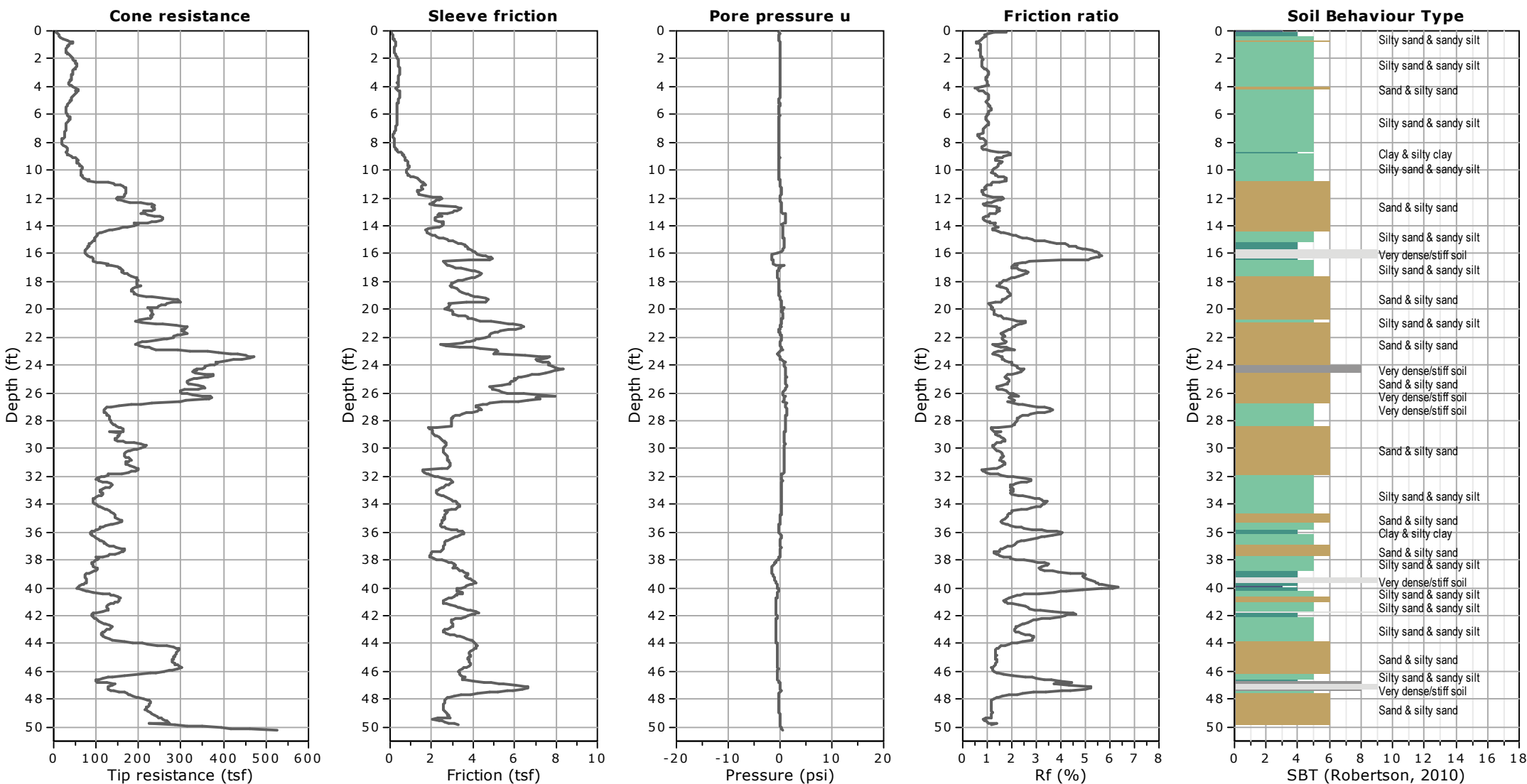


**Project:** GeoTek / Xenia Site

**Location:** Beaumont, CA

**CPT-4**

Total depth: 50.21 ft, Date: 6/15/2021



# **APPENDIX D**

## **LABORATORY TEST RESULTS BY GEOTEK**

**Updated Geotechnical and Infiltration Evaluation  
Xenia Apartment Project, Beaumont, California  
Project No. 2784-CR**



## **SUMMARY OF LABORATORY TESTING**

### **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 C.

### **Moisture-Density Relationship**

Laboratory testing was performed on a selected sample collected during the subsurface exploration. The laboratory maximum dry density and optimum moisture content for the soil types were determined in general accordance with test method ASTM Test Procedure D 1557. The results are included herein.

### **Direct Shear**

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

### **Expansion Index**

Expansion Index testing was performed on a selected soil sample collected from the site. Testing was performed in general accordance with ASTM Test Method D 4829. The test results are presented herein.

### **Collapse**

Collapse tests were conducted in accordance with ASTM D2435. The results of these tests are presented herein.

### **Sulfate Content, Resistivity and Chloride Content**

Testing to determine the water-soluble sulfate content was performed by others in general accordance with ASTM D4327. Resistivity testing was completed by others in general accordance with ASTM G187. Testing to determine the chloride content was performed by others in general accordance with ASTM D4327. pH testing was completed by others in general accordance with ASTM D4972. The results of the testing are provided below.



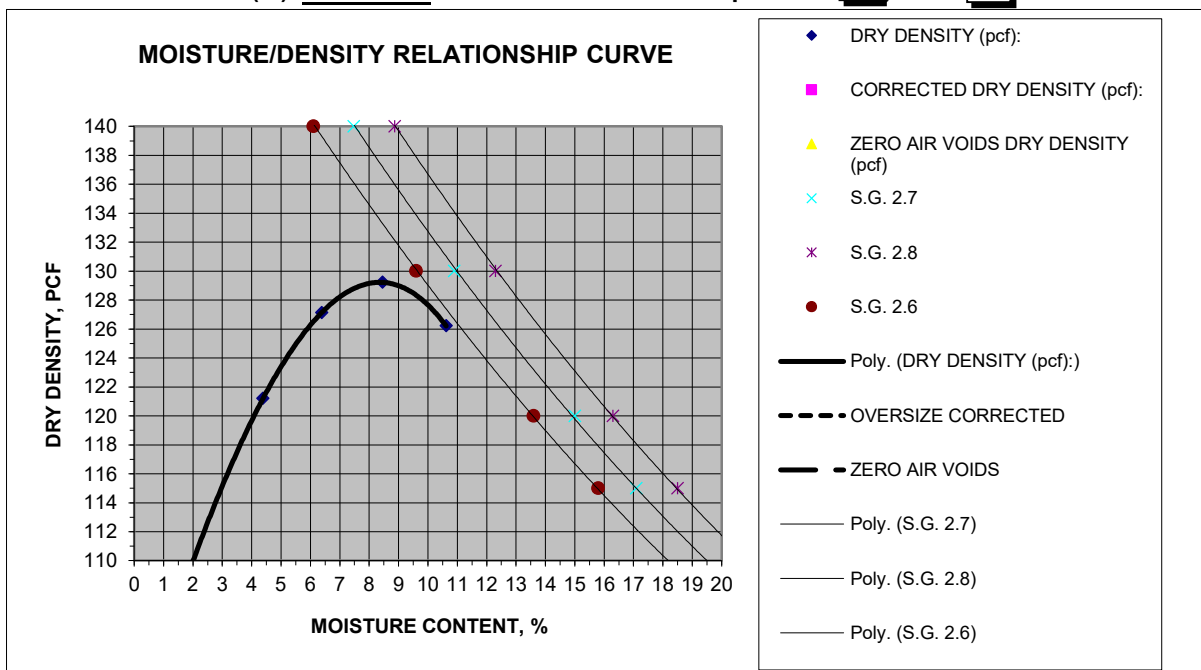
## MOISTURE/DENSITY RELATIONSHIP

**Client:** Beaumont Land Partners  
**Project:** Xenia Apartments  
**Location:** Beaumont  
**Material Type:** Brown Silty Sand  
**Material Supplier:** -  
**Material Source:** -  
**Sample Location:** B1 @ 0-5'  
**Sampled By:** FS  
**Received By:** RJ  
**Tested By:** RL  
**Reviewed By:** RJ

**Job No.:** 2784-CR  
**Lab No.:** Corona

**Date Sampled:** 6/14/2021  
**Date Received:** 6/14/2021  
**Date Tested:** 6/28/2021  
**Date Reviewed:** 6/30/2021

**Test Procedure:** ASTM D1557 **Method:** A  
**Oversized Material (%):** 3.9 **Correction Required:** ☐ yes ☒ no



### MOISTURE DENSITY RELATIONSHIP VALUES

**Maximum Dry Density, pcf** 129.5 **@ Optimum Moisture, %** 8.5  
**Corrected Maximum Dry Density, pcf**  **@ Optimum Moisture, %**

### 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:

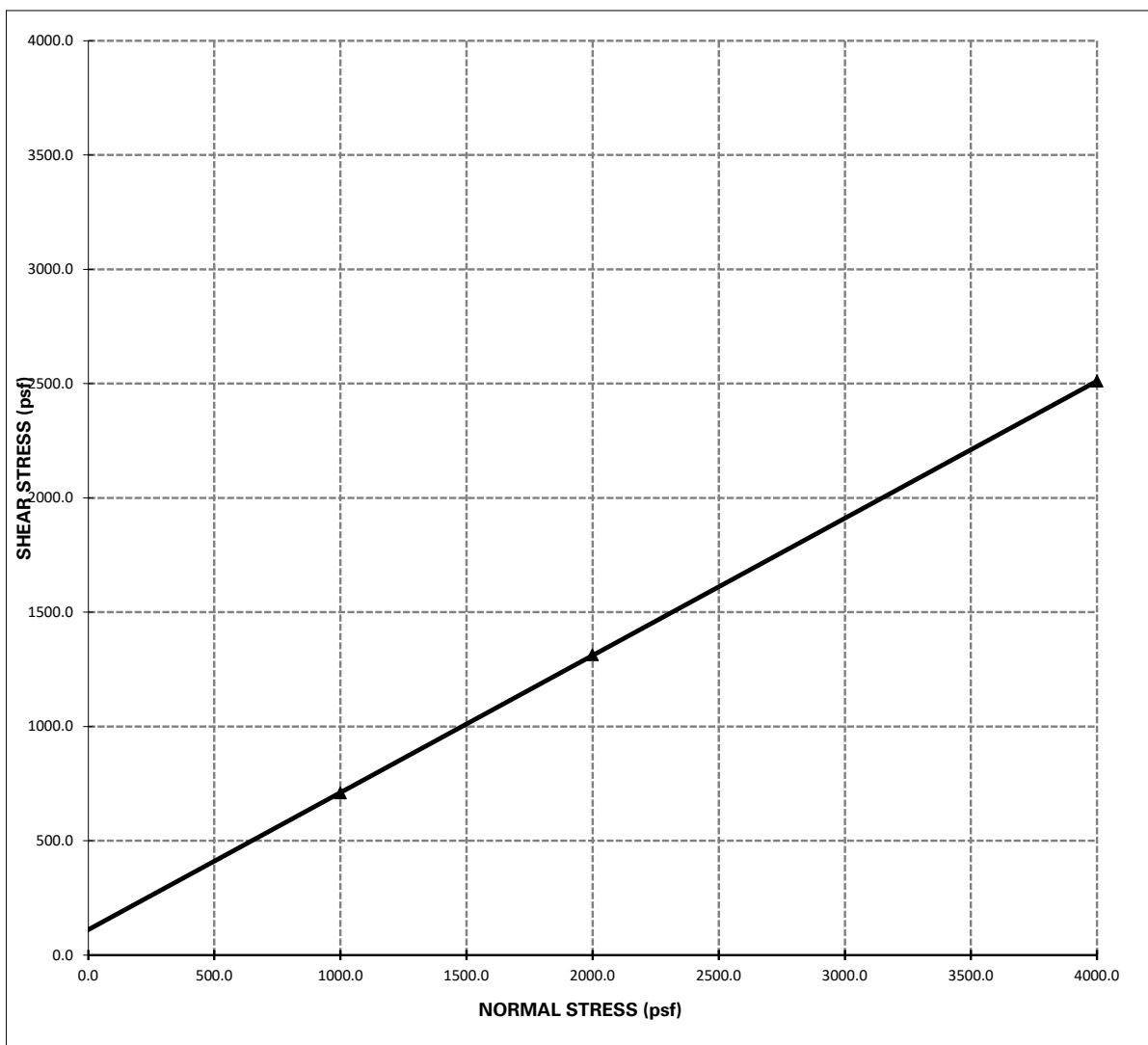
Liquid Limit, %  
 Plastic Limit, %  
 Plasticity Index, %



## DIRECT SHEAR TEST

**Project Name:** Beaumont Land Partners  
**Project Number:** 2784-CR

**Sample Location:** BI @ 0-5'  
**Date Tested:** 7/1/2021



**Shear Strength:**  $\Phi = 31^{\circ}$  ;  $C = 111 \text{ psf}$

- 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:** Beaumont Land Partners  
**Project Number:** 2784-CR  
**Project Location:** Xenia Apartments Project

**Tested/ Checked By:** CD Lab No Corona  
**Date Tested:** 6/23/2021  
**Sample Source:** B1 @ 0-5'  
**Sample Description:**

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

### DENSITY DETERMINATION

|          |                                              |              |
|----------|----------------------------------------------|--------------|
| <b>A</b> | Weight of compacted sample & ring (gm)       | 780.8        |
| <b>B</b> | Weight of ring (gm)                          | 365.5        |
| <b>C</b> | Net weight of sample (gm)                    | <b>415.3</b> |
| <b>D</b> | Wet Density, lb / ft <sup>3</sup> (C*0.3016) | <b>125.3</b> |
| <b>E</b> | Dry Density, lb / ft <sup>3</sup> (D/1.F)    | <b>115.0</b> |

### SATURATION DETERMINATION

|          |                                  |             |
|----------|----------------------------------|-------------|
| <b>F</b> | Moisture Content, %              | 8.9         |
| <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>51.7</b> |

### READINGS

| DATE      | TIME | READING |            |
|-----------|------|---------|------------|
| 6/23/2021 |      | 0.3410  | Initial    |
| 6/23/2021 |      | 0.3390  | 10 min/Dry |
|           |      |         |            |
|           |      |         |            |
|           |      |         |            |
| 6/24/2021 |      | 0.3440  | Final      |

### FINAL MOISTURE

|                                   |             |
|-----------------------------------|-------------|
| Final Weight of wet sample & tare | % Moisture  |
| 804.3                             | <b>14.6</b> |

**EXPANSION INDEX = 5**



## EXPANSION INDEX TEST

(ASTM D4829)

**Client:** Beaumont Land Partners  
**Project Number:** 2784-CR  
**Project Location:** Xenia Apartments Project

**Tested/ Checked By:** CD    Lab No    Corona  
**Date Tested:** 6/24/2021  
**Sample Source:** B2 @ 0-5'  
**Sample Description:** \_\_\_\_\_

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

### DENSITY DETERMINATION

|          |                                              |              |
|----------|----------------------------------------------|--------------|
| <b>A</b> | Weight of compacted sample & ring (gm)       | 781.9        |
| <b>B</b> | Weight of ring (gm)                          | 365.4        |
| <b>C</b> | Net weight of sample (gm)                    | <b>416.5</b> |
| <b>D</b> | Wet Density, lb / ft <sup>3</sup> (C*0.3016) | <b>125.6</b> |
| <b>E</b> | Dry Density, lb / ft <sup>3</sup> (D/1.F)    | <b>115.5</b> |

### SATURATION DETERMINATION

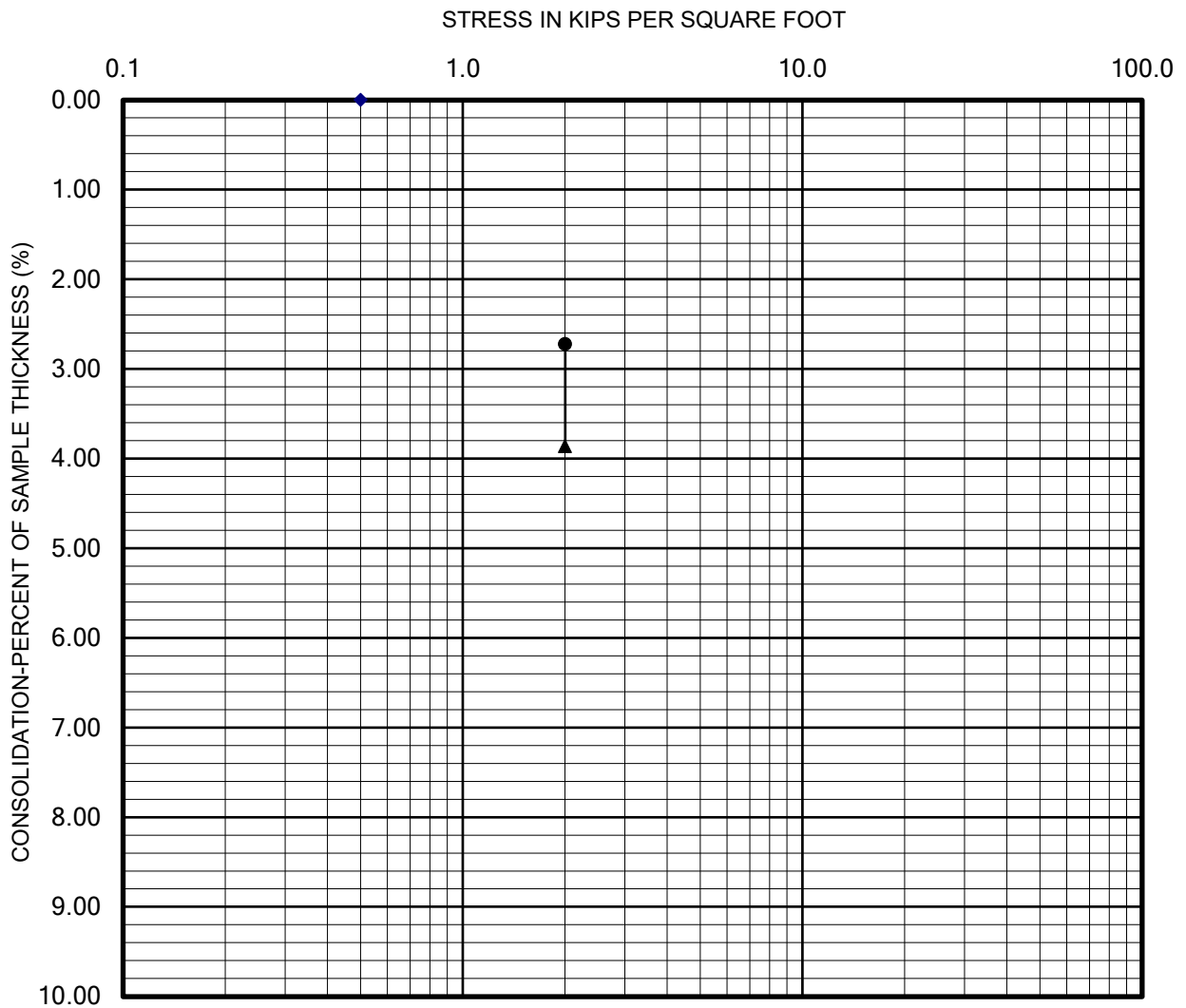
|          |                                  |             |
|----------|----------------------------------|-------------|
| <b>F</b> | Moisture Content, %              | 8.8         |
| <b>G</b> | Specific Gravity, assumed        | <b>2.70</b> |
| <b>H</b> | Unit Wt. of Water @ 20 °C, (pcf) | <b>62.4</b> |
| <b>I</b> | % Saturation                     | <b>51.7</b> |

| READINGS  |      |         |
|-----------|------|---------|
| DATE      | TIME | READING |
| 6/24/2021 |      | 0.2290  |
| 6/24/2021 |      | 0.2290  |
|           |      |         |
|           |      |         |
|           |      |         |
| 6/25/2021 |      | 0.2390  |

Initial  
 10 min/Dry  
  
  
  
 Final

| FINAL MOISTURE                    |             |
|-----------------------------------|-------------|
| Final Weight of wet sample & tare | % Moisture  |
| 810.3                             | <b>15.6</b> |

**EXPANSION INDEX =                      10**



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

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4546



## COLLAPSE REPORT

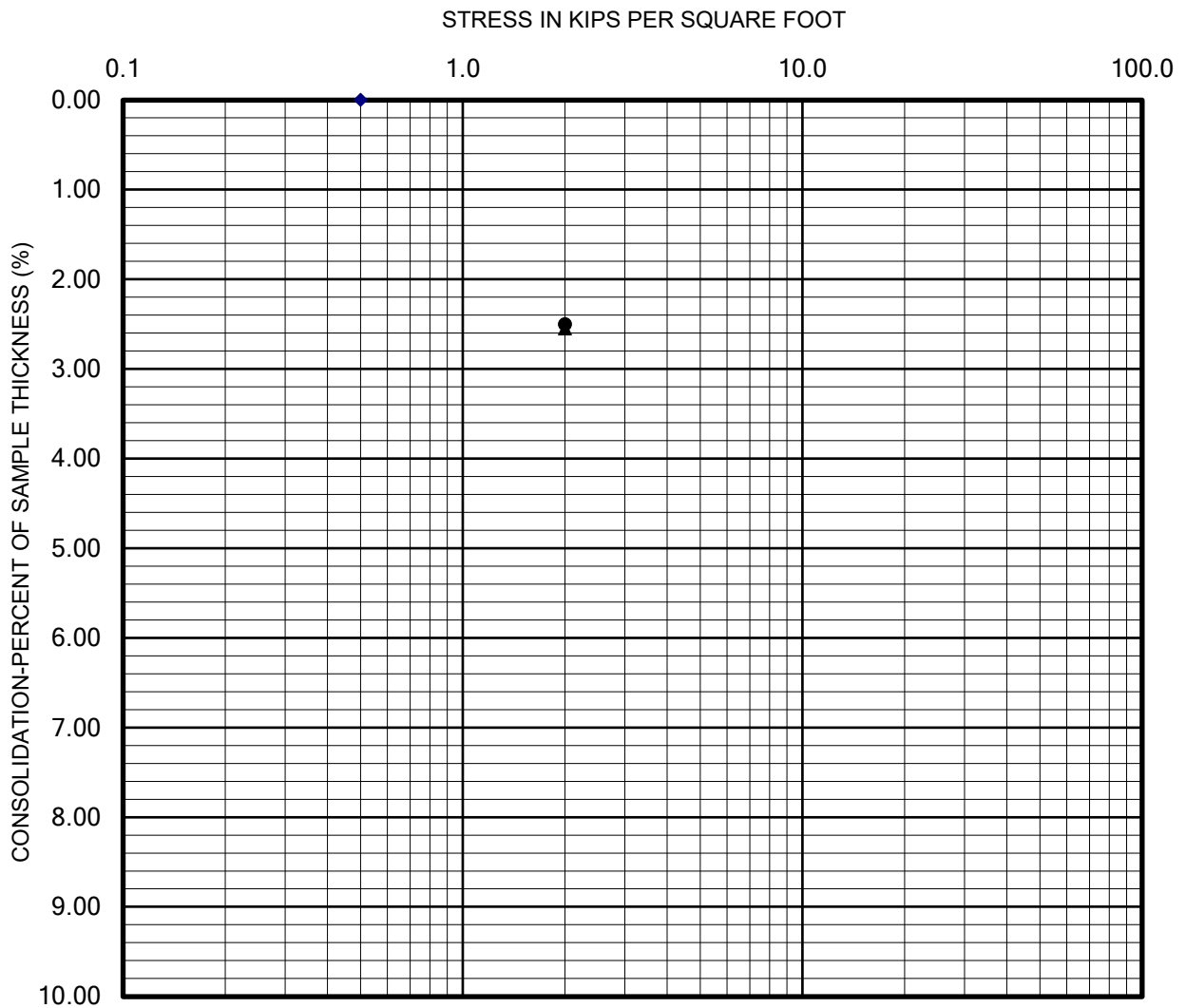
**Sample: B-1 @ 6 feet**

CHECKED BY: RJ

Lab: Corona

PROJECT NO.: 2784-CR

Date: 7-1-21



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

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4546



## COLLAPSE REPORT

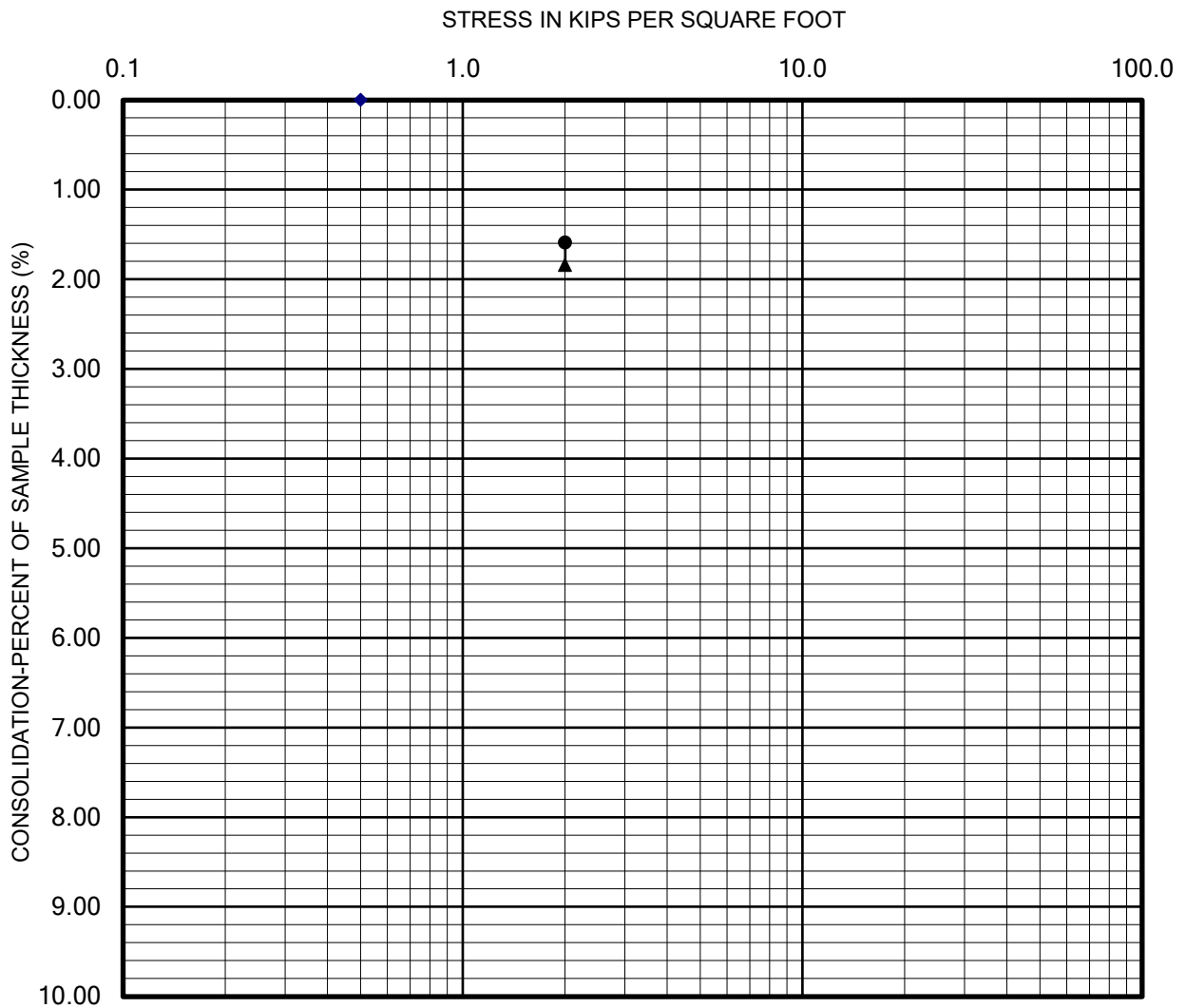
**Sample: B-2 @ 7 feet**

CHECKED BY: RJ

Lab: Corona

PROJECT NO.: 2784-CR

Date: 7-1-21



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

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4546



## COLLAPSE REPORT

**Sample: B-2 @ 10 feet**

CHECKED BY: RJ

Lab: Corona

PROJECT NO.: 2784-CR

Date: 7-1-21



## Soil Analysis Lab Results

Client: GeoTek, Inc.

Job Name: Xenia Apartment Project, Beaumont

Client Job Number: 2484-CR Beaumont Land Project

Project X Job Number: S210701B

July 6, 2021

| Bore# / Description | Method | ASTM D4327                    |        | ASTM D4327      |        | ASTM G187          |          | ASTM D4972 | ASTM G200 | SM 4500-S2-D    | ASTM D4327                   | ASTM D6919                   | ASTM D6919      | ASTM D6919      | ASTM D6919     | ASTM D6919       | ASTM D6919       | ASTM D4327                  | ASTM D4327                    |
|---------------------|--------|-------------------------------|--------|-----------------|--------|--------------------|----------|------------|-----------|-----------------|------------------------------|------------------------------|-----------------|-----------------|----------------|------------------|------------------|-----------------------------|-------------------------------|
|                     | Depth  | Sulfates                      |        | Chlorides       |        | Resistivity        |          | pH         | Redox     | Sulfide         | Nitrate                      | Ammonium                     | Lithium         | Sodium          | Potassium      | Magnesium        | Calcium          | Fluoride                    | Phosphate                     |
|                     | (ft)   | SO <sub>4</sub> <sup>2-</sup> |        | Cl <sup>-</sup> |        | As Rec'd   Minimum |          |            |           | S <sup>2-</sup> | NO <sub>3</sub> <sup>-</sup> | NH <sub>4</sub> <sup>+</sup> | Li <sup>+</sup> | Na <sup>+</sup> | K <sup>+</sup> | Mg <sup>2+</sup> | Ca <sup>2+</sup> | F <sub>2</sub> <sup>-</sup> | PO <sub>4</sub> <sup>3-</sup> |
|                     |        | (mg/kg)                       | (wt%)  | (mg/kg)         | (wt%)  | (Ohm-cm)           | (Ohm-cm) |            | (mV)      | (mg/kg)         | (mg/kg)                      | (mg/kg)                      | (mg/kg)         | (mg/kg)         | (mg/kg)        | (mg/kg)          | (mg/kg)          | (mg/kg)                     | (mg/kg)                       |
| 2784-CR B-1         | 0-5    | 12.2                          | 0.0012 | 5.7             | 0.0006 | 40,200             | 9,380    | 7.2        | 118       | <0.01           | 14.0                         | 22.7                         | 0.04            | 49.5            | 4.8            | 51.2             | 246.5            | 2.8                         | 0.3                           |
| 2784-CR B-2         | 0-5    | 16.4                          | 0.0016 | 5.6             | 0.0006 | 66,330             | 12,730   | 8.3        | 175       | <0.01           | 4.2                          | 34.2                         | 0.03            | 63.8            | 4.3            | 56.5             | 266.5            | 1.9                         | 0.6                           |

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

PPM = mg/kg (soil) = mg/L (Liquid)

# **APPENDIX E**

## **PERCOLATION/INFILTRATION TEST DATA**

**Updated Geotechnical and Infiltration Evaluation  
Xenia Apartment Project, Beaumont, California  
Project No. 2784-CR**



**Client:** Beaumont Land Partners  
**Project:** Xenia Apartments  
**Project No:** 2784-CR  
**Date:** 7/7/2021

**Boring No.** I-I

### Infiltration Rate (Porchet Method)

|                                 |       |     |
|---------------------------------|-------|-----|
| Time Interval, $\Delta t =$     | 10    | min |
| Final Depth to Water, $D_F =$   | 44.25 | in  |
| Test Hole Radius, $r =$         | 4     | in  |
| Initial Depth to Water, $D_O =$ | 40.25 | in  |
| Total Test Hole Depth, $D_T =$  | 60.25 | in  |

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

|                                     |    |    |
|-------------------------------------|----|----|
| $H_O = D_T - D_O =$                 | 20 | in |
| $H_F = D_T - D_F =$                 | 16 | in |
| $\Delta H = \Delta D = H_O - H_F =$ | 4  | in |
| $H_{avg} = (H_O + H_F)/2 =$         | 18 | in |

$I_t =$ 
2.4
 Inches per Hour

**Client:** Beaumont Land Partners  
**Project:** Xenia Apartments  
**Project No:** 2784-CR  
**Date:** 7/7/2021

**Boring No.** I-2

### Infiltration Rate (Porchet Method)

|                                 |       |     |
|---------------------------------|-------|-----|
| Time Interval, $\Delta t =$     | 10    | min |
| Final Depth to Water, $D_F =$   | 45.75 | in  |
| Test Hole Radius, $r =$         | 4     | in  |
| Initial Depth to Water, $D_O =$ | 40.5  | in  |
| Total Test Hole Depth, $D_T =$  | 60.5  | in  |

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

|                                     |        |    |
|-------------------------------------|--------|----|
| $H_O = D_T - D_O =$                 | 20     | in |
| $H_F = D_T - D_F =$                 | 14.75  | in |
| $\Delta H = \Delta D = H_O - H_F =$ | 5.25   | in |
| $H_{avg} = (H_O + H_F)/2 =$         | 17.375 | in |

$I_t =$ 
3.3
 Inches per Hour

**Client:** Beaumont Land Partners  
**Project:** Xenia Apartments  
**Project No:** 2784-CR  
**Date:** 7/7/2021

**Boring No.** I-3

### Infiltration Rate (Porchet Method)

|                                 |       |     |
|---------------------------------|-------|-----|
| Time Interval, $\Delta t$ =     | 10    | min |
| Final Depth to Water, $D_F$ =   | 44.63 | in  |
| Test Hole Radius, $r$ =         | 4     | in  |
| Initial Depth to Water, $D_O$ = | 42.75 | in  |
| Total Test Hole Depth, $D_T$ =  | 62.75 | in  |

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

|                                     |       |    |
|-------------------------------------|-------|----|
| $H_O = D_T - D_O =$                 | 20    | in |
| $H_F = D_T - D_F =$                 | 18.12 | in |
| $\Delta H = \Delta D = H_O - H_F =$ | 1.88  | in |
| $H_{avg} = (H_O + H_F)/2 =$         | 19.06 | in |

$I_t =$  1.1 Inches per Hour

**Client:** Beaumont Land Partners  
**Project:** Xenia Apartments  
**Project No:** 2784-CR  
**Date:** 7/7/2021

**Boring No.** I-4

### Infiltration Rate (Porchet Method)

|                                 |      |     |
|---------------------------------|------|-----|
| Time Interval, $\Delta t =$     | 10   | min |
| Final Depth to Water, $D_F =$   | 46   | in  |
| Test Hole Radius, $r =$         | 4    | in  |
| Initial Depth to Water, $D_O =$ | 43.5 | in  |
| Total Test Hole Depth, $D_T =$  | 63.5 | in  |

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

|                                     |       |    |
|-------------------------------------|-------|----|
| $H_O = D_T - D_O =$                 | 20    | in |
| $H_F = D_T - D_F =$                 | 17.5  | in |
| $\Delta H = \Delta D = H_O - H_F =$ | 2.5   | in |
| $H_{avg} = (H_O + H_F)/2 =$         | 18.75 | in |

$I_t =$ 
1.4
 Inches per Hour

### Percolation Test Data Sheet

|                                              |                             |                                  |             |               |              |
|----------------------------------------------|-----------------------------|----------------------------------|-------------|---------------|--------------|
| <b>Project:</b>                              | Xenia Apt Project, Beaumont | <b>Project No:</b>               | 2784-CR     | <b>Date:</b>  | 6/16/21      |
| <b>Test Hole No:</b>                         | I-1                         | <b>Tested By:</b>                | F. Sullivan |               |              |
| <b>Depth of Test Hole, <math>D_t</math>:</b> | 5.02'                       | <b>USCS Soil Classification:</b> | SM          |               |              |
| <b>Test Hole Dimensions (Inches)</b>         |                             |                                  |             | <b>Length</b> | <b>Width</b> |
| <b>Diameter (if round)=</b>                  | 8                           | <b>Sides (if rectangular)=</b>   |             |               |              |

#### 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         | 9:00       | 9:25      | 25                    | 40.25                        | 50.25                      | 10                          | Y                                  |
| 2         | 9:25       | 9:50      | 25                    | 40.25                        | 50                         | 9.25                        | 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 | $\Delta t$<br>Time Interval (min.) | $D_o$<br>Initial Depth to Water (in.) | $D_i$<br>Final Depth to Water (in.) | $\Delta D$<br>Change in Water Level (in.) | Percolation Rate (min./in.) |
|-----------|------------|-----------|------------------------------------|---------------------------------------|-------------------------------------|-------------------------------------------|-----------------------------|
| 1         | 9:50       | 10:00     | 10                                 | 40.25                                 | 44.75                               | 4.5                                       | 2.22                        |
| 2         | 10:00      | 10:14     | 10                                 | 40.25                                 | 44.5                                | 4.25                                      | 2.35                        |
| 3         | 10:14      | 10:24     | 10                                 | 40.25                                 | 44.5                                | 4.25                                      | 2.35                        |
| 4         | 10:24      | 10:34     | 10                                 | 40.25                                 | 44.25                               | 4.0                                       | 2.5                         |
| 5         | 10:34      | 10:44     | 10                                 | 40.25                                 | 45.11                               | 4.86                                      | 2.06                        |
| 6         | 10:44      | 10:54     | 10                                 | 40.25                                 | 44.25                               | 4.0                                       | 2.5                         |
| 7         |            |           |                                    |                                       |                                     |                                           |                             |
| 8         |            |           |                                    |                                       |                                     |                                           |                             |
| 9         |            |           |                                    |                                       |                                     |                                           |                             |
| 10        |            |           |                                    |                                       |                                     |                                           |                             |
| 11        |            |           |                                    |                                       |                                     |                                           |                             |
| 12        |            |           |                                    |                                       |                                     |                                           |                             |
| 13        |            |           |                                    |                                       |                                     |                                           |                             |
| 14        |            |           |                                    |                                       |                                     |                                           |                             |
| 15        |            |           |                                    |                                       |                                     |                                           |                             |

COMMENTS:

### Percolation Test Data Sheet

|                                              |                             |                                  |               |              |         |
|----------------------------------------------|-----------------------------|----------------------------------|---------------|--------------|---------|
| <b>Project:</b>                              | Xenia Apt Project, Beaumont | <b>Project No:</b>               | 2794-CR       | <b>Date:</b> | 6/16/21 |
| <b>Test Hole No:</b>                         | I-2                         | <b>Tested By:</b>                | F. Sullivan   |              |         |
| <b>Depth of Test Hole, <math>D_1</math>:</b> | 5.04'                       | <b>USCS Soil Classification:</b> | SM            |              |         |
| <b>Test Hole Dimensions (inches)</b>         |                             |                                  | <b>Length</b> | <b>Width</b> |         |
| <b>Diameter (if round)=</b>                  | 8                           | <b>Sides (if rectangular)=</b>   |               |              |         |

#### 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         | 9:15       | 9:40      | 25                    | 40.5                         | 54.5                       | 14.5                        | Y                                  |
| 2         | 9:40       | 10:05     | 25                    | 40.5                         | 53.5                       | 13.0                        | 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 | $\Delta t$<br>Time Interval (min.) | $D_0$<br>Initial Depth to Water (in.) | $D_1$<br>Final Depth to Water (in.) | $\Delta D$<br>Change in Water Level (in.) | Percolation Rate (min./in.) |
|-----------|------------|-----------|------------------------------------|---------------------------------------|-------------------------------------|-------------------------------------------|-----------------------------|
| 1         | 10:05      | 10:15     | 10                                 | 40.5                                  | 46                                  | 5.5                                       | 1.82                        |
| 2         | 10:15      | 10:25     | 10                                 | 40.5                                  | 45.75                               | 5.25                                      | 1.90                        |
| 3         | 10:25      | 10:35     | 10                                 | 40.5                                  | 46                                  | 5.5                                       | 1.82                        |
| 4         | 10:35      | 10:45     | 10                                 | 40.5                                  | 45.75                               | 5.25                                      | 1.90                        |
| 5         | 10:45      | 10:55     | 10                                 | 40.5                                  | 45                                  | 4.5                                       | 2.22                        |
| 6         | 10:55      | 11:05     | 10                                 | 40.5                                  | 45.75                               | 5.25                                      | 1.90                        |
| 7         |            |           |                                    |                                       |                                     |                                           |                             |
| 8         |            |           |                                    |                                       |                                     |                                           |                             |
| 9         |            |           |                                    |                                       |                                     |                                           |                             |
| 10        |            |           |                                    |                                       |                                     |                                           |                             |
| 11        |            |           |                                    |                                       |                                     |                                           |                             |
| 12        |            |           |                                    |                                       |                                     |                                           |                             |
| 13        |            |           |                                    |                                       |                                     |                                           |                             |
| 14        |            |           |                                    |                                       |                                     |                                           |                             |
| 15        |            |           |                                    |                                       |                                     |                                           |                             |

COMMENTS:

### Percolation Test Data Sheet

**Project:** Xenia Apt project, Beaumont **Project No:** 2784-CR **Date:** 6/16/21

**Test Hole No:** I-3 **Tested By:** F. Sullivan

**Depth of Test Hole,  $D_t$ :** 5.23' **USCS Soil Classification:** SM

| Test Hole Dimensions (inches) |                         | Length | Width |
|-------------------------------|-------------------------|--------|-------|
| Diameter (if round)= 8        | 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         | 10:48      | 11:13     | 25                    | 42.75                        | 49                         | 6.25                        | Y                                  |
| 2         | 11:13      | 11:38     | 25                    | 42.75                        | 48.75                      | 6.0                         | 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 | $\Delta t$<br>Time Interval (min.) | $D_o$<br>Initial Depth to Water (in.) | $D_f$<br>Final Depth to Water (in.) | $\Delta D$<br>Change in Water Level (in.) | Percolation Rate (min./in.) |
|-----------|------------|-----------|------------------------------------|---------------------------------------|-------------------------------------|-------------------------------------------|-----------------------------|
| 1         | 11:48      | 11:58     | 10                                 | 42.75                                 | 44.5                                | 1.75                                      | 5.71                        |
| 2         | 11:58      | 12:08     | 10                                 | 42.75                                 | 45.25                               | 2.5                                       | 4.0                         |
| 3         | 12:08      | 12:18     | 10                                 | 42.75                                 | 45.0                                | 2.25                                      | 4.44                        |
| 4         | 12:18      | 12:28     | 10                                 | 42.75                                 | 44.75                               | 2.0                                       | 5.0                         |
| 5         | 12:28      | 12:38     | 10                                 | 42.75                                 | 45.25                               | 2.5                                       | 4.0                         |
| 6         | 12:38      | 12:48     | 10                                 | 42.75                                 | 44.63                               | 1.88                                      | 5.32                        |
| 7         |            |           |                                    |                                       |                                     |                                           |                             |
| 8         |            |           |                                    |                                       |                                     |                                           |                             |
| 9         |            |           |                                    |                                       |                                     |                                           |                             |
| 10        |            |           |                                    |                                       |                                     |                                           |                             |
| 11        |            |           |                                    |                                       |                                     |                                           |                             |
| 12        |            |           |                                    |                                       |                                     |                                           |                             |
| 13        |            |           |                                    |                                       |                                     |                                           |                             |
| 14        |            |           |                                    |                                       |                                     |                                           |                             |
| 15        |            |           |                                    |                                       |                                     |                                           |                             |

COMMENTS:

### Percolation Test Data Sheet

|                                              |                             |                                  |               |              |         |
|----------------------------------------------|-----------------------------|----------------------------------|---------------|--------------|---------|
| <b>Project:</b>                              | Xenia Apt Project, Beaumont | <b>Project No:</b>               | 2784-Cr       | <b>Date:</b> | 6/16/21 |
| <b>Test Hole No:</b>                         | I-4                         | <b>Tested By:</b>                | F. Sullivan   |              |         |
| <b>Depth of Test Hole, <math>D_1</math>:</b> | 5.29'                       | <b>USCS Soil Classification:</b> | SM            |              |         |
| <b>Test Hole Dimensions (inches)</b>         |                             |                                  | <b>Length</b> | <b>Width</b> |         |
| <b>Diameter (if round)=</b>                  | 8                           | <b>Sides (if rectangular)=</b>   |               |              |         |

#### 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         | 12:16      | 12:41     | 25                    | 43.5                         | 50                         | 6.5                         | Y                                  |
| 2         | 12:41      | 1:06      | 25                    | 43.5                         | 49.88                      | 6.38                        | 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 | $\Delta t$<br>Time Interval (min.) | $D_0$<br>Initial Depth to Water (in.) | $D_1$<br>Final Depth to Water (in.) | $\Delta D$<br>Change in Water Level (in.) | Percolation Rate (min./in.) |
|-----------|------------|-----------|------------------------------------|---------------------------------------|-------------------------------------|-------------------------------------------|-----------------------------|
| 1         | 1:06       | 1:16      | 10                                 | 43.5                                  | 46.63                               | 3.13                                      | 3.19                        |
| 2         | 1:16       | 1:26      | 10                                 | 43.5                                  | 46.5                                | 3.0                                       | 3.33                        |
| 3         | 1:26       | 1:36      | 10                                 | 43.5                                  | 46.25                               | 2.75                                      | 3.64                        |
| 4         | 1:36       | 1:46      | 10                                 | 43.5                                  | 46.5                                | 3                                         | 3.33                        |
| 5         | 1:46       | 1:56      | 10                                 | 43.5                                  | 46.5                                | 3                                         | 3.33                        |
| 6         | 1:56       | 2:06      | 10                                 | 43.5                                  | 46.0                                | 2.5                                       | 4                           |
| 7         |            |           |                                    |                                       |                                     |                                           |                             |
| 8         |            |           |                                    |                                       |                                     |                                           |                             |
| 9         |            |           |                                    |                                       |                                     |                                           |                             |
| 10        |            |           |                                    |                                       |                                     |                                           |                             |
| 11        |            |           |                                    |                                       |                                     |                                           |                             |
| 12        |            |           |                                    |                                       |                                     |                                           |                             |
| 13        |            |           |                                    |                                       |                                     |                                           |                             |
| 14        |            |           |                                    |                                       |                                     |                                           |                             |
| 15        |            |           |                                    |                                       |                                     |                                           |                             |

COMMENTS:

# **APPENDIX F**

## **SEISMIC SETTLEMENT ANALYSES**

**Updated Geotechnical and Infiltration Evaluation  
Xenia Apartment Project, Beaumont, California  
Project No. 2784-CR**



**LIQUEFACTION ANALYSIS REPORT**

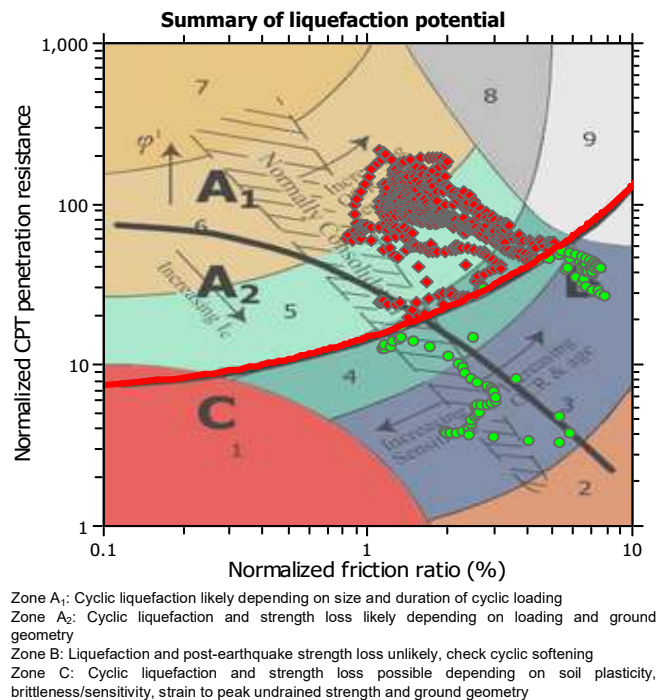
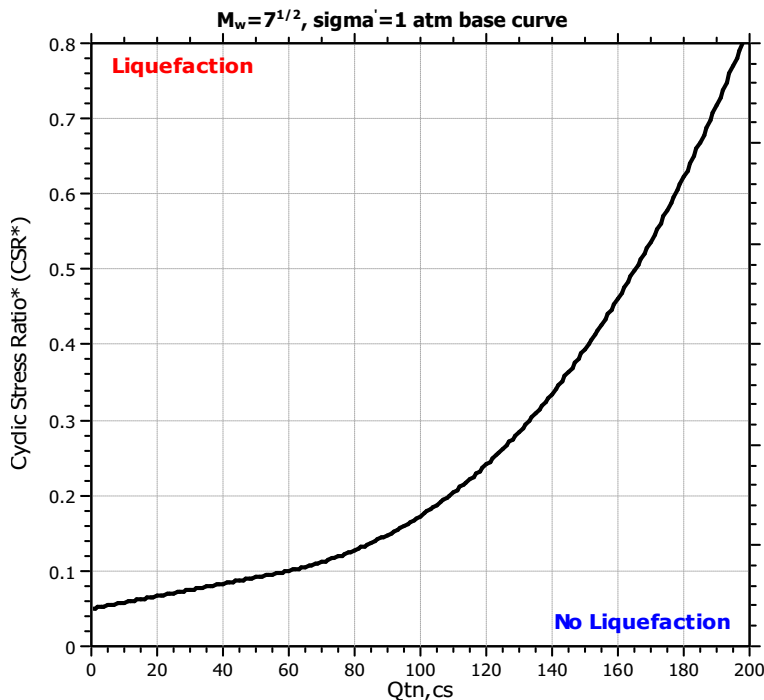
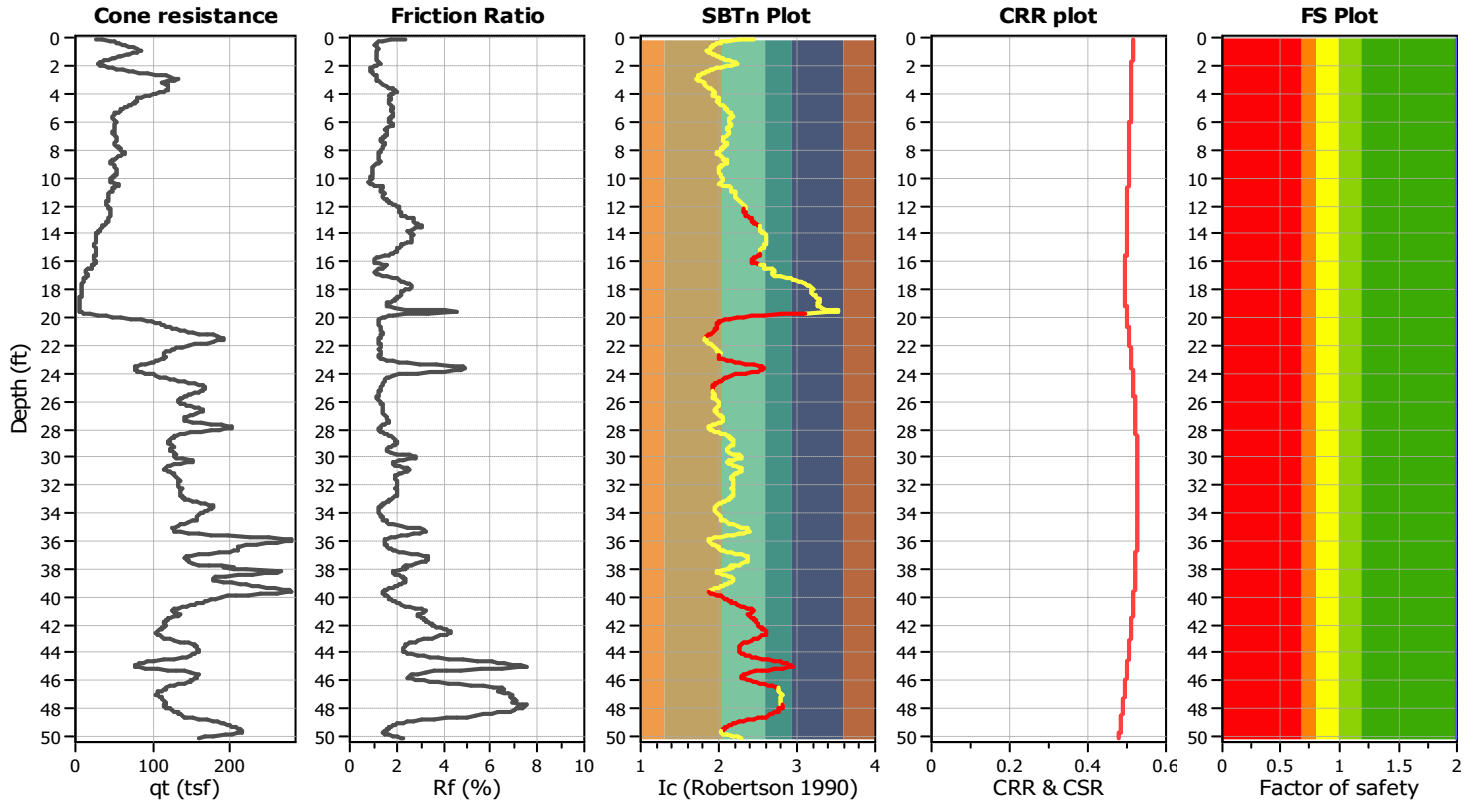
**Project title : Xenia Site**

**Location : Beaumont, California**

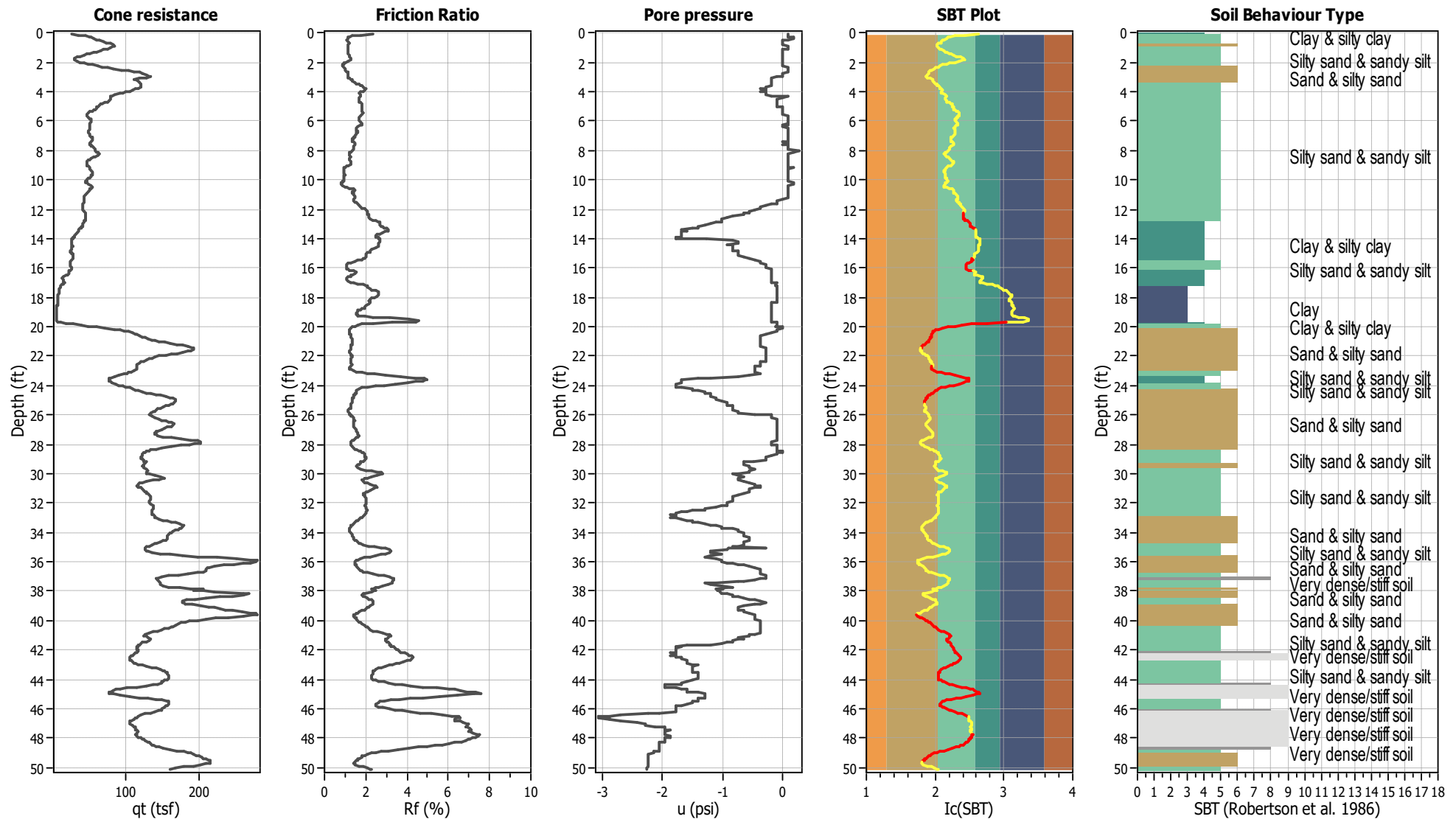
**CPT file : CPT-1**

**Input parameters and analysis data**

|                              |                   |                           |              |                         |     |                      |              |
|------------------------------|-------------------|---------------------------|--------------|-------------------------|-----|----------------------|--------------|
| Analysis method:             | NCEER (1998)      | G.W.T. (in-situ):         | 100.00 ft    | Use fill:               | No  | Clay like behavior   |              |
| Fines correction method:     | NCEER (1998)      | G.W.T. (earthq.):         | 100.00 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 $M_w$ : | 7.13              | Ic cut-off value:         | 2.60         | Trans. detect. applied: | Yes | Limit depth:         | 60.00 ft     |
| Peak ground acceleration:    | 0.90              | Unit weight calculation:  | Based on SBT | $K_0$ applied:          | Yes | MSF method:          | Method based |



## CPT basic interpretation plots



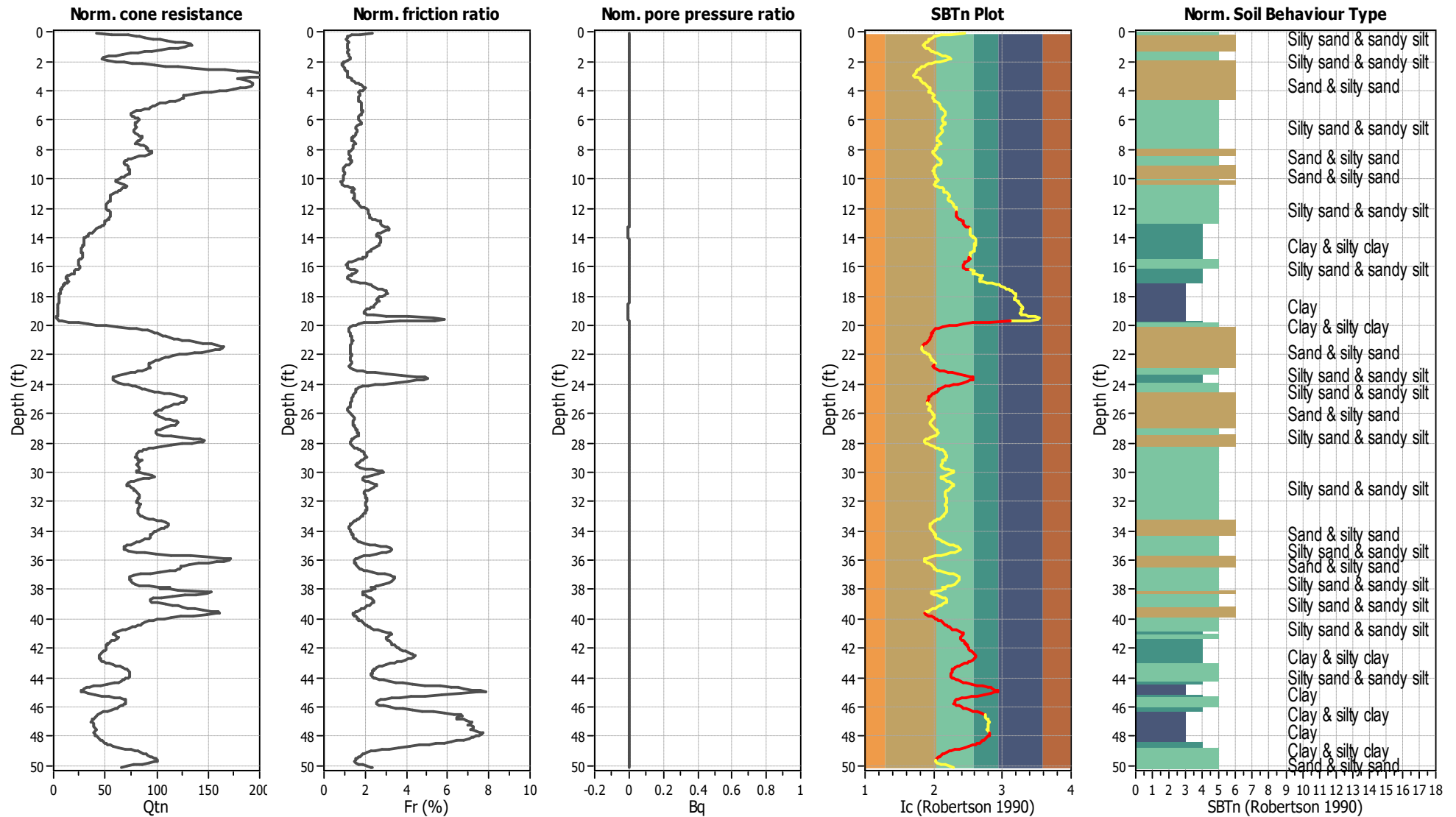
## Input parameters and analysis data

|                                       |                   |                                |              |                             |            |
|---------------------------------------|-------------------|--------------------------------|--------------|-----------------------------|------------|
| Analysis method:                      | NCEER (1998)      | Depth to water table (erthq.): | 100.00 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> : | 7.13              | Unit weight calculation:       | Based on SBT | Clay like behavior applied: | Sands only |
| Peak ground acceleration:             | 0.90              | Use fill:                      | No           | Limit depth applied:        | Yes        |
| Depth to water table (insitu):        | 100.00 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)

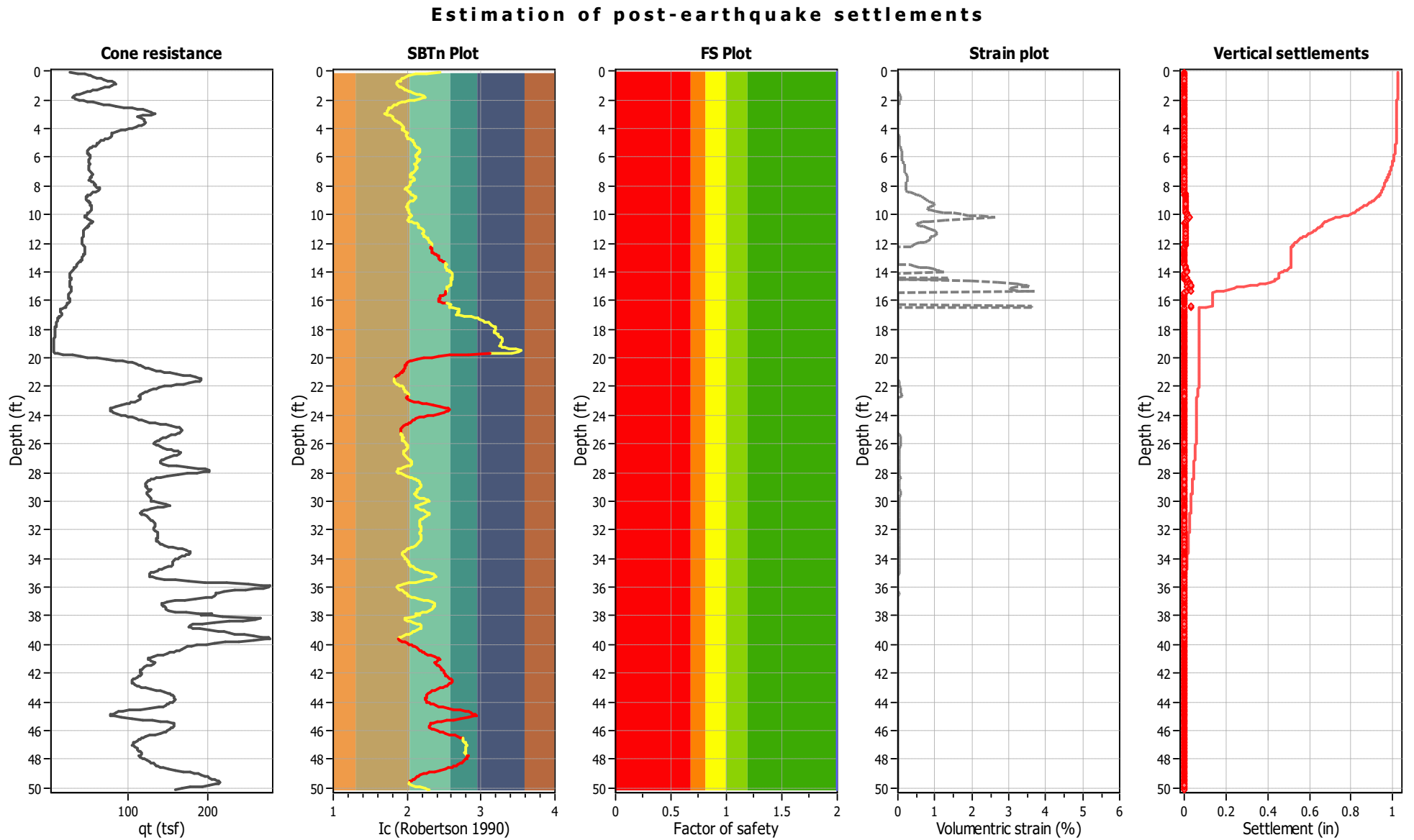


## Input parameters and analysis data

|                                       |                   |                                |              |                             |            |
|---------------------------------------|-------------------|--------------------------------|--------------|-----------------------------|------------|
| Analysis method:                      | NCEER (1998)      | Depth to water table (erthq.): | 100.00 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> : | 7.13              | Unit weight calculation:       | Based on SBT | Clay like behavior applied: | Sands only |
| Peak ground acceleration:             | 0.90              | Use fill:                      | No           | Limit depth applied:        | Yes        |
| Depth to water table (insitu):        | 100.00 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 |



Abbreviations

- $q_t$ : 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                                          | 2.44 | 41.38           | 2.62 | 108.40             | 27                        | 512                    | 0.51 | 0.001        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.14                                          | 2.26 | 56.36           | 1.77 | 99.83              | 23                        | 549                    | 0.51 | 0.001        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.20                                          | 2.11 | 71.95           | 1.43 | 102.93             | 22                        | 582                    | 0.51 | 0.001        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.27                                          | 2.04 | 80.23           | 1.34 | 107.48             | 23                        | 592                    | 0.51 | 0.002        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.33                                          | 2.02 | 83.38           | 1.32 | 110.11             | 23                        | 600                    | 0.51 | 0.002        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.40                                          | 1.98 | 88.57           | 1.29 | 114.53             | 24                        | 611                    | 0.51 | 0.003        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.47                                          | 1.95 | 96.36           | 1.27 | 122.23             | 25                        | 636                    | 0.51 | 0.003        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.54                                          | 1.93 | 103.20          | 1.25 | 129.46             | 26                        | 663                    | 0.51 | 0.004        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.60                                          | 1.92 | 110.04          | 1.25 | 137.41             | 28                        | 699                    | 0.51 | 0.004        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.67                                          | 1.91 | 117.58          | 1.24 | 145.89             | 29                        | 736                    | 0.51 | 0.004        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.75                                          | 1.88 | 126.27          | 1.23 | 154.76             | 31                        | 768                    | 0.51 | 0.005        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.82                                          | 1.86 | 132.41          | 1.21 | 160.43             | 32                        | 786                    | 0.51 | 0.005        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.89                                          | 1.86 | 134.40          | 1.20 | 161.91             | 32                        | 789                    | 0.51 | 0.005        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.93                                          | 1.86 | 132.20          | 1.21 | 159.76             | 32                        | 781                    | 0.51 | 0.006        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 1.00                                          | 1.87 | 127.00          | 1.22 | 154.88             | 31                        | 764                    | 0.51 | 0.007        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 1.08                                          | 1.89 | 120.74          | 1.23 | 148.77             | 30                        | 743                    | 0.51 | 0.008        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 1.12                                          | 1.92 | 112.39          | 1.25 | 140.33             | 28                        | 714                    | 0.51 | 0.009        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 1.20                                          | 1.94 | 104.24          | 1.26 | 131.84             | 27                        | 683                    | 0.51 | 0.010        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 1.27                                          | 1.97 | 95.34           | 1.28 | 122.44             | 25                        | 647                    | 0.51 | 0.012        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 1.34                                          | 1.99 | 88.88           | 1.30 | 115.51             | 24                        | 619                    | 0.51 | 0.015        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 1.38                                          | 2.02 | 81.98           | 1.32 | 108.47             | 23                        | 592                    | 0.51 | 0.017        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 1.45                                          | 2.05 | 75.58           | 1.35 | 102.16             | 22                        | 566                    | 0.51 | 0.021        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 1.52                                          | 2.09 | 67.58           | 1.40 | 94.65              | 20                        | 532                    | 0.51 | 0.026        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 1.58                                          | 2.13 | 60.37           | 1.46 | 88.16              | 19                        | 499                    | 0.51 | 0.034        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 1.66                                          | 2.18 | 53.32           | 1.56 | 83.09              | 19                        | 470                    | 0.51 | 0.046        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 1.73                                          | 2.22 | 48.56           | 1.66 | 80.82              | 18                        | 452                    | 0.51 | 0.057        | 0.06                     | 11.89          | 0.06               | 0.000        |
| 1.81                                          | 2.24 | 46.35           | 1.73 | 80.22              | 18                        | 444                    | 0.51 | 0.067        | 0.07                     | 11.89          | 0.06               | 0.001        |
| 1.85                                          | 2.22 | 47.65           | 1.68 | 80.01              | 18                        | 447                    | 0.51 | 0.068        | 0.08                     | 11.89          | 0.07               | 0.000        |
| 1.92                                          | 2.17 | 52.39           | 1.54 | 80.80              | 18                        | 458                    | 0.51 | 0.067        | 0.08                     | 11.89          | 0.07               | 0.001        |
| 1.99                                          | 2.09 | 60.14           | 1.41 | 84.71              | 18                        | 477                    | 0.51 | 0.062        | 0.07                     | 11.89          | 0.06               | 0.000        |
| 2.07                                          | 2.03 | 68.13           | 1.33 | 90.84              | 19                        | 498                    | 0.51 | 0.057        | 0.06                     | 11.89          | 0.05               | 0.000        |
| 2.11                                          | 1.98 | 76.77           | 1.29 | 98.92              | 20                        | 525                    | 0.51 | 0.049        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 2.17                                          | 1.93 | 86.41           | 1.26 | 108.57             | 22                        | 557                    | 0.51 | 0.043        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 2.25                                          | 1.89 | 97.99           | 1.23 | 120.30             | 24                        | 598                    | 0.51 | 0.037        | 0.03                     | 11.89          | 0.03               | 0.000        |
| 2.32                                          | 1.86 | 108.53          | 1.21 | 130.89             | 26                        | 638                    | 0.51 | 0.032        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 2.36                                          | 1.83 | 120.53          | 1.18 | 142.82             | 28                        | 687                    | 0.51 | 0.027        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 2.44                                          | 1.81 | 133.56          | 1.16 | 155.15             | 30                        | 738                    | 0.51 | 0.024        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 2.52                                          | 1.78 | 149.94          | 1.13 | 168.97             | 32                        | 799                    | 0.51 | 0.021        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 2.58                                          | 1.76 | 166.18          | 1.10 | 182.13             | 35                        | 861                    | 0.51 | 0.019        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 2.66                                          | 1.75 | 178.76          | 1.08 | 192.74             | 37                        | 914                    | 0.51 | 0.017        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 2.69                                          | 1.74 | 189.46          | 1.07 | 203.28             | 39                        | 965                    | 0.51 | 0.016        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 2.77                                          | 1.74 | 197.35          | 1.07 | 210.64             | 40                        | 1001                   | 0.51 | 0.015        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 2.84                                          | 1.73 | 206.49          | 1.04 | 215.41             | 41                        | 1030                   | 0.51 | 0.015        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 2.92                                          | 1.71 | 212.37          | 1.02 | 215.61             | 40                        | 1041                   | 0.51 | 0.015        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 2.96                                          | 1.70 | 215.16          | 1.00 | 215.16             | 40                        | 1040                   | 0.51 | 0.016        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 3.03                                          | 1.73 | 205.06          | 1.04 | 214.09             | 40                        | 1024                   | 0.51 | 0.017        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 3.10                                          | 1.77 | 190.46          | 1.11 | 212.21             | 41                        | 1003                   | 0.51 | 0.018        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 3.18                                          | 1.81 | 178.16          | 1.16 | 207.28             | 40                        | 987                    | 0.51 | 0.019        | 0.01                     | 11.89          | 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) |
| 3.22                                                      | 1.81 | 179.36          | 1.17 | 209.31             | 41                        | 998                    | 0.51 | 0.019        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 3.29                                                      | 1.81 | 186.14          | 1.16 | 216.54             | 42                        | 1031                   | 0.51 | 0.019        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 3.36                                                      | 1.82 | 191.13          | 1.18 | 224.82             | 44                        | 1076                   | 0.51 | 0.018        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 3.44                                                      | 1.85 | 192.87          | 1.20 | 231.19             | 45                        | 1121                   | 0.51 | 0.017        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 3.51                                                      | 1.87 | 193.12          | 1.22 | 234.67             | 46                        | 1153                   | 0.51 | 0.017        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 3.55                                                      | 1.88 | 193.71          | 1.23 | 237.46             | 47                        | 1179                   | 0.51 | 0.016        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 3.63                                                      | 1.90 | 193.66          | 1.23 | 238.92             | 48                        | 1196                   | 0.51 | 0.016        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 3.70                                                      | 1.91 | 191.95          | 1.24 | 238.66             | 48                        | 1207                   | 0.51 | 0.016        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 3.77                                                      | 1.93 | 187.19          | 1.25 | 234.81             | 48                        | 1203                   | 0.51 | 0.017        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 3.84                                                      | 1.94 | 181.68          | 1.26 | 229.75             | 47                        | 1190                   | 0.51 | 0.018        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 3.88                                                      | 1.95 | 175.03          | 1.27 | 222.26             | 45                        | 1158                   | 0.51 | 0.019        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 3.95                                                      | 1.94 | 167.98          | 1.26 | 212.46             | 43                        | 1101                   | 0.51 | 0.021        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 4.03                                                      | 1.93 | 160.87          | 1.26 | 202.57             | 41                        | 1043                   | 0.51 | 0.025        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 4.07                                                      | 1.93 | 153.32          | 1.26 | 193.07             | 39                        | 994                    | 0.51 | 0.028        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 4.14                                                      | 1.95 | 146.42          | 1.27 | 185.88             | 38                        | 968                    | 0.51 | 0.030        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 4.22                                                      | 1.98 | 136.27          | 1.29 | 175.72             | 36                        | 934                    | 0.51 | 0.034        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 4.29                                                      | 2.00 | 129.12          | 1.31 | 168.52             | 35                        | 907                    | 0.51 | 0.037        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 4.34                                                      | 2.00 | 125.77          | 1.31 | 164.85             | 34                        | 892                    | 0.51 | 0.040        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 4.41                                                      | 1.99 | 126.77          | 1.30 | 164.86             | 34                        | 885                    | 0.51 | 0.042        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 4.48                                                      | 1.99 | 126.71          | 1.30 | 164.18             | 34                        | 877                    | 0.51 | 0.044        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 4.56                                                      | 1.99 | 125.00          | 1.30 | 162.35             | 34                        | 870                    | 0.51 | 0.046        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 4.60                                                      | 2.00 | 122.30          | 1.31 | 159.72             | 33                        | 861                    | 0.51 | 0.048        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 4.67                                                      | 2.01 | 118.69          | 1.32 | 156.34             | 33                        | 849                    | 0.51 | 0.051        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 4.76                                                      | 2.04 | 113.23          | 1.34 | 151.66             | 32                        | 835                    | 0.51 | 0.056        | 0.03                     | 11.89          | 0.03               | 0.000        |
| 4.82                                                      | 2.06 | 108.13          | 1.36 | 147.51             | 31                        | 821                    | 0.51 | 0.060        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 4.87                                                      | 2.08 | 103.73          | 1.39 | 143.78             | 31                        | 805                    | 0.51 | 0.065        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 4.94                                                      | 2.08 | 100.72          | 1.40 | 140.72             | 30                        | 791                    | 0.51 | 0.071        | 0.04                     | 11.89          | 0.04               | 0.000        |
| 5.01                                                      | 2.09 | 98.12           | 1.40 | 137.82             | 30                        | 775                    | 0.51 | 0.077        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 5.08                                                      | 2.09 | 96.36           | 1.41 | 135.84             | 29                        | 765                    | 0.51 | 0.083        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 5.12                                                      | 2.10 | 94.46           | 1.42 | 134.05             | 29                        | 756                    | 0.51 | 0.088        | 0.06                     | 11.89          | 0.05               | 0.000        |
| 5.19                                                      | 2.11 | 92.00           | 1.43 | 131.87             | 29                        | 745                    | 0.51 | 0.095        | 0.06                     | 11.89          | 0.05               | 0.000        |
| 5.27                                                      | 2.12 | 88.44           | 1.46 | 128.80             | 28                        | 729                    | 0.51 | 0.105        | 0.07                     | 11.89          | 0.06               | 0.001        |
| 5.35                                                      | 2.14 | 84.84           | 1.48 | 125.79             | 28                        | 713                    | 0.51 | 0.118        | 0.08                     | 11.89          | 0.07               | 0.001        |
| 5.38                                                      | 2.16 | 81.14           | 1.52 | 123.03             | 27                        | 697                    | 0.51 | 0.130        | 0.09                     | 11.89          | 0.07               | 0.000        |
| 5.45                                                      | 2.17 | 77.99           | 1.55 | 120.60             | 27                        | 683                    | 0.51 | 0.146        | 0.10                     | 11.89          | 0.08               | 0.001        |
| 5.53                                                      | 2.18 | 75.63           | 1.56 | 117.76             | 26                        | 666                    | 0.51 | 0.166        | 0.12                     | 11.89          | 0.10               | 0.001        |
| 5.60                                                      | 2.17 | 74.77           | 1.54 | 115.52             | 26                        | 654                    | 0.51 | 0.185        | 0.14                     | 11.89          | 0.11               | 0.001        |
| 5.68                                                      | 2.16 | 74.97           | 1.53 | 114.33             | 25                        | 648                    | 0.51 | 0.199        | 0.15                     | 11.89          | 0.12               | 0.001        |
| 5.72                                                      | 2.15 | 76.01           | 1.51 | 114.48             | 25                        | 649                    | 0.51 | 0.200        | 0.15                     | 11.89          | 0.12               | 0.001        |
| 5.79                                                      | 2.14 | 77.55           | 1.49 | 115.45             | 25                        | 655                    | 0.51 | 0.199        | 0.15                     | 11.89          | 0.12               | 0.001        |
| 5.87                                                      | 2.13 | 79.49           | 1.47 | 116.84             | 26                        | 662                    | 0.51 | 0.195        | 0.14                     | 11.89          | 0.12               | 0.001        |
| 5.91                                                      | 2.12 | 81.69           | 1.45 | 118.68             | 26                        | 672                    | 0.51 | 0.186        | 0.14                     | 11.89          | 0.11               | 0.001        |
| 5.98                                                      | 2.12 | 82.64           | 1.45 | 119.94             | 26                        | 679                    | 0.51 | 0.183        | 0.13                     | 11.89          | 0.11               | 0.001        |
| 6.05                                                      | 2.13 | 82.13           | 1.47 | 120.73             | 26                        | 684                    | 0.51 | 0.182        | 0.13                     | 11.89          | 0.10               | 0.001        |
| 6.13                                                      | 2.15 | 80.07           | 1.51 | 120.86             | 27                        | 685                    | 0.51 | 0.186        | 0.13                     | 11.89          | 0.11               | 0.001        |
| 6.20                                                      | 2.16 | 79.16           | 1.53 | 121.01             | 27                        | 686                    | 0.51 | 0.190        | 0.13                     | 11.89          | 0.11               | 0.001        |
| 6.24                                                      | 2.16 | 78.71           | 1.52 | 119.92             | 27                        | 680                    | 0.51 | 0.201        | 0.14                     | 11.89          | 0.11               | 0.001        |
| 6.31                                                      | 2.14 | 79.30           | 1.49 | 118.21             | 26                        | 670                    | 0.51 | 0.219        | 0.16                     | 11.89          | 0.13               | 0.001        |

| :: Post-earthquake settlement of dry sands :: (continued) |      |                 |      |                    |                              |                           |      |                 |                             |                |                       |                 |
|-----------------------------------------------------------|------|-----------------|------|--------------------|------------------------------|---------------------------|------|-----------------|-----------------------------|----------------|-----------------------|-----------------|
| Depth<br>(ft)                                             | Ic   | Q <sub>tn</sub> | Kc   | Q <sub>tn,cs</sub> | N <sub>1,60</sub><br>(blows) | G <sub>max</sub><br>(tsf) | CSR  | Shear, γ<br>(%) | e <sub>vol(15)</sub><br>(%) | N <sub>c</sub> | e <sub>v</sub><br>(%) | Settle.<br>(in) |
| 6.39                                                      | 2.13 | 79.49           | 1.46 | 115.98             | 25                           | 657                       | 0.51 | 0.246           | 0.19                        | 11.89          | 0.15                  | 0.001           |
| 6.46                                                      | 2.11 | 80.38           | 1.43 | 114.96             | 25                           | 649                       | 0.51 | 0.266           | 0.20                        | 11.89          | 0.16                  | 0.001           |
| 6.50                                                      | 2.10 | 80.18           | 1.42 | 114.21             | 25                           | 645                       | 0.51 | 0.279           | 0.22                        | 11.89          | 0.17                  | 0.001           |
| 6.57                                                      | 2.11 | 79.33           | 1.44 | 113.92             | 25                           | 644                       | 0.51 | 0.288           | 0.22                        | 11.89          | 0.18                  | 0.002           |
| 6.65                                                      | 2.12 | 78.07           | 1.45 | 113.55             | 25                           | 643                       | 0.51 | 0.299           | 0.23                        | 11.89          | 0.18                  | 0.002           |
| 6.72                                                      | 2.13 | 77.51           | 1.46 | 113.34             | 25                           | 642                       | 0.51 | 0.309           | 0.24                        | 11.89          | 0.19                  | 0.002           |
| 6.80                                                      | 2.13 | 77.56           | 1.46 | 113.29             | 25                           | 642                       | 0.51 | 0.318           | 0.25                        | 11.89          | 0.20                  | 0.002           |
| 6.84                                                      | 2.12 | 78.26           | 1.45 | 113.68             | 25                           | 644                       | 0.51 | 0.318           | 0.25                        | 11.89          | 0.20                  | 0.001           |
| 6.91                                                      | 2.11 | 79.40           | 1.44 | 114.18             | 25                           | 646                       | 0.51 | 0.322           | 0.25                        | 11.89          | 0.20                  | 0.002           |
| 6.98                                                      | 2.10 | 81.34           | 1.41 | 115.00             | 25                           | 648                       | 0.51 | 0.324           | 0.25                        | 11.89          | 0.20                  | 0.002           |
| 7.06                                                      | 2.08 | 83.59           | 1.39 | 115.95             | 25                           | 650                       | 0.51 | 0.329           | 0.25                        | 11.89          | 0.20                  | 0.002           |
| 7.10                                                      | 2.06 | 85.38           | 1.37 | 116.83             | 25                           | 651                       | 0.51 | 0.331           | 0.25                        | 11.89          | 0.20                  | 0.001           |
| 7.17                                                      | 2.05 | 86.12           | 1.36 | 116.95             | 25                           | 649                       | 0.51 | 0.344           | 0.26                        | 11.89          | 0.21                  | 0.002           |
| 7.24                                                      | 2.05 | 85.91           | 1.35 | 116.16             | 25                           | 643                       | 0.51 | 0.368           | 0.29                        | 11.89          | 0.23                  | 0.002           |
| 7.32                                                      | 2.05 | 85.16           | 1.35 | 114.95             | 24                           | 636                       | 0.51 | 0.400           | 0.32                        | 11.89          | 0.25                  | 0.002           |
| 7.36                                                      | 2.05 | 83.70           | 1.36 | 113.55             | 24                           | 630                       | 0.51 | 0.424           | 0.34                        | 11.89          | 0.27                  | 0.001           |
| 7.43                                                      | 2.07 | 81.70           | 1.38 | 112.97             | 24                           | 632                       | 0.51 | 0.427           | 0.34                        | 11.89          | 0.27                  | 0.002           |
| 7.51                                                      | 2.09 | 80.19           | 1.41 | 112.91             | 24                           | 636                       | 0.51 | 0.427           | 0.34                        | 11.89          | 0.26                  | 0.003           |
| 7.57                                                      | 2.10 | 79.78           | 1.42 | 113.39             | 25                           | 640                       | 0.51 | 0.423           | 0.33                        | 11.89          | 0.26                  | 0.002           |
| 7.61                                                      | 2.09 | 81.53           | 1.40 | 114.12             | 25                           | 641                       | 0.51 | 0.424           | 0.33                        | 11.89          | 0.26                  | 0.001           |
| 7.69                                                      | 2.07 | 84.47           | 1.37 | 115.99             | 25                           | 647                       | 0.51 | 0.415           | 0.32                        | 11.89          | 0.25                  | 0.002           |
| 7.77                                                      | 2.05 | 87.31           | 1.36 | 118.32             | 25                           | 656                       | 0.51 | 0.399           | 0.30                        | 11.89          | 0.24                  | 0.002           |
| 7.84                                                      | 2.04 | 89.38           | 1.35 | 120.26             | 25                           | 664                       | 0.51 | 0.385           | 0.29                        | 11.89          | 0.23                  | 0.002           |
| 7.88                                                      | 2.04 | 90.93           | 1.34 | 121.89             | 26                           | 674                       | 0.51 | 0.362           | 0.27                        | 11.89          | 0.21                  | 0.001           |
| 7.95                                                      | 2.04 | 90.20           | 1.35 | 121.37             | 26                           | 676                       | 0.51 | 0.366           | 0.27                        | 11.89          | 0.21                  | 0.002           |
| 8.03                                                      | 2.03 | 91.32           | 1.33 | 121.67             | 26                           | 680                       | 0.51 | 0.365           | 0.27                        | 11.89          | 0.21                  | 0.002           |
| 8.09                                                      | 2.01 | 92.36           | 1.32 | 121.60             | 25                           | 680                       | 0.51 | 0.372           | 0.28                        | 11.89          | 0.22                  | 0.002           |
| 8.17                                                      | 1.98 | 95.30           | 1.29 | 123.31             | 26                           | 687                       | 0.51 | 0.363           | 0.27                        | 11.89          | 0.21                  | 0.002           |
| 8.23                                                      | 1.98 | 95.78           | 1.29 | 123.48             | 25                           | 689                       | 0.51 | 0.364           | 0.27                        | 11.89          | 0.21                  | 0.002           |
| 8.27                                                      | 1.98 | 94.83           | 1.29 | 122.61             | 25                           | 688                       | 0.51 | 0.372           | 0.28                        | 11.89          | 0.22                  | 0.001           |
| 8.34                                                      | 2.00 | 92.12           | 1.31 | 120.24             | 25                           | 682                       | 0.51 | 0.395           | 0.30                        | 11.89          | 0.23                  | 0.002           |
| 8.41                                                      | 2.02 | 88.16           | 1.32 | 116.57             | 24                           | 669                       | 0.51 | 0.444           | 0.35                        | 11.89          | 0.27                  | 0.002           |
| 8.49                                                      | 2.04 | 83.52           | 1.34 | 112.00             | 24                           | 650                       | 0.51 | 0.526           | 0.43                        | 11.89          | 0.33                  | 0.003           |
| 8.56                                                      | 2.05 | 79.23           | 1.36 | 107.40             | 23                           | 628                       | 0.50 | 0.642           | 0.55                        | 11.89          | 0.42                  | 0.004           |
| 8.63                                                      | 2.06 | 75.82           | 1.37 | 103.73             | 22                           | 611                       | 0.50 | 0.763           | 0.68                        | 11.89          | 0.52                  | 0.004           |
| 8.66                                                      | 2.08 | 73.15           | 1.39 | 101.50             | 22                           | 600                       | 0.50 | 0.851           | 0.77                        | 11.89          | 0.59                  | 0.002           |
| 8.73                                                      | 2.09 | 70.97           | 1.41 | 100.08             | 22                           | 595                       | 0.50 | 0.913           | 0.83                        | 11.89          | 0.64                  | 0.005           |
| 8.80                                                      | 2.11 | 69.26           | 1.43 | 99.35              | 22                           | 593                       | 0.50 | 0.950           | 0.87                        | 11.89          | 0.66                  | 0.005           |
| 8.87                                                      | 2.11 | 68.31           | 1.44 | 98.43              | 21                           | 591                       | 0.50 | 0.997           | 0.92                        | 11.89          | 0.70                  | 0.006           |
| 8.94                                                      | 2.10 | 68.45           | 1.42 | 97.36              | 21                           | 588                       | 0.50 | 1.048           | 0.98                        | 11.89          | 0.75                  | 0.006           |
| 9.01                                                      | 2.08 | 69.50           | 1.39 | 96.53              | 21                           | 586                       | 0.50 | 1.091           | 1.05                        | 11.89          | 0.80                  | 0.007           |
| 9.09                                                      | 2.05 | 71.01           | 1.36 | 96.27              | 20                           | 585                       | 0.50 | 1.125           | 1.10                        | 11.89          | 0.84                  | 0.008           |
| 9.12                                                      | 2.03 | 72.10           | 1.33 | 96.03              | 20                           | 582                       | 0.50 | 1.176           | 1.16                        | 11.89          | 0.88                  | 0.004           |
| 9.19                                                      | 2.02 | 71.96           | 1.32 | 95.12              | 20                           | 577                       | 0.50 | 1.261           | 1.27                        | 11.89          | 0.96                  | 0.008           |
| 9.27                                                      | 2.01 | 72.04           | 1.31 | 94.72              | 20                           | 576                       | 0.50 | 1.306           | 1.32                        | 11.89          | 1.01                  | 0.009           |
| 9.34                                                      | 2.00 | 72.59           | 1.31 | 95.18              | 20                           | 581                       | 0.50 | 1.273           | 1.28                        | 11.89          | 0.97                  | 0.009           |
| 9.41                                                      | 2.00 | 73.48           | 1.31 | 95.90              | 20                           | 586                       | 0.50 | 1.230           | 1.23                        | 11.89          | 0.93                  | 0.008           |
| 9.45                                                      | 1.99 | 74.19           | 1.30 | 96.64              | 20                           | 592                       | 0.50 | 1.181           | 1.18                        | 11.89          | 0.89                  | 0.004           |

| :: 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) |
| 9.52                                                      | 2.00 | 74.33           | 1.31 | 97.18              | 20                        | 599                    | 0.50 | 1.121        | 1.11                     | 11.89          | 0.84               | 0.007        |
| 9.59                                                      | 2.01 | 74.37           | 1.31 | 97.60              | 20                        | 606                    | 0.50 | 1.073        | 1.05                     | 11.89          | 0.79               | 0.006        |
| 9.66                                                      | 2.01 | 73.89           | 1.32 | 97.24              | 20                        | 607                    | 0.50 | 1.079        | 1.06                     | 11.89          | 0.80               | 0.007        |
| 9.73                                                      | 2.02 | 72.35           | 1.32 | 95.55              | 20                        | 600                    | 0.50 | 1.176        | 1.18                     | 11.89          | 0.88               | 0.007        |
| 9.81                                                      | 2.02 | 70.29           | 1.33 | 93.28              | 20                        | 590                    | 0.50 | 1.328        | 1.36                     | 11.89          | 1.02               | 0.009        |
| 9.84                                                      | 2.03 | 68.12           | 1.33 | 90.70              | 19                        | 576                    | 0.50 | 1.556        | 1.65                     | 11.89          | 1.24               | 0.006        |
| 9.91                                                      | 2.03 | 66.16           | 1.33 | 88.27              | 19                        | 564                    | 0.50 | 1.820        | 1.99                     | 11.89          | 1.49               | 0.012        |
| 9.98                                                      | 2.04 | 63.95           | 1.35 | 86.08              | 18                        | 554                    | 0.50 | 2.075        | 2.32                     | 11.89          | 1.74               | 0.014        |
| 10.05                                                     | 2.06 | 61.91           | 1.37 | 84.51              | 18                        | 549                    | 0.50 | 2.260        | 2.56                     | 11.89          | 1.92               | 0.017        |
| 10.13                                                     | 2.06 | 60.49           | 1.37 | 82.70              | 18                        | 540                    | 0.50 | 2.575        | 3.00                     | 11.89          | 2.24               | 0.020        |
| 10.20                                                     | 2.05 | 59.92           | 1.36 | 81.29              | 17                        | 532                    | 0.50 | 2.903        | 3.46                     | 11.89          | 2.58               | 0.023        |
| 10.24                                                     | 2.03 | 60.97           | 1.34 | 81.53              | 17                        | 532                    | 0.50 | 2.933        | 3.52                     | 11.89          | 2.62               | 0.013        |
| 10.31                                                     | 2.02 | 64.09           | 1.32 | 84.86              | 18                        | 553                    | 0.50 | 2.307        | 2.65                     | 11.89          | 1.97               | 0.016        |
| 10.38                                                     | 2.01 | 68.44           | 1.32 | 90.10              | 19                        | 588                    | 0.50 | 1.602        | 1.72                     | 11.89          | 1.28               | 0.011        |
| 10.46                                                     | 2.02 | 71.63           | 1.32 | 94.88              | 20                        | 624                    | 0.50 | 1.147        | 1.15                     | 11.89          | 0.86               | 0.007        |
| 10.53                                                     | 2.05 | 71.52           | 1.36 | 97.06              | 21                        | 648                    | 0.50 | 0.947        | 0.91                     | 11.89          | 0.68               | 0.006        |
| 10.60                                                     | 2.09 | 69.60           | 1.41 | 98.09              | 21                        | 662                    | 0.50 | 0.857        | 0.80                     | 11.89          | 0.59               | 0.005        |
| 10.64                                                     | 2.14 | 67.53           | 1.48 | 99.78              | 22                        | 673                    | 0.50 | 0.786        | 0.70                     | 11.89          | 0.52               | 0.002        |
| 10.71                                                     | 2.15 | 66.20           | 1.51 | 100.04             | 22                        | 676                    | 0.50 | 0.784        | 0.69                     | 11.89          | 0.51               | 0.004        |
| 10.77                                                     | 2.16 | 64.63           | 1.52 | 98.01              | 22                        | 665                    | 0.50 | 0.874        | 0.79                     | 11.89          | 0.58               | 0.005        |
| 10.85                                                     | 2.15 | 63.34           | 1.50 | 95.31              | 21                        | 650                    | 0.50 | 1.007        | 0.95                     | 11.89          | 0.70               | 0.006        |
| 10.92                                                     | 2.16 | 62.06           | 1.52 | 94.14              | 21                        | 644                    | 0.50 | 1.081        | 1.03                     | 11.89          | 0.76               | 0.006        |
| 10.96                                                     | 2.18 | 60.16           | 1.56 | 93.97              | 21                        | 641                    | 0.50 | 1.128        | 1.06                     | 11.89          | 0.78               | 0.004        |
| 11.04                                                     | 2.20 | 57.46           | 1.61 | 92.80              | 21                        | 630                    | 0.50 | 1.269        | 1.20                     | 11.89          | 0.88               | 0.008        |
| 11.11                                                     | 2.22 | 55.23           | 1.66 | 91.77              | 21                        | 620                    | 0.50 | 1.417        | 1.35                     | 11.89          | 0.99               | 0.009        |
| 11.16                                                     | 2.22 | 54.59           | 1.67 | 91.29              | 21                        | 618                    | 0.50 | 1.473        | 1.41                     | 11.89          | 1.03               | 0.006        |
| 11.23                                                     | 2.22 | 54.73           | 1.66 | 90.96              | 21                        | 619                    | 0.50 | 1.475        | 1.42                     | 11.89          | 1.03               | 0.008        |
| 11.30                                                     | 2.22 | 54.73           | 1.65 | 90.46              | 21                        | 620                    | 0.50 | 1.496        | 1.45                     | 11.89          | 1.06               | 0.009        |
| 11.36                                                     | 2.21 | 54.76           | 1.65 | 90.21              | 20                        | 621                    | 0.50 | 1.500        | 1.46                     | 11.89          | 1.06               | 0.009        |
| 11.43                                                     | 2.22 | 54.78           | 1.66 | 90.86              | 21                        | 627                    | 0.50 | 1.445        | 1.39                     | 11.89          | 1.01               | 0.008        |
| 11.51                                                     | 2.23 | 54.53           | 1.69 | 92.14              | 21                        | 635                    | 0.50 | 1.367        | 1.29                     | 11.89          | 0.93               | 0.009        |
| 11.58                                                     | 2.24 | 53.84           | 1.74 | 93.40              | 21                        | 640                    | 0.50 | 1.323        | 1.22                     | 11.89          | 0.88               | 0.007        |
| 11.62                                                     | 2.26 | 52.71           | 1.79 | 94.22              | 22                        | 640                    | 0.50 | 1.338        | 1.21                     | 11.89          | 0.87               | 0.004        |
| 11.69                                                     | 2.27 | 51.73           | 1.83 | 94.59              | 22                        | 640                    | 0.50 | 1.367        | 1.22                     | 11.89          | 0.88               | 0.008        |
| 11.76                                                     | 2.28 | 51.11           | 1.86 | 95.02              | 22                        | 641                    | 0.50 | 1.373        | 1.21                     | 11.89          | 0.87               | 0.008        |
| 11.84                                                     | 2.29 | 50.79           | 1.90 | 96.40              | 23                        | 648                    | 0.50 | 1.316        | 1.14                     | 11.89          | 0.82               | 0.008        |
| 11.91                                                     | 2.31 | 50.54           | 1.95 | 98.65              | 23                        | 658                    | 0.50 | 1.223        | 1.02                     | 11.89          | 0.73               | 0.006        |
| 11.95                                                     | 2.32 | 50.86           | 2.02 | 102.71             | 24                        | 677                    | 0.50 | 1.055        | 0.83                     | 11.89          | 0.60               | 0.003        |
| 12.03                                                     | 2.33 | 51.50           | 2.06 | 106.25             | 25                        | 696                    | 0.50 | 0.915        | 0.69                     | 11.89          | 0.49               | 0.004        |
| 12.10                                                     | 2.34 | 52.56           | 2.07 | 108.83             | 26                        | 716                    | 0.50 | 0.804        | 0.59                     | 11.89          | 0.42               | 0.004        |
| 12.18                                                     | 2.33 | 53.46           | 2.05 | 109.57             | 26                        | 727                    | 0.50 | 0.751        | 0.54                     | 11.89          | 0.39               | 0.003        |
| 12.22                                                     | 2.32 | 54.41           | 2.02 | 109.91             | 26                        | 736                    | 0.50 | 0.711        | 0.52                     | 11.89          | 0.37               | 0.002        |
| 12.29                                                     | 2.32 | 54.73           | 2.01 | 110.15             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 12.37                                                     | 2.32 | 54.74           | 2.02 | 110.53             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 12.40                                                     | 2.33 | 54.79           | 2.03 | 111.35             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 12.48                                                     | 2.33 | 54.69           | 2.05 | 112.04             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 12.55                                                     | 2.33 | 54.44           | 2.06 | 112.16             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 12.62                                                     | 2.34 | 54.01           | 2.08 | 112.53             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |

| :: Post-earthquake settlement of dry sands :: (continued) |      |                 |      |                    |                              |                           |      |                 |                             |                |                       |                 |
|-----------------------------------------------------------|------|-----------------|------|--------------------|------------------------------|---------------------------|------|-----------------|-----------------------------|----------------|-----------------------|-----------------|
| Depth<br>(ft)                                             | Ic   | Q <sub>tn</sub> | Kc   | Q <sub>tn,cs</sub> | N <sub>1,60</sub><br>(blows) | G <sub>max</sub><br>(tsf) | CSR  | Shear, γ<br>(%) | e <sub>vol(15)</sub><br>(%) | N <sub>c</sub> | e <sub>v</sub><br>(%) | Settle.<br>(in) |
| 12.69                                                     | 2.35 | 53.60           | 2.12 | 113.57             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 12.73                                                     | 2.36 | 53.09           | 2.20 | 116.63             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 12.81                                                     | 2.39 | 52.09           | 2.30 | 120.08             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 12.89                                                     | 2.41 | 50.94           | 2.43 | 123.63             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 12.93                                                     | 2.43 | 50.18           | 2.51 | 126.14             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 13.00                                                     | 2.43 | 49.72           | 2.54 | 126.42             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 13.08                                                     | 2.43 | 49.19           | 2.56 | 125.94             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 13.15                                                     | 2.44 | 48.18           | 2.61 | 125.90             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 13.22                                                     | 2.46 | 47.02           | 2.70 | 126.93             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 13.26                                                     | 2.48 | 45.85           | 2.81 | 128.93             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 13.33                                                     | 2.50 | 43.63           | 2.99 | 130.64             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 13.40                                                     | 2.53 | 41.52           | 3.16 | 131.38             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 13.48                                                     | 2.54 | 40.02           | 3.26 | 130.31             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 13.52                                                     | 2.53 | 40.06           | 3.16 | 126.67             | 33                           | 740                       | 0.50 | 0.911           | 0.50                        | 11.89          | 0.35                  | 0.001           |
| 13.59                                                     | 2.52 | 38.87           | 3.15 | 122.32             | 32                           | 720                       | 0.50 | 1.078           | 0.62                        | 11.89          | 0.43                  | 0.004           |
| 13.67                                                     | 2.52 | 37.06           | 3.14 | 116.51             | 30                           | 689                       | 0.50 | 1.402           | 0.85                        | 11.89          | 0.59                  | 0.006           |
| 13.75                                                     | 2.53 | 35.25           | 3.16 | 111.43             | 29                           | 660                       | 0.50 | 1.838           | 1.17                        | 11.89          | 0.81                  | 0.007           |
| 13.78                                                     | 2.53 | 34.08           | 3.19 | 108.68             | 28                           | 643                       | 0.50 | 2.188           | 1.44                        | 11.89          | 0.99                  | 0.004           |
| 13.86                                                     | 2.54 | 33.05           | 3.29 | 108.65             | 29                           | 636                       | 0.50 | 2.380           | 1.55                        | 11.89          | 1.07                  | 0.010           |
| 13.94                                                     | 2.57 | 31.74           | 3.47 | 110.01             | 29                           | 630                       | 0.50 | 2.566           | 1.62                        | 11.89          | 1.12                  | 0.010           |
| 13.98                                                     | 2.58 | 30.94           | 3.58 | 110.78             | 30                           | 626                       | 0.50 | 2.699           | 1.68                        | 11.89          | 1.16                  | 0.006           |
| 14.05                                                     | 2.60 | 29.85           | 3.72 | 111.14             | 30                           | 619                       | 0.50 | 2.959           | 1.82                        | 11.89          | 1.25                  | 0.010           |
| 14.13                                                     | 2.60 | 29.28           | 3.77 | 110.50             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 14.20                                                     | 2.60 | 28.99           | 3.79 | 109.83             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 14.27                                                     | 2.60 | 28.99           | 3.77 | 109.40             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 14.31                                                     | 2.60 | 29.03           | 3.76 | 109.23             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 14.38                                                     | 2.60 | 28.94           | 3.77 | 109.05             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 14.46                                                     | 2.60 | 29.18           | 3.73 | 108.85             | 29                           | 620                       | 0.50 | 3.178           | 2.00                        | 11.89          | 1.36                  | 0.013           |
| 14.53                                                     | 2.60 | 29.19           | 3.73 | 108.97             | 29                           | 623                       | 0.50 | 3.123           | 1.96                        | 11.89          | 1.33                  | 0.012           |
| 14.57                                                     | 2.60 | 28.67           | 3.76 | 107.82             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 14.65                                                     | 2.60 | 27.62           | 3.75 | 103.55             | 28                           | 595                       | 0.50 | 4.368           | 2.92                        | 11.89          | 1.97                  | 0.019           |
| 14.72                                                     | 2.59 | 26.73           | 3.71 | 99.08              | 27                           | 575                       | 0.50 | 5.650           | 3.99                        | 11.89          | 2.70                  | 0.023           |
| 14.79                                                     | 2.59 | 26.40           | 3.64 | 96.18              | 26                           | 565                       | 0.50 | 6.501           | 4.78                        | 11.89          | 3.22                  | 0.026           |
| 14.83                                                     | 2.59 | 26.38           | 3.65 | 96.20              | 26                           | 566                       | 0.50 | 6.468           | 4.75                        | 11.89          | 3.20                  | 0.015           |
| 14.90                                                     | 2.59 | 26.20           | 3.64 | 95.29              | 26                           | 564                       | 0.50 | 6.778           | 5.04                        | 11.89          | 3.39                  | 0.030           |
| 14.98                                                     | 2.57 | 26.57           | 3.52 | 93.51              | 25                           | 564                       | 0.50 | 6.832           | 5.24                        | 11.89          | 3.52                  | 0.032           |
| 15.05                                                     | 2.55 | 27.41           | 3.33 | 91.36              | 24                           | 568                       | 0.50 | 6.610           | 5.28                        | 11.89          | 3.55                  | 0.031           |
| 15.09                                                     | 2.53 | 28.34           | 3.22 | 91.13              | 24                           | 578                       | 0.50 | 5.907           | 4.78                        | 11.89          | 3.20                  | 0.015           |
| 15.17                                                     | 2.53 | 28.45           | 3.22 | 91.63              | 24                           | 583                       | 0.50 | 5.634           | 4.53                        | 11.89          | 3.03                  | 0.029           |
| 15.24                                                     | 2.53 | 28.35           | 3.23 | 91.47              | 24                           | 584                       | 0.50 | 5.679           | 4.57                        | 11.89          | 3.05                  | 0.026           |
| 15.32                                                     | 2.53 | 28.12           | 3.21 | 90.17              | 24                           | 580                       | 0.50 | 6.076           | 4.98                        | 11.89          | 3.32                  | 0.032           |
| 15.36                                                     | 2.52 | 28.30           | 3.09 | 87.36              | 23                           | 573                       | 0.50 | 6.650           | 5.72                        | 11.89          | 3.70                  | 0.016           |
| 15.43                                                     | 2.52 | 27.13           | 3.13 | 84.91              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 15.51                                                     | 2.52 | 25.83           | 3.11 | 80.21              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 15.58                                                     | 2.51 | 24.49           | 3.05 | 74.68              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 15.65                                                     | 2.48 | 24.27           | 2.84 | 68.85              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 15.69                                                     | 2.45 | 24.12           | 2.68 | 64.66              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 15.76                                                     | 2.44 | 24.19           | 2.60 | 62.99              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |

| :: Post-earthquake settlement of dry sands :: (continued) |      |                 |       |                    |                              |                           |      |                 |                             |                |                       |                 |
|-----------------------------------------------------------|------|-----------------|-------|--------------------|------------------------------|---------------------------|------|-----------------|-----------------------------|----------------|-----------------------|-----------------|
| Depth<br>(ft)                                             | Ic   | Q <sub>tn</sub> | Kc    | Q <sub>tn,cs</sub> | N <sub>1,60</sub><br>(blows) | G <sub>max</sub><br>(tsf) | CSR  | Shear, γ<br>(%) | e <sub>vol(15)</sub><br>(%) | N <sub>c</sub> | e <sub>v</sub><br>(%) | Settle.<br>(in) |
| 15.84                                                     | 2.44 | 24.29           | 2.58  | 62.58              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 15.88                                                     | 2.43 | 24.75           | 2.56  | 63.31              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 15.96                                                     | 2.43 | 24.89           | 2.56  | 63.63              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 16.03                                                     | 2.43 | 24.99           | 2.55  | 63.71              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 16.10                                                     | 2.44 | 24.91           | 2.58  | 64.37              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 16.14                                                     | 2.48 | 23.97           | 2.81  | 67.46              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 16.21                                                     | 2.54 | 22.11           | 3.26  | 72.09              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 16.28                                                     | 2.58 | 20.80           | 3.62  | 75.20              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 16.36                                                     | 2.58 | 20.51           | 3.55  | 72.87              | 19                           | 470                       | 0.50 | 40.188          | 41.47                       | 11.89          | 3.61                  | 0.034           |
| 16.44                                                     | 2.57 | 19.73           | 3.53  | 69.56              | 19                           | 452                       | 0.50 | 58.174          | 63.59                       | 11.89          | 3.61                  | 0.034           |
| 16.47                                                     | 2.61 | 17.30           | 3.83  | 66.21              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 16.55                                                     | 2.67 | 14.39           | 4.44  | 63.85              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 16.62                                                     | 2.70 | 12.80           | 4.74  | 60.60              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 16.70                                                     | 2.70 | 12.43           | 4.72  | 58.63              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 16.76                                                     | 2.70 | 12.58           | 4.65  | 58.54              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 16.80                                                     | 2.68 | 13.18           | 4.51  | 59.35              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 16.88                                                     | 2.68 | 13.87           | 4.46  | 61.81              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 16.96                                                     | 2.67 | 14.56           | 4.42  | 64.28              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 17.00                                                     | 2.71 | 14.08           | 4.79  | 67.44              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 17.07                                                     | 2.78 | 12.77           | 5.58  | 71.21              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 17.15                                                     | 2.86 | 11.19           | 6.66  | 74.59              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 17.22                                                     | 2.92 | 10.20           | 7.48  | 76.27              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 17.26                                                     | 2.95 | 9.48            | 8.00  | 75.84              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 17.33                                                     | 2.98 | 8.89            | 8.47  | 75.26              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 17.41                                                     | 3.03 | 8.14            | 9.24  | 75.29              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 17.48                                                     | 3.06 | 7.75            | 9.77  | 75.64              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 17.52                                                     | 3.10 | 7.27            | 10.58 | 76.98              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 17.60                                                     | 3.12 | 7.12            | 10.92 | 77.79              | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 17.67                                                     | 3.13 | 7.00            | 11.12 | 77.88              | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 17.74                                                     | 3.15 | 6.67            | 11.53 | 76.95              | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 17.82                                                     | 3.17 | 6.25            | 12.10 | 75.64              | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 17.86                                                     | 3.19 | 5.88            | 12.59 | 73.96              | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 17.93                                                     | 3.20 | 5.67            | 12.73 | 72.22              | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 18.01                                                     | 3.19 | 5.59            | 12.61 | 70.50              | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 18.05                                                     | 3.19 | 5.55            | 12.46 | 69.16              | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 18.12                                                     | 3.18 | 5.56            | 12.25 | 68.09              | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 18.20                                                     | 3.18 | 5.48            | 12.31 | 67.41              | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 18.27                                                     | 3.20 | 5.30            | 12.63 | 67.02              | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 18.34                                                     | 3.22 | 5.08            | 13.12 | 66.58              | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 18.39                                                     | 3.23 | 4.89            | 13.39 | 65.47              | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 18.46                                                     | 3.24 | 4.72            | 13.57 | 64.06              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 18.53                                                     | 3.25 | 4.50            | 13.85 | 62.34              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 18.60                                                     | 3.26 | 4.28            | 14.25 | 61.02              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 18.64                                                     | 3.28 | 4.10            | 14.63 | 59.95              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 18.72                                                     | 3.29 | 3.94            | 14.96 | 58.91              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 18.79                                                     | 3.30 | 3.80            | 15.06 | 57.27              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 18.86                                                     | 3.29 | 3.70            | 15.02 | 55.63              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 18.90                                                     | 3.28 | 3.70            | 14.75 | 54.49              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |

| :: Post-earthquake settlement of dry sands :: (continued) |                |                 |                |                    |                              |                           |      |                 |                             |                |                       |                 |
|-----------------------------------------------------------|----------------|-----------------|----------------|--------------------|------------------------------|---------------------------|------|-----------------|-----------------------------|----------------|-----------------------|-----------------|
| Depth<br>(ft)                                             | I <sub>c</sub> | Q <sub>tn</sub> | K <sub>c</sub> | Q <sub>tn,cs</sub> | N <sub>1,60</sub><br>(blows) | G <sub>max</sub><br>(tsf) | CSR  | Shear, γ<br>(%) | e <sub>vol(15)</sub><br>(%) | N <sub>c</sub> | e <sub>v</sub><br>(%) | Settle.<br>(in) |
| 18.98                                                     | 3.27           | 3.74            | 14.48          | 54.13              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 19.06                                                     | 3.27           | 3.78            | 14.30          | 54.05              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 19.12                                                     | 3.26           | 3.82            | 14.14          | 54.03              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 19.16                                                     | 3.27           | 3.79            | 14.35          | 54.34              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 19.24                                                     | 3.28           | 3.71            | 14.72          | 54.68              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 19.32                                                     | 3.33           | 3.61            | 15.89          | 57.45              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 19.39                                                     | 3.38           | 3.52            | 17.44          | 61.30              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 19.43                                                     | 3.47           | 3.34            | 20.31          | 67.85              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 19.51                                                     | 3.54           | 3.27            | 22.77          | 74.45              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 19.57                                                     | 3.51           | 3.72            | 21.85          | 81.35              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 19.65                                                     | 3.41           | 4.76            | 18.21          | 86.59              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 19.69                                                     | 3.12           | 8.24            | 10.96          | 90.26              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 19.77                                                     | 2.82           | 14.56           | 6.12           | 89.01              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 19.84                                                     | 2.58           | 23.87           | 3.56           | 84.88              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 19.91                                                     | 2.43           | 32.99           | 2.53           | 83.47              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 19.98                                                     | 2.33           | 41.37           | 2.03           | 84.03              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 20.01                                                     | 2.23           | 51.38           | 1.68           | 86.44              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 20.09                                                     | 2.14           | 62.32           | 1.48           | 92.08              | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 20.16                                                     | 2.07           | 73.32           | 1.38           | 100.83             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 20.24                                                     | 2.03           | 80.51           | 1.34           | 107.71             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 20.28                                                     | 2.01           | 86.32           | 1.32           | 113.72             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 20.35                                                     | 2.00           | 91.01           | 1.30           | 118.76             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 20.43                                                     | 1.99           | 95.43           | 1.30           | 123.64             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 20.50                                                     | 1.98           | 98.46           | 1.29           | 127.05             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 20.54                                                     | 1.98           | 100.72          | 1.29           | 129.75             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 20.61                                                     | 1.97           | 102.82          | 1.29           | 132.31             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 20.69                                                     | 1.97           | 105.47          | 1.28           | 135.40             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 20.75                                                     | 1.96           | 108.95          | 1.28           | 139.25             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 20.83                                                     | 1.95           | 113.03          | 1.27           | 143.74             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 20.90                                                     | 1.94           | 116.97          | 1.27           | 148.11             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 20.94                                                     | 1.94           | 121.01          | 1.26           | 152.67             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 21.01                                                     | 1.93           | 125.24          | 1.26           | 157.39             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 21.08                                                     | 1.92           | 131.15          | 1.25           | 163.82             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 21.16                                                     | 1.90           | 138.40          | 1.24           | 171.21             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 21.23                                                     | 1.88           | 145.43          | 1.22           | 177.87             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 21.26                                                     | 1.86           | 152.73          | 1.21           | 184.23             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 21.34                                                     | 1.84           | 158.48          | 1.19           | 189.00             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 21.41                                                     | 1.83           | 163.06          | 1.18           | 192.78             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 21.48                                                     | 1.82           | 164.85          | 1.18           | 193.95             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 21.56                                                     | 1.82           | 164.22          | 1.17           | 192.87             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 21.63                                                     | 1.82           | 161.66          | 1.18           | 190.20             | 37                           | 1703                      | 0.51 | 0.099           | 0.05                        | 11.89          | 0.03                  | 0.000           |
| 21.67                                                     | 1.83           | 157.17          | 1.18           | 186.07             | 36                           | 1675                      | 0.51 | 0.103           | 0.05                        | 11.89          | 0.03                  | 0.000           |
| 21.74                                                     | 1.84           | 150.44          | 1.20           | 179.99             | 35                           | 1638                      | 0.51 | 0.110           | 0.06                        | 11.89          | 0.03                  | 0.000           |
| 21.81                                                     | 1.86           | 143.55          | 1.21           | 173.55             | 34                           | 1600                      | 0.51 | 0.118           | 0.06                        | 11.89          | 0.04                  | 0.000           |
| 21.85                                                     | 1.88           | 136.28          | 1.22           | 166.86             | 33                           | 1564                      | 0.51 | 0.126           | 0.07                        | 11.89          | 0.04                  | 0.000           |
| 21.92                                                     | 1.90           | 129.07          | 1.24           | 160.08             | 32                           | 1531                      | 0.51 | 0.135           | 0.08                        | 11.89          | 0.04                  | 0.000           |
| 22.00                                                     | 1.93           | 121.52          | 1.26           | 152.59             | 31                           | 1491                      | 0.51 | 0.147           | 0.09                        | 11.89          | 0.05                  | 0.000           |
| 22.08                                                     | 1.94           | 115.92          | 1.27           | 146.73             | 30                           | 1455                      | 0.51 | 0.159           | 0.10                        | 11.89          | 0.06                  | 0.001           |

| :: Post-earthquake settlement of dry sands :: (continued) |      |                 |      |                    |                              |                           |      |                 |                             |                |                       |                 |
|-----------------------------------------------------------|------|-----------------|------|--------------------|------------------------------|---------------------------|------|-----------------|-----------------------------|----------------|-----------------------|-----------------|
| Depth<br>(ft)                                             | Ic   | Q <sub>tn</sub> | Kc   | Q <sub>tn,cs</sub> | N <sub>1,60</sub><br>(blows) | G <sub>max</sub><br>(tsf) | CSR  | Shear, γ<br>(%) | e <sub>vol(15)</sub><br>(%) | N <sub>c</sub> | e <sub>v</sub><br>(%) | Settle.<br>(in) |
| 22.12                                                     | 1.95 | 111.97          | 1.27 | 142.24             | 29                           | 1420                      | 0.51 | 0.172           | 0.11                        | 11.89          | 0.06                  | 0.000           |
| 22.19                                                     | 1.96 | 108.64          | 1.27 | 138.39             | 28                           | 1390                      | 0.51 | 0.185           | 0.12                        | 11.89          | 0.07                  | 0.001           |
| 22.27                                                     | 1.96 | 105.09          | 1.28 | 134.44             | 28                           | 1362                      | 0.51 | 0.199           | 0.14                        | 11.89          | 0.08                  | 0.001           |
| 22.34                                                     | 1.97 | 102.15          | 1.29 | 131.38             | 27                           | 1344                      | 0.51 | 0.210           | 0.15                        | 11.89          | 0.08                  | 0.001           |
| 22.38                                                     | 1.99 | 99.24           | 1.30 | 128.56             | 27                           | 1329                      | 0.51 | 0.219           | 0.16                        | 11.89          | 0.09                  | 0.000           |
| 22.45                                                     | 2.00 | 96.35           | 1.31 | 125.92             | 26                           | 1319                      | 0.51 | 0.226           | 0.16                        | 11.89          | 0.09                  | 0.001           |
| 22.53                                                     | 2.02 | 93.65           | 1.32 | 123.65             | 26                           | 1312                      | 0.51 | 0.232           | 0.17                        | 11.89          | 0.09                  | 0.001           |
| 22.61                                                     | 2.02 | 92.64           | 1.32 | 122.57             | 26                           | 1306                      | 0.51 | 0.237           | 0.18                        | 11.89          | 0.10                  | 0.001           |
| 22.64                                                     | 2.01 | 92.39           | 1.32 | 121.59             | 25                           | 1290                      | 0.51 | 0.249           | 0.19                        | 11.89          | 0.10                  | 0.000           |
| 22.72                                                     | 2.00 | 92.72           | 1.31 | 121.21             | 25                           | 1280                      | 0.51 | 0.258           | 0.19                        | 11.89          | 0.11                  | 0.001           |
| 22.79                                                     | 2.00 | 92.91           | 1.30 | 121.11             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 22.87                                                     | 2.00 | 93.30           | 1.30 | 121.74             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 22.91                                                     | 2.01 | 92.68           | 1.31 | 121.71             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 22.97                                                     | 2.04 | 89.31           | 1.35 | 120.41             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 23.04                                                     | 2.09 | 85.52           | 1.41 | 120.58             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 23.12                                                     | 2.16 | 81.44           | 1.52 | 123.39             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 23.19                                                     | 2.20 | 79.04           | 1.62 | 128.33             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 23.23                                                     | 2.27 | 75.30           | 1.81 | 136.40             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 23.31                                                     | 2.35 | 69.86           | 2.13 | 148.95             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 23.38                                                     | 2.45 | 63.71           | 2.65 | 168.64             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 23.46                                                     | 2.52 | 59.37           | 3.14 | 186.48             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 23.50                                                     | 2.56 | 57.80           | 3.44 | 198.76             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 23.57                                                     | 2.57 | 57.61           | 3.52 | 202.57             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 23.64                                                     | 2.57 | 57.44           | 3.51 | 201.56             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 23.72                                                     | 2.56 | 57.33           | 3.43 | 196.45             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 23.76                                                     | 2.54 | 57.92           | 3.24 | 187.50             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 23.83                                                     | 2.49 | 59.83           | 2.93 | 175.60             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 23.90                                                     | 2.43 | 63.59           | 2.51 | 159.72             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 23.98                                                     | 2.35 | 68.11           | 2.13 | 144.87             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 24.05                                                     | 2.28 | 72.03           | 1.86 | 134.15             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 24.09                                                     | 2.22 | 75.87           | 1.67 | 126.35             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 24.17                                                     | 2.16 | 79.54           | 1.53 | 122.00             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 24.24                                                     | 2.12 | 83.22           | 1.45 | 120.36             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 24.28                                                     | 2.09 | 86.41           | 1.40 | 121.39             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 24.35                                                     | 2.08 | 89.19           | 1.39 | 123.55             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 24.42                                                     | 2.06 | 92.93           | 1.37 | 126.89             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 24.50                                                     | 2.04 | 97.47           | 1.35 | 131.21             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 24.57                                                     | 2.02 | 102.16          | 1.33 | 135.63             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 24.61                                                     | 2.00 | 107.87          | 1.31 | 141.04             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 24.69                                                     | 1.98 | 113.28          | 1.29 | 146.25             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 24.75                                                     | 1.96 | 119.18          | 1.28 | 151.99             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 24.83                                                     | 1.94 | 123.66          | 1.26 | 156.33             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 24.90                                                     | 1.93 | 126.72          | 1.26 | 159.21             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 24.94                                                     | 1.92 | 128.49          | 1.25 | 160.80             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 25.01                                                     | 1.92 | 128.76          | 1.25 | 160.92             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 25.08                                                     | 1.92 | 128.38          | 1.25 | 160.24             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 25.15                                                     | 1.91 | 127.25          | 1.25 | 158.62             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 25.23                                                     | 1.91 | 125.94          | 1.24 | 156.72             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 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) |
| 25.26                                                     | 1.91 | 123.94          | 1.24 | 154.18             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 25.34                                                     | 1.92 | 120.95          | 1.25 | 150.86             | 30                        | 1601                   | 0.52 | 0.155        | 0.09                     | 11.89          | 0.05               | 0.000        |
| 25.41                                                     | 1.93 | 117.19          | 1.25 | 146.91             | 30                        | 1575                   | 0.52 | 0.163        | 0.10                     | 11.89          | 0.05               | 0.000        |
| 25.48                                                     | 1.94 | 113.46          | 1.26 | 143.12             | 29                        | 1554                   | 0.52 | 0.171        | 0.11                     | 11.89          | 0.06               | 0.000        |
| 25.56                                                     | 1.94 | 110.64          | 1.27 | 140.12             | 29                        | 1534                   | 0.52 | 0.179        | 0.12                     | 11.89          | 0.06               | 0.001        |
| 25.60                                                     | 1.94 | 108.44          | 1.26 | 136.73             | 28                        | 1488                   | 0.52 | 0.198        | 0.13                     | 11.89          | 0.07               | 0.000        |
| 25.67                                                     | 1.93 | 106.35          | 1.26 | 133.75             | 27                        | 1452                   | 0.52 | 0.215        | 0.15                     | 11.89          | 0.08               | 0.001        |
| 25.74                                                     | 1.93 | 104.16          | 1.26 | 130.99             | 27                        | 1424                   | 0.52 | 0.231        | 0.16                     | 11.89          | 0.08               | 0.001        |
| 25.81                                                     | 1.95 | 102.12          | 1.27 | 129.58             | 26                        | 1432                   | 0.52 | 0.227        | 0.16                     | 11.89          | 0.08               | 0.001        |
| 25.88                                                     | 1.97 | 99.28           | 1.28 | 127.42             | 26                        | 1437                   | 0.52 | 0.226        | 0.16                     | 11.89          | 0.08               | 0.001        |
| 25.95                                                     | 1.98 | 98.43           | 1.29 | 127.08             | 26                        | 1448                   | 0.52 | 0.222        | 0.16                     | 11.89          | 0.08               | 0.001        |
| 26.00                                                     | 1.99 | 97.86           | 1.30 | 127.11             | 26                        | 1462                   | 0.52 | 0.215        | 0.15                     | 11.89          | 0.08               | 0.000        |
| 26.06                                                     | 1.99 | 99.42           | 1.30 | 129.15             | 27                        | 1488                   | 0.52 | 0.204        | 0.14                     | 11.89          | 0.07               | 0.001        |
| 26.14                                                     | 2.00 | 100.30          | 1.31 | 130.91             | 27                        | 1520                   | 0.52 | 0.192        | 0.13                     | 11.89          | 0.07               | 0.001        |
| 26.20                                                     | 2.00 | 102.61          | 1.31 | 134.17             | 28                        | 1565                   | 0.52 | 0.176        | 0.12                     | 11.89          | 0.06               | 0.000        |
| 26.28                                                     | 2.00 | 105.76          | 1.31 | 138.11             | 29                        | 1611                   | 0.52 | 0.162        | 0.11                     | 11.89          | 0.05               | 0.000        |
| 26.35                                                     | 1.99 | 109.06          | 1.30 | 141.86             | 29                        | 1650                   | 0.52 | 0.152        | 0.10                     | 11.89          | 0.05               | 0.000        |
| 26.39                                                     | 1.98 | 112.83          | 1.29 | 145.75             | 30                        | 1681                   | 0.52 | 0.145        | 0.09                     | 11.89          | 0.04               | 0.000        |
| 26.45                                                     | 1.97 | 116.39          | 1.28 | 149.28             | 31                        | 1706                   | 0.52 | 0.140        | 0.08                     | 11.89          | 0.04               | 0.000        |
| 26.53                                                     | 1.96 | 119.52          | 1.27 | 152.38             | 31                        | 1729                   | 0.52 | 0.135        | 0.08                     | 11.89          | 0.04               | 0.000        |
| 26.60                                                     | 1.95 | 121.17          | 1.27 | 154.02             | 31                        | 1742                   | 0.52 | 0.133        | 0.08                     | 11.89          | 0.04               | 0.000        |
| 26.64                                                     | 1.95 | 121.24          | 1.27 | 154.09             | 31                        | 1744                   | 0.52 | 0.133        | 0.08                     | 11.89          | 0.04               | 0.000        |
| 26.72                                                     | 1.96 | 119.87          | 1.27 | 152.69             | 31                        | 1738                   | 0.52 | 0.135        | 0.08                     | 11.89          | 0.04               | 0.000        |
| 26.78                                                     | 1.96 | 117.48          | 1.28 | 150.29             | 31                        | 1726                   | 0.52 | 0.138        | 0.08                     | 11.89          | 0.04               | 0.000        |
| 26.85                                                     | 1.98 | 114.14          | 1.29 | 147.07             | 30                        | 1710                   | 0.52 | 0.142        | 0.09                     | 11.89          | 0.04               | 0.000        |
| 26.92                                                     | 1.99 | 110.32          | 1.30 | 143.61             | 30                        | 1697                   | 0.52 | 0.146        | 0.09                     | 11.89          | 0.04               | 0.000        |
| 26.99                                                     | 2.01 | 106.30          | 1.32 | 140.19             | 29                        | 1686                   | 0.52 | 0.150        | 0.09                     | 11.89          | 0.05               | 0.000        |
| 27.07                                                     | 2.03 | 102.99          | 1.34 | 137.52             | 29                        | 1678                   | 0.52 | 0.152        | 0.10                     | 11.89          | 0.05               | 0.000        |
| 27.14                                                     | 2.04 | 100.81          | 1.35 | 135.78             | 29                        | 1672                   | 0.52 | 0.154        | 0.10                     | 11.89          | 0.05               | 0.000        |
| 27.17                                                     | 2.05 | 99.73           | 1.35 | 134.94             | 29                        | 1670                   | 0.52 | 0.155        | 0.10                     | 11.89          | 0.05               | 0.000        |
| 27.25                                                     | 2.05 | 99.13           | 1.36 | 134.60             | 29                        | 1673                   | 0.52 | 0.155        | 0.10                     | 11.89          | 0.05               | 0.000        |
| 27.33                                                     | 2.06 | 98.71           | 1.36 | 134.56             | 29                        | 1681                   | 0.52 | 0.154        | 0.10                     | 11.89          | 0.05               | 0.000        |
| 27.36                                                     | 2.06 | 99.19           | 1.37 | 135.52             | 29                        | 1697                   | 0.52 | 0.150        | 0.10                     | 11.89          | 0.05               | 0.000        |
| 27.44                                                     | 2.06 | 101.25          | 1.36 | 137.78             | 29                        | 1724                   | 0.52 | 0.144        | 0.09                     | 11.89          | 0.04               | 0.000        |
| 27.51                                                     | 2.04 | 106.25          | 1.34 | 142.43             | 30                        | 1764                   | 0.52 | 0.136        | 0.08                     | 11.89          | 0.04               | 0.000        |
| 27.58                                                     | 2.00 | 114.47          | 1.31 | 149.72             | 31                        | 1810                   | 0.52 | 0.128        | 0.07                     | 11.89          | 0.04               | 0.000        |
| 27.65                                                     | 1.96 | 125.33          | 1.27 | 159.61             | 33                        | 1859                   | 0.52 | 0.120        | 0.07                     | 11.89          | 0.03               | 0.000        |
| 27.72                                                     | 1.92 | 135.02          | 1.25 | 168.47             | 34                        | 1898                   | 0.52 | 0.114        | 0.06                     | 11.89          | 0.03               | 0.000        |
| 27.76                                                     | 1.89 | 142.73          | 1.23 | 175.29             | 35                        | 1926                   | 0.52 | 0.110        | 0.06                     | 11.89          | 0.03               | 0.000        |
| 27.83                                                     | 1.87 | 145.89          | 1.22 | 177.53             | 35                        | 1927                   | 0.52 | 0.110        | 0.06                     | 11.89          | 0.03               | 0.000        |
| 27.91                                                     | 1.86 | 145.56          | 1.21 | 176.34             | 35                        | 1906                   | 0.52 | 0.114        | 0.06                     | 11.89          | 0.03               | 0.000        |
| 27.98                                                     | 1.87 | 140.40          | 1.22 | 170.74             | 34                        | 1858                   | 0.52 | 0.122        | 0.06                     | 11.89          | 0.03               | 0.000        |
| 28.05                                                     | 1.88 | 133.62          | 1.23 | 163.86             | 33                        | 1808                   | 0.52 | 0.132        | 0.07                     | 11.89          | 0.03               | 0.000        |
| 28.09                                                     | 1.91 | 124.30          | 1.24 | 154.66             | 31                        | 1749                   | 0.52 | 0.144        | 0.08                     | 11.89          | 0.04               | 0.000        |
| 28.17                                                     | 1.95 | 114.57          | 1.27 | 145.38             | 30                        | 1704                   | 0.52 | 0.156        | 0.10                     | 11.89          | 0.05               | 0.000        |
| 28.24                                                     | 2.00 | 104.09          | 1.30 | 135.81             | 28                        | 1664                   | 0.52 | 0.168        | 0.11                     | 11.89          | 0.05               | 0.000        |
| 28.32                                                     | 2.04 | 97.09           | 1.34 | 130.17             | 27                        | 1646                   | 0.52 | 0.174        | 0.12                     | 11.89          | 0.06               | 0.000        |
| 28.35                                                     | 2.07 | 92.32           | 1.38 | 127.12             | 27                        | 1641                   | 0.52 | 0.176        | 0.12                     | 11.89          | 0.06               | 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) |
| 28.43                                                     | 2.10 | 89.35           | 1.41 | 126.12             | 27                        | 1653                   | 0.52 | 0.173        | 0.12                     | 11.89          | 0.06               | 0.001        |
| 28.50                                                     | 2.12 | 86.84           | 1.45 | 126.16             | 28                        | 1672                   | 0.52 | 0.168        | 0.11                     | 11.89          | 0.05               | 0.000        |
| 28.58                                                     | 2.14 | 85.35           | 1.48 | 126.61             | 28                        | 1689                   | 0.52 | 0.164        | 0.11                     | 11.89          | 0.05               | 0.000        |
| 28.61                                                     | 2.15 | 83.86           | 1.51 | 126.81             | 28                        | 1698                   | 0.52 | 0.162        | 0.11                     | 11.89          | 0.05               | 0.000        |
| 28.69                                                     | 2.17 | 82.13           | 1.54 | 126.21             | 28                        | 1696                   | 0.52 | 0.163        | 0.11                     | 11.89          | 0.05               | 0.000        |
| 28.76                                                     | 2.17 | 81.11           | 1.55 | 126.02             | 28                        | 1697                   | 0.52 | 0.164        | 0.11                     | 11.89          | 0.05               | 0.000        |
| 28.84                                                     | 2.18 | 80.04           | 1.57 | 125.86             | 28                        | 1699                   | 0.52 | 0.164        | 0.11                     | 11.89          | 0.05               | 0.000        |
| 28.88                                                     | 2.19 | 80.30           | 1.58 | 126.83             | 28                        | 1713                   | 0.52 | 0.160        | 0.11                     | 11.89          | 0.05               | 0.000        |
| 28.95                                                     | 2.18 | 81.07           | 1.57 | 127.49             | 29                        | 1726                   | 0.52 | 0.158        | 0.10                     | 11.89          | 0.05               | 0.000        |
| 29.02                                                     | 2.19 | 79.53           | 1.60 | 127.12             | 29                        | 1723                   | 0.52 | 0.159        | 0.10                     | 11.89          | 0.05               | 0.000        |
| 29.09                                                     | 2.17 | 81.50           | 1.55 | 126.70             | 28                        | 1721                   | 0.52 | 0.160        | 0.11                     | 11.89          | 0.05               | 0.000        |
| 29.16                                                     | 2.16 | 82.24           | 1.53 | 125.57             | 28                        | 1707                   | 0.52 | 0.165        | 0.11                     | 11.89          | 0.05               | 0.000        |
| 29.22                                                     | 2.13 | 85.36           | 1.47 | 125.10             | 27                        | 1693                   | 0.52 | 0.169        | 0.12                     | 11.89          | 0.05               | 0.000        |
| 29.30                                                     | 2.13 | 83.78           | 1.46 | 122.70             | 27                        | 1664                   | 0.52 | 0.179        | 0.13                     | 11.89          | 0.06               | 0.001        |
| 29.34                                                     | 2.13 | 81.90           | 1.47 | 119.98             | 26                        | 1629                   | 0.52 | 0.191        | 0.14                     | 11.89          | 0.06               | 0.000        |
| 29.41                                                     | 2.12 | 81.48           | 1.45 | 117.93             | 26                        | 1598                   | 0.52 | 0.203        | 0.15                     | 11.89          | 0.07               | 0.001        |
| 29.49                                                     | 2.11 | 81.00           | 1.44 | 116.25             | 25                        | 1575                   | 0.53 | 0.214        | 0.16                     | 11.89          | 0.07               | 0.001        |
| 29.53                                                     | 2.11 | 81.63           | 1.43 | 116.47             | 25                        | 1576                   | 0.53 | 0.214        | 0.16                     | 11.89          | 0.07               | 0.000        |
| 29.60                                                     | 2.11 | 82.19           | 1.44 | 118.37             | 26                        | 1610                   | 0.53 | 0.201        | 0.15                     | 11.89          | 0.07               | 0.001        |
| 29.67                                                     | 2.13 | 83.41           | 1.48 | 123.04             | 27                        | 1687                   | 0.53 | 0.176        | 0.12                     | 11.89          | 0.05               | 0.000        |
| 29.75                                                     | 2.17 | 83.65           | 1.55 | 129.96             | 29                        | 1795                   | 0.53 | 0.148        | 0.09                     | 11.89          | 0.04               | 0.000        |
| 29.82                                                     | 2.22 | 82.94           | 1.66 | 137.75             | 31                        | 1902                   | 0.53 | 0.127        | 0.07                     | 11.89          | 0.03               | 0.000        |
| 29.86                                                     | 2.26 | 81.87           | 1.78 | 145.72             | 34                        | 1994                   | 0.53 | 0.113        | 0.06                     | 11.89          | 0.03               | 0.000        |
| 29.93                                                     | 2.28 | 81.16           | 1.86 | 151.07             | 35                        | 2052                   | 0.53 | 0.106        | 0.05                     | 11.89          | 0.02               | 0.000        |
| 30.01                                                     | 2.29 | 80.92           | 1.90 | 154.14             | 36                        | 2087                   | 0.53 | 0.102        | 0.05                     | 11.89          | 0.02               | 0.000        |
| 30.05                                                     | 2.28 | 82.82           | 1.85 | 153.56             | 36                        | 2094                   | 0.53 | 0.102        | 0.05                     | 11.89          | 0.02               | 0.000        |
| 30.13                                                     | 2.24 | 87.97           | 1.72 | 151.01             | 35                        | 2093                   | 0.53 | 0.102        | 0.05                     | 11.89          | 0.02               | 0.000        |
| 30.20                                                     | 2.18 | 94.85           | 1.57 | 148.64             | 33                        | 2078                   | 0.53 | 0.104        | 0.06                     | 11.89          | 0.02               | 0.000        |
| 30.27                                                     | 2.14 | 98.65           | 1.48 | 145.77             | 32                        | 2029                   | 0.53 | 0.111        | 0.06                     | 11.89          | 0.03               | 0.000        |
| 30.35                                                     | 2.12 | 98.07           | 1.44 | 141.61             | 31                        | 1963                   | 0.53 | 0.120        | 0.07                     | 11.89          | 0.03               | 0.000        |
| 30.38                                                     | 2.12 | 93.25           | 1.45 | 134.80             | 29                        | 1871                   | 0.53 | 0.137        | 0.09                     | 11.89          | 0.04               | 0.000        |
| 30.46                                                     | 2.13 | 87.81           | 1.47 | 129.23             | 28                        | 1806                   | 0.53 | 0.151        | 0.10                     | 11.89          | 0.04               | 0.000        |
| 30.54                                                     | 2.16 | 81.91           | 1.52 | 124.63             | 28                        | 1754                   | 0.53 | 0.164        | 0.11                     | 11.89          | 0.05               | 0.000        |
| 30.62                                                     | 2.19 | 77.79           | 1.59 | 123.62             | 28                        | 1747                   | 0.53 | 0.167        | 0.11                     | 11.89          | 0.05               | 0.000        |
| 30.65                                                     | 2.22 | 74.81           | 1.67 | 125.02             | 28                        | 1763                   | 0.53 | 0.163        | 0.11                     | 11.89          | 0.05               | 0.000        |
| 30.73                                                     | 2.25 | 72.80           | 1.76 | 128.27             | 30                        | 1799                   | 0.53 | 0.155        | 0.10                     | 11.89          | 0.04               | 0.000        |
| 30.80                                                     | 2.28 | 71.33           | 1.86 | 132.54             | 31                        | 1843                   | 0.53 | 0.145        | 0.09                     | 11.89          | 0.04               | 0.000        |
| 30.88                                                     | 2.30 | 70.81           | 1.91 | 135.23             | 32                        | 1873                   | 0.53 | 0.140        | 0.08                     | 11.89          | 0.03               | 0.000        |
| 30.91                                                     | 2.29 | 71.80           | 1.90 | 136.37             | 32                        | 1892                   | 0.53 | 0.136        | 0.08                     | 11.89          | 0.03               | 0.000        |
| 30.99                                                     | 2.28 | 73.56           | 1.84 | 135.72             | 32                        | 1900                   | 0.53 | 0.135        | 0.08                     | 11.89          | 0.03               | 0.000        |
| 31.06                                                     | 2.26 | 75.64           | 1.77 | 134.05             | 31                        | 1894                   | 0.53 | 0.137        | 0.08                     | 11.89          | 0.03               | 0.000        |
| 31.13                                                     | 2.23 | 77.35           | 1.69 | 131.07             | 30                        | 1868                   | 0.53 | 0.142        | 0.09                     | 11.89          | 0.04               | 0.000        |
| 31.20                                                     | 2.21 | 78.34           | 1.64 | 128.17             | 29                        | 1836                   | 0.53 | 0.150        | 0.10                     | 11.89          | 0.04               | 0.000        |
| 31.24                                                     | 2.19 | 79.32           | 1.58 | 125.72             | 28                        | 1804                   | 0.53 | 0.157        | 0.10                     | 11.89          | 0.04               | 0.000        |
| 31.31                                                     | 2.18 | 80.01           | 1.56 | 124.69             | 28                        | 1792                   | 0.53 | 0.161        | 0.11                     | 11.89          | 0.05               | 0.000        |
| 31.39                                                     | 2.17 | 80.89           | 1.54 | 124.74             | 28                        | 1795                   | 0.53 | 0.161        | 0.11                     | 11.89          | 0.05               | 0.000        |
| 31.46                                                     | 2.17 | 81.61           | 1.54 | 125.66             | 28                        | 1811                   | 0.53 | 0.157        | 0.11                     | 11.89          | 0.04               | 0.000        |
| 31.50                                                     | 2.17 | 82.36           | 1.54 | 127.18             | 28                        | 1835                   | 0.53 | 0.152        | 0.10                     | 11.89          | 0.04               | 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) |
| 31.57                                                     | 2.17 | 82.84           | 1.55 | 128.37             | 29                        | 1856                   | 0.53 | 0.148        | 0.10                     | 11.89          | 0.04               | 0.000        |
| 31.65                                                     | 2.18 | 82.96           | 1.56 | 129.19             | 29                        | 1872                   | 0.53 | 0.145        | 0.09                     | 11.89          | 0.04               | 0.000        |
| 31.72                                                     | 2.18 | 82.67           | 1.57 | 129.42             | 29                        | 1879                   | 0.53 | 0.144        | 0.09                     | 11.89          | 0.04               | 0.000        |
| 31.76                                                     | 2.18 | 82.11           | 1.57 | 129.21             | 29                        | 1878                   | 0.53 | 0.145        | 0.09                     | 11.89          | 0.04               | 0.000        |
| 31.84                                                     | 2.19 | 81.36           | 1.58 | 128.82             | 29                        | 1876                   | 0.53 | 0.146        | 0.09                     | 11.89          | 0.04               | 0.000        |
| 31.92                                                     | 2.19 | 81.25           | 1.58 | 128.47             | 29                        | 1874                   | 0.53 | 0.146        | 0.09                     | 11.89          | 0.04               | 0.000        |
| 31.97                                                     | 2.19 | 80.49           | 1.59 | 128.12             | 29                        | 1871                   | 0.53 | 0.147        | 0.10                     | 11.89          | 0.04               | 0.000        |
| 32.04                                                     | 2.19 | 81.11           | 1.58 | 128.21             | 29                        | 1876                   | 0.53 | 0.147        | 0.10                     | 11.89          | 0.04               | 0.000        |
| 32.11                                                     | 2.18 | 81.78           | 1.57 | 128.39             | 29                        | 1881                   | 0.53 | 0.146        | 0.09                     | 11.89          | 0.04               | 0.000        |
| 32.19                                                     | 2.17 | 83.42           | 1.55 | 128.99             | 29                        | 1892                   | 0.53 | 0.145        | 0.09                     | 11.89          | 0.04               | 0.000        |
| 32.23                                                     | 2.17 | 83.93           | 1.54 | 129.42             | 29                        | 1900                   | 0.53 | 0.143        | 0.09                     | 11.89          | 0.04               | 0.000        |
| 32.30                                                     | 2.17 | 83.50           | 1.55 | 129.74             | 29                        | 1909                   | 0.53 | 0.142        | 0.09                     | 11.89          | 0.04               | 0.000        |
| 32.37                                                     | 2.18 | 82.96           | 1.57 | 130.17             | 29                        | 1919                   | 0.53 | 0.140        | 0.09                     | 11.89          | 0.04               | 0.000        |
| 32.45                                                     | 2.19 | 82.51           | 1.58 | 130.42             | 29                        | 1927                   | 0.53 | 0.139        | 0.09                     | 11.89          | 0.04               | 0.000        |
| 32.49                                                     | 2.19 | 82.44           | 1.58 | 130.32             | 29                        | 1927                   | 0.53 | 0.140        | 0.09                     | 11.89          | 0.04               | 0.000        |
| 32.56                                                     | 2.18 | 82.28           | 1.58 | 129.69             | 29                        | 1921                   | 0.53 | 0.141        | 0.09                     | 11.89          | 0.04               | 0.000        |
| 32.64                                                     | 2.18 | 82.01           | 1.57 | 128.83             | 29                        | 1911                   | 0.53 | 0.144        | 0.09                     | 11.89          | 0.04               | 0.000        |
| 32.71                                                     | 2.18 | 81.75           | 1.57 | 128.06             | 29                        | 1903                   | 0.53 | 0.146        | 0.09                     | 11.89          | 0.04               | 0.000        |
| 32.75                                                     | 2.18 | 81.90           | 1.56 | 127.44             | 28                        | 1895                   | 0.53 | 0.148        | 0.10                     | 11.89          | 0.04               | 0.000        |
| 32.82                                                     | 2.17 | 82.50           | 1.54 | 126.95             | 28                        | 1889                   | 0.53 | 0.149        | 0.10                     | 11.89          | 0.04               | 0.000        |
| 32.89                                                     | 2.15 | 83.52           | 1.51 | 126.35             | 28                        | 1880                   | 0.53 | 0.152        | 0.10                     | 11.89          | 0.04               | 0.000        |
| 32.97                                                     | 2.14 | 84.43           | 1.49 | 125.83             | 28                        | 1870                   | 0.53 | 0.154        | 0.10                     | 11.89          | 0.04               | 0.000        |
| 33.01                                                     | 2.13 | 85.81           | 1.46 | 125.61             | 28                        | 1861                   | 0.53 | 0.157        | 0.11                     | 11.89          | 0.04               | 0.000        |
| 33.08                                                     | 2.11 | 88.19           | 1.43 | 126.35             | 27                        | 1861                   | 0.53 | 0.157        | 0.11                     | 11.89          | 0.04               | 0.000        |
| 33.16                                                     | 2.08 | 92.07           | 1.39 | 128.27             | 28                        | 1868                   | 0.53 | 0.156        | 0.11                     | 11.89          | 0.04               | 0.000        |
| 33.24                                                     | 2.06 | 96.20           | 1.36 | 130.87             | 28                        | 1877                   | 0.53 | 0.155        | 0.10                     | 11.89          | 0.04               | 0.000        |
| 33.28                                                     | 2.03 | 100.63          | 1.33 | 134.15             | 28                        | 1890                   | 0.53 | 0.152        | 0.10                     | 11.89          | 0.04               | 0.000        |
| 33.36                                                     | 2.01 | 104.62          | 1.31 | 137.23             | 29                        | 1899                   | 0.53 | 0.151        | 0.10                     | 11.89          | 0.04               | 0.000        |
| 33.43                                                     | 1.98 | 108.47          | 1.29 | 140.17             | 29                        | 1901                   | 0.53 | 0.151        | 0.10                     | 11.89          | 0.04               | 0.000        |
| 33.50                                                     | 1.96 | 110.82          | 1.28 | 141.71             | 29                        | 1891                   | 0.53 | 0.153        | 0.10                     | 11.89          | 0.04               | 0.000        |
| 33.54                                                     | 1.95 | 111.92          | 1.27 | 142.04             | 29                        | 1872                   | 0.53 | 0.158        | 0.10                     | 11.89          | 0.04               | 0.000        |
| 33.61                                                     | 1.94 | 111.59          | 1.26 | 141.04             | 29                        | 1847                   | 0.53 | 0.164        | 0.11                     | 11.89          | 0.04               | 0.000        |
| 33.68                                                     | 1.94 | 110.35          | 1.26 | 139.14             | 28                        | 1817                   | 0.53 | 0.172        | 0.11                     | 11.89          | 0.04               | 0.000        |
| 33.75                                                     | 1.94 | 108.75          | 1.26 | 137.15             | 28                        | 1794                   | 0.53 | 0.179        | 0.12                     | 11.89          | 0.05               | 0.000        |
| 33.79                                                     | 1.94 | 106.77          | 1.26 | 135.04             | 27                        | 1777                   | 0.53 | 0.184        | 0.13                     | 11.89          | 0.05               | 0.000        |
| 33.87                                                     | 1.95 | 104.60          | 1.27 | 132.97             | 27                        | 1769                   | 0.53 | 0.187        | 0.13                     | 11.89          | 0.05               | 0.000        |
| 33.94                                                     | 1.97 | 101.99          | 1.28 | 130.62             | 27                        | 1763                   | 0.53 | 0.190        | 0.13                     | 11.89          | 0.05               | 0.000        |
| 34.03                                                     | 1.98 | 99.99           | 1.29 | 128.92             | 27                        | 1763                   | 0.53 | 0.190        | 0.14                     | 11.89          | 0.05               | 0.001        |
| 34.07                                                     | 1.99 | 98.24           | 1.30 | 127.59             | 26                        | 1766                   | 0.53 | 0.190        | 0.14                     | 11.89          | 0.05               | 0.000        |
| 34.14                                                     | 2.00 | 96.68           | 1.31 | 126.59             | 26                        | 1776                   | 0.53 | 0.188        | 0.13                     | 11.89          | 0.05               | 0.000        |
| 34.22                                                     | 2.01 | 95.25           | 1.32 | 125.74             | 26                        | 1785                   | 0.53 | 0.185        | 0.13                     | 11.89          | 0.05               | 0.000        |
| 34.25                                                     | 2.02 | 94.62           | 1.33 | 125.56             | 26                        | 1795                   | 0.53 | 0.182        | 0.13                     | 11.89          | 0.05               | 0.000        |
| 34.33                                                     | 2.02 | 94.52           | 1.33 | 125.64             | 26                        | 1803                   | 0.53 | 0.181        | 0.13                     | 11.89          | 0.05               | 0.000        |
| 34.40                                                     | 2.03 | 94.57           | 1.33 | 125.80             | 26                        | 1809                   | 0.53 | 0.180        | 0.13                     | 11.89          | 0.05               | 0.000        |
| 34.47                                                     | 2.03 | 93.70           | 1.34 | 125.41             | 26                        | 1818                   | 0.53 | 0.178        | 0.13                     | 11.89          | 0.05               | 0.000        |
| 34.55                                                     | 2.05 | 92.03           | 1.35 | 124.65             | 26                        | 1830                   | 0.53 | 0.175        | 0.12                     | 11.89          | 0.05               | 0.000        |
| 34.59                                                     | 2.08 | 89.14           | 1.39 | 123.54             | 26                        | 1848                   | 0.53 | 0.170        | 0.12                     | 11.89          | 0.05               | 0.000        |
| 34.66                                                     | 2.10 | 85.99           | 1.42 | 121.76             | 26                        | 1846                   | 0.53 | 0.171        | 0.12                     | 11.89          | 0.05               | 0.000        |

| :: Post-earthquake settlement of dry sands :: (continued) |      |                 |      |                    |                              |                           |      |                 |                             |                |                       |                 |
|-----------------------------------------------------------|------|-----------------|------|--------------------|------------------------------|---------------------------|------|-----------------|-----------------------------|----------------|-----------------------|-----------------|
| Depth<br>(ft)                                             | Ic   | Q <sub>tn</sub> | Kc   | Q <sub>tn,cs</sub> | N <sub>1,60</sub><br>(blows) | G <sub>max</sub><br>(tsf) | CSR  | Shear, γ<br>(%) | e <sub>vol(15)</sub><br>(%) | N <sub>c</sub> | e <sub>v</sub><br>(%) | Settle.<br>(in) |
| 34.74                                                     | 2.12 | 83.07           | 1.45 | 120.31             | 26                           | 1844                      | 0.53 | 0.172           | 0.12                        | 11.89          | 0.05                  | 0.000           |
| 34.78                                                     | 2.14 | 80.71           | 1.49 | 120.05             | 26                           | 1856                      | 0.53 | 0.170           | 0.12                        | 11.89          | 0.04                  | 0.000           |
| 34.86                                                     | 2.18 | 78.14           | 1.56 | 122.06             | 27                           | 1903                      | 0.53 | 0.159           | 0.11                        | 11.89          | 0.04                  | 0.000           |
| 34.93                                                     | 2.23 | 74.53           | 1.70 | 126.85             | 29                           | 1977                      | 0.53 | 0.144           | 0.09                        | 11.89          | 0.03                  | 0.000           |
| 35.01                                                     | 2.28 | 71.61           | 1.86 | 133.05             | 31                           | 2050                      | 0.53 | 0.132           | 0.08                        | 11.89          | 0.03                  | 0.000           |
| 35.05                                                     | 2.33 | 69.26           | 2.04 | 141.17             | 34                           | 2133                      | 0.53 | 0.120           | 0.06                        | 11.89          | 0.02                  | 0.000           |
| 35.12                                                     | 2.36 | 68.54           | 2.16 | 148.22             | 36                           | 2208                      | 0.53 | 0.110           | 0.06                        | 11.89          | 0.02                  | 0.000           |
| 35.19                                                     | 2.38 | 68.18           | 2.26 | 154.11             | 38                           | 2271                      | 0.53 | 0.104           | 0.05                        | 11.89          | 0.02                  | 0.000           |
| 35.27                                                     | 2.38 | 68.54           | 2.29 | 156.93             | 38                           | 2308                      | 0.53 | 0.100           | 0.05                        | 11.89          | 0.02                  | 0.000           |
| 35.31                                                     | 2.38 | 69.56           | 2.27 | 157.94             | 38                           | 2331                      | 0.53 | 0.098           | 0.04                        | 11.89          | 0.02                  | 0.000           |
| 35.38                                                     | 2.36 | 73.01           | 2.16 | 157.82             | 38                           | 2366                      | 0.53 | 0.095           | 0.04                        | 11.89          | 0.02                  | 0.000           |
| 35.46                                                     | 2.31 | 79.98           | 1.96 | 157.08             | 37                           | 2418                      | 0.53 | 0.091           | 0.04                        | 11.89          | 0.02                  | 0.000           |
| 35.53                                                     | 2.26 | 88.45           | 1.78 | 157.02             | 36                           | 2468                      | 0.53 | 0.088           | 0.04                        | 11.89          | 0.02                  | 0.000           |
| 35.57                                                     | 2.19 | 99.78           | 1.59 | 158.48             | 36                           | 2511                      | 0.53 | 0.085           | 0.04                        | 11.89          | 0.02                  | 0.000           |
| 35.64                                                     | 2.11 | 114.13          | 1.44 | 163.87             | 36                           | 2551                      | 0.53 | 0.082           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 35.71                                                     | 2.02 | 132.97          | 1.33 | 176.39             | 37                           | 2596                      | 0.52 | 0.080           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 35.78                                                     | 1.95 | 151.49          | 1.27 | 192.03             | 39                           | 2636                      | 0.52 | 0.077           | 0.03                        | 11.89          | 0.01                  | 0.000           |
| 35.86                                                     | 1.90 | 164.86          | 1.23 | 203.59             | 41                           | 2663                      | 0.52 | 0.076           | 0.03                        | 11.89          | 0.01                  | 0.000           |
| 35.93                                                     | 1.87 | 171.42          | 1.22 | 208.76             | 41                           | 2669                      | 0.52 | 0.076           | 0.03                        | 11.89          | 0.01                  | 0.000           |
| 35.97                                                     | 1.87 | 171.03          | 1.21 | 207.55             | 41                           | 2641                      | 0.52 | 0.078           | 0.03                        | 11.89          | 0.01                  | 0.000           |
| 36.05                                                     | 1.87 | 165.74          | 1.22 | 201.81             | 40                           | 2585                      | 0.52 | 0.081           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 36.12                                                     | 1.88 | 158.88          | 1.23 | 194.64             | 39                           | 2522                      | 0.52 | 0.085           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 36.16                                                     | 1.90 | 150.20          | 1.24 | 185.96             | 37                           | 2457                      | 0.52 | 0.090           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 36.23                                                     | 1.93 | 141.06          | 1.25 | 176.99             | 36                           | 2403                      | 0.52 | 0.095           | 0.05                        | 11.89          | 0.02                  | 0.000           |
| 36.30                                                     | 1.96 | 131.77          | 1.27 | 167.93             | 34                           | 2352                      | 0.52 | 0.100           | 0.05                        | 11.89          | 0.02                  | 0.000           |
| 36.38                                                     | 1.98 | 125.94          | 1.29 | 162.41             | 34                           | 2326                      | 0.52 | 0.102           | 0.06                        | 11.89          | 0.02                  | 0.000           |
| 36.42                                                     | 1.99 | 123.58          | 1.30 | 160.48             | 33                           | 2326                      | 0.52 | 0.103           | 0.06                        | 11.89          | 0.02                  | 0.000           |
| 36.49                                                     | 2.00 | 122.91          | 1.31 | 160.48             | 33                           | 2348                      | 0.52 | 0.101           | 0.05                        | 11.89          | 0.02                  | 0.000           |
| 36.57                                                     | 2.01 | 122.09          | 1.32 | 160.90             | 34                           | 2388                      | 0.52 | 0.097           | 0.05                        | 11.89          | 0.02                  | 0.000           |
| 36.64                                                     | 2.03 | 120.96          | 1.33 | 161.25             | 34                           | 2431                      | 0.52 | 0.094           | 0.05                        | 11.89          | 0.02                  | 0.000           |
| 36.68                                                     | 2.05 | 118.27          | 1.36 | 160.72             | 34                           | 2472                      | 0.52 | 0.091           | 0.05                        | 11.89          | 0.02                  | 0.000           |
| 36.76                                                     | 2.10 | 112.30          | 1.41 | 158.56             | 34                           | 2507                      | 0.52 | 0.088           | 0.05                        | 11.89          | 0.02                  | 0.000           |
| 36.83                                                     | 2.16 | 102.94          | 1.52 | 156.31             | 35                           | 2534                      | 0.52 | 0.086           | 0.04                        | 11.89          | 0.02                  | 0.000           |
| 36.90                                                     | 2.22 | 93.38           | 1.67 | 156.23             | 36                           | 2547                      | 0.52 | 0.086           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 36.94                                                     | 2.29 | 84.55           | 1.88 | 158.60             | 37                           | 2550                      | 0.52 | 0.086           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 37.02                                                     | 2.34 | 78.32           | 2.07 | 161.97             | 39                           | 2553                      | 0.52 | 0.086           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 37.10                                                     | 2.37 | 74.38           | 2.21 | 164.74             | 40                           | 2555                      | 0.52 | 0.086           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 37.17                                                     | 2.38 | 73.22           | 2.26 | 165.46             | 40                           | 2556                      | 0.52 | 0.086           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 37.21                                                     | 2.37 | 73.56           | 2.24 | 165.04             | 40                           | 2557                      | 0.52 | 0.086           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 37.29                                                     | 2.37 | 74.21           | 2.22 | 164.75             | 40                           | 2564                      | 0.52 | 0.086           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 37.36                                                     | 2.36 | 75.13           | 2.19 | 164.40             | 40                           | 2573                      | 0.52 | 0.085           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 37.44                                                     | 2.36 | 75.66           | 2.17 | 164.10             | 40                           | 2579                      | 0.52 | 0.085           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 37.48                                                     | 2.36 | 75.70           | 2.17 | 163.95             | 40                           | 2580                      | 0.52 | 0.085           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 37.55                                                     | 2.34 | 75.97           | 2.08 | 158.02             | 38                           | 2517                      | 0.52 | 0.089           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 37.62                                                     | 2.30 | 79.00           | 1.93 | 152.26             | 36                           | 2472                      | 0.52 | 0.093           | 0.05                        | 11.89          | 0.02                  | 0.000           |
| 37.70                                                     | 2.26 | 83.77           | 1.77 | 148.50             | 34                           | 2449                      | 0.52 | 0.095           | 0.05                        | 11.89          | 0.02                  | 0.000           |
| 37.74                                                     | 2.21 | 92.47           | 1.64 | 151.95             | 34                           | 2523                      | 0.52 | 0.090           | 0.05                        | 11.89          | 0.02                  | 0.000           |
| 37.81                                                     | 2.17 | 101.86          | 1.54 | 156.94             | 35                           | 2602                      | 0.52 | 0.084           | 0.04                        | 11.89          | 0.01                  | 0.000           |

| :: Post-earthquake settlement of dry sands :: (continued) |                |                 |                |                    |                              |                           |      |                 |                             |                |                       |                 |
|-----------------------------------------------------------|----------------|-----------------|----------------|--------------------|------------------------------|---------------------------|------|-----------------|-----------------------------|----------------|-----------------------|-----------------|
| Depth<br>(ft)                                             | I <sub>c</sub> | Q <sub>tn</sub> | K <sub>c</sub> | Q <sub>tn,cs</sub> | N <sub>1,60</sub><br>(blows) | G <sub>max</sub><br>(tsf) | CSR  | Shear, γ<br>(%) | e <sub>vol(15)</sub><br>(%) | N <sub>c</sub> | e <sub>v</sub><br>(%) | Settle.<br>(in) |
| 37.88                                                     | 2.12           | 113.00          | 1.45           | 163.87             | 36                           | 2681                      | 0.52 | 0.080           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 37.96                                                     | 2.18           | 103.84          | 1.56           | 161.70             | 36                           | 2692                      | 0.52 | 0.079           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 37.99                                                     | 2.14           | 112.14          | 1.49           | 166.90             | 37                           | 2759                      | 0.52 | 0.075           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 38.06                                                     | 2.10           | 121.08          | 1.43           | 172.54             | 37                           | 2813                      | 0.52 | 0.073           | 0.03                        | 11.89          | 0.01                  | 0.000           |
| 38.12                                                     | 1.99           | 148.33          | 1.30           | 192.89             | 40                           | 2893                      | 0.52 | 0.069           | 0.03                        | 11.89          | 0.01                  | 0.000           |
| 38.19                                                     | 1.97           | 153.14          | 1.28           | 196.38             | 40                           | 2880                      | 0.52 | 0.070           | 0.03                        | 11.89          | 0.01                  | 0.000           |
| 38.27                                                     | 1.97           | 149.22          | 1.29           | 191.86             | 40                           | 2831                      | 0.52 | 0.072           | 0.03                        | 11.89          | 0.01                  | 0.000           |
| 38.35                                                     | 2.00           | 138.83          | 1.31           | 181.69             | 38                           | 2762                      | 0.52 | 0.076           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 38.42                                                     | 2.04           | 126.89          | 1.35           | 170.90             | 36                           | 2695                      | 0.52 | 0.080           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 38.46                                                     | 2.09           | 115.11          | 1.40           | 161.19             | 35                           | 2623                      | 0.52 | 0.084           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 38.53                                                     | 2.13           | 105.13          | 1.47           | 154.04             | 34                           | 2563                      | 0.52 | 0.089           | 0.05                        | 11.89          | 0.01                  | 0.000           |
| 38.60                                                     | 2.17           | 97.05           | 1.54           | 149.50             | 33                           | 2519                      | 0.52 | 0.092           | 0.05                        | 11.89          | 0.02                  | 0.000           |
| 38.68                                                     | 2.18           | 94.23           | 1.58           | 148.47             | 33                           | 2511                      | 0.52 | 0.093           | 0.05                        | 11.89          | 0.02                  | 0.000           |
| 38.75                                                     | 2.19           | 93.34           | 1.59           | 148.60             | 33                           | 2519                      | 0.52 | 0.092           | 0.05                        | 11.89          | 0.02                  | 0.000           |
| 38.79                                                     | 2.19           | 94.04           | 1.59           | 149.65             | 34                           | 2538                      | 0.52 | 0.091           | 0.05                        | 11.89          | 0.02                  | 0.000           |
| 38.86                                                     | 2.19           | 95.85           | 1.58           | 151.42             | 34                           | 2571                      | 0.52 | 0.089           | 0.05                        | 11.89          | 0.01                  | 0.000           |
| 38.93                                                     | 2.16           | 101.20          | 1.53           | 154.90             | 34                           | 2624                      | 0.52 | 0.085           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 39.00                                                     | 2.13           | 108.40          | 1.47           | 159.30             | 35                           | 2677                      | 0.52 | 0.082           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 39.07                                                     | 2.10           | 115.38          | 1.42           | 163.78             | 35                           | 2717                      | 0.52 | 0.080           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 39.14                                                     | 2.08           | 120.46          | 1.39           | 167.16             | 36                           | 2739                      | 0.52 | 0.079           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 39.18                                                     | 2.06           | 124.95          | 1.36           | 170.09             | 36                           | 2748                      | 0.52 | 0.078           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 39.25                                                     | 2.03           | 129.70          | 1.34           | 173.20             | 36                           | 2748                      | 0.52 | 0.078           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 39.33                                                     | 2.00           | 136.96          | 1.30           | 178.55             | 37                           | 2747                      | 0.52 | 0.079           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 39.40                                                     | 1.96           | 145.56          | 1.27           | 185.44             | 38                           | 2745                      | 0.52 | 0.079           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 39.47                                                     | 1.92           | 153.32          | 1.25           | 191.79             | 39                           | 2741                      | 0.52 | 0.079           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 39.50                                                     | 1.89           | 159.27          | 1.23           | 196.07             | 39                           | 2717                      | 0.52 | 0.081           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 39.57                                                     | 1.87           | 161.00          | 1.22           | 196.20             | 39                           | 2674                      | 0.52 | 0.083           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 39.64                                                     | 1.87           | 157.81          | 1.22           | 191.82             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 39.72                                                     | 1.89           | 148.39          | 1.23           | 182.42             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 39.79                                                     | 1.93           | 135.13          | 1.26           | 169.70             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 39.86                                                     | 1.97           | 123.84          | 1.28           | 158.84             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 39.90                                                     | 2.00           | 114.43          | 1.31           | 149.83             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 39.97                                                     | 2.02           | 107.67          | 1.33           | 143.07             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 40.05                                                     | 2.05           | 100.80          | 1.36           | 136.86             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 40.13                                                     | 2.08           | 96.02           | 1.39           | 133.16             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 40.16                                                     | 2.10           | 92.15           | 1.43           | 131.35             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 40.24                                                     | 2.13           | 89.26           | 1.46           | 130.56             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 40.31                                                     | 2.15           | 86.45           | 1.51           | 130.33             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 40.39                                                     | 2.17           | 84.42           | 1.55           | 130.46             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 40.43                                                     | 2.19           | 82.23           | 1.59           | 130.48             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 40.50                                                     | 2.21           | 79.78           | 1.63           | 130.40             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 40.57                                                     | 2.23           | 76.87           | 1.68           | 129.23             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 40.65                                                     | 2.25           | 73.67           | 1.75           | 128.71             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 40.71                                                     | 2.28           | 70.45           | 1.84           | 129.64             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 40.75                                                     | 2.32           | 66.67           | 2.00           | 133.55             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 40.83                                                     | 2.36           | 63.07           | 2.20           | 138.68             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 40.90                                                     | 2.41           | 59.43           | 2.42           | 143.87             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 40.96                                                     | 2.43           | 58.45           | 2.51           | 146.86             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |

| :: Post-earthquake settlement of dry sands :: (continued) |                |                 |                |                    |                              |                           |      |                 |                             |                |                       |                 |
|-----------------------------------------------------------|----------------|-----------------|----------------|--------------------|------------------------------|---------------------------|------|-----------------|-----------------------------|----------------|-----------------------|-----------------|
| Depth<br>(ft)                                             | I <sub>c</sub> | Q <sub>tn</sub> | K <sub>c</sub> | Q <sub>tn,cs</sub> | N <sub>1,60</sub><br>(blows) | G <sub>max</sub><br>(tsf) | CSR  | Shear, γ<br>(%) | e <sub>vol(15)</sub><br>(%) | N <sub>c</sub> | e <sub>v</sub><br>(%) | Settle.<br>(in) |
| 41.03                                                     | 2.44           | 57.57           | 2.58           | 148.46             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.09                                                     | 2.42           | 58.88           | 2.51           | 147.77             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.16                                                     | 2.41           | 60.01           | 2.45           | 146.96             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.23                                                     | 2.39           | 62.22           | 2.33           | 144.97             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.30                                                     | 2.38           | 62.94           | 2.28           | 143.30             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.34                                                     | 2.39           | 61.56           | 2.31           | 142.33             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.42                                                     | 2.41           | 59.13           | 2.41           | 142.63             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.49                                                     | 2.43           | 56.48           | 2.54           | 143.63             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.56                                                     | 2.45           | 54.67           | 2.64           | 144.39             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.64                                                     | 2.46           | 53.65           | 2.69           | 144.46             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.70                                                     | 2.46           | 53.00           | 2.73           | 144.45             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.74                                                     | 2.47           | 52.20           | 2.78           | 145.20             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.81                                                     | 2.48           | 51.43           | 2.86           | 147.14             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.89                                                     | 2.49           | 50.95           | 2.94           | 149.81             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.96                                                     | 2.50           | 50.96           | 2.99           | 152.14             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 42.00                                                     | 2.50           | 51.21           | 3.00           | 153.64             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 42.08                                                     | 2.51           | 50.98           | 3.05           | 155.50             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 42.15                                                     | 2.52           | 50.27           | 3.14           | 158.05             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 42.19                                                     | 2.54           | 48.89           | 3.30           | 161.44             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 42.27                                                     | 2.56           | 47.55           | 3.45           | 163.96             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 42.35                                                     | 2.58           | 46.23           | 3.59           | 166.19             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 42.42                                                     | 2.60           | 45.17           | 3.71           | 167.58             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 42.46                                                     | 2.61           | 44.25           | 3.81           | 168.65             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 42.54                                                     | 2.61           | 43.78           | 3.85           | 168.59             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 42.61                                                     | 2.61           | 43.84           | 3.81           | 167.10             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 42.69                                                     | 2.60           | 44.20           | 3.73           | 164.98             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 42.72                                                     | 2.58           | 45.00           | 3.60           | 161.86             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 42.80                                                     | 2.56           | 46.02           | 3.44           | 158.16             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 42.87                                                     | 2.54           | 47.48           | 3.23           | 153.56             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 42.95                                                     | 2.51           | 48.82           | 3.07           | 149.80             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 42.98                                                     | 2.49           | 50.76           | 2.88           | 146.18             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 43.06                                                     | 2.45           | 53.39           | 2.67           | 142.77             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 43.13                                                     | 2.41           | 57.27           | 2.43           | 138.99             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 43.21                                                     | 2.37           | 60.83           | 2.24           | 136.40             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 43.25                                                     | 2.34           | 64.47           | 2.08           | 134.35             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 43.32                                                     | 2.31           | 67.38           | 1.97           | 132.90             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 43.39                                                     | 2.29           | 70.01           | 1.88           | 131.87             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 43.47                                                     | 2.28           | 71.41           | 1.84           | 131.40             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 43.51                                                     | 2.27           | 72.20           | 1.82           | 131.39             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 43.58                                                     | 2.27           | 72.78           | 1.81           | 131.37             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 43.66                                                     | 2.26           | 73.40           | 1.79           | 131.20             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 43.73                                                     | 2.26           | 73.86           | 1.77           | 130.83             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 43.77                                                     | 2.25           | 74.19           | 1.76           | 130.38             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 43.84                                                     | 2.25           | 74.19           | 1.76           | 130.37             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 43.93                                                     | 2.26           | 73.84           | 1.77           | 130.80             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 44.00                                                     | 2.27           | 72.51           | 1.82           | 131.71             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 44.03                                                     | 2.29           | 70.29           | 1.90           | 133.58             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 44.11                                                     | 2.32           | 68.32           | 2.01           | 137.32             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |

| :: Post-earthquake settlement of dry sands :: (continued) |      |                 |      |                    |                              |                           |      |                 |                             |                |                       |                 |
|-----------------------------------------------------------|------|-----------------|------|--------------------|------------------------------|---------------------------|------|-----------------|-----------------------------|----------------|-----------------------|-----------------|
| Depth<br>(ft)                                             | Ic   | Q <sub>tn</sub> | Kc   | Q <sub>tn,cs</sub> | N <sub>1,60</sub><br>(blows) | G <sub>max</sub><br>(tsf) | CSR  | Shear, γ<br>(%) | e <sub>vol(15)</sub><br>(%) | N <sub>c</sub> | e <sub>v</sub><br>(%) | Settle.<br>(in) |
| 44.18                                                     | 2.35 | 66.76           | 2.15 | 143.45             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 44.25                                                     | 2.39 | 65.34           | 2.31 | 151.07             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 44.33                                                     | 2.43 | 62.47           | 2.55 | 159.07             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 44.40                                                     | 2.48 | 58.67           | 2.84 | 166.35             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 44.44                                                     | 2.55 | 52.72           | 3.32 | 174.83             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 44.51                                                     | 2.63 | 45.61           | 4.04 | 184.20             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 44.59                                                     | 2.72 | 39.01           | 4.93 | 192.50             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 44.63                                                     | 2.79 | 34.46           | 5.73 | 197.53             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 44.71                                                     | 2.83 | 31.98           | 6.22 | 198.79             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 44.79                                                     | 2.86 | 30.11           | 6.63 | 199.54             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 44.82                                                     | 2.89 | 28.41           | 7.10 | 201.82             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 44.90                                                     | 2.93 | 27.07           | 7.59 | 205.55             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 44.97                                                     | 2.94 | 26.65           | 7.84 | 208.98             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 45.02                                                     | 2.90 | 28.93           | 7.22 | 209.03             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 45.09                                                     | 2.82 | 33.41           | 6.14 | 205.15             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 45.16                                                     | 2.72 | 39.88           | 4.94 | 196.93             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 45.23                                                     | 2.62 | 47.03           | 3.94 | 185.32             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 45.32                                                     | 2.54 | 53.06           | 3.28 | 174.09             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 45.36                                                     | 2.47 | 59.11           | 2.76 | 162.93             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 45.43                                                     | 2.40 | 64.08           | 2.39 | 153.19             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 45.51                                                     | 2.35 | 68.04           | 2.14 | 145.72             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 45.54                                                     | 2.33 | 69.66           | 2.02 | 140.95             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 45.62                                                     | 2.31 | 70.21           | 1.96 | 137.62             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 45.69                                                     | 2.30 | 70.14           | 1.92 | 134.67             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 45.76                                                     | 2.30 | 69.46           | 1.92 | 133.07             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 45.83                                                     | 2.31 | 68.29           | 1.95 | 133.43             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 45.87                                                     | 2.33 | 66.90           | 2.04 | 136.39             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 45.95                                                     | 2.36 | 65.49           | 2.17 | 142.43             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 46.03                                                     | 2.40 | 63.46           | 2.38 | 151.26             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 46.10                                                     | 2.44 | 61.90           | 2.58 | 159.46             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 46.14                                                     | 2.48 | 59.73           | 2.82 | 168.28             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 46.21                                                     | 2.52 | 56.50           | 3.15 | 178.24             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 46.29                                                     | 2.58 | 52.69           | 3.59 | 188.91             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 46.33                                                     | 2.64 | 48.57           | 4.10 | 199.36             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 46.40                                                     | 2.69 | 45.44           | 4.60 | 208.85             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 46.47                                                     | 2.73 | 43.38           | 5.01 | 217.54             | 0                            | 0                         | 0.50 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 46.55                                                     | 2.75 | 42.33           | 5.28 | 223.69             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 46.62                                                     | 2.76 | 42.04           | 5.34 | 224.42             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 46.66                                                     | 2.75 | 41.28           | 5.30 | 218.70             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 46.74                                                     | 2.76 | 40.04           | 5.35 | 214.24             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 46.81                                                     | 2.77 | 38.70           | 5.48 | 211.95             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 46.86                                                     | 2.79 | 37.84           | 5.72 | 216.29             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 46.92                                                     | 2.80 | 37.48           | 5.84 | 219.09             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 47.00                                                     | 2.81 | 36.84           | 6.04 | 222.36             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 47.06                                                     | 2.81 | 37.39           | 5.99 | 224.04             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 47.14                                                     | 2.80 | 38.36           | 5.87 | 225.01             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 47.21                                                     | 2.79 | 39.54           | 5.71 | 225.82             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 47.25                                                     | 2.79 | 39.59           | 5.76 | 228.16             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |

| :: Post-earthquake settlement of dry sands :: (continued) |                |                 |                |                    |                              |                           |      |                 |                             |                |                       |                 |
|-----------------------------------------------------------|----------------|-----------------|----------------|--------------------|------------------------------|---------------------------|------|-----------------|-----------------------------|----------------|-----------------------|-----------------|
| Depth<br>(ft)                                             | I <sub>c</sub> | Q <sub>tn</sub> | K <sub>c</sub> | Q <sub>tn,cs</sub> | N <sub>1,60</sub><br>(blows) | G <sub>max</sub><br>(tsf) | CSR  | Shear, γ<br>(%) | e <sub>vol(15)</sub><br>(%) | N <sub>c</sub> | e <sub>v</sub><br>(%) | Settle.<br>(in) |
| 47.32                                                     | 2.80           | 39.38           | 5.86           | 230.70             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 47.40                                                     | 2.80           | 39.80           | 5.84           | 232.26             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 47.47                                                     | 2.79           | 40.45           | 5.75           | 232.65             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 47.51                                                     | 2.78           | 41.39           | 5.61           | 232.38             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 47.58                                                     | 2.79           | 41.17           | 5.67           | 233.62             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 47.66                                                     | 2.80           | 40.46           | 5.83           | 235.87             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 47.73                                                     | 2.81           | 39.55           | 6.03           | 238.39             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 47.78                                                     | 2.82           | 39.22           | 6.13           | 240.25             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 47.85                                                     | 2.82           | 39.75           | 6.05           | 240.56             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 47.92                                                     | 2.80           | 40.75           | 5.89           | 240.07             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 47.99                                                     | 2.79           | 42.04           | 5.68           | 238.89             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 48.03                                                     | 2.77           | 43.00           | 5.54           | 238.39             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 48.11                                                     | 2.77           | 43.58           | 5.47           | 238.25             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 48.18                                                     | 2.75           | 44.54           | 5.31           | 236.45             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 48.26                                                     | 2.74           | 45.79           | 5.09           | 233.14             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 48.30                                                     | 2.71           | 47.26           | 4.82           | 227.93             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 48.37                                                     | 2.69           | 48.28           | 4.61           | 222.35             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 48.45                                                     | 2.67           | 49.21           | 4.37           | 214.90             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 48.52                                                     | 2.64           | 50.65           | 4.07           | 206.21             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 48.59                                                     | 2.60           | 52.36           | 3.78           | 197.72             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 48.63                                                     | 2.56           | 54.71           | 3.44           | 188.10             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 48.70                                                     | 2.51           | 58.07           | 3.05           | 177.24             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 48.77                                                     | 2.44           | 63.21           | 2.61           | 164.89             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 48.84                                                     | 2.37           | 69.50           | 2.21           | 153.58             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 48.92                                                     | 2.31           | 74.62           | 1.95           | 145.82             | 0                            | 0                         | 0.48 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 48.96                                                     | 2.26           | 78.58           | 1.78           | 139.77             | 0                            | 0                         | 0.48 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 49.03                                                     | 2.22           | 81.39           | 1.66           | 135.52             | 0                            | 0                         | 0.48 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 49.10                                                     | 2.18           | 84.69           | 1.56           | 132.50             | 0                            | 0                         | 0.48 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 49.18                                                     | 2.15           | 87.41           | 1.50           | 131.33             | 0                            | 0                         | 0.48 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 49.22                                                     | 2.13           | 89.78           | 1.46           | 131.35             | 0                            | 0                         | 0.48 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 49.29                                                     | 2.11           | 91.65           | 1.44           | 131.60             | 0                            | 0                         | 0.48 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 49.37                                                     | 2.09           | 93.88           | 1.41           | 131.93             | 0                            | 0                         | 0.48 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 49.44                                                     | 2.07           | 95.83           | 1.38           | 132.34             | 0                            | 0                         | 0.48 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 49.48                                                     | 2.05           | 98.05           | 1.36           | 133.20             | 0                            | 0                         | 0.48 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 49.56                                                     | 2.04           | 99.50           | 1.34           | 133.78             | 0                            | 0                         | 0.48 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 49.63                                                     | 2.03           | 100.35          | 1.33           | 133.84             | 0                            | 0                         | 0.48 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 49.67                                                     | 2.02           | 100.09          | 1.32           | 132.30             | 0                            | 0                         | 0.48 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 49.74                                                     | 2.03           | 97.42           | 1.33           | 129.98             | 27                           | 2435                      | 0.48 | 0.117           | 0.08                        | 11.89          | 0.01                  | 0.000           |
| 49.82                                                     | 2.06           | 92.91           | 1.36           | 126.50             | 27                           | 2428                      | 0.48 | 0.117           | 0.08                        | 11.89          | 0.01                  | 0.000           |
| 49.89                                                     | 2.11           | 86.38           | 1.43           | 123.91             | 27                           | 2475                      | 0.48 | 0.113           | 0.08                        | 11.89          | 0.01                  | 0.000           |
| 49.97                                                     | 2.18           | 77.44           | 1.56           | 120.69             | 27                           | 2481                      | 0.48 | 0.112           | 0.08                        | 11.89          | 0.01                  | 0.000           |
| 50.01                                                     | 2.24           | 70.92           | 1.71           | 121.32             | 28                           | 2512                      | 0.48 | 0.109           | 0.07                        | 11.89          | 0.01                  | 0.000           |
| 50.09                                                     | 2.28           | 66.05           | 1.86           | 123.07             | 29                           | 2537                      | 0.48 | 0.107           | 0.07                        | 11.89          | 0.01                  | 0.000           |
| 50.13                                                     | 2.29           | 65.68           | 1.90           | 124.54             | 29                           | 2563                      | 0.48 | 0.105           | 0.07                        | 11.89          | 0.01                  | 0.000           |

**:: Post-earthquake settlement of dry sands :: (continued)**

| Depth<br>(ft) | I <sub>c</sub> | Q <sub>tn</sub> | K <sub>c</sub> | Q <sub>tn,cs</sub> | N <sub>1,60</sub><br>(blows) | G <sub>max</sub><br>(tsf) | CSR | Shear, γ<br>(%) | e <sub>vol(15)</sub><br>(%) | N <sub>c</sub> | e <sub>v</sub><br>(%) | Settle.<br>(in) |
|---------------|----------------|-----------------|----------------|--------------------|------------------------------|---------------------------|-----|-----------------|-----------------------------|----------------|-----------------------|-----------------|
|---------------|----------------|-----------------|----------------|--------------------|------------------------------|---------------------------|-----|-----------------|-----------------------------|----------------|-----------------------|-----------------|

**Total estimated settlement: 1.02****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                            |

## LIQUEFACTION ANALYSIS REPORT

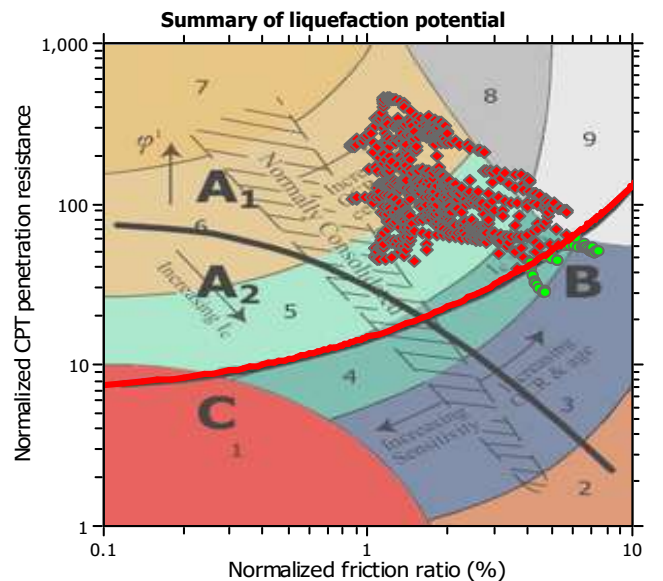
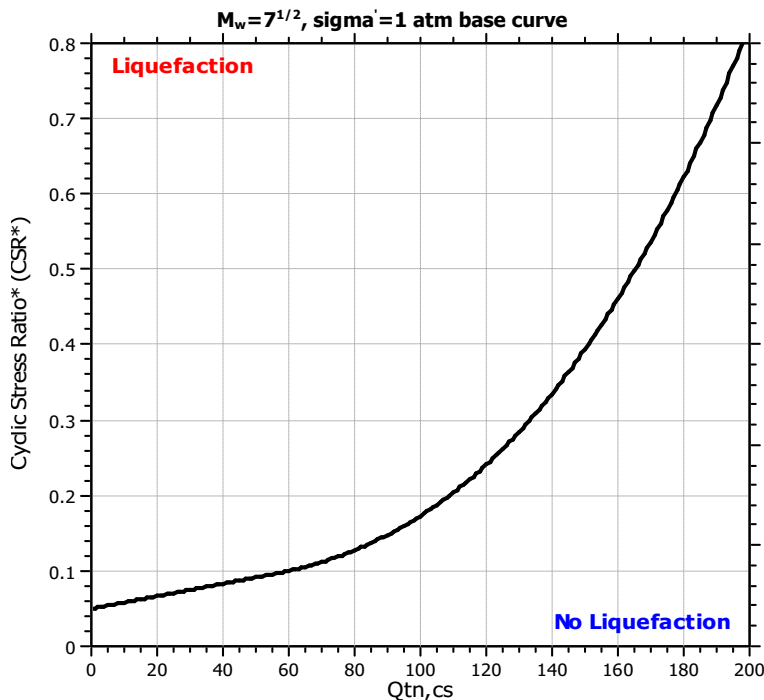
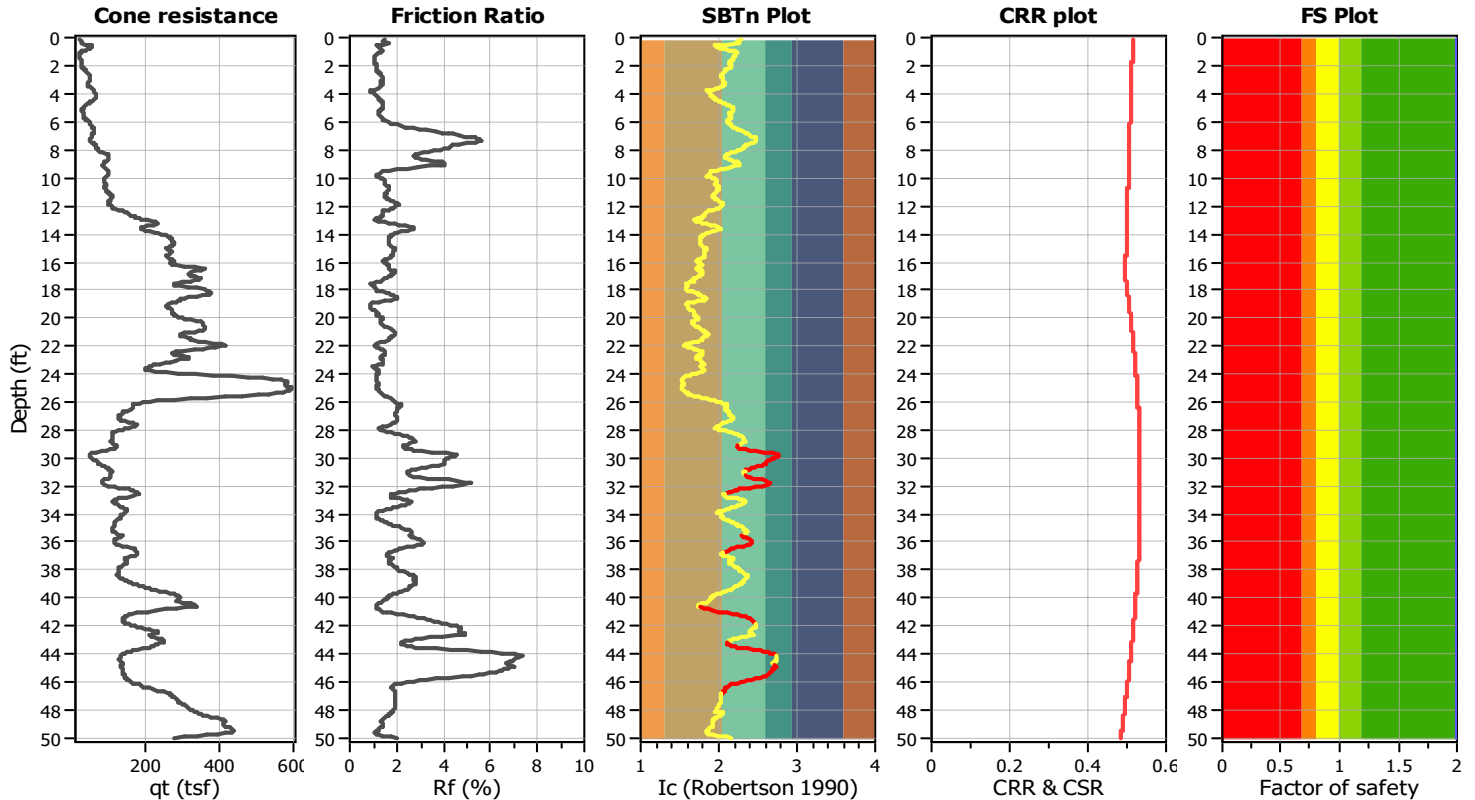
**Project title : Xenia Site**

**Location : Beaumont, California**

**CPT file : CPT-2**

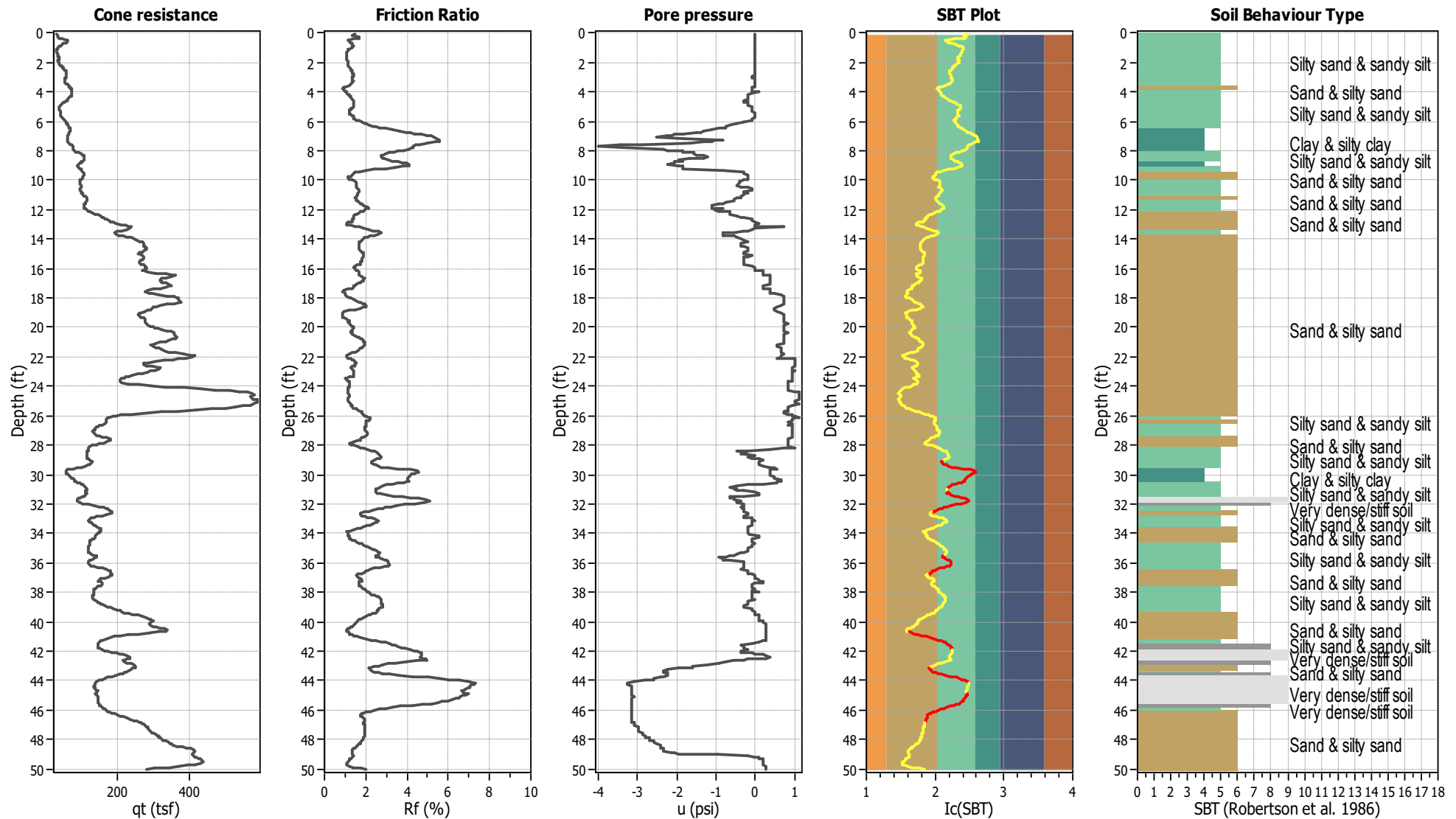
### Input parameters and analysis data

|                              |                   |                           |              |                         |     |                      |              |
|------------------------------|-------------------|---------------------------|--------------|-------------------------|-----|----------------------|--------------|
| Analysis method:             | NCEER (1998)      | G.W.T. (in-situ):         | 100.00 ft    | Use fill:               | No  | Clay like behavior   |              |
| Fines correction method:     | NCEER (1998)      | G.W.T. (earthq.):         | 100.00 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 $M_w$ : | 7.13              | Ic cut-off value:         | 2.60         | Trans. detect. applied: | Yes | Limit depth:         | 60.00 ft     |
| Peak ground acceleration:    | 0.90              | Unit weight calculation:  | Based on SBT | $K_0$ applied:          | Yes | MSF method:          | Method based |



Zone A<sub>1</sub>: Cyclic liquefaction likely depending on size and duration of cyclic loading  
 Zone A<sub>2</sub>: Cyclic liquefaction and strength loss likely depending on loading and ground geometry  
 Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening  
 Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

## CPT basic interpretation plots



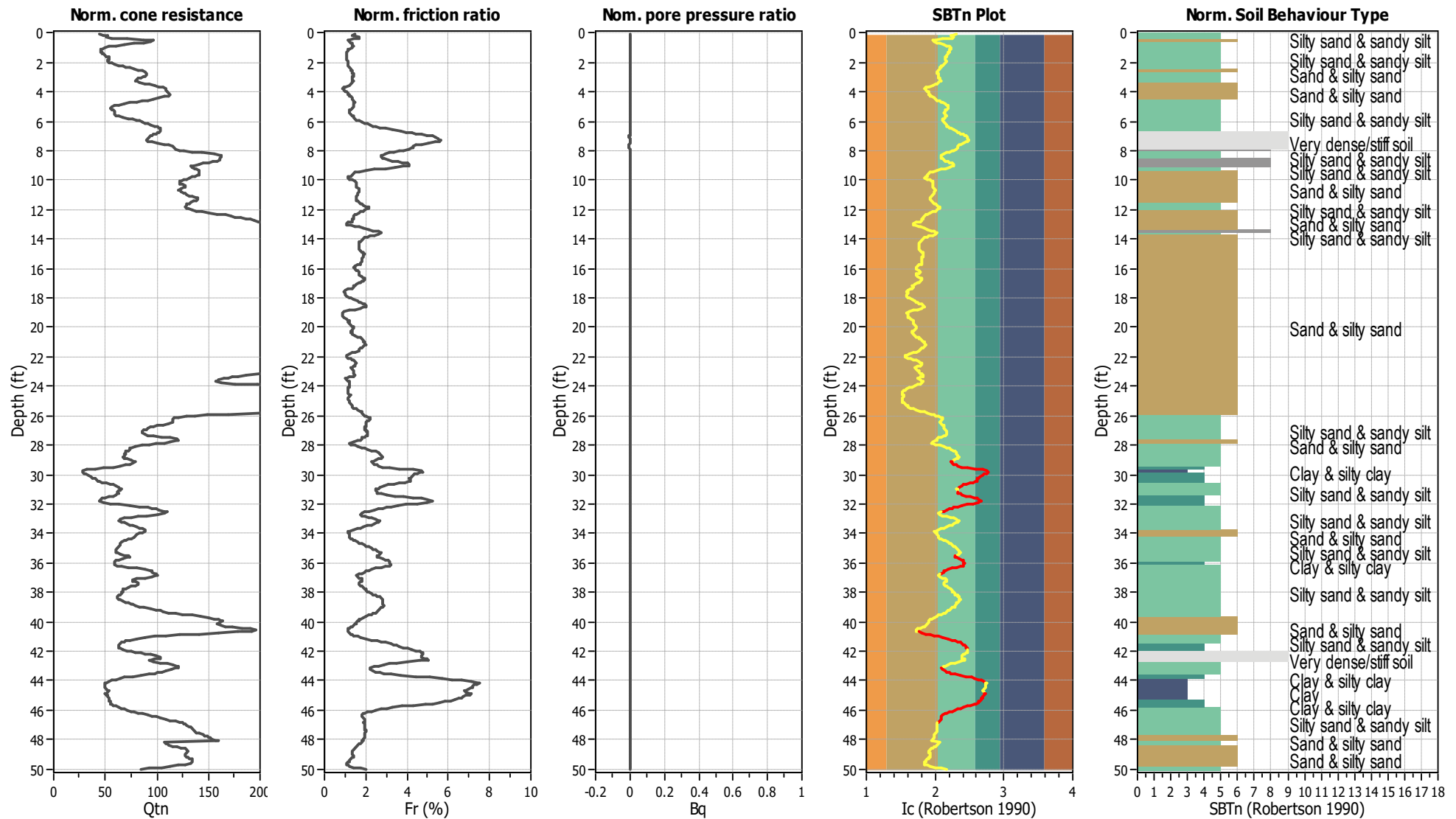
## Input parameters and analysis data

|                                       |                   |                                |              |                             |            |
|---------------------------------------|-------------------|--------------------------------|--------------|-----------------------------|------------|
| Analysis method:                      | NCEER (1998)      | Depth to water table (erthq.): | 100.00 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> : | 7.13              | Unit weight calculation:       | Based on SBT | Clay like behavior applied: | Sands only |
| Peak ground acceleration:             | 0.90              | Use fill:                      | No           | Limit depth applied:        | Yes        |
| Depth to water table (insitu):        | 100.00 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 |

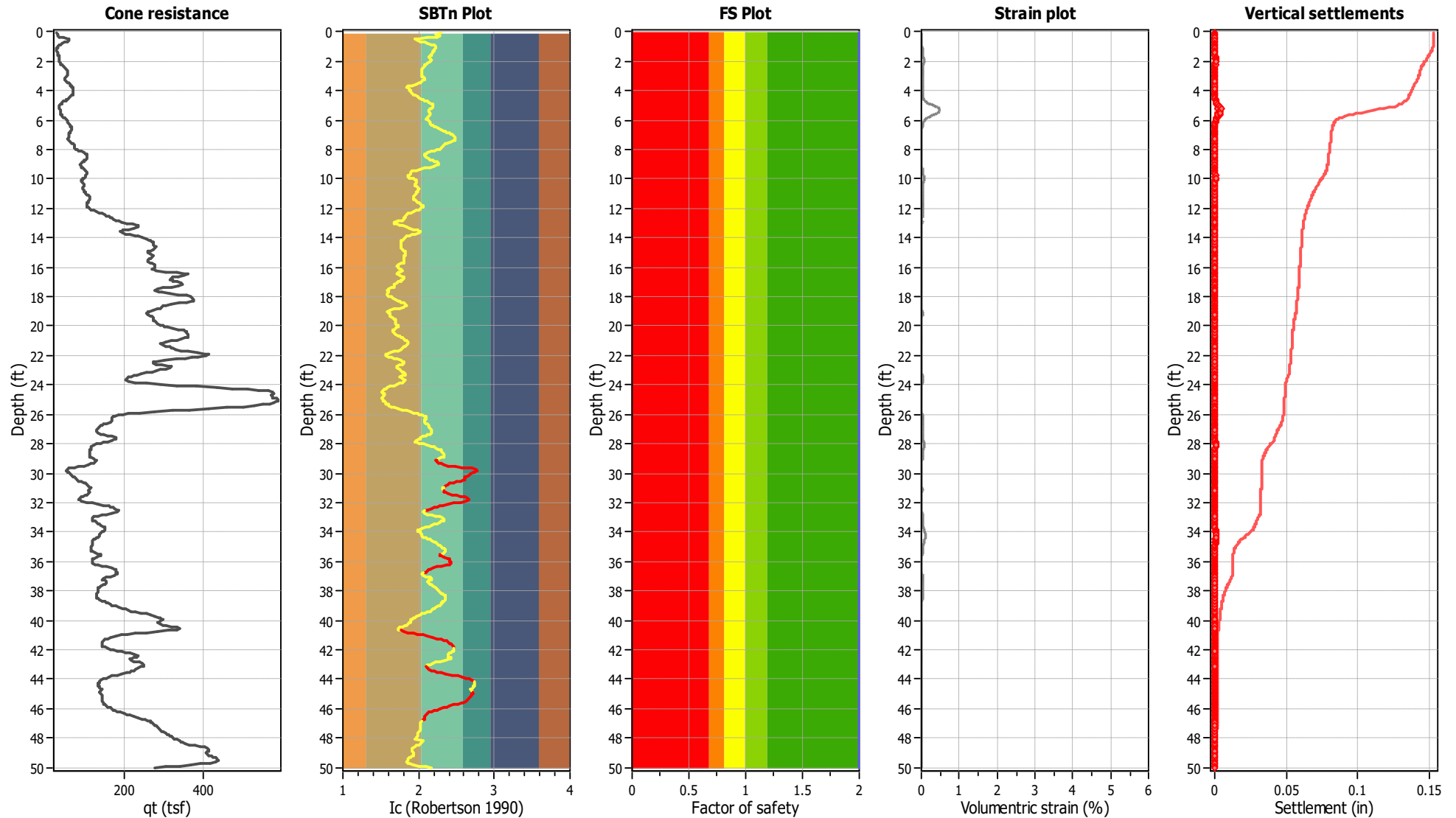
## CPT basic interpretation plots (normalized)



## Input parameters and analysis data

|                                       |                   |                                |              |                             |            |
|---------------------------------------|-------------------|--------------------------------|--------------|-----------------------------|------------|
| Analysis method:                      | NCEER (1998)      | Depth to water table (erthq.): | 100.00 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> : | 7.13              | Unit weight calculation:       | Based on SBT | Clay like behavior applied: | Sands only |
| Peak ground acceleration:             | 0.90              | Use fill:                      | No           | Limit depth applied:        | Yes        |
| Depth to water table (insitu):        | 100.00 ft         | Fill height:                   | N/A          | Limit depth:                | 60.00 ft   |

## Estimation of post-earthquake settlements



### Abbreviations

$q_t$ : 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) |
| 0.07                                          | 2.30 | 43.80           | 1.92 | 84.30              | 20                        | 452                    | 0.51 | 0.001        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.14                                          | 2.24 | 48.25           | 1.73 | 83.39              | 19                        | 462                    | 0.51 | 0.001        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.22                                          | 2.22 | 51.74           | 1.68 | 86.76              | 20                        | 484                    | 0.51 | 0.002        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.29                                          | 2.28 | 51.33           | 1.84 | 94.31              | 22                        | 513                    | 0.51 | 0.003        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.33                                          | 2.24 | 56.93           | 1.72 | 98.08              | 22                        | 544                    | 0.51 | 0.003        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.41                                          | 2.11 | 71.48           | 1.44 | 103.06             | 22                        | 583                    | 0.51 | 0.003        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.49                                          | 2.00 | 87.58           | 1.31 | 114.78             | 24                        | 621                    | 0.51 | 0.004        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.53                                          | 1.96 | 96.72           | 1.28 | 123.51             | 25                        | 648                    | 0.51 | 0.004        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.62                                          | 1.98 | 94.31           | 1.29 | 121.93             | 25                        | 650                    | 0.51 | 0.005        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.70                                          | 2.02 | 87.45           | 1.33 | 116.15             | 24                        | 635                    | 0.51 | 0.005        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.74                                          | 2.08 | 77.85           | 1.39 | 107.87             | 23                        | 604                    | 0.51 | 0.006        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 0.81                                          | 2.12 | 68.59           | 1.46 | 99.93              | 22                        | 566                    | 0.51 | 0.008        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 0.89                                          | 2.17 | 60.48           | 1.54 | 93.33              | 21                        | 528                    | 0.51 | 0.011        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 0.92                                          | 2.20 | 54.13           | 1.62 | 87.65              | 20                        | 493                    | 0.51 | 0.013        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 1.00                                          | 2.22 | 50.02           | 1.66 | 83.27              | 19                        | 466                    | 0.51 | 0.018        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 1.07                                          | 2.23 | 46.91           | 1.68 | 78.86              | 18                        | 440                    | 0.51 | 0.023        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 1.15                                          | 2.22 | 45.96           | 1.66 | 76.25              | 17                        | 427                    | 0.51 | 0.029        | 0.03                     | 11.89          | 0.03               | 0.000        |
| 1.19                                          | 2.21 | 45.85           | 1.63 | 74.92              | 17                        | 421                    | 0.51 | 0.033        | 0.04                     | 11.89          | 0.04               | 0.000        |
| 1.26                                          | 2.20 | 46.04           | 1.62 | 74.41              | 17                        | 419                    | 0.51 | 0.037        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 1.35                                          | 2.19 | 46.44           | 1.60 | 74.20              | 17                        | 418                    | 0.51 | 0.042        | 0.05                     | 11.89          | 0.05               | 0.000        |
| 1.38                                          | 2.19 | 46.99           | 1.58 | 74.29              | 17                        | 419                    | 0.51 | 0.044        | 0.05                     | 11.89          | 0.05               | 0.000        |
| 1.46                                          | 2.18 | 47.73           | 1.57 | 75.12              | 17                        | 424                    | 0.51 | 0.047        | 0.06                     | 11.89          | 0.05               | 0.000        |
| 1.53                                          | 2.18 | 49.22           | 1.56 | 76.60              | 17                        | 433                    | 0.51 | 0.048        | 0.06                     | 11.89          | 0.05               | 0.000        |
| 1.61                                          | 2.16 | 51.22           | 1.53 | 78.24              | 17                        | 443                    | 0.51 | 0.049        | 0.06                     | 11.89          | 0.05               | 0.000        |
| 1.65                                          | 2.14 | 53.07           | 1.49 | 79.24              | 17                        | 449                    | 0.51 | 0.049        | 0.06                     | 11.89          | 0.05               | 0.000        |
| 1.72                                          | 2.14 | 53.61           | 1.48 | 79.57              | 18                        | 451                    | 0.51 | 0.053        | 0.06                     | 11.89          | 0.05               | 0.001        |
| 1.81                                          | 2.14 | 53.35           | 1.49 | 79.68              | 18                        | 452                    | 0.51 | 0.058        | 0.07                     | 11.89          | 0.06               | 0.001        |
| 1.84                                          | 2.16 | 52.70           | 1.52 | 79.86              | 18                        | 453                    | 0.51 | 0.060        | 0.07                     | 11.89          | 0.06               | 0.000        |
| 1.92                                          | 2.16 | 52.85           | 1.53 | 80.69              | 18                        | 457                    | 0.51 | 0.063        | 0.07                     | 11.89          | 0.06               | 0.001        |
| 1.99                                          | 2.16 | 54.04           | 1.52 | 82.05              | 18                        | 465                    | 0.51 | 0.064        | 0.07                     | 11.89          | 0.06               | 0.001        |
| 2.07                                          | 2.15 | 55.73           | 1.50 | 83.53              | 18                        | 474                    | 0.51 | 0.065        | 0.07                     | 11.89          | 0.06               | 0.001        |
| 2.10                                          | 2.12 | 58.87           | 1.46 | 85.83              | 19                        | 486                    | 0.51 | 0.060        | 0.07                     | 11.89          | 0.06               | 0.000        |
| 2.18                                          | 2.10 | 62.52           | 1.42 | 88.97              | 19                        | 502                    | 0.51 | 0.058        | 0.06                     | 11.89          | 0.05               | 0.001        |
| 2.26                                          | 2.09 | 66.71           | 1.40 | 93.29              | 20                        | 524                    | 0.51 | 0.053        | 0.05                     | 11.89          | 0.05               | 0.000        |
| 2.33                                          | 2.08 | 69.81           | 1.39 | 96.91              | 21                        | 543                    | 0.51 | 0.050        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 2.37                                          | 2.07 | 73.25           | 1.38 | 101.12             | 22                        | 566                    | 0.51 | 0.045        | 0.04                     | 11.89          | 0.04               | 0.000        |
| 2.45                                          | 2.06 | 77.60           | 1.37 | 106.10             | 23                        | 591                    | 0.51 | 0.042        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 2.53                                          | 2.05 | 81.94           | 1.35 | 111.01             | 24                        | 615                    | 0.51 | 0.040        | 0.03                     | 11.89          | 0.03               | 0.000        |
| 2.56                                          | 2.04 | 85.94           | 1.34 | 115.28             | 24                        | 635                    | 0.51 | 0.037        | 0.03                     | 11.89          | 0.03               | 0.000        |
| 2.64                                          | 2.03 | 88.28           | 1.34 | 118.09             | 25                        | 649                    | 0.51 | 0.037        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 2.72                                          | 2.04 | 89.77           | 1.34 | 120.23             | 25                        | 662                    | 0.51 | 0.037        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 2.79                                          | 2.04 | 89.92           | 1.35 | 121.07             | 26                        | 669                    | 0.51 | 0.037        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 2.82                                          | 2.05 | 89.31           | 1.35 | 120.55             | 26                        | 667                    | 0.51 | 0.038        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 2.91                                          | 2.05 | 88.16           | 1.35 | 119.06             | 25                        | 659                    | 0.51 | 0.042        | 0.03                     | 11.89          | 0.03               | 0.000        |
| 2.98                                          | 2.05 | 86.70           | 1.35 | 117.11             | 25                        | 648                    | 0.51 | 0.046        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 3.02                                          | 2.05 | 84.69           | 1.35 | 114.72             | 24                        | 636                    | 0.51 | 0.050        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 3.10                                          | 2.06 | 82.13           | 1.37 | 112.40             | 24                        | 626                    | 0.51 | 0.055        | 0.04                     | 11.89          | 0.04               | 0.000        |
| 3.17                                          | 2.07 | 79.92           | 1.38 | 110.43             | 24                        | 618                    | 0.51 | 0.061        | 0.05                     | 11.89          | 0.04               | 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) |
| 3.25                                                      | 2.08 | 78.77           | 1.39 | 109.60             | 24                        | 615                    | 0.51 | 0.065        | 0.05                     | 11.89          | 0.05               | 0.000        |
| 3.29                                                      | 2.07 | 80.01           | 1.38 | 110.18             | 24                        | 616                    | 0.51 | 0.066        | 0.05                     | 11.89          | 0.05               | 0.000        |
| 3.37                                                      | 2.05 | 83.06           | 1.35 | 112.46             | 24                        | 623                    | 0.51 | 0.067        | 0.05                     | 11.89          | 0.05               | 0.000        |
| 3.44                                                      | 2.02 | 87.96           | 1.33 | 116.78             | 25                        | 639                    | 0.51 | 0.064        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 3.52                                                      | 2.00 | 92.60           | 1.31 | 121.28             | 25                        | 655                    | 0.51 | 0.061        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 3.55                                                      | 1.97 | 97.65           | 1.28 | 125.18             | 26                        | 660                    | 0.51 | 0.061        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 3.63                                                      | 1.91 | 102.24          | 1.25 | 127.40             | 26                        | 646                    | 0.51 | 0.069        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 3.70                                                      | 1.86 | 106.33          | 1.21 | 128.86             | 25                        | 631                    | 0.51 | 0.077        | 0.06                     | 11.89          | 0.05               | 0.000        |
| 3.74                                                      | 1.84 | 108.38          | 1.20 | 129.62             | 25                        | 627                    | 0.51 | 0.081        | 0.06                     | 11.89          | 0.05               | 0.000        |
| 3.81                                                      | 1.86 | 109.17          | 1.21 | 131.59             | 26                        | 641                    | 0.51 | 0.078        | 0.06                     | 11.89          | 0.05               | 0.000        |
| 3.90                                                      | 1.87 | 109.37          | 1.22 | 133.15             | 26                        | 656                    | 0.51 | 0.075        | 0.05                     | 11.89          | 0.05               | 0.000        |
| 3.96                                                      | 1.89 | 109.69          | 1.23 | 134.63             | 27                        | 669                    | 0.51 | 0.073        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 4.01                                                      | 1.90 | 110.13          | 1.24 | 136.08             | 27                        | 682                    | 0.51 | 0.070        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 4.09                                                      | 1.90 | 111.57          | 1.24 | 138.25             | 28                        | 696                    | 0.51 | 0.068        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 4.16                                                      | 1.91 | 112.74          | 1.24 | 140.32             | 28                        | 711                    | 0.51 | 0.065        | 0.04                     | 11.89          | 0.04               | 0.000        |
| 4.23                                                      | 1.92 | 112.83          | 1.25 | 141.17             | 29                        | 720                    | 0.51 | 0.065        | 0.04                     | 11.89          | 0.04               | 0.000        |
| 4.30                                                      | 1.94 | 111.28          | 1.26 | 140.27             | 28                        | 723                    | 0.51 | 0.066        | 0.04                     | 11.89          | 0.04               | 0.000        |
| 4.34                                                      | 1.96 | 107.57          | 1.27 | 137.03             | 28                        | 717                    | 0.51 | 0.069        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 4.41                                                      | 1.98 | 102.46          | 1.29 | 132.33             | 27                        | 705                    | 0.51 | 0.076        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 4.49                                                      | 2.01 | 96.05           | 1.32 | 126.40             | 26                        | 686                    | 0.51 | 0.086        | 0.06                     | 11.89          | 0.05               | 0.000        |
| 4.56                                                      | 2.04 | 90.79           | 1.34 | 121.61             | 26                        | 669                    | 0.51 | 0.097        | 0.07                     | 11.89          | 0.06               | 0.001        |
| 4.60                                                      | 2.06 | 85.54           | 1.37 | 116.91             | 25                        | 651                    | 0.51 | 0.110        | 0.08                     | 11.89          | 0.07               | 0.000        |
| 4.68                                                      | 2.08 | 80.28           | 1.40 | 112.18             | 24                        | 630                    | 0.51 | 0.130        | 0.10                     | 11.89          | 0.09               | 0.001        |
| 4.75                                                      | 2.11 | 74.12           | 1.44 | 106.58             | 23                        | 603                    | 0.51 | 0.161        | 0.14                     | 11.89          | 0.11               | 0.001        |
| 4.81                                                      | 2.14 | 68.27           | 1.48 | 101.26             | 22                        | 574                    | 0.51 | 0.206        | 0.18                     | 11.89          | 0.15               | 0.001        |
| 4.89                                                      | 2.16 | 63.56           | 1.53 | 97.19              | 22                        | 551                    | 0.51 | 0.260        | 0.24                     | 11.89          | 0.20               | 0.002        |
| 4.93                                                      | 2.18 | 59.60           | 1.57 | 93.81              | 21                        | 530                    | 0.51 | 0.320        | 0.30                     | 11.89          | 0.25               | 0.001        |
| 5.00                                                      | 2.19 | 56.94           | 1.60 | 91.05              | 20                        | 513                    | 0.51 | 0.391        | 0.38                     | 11.89          | 0.31               | 0.003        |
| 5.07                                                      | 2.20 | 55.19           | 1.60 | 88.50              | 20                        | 499                    | 0.51 | 0.474        | 0.48                     | 11.89          | 0.39               | 0.004        |
| 5.15                                                      | 2.19 | 54.78           | 1.59 | 87.00              | 20                        | 491                    | 0.51 | 0.538        | 0.55                     | 11.89          | 0.46               | 0.004        |
| 5.19                                                      | 2.17 | 55.78           | 1.55 | 86.57              | 19                        | 490                    | 0.51 | 0.556        | 0.58                     | 11.89          | 0.48               | 0.002        |
| 5.26                                                      | 2.15 | 57.42           | 1.51 | 86.85              | 19                        | 492                    | 0.51 | 0.563        | 0.59                     | 11.89          | 0.48               | 0.004        |
| 5.34                                                      | 2.14 | 59.01           | 1.48 | 87.47              | 19                        | 496                    | 0.51 | 0.563        | 0.59                     | 11.89          | 0.48               | 0.004        |
| 5.41                                                      | 2.14 | 59.66           | 1.48 | 88.31              | 19                        | 501                    | 0.51 | 0.553        | 0.57                     | 11.89          | 0.47               | 0.004        |
| 5.49                                                      | 2.15 | 59.55           | 1.50 | 89.10              | 20                        | 505                    | 0.51 | 0.547        | 0.56                     | 11.89          | 0.46               | 0.004        |
| 5.52                                                      | 2.16 | 59.70           | 1.52 | 90.55              | 20                        | 513                    | 0.51 | 0.510        | 0.51                     | 11.89          | 0.41               | 0.001        |
| 5.59                                                      | 2.16 | 60.75           | 1.52 | 92.60              | 21                        | 525                    | 0.51 | 0.470        | 0.45                     | 11.89          | 0.37               | 0.003        |
| 5.66                                                      | 2.16 | 63.19           | 1.52 | 95.91              | 21                        | 544                    | 0.51 | 0.403        | 0.37                     | 11.89          | 0.31               | 0.002        |
| 5.73                                                      | 2.14 | 67.39           | 1.49 | 100.25             | 22                        | 568                    | 0.51 | 0.333        | 0.30                     | 11.89          | 0.24               | 0.002        |
| 5.81                                                      | 2.12 | 71.88           | 1.46 | 104.67             | 23                        | 593                    | 0.51 | 0.281        | 0.24                     | 11.89          | 0.19               | 0.002        |
| 5.84                                                      | 2.11 | 76.73           | 1.43 | 109.69             | 24                        | 620                    | 0.51 | 0.232        | 0.19                     | 11.89          | 0.15               | 0.001        |
| 5.91                                                      | 2.11 | 80.22           | 1.43 | 114.50             | 25                        | 647                    | 0.51 | 0.198        | 0.15                     | 11.89          | 0.12               | 0.001        |
| 5.99                                                      | 2.11 | 83.36           | 1.44 | 120.15             | 26                        | 680                    | 0.51 | 0.165        | 0.12                     | 11.89          | 0.10               | 0.001        |
| 6.06                                                      | 2.13 | 85.96           | 1.47 | 126.16             | 28                        | 715                    | 0.51 | 0.139        | 0.09                     | 11.89          | 0.08               | 0.001        |
| 6.14                                                      | 2.14 | 88.24           | 1.49 | 131.58             | 29                        | 746                    | 0.51 | 0.122        | 0.08                     | 11.89          | 0.06               | 0.001        |
| 6.18                                                      | 2.15 | 91.09           | 1.51 | 137.44             | 30                        | 779                    | 0.51 | 0.105        | 0.06                     | 11.89          | 0.05               | 0.000        |
| 6.25                                                      | 2.16 | 94.23           | 1.53 | 143.77             | 32                        | 815                    | 0.51 | 0.093        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 6.32                                                      | 2.17 | 98.02           | 1.55 | 151.90             | 34                        | 860                    | 0.51 | 0.079        | 0.04                     | 11.89          | 0.03               | 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                                                      | 2.18 | 100.91          | 1.58 | 159.15             | 36                        | 899                    | 0.51 | 0.071        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 6.44                                                      | 2.20 | 102.61          | 1.62 | 166.71             | 38                        | 937                    | 0.51 | 0.063        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 6.51                                                      | 2.23 | 103.25          | 1.70 | 175.27             | 40                        | 976                    | 0.51 | 0.058        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 6.58                                                      | 2.27 | 103.34          | 1.80 | 186.46             | 43                        | 1020                   | 0.51 | 0.052        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 6.65                                                      | 2.30 | 103.03          | 1.94 | 199.59             | 47                        | 1067                   | 0.51 | 0.048        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 6.73                                                      | 2.33 | 102.42          | 2.05 | 210.38             | 50                        | 1100                   | 0.51 | 0.045        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 6.77                                                      | 2.36 | 101.21          | 2.16 | 218.34             | 53                        | 1120                   | 0.51 | 0.044        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 6.84                                                      | 2.38 | 99.09           | 2.26 | 223.57             | 54                        | 1126                   | 0.51 | 0.044        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 6.91                                                      | 2.41 | 96.58           | 2.40 | 232.13             | 57                        | 1138                   | 0.51 | 0.043        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 6.99                                                      | 2.43 | 94.71           | 2.54 | 240.83             | 60                        | 1152                   | 0.51 | 0.043        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 7.02                                                      | 2.45 | 93.71           | 2.65 | 248.76             | 63                        | 1168                   | 0.51 | 0.042        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 7.10                                                      | 2.46 | 92.81           | 2.73 | 253.05             | 64                        | 1174                   | 0.51 | 0.042        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 7.15                                                      | 2.47 | 91.56           | 2.80 | 256.73             | 65                        | 1176                   | 0.51 | 0.043        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 7.25                                                      | 2.48 | 90.46           | 2.86 | 258.98             | 66                        | 1176                   | 0.51 | 0.044        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 7.29                                                      | 2.49 | 90.12           | 2.89 | 260.29             | 67                        | 1177                   | 0.51 | 0.044        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 7.36                                                      | 2.48 | 91.35           | 2.84 | 259.65             | 66                        | 1182                   | 0.51 | 0.044        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 7.43                                                      | 2.46 | 94.79           | 2.70 | 255.78             | 65                        | 1192                   | 0.51 | 0.044        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 7.51                                                      | 2.42 | 100.52          | 2.47 | 248.51             | 62                        | 1204                   | 0.51 | 0.044        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 7.58                                                      | 2.38 | 106.85          | 2.26 | 241.28             | 59                        | 1215                   | 0.51 | 0.044        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 7.62                                                      | 2.35 | 112.03          | 2.11 | 236.54             | 57                        | 1224                   | 0.51 | 0.043        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 7.70                                                      | 2.33 | 115.07          | 2.04 | 235.14             | 56                        | 1232                   | 0.51 | 0.043        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 7.78                                                      | 2.32 | 116.31          | 2.02 | 235.19             | 56                        | 1237                   | 0.51 | 0.044        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 7.82                                                      | 2.32 | 116.97          | 2.00 | 234.38             | 56                        | 1237                   | 0.51 | 0.044        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 7.89                                                      | 2.30 | 118.37          | 1.94 | 229.31             | 54                        | 1226                   | 0.51 | 0.046        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 7.97                                                      | 2.28 | 121.63          | 1.83 | 223.18             | 52                        | 1215                   | 0.51 | 0.048        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 8.04                                                      | 2.24 | 126.17          | 1.73 | 218.58             | 50                        | 1210                   | 0.51 | 0.049        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 8.08                                                      | 2.21 | 133.73          | 1.63 | 217.80             | 49                        | 1224                   | 0.51 | 0.048        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 8.15                                                      | 2.16 | 144.07          | 1.53 | 220.18             | 49                        | 1248                   | 0.51 | 0.046        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 8.23                                                      | 2.12 | 155.05          | 1.45 | 224.55             | 49                        | 1273                   | 0.51 | 0.045        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 8.30                                                      | 2.09 | 160.49          | 1.41 | 226.49             | 49                        | 1295                   | 0.51 | 0.044        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 8.34                                                      | 2.08 | 162.81          | 1.40 | 227.19             | 49                        | 1304                   | 0.51 | 0.044        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 8.42                                                      | 2.08 | 162.15          | 1.39 | 226.20             | 49                        | 1307                   | 0.51 | 0.044        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 8.50                                                      | 2.09 | 161.56          | 1.41 | 227.09             | 49                        | 1321                   | 0.51 | 0.044        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 8.57                                                      | 2.11 | 160.76          | 1.43 | 229.37             | 50                        | 1341                   | 0.50 | 0.043        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 8.61                                                      | 2.13 | 160.47          | 1.46 | 234.39             | 51                        | 1372                   | 0.50 | 0.041        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 8.68                                                      | 2.15 | 158.31          | 1.51 | 238.95             | 53                        | 1398                   | 0.50 | 0.040        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 8.75                                                      | 2.19 | 153.95          | 1.59 | 244.12             | 55                        | 1417                   | 0.50 | 0.039        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 8.83                                                      | 2.21 | 150.38          | 1.65 | 248.17             | 56                        | 1430                   | 0.50 | 0.039        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 8.86                                                      | 2.24 | 145.46          | 1.73 | 251.87             | 58                        | 1429                   | 0.50 | 0.040        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 8.93                                                      | 2.26 | 140.96          | 1.78 | 250.99             | 58                        | 1415                   | 0.50 | 0.041        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 9.01                                                      | 2.27 | 135.42          | 1.81 | 245.34             | 57                        | 1382                   | 0.50 | 0.044        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 9.08                                                      | 2.25 | 133.56          | 1.75 | 234.19             | 54                        | 1347                   | 0.50 | 0.047        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 9.12                                                      | 2.21 | 134.66          | 1.63 | 219.64             | 50                        | 1304                   | 0.50 | 0.051        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 9.20                                                      | 2.15 | 136.64          | 1.51 | 206.00             | 46                        | 1260                   | 0.50 | 0.056        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 9.28                                                      | 2.08 | 138.90          | 1.40 | 194.10             | 42                        | 1204                   | 0.50 | 0.064        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 9.35                                                      | 2.02 | 140.35          | 1.32 | 185.84             | 39                        | 1144                   | 0.50 | 0.074        | 0.03                     | 11.89          | 0.03               | 0.000        |
| 9.42                                                      | 1.96 | 141.00          | 1.28 | 180.27             | 37                        | 1089                   | 0.50 | 0.086        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 9.46                                                      | 1.92 | 141.51          | 1.25 | 176.90             | 36                        | 1049                   | 0.50 | 0.097        | 0.05                     | 11.89          | 0.04               | 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) |
| 9.54                                                      | 1.90 | 141.04          | 1.24 | 174.57             | 35                        | 1031                   | 0.50 | 0.104        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 9.62                                                      | 1.89 | 140.32          | 1.23 | 173.01             | 35                        | 1024                   | 0.50 | 0.108        | 0.06                     | 11.89          | 0.04               | 0.000        |
| 9.65                                                      | 1.89 | 139.14          | 1.23 | 171.56             | 34                        | 1017                   | 0.50 | 0.111        | 0.06                     | 11.89          | 0.04               | 0.000        |
| 9.73                                                      | 1.88 | 137.02          | 1.22 | 167.35             | 33                        | 990                    | 0.50 | 0.124        | 0.07                     | 11.89          | 0.05               | 0.000        |
| 9.81                                                      | 1.86 | 134.41          | 1.21 | 162.26             | 32                        | 956                    | 0.50 | 0.142        | 0.08                     | 11.89          | 0.06               | 0.001        |
| 9.85                                                      | 1.86 | 132.08          | 1.20 | 159.11             | 31                        | 939                    | 0.50 | 0.153        | 0.09                     | 11.89          | 0.07               | 0.000        |
| 9.92                                                      | 1.88 | 129.35          | 1.23 | 158.67             | 32                        | 952                    | 0.50 | 0.147        | 0.08                     | 11.89          | 0.06               | 0.001        |
| 10.00                                                     | 1.93 | 126.33          | 1.25 | 158.37             | 32                        | 975                    | 0.50 | 0.138        | 0.08                     | 11.89          | 0.06               | 0.001        |
| 10.07                                                     | 1.95 | 123.52          | 1.27 | 157.06             | 32                        | 986                    | 0.50 | 0.135        | 0.08                     | 11.89          | 0.06               | 0.000        |
| 10.11                                                     | 1.97 | 122.27          | 1.28 | 156.70             | 32                        | 993                    | 0.50 | 0.132        | 0.07                     | 11.89          | 0.06               | 0.000        |
| 10.18                                                     | 1.97 | 121.73          | 1.29 | 156.43             | 32                        | 998                    | 0.50 | 0.132        | 0.07                     | 11.89          | 0.06               | 0.000        |
| 10.25                                                     | 1.97 | 122.68          | 1.29 | 157.78             | 33                        | 1012                   | 0.50 | 0.128        | 0.07                     | 11.89          | 0.05               | 0.000        |
| 10.32                                                     | 1.97 | 124.84          | 1.28 | 159.97             | 33                        | 1027                   | 0.50 | 0.123        | 0.07                     | 11.89          | 0.05               | 0.000        |
| 10.40                                                     | 1.96 | 127.02          | 1.28 | 162.22             | 33                        | 1043                   | 0.50 | 0.119        | 0.06                     | 11.89          | 0.05               | 0.000        |
| 10.44                                                     | 1.96 | 127.93          | 1.28 | 163.22             | 33                        | 1051                   | 0.50 | 0.117        | 0.06                     | 11.89          | 0.05               | 0.000        |
| 10.51                                                     | 1.97 | 125.61          | 1.29 | 161.48             | 33                        | 1052                   | 0.50 | 0.118        | 0.06                     | 11.89          | 0.05               | 0.000        |
| 10.59                                                     | 1.99 | 122.86          | 1.30 | 159.83             | 33                        | 1057                   | 0.50 | 0.118        | 0.06                     | 11.89          | 0.05               | 0.000        |
| 10.67                                                     | 2.01 | 120.89          | 1.31 | 158.65             | 33                        | 1061                   | 0.50 | 0.119        | 0.06                     | 11.89          | 0.05               | 0.000        |
| 10.71                                                     | 2.00 | 121.94          | 1.31 | 159.75             | 33                        | 1069                   | 0.50 | 0.116        | 0.06                     | 11.89          | 0.05               | 0.000        |
| 10.78                                                     | 2.00 | 123.46          | 1.30 | 160.89             | 33                        | 1078                   | 0.50 | 0.115        | 0.06                     | 11.89          | 0.05               | 0.000        |
| 10.86                                                     | 1.98 | 125.53          | 1.29 | 162.49             | 34                        | 1088                   | 0.50 | 0.113        | 0.06                     | 11.89          | 0.04               | 0.000        |
| 10.93                                                     | 1.98 | 126.91          | 1.29 | 163.76             | 34                        | 1098                   | 0.50 | 0.111        | 0.06                     | 11.89          | 0.04               | 0.000        |
| 10.97                                                     | 1.97 | 129.16          | 1.28 | 165.55             | 34                        | 1106                   | 0.50 | 0.110        | 0.06                     | 11.89          | 0.04               | 0.000        |
| 11.05                                                     | 1.96 | 131.59          | 1.27 | 167.63             | 34                        | 1118                   | 0.50 | 0.107        | 0.06                     | 11.89          | 0.04               | 0.000        |
| 11.12                                                     | 1.94 | 134.49          | 1.27 | 170.27             | 35                        | 1134                   | 0.50 | 0.104        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 11.16                                                     | 1.93 | 137.64          | 1.26 | 173.31             | 35                        | 1150                   | 0.50 | 0.101        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 11.24                                                     | 1.93 | 139.25          | 1.26 | 174.87             | 35                        | 1161                   | 0.50 | 0.099        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 11.31                                                     | 1.93 | 139.50          | 1.26 | 175.38             | 36                        | 1171                   | 0.50 | 0.098        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 11.39                                                     | 1.94 | 138.16          | 1.26 | 174.57             | 36                        | 1177                   | 0.50 | 0.098        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 11.43                                                     | 1.96 | 136.00          | 1.27 | 173.25             | 35                        | 1181                   | 0.50 | 0.097        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 11.50                                                     | 1.97 | 133.46          | 1.29 | 171.62             | 35                        | 1186                   | 0.50 | 0.097        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 11.58                                                     | 1.99 | 130.98          | 1.30 | 170.11             | 35                        | 1191                   | 0.50 | 0.097        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 11.62                                                     | 2.01 | 128.89          | 1.32 | 169.51             | 35                        | 1201                   | 0.50 | 0.096        | 0.05                     | 11.89          | 0.03               | 0.000        |
| 11.70                                                     | 2.03 | 128.20          | 1.33 | 170.70             | 36                        | 1224                   | 0.50 | 0.092        | 0.05                     | 11.89          | 0.03               | 0.000        |
| 11.77                                                     | 2.05 | 127.25          | 1.36 | 172.44             | 37                        | 1251                   | 0.50 | 0.087        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 11.85                                                     | 2.06 | 127.57          | 1.37 | 174.50             | 37                        | 1277                   | 0.50 | 0.083        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 11.88                                                     | 2.06 | 128.56          | 1.37 | 175.95             | 38                        | 1290                   | 0.50 | 0.082        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 11.96                                                     | 2.05 | 130.87          | 1.35 | 176.67             | 37                        | 1295                   | 0.50 | 0.082        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 12.03                                                     | 2.02 | 134.26          | 1.33 | 178.17             | 37                        | 1300                   | 0.50 | 0.082        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 12.11                                                     | 2.00 | 137.62          | 1.31 | 179.93             | 37                        | 1305                   | 0.50 | 0.082        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 12.15                                                     | 1.97 | 143.31          | 1.28 | 184.03             | 38                        | 1317                   | 0.50 | 0.080        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 12.23                                                     | 1.93 | 150.55          | 1.26 | 189.60             | 38                        | 1334                   | 0.50 | 0.079        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 12.30                                                     | 1.90 | 158.85          | 1.23 | 195.99             | 39                        | 1352                   | 0.50 | 0.077        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 12.34                                                     | 1.86 | 166.68          | 1.21 | 201.79             | 40                        | 1370                   | 0.50 | 0.074        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 12.42                                                     | 1.84 | 172.08          | 1.19 | 205.16             | 40                        | 1383                   | 0.50 | 0.073        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 12.49                                                     | 1.83 | 176.24          | 1.19 | 208.86             | 41                        | 1409                   | 0.50 | 0.071        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 12.57                                                     | 1.82 | 181.33          | 1.18 | 213.46             | 42                        | 1441                   | 0.50 | 0.068        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 12.64                                                     | 1.82 | 186.33          | 1.17 | 218.01             | 42                        | 1473                   | 0.50 | 0.065        | 0.03                     | 11.89          | 0.02               | 0.000        |

| :: Post-earthquake settlement of dry sands :: (continued) |      |                 |      |                    |                              |                           |      |                 |                             |                |                       |                 |
|-----------------------------------------------------------|------|-----------------|------|--------------------|------------------------------|---------------------------|------|-----------------|-----------------------------|----------------|-----------------------|-----------------|
| Depth<br>(ft)                                             | Ic   | Q <sub>tn</sub> | Kc   | Q <sub>tn,cs</sub> | N <sub>1,60</sub><br>(blows) | G <sub>max</sub><br>(tsf) | CSR  | Shear, γ<br>(%) | e <sub>vol(15)</sub><br>(%) | N <sub>c</sub> | e <sub>v</sub><br>(%) | Settle.<br>(in) |
| 12.68                                                     | 1.81 | 190.46          | 1.16 | 220.79             | 43                           | 1491                      | 0.50 | 0.063           | 0.03                        | 11.89          | 0.02                  | 0.000           |
| 12.75                                                     | 1.80 | 194.66          | 1.15 | 223.87             | 43                           | 1515                      | 0.50 | 0.062           | 0.02                        | 11.89          | 0.02                  | 0.000           |
| 12.83                                                     | 1.78 | 198.24          | 1.13 | 224.56             | 43                           | 1523                      | 0.50 | 0.061           | 0.02                        | 11.89          | 0.02                  | 0.000           |
| 12.86                                                     | 1.73 | 204.69          | 1.04 | 213.11             | 40                           | 1475                      | 0.50 | 0.067           | 0.03                        | 11.89          | 0.02                  | 0.000           |
| 12.94                                                     | 1.68 | 213.20          | 1.00 | 213.20             | 40                           | 1470                      | 0.50 | 0.068           | 0.03                        | 11.89          | 0.02                  | 0.000           |
| 13.01                                                     | 1.68 | 228.55          | 1.00 | 228.55             | 42                           | 1565                      | 0.50 | 0.059           | 0.02                        | 11.89          | 0.02                  | 0.000           |
| 13.09                                                     | 1.71 | 243.48          | 1.01 | 246.39             | 46                           | 1743                      | 0.50 | 0.047           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 13.13                                                     | 1.76 | 253.30          | 1.09 | 277.34             | 53                           | 1913                      | 0.50 | 0.040           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 13.21                                                     | 1.79 | 259.14          | 1.14 | 295.74             | 57                           | 2042                      | 0.50 | 0.036           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 13.27                                                     | 1.84 | 257.45          | 1.19 | 306.24             | 60                           | 2149                      | 0.50 | 0.033           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 13.35                                                     | 1.88 | 248.07          | 1.23 | 304.30             | 61                           | 2198                      | 0.50 | 0.032           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 13.42                                                     | 1.94 | 231.94          | 1.26 | 293.28             | 60                           | 2204                      | 0.50 | 0.032           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 13.46                                                     | 1.99 | 218.55          | 1.30 | 283.85             | 59                           | 2201                      | 0.50 | 0.032           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 13.53                                                     | 2.01 | 212.08          | 1.32 | 279.60             | 58                           | 2203                      | 0.50 | 0.032           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 13.62                                                     | 2.02 | 209.77          | 1.32 | 277.83             | 58                           | 2206                      | 0.50 | 0.033           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 13.65                                                     | 2.00 | 213.73          | 1.31 | 279.08             | 58                           | 2196                      | 0.50 | 0.033           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 13.73                                                     | 1.96 | 222.00          | 1.28 | 283.51             | 58                           | 2189                      | 0.50 | 0.033           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 13.81                                                     | 1.92 | 233.00          | 1.25 | 290.54             | 59                           | 2187                      | 0.50 | 0.034           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 13.88                                                     | 1.88 | 243.83          | 1.22 | 297.75             | 59                           | 2195                      | 0.50 | 0.034           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 13.92                                                     | 1.85 | 253.06          | 1.20 | 303.20             | 60                           | 2203                      | 0.50 | 0.034           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 13.99                                                     | 1.82 | 261.48          | 1.18 | 307.73             | 60                           | 2220                      | 0.50 | 0.033           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 14.07                                                     | 1.80 | 269.63          | 1.15 | 311.39             | 60                           | 2240                      | 0.50 | 0.033           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 14.14                                                     | 1.79 | 276.04          | 1.14 | 314.02             | 60                           | 2260                      | 0.50 | 0.033           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 14.18                                                     | 1.78 | 280.69          | 1.12 | 315.38             | 60                           | 2273                      | 0.50 | 0.033           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 14.26                                                     | 1.77 | 283.64          | 1.11 | 315.60             | 60                           | 2283                      | 0.50 | 0.033           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 14.33                                                     | 1.76 | 285.60          | 1.11 | 315.67             | 60                           | 2292                      | 0.50 | 0.033           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 14.37                                                     | 1.76 | 285.60          | 1.11 | 315.95             | 60                           | 2298                      | 0.50 | 0.033           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 14.45                                                     | 1.77 | 284.59          | 1.11 | 316.84             | 61                           | 2310                      | 0.50 | 0.033           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 14.52                                                     | 1.77 | 285.08          | 1.12 | 318.93             | 61                           | 2332                      | 0.50 | 0.032           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 14.59                                                     | 1.77 | 286.90          | 1.11 | 319.82             | 61                           | 2346                      | 0.50 | 0.032           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 14.63                                                     | 1.76 | 288.46          | 1.11 | 319.02             | 61                           | 2346                      | 0.50 | 0.032           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 14.70                                                     | 1.77 | 286.09          | 1.11 | 317.08             | 61                           | 2338                      | 0.50 | 0.033           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 14.79                                                     | 1.78 | 280.21          | 1.13 | 315.94             | 61                           | 2336                      | 0.50 | 0.033           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 14.86                                                     | 1.80 | 272.86          | 1.15 | 314.84             | 61                           | 2342                      | 0.50 | 0.033           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 14.93                                                     | 1.82 | 266.27          | 1.17 | 312.46             | 61                           | 2345                      | 0.50 | 0.033           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 14.97                                                     | 1.83 | 263.71          | 1.18 | 311.92             | 61                           | 2354                      | 0.50 | 0.033           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 15.05                                                     | 1.83 | 265.77          | 1.18 | 314.53             | 61                           | 2382                      | 0.50 | 0.033           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 15.12                                                     | 1.82 | 271.40          | 1.18 | 319.38             | 62                           | 2419                      | 0.50 | 0.032           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 15.19                                                     | 1.82 | 276.02          | 1.17 | 322.82             | 63                           | 2445                      | 0.50 | 0.032           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 15.23                                                     | 1.81 | 276.02          | 1.17 | 321.61             | 62                           | 2436                      | 0.50 | 0.032           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 15.31                                                     | 1.81 | 272.20          | 1.16 | 317.02             | 62                           | 2409                      | 0.50 | 0.033           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 15.38                                                     | 1.81 | 266.98          | 1.17 | 311.26             | 60                           | 2373                      | 0.50 | 0.034           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 15.46                                                     | 1.81 | 262.73          | 1.17 | 306.56             | 60                           | 2346                      | 0.50 | 0.035           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 15.50                                                     | 1.81 | 259.27          | 1.17 | 302.50             | 59                           | 2318                      | 0.50 | 0.036           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 15.57                                                     | 1.81 | 257.58          | 1.17 | 300.52             | 58                           | 2310                      | 0.50 | 0.036           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 15.64                                                     | 1.81 | 257.95          | 1.17 | 300.55             | 58                           | 2315                      | 0.50 | 0.036           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 15.68                                                     | 1.80 | 262.31          | 1.15 | 301.52             | 58                           | 2317                      | 0.50 | 0.037           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 15.76                                                     | 1.77 | 266.51          | 1.11 | 295.90             | 57                           | 2274                      | 0.50 | 0.038           | 0.01                        | 11.89          | 0.01                  | 0.000           |

| :: Post-earthquake settlement of dry sands :: (continued) |                |                 |                |                    |                              |                           |      |                 |                             |                |                       |                 |
|-----------------------------------------------------------|----------------|-----------------|----------------|--------------------|------------------------------|---------------------------|------|-----------------|-----------------------------|----------------|-----------------------|-----------------|
| Depth<br>(ft)                                             | I <sub>c</sub> | Q <sub>tn</sub> | K <sub>c</sub> | Q <sub>tn,cs</sub> | N <sub>1,60</sub><br>(blows) | G <sub>max</sub><br>(tsf) | CSR  | Shear, γ<br>(%) | e <sub>vol(15)</sub><br>(%) | N <sub>c</sub> | e <sub>v</sub><br>(%) | Settle.<br>(in) |
| 15.84                                                     | 1.74           | 271.22          | 1.06           | 288.46             | 55                           | 2239                      | 0.50 | 0.039           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 15.91                                                     | 1.72           | 272.86          | 1.03           | 281.91             | 53                           | 2215                      | 0.50 | 0.040           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 15.95                                                     | 1.73           | 271.86          | 1.04           | 283.45             | 53                           | 2223                      | 0.50 | 0.040           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 16.03                                                     | 1.73           | 271.31          | 1.05           | 283.69             | 53                           | 2229                      | 0.50 | 0.040           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 16.09                                                     | 1.76           | 262.50          | 1.10           | 287.86             | 55                           | 2242                      | 0.50 | 0.040           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 16.16                                                     | 1.77           | 264.87          | 1.12           | 296.41             | 57                           | 2311                      | 0.50 | 0.038           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 16.23                                                     | 1.78           | 273.42          | 1.13           | 308.74             | 59                           | 2415                      | 0.50 | 0.036           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 16.30                                                     | 1.76           | 296.65          | 1.09           | 324.65             | 62                           | 2549                      | 0.50 | 0.033           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 16.34                                                     | 1.73           | 321.85          | 1.05           | 338.37             | 64                           | 2684                      | 0.50 | 0.030           | 0.01                        | 11.89          | 0.00                  | 0.000           |
| 16.42                                                     | 1.72           | 339.62          | 1.03           | 348.32             | 65                           | 2794                      | 0.50 | 0.029           | 0.01                        | 11.89          | 0.00                  | 0.000           |
| 16.49                                                     | 1.72           | 346.03          | 1.03           | 357.68             | 67                           | 2869                      | 0.50 | 0.028           | 0.01                        | 11.89          | 0.00                  | 0.000           |
| 16.56                                                     | 1.75           | 336.03          | 1.08           | 364.09             | 69                           | 2889                      | 0.50 | 0.028           | 0.01                        | 11.89          | 0.00                  | 0.000           |
| 16.63                                                     | 1.78           | 320.89          | 1.13           | 362.41             | 70                           | 2878                      | 0.50 | 0.028           | 0.01                        | 11.89          | 0.00                  | 0.000           |
| 16.67                                                     | 1.80           | 308.46          | 1.15           | 356.19             | 69                           | 2844                      | 0.50 | 0.029           | 0.01                        | 11.89          | 0.00                  | 0.000           |
| 16.75                                                     | 1.80           | 304.73          | 1.15           | 350.21             | 68                           | 2801                      | 0.50 | 0.029           | 0.01                        | 11.89          | 0.00                  | 0.000           |
| 16.82                                                     | 1.79           | 301.46          | 1.14           | 344.10             | 66                           | 2755                      | 0.50 | 0.030           | 0.01                        | 11.89          | 0.00                  | 0.000           |
| 16.89                                                     | 1.78           | 304.28          | 1.12           | 341.45             | 65                           | 2735                      | 0.50 | 0.031           | 0.01                        | 11.89          | 0.00                  | 0.000           |
| 16.96                                                     | 1.77           | 305.43          | 1.11           | 339.53             | 65                           | 2727                      | 0.50 | 0.031           | 0.01                        | 11.89          | 0.00                  | 0.000           |
| 17.00                                                     | 1.74           | 314.69          | 1.07           | 336.25             | 64                           | 2719                      | 0.50 | 0.031           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 17.07                                                     | 1.71           | 322.76          | 1.00           | 323.68             | 61                           | 2681                      | 0.50 | 0.032           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 17.15                                                     | 1.68           | 326.64          | 1.00           | 326.64             | 61                           | 2629                      | 0.50 | 0.034           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 17.22                                                     | 1.67           | 324.09          | 1.00           | 324.09             | 60                           | 2577                      | 0.50 | 0.035           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 17.26                                                     | 1.68           | 313.88          | 1.00           | 313.88             | 58                           | 2528                      | 0.50 | 0.036           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 17.34                                                     | 1.67           | 298.42          | 1.00           | 298.42             | 55                           | 2389                      | 0.50 | 0.040           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 17.41                                                     | 1.64           | 278.62          | 1.00           | 278.62             | 51                           | 2155                      | 0.50 | 0.048           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 17.50                                                     | 1.60           | 263.07          | 1.00           | 263.07             | 47                           | 1936                      | 0.50 | 0.060           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 17.54                                                     | 1.59           | 256.26          | 1.00           | 256.26             | 46                           | 1851                      | 0.50 | 0.067           | 0.02                        | 11.89          | 0.02                  | 0.000           |
| 17.62                                                     | 1.60           | 256.58          | 1.00           | 256.58             | 46                           | 1895                      | 0.50 | 0.064           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 17.65                                                     | 1.61           | 264.63          | 1.00           | 264.63             | 48                           | 1970                      | 0.50 | 0.059           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 17.73                                                     | 1.61           | 272.39          | 1.00           | 272.39             | 49                           | 2039                      | 0.50 | 0.055           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 17.80                                                     | 1.59           | 291.08          | 1.00           | 291.08             | 52                           | 2134                      | 0.50 | 0.051           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 17.87                                                     | 1.58           | 309.69          | 1.00           | 309.69             | 56                           | 2250                      | 0.50 | 0.046           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 17.94                                                     | 1.58           | 328.73          | 1.00           | 328.73             | 59                           | 2390                      | 0.50 | 0.042           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 18.01                                                     | 1.60           | 335.65          | 1.00           | 335.65             | 61                           | 2506                      | 0.50 | 0.039           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 18.05                                                     | 1.63           | 337.22          | 1.00           | 337.22             | 62                           | 2623                      | 0.50 | 0.036           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 18.12                                                     | 1.67           | 337.46          | 1.00           | 337.46             | 62                           | 2752                      | 0.50 | 0.034           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 18.20                                                     | 1.70           | 340.23          | 1.00           | 340.23             | 64                           | 2903                      | 0.50 | 0.031           | 0.01                        | 11.89          | 0.00                  | 0.000           |
| 18.27                                                     | 1.73           | 339.98          | 1.04           | 353.94             | 67                           | 3004                      | 0.50 | 0.030           | 0.01                        | 11.89          | 0.00                  | 0.000           |
| 18.32                                                     | 1.75           | 336.40          | 1.08           | 362.48             | 69                           | 3056                      | 0.50 | 0.029           | 0.01                        | 11.89          | 0.00                  | 0.000           |
| 18.39                                                     | 1.77           | 321.38          | 1.12           | 359.51             | 69                           | 3029                      | 0.50 | 0.030           | 0.01                        | 11.89          | 0.00                  | 0.000           |
| 18.46                                                     | 1.80           | 304.10          | 1.15           | 350.52             | 68                           | 2976                      | 0.50 | 0.031           | 0.01                        | 11.89          | 0.00                  | 0.000           |
| 18.51                                                     | 1.83           | 284.81          | 1.18           | 336.30             | 66                           | 2893                      | 0.50 | 0.032           | 0.01                        | 11.89          | 0.00                  | 0.000           |
| 18.58                                                     | 1.84           | 273.22          | 1.19           | 325.40             | 64                           | 2824                      | 0.50 | 0.033           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 18.64                                                     | 1.83           | 265.17          | 1.18           | 313.53             | 61                           | 2712                      | 0.50 | 0.036           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 18.74                                                     | 1.80           | 261.65          | 1.16           | 302.87             | 59                           | 2599                      | 0.50 | 0.039           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 18.77                                                     | 1.75           | 259.32          | 1.08           | 281.03             | 53                           | 2401                      | 0.50 | 0.044           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 18.85                                                     | 1.68           | 253.20          | 1.00           | 253.20             | 47                           | 2157                      | 0.50 | 0.054           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 18.93                                                     | 1.62           | 244.31          | 1.00           | 244.31             | 44                           | 1913                      | 0.51 | 0.070           | 0.03                        | 11.89          | 0.02                  | 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) |
| 19.00                                                     | 1.59           | 234.56          | 1.00           | 234.56             | 42                        | 1781                   | 0.51 | 0.083        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 19.03                                                     | 1.60           | 230.19          | 1.00           | 230.19             | 42                        | 1768                   | 0.51 | 0.085        | 0.04                     | 11.89          | 0.02               | 0.000        |
| 19.11                                                     | 1.61           | 228.26          | 1.00           | 228.26             | 41                        | 1771                   | 0.51 | 0.085        | 0.04                     | 11.89          | 0.02               | 0.000        |
| 19.16                                                     | 1.61           | 227.32          | 1.00           | 227.32             | 41                        | 1784                   | 0.51 | 0.084        | 0.04                     | 11.89          | 0.02               | 0.000        |
| 19.26                                                     | 1.61           | 229.00          | 1.00           | 229.00             | 41                        | 1800                   | 0.51 | 0.083        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 19.29                                                     | 1.61           | 233.63          | 1.00           | 233.63             | 42                        | 1838                   | 0.51 | 0.079        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 19.36                                                     | 1.62           | 238.80          | 1.00           | 238.80             | 43                        | 1907                   | 0.51 | 0.073        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 19.44                                                     | 1.65           | 240.44          | 1.00           | 240.44             | 44                        | 1995                   | 0.51 | 0.067        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 19.51                                                     | 1.68           | 240.28          | 1.00           | 240.28             | 44                        | 2068                   | 0.51 | 0.062        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 19.58                                                     | 1.69           | 238.88          | 1.00           | 238.88             | 44                        | 2102                   | 0.51 | 0.061        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 19.65                                                     | 1.69           | 239.20          | 1.00           | 239.20             | 45                        | 2112                   | 0.51 | 0.060        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 19.69                                                     | 1.69           | 240.73          | 1.00           | 240.73             | 45                        | 2109                   | 0.51 | 0.061        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 19.76                                                     | 1.69           | 242.11          | 1.00           | 242.11             | 45                        | 2133                   | 0.51 | 0.060        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 19.84                                                     | 1.70           | 246.41          | 1.00           | 246.41             | 46                        | 2208                   | 0.51 | 0.056        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 19.91                                                     | 1.72           | 249.90          | 1.03           | 256.96             | 48                        | 2299                   | 0.51 | 0.052        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 19.95                                                     | 1.73           | 256.31          | 1.04           | 266.63             | 50                        | 2379                   | 0.51 | 0.049        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 20.03                                                     | 1.72           | 260.46          | 1.04           | 270.36             | 51                        | 2419                   | 0.51 | 0.048        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 20.09                                                     | 1.72           | 265.72          | 1.02           | 272.22             | 51                        | 2451                   | 0.51 | 0.047        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 20.14                                                     | 1.70           | 276.51          | 1.00           | 276.51             | 52                        | 2490                   | 0.51 | 0.046        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 20.22                                                     | 1.68           | 288.89          | 1.00           | 288.89             | 54                        | 2539                   | 0.51 | 0.045        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 20.28                                                     | 1.66           | 301.14          | 1.00           | 301.14             | 55                        | 2589                   | 0.51 | 0.043        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 20.36                                                     | 1.66           | 304.58          | 1.00           | 304.58             | 56                        | 2618                   | 0.51 | 0.043        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 20.41                                                     | 1.66           | 305.12          | 1.00           | 305.12             | 56                        | 2644                   | 0.51 | 0.042        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 20.49                                                     | 1.68           | 304.54          | 1.00           | 304.54             | 56                        | 2692                   | 0.51 | 0.041        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 20.56                                                     | 1.70           | 305.24          | 1.00           | 305.24             | 57                        | 2796                   | 0.51 | 0.039        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 20.63                                                     | 1.73           | 305.66          | 1.05           | 322.25             | 61                        | 2921                   | 0.51 | 0.036        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 20.71                                                     | 1.76           | 305.35          | 1.10           | 334.57             | 64                        | 3021                   | 0.51 | 0.035        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 20.75                                                     | 1.77           | 302.42          | 1.12           | 338.32             | 65                        | 3060                   | 0.51 | 0.034        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 20.83                                                     | 1.79           | 295.96          | 1.14           | 336.47             | 65                        | 3058                   | 0.51 | 0.034        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 20.90                                                     | 1.80           | 286.16          | 1.16           | 330.80             | 64                        | 3028                   | 0.51 | 0.035        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 20.97                                                     | 1.82           | 276.47          | 1.17           | 323.88             | 63                        | 2991                   | 0.51 | 0.036        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 21.01                                                     | 1.84           | 264.07          | 1.19           | 314.00             | 61                        | 2934                   | 0.51 | 0.037        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 21.09                                                     | 1.85           | 252.34          | 1.20           | 303.57             | 60                        | 2874                   | 0.51 | 0.038        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 21.16                                                     | 1.86           | 242.79          | 1.21           | 294.34             | 58                        | 2817                   | 0.51 | 0.040        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 21.20                                                     | 1.86           | 239.99          | 1.21           | 290.24             | 57                        | 2773                   | 0.51 | 0.041        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 21.27                                                     | 1.84           | 243.78          | 1.20           | 291.50             | 57                        | 2758                   | 0.51 | 0.041        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 21.35                                                     | 1.82           | 251.17          | 1.17           | 294.89             | 57                        | 2757                   | 0.51 | 0.042        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 21.42                                                     | 1.80           | 258.96          | 1.15           | 298.28             | 58                        | 2768                   | 0.52 | 0.042        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 21.46                                                     | 1.79           | 263.26          | 1.14           | 299.63             | 58                        | 2773                   | 0.52 | 0.042        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 21.53                                                     | 1.78           | 265.42          | 1.13           | 300.19             | 58                        | 2779                   | 0.52 | 0.042        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 21.60                                                     | 1.77           | 269.50          | 1.12           | 302.04             | 58                        | 2799                   | 0.52 | 0.041        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 21.67                                                     | 1.73           | 280.86          | 1.05           | 295.62             | 56                        | 2758                   | 0.52 | 0.043        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 21.75                                                     | 1.68           | 296.40          | 1.00           | 296.40             | 55                        | 2717                   | 0.52 | 0.044        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 21.79                                                     | 1.62           | 317.94          | 1.00           | 317.94             | 58                        | 2680                   | 0.52 | 0.045        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 21.87                                                     | 1.58           | 333.13          | 1.00           | 333.13             | 60                        | 2684                   | 0.52 | 0.045        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 21.93                                                     | 1.56           | 340.89          | 1.00           | 340.89             | 61                        | 2687                   | 0.52 | 0.045        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 22.01                                                     | 1.57           | 333.53          | 1.00           | 333.53             | 60                        | 2673                   | 0.52 | 0.046        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 22.08                                                     | 1.61           | 317.59          | 1.00           | 317.59             | 58                        | 2678                   | 0.52 | 0.046        | 0.01                     | 11.89          | 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) |
| 22.12                                                     | 1.65 | 303.43          | 1.00 | 303.43             | 56                        | 2678                   | 0.52 | 0.046        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 22.18                                                     | 1.68 | 287.31          | 1.00 | 287.31             | 53                        | 2666                   | 0.52 | 0.046        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 22.26                                                     | 1.72 | 268.52          | 1.03 | 275.67             | 52                        | 2629                   | 0.52 | 0.048        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 22.32                                                     | 1.77 | 242.71          | 1.11 | 269.53             | 51                        | 2543                   | 0.52 | 0.051        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 22.38                                                     | 1.79 | 224.98          | 1.15 | 257.65             | 50                        | 2449                   | 0.52 | 0.055        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 22.45                                                     | 1.80 | 216.75          | 1.16 | 250.36             | 48                        | 2392                   | 0.52 | 0.058        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 22.51                                                     | 1.80 | 217.06          | 1.15 | 249.50             | 48                        | 2383                   | 0.52 | 0.058        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 22.59                                                     | 1.78 | 222.84          | 1.13 | 252.05             | 48                        | 2401                   | 0.52 | 0.058        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 22.64                                                     | 1.75 | 235.93          | 1.08 | 254.96             | 48                        | 2428                   | 0.52 | 0.057        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 22.72                                                     | 1.71 | 250.18          | 1.02 | 254.19             | 48                        | 2461                   | 0.52 | 0.055        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 22.77                                                     | 1.71 | 254.87          | 1.00 | 255.72             | 48                        | 2490                   | 0.52 | 0.054        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 22.85                                                     | 1.72 | 250.35          | 1.03 | 258.84             | 49                        | 2500                   | 0.52 | 0.054        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 22.91                                                     | 1.75 | 241.07          | 1.08 | 259.56             | 49                        | 2489                   | 0.52 | 0.055        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 22.97                                                     | 1.76 | 231.33          | 1.10 | 254.11             | 48                        | 2438                   | 0.52 | 0.057        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 23.05                                                     | 1.77 | 221.96          | 1.11 | 247.04             | 47                        | 2376                   | 0.52 | 0.061        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 23.11                                                     | 1.78 | 211.01          | 1.13 | 238.78             | 46                        | 2305                   | 0.52 | 0.064        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 23.17                                                     | 1.80 | 199.66          | 1.16 | 230.78             | 45                        | 2247                   | 0.52 | 0.068        | 0.03                     | 11.89          | 0.01               | 0.000        |
| 23.25                                                     | 1.83 | 186.96          | 1.18 | 220.95             | 43                        | 2185                   | 0.52 | 0.073        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 23.30                                                     | 1.83 | 178.39          | 1.18 | 210.82             | 41                        | 2088                   | 0.52 | 0.080        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 23.36                                                     | 1.79 | 173.51          | 1.14 | 198.48             | 38                        | 1934                   | 0.52 | 0.096        | 0.04                     | 11.89          | 0.02               | 0.000        |
| 23.43                                                     | 1.76 | 169.35          | 1.10 | 185.92             | 35                        | 1803                   | 0.52 | 0.115        | 0.06                     | 11.89          | 0.03               | 0.000        |
| 23.50                                                     | 1.75 | 164.89          | 1.09 | 178.94             | 34                        | 1740                   | 0.52 | 0.127        | 0.07                     | 11.89          | 0.04               | 0.000        |
| 23.57                                                     | 1.78 | 160.02          | 1.13 | 181.17             | 35                        | 1769                   | 0.52 | 0.122        | 0.06                     | 11.89          | 0.03               | 0.000        |
| 23.62                                                     | 1.80 | 157.93          | 1.16 | 182.52             | 35                        | 1797                   | 0.52 | 0.117        | 0.06                     | 11.89          | 0.03               | 0.000        |
| 23.69                                                     | 1.82 | 156.73          | 1.17 | 183.66             | 36                        | 1826                   | 0.52 | 0.113        | 0.06                     | 11.89          | 0.03               | 0.000        |
| 23.76                                                     | 1.81 | 162.33          | 1.16 | 188.92             | 37                        | 1873                   | 0.52 | 0.107        | 0.05                     | 11.89          | 0.03               | 0.000        |
| 23.83                                                     | 1.79 | 175.73          | 1.14 | 199.50             | 38                        | 1962                   | 0.52 | 0.096        | 0.04                     | 11.89          | 0.02               | 0.000        |
| 23.90                                                     | 1.75 | 197.60          | 1.09 | 215.17             | 41                        | 2111                   | 0.52 | 0.081        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 23.97                                                     | 1.71 | 226.08          | 1.02 | 230.08             | 43                        | 2292                   | 0.52 | 0.069        | 0.03                     | 11.89          | 0.01               | 0.000        |
| 24.05                                                     | 1.67 | 260.57          | 1.00 | 260.57             | 48                        | 2483                   | 0.52 | 0.059        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 24.11                                                     | 1.62 | 299.79          | 1.00 | 299.79             | 54                        | 2676                   | 0.52 | 0.052        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 24.18                                                     | 1.58 | 339.30          | 1.00 | 339.30             | 61                        | 2893                   | 0.52 | 0.045        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 24.25                                                     | 1.56 | 371.08          | 1.00 | 371.08             | 66                        | 3082                   | 0.52 | 0.041        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 24.29                                                     | 1.54 | 400.22          | 1.00 | 400.22             | 71                        | 3262                   | 0.52 | 0.038        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 24.37                                                     | 1.53 | 420.61          | 1.00 | 420.61             | 74                        | 3384                   | 0.52 | 0.036        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 24.41                                                     | 1.52 | 439.02          | 1.00 | 439.02             | 77                        | 3485                   | 0.52 | 0.034        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 24.48                                                     | 1.52 | 447.64          | 1.00 | 447.64             | 79                        | 3538                   | 0.52 | 0.034        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 24.55                                                     | 1.53 | 450.91          | 1.00 | 450.91             | 79                        | 3627                   | 0.52 | 0.032        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 24.61                                                     | 1.55 | 447.33          | 1.00 | 447.33             | 79                        | 3692                   | 0.52 | 0.032        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 24.68                                                     | 1.55 | 446.14          | 1.00 | 446.14             | 79                        | 3686                   | 0.53 | 0.032        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 24.74                                                     | 1.54 | 441.73          | 1.00 | 441.73             | 78                        | 3620                   | 0.53 | 0.033        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 24.81                                                     | 1.52 | 444.09          | 1.00 | 444.09             | 78                        | 3558                   | 0.53 | 0.034        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 24.88                                                     | 1.52 | 444.98          | 1.00 | 444.98             | 78                        | 3562                   | 0.53 | 0.034        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 24.94                                                     | 1.52 | 452.93          | 1.00 | 452.93             | 79                        | 3612                   | 0.53 | 0.033        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 25.01                                                     | 1.53 | 453.63          | 1.00 | 453.63             | 80                        | 3666                   | 0.53 | 0.033        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 25.07                                                     | 1.53 | 452.70          | 1.00 | 452.70             | 80                        | 3697                   | 0.53 | 0.032        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 25.14                                                     | 1.54 | 448.68          | 1.00 | 448.68             | 79                        | 3709                   | 0.53 | 0.032        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 25.21                                                     | 1.56 | 443.69          | 1.00 | 443.69             | 79                        | 3759                   | 0.53 | 0.032        | 0.01                     | 11.89          | 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) |
| 25.27                                                     | 1.57 | 436.14          | 1.00 | 436.14             | 78                        | 3770                   | 0.53 | 0.032        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 25.34                                                     | 1.59 | 421.69          | 1.00 | 421.69             | 76                        | 3747                   | 0.53 | 0.032        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 25.41                                                     | 1.61 | 403.20          | 1.00 | 403.20             | 73                        | 3658                   | 0.53 | 0.033        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 25.48                                                     | 1.64 | 380.98          | 1.00 | 380.98             | 70                        | 3589                   | 0.53 | 0.034        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 25.53                                                     | 1.68 | 347.51          | 1.00 | 347.51             | 64                        | 3481                   | 0.53 | 0.036        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 25.62                                                     | 1.73 | 309.22          | 1.05 | 325.73             | 61                        | 3340                   | 0.53 | 0.039        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 25.69                                                     | 1.79 | 269.48          | 1.14 | 308.10             | 59                        | 3175                   | 0.53 | 0.042        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 25.73                                                     | 1.84 | 234.51          | 1.19 | 279.21             | 55                        | 2956                   | 0.53 | 0.047        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 25.80                                                     | 1.89 | 200.62          | 1.23 | 246.42             | 49                        | 2718                   | 0.53 | 0.055        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 25.88                                                     | 1.94 | 169.63          | 1.26 | 214.09             | 44                        | 2478                   | 0.53 | 0.066        | 0.03                     | 11.89          | 0.01               | 0.000        |
| 25.95                                                     | 1.98 | 149.26          | 1.29 | 192.97             | 40                        | 2326                   | 0.53 | 0.075        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 26.00                                                     | 2.01 | 137.21          | 1.32 | 181.04             | 38                        | 2243                   | 0.53 | 0.081        | 0.04                     | 11.89          | 0.02               | 0.000        |
| 26.07                                                     | 2.05 | 128.47          | 1.35 | 173.65             | 37                        | 2205                   | 0.53 | 0.084        | 0.04                     | 11.89          | 0.02               | 0.000        |
| 26.15                                                     | 2.08 | 121.12          | 1.39 | 168.69             | 36                        | 2189                   | 0.53 | 0.086        | 0.04                     | 11.89          | 0.02               | 0.000        |
| 26.18                                                     | 2.10 | 117.05          | 1.42 | 166.64             | 36                        | 2186                   | 0.53 | 0.086        | 0.04                     | 11.89          | 0.02               | 0.000        |
| 26.26                                                     | 2.10 | 115.60          | 1.42 | 164.58             | 36                        | 2163                   | 0.53 | 0.089        | 0.04                     | 11.89          | 0.02               | 0.000        |
| 26.34                                                     | 2.10 | 115.08          | 1.41 | 162.64             | 35                        | 2136                   | 0.53 | 0.092        | 0.05                     | 11.89          | 0.02               | 0.000        |
| 26.38                                                     | 2.08 | 115.53          | 1.39 | 160.92             | 35                        | 2101                   | 0.53 | 0.096        | 0.05                     | 11.89          | 0.02               | 0.000        |
| 26.46                                                     | 2.08 | 115.04          | 1.39 | 159.44             | 34                        | 2080                   | 0.53 | 0.098        | 0.05                     | 11.89          | 0.03               | 0.000        |
| 26.53                                                     | 2.08 | 111.38          | 1.40 | 155.40             | 33                        | 2039                   | 0.53 | 0.103        | 0.06                     | 11.89          | 0.03               | 0.000        |
| 26.60                                                     | 2.10 | 105.53          | 1.42 | 150.04             | 33                        | 1989                   | 0.53 | 0.110        | 0.06                     | 11.89          | 0.03               | 0.000        |
| 26.66                                                     | 2.12 | 100.23          | 1.45 | 145.17             | 32                        | 1939                   | 0.53 | 0.118        | 0.07                     | 11.89          | 0.03               | 0.000        |
| 26.73                                                     | 2.13 | 96.67           | 1.46 | 141.32             | 31                        | 1895                   | 0.53 | 0.125        | 0.07                     | 11.89          | 0.04               | 0.000        |
| 26.80                                                     | 2.13 | 94.28           | 1.47 | 138.17             | 30                        | 1858                   | 0.53 | 0.133        | 0.08                     | 11.89          | 0.04               | 0.000        |
| 26.87                                                     | 2.14 | 91.65           | 1.48 | 135.47             | 30                        | 1828                   | 0.53 | 0.139        | 0.09                     | 11.89          | 0.04               | 0.000        |
| 26.91                                                     | 2.14 | 89.63           | 1.49 | 133.69             | 29                        | 1809                   | 0.53 | 0.143        | 0.09                     | 11.89          | 0.04               | 0.000        |
| 26.98                                                     | 2.15 | 87.85           | 1.51 | 132.67             | 29                        | 1801                   | 0.53 | 0.146        | 0.09                     | 11.89          | 0.04               | 0.000        |
| 27.06                                                     | 2.16 | 86.34           | 1.53 | 132.15             | 29                        | 1800                   | 0.53 | 0.147        | 0.09                     | 11.89          | 0.05               | 0.000        |
| 27.10                                                     | 2.17 | 85.68           | 1.55 | 132.55             | 30                        | 1809                   | 0.53 | 0.145        | 0.09                     | 11.89          | 0.04               | 0.000        |
| 27.18                                                     | 2.17 | 86.17           | 1.55 | 133.55             | 30                        | 1826                   | 0.53 | 0.142        | 0.09                     | 11.89          | 0.04               | 0.000        |
| 27.26                                                     | 2.17 | 88.30           | 1.54 | 135.55             | 30                        | 1856                   | 0.53 | 0.136        | 0.08                     | 11.89          | 0.04               | 0.000        |
| 27.33                                                     | 2.15 | 91.55           | 1.51 | 137.95             | 30                        | 1889                   | 0.53 | 0.131        | 0.08                     | 11.89          | 0.04               | 0.000        |
| 27.37                                                     | 2.12 | 97.23           | 1.46 | 141.78             | 31                        | 1932                   | 0.53 | 0.124        | 0.07                     | 11.89          | 0.04               | 0.000        |
| 27.45                                                     | 2.09 | 104.49          | 1.41 | 146.83             | 32                        | 1978                   | 0.53 | 0.117        | 0.07                     | 11.89          | 0.03               | 0.000        |
| 27.52                                                     | 2.05 | 112.91          | 1.36 | 153.30             | 33                        | 2026                   | 0.53 | 0.111        | 0.06                     | 11.89          | 0.03               | 0.000        |
| 27.59                                                     | 2.03 | 118.99          | 1.33 | 158.33             | 33                        | 2058                   | 0.53 | 0.107        | 0.06                     | 11.89          | 0.03               | 0.000        |
| 27.63                                                     | 2.02 | 121.09          | 1.32 | 160.19             | 34                        | 2072                   | 0.53 | 0.106        | 0.06                     | 11.89          | 0.03               | 0.000        |
| 27.70                                                     | 2.00 | 118.86          | 1.31 | 155.38             | 32                        | 1984                   | 0.53 | 0.118        | 0.07                     | 11.89          | 0.03               | 0.000        |
| 27.78                                                     | 1.97 | 113.21          | 1.29 | 145.75             | 30                        | 1824                   | 0.53 | 0.147        | 0.09                     | 11.89          | 0.04               | 0.000        |
| 27.86                                                     | 1.95 | 106.85          | 1.27 | 135.36             | 28                        | 1652                   | 0.53 | 0.197        | 0.13                     | 11.89          | 0.06               | 0.001        |
| 27.90                                                     | 1.96 | 99.28           | 1.28 | 127.05             | 26                        | 1579                   | 0.53 | 0.228        | 0.17                     | 11.89          | 0.08               | 0.000        |
| 27.98                                                     | 2.01 | 92.91           | 1.31 | 122.15             | 26                        | 1581                   | 0.53 | 0.228        | 0.17                     | 11.89          | 0.08               | 0.001        |
| 28.02                                                     | 2.07 | 85.48           | 1.38 | 117.55             | 25                        | 1586                   | 0.53 | 0.226        | 0.17                     | 11.89          | 0.08               | 0.000        |
| 28.10                                                     | 2.12 | 78.88           | 1.46 | 115.01             | 25                        | 1596                   | 0.53 | 0.223        | 0.17                     | 11.89          | 0.08               | 0.001        |
| 28.16                                                     | 2.17 | 74.85           | 1.54 | 115.62             | 26                        | 1620                   | 0.53 | 0.213        | 0.16                     | 11.89          | 0.07               | 0.000        |
| 28.23                                                     | 2.20 | 73.48           | 1.61 | 118.56             | 27                        | 1665                   | 0.53 | 0.196        | 0.14                     | 11.89          | 0.07               | 0.001        |
| 28.30                                                     | 2.22 | 73.46           | 1.68 | 123.32             | 28                        | 1730                   | 0.53 | 0.176        | 0.12                     | 11.89          | 0.05               | 0.000        |
| 28.38                                                     | 2.26 | 71.96           | 1.78 | 128.07             | 30                        | 1785                   | 0.53 | 0.162        | 0.10                     | 11.89          | 0.05               | 0.000        |

| :: Post-earthquake settlement of dry sands :: (continued) |                |                 |                |                    |                              |                           |      |                 |                             |                |                       |                 |
|-----------------------------------------------------------|----------------|-----------------|----------------|--------------------|------------------------------|---------------------------|------|-----------------|-----------------------------|----------------|-----------------------|-----------------|
| Depth<br>(ft)                                             | I <sub>c</sub> | Q <sub>tn</sub> | K <sub>c</sub> | Q <sub>tn,cs</sub> | N <sub>1,60</sub><br>(blows) | G <sub>max</sub><br>(tsf) | CSR  | Shear, γ<br>(%) | e <sub>vol(15)</sub><br>(%) | N <sub>c</sub> | e <sub>v</sub><br>(%) | Settle.<br>(in) |
| 28.42                                                     | 2.29           | 70.07           | 1.89           | 132.48             | 31                           | 1825                      | 0.53 | 0.152           | 0.09                        | 11.89          | 0.04                  | 0.000           |
| 28.49                                                     | 2.31           | 69.39           | 1.95           | 135.25             | 32                           | 1852                      | 0.53 | 0.147           | 0.08                        | 11.89          | 0.04                  | 0.000           |
| 28.58                                                     | 2.32           | 68.88           | 1.99           | 137.25             | 33                           | 1873                      | 0.53 | 0.143           | 0.08                        | 11.89          | 0.04                  | 0.000           |
| 28.61                                                     | 2.32           | 69.32           | 2.00           | 138.40             | 33                           | 1890                      | 0.53 | 0.140           | 0.08                        | 11.89          | 0.04                  | 0.000           |
| 28.69                                                     | 2.33           | 68.59           | 2.03           | 139.50             | 33                           | 1899                      | 0.53 | 0.139           | 0.08                        | 11.89          | 0.03                  | 0.000           |
| 28.77                                                     | 2.34           | 67.93           | 2.07           | 140.43             | 34                           | 1907                      | 0.53 | 0.138           | 0.07                        | 11.89          | 0.03                  | 0.000           |
| 28.81                                                     | 2.34           | 67.45           | 2.09           | 140.99             | 34                           | 1911                      | 0.53 | 0.137           | 0.07                        | 11.89          | 0.03                  | 0.000           |
| 28.88                                                     | 2.33           | 68.48           | 2.04           | 139.87             | 33                           | 1911                      | 0.53 | 0.138           | 0.07                        | 11.89          | 0.03                  | 0.000           |
| 28.95                                                     | 2.30           | 71.22           | 1.93           | 137.72             | 32                           | 1913                      | 0.53 | 0.138           | 0.08                        | 11.89          | 0.04                  | 0.000           |
| 29.03                                                     | 2.27           | 74.91           | 1.81           | 135.38             | 31                           | 1913                      | 0.53 | 0.138           | 0.08                        | 11.89          | 0.04                  | 0.000           |
| 29.11                                                     | 2.24           | 77.88           | 1.72           | 133.89             | 31                           | 1911                      | 0.53 | 0.139           | 0.08                        | 11.89          | 0.04                  | 0.000           |
| 29.14                                                     | 2.23           | 78.81           | 1.69           | 133.20             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 29.22                                                     | 2.24           | 76.93           | 1.73           | 133.09             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 29.29                                                     | 2.27           | 73.90           | 1.81           | 133.46             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 29.33                                                     | 2.30           | 69.49           | 1.92           | 133.44             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 29.42                                                     | 2.34           | 63.92           | 2.08           | 133.00             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 29.49                                                     | 2.39           | 57.38           | 2.33           | 133.49             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 29.53                                                     | 2.48           | 48.74           | 2.81           | 137.17             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 29.61                                                     | 2.58           | 40.09           | 3.59           | 143.84             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 29.68                                                     | 2.70           | 32.39           | 4.66           | 150.94             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 29.76                                                     | 2.76           | 28.69           | 5.37           | 154.13             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 29.80                                                     | 2.78           | 27.72           | 5.56           | 154.10             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 29.88                                                     | 2.76           | 28.26           | 5.40           | 152.70             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 29.95                                                     | 2.74           | 29.29           | 5.16           | 151.20             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 29.99                                                     | 2.71           | 31.05           | 4.86           | 150.92             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 30.06                                                     | 2.69           | 33.18           | 4.58           | 151.96             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 30.14                                                     | 2.66           | 35.95           | 4.28           | 153.73             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 30.22                                                     | 2.63           | 38.25           | 4.05           | 155.09             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 30.26                                                     | 2.62           | 40.23           | 3.90           | 156.96             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 30.33                                                     | 2.61           | 41.60           | 3.83           | 159.16             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 30.41                                                     | 2.60           | 42.74           | 3.77           | 161.04             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 30.45                                                     | 2.59           | 44.24           | 3.63           | 160.70             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 30.53                                                     | 2.55           | 46.67           | 3.38           | 157.60             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 30.60                                                     | 2.50           | 50.76           | 3.01           | 152.57             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 30.67                                                     | 2.46           | 54.69           | 2.71           | 148.18             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 30.72                                                     | 2.42           | 58.13           | 2.46           | 143.16             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 30.79                                                     | 2.38           | 60.44           | 2.29           | 138.55             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 30.86                                                     | 2.35           | 62.85           | 2.14           | 134.34             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 30.94                                                     | 2.33           | 64.69           | 2.04           | 132.05             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 30.99                                                     | 2.31           | 66.05           | 1.97           | 130.06             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 31.06                                                     | 2.32           | 63.89           | 2.02           | 128.77             | 31                           | 1867                      | 0.53 | 0.163           | 0.10                        | 11.89          | 0.04                  | 0.000           |
| 31.11                                                     | 2.32           | 63.15           | 2.02           | 127.61             | 30                           | 1852                      | 0.53 | 0.167           | 0.10                        | 11.89          | 0.04                  | 0.000           |
| 31.19                                                     | 2.34           | 61.89           | 2.08           | 128.54             | 31                           | 1855                      | 0.53 | 0.167           | 0.10                        | 11.89          | 0.04                  | 0.000           |
| 31.27                                                     | 2.33           | 63.10           | 2.06           | 130.13             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 31.31                                                     | 2.36           | 62.30           | 2.18           | 135.62             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 31.38                                                     | 2.40           | 60.74           | 2.36           | 143.24             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 31.45                                                     | 2.45           | 57.61           | 2.66           | 153.28             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 31.53                                                     | 2.50           | 54.00           | 3.00           | 162.23             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |

| :: Post-earthquake settlement of dry sands :: (continued) |                |                 |                |                    |                              |                           |      |                 |                             |                |                       |                 |
|-----------------------------------------------------------|----------------|-----------------|----------------|--------------------|------------------------------|---------------------------|------|-----------------|-----------------------------|----------------|-----------------------|-----------------|
| Depth<br>(ft)                                             | I <sub>c</sub> | Q <sub>tn</sub> | K <sub>c</sub> | Q <sub>tn,cs</sub> | N <sub>1,60</sub><br>(blows) | G <sub>max</sub><br>(tsf) | CSR  | Shear, γ<br>(%) | e <sub>vol(15)</sub><br>(%) | N <sub>c</sub> | e <sub>v</sub><br>(%) | Settle.<br>(in) |
| 31.57                                                     | 2.56           | 50.00           | 3.44           | 171.79             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 31.65                                                     | 2.61           | 46.68           | 3.86           | 180.16             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 31.73                                                     | 2.64           | 45.30           | 4.11           | 186.34             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 31.80                                                     | 2.67           | 43.70           | 4.37           | 191.09             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 31.84                                                     | 2.66           | 44.72           | 4.28           | 191.28             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 31.91                                                     | 2.62           | 47.81           | 3.94           | 188.50             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 31.99                                                     | 2.55           | 54.47           | 3.34           | 182.17             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 32.03                                                     | 2.47           | 63.57           | 2.77           | 175.97             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 32.11                                                     | 2.39           | 73.66           | 2.32           | 170.94             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 32.18                                                     | 2.32           | 83.41           | 2.01           | 168.04             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 32.22                                                     | 2.27           | 90.88           | 1.83           | 166.27             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 32.29                                                     | 2.24           | 94.71           | 1.73           | 164.04             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 32.37                                                     | 2.20           | 98.95           | 1.62           | 160.64             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 32.45                                                     | 2.17           | 102.56          | 1.54           | 157.66             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 32.48                                                     | 2.12           | 107.19          | 1.45           | 155.26             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 32.56                                                     | 2.08           | 109.46          | 1.39           | 152.36             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 32.63                                                     | 2.06           | 107.84          | 1.36           | 146.97             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 32.70                                                     | 2.07           | 100.03          | 1.38           | 138.28             | 30                           | 2078                      | 0.53 | 0.132           | 0.08                        | 11.89          | 0.03                  | 0.000           |
| 32.78                                                     | 2.12           | 90.60           | 1.44           | 130.66             | 28                           | 2009                      | 0.53 | 0.144           | 0.09                        | 11.89          | 0.04                  | 0.000           |
| 32.82                                                     | 2.17           | 81.45           | 1.55           | 125.93             | 28                           | 1968                      | 0.53 | 0.152           | 0.10                        | 11.89          | 0.04                  | 0.000           |
| 32.90                                                     | 2.22           | 74.51           | 1.68           | 124.94             | 28                           | 1957                      | 0.53 | 0.155           | 0.10                        | 11.89          | 0.04                  | 0.000           |
| 32.98                                                     | 2.27           | 68.75           | 1.83           | 126.07             | 29                           | 1955                      | 0.53 | 0.156           | 0.10                        | 11.89          | 0.04                  | 0.000           |
| 33.02                                                     | 2.32           | 65.09           | 1.98           | 129.16             | 31                           | 1972                      | 0.53 | 0.153           | 0.09                        | 11.89          | 0.04                  | 0.000           |
| 33.10                                                     | 2.33           | 64.08           | 2.05           | 131.52             | 31                           | 1995                      | 0.53 | 0.149           | 0.09                        | 11.89          | 0.03                  | 0.000           |
| 33.14                                                     | 2.34           | 63.74           | 2.10           | 133.55             | 32                           | 2016                      | 0.53 | 0.145           | 0.08                        | 11.89          | 0.03                  | 0.000           |
| 33.21                                                     | 2.33           | 65.56           | 2.03           | 133.40             | 32                           | 2033                      | 0.53 | 0.142           | 0.08                        | 11.89          | 0.03                  | 0.000           |
| 33.29                                                     | 2.30           | 68.15           | 1.94           | 132.35             | 31                           | 2043                      | 0.53 | 0.141           | 0.08                        | 11.89          | 0.03                  | 0.000           |
| 33.36                                                     | 2.27           | 71.38           | 1.83           | 130.59             | 30                           | 2043                      | 0.53 | 0.141           | 0.09                        | 11.89          | 0.03                  | 0.000           |
| 33.40                                                     | 2.24           | 74.07           | 1.73           | 128.36             | 29                           | 2026                      | 0.53 | 0.144           | 0.09                        | 11.89          | 0.04                  | 0.000           |
| 33.47                                                     | 2.21           | 76.63           | 1.64           | 125.67             | 28                           | 1995                      | 0.53 | 0.151           | 0.10                        | 11.89          | 0.04                  | 0.000           |
| 33.55                                                     | 2.17           | 79.99           | 1.54           | 123.56             | 28                           | 1961                      | 0.53 | 0.158           | 0.11                        | 11.89          | 0.04                  | 0.000           |
| 33.62                                                     | 2.13           | 83.67           | 1.47           | 122.92             | 27                           | 1935                      | 0.53 | 0.164           | 0.11                        | 11.89          | 0.04                  | 0.000           |
| 33.70                                                     | 2.10           | 86.55           | 1.41           | 122.38             | 26                           | 1902                      | 0.53 | 0.173           | 0.12                        | 11.89          | 0.05                  | 0.000           |
| 33.74                                                     | 2.05           | 88.69           | 1.35           | 119.83             | 25                           | 1805                      | 0.53 | 0.201           | 0.15                        | 11.89          | 0.06                  | 0.000           |
| 33.82                                                     | 2.01           | 88.96           | 1.31           | 116.94             | 24                           | 1711                      | 0.53 | 0.237           | 0.19                        | 11.89          | 0.07                  | 0.001           |
| 33.89                                                     | 1.98           | 88.36           | 1.29           | 114.34             | 24                           | 1637                      | 0.53 | 0.274           | 0.22                        | 11.89          | 0.09                  | 0.001           |
| 33.93                                                     | 2.00           | 86.42           | 1.30           | 112.75             | 23                           | 1635                      | 0.53 | 0.275           | 0.23                        | 11.89          | 0.09                  | 0.000           |
| 34.00                                                     | 2.02           | 82.93           | 1.32           | 109.71             | 23                           | 1624                      | 0.53 | 0.283           | 0.24                        | 11.89          | 0.09                  | 0.001           |
| 34.08                                                     | 2.03           | 80.22           | 1.34           | 107.25             | 23                           | 1609                      | 0.53 | 0.292           | 0.25                        | 11.89          | 0.10                  | 0.001           |
| 34.15                                                     | 2.04           | 78.57           | 1.35           | 105.72             | 22                           | 1598                      | 0.53 | 0.300           | 0.26                        | 11.89          | 0.10                  | 0.001           |
| 34.22                                                     | 2.04           | 78.68           | 1.34           | 105.64             | 22                           | 1596                      | 0.53 | 0.302           | 0.26                        | 11.89          | 0.10                  | 0.001           |
| 34.26                                                     | 2.04           | 77.70           | 1.35           | 104.85             | 22                           | 1593                      | 0.53 | 0.304           | 0.27                        | 11.89          | 0.10                  | 0.000           |
| 34.33                                                     | 2.07           | 75.25           | 1.37           | 103.29             | 22                           | 1595                      | 0.53 | 0.304           | 0.27                        | 11.89          | 0.10                  | 0.001           |
| 34.41                                                     | 2.09           | 72.39           | 1.41           | 101.97             | 22                           | 1603                      | 0.53 | 0.300           | 0.27                        | 11.89          | 0.10                  | 0.001           |
| 34.49                                                     | 2.12           | 69.93           | 1.45           | 101.57             | 22                           | 1621                      | 0.53 | 0.290           | 0.26                        | 11.89          | 0.10                  | 0.001           |
| 34.53                                                     | 2.15           | 67.91           | 1.50           | 102.11             | 23                           | 1646                      | 0.53 | 0.275           | 0.24                        | 11.89          | 0.09                  | 0.000           |
| 34.61                                                     | 2.18           | 66.23           | 1.56           | 103.46             | 23                           | 1680                      | 0.53 | 0.259           | 0.22                        | 11.89          | 0.08                  | 0.001           |
| 34.68                                                     | 2.20           | 64.94           | 1.62           | 105.42             | 24                           | 1717                      | 0.53 | 0.242           | 0.20                        | 11.89          | 0.07                  | 0.001           |

| :: Post-earthquake settlement of dry sands :: (continued) |      |                 |      |                    |                              |                           |      |                 |                             |                |                       |                 |
|-----------------------------------------------------------|------|-----------------|------|--------------------|------------------------------|---------------------------|------|-----------------|-----------------------------|----------------|-----------------------|-----------------|
| Depth<br>(ft)                                             | Ic   | Q <sub>tn</sub> | Kc   | Q <sub>tn,cs</sub> | N <sub>1,60</sub><br>(blows) | G <sub>max</sub><br>(tsf) | CSR  | Shear, γ<br>(%) | e <sub>vol(15)</sub><br>(%) | N <sub>c</sub> | e <sub>v</sub><br>(%) | Settle.<br>(in) |
| 34.73                                                     | 2.22 | 64.25           | 1.68 | 107.93             | 25                           | 1757                      | 0.53 | 0.226           | 0.18                        | 11.89          | 0.07                  | 0.000           |
| 34.80                                                     | 2.24 | 63.79           | 1.73 | 110.60             | 25                           | 1798                      | 0.53 | 0.211           | 0.16                        | 11.89          | 0.06                  | 0.001           |
| 34.87                                                     | 2.26 | 63.20           | 1.79 | 113.28             | 26                           | 1837                      | 0.53 | 0.199           | 0.14                        | 11.89          | 0.05                  | 0.000           |
| 34.91                                                     | 2.28 | 62.46           | 1.86 | 116.18             | 27                           | 1874                      | 0.53 | 0.188           | 0.13                        | 11.89          | 0.05                  | 0.000           |
| 34.99                                                     | 2.30 | 61.52           | 1.94 | 119.16             | 28                           | 1910                      | 0.53 | 0.179           | 0.12                        | 11.89          | 0.04                  | 0.000           |
| 35.07                                                     | 2.32 | 60.93           | 2.00 | 122.15             | 29                           | 1947                      | 0.53 | 0.170           | 0.11                        | 11.89          | 0.04                  | 0.000           |
| 35.11                                                     | 2.34 | 60.44           | 2.07 | 125.01             | 30                           | 1979                      | 0.53 | 0.163           | 0.10                        | 11.89          | 0.04                  | 0.000           |
| 35.18                                                     | 2.35 | 60.25           | 2.12 | 127.91             | 31                           | 2015                      | 0.53 | 0.156           | 0.09                        | 11.89          | 0.03                  | 0.000           |
| 35.27                                                     | 2.36 | 60.21           | 2.17 | 130.86             | 32                           | 2052                      | 0.53 | 0.149           | 0.09                        | 11.89          | 0.03                  | 0.000           |
| 35.31                                                     | 2.36 | 61.46           | 2.17 | 133.46             | 32                           | 2096                      | 0.53 | 0.141           | 0.08                        | 11.89          | 0.03                  | 0.000           |
| 35.38                                                     | 2.34 | 64.60           | 2.09 | 134.96             | 32                           | 2144                      | 0.53 | 0.134           | 0.08                        | 11.89          | 0.03                  | 0.000           |
| 35.46                                                     | 2.32 | 68.53           | 1.98 | 136.02             | 32                           | 2191                      | 0.53 | 0.127           | 0.07                        | 11.89          | 0.03                  | 0.000           |
| 35.50                                                     | 2.29 | 72.78           | 1.88 | 136.78             | 32                           | 2230                      | 0.53 | 0.122           | 0.07                        | 11.89          | 0.02                  | 0.000           |
| 35.58                                                     | 2.28 | 73.87           | 1.86 | 137.57             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 35.65                                                     | 2.30 | 71.61           | 1.94 | 138.82             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 35.73                                                     | 2.34 | 67.11           | 2.09 | 140.50             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 35.77                                                     | 2.38 | 62.52           | 2.28 | 142.57             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 35.84                                                     | 2.40 | 60.13           | 2.39 | 143.80             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 35.92                                                     | 2.42 | 58.79           | 2.46 | 144.71             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 35.99                                                     | 2.42 | 58.82           | 2.47 | 145.04             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 36.03                                                     | 2.42 | 58.79           | 2.48 | 146.06             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 36.11                                                     | 2.42 | 59.39           | 2.48 | 147.13             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 36.18                                                     | 2.40 | 61.91           | 2.37 | 147.00             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 36.26                                                     | 2.37 | 66.08           | 2.20 | 145.49             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 36.30                                                     | 2.31 | 73.06           | 1.95 | 142.79             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 36.37                                                     | 2.25 | 80.77           | 1.75 | 141.00             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 36.44                                                     | 2.19 | 88.61           | 1.59 | 140.86             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 36.51                                                     | 2.15 | 93.39           | 1.51 | 141.28             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 36.55                                                     | 2.14 | 95.34           | 1.48 | 140.86             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 36.62                                                     | 2.12 | 95.94           | 1.45 | 139.29             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 36.70                                                     | 2.09 | 97.36           | 1.41 | 137.00             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 36.78                                                     | 2.06 | 99.26           | 1.37 | 135.66             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 36.82                                                     | 2.04 | 100.83          | 1.34 | 135.33             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 36.89                                                     | 2.04 | 99.04           | 1.35 | 133.56             | 28                           | 2130                      | 0.53 | 0.142           | 0.09                        | 11.89          | 0.03                  | 0.000           |
| 36.97                                                     | 2.06 | 95.16           | 1.37 | 130.52             | 28                           | 2116                      | 0.53 | 0.145           | 0.10                        | 11.89          | 0.03                  | 0.000           |
| 37.01                                                     | 2.10 | 89.10           | 1.42 | 126.15             | 27                           | 2090                      | 0.53 | 0.149           | 0.10                        | 11.89          | 0.03                  | 0.000           |
| 37.09                                                     | 2.15 | 81.04           | 1.50 | 121.63             | 27                           | 2062                      | 0.53 | 0.155           | 0.11                        | 11.89          | 0.04                  | 0.000           |
| 37.15                                                     | 2.17 | 77.00           | 1.55 | 119.16             | 27                           | 2033                      | 0.53 | 0.161           | 0.11                        | 11.89          | 0.04                  | 0.000           |
| 37.23                                                     | 2.17 | 76.06           | 1.55 | 117.81             | 26                           | 2013                      | 0.53 | 0.166           | 0.12                        | 11.89          | 0.04                  | 0.000           |
| 37.30                                                     | 2.14 | 79.60           | 1.49 | 118.40             | 26                           | 2011                      | 0.53 | 0.167           | 0.12                        | 11.89          | 0.04                  | 0.000           |
| 37.34                                                     | 2.13 | 81.57           | 1.46 | 119.18             | 26                           | 2014                      | 0.53 | 0.166           | 0.12                        | 11.89          | 0.04                  | 0.000           |
| 37.41                                                     | 2.12 | 82.45           | 1.45 | 119.74             | 26                           | 2022                      | 0.53 | 0.165           | 0.12                        | 11.89          | 0.04                  | 0.000           |
| 37.49                                                     | 2.13 | 81.58           | 1.46 | 119.34             | 26                           | 2023                      | 0.53 | 0.165           | 0.12                        | 11.89          | 0.04                  | 0.000           |
| 37.57                                                     | 2.14 | 79.25           | 1.49 | 118.24             | 26                           | 2019                      | 0.53 | 0.166           | 0.12                        | 11.89          | 0.04                  | 0.000           |
| 37.60                                                     | 2.17 | 75.69           | 1.54 | 116.71             | 26                           | 2008                      | 0.53 | 0.169           | 0.12                        | 11.89          | 0.04                  | 0.000           |
| 37.68                                                     | 2.19 | 72.26           | 1.60 | 115.59             | 26                           | 1998                      | 0.53 | 0.171           | 0.13                        | 11.89          | 0.04                  | 0.000           |
| 37.75                                                     | 2.22 | 69.16           | 1.66 | 115.09             | 26                           | 1993                      | 0.53 | 0.173           | 0.13                        | 11.89          | 0.04                  | 0.000           |
| 37.83                                                     | 2.23 | 67.56           | 1.71 | 115.23             | 26                           | 1996                      | 0.53 | 0.172           | 0.12                        | 11.89          | 0.04                  | 0.000           |

| :: Post-earthquake settlement of dry sands :: (continued) |      |                 |      |                    |                              |                           |      |                 |                             |                |                       |                 |
|-----------------------------------------------------------|------|-----------------|------|--------------------|------------------------------|---------------------------|------|-----------------|-----------------------------|----------------|-----------------------|-----------------|
| Depth<br>(ft)                                             | Ic   | Q <sub>tn</sub> | Kc   | Q <sub>tn,cs</sub> | N <sub>1,60</sub><br>(blows) | G <sub>max</sub><br>(tsf) | CSR  | Shear, γ<br>(%) | e <sub>vol(15)</sub><br>(%) | N <sub>c</sub> | e <sub>v</sub><br>(%) | Settle.<br>(in) |
| 37.87                                                     | 2.24 | 67.03           | 1.73 | 116.27             | 27                           | 2013                      | 0.53 | 0.169           | 0.12                        | 11.89          | 0.04                  | 0.000           |
| 37.95                                                     | 2.25 | 66.73           | 1.77 | 117.88             | 27                           | 2040                      | 0.53 | 0.163           | 0.11                        | 11.89          | 0.04                  | 0.000           |
| 38.02                                                     | 2.27 | 66.41           | 1.80 | 119.74             | 28                           | 2070                      | 0.53 | 0.157           | 0.11                        | 11.89          | 0.03                  | 0.000           |
| 38.06                                                     | 2.28 | 65.76           | 1.85 | 121.88             | 28                           | 2100                      | 0.53 | 0.152           | 0.10                        | 11.89          | 0.03                  | 0.000           |
| 38.14                                                     | 2.30 | 64.65           | 1.92 | 124.07             | 29                           | 2128                      | 0.53 | 0.147           | 0.09                        | 11.89          | 0.03                  | 0.000           |
| 38.21                                                     | 2.32 | 63.25           | 2.01 | 126.91             | 30                           | 2161                      | 0.53 | 0.142           | 0.09                        | 11.89          | 0.03                  | 0.000           |
| 38.29                                                     | 2.34 | 62.18           | 2.08 | 129.40             | 31                           | 2188                      | 0.53 | 0.138           | 0.08                        | 11.89          | 0.03                  | 0.000           |
| 38.33                                                     | 2.35 | 61.74           | 2.14 | 132.06             | 32                           | 2220                      | 0.53 | 0.133           | 0.08                        | 11.89          | 0.02                  | 0.000           |
| 38.40                                                     | 2.36 | 62.04           | 2.17 | 134.50             | 32                           | 2257                      | 0.53 | 0.128           | 0.07                        | 11.89          | 0.02                  | 0.000           |
| 38.48                                                     | 2.36 | 62.76           | 2.18 | 136.76             | 33                           | 2296                      | 0.53 | 0.123           | 0.07                        | 11.89          | 0.02                  | 0.000           |
| 38.52                                                     | 2.36 | 64.30           | 2.16 | 138.74             | 33                           | 2337                      | 0.53 | 0.119           | 0.06                        | 11.89          | 0.02                  | 0.000           |
| 38.59                                                     | 2.35 | 66.61           | 2.11 | 140.51             | 34                           | 2383                      | 0.53 | 0.114           | 0.06                        | 11.89          | 0.02                  | 0.000           |
| 38.67                                                     | 2.33 | 69.70           | 2.05 | 142.56             | 34                           | 2439                      | 0.53 | 0.108           | 0.06                        | 11.89          | 0.02                  | 0.000           |
| 38.75                                                     | 2.32 | 72.39           | 1.99 | 144.40             | 34                           | 2488                      | 0.53 | 0.104           | 0.05                        | 11.89          | 0.02                  | 0.000           |
| 38.78                                                     | 2.31 | 74.60           | 1.96 | 146.51             | 35                           | 2534                      | 0.53 | 0.100           | 0.05                        | 11.89          | 0.02                  | 0.000           |
| 38.85                                                     | 2.31 | 76.58           | 1.95 | 148.98             | 35                           | 2585                      | 0.53 | 0.096           | 0.05                        | 11.89          | 0.01                  | 0.000           |
| 38.93                                                     | 2.30 | 79.47           | 1.91 | 151.69             | 36                           | 2646                      | 0.53 | 0.091           | 0.05                        | 11.89          | 0.01                  | 0.000           |
| 39.00                                                     | 2.28 | 82.84           | 1.86 | 153.87             | 36                           | 2700                      | 0.53 | 0.088           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 39.05                                                     | 2.26 | 87.76           | 1.78 | 155.79             | 36                           | 2753                      | 0.53 | 0.085           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 39.13                                                     | 2.23 | 93.33           | 1.69 | 157.91             | 36                           | 2806                      | 0.53 | 0.082           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 39.20                                                     | 2.20 | 99.16           | 1.62 | 160.90             | 36                           | 2864                      | 0.52 | 0.079           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 39.27                                                     | 2.19 | 103.20          | 1.58 | 163.49             | 37                           | 2910                      | 0.52 | 0.076           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 39.31                                                     | 2.18 | 106.59          | 1.56 | 165.84             | 37                           | 2949                      | 0.52 | 0.075           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 39.38                                                     | 2.16 | 110.81          | 1.51 | 167.86             | 37                           | 2975                      | 0.52 | 0.074           | 0.03                        | 11.89          | 0.01                  | 0.000           |
| 39.46                                                     | 2.12 | 117.88          | 1.45 | 171.29             | 37                           | 3003                      | 0.52 | 0.072           | 0.03                        | 11.89          | 0.01                  | 0.000           |
| 39.53                                                     | 2.09 | 125.41          | 1.40 | 175.62             | 38                           | 3026                      | 0.52 | 0.072           | 0.03                        | 11.89          | 0.01                  | 0.000           |
| 39.57                                                     | 2.05 | 134.19          | 1.36 | 181.98             | 39                           | 3058                      | 0.52 | 0.070           | 0.03                        | 11.89          | 0.01                  | 0.000           |
| 39.65                                                     | 2.02 | 141.88          | 1.32 | 187.80             | 39                           | 3075                      | 0.52 | 0.070           | 0.03                        | 11.89          | 0.01                  | 0.000           |
| 39.72                                                     | 1.98 | 150.08          | 1.29 | 193.47             | 40                           | 3045                      | 0.52 | 0.071           | 0.03                        | 11.89          | 0.01                  | 0.000           |
| 39.79                                                     | 1.95 | 155.54          | 1.27 | 197.22             | 40                           | 3012                      | 0.52 | 0.073           | 0.03                        | 11.89          | 0.01                  | 0.000           |
| 39.83                                                     | 1.92 | 159.58          | 1.25 | 199.95             | 40                           | 2981                      | 0.52 | 0.074           | 0.03                        | 11.89          | 0.01                  | 0.000           |
| 39.91                                                     | 1.91 | 162.11          | 1.25 | 201.94             | 41                           | 2979                      | 0.52 | 0.074           | 0.03                        | 11.89          | 0.01                  | 0.000           |
| 39.99                                                     | 1.90 | 163.93          | 1.24 | 202.53             | 41                           | 2943                      | 0.52 | 0.076           | 0.03                        | 11.89          | 0.01                  | 0.000           |
| 40.06                                                     | 1.90 | 160.41          | 1.24 | 198.12             | 40                           | 2880                      | 0.52 | 0.079           | 0.03                        | 11.89          | 0.01                  | 0.000           |
| 40.11                                                     | 1.89 | 158.90          | 1.23 | 195.36             | 39                           | 2818                      | 0.52 | 0.083           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 40.18                                                     | 1.88 | 157.80          | 1.22 | 193.02             | 38                           | 2761                      | 0.52 | 0.086           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 40.25                                                     | 1.86 | 162.17          | 1.21 | 195.53             | 39                           | 2734                      | 0.52 | 0.088           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 40.32                                                     | 1.84 | 166.78          | 1.19 | 198.38             | 39                           | 2728                      | 0.52 | 0.089           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 40.39                                                     | 1.82 | 172.82          | 1.17 | 202.15             | 39                           | 2736                      | 0.52 | 0.088           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 40.43                                                     | 1.78 | 182.45          | 1.13 | 206.33             | 40                           | 2735                      | 0.52 | 0.088           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 40.50                                                     | 1.75 | 191.06          | 1.08 | 207.12             | 39                           | 2723                      | 0.52 | 0.089           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 40.58                                                     | 1.73 | 196.61          | 1.04 | 205.26             | 39                           | 2706                      | 0.52 | 0.090           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 40.62                                                     | 1.73 | 192.36          | 1.06 | 203.17             | 38                           | 2677                      | 0.52 | 0.093           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 40.69                                                     | 1.77 | 178.83          | 1.11 | 198.25             | 38                           | 2622                      | 0.52 | 0.097           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 40.76                                                     | 1.81 | 160.22          | 1.17 | 186.67             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 40.83                                                     | 1.87 | 140.60          | 1.21 | 170.46             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 40.90                                                     | 1.93 | 122.52          | 1.25 | 153.70             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 40.98                                                     | 1.99 | 108.80          | 1.30 | 141.10             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |

| :: Post-earthquake settlement of dry sands :: (continued) |      |                 |      |                    |                              |                           |      |                 |                             |                |                       |                 |
|-----------------------------------------------------------|------|-----------------|------|--------------------|------------------------------|---------------------------|------|-----------------|-----------------------------|----------------|-----------------------|-----------------|
| Depth<br>(ft)                                             | Ic   | Q <sub>tn</sub> | Kc   | Q <sub>tn,cs</sub> | N <sub>1,60</sub><br>(blows) | G <sub>max</sub><br>(tsf) | CSR  | Shear, γ<br>(%) | e <sub>vol(15)</sub><br>(%) | N <sub>c</sub> | e <sub>v</sub><br>(%) | Settle.<br>(in) |
| 41.01                                                     | 2.05 | 97.59           | 1.36 | 132.46             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.09                                                     | 2.11 | 88.95           | 1.44 | 128.03             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.16                                                     | 2.19 | 80.33           | 1.58 | 126.93             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.24                                                     | 2.25 | 74.23           | 1.75 | 129.99             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.31                                                     | 2.30 | 70.38           | 1.92 | 134.88             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.35                                                     | 2.33 | 67.97           | 2.06 | 140.26             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.42                                                     | 2.37 | 66.06           | 2.20 | 145.36             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.50                                                     | 2.39 | 64.48           | 2.34 | 150.91             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.56                                                     | 2.41 | 63.38           | 2.45 | 155.33             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.60                                                     | 2.43 | 62.75           | 2.54 | 159.42             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.68                                                     | 2.45 | 62.45           | 2.63 | 164.18             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.75                                                     | 2.46 | 63.00           | 2.70 | 170.35             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.82                                                     | 2.46 | 64.82           | 2.74 | 177.49             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.89                                                     | 2.47 | 67.73           | 2.77 | 187.27             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.96                                                     | 2.47 | 70.80           | 2.78 | 196.80             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 42.00                                                     | 2.47 | 74.51           | 2.78 | 206.86             | 53                           | 3491                      | 0.52 | 0.058           | 0.02                        | 11.89          | 0.00                  | 0.000           |
| 42.07                                                     | 2.46 | 78.54           | 2.73 | 214.68             | 54                           | 3644                      | 0.52 | 0.055           | 0.02                        | 11.89          | 0.00                  | 0.000           |
| 42.15                                                     | 2.45 | 83.92           | 2.65 | 222.64             | 56                           | 3818                      | 0.52 | 0.051           | 0.01                        | 11.89          | 0.00                  | 0.000           |
| 42.22                                                     | 2.43 | 89.16           | 2.56 | 228.04             | 57                           | 3957                      | 0.52 | 0.048           | 0.01                        | 11.89          | 0.00                  | 0.000           |
| 42.26                                                     | 2.42 | 94.61           | 2.45 | 232.22             | 58                           | 4078                      | 0.52 | 0.046           | 0.01                        | 11.89          | 0.00                  | 0.000           |
| 42.32                                                     | 2.40 | 99.51           | 2.37 | 235.65             | 58                           | 4184                      | 0.52 | 0.044           | 0.01                        | 11.89          | 0.00                  | 0.000           |
| 42.40                                                     | 2.39 | 103.41          | 2.31 | 239.08             | 58                           | 4278                      | 0.52 | 0.043           | 0.01                        | 11.89          | 0.00                  | 0.000           |
| 42.47                                                     | 2.40 | 102.69          | 2.36 | 242.46             | 60                           | 4321                      | 0.52 | 0.042           | 0.01                        | 11.89          | 0.00                  | 0.000           |
| 42.55                                                     | 2.42 | 98.32           | 2.49 | 244.60             | 61                           | 4305                      | 0.52 | 0.043           | 0.01                        | 11.89          | 0.00                  | 0.000           |
| 42.62                                                     | 2.43 | 93.93           | 2.56 | 240.89             | 60                           | 4210                      | 0.51 | 0.044           | 0.01                        | 11.89          | 0.00                  | 0.000           |
| 42.66                                                     | 2.41 | 93.08           | 2.42 | 225.41             | 56                           | 4005                      | 0.51 | 0.048           | 0.01                        | 11.89          | 0.00                  | 0.000           |
| 42.73                                                     | 2.35 | 96.97           | 2.14 | 207.51             | 50                           | 3807                      | 0.51 | 0.051           | 0.02                        | 11.89          | 0.00                  | 0.000           |
| 42.80                                                     | 2.29 | 103.17          | 1.88 | 193.45             | 45                           | 3645                      | 0.51 | 0.055           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 42.88                                                     | 2.23 | 110.54          | 1.70 | 188.16             | 43                           | 3583                      | 0.51 | 0.057           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 42.95                                                     | 2.19 | 115.62          | 1.59 | 183.98             | 41                           | 3502                      | 0.51 | 0.059           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 42.99                                                     | 2.15 | 119.52          | 1.51 | 179.99             | 40                           | 3396                      | 0.51 | 0.062           | 0.03                        | 11.89          | 0.01                  | 0.000           |
| 43.07                                                     | 2.12 | 120.89          | 1.45 | 175.52             | 38                           | 3275                      | 0.51 | 0.066           | 0.03                        | 11.89          | 0.01                  | 0.000           |
| 43.14                                                     | 2.10 | 121.28          | 1.41 | 171.21             | 37                           | 3152                      | 0.51 | 0.071           | 0.03                        | 11.89          | 0.01                  | 0.000           |
| 43.18                                                     | 2.09 | 118.16          | 1.41 | 166.57             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 43.26                                                     | 2.11 | 113.69          | 1.43 | 163.09             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 43.33                                                     | 2.14 | 108.57          | 1.49 | 161.29             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 43.41                                                     | 2.17 | 104.95          | 1.54 | 161.86             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 43.45                                                     | 2.20 | 101.29          | 1.62 | 164.54             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 43.53                                                     | 2.24 | 97.88           | 1.72 | 167.89             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 43.57                                                     | 2.29 | 92.13           | 1.89 | 174.46             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 43.64                                                     | 2.36 | 84.72           | 2.18 | 185.10             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 43.72                                                     | 2.45 | 76.11           | 2.65 | 201.39             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 43.79                                                     | 2.53 | 68.96           | 3.17 | 218.34             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 43.87                                                     | 2.58 | 64.40           | 3.58 | 230.60             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 43.91                                                     | 2.62 | 60.63           | 3.97 | 240.39             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 43.98                                                     | 2.67 | 57.00           | 4.36 | 248.54             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 44.05                                                     | 2.71 | 53.15           | 4.81 | 255.62             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 44.13                                                     | 2.74 | 50.94           | 5.09 | 259.08             | 0                            | 0                         | 0.51 | 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) |
| 44.17                                                     | 2.74 | 50.14           | 5.17 | 259.07             | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 44.24                                                     | 2.74 | 50.18           | 5.11 | 256.19             | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 44.32                                                     | 2.73 | 49.84           | 5.08 | 253.12             | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 44.40                                                     | 2.73 | 49.49           | 5.07 | 250.72             | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 44.44                                                     | 2.73 | 49.39           | 5.06 | 250.14             | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 44.51                                                     | 2.73 | 50.02           | 4.98 | 249.12             | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 44.58                                                     | 2.71 | 51.15           | 4.85 | 247.84             | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 44.66                                                     | 2.70 | 52.43           | 4.70 | 246.45             | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 44.69                                                     | 2.69 | 53.29           | 4.61 | 245.89             | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 44.77                                                     | 2.70 | 52.26           | 4.73 | 247.10             | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 44.85                                                     | 2.72 | 50.95           | 4.88 | 248.58             | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 44.89                                                     | 2.73 | 50.11           | 4.99 | 249.85             | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 44.96                                                     | 2.72 | 51.06           | 4.87 | 248.59             | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 45.03                                                     | 2.70 | 52.18           | 4.72 | 246.41             | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 45.08                                                     | 2.69 | 52.84           | 4.62 | 244.40             | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 45.15                                                     | 2.69 | 53.03           | 4.57 | 242.39             | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 45.23                                                     | 2.68 | 53.28           | 4.50 | 239.83             | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 45.30                                                     | 2.67 | 53.73           | 4.37 | 234.82             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 45.38                                                     | 2.65 | 54.16           | 4.23 | 229.20             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 45.42                                                     | 2.64 | 54.42           | 4.09 | 222.62             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 45.50                                                     | 2.62 | 54.81           | 3.94 | 215.89             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 45.56                                                     | 2.60 | 55.64           | 3.72 | 207.14             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 45.64                                                     | 2.57 | 56.61           | 3.49 | 197.31             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 45.68                                                     | 2.52 | 58.32           | 3.11 | 181.48             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 45.75                                                     | 2.47 | 60.55           | 2.75 | 166.66             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 45.83                                                     | 2.41 | 63.15           | 2.44 | 154.10             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 45.87                                                     | 2.37 | 66.11           | 2.22 | 146.88             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 45.95                                                     | 2.33 | 68.82           | 2.03 | 139.81             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 46.02                                                     | 2.28 | 71.42           | 1.87 | 133.35             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 46.09                                                     | 2.24 | 74.81           | 1.72 | 129.04             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 46.16                                                     | 2.20 | 78.05           | 1.62 | 126.68             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 46.20                                                     | 2.17 | 82.31           | 1.53 | 126.35             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 46.28                                                     | 2.14 | 85.93           | 1.48 | 127.48             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 46.36                                                     | 2.11 | 90.60           | 1.44 | 130.42             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 46.43                                                     | 2.10 | 94.84           | 1.41 | 134.10             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 46.47                                                     | 2.09 | 99.13           | 1.40 | 139.21             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 46.54                                                     | 2.09 | 103.64          | 1.40 | 145.04             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 46.62                                                     | 2.08 | 108.80          | 1.39 | 151.35             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 46.69                                                     | 2.07 | 113.34          | 1.38 | 156.29             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 46.73                                                     | 2.06 | 118.03          | 1.36 | 160.86             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 46.80                                                     | 2.04 | 121.81          | 1.35 | 164.35             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 46.88                                                     | 2.04 | 124.71          | 1.34 | 167.06             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 46.92                                                     | 2.03 | 126.11          | 1.34 | 168.54             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 46.99                                                     | 2.03 | 127.28          | 1.34 | 170.24             | 36                        | 3171                   | 0.50 | 0.073        | 0.04                     | 11.89          | 0.01               | 0.000        |
| 47.06                                                     | 2.03 | 129.23          | 1.34 | 172.55             | 36                        | 3210                   | 0.50 | 0.072        | 0.04                     | 11.89          | 0.01               | 0.000        |
| 47.14                                                     | 2.03 | 130.97          | 1.33 | 174.54             | 37                        | 3243                   | 0.50 | 0.071        | 0.03                     | 11.89          | 0.01               | 0.000        |
| 47.18                                                     | 2.02 | 132.90          | 1.33 | 176.42             | 37                        | 3263                   | 0.50 | 0.070        | 0.03                     | 11.89          | 0.01               | 0.000        |
| 47.25                                                     | 2.02 | 133.97          | 1.33 | 177.78             | 37                        | 3290                   | 0.50 | 0.069        | 0.03                     | 11.89          | 0.01               | 0.000        |

| :: Post-earthquake settlement of dry sands :: (continued) |      |                 |      |                    |                              |                           |      |                 |                             |                |                       |                 |
|-----------------------------------------------------------|------|-----------------|------|--------------------|------------------------------|---------------------------|------|-----------------|-----------------------------|----------------|-----------------------|-----------------|
| Depth<br>(ft)                                             | Ic   | Q <sub>tn</sub> | Kc   | Q <sub>tn,cs</sub> | N <sub>1,60</sub><br>(blows) | G <sub>max</sub><br>(tsf) | CSR  | Shear, γ<br>(%) | e <sub>vol(15)</sub><br>(%) | N <sub>c</sub> | e <sub>v</sub><br>(%) | Settle.<br>(in) |
| 47.33                                                     | 2.02 | 134.93          | 1.33 | 179.14             | 38                           | 3321                      | 0.50 | 0.068           | 0.03                        | 11.89          | 0.01                  | 0.000           |
| 47.41                                                     | 2.02 | 135.37          | 1.33 | 179.90             | 38                           | 3343                      | 0.50 | 0.067           | 0.03                        | 11.89          | 0.01                  | 0.000           |
| 47.45                                                     | 2.02 | 136.44          | 1.33 | 180.99             | 38                           | 3357                      | 0.50 | 0.067           | 0.03                        | 11.89          | 0.01                  | 0.000           |
| 47.51                                                     | 2.01 | 138.68          | 1.32 | 182.93             | 38                           | 3369                      | 0.50 | 0.066           | 0.03                        | 11.89          | 0.01                  | 0.000           |
| 47.59                                                     | 2.00 | 141.58          | 1.31 | 185.52             | 39                           | 3386                      | 0.50 | 0.066           | 0.03                        | 11.89          | 0.01                  | 0.000           |
| 47.66                                                     | 2.00 | 144.46          | 1.30 | 188.41             | 39                           | 3416                      | 0.50 | 0.065           | 0.03                        | 11.89          | 0.01                  | 0.000           |
| 47.74                                                     | 1.99 | 146.43          | 1.30 | 190.59             | 40                           | 3447                      | 0.49 | 0.064           | 0.03                        | 11.89          | 0.00                  | 0.000           |
| 47.78                                                     | 1.99 | 148.47          | 1.30 | 192.85             | 40                           | 3477                      | 0.49 | 0.063           | 0.03                        | 11.89          | 0.00                  | 0.000           |
| 47.85                                                     | 1.99 | 149.93          | 1.30 | 194.26             | 40                           | 3490                      | 0.49 | 0.063           | 0.03                        | 11.89          | 0.00                  | 0.000           |
| 47.93                                                     | 1.98 | 151.80          | 1.29 | 195.94             | 40                           | 3499                      | 0.49 | 0.063           | 0.03                        | 11.89          | 0.00                  | 0.000           |
| 48.00                                                     | 1.97 | 153.31          | 1.29 | 197.23             | 41                           | 3504                      | 0.49 | 0.062           | 0.03                        | 11.89          | 0.00                  | 0.000           |
| 48.03                                                     | 1.96 | 156.52          | 1.28 | 199.96             | 41                           | 3505                      | 0.49 | 0.062           | 0.03                        | 11.89          | 0.00                  | 0.000           |
| 48.12                                                     | 1.95 | 160.11          | 1.27 | 203.19             | 41                           | 3516                      | 0.49 | 0.062           | 0.03                        | 11.89          | 0.00                  | 0.000           |
| 48.19                                                     | 2.06 | 107.70          | 1.36 | 146.96             | 31                           | 4120                      | 0.49 | 0.049           | 0.03                        | 11.89          | 0.00                  | 0.000           |
| 48.27                                                     | 2.05 | 108.91          | 1.36 | 147.61             | 31                           | 4130                      | 0.49 | 0.048           | 0.03                        | 11.89          | 0.00                  | 0.000           |
| 48.31                                                     | 2.04 | 110.02          | 1.34 | 147.62             | 31                           | 4109                      | 0.49 | 0.049           | 0.03                        | 11.89          | 0.00                  | 0.000           |
| 48.38                                                     | 2.02 | 111.85          | 1.32 | 148.16             | 31                           | 4091                      | 0.49 | 0.049           | 0.03                        | 11.89          | 0.00                  | 0.000           |
| 48.45                                                     | 2.00 | 115.42          | 1.30 | 150.59             | 31                           | 4107                      | 0.49 | 0.049           | 0.03                        | 11.89          | 0.00                  | 0.000           |
| 48.52                                                     | 1.98 | 119.54          | 1.29 | 154.07             | 32                           | 4152                      | 0.49 | 0.048           | 0.03                        | 11.89          | 0.00                  | 0.000           |
| 48.56                                                     | 1.96 | 123.86          | 1.28 | 158.15             | 32                           | 4216                      | 0.49 | 0.047           | 0.03                        | 11.89          | 0.00                  | 0.000           |
| 48.63                                                     | 1.94 | 127.08          | 1.27 | 160.78             | 33                           | 4239                      | 0.49 | 0.047           | 0.03                        | 11.89          | 0.00                  | 0.000           |
| 48.70                                                     | 1.92 | 129.18          | 1.25 | 161.68             | 33                           | 4205                      | 0.49 | 0.047           | 0.03                        | 11.89          | 0.00                  | 0.000           |
| 48.78                                                     | 1.91 | 129.77          | 1.24 | 161.52             | 33                           | 4175                      | 0.49 | 0.048           | 0.03                        | 11.89          | 0.00                  | 0.000           |
| 48.86                                                     | 1.91 | 129.11          | 1.24 | 160.69             | 32                           | 4160                      | 0.49 | 0.048           | 0.03                        | 11.89          | 0.00                  | 0.000           |
| 48.89                                                     | 1.92 | 128.48          | 1.25 | 160.68             | 32                           | 4192                      | 0.49 | 0.048           | 0.03                        | 11.89          | 0.00                  | 0.000           |
| 48.97                                                     | 1.92 | 127.56          | 1.25 | 159.87             | 32                           | 4190                      | 0.49 | 0.048           | 0.03                        | 11.89          | 0.00                  | 0.000           |
| 49.04                                                     | 1.93 | 127.35          | 1.25 | 159.69             | 32                           | 4195                      | 0.49 | 0.048           | 0.03                        | 11.89          | 0.00                  | 0.000           |
| 49.09                                                     | 1.93 | 127.57          | 1.26 | 160.15             | 32                           | 4217                      | 0.49 | 0.047           | 0.03                        | 11.89          | 0.00                  | 0.000           |
| 49.18                                                     | 1.92 | 128.69          | 1.25 | 161.28             | 33                           | 4246                      | 0.49 | 0.047           | 0.03                        | 11.89          | 0.00                  | 0.000           |
| 49.22                                                     | 1.91 | 130.46          | 1.25 | 162.62             | 33                           | 4253                      | 0.49 | 0.047           | 0.03                        | 11.89          | 0.00                  | 0.000           |
| 49.29                                                     | 1.90 | 132.14          | 1.24 | 163.21             | 33                           | 4221                      | 0.49 | 0.047           | 0.03                        | 11.89          | 0.00                  | 0.000           |
| 49.36                                                     | 1.88 | 133.89          | 1.22 | 163.86             | 33                           | 4194                      | 0.49 | 0.048           | 0.03                        | 11.89          | 0.00                  | 0.000           |
| 49.43                                                     | 1.87 | 134.77          | 1.22 | 163.76             | 32                           | 4164                      | 0.49 | 0.048           | 0.03                        | 11.89          | 0.00                  | 0.000           |
| 49.51                                                     | 1.86 | 134.82          | 1.21 | 163.13             | 32                           | 4136                      | 0.49 | 0.049           | 0.03                        | 11.89          | 0.00                  | 0.000           |
| 49.55                                                     | 1.85 | 134.86          | 1.20 | 162.06             | 32                           | 4085                      | 0.49 | 0.050           | 0.03                        | 11.89          | 0.00                  | 0.000           |
| 49.62                                                     | 1.85 | 132.86          | 1.20 | 158.98             | 31                           | 4000                      | 0.49 | 0.051           | 0.03                        | 11.89          | 0.00                  | 0.000           |
| 49.70                                                     | 1.85 | 127.91          | 1.20 | 153.90             | 30                           | 3896                      | 0.49 | 0.053           | 0.03                        | 11.89          | 0.00                  | 0.000           |
| 49.77                                                     | 1.88 | 120.98          | 1.22 | 147.78             | 29                           | 3807                      | 0.49 | 0.055           | 0.03                        | 11.89          | 0.00                  | 0.000           |
| 49.81                                                     | 1.93 | 112.48          | 1.26 | 141.49             | 29                           | 3795                      | 0.49 | 0.056           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 49.88                                                     | 2.00 | 104.22          | 1.31 | 136.01             | 28                           | 3826                      | 0.49 | 0.055           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 49.95                                                     | 2.10 | 92.60           | 1.41 | 130.82             | 28                           | 3857                      | 0.48 | 0.054           | 0.04                        | 11.89          | 0.00                  | 0.000           |
| 50.04                                                     | 2.17 | 84.59           | 1.54 | 130.15             | 29                           | 3863                      | 0.48 | 0.054           | 0.03                        | 11.89          | 0.00                  | 0.000           |

| :: Post-earthquake settlement of dry sands :: (continued) |                |                 |                |                    |                              |                           |     |                 |                             |                |                       |                 |
|-----------------------------------------------------------|----------------|-----------------|----------------|--------------------|------------------------------|---------------------------|-----|-----------------|-----------------------------|----------------|-----------------------|-----------------|
| Depth<br>(ft)                                             | I <sub>c</sub> | Q <sub>tn</sub> | K <sub>c</sub> | Q <sub>tn,cs</sub> | N <sub>1,60</sub><br>(blows) | G <sub>max</sub><br>(tsf) | CSR | Shear, γ<br>(%) | e <sub>vol(15)</sub><br>(%) | N <sub>c</sub> | e <sub>v</sub><br>(%) | Settle.<br>(in) |
| Total estimated settlement: 0.15                          |                |                 |                |                    |                              |                           |     |                 |                             |                |                       |                 |

**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                            |

**LIQUEFACTION ANALYSIS REPORT**

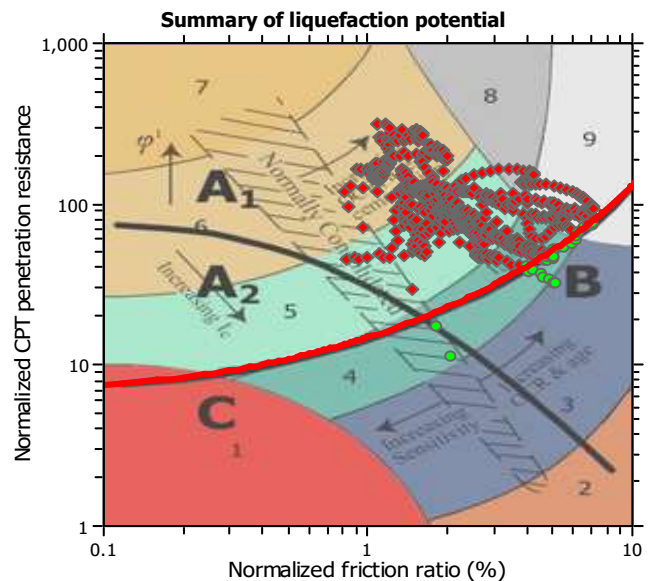
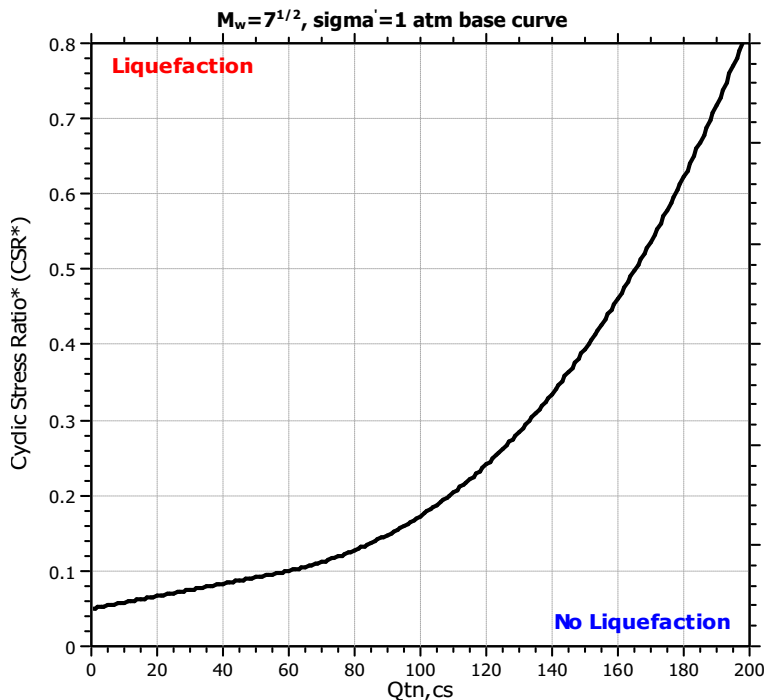
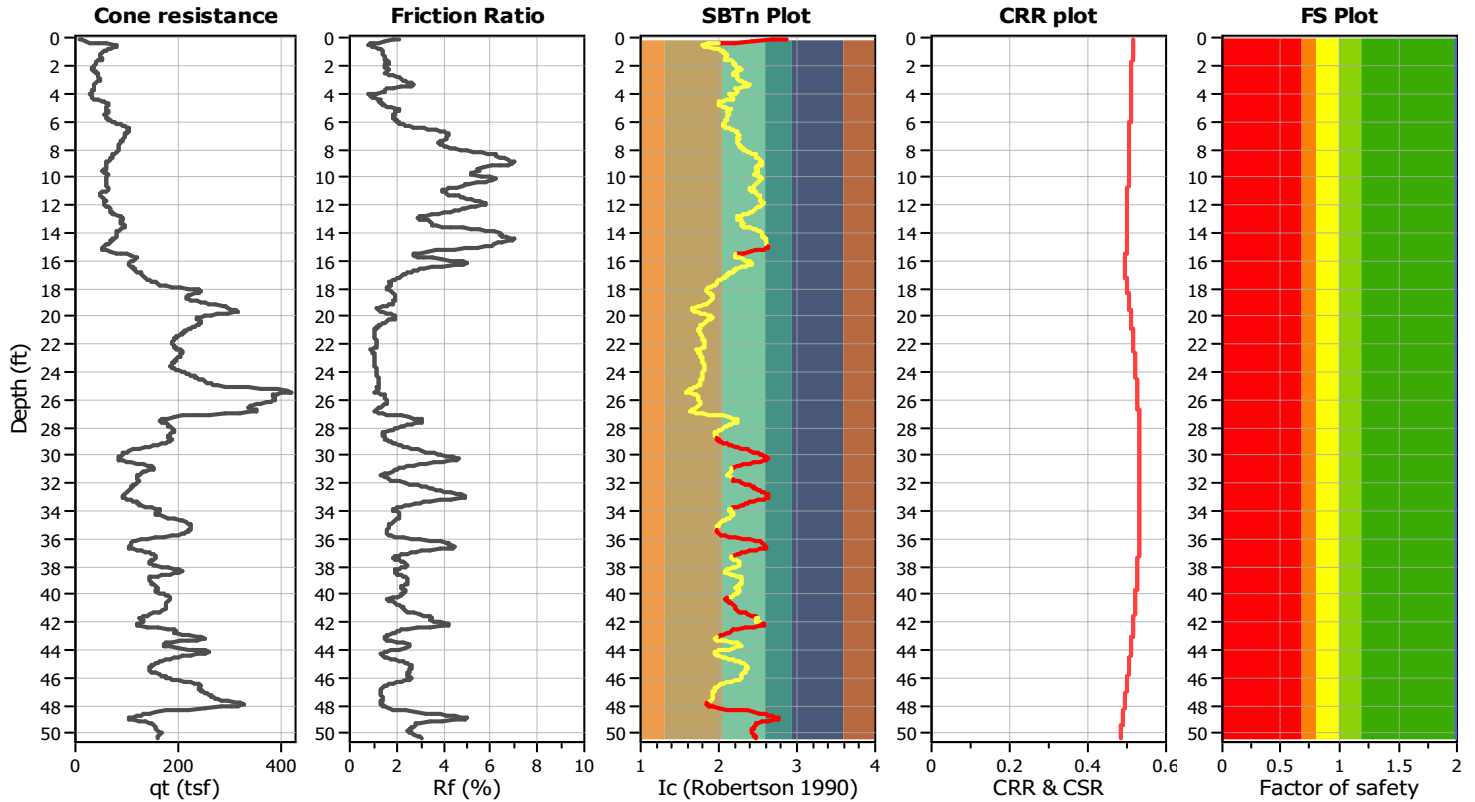
**Project title : Xenia Site**

**Location : Beaumont, California**

**CPT file : CPT-3**

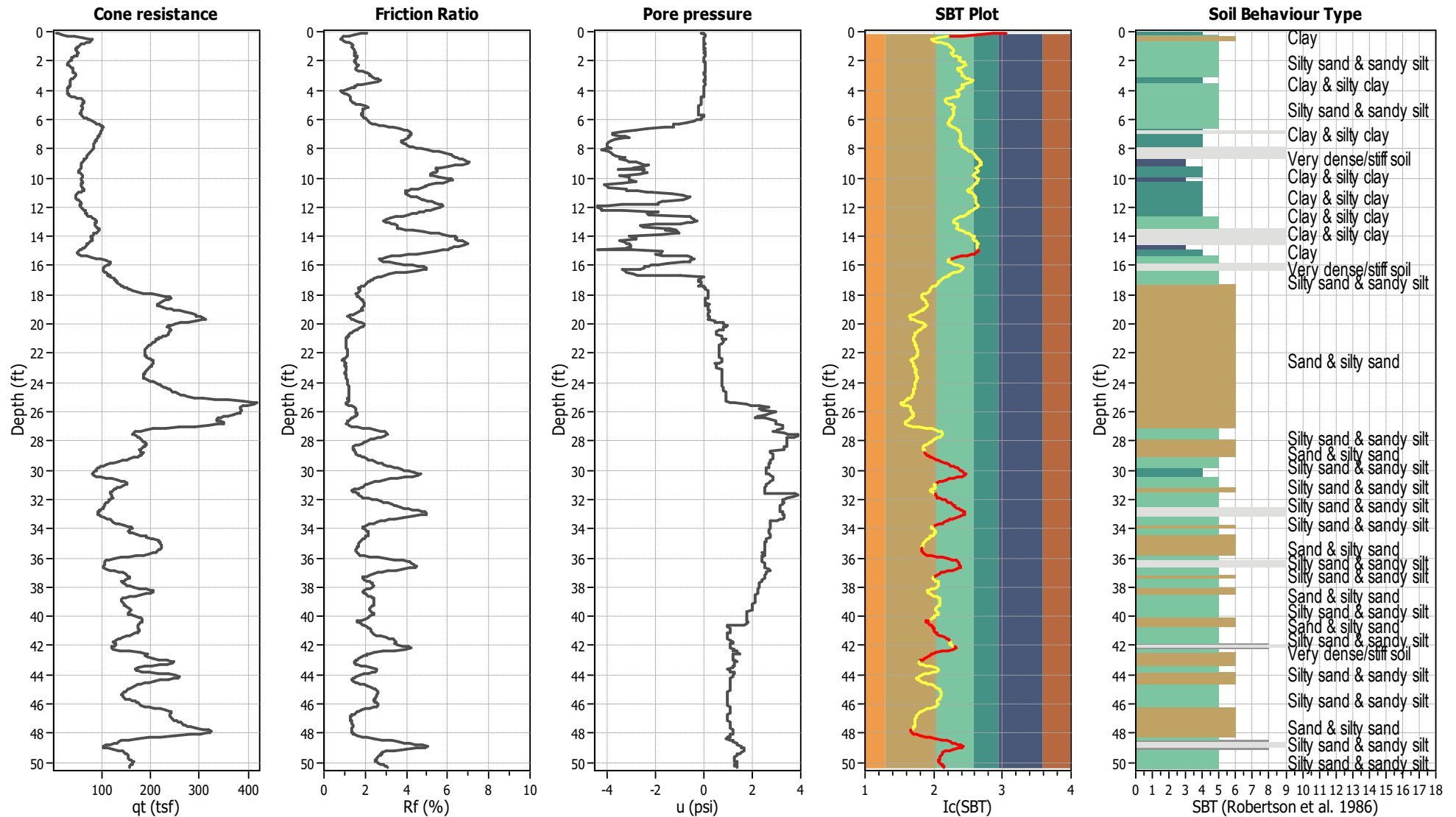
**Input parameters and analysis data**

|                              |                   |                           |              |                         |     |                      |              |
|------------------------------|-------------------|---------------------------|--------------|-------------------------|-----|----------------------|--------------|
| Analysis method:             | NCEER (1998)      | G.W.T. (in-situ):         | 100.00 ft    | Use fill:               | No  | Clay like behavior   |              |
| Fines correction method:     | NCEER (1998)      | G.W.T. (earthq.):         | 100.00 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 $M_w$ : | 7.13              | Ic cut-off value:         | 2.60         | Trans. detect. applied: | Yes | Limit depth:         | 60.00 ft     |
| Peak ground acceleration:    | 0.90              | Unit weight calculation:  | Based on SBT | $K_0$ applied:          | Yes | MSF method:          | Method based |



Zone A<sub>1</sub>: Cyclic liquefaction likely depending on size and duration of cyclic loading  
 Zone A<sub>2</sub>: Cyclic liquefaction and strength loss likely depending on loading and ground geometry  
 Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening  
 Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

## CPT basic interpretation plots



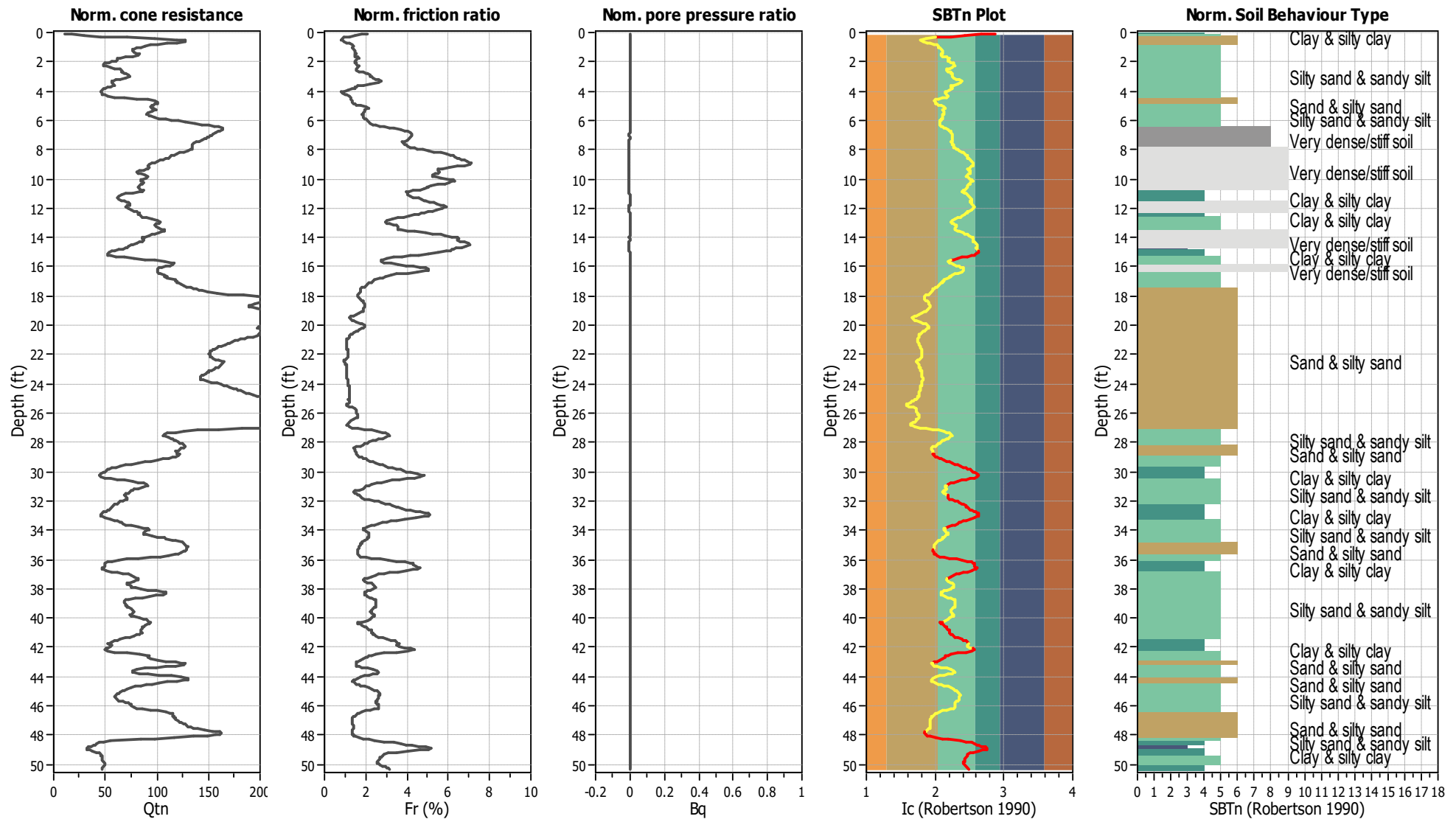
### Input parameters and analysis data

|                                       |                   |                                |              |                             |            |
|---------------------------------------|-------------------|--------------------------------|--------------|-----------------------------|------------|
| Analysis method:                      | NCEER (1998)      | Depth to water table (erthq.): | 100.00 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> : | 7.13              | Unit weight calculation:       | Based on SBT | Clay like behavior applied: | Sands only |
| Peak ground acceleration:             | 0.90              | Use fill:                      | No           | Limit depth applied:        | Yes        |
| Depth to water table (insitu):        | 100.00 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)



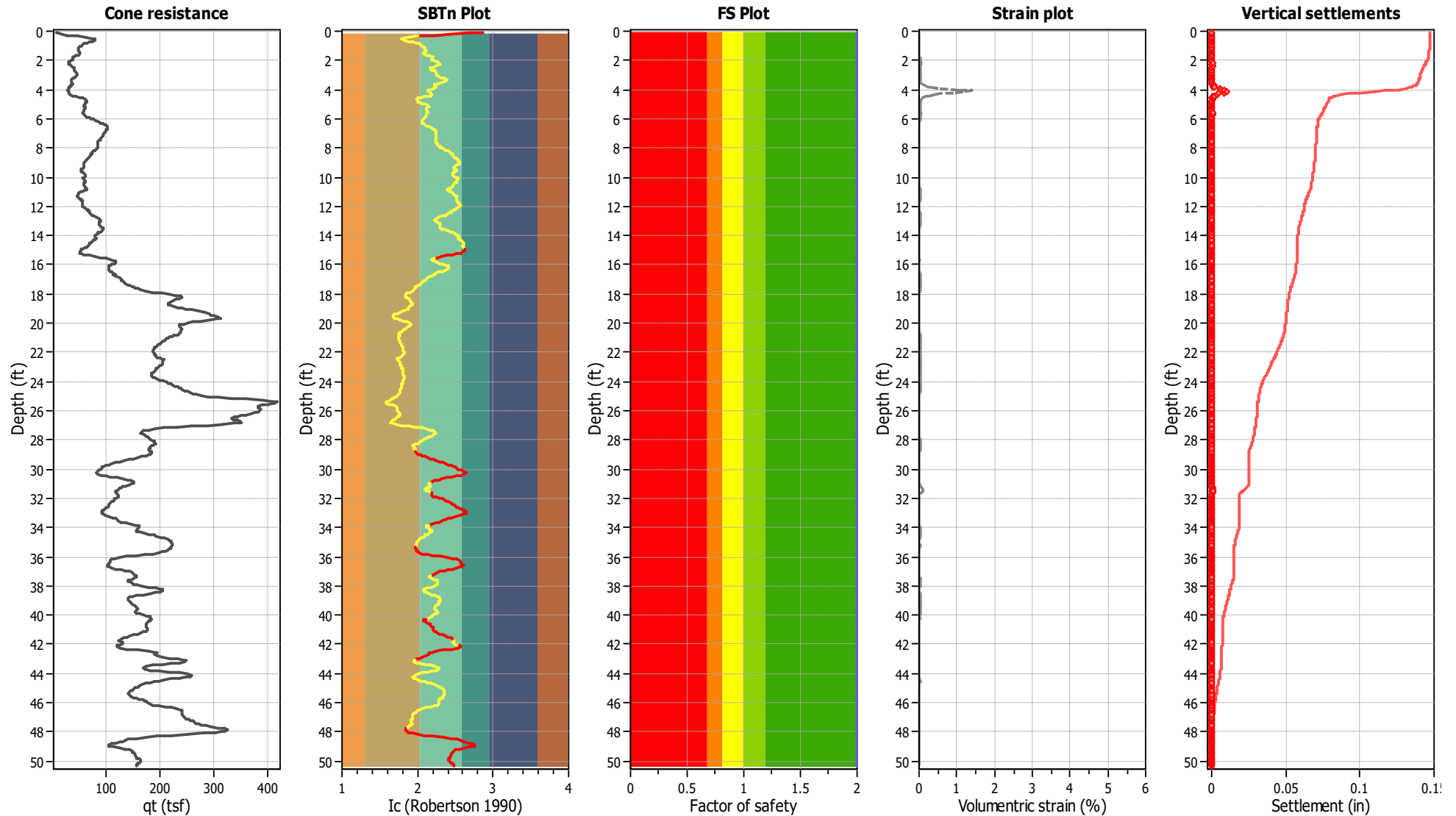
## Input parameters and analysis data

|                                       |                   |                                |              |                             |            |
|---------------------------------------|-------------------|--------------------------------|--------------|-----------------------------|------------|
| Analysis method:                      | NCEER (1998)      | Depth to water table (erthq.): | 100.00 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> : | 7.13              | Unit weight calculation:       | Based on SBT | Clay like behavior applied: | Sands only |
| Peak ground acceleration:             | 0.90              | Use fill:                      | No           | Limit depth applied:        | Yes        |
| Depth to water table (insitu):        | 100.00 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 |

## Estimation of post-earthquake settlements



### Abbreviations

$q_t$ : 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) |
| 0.10                                          | 2.87 | 11.24           | 6.71 | 75.46              | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 0.14                                          | 2.68 | 17.24           | 4.51 | 77.67              | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 0.22                                          | 2.43 | 29.49           | 2.56 | 75.54              | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.30                                          | 2.22 | 46.28           | 1.67 | 77.51              | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.34                                          | 2.01 | 71.67           | 1.32 | 94.42              | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.42                                          | 1.87 | 97.41           | 1.22 | 118.59             | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.49                                          | 1.79 | 119.61          | 1.15 | 137.03             | 26                        | 649                    | 0.51 | 0.003        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.56                                          | 1.78 | 128.05          | 1.13 | 145.21             | 28                        | 687                    | 0.51 | 0.004        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.60                                          | 1.82 | 127.20          | 1.17 | 148.97             | 29                        | 711                    | 0.51 | 0.004        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.68                                          | 1.88 | 119.04          | 1.22 | 145.28             | 29                        | 717                    | 0.51 | 0.004        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.76                                          | 1.94 | 110.08          | 1.26 | 138.72             | 28                        | 715                    | 0.51 | 0.005        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.79                                          | 1.99 | 100.83          | 1.30 | 131.03             | 27                        | 702                    | 0.51 | 0.005        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.87                                          | 2.02 | 94.62           | 1.32 | 125.25             | 26                        | 683                    | 0.51 | 0.006        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.96                                          | 2.04 | 88.86           | 1.35 | 119.61             | 25                        | 661                    | 0.51 | 0.008        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 1.00                                          | 2.05 | 84.26           | 1.36 | 114.57             | 24                        | 636                    | 0.51 | 0.009        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 1.08                                          | 2.07 | 80.65           | 1.38 | 111.20             | 24                        | 622                    | 0.51 | 0.010        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 1.15                                          | 2.09 | 77.90           | 1.40 | 109.04             | 23                        | 613                    | 0.51 | 0.011        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 1.19                                          | 2.10 | 76.99           | 1.41 | 108.85             | 24                        | 613                    | 0.51 | 0.012        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 1.26                                          | 2.11 | 76.99           | 1.43 | 109.93             | 24                        | 621                    | 0.51 | 0.013        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 1.34                                          | 2.11 | 78.23           | 1.43 | 111.83             | 24                        | 632                    | 0.51 | 0.013        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 1.42                                          | 2.10 | 80.37           | 1.42 | 114.05             | 25                        | 643                    | 0.51 | 0.014        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 1.45                                          | 2.08 | 82.87           | 1.39 | 115.50             | 25                        | 648                    | 0.51 | 0.014        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 1.53                                          | 2.09 | 81.61           | 1.40 | 114.08             | 25                        | 641                    | 0.51 | 0.016        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 1.61                                          | 2.11 | 77.15           | 1.43 | 110.62             | 24                        | 625                    | 0.51 | 0.018        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 1.65                                          | 2.16 | 69.85           | 1.52 | 106.46             | 24                        | 603                    | 0.51 | 0.021        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 1.72                                          | 2.19 | 64.84           | 1.60 | 103.73             | 23                        | 585                    | 0.51 | 0.024        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 1.81                                          | 2.21 | 62.19           | 1.63 | 101.42             | 23                        | 570                    | 0.51 | 0.028        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 1.85                                          | 2.19 | 61.63           | 1.60 | 98.42              | 22                        | 555                    | 0.51 | 0.032        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 1.92                                          | 2.19 | 60.08           | 1.60 | 95.83              | 22                        | 540                    | 0.51 | 0.037        | 0.03                     | 11.89          | 0.03               | 0.000        |
| 1.99                                          | 2.21 | 56.57           | 1.64 | 92.70              | 21                        | 520                    | 0.51 | 0.045        | 0.04                     | 11.89          | 0.04               | 0.000        |
| 2.07                                          | 2.24 | 53.06           | 1.71 | 90.75              | 21                        | 504                    | 0.51 | 0.054        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 2.10                                          | 2.26 | 50.00           | 1.79 | 89.61              | 21                        | 491                    | 0.51 | 0.061        | 0.06                     | 11.89          | 0.05               | 0.000        |
| 2.19                                          | 2.28 | 48.90           | 1.84 | 89.74              | 21                        | 489                    | 0.51 | 0.067        | 0.06                     | 11.89          | 0.06               | 0.001        |
| 2.26                                          | 2.29 | 48.59           | 1.89 | 91.66              | 21                        | 494                    | 0.51 | 0.069        | 0.06                     | 11.89          | 0.05               | 0.000        |
| 2.30                                          | 2.28 | 50.54           | 1.85 | 93.33              | 22                        | 507                    | 0.51 | 0.065        | 0.06                     | 11.89          | 0.05               | 0.000        |
| 2.38                                          | 2.25 | 54.38           | 1.75 | 95.10              | 22                        | 525                    | 0.51 | 0.061        | 0.06                     | 11.89          | 0.05               | 0.000        |
| 2.46                                          | 2.21 | 59.12           | 1.63 | 96.64              | 22                        | 543                    | 0.51 | 0.058        | 0.05                     | 11.89          | 0.05               | 0.000        |
| 2.50                                          | 2.18 | 63.77           | 1.56 | 99.44              | 22                        | 562                    | 0.51 | 0.053        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 2.57                                          | 2.18 | 65.62           | 1.56 | 102.46             | 23                        | 579                    | 0.51 | 0.051        | 0.04                     | 11.89          | 0.04               | 0.000        |
| 2.65                                          | 2.20 | 66.56           | 1.60 | 106.81             | 24                        | 602                    | 0.51 | 0.048        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 2.72                                          | 2.22 | 66.35           | 1.68 | 111.28             | 25                        | 621                    | 0.51 | 0.045        | 0.03                     | 11.89          | 0.03               | 0.000        |
| 2.76                                          | 2.24 | 67.80           | 1.72 | 116.45             | 27                        | 646                    | 0.51 | 0.041        | 0.03                     | 11.89          | 0.03               | 0.000        |
| 2.83                                          | 2.24 | 69.94           | 1.73 | 121.01             | 28                        | 670                    | 0.51 | 0.039        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 2.91                                          | 2.24 | 72.48           | 1.73 | 125.56             | 29                        | 695                    | 0.51 | 0.037        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 2.98                                          | 2.24 | 74.37           | 1.73 | 128.47             | 29                        | 712                    | 0.51 | 0.036        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 3.02                                          | 2.25 | 73.51           | 1.76 | 129.67             | 30                        | 714                    | 0.51 | 0.037        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 3.09                                          | 2.28 | 70.11           | 1.84 | 129.24             | 30                        | 703                    | 0.51 | 0.040        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 3.17                                          | 2.31 | 65.06           | 1.97 | 128.30             | 30                        | 681                    | 0.51 | 0.046        | 0.03                     | 11.89          | 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) |
| 3.24                                                      | 2.35 | 60.30           | 2.14 | 129.16             | 31                        | 664                    | 0.51 | 0.052        | 0.03                     | 11.89          | 0.03               | 0.000        |
| 3.32                                                      | 2.38 | 57.44           | 2.28 | 130.68             | 32                        | 656                    | 0.51 | 0.056        | 0.03                     | 11.89          | 0.03               | 0.000        |
| 3.36                                                      | 2.39 | 56.08           | 2.34 | 131.28             | 32                        | 651                    | 0.51 | 0.059        | 0.03                     | 11.89          | 0.03               | 0.000        |
| 3.43                                                      | 2.37 | 56.07           | 2.25 | 125.93             | 31                        | 635                    | 0.51 | 0.067        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 3.50                                                      | 2.32 | 57.27           | 2.00 | 114.79             | 27                        | 606                    | 0.51 | 0.082        | 0.06                     | 11.89          | 0.05               | 0.000        |
| 3.58                                                      | 2.26 | 58.57           | 1.79 | 104.57             | 24                        | 574                    | 0.51 | 0.106        | 0.08                     | 11.89          | 0.07               | 0.001        |
| 3.61                                                      | 2.22 | 57.92           | 1.67 | 96.90              | 22                        | 541                    | 0.51 | 0.138        | 0.12                     | 11.89          | 0.10               | 0.000        |
| 3.70                                                      | 2.23 | 55.20           | 1.68 | 92.87              | 21                        | 518                    | 0.51 | 0.176        | 0.16                     | 11.89          | 0.14               | 0.001        |
| 3.77                                                      | 2.24 | 51.70           | 1.73 | 89.54              | 21                        | 496                    | 0.51 | 0.227        | 0.22                     | 11.89          | 0.19               | 0.002        |
| 3.84                                                      | 2.25 | 50.19           | 1.75 | 87.86              | 20                        | 485                    | 0.51 | 0.264        | 0.26                     | 11.89          | 0.22               | 0.002        |
| 3.88                                                      | 2.24 | 48.59           | 1.73 | 83.86              | 19                        | 465                    | 0.51 | 0.336        | 0.35                     | 11.89          | 0.30               | 0.001        |
| 3.96                                                      | 2.21 | 46.88           | 1.63 | 76.28              | 17                        | 429                    | 0.51 | 0.554        | 0.66                     | 11.89          | 0.56               | 0.006        |
| 4.03                                                      | 2.16 | 46.00           | 1.52 | 70.01              | 16                        | 397                    | 0.51 | 0.924        | 1.25                     | 11.89          | 1.05               | 0.009        |
| 4.07                                                      | 2.14 | 45.40           | 1.49 | 67.57              | 15                        | 383                    | 0.51 | 1.189        | 1.70                     | 11.89          | 1.42               | 0.007        |
| 4.15                                                      | 2.15 | 46.35           | 1.51 | 69.83              | 15                        | 396                    | 0.51 | 1.017        | 1.39                     | 11.89          | 1.16               | 0.010        |
| 4.22                                                      | 2.17 | 47.17           | 1.54 | 72.64              | 16                        | 411                    | 0.51 | 0.844        | 1.09                     | 11.89          | 0.91               | 0.008        |
| 4.29                                                      | 2.18 | 49.71           | 1.56 | 77.49              | 17                        | 438                    | 0.51 | 0.606        | 0.72                     | 11.89          | 0.60               | 0.005        |
| 4.36                                                      | 2.18 | 52.80           | 1.57 | 82.94              | 19                        | 469                    | 0.51 | 0.437        | 0.48                     | 11.89          | 0.40               | 0.004        |
| 4.41                                                      | 2.16 | 58.69           | 1.53 | 89.63              | 20                        | 508                    | 0.51 | 0.295        | 0.30                     | 11.89          | 0.25               | 0.001        |
| 4.48                                                      | 2.11 | 68.63           | 1.43 | 97.93              | 21                        | 553                    | 0.51 | 0.205        | 0.19                     | 11.89          | 0.16               | 0.001        |
| 4.56                                                      | 2.05 | 79.98           | 1.35 | 108.24             | 23                        | 600                    | 0.51 | 0.150        | 0.13                     | 11.89          | 0.11               | 0.001        |
| 4.60                                                      | 2.01 | 90.67           | 1.32 | 119.26             | 25                        | 647                    | 0.51 | 0.113        | 0.09                     | 11.89          | 0.07               | 0.000        |
| 4.68                                                      | 2.00 | 97.37           | 1.30 | 126.96             | 26                        | 683                    | 0.51 | 0.095        | 0.07                     | 11.89          | 0.06               | 0.001        |
| 4.75                                                      | 2.00 | 100.61          | 1.31 | 131.46             | 27                        | 709                    | 0.51 | 0.087        | 0.06                     | 11.89          | 0.05               | 0.000        |
| 4.82                                                      | 2.01 | 100.30          | 1.32 | 131.97             | 28                        | 716                    | 0.51 | 0.086        | 0.06                     | 11.89          | 0.05               | 0.000        |
| 4.86                                                      | 2.03 | 98.65           | 1.33 | 131.16             | 28                        | 718                    | 0.51 | 0.087        | 0.06                     | 11.89          | 0.05               | 0.000        |
| 4.93                                                      | 2.05 | 96.74           | 1.36 | 131.30             | 28                        | 729                    | 0.51 | 0.085        | 0.06                     | 11.89          | 0.05               | 0.000        |
| 5.02                                                      | 2.09 | 95.49           | 1.41 | 134.30             | 29                        | 756                    | 0.51 | 0.078        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 5.09                                                      | 2.13 | 94.48           | 1.47 | 138.87             | 30                        | 787                    | 0.51 | 0.070        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 5.13                                                      | 2.15 | 95.17           | 1.50 | 143.01             | 32                        | 811                    | 0.51 | 0.065        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 5.20                                                      | 2.14 | 96.82           | 1.48 | 143.39             | 32                        | 813                    | 0.51 | 0.066        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 5.28                                                      | 2.12 | 98.80           | 1.44 | 142.56             | 31                        | 806                    | 0.51 | 0.070        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 5.32                                                      | 2.11 | 97.95           | 1.43 | 140.16             | 30                        | 792                    | 0.51 | 0.075        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 5.40                                                      | 2.12 | 94.64           | 1.45 | 137.06             | 30                        | 776                    | 0.51 | 0.083        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 5.47                                                      | 2.13 | 91.29           | 1.47 | 133.76             | 29                        | 758                    | 0.51 | 0.092        | 0.06                     | 11.89          | 0.05               | 0.000        |
| 5.55                                                      | 2.13 | 89.98           | 1.46 | 131.42             | 29                        | 744                    | 0.51 | 0.101        | 0.07                     | 11.89          | 0.05               | 0.001        |
| 5.59                                                      | 2.12 | 90.92           | 1.44 | 131.19             | 29                        | 742                    | 0.51 | 0.104        | 0.07                     | 11.89          | 0.06               | 0.000        |
| 5.66                                                      | 2.12 | 91.97           | 1.44 | 132.77             | 29                        | 751                    | 0.51 | 0.102        | 0.07                     | 11.89          | 0.05               | 0.000        |
| 5.74                                                      | 2.11 | 94.11           | 1.44 | 135.50             | 29                        | 766                    | 0.51 | 0.098        | 0.06                     | 11.89          | 0.05               | 0.000        |
| 5.78                                                      | 2.11 | 97.41           | 1.43 | 139.57             | 30                        | 789                    | 0.51 | 0.090        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 5.85                                                      | 2.10 | 102.35          | 1.42 | 145.23             | 31                        | 819                    | 0.51 | 0.081        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 5.93                                                      | 2.09 | 108.79          | 1.41 | 152.89             | 33                        | 860                    | 0.51 | 0.072        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 6.01                                                      | 2.08 | 114.58          | 1.40 | 159.97             | 34                        | 898                    | 0.51 | 0.064        | 0.03                     | 11.89          | 0.03               | 0.000        |
| 6.04                                                      | 2.07 | 121.28          | 1.38 | 167.57             | 36                        | 938                    | 0.51 | 0.058        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 6.12                                                      | 2.07 | 128.07          | 1.37 | 175.78             | 38                        | 981                    | 0.51 | 0.052        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 6.19                                                      | 2.06 | 136.76          | 1.37 | 187.10             | 40                        | 1043                   | 0.51 | 0.045        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 6.27                                                      | 2.06 | 144.04          | 1.37 | 197.42             | 42                        | 1101                   | 0.51 | 0.041        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 6.31                                                      | 2.07 | 150.43          | 1.38 | 207.89             | 45                        | 1163                   | 0.51 | 0.036        | 0.01                     | 11.89          | 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) |
| 6.39                                                      | 2.09           | 155.72          | 1.40           | 218.47             | 47                        | 1229                   | 0.51 | 0.033        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 6.46                                                      | 2.11           | 160.11          | 1.43           | 228.78             | 50                        | 1292                   | 0.51 | 0.030        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 6.50                                                      | 2.13           | 163.15          | 1.46           | 238.83             | 52                        | 1353                   | 0.51 | 0.028        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 6.57                                                      | 2.15           | 163.89          | 1.51           | 247.61             | 55                        | 1404                   | 0.51 | 0.026        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 6.65                                                      | 2.18           | 163.17          | 1.57           | 256.94             | 58                        | 1452                   | 0.51 | 0.025        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 6.72                                                      | 2.21           | 161.55          | 1.63           | 263.69             | 60                        | 1481                   | 0.51 | 0.025        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 6.77                                                      | 2.22           | 159.39          | 1.68           | 267.59             | 61                        | 1494                   | 0.51 | 0.025        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 6.84                                                      | 2.24           | 157.12          | 1.71           | 269.02             | 62                        | 1494                   | 0.51 | 0.025        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 6.92                                                      | 2.25           | 154.61          | 1.74           | 269.01             | 62                        | 1488                   | 0.51 | 0.026        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 6.99                                                      | 2.25           | 152.65          | 1.75           | 267.84             | 62                        | 1478                   | 0.51 | 0.026        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 7.03                                                      | 2.25           | 151.30          | 1.76           | 265.64             | 61                        | 1466                   | 0.51 | 0.027        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 7.10                                                      | 2.25           | 150.49          | 1.75           | 263.38             | 61                        | 1454                   | 0.51 | 0.028        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 7.18                                                      | 2.25           | 149.24          | 1.75           | 260.81             | 60                        | 1441                   | 0.51 | 0.029        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 7.25                                                      | 2.25           | 148.04          | 1.75           | 258.89             | 60                        | 1430                   | 0.51 | 0.030        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 7.29                                                      | 2.25           | 146.08          | 1.76           | 256.62             | 59                        | 1416                   | 0.51 | 0.030        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 7.37                                                      | 2.25           | 143.46          | 1.74           | 249.99             | 57                        | 1382                   | 0.51 | 0.032        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 7.45                                                      | 2.24           | 140.55          | 1.72           | 242.14             | 56                        | 1343                   | 0.51 | 0.035        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 7.49                                                      | 2.24           | 137.84          | 1.71           | 235.83             | 54                        | 1310                   | 0.51 | 0.037        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 7.57                                                      | 2.24           | 136.03          | 1.73           | 235.36             | 54                        | 1304                   | 0.51 | 0.038        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 7.64                                                      | 2.25           | 134.63          | 1.76           | 236.92             | 55                        | 1306                   | 0.51 | 0.039        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 7.68                                                      | 2.26           | 133.92          | 1.78           | 238.98             | 55                        | 1312                   | 0.51 | 0.038        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 7.75                                                      | 2.27           | 133.56          | 1.81           | 242.34             | 56                        | 1324                   | 0.51 | 0.038        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 7.82                                                      | 2.28           | 134.20          | 1.84           | 247.42             | 58                        | 1345                   | 0.51 | 0.038        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 7.90                                                      | 2.29           | 134.55          | 1.89           | 254.16             | 60                        | 1370                   | 0.51 | 0.037        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 7.97                                                      | 2.30           | 134.54          | 1.94           | 260.70             | 61                        | 1393                   | 0.51 | 0.036        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 8.01                                                      | 2.33           | 132.64          | 2.03           | 268.86             | 64                        | 1413                   | 0.51 | 0.035        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 8.09                                                      | 2.35           | 129.78          | 2.14           | 277.91             | 67                        | 1430                   | 0.51 | 0.035        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 8.17                                                      | 2.38           | 126.52          | 2.27           | 287.13             | 70                        | 1443                   | 0.51 | 0.035        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 8.21                                                      | 2.41           | 122.72          | 2.41           | 295.59             | 73                        | 1448                   | 0.51 | 0.035        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 8.29                                                      | 2.43           | 119.21          | 2.54           | 302.49             | 75                        | 1449                   | 0.51 | 0.035        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 8.37                                                      | 2.45           | 116.30          | 2.65           | 308.28             | 78                        | 1448                   | 0.51 | 0.036        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 8.40                                                      | 2.46           | 114.35          | 2.72           | 311.11             | 79                        | 1445                   | 0.51 | 0.036        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 8.48                                                      | 2.47           | 112.85          | 2.77           | 312.19             | 79                        | 1439                   | 0.51 | 0.037        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 8.55                                                      | 2.48           | 110.79          | 2.83           | 313.64             | 80                        | 1431                   | 0.50 | 0.038        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 8.63                                                      | 2.49           | 109.08          | 2.89           | 315.12             | 81                        | 1425                   | 0.50 | 0.039        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 8.67                                                      | 2.50           | 106.53          | 2.98           | 317.34             | 82                        | 1415                   | 0.50 | 0.040        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 8.74                                                      | 2.52           | 103.52          | 3.08           | 319.25             | 83                        | 1401                   | 0.50 | 0.041        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 8.82                                                      | 2.53           | 100.37          | 3.20           | 320.99             | 84                        | 1386                   | 0.50 | 0.043        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 8.86                                                      | 2.54           | 97.57           | 3.30           | 321.79             | 85                        | 1370                   | 0.50 | 0.044        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 8.93                                                      | 2.55           | 95.07           | 3.36           | 319.84             | 85                        | 1350                   | 0.50 | 0.046        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 9.01                                                      | 2.56           | 92.56           | 3.39           | 313.64             | 83                        | 1319                   | 0.50 | 0.049        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 9.09                                                      | 2.55           | 91.46           | 3.33           | 304.24             | 80                        | 1290                   | 0.50 | 0.053        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 9.13                                                      | 2.53           | 91.80           | 3.18           | 291.98             | 76                        | 1264                   | 0.50 | 0.056        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 9.20                                                      | 2.50           | 92.75           | 3.01           | 279.00             | 72                        | 1239                   | 0.50 | 0.060        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 9.28                                                      | 2.49           | 91.72           | 2.89           | 264.85             | 68                        | 1212                   | 0.50 | 0.064        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 9.35                                                      | 2.48           | 89.84           | 2.84           | 255.20             | 65                        | 1187                   | 0.50 | 0.069        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 9.39                                                      | 2.49           | 86.78           | 2.89           | 250.65             | 64                        | 1159                   | 0.50 | 0.074        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 9.46                                                      | 2.50           | 83.42           | 2.98           | 248.56             | 64                        | 1137                   | 0.50 | 0.079        | 0.02                     | 11.89          | 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) |
| 9.55                                                      | 2.51 | 80.78           | 3.06 | 246.91             | 64                        | 1122                   | 0.50 | 0.083        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 9.58                                                      | 2.51 | 81.28           | 3.02 | 245.41             | 63                        | 1127                   | 0.50 | 0.083        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 9.66                                                      | 2.49 | 84.20           | 2.89 | 243.42             | 62                        | 1152                   | 0.50 | 0.079        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 9.73                                                      | 2.47 | 88.24           | 2.76 | 243.25             | 62                        | 1190                   | 0.50 | 0.073        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 9.81                                                      | 2.46 | 91.06           | 2.69 | 245.02             | 62                        | 1223                   | 0.50 | 0.069        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 9.85                                                      | 2.46 | 91.68           | 2.74 | 251.10             | 64                        | 1245                   | 0.50 | 0.066        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 9.93                                                      | 2.49 | 89.39           | 2.91 | 259.79             | 67                        | 1256                   | 0.50 | 0.066        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 10.00                                                     | 2.52 | 86.37           | 3.12 | 269.06             | 70                        | 1261                   | 0.50 | 0.066        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 10.04                                                     | 2.54 | 84.38           | 3.27 | 275.62             | 72                        | 1263                   | 0.50 | 0.066        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 10.11                                                     | 2.54 | 84.39           | 3.27 | 276.10             | 73                        | 1272                   | 0.50 | 0.066        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 10.19                                                     | 2.53 | 85.61           | 3.19 | 273.32             | 71                        | 1285                   | 0.50 | 0.065        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 10.26                                                     | 2.52 | 86.60           | 3.12 | 270.09             | 70                        | 1294                   | 0.50 | 0.065        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 10.34                                                     | 2.51 | 86.33           | 3.06 | 263.74             | 68                        | 1286                   | 0.50 | 0.066        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 10.38                                                     | 2.49 | 84.74           | 2.93 | 248.44             | 64                        | 1243                   | 0.50 | 0.073        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 10.45                                                     | 2.47 | 83.70           | 2.81 | 234.87             | 60                        | 1210                   | 0.50 | 0.079        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 10.53                                                     | 2.47 | 81.89           | 2.78 | 227.45             | 58                        | 1186                   | 0.50 | 0.085        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 10.57                                                     | 2.47 | 82.38           | 2.78 | 229.16             | 58                        | 1197                   | 0.50 | 0.084        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 10.65                                                     | 2.45 | 83.51           | 2.69 | 224.27             | 57                        | 1202                   | 0.50 | 0.084        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 10.72                                                     | 2.43 | 84.91           | 2.56 | 217.76             | 54                        | 1203                   | 0.50 | 0.085        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 10.76                                                     | 2.40 | 87.71           | 2.37 | 208.31             | 51                        | 1201                   | 0.50 | 0.086        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 10.84                                                     | 2.39 | 86.54           | 2.33 | 201.51             | 49                        | 1179                   | 0.50 | 0.091        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 10.91                                                     | 2.39 | 83.16           | 2.33 | 193.57             | 47                        | 1140                   | 0.50 | 0.102        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 10.99                                                     | 2.42 | 76.29           | 2.48 | 189.20             | 47                        | 1085                   | 0.50 | 0.121        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 11.03                                                     | 2.45 | 70.01           | 2.63 | 183.95             | 46                        | 1026                   | 0.50 | 0.147        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 11.10                                                     | 2.46 | 65.72           | 2.74 | 180.02             | 46                        | 988                    | 0.50 | 0.170        | 0.06                     | 11.89          | 0.05               | 0.000        |
| 11.17                                                     | 2.49 | 62.56           | 2.88 | 180.17             | 46                        | 969                    | 0.50 | 0.185        | 0.07                     | 11.89          | 0.05               | 0.000        |
| 11.25                                                     | 2.50 | 61.48           | 3.00 | 184.28             | 48                        | 977                    | 0.50 | 0.183        | 0.06                     | 11.89          | 0.05               | 0.000        |
| 11.29                                                     | 2.52 | 61.56           | 3.12 | 192.07             | 50                        | 1000                   | 0.50 | 0.169        | 0.06                     | 11.89          | 0.04               | 0.000        |
| 11.36                                                     | 2.52 | 63.29           | 3.14 | 198.99             | 52                        | 1037                   | 0.50 | 0.150        | 0.05                     | 11.89          | 0.03               | 0.000        |
| 11.45                                                     | 2.52 | 65.38           | 3.14 | 205.56             | 54                        | 1078                   | 0.50 | 0.134        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 11.49                                                     | 2.51 | 68.63           | 3.08 | 211.61             | 55                        | 1125                   | 0.50 | 0.118        | 0.03                     | 11.89          | 0.03               | 0.000        |
| 11.56                                                     | 2.52 | 70.92           | 3.09 | 219.10             | 57                        | 1170                   | 0.50 | 0.105        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 11.64                                                     | 2.52 | 72.86           | 3.13 | 227.69             | 59                        | 1216                   | 0.50 | 0.095        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 11.71                                                     | 2.53 | 73.57           | 3.19 | 235.00             | 61                        | 1247                   | 0.50 | 0.090        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 11.76                                                     | 2.54 | 73.20           | 3.28 | 240.40             | 63                        | 1262                   | 0.50 | 0.087        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 11.83                                                     | 2.56 | 71.78           | 3.39 | 243.60             | 65                        | 1264                   | 0.50 | 0.088        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 11.91                                                     | 2.57 | 70.54           | 3.47 | 244.84             | 65                        | 1263                   | 0.50 | 0.089        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 11.94                                                     | 2.57 | 70.45           | 3.46 | 244.01             | 65                        | 1264                   | 0.50 | 0.090        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 12.02                                                     | 2.55 | 71.85           | 3.36 | 241.11             | 64                        | 1277                   | 0.50 | 0.088        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 12.10                                                     | 2.52 | 74.86           | 3.15 | 236.02             | 62                        | 1298                   | 0.50 | 0.085        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 12.18                                                     | 2.50 | 77.80           | 2.97 | 231.39             | 60                        | 1318                   | 0.50 | 0.083        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 12.21                                                     | 2.48 | 80.64           | 2.82 | 227.26             | 58                        | 1333                   | 0.50 | 0.081        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 12.29                                                     | 2.46 | 81.95           | 2.73 | 223.47             | 57                        | 1340                   | 0.50 | 0.080        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 12.36                                                     | 2.45 | 82.56           | 2.65 | 218.43             | 55                        | 1336                   | 0.50 | 0.082        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 12.44                                                     | 2.44 | 82.24           | 2.59 | 213.21             | 53                        | 1325                   | 0.50 | 0.085        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 12.48                                                     | 2.42 | 82.73           | 2.50 | 206.84             | 51                        | 1312                   | 0.50 | 0.087        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 12.55                                                     | 2.40 | 84.18           | 2.37 | 199.24             | 49                        | 1304                   | 0.50 | 0.090        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 12.62                                                     | 2.37 | 86.35           | 2.22 | 191.45             | 46                        | 1299                   | 0.50 | 0.092        | 0.03                     | 11.89          | 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) |
| 12.67                                                     | 2.33 | 90.26           | 2.04 | 183.94             | 44                        | 1300                   | 0.50 | 0.092        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 12.75                                                     | 2.29 | 95.08           | 1.88 | 178.71             | 42                        | 1313                   | 0.50 | 0.091        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 12.82                                                     | 2.25 | 100.48          | 1.75 | 175.54             | 40                        | 1331                   | 0.50 | 0.088        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 12.90                                                     | 2.23 | 103.39          | 1.69 | 174.74             | 40                        | 1346                   | 0.50 | 0.087        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 12.93                                                     | 2.23 | 103.95          | 1.69 | 175.28             | 40                        | 1353                   | 0.50 | 0.086        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 13.01                                                     | 2.24 | 101.94          | 1.74 | 176.96             | 41                        | 1360                   | 0.50 | 0.086        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 13.09                                                     | 2.27 | 99.58           | 1.80 | 179.59             | 42                        | 1368                   | 0.50 | 0.085        | 0.04                     | 11.89          | 0.02               | 0.000        |
| 13.13                                                     | 2.29 | 98.16           | 1.87 | 183.85             | 43                        | 1384                   | 0.50 | 0.083        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 13.20                                                     | 2.30 | 98.11           | 1.92 | 188.68             | 44                        | 1411                   | 0.50 | 0.080        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 13.27                                                     | 2.30 | 99.37           | 1.94 | 192.53             | 45                        | 1442                   | 0.50 | 0.076        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 13.35                                                     | 2.30 | 102.03          | 1.91 | 195.37             | 46                        | 1477                   | 0.50 | 0.072        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 13.42                                                     | 2.29 | 104.57          | 1.89 | 197.79             | 46                        | 1509                   | 0.50 | 0.069        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 13.46                                                     | 2.30 | 106.84          | 1.92 | 204.79             | 48                        | 1558                   | 0.50 | 0.065        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 13.54                                                     | 2.32 | 106.88          | 2.02 | 216.01             | 51                        | 1616                   | 0.50 | 0.060        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 13.62                                                     | 2.36 | 105.83          | 2.16 | 228.07             | 55                        | 1667                   | 0.50 | 0.056        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 13.65                                                     | 2.40 | 101.67          | 2.39 | 243.26             | 60                        | 1699                   | 0.50 | 0.054        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 13.75                                                     | 2.44 | 98.14           | 2.58 | 253.62             | 63                        | 1718                   | 0.50 | 0.054        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 13.78                                                     | 2.47 | 94.72           | 2.79 | 264.41             | 67                        | 1729                   | 0.50 | 0.053        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 13.86                                                     | 2.49 | 92.22           | 2.94 | 270.68             | 70                        | 1736                   | 0.50 | 0.053        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 13.94                                                     | 2.52 | 88.80           | 3.14 | 278.57             | 73                        | 1739                   | 0.50 | 0.054        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 14.01                                                     | 2.54 | 86.53           | 3.29 | 285.02             | 75                        | 1746                   | 0.50 | 0.054        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 14.08                                                     | 2.55 | 86.47           | 3.32 | 287.40             | 76                        | 1760                   | 0.50 | 0.053        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 14.12                                                     | 2.54 | 87.80           | 3.27 | 287.45             | 76                        | 1778                   | 0.50 | 0.052        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 14.20                                                     | 2.54 | 87.89           | 3.27 | 287.54             | 76                        | 1788                   | 0.50 | 0.052        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 14.28                                                     | 2.55 | 86.55           | 3.34 | 288.74             | 76                        | 1788                   | 0.50 | 0.052        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 14.32                                                     | 2.57 | 83.40           | 3.50 | 291.78             | 78                        | 1770                   | 0.50 | 0.054        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 14.39                                                     | 2.59 | 79.96           | 3.67 | 293.60             | 79                        | 1749                   | 0.50 | 0.056        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 14.47                                                     | 2.61 | 76.72           | 3.81 | 292.60             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 14.54                                                     | 2.61 | 74.57           | 3.87 | 288.74             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 14.58                                                     | 2.61 | 73.11           | 3.84 | 280.64             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 14.66                                                     | 2.60 | 71.54           | 3.77 | 270.05             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 14.74                                                     | 2.60 | 69.77           | 3.72 | 259.56             | 70                        | 1570                   | 0.50 | 0.074        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 14.77                                                     | 2.60 | 66.83           | 3.77 | 251.81             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 14.85                                                     | 2.62 | 63.05           | 3.89 | 245.18             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 14.92                                                     | 2.63 | 59.25           | 4.01 | 237.75             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 14.96                                                     | 2.63 | 56.28           | 4.03 | 226.70             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 15.04                                                     | 2.62 | 54.03           | 3.94 | 212.78             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 15.11                                                     | 2.60 | 52.37           | 3.76 | 196.66             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 15.18                                                     | 2.57 | 52.64           | 3.47 | 182.70             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 15.25                                                     | 2.53 | 54.53           | 3.16 | 172.46             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 15.29                                                     | 2.47 | 60.08           | 2.75 | 165.15             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 15.38                                                     | 2.39 | 68.59           | 2.32 | 159.46             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 15.45                                                     | 2.32 | 78.12           | 2.01 | 157.01             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 15.49                                                     | 2.26 | 88.29           | 1.79 | 157.78             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 15.56                                                     | 2.22 | 98.34           | 1.66 | 163.37             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 15.64                                                     | 2.20 | 107.79          | 1.61 | 173.40             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 15.71                                                     | 2.20 | 113.89          | 1.61 | 183.65             | 41                        | 1661                   | 0.50 | 0.072        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 15.75                                                     | 2.22 | 116.19          | 1.68 | 195.01             | 44                        | 1752                   | 0.50 | 0.064        | 0.02                     | 11.89          | 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) |
| 15.83                                                     | 2.26 | 115.60          | 1.78 | 206.18             | 48                        | 1827                   | 0.50 | 0.059        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 15.90                                                     | 2.30 | 112.70          | 1.94 | 218.55             | 52                        | 1889                   | 0.50 | 0.055        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 15.97                                                     | 2.34 | 108.67          | 2.10 | 228.71             | 55                        | 1922                   | 0.50 | 0.054        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 16.02                                                     | 2.38 | 105.00          | 2.27 | 237.87             | 58                        | 1942                   | 0.50 | 0.053        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 16.10                                                     | 2.40 | 102.57          | 2.38 | 244.44             | 60                        | 1961                   | 0.50 | 0.052        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 16.17                                                     | 2.42 | 101.20          | 2.46 | 248.57             | 62                        | 1976                   | 0.50 | 0.052        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 16.21                                                     | 2.42 | 100.92          | 2.46 | 247.89             | 61                        | 1974                   | 0.50 | 0.052        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 16.28                                                     | 2.41 | 100.45          | 2.42 | 243.36             | 60                        | 1958                   | 0.50 | 0.053        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 16.36                                                     | 2.38 | 100.78          | 2.27 | 229.00             | 56                        | 1901                   | 0.50 | 0.057        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 16.44                                                     | 2.34 | 101.61          | 2.08 | 210.99             | 50                        | 1825                   | 0.50 | 0.062        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 16.48                                                     | 2.29 | 103.99          | 1.88 | 195.24             | 46                        | 1756                   | 0.50 | 0.068        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 16.55                                                     | 2.25 | 106.84          | 1.75 | 187.12             | 43                        | 1726                   | 0.50 | 0.071        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 16.63                                                     | 2.21 | 110.73          | 1.65 | 182.79             | 41                        | 1718                   | 0.50 | 0.073        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 16.70                                                     | 2.22 | 107.12          | 1.67 | 178.76             | 41                        | 1682                   | 0.50 | 0.077        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 16.74                                                     | 2.19 | 109.77          | 1.60 | 175.68             | 40                        | 1669                   | 0.50 | 0.079        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 16.83                                                     | 2.18 | 110.71          | 1.56 | 173.11             | 39                        | 1657                   | 0.50 | 0.081        | 0.04                     | 11.89          | 0.02               | 0.000        |
| 16.90                                                     | 2.13 | 118.21          | 1.47 | 173.25             | 38                        | 1667                   | 0.50 | 0.080        | 0.04                     | 11.89          | 0.02               | 0.000        |
| 16.94                                                     | 2.12 | 118.75          | 1.45 | 172.25             | 38                        | 1659                   | 0.50 | 0.081        | 0.04                     | 11.89          | 0.02               | 0.000        |
| 17.01                                                     | 2.11 | 119.27          | 1.43 | 171.12             | 37                        | 1650                   | 0.50 | 0.083        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 17.09                                                     | 2.10 | 119.92          | 1.42 | 170.07             | 37                        | 1642                   | 0.50 | 0.085        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 17.13                                                     | 2.08 | 121.31          | 1.40 | 169.43             | 36                        | 1631                   | 0.50 | 0.086        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 17.21                                                     | 2.07 | 123.10          | 1.38 | 169.51             | 36                        | 1629                   | 0.50 | 0.087        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 17.28                                                     | 2.05 | 125.97          | 1.35 | 170.42             | 36                        | 1628                   | 0.50 | 0.088        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 17.36                                                     | 2.03 | 128.67          | 1.33 | 171.61             | 36                        | 1629                   | 0.50 | 0.089        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 17.39                                                     | 2.01 | 132.42          | 1.31 | 173.67             | 36                        | 1626                   | 0.50 | 0.089        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 17.47                                                     | 1.99 | 135.34          | 1.30 | 175.44             | 36                        | 1628                   | 0.50 | 0.090        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 17.54                                                     | 1.97 | 138.35          | 1.28 | 177.69             | 37                        | 1635                   | 0.50 | 0.089        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 17.59                                                     | 1.96 | 141.13          | 1.28 | 180.61             | 37                        | 1657                   | 0.50 | 0.087        | 0.04                     | 11.89          | 0.03               | 0.000        |
| 17.66                                                     | 1.96 | 144.17          | 1.28 | 184.47             | 38                        | 1696                   | 0.50 | 0.083        | 0.04                     | 11.89          | 0.02               | 0.000        |
| 17.73                                                     | 1.95 | 149.42          | 1.27 | 190.10             | 39                        | 1739                   | 0.50 | 0.078        | 0.04                     | 11.89          | 0.02               | 0.000        |
| 17.80                                                     | 1.93 | 158.34          | 1.26 | 198.96             | 40                        | 1793                   | 0.50 | 0.074        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 17.88                                                     | 1.90 | 169.01          | 1.24 | 208.81             | 42                        | 1842                   | 0.50 | 0.070        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 17.93                                                     | 1.86 | 183.41          | 1.21 | 222.12             | 44                        | 1915                   | 0.50 | 0.064        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 18.00                                                     | 1.85 | 197.17          | 1.20 | 236.27             | 46                        | 2021                   | 0.50 | 0.058        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 18.08                                                     | 1.84 | 209.03          | 1.19 | 249.16             | 49                        | 2127                   | 0.50 | 0.053        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 18.12                                                     | 1.84 | 216.11          | 1.20 | 258.34             | 51                        | 2214                   | 0.50 | 0.049        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 18.19                                                     | 1.84 | 217.88          | 1.20 | 260.57             | 51                        | 2240                   | 0.50 | 0.048        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 18.26                                                     | 1.85 | 216.50          | 1.20 | 260.63             | 51                        | 2259                   | 0.50 | 0.048        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 18.34                                                     | 1.87 | 211.79          | 1.22 | 257.64             | 51                        | 2264                   | 0.50 | 0.048        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 18.38                                                     | 1.89 | 206.10          | 1.23 | 253.56             | 51                        | 2263                   | 0.50 | 0.048        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 18.45                                                     | 1.90 | 199.88          | 1.24 | 247.66             | 50                        | 2238                   | 0.50 | 0.049        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 18.53                                                     | 1.91 | 194.81          | 1.24 | 242.51             | 49                        | 2212                   | 0.50 | 0.051        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 18.61                                                     | 1.92 | 190.91          | 1.25 | 238.81             | 48                        | 2200                   | 0.50 | 0.051        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 18.64                                                     | 1.93 | 189.12          | 1.26 | 237.41             | 48                        | 2201                   | 0.50 | 0.051        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 18.72                                                     | 1.93 | 189.46          | 1.26 | 237.91             | 48                        | 2213                   | 0.50 | 0.051        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 18.80                                                     | 1.92 | 191.46          | 1.25 | 239.68             | 48                        | 2225                   | 0.50 | 0.051        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 18.83                                                     | 1.90 | 197.26          | 1.24 | 244.62             | 49                        | 2242                   | 0.50 | 0.050        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 18.91                                                     | 1.89 | 204.28          | 1.23 | 250.66             | 50                        | 2270                   | 0.51 | 0.050        | 0.02                     | 11.89          | 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) |
| 18.99                                                     | 1.88 | 211.20          | 1.22 | 257.80             | 51                        | 2325                   | 0.51 | 0.048        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 19.07                                                     | 1.87 | 217.19          | 1.22 | 264.25             | 52                        | 2380                   | 0.51 | 0.046        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 19.11                                                     | 1.85 | 225.31          | 1.20 | 271.10             | 53                        | 2415                   | 0.51 | 0.045        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 19.18                                                     | 1.81 | 236.99          | 1.17 | 276.76             | 54                        | 2418                   | 0.51 | 0.045        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 19.25                                                     | 1.77 | 249.12          | 1.12 | 278.86             | 53                        | 2414                   | 0.51 | 0.045        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 19.32                                                     | 1.73 | 255.19          | 1.05 | 268.29             | 51                        | 2345                   | 0.51 | 0.048        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 19.40                                                     | 1.70 | 256.16          | 1.00 | 256.16             | 48                        | 2250                   | 0.51 | 0.052        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 19.44                                                     | 1.67 | 257.07          | 1.00 | 257.07             | 47                        | 2187                   | 0.51 | 0.055        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 19.52                                                     | 1.67 | 261.88          | 1.00 | 261.88             | 48                        | 2235                   | 0.51 | 0.053        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 19.59                                                     | 1.68 | 268.11          | 1.00 | 268.11             | 50                        | 2321                   | 0.51 | 0.050        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 19.63                                                     | 1.70 | 271.11          | 1.00 | 271.11             | 51                        | 2403                   | 0.51 | 0.047        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 19.70                                                     | 1.73 | 265.99          | 1.04 | 276.94             | 52                        | 2454                   | 0.51 | 0.046        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 19.77                                                     | 1.78 | 251.57          | 1.12 | 282.44             | 54                        | 2485                   | 0.51 | 0.045        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 19.84                                                     | 1.82 | 235.46          | 1.18 | 277.14             | 54                        | 2482                   | 0.51 | 0.045        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 19.90                                                     | 1.86 | 222.46          | 1.21 | 269.28             | 53                        | 2477                   | 0.51 | 0.046        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 19.97                                                     | 1.89 | 213.56          | 1.23 | 262.33             | 52                        | 2463                   | 0.51 | 0.046        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 20.05                                                     | 1.91 | 205.64          | 1.24 | 255.18             | 51                        | 2437                   | 0.51 | 0.047        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 20.09                                                     | 1.92 | 198.82          | 1.25 | 248.00             | 50                        | 2390                   | 0.51 | 0.049        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 20.17                                                     | 1.91 | 197.27          | 1.24 | 244.73             | 49                        | 2345                   | 0.51 | 0.051        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 20.24                                                     | 1.89 | 198.13          | 1.23 | 243.22             | 49                        | 2301                   | 0.51 | 0.053        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 20.28                                                     | 1.86 | 201.12          | 1.21 | 243.13             | 48                        | 2259                   | 0.51 | 0.055        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 20.36                                                     | 1.84 | 202.47          | 1.19 | 241.77             | 47                        | 2224                   | 0.51 | 0.057        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 20.43                                                     | 1.82 | 202.15          | 1.18 | 237.83             | 46                        | 2168                   | 0.51 | 0.061        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 20.50                                                     | 1.80 | 200.25          | 1.16 | 231.56             | 45                        | 2096                   | 0.51 | 0.065        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 20.58                                                     | 1.78 | 199.06          | 1.13 | 224.99             | 43                        | 2028                   | 0.51 | 0.071        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 20.62                                                     | 1.76 | 199.59          | 1.10 | 220.22             | 42                        | 1983                   | 0.51 | 0.074        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 20.69                                                     | 1.76 | 197.56          | 1.10 | 216.47             | 41                        | 1954                   | 0.51 | 0.077        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 20.77                                                     | 1.76 | 193.68          | 1.10 | 212.61             | 40                        | 1923                   | 0.51 | 0.080        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 20.81                                                     | 1.76 | 188.13          | 1.10 | 207.15             | 39                        | 1876                   | 0.51 | 0.085        | 0.04                     | 11.89          | 0.02               | 0.000        |
| 20.88                                                     | 1.75 | 184.81          | 1.09 | 201.61             | 38                        | 1830                   | 0.51 | 0.091        | 0.04                     | 11.89          | 0.02               | 0.000        |
| 20.96                                                     | 1.75 | 181.32          | 1.08 | 195.41             | 37                        | 1780                   | 0.51 | 0.098        | 0.05                     | 11.89          | 0.03               | 0.000        |
| 21.04                                                     | 1.74 | 178.86          | 1.07 | 191.51             | 36                        | 1749                   | 0.51 | 0.103        | 0.05                     | 11.89          | 0.03               | 0.000        |
| 21.07                                                     | 1.75 | 176.04          | 1.08 | 189.48             | 36                        | 1731                   | 0.51 | 0.106        | 0.05                     | 11.89          | 0.03               | 0.000        |
| 21.15                                                     | 1.75 | 173.41          | 1.09 | 188.80             | 36                        | 1726                   | 0.51 | 0.108        | 0.05                     | 11.89          | 0.03               | 0.000        |
| 21.23                                                     | 1.76 | 170.89          | 1.10 | 188.32             | 36                        | 1724                   | 0.51 | 0.109        | 0.05                     | 11.89          | 0.03               | 0.000        |
| 21.27                                                     | 1.77 | 168.63          | 1.11 | 187.45             | 36                        | 1718                   | 0.51 | 0.110        | 0.05                     | 11.89          | 0.03               | 0.000        |
| 21.34                                                     | 1.77 | 166.02          | 1.12 | 185.74             | 36                        | 1707                   | 0.51 | 0.112        | 0.06                     | 11.89          | 0.03               | 0.000        |
| 21.42                                                     | 1.78 | 162.93          | 1.13 | 183.51             | 35                        | 1691                   | 0.51 | 0.116        | 0.06                     | 11.89          | 0.03               | 0.000        |
| 21.49                                                     | 1.78 | 160.20          | 1.13 | 181.61             | 35                        | 1679                   | 0.52 | 0.119        | 0.06                     | 11.89          | 0.03               | 0.000        |
| 21.53                                                     | 1.79 | 157.85          | 1.14 | 180.07             | 35                        | 1669                   | 0.52 | 0.121        | 0.06                     | 11.89          | 0.04               | 0.000        |
| 21.61                                                     | 1.80 | 155.68          | 1.15 | 178.76             | 35                        | 1664                   | 0.52 | 0.123        | 0.06                     | 11.89          | 0.04               | 0.000        |
| 21.68                                                     | 1.80 | 153.94          | 1.15 | 177.72             | 34                        | 1660                   | 0.52 | 0.124        | 0.06                     | 11.89          | 0.04               | 0.000        |
| 21.72                                                     | 1.81 | 153.00          | 1.16 | 177.32             | 34                        | 1661                   | 0.52 | 0.125        | 0.07                     | 11.89          | 0.04               | 0.000        |
| 21.80                                                     | 1.81 | 152.24          | 1.16 | 176.86             | 34                        | 1662                   | 0.52 | 0.125        | 0.07                     | 11.89          | 0.04               | 0.000        |
| 21.87                                                     | 1.81 | 151.52          | 1.17 | 176.53             | 34                        | 1665                   | 0.52 | 0.125        | 0.07                     | 11.89          | 0.04               | 0.000        |
| 21.95                                                     | 1.81 | 150.96          | 1.17 | 176.32             | 34                        | 1668                   | 0.52 | 0.125        | 0.07                     | 11.89          | 0.04               | 0.000        |
| 21.99                                                     | 1.81 | 151.01          | 1.17 | 176.52             | 34                        | 1673                   | 0.52 | 0.125        | 0.07                     | 11.89          | 0.04               | 0.000        |
| 22.06                                                     | 1.81 | 151.19          | 1.17 | 176.59             | 34                        | 1676                   | 0.52 | 0.125        | 0.07                     | 11.89          | 0.04               | 0.000        |

| :: Post-earthquake settlement of dry sands :: (continued) |      |                 |      |                    |                              |                           |      |                 |                             |                |                       |                 |
|-----------------------------------------------------------|------|-----------------|------|--------------------|------------------------------|---------------------------|------|-----------------|-----------------------------|----------------|-----------------------|-----------------|
| Depth<br>(ft)                                             | Ic   | Q <sub>tn</sub> | Kc   | Q <sub>tn,cs</sub> | N <sub>1,60</sub><br>(blows) | G <sub>max</sub><br>(tsf) | CSR  | Shear, γ<br>(%) | e <sub>vol(15)</sub><br>(%) | N <sub>c</sub> | e <sub>v</sub><br>(%) | Settle.<br>(in) |
| 22.14                                                     | 1.81 | 151.78          | 1.16 | 176.74             | 34                           | 1678                      | 0.52 | 0.125           | 0.07                        | 11.89          | 0.04                  | 0.000           |
| 22.21                                                     | 1.81 | 152.42          | 1.16 | 176.89             | 34                           | 1680                      | 0.52 | 0.126           | 0.07                        | 11.89          | 0.04                  | 0.000           |
| 22.25                                                     | 1.79 | 154.01          | 1.15 | 176.42             | 34                           | 1668                      | 0.52 | 0.128           | 0.07                        | 11.89          | 0.04                  | 0.000           |
| 22.33                                                     | 1.76 | 156.73          | 1.11 | 173.59             | 33                           | 1635                      | 0.52 | 0.136           | 0.07                        | 11.89          | 0.04                  | 0.000           |
| 22.41                                                     | 1.74 | 160.07          | 1.06 | 170.32             | 32                           | 1612                      | 0.52 | 0.143           | 0.08                        | 11.89          | 0.05                  | 0.000           |
| 22.45                                                     | 1.72 | 163.52          | 1.04 | 169.53             | 32                           | 1616                      | 0.52 | 0.142           | 0.08                        | 11.89          | 0.05                  | 0.000           |
| 22.52                                                     | 1.73 | 164.98          | 1.05 | 173.55             | 33                           | 1651                      | 0.52 | 0.135           | 0.07                        | 11.89          | 0.04                  | 0.000           |
| 22.60                                                     | 1.75 | 164.00          | 1.08 | 177.62             | 34                           | 1685                      | 0.52 | 0.128           | 0.07                        | 11.89          | 0.04                  | 0.000           |
| 22.67                                                     | 1.76 | 163.02          | 1.10 | 180.11             | 34                           | 1710                      | 0.52 | 0.124           | 0.06                        | 11.89          | 0.04                  | 0.000           |
| 22.72                                                     | 1.77 | 161.92          | 1.12 | 180.62             | 35                           | 1718                      | 0.52 | 0.123           | 0.06                        | 11.89          | 0.04                  | 0.000           |
| 22.79                                                     | 1.77 | 161.39          | 1.11 | 179.82             | 34                           | 1713                      | 0.52 | 0.124           | 0.06                        | 11.89          | 0.04                  | 0.000           |
| 22.87                                                     | 1.77 | 159.62          | 1.12 | 178.31             | 34                           | 1703                      | 0.52 | 0.127           | 0.07                        | 11.89          | 0.04                  | 0.000           |
| 22.91                                                     | 1.78 | 157.65          | 1.13 | 177.43             | 34                           | 1698                      | 0.52 | 0.128           | 0.07                        | 11.89          | 0.04                  | 0.000           |
| 22.98                                                     | 1.78 | 155.41          | 1.13 | 176.20             | 34                           | 1692                      | 0.52 | 0.130           | 0.07                        | 11.89          | 0.04                  | 0.000           |
| 23.05                                                     | 1.79 | 152.86          | 1.14 | 174.72             | 34                           | 1684                      | 0.52 | 0.133           | 0.07                        | 11.89          | 0.04                  | 0.000           |
| 23.13                                                     | 1.80 | 150.85          | 1.15 | 173.50             | 34                           | 1679                      | 0.52 | 0.135           | 0.07                        | 11.89          | 0.04                  | 0.000           |
| 23.16                                                     | 1.80 | 149.86          | 1.15 | 172.65             | 33                           | 1673                      | 0.52 | 0.136           | 0.07                        | 11.89          | 0.04                  | 0.000           |
| 23.24                                                     | 1.80 | 148.90          | 1.15 | 171.15             | 33                           | 1661                      | 0.52 | 0.140           | 0.08                        | 11.89          | 0.04                  | 0.000           |
| 23.32                                                     | 1.80 | 147.39          | 1.15 | 169.39             | 33                           | 1646                      | 0.52 | 0.144           | 0.08                        | 11.89          | 0.04                  | 0.000           |
| 23.40                                                     | 1.80 | 145.62          | 1.15 | 167.82             | 32                           | 1636                      | 0.52 | 0.148           | 0.08                        | 11.89          | 0.04                  | 0.000           |
| 23.43                                                     | 1.81 | 143.64          | 1.16 | 166.85             | 32                           | 1634                      | 0.52 | 0.148           | 0.08                        | 11.89          | 0.05                  | 0.000           |
| 23.51                                                     | 1.81 | 142.94          | 1.17 | 166.67             | 32                           | 1639                      | 0.52 | 0.148           | 0.08                        | 11.89          | 0.05                  | 0.000           |
| 23.58                                                     | 1.82 | 142.01          | 1.17 | 166.55             | 32                           | 1646                      | 0.52 | 0.147           | 0.08                        | 11.89          | 0.04                  | 0.000           |
| 23.65                                                     | 1.82 | 142.43          | 1.18 | 167.46             | 33                           | 1661                      | 0.52 | 0.144           | 0.08                        | 11.89          | 0.04                  | 0.000           |
| 23.73                                                     | 1.83 | 142.54          | 1.18 | 168.15             | 33                           | 1675                      | 0.52 | 0.141           | 0.08                        | 11.89          | 0.04                  | 0.000           |
| 23.77                                                     | 1.82 | 144.76          | 1.18 | 170.23             | 33                           | 1693                      | 0.52 | 0.137           | 0.07                        | 11.89          | 0.04                  | 0.000           |
| 23.84                                                     | 1.81 | 148.42          | 1.17 | 173.47             | 34                           | 1722                      | 0.52 | 0.132           | 0.07                        | 11.89          | 0.04                  | 0.000           |
| 23.92                                                     | 1.81 | 152.78          | 1.16 | 177.30             | 34                           | 1756                      | 0.52 | 0.126           | 0.07                        | 11.89          | 0.04                  | 0.000           |
| 23.96                                                     | 1.80 | 157.84          | 1.15 | 182.09             | 35                           | 1800                      | 0.52 | 0.118           | 0.06                        | 11.89          | 0.03                  | 0.000           |
| 24.04                                                     | 1.80 | 161.75          | 1.15 | 186.06             | 36                           | 1841                      | 0.52 | 0.112           | 0.06                        | 11.89          | 0.03                  | 0.000           |
| 24.12                                                     | 1.80 | 164.93          | 1.15 | 189.39             | 37                           | 1876                      | 0.52 | 0.108           | 0.05                        | 11.89          | 0.03                  | 0.000           |
| 24.16                                                     | 1.79 | 167.71          | 1.15 | 192.17             | 37                           | 1903                      | 0.52 | 0.104           | 0.05                        | 11.89          | 0.03                  | 0.000           |
| 24.23                                                     | 1.79 | 170.56          | 1.14 | 194.68             | 37                           | 1929                      | 0.52 | 0.101           | 0.05                        | 11.89          | 0.03                  | 0.000           |
| 24.30                                                     | 1.79 | 174.09          | 1.14 | 197.78             | 38                           | 1961                      | 0.52 | 0.098           | 0.05                        | 11.89          | 0.02                  | 0.000           |
| 24.38                                                     | 1.78 | 176.77          | 1.13 | 200.15             | 38                           | 1986                      | 0.52 | 0.095           | 0.04                        | 11.89          | 0.02                  | 0.000           |
| 24.41                                                     | 1.78 | 179.17          | 1.13 | 202.47             | 39                           | 2010                      | 0.52 | 0.093           | 0.04                        | 11.89          | 0.02                  | 0.000           |
| 24.49                                                     | 1.78 | 181.09          | 1.13 | 203.98             | 39                           | 2027                      | 0.52 | 0.092           | 0.04                        | 11.89          | 0.02                  | 0.000           |
| 24.57                                                     | 1.77 | 183.27          | 1.12 | 205.52             | 39                           | 2044                      | 0.52 | 0.090           | 0.04                        | 11.89          | 0.02                  | 0.000           |
| 24.61                                                     | 1.77 | 186.09          | 1.12 | 207.69             | 40                           | 2066                      | 0.52 | 0.088           | 0.04                        | 11.89          | 0.02                  | 0.000           |
| 24.68                                                     | 1.77 | 189.33          | 1.11 | 210.88             | 40                           | 2101                      | 0.52 | 0.085           | 0.04                        | 11.89          | 0.02                  | 0.000           |
| 24.76                                                     | 1.76 | 193.44          | 1.11 | 213.80             | 41                           | 2133                      | 0.52 | 0.083           | 0.04                        | 11.89          | 0.02                  | 0.000           |
| 24.83                                                     | 1.76 | 197.92          | 1.10 | 217.09             | 41                           | 2168                      | 0.52 | 0.080           | 0.03                        | 11.89          | 0.02                  | 0.000           |
| 24.91                                                     | 1.75 | 202.08          | 1.09 | 219.44             | 42                           | 2196                      | 0.52 | 0.078           | 0.03                        | 11.89          | 0.02                  | 0.000           |
| 24.94                                                     | 1.74 | 208.45          | 1.07 | 222.54             | 42                           | 2233                      | 0.52 | 0.076           | 0.03                        | 11.89          | 0.02                  | 0.000           |
| 25.02                                                     | 1.72 | 219.84          | 1.03 | 225.35             | 42                           | 2286                      | 0.53 | 0.073           | 0.03                        | 11.89          | 0.02                  | 0.000           |
| 25.10                                                     | 1.70 | 234.07          | 1.00 | 234.07             | 44                           | 2361                      | 0.53 | 0.068           | 0.03                        | 11.89          | 0.01                  | 0.000           |
| 25.14                                                     | 1.67 | 253.32          | 1.00 | 253.32             | 47                           | 2484                      | 0.53 | 0.062           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 25.21                                                     | 1.66 | 274.36          | 1.00 | 274.36             | 50                           | 2636                      | 0.53 | 0.056           | 0.02                        | 11.89          | 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) |
| 25.27                                                     | 1.64 | 297.97          | 1.00 | 297.97             | 54                        | 2792                   | 0.53 | 0.050        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 25.35                                                     | 1.61 | 313.75          | 1.00 | 313.75             | 57                        | 2836                   | 0.53 | 0.049        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 25.42                                                     | 1.59 | 318.49          | 1.00 | 318.49             | 57                        | 2797                   | 0.53 | 0.051        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 25.46                                                     | 1.59 | 313.76          | 1.00 | 313.76             | 56                        | 2760                   | 0.53 | 0.052        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 25.54                                                     | 1.63 | 303.24          | 1.00 | 303.24             | 55                        | 2818                   | 0.53 | 0.050        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 25.62                                                     | 1.68 | 292.95          | 1.00 | 292.95             | 54                        | 2930                   | 0.53 | 0.047        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 25.68                                                     | 1.72 | 286.44          | 1.02 | 293.22             | 55                        | 3020                   | 0.53 | 0.045        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 25.74                                                     | 1.73 | 285.25          | 1.05 | 300.11             | 57                        | 3074                   | 0.53 | 0.044        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 25.82                                                     | 1.73 | 285.93          | 1.06 | 302.44             | 57                        | 3100                   | 0.53 | 0.044        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 25.85                                                     | 1.73 | 286.75          | 1.05 | 302.42             | 57                        | 3104                   | 0.53 | 0.044        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 25.93                                                     | 1.73 | 286.69          | 1.05 | 302.29             | 57                        | 3108                   | 0.53 | 0.044        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 26.00                                                     | 1.74 | 284.83          | 1.07 | 303.57             | 57                        | 3121                   | 0.53 | 0.043        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 26.08                                                     | 1.75 | 282.39          | 1.08 | 304.90             | 58                        | 3136                   | 0.53 | 0.043        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 26.12                                                     | 1.76 | 277.43          | 1.10 | 304.54             | 58                        | 3133                   | 0.53 | 0.043        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 26.20                                                     | 1.77 | 270.31          | 1.11 | 299.69             | 57                        | 3090                   | 0.53 | 0.045        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 26.27                                                     | 1.77 | 262.39          | 1.11 | 290.76             | 56                        | 3003                   | 0.53 | 0.047        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 26.35                                                     | 1.76 | 256.93          | 1.09 | 281.24             | 54                        | 2908                   | 0.53 | 0.050        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 26.38                                                     | 1.74 | 251.68          | 1.07 | 270.47             | 51                        | 2801                   | 0.53 | 0.053        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 26.46                                                     | 1.73 | 247.42          | 1.06 | 261.17             | 49                        | 2716                   | 0.53 | 0.056        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 26.53                                                     | 1.72 | 245.30          | 1.03 | 251.54             | 47                        | 2638                   | 0.53 | 0.060        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 26.61                                                     | 1.70 | 247.23          | 1.00 | 247.23             | 46                        | 2589                   | 0.53 | 0.062        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 26.64                                                     | 1.68 | 252.56          | 1.00 | 252.56             | 47                        | 2559                   | 0.53 | 0.064        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 26.71                                                     | 1.65 | 258.54          | 1.00 | 258.54             | 47                        | 2537                   | 0.53 | 0.065        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 26.79                                                     | 1.64 | 259.87          | 1.00 | 259.87             | 48                        | 2521                   | 0.53 | 0.066        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 26.86                                                     | 1.66 | 249.77          | 1.00 | 249.77             | 46                        | 2499                   | 0.53 | 0.067        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 26.94                                                     | 1.71 | 231.92          | 1.00 | 232.03             | 43                        | 2474                   | 0.53 | 0.069        | 0.03                     | 11.89          | 0.01               | 0.000        |
| 26.98                                                     | 1.78 | 208.26          | 1.13 | 234.92             | 45                        | 2472                   | 0.53 | 0.069        | 0.03                     | 11.89          | 0.01               | 0.000        |
| 27.05                                                     | 1.87 | 183.00          | 1.22 | 222.58             | 44                        | 2482                   | 0.53 | 0.069        | 0.03                     | 11.89          | 0.01               | 0.000        |
| 27.13                                                     | 1.97 | 159.38          | 1.28 | 204.21             | 42                        | 2489                   | 0.53 | 0.069        | 0.03                     | 11.89          | 0.01               | 0.000        |
| 27.17                                                     | 2.06 | 139.66          | 1.36 | 190.29             | 40                        | 2491                   | 0.53 | 0.069        | 0.03                     | 11.89          | 0.01               | 0.000        |
| 27.25                                                     | 2.12 | 126.73          | 1.45 | 184.38             | 40                        | 2494                   | 0.53 | 0.069        | 0.03                     | 11.89          | 0.01               | 0.000        |
| 27.33                                                     | 2.18 | 117.50          | 1.56 | 182.91             | 41                        | 2502                   | 0.53 | 0.069        | 0.03                     | 11.89          | 0.01               | 0.000        |
| 27.37                                                     | 2.21 | 110.49          | 1.65 | 182.16             | 41                        | 2489                   | 0.53 | 0.069        | 0.03                     | 11.89          | 0.01               | 0.000        |
| 27.44                                                     | 2.23 | 107.11          | 1.70 | 182.62             | 42                        | 2491                   | 0.53 | 0.070        | 0.03                     | 11.89          | 0.01               | 0.000        |
| 27.52                                                     | 2.24 | 105.65          | 1.73 | 183.09             | 42                        | 2496                   | 0.53 | 0.070        | 0.03                     | 11.89          | 0.01               | 0.000        |
| 27.60                                                     | 2.23 | 107.78          | 1.70 | 183.35             | 42                        | 2512                   | 0.53 | 0.069        | 0.03                     | 11.89          | 0.01               | 0.000        |
| 27.64                                                     | 2.21 | 110.75          | 1.64 | 181.97             | 41                        | 2506                   | 0.53 | 0.070        | 0.03                     | 11.89          | 0.01               | 0.000        |
| 27.71                                                     | 2.19 | 113.63          | 1.58 | 179.56             | 40                        | 2482                   | 0.53 | 0.071        | 0.03                     | 11.89          | 0.01               | 0.000        |
| 27.79                                                     | 2.16 | 115.75          | 1.53 | 176.64             | 39                        | 2443                   | 0.53 | 0.074        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 27.83                                                     | 2.14 | 117.20          | 1.48 | 173.26             | 38                        | 2388                   | 0.53 | 0.077        | 0.04                     | 11.89          | 0.02               | 0.000        |
| 27.90                                                     | 2.11 | 118.27          | 1.44 | 170.43             | 37                        | 2338                   | 0.53 | 0.081        | 0.04                     | 11.89          | 0.02               | 0.000        |
| 27.97                                                     | 2.09 | 120.33          | 1.40 | 168.55             | 36                        | 2290                   | 0.53 | 0.085        | 0.04                     | 11.89          | 0.02               | 0.000        |
| 28.05                                                     | 2.06 | 122.64          | 1.37 | 167.97             | 36                        | 2256                   | 0.53 | 0.088        | 0.04                     | 11.89          | 0.02               | 0.000        |
| 28.12                                                     | 2.04 | 124.58          | 1.35 | 167.87             | 36                        | 2230                   | 0.53 | 0.091        | 0.05                     | 11.89          | 0.02               | 0.000        |
| 28.16                                                     | 2.03 | 126.37          | 1.33 | 168.03             | 35                        | 2206                   | 0.53 | 0.093        | 0.05                     | 11.89          | 0.02               | 0.000        |
| 28.23                                                     | 2.00 | 127.10          | 1.31 | 165.87             | 34                        | 2133                   | 0.53 | 0.101        | 0.05                     | 11.89          | 0.02               | 0.000        |
| 28.31                                                     | 1.96 | 127.09          | 1.28 | 162.51             | 33                        | 2030                   | 0.53 | 0.114        | 0.06                     | 11.89          | 0.03               | 0.000        |
| 28.35                                                     | 1.94 | 125.71          | 1.26 | 158.84             | 32                        | 1945                   | 0.53 | 0.127        | 0.07                     | 11.89          | 0.03               | 0.000        |

| :: Post-earthquake settlement of dry sands :: (continued) |      |                 |      |                    |                              |                           |      |                 |                             |                |                       |                 |
|-----------------------------------------------------------|------|-----------------|------|--------------------|------------------------------|---------------------------|------|-----------------|-----------------------------|----------------|-----------------------|-----------------|
| Depth<br>(ft)                                             | Ic   | Q <sub>tn</sub> | Kc   | Q <sub>tn,cs</sub> | N <sub>1,60</sub><br>(blows) | G <sub>max</sub><br>(tsf) | CSR  | Shear, γ<br>(%) | e <sub>vol(15)</sub><br>(%) | N <sub>c</sub> | e <sub>v</sub><br>(%) | Settle.<br>(in) |
| 28.43                                                     | 1.94 | 123.58          | 1.27 | 156.35             | 32                           | 1923                      | 0.53 | 0.132           | 0.08                        | 11.89          | 0.04                  | 0.000           |
| 28.50                                                     | 1.96 | 121.63          | 1.27 | 154.91             | 32                           | 1930                      | 0.53 | 0.131           | 0.08                        | 11.89          | 0.04                  | 0.000           |
| 28.54                                                     | 1.96 | 120.82          | 1.28 | 154.25             | 32                           | 1932                      | 0.53 | 0.131           | 0.08                        | 11.89          | 0.04                  | 0.000           |
| 28.62                                                     | 1.97 | 118.27          | 1.29 | 152.24             | 31                           | 1936                      | 0.53 | 0.131           | 0.08                        | 11.89          | 0.04                  | 0.000           |
| 28.69                                                     | 1.98 | 118.94          | 1.29 | 153.23             | 32                           | 1954                      | 0.53 | 0.128           | 0.07                        | 11.89          | 0.03                  | 0.000           |
| 28.77                                                     | 1.98 | 119.56          | 1.29 | 154.15             | 32                           | 1972                      | 0.53 | 0.126           | 0.07                        | 11.89          | 0.03                  | 0.000           |
| 28.81                                                     | 1.97 | 122.22          | 1.28 | 156.99             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 28.88                                                     | 1.99 | 120.90          | 1.30 | 156.77             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 28.96                                                     | 2.01 | 118.31          | 1.32 | 155.83             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 29.03                                                     | 2.04 | 115.34          | 1.34 | 154.66             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 29.07                                                     | 2.06 | 111.38          | 1.37 | 152.71             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 29.15                                                     | 2.09 | 106.46          | 1.41 | 150.02             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 29.23                                                     | 2.13 | 100.10          | 1.47 | 146.85             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 29.30                                                     | 2.16 | 94.36           | 1.53 | 144.44             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 29.34                                                     | 2.20 | 88.07           | 1.62 | 142.93             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 29.42                                                     | 2.25 | 81.60           | 1.74 | 142.29             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 29.49                                                     | 2.30 | 74.72           | 1.91 | 142.66             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 29.56                                                     | 2.33 | 69.48           | 2.06 | 143.26             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 29.61                                                     | 2.37 | 64.95           | 2.22 | 143.99             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 29.68                                                     | 2.40 | 60.64           | 2.40 | 145.32             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 29.76                                                     | 2.44 | 56.74           | 2.60 | 147.49             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 29.80                                                     | 2.47 | 53.88           | 2.81 | 151.38             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 29.87                                                     | 2.50 | 52.22           | 2.98 | 155.64             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 29.95                                                     | 2.52 | 50.98           | 3.13 | 159.64             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 29.99                                                     | 2.54 | 49.81           | 3.27 | 162.88             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 30.06                                                     | 2.57 | 47.92           | 3.48 | 166.78             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 30.14                                                     | 2.60 | 45.46           | 3.79 | 172.47             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 30.22                                                     | 2.63 | 44.24           | 3.99 | 176.70             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 30.26                                                     | 2.64 | 43.94           | 4.09 | 179.52             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 30.33                                                     | 2.61 | 46.00           | 3.87 | 178.05             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 30.40                                                     | 2.57 | 49.68           | 3.51 | 174.28             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 30.48                                                     | 2.52 | 54.61           | 3.09 | 168.92             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 30.52                                                     | 2.45 | 61.20           | 2.66 | 162.87             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 30.60                                                     | 2.39 | 68.40           | 2.30 | 157.52             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 30.67                                                     | 2.32 | 75.93           | 2.02 | 153.49             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 30.71                                                     | 2.27 | 82.19           | 1.83 | 150.36             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 30.78                                                     | 2.23 | 86.83           | 1.70 | 147.21             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 30.86                                                     | 2.19 | 90.30           | 1.59 | 143.36             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 30.94                                                     | 2.16 | 91.45           | 1.53 | 139.79             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 30.97                                                     | 2.15 | 89.74           | 1.51 | 135.11             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 31.05                                                     | 2.15 | 86.11           | 1.51 | 130.08             | 29                           | 1945                      | 0.53 | 0.145           | 0.09                        | 11.89          | 0.04                  | 0.000           |
| 31.13                                                     | 2.16 | 81.64           | 1.53 | 124.72             | 28                           | 1871                      | 0.53 | 0.162           | 0.11                        | 11.89          | 0.05                  | 0.000           |
| 31.20                                                     | 2.17 | 78.25           | 1.54 | 120.75             | 27                           | 1816                      | 0.53 | 0.176           | 0.12                        | 11.89          | 0.05                  | 0.000           |
| 31.24                                                     | 2.14 | 76.49           | 1.49 | 114.25             | 25                           | 1712                      | 0.53 | 0.210           | 0.16                        | 11.89          | 0.07                  | 0.000           |
| 31.32                                                     | 2.12 | 75.35           | 1.45 | 109.16             | 24                           | 1626                      | 0.53 | 0.248           | 0.20                        | 11.89          | 0.09                  | 0.001           |
| 31.39                                                     | 2.10 | 74.02           | 1.42 | 105.05             | 23                           | 1555                      | 0.53 | 0.289           | 0.25                        | 11.89          | 0.10                  | 0.001           |
| 31.47                                                     | 2.12 | 72.19           | 1.45 | 104.93             | 23                           | 1570                      | 0.53 | 0.281           | 0.24                        | 11.89          | 0.10                  | 0.001           |
| 31.51                                                     | 2.15 | 70.19           | 1.50 | 105.41             | 23                           | 1591                      | 0.53 | 0.269           | 0.22                        | 11.89          | 0.09                  | 0.000           |

| :: Post-earthquake settlement of dry sands :: (continued) |      |                 |      |                    |                              |                           |      |                 |                             |                |                       |                 |
|-----------------------------------------------------------|------|-----------------|------|--------------------|------------------------------|---------------------------|------|-----------------|-----------------------------|----------------|-----------------------|-----------------|
| Depth<br>(ft)                                             | Ic   | Q <sub>tn</sub> | Kc   | Q <sub>tn,cs</sub> | N <sub>1,60</sub><br>(blows) | G <sub>max</sub><br>(tsf) | CSR  | Shear, γ<br>(%) | e <sub>vol(15)</sub><br>(%) | N <sub>c</sub> | e <sub>v</sub><br>(%) | Settle.<br>(in) |
| 31.59                                                     | 2.17 | 69.37           | 1.54 | 106.61             | 24                           | 1617                      | 0.53 | 0.256           | 0.21                        | 11.89          | 0.09                  | 0.001           |
| 31.64                                                     | 2.18 | 68.84           | 1.57 | 108.28             | 24                           | 1647                      | 0.53 | 0.242           | 0.19                        | 11.89          | 0.08                  | 0.001           |
| 31.71                                                     | 2.18 | 70.20           | 1.57 | 110.22             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 31.78                                                     | 2.19 | 70.91           | 1.60 | 113.44             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 31.86                                                     | 2.21 | 71.30           | 1.64 | 117.17             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 31.90                                                     | 2.25 | 69.65           | 1.76 | 122.34             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 31.97                                                     | 2.29 | 67.28           | 1.89 | 127.33             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 32.05                                                     | 2.33 | 65.01           | 2.04 | 132.88             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 32.12                                                     | 2.36 | 63.51           | 2.16 | 136.90             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 32.16                                                     | 2.38 | 61.76           | 2.28 | 140.90             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 32.24                                                     | 2.41 | 59.58           | 2.43 | 144.88             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 32.31                                                     | 2.44 | 57.51           | 2.60 | 149.57             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 32.39                                                     | 2.46 | 56.44           | 2.71 | 153.11             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 32.43                                                     | 2.47 | 55.93           | 2.80 | 156.62             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 32.50                                                     | 2.49 | 55.06           | 2.92 | 160.76             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 32.58                                                     | 2.52 | 53.71           | 3.09 | 165.89             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 32.65                                                     | 2.54 | 52.26           | 3.27 | 170.75             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 32.69                                                     | 2.57 | 50.54           | 3.49 | 176.24             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 32.77                                                     | 2.60 | 48.88           | 3.71 | 181.44             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 32.85                                                     | 2.62 | 47.52           | 3.91 | 186.01             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 32.88                                                     | 2.63 | 46.74           | 4.04 | 188.89             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 32.96                                                     | 2.64 | 46.14           | 4.11 | 189.50             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 33.03                                                     | 2.64 | 45.86           | 4.11 | 188.66             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 33.07                                                     | 2.62 | 47.07           | 3.90 | 183.63             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 33.15                                                     | 2.57 | 49.93           | 3.52 | 175.71             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 33.23                                                     | 2.51 | 54.52           | 3.03 | 165.16             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 33.31                                                     | 2.45 | 58.75           | 2.67 | 156.68             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 33.34                                                     | 2.41 | 62.24           | 2.41 | 149.71             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 33.42                                                     | 2.38 | 63.84           | 2.27 | 144.67             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 33.49                                                     | 2.35 | 65.17           | 2.14 | 139.27             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 33.56                                                     | 2.32 | 66.93           | 2.01 | 134.49             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 33.64                                                     | 2.29 | 69.70           | 1.88 | 130.92             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 33.68                                                     | 2.24 | 74.73           | 1.73 | 129.31             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 33.75                                                     | 2.19 | 81.22           | 1.60 | 129.54             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 33.83                                                     | 2.15 | 87.66           | 1.50 | 131.32             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 33.87                                                     | 2.12 | 91.86           | 1.45 | 133.35             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 33.95                                                     | 2.12 | 92.17           | 1.45 | 134.10             | 29                           | 2115                      | 0.53 | 0.131           | 0.08                        | 11.89          | 0.03                  | 0.000           |
| 34.01                                                     | 2.14 | 90.62           | 1.48 | 134.24             | 30                           | 2132                      | 0.53 | 0.129           | 0.08                        | 11.89          | 0.03                  | 0.000           |
| 34.06                                                     | 2.16 | 88.65           | 1.52 | 134.62             | 30                           | 2151                      | 0.53 | 0.127           | 0.08                        | 11.89          | 0.03                  | 0.000           |
| 34.14                                                     | 2.18 | 86.96           | 1.56 | 135.47             | 30                           | 2175                      | 0.53 | 0.124           | 0.08                        | 11.89          | 0.03                  | 0.000           |
| 34.20                                                     | 2.18 | 86.78           | 1.57 | 136.48             | 31                           | 2196                      | 0.53 | 0.121           | 0.07                        | 11.89          | 0.03                  | 0.000           |
| 34.28                                                     | 2.18 | 87.36           | 1.57 | 137.07             | 31                           | 2208                      | 0.53 | 0.120           | 0.07                        | 11.89          | 0.03                  | 0.000           |
| 34.32                                                     | 2.17 | 90.43           | 1.55 | 139.85             | 31                           | 2252                      | 0.53 | 0.114           | 0.07                        | 11.89          | 0.03                  | 0.000           |
| 34.40                                                     | 2.15 | 95.49           | 1.51 | 144.13             | 32                           | 2317                      | 0.53 | 0.108           | 0.06                        | 11.89          | 0.02                  | 0.000           |
| 34.48                                                     | 2.13 | 101.12          | 1.47 | 149.01             | 33                           | 2386                      | 0.53 | 0.101           | 0.06                        | 11.89          | 0.02                  | 0.000           |
| 34.52                                                     | 2.10 | 107.74          | 1.42 | 153.35             | 33                           | 2426                      | 0.53 | 0.098           | 0.05                        | 11.89          | 0.02                  | 0.000           |
| 34.59                                                     | 2.10 | 109.09          | 1.42 | 154.44             | 33                           | 2440                      | 0.53 | 0.096           | 0.05                        | 11.89          | 0.02                  | 0.000           |
| 34.67                                                     | 2.07 | 114.86          | 1.38 | 158.21             | 34                           | 2462                      | 0.53 | 0.095           | 0.05                        | 11.89          | 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) |
| 34.74                                                     | 2.05 | 118.47          | 1.36 | 160.66             | 34                        | 2472                   | 0.53 | 0.094        | 0.05                     | 11.89          | 0.02               | 0.000        |
| 34.81                                                     | 2.02 | 124.86          | 1.32 | 165.33             | 35                        | 2484                   | 0.53 | 0.094        | 0.05                     | 11.89          | 0.02               | 0.000        |
| 34.88                                                     | 2.01 | 125.72          | 1.32 | 165.74             | 35                        | 2480                   | 0.53 | 0.094        | 0.05                     | 11.89          | 0.02               | 0.000        |
| 34.92                                                     | 2.00 | 126.79          | 1.31 | 166.24             | 35                        | 2471                   | 0.53 | 0.095        | 0.05                     | 11.89          | 0.02               | 0.000        |
| 35.00                                                     | 2.00 | 128.02          | 1.30 | 166.84             | 35                        | 2462                   | 0.53 | 0.096        | 0.05                     | 11.89          | 0.02               | 0.000        |
| 35.08                                                     | 1.99 | 129.04          | 1.30 | 167.35             | 35                        | 2454                   | 0.53 | 0.097        | 0.05                     | 11.89          | 0.02               | 0.000        |
| 35.11                                                     | 1.98 | 129.58          | 1.29 | 167.61             | 35                        | 2449                   | 0.53 | 0.097        | 0.05                     | 11.89          | 0.02               | 0.000        |
| 35.19                                                     | 1.98 | 129.36          | 1.29 | 167.21             | 35                        | 2444                   | 0.53 | 0.098        | 0.05                     | 11.89          | 0.02               | 0.000        |
| 35.26                                                     | 1.98 | 129.09          | 1.29 | 166.46             | 34                        | 2426                   | 0.53 | 0.100        | 0.05                     | 11.89          | 0.02               | 0.000        |
| 35.33                                                     | 1.97 | 128.41          | 1.29 | 165.11             | 34                        | 2399                   | 0.53 | 0.103        | 0.05                     | 11.89          | 0.02               | 0.000        |
| 35.41                                                     | 1.97 | 127.54          | 1.28 | 163.66             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 35.45                                                     | 1.97 | 125.83          | 1.29 | 161.78             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 35.52                                                     | 1.98 | 123.49          | 1.29 | 159.47             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 35.60                                                     | 1.99 | 120.96          | 1.30 | 156.96             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 35.64                                                     | 2.00 | 117.76          | 1.31 | 153.86             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 35.71                                                     | 2.03 | 111.64          | 1.33 | 148.64             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 35.80                                                     | 2.07 | 103.92          | 1.37 | 142.85             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 35.83                                                     | 2.13 | 93.35           | 1.47 | 137.47             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 35.91                                                     | 2.21 | 82.32           | 1.65 | 135.81             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 35.99                                                     | 2.30 | 71.62           | 1.94 | 138.97             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 36.03                                                     | 2.39 | 62.97           | 2.32 | 145.88             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 36.10                                                     | 2.46 | 56.61           | 2.73 | 154.32             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 36.18                                                     | 2.52 | 52.12           | 3.13 | 163.24             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 36.26                                                     | 2.55 | 50.20           | 3.37 | 169.01             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 36.29                                                     | 2.56 | 49.97           | 3.44 | 171.79             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 36.36                                                     | 2.57 | 49.92           | 3.47 | 173.24             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 36.44                                                     | 2.58 | 49.11           | 3.57 | 175.39             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 36.52                                                     | 2.59 | 48.03           | 3.69 | 177.45             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 36.56                                                     | 2.60 | 47.28           | 3.77 | 178.19             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 36.64                                                     | 2.60 | 47.35           | 3.71 | 175.74             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 36.71                                                     | 2.57 | 48.67           | 3.51 | 170.83             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 36.75                                                     | 2.53 | 51.58           | 3.17 | 163.38             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 36.82                                                     | 2.47 | 56.33           | 2.76 | 155.25             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 36.90                                                     | 2.40 | 62.21           | 2.37 | 147.65             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 36.97                                                     | 2.35 | 67.26           | 2.12 | 142.91             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 37.01                                                     | 2.30 | 71.90           | 1.93 | 139.09             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 37.09                                                     | 2.27 | 75.20           | 1.80 | 135.54             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 37.16                                                     | 2.23 | 78.32           | 1.68 | 131.78             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 37.24                                                     | 2.20 | 80.22           | 1.61 | 128.86             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 37.27                                                     | 2.17 | 81.94           | 1.54 | 126.10             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 37.36                                                     | 2.16 | 81.88           | 1.52 | 124.52             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 37.43                                                     | 2.16 | 80.74           | 1.53 | 123.34             | 27                        | 2111                   | 0.53 | 0.147        | 0.10                     | 11.89          | 0.03               | 0.000        |
| 37.47                                                     | 2.19 | 77.84           | 1.59 | 123.45             | 28                        | 2124                   | 0.53 | 0.145        | 0.10                     | 11.89          | 0.03               | 0.000        |
| 37.55                                                     | 2.22 | 74.45           | 1.67 | 124.33             | 28                        | 2144                   | 0.53 | 0.142        | 0.09                     | 11.89          | 0.03               | 0.000        |
| 37.62                                                     | 2.25 | 71.37           | 1.77 | 126.20             | 29                        | 2169                   | 0.53 | 0.138        | 0.09                     | 11.89          | 0.03               | 0.000        |
| 37.67                                                     | 2.27 | 71.38           | 1.80 | 128.81             | 30                        | 2210                   | 0.53 | 0.132        | 0.08                     | 11.89          | 0.03               | 0.000        |
| 37.74                                                     | 2.27 | 72.61           | 1.81 | 131.17             | 30                        | 2254                   | 0.53 | 0.126        | 0.08                     | 11.89          | 0.02               | 0.000        |
| 37.81                                                     | 2.26 | 74.76           | 1.79 | 134.07             | 31                        | 2309                   | 0.53 | 0.120        | 0.07                     | 11.89          | 0.02               | 0.000        |

| :: Post-earthquake settlement of dry sands :: (continued) |                |                 |                |                    |                              |                           |      |                 |                             |                |                       |                 |
|-----------------------------------------------------------|----------------|-----------------|----------------|--------------------|------------------------------|---------------------------|------|-----------------|-----------------------------|----------------|-----------------------|-----------------|
| Depth<br>(ft)                                             | I <sub>c</sub> | Q <sub>tn</sub> | K <sub>c</sub> | Q <sub>tn,cs</sub> | N <sub>1,60</sub><br>(blows) | G <sub>max</sub><br>(tsf) | CSR  | Shear, γ<br>(%) | e <sub>vol(15)</sub><br>(%) | N <sub>c</sub> | e <sub>v</sub><br>(%) | Settle.<br>(in) |
| 37.89                                                     | 2.27           | 75.73           | 1.80           | 136.57             | 32                           | 2354                      | 0.53 | 0.115           | 0.07                        | 11.89          | 0.02                  | 0.000           |
| 37.93                                                     | 2.25           | 78.73           | 1.76           | 138.71             | 32                           | 2400                      | 0.53 | 0.110           | 0.06                        | 11.89          | 0.02                  | 0.000           |
| 38.00                                                     | 2.22           | 84.22           | 1.67           | 140.42             | 32                           | 2442                      | 0.53 | 0.106           | 0.06                        | 11.89          | 0.02                  | 0.000           |
| 38.08                                                     | 2.18           | 91.85           | 1.56           | 142.95             | 32                           | 2484                      | 0.53 | 0.102           | 0.06                        | 11.89          | 0.02                  | 0.000           |
| 38.15                                                     | 2.13           | 99.82           | 1.47           | 146.35             | 32                           | 2513                      | 0.53 | 0.100           | 0.06                        | 11.89          | 0.02                  | 0.000           |
| 38.23                                                     | 2.10           | 105.38          | 1.42           | 149.25             | 32                           | 2529                      | 0.53 | 0.099           | 0.06                        | 11.89          | 0.02                  | 0.000           |
| 38.26                                                     | 2.08           | 108.77          | 1.39           | 151.29             | 32                           | 2536                      | 0.53 | 0.098           | 0.05                        | 11.89          | 0.02                  | 0.000           |
| 38.33                                                     | 2.08           | 108.51          | 1.39           | 150.93             | 32                           | 2534                      | 0.53 | 0.099           | 0.06                        | 11.89          | 0.02                  | 0.000           |
| 38.41                                                     | 2.09           | 105.82          | 1.41           | 148.72             | 32                           | 2517                      | 0.53 | 0.100           | 0.06                        | 11.89          | 0.02                  | 0.000           |
| 38.48                                                     | 2.12           | 99.81           | 1.45           | 144.29             | 31                           | 2480                      | 0.53 | 0.104           | 0.06                        | 11.89          | 0.02                  | 0.000           |
| 38.55                                                     | 2.15           | 93.22           | 1.50           | 139.96             | 31                           | 2438                      | 0.53 | 0.108           | 0.06                        | 11.89          | 0.02                  | 0.000           |
| 38.59                                                     | 2.19           | 85.59           | 1.59           | 136.09             | 31                           | 2393                      | 0.53 | 0.113           | 0.07                        | 11.89          | 0.02                  | 0.000           |
| 38.66                                                     | 2.23           | 78.59           | 1.70           | 133.40             | 30                           | 2349                      | 0.53 | 0.118           | 0.07                        | 11.89          | 0.02                  | 0.000           |
| 38.74                                                     | 2.27           | 72.82           | 1.81           | 131.85             | 31                           | 2311                      | 0.53 | 0.122           | 0.07                        | 11.89          | 0.02                  | 0.000           |
| 38.78                                                     | 2.29           | 69.58           | 1.88           | 131.15             | 31                           | 2286                      | 0.53 | 0.125           | 0.07                        | 11.89          | 0.02                  | 0.000           |
| 38.86                                                     | 2.30           | 68.65           | 1.91           | 131.13             | 31                           | 2284                      | 0.53 | 0.126           | 0.08                        | 11.89          | 0.02                  | 0.000           |
| 38.93                                                     | 2.30           | 68.70           | 1.91           | 131.32             | 31                           | 2290                      | 0.53 | 0.125           | 0.07                        | 11.89          | 0.02                  | 0.000           |
| 39.01                                                     | 2.29           | 69.27           | 1.90           | 131.52             | 31                           | 2300                      | 0.53 | 0.124           | 0.07                        | 11.89          | 0.02                  | 0.000           |
| 39.04                                                     | 2.29           | 69.96           | 1.88           | 131.86             | 31                           | 2310                      | 0.53 | 0.123           | 0.07                        | 11.89          | 0.02                  | 0.000           |
| 39.12                                                     | 2.29           | 70.23           | 1.89           | 132.39             | 31                           | 2323                      | 0.53 | 0.122           | 0.07                        | 11.89          | 0.02                  | 0.000           |
| 39.20                                                     | 2.29           | 70.78           | 1.88           | 132.73             | 31                           | 2335                      | 0.52 | 0.121           | 0.07                        | 11.89          | 0.02                  | 0.000           |
| 39.28                                                     | 2.28           | 71.36           | 1.86           | 132.70             | 31                           | 2341                      | 0.52 | 0.120           | 0.07                        | 11.89          | 0.02                  | 0.000           |
| 39.31                                                     | 2.27           | 72.79           | 1.81           | 131.93             | 31                           | 2337                      | 0.52 | 0.121           | 0.07                        | 11.89          | 0.02                  | 0.000           |
| 39.38                                                     | 2.25           | 74.76           | 1.76           | 131.27             | 30                           | 2337                      | 0.52 | 0.121           | 0.07                        | 11.89          | 0.02                  | 0.000           |
| 39.46                                                     | 2.23           | 77.06           | 1.70           | 131.11             | 30                           | 2343                      | 0.52 | 0.120           | 0.07                        | 11.89          | 0.02                  | 0.000           |
| 39.54                                                     | 2.22           | 78.45           | 1.68           | 131.48             | 30                           | 2355                      | 0.52 | 0.119           | 0.07                        | 11.89          | 0.02                  | 0.000           |
| 39.58                                                     | 2.23           | 78.39           | 1.68           | 131.98             | 30                           | 2365                      | 0.52 | 0.118           | 0.07                        | 11.89          | 0.02                  | 0.000           |
| 39.65                                                     | 2.24           | 76.86           | 1.72           | 132.54             | 30                           | 2375                      | 0.52 | 0.117           | 0.07                        | 11.89          | 0.02                  | 0.000           |
| 39.73                                                     | 2.26           | 75.07           | 1.77           | 133.25             | 31                           | 2386                      | 0.52 | 0.116           | 0.07                        | 11.89          | 0.02                  | 0.000           |
| 39.77                                                     | 2.27           | 73.98           | 1.81           | 134.11             | 31                           | 2397                      | 0.52 | 0.115           | 0.07                        | 11.89          | 0.02                  | 0.000           |
| 39.85                                                     | 2.26           | 74.96           | 1.79           | 134.46             | 31                           | 2410                      | 0.52 | 0.114           | 0.07                        | 11.89          | 0.02                  | 0.000           |
| 39.92                                                     | 2.24           | 78.26           | 1.72           | 134.93             | 31                           | 2430                      | 0.52 | 0.112           | 0.07                        | 11.89          | 0.02                  | 0.000           |
| 39.99                                                     | 2.21           | 83.01           | 1.64           | 136.15             | 31                           | 2460                      | 0.52 | 0.109           | 0.06                        | 11.89          | 0.02                  | 0.000           |
| 40.06                                                     | 2.19           | 87.09           | 1.59           | 138.08             | 31                           | 2494                      | 0.52 | 0.106           | 0.06                        | 11.89          | 0.02                  | 0.000           |
| 40.11                                                     | 2.18           | 89.50           | 1.57           | 140.26             | 31                           | 2533                      | 0.52 | 0.103           | 0.06                        | 11.89          | 0.02                  | 0.000           |
| 40.18                                                     | 2.15           | 91.16           | 1.51           | 137.40             | 30                           | 2468                      | 0.52 | 0.109           | 0.07                        | 11.89          | 0.02                  | 0.000           |
| 40.26                                                     | 2.11           | 92.60           | 1.44           | 133.30             | 29                           | 2360                      | 0.52 | 0.120           | 0.08                        | 11.89          | 0.02                  | 0.000           |
| 40.29                                                     | 2.07           | 93.48           | 1.38           | 129.39             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 40.36                                                     | 2.08           | 92.77           | 1.39           | 128.76             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 40.44                                                     | 2.10           | 91.42           | 1.42           | 129.45             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 40.52                                                     | 2.12           | 88.91           | 1.46           | 129.54             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 40.56                                                     | 2.14           | 87.17           | 1.49           | 130.17             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 40.63                                                     | 2.16           | 85.65           | 1.53           | 131.01             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 40.71                                                     | 2.18           | 85.55           | 1.56           | 133.30             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 40.78                                                     | 2.19           | 85.16           | 1.59           | 135.45             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 40.82                                                     | 2.20           | 85.09           | 1.62           | 137.64             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 40.90                                                     | 2.21           | 85.23           | 1.63           | 138.82             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 40.97                                                     | 2.21           | 85.30           | 1.64           | 139.49             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |

| :: Post-earthquake settlement of dry sands :: (continued) |                |                 |                |                    |                              |                           |      |                 |                             |                |                       |                 |
|-----------------------------------------------------------|----------------|-----------------|----------------|--------------------|------------------------------|---------------------------|------|-----------------|-----------------------------|----------------|-----------------------|-----------------|
| Depth<br>(ft)                                             | I <sub>c</sub> | Q <sub>tn</sub> | K <sub>c</sub> | Q <sub>tn,cs</sub> | N <sub>1,60</sub><br>(blows) | G <sub>max</sub><br>(tsf) | CSR  | Shear, γ<br>(%) | e <sub>vol(15)</sub><br>(%) | N <sub>c</sub> | e <sub>v</sub><br>(%) | Settle.<br>(in) |
| 41.01                                                     | 2.21           | 84.66           | 1.65           | 139.35             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.08                                                     | 2.22           | 82.88           | 1.68           | 138.86             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.16                                                     | 2.24           | 80.11           | 1.73           | 138.25             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.24                                                     | 2.26           | 77.26           | 1.79           | 138.23             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.28                                                     | 2.29           | 73.60           | 1.90           | 139.48             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.36                                                     | 2.33           | 69.42           | 2.05           | 142.14             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.43                                                     | 2.38           | 64.56           | 2.27           | 146.52             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.51                                                     | 2.41           | 61.21           | 2.45           | 150.19             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.55                                                     | 2.44           | 58.52           | 2.61           | 152.84             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.62                                                     | 2.47           | 55.82           | 2.76           | 154.06             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.70                                                     | 2.49           | 53.60           | 2.88           | 154.61             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.74                                                     | 2.49           | 52.99           | 2.91           | 154.32             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 41.81                                                     | 2.48           | 54.58           | 2.82           | 153.80             | 39                           | 2572                      | 0.52 | 0.102           | 0.05                        | 11.89          | 0.01                  | 0.000           |
| 41.89                                                     | 2.47           | 55.98           | 2.76           | 154.37             | 39                           | 2602                      | 0.52 | 0.100           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 41.93                                                     | 2.48           | 55.57           | 2.84           | 157.98             | 40                           | 2641                      | 0.52 | 0.097           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 42.00                                                     | 2.52           | 52.92           | 3.10           | 163.87             | 43                           | 2675                      | 0.52 | 0.095           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 42.08                                                     | 2.55           | 50.36           | 3.37           | 169.71             | 45                           | 2706                      | 0.52 | 0.093           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 42.16                                                     | 2.57           | 49.00           | 3.53           | 172.80             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 42.20                                                     | 2.57           | 49.05           | 3.50           | 171.90             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 42.28                                                     | 2.53           | 51.83           | 3.21           | 166.17             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 42.35                                                     | 2.44           | 59.50           | 2.62           | 155.69             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 42.42                                                     | 2.34           | 70.68           | 2.07           | 146.57             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 42.46                                                     | 2.24           | 83.18           | 1.72           | 142.82             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 42.53                                                     | 2.18           | 90.70           | 1.57           | 142.45             | 0                            | 0                         | 0.52 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 42.61                                                     | 2.16           | 93.22           | 1.52           | 141.25             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 42.68                                                     | 2.15           | 91.55           | 1.51           | 138.50             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 42.72                                                     | 2.14           | 90.92           | 1.49           | 135.57             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 42.80                                                     | 2.11           | 93.79           | 1.44           | 134.96             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 42.87                                                     | 2.07           | 100.83          | 1.37           | 138.41             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 42.95                                                     | 2.03           | 108.88          | 1.33           | 144.81             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 42.99                                                     | 1.99           | 118.03          | 1.30           | 153.14             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 43.06                                                     | 1.97           | 123.94          | 1.28           | 158.87             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 43.14                                                     | 1.95           | 127.49          | 1.27           | 162.34             | 0                            | 0                         | 0.51 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 43.18                                                     | 1.96           | 125.76          | 1.28           | 160.47             | 33                           | 2614                      | 0.51 | 0.101           | 0.06                        | 11.89          | 0.01                  | 0.000           |
| 43.26                                                     | 1.99           | 118.54          | 1.30           | 153.65             | 32                           | 2580                      | 0.51 | 0.104           | 0.06                        | 11.89          | 0.01                  | 0.000           |
| 43.33                                                     | 2.03           | 109.35          | 1.33           | 145.62             | 31                           | 2549                      | 0.51 | 0.107           | 0.06                        | 11.89          | 0.02                  | 0.000           |
| 43.37                                                     | 2.09           | 98.85           | 1.40           | 138.79             | 30                           | 2553                      | 0.51 | 0.107           | 0.07                        | 11.89          | 0.02                  | 0.000           |
| 43.44                                                     | 2.16           | 88.39           | 1.53           | 135.21             | 30                           | 2577                      | 0.51 | 0.105           | 0.06                        | 11.89          | 0.02                  | 0.000           |
| 43.52                                                     | 2.23           | 80.08           | 1.70           | 136.33             | 31                           | 2622                      | 0.51 | 0.101           | 0.06                        | 11.89          | 0.01                  | 0.000           |
| 43.59                                                     | 2.28           | 76.10           | 1.84           | 139.68             | 33                           | 2673                      | 0.51 | 0.097           | 0.05                        | 11.89          | 0.01                  | 0.000           |
| 43.67                                                     | 2.28           | 76.57           | 1.86           | 142.06             | 33                           | 2719                      | 0.51 | 0.094           | 0.05                        | 11.89          | 0.01                  | 0.000           |
| 43.71                                                     | 2.27           | 78.41           | 1.83           | 143.50             | 33                           | 2753                      | 0.51 | 0.092           | 0.05                        | 11.89          | 0.01                  | 0.000           |
| 43.78                                                     | 2.25           | 82.83           | 1.75           | 144.80             | 33                           | 2793                      | 0.51 | 0.089           | 0.05                        | 11.89          | 0.01                  | 0.000           |
| 43.86                                                     | 2.20           | 91.54           | 1.60           | 146.87             | 33                           | 2837                      | 0.51 | 0.087           | 0.05                        | 11.89          | 0.01                  | 0.000           |
| 43.93                                                     | 2.13           | 102.36          | 1.47           | 150.87             | 33                           | 2868                      | 0.51 | 0.085           | 0.05                        | 11.89          | 0.01                  | 0.000           |
| 43.97                                                     | 2.06           | 114.62          | 1.37           | 157.28             | 34                           | 2870                      | 0.51 | 0.085           | 0.05                        | 11.89          | 0.01                  | 0.000           |
| 44.04                                                     | 2.01           | 124.15          | 1.31           | 163.14             | 34                           | 2834                      | 0.51 | 0.087           | 0.05                        | 11.89          | 0.01                  | 0.000           |
| 44.12                                                     | 1.96           | 129.99          | 1.28           | 166.32             | 34                           | 2762                      | 0.51 | 0.092           | 0.05                        | 11.89          | 0.01                  | 0.000           |

| :: Post-earthquake settlement of dry sands :: (continued) |      |                 |      |                    |                              |                           |      |                 |                             |                |                       |                 |
|-----------------------------------------------------------|------|-----------------|------|--------------------|------------------------------|---------------------------|------|-----------------|-----------------------------|----------------|-----------------------|-----------------|
| Depth<br>(ft)                                             | Ic   | Q <sub>tn</sub> | Kc   | Q <sub>tn,cs</sub> | N <sub>1,60</sub><br>(blows) | G <sub>max</sub><br>(tsf) | CSR  | Shear, γ<br>(%) | e <sub>vol(15)</sub><br>(%) | N <sub>c</sub> | e <sub>v</sub><br>(%) | Settle.<br>(in) |
| 44.19                                                     | 1.94 | 130.06          | 1.27 | 164.58             | 34                           | 2675                      | 0.51 | 0.098           | 0.05                        | 11.89          | 0.01                  | 0.000           |
| 44.23                                                     | 1.94 | 126.13          | 1.26 | 159.09             | 32                           | 2569                      | 0.51 | 0.106           | 0.06                        | 11.89          | 0.01                  | 0.000           |
| 44.30                                                     | 1.95 | 119.44          | 1.27 | 151.31             | 31                           | 2469                      | 0.51 | 0.116           | 0.07                        | 11.89          | 0.02                  | 0.000           |
| 44.38                                                     | 1.97 | 110.18          | 1.29 | 141.74             | 29                           | 2388                      | 0.51 | 0.125           | 0.08                        | 11.89          | 0.02                  | 0.000           |
| 44.46                                                     | 2.01 | 101.81          | 1.32 | 134.19             | 28                           | 2357                      | 0.51 | 0.129           | 0.09                        | 11.89          | 0.02                  | 0.000           |
| 44.49                                                     | 2.05 | 95.12           | 1.36 | 129.00             | 27                           | 2347                      | 0.51 | 0.130           | 0.09                        | 11.89          | 0.02                  | 0.000           |
| 44.57                                                     | 2.09 | 89.62           | 1.40 | 125.84             | 27                           | 2359                      | 0.51 | 0.129           | 0.09                        | 11.89          | 0.02                  | 0.000           |
| 44.65                                                     | 2.13 | 84.41           | 1.47 | 123.87             | 27                           | 2379                      | 0.51 | 0.126           | 0.09                        | 11.89          | 0.02                  | 0.000           |
| 44.69                                                     | 2.18 | 79.28           | 1.57 | 124.15             | 28                           | 2425                      | 0.51 | 0.121           | 0.08                        | 11.89          | 0.02                  | 0.000           |
| 44.77                                                     | 2.22 | 75.15           | 1.67 | 125.71             | 29                           | 2470                      | 0.51 | 0.116           | 0.08                        | 11.89          | 0.02                  | 0.000           |
| 44.84                                                     | 2.26 | 71.37           | 1.80 | 128.21             | 30                           | 2513                      | 0.51 | 0.112           | 0.07                        | 11.89          | 0.02                  | 0.000           |
| 44.91                                                     | 2.29 | 68.84           | 1.89 | 130.10             | 30                           | 2538                      | 0.51 | 0.110           | 0.07                        | 11.89          | 0.01                  | 0.000           |
| 44.95                                                     | 2.31 | 66.51           | 1.97 | 131.34             | 31                           | 2546                      | 0.51 | 0.109           | 0.06                        | 11.89          | 0.01                  | 0.000           |
| 45.03                                                     | 2.33 | 64.32           | 2.06 | 132.19             | 32                           | 2547                      | 0.51 | 0.109           | 0.06                        | 11.89          | 0.01                  | 0.000           |
| 45.12                                                     | 2.35 | 62.52           | 2.12 | 132.80             | 32                           | 2545                      | 0.51 | 0.110           | 0.06                        | 11.89          | 0.01                  | 0.000           |
| 45.15                                                     | 2.36 | 61.40           | 2.16 | 132.74             | 32                           | 2536                      | 0.51 | 0.110           | 0.06                        | 11.89          | 0.01                  | 0.000           |
| 45.23                                                     | 2.36 | 60.46           | 2.18 | 131.55             | 32                           | 2513                      | 0.50 | 0.113           | 0.06                        | 11.89          | 0.01                  | 0.000           |
| 45.30                                                     | 2.36 | 59.74           | 2.18 | 129.94             | 31                           | 2485                      | 0.50 | 0.115           | 0.07                        | 11.89          | 0.01                  | 0.000           |
| 45.37                                                     | 2.36 | 59.43           | 2.16 | 128.57             | 31                           | 2465                      | 0.50 | 0.118           | 0.07                        | 11.89          | 0.01                  | 0.000           |
| 45.41                                                     | 2.35 | 59.61           | 2.15 | 127.99             | 31                           | 2460                      | 0.50 | 0.118           | 0.07                        | 11.89          | 0.01                  | 0.000           |
| 45.49                                                     | 2.35 | 60.06           | 2.13 | 128.16             | 31                           | 2470                      | 0.50 | 0.117           | 0.07                        | 11.89          | 0.01                  | 0.000           |
| 45.56                                                     | 2.34 | 61.54           | 2.09 | 128.62             | 31                           | 2492                      | 0.50 | 0.115           | 0.07                        | 11.89          | 0.01                  | 0.000           |
| 45.63                                                     | 2.33 | 63.53           | 2.03 | 129.20             | 31                           | 2520                      | 0.50 | 0.112           | 0.07                        | 11.89          | 0.01                  | 0.000           |
| 45.67                                                     | 2.31 | 66.58           | 1.95 | 129.91             | 31                           | 2555                      | 0.50 | 0.109           | 0.07                        | 11.89          | 0.01                  | 0.000           |
| 45.75                                                     | 2.29 | 69.64           | 1.89 | 131.57             | 31                           | 2603                      | 0.50 | 0.105           | 0.06                        | 11.89          | 0.01                  | 0.000           |
| 45.83                                                     | 2.28 | 72.48           | 1.85 | 134.38             | 31                           | 2669                      | 0.50 | 0.100           | 0.06                        | 11.89          | 0.01                  | 0.000           |
| 45.91                                                     | 2.28 | 73.96           | 1.85 | 137.05             | 32                           | 2726                      | 0.50 | 0.096           | 0.05                        | 11.89          | 0.01                  | 0.000           |
| 45.94                                                     | 2.29 | 74.67           | 1.87 | 139.62             | 33                           | 2775                      | 0.50 | 0.093           | 0.05                        | 11.89          | 0.01                  | 0.000           |
| 46.01                                                     | 2.29 | 75.52           | 1.88 | 141.75             | 33                           | 2820                      | 0.50 | 0.090           | 0.05                        | 11.89          | 0.01                  | 0.000           |
| 46.08                                                     | 2.28 | 77.79           | 1.85 | 143.76             | 34                           | 2868                      | 0.50 | 0.087           | 0.05                        | 11.89          | 0.01                  | 0.000           |
| 46.16                                                     | 2.26 | 80.99           | 1.79 | 144.77             | 33                           | 2902                      | 0.50 | 0.085           | 0.05                        | 11.89          | 0.01                  | 0.000           |
| 46.20                                                     | 2.22 | 86.53           | 1.67 | 144.61             | 33                           | 2908                      | 0.50 | 0.085           | 0.05                        | 11.89          | 0.01                  | 0.000           |
| 46.27                                                     | 2.17 | 93.69           | 1.54 | 144.41             | 32                           | 2885                      | 0.50 | 0.086           | 0.05                        | 11.89          | 0.01                  | 0.000           |
| 46.35                                                     | 2.11 | 101.22          | 1.44 | 145.76             | 32                           | 2849                      | 0.50 | 0.088           | 0.05                        | 11.89          | 0.01                  | 0.000           |
| 46.39                                                     | 2.06 | 108.15          | 1.37 | 148.25             | 32                           | 2803                      | 0.50 | 0.091           | 0.05                        | 11.89          | 0.01                  | 0.000           |
| 46.47                                                     | 2.03 | 112.98          | 1.33 | 150.56             | 32                           | 2764                      | 0.50 | 0.094           | 0.05                        | 11.89          | 0.01                  | 0.000           |
| 46.54                                                     | 2.00 | 115.50          | 1.31 | 151.33             | 32                           | 2714                      | 0.50 | 0.097           | 0.06                        | 11.89          | 0.01                  | 0.000           |
| 46.60                                                     | 1.99 | 115.83          | 1.30 | 150.43             | 31                           | 2661                      | 0.50 | 0.101           | 0.06                        | 11.89          | 0.01                  | 0.000           |
| 46.67                                                     | 1.97 | 115.76          | 1.29 | 149.04             | 31                           | 2597                      | 0.50 | 0.107           | 0.06                        | 11.89          | 0.01                  | 0.000           |
| 46.74                                                     | 1.96 | 116.61          | 1.27 | 148.50             | 30                           | 2535                      | 0.50 | 0.112           | 0.07                        | 11.89          | 0.01                  | 0.000           |
| 46.83                                                     | 1.94 | 117.30          | 1.26 | 148.30             | 30                           | 2495                      | 0.50 | 0.116           | 0.07                        | 11.89          | 0.01                  | 0.000           |
| 46.87                                                     | 1.94 | 117.61          | 1.26 | 148.38             | 30                           | 2487                      | 0.50 | 0.117           | 0.07                        | 11.89          | 0.01                  | 0.000           |
| 46.94                                                     | 1.93 | 118.59          | 1.26 | 149.38             | 30                           | 2497                      | 0.50 | 0.116           | 0.07                        | 11.89          | 0.01                  | 0.000           |
| 47.02                                                     | 1.93 | 120.24          | 1.26 | 151.14             | 31                           | 2518                      | 0.50 | 0.114           | 0.07                        | 11.89          | 0.01                  | 0.000           |
| 47.09                                                     | 1.93 | 122.03          | 1.25 | 153.00             | 31                           | 2537                      | 0.50 | 0.112           | 0.07                        | 11.89          | 0.01                  | 0.000           |
| 47.13                                                     | 1.92 | 124.07          | 1.25 | 155.32             | 31                           | 2568                      | 0.50 | 0.110           | 0.06                        | 11.89          | 0.01                  | 0.000           |
| 47.20                                                     | 1.92 | 126.07          | 1.25 | 157.72             | 32                           | 2607                      | 0.50 | 0.106           | 0.06                        | 11.89          | 0.01                  | 0.000           |
| 47.28                                                     | 1.92 | 127.82          | 1.25 | 159.94             | 32                           | 2647                      | 0.50 | 0.103           | 0.06                        | 11.89          | 0.01                  | 0.000           |

| :: Post-earthquake settlement of dry sands :: (continued) |      |                 |      |                    |                              |                           |      |                 |                             |                |                       |                 |
|-----------------------------------------------------------|------|-----------------|------|--------------------|------------------------------|---------------------------|------|-----------------|-----------------------------|----------------|-----------------------|-----------------|
| Depth<br>(ft)                                             | Ic   | Q <sub>tn</sub> | Kc   | Q <sub>tn,cs</sub> | N <sub>1,60</sub><br>(blows) | G <sub>max</sub><br>(tsf) | CSR  | Shear, γ<br>(%) | e <sub>vol(15)</sub><br>(%) | N <sub>c</sub> | e <sub>v</sub><br>(%) | Settle.<br>(in) |
| 47.32                                                     | 1.92 | 129.25          | 1.25 | 161.88             | 33                           | 2686                      | 0.50 | 0.100           | 0.06                        | 11.89          | 0.01                  | 0.000           |
| 47.39                                                     | 1.92 | 130.49          | 1.25 | 163.54             | 33                           | 2720                      | 0.50 | 0.098           | 0.05                        | 11.89          | 0.01                  | 0.000           |
| 47.46                                                     | 1.92 | 132.61          | 1.25 | 165.96             | 34                           | 2755                      | 0.50 | 0.095           | 0.05                        | 11.89          | 0.01                  | 0.000           |
| 47.54                                                     | 1.92 | 135.03          | 1.25 | 168.48             | 34                           | 2781                      | 0.50 | 0.094           | 0.05                        | 11.89          | 0.01                  | 0.000           |
| 47.58                                                     | 1.90 | 139.31          | 1.24 | 172.61             | 35                           | 2808                      | 0.49 | 0.092           | 0.05                        | 11.89          | 0.01                  | 0.000           |
| 47.65                                                     | 1.88 | 145.85          | 1.23 | 178.78             | 36                           | 2848                      | 0.49 | 0.089           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 47.72                                                     | 1.86 | 154.34          | 1.21 | 186.67             | 37                           | 2905                      | 0.49 | 0.086           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 47.80                                                     | 1.85 | 160.78          | 1.20 | 192.68             | 38                           | 2959                      | 0.49 | 0.083           | 0.04                        | 11.89          | 0.01                  | 0.000           |
| 47.84                                                     | 1.85 | 163.00          | 1.20 | 195.27             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 47.92                                                     | 1.86 | 160.55          | 1.21 | 193.50             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 48.00                                                     | 1.87 | 156.55          | 1.21 | 190.00             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 48.03                                                     | 1.89 | 149.32          | 1.23 | 183.22             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 48.11                                                     | 1.93 | 136.02          | 1.26 | 170.91             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 48.19                                                     | 2.01 | 116.45          | 1.32 | 153.27             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 48.26                                                     | 2.10 | 98.60           | 1.42 | 139.88             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 48.30                                                     | 2.19 | 84.43           | 1.58 | 133.48             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 48.38                                                     | 2.36 | 54.90           | 2.18 | 119.74             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 48.45                                                     | 2.45 | 48.37           | 2.67 | 128.91             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 48.53                                                     | 2.53 | 43.82           | 3.17 | 138.99             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 48.57                                                     | 2.57 | 41.86           | 3.52 | 147.15             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 48.64                                                     | 2.60 | 40.54           | 3.78 | 153.27             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 48.72                                                     | 2.64 | 38.93           | 4.08 | 158.67             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 48.76                                                     | 2.68 | 36.32           | 4.50 | 163.56             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 48.84                                                     | 2.72 | 33.75           | 4.96 | 167.39             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 48.91                                                     | 2.76 | 31.73           | 5.36 | 170.05             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 48.95                                                     | 2.75 | 32.00           | 5.26 | 168.24             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 49.03                                                     | 2.70 | 34.29           | 4.72 | 161.78             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 49.10                                                     | 2.63 | 37.93           | 4.02 | 152.44             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 49.18                                                     | 2.56 | 41.45           | 3.40 | 140.83             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 49.25                                                     | 2.50 | 43.78           | 3.00 | 131.15             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 49.28                                                     | 2.47 | 45.04           | 2.80 | 126.18             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 49.36                                                     | 2.47 | 45.70           | 2.75 | 125.66             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 49.44                                                     | 2.46 | 46.31           | 2.73 | 126.40             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 49.48                                                     | 2.45 | 46.83           | 2.66 | 124.65             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 49.56                                                     | 2.44 | 46.97           | 2.61 | 122.63             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 49.63                                                     | 2.44 | 46.97           | 2.58 | 121.04             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 49.69                                                     | 2.43 | 47.23           | 2.54 | 119.91             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 49.78                                                     | 2.42 | 47.66           | 2.50 | 119.24             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 49.81                                                     | 2.41 | 48.58           | 2.45 | 118.83             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 49.88                                                     | 2.41 | 49.36           | 2.42 | 119.68             | 0                            | 0                         | 0.48 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 49.96                                                     | 2.41 | 49.89           | 2.43 | 121.18             | 0                            | 0                         | 0.48 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 50.00                                                     | 2.42 | 49.63           | 2.49 | 123.83             | 0                            | 0                         | 0.48 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 50.08                                                     | 2.44 | 48.79           | 2.59 | 126.60             | 0                            | 0                         | 0.48 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 50.15                                                     | 2.46 | 47.80           | 2.71 | 129.64             | 0                            | 0                         | 0.48 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 50.23                                                     | 2.47 | 47.42           | 2.77 | 131.46             | 0                            | 0                         | 0.48 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 50.27                                                     | 2.48 | 47.12           | 2.84 | 133.72             | 0                            | 0                         | 0.48 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 50.34                                                     | 2.48 | 47.00           | 2.88 | 135.18             | 0                            | 0                         | 0.48 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |

| :: Post-earthquake settlement of dry sands :: (continued) |                |                 |                |                    |                              |                           |     |                 |                             |                |                       |                 |
|-----------------------------------------------------------|----------------|-----------------|----------------|--------------------|------------------------------|---------------------------|-----|-----------------|-----------------------------|----------------|-----------------------|-----------------|
| Depth<br>(ft)                                             | I <sub>c</sub> | Q <sub>tn</sub> | K <sub>c</sub> | Q <sub>tn,cs</sub> | N <sub>1,60</sub><br>(blows) | G <sub>max</sub><br>(tsf) | CSR | Shear, γ<br>(%) | e <sub>vol(15)</sub><br>(%) | N <sub>c</sub> | e <sub>v</sub><br>(%) | Settle.<br>(in) |
| Total estimated settlement: 0.15                          |                |                 |                |                    |                              |                           |     |                 |                             |                |                       |                 |

**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                            |

**LIQUEFACTION ANALYSIS REPORT**

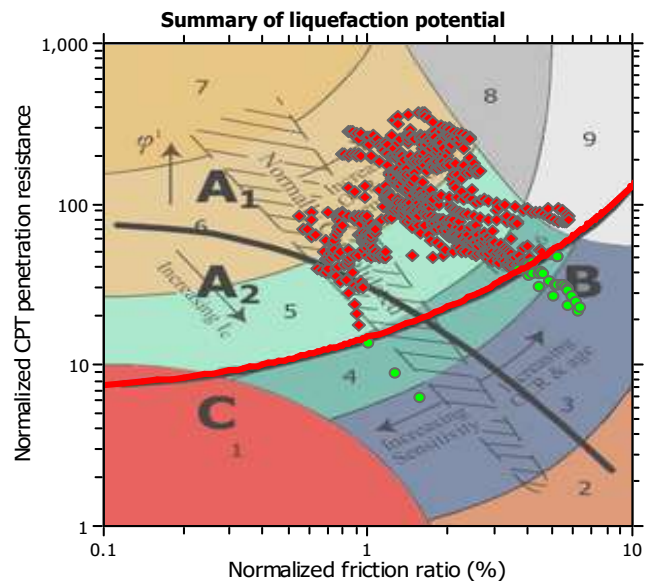
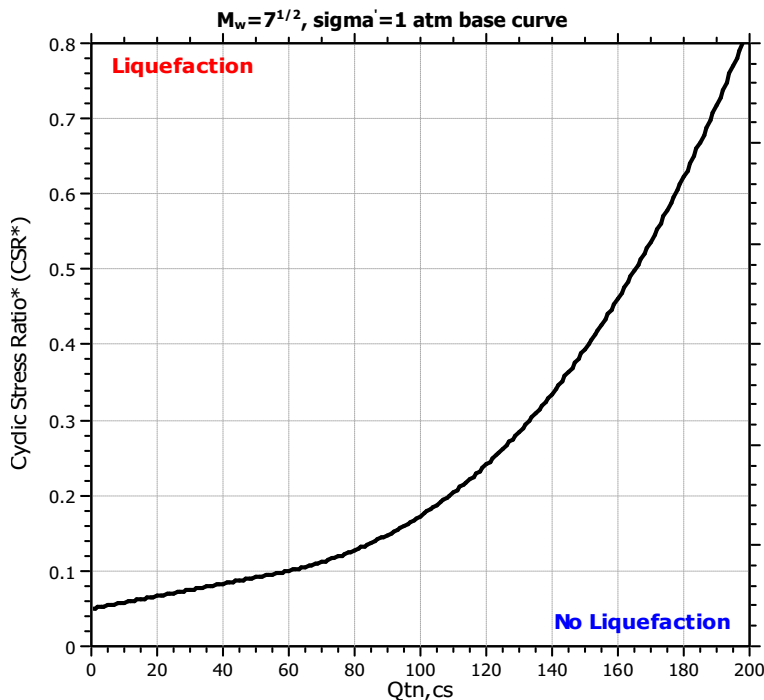
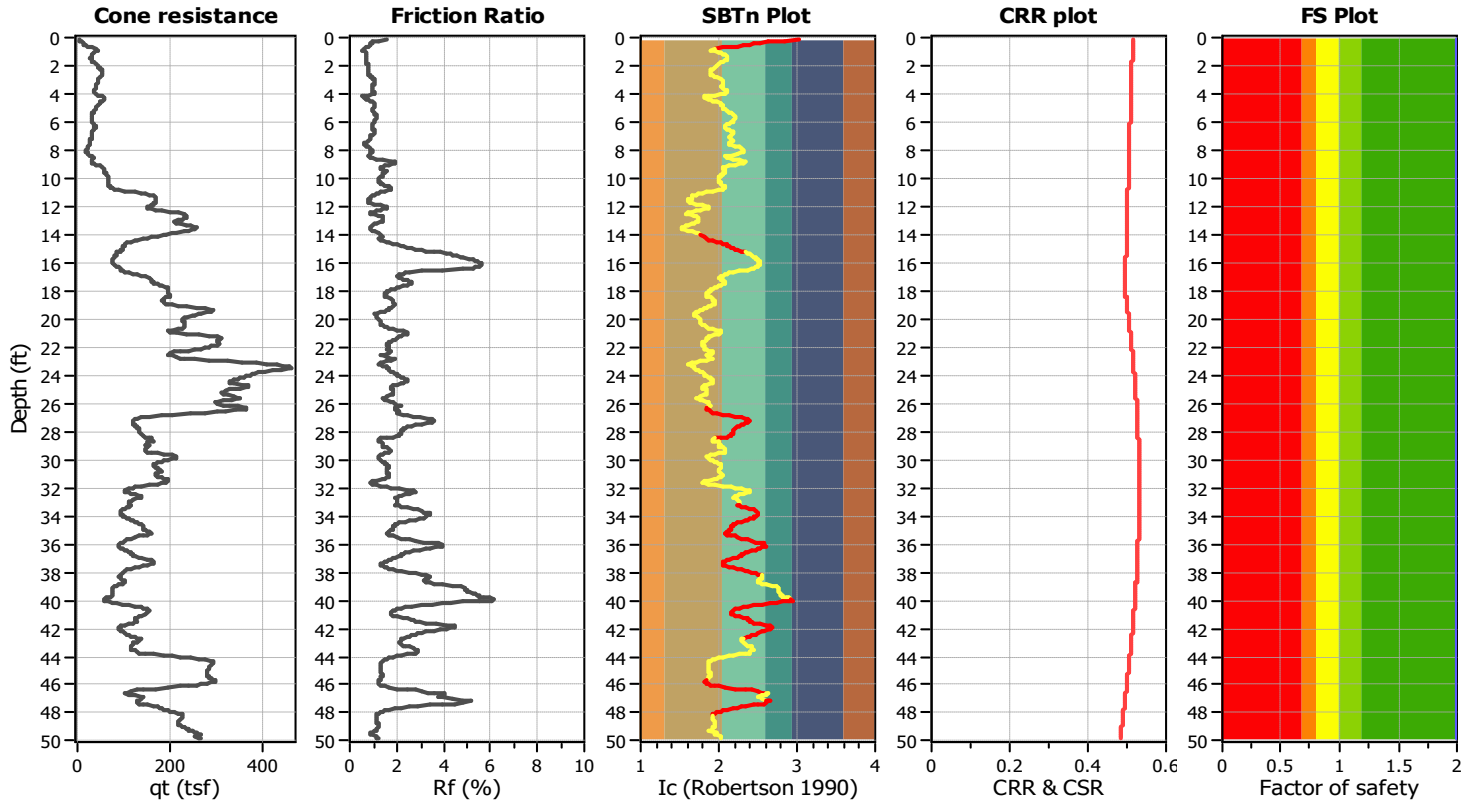
**Project title : Xenia Site**

**Location : Beaumont, California**

**CPT file : CPT-4**

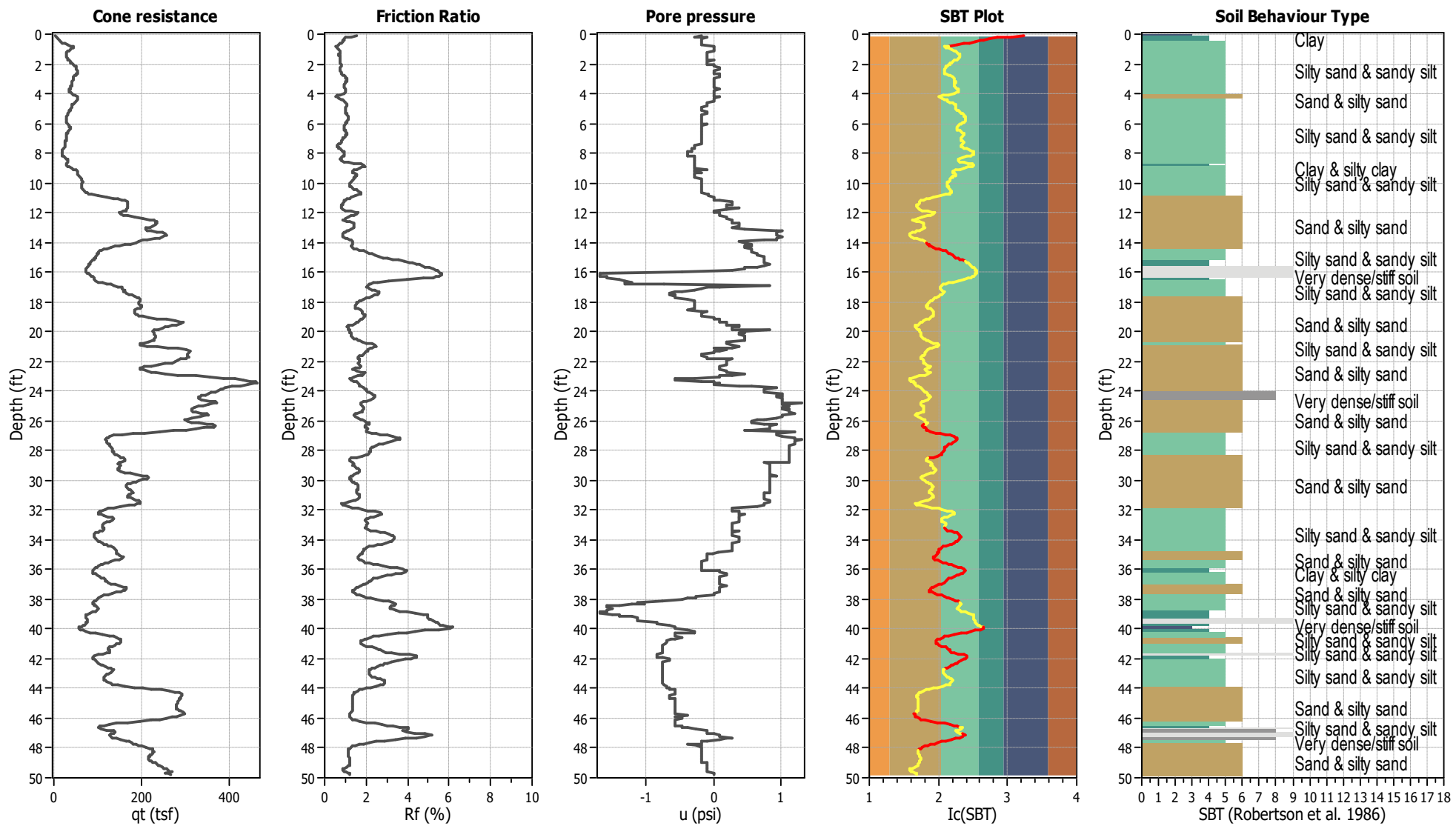
**Input parameters and analysis data**

|                              |                   |                           |              |                         |     |                      |              |
|------------------------------|-------------------|---------------------------|--------------|-------------------------|-----|----------------------|--------------|
| Analysis method:             | NCEER (1998)      | G.W.T. (in-situ):         | 100.00 ft    | Use fill:               | No  | Clay like behavior   |              |
| Fines correction method:     | NCEER (1998)      | G.W.T. (earthq.):         | 100.00 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 $M_w$ : | 7.13              | Ic cut-off value:         | 2.60         | Trans. detect. applied: | Yes | Limit depth:         | 60.00 ft     |
| Peak ground acceleration:    | 0.90              | Unit weight calculation:  | Based on SBT | $K_0$ applied:          | Yes | MSF method:          | Method based |



Zone A<sub>1</sub>: Cyclic liquefaction likely depending on size and duration of cyclic loading  
 Zone A<sub>2</sub>: Cyclic liquefaction and strength loss likely depending on loading and ground geometry  
 Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening  
 Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots



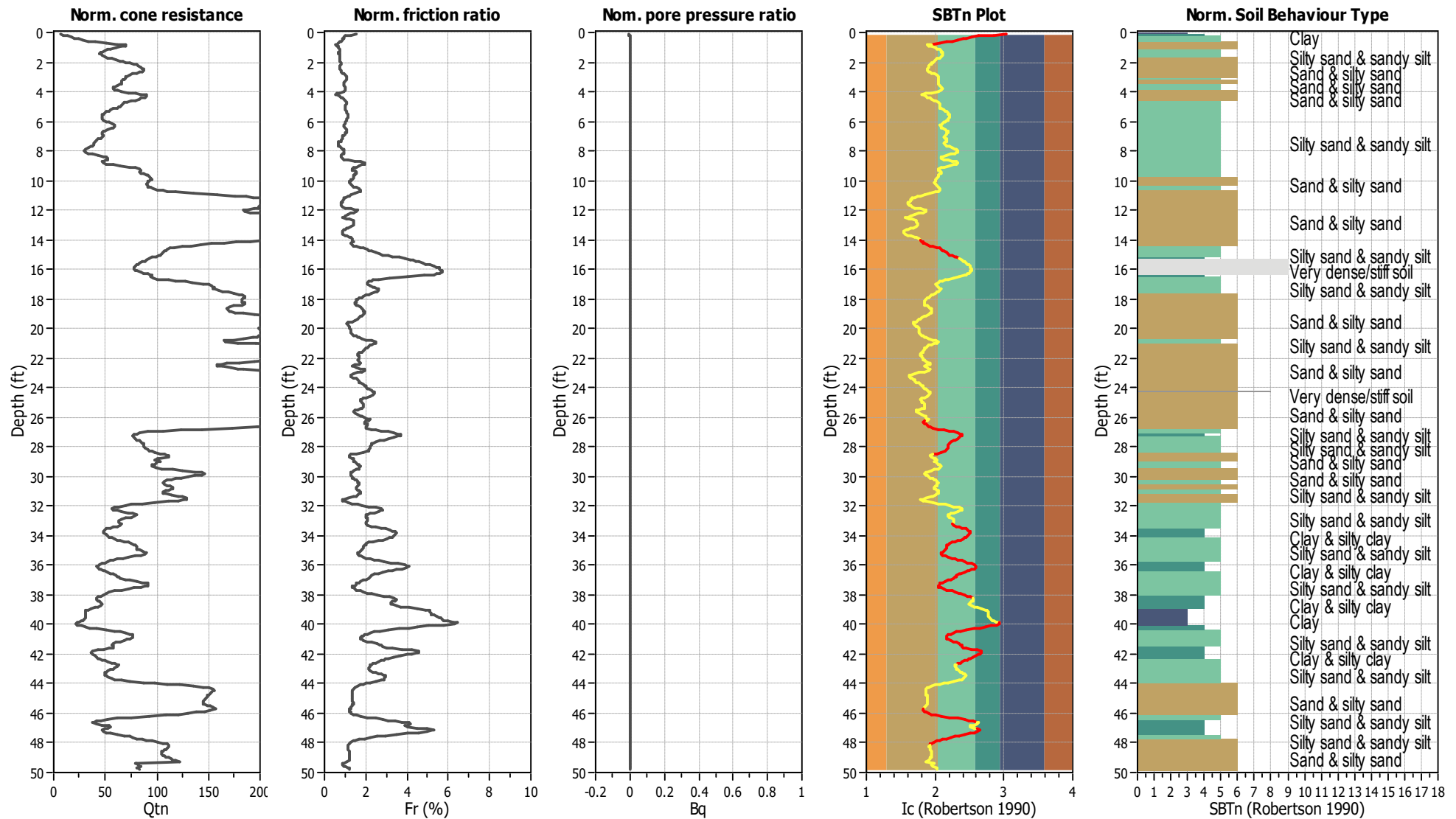
Input parameters and analysis data

|                                       |                   |                                |              |                             |            |
|---------------------------------------|-------------------|--------------------------------|--------------|-----------------------------|------------|
| Analysis method:                      | NCEER (1998)      | Depth to water table (erthq.): | 100.00 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> : | 7.13              | Unit weight calculation:       | Based on SBT | Clay like behavior applied: | Sands only |
| Peak ground acceleration:             | 0.90              | Use fill:                      | No           | Limit depth applied:        | Yes        |
| Depth to water table (insitu):        | 100.00 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)



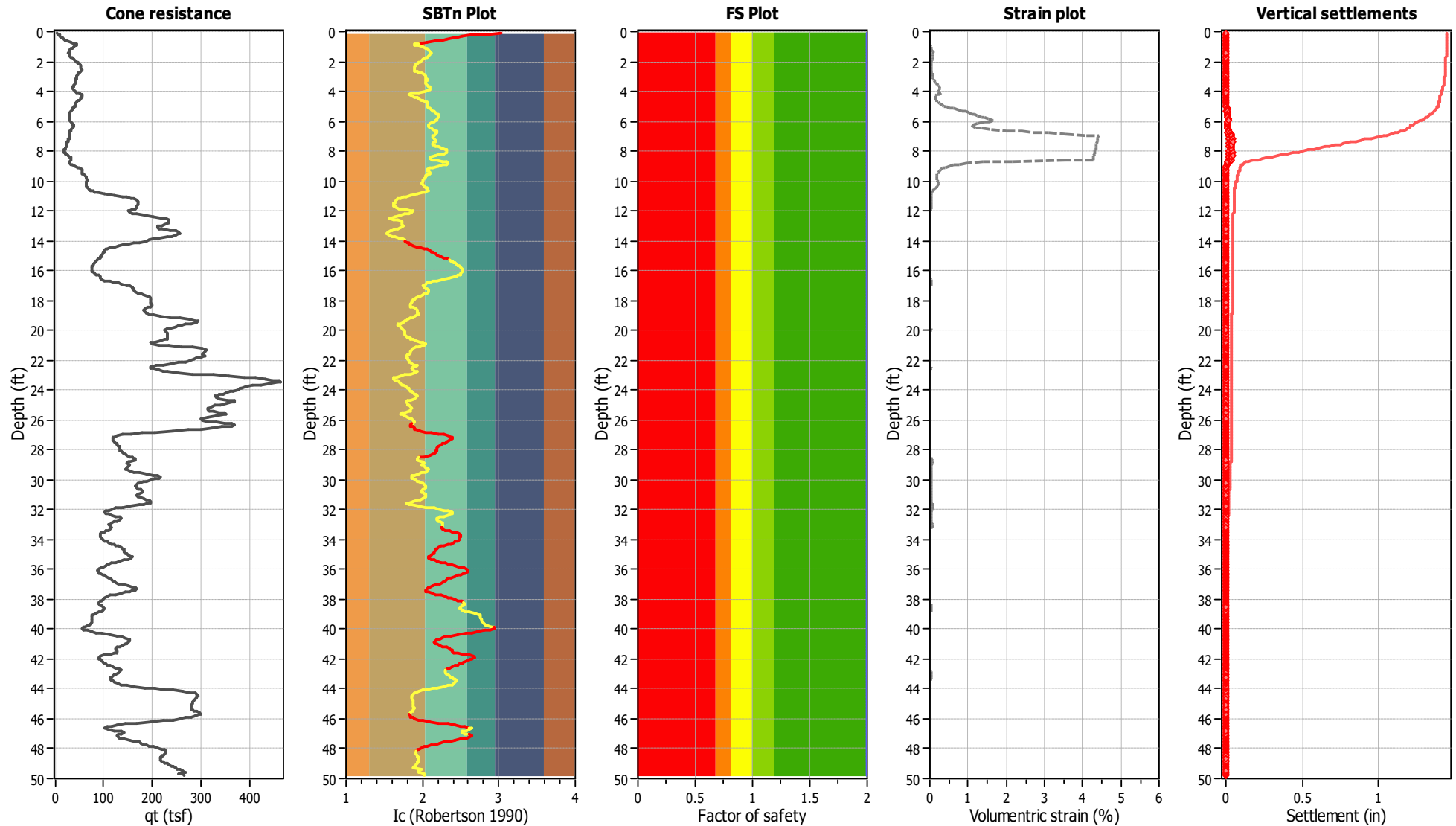
## Input parameters and analysis data

|                                       |                   |                                |              |                             |            |
|---------------------------------------|-------------------|--------------------------------|--------------|-----------------------------|------------|
| Analysis method:                      | NCEER (1998)      | Depth to water table (erthq.): | 100.00 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> : | 7.13              | Unit weight calculation:       | Based on SBT | Clay like behavior applied: | Sands only |
| Peak ground acceleration:             | 0.90              | Use fill:                      | No           | Limit depth applied:        | Yes        |
| Depth to water table (insitu):        | 100.00 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 |

## Estimation of post-earthquake settlements



### Abbreviations

$q_t$ : 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) |
| 0.07                                          | 3.03 | 6.14            | 9.36 | 57.47              | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 0.14                                          | 2.85 | 8.84            | 6.49 | 57.33              | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 0.22                                          | 2.64 | 13.53           | 4.11 | 55.56              | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 0.29                                          | 2.52 | 17.52           | 3.14 | 54.98              | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.33                                          | 2.45 | 20.77           | 2.68 | 55.63              | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.41                                          | 2.40 | 23.56           | 2.39 | 56.27              | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.48                                          | 2.32 | 28.06           | 2.02 | 56.70              | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.56                                          | 2.25 | 33.05           | 1.75 | 57.75              | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.59                                          | 2.16 | 40.20           | 1.53 | 61.62              | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.67                                          | 2.06 | 50.34           | 1.36 | 68.69              | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.74                                          | 1.95 | 62.39           | 1.27 | 79.39              | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.82                                          | 1.89 | 70.08           | 1.23 | 86.42              | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 0.86                                          | 1.90 | 70.38           | 1.24 | 87.02              | 17                        | 437                    | 0.51 | 0.014        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 0.93                                          | 1.95 | 65.32           | 1.27 | 82.81              | 17                        | 430                    | 0.51 | 0.016        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 1.01                                          | 2.00 | 59.87           | 1.31 | 78.17              | 16                        | 421                    | 0.51 | 0.020        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 1.05                                          | 2.04 | 55.61           | 1.34 | 74.50              | 16                        | 410                    | 0.51 | 0.023        | 0.03                     | 11.89          | 0.03               | 0.000        |
| 1.12                                          | 2.06 | 52.56           | 1.36 | 71.71              | 15                        | 399                    | 0.51 | 0.029        | 0.04                     | 11.89          | 0.04               | 0.000        |
| 1.19                                          | 2.08 | 49.40           | 1.39 | 68.60              | 15                        | 385                    | 0.51 | 0.037        | 0.05                     | 11.89          | 0.05               | 0.000        |
| 1.26                                          | 2.09 | 46.65           | 1.41 | 65.84              | 14                        | 371                    | 0.51 | 0.048        | 0.07                     | 11.89          | 0.06               | 0.001        |
| 1.33                                          | 2.10 | 45.56           | 1.42 | 64.61              | 14                        | 364                    | 0.51 | 0.058        | 0.09                     | 11.89          | 0.08               | 0.001        |
| 1.41                                          | 2.11 | 44.91           | 1.43 | 64.27              | 14                        | 363                    | 0.51 | 0.068        | 0.10                     | 11.89          | 0.09               | 0.001        |
| 1.45                                          | 2.10 | 45.80           | 1.42 | 65.24              | 14                        | 368                    | 0.51 | 0.068        | 0.10                     | 11.89          | 0.09               | 0.000        |
| 1.52                                          | 2.10 | 46.82           | 1.42 | 66.53              | 14                        | 375                    | 0.51 | 0.070        | 0.10                     | 11.89          | 0.09               | 0.001        |
| 1.59                                          | 2.08 | 49.76           | 1.39 | 69.27              | 15                        | 389                    | 0.51 | 0.068        | 0.10                     | 11.89          | 0.08               | 0.001        |
| 1.67                                          | 2.06 | 52.60           | 1.37 | 72.00              | 15                        | 401                    | 0.51 | 0.066        | 0.09                     | 11.89          | 0.08               | 0.001        |
| 1.71                                          | 2.04 | 56.30           | 1.34 | 75.49              | 16                        | 416                    | 0.51 | 0.061        | 0.08                     | 11.89          | 0.07               | 0.000        |
| 1.79                                          | 2.01 | 60.25           | 1.32 | 79.39              | 17                        | 431                    | 0.51 | 0.058        | 0.07                     | 11.89          | 0.06               | 0.001        |
| 1.86                                          | 1.99 | 64.14           | 1.30 | 83.39              | 17                        | 447                    | 0.51 | 0.056        | 0.07                     | 11.89          | 0.06               | 0.001        |
| 1.90                                          | 1.98 | 67.43           | 1.29 | 87.07              | 18                        | 463                    | 0.51 | 0.051        | 0.06                     | 11.89          | 0.05               | 0.000        |
| 1.98                                          | 1.97 | 70.43           | 1.28 | 90.45              | 19                        | 478                    | 0.51 | 0.050        | 0.05                     | 11.89          | 0.05               | 0.000        |
| 2.06                                          | 1.95 | 74.12           | 1.27 | 94.36              | 19                        | 493                    | 0.51 | 0.048        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 2.13                                          | 1.94 | 77.32           | 1.26 | 97.53              | 20                        | 504                    | 0.51 | 0.049        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 2.17                                          | 1.92 | 80.22           | 1.25 | 100.24             | 20                        | 511                    | 0.51 | 0.048        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 2.24                                          | 1.91 | 82.36           | 1.24 | 102.25             | 21                        | 516                    | 0.51 | 0.050        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 2.32                                          | 1.90 | 84.41           | 1.23 | 104.21             | 21                        | 522                    | 0.51 | 0.051        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 2.40                                          | 1.89 | 85.80           | 1.23 | 105.64             | 21                        | 527                    | 0.51 | 0.053        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 2.43                                          | 1.89 | 86.89           | 1.23 | 106.85             | 21                        | 533                    | 0.51 | 0.053        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 2.51                                          | 1.89 | 87.13           | 1.23 | 107.27             | 21                        | 535                    | 0.51 | 0.056        | 0.05                     | 11.89          | 0.04               | 0.000        |
| 2.58                                          | 1.91 | 85.67           | 1.24 | 106.27             | 21                        | 536                    | 0.51 | 0.059        | 0.05                     | 11.89          | 0.05               | 0.000        |
| 2.66                                          | 1.93 | 83.27           | 1.25 | 104.40             | 21                        | 534                    | 0.51 | 0.063        | 0.06                     | 11.89          | 0.05               | 0.000        |
| 2.69                                          | 1.95 | 80.02           | 1.27 | 101.87             | 21                        | 533                    | 0.51 | 0.066        | 0.06                     | 11.89          | 0.05               | 0.000        |
| 2.76                                          | 1.99 | 76.67           | 1.30 | 99.33              | 21                        | 531                    | 0.51 | 0.070        | 0.07                     | 11.89          | 0.06               | 0.000        |
| 2.84                                          | 2.02 | 73.31           | 1.32 | 96.90              | 20                        | 528                    | 0.51 | 0.076        | 0.07                     | 11.89          | 0.06               | 0.001        |
| 2.91                                          | 2.04 | 71.04           | 1.34 | 95.32              | 20                        | 525                    | 0.51 | 0.082        | 0.08                     | 11.89          | 0.07               | 0.001        |
| 2.99                                          | 2.04 | 70.38           | 1.35 | 94.83              | 20                        | 524                    | 0.51 | 0.088        | 0.09                     | 11.89          | 0.08               | 0.001        |
| 3.03                                          | 2.04 | 70.13           | 1.35 | 94.53              | 20                        | 522                    | 0.51 | 0.092        | 0.09                     | 11.89          | 0.08               | 0.000        |
| 3.10                                          | 2.05 | 69.03           | 1.35 | 93.48              | 20                        | 518                    | 0.51 | 0.100        | 0.10                     | 11.89          | 0.09               | 0.001        |
| 3.17                                          | 2.05 | 67.58           | 1.36 | 91.91              | 20                        | 511                    | 0.51 | 0.113        | 0.12                     | 11.89          | 0.10               | 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) |
| 3.26                                                      | 2.06 | 66.37           | 1.36 | 90.44              | 19                        | 503                    | 0.51 | 0.127        | 0.13                     | 11.89          | 0.11               | 0.001        |
| 3.28                                                      | 2.05 | 66.02           | 1.35 | 89.40              | 19                        | 495                    | 0.51 | 0.139        | 0.15                     | 11.89          | 0.13               | 0.000        |
| 3.37                                                      | 2.04 | 65.76           | 1.35 | 88.53              | 19                        | 489                    | 0.51 | 0.156        | 0.17                     | 11.89          | 0.14               | 0.001        |
| 3.44                                                      | 2.04 | 65.30           | 1.34 | 87.61              | 19                        | 483                    | 0.51 | 0.175        | 0.19                     | 11.89          | 0.16               | 0.002        |
| 3.48                                                      | 2.05 | 63.85           | 1.35 | 86.28              | 18                        | 478                    | 0.51 | 0.190        | 0.21                     | 11.89          | 0.18               | 0.001        |
| 3.56                                                      | 2.06 | 61.84           | 1.37 | 84.76              | 18                        | 473                    | 0.51 | 0.211        | 0.24                     | 11.89          | 0.20               | 0.002        |
| 3.64                                                      | 2.08 | 59.69           | 1.40 | 83.28              | 18                        | 468                    | 0.51 | 0.235        | 0.27                     | 11.89          | 0.23               | 0.002        |
| 3.68                                                      | 2.10 | 58.28           | 1.41 | 82.30              | 18                        | 464                    | 0.51 | 0.253        | 0.29                     | 11.89          | 0.25               | 0.001        |
| 3.75                                                      | 2.10 | 58.07           | 1.42 | 82.39              | 18                        | 465                    | 0.51 | 0.263        | 0.30                     | 11.89          | 0.25               | 0.002        |
| 3.83                                                      | 2.10 | 59.26           | 1.41 | 83.72              | 18                        | 472                    | 0.51 | 0.258        | 0.29                     | 11.89          | 0.24               | 0.002        |
| 3.90                                                      | 2.08 | 61.66           | 1.40 | 86.08              | 19                        | 483                    | 0.51 | 0.240        | 0.26                     | 11.89          | 0.22               | 0.002        |
| 3.94                                                      | 2.04 | 66.36           | 1.34 | 89.00              | 19                        | 490                    | 0.51 | 0.230        | 0.25                     | 11.89          | 0.21               | 0.001        |
| 4.02                                                      | 1.95 | 72.60           | 1.27 | 92.26              | 19                        | 481                    | 0.51 | 0.266        | 0.29                     | 11.89          | 0.24               | 0.002        |
| 4.10                                                      | 1.87 | 79.29           | 1.21 | 96.16              | 19                        | 472                    | 0.51 | 0.310        | 0.33                     | 11.89          | 0.28               | 0.002        |
| 4.14                                                      | 1.81 | 85.19           | 1.17 | 99.57              | 19                        | 475                    | 0.51 | 0.306        | 0.32                     | 11.89          | 0.27               | 0.001        |
| 4.21                                                      | 1.82 | 89.63           | 1.17 | 105.14             | 20                        | 503                    | 0.51 | 0.243        | 0.24                     | 11.89          | 0.20               | 0.002        |
| 4.29                                                      | 1.86 | 89.57           | 1.21 | 108.01             | 21                        | 527                    | 0.51 | 0.204        | 0.19                     | 11.89          | 0.16               | 0.001        |
| 4.35                                                      | 1.89 | 88.66           | 1.23 | 109.15             | 22                        | 545                    | 0.51 | 0.181        | 0.16                     | 11.89          | 0.14               | 0.001        |
| 4.42                                                      | 1.93 | 85.16           | 1.26 | 107.15             | 22                        | 551                    | 0.51 | 0.179        | 0.16                     | 11.89          | 0.14               | 0.001        |
| 4.49                                                      | 1.95 | 83.60           | 1.27 | 106.24             | 22                        | 554                    | 0.51 | 0.182        | 0.16                     | 11.89          | 0.14               | 0.001        |
| 4.53                                                      | 1.98 | 79.35           | 1.29 | 102.73             | 21                        | 548                    | 0.51 | 0.195        | 0.18                     | 11.89          | 0.15               | 0.001        |
| 4.61                                                      | 2.02 | 75.14           | 1.32 | 99.20              | 21                        | 540                    | 0.51 | 0.218        | 0.21                     | 11.89          | 0.17               | 0.001        |
| 4.68                                                      | 2.04 | 71.68           | 1.34 | 96.32              | 20                        | 531                    | 0.51 | 0.246        | 0.24                     | 11.89          | 0.20               | 0.002        |
| 4.72                                                      | 2.06 | 68.98           | 1.36 | 93.86              | 20                        | 522                    | 0.51 | 0.275        | 0.28                     | 11.89          | 0.23               | 0.001        |
| 4.80                                                      | 2.06 | 66.98           | 1.37 | 91.75              | 20                        | 511                    | 0.51 | 0.315        | 0.32                     | 11.89          | 0.27               | 0.002        |
| 4.88                                                      | 2.07 | 65.32           | 1.37 | 89.64              | 19                        | 500                    | 0.51 | 0.370        | 0.39                     | 11.89          | 0.32               | 0.003        |
| 4.95                                                      | 2.06 | 64.26           | 1.37 | 88.09              | 19                        | 491                    | 0.51 | 0.423        | 0.46                     | 11.89          | 0.38               | 0.003        |
| 4.99                                                      | 2.06 | 63.36           | 1.37 | 86.78              | 19                        | 484                    | 0.51 | 0.471        | 0.52                     | 11.89          | 0.43               | 0.002        |
| 5.07                                                      | 2.08 | 61.20           | 1.39 | 84.81              | 18                        | 475                    | 0.51 | 0.544        | 0.61                     | 11.89          | 0.50               | 0.005        |
| 5.14                                                      | 2.10 | 58.29           | 1.41 | 82.47              | 18                        | 465                    | 0.51 | 0.642        | 0.74                     | 11.89          | 0.61               | 0.005        |
| 5.22                                                      | 2.12 | 55.44           | 1.45 | 80.42              | 18                        | 455                    | 0.51 | 0.755        | 0.88                     | 11.89          | 0.73               | 0.006        |
| 5.26                                                      | 2.14 | 53.03           | 1.49 | 78.88              | 17                        | 447                    | 0.51 | 0.859        | 1.02                     | 11.89          | 0.84               | 0.004        |
| 5.34                                                      | 2.16 | 51.23           | 1.52 | 78.01              | 17                        | 442                    | 0.51 | 0.966        | 1.15                     | 11.89          | 0.94               | 0.009        |
| 5.41                                                      | 2.18 | 49.57           | 1.56 | 77.42              | 17                        | 438                    | 0.51 | 1.069        | 1.27                     | 11.89          | 1.04               | 0.009        |
| 5.48                                                      | 2.19 | 48.46           | 1.59 | 77.22              | 17                        | 435                    | 0.51 | 1.150        | 1.36                     | 11.89          | 1.11               | 0.009        |
| 5.52                                                      | 2.20 | 47.56           | 1.62 | 76.97              | 17                        | 433                    | 0.51 | 1.220        | 1.44                     | 11.89          | 1.18               | 0.006        |
| 5.60                                                      | 2.21 | 46.95           | 1.64 | 76.82              | 17                        | 431                    | 0.51 | 1.308        | 1.55                     | 11.89          | 1.26               | 0.012        |
| 5.68                                                      | 2.21 | 46.65           | 1.64 | 76.67              | 17                        | 430                    | 0.51 | 1.392        | 1.65                     | 11.89          | 1.34               | 0.013        |
| 5.72                                                      | 2.21 | 46.69           | 1.63 | 76.15              | 17                        | 428                    | 0.51 | 1.473        | 1.76                     | 11.89          | 1.43               | 0.007        |
| 5.79                                                      | 2.20 | 47.08           | 1.61 | 75.65              | 17                        | 426                    | 0.51 | 1.574        | 1.91                     | 11.89          | 1.55               | 0.014        |
| 5.87                                                      | 2.18 | 47.77           | 1.58 | 75.27              | 17                        | 425                    | 0.51 | 1.665        | 2.04                     | 11.89          | 1.66               | 0.015        |
| 5.94                                                      | 2.17 | 48.81           | 1.55 | 75.54              | 17                        | 428                    | 0.51 | 1.669        | 2.05                     | 11.89          | 1.66               | 0.014        |
| 5.98                                                      | 2.15 | 50.61           | 1.51 | 76.32              | 17                        | 433                    | 0.51 | 1.577        | 1.93                     | 11.89          | 1.57               | 0.008        |
| 6.06                                                      | 2.13 | 53.15           | 1.46 | 77.83              | 17                        | 441                    | 0.51 | 1.454        | 1.76                     | 11.89          | 1.42               | 0.013        |
| 6.14                                                      | 2.10 | 56.15           | 1.42 | 79.93              | 17                        | 451                    | 0.51 | 1.307        | 1.55                     | 11.89          | 1.25               | 0.011        |
| 6.21                                                      | 2.09 | 58.40           | 1.40 | 81.69              | 18                        | 459                    | 0.51 | 1.215        | 1.42                     | 11.89          | 1.14               | 0.010        |
| 6.25                                                      | 2.08 | 59.70           | 1.39 | 82.73              | 18                        | 463                    | 0.51 | 1.169        | 1.35                     | 11.89          | 1.09               | 0.005        |
| 6.32                                                      | 2.08 | 59.49           | 1.39 | 82.67              | 18                        | 464                    | 0.51 | 1.208        | 1.39                     | 11.89          | 1.12               | 0.010        |

| :: Post-earthquake settlement of dry sands :: (continued) |      |                 |      |                    |                              |                           |      |                 |                             |                |                       |                 |
|-----------------------------------------------------------|------|-----------------|------|--------------------|------------------------------|---------------------------|------|-----------------|-----------------------------|----------------|-----------------------|-----------------|
| Depth<br>(ft)                                             | Ic   | Q <sub>tn</sub> | Kc   | Q <sub>tn,cs</sub> | N <sub>1,60</sub><br>(blows) | G <sub>max</sub><br>(tsf) | CSR  | Shear, γ<br>(%) | e <sub>vol(15)</sub><br>(%) | N <sub>c</sub> | e <sub>v</sub><br>(%) | Settle.<br>(in) |
| 6.40                                                      | 2.09 | 58.33           | 1.41 | 82.01              | 18                           | 462                       | 0.51 | 1.291           | 1.50                        | 11.89          | 1.20                  | 0.011           |
| 6.44                                                      | 2.11 | 55.88           | 1.44 | 80.56              | 18                           | 456                       | 0.51 | 1.426           | 1.67                        | 11.89          | 1.34                  | 0.006           |
| 6.51                                                      | 2.14 | 52.87           | 1.49 | 78.78              | 17                           | 447                       | 0.51 | 1.684           | 2.00                        | 11.89          | 1.60                  | 0.014           |
| 6.59                                                      | 2.17 | 50.02           | 1.54 | 76.93              | 17                           | 436                       | 0.51 | 2.069           | 2.50                        | 11.89          | 2.00                  | 0.019           |
| 6.67                                                      | 2.18 | 48.16           | 1.57 | 75.52              | 17                           | 427                       | 0.51 | 2.470           | 3.02                        | 11.89          | 2.42                  | 0.022           |
| 6.71                                                      | 2.18 | 47.45           | 1.57 | 74.62              | 17                           | 422                       | 0.51 | 2.747           | 3.41                        | 11.89          | 2.72                  | 0.013           |
| 6.78                                                      | 2.18 | 47.24           | 1.56 | 73.71              | 16                           | 417                       | 0.51 | 3.081           | 3.89                        | 11.89          | 3.10                  | 0.026           |
| 6.86                                                      | 2.17 | 47.38           | 1.54 | 72.82              | 16                           | 412                       | 0.51 | 3.467           | 4.47                        | 11.89          | 3.56                  | 0.035           |
| 6.90                                                      | 2.15 | 47.73           | 1.50 | 71.75              | 16                           | 407                       | 0.51 | 3.899           | 5.16                        | 11.89          | 4.10                  | 0.017           |
| 6.97                                                      | 2.14 | 47.83           | 1.48 | 70.82              | 16                           | 401                       | 0.51 | 4.462           | 6.03                        | 11.89          | 4.41                  | 0.040           |
| 7.04                                                      | 2.14 | 46.98           | 1.48 | 69.41              | 15                           | 393                       | 0.51 | 5.376           | 7.45                        | 11.89          | 4.40                  | 0.038           |
| 7.13                                                      | 2.15 | 45.52           | 1.49 | 68.02              | 15                           | 386                       | 0.51 | 6.532           | 9.23                        | 11.89          | 4.40                  | 0.043           |
| 7.16                                                      | 2.16 | 43.57           | 1.52 | 66.43              | 15                           | 376                       | 0.51 | 8.062           | 11.63                       | 11.89          | 4.39                  | 0.021           |
| 7.24                                                      | 2.17 | 42.05           | 1.55 | 65.07              | 14                           | 368                       | 0.51 | 9.967           | 14.66                       | 11.89          | 4.39                  | 0.039           |
| 7.31                                                      | 2.17 | 40.64           | 1.54 | 62.45              | 14                           | 354                       | 0.51 | 14.448          | 22.38                       | 11.89          | 4.38                  | 0.036           |
| 7.39                                                      | 2.15 | 39.94           | 1.51 | 60.20              | 13                           | 341                       | 0.51 | 20.551          | 33.51                       | 11.89          | 4.37                  | 0.044           |
| 7.43                                                      | 2.14 | 39.54           | 1.48 | 58.47              | 13                           | 331                       | 0.51 | 27.183          | 46.24                       | 11.89          | 4.37                  | 0.019           |
| 7.51                                                      | 2.14 | 39.23           | 1.49 | 58.33              | 13                           | 331                       | 0.51 | 28.882          | 49.16                       | 11.89          | 4.36                  | 0.041           |
| 7.58                                                      | 2.15 | 38.87           | 1.50 | 58.50              | 13                           | 332                       | 0.51 | 29.194          | 49.29                       | 11.89          | 4.36                  | 0.037           |
| 7.62                                                      | 2.17 | 38.12           | 1.54 | 58.69              | 13                           | 332                       | 0.51 | 29.266          | 48.81                       | 11.89          | 4.35                  | 0.021           |
| 7.69                                                      | 2.21 | 35.86           | 1.64 | 58.65              | 13                           | 329                       | 0.51 | 33.164          | 54.25                       | 11.89          | 4.35                  | 0.040           |
| 7.76                                                      | 2.25 | 33.51           | 1.76 | 58.99              | 14                           | 325                       | 0.51 | 38.465          | 61.12                       | 11.89          | 4.34                  | 0.033           |
| 7.83                                                      | 2.30 | 31.15           | 1.92 | 59.73              | 14                           | 320                       | 0.51 | 46.117          | 70.50                       | 11.89          | 4.34                  | 0.041           |
| 7.90                                                      | 2.31 | 30.50           | 1.98 | 60.32              | 14                           | 320                       | 0.51 | 48.464          | 72.61                       | 11.89          | 4.33                  | 0.037           |
| 7.95                                                      | 2.32 | 30.04           | 2.02 | 60.77              | 14                           | 320                       | 0.51 | 49.970          | 73.77                       | 11.89          | 4.33                  | 0.022           |
| 8.03                                                      | 2.32 | 30.38           | 2.01 | 61.17              | 15                           | 322                       | 0.51 | 48.157          | 70.62                       | 11.89          | 4.32                  | 0.043           |
| 8.10                                                      | 2.31 | 31.23           | 1.97 | 61.53              | 15                           | 327                       | 0.51 | 43.855          | 64.23                       | 11.89          | 4.31                  | 0.037           |
| 8.14                                                      | 2.28 | 33.17           | 1.87 | 62.01              | 14                           | 336                       | 0.51 | 35.043          | 51.56                       | 11.89          | 4.31                  | 0.021           |
| 8.21                                                      | 2.23 | 37.37           | 1.68 | 62.81              | 14                           | 351                       | 0.51 | 24.473          | 36.56                       | 11.89          | 4.30                  | 0.037           |
| 8.30                                                      | 2.16 | 42.36           | 1.53 | 64.82              | 14                           | 367                       | 0.51 | 16.961          | 25.16                       | 11.89          | 4.30                  | 0.043           |
| 8.34                                                      | 2.11 | 47.86           | 1.43 | 68.36              | 15                           | 386                       | 0.51 | 11.390          | 16.30                       | 11.89          | 4.29                  | 0.022           |
| 8.42                                                      | 2.09 | 50.55           | 1.40 | 70.99              | 15                           | 399                       | 0.51 | 8.974           | 12.37                       | 11.89          | 4.29                  | 0.040           |
| 8.47                                                      | 2.09 | 52.35           | 1.41 | 73.76              | 16                           | 415                       | 0.51 | 6.772           | 8.90                        | 11.89          | 4.28                  | 0.029           |
| 8.54                                                      | 2.13 | 52.24           | 1.46 | 76.23              | 17                           | 432                       | 0.51 | 5.201           | 6.47                        | 11.89          | 4.28                  | 0.035           |
| 8.61                                                      | 2.18 | 50.48           | 1.58 | 79.56              | 18                           | 449                       | 0.50 | 3.998           | 4.59                        | 11.89          | 3.53                  | 0.030           |
| 8.66                                                      | 2.26 | 48.48           | 1.78 | 86.22              | 20                           | 474                       | 0.50 | 2.812           | 2.83                        | 11.89          | 2.17                  | 0.014           |
| 8.74                                                      | 2.32 | 47.27           | 1.99 | 94.28              | 22                           | 499                       | 0.50 | 2.058           | 1.80                        | 11.89          | 1.38                  | 0.012           |
| 8.81                                                      | 2.34 | 48.51           | 2.07 | 100.38             | 24                           | 523                       | 0.50 | 1.547           | 1.24                        | 11.89          | 0.95                  | 0.008           |
| 8.86                                                      | 2.32 | 51.61           | 1.99 | 102.79             | 24                           | 544                       | 0.50 | 1.247           | 0.98                        | 11.89          | 0.75                  | 0.005           |
| 8.93                                                      | 2.26 | 57.70           | 1.79 | 103.49             | 24                           | 567                       | 0.50 | 0.995           | 0.80                        | 11.89          | 0.61                  | 0.005           |
| 9.01                                                      | 2.20 | 64.80           | 1.63 | 105.38             | 24                           | 592                       | 0.50 | 0.799           | 0.65                        | 11.89          | 0.49                  | 0.004           |
| 9.06                                                      | 2.14 | 73.20           | 1.48 | 108.10             | 24                           | 619                       | 0.50 | 0.635           | 0.52                        | 11.89          | 0.39                  | 0.002           |
| 9.14                                                      | 2.09 | 78.83           | 1.41 | 110.88             | 24                           | 643                       | 0.50 | 0.536           | 0.43                        | 11.89          | 0.33                  | 0.003           |
| 9.19                                                      | 2.06 | 83.71           | 1.36 | 113.97             | 24                           | 662                       | 0.50 | 0.470           | 0.37                        | 11.89          | 0.28                  | 0.002           |
| 9.27                                                      | 2.05 | 84.89           | 1.36 | 115.30             | 24                           | 673                       | 0.50 | 0.442           | 0.35                        | 11.89          | 0.26                  | 0.002           |
| 9.32                                                      | 2.07 | 84.44           | 1.38 | 116.56             | 25                           | 685                       | 0.50 | 0.413           | 0.32                        | 11.89          | 0.24                  | 0.002           |
| 9.40                                                      | 2.09 | 83.84           | 1.40 | 117.61             | 25                           | 696                       | 0.50 | 0.391           | 0.29                        | 11.89          | 0.22                  | 0.002           |
| 9.47                                                      | 2.09 | 84.73           | 1.41 | 119.07             | 26                           | 709                       | 0.50 | 0.367           | 0.27                        | 11.89          | 0.21                  | 0.002           |

| :: Post-earthquake settlement of dry sands :: (continued) |      |                 |      |                    |                              |                           |      |                 |                             |                |                       |                 |
|-----------------------------------------------------------|------|-----------------|------|--------------------|------------------------------|---------------------------|------|-----------------|-----------------------------|----------------|-----------------------|-----------------|
| Depth<br>(ft)                                             | Ic   | Q <sub>tn</sub> | Kc   | Q <sub>tn,cs</sub> | N <sub>1,60</sub><br>(blows) | G <sub>max</sub><br>(tsf) | CSR  | Shear, γ<br>(%) | e <sub>vol(15)</sub><br>(%) | N <sub>c</sub> | e <sub>v</sub><br>(%) | Settle.<br>(in) |
| 9.53                                                      | 2.07 | 87.35           | 1.38 | 120.34             | 26                           | 718                       | 0.50 | 0.350           | 0.26                        | 11.89          | 0.20                  | 0.001           |
| 9.59                                                      | 2.05 | 89.46           | 1.36 | 121.62             | 26                           | 728                       | 0.50 | 0.335           | 0.25                        | 11.89          | 0.19                  | 0.001           |
| 9.65                                                      | 2.05 | 90.81           | 1.35 | 122.68             | 26                           | 737                       | 0.50 | 0.322           | 0.23                        | 11.89          | 0.18                  | 0.001           |
| 9.72                                                      | 2.04 | 92.36           | 1.34 | 123.91             | 26                           | 746                       | 0.50 | 0.309           | 0.22                        | 11.89          | 0.17                  | 0.001           |
| 9.79                                                      | 2.02 | 94.07           | 1.33 | 124.74             | 26                           | 752                       | 0.50 | 0.305           | 0.22                        | 11.89          | 0.17                  | 0.001           |
| 9.87                                                      | 2.01 | 94.81           | 1.31 | 124.45             | 26                           | 750                       | 0.50 | 0.314           | 0.23                        | 11.89          | 0.17                  | 0.002           |
| 9.91                                                      | 2.00 | 93.78           | 1.31 | 122.51             | 25                           | 739                       | 0.50 | 0.341           | 0.25                        | 11.89          | 0.19                  | 0.001           |
| 9.99                                                      | 2.00 | 92.36           | 1.31 | 120.61             | 25                           | 731                       | 0.50 | 0.365           | 0.28                        | 11.89          | 0.21                  | 0.002           |
| 10.06                                                     | 2.00 | 91.13           | 1.30 | 118.90             | 25                           | 724                       | 0.50 | 0.390           | 0.30                        | 11.89          | 0.23                  | 0.002           |
| 10.14                                                     | 2.00 | 90.68           | 1.30 | 118.26             | 25                           | 724                       | 0.50 | 0.399           | 0.31                        | 11.89          | 0.23                  | 0.002           |
| 10.18                                                     | 2.00 | 90.55           | 1.31 | 118.72             | 25                           | 730                       | 0.50 | 0.385           | 0.30                        | 11.89          | 0.22                  | 0.001           |
| 10.25                                                     | 2.02 | 90.50           | 1.32 | 119.47             | 25                           | 742                       | 0.50 | 0.366           | 0.28                        | 11.89          | 0.21                  | 0.002           |
| 10.33                                                     | 2.03 | 90.88           | 1.33 | 121.23             | 26                           | 760                       | 0.50 | 0.333           | 0.25                        | 11.89          | 0.18                  | 0.002           |
| 10.40                                                     | 2.04 | 91.60           | 1.34 | 122.93             | 26                           | 776                       | 0.50 | 0.309           | 0.23                        | 11.89          | 0.17                  | 0.001           |
| 10.44                                                     | 2.05 | 93.35           | 1.36 | 126.92             | 27                           | 807                       | 0.50 | 0.264           | 0.18                        | 11.89          | 0.14                  | 0.001           |
| 10.52                                                     | 2.07 | 95.98           | 1.38 | 132.23             | 28                           | 847                       | 0.50 | 0.219           | 0.14                        | 11.89          | 0.11                  | 0.001           |
| 10.59                                                     | 2.07 | 100.79          | 1.38 | 139.13             | 30                           | 897                       | 0.50 | 0.179           | 0.11                        | 11.89          | 0.08                  | 0.001           |
| 10.67                                                     | 2.06 | 106.17          | 1.36 | 144.86             | 31                           | 936                       | 0.50 | 0.155           | 0.09                        | 11.89          | 0.07                  | 0.001           |
| 10.71                                                     | 2.05 | 109.95          | 1.35 | 148.54             | 31                           | 960                       | 0.50 | 0.143           | 0.08                        | 11.89          | 0.06                  | 0.000           |
| 10.78                                                     | 2.01 | 118.50          | 1.31 | 155.51             | 32                           | 996                       | 0.50 | 0.127           | 0.07                        | 11.89          | 0.05                  | 0.000           |
| 10.85                                                     | 1.93 | 136.20          | 1.25 | 170.80             | 35                           | 1057                      | 0.50 | 0.106           | 0.06                        | 11.89          | 0.04                  | 0.000           |
| 10.91                                                     | 1.84 | 158.84          | 1.19 | 189.36             | 37                           | 1131                      | 0.50 | 0.088           | 0.04                        | 11.89          | 0.03                  | 0.000           |
| 10.99                                                     | 1.78 | 175.53          | 1.13 | 199.07             | 38                           | 1184                      | 0.50 | 0.078           | 0.04                        | 11.89          | 0.03                  | 0.000           |
| 11.03                                                     | 1.74 | 186.11          | 1.08 | 200.09             | 38                           | 1206                      | 0.50 | 0.075           | 0.03                        | 11.89          | 0.03                  | 0.000           |
| 11.11                                                     | 1.71 | 193.95          | 1.00 | 194.12             | 36                           | 1212                      | 0.50 | 0.075           | 0.04                        | 11.89          | 0.03                  | 0.000           |
| 11.18                                                     | 1.67 | 201.20          | 1.00 | 201.20             | 37                           | 1215                      | 0.50 | 0.076           | 0.04                        | 11.89          | 0.03                  | 0.000           |
| 11.26                                                     | 1.65 | 205.04          | 1.00 | 205.04             | 38                           | 1222                      | 0.50 | 0.075           | 0.04                        | 11.89          | 0.03                  | 0.000           |
| 11.30                                                     | 1.65 | 206.41          | 1.00 | 206.41             | 38                           | 1231                      | 0.50 | 0.074           | 0.03                        | 11.89          | 0.03                  | 0.000           |
| 11.37                                                     | 1.65 | 206.36          | 1.00 | 206.36             | 38                           | 1224                      | 0.50 | 0.076           | 0.04                        | 11.89          | 0.03                  | 0.000           |
| 11.45                                                     | 1.63 | 205.44          | 1.00 | 205.44             | 37                           | 1204                      | 0.50 | 0.081           | 0.04                        | 11.89          | 0.03                  | 0.000           |
| 11.48                                                     | 1.61 | 205.67          | 1.00 | 205.67             | 37                           | 1180                      | 0.50 | 0.086           | 0.04                        | 11.89          | 0.03                  | 0.000           |
| 11.56                                                     | 1.61 | 204.77          | 1.00 | 204.77             | 37                           | 1179                      | 0.50 | 0.088           | 0.04                        | 11.89          | 0.03                  | 0.000           |
| 11.64                                                     | 1.62 | 202.43          | 1.00 | 202.43             | 37                           | 1187                      | 0.50 | 0.087           | 0.04                        | 11.89          | 0.03                  | 0.000           |
| 11.71                                                     | 1.63 | 200.09          | 1.00 | 200.09             | 37                           | 1192                      | 0.50 | 0.087           | 0.04                        | 11.89          | 0.03                  | 0.000           |
| 11.75                                                     | 1.66 | 199.15          | 1.00 | 199.15             | 37                           | 1221                      | 0.50 | 0.082           | 0.04                        | 11.89          | 0.03                  | 0.000           |
| 11.83                                                     | 1.70 | 198.30          | 1.00 | 198.30             | 37                           | 1282                      | 0.50 | 0.073           | 0.03                        | 11.89          | 0.03                  | 0.000           |
| 11.90                                                     | 1.78 | 194.18          | 1.12 | 218.28             | 42                           | 1364                      | 0.50 | 0.063           | 0.03                        | 11.89          | 0.02                  | 0.000           |
| 11.98                                                     | 1.84 | 187.50          | 1.19 | 223.63             | 44                           | 1419                      | 0.50 | 0.058           | 0.02                        | 11.89          | 0.02                  | 0.000           |
| 12.02                                                     | 1.87 | 183.54          | 1.22 | 223.42             | 44                           | 1440                      | 0.50 | 0.056           | 0.02                        | 11.89          | 0.02                  | 0.000           |
| 12.10                                                     | 1.86 | 184.80          | 1.21 | 223.00             | 44                           | 1434                      | 0.50 | 0.058           | 0.02                        | 11.89          | 0.02                  | 0.000           |
| 12.17                                                     | 1.82 | 190.45          | 1.17 | 223.65             | 44                           | 1424                      | 0.50 | 0.059           | 0.02                        | 11.89          | 0.02                  | 0.000           |
| 12.21                                                     | 1.77 | 200.46          | 1.11 | 223.40             | 43                           | 1420                      | 0.50 | 0.060           | 0.02                        | 11.89          | 0.02                  | 0.000           |
| 12.29                                                     | 1.71 | 216.36          | 1.01 | 218.44             | 41                           | 1442                      | 0.50 | 0.058           | 0.02                        | 11.89          | 0.02                  | 0.000           |
| 12.36                                                     | 1.65 | 234.67          | 1.00 | 234.67             | 43                           | 1462                      | 0.50 | 0.057           | 0.02                        | 11.89          | 0.02                  | 0.000           |
| 12.43                                                     | 1.59 | 252.49          | 1.00 | 252.49             | 45                           | 1478                      | 0.50 | 0.056           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 12.47                                                     | 1.57 | 264.66          | 1.00 | 264.66             | 47                           | 1504                      | 0.50 | 0.054           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 12.54                                                     | 1.62 | 267.64          | 1.00 | 267.64             | 49                           | 1628                      | 0.50 | 0.046           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 12.62                                                     | 1.67 | 270.80          | 1.00 | 270.80             | 50                           | 1757                      | 0.50 | 0.040           | 0.01                        | 11.89          | 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) |
| 12.69                                                     | 1.72 | 269.79          | 1.04 | 279.34             | 53                        | 1859                   | 0.50 | 0.036        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 12.73                                                     | 1.73 | 271.05          | 1.04 | 281.79             | 53                        | 1876                   | 0.50 | 0.036        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 12.81                                                     | 1.73 | 267.90          | 1.04 | 279.88             | 53                        | 1867                   | 0.50 | 0.037        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 12.89                                                     | 1.74 | 259.23          | 1.06 | 274.45             | 52                        | 1828                   | 0.50 | 0.039        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 12.96                                                     | 1.74 | 250.70          | 1.07 | 269.04             | 51                        | 1790                   | 0.50 | 0.040        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 13.00                                                     | 1.75 | 240.77          | 1.08 | 261.08             | 50                        | 1736                   | 0.50 | 0.043        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 13.08                                                     | 1.72 | 239.70          | 1.03 | 247.39             | 47                        | 1679                   | 0.50 | 0.047        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 13.15                                                     | 1.68 | 240.31          | 1.00 | 240.31             | 45                        | 1621                   | 0.50 | 0.051        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 13.19                                                     | 1.65 | 249.90          | 1.00 | 249.90             | 46                        | 1614                   | 0.50 | 0.051        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 13.26                                                     | 1.61 | 262.88          | 1.00 | 262.88             | 48                        | 1633                   | 0.50 | 0.051        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 13.34                                                     | 1.58 | 274.33          | 1.00 | 274.33             | 49                        | 1640                   | 0.50 | 0.051        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 13.42                                                     | 1.55 | 281.35          | 1.00 | 281.35             | 50                        | 1621                   | 0.50 | 0.052        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 13.46                                                     | 1.53 | 282.94          | 1.00 | 282.94             | 50                        | 1605                   | 0.50 | 0.054        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 13.54                                                     | 1.54 | 280.91          | 1.00 | 280.91             | 50                        | 1609                   | 0.50 | 0.054        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 13.60                                                     | 1.56 | 273.99          | 1.00 | 273.99             | 49                        | 1624                   | 0.50 | 0.053        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 13.68                                                     | 1.60 | 263.41          | 1.00 | 263.41             | 48                        | 1649                   | 0.50 | 0.052        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 13.72                                                     | 1.65 | 252.43          | 1.00 | 252.43             | 46                        | 1667                   | 0.50 | 0.051        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 13.79                                                     | 1.70 | 234.24          | 1.00 | 234.24             | 44                        | 1652                   | 0.50 | 0.053        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 13.85                                                     | 1.73 | 223.45          | 1.05 | 234.72             | 44                        | 1638                   | 0.50 | 0.054        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 13.92                                                     | 1.76 | 211.23          | 1.11 | 233.64             | 45                        | 1614                   | 0.50 | 0.056        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 13.99                                                     | 1.78 | 204.55          | 1.12 | 229.74             | 44                        | 1590                   | 0.50 | 0.059        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 14.07                                                     | 1.81 | 190.87          | 1.16 | 221.33             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 14.11                                                     | 1.82 | 177.33          | 1.18 | 208.41             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 14.19                                                     | 1.83 | 164.58          | 1.18 | 195.00             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 14.27                                                     | 1.84 | 152.88          | 1.19 | 182.53             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 14.31                                                     | 1.88 | 142.27          | 1.22 | 174.06             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 14.39                                                     | 1.93 | 132.98          | 1.25 | 166.76             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 14.47                                                     | 1.97 | 124.30          | 1.29 | 159.92             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 14.50                                                     | 2.02 | 117.19          | 1.33 | 155.30             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 14.58                                                     | 2.06 | 113.05          | 1.36 | 154.30             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 14.66                                                     | 2.09 | 110.37          | 1.41 | 155.51             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 14.73                                                     | 2.11 | 109.22          | 1.44 | 157.45             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 14.77                                                     | 2.14 | 107.82          | 1.48 | 159.47             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 14.85                                                     | 2.16 | 106.26          | 1.53 | 162.37             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 14.93                                                     | 2.19 | 104.79          | 1.59 | 167.12             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 15.00                                                     | 2.22 | 103.64          | 1.66 | 171.86             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 15.04                                                     | 2.25 | 101.59          | 1.75 | 177.56             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 15.12                                                     | 2.28 | 99.03           | 1.85 | 183.02             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 15.16                                                     | 2.32 | 95.78           | 1.99 | 190.60             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 15.23                                                     | 2.35 | 92.57           | 2.14 | 197.91             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 15.31                                                     | 2.38 | 90.17           | 2.28 | 205.29             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 15.38                                                     | 2.40 | 89.32           | 2.36 | 210.42             | 52                        | 1552                   | 0.50 | 0.073        | 0.02                     | 11.89          | 0.02               | 0.000        |
| 15.42                                                     | 2.41 | 88.05           | 2.44 | 214.92             | 53                        | 1563                   | 0.50 | 0.072        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 15.50                                                     | 2.43 | 86.36           | 2.53 | 218.10             | 54                        | 1569                   | 0.50 | 0.072        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 15.57                                                     | 2.45 | 83.70           | 2.66 | 222.23             | 56                        | 1568                   | 0.50 | 0.073        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 15.65                                                     | 2.46 | 81.95           | 2.75 | 225.11             | 57                        | 1570                   | 0.50 | 0.073        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 15.69                                                     | 2.48 | 79.92           | 2.88 | 229.82             | 59                        | 1572                   | 0.50 | 0.073        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 15.76                                                     | 2.50 | 78.56           | 2.99 | 234.69             | 61                        | 1584                   | 0.50 | 0.073        | 0.02                     | 11.89          | 0.01               | 0.000        |

| :: Post-earthquake settlement of dry sands :: (continued) |      |                 |      |                    |                              |                           |      |                 |                             |                |                       |                 |
|-----------------------------------------------------------|------|-----------------|------|--------------------|------------------------------|---------------------------|------|-----------------|-----------------------------|----------------|-----------------------|-----------------|
| Depth<br>(ft)                                             | Ic   | Q <sub>tn</sub> | Kc   | Q <sub>tn,cs</sub> | N <sub>1,60</sub><br>(blows) | G <sub>max</sub><br>(tsf) | CSR  | Shear, γ<br>(%) | e <sub>vol(15)</sub><br>(%) | N <sub>c</sub> | e <sub>v</sub><br>(%) | Settle.<br>(in) |
| 15.84                                                     | 2.51 | 77.92           | 3.07 | 239.18             | 62                           | 1601                      | 0.50 | 0.071           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 15.88                                                     | 2.52 | 77.91           | 3.11 | 242.52             | 63                           | 1617                      | 0.50 | 0.070           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 15.96                                                     | 2.52 | 78.03           | 3.13 | 244.48             | 64                           | 1632                      | 0.50 | 0.069           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 16.03                                                     | 2.52 | 79.03           | 3.14 | 248.17             | 65                           | 1662                      | 0.50 | 0.067           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 16.11                                                     | 2.52 | 80.88           | 3.11 | 251.26             | 65                           | 1699                      | 0.50 | 0.064           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 16.15                                                     | 2.51 | 83.98           | 3.03 | 254.77             | 66                           | 1746                      | 0.50 | 0.061           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 16.22                                                     | 2.49 | 87.38           | 2.92 | 255.40             | 66                           | 1789                      | 0.50 | 0.058           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 16.29                                                     | 2.47 | 91.37           | 2.78 | 254.35             | 65                           | 1830                      | 0.50 | 0.056           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 16.37                                                     | 2.45 | 93.85           | 2.68 | 251.22             | 63                           | 1848                      | 0.50 | 0.055           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 16.41                                                     | 2.42 | 94.98           | 2.48 | 235.58             | 58                           | 1799                      | 0.50 | 0.058           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 16.49                                                     | 2.36 | 94.41           | 2.16 | 204.03             | 49                           | 1661                      | 0.50 | 0.070           | 0.02                        | 11.89          | 0.02                  | 0.000           |
| 16.57                                                     | 2.27 | 96.47           | 1.81 | 174.99             | 41                           | 1529                      | 0.50 | 0.087           | 0.04                        | 11.89          | 0.02                  | 0.000           |
| 16.64                                                     | 2.19 | 100.62          | 1.60 | 161.14             | 36                           | 1460                      | 0.50 | 0.099           | 0.05                        | 11.89          | 0.03                  | 0.000           |
| 16.68                                                     | 2.14 | 111.50          | 1.48 | 165.13             | 36                           | 1511                      | 0.50 | 0.091           | 0.04                        | 11.89          | 0.03                  | 0.000           |
| 16.75                                                     | 2.10 | 118.43          | 1.43 | 168.88             | 37                           | 1545                      | 0.50 | 0.086           | 0.04                        | 11.89          | 0.03                  | 0.000           |
| 16.82                                                     | 2.07 | 127.01          | 1.38 | 174.71             | 37                           | 1588                      | 0.50 | 0.081           | 0.04                        | 11.89          | 0.02                  | 0.000           |
| 16.88                                                     | 2.04 | 134.44          | 1.35 | 181.34             | 38                           | 1637                      | 0.50 | 0.076           | 0.03                        | 11.89          | 0.02                  | 0.000           |
| 16.96                                                     | 2.02 | 144.40          | 1.32 | 190.73             | 40                           | 1702                      | 0.50 | 0.070           | 0.03                        | 11.89          | 0.02                  | 0.000           |
| 17.00                                                     | 2.01 | 150.56          | 1.32 | 198.32             | 41                           | 1769                      | 0.50 | 0.064           | 0.03                        | 11.89          | 0.02                  | 0.000           |
| 17.08                                                     | 2.02 | 153.06          | 1.33 | 203.08             | 43                           | 1828                      | 0.50 | 0.060           | 0.02                        | 11.89          | 0.02                  | 0.000           |
| 17.15                                                     | 2.04 | 154.56          | 1.34 | 207.63             | 44                           | 1891                      | 0.50 | 0.056           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 17.22                                                     | 2.05 | 155.79          | 1.36 | 211.44             | 45                           | 1943                      | 0.50 | 0.054           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 17.27                                                     | 2.07 | 155.01          | 1.38 | 213.84             | 46                           | 1983                      | 0.50 | 0.052           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 17.34                                                     | 2.08 | 156.18          | 1.39 | 216.76             | 47                           | 2021                      | 0.50 | 0.050           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 17.42                                                     | 2.07 | 159.14          | 1.38 | 220.02             | 47                           | 2056                      | 0.50 | 0.049           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 17.46                                                     | 2.06 | 164.19          | 1.36 | 223.44             | 48                           | 2077                      | 0.50 | 0.048           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 17.54                                                     | 2.03 | 168.73          | 1.34 | 225.67             | 48                           | 2083                      | 0.50 | 0.048           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 17.60                                                     | 2.00 | 174.36          | 1.31 | 228.32             | 48                           | 2077                      | 0.49 | 0.049           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 17.68                                                     | 1.97 | 179.46          | 1.29 | 230.76             | 48                           | 2064                      | 0.49 | 0.050           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 17.72                                                     | 1.94 | 183.14          | 1.27 | 231.95             | 47                           | 2038                      | 0.49 | 0.051           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 17.80                                                     | 1.92 | 185.09          | 1.25 | 231.58             | 47                           | 2005                      | 0.49 | 0.053           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 17.87                                                     | 1.90 | 185.19          | 1.24 | 229.13             | 46                           | 1959                      | 0.49 | 0.056           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 17.95                                                     | 1.88 | 184.24          | 1.23 | 226.00             | 45                           | 1916                      | 0.50 | 0.059           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 17.99                                                     | 1.87 | 183.09          | 1.22 | 222.95             | 44                           | 1877                      | 0.50 | 0.062           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 18.06                                                     | 1.86 | 182.23          | 1.21 | 220.60             | 44                           | 1850                      | 0.50 | 0.064           | 0.03                        | 11.89          | 0.02                  | 0.000           |
| 18.15                                                     | 1.85 | 181.89          | 1.20 | 219.05             | 43                           | 1833                      | 0.50 | 0.066           | 0.03                        | 11.89          | 0.02                  | 0.000           |
| 18.19                                                     | 1.85 | 182.22          | 1.20 | 218.74             | 43                           | 1828                      | 0.50 | 0.067           | 0.03                        | 11.89          | 0.02                  | 0.000           |
| 18.26                                                     | 1.84 | 185.33          | 1.19 | 220.34             | 43                           | 1832                      | 0.50 | 0.067           | 0.03                        | 11.89          | 0.02                  | 0.000           |
| 18.33                                                     | 1.84 | 184.61          | 1.19 | 220.03             | 43                           | 1837                      | 0.50 | 0.067           | 0.03                        | 11.89          | 0.02                  | 0.000           |
| 18.41                                                     | 1.85 | 182.07          | 1.20 | 218.65             | 43                           | 1842                      | 0.50 | 0.067           | 0.03                        | 11.89          | 0.02                  | 0.000           |
| 18.44                                                     | 1.89 | 175.07          | 1.23 | 214.91             | 43                           | 1857                      | 0.50 | 0.066           | 0.03                        | 11.89          | 0.02                  | 0.000           |
| 18.52                                                     | 1.91 | 170.47          | 1.25 | 212.29             | 43                           | 1875                      | 0.50 | 0.065           | 0.03                        | 11.89          | 0.02                  | 0.000           |
| 18.59                                                     | 1.93 | 167.54          | 1.26 | 210.90             | 43                           | 1897                      | 0.50 | 0.064           | 0.03                        | 11.89          | 0.02                  | 0.000           |
| 18.67                                                     | 1.94 | 167.26          | 1.26 | 211.08             | 43                           | 1912                      | 0.50 | 0.063           | 0.03                        | 11.89          | 0.02                  | 0.000           |
| 18.72                                                     | 1.94 | 168.92          | 1.26 | 213.19             | 43                           | 1934                      | 0.50 | 0.062           | 0.02                        | 11.89          | 0.02                  | 0.000           |
| 18.79                                                     | 1.94 | 170.54          | 1.26 | 215.67             | 44                           | 1968                      | 0.50 | 0.060           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 18.86                                                     | 1.95 | 172.09          | 1.27 | 218.29             | 45                           | 2005                      | 0.50 | 0.058           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 18.90                                                     | 1.95 | 175.55          | 1.27 | 222.45             | 45                           | 2044                      | 0.50 | 0.056           | 0.02                        | 11.89          | 0.01                  | 0.000           |

| :: Post-earthquake settlement of dry sands :: (continued) |      |                 |      |                    |                              |                           |      |                 |                             |                |                       |                 |
|-----------------------------------------------------------|------|-----------------|------|--------------------|------------------------------|---------------------------|------|-----------------|-----------------------------|----------------|-----------------------|-----------------|
| Depth<br>(ft)                                             | Ic   | Q <sub>tn</sub> | Kc   | Q <sub>tn,cs</sub> | N <sub>1,60</sub><br>(blows) | G <sub>max</sub><br>(tsf) | CSR  | Shear, γ<br>(%) | e <sub>vol(15)</sub><br>(%) | N <sub>c</sub> | e <sub>v</sub><br>(%) | Settle.<br>(in) |
| 18.98                                                     | 1.93 | 183.61          | 1.26 | 230.50             | 47                           | 2095                      | 0.50 | 0.054           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 19.06                                                     | 1.90 | 195.20          | 1.24 | 241.76             | 48                           | 2160                      | 0.50 | 0.051           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 19.10                                                     | 1.87 | 212.52          | 1.22 | 258.62             | 51                           | 2262                      | 0.50 | 0.047           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 19.17                                                     | 1.84 | 231.23          | 1.19 | 275.27             | 54                           | 2363                      | 0.50 | 0.044           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 19.25                                                     | 1.80 | 249.16          | 1.16 | 288.53             | 56                           | 2445                      | 0.50 | 0.041           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 19.32                                                     | 1.78 | 259.79          | 1.13 | 293.10             | 56                           | 2474                      | 0.50 | 0.041           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 19.36                                                     | 1.76 | 264.69          | 1.11 | 292.56             | 56                           | 2470                      | 0.50 | 0.041           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 19.43                                                     | 1.75 | 260.11          | 1.08 | 280.40             | 53                           | 2379                      | 0.50 | 0.044           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 19.51                                                     | 1.71 | 251.16          | 1.02 | 255.88             | 48                           | 2212                      | 0.50 | 0.051           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 19.59                                                     | 1.69 | 240.15          | 1.00 | 240.15             | 45                           | 2041                      | 0.50 | 0.060           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 19.63                                                     | 1.68 | 232.74          | 1.00 | 232.74             | 43                           | 1954                      | 0.50 | 0.066           | 0.03                        | 11.89          | 0.02                  | 0.000           |
| 19.71                                                     | 1.69 | 226.31          | 1.00 | 226.31             | 42                           | 1942                      | 0.50 | 0.067           | 0.03                        | 11.89          | 0.02                  | 0.000           |
| 19.79                                                     | 1.70 | 219.83          | 1.00 | 219.83             | 41                           | 1926                      | 0.50 | 0.069           | 0.03                        | 11.89          | 0.02                  | 0.000           |
| 19.83                                                     | 1.73 | 209.69          | 1.05 | 219.36             | 41                           | 1897                      | 0.50 | 0.071           | 0.03                        | 11.89          | 0.02                  | 0.000           |
| 19.90                                                     | 1.74 | 203.29          | 1.07 | 216.82             | 41                           | 1870                      | 0.50 | 0.074           | 0.03                        | 11.89          | 0.02                  | 0.000           |
| 19.98                                                     | 1.76 | 198.10          | 1.10 | 217.08             | 41                           | 1869                      | 0.50 | 0.074           | 0.03                        | 11.89          | 0.02                  | 0.000           |
| 20.05                                                     | 1.76 | 199.85          | 1.10 | 219.94             | 42                           | 1897                      | 0.50 | 0.072           | 0.03                        | 11.89          | 0.02                  | 0.000           |
| 20.08                                                     | 1.77 | 200.80          | 1.12 | 223.98             | 43                           | 1934                      | 0.50 | 0.070           | 0.03                        | 11.89          | 0.02                  | 0.000           |
| 20.16                                                     | 1.77 | 201.53          | 1.12 | 225.37             | 43                           | 1950                      | 0.51 | 0.069           | 0.03                        | 11.89          | 0.02                  | 0.000           |
| 20.24                                                     | 1.77 | 202.31          | 1.12 | 225.64             | 43                           | 1957                      | 0.51 | 0.069           | 0.03                        | 11.89          | 0.02                  | 0.000           |
| 20.31                                                     | 1.77 | 202.17          | 1.12 | 226.01             | 43                           | 1965                      | 0.51 | 0.068           | 0.03                        | 11.89          | 0.02                  | 0.000           |
| 20.36                                                     | 1.79 | 200.71          | 1.14 | 228.02             | 44                           | 1989                      | 0.51 | 0.067           | 0.03                        | 11.89          | 0.02                  | 0.000           |
| 20.43                                                     | 1.81 | 199.37          | 1.16 | 231.78             | 45                           | 2041                      | 0.51 | 0.064           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 20.50                                                     | 1.83 | 198.28          | 1.19 | 235.08             | 46                           | 2099                      | 0.51 | 0.060           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 20.58                                                     | 1.85 | 197.52          | 1.20 | 236.93             | 47                           | 2142                      | 0.51 | 0.058           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 20.62                                                     | 1.87 | 193.74          | 1.22 | 235.61             | 47                           | 2164                      | 0.51 | 0.057           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 20.69                                                     | 1.91 | 184.35          | 1.24 | 229.41             | 46                           | 2180                      | 0.51 | 0.057           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 20.77                                                     | 1.96 | 173.88          | 1.28 | 222.12             | 46                           | 2202                      | 0.51 | 0.056           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 20.81                                                     | 2.01 | 165.44          | 1.32 | 218.35             | 46                           | 2253                      | 0.51 | 0.054           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 20.88                                                     | 2.04 | 166.33          | 1.34 | 223.42             | 47                           | 2347                      | 0.51 | 0.050           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 20.95                                                     | 2.03 | 178.88          | 1.33 | 238.01             | 50                           | 2487                      | 0.51 | 0.045           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 21.03                                                     | 1.99 | 196.43          | 1.30 | 255.29             | 53                           | 2612                      | 0.51 | 0.042           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 21.07                                                     | 1.94 | 219.57          | 1.27 | 277.81             | 57                           | 2742                      | 0.51 | 0.039           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 21.14                                                     | 1.91 | 238.12          | 1.24 | 295.70             | 59                           | 2843                      | 0.51 | 0.037           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 21.21                                                     | 1.88 | 254.21          | 1.22 | 310.36             | 62                           | 2919                      | 0.51 | 0.035           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 21.29                                                     | 1.86 | 260.63          | 1.21 | 315.29             | 62                           | 2940                      | 0.51 | 0.035           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 21.33                                                     | 1.85 | 261.13          | 1.20 | 314.00             | 62                           | 2912                      | 0.51 | 0.036           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 21.41                                                     | 1.85 | 257.80          | 1.20 | 308.80             | 61                           | 2860                      | 0.51 | 0.037           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 21.49                                                     | 1.83 | 254.96          | 1.19 | 302.39             | 59                           | 2784                      | 0.51 | 0.039           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 21.56                                                     | 1.82 | 254.15          | 1.17 | 297.57             | 58                           | 2722                      | 0.51 | 0.041           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 21.59                                                     | 1.80 | 255.30          | 1.15 | 294.47             | 57                           | 2677                      | 0.51 | 0.042           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 21.67                                                     | 1.78 | 258.31          | 1.13 | 292.26             | 56                           | 2648                      | 0.51 | 0.043           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 21.74                                                     | 1.78 | 255.75          | 1.13 | 288.14             | 55                           | 2615                      | 0.51 | 0.044           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 21.82                                                     | 1.78 | 250.71          | 1.13 | 283.71             | 54                           | 2582                      | 0.51 | 0.045           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 21.85                                                     | 1.81 | 240.79          | 1.16 | 279.09             | 54                           | 2562                      | 0.51 | 0.046           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 21.93                                                     | 1.81 | 235.37          | 1.17 | 274.71             | 53                           | 2536                      | 0.51 | 0.047           | 0.01                        | 11.89          | 0.01                  | 0.000           |
| 22.01                                                     | 1.82 | 228.17          | 1.17 | 267.52             | 52                           | 2481                      | 0.51 | 0.049           | 0.02                        | 11.89          | 0.01                  | 0.000           |
| 22.09                                                     | 1.82 | 221.57          | 1.17 | 259.70             | 51                           | 2414                      | 0.51 | 0.052           | 0.02                        | 11.89          | 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) |
| 22.12                                                     | 1.84 | 209.42          | 1.19 | 249.15             | 49                        | 2343                   | 0.51 | 0.055        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 22.20                                                     | 1.87 | 194.58          | 1.21 | 236.37             | 47                        | 2276                   | 0.51 | 0.058        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 22.28                                                     | 1.90 | 179.89          | 1.24 | 222.70             | 45                        | 2207                   | 0.51 | 0.062        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 22.32                                                     | 1.92 | 168.27          | 1.25 | 210.85             | 43                        | 2132                   | 0.51 | 0.067        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 22.39                                                     | 1.92 | 161.82          | 1.25 | 201.99             | 41                        | 2035                   | 0.51 | 0.074        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 22.47                                                     | 1.89 | 158.09          | 1.23 | 194.15             | 39                        | 1912                   | 0.51 | 0.086        | 0.04                     | 11.89          | 0.02               | 0.000        |
| 22.51                                                     | 1.85 | 158.87          | 1.20 | 191.23             | 38                        | 1838                   | 0.51 | 0.095        | 0.04                     | 11.89          | 0.02               | 0.000        |
| 22.58                                                     | 1.85 | 164.15          | 1.20 | 197.34             | 39                        | 1898                   | 0.51 | 0.088        | 0.04                     | 11.89          | 0.02               | 0.000        |
| 22.67                                                     | 1.88 | 171.27          | 1.22 | 209.49             | 42                        | 2063                   | 0.51 | 0.074        | 0.03                     | 11.89          | 0.02               | 0.000        |
| 22.74                                                     | 1.91 | 178.11          | 1.24 | 220.95             | 44                        | 2226                   | 0.51 | 0.063        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 22.78                                                     | 1.93 | 184.17          | 1.26 | 231.43             | 47                        | 2383                   | 0.52 | 0.055        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 22.86                                                     | 1.90 | 202.48          | 1.24 | 250.45             | 50                        | 2521                   | 0.52 | 0.050        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 22.94                                                     | 1.85 | 227.45          | 1.20 | 272.73             | 54                        | 2643                   | 0.52 | 0.046        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 22.98                                                     | 1.77 | 262.65          | 1.11 | 291.49             | 56                        | 2731                   | 0.52 | 0.044        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 23.05                                                     | 1.71 | 290.19          | 1.00 | 290.19             | 54                        | 2783                   | 0.52 | 0.043        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 23.12                                                     | 1.65 | 317.57          | 1.00 | 317.57             | 58                        | 2825                   | 0.52 | 0.042        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 23.19                                                     | 1.62 | 336.13          | 1.00 | 336.13             | 61                        | 2872                   | 0.52 | 0.041        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 23.23                                                     | 1.62 | 353.30          | 1.00 | 353.30             | 64                        | 3027                   | 0.52 | 0.038        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 23.31                                                     | 1.65 | 364.11          | 1.00 | 364.11             | 67                        | 3233                   | 0.52 | 0.034        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 23.37                                                     | 1.67 | 373.57          | 1.00 | 373.57             | 69                        | 3444                   | 0.52 | 0.031        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 23.44                                                     | 1.69 | 374.09          | 1.00 | 374.09             | 70                        | 3530                   | 0.52 | 0.030        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 23.50                                                     | 1.70 | 368.73          | 1.00 | 368.73             | 69                        | 3522                   | 0.52 | 0.031        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 23.56                                                     | 1.71 | 354.53          | 1.00 | 355.12             | 66                        | 3449                   | 0.52 | 0.032        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 23.63                                                     | 1.73 | 338.97          | 1.04 | 352.70             | 66                        | 3389                   | 0.52 | 0.033        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 23.69                                                     | 1.76 | 322.54          | 1.09 | 352.62             | 67                        | 3366                   | 0.52 | 0.033        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 23.77                                                     | 1.79 | 309.41          | 1.14 | 352.38             | 68                        | 3385                   | 0.52 | 0.033        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 23.82                                                     | 1.81 | 301.89          | 1.16 | 351.38             | 68                        | 3411                   | 0.52 | 0.033        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 23.90                                                     | 1.82 | 298.52          | 1.17 | 350.39             | 68                        | 3426                   | 0.52 | 0.032        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 23.96                                                     | 1.83 | 294.25          | 1.18 | 347.51             | 68                        | 3418                   | 0.52 | 0.033        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 24.02                                                     | 1.85 | 286.04          | 1.20 | 342.42             | 67                        | 3413                   | 0.52 | 0.033        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 24.10                                                     | 1.86 | 278.80          | 1.21 | 337.89             | 67                        | 3422                   | 0.52 | 0.033        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 24.16                                                     | 1.89 | 272.52          | 1.23 | 334.32             | 67                        | 3449                   | 0.52 | 0.033        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 24.23                                                     | 1.91 | 266.11          | 1.24 | 330.12             | 66                        | 3472                   | 0.52 | 0.032        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 24.30                                                     | 1.92 | 258.17          | 1.25 | 323.37             | 65                        | 3462                   | 0.52 | 0.033        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 24.38                                                     | 1.93 | 254.34          | 1.26 | 319.34             | 65                        | 3440                   | 0.52 | 0.033        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 24.41                                                     | 1.93 | 251.52          | 1.25 | 315.34             | 64                        | 3392                   | 0.52 | 0.034        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 24.49                                                     | 1.91 | 252.96          | 1.25 | 315.08             | 63                        | 3359                   | 0.52 | 0.034        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 24.56                                                     | 1.89 | 258.11          | 1.23 | 317.39             | 63                        | 3322                   | 0.52 | 0.035        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 24.64                                                     | 1.84 | 271.67          | 1.20 | 324.99             | 64                        | 3291                   | 0.52 | 0.036        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 24.70                                                     | 1.81 | 283.10          | 1.16 | 328.47             | 64                        | 3257                   | 0.52 | 0.037        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 24.74                                                     | 1.79 | 285.13          | 1.14 | 324.55             | 62                        | 3197                   | 0.52 | 0.038        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 24.82                                                     | 1.79 | 279.97          | 1.14 | 318.39             | 61                        | 3141                   | 0.52 | 0.039        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 24.89                                                     | 1.80 | 269.35          | 1.15 | 310.13             | 60                        | 3079                   | 0.52 | 0.040        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 24.97                                                     | 1.81 | 260.45          | 1.17 | 303.64             | 59                        | 3039                   | 0.52 | 0.041        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 25.01                                                     | 1.83 | 250.11          | 1.19 | 296.38             | 58                        | 3004                   | 0.52 | 0.042        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 25.09                                                     | 1.84 | 243.41          | 1.20 | 291.06             | 57                        | 2981                   | 0.52 | 0.043        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 25.17                                                     | 1.85 | 238.57          | 1.20 | 286.83             | 56                        | 2960                   | 0.52 | 0.044        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 25.20                                                     | 1.85 | 236.55          | 1.20 | 284.48             | 56                        | 2940                   | 0.52 | 0.044        | 0.01                     | 11.89          | 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) |
| 25.28                                                     | 1.85 | 236.71          | 1.20 | 283.80             | 56                        | 2929                   | 0.52 | 0.045        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 25.36                                                     | 1.84 | 238.34          | 1.19 | 284.35             | 56                        | 2926                   | 0.52 | 0.045        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 25.40                                                     | 1.82 | 245.71          | 1.17 | 287.25             | 56                        | 2911                   | 0.52 | 0.045        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 25.47                                                     | 1.77 | 255.77          | 1.12 | 285.98             | 55                        | 2856                   | 0.52 | 0.047        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 25.55                                                     | 1.73 | 265.24          | 1.06 | 280.39             | 53                        | 2812                   | 0.52 | 0.049        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 25.62                                                     | 1.72 | 268.38          | 1.02 | 274.75             | 52                        | 2782                   | 0.52 | 0.050        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 25.66                                                     | 1.73 | 264.18          | 1.05 | 276.68             | 52                        | 2788                   | 0.52 | 0.050        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 25.73                                                     | 1.76 | 250.80          | 1.10 | 275.79             | 53                        | 2768                   | 0.52 | 0.050        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 25.79                                                     | 1.80 | 235.73          | 1.15 | 272.23             | 53                        | 2767                   | 0.52 | 0.051        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 25.89                                                     | 1.84 | 223.42          | 1.19 | 266.61             | 52                        | 2780                   | 0.52 | 0.050        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 25.93                                                     | 1.86 | 220.52          | 1.21 | 266.89             | 53                        | 2830                   | 0.52 | 0.049        | 0.02                     | 11.89          | 0.01               | 0.000        |
| 26.01                                                     | 1.88 | 223.72          | 1.22 | 272.97             | 54                        | 2933                   | 0.52 | 0.046        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 26.08                                                     | 1.89 | 230.20          | 1.23 | 283.25             | 57                        | 3088                   | 0.52 | 0.043        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 26.12                                                     | 1.90 | 241.57          | 1.24 | 298.87             | 60                        | 3290                   | 0.52 | 0.039        | 0.01                     | 11.89          | 0.01               | 0.000        |
| 26.19                                                     | 1.88 | 254.93          | 1.22 | 311.97             | 62                        | 3381                   | 0.52 | 0.037        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 26.26                                                     | 1.85 | 266.22          | 1.20 | 320.39             | 63                        | 3403                   | 0.53 | 0.037        | 0.01                     | 11.89          | 0.00               | 0.000        |
| 26.34                                                     | 1.83 | 270.24          | 1.19 | 320.51             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 26.41                                                     | 1.84 | 266.89          | 1.19 | 318.34             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 26.44                                                     | 1.87 | 250.82          | 1.22 | 304.94             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 26.52                                                     | 1.89 | 233.86          | 1.23 | 287.91             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 26.59                                                     | 1.90 | 217.53          | 1.24 | 269.08             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 26.66                                                     | 1.92 | 196.86          | 1.25 | 246.31             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 26.73                                                     | 1.97 | 172.69          | 1.28 | 221.15             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 26.79                                                     | 2.05 | 143.90          | 1.36 | 195.02             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 26.86                                                     | 2.12 | 124.08          | 1.45 | 180.22             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 26.92                                                     | 2.20 | 106.02          | 1.61 | 171.02             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 26.99                                                     | 2.28 | 91.62           | 1.84 | 168.73             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 27.05                                                     | 2.33 | 83.81           | 2.05 | 172.05             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 27.11                                                     | 2.37 | 79.94           | 2.20 | 176.06             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 27.19                                                     | 2.38 | 77.71           | 2.29 | 177.76             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 27.26                                                     | 2.39 | 76.46           | 2.32 | 177.17             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 27.30                                                     | 2.38 | 76.36           | 2.27 | 172.97             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 27.38                                                     | 2.36 | 77.37           | 2.15 | 166.59             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 27.45                                                     | 2.32 | 79.03           | 2.01 | 159.03             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 27.52                                                     | 2.29 | 80.70           | 1.90 | 153.23             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 27.56                                                     | 2.26 | 82.67           | 1.80 | 148.55             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 27.64                                                     | 2.24 | 84.49           | 1.72 | 145.00             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 27.71                                                     | 2.21 | 86.11           | 1.65 | 142.26             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 27.76                                                     | 2.20 | 87.06           | 1.62 | 140.80             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 27.84                                                     | 2.20 | 87.27           | 1.60 | 140.04             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 27.91                                                     | 2.19 | 87.33           | 1.60 | 139.54             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 27.99                                                     | 2.19 | 87.40           | 1.59 | 139.22             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 28.03                                                     | 2.19 | 88.03           | 1.58 | 139.16             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 28.10                                                     | 2.18 | 89.01           | 1.56 | 139.20             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 28.18                                                     | 2.17 | 90.65           | 1.54 | 139.59             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 28.25                                                     | 2.16 | 92.38           | 1.52 | 140.17             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 28.29                                                     | 2.14 | 94.91           | 1.49 | 141.23             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 28.37                                                     | 2.10 | 98.61           | 1.41 | 139.23             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 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) |
| 28.44                                                     | 2.03 | 102.99          | 1.33 | 137.26             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 28.48                                                     | 1.96 | 107.61          | 1.28 | 137.32             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 28.56                                                     | 1.93 | 110.38          | 1.26 | 138.70             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 28.63                                                     | 1.93 | 111.59          | 1.26 | 140.23             | 28                        | 1683                   | 0.53 | 0.183        | 0.12                     | 11.89          | 0.06               | 0.000        |
| 28.71                                                     | 1.94 | 111.16          | 1.26 | 140.16             | 28                        | 1695                   | 0.53 | 0.180        | 0.12                     | 11.89          | 0.05               | 0.001        |
| 28.75                                                     | 1.99 | 102.44          | 1.30 | 132.88             | 28                        | 1685                   | 0.53 | 0.183        | 0.13                     | 11.89          | 0.06               | 0.000        |
| 28.82                                                     | 2.00 | 100.21          | 1.31 | 131.12             | 27                        | 1686                   | 0.53 | 0.184        | 0.13                     | 11.89          | 0.06               | 0.000        |
| 28.89                                                     | 2.02 | 97.94           | 1.32 | 129.47             | 27                        | 1688                   | 0.53 | 0.184        | 0.13                     | 11.89          | 0.06               | 0.000        |
| 28.96                                                     | 1.99 | 102.86          | 1.30 | 134.02             | 28                        | 1719                   | 0.53 | 0.175        | 0.12                     | 11.89          | 0.05               | 0.000        |
| 29.04                                                     | 2.01 | 101.22          | 1.32 | 133.43             | 28                        | 1740                   | 0.53 | 0.170        | 0.11                     | 11.89          | 0.05               | 0.000        |
| 29.08                                                     | 2.03 | 99.55           | 1.34 | 133.08             | 28                        | 1763                   | 0.53 | 0.164        | 0.11                     | 11.89          | 0.05               | 0.000        |
| 29.15                                                     | 2.05 | 97.73           | 1.36 | 132.57             | 28                        | 1782                   | 0.53 | 0.159        | 0.11                     | 11.89          | 0.05               | 0.000        |
| 29.23                                                     | 2.07 | 95.93           | 1.38 | 132.04             | 28                        | 1797                   | 0.53 | 0.156        | 0.10                     | 11.89          | 0.05               | 0.000        |
| 29.27                                                     | 2.08 | 94.66           | 1.39 | 132.01             | 28                        | 1813                   | 0.53 | 0.153        | 0.10                     | 11.89          | 0.05               | 0.000        |
| 29.35                                                     | 2.09 | 95.18           | 1.40 | 133.19             | 29                        | 1836                   | 0.53 | 0.148        | 0.10                     | 11.89          | 0.04               | 0.000        |
| 29.43                                                     | 2.07 | 99.15           | 1.38 | 136.60             | 29                        | 1869                   | 0.53 | 0.142        | 0.09                     | 11.89          | 0.04               | 0.000        |
| 29.50                                                     | 2.04 | 105.26          | 1.34 | 141.45             | 30                        | 1902                   | 0.53 | 0.136        | 0.08                     | 11.89          | 0.04               | 0.000        |
| 29.53                                                     | 1.99 | 115.13          | 1.30 | 149.59             | 31                        | 1935                   | 0.53 | 0.130        | 0.08                     | 11.89          | 0.03               | 0.000        |
| 29.61                                                     | 1.94 | 125.45          | 1.26 | 158.66             | 32                        | 1968                   | 0.53 | 0.125        | 0.07                     | 11.89          | 0.03               | 0.000        |
| 29.68                                                     | 1.90 | 136.42          | 1.23 | 168.33             | 34                        | 2000                   | 0.53 | 0.121        | 0.06                     | 11.89          | 0.03               | 0.000        |
| 29.76                                                     | 1.87 | 143.20          | 1.21 | 173.88             | 34                        | 2018                   | 0.53 | 0.119        | 0.06                     | 11.89          | 0.03               | 0.000        |
| 29.80                                                     | 1.85 | 145.98          | 1.20 | 175.74             | 35                        | 2018                   | 0.53 | 0.119        | 0.06                     | 11.89          | 0.03               | 0.000        |
| 29.87                                                     | 1.86 | 143.31          | 1.21 | 173.15             | 34                        | 2000                   | 0.53 | 0.122        | 0.06                     | 11.89          | 0.03               | 0.000        |
| 29.95                                                     | 1.88 | 137.26          | 1.22 | 167.79             | 33                        | 1974                   | 0.53 | 0.126        | 0.07                     | 11.89          | 0.03               | 0.000        |
| 30.03                                                     | 1.91 | 130.15          | 1.24 | 161.48             | 32                        | 1951                   | 0.53 | 0.131        | 0.07                     | 11.89          | 0.03               | 0.000        |
| 30.07                                                     | 1.93 | 123.54          | 1.26 | 155.54             | 32                        | 1932                   | 0.53 | 0.134        | 0.08                     | 11.89          | 0.03               | 0.000        |
| 30.15                                                     | 1.96 | 118.53          | 1.27 | 151.08             | 31                        | 1922                   | 0.53 | 0.137        | 0.08                     | 11.89          | 0.04               | 0.000        |
| 30.19                                                     | 1.98 | 113.45          | 1.29 | 146.81             | 30                        | 1916                   | 0.53 | 0.138        | 0.08                     | 11.89          | 0.04               | 0.000        |
| 30.26                                                     | 2.01 | 109.90          | 1.31 | 144.19             | 30                        | 1921                   | 0.53 | 0.138        | 0.08                     | 11.89          | 0.04               | 0.000        |
| 30.34                                                     | 2.03 | 107.13          | 1.33 | 142.52             | 30                        | 1934                   | 0.53 | 0.136        | 0.08                     | 11.89          | 0.04               | 0.000        |
| 30.41                                                     | 2.04 | 106.15          | 1.34 | 142.21             | 30                        | 1946                   | 0.53 | 0.134        | 0.08                     | 11.89          | 0.04               | 0.000        |
| 30.45                                                     | 2.04 | 106.38          | 1.34 | 142.78             | 30                        | 1959                   | 0.53 | 0.132        | 0.08                     | 11.89          | 0.04               | 0.000        |
| 30.52                                                     | 2.03 | 107.53          | 1.34 | 143.91             | 30                        | 1973                   | 0.53 | 0.130        | 0.08                     | 11.89          | 0.03               | 0.000        |
| 30.60                                                     | 2.02 | 109.92          | 1.33 | 145.87             | 31                        | 1985                   | 0.53 | 0.129        | 0.08                     | 11.89          | 0.03               | 0.000        |
| 30.68                                                     | 2.01 | 112.48          | 1.31 | 147.85             | 31                        | 1993                   | 0.53 | 0.128        | 0.08                     | 11.89          | 0.03               | 0.000        |
| 30.71                                                     | 1.99 | 115.30          | 1.30 | 150.17             | 31                        | 2001                   | 0.53 | 0.127        | 0.07                     | 11.89          | 0.03               | 0.000        |
| 30.79                                                     | 1.99 | 115.81          | 1.30 | 150.68             | 31                        | 2008                   | 0.53 | 0.126        | 0.07                     | 11.89          | 0.03               | 0.000        |
| 30.87                                                     | 2.00 | 114.60          | 1.31 | 149.81             | 31                        | 2013                   | 0.53 | 0.126        | 0.07                     | 11.89          | 0.03               | 0.000        |
| 30.91                                                     | 2.02 | 110.96          | 1.33 | 147.08             | 31                        | 2012                   | 0.53 | 0.126        | 0.07                     | 11.89          | 0.03               | 0.000        |
| 30.98                                                     | 2.04 | 108.07          | 1.34 | 145.07             | 31                        | 2015                   | 0.53 | 0.126        | 0.08                     | 11.89          | 0.03               | 0.000        |
| 31.06                                                     | 2.05 | 106.20          | 1.36 | 143.98             | 31                        | 2021                   | 0.53 | 0.126        | 0.08                     | 11.89          | 0.03               | 0.000        |
| 31.13                                                     | 2.05 | 106.65          | 1.35 | 144.43             | 31                        | 2029                   | 0.53 | 0.125        | 0.07                     | 11.89          | 0.03               | 0.000        |
| 31.17                                                     | 2.04 | 109.34          | 1.34 | 146.42             | 31                        | 2037                   | 0.53 | 0.124        | 0.07                     | 11.89          | 0.03               | 0.000        |
| 31.24                                                     | 2.01 | 114.35          | 1.31 | 150.17             | 31                        | 2047                   | 0.53 | 0.123        | 0.07                     | 11.89          | 0.03               | 0.000        |
| 31.32                                                     | 1.97 | 120.40          | 1.29 | 154.87             | 32                        | 2051                   | 0.53 | 0.122        | 0.07                     | 11.89          | 0.03               | 0.000        |
| 31.40                                                     | 1.94 | 125.09          | 1.26 | 157.78             | 32                        | 2022                   | 0.53 | 0.127        | 0.07                     | 11.89          | 0.03               | 0.000        |
| 31.44                                                     | 1.87 | 128.75          | 1.22 | 156.78             | 31                        | 1890                   | 0.53 | 0.152        | 0.09                     | 11.89          | 0.04               | 0.000        |
| 31.51                                                     | 1.82 | 129.29          | 1.17 | 151.39             | 29                        | 1749                   | 0.53 | 0.190        | 0.12                     | 11.89          | 0.05               | 0.000        |

| :: Post-earthquake settlement of dry sands :: (continued) |      |                 |      |                    |                              |                           |      |                 |                             |                |                       |                 |
|-----------------------------------------------------------|------|-----------------|------|--------------------|------------------------------|---------------------------|------|-----------------|-----------------------------|----------------|-----------------------|-----------------|
| Depth<br>(ft)                                             | Ic   | Q <sub>tn</sub> | Kc   | Q <sub>tn,cs</sub> | N <sub>1,60</sub><br>(blows) | G <sub>max</sub><br>(tsf) | CSR  | Shear, γ<br>(%) | e <sub>vol(15)</sub><br>(%) | N <sub>c</sub> | e <sub>v</sub><br>(%) | Settle.<br>(in) |
| 31.59                                                     | 1.78 | 126.59          | 1.13 | 143.53             | 28                           | 1632                      | 0.53 | 0.236           | 0.16                        | 11.89          | 0.07                  | 0.001           |
| 31.66                                                     | 1.82 | 120.35          | 1.17 | 140.78             | 27                           | 1629                      | 0.53 | 0.238           | 0.16                        | 11.89          | 0.07                  | 0.001           |
| 31.70                                                     | 1.87 | 111.60          | 1.21 | 135.50             | 27                           | 1634                      | 0.53 | 0.236           | 0.17                        | 11.89          | 0.07                  | 0.000           |
| 31.78                                                     | 1.96 | 97.34           | 1.28 | 124.22             | 25                           | 1638                      | 0.53 | 0.235           | 0.18                        | 11.89          | 0.07                  | 0.001           |
| 31.83                                                     | 2.05 | 85.42           | 1.36 | 115.77             | 25                           | 1652                      | 0.53 | 0.229           | 0.18                        | 11.89          | 0.07                  | 0.000           |
| 31.91                                                     | 2.15 | 74.72           | 1.49 | 111.68             | 25                           | 1670                      | 0.53 | 0.222           | 0.17                        | 11.89          | 0.07                  | 0.001           |
| 31.99                                                     | 2.20 | 70.24           | 1.61 | 113.07             | 25                           | 1703                      | 0.53 | 0.210           | 0.16                        | 11.89          | 0.06                  | 0.001           |
| 32.03                                                     | 2.28 | 63.65           | 1.84 | 117.19             | 27                           | 1739                      | 0.53 | 0.198           | 0.14                        | 11.89          | 0.06                  | 0.000           |
| 32.10                                                     | 2.34 | 58.93           | 2.10 | 123.68             | 30                           | 1782                      | 0.53 | 0.185           | 0.12                        | 11.89          | 0.05                  | 0.000           |
| 32.18                                                     | 2.38 | 56.97           | 2.29 | 130.60             | 32                           | 1838                      | 0.53 | 0.170           | 0.10                        | 11.89          | 0.04                  | 0.000           |
| 32.25                                                     | 2.39 | 57.74           | 2.33 | 134.42             | 33                           | 1886                      | 0.53 | 0.158           | 0.09                        | 11.89          | 0.04                  | 0.000           |
| 32.29                                                     | 2.37 | 61.31           | 2.20 | 134.96             | 33                           | 1928                      | 0.53 | 0.150           | 0.08                        | 11.89          | 0.03                  | 0.000           |
| 32.37                                                     | 2.33 | 65.87           | 2.03 | 133.66             | 32                           | 1956                      | 0.53 | 0.144           | 0.08                        | 11.89          | 0.03                  | 0.000           |
| 32.44                                                     | 2.27 | 71.89           | 1.83 | 131.65             | 31                           | 1976                      | 0.53 | 0.141           | 0.08                        | 11.89          | 0.03                  | 0.000           |
| 32.51                                                     | 2.23 | 76.88           | 1.69 | 130.26             | 30                           | 1980                      | 0.53 | 0.141           | 0.09                        | 11.89          | 0.04                  | 0.000           |
| 32.55                                                     | 2.20 | 79.94           | 1.61 | 128.77             | 29                           | 1965                      | 0.53 | 0.144           | 0.09                        | 11.89          | 0.04                  | 0.000           |
| 32.63                                                     | 2.19 | 79.93           | 1.59 | 126.73             | 28                           | 1937                      | 0.53 | 0.150           | 0.10                        | 11.89          | 0.04                  | 0.000           |
| 32.71                                                     | 2.19 | 78.33           | 1.59 | 124.38             | 28                           | 1905                      | 0.53 | 0.157           | 0.11                        | 11.89          | 0.04                  | 0.000           |
| 32.75                                                     | 2.21 | 74.76           | 1.63 | 121.97             | 28                           | 1869                      | 0.53 | 0.166           | 0.11                        | 11.89          | 0.05                  | 0.000           |
| 32.82                                                     | 2.23 | 70.22           | 1.70 | 119.53             | 27                           | 1829                      | 0.53 | 0.177           | 0.12                        | 11.89          | 0.05                  | 0.000           |
| 32.90                                                     | 2.26 | 65.57           | 1.79 | 117.12             | 27                           | 1784                      | 0.53 | 0.190           | 0.13                        | 11.89          | 0.05                  | 0.000           |
| 32.98                                                     | 2.27 | 63.68           | 1.81 | 115.16             | 27                           | 1754                      | 0.53 | 0.201           | 0.14                        | 11.89          | 0.06                  | 0.001           |
| 33.02                                                     | 2.27 | 62.72           | 1.82 | 113.99             | 26                           | 1736                      | 0.53 | 0.208           | 0.15                        | 11.89          | 0.06                  | 0.000           |
| 33.09                                                     | 2.26 | 63.57           | 1.78 | 113.39             | 26                           | 1735                      | 0.53 | 0.209           | 0.15                        | 11.89          | 0.06                  | 0.001           |
| 33.17                                                     | 2.26 | 63.82           | 1.77 | 113.22             | 26                           | 1737                      | 0.53 | 0.208           | 0.15                        | 11.89          | 0.06                  | 0.001           |
| 33.21                                                     | 2.25 | 65.20           | 1.75 | 114.04             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 33.28                                                     | 2.27 | 64.24           | 1.81 | 116.43             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 33.36                                                     | 2.30 | 61.94           | 1.93 | 119.72             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 33.40                                                     | 2.35 | 58.08           | 2.14 | 124.28             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 33.47                                                     | 2.40 | 54.42           | 2.37 | 128.76             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 33.55                                                     | 2.44 | 51.10           | 2.61 | 133.54             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 33.62                                                     | 2.47 | 49.21           | 2.80 | 137.63             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 33.70                                                     | 2.49 | 48.39           | 2.91 | 140.63             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 33.74                                                     | 2.50 | 48.11           | 2.99 | 143.89             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 33.82                                                     | 2.51 | 48.19           | 3.03 | 146.02             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 33.86                                                     | 2.50 | 48.97           | 3.00 | 146.91             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 33.93                                                     | 2.49 | 50.38           | 2.91 | 146.55             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 34.01                                                     | 2.47 | 52.20           | 2.80 | 146.00             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 34.08                                                     | 2.46 | 53.85           | 2.71 | 145.68             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 34.13                                                     | 2.44 | 56.02           | 2.57 | 144.09             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 34.20                                                     | 2.41 | 58.62           | 2.41 | 141.03             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 34.28                                                     | 2.37 | 61.95           | 2.22 | 137.32             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 34.35                                                     | 2.33 | 65.07           | 2.05 | 133.28             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 34.39                                                     | 2.28 | 68.67           | 1.86 | 127.69             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 34.46                                                     | 2.24 | 72.12           | 1.73 | 124.44             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 34.54                                                     | 2.20 | 75.64           | 1.63 | 122.96             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 34.61                                                     | 2.19 | 77.78           | 1.59 | 123.83             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 34.65                                                     | 2.18 | 79.37           | 1.56 | 123.62             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |

| :: Post-earthquake settlement of dry sands :: (continued) |                |                 |                |                    |                              |                           |      |                 |                             |                |                       |                 |
|-----------------------------------------------------------|----------------|-----------------|----------------|--------------------|------------------------------|---------------------------|------|-----------------|-----------------------------|----------------|-----------------------|-----------------|
| Depth<br>(ft)                                             | I <sub>c</sub> | Q <sub>tn</sub> | K <sub>c</sub> | Q <sub>tn,cs</sub> | N <sub>1,60</sub><br>(blows) | G <sub>max</sub><br>(tsf) | CSR  | Shear, γ<br>(%) | e <sub>vol(15)</sub><br>(%) | N <sub>c</sub> | e <sub>v</sub><br>(%) | Settle.<br>(in) |
| 34.72                                                     | 2.17           | 79.99           | 1.54           | 123.09             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 34.80                                                     | 2.16           | 80.28           | 1.53           | 122.55             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 34.86                                                     | 2.16           | 80.45           | 1.52           | 122.23             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 34.94                                                     | 2.15           | 80.85           | 1.51           | 122.22             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 34.97                                                     | 2.14           | 82.55           | 1.49           | 122.86             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 35.06                                                     | 2.12           | 85.40           | 1.45           | 123.92             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 35.14                                                     | 2.10           | 88.50           | 1.42           | 125.23             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 35.17                                                     | 2.08           | 90.53           | 1.39           | 125.98             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 35.24                                                     | 2.09           | 89.23           | 1.40           | 124.78             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 35.32                                                     | 2.11           | 84.58           | 1.44           | 121.67             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 35.40                                                     | 2.15           | 78.66           | 1.51           | 118.56             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 35.44                                                     | 2.20           | 72.32           | 1.61           | 116.29             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 35.52                                                     | 2.24           | 67.12           | 1.72           | 115.78             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 35.59                                                     | 2.29           | 61.91           | 1.90           | 117.48             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 35.67                                                     | 2.34           | 58.35           | 2.07           | 120.62             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 35.70                                                     | 2.38           | 55.43           | 2.27           | 125.79             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 35.78                                                     | 2.43           | 52.58           | 2.52           | 132.60             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 35.86                                                     | 2.48           | 49.62           | 2.83           | 140.51             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 35.90                                                     | 2.53           | 46.69           | 3.18           | 148.37             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 35.97                                                     | 2.57           | 44.19           | 3.49           | 154.18             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 36.05                                                     | 2.59           | 43.01           | 3.66           | 157.26             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 36.12                                                     | 2.60           | 42.10           | 3.76           | 158.10             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 0.00           | 0.00                  | 0.000           |
| 36.16                                                     | 2.59           | 42.71           | 3.64           | 155.27             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 36.24                                                     | 2.56           | 43.71           | 3.45           | 150.94             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 36.32                                                     | 2.53           | 45.82           | 3.17           | 145.42             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 36.35                                                     | 2.50           | 47.77           | 2.95           | 140.71             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 36.43                                                     | 2.46           | 49.58           | 2.74           | 135.98             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 36.50                                                     | 2.42           | 52.36           | 2.48           | 129.98             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 36.58                                                     | 2.38           | 55.17           | 2.27           | 124.98             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 36.62                                                     | 2.34           | 57.97           | 2.09           | 121.28             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 36.70                                                     | 2.32           | 59.93           | 1.99           | 119.43             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 36.77                                                     | 2.30           | 61.43           | 1.93           | 118.41             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 36.81                                                     | 2.29           | 62.76           | 1.88           | 118.12             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 36.89                                                     | 2.27           | 64.86           | 1.81           | 117.61             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 36.96                                                     | 2.23           | 69.33           | 1.69           | 117.34             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 37.04                                                     | 2.19           | 74.47           | 1.58           | 117.97             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 37.08                                                     | 2.14           | 80.87           | 1.49           | 120.21             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 37.15                                                     | 2.10           | 86.29           | 1.42           | 122.83             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 37.23                                                     | 2.07           | 90.63           | 1.38           | 125.26             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 37.28                                                     | 2.06           | 91.90           | 1.37           | 125.49             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 37.36                                                     | 2.05           | 90.66           | 1.35           | 122.64             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 37.43                                                     | 2.04           | 88.35           | 1.34           | 118.82             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 37.47                                                     | 2.05           | 84.37           | 1.35           | 114.16             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 37.55                                                     | 2.08           | 78.49           | 1.40           | 109.59             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 37.63                                                     | 2.13           | 72.15           | 1.47           | 105.72             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 37.67                                                     | 2.18           | 66.03           | 1.56           | 102.71             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 37.75                                                     | 2.24           | 58.86           | 1.72           | 101.41             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 37.80                                                     | 2.29           | 54.26           | 1.89           | 102.79             | 0                            | 0                         | 0.53 | 0.000           | 0.00                        | 11.89          | 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) |
| 37.87                                                     | 2.34 | 51.08           | 2.08 | 106.45             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 37.94                                                     | 2.37 | 50.55           | 2.21 | 111.56             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 38.02                                                     | 2.42 | 47.99           | 2.48 | 119.00             | 0                         | 0                      | 0.53 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 38.09                                                     | 2.47 | 45.65           | 2.76 | 126.22             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 38.13                                                     | 2.51 | 43.47           | 3.05 | 132.73             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 38.20                                                     | 2.54 | 42.03           | 3.28 | 137.81             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 38.28                                                     | 2.56 | 41.44           | 3.41 | 141.20             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 38.36                                                     | 2.56 | 41.73           | 3.40 | 141.99             | 38                        | 2040                   | 0.52 | 0.158        | 0.07                     | 11.89          | 0.02               | 0.000        |
| 38.39                                                     | 2.54 | 42.60           | 3.30 | 140.45             | 37                        | 2040                   | 0.52 | 0.158        | 0.08                     | 11.89          | 0.02               | 0.000        |
| 38.47                                                     | 2.52 | 43.97           | 3.14 | 138.19             | 36                        | 2041                   | 0.52 | 0.158        | 0.08                     | 11.89          | 0.02               | 0.000        |
| 38.54                                                     | 2.50 | 45.82           | 2.99 | 137.06             | 35                        | 2060                   | 0.52 | 0.154        | 0.08                     | 11.89          | 0.02               | 0.000        |
| 38.61                                                     | 2.49 | 47.31           | 2.91 | 137.76             | 35                        | 2091                   | 0.52 | 0.149        | 0.08                     | 11.89          | 0.02               | 0.000        |
| 38.66                                                     | 2.50 | 47.40           | 2.97 | 140.56             | 36                        | 2123                   | 0.52 | 0.143        | 0.07                     | 11.89          | 0.02               | 0.000        |
| 38.73                                                     | 2.53 | 45.65           | 3.17 | 144.57             | 38                        | 2143                   | 0.52 | 0.140        | 0.07                     | 11.89          | 0.02               | 0.000        |
| 38.81                                                     | 2.56 | 43.20           | 3.45 | 148.97             | 40                        | 2153                   | 0.52 | 0.139        | 0.06                     | 11.89          | 0.02               | 0.000        |
| 38.85                                                     | 2.62 | 39.87           | 3.89 | 155.08             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 38.92                                                     | 2.67 | 36.27           | 4.45 | 161.42             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 39.00                                                     | 2.73 | 33.11           | 5.03 | 166.60             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 39.08                                                     | 2.76 | 31.42           | 5.37 | 168.55             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 39.12                                                     | 2.76 | 31.07           | 5.40 | 167.91             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 39.19                                                     | 2.76 | 31.00           | 5.41 | 167.63             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 39.26                                                     | 2.76 | 31.09           | 5.42 | 168.45             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 39.34                                                     | 2.77 | 31.25           | 5.44 | 169.93             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 39.38                                                     | 2.77 | 31.47           | 5.47 | 172.06             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 39.45                                                     | 2.78 | 31.31           | 5.57 | 174.44             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 39.53                                                     | 2.79 | 31.06           | 5.69 | 176.80             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 39.60                                                     | 2.80 | 30.70           | 5.80 | 178.19             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 39.64                                                     | 2.81 | 29.90           | 5.95 | 177.80             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 39.72                                                     | 2.82 | 28.68           | 6.16 | 176.64             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 39.76                                                     | 2.86 | 26.63           | 6.58 | 175.27             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 39.84                                                     | 2.90 | 24.41           | 7.16 | 174.74             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 39.91                                                     | 2.93 | 22.37           | 7.71 | 172.48             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 39.99                                                     | 2.94 | 21.58           | 7.82 | 168.81             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 40.03                                                     | 2.89 | 23.06           | 7.09 | 163.56             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 40.12                                                     | 2.81 | 26.49           | 5.96 | 157.99             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 40.19                                                     | 2.73 | 30.67           | 5.00 | 153.39             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 40.23                                                     | 2.65 | 35.51           | 4.24 | 150.43             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 40.30                                                     | 2.57 | 42.16           | 3.46 | 145.96             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 40.38                                                     | 2.46 | 51.11           | 2.70 | 137.84             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 40.46                                                     | 2.36 | 59.34           | 2.20 | 130.50             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 40.50                                                     | 2.30 | 65.09           | 1.94 | 126.10             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 40.57                                                     | 2.26 | 69.26           | 1.80 | 124.37             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 40.65                                                     | 2.22 | 73.69           | 1.67 | 122.96             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 40.72                                                     | 2.19 | 76.09           | 1.60 | 121.59             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 40.75                                                     | 2.17 | 76.93           | 1.56 | 119.64             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 40.82                                                     | 2.17 | 76.32           | 1.54 | 117.40             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 40.90                                                     | 2.16 | 75.89           | 1.52 | 115.59             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 40.97                                                     | 2.17 | 74.10           | 1.54 | 114.29             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 11.89          | 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) |
| 41.04                                                     | 2.19 | 71.38           | 1.59 | 113.46             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 41.08                                                     | 2.22 | 67.82           | 1.67 | 113.37             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 41.15                                                     | 2.27 | 63.91           | 1.80 | 115.11             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 41.22                                                     | 2.32 | 60.03           | 1.99 | 119.62             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 41.30                                                     | 2.36 | 57.70           | 2.17 | 125.10             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 41.37                                                     | 2.38 | 57.03           | 2.26 | 129.06             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 41.41                                                     | 2.38 | 57.62           | 2.28 | 131.55             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 41.49                                                     | 2.39 | 57.86           | 2.33 | 134.88             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 41.56                                                     | 2.41 | 57.10           | 2.44 | 139.35             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 41.60                                                     | 2.46 | 53.98           | 2.71 | 146.26             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 41.67                                                     | 2.53 | 48.51           | 3.18 | 154.49             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 41.76                                                     | 2.61 | 42.57           | 3.81 | 162.23             | 0                         | 0                      | 0.52 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 41.83                                                     | 2.67 | 38.15           | 4.36 | 166.21             | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 41.87                                                     | 2.68 | 36.89           | 4.46 | 164.65             | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 41.94                                                     | 2.67 | 36.48           | 4.42 | 161.23             | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 42.03                                                     | 2.65 | 37.04           | 4.23 | 156.54             | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 42.07                                                     | 2.63 | 37.82           | 4.00 | 151.12             | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 42.14                                                     | 2.59 | 39.62           | 3.64 | 144.11             | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 42.22                                                     | 2.54 | 41.52           | 3.29 | 136.76             | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 42.30                                                     | 2.51 | 42.97           | 3.06 | 131.69             | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 42.33                                                     | 2.49 | 44.51           | 2.89 | 128.63             | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 42.41                                                     | 2.46 | 46.42           | 2.73 | 126.68             | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 42.48                                                     | 2.43 | 49.28           | 2.53 | 124.63             | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 42.55                                                     | 2.40 | 52.26           | 2.36 | 123.08             | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 42.59                                                     | 2.36 | 55.84           | 2.18 | 121.70             | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 42.66                                                     | 2.33 | 59.16           | 2.04 | 120.55             | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 42.74                                                     | 2.30 | 61.79           | 1.94 | 119.61             | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 42.79                                                     | 2.29 | 62.50           | 1.90 | 118.54             | 0                         | 0                      | 0.51 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 42.86                                                     | 2.30 | 61.33           | 1.91 | 117.00             | 27                        | 2160                   | 0.51 | 0.149        | 0.10                     | 11.89          | 0.03               | 0.000        |
| 42.94                                                     | 2.30 | 59.24           | 1.94 | 114.91             | 27                        | 2119                   | 0.51 | 0.157        | 0.11                     | 11.89          | 0.03               | 0.000        |
| 43.01                                                     | 2.31 | 57.14           | 1.98 | 113.00             | 27                        | 2079                   | 0.51 | 0.164        | 0.12                     | 11.89          | 0.03               | 0.000        |
| 43.05                                                     | 2.33 | 54.99           | 2.03 | 111.83             | 27                        | 2048                   | 0.51 | 0.171        | 0.12                     | 11.89          | 0.03               | 0.000        |
| 43.13                                                     | 2.35 | 52.93           | 2.12 | 112.24             | 27                        | 2040                   | 0.51 | 0.173        | 0.12                     | 11.89          | 0.03               | 0.000        |
| 43.21                                                     | 2.37 | 51.03           | 2.23 | 113.74             | 28                        | 2046                   | 0.51 | 0.172        | 0.12                     | 11.89          | 0.03               | 0.000        |
| 43.24                                                     | 2.40 | 49.87           | 2.35 | 117.23             | 29                        | 2082                   | 0.51 | 0.164        | 0.11                     | 11.89          | 0.03               | 0.000        |
| 43.32                                                     | 2.42 | 49.36           | 2.46 | 121.45             | 30                        | 2133                   | 0.51 | 0.155        | 0.09                     | 11.89          | 0.02               | 0.000        |
| 43.39                                                     | 2.43 | 49.28           | 2.56 | 126.00             | 31                        | 2193                   | 0.51 | 0.145        | 0.08                     | 11.89          | 0.02               | 0.000        |
| 43.47                                                     | 2.44 | 49.43           | 2.62 | 129.47             | 32                        | 2242                   | 0.51 | 0.137        | 0.08                     | 11.89          | 0.02               | 0.000        |
| 43.51                                                     | 2.44 | 50.49           | 2.62 | 132.22             | 33                        | 2291                   | 0.51 | 0.131        | 0.07                     | 11.89          | 0.02               | 0.000        |
| 43.59                                                     | 2.43 | 52.80           | 2.54 | 134.16             | 33                        | 2348                   | 0.51 | 0.124        | 0.07                     | 11.89          | 0.02               | 0.000        |
| 43.66                                                     | 2.41 | 56.26           | 2.41 | 135.85             | 34                        | 2414                   | 0.51 | 0.116        | 0.06                     | 11.89          | 0.01               | 0.000        |
| 43.73                                                     | 2.39 | 58.96           | 2.33 | 137.18             | 34                        | 2465                   | 0.51 | 0.111        | 0.06                     | 11.89          | 0.01               | 0.000        |
| 43.77                                                     | 2.34 | 65.47           | 2.09 | 136.78             | 33                        | 2523                   | 0.51 | 0.106        | 0.06                     | 11.89          | 0.01               | 0.000        |
| 43.84                                                     | 2.27 | 74.30           | 1.83 | 136.30             | 32                        | 2576                   | 0.51 | 0.101        | 0.06                     | 11.89          | 0.01               | 0.000        |
| 43.92                                                     | 2.19 | 87.56           | 1.58 | 138.69             | 31                        | 2635                   | 0.51 | 0.097        | 0.06                     | 11.89          | 0.01               | 0.000        |
| 43.99                                                     | 2.13 | 98.29           | 1.46 | 143.38             | 31                        | 2675                   | 0.51 | 0.094        | 0.05                     | 11.89          | 0.01               | 0.000        |
| 44.03                                                     | 2.06 | 110.40          | 1.37 | 151.23             | 32                        | 2716                   | 0.51 | 0.091        | 0.05                     | 11.89          | 0.01               | 0.000        |
| 44.10                                                     | 2.01 | 122.50          | 1.31 | 160.92             | 34                        | 2756                   | 0.51 | 0.089        | 0.05                     | 11.89          | 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) |
| 44.18                                                     | 1.95 | 135.26          | 1.27 | 172.11             | 35                        | 2789                   | 0.51 | 0.087        | 0.04                     | 11.89          | 0.01               | 0.000        |
| 44.26                                                     | 1.92 | 144.52          | 1.25 | 180.30             | 36                        | 2806                   | 0.51 | 0.086        | 0.04                     | 11.89          | 0.01               | 0.000        |
| 44.30                                                     | 1.89 | 150.96          | 1.23 | 185.68             | 37                        | 2809                   | 0.51 | 0.086        | 0.04                     | 11.89          | 0.01               | 0.000        |
| 44.36                                                     | 1.87 | 154.21          | 1.22 | 187.97             | 37                        | 2799                   | 0.51 | 0.086        | 0.04                     | 11.89          | 0.01               | 0.000        |
| 44.44                                                     | 1.86 | 155.32          | 1.21 | 188.22             | 37                        | 2778                   | 0.51 | 0.088        | 0.04                     | 11.89          | 0.01               | 0.000        |
| 44.52                                                     | 1.86 | 154.56          | 1.21 | 186.94             | 37                        | 2753                   | 0.51 | 0.089        | 0.04                     | 11.89          | 0.01               | 0.000        |
| 44.56                                                     | 1.86 | 153.29          | 1.21 | 185.49             | 37                        | 2735                   | 0.51 | 0.091        | 0.04                     | 11.89          | 0.01               | 0.000        |
| 44.64                                                     | 1.86 | 152.29          | 1.21 | 184.52             | 36                        | 2730                   | 0.50 | 0.091        | 0.04                     | 11.89          | 0.01               | 0.000        |
| 44.71                                                     | 1.87 | 151.12          | 1.21 | 183.60             | 36                        | 2731                   | 0.50 | 0.091        | 0.04                     | 11.89          | 0.01               | 0.000        |
| 44.78                                                     | 1.87 | 150.04          | 1.22 | 182.85             | 36                        | 2738                   | 0.50 | 0.091        | 0.04                     | 11.89          | 0.01               | 0.000        |
| 44.82                                                     | 1.88 | 149.12          | 1.22 | 182.11             | 36                        | 2738                   | 0.50 | 0.091        | 0.04                     | 11.89          | 0.01               | 0.000        |
| 44.89                                                     | 1.88 | 148.40          | 1.22 | 181.26             | 36                        | 2729                   | 0.50 | 0.091        | 0.05                     | 11.89          | 0.01               | 0.000        |
| 44.97                                                     | 1.88 | 147.81          | 1.22 | 180.44             | 36                        | 2717                   | 0.50 | 0.092        | 0.05                     | 11.89          | 0.01               | 0.000        |
| 45.01                                                     | 1.88 | 147.18          | 1.22 | 179.70             | 36                        | 2708                   | 0.50 | 0.093        | 0.05                     | 11.89          | 0.01               | 0.000        |
| 45.10                                                     | 1.88 | 146.27          | 1.22 | 178.98             | 36                        | 2711                   | 0.50 | 0.093        | 0.05                     | 11.89          | 0.01               | 0.000        |
| 45.17                                                     | 1.88 | 145.40          | 1.23 | 178.36             | 36                        | 2717                   | 0.50 | 0.092        | 0.05                     | 11.89          | 0.01               | 0.000        |
| 45.25                                                     | 1.89 | 144.88          | 1.23 | 178.01             | 36                        | 2723                   | 0.50 | 0.092        | 0.05                     | 11.89          | 0.01               | 0.000        |
| 45.29                                                     | 1.89 | 144.73          | 1.23 | 177.86             | 35                        | 2724                   | 0.50 | 0.092        | 0.05                     | 11.89          | 0.01               | 0.000        |
| 45.36                                                     | 1.89 | 145.54          | 1.23 | 178.57             | 36                        | 2729                   | 0.50 | 0.092        | 0.05                     | 11.89          | 0.01               | 0.000        |
| 45.44                                                     | 1.88 | 146.78          | 1.22 | 179.67             | 36                        | 2737                   | 0.50 | 0.091        | 0.05                     | 11.89          | 0.01               | 0.000        |
| 45.48                                                     | 1.87 | 149.01          | 1.22 | 181.64             | 36                        | 2747                   | 0.50 | 0.091        | 0.04                     | 11.89          | 0.01               | 0.000        |
| 45.55                                                     | 1.86 | 151.45          | 1.21 | 183.48             | 36                        | 2749                   | 0.50 | 0.091        | 0.04                     | 11.89          | 0.01               | 0.000        |
| 45.63                                                     | 1.85 | 154.93          | 1.20 | 185.57             | 36                        | 2735                   | 0.50 | 0.092        | 0.04                     | 11.89          | 0.01               | 0.000        |
| 45.71                                                     | 1.83 | 157.55          | 1.18 | 186.39             | 36                        | 2708                   | 0.50 | 0.094        | 0.05                     | 11.89          | 0.01               | 0.000        |
| 45.75                                                     | 1.82 | 157.27          | 1.18 | 185.00             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 45.82                                                     | 1.83 | 152.27          | 1.19 | 180.54             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 45.90                                                     | 1.85 | 146.10          | 1.20 | 175.19             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 45.93                                                     | 1.87 | 138.88          | 1.22 | 168.88             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 46.01                                                     | 1.90 | 130.47          | 1.24 | 161.62             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 46.09                                                     | 1.95 | 120.79          | 1.27 | 153.02             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 46.13                                                     | 2.01 | 108.28          | 1.31 | 142.16             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 46.20                                                     | 2.09 | 93.05           | 1.41 | 130.91             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 46.28                                                     | 2.21 | 75.26           | 1.65 | 124.08             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 46.35                                                     | 2.33 | 61.30           | 2.05 | 125.97             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 46.40                                                     | 2.42 | 51.95           | 2.51 | 130.27             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 46.48                                                     | 2.49 | 45.88           | 2.92 | 133.96             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 46.56                                                     | 2.55 | 41.27           | 3.34 | 137.98             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 11.89          | 0.00               | 0.000        |
| 46.60                                                     | 2.60 | 38.51           | 3.76 | 144.75             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 46.67                                                     | 2.64 | 37.42           | 4.11 | 153.69             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 46.74                                                     | 2.61 | 41.03           | 3.88 | 159.14             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 46.81                                                     | 2.56 | 47.01           | 3.45 | 162.43             | 43                        | 2771                   | 0.50 | 0.091        | 0.04                     | 11.89          | 0.01               | 0.000        |
| 46.88                                                     | 2.51 | 53.66           | 3.04 | 163.30             | 42                        | 2892                   | 0.50 | 0.083        | 0.03                     | 11.89          | 0.01               | 0.000        |
| 46.92                                                     | 2.52 | 55.11           | 3.08 | 169.98             | 44                        | 3001                   | 0.50 | 0.078        | 0.03                     | 11.89          | 0.01               | 0.000        |
| 47.00                                                     | 2.56 | 52.36           | 3.45 | 180.45             | 48                        | 3093                   | 0.50 | 0.074        | 0.03                     | 11.89          | 0.00               | 0.000        |
| 47.08                                                     | 2.61 | 49.15           | 3.88 | 190.86             | 0                         | 0                      | 0.50 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 47.12                                                     | 2.65 | 47.14           | 4.17 | 196.67             | 0                         | 0                      | 0.49 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 47.19                                                     | 2.64 | 47.14           | 4.15 | 195.86             | 0                         | 0                      | 0.49 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |
| 47.26                                                     | 2.62 | 48.50           | 3.91 | 189.67             | 0                         | 0                      | 0.49 | 0.000        | 0.00                     | 0.00           | 0.00               | 0.000        |

| :: Post-earthquake settlement of dry sands :: (continued) |      |                 |      |                    |                              |                           |      |                 |                             |                |                       |                 |
|-----------------------------------------------------------|------|-----------------|------|--------------------|------------------------------|---------------------------|------|-----------------|-----------------------------|----------------|-----------------------|-----------------|
| Depth<br>(ft)                                             | Ic   | Q <sub>tn</sub> | Kc   | Q <sub>tn,cs</sub> | N <sub>1,60</sub><br>(blows) | G <sub>max</sub><br>(tsf) | CSR  | Shear, γ<br>(%) | e <sub>vol(15)</sub><br>(%) | N <sub>c</sub> | e <sub>v</sub><br>(%) | Settle.<br>(in) |
| 47.34                                                     | 2.58 | 50.86           | 3.56 | 180.90             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 47.38                                                     | 2.51 | 55.60           | 3.04 | 169.08             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 47.45                                                     | 2.44 | 61.38           | 2.57 | 157.76             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 47.52                                                     | 2.35 | 68.17           | 2.14 | 145.60             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 47.60                                                     | 2.28 | 73.20           | 1.87 | 136.82             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 47.64                                                     | 2.23 | 77.07           | 1.68 | 129.50             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 47.72                                                     | 2.17 | 80.61           | 1.55 | 124.82             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 47.79                                                     | 2.11 | 85.40           | 1.44 | 122.58             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 47.87                                                     | 2.06 | 89.96           | 1.37 | 123.18             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 47.91                                                     | 2.02 | 95.30           | 1.32 | 126.10             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 47.99                                                     | 1.98 | 100.88          | 1.29 | 130.31             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 48.06                                                     | 1.95 | 106.34          | 1.27 | 134.85             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 48.10                                                     | 1.93 | 110.12          | 1.25 | 138.10             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 48.18                                                     | 1.92 | 111.58          | 1.25 | 139.33             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 48.26                                                     | 1.91 | 112.03          | 1.25 | 139.67             | 0                            | 0                         | 0.49 | 0.000           | 0.00                        | 11.89          | 0.00                  | 0.000           |
| 48.30                                                     | 1.92 | 111.39          | 1.25 | 139.03             | 28                           | 2291                      | 0.49 | 0.137           | 0.09                        | 11.89          | 0.01                  | 0.000           |
| 48.37                                                     | 1.92 | 110.18          | 1.25 | 137.84             | 28                           | 2284                      | 0.49 | 0.138           | 0.09                        | 11.89          | 0.02                  | 0.000           |
| 48.45                                                     | 1.93 | 108.53          | 1.25 | 136.19             | 28                           | 2275                      | 0.49 | 0.140           | 0.09                        | 11.89          | 0.02                  | 0.000           |
| 48.52                                                     | 1.93 | 106.92          | 1.26 | 134.62             | 27                           | 2267                      | 0.49 | 0.141           | 0.10                        | 11.89          | 0.02                  | 0.000           |
| 48.56                                                     | 1.94 | 105.52          | 1.26 | 133.28             | 27                           | 2262                      | 0.49 | 0.142           | 0.10                        | 11.89          | 0.02                  | 0.000           |
| 48.63                                                     | 1.94 | 104.58          | 1.27 | 132.45             | 27                           | 2262                      | 0.49 | 0.142           | 0.10                        | 11.89          | 0.02                  | 0.000           |
| 48.71                                                     | 1.95 | 104.20          | 1.27 | 132.19             | 27                           | 2269                      | 0.49 | 0.141           | 0.10                        | 11.89          | 0.02                  | 0.000           |
| 48.78                                                     | 1.95 | 104.72          | 1.27 | 132.84             | 27                           | 2281                      | 0.49 | 0.139           | 0.10                        | 11.89          | 0.02                  | 0.000           |
| 48.85                                                     | 1.95 | 105.63          | 1.27 | 133.86             | 27                           | 2296                      | 0.49 | 0.137           | 0.09                        | 11.89          | 0.01                  | 0.000           |
| 48.89                                                     | 1.94 | 107.18          | 1.26 | 135.54             | 28                           | 2315                      | 0.49 | 0.134           | 0.09                        | 11.89          | 0.01                  | 0.000           |
| 48.96                                                     | 1.94 | 108.98          | 1.26 | 137.40             | 28                           | 2334                      | 0.49 | 0.132           | 0.09                        | 11.89          | 0.01                  | 0.000           |
| 49.03                                                     | 1.93 | 111.47          | 1.26 | 139.93             | 28                           | 2356                      | 0.49 | 0.129           | 0.09                        | 11.89          | 0.01                  | 0.000           |
| 49.11                                                     | 1.92 | 113.64          | 1.25 | 142.07             | 29                           | 2373                      | 0.49 | 0.127           | 0.08                        | 11.89          | 0.01                  | 0.000           |
| 49.15                                                     | 1.91 | 115.97          | 1.24 | 144.34             | 29                           | 2389                      | 0.49 | 0.125           | 0.08                        | 11.89          | 0.01                  | 0.000           |
| 49.22                                                     | 1.90 | 118.12          | 1.24 | 146.43             | 29                           | 2405                      | 0.49 | 0.124           | 0.08                        | 11.89          | 0.01                  | 0.000           |
| 49.30                                                     | 1.87 | 122.04          | 1.22 | 148.48             | 29                           | 2352                      | 0.49 | 0.130           | 0.08                        | 11.89          | 0.01                  | 0.000           |
| 49.37                                                     | 1.98 | 79.42           | 1.29 | 102.62             | 21                           | 2754                      | 0.48 | 0.094           | 0.09                        | 11.89          | 0.01                  | 0.000           |
| 49.41                                                     | 1.95 | 80.91           | 1.27 | 102.76             | 21                           | 2700                      | 0.48 | 0.097           | 0.09                        | 11.89          | 0.01                  | 0.000           |
| 49.49                                                     | 1.95 | 82.22           | 1.27 | 104.27             | 21                           | 2738                      | 0.48 | 0.095           | 0.09                        | 11.89          | 0.01                  | 0.000           |
| 49.57                                                     | 1.96 | 83.36           | 1.28 | 106.34             | 22                           | 2820                      | 0.48 | 0.089           | 0.08                        | 11.89          | 0.01                  | 0.000           |
| 49.61                                                     | 1.97 | 84.51           | 1.28 | 108.33             | 22                           | 2893                      | 0.48 | 0.085           | 0.07                        | 11.89          | 0.01                  | 0.000           |
| 49.68                                                     | 2.02 | 80.00           | 1.32 | 105.88             | 22                           | 2928                      | 0.48 | 0.083           | 0.07                        | 11.89          | 0.01                  | 0.000           |
| 49.75                                                     | 2.03 | 81.87           | 1.33 | 108.89             | 23                           | 3028                      | 0.48 | 0.078           | 0.07                        | 11.89          | 0.01                  | 0.000           |
| 49.81                                                     | 2.03 | 83.14           | 1.33 | 110.87             | 23                           | 3093                      | 0.48 | 0.076           | 0.06                        | 11.89          | 0.01                  | 0.000           |

**:: Post-earthquake settlement of dry sands :: (continued)**

| Depth<br>(ft) | I <sub>c</sub> | Q <sub>tn</sub> | K <sub>c</sub> | Q <sub>tn,cs</sub> | N <sub>1,60</sub><br>(blows) | G <sub>max</sub><br>(tsf) | CSR | Shear, γ<br>(%) | e <sub>vol(15)</sub><br>(%) | N <sub>c</sub> | e <sub>v</sub><br>(%) | Settle.<br>(in) |
|---------------|----------------|-----------------|----------------|--------------------|------------------------------|---------------------------|-----|-----------------|-----------------------------|----------------|-----------------------|-----------------|
|---------------|----------------|-----------------|----------------|--------------------|------------------------------|---------------------------|-----|-----------------|-----------------------------|----------------|-----------------------|-----------------|

**Total estimated settlement: 1.44****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                            |

# **APPENDIX G**

## **GENERAL GRADING GUIDELINES**

**Updated Geotechnical and Infiltration Evaluation  
Xenia Apartment Project, Beaumont, California  
Project No. 2784-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 contractors 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 contractors' 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 contractors 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 contractors 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.

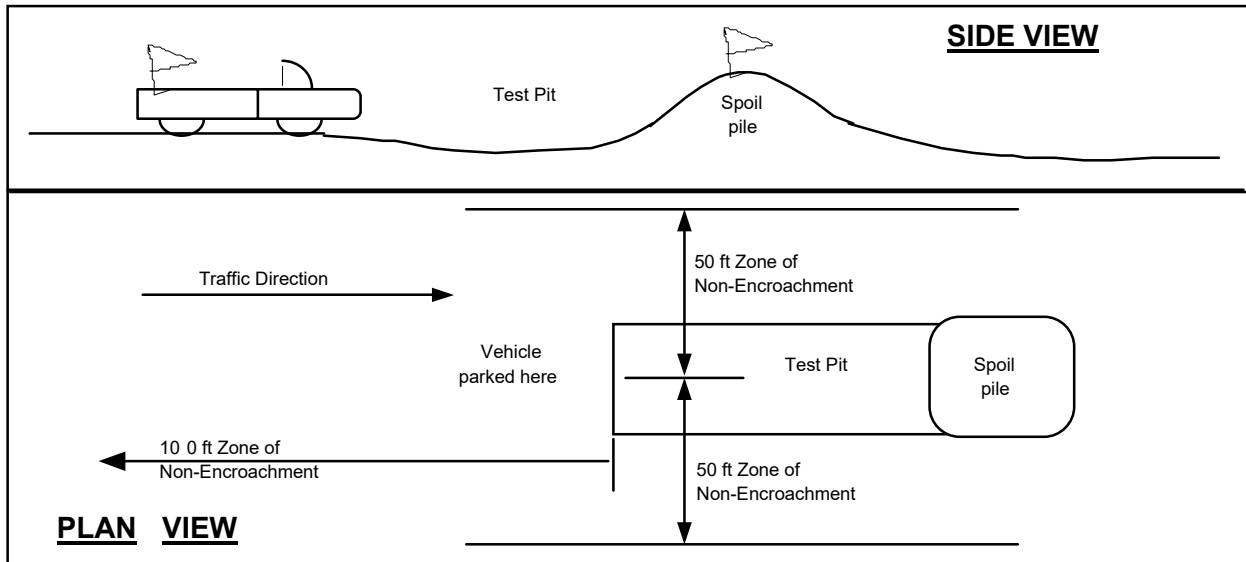
### **Test Pits Location, Orientation and Clearance**

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**

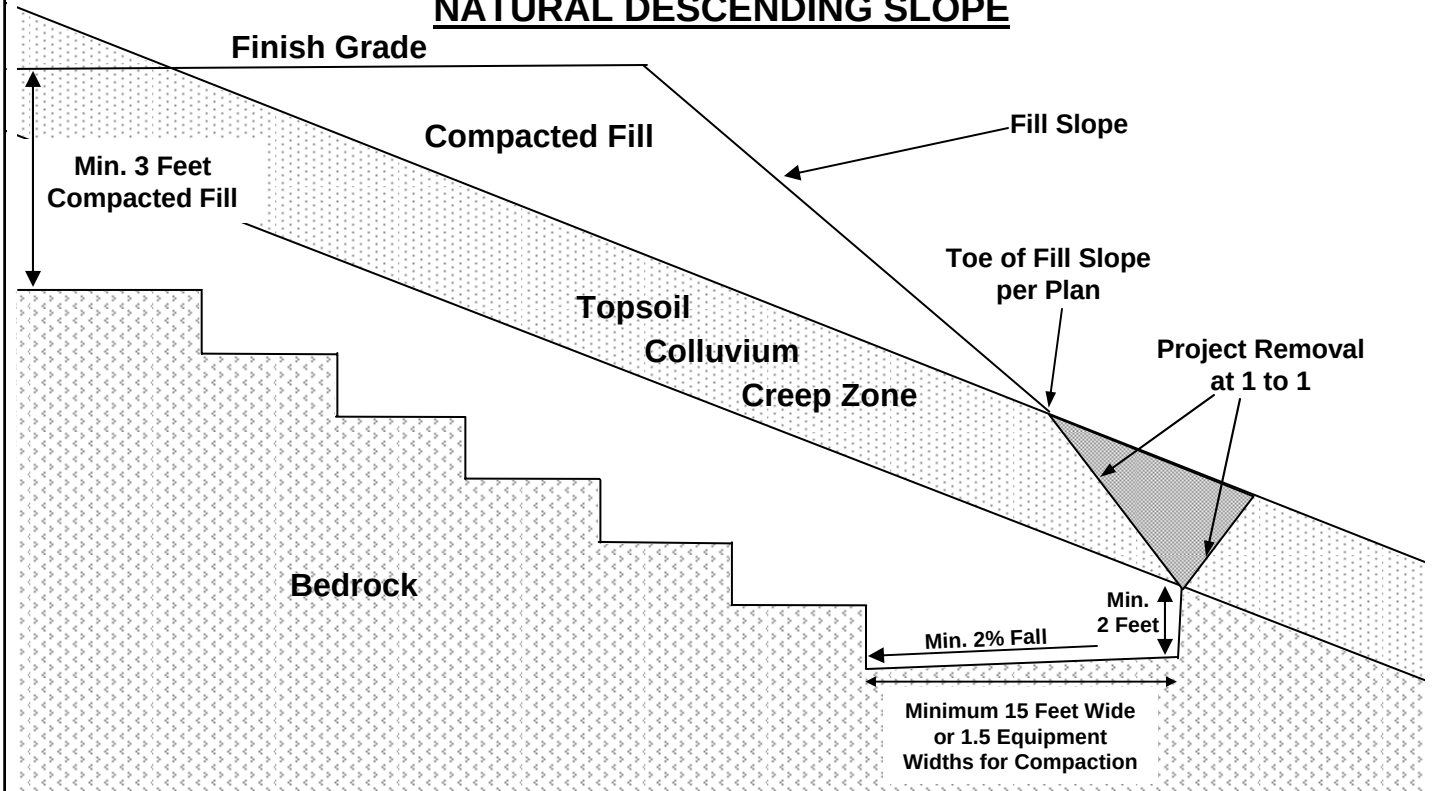
In the event that the technician's safety is jeopardized or compromised as a result of the contractor's failure to comply with any of the above, the technician is directed to inform both the developer's and contractor's representatives. If the condition is not rectified, the technician is required, by 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.

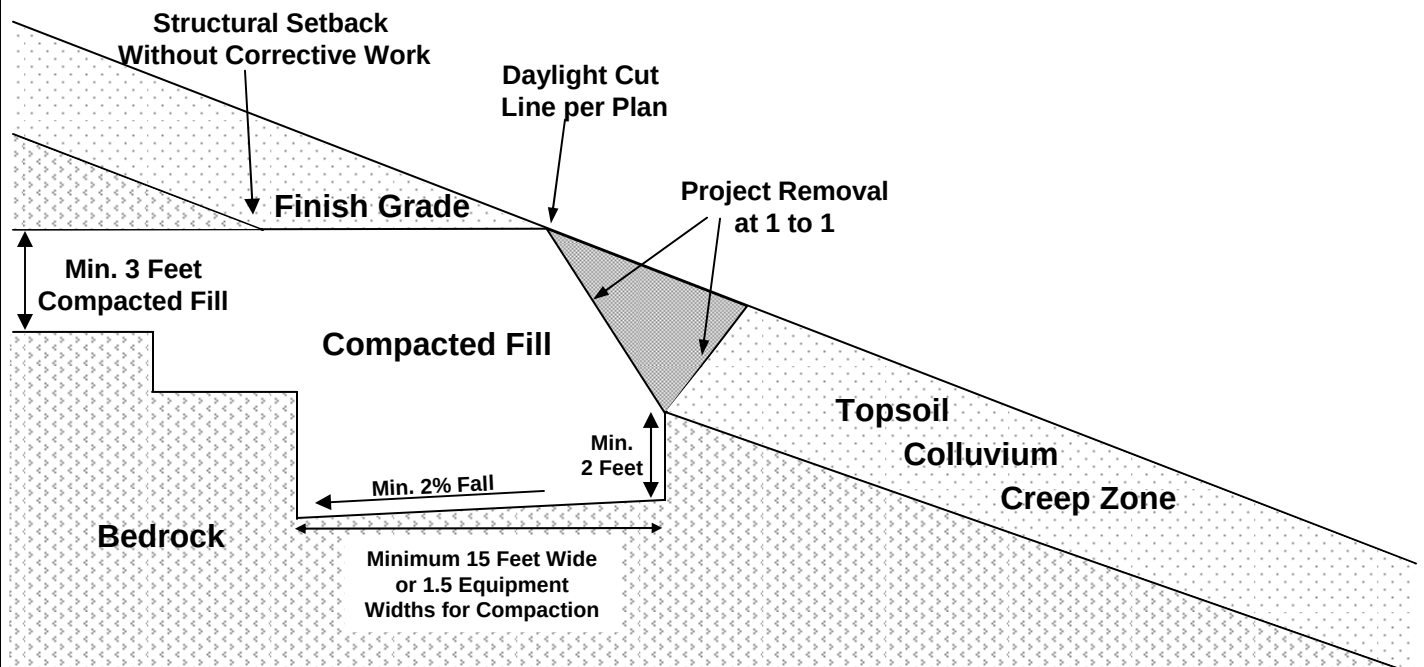
The safety procedures outlined above should be discussed at the contractor's safety meetings. This will serve to inform and remind equipment operators of these safety procedures particularly the zone of non-encroachment.

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.

## TYPICAL FILL SLOPE OVER NATURAL DESCENDING SLOPE



## DAYLIGHT CUT AREA OVER NATURAL DESCENDING SLOPE



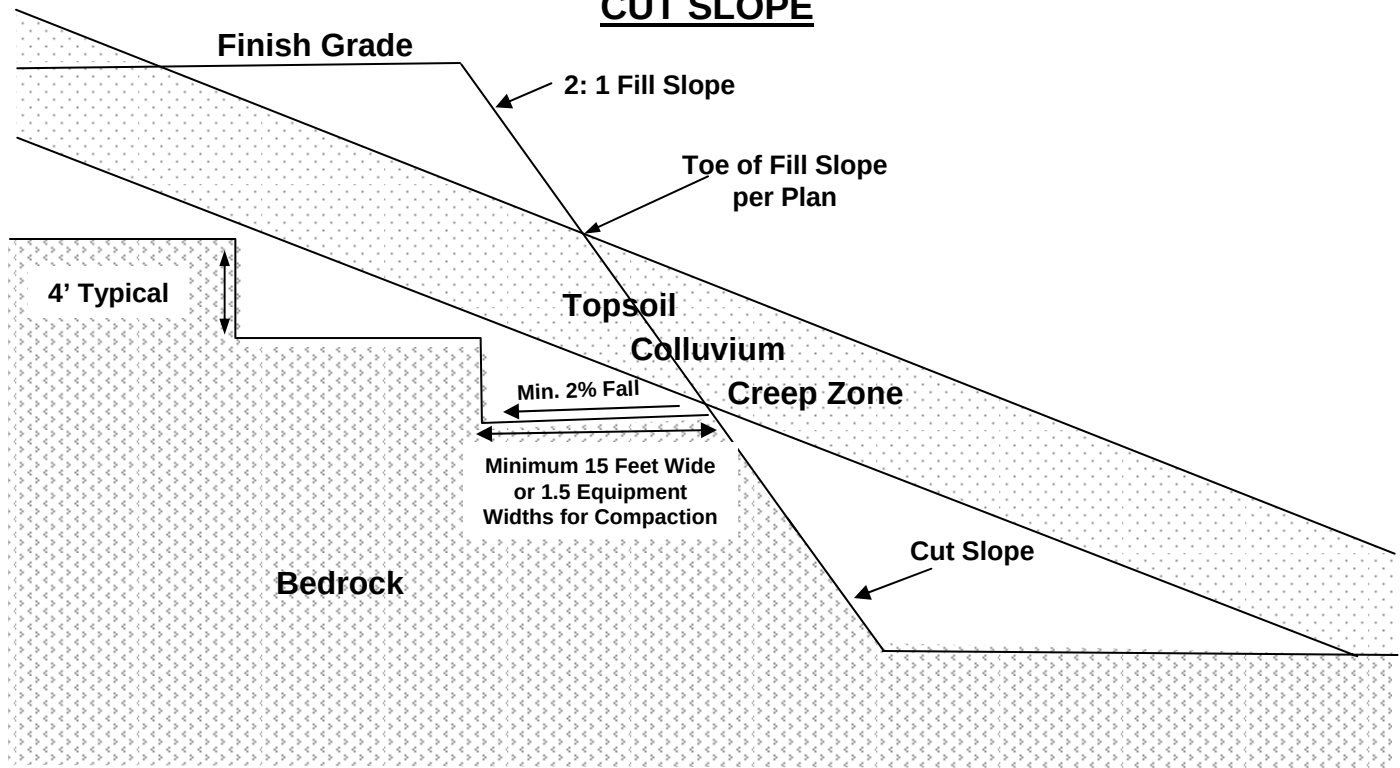
1548 North Maple Street  
Corona, California 92880

TREATMENT ABOVE  
NATURAL SLOPES

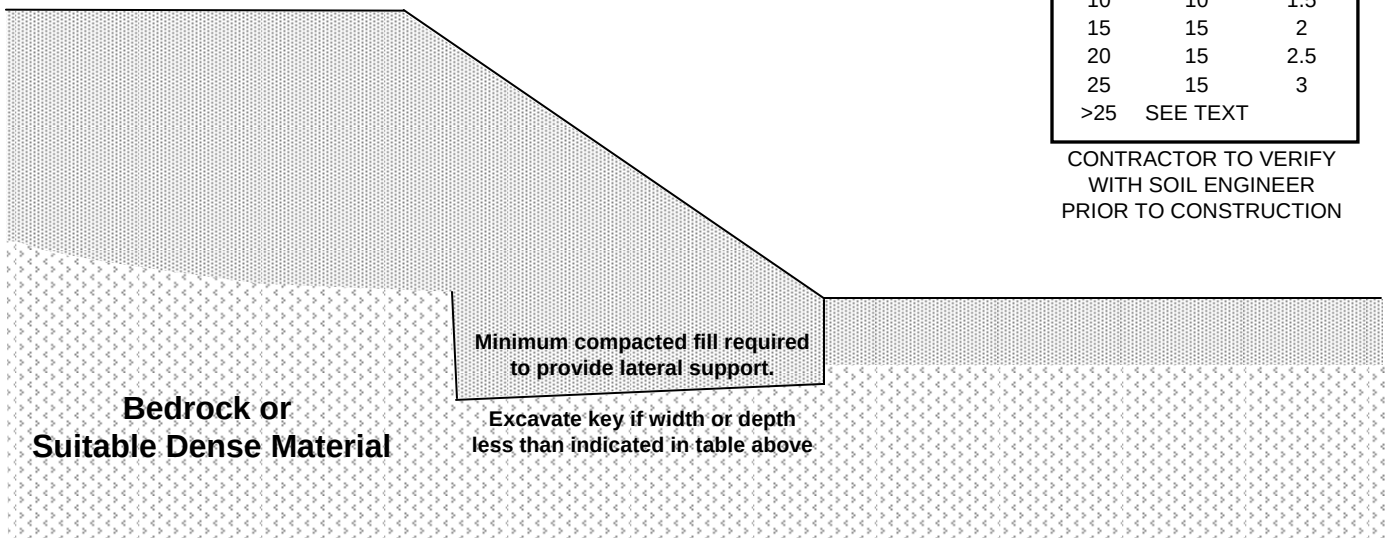
STANDARD GRADING  
GUIDELINES

PLATE G-1

## TYPICAL FILL SLOPE OVER CUT SLOPE



## TYPICAL FILL SLOPE



| SLOPE<br>HEIGHT | MIN. KEY<br>WIDTH | MIN. KEY<br>DEPTH |
|-----------------|-------------------|-------------------|
| 5               | 7                 | 1                 |
| 10              | 10                | 1.5               |
| 15              | 15                | 2                 |
| 20              | 15                | 2.5               |
| 25              | 15                | 3                 |
| >25             | SEE TEXT          |                   |

CONTRACTOR TO VERIFY  
WITH SOIL ENGINEER  
PRIOR TO CONSTRUCTION



1548 North Maple Street  
Corona, California 92880

COMMON FILL  
SLOPE KEYS

STANDARD GRADING  
GUIDELINES

PLATE G-2