A 2018 EARTH SYSTEMS PACIFIC GEOTECHNICAL ENGINEERING REPORT

GEOTECHNICAL ENGINEERING REPORT
OXNARD HIGH SCHOOL NO. 8
NORTHEAST OF CAMINO DEL SOL AND NORTH ROSE AVENUE
OXNARD, CALIFORNIA

August 31, 2018

Prepared for

Mr. James R. Steele
Tetra Tech, Inc.

Prepared by

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August 31, 2018

File No.: 301953-002

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PROJECT: OXNARD HIGH SCHOOL NO. 8
NORTHEAST OF CAMINO DEL SOL AND NORTH ROSE AVENUE
OXNARD, CALIFORNIA

SUBJECT: Geotechnical Engineering Report

REF: Proposal to Provide a Geotechnical Engineering Report, Oxnard High School No. 8, Northeast of Camino Del Sol and North Rose Avenue, Oxnard, California by Earth Systems Pacific, dated June 27, 2018, Doc. No. 1806-063.PRP

Dear Mr. Steele:

In accordance with the authorization of the above-referenced proposal, this geotechnical engineering report has been prepared for use in the development of plans and specifications for the Oxnard High School No. 8 project. The school campus is located northeast of Camino Del Sol and North Rose Avenue in the City of Oxnard, California. Preliminary geotechnical recommendations for site preparation, grading, utility trenches, foundations, retaining walls, slabs-on-grade and exterior flatwork, pavement sections, drainage and maintenance, and construction observation and testing are presented herein. Two bound copies and an electronic copy of this report are being furnished for your use.

We appreciate the opportunity to have provided services for this project and look forward to working with you again in the future. If there are any questions concerning this report, please do not hesitate to contact the undersigned.

Sincerely,

Earth Systems Pacific

Doug Dunham

Doug Dunham, GE
Associate Engineer

Doc. No. 1808-091.SER/ln

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Appendices

1.0 INTRODUCTION

Oxnard High School No. 8 is planned northeast of Camino Del Sol and North Rose Avenue in the City of Oxnard, California. The school campus is referred to herein as "the site." The site is shown on the Exploration Location Map presented in Appendix A.

We understand it is planned to construct the following buildings/structures, athletic facilities, and surface improvements.

Buildings/Structures

Buildings/Structures	Building/Structure Footprint (feet^2)	Number of Stories
Locker Room/Gymnasium	45,730	2
Performing Arts	26,500	2
Media/Administration	14,575	1
Shops 1	14,025	2
Shops 2	11,160	1
Academic Labs	17,400	2
Kitchen/Multipurpose Room	17,770	1
Academic Classroom 1	5,380	2
Academic Classroom 2	5,690	2
Academic Classroom 3	14,470	2
Daycare	2,900	1
Stadium Restroom 1	1,600	1
Stadium Restroom 2	1,600	1
Home Bleachers	15,175	n/a
Visitor Bleachers	7,500	n/a

Athletic Facilities

Sports Facilities	Facility Footprint (feet^2)	Surface Covering
Track/Football Field	159,031	Turf
Varsity Baseball Field	135,347	Turf
Junior Varsity Baseball Field	113,034	Turf
Varsity Softball Field	55,259	Turf
Junior Varsity Softball Field	53,695	Turf
Soccer Field	182,831	Turf
Basketball Courts	52,960	Paved
Tennis Courts	43,590	Paved

Surface Improvements

Parking Lots	Parking Lot Footprint (feet^2)	Number of Parking Spaces
Staff	180,088	318
Student	123,300	305
Visitor	3,230	18
Northeast Joint Use	33,115	89
Northwest Joint Use	46,810	76

As the project is in its preliminary design stages, we have assumed that: 1) the buildings/structures depending on size and usage will be of wood-frame, of steel-frame, of masonry, of Portland cement concrete (PCC) construction materials, or combinations thereof; 2) the buildings/structures will utilize PCC slabs-on-grade; 3) masonry or PCC retaining walls for site work but not forming part of a building and less than 6 feet in height may also be constructed; and 4) maximum line and point loads will be on the order of 4 kips/foot and 60 kips, respectively.

We have assumed surface improvements will consist of hot mix asphalt (HMA) and/or PCC pavement placed on aggregate base (AB) for vehicle use, and PCC flatwork placed on AB or compacted soils for pedestrian use. Subsurface improvements are assumed to be the underground municipal sewer, water, storm drain, power, and communication conduits that will provide utility service to the project. No on-site effluent disposal systems for sewage or Low Impact Development (LID) drainage improvements for runoff infiltration and/or filtering have been identified as part of the project; therefore, these items are not addressed within this report.

We have assumed the site will be mass graded to develop the building and surface improvement areas, to improve access, and to improve drainage. Due to the relatively level to very gently sloping topography at the site, grading cuts and fills are anticipated to be minimal to develop final grades; no slopes are anticipated.

2.0 SCOPE OF SERVICES

The scope of work for the geotechnical engineering report included a general site reconnaissance, subsurface exploration, laboratory testing of selected soil samples, geotechnical analysis of data, and preparation of this report. The analysis and subsequent recommendations were based, in part, upon information provided by the client.

This report and preliminary geotechnical recommendations are intended to comply with the considerations of the California Building Code (CBC) Sections 1803A.1 through 1803A.6, J104.3 and J104.4 (CBSCa, 2016), as applicable; the California Geological Survey (CGS) Note 48 (CGS, 2013); the California Code of Regulations Title 24 (CBSCb, 2016); and common geotechnical engineering practice in this area under similar conditions at this time. The test procedures were accomplished in general conformance with the standards noted, as modified by common geotechnical engineering practice in this area under similar conditions at this time.

Preliminary geotechnical recommendations for site preparation, grading, utility trenches, foundations, retaining walls, slabs-on-grade and exterior flatwork, pavement sections, drainage and maintenance, and construction observation and testing are presented to guide the development of project plans and specifications. It is our intent that this report be used exclusively by the client to form the geotechnical basis of the design of the project and in the preparation of plans and specifications. Application beyond this intent is strictly at the user's risk. If future parties wish to use this report, such use may be allowed to the extent the report is applicable, only if the user agrees to be bound by the same contractual conditions as the original client, or contractual conditions that may be applicable at the time of the report use.

This report does not address issues in the domain of contractors such as, but not limited to, site safety, loss of volume due to stripping of the site, shrinkage of soils during compaction, dewatering, temporary slope angles, construction means and methods, etc. Analyses of the

soil for asbestos (either man-made or naturally occurring), radioisotopes, mold or other microbial content, hydrocarbons, lead, and/or other chemical properties (except for geotechnical corrosivity) are beyond the scope of this report. Ancillary features such as temporary access roads, fencing, flag and light poles, signage, LID drainage improvements, effluent disposal systems; and nonstructural fills and slopes are not within our scope and are also not addressed.

As there may be unresolved geotechnical issues with respect to this project, the geotechnical engineer should be retained to provide consultation as the design progresses, and to review project plans as they near completion to assist in verifying that pertinent geotechnical issues have been addressed and to aid in conformance with the intent of this report. In the event that there are any changes in the nature, design, or location of improvements, or if any assumptions used in the preparation of this report prove to be incorrect, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions of this report are verified or modified by the geotechnical engineer in writing. The criteria presented in this report are considered preliminary until such time as any peer review or review by any jurisdiction has been completed, conditions are observed by the geotechnical engineer in the field during construction, and the recommendations have been verified as appropriate or are modified by the geotechnical engineer in writing.

3.0 SITE SETTING

The site is located northeast of the intersection of Camino Del Sol and North Rose Avenue within the northeast sector of the City of Oxnard, California. The site is currently accessed off of Camino Del Sol. The approximate central coordinates and elevation from the Google Earth website (Google, 2018) where a majority of the campus buildings are currently planned are latitude 34.2077 degrees north, longitude 119.1554 degrees west, and 56 feet.

At the writing of this report, the site is being utilized for agriculture purposes; however, it was temporarily devoid of vegetation during our subsurface exploration program due to the crop rotation process. Surface and subsurface improvements associated with the agriculture operations exist within the site. Topographically, the site is relatively level to very gently sloping. Drainage is by sheet flow to south-southwest.

4.0 FIELD INVESTIGATION AND LABORATORY ANALYSIS

On April 10, 2018 and between July 16 to 26, 2018, fifty-three exploratory borings were drilled at the site to depths ranging from approximately 10 to 51.5 feet below the existing ground surface. The borings were drilled with a Mobile Drill Model B-53 drill rig, equipped with 6-inch outside diameter hollow stem auger and an automatic trip hammer for sampling. On April 20, 2018 and July 16, 2018, ten cone penetrometer test (CPT) soundings were also performed at the site. The CPT soundings were advanced to depths ranging from approximately 11 to 60 feet below the existing ground surface. Three of the CPT soundings met refusal at relatively shallow depths; therefore, those soundings are not included within this report. We have only included and analyzed the CPT soundings that extend to depths of approximately 45 feet or deeper below the existing ground surface. The approximate locations of the borings and CPT soundings are shown on the Exploration Location Map presented in Appendix A.

Soils encountered in the exploratory borings were categorized and logged in general accordance with the Unified Soil Classification System and ASTM D2488-17. Copies of the boring logs and a Boring Log Legend are included in Appendix A. In reviewing the boring logs and legend, the reader should recognize that the legend is intended as a guideline only, and there are a number of conditions that may influence the soil characteristics as observed during drilling. These include, but are not limited to, the presence of cobbles or boulders, cementation, variations in soil moisture, presence of groundwater, and other factors.

Consequently, the logger must exercise judgment in interpreting the subsurface characteristics, possibly resulting in descriptions that vary somewhat from the legend.

The CPT soundings were conducted in general accordance with ASTM D5778-12 and D3441-16 using an electric cone penetrometer. Copies of the graphical CPT data can also be found in Appendix A.

As the exploratory borings were drilled, soil samples were obtained using a ring-lined barrel sampler (ASTM D3550-17, with shoe similar to D2937-17) and Standard Penetration Tests (SPT) were conducted at selected depths within the borings (ASTM D1586-11). Bulk soil samples were also obtained from the auger cuttings.

Ring samples were tested for bulk density per ASTM D2937-17 (modified for ring liners). Four bulk samples were tested for maximum density and optimum moisture content (ASTM D1557-12). Direct shear tests (ASTM D3080/D3080M-11) were conducted on the same four bulk samples after they were remolded to approximately 90 percent of maximum dry density. Six one-dimensional consolidation tests (ASTM D2435/D2435M-11) were performed on ring samples. Particle size tests (ASTM D422-63/07 and D1140-17) were conducted on fourteen bulk and ring samples. The expansion index (ASTM D4829-11) was determined for one bulk sample. For use in the development of pavement design criteria, two bulk samples were tested for R-value (ASTM D2844/D2844M-13). Four bulk samples were also sent to Cerco Analytical of Concord, California for use in preparing a corrosion evaluation report. The evaluation and associated test results are for use by the architect/engineer in determining appropriate corrosion mitigation measures. The laboratory test results and the corrosion evaluation report prepared by Cerco Analytical are presented in Appendices B and C, respectively.

Sampler Blow Counts in Granular Alluvial Soils

The majority of the alluvial soils observed in the borings were generally classified as sands, and some of the sand layers had variable amounts of rocks (from 0 to approximately 17 percent) that ranged from fine gravel to cobble in size. Where these sand soils were below the existing groundwater elevations, flow sands were encountered at isolated depths in some of the deeper borings. These conditions can have an influence on the sampler blow counts.

Using our knowledge of the subsurface conditions in Oxnard, we implemented a drilling and sample acquisition monitoring program with respect to addressing the influence that rocks and flow sands could have on the sampler blow counts. All drilling and sampling operations were closely monitored. We further utilized drilling fluid in the deeper borings below the groundwater surface to reduce the potential for flow sands to intrude into the bottom of the hollow stem drill auger. The specific depths where the sampler blow counts appeared to be comprised by rocks or by flow sands are noted within the boring logs. Because of the potential uncertainties of some of the sampler blow counts, we exclusively used the CPT data for estimating the magnitude of liquefaction and seismically induced settlement of dry sand presented later in this report.

5.0 GENERAL SUBSURFACE PROFILE

The general subsurface profile observed in the borings consisted of layered alluvial sand soils with varying amounts of silt and clay. The only exceptions were relatively thin isolated silt and clay soil layers encountered at various elevations within several of the borings. The sand soils were in a slightly moist to wet condition with a loose to dense consistency. The silt and clay soils were moist to wet and very soft to very stiff. Several of the sand soil layers also had varying amounts of fine to coarse gravel and cobbles. Subsurface water was encountered between the depths of approximately 20 to 25 feet below the existing ground surface in the deeper borings. Please refer to the boring logs and graphical CPT data for a more complete description of the subsurface conditions. It should be noted that the CPT soil behavior data

correlated fairly well to the soil conditions observed in the deeper borings drilled in close proximity to each of the CPT Soundings. Based on the subsurface soil profile described above, the Site Class per Chapter 20 Table 20.3-1 (ASCE, 2013) is "D", a "Stiff Soil Profile".

6.0 CONCLUSIONS

In our opinion, the site is suitable, from a geotechnical engineering standpoint, for the planned buildings/structures and improvements as described in the "Introduction" section of this report, provided the recommendations contained herein are implemented in the design and construction. The upper site soils were tested and found to be generally nonexpansive; therefore, no special measures with respect to expansive soils are considered necessary. Assuming the site is designed and prepared in accordance with the "Preliminary Geotechnical Recommendations" section of this report, the buildings and other ancillary structures may be supported by shallow conventional continuous and spread (pad) footings, and structures such as stadium light standards, scoreboards, etc. may alternatively be supported by deeper cast-in-drilled-hole (CIDH) piles.

The primary geotechnical engineering concerns at the site are the potential for settlement, the excavation characteristics of the soils, the suitability of the soils for use as fill and backfill, the stability of the soils during grading, the corrosive nature of the soils, the erodible nature of the soils, and the potential for liquefaction and seismically induced settlement of dry sand.

Settlement Potential

Settlement (total and differential) can occur when foundations and surface improvements span soil materials having variable moisture and density characteristics. Such a situation could stress and possibly damage foundations and surface improvements, often resulting in severe cracks and displacement. To reduce this settlement potential, it is necessary for all foundations and surface improvements to bear on material that is as uniform as practicable. A program of overexcavation, scarification, moisture conditioning, and compaction of the

upper soils in the building and the surface improvement areas is recommended to provide more uniform soil moisture and density, and appropriate support.

Excavation Characteristics

The site soils are anticipated to be readily excavatable with conventional earthmoving equipment; however, the stability of excavations is a concern. Additionally, various size rocks were noted within some of the soil layers. Based on our preliminary testing, the soils are considered to be "Type C" per the 2007 Cal/OSHA classification system. This classification should be verified by the contractor's "Competent Person" at the time of construction. Excavation sloping and shoring will be needed to safely work in and to restrict the size of the excavations, and to reduce the potential for falling rock hazards. As with all construction safety issues, the methods of excavation stabilization, sloping, and/or shoring are ultimately the responsibility of the contractor.

Suitability of the Soils for Use as Fill and Backfill

We anticipate that the majority, if not all, of the soils excavated at the site will be acceptable from a geotechnical viewpoint for reuse as compacted fill and backfill. However, special requirements for utility trench bedding and shading per the specifications of the City of Oxnard, the conduit manufacturer, and the utility companies should be anticipated.

Stability of the Soils During Grading

The site soils may be susceptible to temporary high soil moisture contents, especially during or soon after the rainy season. Attempting to compact the soils in an overly moist condition may create unstable conditions in the form of pumping, yielding, shearing, and/or rutting. These conditions will not allow proper compaction and are inappropriate for continued fill placement. Therefore, the construction schedule should allow adequate time during grading for aerating and drying the soils to near optimum moisture content prior to compaction. If

unstable conditions occur, the geotechnical engineer should be consulted to provide recommendations for correction of the conditions.

Corrosive Soils

Based on the testing performed by Cerco Analytical, the upper site soils were classified as "corrosive" to certain construction materials that will be in contact with the soils. The architect/engineer should refer to the Cerco Analytical report presented in Appendix C for use in determining appropriate mitigation measures for the soil's corrosivity.

Soil Erosion

The site soils are considered to be highly erodible. Stabilization of surface soils, particularly those disturbed during construction, by vegetation or other means *during* and *following* construction is essential to reduce the potential of erosion damage. Care should be taken to establish and maintain proper drainage around the structures and improvements.

Liquefaction and Seismically Induced Settlement of Dry Sand

Liquefaction is the loss of soil strength caused by a significant seismic event. It occurs primarily in loose, fine to medium-grained sands, and in very soft to medium stiff silts that are saturated by groundwater. During a major earthquake, the saturated sands and silts tend to compress and the void spaces between the soil particles that are filled with water decrease in volume. This causes the pore water pressure to build up in the soils. Then if the water does drain away rapidly, the soils may lose their strength and transition into a liquefied state.

Seismically induced settlement of dry sand is also caused by a significant seismic event which could occur in lower density sand and silt soils that are not saturated by groundwater. During a major earthquake, the air void spaces between the unsaturated soil particles tend to compress which translates to a decrease in volume or settlement.

In order to assess the potential for liquefaction and seismically induced settlement of dry sand to occur at the site, we reviewed the boring data and utilized methods suggested by the Guidelines for Evaluating and Mitigating Seismic Hazards in California, Special Publication 117a (CDMG, 2008). Considering the presence of groundwater in the upper 50 feet of soil (measured at 20 to 25 feet below the existing ground surface) and the density of sand and silt soils, there appears to be a potential for both liquefaction and seismically induced settlement of dry sand to occur at the site.

To further understand the effects of liquefaction, we performed analyses of the CPT data using the site-specific PGA of 0.969g (provided by the client from their site specific ground motion analysis), an earthquake modal magnitude of 6.77 (USGS, 2018), an assumed historical high groundwater depth of 8 feet below the existing ground surface (provided by the client), and the approximate existing groundwater depth of approximately 20 feet below the existing ground surface. Based on the analyses presented in Appendix D, it appears liquefaction occurs in relatively thin discontinuous soil layers. Total liquefaction induced dynamic settlement assuming a groundwater depth of 8 feet ranged between 0.2 to 1.2 inches, and 0.1 to 0.6 inches for a groundwater depth of 20 feet. The summary of the liquefaction induced dynamic settlement is shown on the Tables below.

As part of the liquefaction evaluation, seismically induced settlement of dry sand was also analyzed. To perform those analyses, we utilized a reduced or modified PGA value of 2/3 (0.969g) = 0.646g. Additionally, the upper 30 inches of soil were neglected in the analyses. The reasoning being that the upper 2 to 3 feet of the surface soils had been recently ripped and plowed as part of the on-going agriculture operations at the site, and these soils will ultimately be removed and replaced as moisture conditioned compacted fill as part of future site development as recommended later in the “Grading” section of this report. Total seismically induced settlement of dry sand assuming a groundwater depth of 8 feet ranged between 0 to 0.2 inches, and 0.1 to 0.2 inches for a groundwater depth of 20 feet. The

summary of seismically induced settlement of dry sand calculated is shown on the Tables below.

Groundwater at 8 feet

CPT Number	Total Liquefiable Thickness (feet)	Dynamic Settlement (inches)	Dry Sand Settlement (inches)	Total Seismic Settlement (inches)
1	1.6	0.2	0.1	0.3
2A	3.8	0.6	0.1	0.7
3	2.3	0.3	0	0.3
4	7.2	1.2	0	1.2
5	5.7	0.8	0.1	0.9
6A	2.1	0.3	0.1	0.4
7	3.1	0.4	0.2	0.6

Groundwater at 20 feet

CPT Number	Total Liquefiable Thickness (feet)	Dynamic Settlement (inches)	Dry Sand Settlement (inches)	Total Seismic Settlement (inches)
1	1.1	0.1	0.1	0.2
2A	3.8	0.6	0.2	0.8
3	2.3	0.3	0.1	0.4
4	3.8	0.5	0.2	0.7
5	1.8	0.2	0.2	0.4
6A	2.1	0.3	0.1	0.4
7	1.3	0.1	0.2	0.3

In summary, total and differential settlement attributed to liquefaction induced dynamic settlement in conjunction with seismically induced settlement of dry sand is not anticipated to exceed 1.5 inches and 0.75 inches, respectively.

Based on the results of the liquefaction analysis, the potential for loss of soil bearing strength and lateral spreading was determined to be very low. The assessment for loss of soil bearing strength was developed by comparing the thickness of the overlying non-liquefiable soils with respect to the depth, the relatively thin thickness, and the discontinuous nature of the

underlying liquefiable soils. Lateral spreading can occur when a soil mass either slides laterally on liquefied soil layers towards a free slope face, or when a soil mass moves downslope on sloping ground. Since a free slope face does not exist within or near the site, we focused on the sloping ground aspect of lateral spreading. Based on the Google Earth website (Google, 2018), the site slopes at approximately 0.35 percent from the north to the south. The assessment for lateral spreading was developed by considering the relatively flat to very gently sloping ground surface with respect to the discontinuous nature of the underlying liquefiable soils. The conditions needed for lateral spreading to occur do not appear to exist at the site.

Based on the information presented above, it is our opinion that no special measures will be needed to protect the structures and improvements from either liquefaction or seismically induced settlement of dry sand.

7.0 PRELIMINARY GEOTECHNICAL RECOMMENDATIONS

The following preliminary geotechnical recommendations are applicable to the planned buildings/structures and improvements as described in the "Introduction" section of this report and assume that all floors will be above grade. If taller buildings, basements, or other features are incorporated into site development, this firm should be contacted for individual assessment.

Definitions

Unless otherwise noted, the following definitions are used in these recommendations. Where specific terms are not defined, common definitions used in the construction industry are intended.

- **Building Area:** The area within and extending a minimum of 5 feet beyond the perimeter of the foundations for a structure. The building area also includes the

foundation areas (plus 5 feet to each side) of any ancillary structure that will be rigidly attached to the main structure and is expected to perform in the same manner as the main structure. Such structures could include staircases, covered walkways, covered work areas, patio covers, arbors, etc.

- **Surface Improvement Area:** The area within and extending a minimum of 2 feet beyond the perimeter of the surface improvement.

- **Scarified**: Ripping the exposed soil surface in two orthogonal directions to a minimum depth of 12 inches.

- **Moisture Conditioning:** Adjusting the soil moisture to optimum moisture content or slightly above, prior to the application of compaction effort.

- **Compacted or Recompacted:** Soils placed in level lifts not exceeding 8 inches in loose thickness, and compacted to a minimum of 90 percent of maximum dry density. A minimum of 95 percent will be required in the upper 1-foot of subgrade below vehicle pavement and in all AB. The standard tests used to define maximum dry density and field density should be ASTM D1557-12 and ASTM D6938-17a, respectively, or by other methods acceptable to the geotechnical engineer and the governing jurisdiction.

Site Preparation

1. The existing ground surface in the building and surface improvements areas should be prepared for construction by removing existing improvements, vegetation, large roots, debris, and other deleterious material. *Any existing fill soils should be completely removed and replaced as compacted fill.* Any existing utilities that will not remain in service should be removed or properly abandoned. The appropriate

method of utility abandonment will depend upon the type and depth of the utility. Recommendations for abandonment can be made as necessary.

2. Voids created by the removal of materials or utilities, and extending below the recommended overexcavation depth, should be immediately called to the attention of the geotechnical engineer. No fill should be placed unless the geotechnical engineer has observed the underlying soil.

Grading

1. Following site preparation, the soils in the building area should be removed on a level plane to a depth of 4 feet below the bottom of the deepest foundation element or 6 feet below existing grade, *whichever is deeper*. During construction, locally deeper removals may be recommended based on field conditions. The resulting soil surface should then be scarified, moisture conditioned, and compacted prior to placing any fill soil.

2. Following site preparation, the soils in the surface improvement area should be removed to a minimum depth of 2 feet below subgrade or 3 feet below existing grade, *whichever is deeper*. During construction, locally deeper removals may be recommended based on field conditions. The resulting soil surface should then be scarified, moisture conditioned, and compacted prior to placing any fill soil.

3. Following site preparation, the soils in fill areas beyond the building and surface improvement areas should be removed to a depth of 3 feet below existing grade. During construction, locally deeper removals may be recommended based on field conditions. The resulting soil surface should then be scarified, moisture conditioned, and compacted prior to placing any fill soil.

4. Voids created by dislodging cobbles and/or debris during scarification should be backfilled and compacted, and the dislodged materials should be removed from the area of work.

5. On-site material and approved import materials may be used as general fill. All imported soil should be nonexpansive. Nonexpansive material is defined as being a coarse-grained soil (ASTM D2487-17) and having an expansion index of 10 or less (ASTM D4829-11). The proposed imported soils should be evaluated by the geotechnical engineer before being used, and on an intermittent basis during placement on the site.

6. All materials used as fill should be cleaned of any debris and rocks larger than 6 inches in diameter. No rocks larger than 3 inches in diameter should be used within the upper 3 feet of finish grade. When fill material includes rocks, the rocks should be placed in a sufficient soil matrix to ensure that voids caused by nesting of the rocks will not occur and that the fill can be properly compacted.

7. The on-site soils are estimated to shrink by approximately 15 to 20 percent when prepared and graded as recommended above.

Utility Trenches

1. Unless otherwise recommended, utility trenches adjacent to foundations should not be excavated within the zone of foundation influence, as shown on Typical Detail A presented in Appendix E.

2. Utilities that must pass beneath foundations should be placed with properly compacted utility trench backfill and the foundation should be designed to span the trench.

3. A select, noncorrosive, granular, easily compacted material should be used as bedding and shading immediately around utilities. Generally, the soil found at the site may be used for trench backfill above the select material.

4. Utility trench backfill should be moisture conditioned and compacted; however, a minimum compaction of 95 percent of maximum dry density in trench backfill in existing or future public roadway areas. A minimum of 95 percent of maximum dry density should also be obtained where trench backfill comprises the upper 1-foot of subgrade beneath vehicle pavement, and in all AB. A minimum of 85 percent of maximum dry density will generally be sufficient where trench backfill is located in landscaped or other unimproved areas where settlement of trench backfill would not be detrimental.

5. Jetting of trench backfill should generally not be allowed as a means of backfill densification. However, to aid in *encasing* utility conduits, particularly corrugated conduits and multiple closely spaced conduits in a single trench, jetting or flooding may be useful. Jetting or flooding should only be attempted with extreme caution, and any jetting or flooding operation should be subject to review by the geotechnical engineer.

6. The Corrosion Evaluation Report prepared by CERCO Analytical and presented in Appendix C should be used by the architect/engineer in specifying appropriate corrosion protection measures for the utility improvements.

7. The recommendations of this section are minimums only and may be superseded by the architect/engineer based upon the soil corrosivity, or the requirements of the pipe manufacturer, the utility companies, or the governing jurisdiction.

Foundations

Shallow Foundations

1. Shallow conventional continuous and spread footings bearing on soil compacted per the "Grading" section of this report may be used to support the buildings/structures. Grade beams should also be placed across all large entrances into the buildings/structures. Footings and grade beams should have a minimum depth of 18 inches below lowest adjacent grade, and footing and grade beam dimensions should also conform to the applicable requirements of CBC Section 1809A (CBSCa, 2016). All spread footings should be a minimum of 2 feet square. Grade beams should also interconnect with spread footings that are less than 3 feet by 3 feet in size on at least two sides. Footing and grade beamreinforcement should be in accordance with the requirements of the architect/engineer; minimum continuous footing and grade beam reinforcement should consist of two No. 4 rebar, one near the top and one near the bottom of the footing or grade beam.

2. Footings should be designed using a maximum allowable bearing capacity of 2,000 psf dead plus live load. The allowable bearing capacity may be increased by 200 psf for each additional 6 inches of embedment below a depth of 18 inches below lowest adjacent grade. The allowable bearing capacity should not exceed 3,000 psf dead plus live loads.

3. Rigid mat foundations should be designed using an allowable bearing capacity of 400 psf dead plus live load for loads distributed over the foundation footprint. They may also be designed using a modulus of subgrade reaction of 50 psi/inch.

4. Using the criteria in the previous two paragraphs, maximum total and differential settlement under static conditions are expected to be on the order of 0.75 inches and 0.25 inches in 40 feet, respectively. Foundations should also be designed to accommodate total and differential settlement due to liquefaction and seismically

induced settlement of dry sand of 1.5 inches and 0.75 inches across the largest building footprint dimension, respectively.

5. Lateral loads may be resisted by soil friction and by passive resistance of the soil acting on foundations. Lateral capacity is based on the assumption that backfill adjacent to foundations is properly compacted. A passive equivalent fluid pressure of 300 pcf and a coefficient of friction of 0.35 may be used in design. These are ultimate values as no factors of safety, load factors, and/or other factors have been applied to any of the values.

Deep Foundations

6. CIDH piles should have a minimum diameter of 24 inches, should have a minimum depth of 10 feet below lowest adjacent grade, and should not be constructed closer than three pile diameters (clear span) to each other without approval from the geotechnical engineer.

7. Allowable skin friction values for compression are shown on the Allowable Axial Capacity for CIDH Piles in Compression Chart presented in Appendix F and should be used for the soil; all end bearing capacity should be neglected. The allowable tension values may be determined using two-thirds of the compression values. Using these criteria, individual pile settlement should not exceed 0.5 inches, and differential settlement between the piles should not exceed 0.125 inches.

8. An ultimate passive equivalent fluid pressure of 300 pcf for soil should be used to determine the lateral capacity of the piles. This ultimate value may require application of appropriate factors of safety, load factors, and/or other factors as deemed appropriate by the architect/engineer.

9. The upper soils may not stand vertically during pile construction. Casing, drill fluid, or other means of keeping the holes open could be necessary.

10. Depending on the location and depth of the piles and the weather conditions at and preceding the time of construction, subsurface water could be encountered during pile drilling operations. Therefore, pile reinforcing should be designed to accommodate a minimum 5-inch diameter tremie pipe. Any water encountered should be removed from the hole prior to placing PCC, or the PCC should be tremied. The recommended Tremie Method is presented in Appendix F.

11. As the piles will utilize skin friction for support, it is not necessary to thoroughly clean the bottoms of the excavations, although excessive loose debris and slough material should be removed. As stated earlier, use of any end bearing capacity is not recommended.

12. PCC used in the piles should be placed at a slump between 4 and 6 inches in dry excavations and between 7 and 9 inches when placed under water.

13. The piles should not deviate from a plumb line taken from the center of the pile by more than 2 percent of the pile length, from the top to the point of interest. Adequate pile oversize may be assumed to provide required tolerance.

General Recommendations and Comments for Shallow and Deep Foundations

14. The allowable bearing and friction capacities may be increased by one-third when transient loads such as wind or seismicity are included. The foundations should be designed using the seismic parameters presented within the Tetra Tech, Inc. Engineering Geology report.

15. Due to the sandy soil conditions at the site, settlement is expected to occur over a very short period of time after the loads on the foundations are applied; long term settlements are not anticipated to be significant.

16. Foundation excavations should be observed by the geotechnical engineer prior to placement of reinforcing steel or any formwork. Foundation excavations should be thoroughly moistened prior to PCC placement and no desiccation cracks should be present.

17. The Corrosion Evaluation Report prepared by CERCO Analytical and presented in Appendix C should be used by the architect/engineer in specifying appropriate corrosion protection measures for all foundation elements.

Retaining Walls

1. All retaining wall foundations should be founded in soil compacted as recommended in the "Grading" section of this report and should be designed per the recommendations presented in the "Foundation" section of this report. It is assumed that retaining walls will not exceed 6 feet in height.

2. As we have assumed that retaining wall heights will not exceed a height of 6 feet, seismic design per CBC Section 1803A.5.12.1 (CBSCa, 2016) is not required. If retaining walls will retain more than 6 feet of soil, seismic design will be required by the geotechnical engineer.

3. Wall design should be based on the following parameters:

Active equivalent fluid pressure (native soils or imported sand or gravel backfill)	35 pcf
At-rest equivalent fluid pressure (native soils or imported sand or gravel backfill)	50 pcf
Passive equivalent fluid pressure (compacted fill)	300 pcf
Maximum toe pressure (compacted fill)	2,000 psf
Coefficient of sliding friction (compacted fill)	0.35

4. No surcharges are taken into consideration in the above values. The maximum toe pressure is an *allowable* value to which a factor of safety has been applied. No factors of safety, load factors, and/or other factors have been applied to any of the remaining values.

5. The above pressures are applicable to a horizontal retained surface behind the wall. Walls having a retained surface that slopes upward from the wall should be designed for an additional equivalent fluid pressure of 1 pcf for the active case and 1.5 pcf for the at-rest case, for every degree of slope inclination.

6. The active and at-rest values presented above are for drained conditions. Consequently, retaining walls should be drained with rigid perforated pipe encased in a free draining gravel blanket. The pipe should be placed perforations downward and should discharge in a nonerosive manner away from foundations and other improvements. The gravel blanket should have a width of approximately 1-foot and should extend upward to approximately 1-foot from the top of the wall. The upper foot should be backfilled with on-site soil, except in areas where a slab or pavement will abut the top of the wall. In such cases, the gravel backfill should extend up to the material that supports the slab or pavement. To reduce infiltration of the soil into the gravel, a permeable synthetic fabric conforming to the Standard Specifications Section 96-1.02B – Class "C," (Caltrans, 2015) should be placed between the two. Manufactured geocomposite wall drains conforming to the Standard Specifications Section 96-1.02C (Caltrans, 2015) are acceptable alternatives to the use of gravel, provided that they are installed in accordance with the recommendations of the manufacturer. Where drainage can be properly controlled, weep holes on maximum 4-foot centers may be used in lieu of perforated pipe. A filter fabric as described above should be placed between the weep holes and the drain gravel.

7. Retaining walls where moisture transmission through the wall would be undesirable should be *thoroughly* waterproofed in accordance with the specifications of the architect/engineer.

8. The architect/engineer should bear in mind that retaining walls by their nature are flexible structures, and that surface treatments on walls often crack. Where walls are to be plastered or otherwise have a finish applied, the flexibility should be considered in determining the suitability of the surfacing material, spacing of horizontal and vertical control joints, etc. The flexibility should also be considered where a retaining wall will abut or be connected to a rigid structure, and where the geometry of the wall is such that its flexibility will vary along its length.

Slabs-on-Grade and Exterior Flatwork

1. Conventional interior light duty PCC slabs-on-grade and exterior flatwork should have a minimum thickness of 4 full inches; however, the thickness of heavy duty slabs and flatwork should be specified by the architect/engineer. Conventional foundation slabs-on-grade should be doweled to footings and grade beams with dowels.

2. Reinforcement size, placement, and dowels should be as directed by the architect/engineer. Light duty exterior flatwork should be reinforced, at a minimum, with No. 3 rebar at 24 inches on-center each way. Heavy duty exterior flatwork should have minimum rebar sizing and spacing that meets the criteria of American Concrete Institute (ACI) 318, Section 7.12.2 (ACI, 2014). A modulus of subgrade reaction (K_{30}) of 50 psi/inch may be used in the design of heavy duty slabs-on-grade founded on compacted native soil. The modulus of subgrade reaction (K_{30}) may be increased to 150 psi/inch if the slab is underlain with a minimum of 6 inches of compacted Class 2 AB (Caltrans, 2015), and to 250 psi/inch if the slab is underlain with a minimum of 12 inches of compacted Class 2 AB.

3. Due to the current use of impermeable floor coverings, water-soluble flooring adhesives, and the speed at which buildings are now constructed, moisture vapor transmission through slabs is a much more common problem than in past years. Where moisture vapor transmitted from the underlying soil would be undesirable, the slabs should be protected from subsurface moisture vapor. A number of options for vapor protection are discussed below; however, the means of vapor protection, including the type and thickness of the vapor retarder, if specified, are left to the discretion of the architect/engineer.

4. Where specified, vapor retarders should conform to ASTM E1745-17. This standard specifies properties for three performance classes, Class "A", "B" and "C". The appropriate class should be selected based on the sensitivity of floor coverings to moisture intrusion and the potential for damage to the vapor retarder during placement of slab reinforcement and concrete.

5. Several recent studies, including those of ACI Document 302.1R-15 (ACI, 2015), have concluded that excess water above the vapor retarder increases the potential for moisture damage to floor coverings and could increase the potential for mold growth or other microbial contamination. The studies also concluded that it is preferable to eliminate the typical sand layer beneath the slab and place the slab concrete in direct contact with a Class "A" vapor retarder, particularly during wet weather construction. However, placing the concrete directly on the vapor retarder requires special attention to using the proper vapor retarder, a very low water-cement ratio in the concrete mix, and special finishing and curing techniques.

6. Probably the next most effective option would be the use of vapor-inhibiting admixtures in the slab concrete mix and/or application of a sealer to the surface of the slab. This would also require special concrete mixes and placement procedures, depending upon the recommendations of the admixture or sealer manufacturer.

7. Another option that may be a reasonable compromise between effectiveness and cost considerations is the use of a subslab vapor retarder protected by a sand layer, however this would increase the potential for moisture damage to floor coverings and for mold growth or other microbiological contamination. If a Class "A" vapor retarder is specified, the retarder can be placed directly on the material at pad grade. The retarder should be covered with a minimum 2 inches of clean sand. If a less durable vapor retarder is specified (Class "B" or "C"), a minimum of 4 inches of clean sand should be provided on top of the material at pad grade, and the retarder should be placed in the center of the clean sand layer. Clean sand is defined as well or poorly graded sand (ASTM D2487-17) of which less than 3 percent passes the No. 200 sieve. The site soils do not fulfill the criteria to be considered "clean" sand.

8. Regardless of the underslab vapor retarder selected, proper installation of the retarder is critical for optimum performance. All seams must be properly lapped, and all seams and utility penetrations properly sealed in accordance with the vapor retarder manufacturer's recommendations. Installation should conform to ASTM E1643-18a.

9. If sand is used between the vapor retarder and the slab, it should be moistened only as necessary to promote concrete curing; saturation of the sand should be avoided, as the excess moisture would be on top of the vapor retarder, potentially resulting in vapor transmission through the slab for months or years.

10. In conventional construction, it is common to use four to six inches of sand beneath exterior flatwork. Another measure that can be taken to reduce the risk of movement of flatwork is to provide thickened edges or grade beams around the perimeters of the flatwork. The thickened edges or grade beams could be up to 12 inches deep, with the deeper edges or grade beams providing better protection. At a minimum,

the thickened edge or grade beam should be reinforced by two No. 4 rebar, one near the top and one near the bottom.

11. Flatwork should be constructed with frequent joints to allow articulation as flatwork moves in response to seasonal moisture and/or temperature variations causing minor expansion and contraction of the soil, or variable bearing conditions. The soil in the subgrade should be moistened to at least optimum moisture content and no desiccation cracks should be present prior to casting the flatwork.

12. Where maintaining the elevation of the flatwork is desired, the flatwork should be doweled to the perimeter foundation as specified by the architect/engineer. In other areas, the flatwork may be doweled to the foundation or the flatwork may be allowed to "float free," at the discretion of the architect/engineer. Flatwork that is intended to float free should be separated from foundations by a felt joint or other means.

13. To reduce shrinkage cracks in PCC, the PCC aggregates should be of appropriate size and proportion, the water/cement ratio should be low, the PCC should be properly placed and finished, contraction joints should be installed, and the PCC should be properly cured. PCC materials, placement, and curing specifications should be at the direction of the architect/engineer. The Guide for Concrete Floor and Slab Construction (ACI, 2015) is suggested as a resource for the architect/engineer in preparing such specifications.

Pavement Sections

Two bulk samples were tested for R-value per ASTM D2488/D2488M-13. The two tests yielded R-values of 9 and 12. These R-value test results indicate that the upper site soils have a very low resistance to the types of loads imposed by traffic.

The following preliminary pavement structural sections are based on an average R-value of 10, and should be used for preliminary cost estimating purposes only. After the site soils are graded and placed up to near the subgrade elevation, the upper soils exposed within the access driveways and parking areas should then be tested for R-value to verify that these preliminary pavement structural sections are appropriate; otherwise, revised pavement sections should be prepared. Preliminary pavement structural sections are provided for Traffic Indices (TI) of 4.5, 5.0, 5.5, 6.0, 6.5, and 7.0. Determination of the appropriate TI for specific areas is left to others. The pavement sections were calculated in accordance with the Highway Design Manual (Caltrans, 2016). The calculated AB and HMA thickness are for compacted material. Normal Caltrans construction tolerances should apply.

Preliminary Pavement Structural Sections

R-value	TI	HMA (inches)	Class 2 AB (inches)
10	4.5	2.50	8.50
10	5.0	2.75	9.50
10	5.5	3.00	11.00
10	6.0	3.25	12.00
10	6.5	3.75	13.50
10	7.0	4.00	14.50

1. The upper 12 inches of subgrade and all AB should be compacted to a minimum of 95 percent of maximum dry density.

2. Subgrade and AB should be firm and unyielding when proof-rolled by heavy rubber-tired equipment prior to paving.

3. Where HMA will lie within 5 feet of landscape or drainage improvements, the HMA should be separated from these improvements by deepened curbs or other means that will reduce the potential for moisture fluctuations in the soils beneath the HMA and improve the stability of the curbs.

4. Finished HMA surfaces should slope toward drainage facilities such that rapid runoff will occur and no ponding is allowed on or adjacent to the HMA.

Drainage and Maintenance

1. Per CBC Section 1804A.4 (CBSCa, 2016) unpaved ground surfaces should be *finish graded* to direct surface runoff away from foundations and other improvements at a minimum 5 percent grade for a minimum distance of 10 feet. The site should be similarly sloped to drain away from foundations, and other improvements during construction. Where this is not practicable due to property lines, other structures or improvements, etc., swales with improved surfaces, area drains, or other drainage facilities, should be used to collect and discharge runoff.

2. The eaves of the new building/structure roofs should be fitted with gutters. Runoff from flatwork, roof gutters, downspouts, planter drains, area drains, etc. should discharge in a nonerosive manner away from foundations and other improvements in accordance with the requirements of the governing agencies. Erosion protection should be placed at all discharge points unless the discharge is on a pavement surface.

3. To reduce the potential for planter drainage gaining access to subslab areas, any raised planter boxes adjacent to foundations should be installed with drains and sealed sides and bottoms. Drains should also be provided for areas adjacent to the structure and in landscape areas that would not otherwise freely drain.

4. The site soils are highly erodible. If the soils are disturbed during construction, stabilization of the soils by vegetation or other means, *during* and *following* construction, is essential to reduce erosion damage. Care should be taken to establish and maintain vegetation. The landscaping should be planned and installed to maintain the surface drainage recommended above. Surface drainage should also be maintained during construction.

5. Maintenance of drainage improvements and other surface improvements is critical to the long-term stability of the site and the integrity of the buildings/structures. Site improvements should be maintained on a regular basis.

6. Finished flatwork surfaces should be sloped to freely drain toward appropriate drainage facilities. Water should not be allowed to stand or pond on or adjacent to exterior pedestrian flatwork, or other improvements as it could infiltrate into the AB and/or the subgrade soils, causing premature deterioration of pavement, flatwork, or other improvements. Any cracks that develop in the pavement and flatwork should be promptly sealed.

7. All exterior drains and drain outlets should be maintained to be free-flowing. Care should be taken to establish and maintain vegetation. Vegetation and erosion matting (if utilized) should be maintained or augmented as needed. Irrigation systems should be maintained so that soils around structures are maintained at a relatively uniform year-round moisture content, and are neither over-watered nor allowed to dry and desiccate.

8. The owner or site maintenance personnel should periodically observe the areas within and around the site for indications of rodent activity and soil instability. The owner or site maintenance personnel should also implement an aggressive program for controlling the rodent activity in the general area.

Construction Observation and Testing

1. It must be recognized that the recommendations contained in this report are based on a limited number of borings and CPT soundings, and rely on continuity of the subsurface conditions encountered. It is assumed that the geotechnical engineer will be retained to provide consultation during the design phase, to review final plans once

they are available, to interpret this report during construction, and to provide construction monitoring in the form of testing and observation.

2. At a minimum, the geotechnical engineer should be retained to provide:
    - Review of final grading, utility, and foundation plans
    - Professional observation during grading, foundation excavations, and trench backfill
    - Oversight of compaction testing during grading
    - Oversight of special inspection during grading

3. Special inspection of grading should be provided as per CBC Section 1705A.6 and CBC Table 1705A.6 (CBSCa, 2016). Deep foundation construction should be considered to fall under CBC Section 1705A.8 (CBSCa, 2016) "Cast-in-Place Deep Foundations." Special inspection of the installation of CIDH piles should be provided as per CBC Table 1705A.8 (CBSCa, 2016). The special inspector should be under the direction of the geotechnical engineer. In our opinion, all construction associated with the deep foundations should be subject to continuous special inspection. It is our opinion that none of the grading construction is of a nature that should warrant continuous special inspection; periodic special inspection should suffice. Subject to approval by the Building Official, the exception to continuous special inspection is described in CBC Section 1704A.2 (CBSCa, 2016) and should be specified by the architect/engineer and periodic special inspection of the following items should be provided by the special inspector.
    - Stripping and clearing of vegetation
    - Overexcavation to the recommended depths
    - Scarification, moisture conditioning, and compaction of the soil
    - Fill quality, placement, and compaction
    - Utility trench backfill
    - Retaining wall drains and backfill

- Foundation excavations
- Subgrade and AB compaction and proofrolling

4. A program of quality control should be developed prior to beginning grading. The contractor or project manager should determine any additional inspection items required by the architect/engineer or the governing jurisdiction.

5. Locations and frequency of compaction tests should be as per the recommendation of the geotechnical engineer at the time of construction. The recommended test location and frequency may be subject to modification by the geotechnical engineer, based upon soil and moisture conditions encountered, size and type of equipment used by the contractor, the general trend of the results of compaction tests, or other factors.

6. A preconstruction conference among the school district, the DSA project inspector, the geotechnical engineer, the City of Oxnard, the special inspector, the architect/engineer, and contractors is recommended to discuss planned construction procedures and quality control requirements.

7. The geotechnical engineer should be notified at least 48 hours prior to beginning construction operations. If Earth Systems Pacific is not retained to provide construction observation and testing services, it shall not be responsible for the interpretation of the information by others or any consequences arising therefrom.

8.0 CLOSURE

Our intent was to perform the investigation in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing in the locality of this project under similar conditions. No representation, warranty, or guarantee is either

expressed or implied. This report is intended for the exclusive use by the client as discussed in the “Scope of Services” section. Application beyond the stated intent is strictly at the user's risk.

This report is valid for conditions as they exist at this time for the type of project described herein. The conclusions and recommendations contained in this report could be rendered invalid, either in whole or in part, due to changes in building codes, regulations, standards of geotechnical or construction practice, changes in physical conditions, or the broadening of knowledge.

If changes with respect to the project become necessary, if items not addressed in this report are incorporated into plans, or if any of the assumptions used in the preparation of this report are not correct, this firm shall be notified for modifications to this report. Any items not specifically addressed in this report should comply with the CBC of other applicable standards, and the requirements of the governing jurisdiction.

The preliminary recommendations presented in this report are based upon the geotechnical conditions encountered at the site, and may be augmented by additional requirements of the client, or by additional recommendations provided by the geotechnical engineer based on peer or jurisdiction reviews, or conditions exposed at the time of construction.

Thank you for this opportunity to have been of service. If you have any questions, please feel free to contact this office at your convenience.

End of Text

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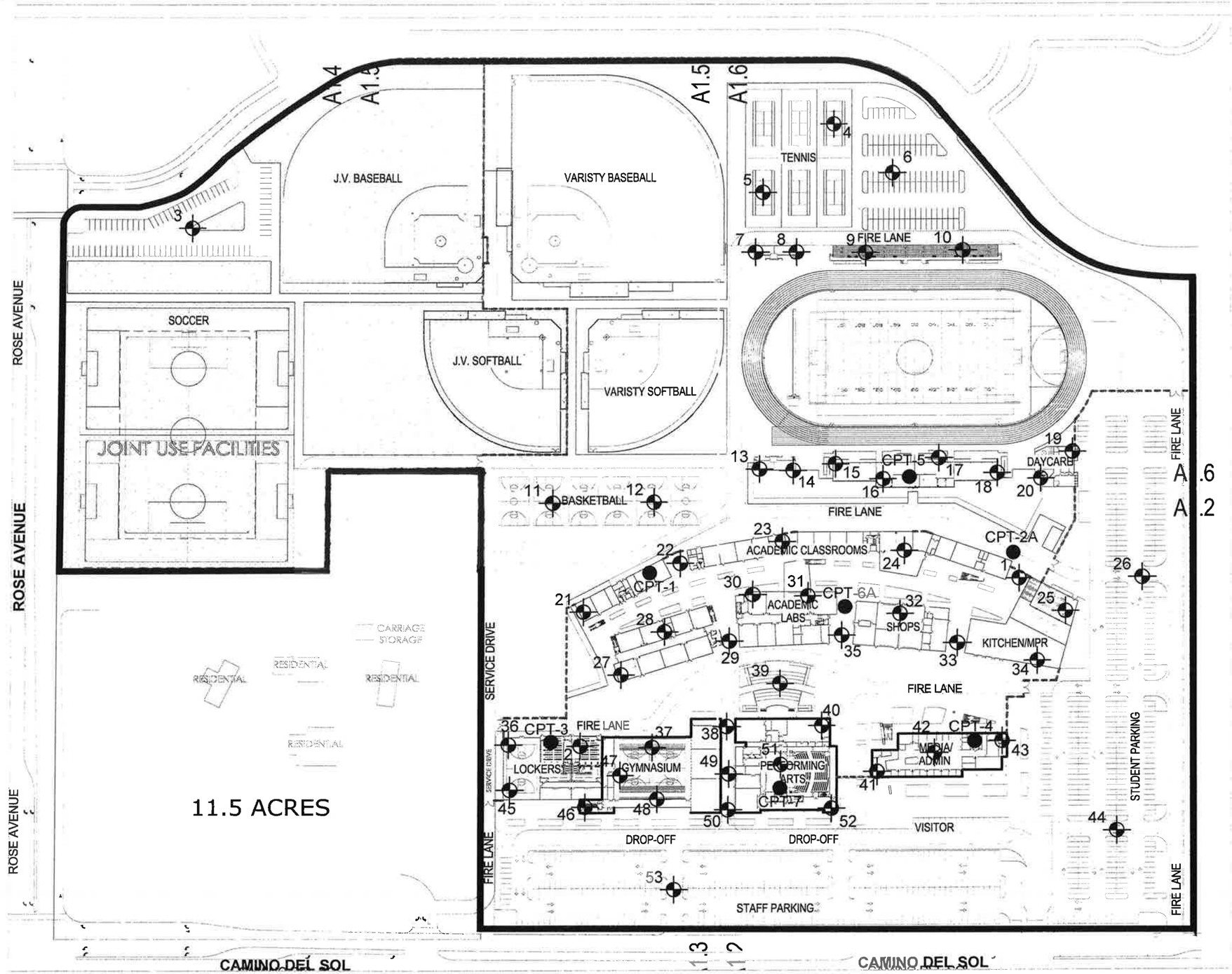
APPENDIX A

Exploration Location Map

Boring Log Legend

Boring Logs

Graphical CPT Data



LEGEND

53 **Boring Location (Approx.)**

CPT-7 **CPT Test Location (Approx.)**

N

NOT TO SCALE

BASE MAP PROVIDED BY: THE CLIENT

Earth Systems
2049 Preisker Lane, Suite E, Santa Maria, CA 93454
www.earthsystems.com
(805) 928-2991 • Fax (805) 928-9253

EXPLORATION LOCATION MAP

OXNARD HIGH SCHOOL NO. 8

Northeast of Camino Del Sol and North Rose Avenue
Oxnard, California

Date
August 31, 2018

Project No.
301953-002

Oxnard Union High School No. 8 ELM 10-5-18 Revised.dwg

Earth Systems Pacific

BORING LOG LEGEND

SAMPLE / SUBSURFACE WATER SYMBOLS	GRAPH. SYMBOL
CALIFORNIA MODIFIED	
STANDARD PENETRATION TEST (SPT)	
SHELBY TUBE	
BULK	
SUBSURFACE WATER DURING DRILLING	
SUBSURFACE WATER AFTER DRILLING	

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487)

MAJOR DIVISIONS	GROUP SYMBOL	TYPICAL DESCRIPTIONS	GRAPH. SYMBOL
COARSE GRAINED SOILS (MORE THAN HALF OF MATERIAL IS LARGER THAN #200 SIEVE SIZE)	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	
	GP	POORLY GRADED GRAVELS, OR GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	
	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES, NON-PLASTIC FINES	
	GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES, PLASTIC FINES	
	SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	
	SP	POORLY GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES	
	SM	SILTY SANDS, SAND-SILT MIXTURES, NON-PLASTIC FINES	
	SC	CLAYEY SANDS, SAND-CLAY MIXTURES, PLASTIC FINES	
FINE GRAINED SOILS (HALF OR MORE OF MATERIAL IS SMALLER THAN #200 SIEVE SIZE)	ML	INORGANIC SILTS AND VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY	
	CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
	OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	
	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS	
	CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	
	OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS	
	PT	PEAT AND OTHER HIGHLY ORGANIC SOILS	

OBSERVED MOISTURE CONDITION

DRY	SLIGHTLY MOIST	MOIST	VERY MOIST	WET (SATURATED)

CONSISTENCY

COARSE GRAINED SOILS			FINE GRAINED SOILS		
BLOWS/FOOT		DESCRIPTIVE TERM	BLOWS/FOOT		DESCRIPTIVE TERM
SPT	CA SAMPLER		SPT	CA SAMPLER	
0-10	0-16	LOOSE	0-2	0-3	VERY SOFT
11-30	17-50	MEDIUM DENSE	3-4	4-7	SOFT
31-50	51-83	DENSE	5-8	8-13	MEDIUM STIFF
OVER 50	OVER 83	VERY DENSE	9-15	14-25	STIFF
			16-30	26-50	VERY STIFF
			OVER 30	OVER 50	HARD

GRAIN SIZES

U.S. STANDARD SERIES SIEVE				CLEAR SQUARE SIEVE OPENING		
# 200	# 40	# 10	# 4	3/4"	3"	12"

SILT & CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

TYPICAL BEDROCK HARDNESS

MAJOR DIVISIONS	TYPICAL DESCRIPTIONS
EXTREMELY HARD	CORE, FRAGMENT, OR EXPOSURE CANNOT BE SCRATCHED WITH KNIFE OR SHARP PICK; CAN ONLY BE CHIPPED WITH REPEATED HEAVY HAMMER BLOWS
VERY HARD	CANNOT BE SCRATCHED WITH KNIFE OR SHARP PICK; CORE OR FRAGMENT BREAKS WITH REPEATED HEAVY HAMMER BLOWS
HARD	CAN BE SCRATCHED WITH KNIFE OR SHARP PICK WITH DIFFICULTY (HEAVY PRESSURE); HEAVY HAMMER BLOW REQUIRED TO BREAK SPECIMEN
MODERATELY HARD	CAN BE GROOVED 1/16 INCH DEEP BY KNIFE OR SHARP PICK WITH MODERATE OR HEAVY PRESSURE; CORE OR FRAGMENT BREAKS WITH LIGHT HAMMER BLOW OR HEAVY MANUAL PRESSURE
SOFT	CAN BE GROOVED OR GOUGED EASILY BY KNIFE OR SHARP PICK WITH LIGHT PRESSURE, CAN BE SCRATCHED WITH FINGERNAIL; BREAKS WITH LIGHT TO MODERATE MANUAL PRESSURE
VERY SOFT	CAN BE READILY INDENTED, GROOVED OR GOUGED WITH FINGERNAIL, OR CARVED WITH KNIFE; BREAKS WITH LIGHT MANUAL PRESSURE

TYPICAL BEDROCK WEATHERING

MAJOR DIVISIONS	TYPICAL DESCRIPTIONS
FRESH	NO DISCOLORATION, NOT OXIDIZED
SLIGHTLY WEATHERED	DISCOLORATION OR OXIDATION IS LIMITED TO SURFACE OF, OR SHORT DISTANCE FROM, FRACTURES: SOME FELDSPAR CRYSTALS ARE DULL
MODERATELY WEATHERED	DISCOLORATION OR OXIDATION EXTENDS FROM FRACTURES, USUALLY THROUGHOUT; Fe-Mg MINERALS ARE "RUSTY", FELDSPAR CRYSTALS ARE "CLOUDY"
INTENSELY WEATHERED	DISCOLORATION OR OXIDATION THROUGHOUT; FELDSPAR AND Fe-Mg MINERALS ARE ALTERED TO CLAY TO SOME EXTENT, OR CHEMICAL ALTERATION PRODUCES IN SITU DISAGGREGATION
DECOMPOSED	DISCOLORATION OR OXIDATION THROUGHOUT, BUT RESISTANT MINERALS SUCH AS QUARTZ MAY BE UNALTERED; FELDSPAR AND Fe-Mg MINERALS ARE COMPLETELY ALTERED TO CLAY

drafting/masters/Boring Log Legend121714.dwg

Earth Systems Pacific

Boring No. 1
PAGE 1 OF 2

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

JOB NO.: 301953-002
DATE: 04-10-2018

OXNARD HIGH SCHOOL NO. 8
Northeast of Camino Del Sol and North Rose Avenue
Oxnard, California

DEPTH (feet)	USCS CLASS	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM	SILTY SAND: brown, loose, moist (Alluvium)	0-4	○			
4		thin lens of sandy silt					
4	SP	POORLY GRADED SAND: light brown/orange brown mottled, loose, moist, medium grained	5.0-6.5	■	98.0	3.5	2 4 6
10	SW	WELL GRADED SAND: gray brown, medium dense, moist	10.0-11.5	■	108.6	3.1	5 10 15
13		trace fine to coarse gravel					
15			15.0-16.5	■	115.0	3.5	9 20 24
20			20.0-21.5	●			9 16 21
25		wet ▼					

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 1
PAGE 2 OF 2

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

JOB NO.: 301953-002
DATE: 04/10/2018

OXNARD HIGH SCHOOL NO. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
27	SW		WELL GRADED SAND: as above					
30	SW-SM		WELL GRADED SAND WITH SILT AND GRAVEL: gray brown, dense, wet, fine to coarse gravel	30.0-31.5	●			6, 17, 20
40			medium dense, thin discontinuous lenses of fine to very fine grained silty sand	40.0-41.5	●			3, 4, 12
50			dense	50.0-51.5	●			8, 15, 21
53			End of Boring @ 51.5' Subsurface water encountered @ 24.5'					

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 2

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

JOB NO.: 301953-002
DATE: 04-10-2018

OXNARD HIGH SCHOOL NO. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, moist (Alluvium)	0-2.5	○			
3	ML		SANDY SILT: gray brown, medium stiff, moist, trace clay	2.5-5	○			
5	SP		POORLY GRADED SAND: light brown/orange brown mottled, loose, moist, medium grained	5.0-6.5	■	99.5	7.3	4 5 9
6				5-9	○			
9			gray brown, medium dense	10.0-11.5	■	110.6	4.9	7 14 21
12	SW		WELL GRADED SAND: gray brown, medium dense, moist, trace fine to coarse gravel	15.0-16.5	■	106.2	3.9	9 16 25
20				20.0-21.5	●			3 5 6
21			wet ▼					

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 2
PAGE 2 OF 2

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

JOB NO.: 301953-002
DATE: 04/10/2018

OXNARD HIGH SCHOOL NO. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
27	SP		POORLY GRADED SAND: brown, medium dense, wet, medium grained, trace fine to coarse gravel, thin lenses of sandy silt					
30				30.0-31.5	●			4 7 9
32			some gravel					
34	SW-SM		WELL GRADED SAND WITH SILT: gray brown, medium dense, wet, trace fine to coarse gravel					
39			gray					
40				40.0-41.5	●			7 9 11
48	SM		SILTY SAND: gray, medium dense, wet, fine grained					
50				50.0-51.5	●			5 7 12
52			End of Boring @ 51.5' Subsurface water encountered @ 21.0'					

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 3
PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-26-2018

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

SOIL DESCRIPTION

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)	0-4	○			2
2			moist	2.0-3.5	■	101.5	7.3	4 4
4	SP		POORLY GRADED SAND: light brown, loose, moist	5.0-6.5	■	97.0	7.8	3 6 9
10				10.0-11.5	●			2 6 9
11			medium dense					
12			End of Boring @ 11.5' No Subsurface Water Encountered					

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 4
PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-16-2018

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

DEPTH (feet)	USCS CLASS	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM	SILTY SAND: brown, loose, moist (Alluvium)	2.0-3.5	Ring	98.8	11.9	1, 2, 3
5	SP	POORLY GRADED SAND: light brown, loose, moist, trace gravel	5.0-6.5	Ring	94.1	5.8	3, 6, 7
8	SW	WELL GRADED SAND: light brown, loose, moist	8.5-10.0	SPT			3, 3, 6
10		End of Boring @ 10.0' No Subsurface Water Encountered					

LEGEND: ■ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 5

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-16-2018

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: light brown, loose, slightly moist (Alluvium)					
2			very moist, trace clay, decreasing silt content	2.0-3.5	■	95.4	17.0	1, 2, 2
3				2-5	○			
5	SP		POORLY GRADED SAND: light brown, loose, moist	5.0-6.5	■	96.0	10.0	2, 4, 8
8	SW		WELL GRADED SAND: light brown, medium dense, moist, trace fine gravel	8.5-10.0	●			4, 6, 7
10			End of Boring @ 10.0' No Subsurface Water Encountered					

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 6

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-16-2018

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: light brown, loose, slightly moist (Alluvium)					
1			moist					2
2				2.0-3.5	■	97.9	9.3	2
3								3
4	ML		SANDY SILT: brown to light brown, soft, very moist					1
5				5.0-6.5	■	89.3	30.5	3
6				4-7	○			4
7	SP		POORLY GRADED SAND: light brown, loose, moist					
8								4
9				8.5-10.0	●			5
10			medium dense					6
11			End of Boring @ 10.0'					
			No Subsurface Water Encountered					

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 7
PAGE 1 OF 1

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

JOB NO.: 301953-002
DATE: 07-16-2018

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: light brown to brown, loose, slightly moist (Alluvium)					
2			moist					
5	SP		POORLY GRADED SAND: light brown, loose, moist, trace fine gravel	5.0-6.5	■	90.9	5.4	2 3 6
10	SW		WELL GRADED SAND: light brown, medium dense, moist, trace fine gravel	10.0-11.5	■	105.8	4.2	4 10 11
15				15.0-16.5	●			4 8 10
16.5			End of Boring @ 16.5' No Subsurface Water Encountered					

LEGEND: ■ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 8
PAGE 1 OF 1

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

JOB NO.: 301953-002
DATE: 07-16-2018

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

SOIL DESCRIPTION

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
2			moist, trace clay					
4	SP		POORLY GRADED SAND: light brown, loose, moist, trace fine gravel	5.0-6.5	■	95.8	5.9	2, 5, 7
9			medium dense	10.0-11.5	■	101.2	7.4	7, 12, 12
12	SW		WELL GRADED SAND: light brown, medium dense, moist, trace fine gravel, trace clay	15.0-16.5	●			5, 9, 10
16			End of Boring @ 16.5' No Subsurface Water Encountered					

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 9
PAGE 1 OF 1

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

JOB NO.: 301953-002
DATE: 07-16-2018

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
2			moist, trace clay					
4	SP		POORLY GRADED SAND: light brown, loose, very moist, trace fine gravel	5.0-6.5	■	96.2	16.3	2, 4, 5
10			medium dense, moist	10.0-11.5	■	98.9	3.6	7, 11, 13
12	SW		WELL GRADED SAND: light brown, medium dense, moist, trace fine to coarse gravel, trace clay					
15				15.0-16.5	■	116.1	3.9	5, 9, 16
18			trace cobbles					
20			dense	20.0-21.5	●			7, 14, 18
24	CL		LEAN CLAY: brown to gray brown, very soft, very moist, trace silt	25.0-26.5	●			0, 1, 1
26			End of Boring @ 26.5' No Subsurface Water Encountered					

LEGEND: ■ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 10
PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-16-2018

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
2			moist					
5				5.0-6.5	■	87.0	31.2	1, 2, 2
7			very moist					
7	SP		POORLY GRADED SAND: light brown, loose, moist					
10	SW		WELL GRADED SAND: light brown, medium dense, moist, trace fine gravel	10.0-11.5	■	105.7	3.5	6, 17, 22
15	SC		CLAYEY SAND: brown, loose, very moist, trace fine gravel	15.0-16.5	●			4, 5, 6
16.5			End of Boring @ 16.5' No Subsurface Water Encountered					

LEGEND: ■ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 11

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-26-2018

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol and North Rose Avenue
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0 - 2	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
			moist	2.0-3.5	■	97.6	11.9	2, 3, 4
4 - 5	SP		POORLY GRADED SAND: light brown, loose, moist	5.0-6.5	■	101.9	6.6	2, 5, 9
9 - 10	SW		WELL GRADED SAND: light brown, medium dense, moist	10.0-11.5	●			6, 9, 12
11 - 12			End of Boring @ 11.5' No Subsurface Water Encountered					

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 12

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-17-2018

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

SOIL DESCRIPTION

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
1			very moist					1
2				2.0-3.5	■	94.0	17.7	3
3								4
4	SW		WELL GRADED SAND: light brown, medium dense, moist, trace fine gravel					4
5				5.0-6.5	■	98.4	4.2	8
6								10
7								
8								3
9				8.5-10.0	●			4
10								8
11			End of Boring @ 10.0'					
12			No Subsurface Water Encountered					
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 13
PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-19-2018

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

SOIL DESCRIPTION

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
2			moist					
4	SW		WELL GRADED SAND: light brown, medium dense, moist	5.0-6.5	■	97.3	3.9	4 6 11
10			thin lense of very moist silty sand ~ 2" to 3" thick	10.0-11.5	■	106.4	4.5	2 7 17
15				15.0-16.5	●			7 15 18
16			dense					
17			End of Boring @ 16.5' No Subsurface Water Encountered					

LEGEND: ■ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 14

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-23-2018

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

SOIL DESCRIPTION

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
2			moist					
4	SW		WELL GRADED SAND: light brown, loose, moist					
5				5.0-6.5	■	100.1	3.7	4 7 8
6			trace fine gravel					
9			lense of poorly graded sand					
10				10.0-11.5	■	89.6	15.7	0 2 7
14			trace cobbles					
15			dense	15.0-16.5	■	105.1	9.4	8 21 28
20				20.0-21.5	●			7 17 16
22			wet, flow sands ▼					
25			blow count from 26.0' to 26.5' not reliable due to flow sands	25.0-26.5	●			10 17 22
26			End of Boring @ 26.5' No Subsurface Water Encountered					

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 15

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-19-2018

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

SOIL DESCRIPTION

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
1			moist					
2								
3			increasing silt content					
4	SW		WELL GRADED SAND: light brown, medium dense, moist, trace fine gravel	5.0-6.5	■	109.4	6.3	3 8 10
5								
6								
7								
8								
9								
10				10.0-11.5	■	98.4	6.2	7 10 17
11								
12								
13								
14								
15				15.0-16.5	●			1 4 9
16								
17			End of Boring @ 16.5' No Subsurface Water Encountered					
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ■ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 16

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

JOB NO.: 301953-002
DATE: 07-23-2018

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

DEPTH (feet)	USCS CLASS	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM	SILTY SAND: brown, loose, slightly moist (Alluvium)					
2		moist					
4	SP	POORLY GRADED SAND: light brown, loose, moist	5.0-6.5	■	92.5	5.5	3, 5, 8
8	SW	WELL GRADED SAND: light brown, medium dense, moist	10.0-11.5	■	98.6	4.4	5, 11, 23
15		dense	15.0-16.5	■	112.6	4.7	11, 24, 36
17		trace fine gravel					
20		medium dense	20.0-21.5	●			8, 11, 14
21		very moist					
22		wet, flow sands ▼					
24							7, 14, 17
25		dense	25.0-26.5	●			

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 16
PAGE 2 OF 2

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

JOB NO.: 301953-002
DATE: 07/23/2018

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

SOIL DESCRIPTION

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
27	SW		WELL GRADED SAND: as above					
30				30.0-31.5	●			10 17 23
31			trace fine to coarse gravel and cobbles, blow count from 31.0' to 31.5' not reliable due to rocks					
34								15
35			cobbles end	35.0-36.5	●			15 18
40				40.0-41.5	●			5 20 23
43			trace cobbles					
45				45.0-46.0	●			18 50/6.0"
46			End of Boring @ 46.0' Due to Refusal Subsurface water encountered @ 22.5'					
53								

LEGEND: ■ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 17
PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-23-2018

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

SOIL DESCRIPTION

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
2			moist					
3			increasing silt content					
5				5.0-6.5	■	103.3	7.6	1, 4, 7
7	SW		WELL GRADED SAND: light brown, loose, moist, trace fine to coarse gravel and cobbles					
10			medium dense	10.0-11.5	■	104.7	3.4	5, 15, 20
15				15.0-16.5	●			8, 11, 8
16			thin silt lense ~2" thick					
17			End of Boring @ 16.5' No Subsurface Water Encountered					

LEGEND: ■ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 18

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-24-2018

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
2			moist					
4	ML		SANDY SILT: brown, very soft, very moist	5.0-6.5	■	80.5	36.1	1 1 2
7	SP		POORLY GRADED SAND: light brown, loose, moist, trace fine gravel					
10	SW		WELL GRADED SAND: light brown, medium dense, moist	10.0-11.5	■	117.5	3.2	6 11 15
14			trace fine gravel	15.0-16.5	●			2 5 7
16.5			End of Boring @ 16.5' No Subsurface Water Encountered					

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 19
PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-20-2018

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

SOIL DESCRIPTION

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
1			moist					
4			very moist, increasing silt content	5.0-6.5	■	93.4	25.6	1, 2, 2
7	SW		WELL GRADED SAND: light brown, loose, moist					
10			medium dense, slightly moist, trace fine gravel	10.0-11.5	■	103.5	2.8	5, 10, 15
15			moist	15.0-16.5	●			6, 11, 12
16			End of Boring @ 16.5'					
			No Subsurface Water Encountered					

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 20
PAGE 1 OF 1

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

JOB NO.: 301953-002
DATE: 07-20-2018

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol and North Rose Avenue
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
1			moist					
4			increasing silt content					1
5				5.0-6.5	■	90.8	26.2	1 2
5			very moist					
6				4-7	○			
9	SW		WELL GRADED SAND: light brown, loose, moist					1
10				10.0-11.5	■	109.7	4.3	1 1
12			thin ~2" thick lense of sandy silt					
14			medium dense					10
15				15.0-16.5	■	108.8	3.9	23 27
15			dense, trace fine to coarse gravel					
19			trace cobbles					1
20				20.0-21.5	●			1 3
20			loose, very moist, thin lense of silty sand ~1" to 2" thick					
25			wet, medium dense ▼	25.0-26.5	●			5
25								12 16
26			End of Boring @ 26.5'					
			Subsurface Water Encountered at 25.0'					

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 21

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-26-2018

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
2			moist					
4			increasing silt content					
5				5.0-6.5	■	99.8	9.2	2, 3, 7
6			decreasing silt content					
7	SP		POORLY GRADED SAND: light brown, loose, moist					
10			medium dense	10.0-11.5	■	111.2	4.8	6, 12, 29
12	SW		WELL GRADED SAND: light brown, medium dense, moist, trace fine gravel					
15			thin lense of silt and clay ~4" thick	15.0-16.5	●			4, 12, 13
16.5			End of Boring @ 16.5' No Subsurface Water Encountered					

LEGEND: ■ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 22

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

JOB NO.: 301953-002
DATE: 07-18-2018

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol and North Rose Avenue
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
1			moist					
4	SP		POORLY GRADED SAND: light brown, loose, very moist	5.0-6.5	■	95.1	16.5	4, 6, 8
10			medium dense, moist	10.0-11.5	■	104.5	8.6	7, 11, 13
14	SW		WELL GRADED SAND: light brown, loose, very moist, trace fine to coarse gravel	15.0-16.5	■	83.5	36.5	5, 6, 8
18			trace fine to coarse gravel and cobbles					
20				20.0-21.5	●			8, 12, 14
21			medium dense, wet ▼					
24								11, 11, 16
25			trace fine gravel, flow sands	25.0-26.5	●			
26								

LEGEND: ■ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 22
PAGE 2 OF 2

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

JOB NO.: 301953-002
DATE: 07/18/2018

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
27	SW		WELL GRADED SAND: as above					
30				30.0-31.5	●			1 7 12
35				35.0-36.5	●			5 10 15
36	SP		POORLY GRADED SAND: light brown, medium dense, wet					
40			thin lenses of very fine grained silty sand	40.0-41.5	●			0 5 16
41	SW		WELL GRADED SAND: light brown, medium dense, wet, trace fine gravel					
45				45.0-46.5	●			3 10 22
47			dense					
50			medium dense	50.0-51.5	●			6 13 13
52			End of Boring @ 51.5' Subsurface water encountered @ 21.0'					
53								

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 23

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-18-2018

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
2			moist					
5			very moist	5.0-6.5	■	83.1	23.4	1, 1, 3
9	SW		WELL GRADED SAND WITH GRAVEL: light brown, loose, moist	10.0-11.5	■	85.9	35.2	3, 1, 5
10			thin lense of very moist sandy silt					
12			decreasing gravel content					
14			medium dense	15.0-16.5	●			8, 11, 15
16			End of Boring @ 16.5' No Subsurface Water Encountered					

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 24

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-24-2018

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

DEPTH (feet)	USCS CLASS	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM	SILTY SAND: brown, loose, slightly moist (Alluvium)					
1		moist					
3		thin lense of sandy silt					
4	SP	POORLY GRADED SAND: light brown, loose, moist	5.0-6.5	■	91.2	5.5	3 4 6
7	SW	WELL GRADED SAND: light brown, loose, moist, trace fine gravel					
10			10.0-11.5	■	101.0	4.4	3 5 8
15		medium dense, slightly moist	15.0-16.5	■	103.0	2.4	6 14 18
20		dense, moist	20.0-21.5	●			8 14 18
24		wet, medium dense	25.0-26.5	●			6 11 15
26		End of Boring @ 26.5' Subsurface Water Encountered at 24.5'					

LEGEND: ■ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 25

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-20-2018

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

SOIL DESCRIPTION

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
1			moist					
2								2
3								
4								
5				5.0-6.5	■	87.5	18.9	2
6			thin lense of very moist sandy silt					4
7	SW		WELL GRADED SAND: light brown, medium dense, moist, trace fine gravel					
8								
9								4
10				10.0-11.5	■	103.6	5.8	8
11								14
12								
13								
14								16
15			dense	15.0-16.5	●			17
16								21
17			End of Boring @ 16.5'					
18			No Subsurface Water Encountered					
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ■ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 26

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-16-2018

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

SOIL DESCRIPTION

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, moist (Alluvium)					0
2			very moist	2.0-3.5	■	93.1	21.8	2 3
4	SP		POORLY GRADED SAND: light brown, loose, moist					2
5				5.0-6.5	■	98.6	3.7	7 7
8								3
9			medium dense	8.5-10.0	●			6 8
10			End of Boring @ 10.0' No Subsurface Water Encountered					

LEGEND: ■ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 27

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-17-2018

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

SOIL DESCRIPTION

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
1			moist					
3			gray brown, increasing silt content					
5	SP		POORLY GRADED SAND: light brown/orange brown mottled, loose, moist	5.0-6.5	■	101.9	8.2	3, 5, 7
9			medium dense					
10	SW		WELL GRADED SAND: light brown, medium dense, moist	10.0-11.5	■	112.0	5.8	8, 16, 23
14			trace fine gravel					
15				15.0-16.5	■	98.7	4.0	9, 21, 27
20			▼	20.0-21.5	●			2, 3, 4
21			wet, loose, thin lenses ~2" thick of sandy silt					
25			dense	25.0-26.5	●			13, 14, 21
26			End of Boring @ 26.5' Subsurface Water Encountered at 20.5'					

LEGEND: ■ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 28

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-17-2018

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

SOIL DESCRIPTION

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
2			moist					
4	SP		POORLY GRADED SAND: light brown/orange brown mottled, loose, moist	5.0-6.5	■	98.0	7.9	3, 5, 5
10			medium dense	10.0-11.5	■	108.0	6.6	7, 15, 20
15	SW		WELL GRADED SAND: light brown, medium dense, moist, trace fine gravel, trace clay	15.0-16.5	●			7, 10, 8
16			End of Boring @ 16.5' No Subsurface Water Encountered					

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 29

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-18-2018

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

SOIL DESCRIPTION

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
2			moist					
3			increasing silt					
4	SP		POORLY GRADED SAND: light brown/orange brown mottled, loose, moist	5.0-6.5	Ring	96.9	8.1	3, 6, 8
10	SW		WELL GRADED SAND: light brown, medium dense, moist, trace fine gravel	10.0-11.5	Ring	107.4	3.9	6, 10, 13
15				15.0-16.5	SPT			6, 13, 11
16			End of Boring @ 16.5' No Subsurface Water Encountered					

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 30
PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-17-2018

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

SOIL DESCRIPTION

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
5	SP		POORLY GRADED SAND: light brown, loose, moist, trace fine gravel	5.0-6.5	■	95.4	5.2	3, 6, 7
6	SW		WELL GRADED SAND: light brown, loose, moist, trace fine gravel					
10			medium dense	10.0-11.5	■	105.9	5.8	6, 13, 18
15				15.0-16.5	●			12, 13, 17
17			End of Boring @ 16.5' No Subsurface Water Encountered					

LEGEND: ■ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 31
PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-24-2018

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

SOIL DESCRIPTION

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
1			moist					
4	SW		WELL GRADED SAND: light brown, medium dense, slightly moist, trace fine to coarse gravel and cobbles	5.0-6.5	■	125.5	2.5	4 7 11
10			moist	10.0-11.5	■	103.2	4.1	4 9 15
14			interbedded with thin lenses of poorly graded sand	15.0-16.5	●			6 9 13
17			End of Boring @ 16.5' No Subsurface Water Encountered					

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 32

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-24-2018

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
1			moist					
3	ML		SANDY SILT: light brown, soft, moist					
4	SP		POORLY GRADED SAND: light brown, loose, moist					3
5				5.0-6.5	■	90.3	4.0	6
6			medium dense					11
8	SW		WELL GRADED SAND: light brown, loose, moist, trace fine gravel					
9								3
10				10.0-11.5	■	97.8	3.2	5
13								8
14			trace cobbles					5
15				15.0-16.5	●			10
16			medium dense					11
17			End of Boring @ 16.5'					
			No Subsurface Water Encountered					

LEGEND: ■ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 33

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-25-2018

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

SOIL DESCRIPTION

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
1			moist					
4	SP		POORLY GRADED SAND: light brown, loose, moist	5.0-6.5	■	110.3	4.6	3, 4, 6
8			trace fine gravel and cobbles					
9	SW		WELL GRADED SAND: light brown, loose, slightly moist, trace fine gravel and cobbles	10.0-11.5	■	96.1	2.6	2, 5, 8
15			medium dense, moist	15.0-16.5	●			3, 6, 9
16			End of Boring @ 16.5'					
			No Subsurface Water Encountered					

LEGEND: ■ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 34
PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-25-2018

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

DEPTH (feet)	USCS CLASS	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM	SILTY SAND: brown, loose, slightly moist (Alluvium)					
2		moist					
4	ML	SANDY SILT: light brown, soft, moist	5.0-6.5	■	113.6	6.5	1, 4, 7
6	SM	SILTY SAND: light brown, loose, moist	6-8	○			
10	SW	WELL GRADED SAND: light brown, medium dense, very moist, trace fine to coarse gravel	10.0-11.5	■	86.9	24.6	8, 12, 19
14		moist, trace cobbles, blow counts from 15.5' to 16.5' not reliable due to rocks	15.0-16.5	■	95.2	7.0	10, 21, 25
20		thin ~2" thick lense of sandy silt	20.0-21.5	●			5, 8, 11
25		wet, thin ~6" thick lense of poorly graded sand	25.0-26.5	●			6, 10, 12
26		End of Boring @ 26.5' Subsurface Water Encountered at 24.5'					

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 35

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

JOB NO.: 301953-002
DATE: 07-24-2018

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol and North Rose Avenue
Oxnard, California

SOIL DESCRIPTION

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
1			moist					
3	SP		POORLY GRADED SAND: light brown, slightly loose, moist, trace fine to coarse gravel and cobbles					
5				5.0-6.5	■	102.4	2.8	9 9 10
6			medium dense					
9	SW		WELL GRADED SAND: light brown, loose, slightly moist, trace fine gravel					
10				10.0-11.5	■	109.4	2.9	5 8 8
13			medium dense, moist					
15				15.0-16.5	■	104.2	4.0	8 15 18
17			trace cobbles					
20				20.0-21.5	●			8 14 16
21			very moist					
22			wet, flow sands					
24								10 15 19
25				25.0-26.5	●			
26			dense					

LEGEND: ■ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 35
PAGE 2 OF 2
JOB NO.: 301953-002
DATE: 07/24/2018

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

SOIL DESCRIPTION

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
27	SW		WELL GRADED SAND: as above					
30			thin lense of clayey sand ~3" to 4" thick	30.0-31.5	●			10, 15, 19
35			gray	35.0-36.5	●			10, 14, 27
40			blow count from 41.0' to 41.5' not reliable due to flow sands	40.0-41.5	●			7, 21, 30
44			SANDY SILT: gray brown, very soft, wet	45.0-46.5	●			0, 0, 6
46	SP-SM		POORLY GRADED SAND WITH SILT: light brown, loose, wet					
52			End of Boring @ 50.0' Subsurface water encountered @ 21.5'					
53								

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 36
PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-26-2018

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

SOIL DESCRIPTION

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
2			moist					
3	ML		SANDY SILT: gray brown, soft, moist					
5	SP		POORLY GRADED SAND: light brown, medium dense, moist, trace fine gravel, trace silt	5.0-6.5	■	92.6	9.4	3 6 11
8	SW		WELL GRADED SAND: light brown, medium dense, moist, trace fine gravel and cobbles					
10				10.0-11.5	■	114.0	5.2	7 22 31
11			blow counts from 10.5' to 11.5' not reliable due to rocks					
15			dense	15.0-16.5	●			6 13 18
16			End of Boring @ 16.5' No Subsurface Water Encountered					

LEGEND: ■ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 37
PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-17-2018

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
1			moist					
3	ML		SANDY SILT: brown, soft, moist, trace clay					
5	SP		POORLY GRADED SAND: light brown/orange brown mottled, medium dense, moist	5.0-6.5	■	93.9	10.6	4, 8, 10
7			trace clay					
10				10.0-11.5	■	111.2	6.6	6, 10, 17
11	SW		WELL GRADED SAND: light brown, medium dense, moist, trace fine gravel					
14			trace cobbles					
15			dense	15.0-16.5	●			7, 14, 18
16			End of Boring @ 16.5'					
			No Subsurface Water Encountered					

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 38
PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-18-2018

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

SOIL DESCRIPTION

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
2			moist					
4	SP		POORLY GRADED SAND: light brown/orange brown mottled, loose, moist	5.0-6.5	■	101.9	10.9	3, 5, 8
10			medium dense, light brown	10.0-11.5	■	106.1	6.2	7, 13, 16
14	SW		WELL GRADED SAND: light brown, medium dense, moist, trace fine gravel	15.0-16.5	●			6, 9, 7
16			End of Boring @ 16.5' No Subsurface Water Encountered					

LEGEND: ■ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 39
PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-19-2018

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
1			moist					
4	ML		SANDY SILT: brown, soft, moist					1
5	SM		SILTY SAND: gray brown, loose, moist	5.0-6.5	■	103.5	15.1	4 6
7	SW		WELL GRADED SAND: light brown, medium dense, moist, trace fine gravel					
10				10.0-11.5	■	121.2	4.6	8 12 15
13			trace cobbles					
15				15.0-16.5	●			6 9 12
16.5			End of Boring @ 16.5' No Subsurface Water Encountered					

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 40
PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-25-2018

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

SOIL DESCRIPTION

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
1			moist					
4	ML		SANDY SILT: brown, medium stiff, moist					2
5				5.0-6.5	■	99.0	6.7	3 4
6	SP		POORLY GRADED SAND: light brown, loose, moist, trace fine gravel					
9								6
10	SW		WELL GRADED SAND: light brown, medium dense, moist, trace fine gravel	10.0-11.5	■	106.9	3.6	10 15
14								6
15				15.0-16.5	●			11 14
17			End of Boring @ 16.5'					
			No Subsurface Water Encountered					

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 41

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-25-2018

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

SOIL DESCRIPTION

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
2			moist					
4	SW		WELL GRADED SAND: light brown, loose, moist, trace fine to coarse gravel	5.0-6.5	■	100.2	3.0	4 7 9
10			medium dense	10.0-11.5	■	102.8	3.5	7 12 10
13			trace cobbles					
15				15.0-16.5	■	95.1	16.3	5 11 22
16			thin clay lense					
20				20.0-21.5	●			10 14 16
22			wet					
25				25.0-26.5	●			5 10 16
26			End of Boring @ 26.5' Subsurface Water Encountered at 21.5'					

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 42

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-25-2018

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

SOIL DESCRIPTION

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
1			moist					
3	SP		POORLY GRADED SAND: light brown, loose, moist, trace fine gravel					
5				5.0-6.5	■	98.0	8.6	2, 3, 5
8	SW		WELL GRADED SAND: light brown, loose, moist, trace fine gravel					
10				10.0-11.5	■	102.9	5.8	4, 10, 22
11			medium dense					
15				15.0-16.5	●			5, 8, 13
16			End of Boring @ 16.5'					
			No Subsurface Water Encountered					

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 43

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

JOB NO.: 301953-002
DATE: 07-25-2018

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol and North Rose Avenue
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
1			moist					
4			increasing silt content					2
5	ML		SANDY SILT: light brown, stiff, moist	5.0-6.5	■	96.5	6.9	5 9
7	SP		POORLY GRADED SAND: light brown, loose, moist					
9	SW		WELL GRADED SAND: light brown, medium dense, moist, trace fine gravel	10.0-11.5	■	105.5	4.6	8 11 19
15				15.0-16.5	■	114.4	4.0	7 19 22
17			trace fine to coarse gravel and cobbles					
20			thin lense of soft clay ~ 4" thick	20.0-21.5	●			0 5 10
21			very moist, cobbles end					
24			gray brown, dense, wet ▼					8
25				25.0-26.5	●			15 23

LEGEND: ■ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 43
PAGE 2 OF 2

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

JOB NO.: 301953-002
DATE: 07/25/2018

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol and North Rose Avenue
Oxnard, California

SOIL DESCRIPTION

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
27	SW		WELL GRADED SAND: as above					
30			gray, medium dense, thick silt/clay lense ~8" to 10"	30.0-31.5	●			2 8 14
35			no sampling at 35.0' due to flow sands					
40	SW-SM		WELL GRADED SAND WITH SILT: gray brown, dense, wet	40.0-41.5	●			6 14 17
45				45.0-46.5	●			5 9 12
46	SW		WELL GRADED SAND: gray brown, medium dense, wet					
50			no sampling at 50.0' due to flow sands					
52			End of Boring @ 50.0' Subsurface water encountered @ 24.0'					
53								

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 44

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-16-2018

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

SOIL DESCRIPTION

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	ML		SANDY SILT: light brown, soft, slightly moist, trace clay (Alluvium)	0-4	○			1
2			moist	2.0-3.5	■	104.6	15.8	2 2
4	SW		WELL GRADED SAND: light brown, loose, slightly moist, trace fine gravel	5.0-6.5	■	99.6	2.4	3 6 9
8			medium dense, moist	8.5-10.0	●			4 7 12
10			End of Boring @ 10.0 No Subsurface Water Encountered					

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 45
PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-26-2018

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

SOIL DESCRIPTION

DEPTH (feet)	USCS CLASS	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM	SILTY SAND: brown, loose, slightly moist (Alluvium)					
2		moist	0-5	○			
4		increasing silt content					5
5	SP	POORLY GRADED SAND: light brown, medium dense, moist	5.0-6.5	■	99.1	8.3	6 13
9	SW	WELL GRADED SAND: light brown, medium dense, moist, trace silt, trace coarse gravel and cobbles					6
10			10.0-11.5	■	118.1	5.1	18 24
14							10
15		dense	15.0-16.5	■	121.4	4.5	27 34
20		▼ silt ends, wet, medium dense	20.0-21.5	●			6 13 15
24	CL	SANDY LEAN CLAY: gray, very soft, moist, trace silt					
25			25.0-26.5	●			0 1 1
26		End of Boring @ 26.5' Subsurface Water Encountered Between 20.0' and 24.0'					

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 46
PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-26-2018

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
2			moist					
3	ML		SANDY SILT: brown, soft, moist					
4	SP		POORLY GRADED SAND: light brown, medium dense, moist	5.0-6.5	■	101.6	11.4	4 18 25
7			trace fine to medium gravel and cobbles					
10				10.0-11.5	■	103.3	18.1	5 10 17
11			very moist, trace silt					
13	SW		WELL GRADED SAND: brown, medium dense, moist, trace fine gravel, trace silt					
15				15.0-16.5	●			8 11 17
16			End of Boring @ 16.5' No Subsurface Water Encountered					

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 47

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-17-2018

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

SOIL DESCRIPTION

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
1			moist, increasing silt content					
3	ML		SANDY SILT: brown, soft, moist, trace clay					
5	SP		POORLY GRADED SAND: light brown/orange brown mottled, medium dense, moist	5.0-6.5	■	103.0	9.4	3, 9, 12
10				10.0-11.5	■	107.0	6.3	10, 16, 24
12			trace fine to coarse gravel					
14			trace cobbles, dense					
15				15.0-16.5	●			15, 18, 19
16			blow counts from 15.5' to 16.5' not reliable due to rocks					
17			End of Boring @ 16.5' No Subsurface Water Encountered					

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 48

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-17-2018

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
1			moist					
2								
3			increasing silt content					
4								3
5	SP		POORLY GRADED SAND: light brown/orange brown mottled, loose, moist	5.0-6.5	■	100.7	8.6	4 7
6								
7								
8			trace fine gravel					
9								7
10			medium dense	10.0-11.5	■	110.1	6.0	16 22
11								
12								
13								
14	SW		WELL GRADED SAND: light brown, dense, moist, trace fine to coarse gravel					9
15				15.0-16.5	●			13 19
16								
17			End of Boring @ 16.5'					
18			No Subsurface Water Encountered					
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ■ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 49

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-18-2018

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

SOIL DESCRIPTION

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
1			gray brown, moist					
5			thin sandy silt lense	5.0-6.5	■	98.1	15.5	3, 4, 7
10	SW		WELL GRADED SAND: light brown, medium dense, moist, trace fine to coarse gravel	10.0-11.5	■	No Return		7, 16, 19
15				15.0-16.5	●			5, 12, 20
16			blow counts from 16.0' to 16.5' not reliable due to rocks					
17			End of Boring @ 16.5' No Subsurface Water Encountered					

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 50

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-18-2018

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

SOIL DESCRIPTION

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
1			moist					
4	ML		SANDY SILT: brown, soft, moist					2
5				5.0-6.5	■	98.9	8.0	7
5	SP		POORLY GRADED SAND: light brown/orange brown mottled, loose, moist					9
10			medium dense, trace silt	10.0-11.5	■	116.1	11.7	8 18 24
14	SW		WELL GRADED SAND: light brown, medium dense, moist, trace fine to coarse gravel and cobbles					12
15				15.0-16.0	■	109.5	5.5	50/5.0"
16			blow counts from 15.5' to 16.0' not reliable due to rocks					
20			wet	20.0-21.5	●			8 13 18
25				25.0-26.5	●			5 16 32
26			End of Boring @ 26.5' Subsurface Water Encountered Between 20.0' and 24.0'					

LEGEND: ■ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 51

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

JOB NO.: 301953-002
DATE: 07-19-2018

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol and North Rose Avenue
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
2			moist					
3			increasing silt content					
5	SP		POORLY GRADED SAND: light brown, loose, moist	5.0-6.5	■	122.4	12.4	3, 6, 10
9			medium dense					
10				10.0-11.5	■	94.9	7.9	6, 17, 24
14	SW		WELL GRADED SAND: light brown, medium dense, moist, trace fine gravel and cobbles	15.0-16.5	■	109.5	5.0	7, 19, 21
20			cobbles end	20.0-21.5	●			7, 11, 14
21			wet ▼					
25				25.0-26.5	●			7, 8, 4
26	SP		POORLY GRADED SAND: gray brown, medium dense, wet, thin lense of silty sand					

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 51
PAGE 2 OF 2

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

JOB NO.: 301953-002
DATE: 07/19/2018

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

SOIL DESCRIPTION

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
27	SP		POORLY GRADED SAND: as above					
30				30.0-31.5	●			8 16 32
31			trace fine gravel and cobbles, flow sands, blow count from 31.0' to 31.5' not reliable due to flow sands					
34								8 12 14
35	SW-SM		WELL GRADED SAND WITH SILT AND GRAVEL: light brown, medium dense, wet	35.0-36.5	●			
40				40.0-41.5	●			6 5 7
43	SW		WELL GRADED SAND: light brown, dense, wet, flow sands end					
45				45.0-46.5	●			5 10 21
49			thin lenses of poorly graded sand					
50				50.0-51.5	●			11 16 24
52			End of Boring @ 51.5' Subsurface water encountered @ 21.0'					
53								

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 52

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-25-2018

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

SOIL DESCRIPTION

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, loose, slightly moist (Alluvium)					
2			moist					
3	ML		SANDY SILT: light gray brown, soft, moist					
5				5.0-6.5	■	108.9	19.4	1 3 3
7	SW		WELL GRADED SAND: light brown, loose, moist					
10			medium dense, slightly moist, trace fine to coarse gravel	10.0-11.5	■	107.6	2.8	5 11 11
13			moist, trace cobbles					
15				15.0-16.5	●			9 12 13
16			End of Boring @ 16.5' No Subsurface Water Encountered					

LEGEND: ■ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No.: 53
PAGE 1 OF 1
JOB NO.: 301953-002
DATE: 07-17-2018

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

OXNARD HIGH SCHOOL No. 8
Northeast of Camino Del Sol
and North Rose Avenue
Oxnard, California

SOIL DESCRIPTION

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: light brown, loose, slightly moist (Alluvium)	0-3	○			1
1			moist, trace roots, increasing silt content					
2				2.0-3.5	▬	94.2	25.1	2
3	ML		SANDY SILT: brown, soft, moist, trace roots					3
4								2
5				5.0-6.5	▬	88.9	9.7	4
6	SP		POORLY GRADED SAND: light brown/gray mottled, loose, moist					7
7								
8								3
9			medium dense	8.5-10.0	●			5
10								6
11			End of Boring @ 10.0 No Subsurface Water Encountered					
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ▬ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

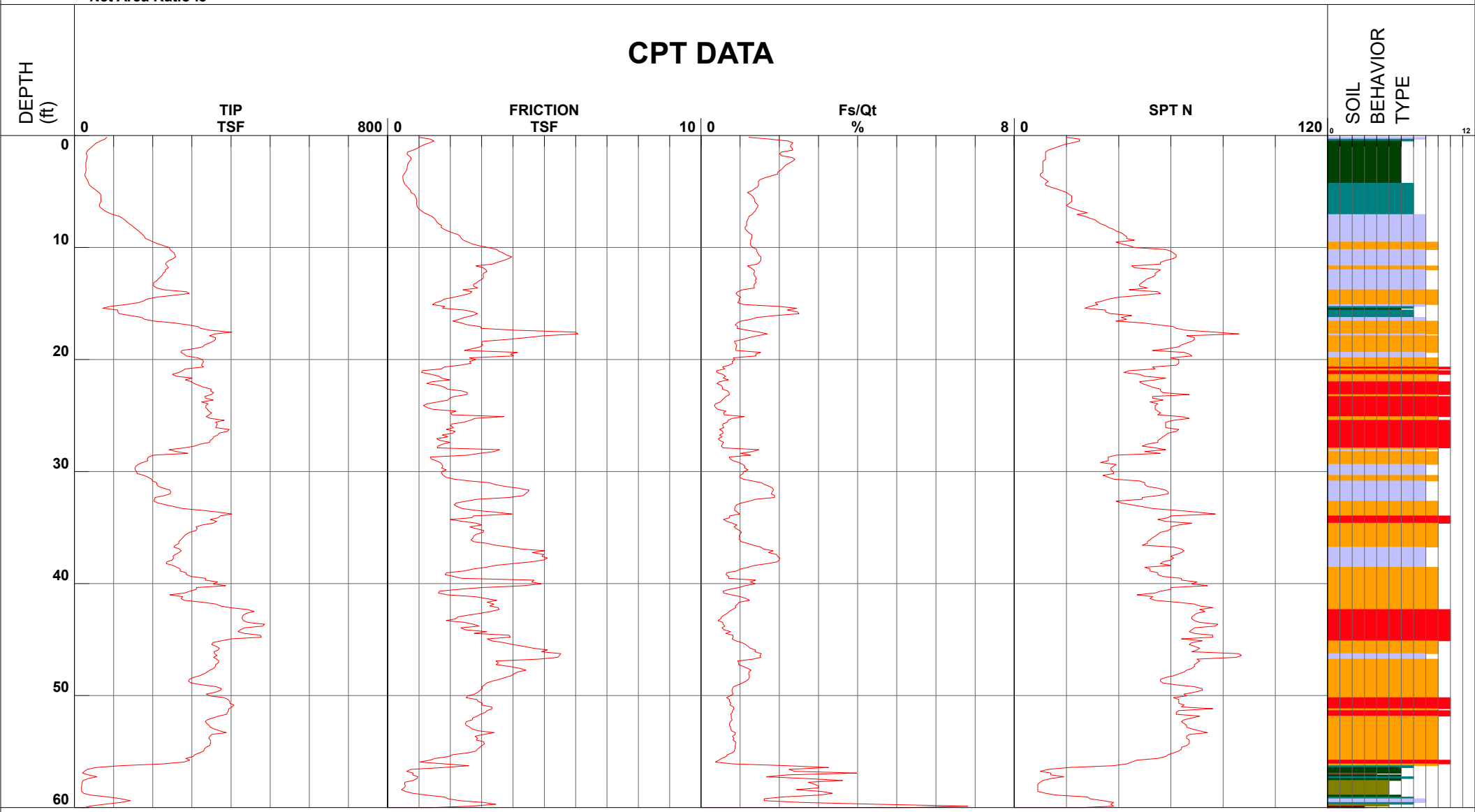
NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems

Project	Oxnard Union HS No.8	Operator	RC AS	Filename	SDF(701).cpt
Job Number	301953-001	Cone Number	DDG1379	GPS	
Hole Number	CPT-01	Date and Time	4/20/2018 10:08:51 AM	Maximum Depth	60.53 ft
EST GW Depth During Test		24.00 ft			

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 10cm squared

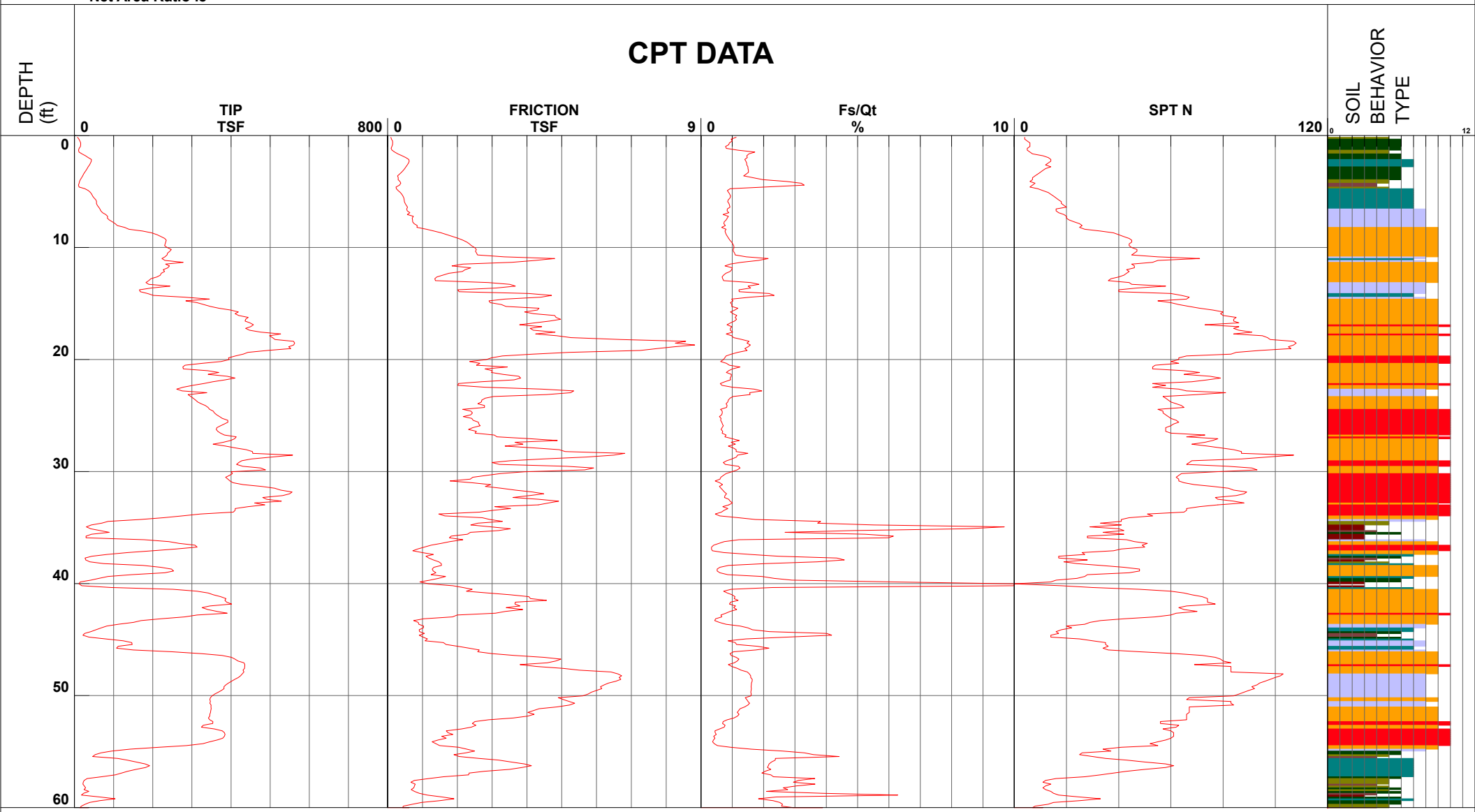
S*Soil behavior type and SPT based on data from UBC-1983

Earth Systems

Project	Oxnard Union High School No.8	Operator	RC AS	Filename	SDF(037).cpt
Job Number	301953-001	Cone Number	DDG1448	GPS	
Hole Number	CPT-02A	Date and Time	7/16/2018 3:49:22 PM	Maximum Depth	61.02 ft
EST GW Depth During Test		15.00 ft			

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 15cm squared

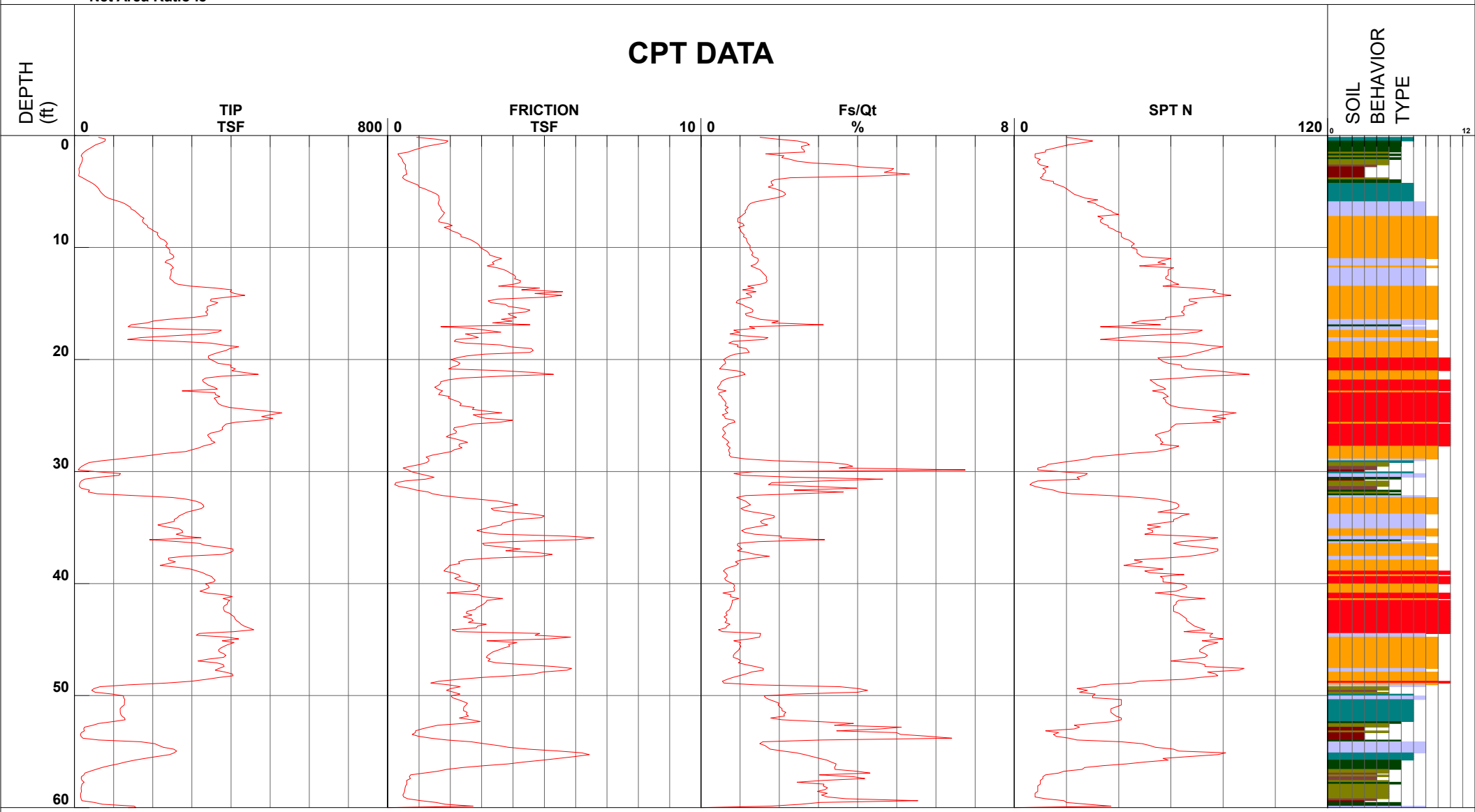
S*Soil behavior type and SPT based on data from UBC-1983

Earth Systems

Project	Oxnard Union HS No.8	Operator	RC AS	Filename	SDF(702).cpt
Job Number	301953-001	Cone Number	DDG1379	GPS	
Hole Number	CPT-03	Date and Time	4/20/2018 11:12:25 AM	Maximum Depth	60.20 ft
EST GW Depth During Test		24.00 ft			

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 10cm squared

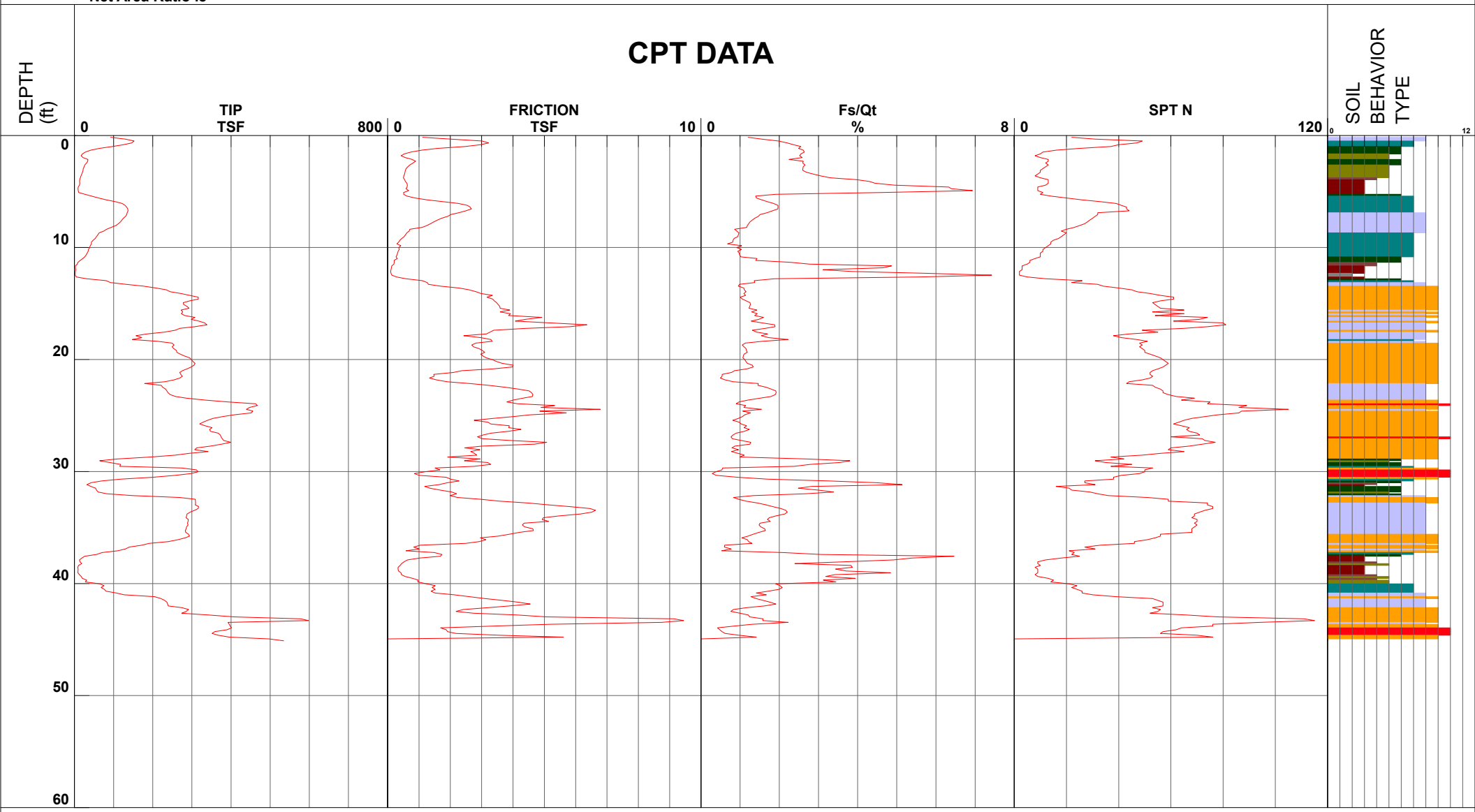
S*Soil behavior type and SPT based on data from UBC-1983

Earth Systems

Project	Oxnard Union HS No.8	Operator	RC AS	Filename	SDF(703).cpt
Job Number	301953-001	Cone Number	DDG1379	GPS	
Hole Number	CPT-04	Date and Time	4/20/2018 11:57:08 AM	Maximum Depth	45.11 ft
EST GW Depth During Test		24.00 ft			

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 10cm squared

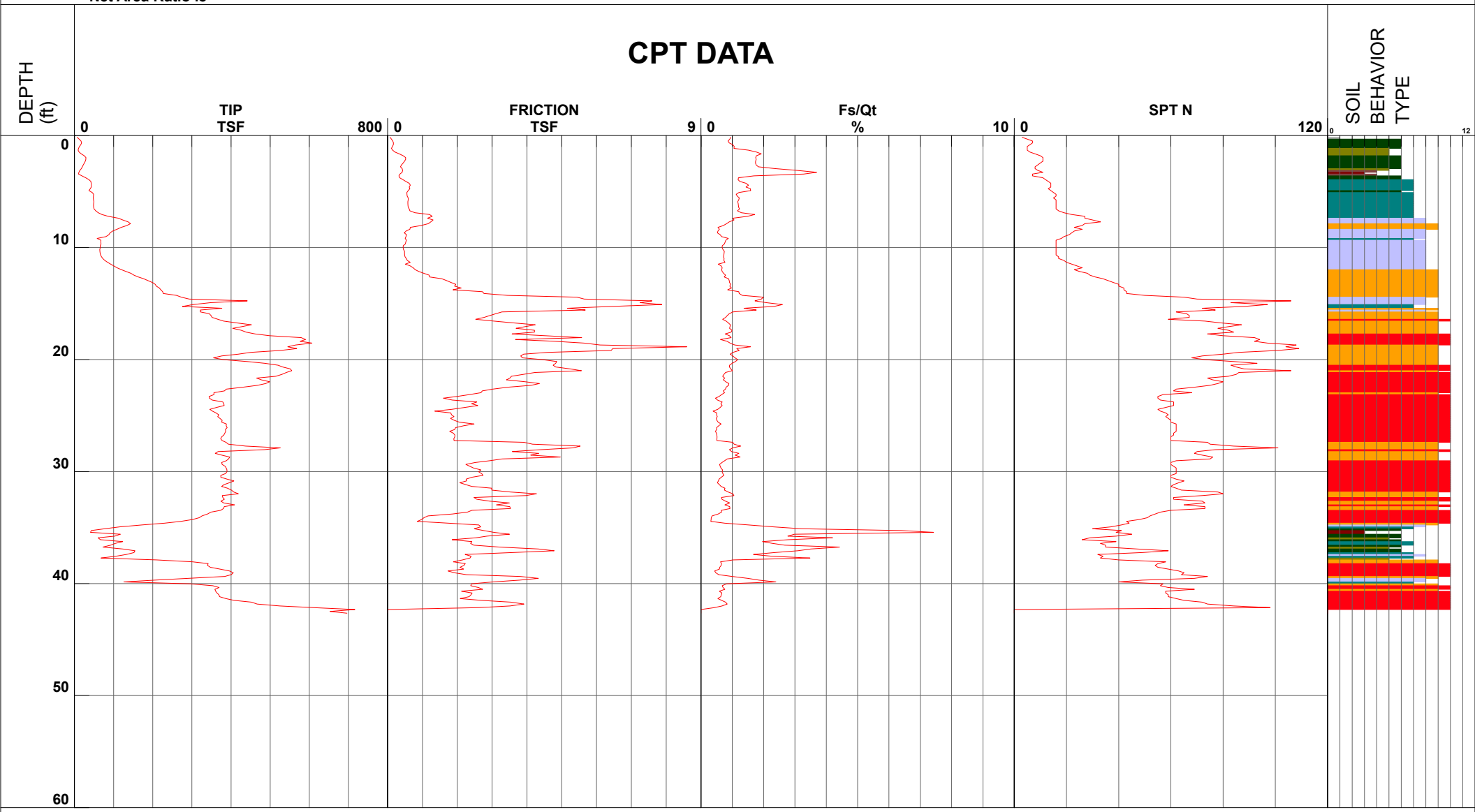
S*Soil behavior type and SPT based on data from UBC-1983

Earth Systems

Project	Oxnard Union High School No.8	Operator	RC AS	Filename	SDF(036).cpt
Job Number	301953-001	Cone Number	DDG1448	GPS	
Hole Number	CPT-05	Date and Time	7/16/2018 3:07:16 PM	Maximum Depth	42.65 ft
EST GW Depth During Test		15.00 ft			

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 15cm squared

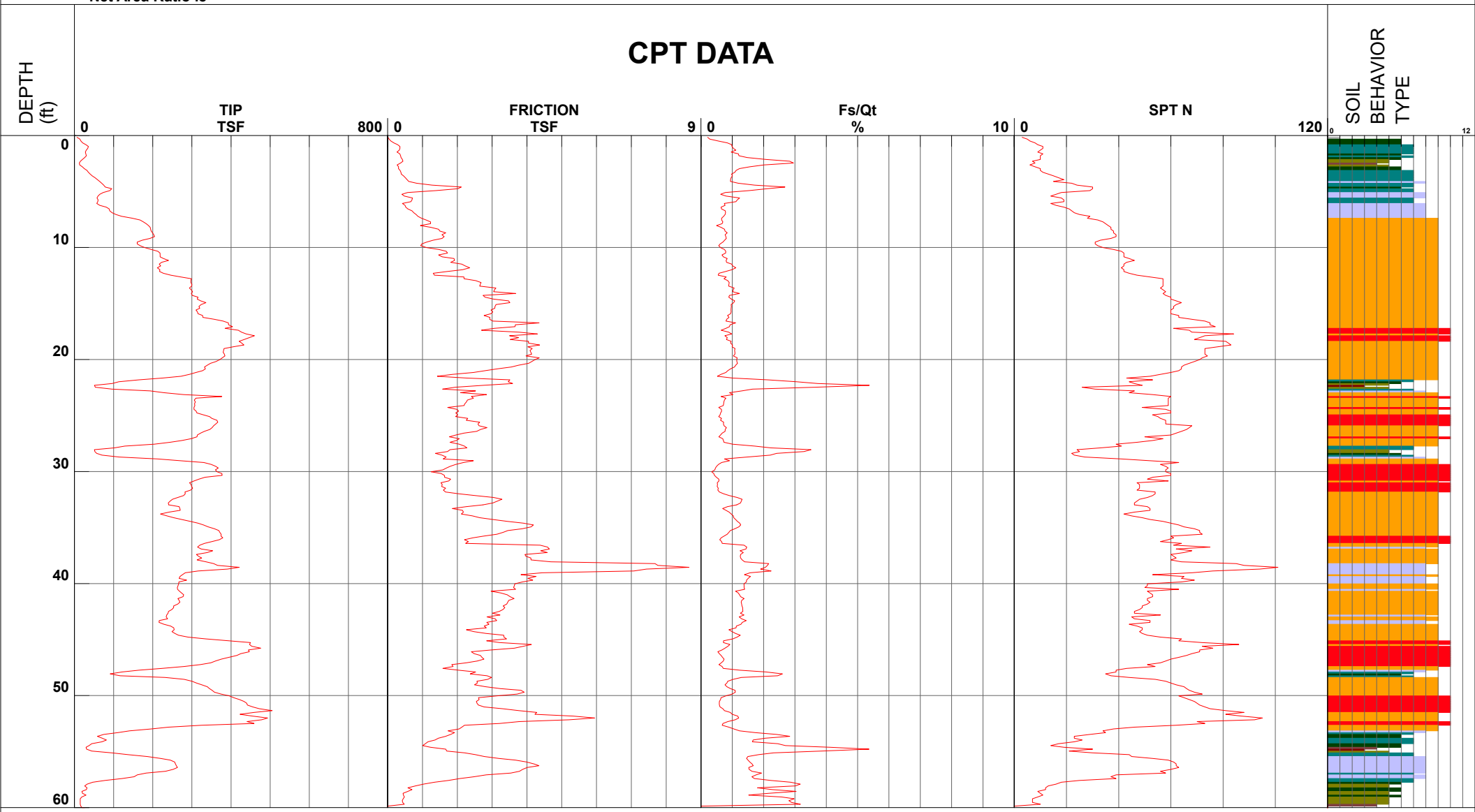
S*Soil behavior type and SPT based on data from UBC-1983

Earth Systems

Project	Oxnard Union High School No.8	Operator	RC AS	Filename	SDF(034).cpt
Job Number	301953-001	Cone Number	DDG1448	GPS	
Hole Number	CPT-06A	Date and Time	7/16/2018 2:15:03 PM	Maximum Depth	60.20 ft
EST GW Depth During Test		15.00 ft			

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 15cm squared

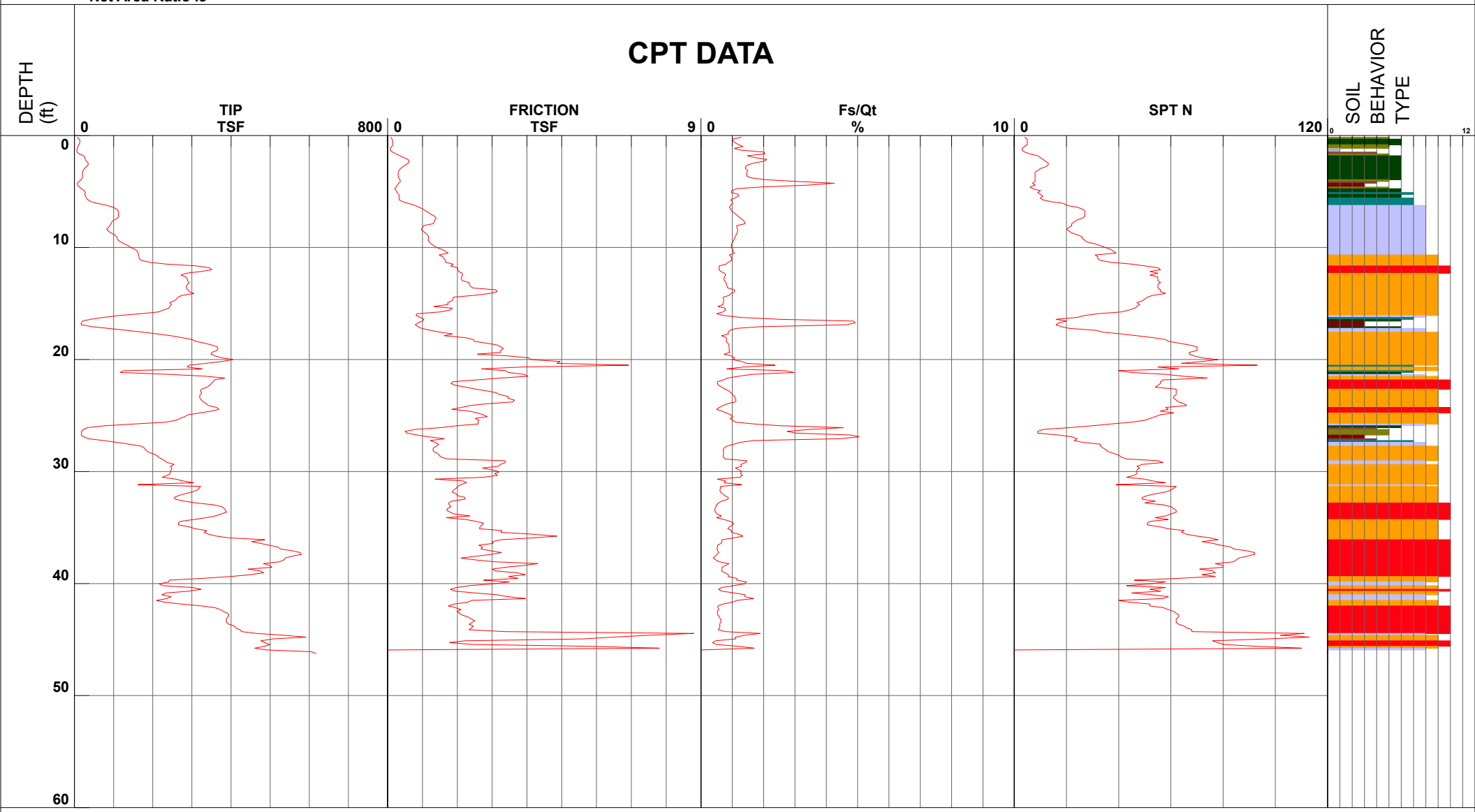
S*Soil behavior type and SPT based on data from UBC-1983

Earth Systems

Project	Oxnard Union High School No.8	Operator	RC AS	Filename	SDF(032).cpt
Job Number	301953-001	Cone Number	DDG1448	GPS	
Hole Number	CPT-07	Date and Time	7/16/2018 1:22:10 PM	Maximum Depth	46.26 ft
EST GW Depth During Test		15.00 ft			

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 15cm squared

S*Soil behavior type and SPT based on data from UBC-1983

APPENDIX B

Laboratory Test Results

BULK DENSITY TEST RESULTS

ASTM D 2937-17 (modified for ring liners)

August 20, 2018

BORING NO.	DEPTH feet	MOISTURE CONTENT, %	WET DENSITY, pcf	DRY DENSITY, pcf
1	6.0 - 6.5	3.5	101.4	98.0
1	11.0 - 11.5	3.1	112.0	108.6
1	16.0 - 16.5	3.5	119.1	115.0
2	6.0 - 6.5	7.3	106.7	99.5
2	11.0 - 11.5	4.9	116.0	110.6
2	16.0 - 16.5	3.9	110.3	106.2
3	3.0 - 3.5	7.3	108.9	101.5
3	6.0 - 6.5	7.8	104.6	97.0
4	3.0 - 3.5	11.9	110.5	98.8
4	6.0 - 6.5	5.8	99.5	94.1
5	3.0 - 3.5	17.0	111.6	95.4
5	6.0 - 6.5	10.0	105.5	96.0
6	3.0 - 3.5	9.3	107.0	97.9
6	6.0 - 6.5	30.5	116.5	89.3
7	6.0 - 6.5	5.4	95.8	90.9
7	11.0 - 11.5	4.2	110.2	105.8
8	6.0 - 6.5	5.9	101.4	95.8
8	11.0 - 11.5	7.4	108.7	101.2
9	6.0 - 6.5	16.3	111.9	96.2
9	11.0 - 11.5	3.6	102.5	98.9
9	16.0 - 16.5	3.9	120.7	116.1
10	6.0 - 6.5	31.2	114.1	87.0
10	11.0 - 11.5	3.5	109.4	105.7
11	3.0 - 3.5	11.9	109.2	97.6
11	6.0 - 6.5	6.6	108.7	101.9
12	3.0 - 3.5	17.7	110.7	94.0
12	6.0 - 6.5	4.2	102.5	98.4
13	6.0 - 6.5	3.9	101.1	97.3
13	11.0 - 11.5	4.5	111.1	106.4
14	6.0 - 6.5	3.7	103.8	100.1
14	11.0 - 11.5	15.7	103.6	89.6
14	16.0 - 16.5	9.4	115.0	105.1
15	6.0 - 6.5	6.3	116.3	109.4
15	11.0 - 11.5	6.2	104.5	98.4
16	6.0 - 6.5	5.5	97.6	92.5
16	11.0 - 11.5	4.4	103.0	98.6

BULK DENSITY TEST RESULTS

ASTM D 2937-17 (modified for ring liners)

August 20, 2018

BORING NO.	DEPTH feet	MOISTURE CONTENT, %	WET DENSITY, pcf	DRY DENSITY, pcf
16	16.0 - 16.5	4.7	117.9	112.6
17	6.0 - 6.5	7.6	111.2	103.3
17	11.0 - 11.5	3.4	108.2	104.7
18	6.0 - 6.5	36.1	109.6	80.5
18	11.0 - 11.5	3.2	121.3	117.5
19	6.0 - 6.5	25.6	117.3	93.4
19	11.0 - 11.5	2.8	106.4	103.5
20	6.0 - 6.5	26.2	114.6	90.8
20	11.0 - 11.5	4.3	114.4	109.7
20	16.0 - 16.5	3.9	113.1	108.8
21	6.0 - 6.5	9.2	109.0	99.8
21	11.0 - 11.5	4.8	116.5	111.2
22	6.0 - 6.5	16.5	110.9	95.1
22	11.0 - 11.5	8.6	113.5	104.5
22	16.0 - 16.5	36.5	113.9	83.5
23	6.0 - 6.5	23.4	102.6	83.1
23	11.0 - 11.5	35.2	116.1	85.9
24	6.0 - 6.5	5.5	96.2	91.2
24	11.0 - 11.5	4.4	105.4	101.0
24	16.0 - 16.5	2.4	105.5	103.0
25	6.0 - 6.5	18.9	104.1	87.5
25	11.0 - 11.5	5.8	109.6	103.6
26	3.0 - 3.5	21.8	113.5	93.1
26	6.0 - 6.5	3.7	102.2	98.6
27	6.0 - 6.5	8.2	110.2	101.9
27	11.0 - 11.5	5.8	118.5	112.0
27	16.0 - 16.5	4.0	102.7	98.7
28	6.0 - 6.5	7.9	105.8	98.0
28	11.0 - 11.5	6.6	115.1	108.0
29	6.0 - 6.5	8.1	104.8	96.9
29	11.0 - 11.5	3.9	111.6	107.4
30	6.0 - 6.5	5.2	100.4	95.4
30	11.0 - 11.5	5.8	112.0	105.9
31	6.0 - 6.5	2.5	128.6	125.5
31	11.0 - 11.5	4.1	107.5	103.2
32	6.0 - 6.5	4.0	93.8	90.3

BULK DENSITY TEST RESULTS

ASTM D 2937-17 (modified for ring liners)

August 20, 2018

BORING NO.	DEPTH feet	MOISTURE CONTENT, %	WET DENSITY, pcf	DRY DENSITY, pcf
32	11.0 - 11.5	3.2	101.0	97.8
33	6.0 - 6.5	4.6	115.3	110.3
33	11.0 - 11.5	2.6	98.6	96.1
34	6.0 - 6.5	6.5	121.0	113.6
34	11.0 - 11.5	24.6	108.3	86.9
34	15.5 - 16.0	7.0	101.9	95.2
35	6.0 - 6.5	2.8	105.3	102.4
35	11.0 - 11.5	2.9	112.6	109.4
35	16.0 - 16.5	4.0	108.4	104.2
36	6.0 - 6.5	9.4	101.2	92.6
36	11.0 - 11.5	5.2	120.0	114.0
37	6.0 - 6.5	10.6	103.9	93.9
37	11.0 - 11.5	6.6	118.6	111.2
38	6.0 - 6.5	10.9	113.0	101.9
38	11.0 - 11.5	6.2	112.7	106.1
39	6.0 - 6.5	15.1	119.1	103.5
39	11.0 - 11.5	4.6	126.8	121.2
40	6.0 - 6.5	6.7	105.6	99.0
40	11.0 - 11.5	3.6	110.7	106.9
41	6.0 - 6.5	3.0	103.2	100.2
41	11.0 - 11.5	3.5	106.5	102.8
41	16.0 - 16.5	16.3	110.6	95.1
42	6.0 - 6.5	8.6	106.5	98.0
42	11.0 - 11.5	5.8	108.9	102.9
43	6.0 - 6.5	6.9	103.2	96.5
43	11.0 - 11.5	4.6	110.3	105.5
43	16.0 - 16.5	4.0	119.0	114.4
44	3.0 - 3.5	15.8	121.1	104.6
44	6.0 - 6.5	2.4	101.9	99.6
45	6.0 - 6.5	8.3	107.3	99.1
45	11.0 - 11.5	5.1	124.1	118.1
45	16.0 - 16.5	4.5	126.9	121.4
46	6.0 - 6.5	11.4	113.3	101.6
46	11.0 - 11.5	18.1	122.1	103.3
47	6.0 - 6.5	9.4	112.7	103.0
47	11.0 - 11.5	6.3	113.7	107.0

BULK DENSITY TEST RESULTS

ASTM D 2937-17 (modified for ring liners)

August 20, 2018

BORING NO.	DEPTH feet	MOISTURE CONTENT, %	WET DENSITY, pcf	DRY DENSITY, pcf
48	6.0 - 6.5	8.6	109.3	100.7
48	11.0 - 11.5	6.0	116.7	110.1
49	6.0 - 6.5	15.5	113.4	98.1
50	6.0 - 6.5	8.0	106.8	98.9
50	11.0 - 11.5	11.7	129.7	116.1
50	16.0 - 16.5	5.5	115.5	109.5
51	6.0 - 6.5	12.4	137.5	122.4
51	11.0 - 11.5	7.9	102.4	94.9
51	16.0 - 16.5	5.0	114.9	109.5
52	6.0 - 6.5	19.4	130.1	108.9
52	11.0 - 11.5	2.8	110.6	107.6
53	3.0 - 3.5	25.1	117.9	94.2
53	6.0 - 6.5	9.7	97.5	88.9

EXPANSION INDEX TEST RESULTS

ASTM D 4829-11

BORING NO.	DEPTH feet	EXPANSION INDEX
45	0.0 - 5.0	5

Oxnard High School No. 8 301953-002

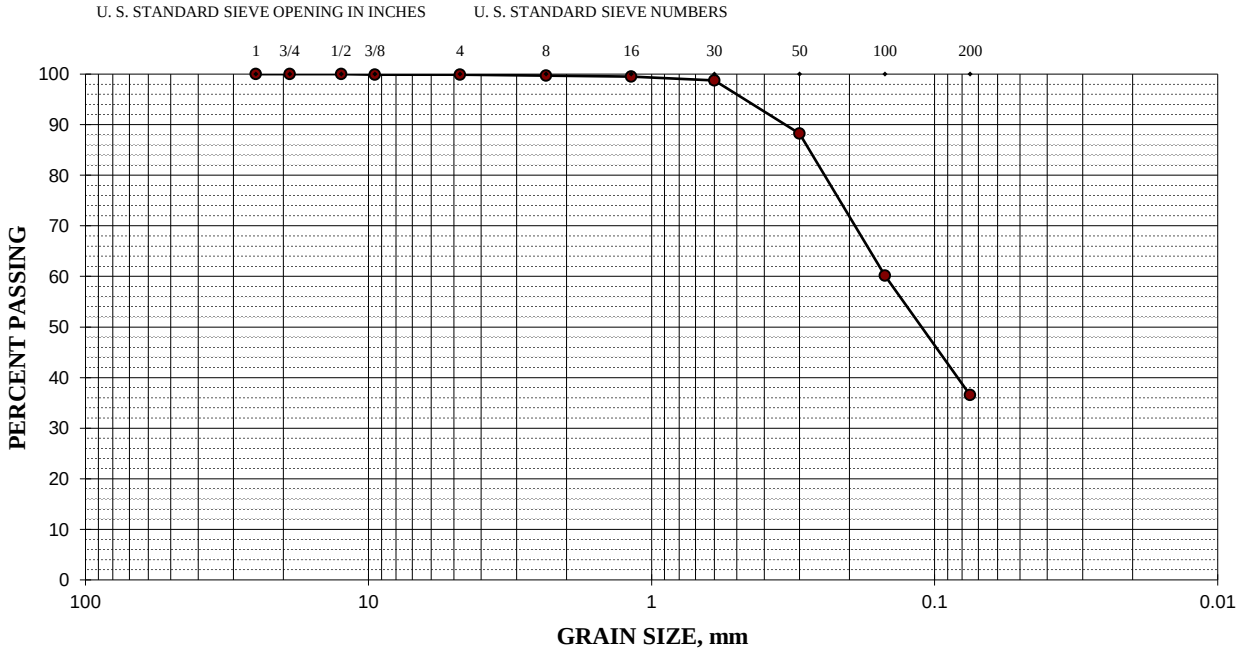
PARTICLE SIZE ANALYSIS

ASTM D 422-63/07; D 1140-17

Boring #5 @ 2.0 - 5.0' August 20, 2018

Silty Sand (SM)

Sieve size	% Retained	% Passing
1" (25-mm)	0	100
3/4" (19-mm)	0	100
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	0	100
#16 (1.18-mm)	0	100
#30 (600-µm)	1	99
#50 (300-µm)	12	88
#100 (150-µm)	40	60
#200 (75-µm)	63	37



Oxnard High School No. 8 301953-002

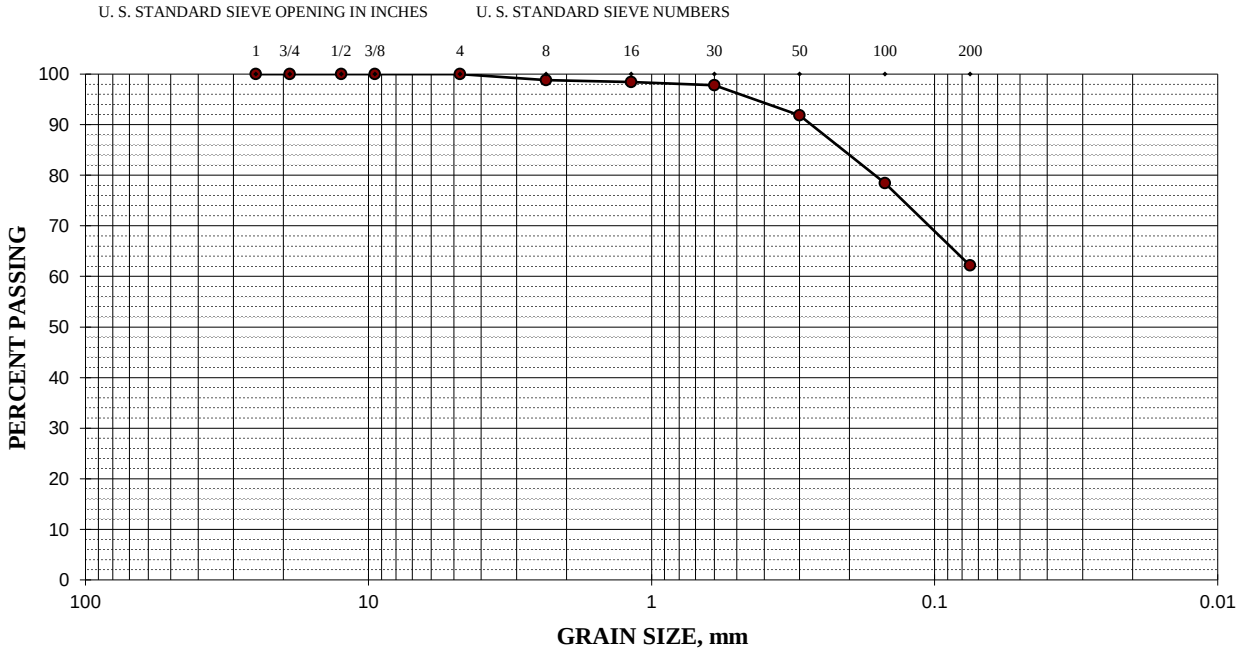
PARTICLE SIZE ANALYSIS

ASTM D 422-63/07; D 1140-17

Boring #6 @ 4.0 - 7.0' August 20, 2018

Sandy Silt (ML)

Sieve size	% Retained	% Passing
1" (25-mm)	0	100
3/4" (19-mm)	0	100
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	1	99
#16 (1.18-mm)	2	98
#30 (600-µm)	2	98
#50 (300-µm)	8	92
#100 (150-µm)	22	78
#200 (75-µm)	38	62



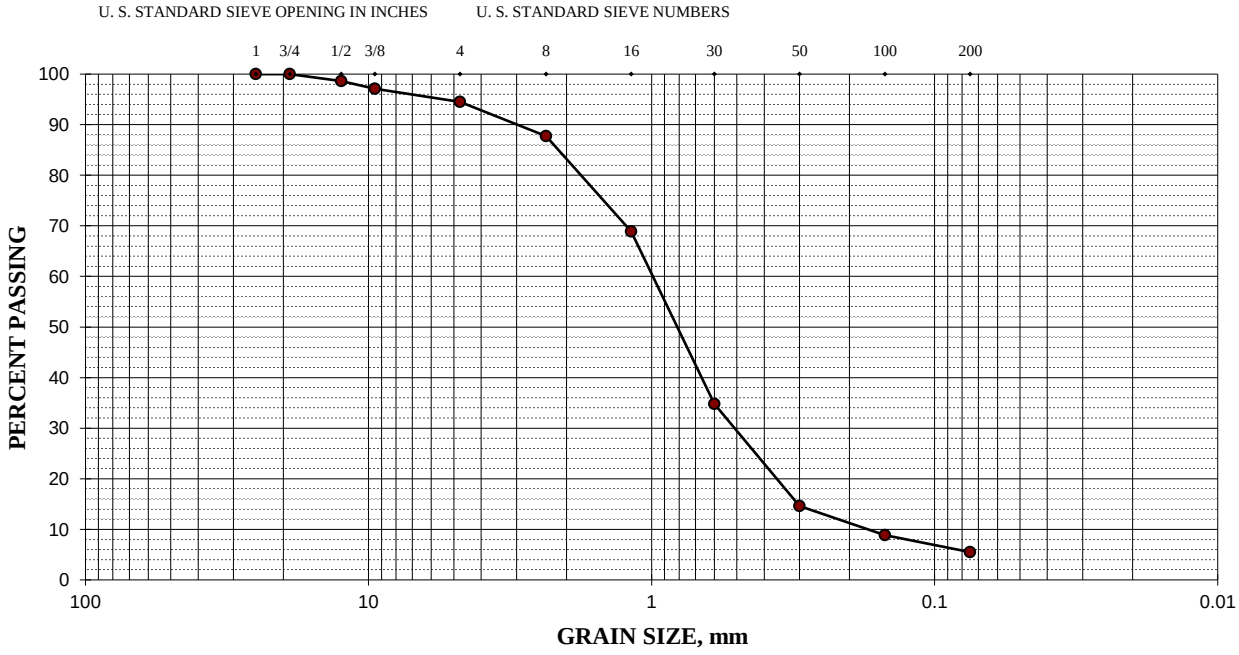
Oxnard High School No. 8 301953-002

PARTICLE SIZE ANALYSIS

ASTM D 422-63/07; D 1140-17

Boring #16 @ 30.0 - 31.5' August 20, 2018
Well Graded Sand (SW)
Cu = 5.7; Cc = 1.5

Sieve size	% Retained	% Passing
1" (25-mm)	0	100
3/4" (19-mm)	0	100
1/2" (12.5-mm)	1	99
3/8" (9.5-mm)	3	97
#4 (4.75-mm)	5	95
#8 (2.36-mm)	12	88
#16 (1.18-mm)	31	69
#30 (600-µm)	65	35
#50 (300-µm)	85	15
#100 (150-µm)	91	9
#200 (75-µm)	95	5



Oxnard High School No. 8 301953-002

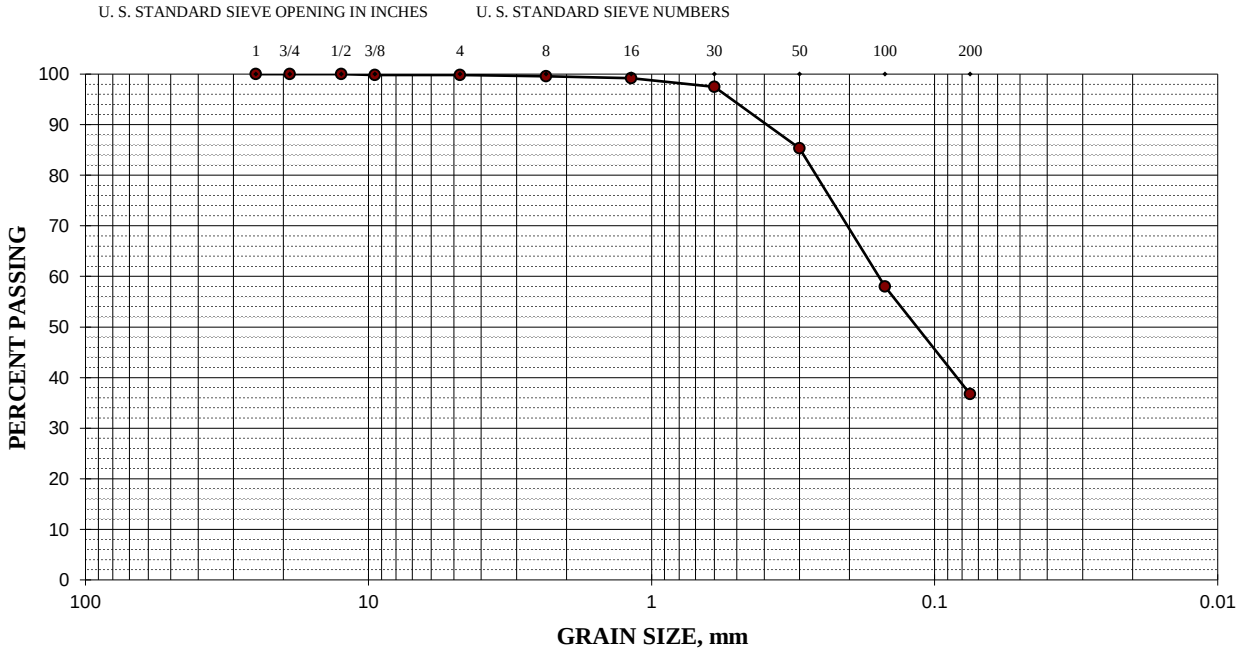
PARTICLE SIZE ANALYSIS

ASTM D 422-63/07; D 1140-17

Boring #20 @ 4.0 - 7.0' August 20, 2018

Silty Sand (SM)

Sieve size	% Retained	% Passing
1" (25-mm)	0	100
3/4" (19-mm)	0	100
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	0	100
#16 (1.18-mm)	1	99
#30 (600-µm)	3	97
#50 (300-µm)	15	85
#100 (150-µm)	42	58
#200 (75-µm)	63	37



Oxnard High School No. 8 301953-002

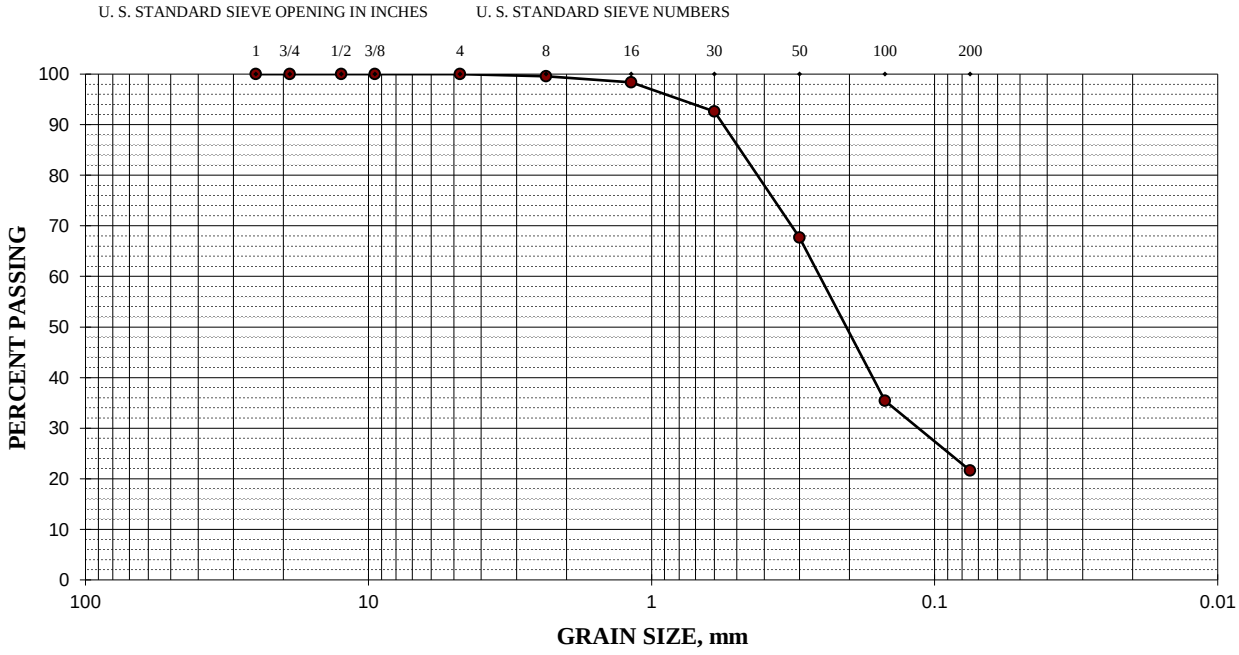
PARTICLE SIZE ANALYSIS

ASTM D 422-63/07; D 1140-17

Boring #34 @ 6.0 - 8.0' August 20, 2018

Silty Sand (SM)

Sieve size	% Retained	% Passing
1" (25-mm)	0	100
3/4" (19-mm)	0	100
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	0	100
#16 (1.18-mm)	2	98
#30 (600-µm)	7	93
#50 (300-µm)	32	68
#100 (150-µm)	65	35
#200 (75-µm)	78	22



Oxnard High School No. 8 301953-002

PARTICLE SIZE ANALYSIS

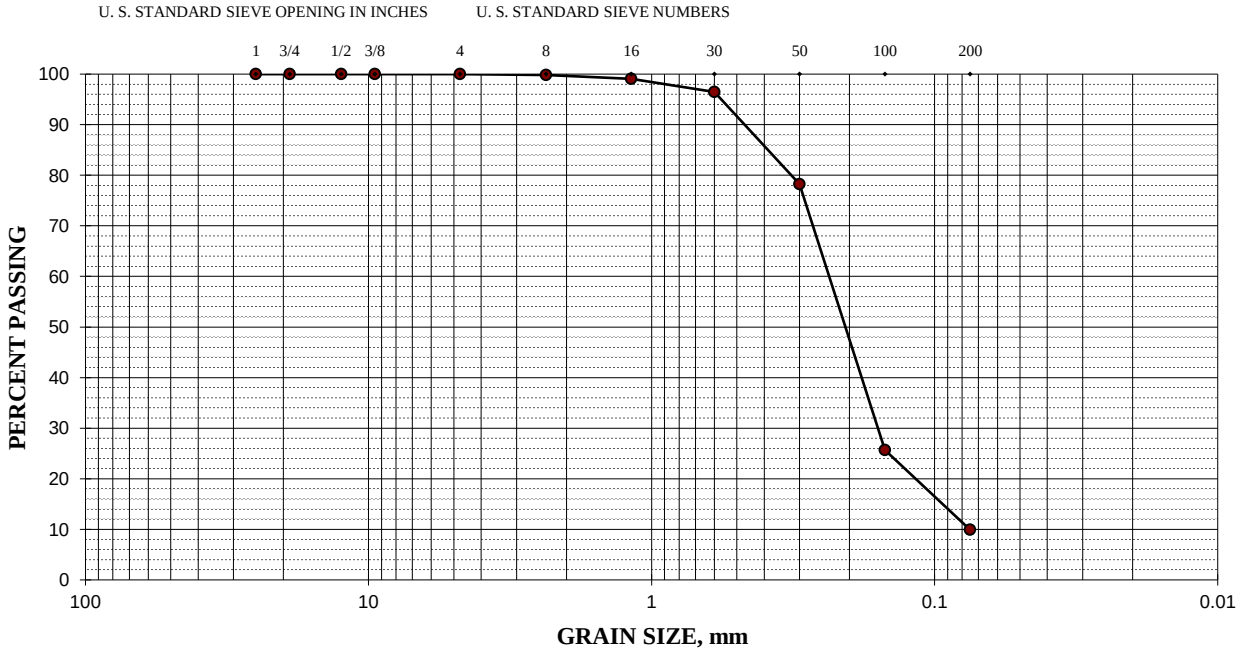
ASTM D 422-63/07; D 1140-17

Boring #35 @ 45.0 - 46.5' August 20, 2018

Poorly Graded Sand with Silt (SP-SM)

Cu = 3.1; Cc = 1.4

Sieve size	% Retained	% Passing
1" (25-mm)	0	100
3/4" (19-mm)	0	100
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	0	100
#16 (1.18-mm)	1	99
#30 (600-µm)	4	96
#50 (300-µm)	22	78
#100 (150-µm)	74	26
#200 (75-µm)	90	10



Oxnard High School No. 8 301953-002

PARTICLE SIZE ANALYSIS

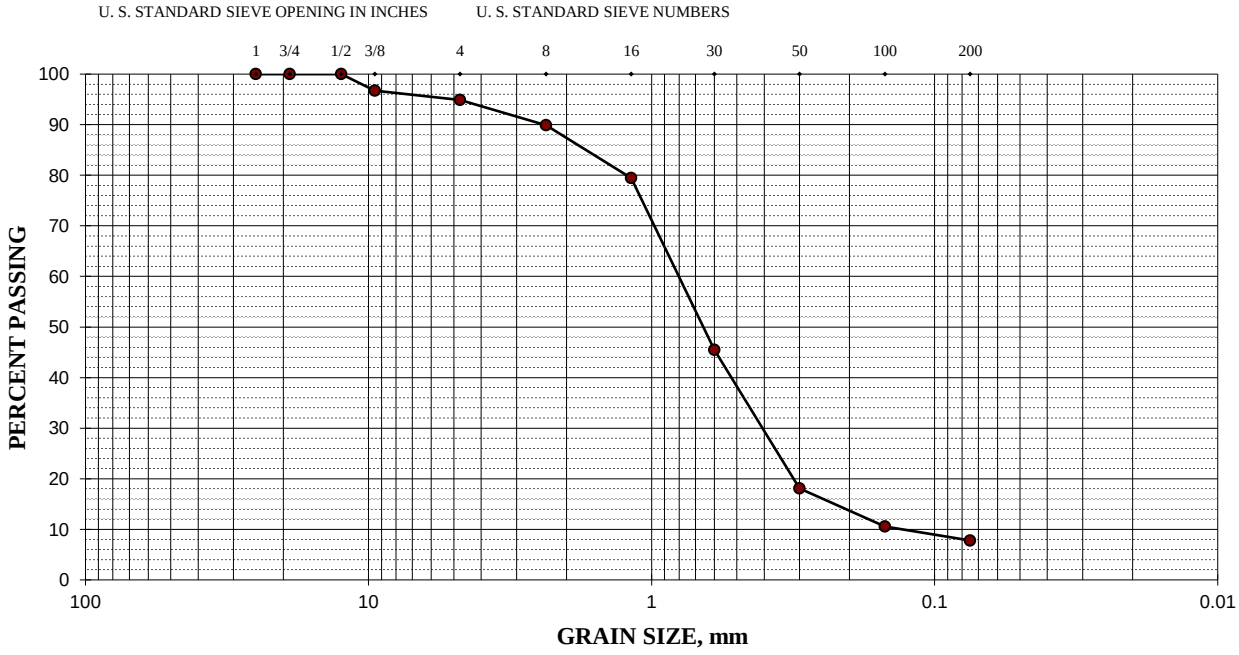
ASTM D 422-63/07; D 1140-17

Boring #43 @ 40.0 - 41.5' August 20, 2018

Well Graded Sand with Silt (SW-SM)

Cu = 6.2; Cc = 1.6

Sieve size	% Retained	% Passing
1" (25-mm)	0	100
3/4" (19-mm)	0	100
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	3	97
#4 (4.75-mm)	5	95
#8 (2.36-mm)	10	90
#16 (1.18-mm)	21	79
#30 (600-µm)	55	45
#50 (300-µm)	82	18
#100 (150-µm)	89	11
#200 (75-µm)	92	8



Oxnard High School No. 8 301953-002

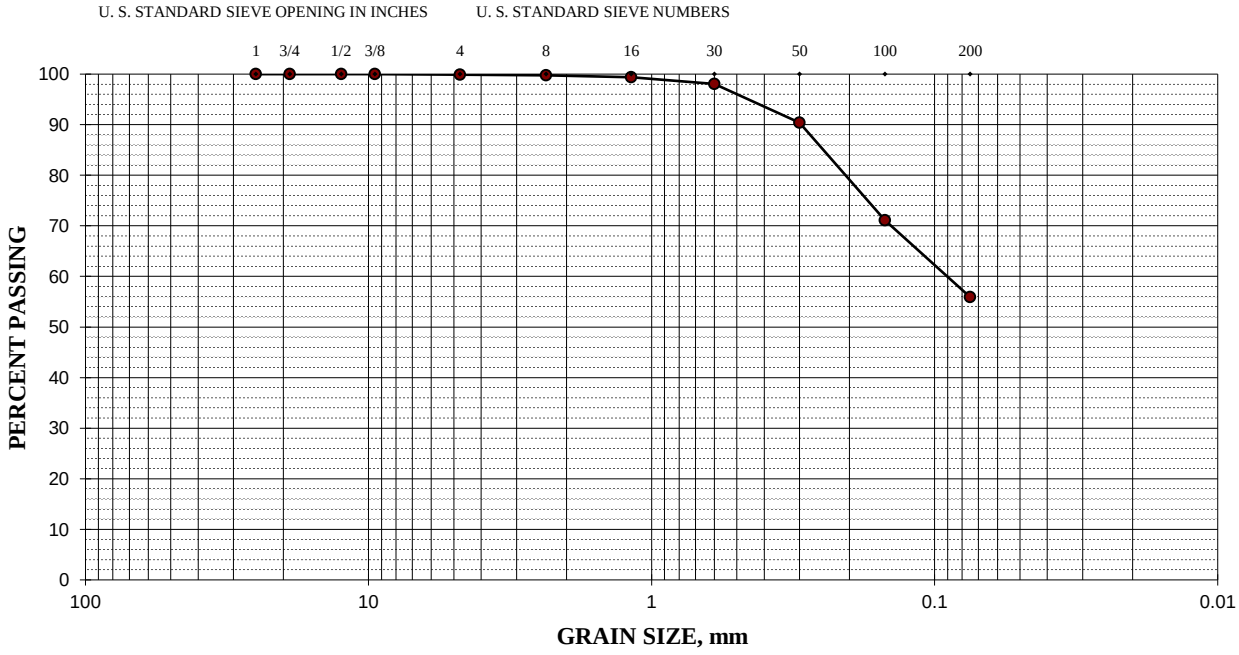
PARTICLE SIZE ANALYSIS

ASTM D 422-63/07; D 1140-17

Boring #44 @ 0.0 - 4.0' August 20, 2018

Sandy Silt (ML)

Sieve size	% Retained	% Passing
1" (25-mm)	0	100
3/4" (19-mm)	0	100
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	0	100
#16 (1.18-mm)	1	99
#30 (600-µm)	2	98
#50 (300-µm)	10	90
#100 (150-µm)	29	71
#200 (75-µm)	44	56



Oxnard High School No. 8 301953-002

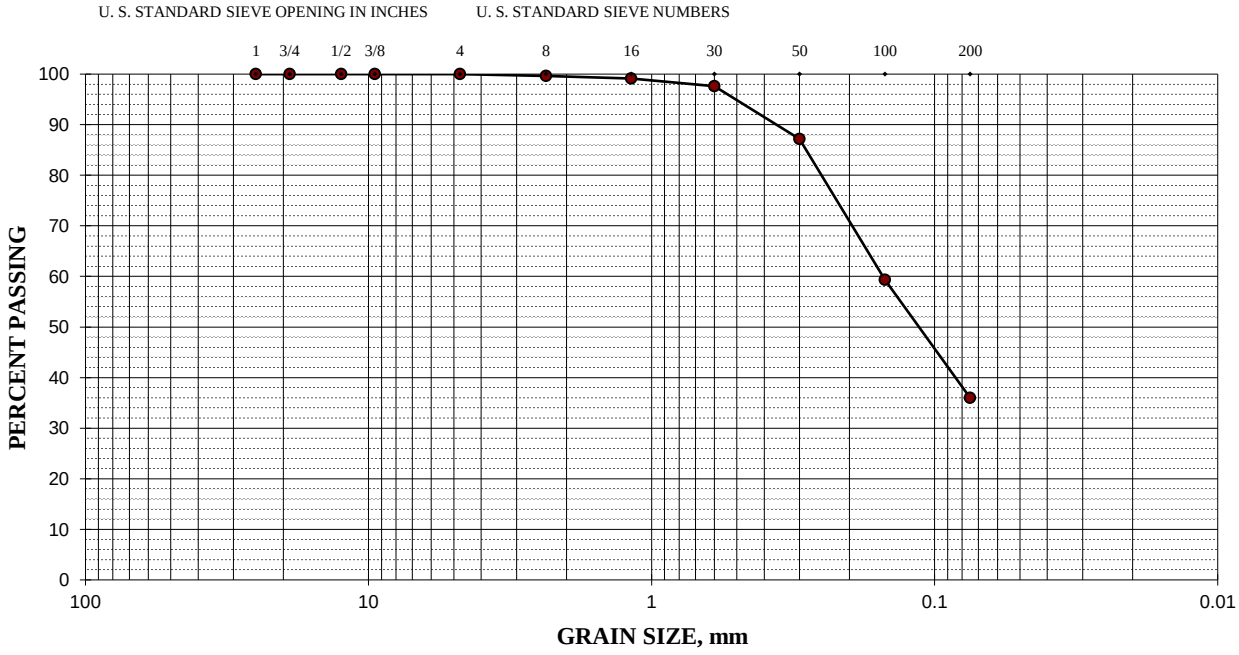
PARTICLE SIZE ANALYSIS

ASTM D 422-63/07; D 1140-17

Boring #45 @ 0.0 - 5.0' August 20, 2018

Silty Sand (SM)

Sieve size	% Retained	% Passing
1" (25-mm)	0	100
3/4" (19-mm)	0	100
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	0	100
#16 (1.18-mm)	1	99
#30 (600-µm)	2	98
#50 (300-µm)	13	87
#100 (150-µm)	41	59
#200 (75-µm)	64	36



Oxnard High School No. 8 301953-002

PARTICLE SIZE ANALYSIS

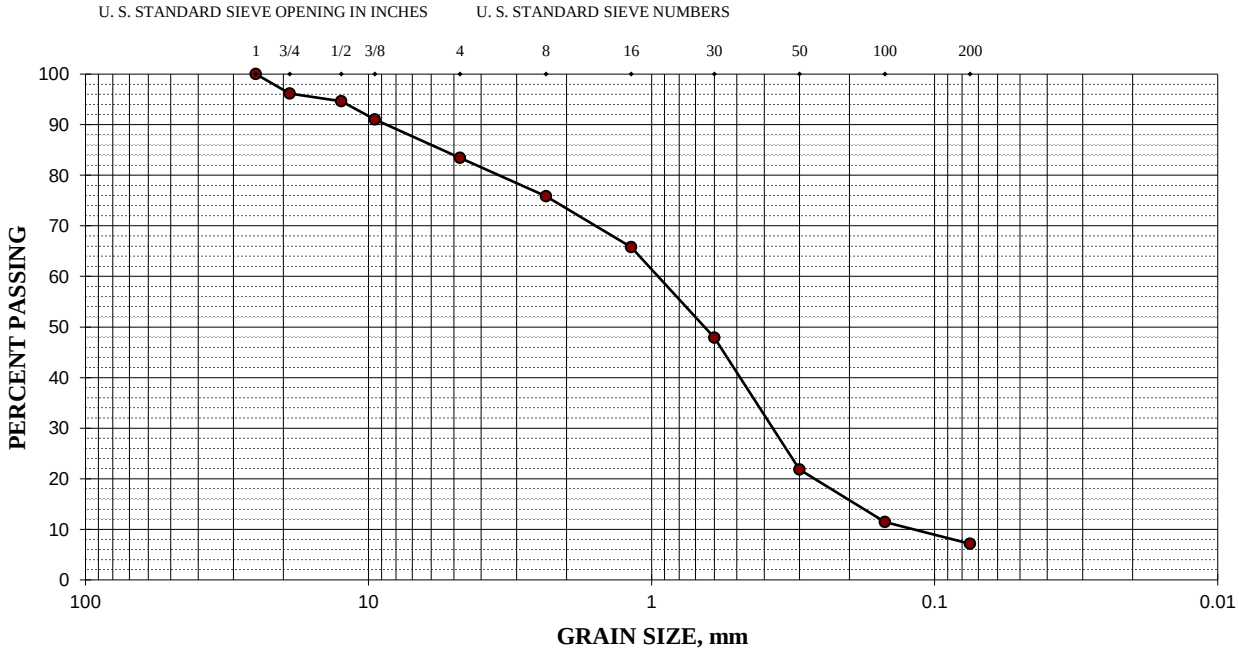
ASTM D 422-63/07; D 1140-17

Boring #51 @ 35.0 - 36.5' August 20, 2018

Well Graded Sand with Silt and Gravel (SW-SM)

Cu = 8.0; Cc = 1.2

Sieve size	% Retained	% Passing
1" (25-mm)	0	100
3/4" (19-mm)	4	96
1/2" (12.5-mm)	5	95
3/8" (9.5-mm)	9	91
#4 (4.75-mm)	17	83
#8 (2.36-mm)	24	76
#16 (1.18-mm)	34	66
#30 (600-µm)	52	48
#50 (300-µm)	78	22
#100 (150-µm)	89	11
#200 (75-µm)	93	7



Oxnard High School No. 8 301953-002

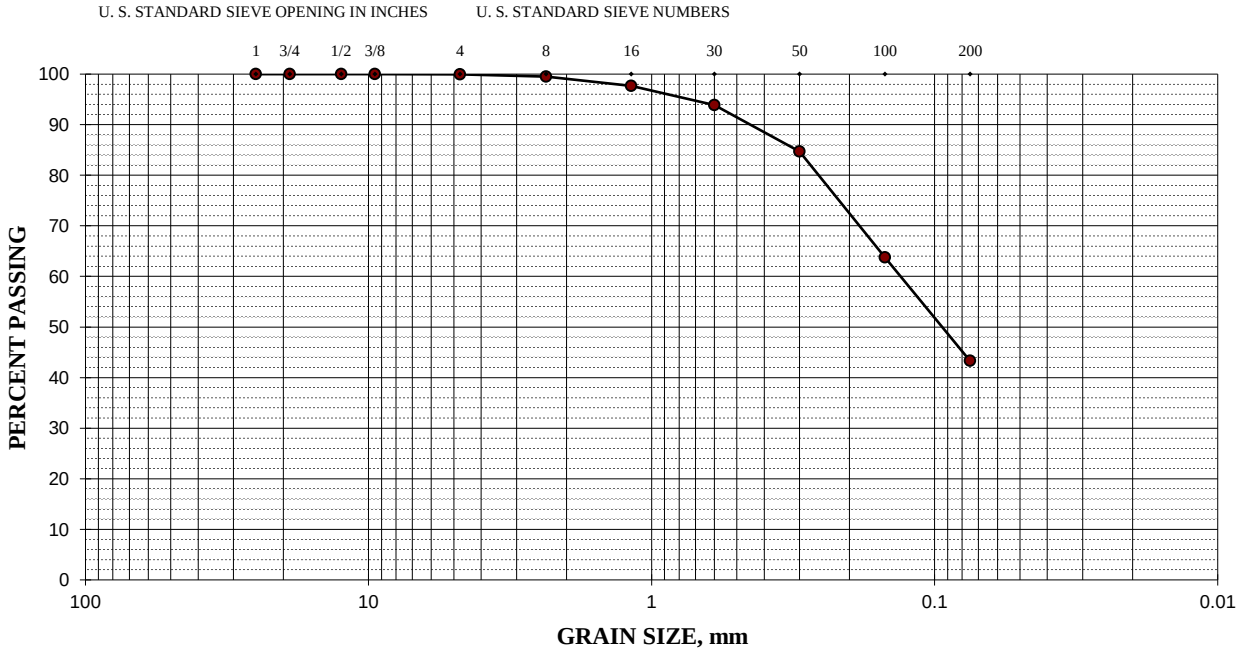
PARTICLE SIZE ANALYSIS

ASTM D 422-63/07; D 1140-17

Boring #53 @ 0.0 - 4.0' August 20, 2018

Silty Sand (SM)

Sieve size	% Retained	% Passing
1" (25-mm)	0	100
3/4" (19-mm)	0	100
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	1	99
#16 (1.18-mm)	2	98
#30 (600-µm)	6	94
#50 (300-µm)	15	85
#100 (150-µm)	36	64
#200 (75-µm)	57	43



Oxnard High School No. 8 301953-002

MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12 (Modified)

PROCEDURE USED: A

PREPARATION METHOD: Moist

RAMMER TYPE: Mechanical

SPECIFIC GRAVITY: 2.65 (assumed)

August 20, 2018

Boring #5 @ 2.0 - 5.0'

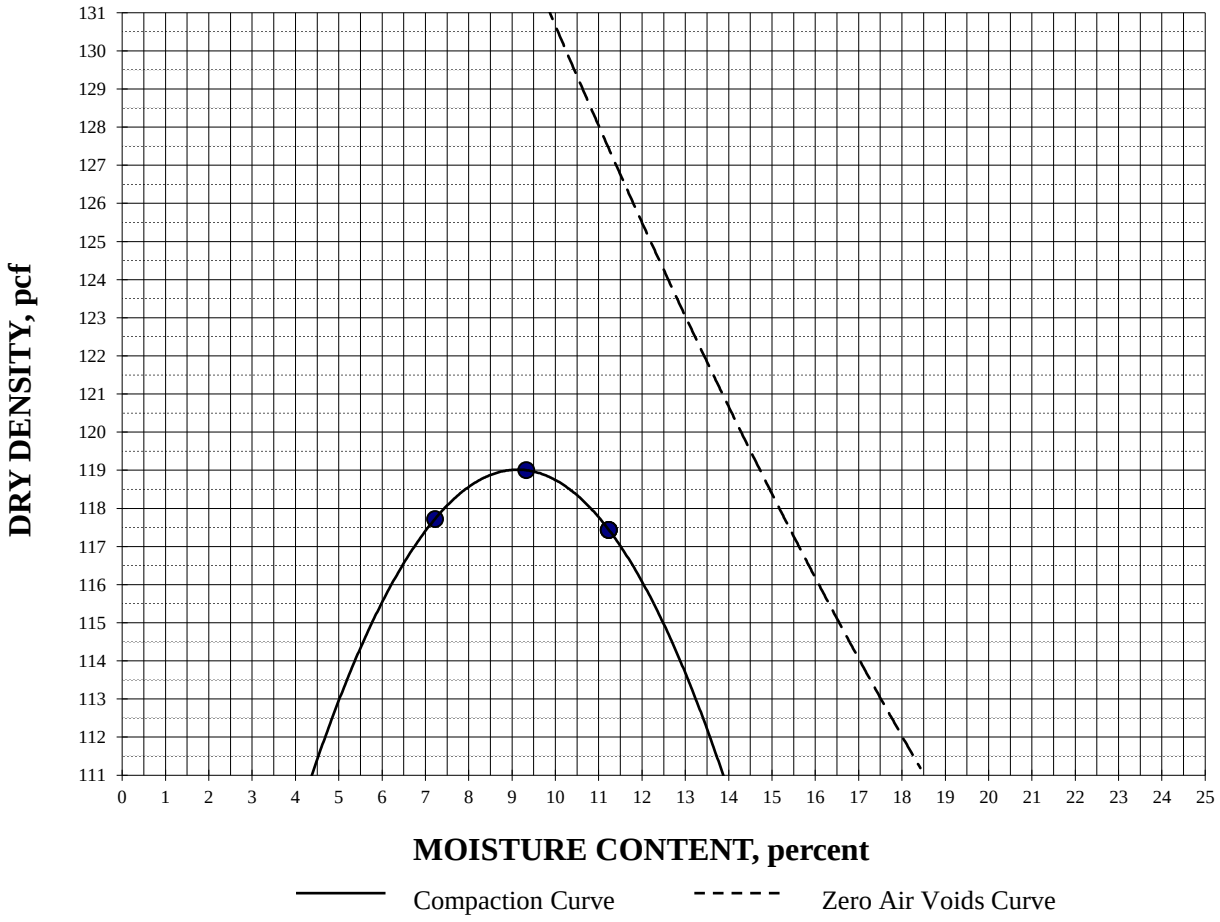
Light Brown Silty Sand (SM)

SIEVE DATA:

Sieve Size	% Retained (Cumulative)
3/4"	0
3/8"	0
#4	0

MAXIMUM DRY DENSITY: 119.0 pcf

OPTIMUM MOISTURE: 9.1%



Oxnard High School No. 8 301953-002

DIRECT SHEAR

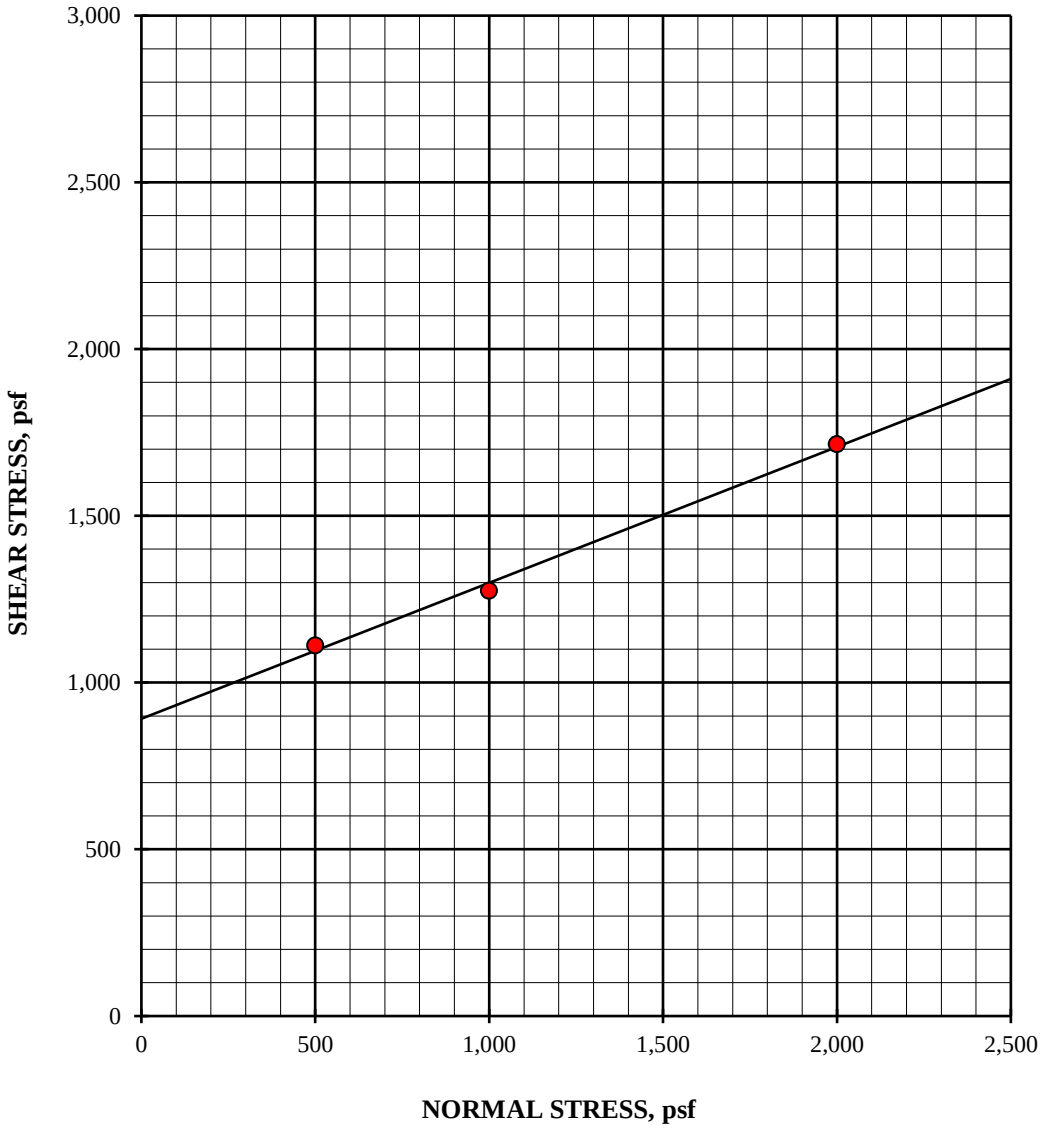
ASTM D 3080/D3080M-11 (modified for consolidated, undrained conditions)

August 20, 2018

Boring #5 @ 2.0 - 5.0'
Silty Sand (SM)
Compacted to 90% RC, saturated

INITIAL DRY DENSITY: 107.1 pcf
INITIAL MOISTURE CONTENT: 9.1 %
PEAK SHEAR ANGLE (Ø): 22°
COHESION (C): 892 psf

SHEAR vs. NORMAL STRESS



DIRECT SHEAR continued

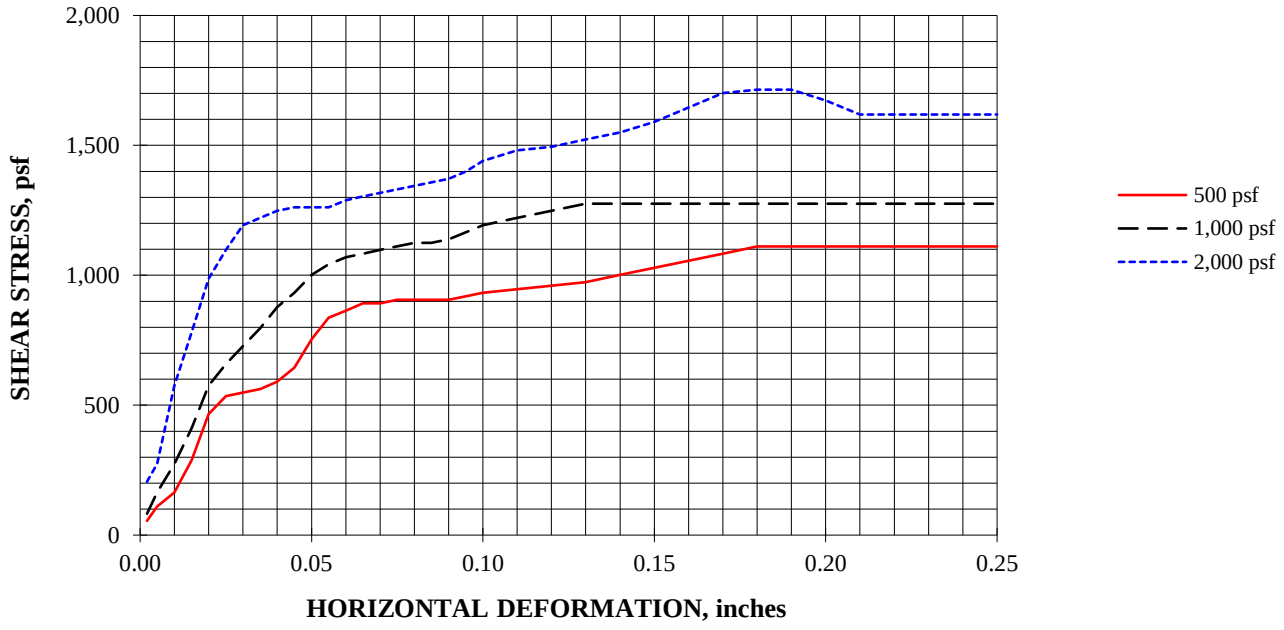
ASTM D 3080/D3080M-11 (modified for consolidated, undrained conditions)

Boring #5 @ 2.0 - 5.0' August 20, 2018

Silty Sand (SM)

Compacted to 90% RC, saturated SPECIFIC GRAVITY: 2.65 (assumed)

SAMPLE NO.:	1	2	3	AVERAGE
INITIAL				
WATER CONTENT, %	9.1	9.1	9.1	9.1
DRY DENSITY, pcf	107.1	107.1	107.1	107.1
SATURATION, %	44.3	44.3	44.3	44.3
VOID RATIO	0.544	0.544	0.544	0.544
DIAMETER, inches	2.375	2.375	2.375	
HEIGHT, inches	1.00	1.00	1.00	
AT TEST				
WATER CONTENT, %	19.8	19.5	17.4	
DRY DENSITY, pcf	108.5	109.2	113.1	
SATURATION, %	100.0	100.0	100.0	
VOID RATIO	0.524	0.514	0.462	
HEIGHT, inches	0.99	0.98	0.95	



Oxnard High School No. 8 301953-002

MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12 (Modified)

PROCEDURE USED: A

PREPARATION METHOD: Moist

RAMMER TYPE: Mechanical

SPECIFIC GRAVITY: 2.70 (assumed)

August 20, 2018

Boring #44 @ 4.0 - 5.0'

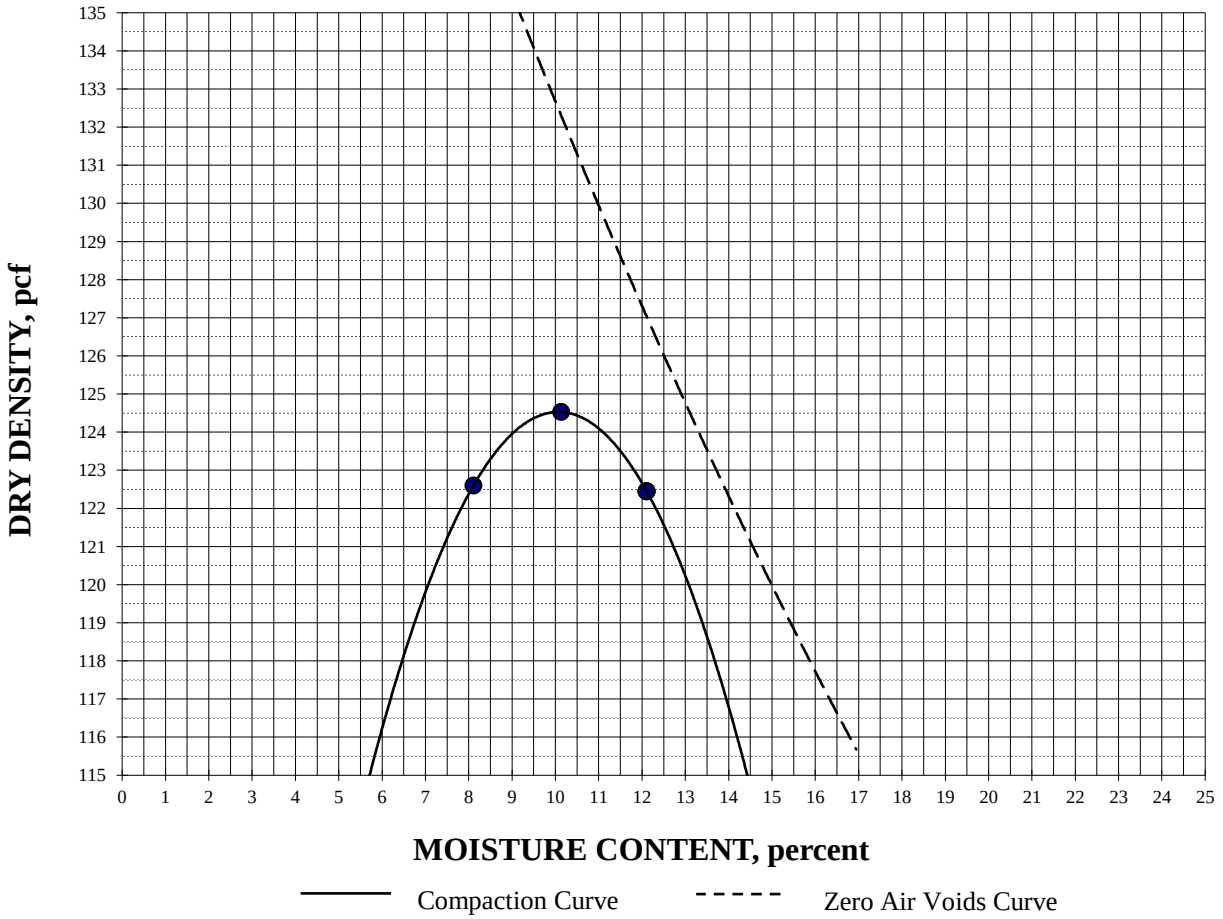
Light Brown Sandy Silt (ML)

SIEVE DATA:

Sieve Size	% Retained (Cumulative)
3/4"	0
3/8"	0
#4	0

MAXIMUM DRY DENSITY: 124.5 pcf

OPTIMUM MOISTURE: 10.1%



Oxnard High School No. 8 301953-002

DIRECT SHEAR

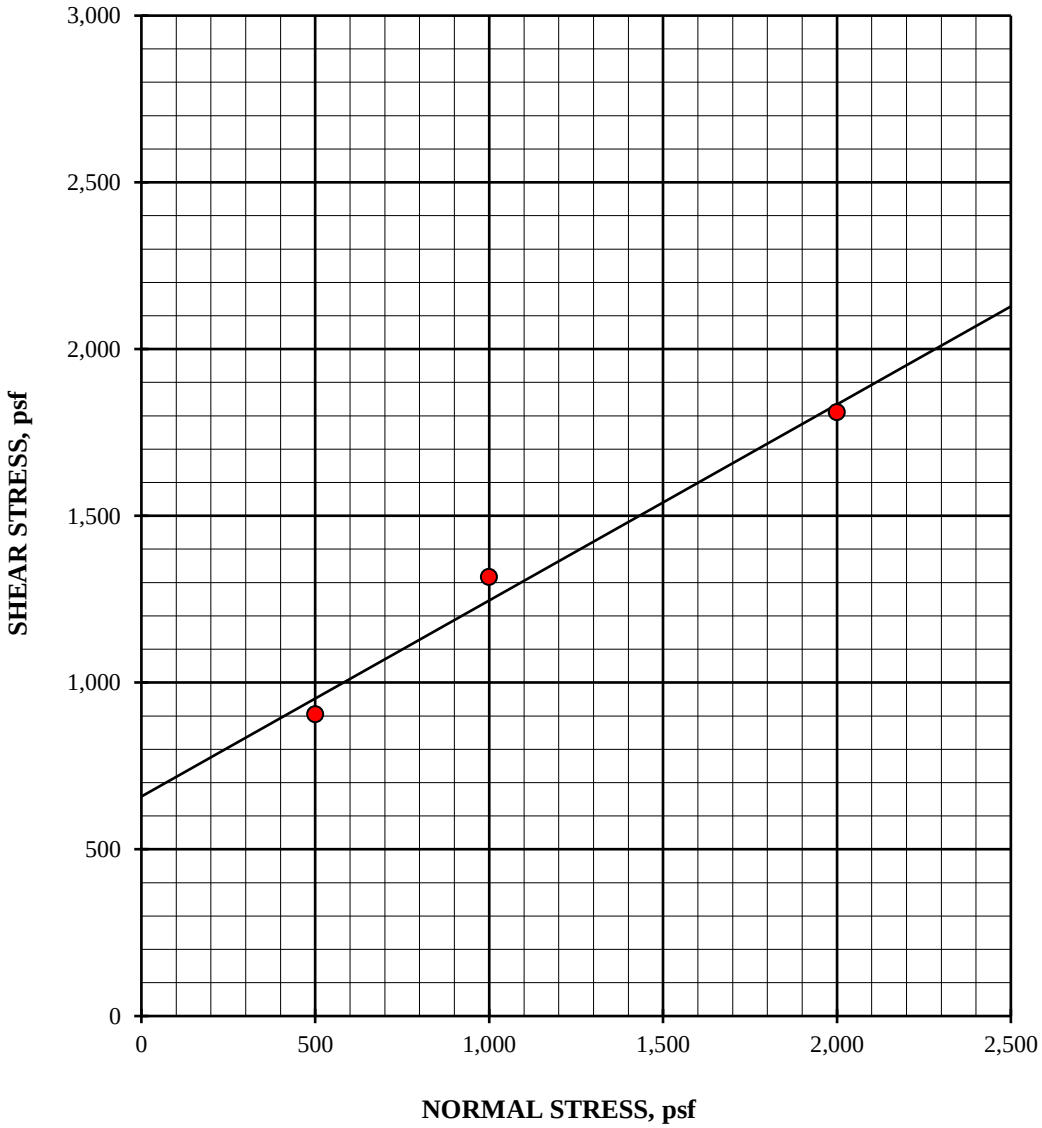
ASTM D 3080/D3080M-11 (modified for consolidated, undrained conditions)

August 20, 2018

Boring #44 @ 4.0 - 5.0'
Sandy Silt (ML)
Compacted to 90% RC, saturated

INITIAL DRY DENSITY: 112.1 pcf
INITIAL MOISTURE CONTENT: 10.1 %
PEAK SHEAR ANGLE (Ø): 30°
COHESION (C): 658 psf

SHEAR vs. NORMAL STRESS



DIRECT SHEAR continued

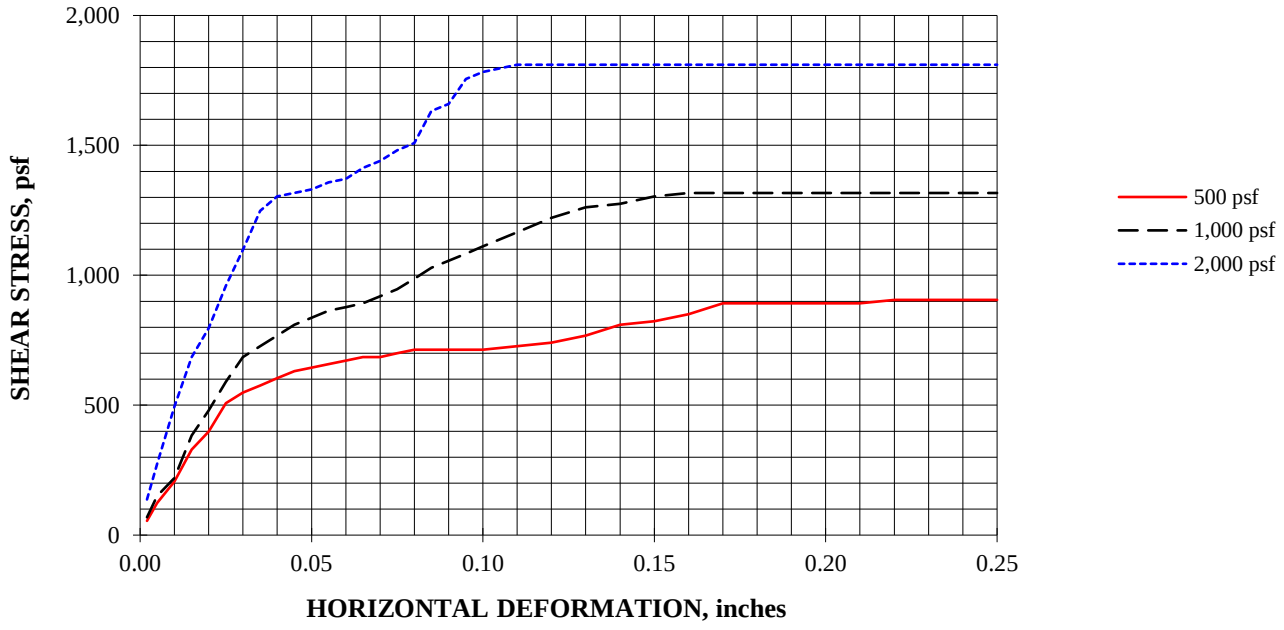
ASTM D 3080/D3080M-11 (modified for consolidated, undrained conditions)

Boring #44 @ 4.0 - 5.0' August 20, 2018

Sandy Silt (ML)

Compacted to 90% RC, saturated SPECIFIC GRAVITY: 2.70 (assumed)

SAMPLE NO.:	1	2	3	AVERAGE
INITIAL				
WATER CONTENT, %	10.1	10.1	10.1	10.1
DRY DENSITY, pcf	112.1	112.1	112.1	112.1
SATURATION, %	54.2	54.2	54.2	54.2
VOID RATIO	0.503	0.503	0.503	0.503
DIAMETER, inches	2.375	2.375	2.375	
HEIGHT, inches	1.00	1.00	1.00	
AT TEST				
WATER CONTENT, %	21.4	22.0	22.4	
DRY DENSITY, pcf	113.0	115.2	115.7	
SATURATION, %	100.0	100.0	100.0	
VOID RATIO	0.491	0.463	0.457	
HEIGHT, inches	0.99	0.97	0.97	



Oxnard High School No. 8 301953-002

RESISTANCE '*R* ' VALUE AND EXPANSION PRESSURE

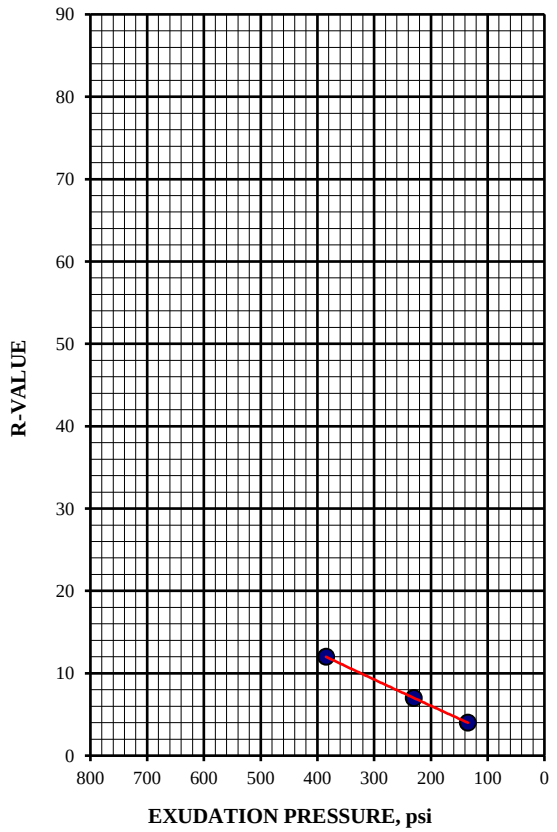
ASTM D 2844/D2844M-13

August 20, 2018

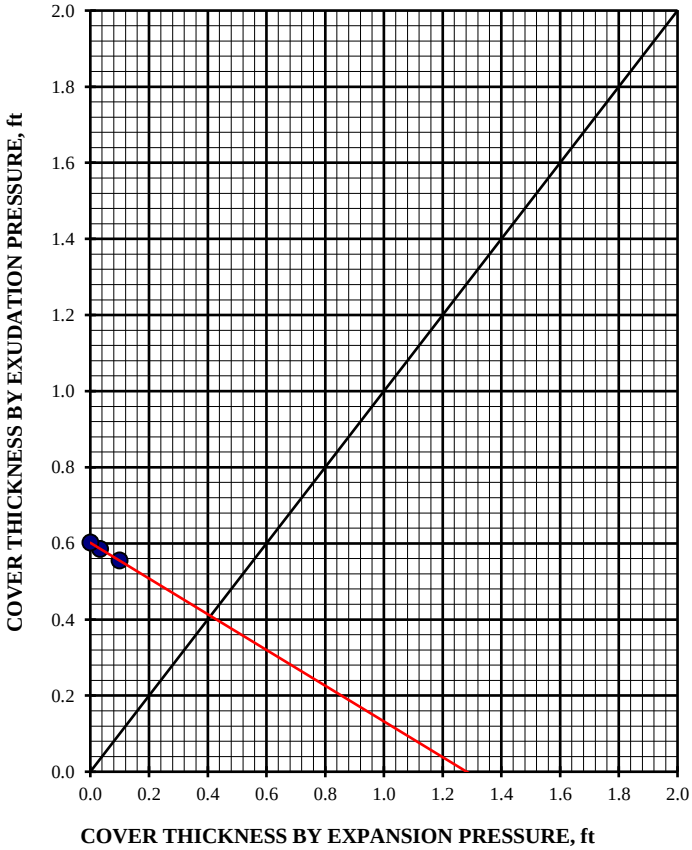
Boring #6 @ 4.0 - 7.0'
Brown to Light Brown Sandy Silt (ML)
Specified Traffic Index: 5.0

Dry Density @ 300 psi Exudation Pressure: 111.7-pcf
%Moisture @ 300 psi Exudation Pressure: 20.7%
R-Value - Exudation Pressure: 9
R-Value - Expansion Pressure: 35
R-Value @ Equilibrium: 9

EXUDATION PRESSURE CHART



EXPANSION PRESSURE CHART



Oxnard High School No. 8 301953-002

RESISTANCE '*R* ' VALUE AND EXPANSION PRESSURE

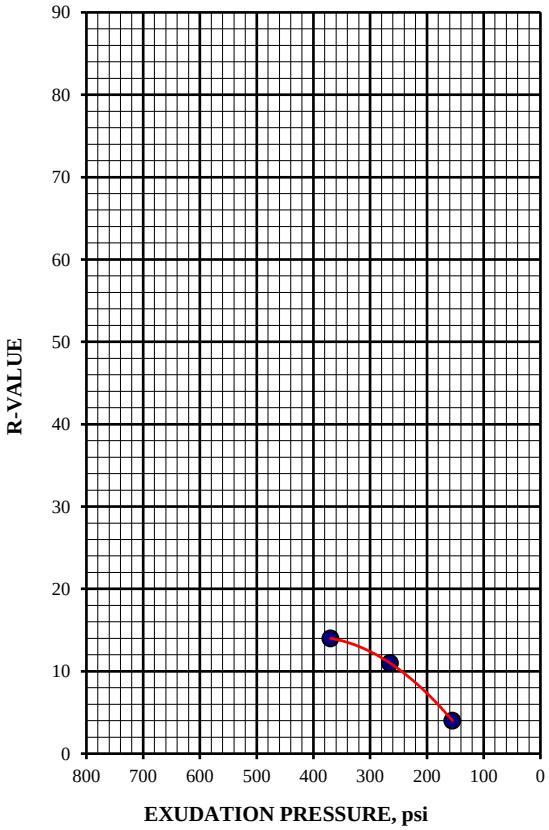
ASTM D 2844/D2844M-13

August 20, 2018

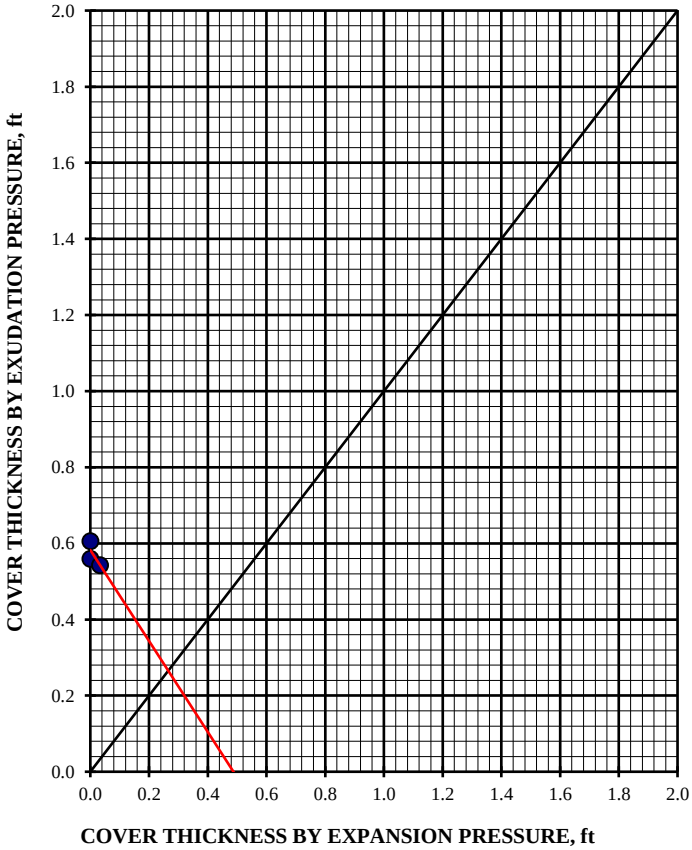
Boring #53 @ 0.0 - 3.0'
Light Brown Silty Sand (SM)
Specified Traffic Index: 5.0

Dry Density @ 300 psi Exudation Pressure: 107.6-pcf
%Moisture @ 300 psi Exudation Pressure: 20.2%
R-Value - Exudation Pressure: 12
R-Value - Expansion Pressure: 58
R-Value @ Equilibrium: 12

EXUDATION PRESSURE CHART



EXPANSION PRESSURE CHART



Oxnard High School No. 8 301953-002

CONSOLIDATION TEST

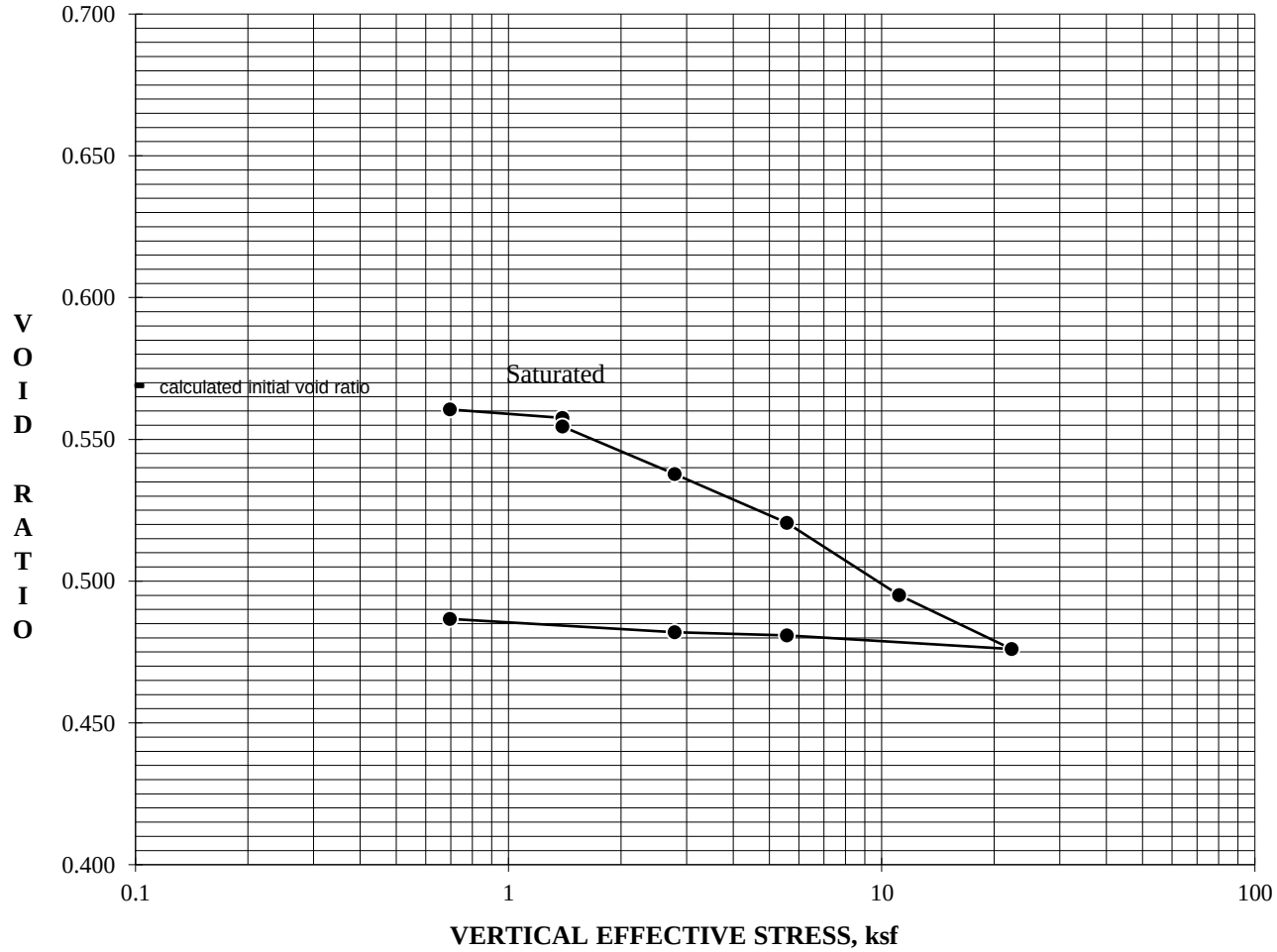
ASTM D 2435/D2435M-11

August 20, 2018

Boring #10 @ 11.0 - 11.5'
Well-Graded Sand (SW)
Ring Sample

DRY DENSITY: 105.5 pcf
MOISTURE CONTENT: 3.5%
SPECIFIC GRAVITY: 2.65 (assumed)
INITIAL VOID RATIO: 0.569

VOID RATIO vs. NORMAL PRESSURE DIAGRAM



Oxnard High School No. 8 301953-002

CONSOLIDATION TEST

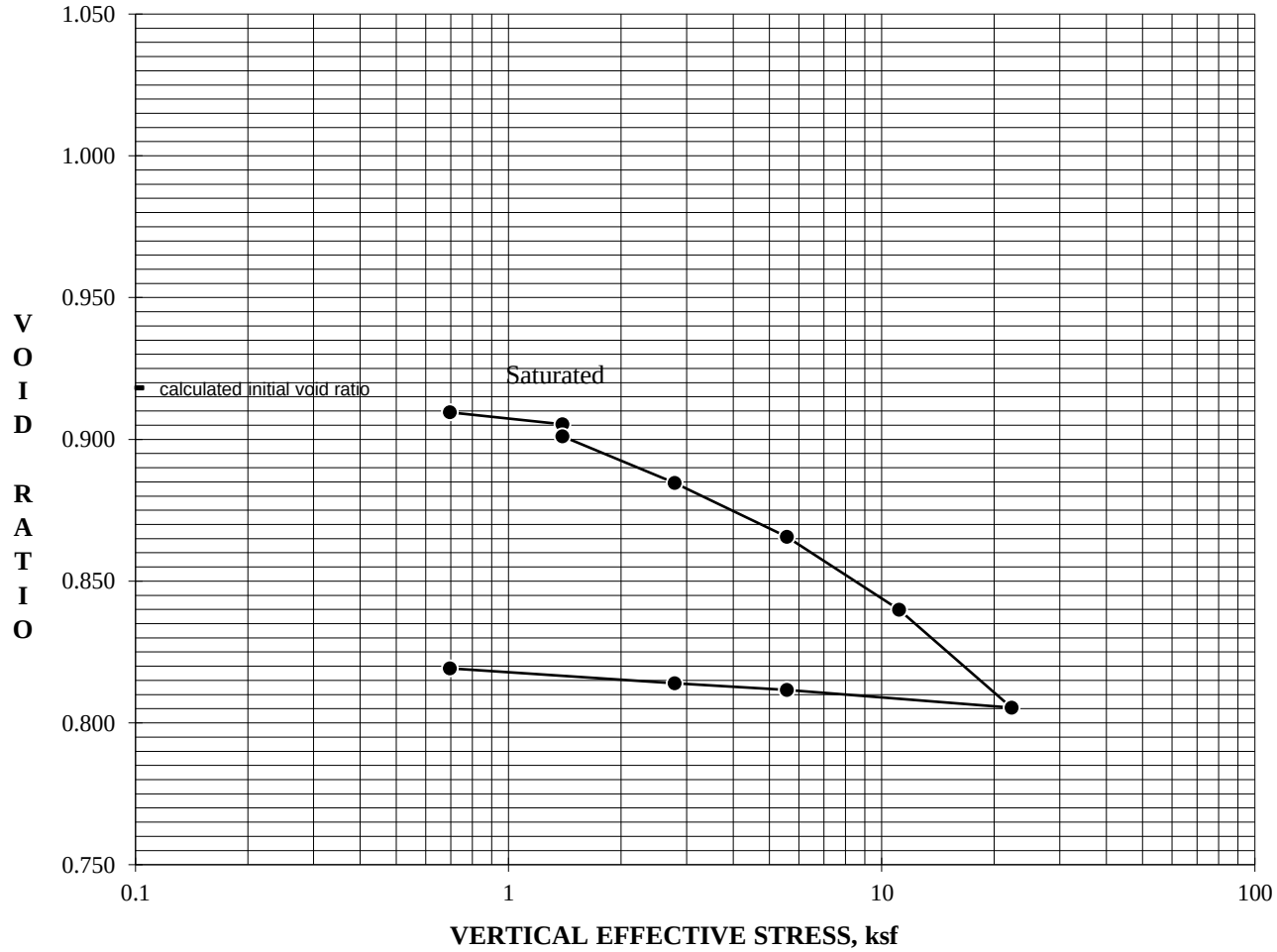
ASTM D 2435/D2435M-11

August 20, 2018

Boring #14 @ 11.0 - 11.5'
Well-Graded Sand (SW)
Ring Sample

DRY DENSITY: 86.3 pcf
MOISTURE CONTENT: 15.7%
SPECIFIC GRAVITY: 2.65 (assumed)
INITIAL VOID RATIO: 0.918

VOID RATIO vs. NORMAL PRESSURE DIAGRAM



Oxnard High School No. 8 301953-002

CONSOLIDATION TEST

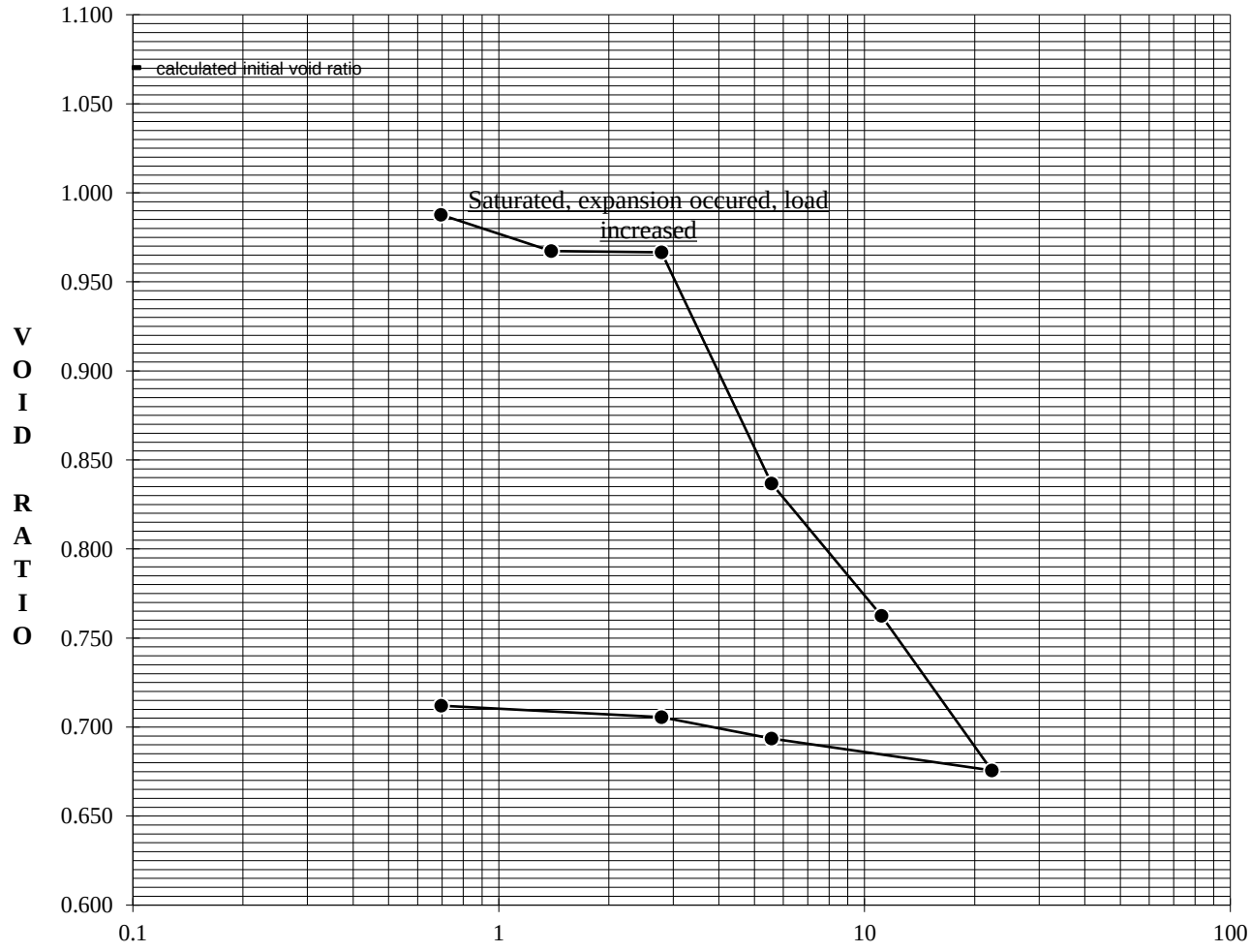
ASTM D 2435/D2435M-11

August 20, 2018

Boring #18 @ 6.0 - 6.5'
Sandy Silt (ML)
Ring Sample

DRY DENSITY: 81.4 pcf
MOISTURE CONTENT: 36.1%
SPECIFIC GRAVITY: 2.70 (assumed)
INITIAL VOID RATIO: 1.070

VOID RATIO vs. NORMAL PRESSURE DIAGRAM



Oxnard High School No. 8 301953-002

CONSOLIDATION TEST

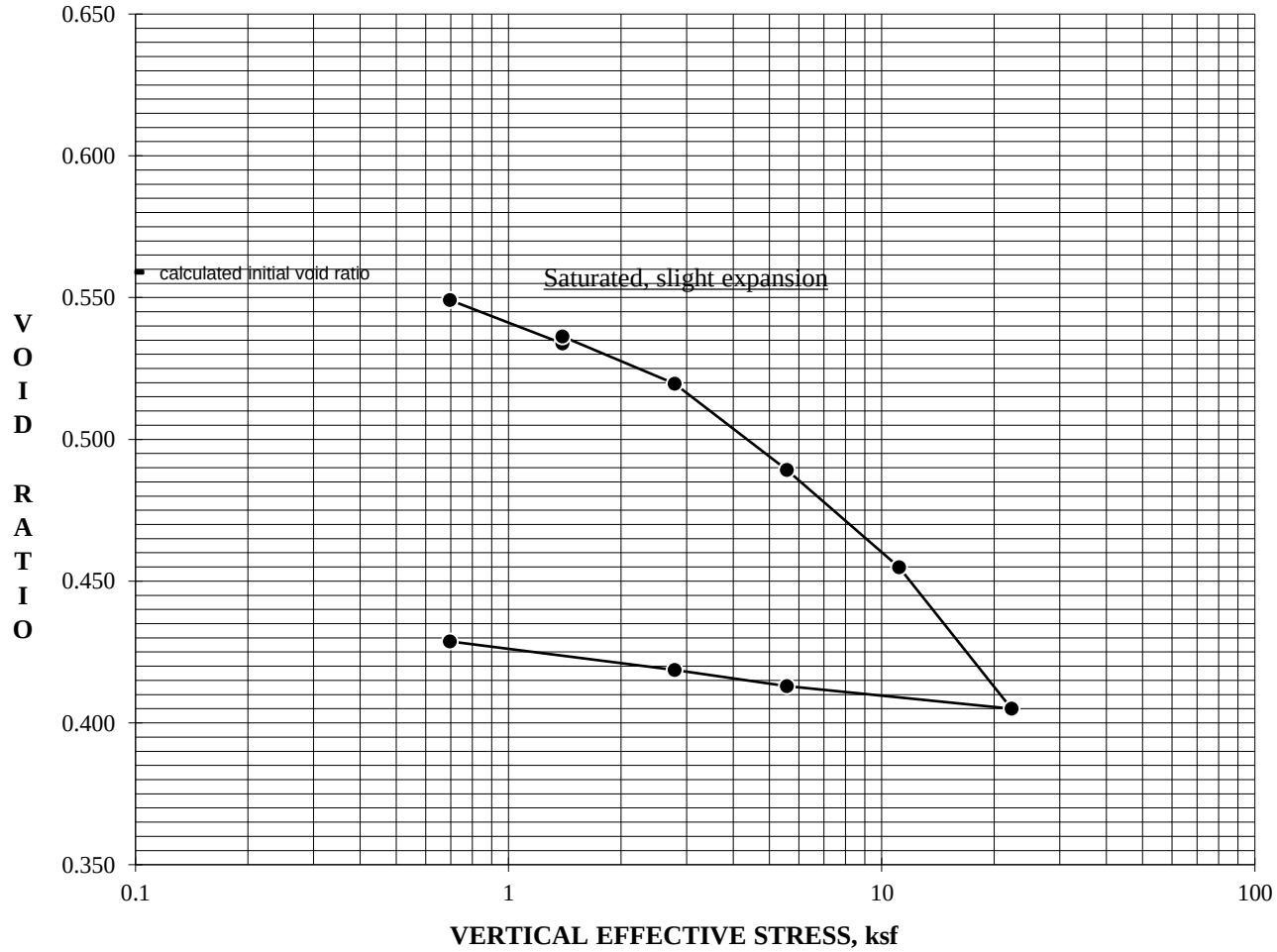
ASTM D 2435/D2435M-11

August 20, 2018

Boring #52 @ 6.0 - 6.5'
Sandy Silt (ML)
Ring Sample

DRY DENSITY: 108.1 pcf
MOISTURE CONTENT: 19.4%
SPECIFIC GRAVITY: 2.70 (assumed)
INITIAL VOID RATIO: 0.559

VOID RATIO vs. NORMAL PRESSURE DIAGRAM



APPENDIX C

Corrosion Evaluation Report

prepared by CERCO Analytical

California State Certified Laboratory No. 2153

CERCO analytical
1100 Willow Pass Court, Suite A
Concord, CA 94520-1006
925 462 2771 Fax. 925 462 2775
www.cercoanalytical.com

23 August, 2018

Job No. 1808074
Cust. No.12651

Mr. Doug Dunham, PE
Earth Systems Pacific
2049 Preisker Lane, Suite E
Santa Maria, CA 93454

Subject: Project No.: 301953-002
Project Name: Oxnard High School No.8, Oxnard, CA
Corrosivity Analysis – CalTrans Test Methods

Dear Mr. Dunham:

Pursuant to your request, CERCO Analytical has analyzed the soil samples submitted on August 08, 2018. Based on the analytical results, a brief corrosivity evaluation is enclosed for your consideration.

Based upon the resistivity measurements, all samples are classified as "corrosive". All buried iron, steel, cast iron, ductile iron, galvanized steel and dielectric coated steel or iron should be properly protected against corrosion depending upon the critical nature of the structure. All buried metallic pressure piping such as ductile iron firewater pipelines should be protected against corrosion.

The chloride ion concentrations ranged 23 to 47 mg/kg, and are determined to be insufficient to attack steel embedded in a concrete mortar coating.

The sulfate ion concentrations ranged from 340 to 1,500 mg/kg and are determined to be sufficient to damage reinforced concrete structures and cement mortar-coated steel at these locations. Therefore, concrete that comes into contact with this soil should use sulfate resistant cement such as Type II, in accordance with the California Building Code requirements with a maximum water-to-cement ratio of 0.50.

The pH of the soils ranged from 7.73 to 7.99, which does not present corrosion problems for buried iron, steel, mortar-coated steel and reinforced concrete structures.

This corrosivity evaluation is based on general corrosion engineering standards and is non-specific in nature. For specific long-term corrosion control design recommendations or consultation, please call *JDH Corrosion Consultants, Inc. at (925) 927-6630.*

We appreciate the opportunity of working with you on this project. If you have any questions, or if you require further information, please do not hesitate to contact us.

Very truly yours,
CERCO ANALYTICAL, INC.

J. Darby Howard, Jr., P.E.
President

JDH/jdl
Enclosure

CERCO analytical
1100 Willow Pass Court, Suite A
Concord, CA 94520-1006
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www.cercoanalytical.com

Client:	Earth Systems Pacific
Client's Project No.:	301953-002
Client's Project Name:	Oxnard High School No.8, Oxnard, CA
Date Sampled:	07/20 - 26/18
Date Received:	8-Aug-18
Matrix:	Soil
Authorization:	Letter dated July 19, 2018

Date of Report: 23-Aug-2018

Job/Sample No.	Sample I.D.	Moisture (%)	pH	Min.Resistivity (ohms-cm)**	Sulfide (mg/kg)*	Chloride (mg/kg)*	Sulfate (mg/kg)*
1808074-001	B-6 @ 4-7'	-	7.81	740	-	47	450
1808074-002	B-20 @ 4-7'	-	7.73	800	-	42	610
1808074-003	B-34 @ 6-8'	-	7.99	1,500	-	23	340
1808074-004	B-45 @ 0-5'	-	7.83	1,000	-	36	1,500

Method:		CT 226 [a]	CT 643 [b]	CT 643 [b]	-	CT 422 [c]	CT 417 [c]
Reporting Limit:		-	-	-	50	15	15
Date Analyzed:		-	17-Aug-2018	22-Aug-2018	-	17-Aug-2018	17-Aug-2018

Cheryl McMillen
Laboratory Director

* Results Reported on an "As Received" Basis

(a) Rev. July 2010 (b) Rev. June 2007 (c) Rev. November 2006

Quality Control Summary - **All laboratory quality control parameters were found to be within established limits**

APPENDIX D

Liquefaction and Seismically Induced Settlement of Dry Sand Analyses

Liquefaction Analysis – Groundwater at 8 feet

CPT-LIQUEFY.XLS - A SPREADSHEET FOR EMPIRICAL ESTIMATION OF LIQUEFACTION POTENTIAL USING CPT DATA
Developed 2003 by Shelton L. Stringer, GE, Earth Systems Southwest

Project: Oxnard High School No. 8
Job No: 301953-001
Date: 8/14/2018
Sounding: CPT-1
Plot: 1

Methods: Liquefaction Analysis using 1998 NCEER workshop methods (Robertson & Wride)
Post-liquefaction Settlement Analysis from Tokimatsu & Seed (1987)
Dry Sand Settlement by Pradel, ASCE Journal of G&GE, Vol 124, No. 4

Total Liquefied Thickness (feet)
1.6

EARTHQUAKE INFORMATION:
Magnitude: 6.77 (7.5)
PGA, g: 0.97 (0.75)
MSF: 1.30
GWT, feet: 20.0
Design GWT, feet: 8.0

Induced CSR (M=7.5): = 0.65*PGA*(po/p'o)*rd/MSF
Clean Sand Qc1n = C_Q*K_C*K_H*Qc
SF = $CRR_{7.5}$*Kσ/CSR
Use Tokimatsu & Seed (0) or Ishihara &Yoshmine (1): 0
Unit Weight of unsaturated soils: 110 pcf
Unit Weight of saturated soils: 110 pcf
Limiting Ic for liquefiable soils: 2.60
Limiting Ic for K_H: 2.0
Required SF: 1.50
Min SF of Liquefiable Layers: 0.50
Avg SF of Liquefiable Layers: 0.02

Probab	Total Induced Subsidence (inches)
Avg	
2%	
Max	
100%	0.2

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	*Volumetric Strain (%)*
0.16	82.43	1.01	1.22	110	0.009	1.000	1.22	0.57	1.70	132.43	1.88		1	88	1.17	0.05	1.00	154.7	1.00	0.424	0.424	0.485	Non-Liq.	Non-Liq.	0.00
0.33	77.94	1.37	1.76	110	0.018	1.000	1.76	0.61	1.70	125.21	2.01		1	86	1.31		1.00	164.0	1.00	Infin.	0.000	0.485	Non-Liq.	Non-Liq.	0.00
0.49	66.43	1.48	2.23	110	0.027	1.000	2.23	0.65	1.70	106.70	2.13		1	80	1.51		1.00	161.4	1.00	Infin.	0.000	0.485	Non-Liq.	Non-Liq.	0.00
0.66	56.46	1.33	2.35	110	0.036	1.000	2.35	0.67	1.70	90.66	2.20		1	73	1.65		1.00	150.0	1.00	0.394	0.394	0.485	Non-Liq.	Non-Liq.	0.00
0.82	50.54	1.16	2.30	110	0.045	1.000	2.30	0.67	1.70	81.14	2.22		1	68	1.72		1.00	139.9	1.00	0.334	0.334	0.485	Non-Liq.	Non-Liq.	0.00
0.98	45.66	1.04	2.28	110	0.054	1.000	2.28	0.68	1.70	73.28	2.25		1	64	1.80		1.00	132.1	1.00	0.294	0.294	0.485	Non-Liq.	Non-Liq.	0.00
1.15	40.24	0.94	2.33	110	0.063	0.999	2.33	0.70	1.70	64.56	2.30		1	59	1.94		1.00	125.2	1.00	0.263	0.263	0.484	Non-Liq.	Non-Liq.	0.00
1.31	40.24	0.94	2.33	110	0.072	0.999	2.33	0.70	1.70	64.54	2.30		1	59	1.94		1.00	125.2	1.00	0.263	0.263	0.484	Non-Liq.	Non-Liq.	0.00
1.48	34.62	0.81	2.34	110	0.081	0.999	2.35	0.71	1.70	55.50	2.35		1	52	2.11		1.00	117.0	1.00	0.229	0.229	0.484	Non-Liq.	Non-Liq.	0.00
1.64	31.09	0.64	2.05	110	0.090	0.998	2.06	0.71	1.70	49.81	2.34		1	48	2.10		1.00	104.5	1.00	0.186	0.186	0.484	Non-Liq.	Non-Liq.	0.00
1.80	30.58	0.62	2.01	110	0.099	0.998	2.02	0.71	1.70	48.98	2.34		1	47	2.10		1.00	102.7	1.00	0.181	0.181	0.484	Non-Liq.	Non-Liq.	0.00
1.97	32.03	0.75	2.33	110	0.108	0.998	2.34	0.72	1.70	51.29	2.37		1	49	2.20		1.00	112.8	1.00	0.213	0.213	0.484	Non-Liq.	Non-Liq.	0.00
2.13	31.02	0.74	2.40	110	0.117	0.997	2.41	0.73	1.70	49.65	2.39		1	48	2.27		1.00	112.8	1.00	0.214	0.214	0.483	Non-Liq.	Non-Liq.	0.00
2.30	29.95	0.70	2.34	110	0.126	0.997	2.35	0.73	1.70	47.92	2.39		1	46	2.29		1.00	109.8	1.00	0.203	0.203	0.483	Non-Liq.	Non-Liq.	0.00
2.46	29.19	0.66	2.26	110	0.135	0.996	2.27	0.73	1.70	46.69	2.39		1	45	2.29		1.00	106.7	1.00	0.193	0.193	0.483	Non-Liq.	Non-Liq.	0.00
2.62	29.17	0.63	2.17	110	0.144	0.996	2.18	0.72	1.70	46.64	2.38		1	45	2.24		1.00	104.4	1.00	0.186	0.186	0.483	Non-Liq.	Non-Liq.	0.00
2.79	29.42	0.62	2.12	110	0.153	0.996	2.13	0.72	1.70	47.03	2.37		1	46	2.20		1.00	103.6	1.00	0.183	0.183	0.483	Non-Liq.	Non-Liq.	0.00
2.95	29.77	0.62	2.08	110	0.162	0.995	2.09	0.72	1.70	47.57	2.36		1	46	2.17		1.00	103.3	1.00	0.182	0.182	0.482	Non-Liq.	Non-Liq.	0.00
3.12	29.70	0.60	2.02	110	0.171	0.995	2.04	0.72	1.70	47.45	2.36		1	46	2.14		1.00	101.7	1.00	0.178	0.178	0.482	Non-Liq.	Non-Liq.	0.00
3.28	28.88	0.57	1.96	110	0.180	0.994	1.98	0.72	1.70	46.11	2.36		1	45	2.15		1.00	99.1	1.00	0.170	0.170	0.482	Non-Liq.	Non-Liq.	0.00
3.44	26.80	0.52	1.95	110	0.189	0.994	1.97	0.72	1.70	42.76	2.38		1	42	2.24		1.00	95.7	1.00	0.162	0.162	0.482	Non-Liq.	Non-Liq.	0.00
3.61	26.96	0.49	1.80	110	0.198	0.994	1.81	0.72	1.70	43.00	2.36		1	42	2.15		1.00	92.3	1.00	0.153	0.153	0.482	Non-Liq.	Non-Liq.	0.00
3.77	29.75	0.49	1.63	110	0.208	0.993	1.65	0.70	1.70	47.47	2.30		1	46	1.94		1.00	92.2	1.00	0.153	0.153	0.482	Non-Liq.	Non-Liq.	0.00
3.94	32.57	0.49	1.50	110	0.217	0.993	1.51	0.68	1.70	51.99	2.24		1	50	1.78		1.00	92.7	1.00	0.154	0.154	0.481	Non-Liq.	Non-Liq.	0.00
4.10	34.78	0.51	1.46	110	0.226	0.993	1.47	0.67	1.70	55.52	2.21		1	52	1.70		1.00	94.6	1.00	0.159	0.159	0.481	Non-Liq.	Non-Liq.	0.00
4.27	36.24	0.53	1.47	110	0.235	0.992	1.48	0.67	1.70	57.85	2.20		1	54	1.67		1.00	96.7	1.00	0.164	0.164	0.481	Non-Liq.	Non-Liq.	0.00
4.43	38.86	0.57	1.47	110	0.244	0.992	1.48	0.66	1.70	62.05	2.18		1	57	1.62		1.00	100.3	1.00	0.174	0.174	0.481	Non-Liq.	Non-Liq.	0.00
4.59	44.03	0.63	1.44	110	0.253	0.991	1.45	0.65	1.70	70.34	2.13		1	62	1.51		1.00	106.4	1.00	0.192	0.192	0.481	Non-Liq.	Non-Liq.	0.00
4.76	50.25	0.69	1.36	110	0.262	0.991	1.37	0.63	1.70	80.32	2.07		1	68	1.41		1.00	112.9	1.00	0.214	0.214	0.480	Non-Liq.	Non-Liq.	0.00
4.92	56.32	0.74	1.31	110	0.271	0.991	1.31	0.61	1.70	90.06	2.02		1	72	1.33		1.00	119.7	1.00	0.239	0.239	0.480	Non-Liq.	Non-Liq.	0.00
5.09	62.37	0.74	1.19	110	0.280	0.990	1.19	0.60	1.70	99.77	1.96		1	77	1.25	0.55	1.19	148.2	1.00	0.383	0.383	0.480	Non-Liq.	Non-Liq.	0.00
5.25	67.00	0.84	1.26	110	0.289	0.990	1.27	0.59	1.70	107.19	1.95		1	80	1.25	0.60	1.19	158.4	1.00	0.449	0.449	0.480	Non-Liq.	Non-Liq.	0.00
5.41	67.37	0.89	1.32	110	0.298	0.989	1.32	0.60	1.70	107.77	1.97		1	80	1.26	0.65	1.19	160.8	1.00	Infin.	0.000	0.480	Non-Liq.	Non-Liq.	0.00
5.58	67.34	0.91	1.35	110	0.307	0.989	1.36	0.60	1.70	107.71	1.97		1	80	1.27	0.70	1.19	162.0	1.00	Infin.	0.000	0.479	Non-Liq.	Non-Liq.	0.00
5.74	67.46	0.93	1.37	110	0.316	0.989	1.38	0.60	1.70	107.89	1.98		1	80	1.27	0.75	1.19	162.9	1.00	Infin.	0.000	0.479	Non-Liq.	Non-Liq.	0.00
5.91	67.82	0.93	1.37	110	0.325	0.988	1.38	0.60	1.70	108.45	1.98		1	80	1.27	0.80	1.19	163.5	1.00	Infin.	0.000	0.479	Non-Liq.	Non-Liq.	0.00
6.07	65.23	0.93	1.42	110	0.334	0.988	1.43	0.61	1.70	104.28	2.00		1	79	1.30	0.85	1.19	160.7	1.00	Infin.	0.000	0.479	Non-Liq.	Non-Liq.	0.00
6.23	63.78	0.93	1.46	110	0.343	0.988	1.47	0.61	1.70	101.93	2.01		1	78	1.32		1.00	134.5	1.00	0.306	0.306	0.479	Non-Liq.	Non-Liq.	0.00
6.40	65.72	0.95	1.45	110	0.352	0.987	1.45	0.61	1.70	105.03	2.00		1	79	1.30		1.00	136.9	1.00	0.319	0.319	0.479	Non-Liq.	Non-Liq.	0.00
6.56	71.05	1.00	1.40	110	0.361	0.987	1.41	0.60	1.70	113.58	1.97		1	82	1.26	1.00	1.00	143.8	1.00	0.357	0.357	0.478	Non-Liq.	Non-Liq.	0.00
6.73	77.49	1.08	1.39	110	0.370	0.986	1.40	0.59	1.70	123.92	1.94		1	86	1.23	1.05	1.00	152.7	1.00	0.411	0.411	0.478	Non-Liq.	Non-Liq.	0.00
6.89	86.69	1.16	1.34	110	0.379	0.986	1.34	0.58	1.70	138.69	1.89		1	90	1.18	1.10	1.00	164.5	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.05	98.48	1.28	1.30	110	0.388	0.986	1.31	0.56	1.70	157.61	1.85		1	96	1.14	1.15	1.00	180.6	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.22	114.53	1.41	1.23	110	0.397	0.985	1.23	0.54	1.70	183.39	1.78		1	100	1.09	1.20	1.00	201.2	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.38	122.82	1.49	1.21	110	0.406	0.985	1.21	0.54	1.67	193.40	1.76		1	100	1.08	1.25	1.00	209.5	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.55	128.68	1.53	1.19	110	0.415	0.985	1.19	0.53	1.65	199.45	1.75		1	100	1.07	1.30	1.00	214.1	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
7.71	128.68	1.53	1.19	110	0.424	0.984	1.19	0.53	1.63	197.34	1.75		1	100	1.07	1.35	1.00	212.2	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
7.87	134.06	1.56	1.17	110	0.433	0.984	1.17	0.53	1.60	202.54	1.74		1	100	1.06	1.40	1.00	215.9	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
8.04	139.69	1.63	1.16	110	0.442	0.984	1.17	0.53	1.58	208.28	1.73		1	100	1.06	1.45	1.00	220.8	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
8.20	147.04	1.72	1.17	110	0.451	0.983	1.17	0.52	1.56	216.44	1.72		1	100	1.05	1.50	1.00	228.1	1.00	Infin.	0.000	0.481	Non-Liq.	Non-Liq.	0.00
8.37	151.94	1.71	1.12	110	0.460	0.983	1.13	0.52	1.54	220.33	1.70		1	100	1.04	1.55	1.00	229.4	1.00	Infin.	0.000	0.486	Non-Liq.	Non-Liq.	0.00
8.53	158.05	1.80	1.14	110	0.469	0.982	1.14	0.52	1.52	226.66	1.69		1	100	1.03	1.60	1.00	235.3	1.00	Infin.	0.000	0.491	Non-Liq.	Non-Liq.	0.00
8.69	163.87	1.92	1.17	110	0.478	0.982	1.18	0.52	1.51	232.90	1.70		1	100	1.04	1.65	1.00	242.3	1.00	Infin.	0.000	0.496	Non-Liq.	Non-Liq.	0.00
8.86	169.68	2.08	1.22	110	0.487	0.982	1.23	0.52	1.50	239.19	1.70		1	100	1.04	1.70	1.00	249.8	1.00	Infin.	0.000	0.501	Non-Liq.	Non-Liq.	0.00
9.02	174.27	2.26	1.30	110	0.496	0.981	1.30	0.52	1.49	244.08	1.72		1	100	1.05	1.75	1.00	257.2	1.00	Infin.	0.000	0.506	Non-Liq.	Non-Liq.	0.00
9.19	179.31	2.32	1.29	110	0.505	0.981	1.30	0.52	1.47	248.52	1.71		1	100	1.05	1.80	1.00	261.0	1.00	Infin.	0.000	0.510	Non-Liq.	Non-Liq.	0.00
9.35	181.08	2.35	1.30	110	0.514	0.981	1.30	0.52	1.46	248.69	1.71		1	100	1.05	1.85	1.00	261.3	1.00	Infin.	0.000	0.515	Non-Liq.	Non-Liq.	0.00
9.51	191.53	2.42	1.26	110	0.523	0.980	1.27	0.52	1.44	259.55	1.69		1	100	1.03	1.90	1.00	269.1	1.00	Infin.	0.000	0.520	Non-Liq.	Non-Liq.	0.00
9.68	202.38	2.57	1.27	110	0.532	0.980	1.27	0.51	1.42	271.29	1.68		1	100	1.03	1.95	1.00	279.3	1.00	Infin.	0.000	0.524	Non-Liq.	Non-Liq.	0.00
9.84	214.08	2.69	1.26	110	0.541	0.980	1.26	0.51	1.41	283.70	1.67		1	100	1.02	2.00	1.00	289.1	1.00	Infin.	0.000	0.529	Non-Liq.	Non-Liq.	0.00
10.01	227.79	2.91	1.28	110	0.550	0.979	1.28	0.51	1.39	298.89	1.66		1	100	1.01	2.05	1.00	302.9	1.00	Infin.	0.000	0.533	Non-Liq.	Non-Liq.	0.00
10.17	242.24	3.22	1.33	110	0.559	0.979	1.33	0.51	1.38	315.27	1.66		1	100	1.01	2.10	1.00	319.4	1.00	Infin.	0.000	0.537	Non-Liq.	Non-Liq.	0.00
10.33	244.06	3.47	1.42	110	0.568	0.979	1.43	0.51	1.37	316.43	1.68		1	100	1.03	2.15	1.00	325.7	1.00	Infin.	0.000	0.541	Non-Liq.	Non-Liq.	0.00
10.50	249.05	3.55	1.43	110	0.577	0.978	1.43	0.51	1.36	320.21	1.68		1	100	1.02	2.20	1.00	329.2	1.00	Infin.	0.000	0.545	Non-Liq.	Non-Liq.	0.00
10.66	254.87	3.69	1.45	110	0.586	0.978	1.45	0.51	1.35	325.19	1.68		1	100	1.03	2.25	1.00	334.7	1.00	Infin.	0.000	0.550	Non-Liq.	Non-Liq.	0.00
10.83	256.89	3.79	1.48	110	0.595	0.978	1.48	0.51	1.34	325.57	1.69		1	100	1.03	2.30	1.00	336.5	1.00	Infin.	0.000	0.554	Non-Liq.	Non-Liq.	0.00
10.99	258.54	3.96	1.53	110	0.604	0.977	1.53	0.52	1.34	325.83	1.70		1	100	1.04	2.35	1.00	339.6	1.00	Infin.	0.000	0.557	Non-Liq.	Non-Liq.	0.00
11.15	252.91	3.87	1.53	110	0.614	0.977	1.53	0.52	1.33	316.61	1.71		1	100	1.04	2.40	1.00	331.4	1.00	Infin.	0.000	0.561	Non-Liq.	Non-Liq.	0.00
11.32	241.86	3.70	1.53	110	0.623	0.977	1.53	0.52	1.32	301.06	1.72		1	100	1.05	2.45	1.00	317.7	1.00	Infin.	0.000	0.565	Non-Liq.	Non-Liq.	0.00
11.48	235.08	3.50	1.49	110	0.632	0.976	1.49	0.52	1.31	290.38	1.72		1	100	1.05	2.50	1.00	306.4	1.00	Infin.	0.000	0.569	Non-Liq.	Non-Liq.	0.00
11.65	233.08	3.34	1.43	110	0.641	0.976	1.44	0.52	1.30	285.38	1.71		1	100	1.05	2.55	1.00	299.4	1.00	Infin.	0.000	0.572	Non-Liq.	Non-Liq.	0.00
11.81	236.89	2.82	1.19	110	0.650	0.975	1.19	0.50	1.28	285.24	1.65		1	100	1.00	2.60	1.00	286.6	1.00	Infin.	0.000	0.576	Non-Liq.	Non-Liq.	0.00
11.98	239.86	3.05	1.27	110	0.659	0.975	1.27	0.51	1.27	287.65	1.67		1	100	1.02	2.65	1.00	293.1	1.00	Infin.	0.000	0.580	Non-Liq.	Non-Liq.	0.00
12.14	232.44	3.13	1.35	110	0.668	0.975	1.35	0.52	1.27	277.93	1.70		1	100	1.04	2.70	1.00	288.9	1.00	Infin.	0.000	0.583	Non-Liq.	Non-Liq.	0.00
12.30	231.56	3.17	1.37	110	0.677	0.974	1.37	0.52	1.26	275.23	1.70		1	100	1.04	2.70	1.00	287.5	1.00	Infin.	0.000	0.587	Non-Liq.	Non-Liq.	0.00
12.47	226.67	3.06	1.35	110	0.686	0.974	1.35	0.52	1.25	267.63	1.71		1	100	1.04	2.70	1.00	280.0	1.00	Infin.	0.000	0.590	Non-Liq.	Non-Liq.	0.00
12.63	224.32	3.05	1.36	110	0.695	0.974	1.36	0.52	1.25	263.26	1.71		1	100	1.05	2.70	1.00	276.6	1.00	Infin.	0.000	0.593	Non-Liq.	Non-Liq.	0.00
12.80	219.31	3.06	1.39	110	0.704	0.973	1.40	0.53	1.24	256.14	1.73		1	100	1.06	2.70	1.00	272.0	1.00	Infin.	0.000	0.597	Non-Liq.	Non-Liq.	0.00

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	M=7.5 CSR	Induced Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
12.96	214.97	3.04	1.41	110	0.713	0.973	1.42	0.53	1.23	249.70	1.74		1	100	1.07	2.70	1.00	267.1	1.00	Infin.	0.000	0.600	**Non-Liq.**	Non-Liq.	**0.00**
13.12	210.39	2.92	1.39	110	0.722	0.973	1.39	0.53	1.23	242.78	1.74		1	100	1.07	2.70	1.00	260.0	1.00	Infin.	0.000	0.603	**Non-Liq.**	Non-Liq.	**0.00**
13.29	202.73	2.85	1.41	110	0.731	0.972	1.41	0.54	1.22	232.77	1.76		1	100	1.08	2.70	1.00	251.7	1.00	Infin.	0.000	0.606	**Non-Liq.**	Non-Liq.	**0.00**
13.45	202.03	2.75	1.36	110	0.740	0.972	1.36	0.53	1.21	230.22	1.75		1	100	1.07	2.70	1.00	247.7	1.00	Infin.	0.000	0.609	**Non-Liq.**	Non-Liq.	**0.00**
13.62	202.36	2.74	1.36	110	0.749	0.972	1.36	0.53	1.20	229.11	1.75		1	100	1.07	2.70	1.00	246.5	1.00	Infin.	0.000	0.612	**Non-Liq.**	Non-Liq.	**0.00**
13.78	210.84	2.87	1.36	110	0.758	0.971	1.37	0.53	1.19	237.04	1.74		1	100	1.07	2.70	1.00	253.8	1.00	Infin.	0.000	0.615	**Non-Liq.**	Non-Liq.	**0.00**
13.94	228.51	2.41	1.05	110	0.767	0.971	1.06	0.50	1.17	252.83	1.64		1	100	1.00	2.70	1.00	253.8	1.00	Infin.	0.000	0.618	**Non-Liq.**	Non-Liq.	**0.00**
14.11	285.52	2.69	0.94	110	0.776	0.971	0.94	0.50	1.17	314.27	1.54		1	100	1.00	2.70	1.00	315.4	1.00	Infin.	0.000	0.621	**Non-Liq.**	Non-Liq.	**0.00**
14.27	292.87	2.62	0.89	110	0.785	0.970	0.90	0.50	1.16	320.51	1.52		1	100	1.00	2.70	1.00	321.7	1.00	Infin.	0.000	0.624	**Non-Liq.**	Non-Liq.	**0.00**
14.44	251.89	2.37	0.94	110	0.794	0.970	0.94	0.50	1.15	273.97	1.58		1	100	1.00	2.70	1.00	275.0	1.00	Infin.	0.000	0.627	**Non-Liq.**	Non-Liq.	**0.00**
14.60	209.49	2.12	1.01	110	0.803	0.970	1.02	0.51	1.15	226.74	1.66		1	100	1.01	2.70	1.00	229.5	1.00	Infin.	0.000	0.629	**Non-Liq.**	Non-Liq.	**0.00**
14.76	185.30	1.81	0.97	110	0.812	0.969	0.98	0.51	1.15	199.73	1.68		1	100	1.03	2.70	1.00	205.8	1.00	Infin.	0.000	0.632	**Non-Liq.**	Non-Liq.	**0.00**
14.93	177.04	1.72	0.97	110	0.821	0.969	0.97	0.52	1.14	189.90	1.70		1	100	1.04	2.70	1.00	197.4	1.00	Infin.	0.000	0.635	**Non-Liq.**	Non-Liq.	**0.00**
15.09	163.66	1.53	0.94	110	0.830	0.969	0.94	0.52	1.13	174.67	1.71		1	100	1.05	2.70	1.00	183.4	1.00	Infin.	0.000	0.637	**Non-Liq.**	Non-Liq.	**0.00**
15.26	131.77	1.43	1.09	110	0.839	0.968	1.10	0.56	1.14	140.77	1.83		1	91	1.13	2.70	1.00	159.1	1.00	0.454	0.454	0.640	**0.71**	76%	**0.58**
15.42	90.92	1.82	2.00	110	0.848	0.968	2.02	0.64	1.15	98.18	2.12		1	76	1.50		1.00	147.1	1.00	0.376	0.376	0.643	**0.59**	85%	**0.86**
15.58	71.71	1.75	2.45	110	0.857	0.967	2.48	0.69	1.16	77.37	2.26		1	66	1.82		1.00	141.2	1.00	0.342	0.342	0.645	**0.53**	89%	**1.00**
15.75	110.76	2.45	2.21	110	0.866	0.967	2.22	0.64	1.14	118.01	2.10		1	84	1.46		1.00	171.7	1.00	Infin.	0.000	0.648	**Non-Liq.**	Non-Liq.	**0.00**
15.91	111.12	2.74	2.46	110	0.875	0.967	2.48	0.65	1.13	117.85	2.14		1	84	1.52		1.00	179.7	1.00	Infin.	0.000	0.650	**Non-Liq.**	Non-Liq.	**0.00**
16.08	114.52	2.87	2.51	110	0.884	0.966	2.52	0.65	1.12	120.66	2.14		1	85	1.52		1.00	183.7	1.00	Infin.	0.000	0.653	**Non-Liq.**	Non-Liq.	**0.00**
16.24	142.13	2.72	1.91	110	0.893	0.966	1.92	0.60	1.11	147.88	1.99		1	93	1.28	1.00	1.00	190.7	1.00	Infin.	0.000	0.655	**Non-Liq.**	Non-Liq.	**0.00**
16.40	171.27	2.46	1.44	110	0.902	0.966	1.45	0.56	1.09	176.09	1.84		1	100	1.14	1.05	1.00	201.7	1.00	Infin.	0.000	0.657	**Non-Liq.**	Non-Liq.	**0.00**
16.57	179.24	2.28	1.27	110	0.911	0.965	1.28	0.55	1.08	182.87	1.79		1	100	1.10	1.10	1.00	202.3	1.00	Infin.	0.000	0.660	**Non-Liq.**	Non-Liq.	**0.00**
16.73	203.64	2.08	1.02	110	0.920	0.965	1.03	0.51	1.07	205.87	1.69		1	100	1.03	1.15	1.00	213.0	1.00	Infin.	0.000	0.662	**Non-Liq.**	Non-Liq.	**0.00**
16.90	253.20	2.34	0.92	110	0.929	0.965	0.93	0.50	1.07	254.42	1.59		1	100	1.00	1.20	1.00	255.4	1.00	Infin.	0.000	0.664	**Non-Liq.**	Non-Liq.	**0.00**
17.06	288.82	2.54	0.88	110	0.938	0.964	0.88	0.50	1.06	288.93	1.54		1	100	1.00	1.25	1.00	290.0	1.00	Infin.	0.000	0.666	**Non-Liq.**	Non-Liq.	**0.00**
17.22	315.97	2.96	0.94	110	0.947	0.964	0.94	0.50	1.06	314.66	1.54		1	100	1.00	1.30	1.00	315.8	1.00	Infin.	0.000	0.669	**Non-Liq.**	Non-Liq.	**0.00**
17.39	322.57	2.98	0.92	110	0.956	0.963	0.93	0.50	1.05	319.73	1.53		1	100	1.00	1.35	1.00	320.9	1.00	Infin.	0.000	0.671	**Non-Liq.**	Non-Liq.	**0.00**
17.55	346.12	4.11	1.19	110	0.965	0.963	1.19	0.50	1.05	341.52	1.60		1	100	1.00	1.40	1.00	342.8	1.00	Infin.	0.000	0.673	**Non-Liq.**	Non-Liq.	**0.00**
17.72	402.20	6.00	1.49	110	0.974	0.963	1.50	0.50	1.04	395.22	1.65		1	100	1.00	1.45	1.00	396.7	1.00	Infin.	0.000	0.675	**Non-Liq.**	Non-Liq.	**0.00**
17.88	358.55	6.07	1.69	110	0.983	0.962	1.70	0.52	1.04	351.16	1.72		1	100	1.05	1.50	1.00	370.5	1.00	Infin.	0.000	0.677	**Non-Liq.**	Non-Liq.	**0.00**
18.04	345.21	4.98	1.44	110	0.992	0.962	1.45	0.51	1.03	336.13	1.67		1	100	1.02	1.55	1.00	343.7	1.00	Infin.	0.000	0.679	**Non-Liq.**	Non-Liq.	**0.00**
18.21	360.17	4.43	1.23	110	1.001	0.962	1.23	0.50	1.03	348.93	1.61		1	100	1.00	1.60	1.00	350.2	1.00	Infin.	0.000	0.681	**Non-Liq.**	Non-Liq.	**0.00**
18.37	359.99	3.79	1.05	110	1.010	0.961	1.06	0.50	1.02	347.18	1.55		1	100	1.00	1.65	1.00	348.5	1.00	Infin.	0.000	0.683	**Non-Liq.**	Non-Liq.	**0.00**
18.54	354.62	3.03	0.86	110	1.020	0.961	0.86	0.50	1.02	340.46	1.49		1	100	1.00	1.70	1.00	341.7	1.00	Infin.	0.000	0.685	**Non-Liq.**	Non-Liq.	**0.00**
18.70	344.24	2.99	0.87	110	1.029	0.960	0.87	0.50	1.01	329.01	1.50		1	100	1.00	1.75	1.00	330.2	1.00	Infin.	0.000	0.687	**Non-Liq.**	Non-Liq.	**0.00**
18.86	332.45	3.04	0.91	110	1.038	0.960	0.92	0.50	1.01	316.31	1.53		1	100	1.00	1.80	1.00	317.5	1.00	Infin.	0.000	0.689	**Non-Liq.**	Non-Liq.	**0.00**
19.03	327.71	2.96	0.90	110	1.047	0.960	0.91	0.50	1.01	310.43	1.53		1	100	1.00	1.85	1.00	311.6	1.00	Infin.	0.000	0.691	**Non-Liq.**	Non-Liq.	**0.00**
19.19	307.45	2.73	0.89	110	1.056	0.959	0.89	0.50	1.00	289.93	1.54		1	100	1.00	1.90	1.00	291.0	1.00	Infin.	0.000	0.692	**Non-Liq.**	Non-Liq.	**0.00**
19.36	274.72	2.45	0.89	110	1.065	0.959	0.89	0.50	1.00	257.85	1.58		1	100	1.00	1.95	1.00	258.8	1.00	Infin.	0.000	0.694	**Non-Liq.**	Non-Liq.	**0.00**
19.52	271.54	4.15	1.53	110	1.074	0.958	1.53	0.54	0.99	253.63	1.76		1	100	1.08	2.00	1.00	275.2	1.00	Infin.	0.000	0.696	**Non-Liq.**	Non-Liq.	**0.00**
19.69	279.83	3.92	1.40	110	1.083	0.958	1.41	0.53	0.99	260.29	1.73		1	100	1.06	2.05	1.00	276.0	1.00	Infin.	0.000	0.698	**Non-Liq.**	Non-Liq.	**0.00**
19.85	285.99	4.02	1.41	110	1.092	0.957	1.41	0.53	0.98	264.88	1.72		1	100	1.05	2.10	1.00	280.2	1.00	Infin.	0.000	0.699	**Non-Liq.**	Non-Liq.	**0.00**
20.01	315.42	2.61	0.83	110	1.101	0.957	0.83	0.50	0.98	291.27	1.52		1	100	1.00	2.15	1.00	292.4	1.00	Infin.	0.000	0.701	**Non-Liq.**	Non-Liq.	**0.00**
20.18	326.56	2.81	0.86	110	1.107	0.957	0.86	0.50	0.98	300.76	1.52		1	100	1.00	2.20	1.00	301.9	1.00	Infin.	0.000	0.703	**Non-Liq.**	Non-Liq.	**0.00**
20.34	329.89	2.62	0.79	110	1.111	0.956	0.80	0.50	0.98	303.30	1.49		1	100	1.00	2.25	1.00	304.4	1.00	Infin.	0.000	0.704	**Non-Liq.**	Non-Liq.	**0.00**
20.51	327.47	2.66	0.81	110	1.115	0.956	0.82	0.50	0.97	300.53	1.50		1	100	1.00	2.30	1.00	301.7	1.00	Infin.	0.000	0.706	**Non-Liq.**	Non-Liq.	**0.00**
20.67	324.48	2.31	0.71	110	1.118	0.955	0.71	0.50	0.97	297.26	1.47		1	100	1.00	2.35	1.00	298.4	1.00	Infin.	0.000	0.708	**Non-Liq.**	Non-Liq.	**0.00**
20.83	329.51	1.82	0.55	110	1.122	0.955	0.55	0.50	0.97	301.35	1.38		1	100	1.00	2.40	1.00	302.5	1.00	Infin.	0.000	0.709	**Non-Liq.**	Non-Liq.	**0.00**
21.00	283.15	1.71	0.61	110	1.126	0.954	0.61	0.50	0.97	258.35	1.46		1	100	1.00	2.45	1.00	259.3	1.00	Infin.	0.000	0.711	**Non-Liq.**	Non-Liq.	**0.00**
21.16	276.58	1.11	0.40	110	1.130	0.954	0.40	0.50	0.97	251.90	1.35		1	100	1.00	2.50	1.00	252.8	1.00	Infin.	0.000	0.712	**Non-Liq.**	Non-Liq.	**0.00**
21.33	265.97	1.09	0.41	110	1.134	0.954	0.41	0.50	0.97	241.77	1.37		1	100	1.00	2.55	1.00	242.7	1.00	Infin.	0.000	0.714	**Non-Liq.**	Non-Liq.	**0.00**
21.49	250.21	1.40	0.56	110	1.138	0.953	0.56	0.50	0.96	226.99	1.48		1	100	1.00	2.60	1.00	227.8	1.00	Infin.	0.000	0.715	**Non-Liq.**	Non-Liq.	**0.00**
21.65	261.15	1.64	0.63	110	1.142	0.953	0.63	0.50	0.96	236.55	1.50		1	100	1.00	2.65	1.00	237.4	1.00	Infin.	0.000	0.717	**Non-Liq.**	Non-Liq.	**0.00**
21.82	300.85	1.72	0.57	110	1.146	0.952	0.57	0.50	0.96	272.20	1.42		1	100	1.00	2.70	1.00	273.2	1.00	Infin.	0.000	0.718	**Non-Liq.**	Non-Liq.	**0.00**
21.98	283.46	1.98	0.70	110	1.150	0.952	0.70	0.50	0.96	255.97	1.50		1	100	1.00	2.75	1.00	256.9	1.00	Infin.	0.000	0.719	**Non-Liq.**	Non-Liq.	**0.00**
22.15	299.30	1.41	0.47	110	1.154	0.951	0.47	0.50	0.96	269.87	1.37		1	100	1.00	2.80	1.00	270.9	1.00	Infin.	0.000	0.721	**Non-Liq.**	Non-Liq.	**0.00**
22.31	305.84	1.24	0.41	110	1.158	0.951	0.41	0.50	0.96	275.32	1.32		1	100	1.00	2.85	1.00	276.3	1.00	Infin.	0.000	0.722	**Non-Liq.**	Non-Liq.	**0.00**
22.47	317.96	1.63	0.51	110	1.161	0.950	0.51	0.50	0.95	285.79	1.38		1	100	1.00	2.90	1.00	286.9	1.00	Infin.	0.000	0.724	**Non-Liq.**	Non-Liq.	**0.00**
22.64	329.92	1.81	0.55	110	1.165	0.950	0.55	0.50	0.95	296.08	1.39		1	100	1.00	2.95	1.00	297.2	1.00	Infin.	0.000	0.725	**Non-Liq.**	Non-Liq.	**0.00**
22.80	349.36	1.91	0.55	110	1.169	0.949	0.55	0.50	0.95	313.06	1.37		1	100	1.00	3.00	1.00	314.2	1.00	Infin.	0.000	0.726	**Non-Liq.**	Non-Liq.	**0.00**
22.97	347.80	2.37	0.68	110	1.173	0.949	0.68	0.50	0.95	311.13	1.44		1	100	1.00	3.05	1.00	312.3	1.00	Infin.	0.000	0.727	**Non-Liq.**	Non-Liq.	**0.00**
23.13	355.41	2.55	0.72	110	1.177	0.948	0.72	0.50	0.95	317.43	1.45		1	100	1.00	3.10	1.00	318.6	1.00	Infin.	0.000	0.729	**Non-Liq.**	Non-Liq.	**0.00**
23.29	348.90	2.53	0.73	110	1.181	0.948	0.73	0.50	0.95	311.08	1.46		1	100	1.00	3.15	1.00	312.2	1.00	Infin.	0.000	0.730	**Non-Liq.**	Non-Liq.	**0.00**
23.46	332.91	2.12	0.64	110	1.185	0.947	0.64	0.50	0.94	296.28	1.43		1	100	1.00	3.20	1.00	297.4	1.00	Infin.	0.000	0.731	**Non-Liq.**	Non-Liq.	**0.00**
23.62	334.85	1.98	0.59	110	1.189	0.947	0.59	0.50	0.94	297.52	1.41		1	100	1.00	3.25	1.00	298.6	1.00	Infin.	0.000	0.732	**Non-Liq.**	Non-Liq.	**0.00**
23.79	354.63	1.92	0.54	110	1.193	0.946	0.54	0.50	0.94	314.64	1.36		1	100	1.00	3.30	1.00	315.8	1.00	Infin.	0.000	0.733	**Non-Liq.**	Non-Liq.	**0.00**
23.95	324.76	1.60	0.49	110	1.197	0.946	0.49	0.50	0.94	287.57	1.36		1	100	1.00	3.35	1.00	288.6	1.00	Infin.	0.000	0.735	**Non-Liq.**	Non-Liq.	**0.00**
24.11	341.67	1.26	0.37	110	1.200	0.945	0.37	0.50	0.94	302.11	1.27		1	100	1.00	3.40	1.00	303.2	1.00	Infin.	0.000	0.736	**Non-Liq.**	Non-Liq.	**0.00**
24.28	335.98	1.14	0.34	110	1.204	0.945	0.34	0.50	0.94	296.57	1.25		1	100	1.00	3.45	1.00	297.7	1.00	Infin.	0.000	0.737	**Non-Liq.**	Non-Liq.	**0.00**
24.44	335.54	1.25	0.37	110	1.208	0.944	0.38	0.50	0.94	295.70	1.28		1	100	1.00	3.50	1.00	296.8	1.00	Infin.	0.000	0.738	**Non-Liq.**	Non-Liq.	**0.00**
24.61	340.03	1.44	0.42	110	1.212	0.943	0.42	0.50	0.93	299.18	1.31		1	100	1.00	3.55	1.00	300.3	1.00	Infin.	0.000	0.739	**Non-Liq.**	Non-Liq.	**0.00**
24.77	343.51	2.18	0.64	110	1.216	0.943	0.64	0.50	0.93	301.77	1.42		1	100	1.00	3.60	1.00	302.9	1.00	Infin.	0.000	0.740	**Non-Liq.**	Non-Liq.	**0.00**
24.93	350.49	2.01	0.57	110	1.220	0.942	0.58	0.50	0.93	307.42	1.39		1	100	1.00	3.65	1.00	308.6	1.00	Infin.	0.000	0.741	**Non-Liq.**	Non-Liq.	**0.00**
25.10	344.14	2.05	0.60	110	1.224	0.942	0.60	0.50	0.93	301.35	1.41		1	100	1.00	3.70	1.00	302.5	1.00	Infin.	0.000	0.742	**Non-Liq.**	Non-Liq.	**0.00**
25.26	336.49	3.71	1.10	110	1.228	0.941	1.11	0.50	0.93	294.16	1.61		1	100	1.00	3.75	1.00	295.3	1.00	Infin.	0.000	0.743	**Non-Liq.**	Non-Liq.	**0.00**
25.43	347.63	2.78	0.80	110	1.232	0.941	0.80	0.50	0.93	303.44	1.50		1	100	1.00	3.80	1.00	304.6	1.00	Infin.	0.000	0.744	**Non-Liq.**	Non-Liq.	**0.00**
25.59	382.52	2.64	0.69	110	1.236	0.940	0.69	0.50	0.93	333.48	1.42		1	100	1.00	3.85	1.00	334.7	1.00	Infin.	0.000	0.745	**Non-Liq.**	Non-Liq.	**0.00**
25.75	360.83	2.44	0.68	110	1.240	0.939	0.68	0.50	0.92	314.01	1.43		1	100	1.00	3.90	1.00	315.2	1.00	Infin.	0.000	0.746	**Non-Liq.**	Non-Liq.	**0.00**
25.92	365.07	2.04	0.56	110	1.243	0.939	0.56	0.50	0.92	317.21	1.37		1	100	1.00	3.95	1.00	318.4	1.00	Infin.	0.000	0.747	**Non-Liq.**	Non-Liq.	**0.00**
26.08	363.26	2.01	0.55	110	1.247	0.938	0.56	0.50	0.92	315.13	1.37		1	100	1.00	4.00	1.00	316.3	1.00	Infin.	0.000	0.747	**Non-Liq.**	Non-Liq.	**0.00**
26.25	360.99	2.10	0.58	110	1.251	0.938	0.58	0.50	0.92	312.66	1.39		1	100	1.00	4.05	1.00	313.8	1.00	Infin.	0.000	0.748	**Non-Liq.**	Non-Liq.	**0.00**
26.41	395.59	1.87	0.47	110	1.255	0.937	0.48	0.50	0.92	342.20	1.30		1	100	1.00	4.10	1.00	343.5	1.00	Infin.	0.000	0.749	**Non-Liq.**	Non-Liq.	**0.00**
26.57	390.21	2.16	0.55	110	1.259	0.936	0.55	0.50	0.92	337.00	1.35		1	100	1.00	4.15	1.00	338.3	1.00	Infin.	0.000	0.750	**Non-Liq.**	Non-Liq.	**0.00**
26.74	369.74	2.08	0.56	110	1.263	0.936	0.57	0.50	0.92	318.77	1.37		1	100	1.00	4.20	1.00	320.0	1.00	Infin.	0.000	0.751	**Non-Liq.**	Non-Liq.	**0.00**
26.90	365.49	1.74	0.48	110	1.267	0.935	0.48	0.50	0.91	314.60	1.32		1	100	1.00	4.25	1.00	315.8	1.00	Infin.	0.000	0.751	**Non-Liq.**	Non-Liq.	**0.00**
27.07	355.65	1.92	0.54	110	1.271	0.934	0.54	0.50	0.91	305.63	1.37		1	100	1.00	4.30	1.00	306.8	1.00	Infin.	0.000	0.752	**Non-Liq.**	Non-Liq.	**0.00**
27.23	353.49	1.57	0.44	110	1.275	0.934	0.44	0.50	0.91	303.30	1.32		1	100	1.00	4.35	1.00	304.4	1.00	Infin.	0.000	0.753	**Non-Liq.**	Non-Liq.	**0.00**
27.40	346.49	1.68	0.48	110	1.279	0.933	0.49	0.50	0.91	296.81	1.35		1	100	1.00	4.40	1.00	297.9	1.00	Infin.	0.000	0.754	**Non-Liq.**	Non-Liq.	**0.00**
27.56	345.45	1.99	0.58	110	1.282	0.932	0.58	0.50	0.91	295.46	1.40		1	100	1.00	4.45	1.00	296.6	1.00	Infin.	0.000	0.754	**Non-Liq.**	Non-Liq.	**0.00**
27.72	320.92	1.75	0.55	110	1.286	0.932	0.55	0.50	0.91	273.99	1.41		1	100	1.00	4.50	1.00	275.0	1.00	Infin.	0.000	0.755	**Non-Liq.**	Non-Liq.	**0.00**
27.89	307.08	1.60	0.52	110	1.290	0.931	0.52	0.50	0.91	261.72	1.41		1	100	1.00	4.55	1.00	262.7	1.00	Infin.	0.000	0.756	**Non-Liq.**	Non-Liq.	**0.00**

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff. Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	M=7.5 CSR	Induced Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
28.05	279.88	1.58	0.56	110	1.294	0.930	0.57	0.50	0.90	238.08	1.46		1	100	1.00	4.60	1.00	239.0	1.00	Infin.	0.000	0.756	**Non-Liq.**	Non-Liq.	**0.00**
28.22	242.13	3.57	1.47	110	1.298	0.929	1.48	0.55	0.89	203.34	1.81		1	100	1.12	4.65	1.00	227.7	1.00	Infin.	0.000	0.757	**Non-Liq.**	Non-Liq.	**0.00**
28.38	259.83	3.41	1.31	110	1.302	0.929	1.32	0.53	0.90	218.73	1.75		1	100	1.07	4.70	1.00	235.7	1.00	Infin.	0.000	0.758	**Non-Liq.**	Non-Liq.	**0.00**
28.54	290.00	2.93	1.01	110	1.306	0.928	1.01	0.50	0.90	245.61	1.63		1	100	1.00	4.75	1.00	246.5	1.00	Infin.	0.000	0.758	**Non-Liq.**	Non-Liq.	**0.00**
28.71	202.32	2.56	1.27	110	1.310	0.927	1.28	0.55	0.89	168.83	1.82		1	99	1.12	4.80	1.00	189.7	1.00	Infin.	0.000	0.759	**Non-Liq.**	Non-Liq.	**0.00**
28.87	189.41	1.37	0.72	110	1.314	0.926	0.73	0.51	0.90	159.28	1.67		1	96	1.01	4.85	1.00	162.2	1.00	Infin.	0.000	0.759	**Non-Liq.**	Non-Liq.	**0.00**
29.04	186.12	1.39	0.74	110	1.318	0.926	0.75	0.51	0.89	156.09	1.68		1	95	1.03	4.90	1.00	160.7	1.00	Infin.	0.000	0.760	**Non-Liq.**	Non-Liq.	**0.00**
29.20	187.42	1.54	0.82	110	1.322	0.925	0.83	0.52	0.89	156.67	1.71		1	95	1.04	4.95	1.00	164.1	1.00	Infin.	0.000	0.760	**Non-Liq.**	Non-Liq.	**0.00**
29.36	174.10	1.68	0.96	110	1.325	0.924	0.97	0.54	0.88	144.51	1.78		1	92	1.09	5.00	1.00	158.6	1.00	0.451	0.451	0.761	**0.59**	85%	**0.61**
29.53	162.50	1.73	1.07	110	1.329	0.923	1.07	0.56	0.88	134.10	1.84		1	89	1.13	5.05	1.00	152.5	1.00	0.410	0.410	0.761	**0.54**	89%	**0.75**
29.69	156.88	1.76	1.12	110	1.333	0.923	1.13	0.57	0.88	128.96	1.86		1	87	1.16	5.10	1.00	149.6	1.00	0.391	0.391	0.762	**0.51**	90%	**0.83**
29.86	154.45	1.73	1.12	110	1.337	0.922	1.13	0.57	0.88	126.69	1.87		1	87	1.16	5.15	1.00	147.5	1.00	0.378	0.378	0.762	**0.50**	91%	**0.88**
30.02	155.22	1.86	1.20	110	1.341	0.921	1.21	0.57	0.87	126.93	1.89		1	87	1.18	5.20	1.00	150.1	1.00	0.394	0.394	0.763	**0.52**	90%	**0.81**
30.18	159.05	1.71	1.08	110	1.345	0.920	1.09	0.56	0.87	130.24	1.85		1	88	1.14	5.25	1.00	149.5	1.00	0.391	0.391	0.763	**0.51**	90%	**0.83**
30.35	160.50	1.73	1.08	110	1.349	0.919	1.09	0.56	0.87	131.25	1.85		1	88	1.14	5.30	1.00	150.4	1.00	0.396	0.396	0.763	**0.52**	90%	**0.81**
30.51	177.29	1.78	1.00	110	1.353	0.918	1.01	0.55	0.87	145.44	1.79		1	92	1.10	5.35	1.00	160.6	1.00	Infin.	0.000	0.764	**Non-Liq.**	Non-Liq.	**0.00**
30.68	188.18	1.86	0.99	110	1.357	0.918	1.00	0.54	0.87	154.46	1.77		1	95	1.08	5.40	1.00	168.0	1.00	Infin.	0.000	0.764	**Non-Liq.**	Non-Liq.	**0.00**
30.84	196.86	2.12	1.08	110	1.361	0.917	1.09	0.54	0.87	161.22	1.78		1	97	1.09	5.45	1.00	176.9	1.00	Infin.	0.000	0.764	**Non-Liq.**	Non-Liq.	**0.00**
31.00	210.21	3.25	1.55	110	1.364	0.916	1.56	0.57	0.86	170.70	1.88		1	99	1.17	5.50	1.00	200.2	1.00	Infin.	0.000	0.765	**Non-Liq.**	Non-Liq.	**0.00**
31.17	210.66	3.44	1.63	110	1.368	0.915	1.64	0.58	0.86	170.54	1.90		1	99	1.19	5.55	1.00	202.9	1.00	Infin.	0.000	0.765	**Non-Liq.**	Non-Liq.	**0.00**
31.33	214.79	3.75	1.75	110	1.372	0.914	1.76	0.58	0.86	173.38	1.91		1	100	1.20	5.60	1.00	209.2	1.00	Infin.	0.000	0.765	**Non-Liq.**	Non-Liq.	**0.00**
31.50	227.93	4.18	1.83	110	1.376	0.913	1.84	0.58	0.86	183.75	1.91		1	100	1.20	5.65	1.00	221.6	1.00	Infin.	0.000	0.765	**Non-Liq.**	Non-Liq.	**0.00**
31.66	244.07	4.52	1.85	110	1.380	0.912	1.86	0.58	0.86	196.76	1.90		1	100	1.19	5.70	1.00	234.4	1.00	Infin.	0.000	0.766	**Non-Liq.**	Non-Liq.	**0.00**
31.82	246.01	4.47	1.82	110	1.384	0.911	1.83	0.57	0.86	198.13	1.89		1	100	1.18	5.75	1.00	234.6	1.00	Infin.	0.000	0.766	**Non-Liq.**	Non-Liq.	**0.00**
31.99	244.38	4.40	1.80	110	1.388	0.910	1.81	0.57	0.86	196.51	1.89		1	100	1.18	5.80	1.00	232.4	1.00	Infin.	0.000	0.766	**Non-Liq.**	Non-Liq.	**0.00**
32.15	229.90	4.32	1.88	110	1.392	0.909	1.89	0.58	0.85	184.00	1.92		1	100	1.21	5.85	1.00	223.5	1.00	Infin.	0.000	0.766	**Non-Liq.**	Non-Liq.	**0.00**
32.32	206.06	3.87	1.88	110	1.396	0.908	1.89	0.59	0.85	164.10	1.95		1	97	1.24	5.90	1.00	204.8	1.00	Infin.	0.000	0.766	**Non-Liq.**	Non-Liq.	**0.00**
32.48	204.67	2.85	1.39	110	1.400	0.907	1.40	0.56	0.85	164.05	1.86		1	97	1.15	5.95	1.00	189.2	1.00	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
32.64	203.20	2.51	1.24	110	1.403	0.906	1.25	0.55	0.86	163.10	1.82		1	97	1.12	6.00	1.00	183.6	1.00	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
32.81	212.73	2.19	1.03	110	1.407	0.905	1.04	0.53	0.86	171.59	1.75		1	99	1.07	6.05	1.00	184.3	1.00	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
32.97	233.49	2.13	0.91	110	1.411	0.904	0.92	0.51	0.86	189.28	1.68		1	100	1.02	6.10	1.00	194.5	1.00	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
33.14	254.97	2.22	0.87	110	1.415	0.903	0.88	0.50	0.86	207.21	1.64		1	100	1.00	6.15	1.00	208.0	1.00	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
33.30	276.58	2.38	0.86	110	1.419	0.902	0.87	0.50	0.86	224.56	1.61		1	100	1.00	6.20	1.00	225.4	1.00	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
33.46	326.02	2.80	0.86	110	1.423	0.901	0.86	0.50	0.86	264.54	1.56		1	100	1.00	6.25	1.00	265.5	1.00	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
33.63	367.65	3.43	0.93	110	1.427	0.900	0.94	0.50	0.86	298.06	1.55		1	100	1.00	6.30	1.00	299.2	1.00	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
33.79	402.25	3.96	0.99	110	1.431	0.899	0.99	0.50	0.86	325.77	1.55		1	100	1.00	6.35	1.00	327.0	1.00	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
33.96	373.21	2.74	0.73	110	1.435	0.898	0.74	0.50	0.86	301.75	1.47		1	100	1.00	6.40	1.00	302.9	1.00	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
34.12	367.69	2.68	0.73	110	1.439	0.897	0.73	0.50	0.86	296.87	1.47		1	100	1.00	6.45	1.00	298.0	1.00	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
34.28	347.49	2.00	0.58	110	1.443	0.896	0.58	0.50	0.86	280.11	1.42		1	100	1.00	6.50	1.00	281.2	1.00	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
34.45	363.15	2.39	0.66	110	1.446	0.895	0.66	0.50	0.86	292.39	1.45		1	100	1.00	6.55	1.00	293.5	0.99	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
34.61	354.73	2.83	0.80	110	1.450	0.894	0.80	0.50	0.85	285.19	1.51		1	100	1.00	6.60	1.00	286.3	0.99	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
34.78	326.42	3.00	0.92	110	1.454	0.893	0.92	0.50	0.85	261.98	1.58		1	100	1.00	6.65	1.00	263.0	0.99	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
34.94	311.03	2.62	0.84	110	1.458	0.892	0.85	0.50	0.85	249.24	1.57		1	100	1.00	6.70	1.00	250.2	0.99	Infin.	0.000	0.766	**Non-Liq.**	Non-Liq.	**0.00**
35.10	313.61	2.84	0.90	110	1.462	0.890	0.91	0.50	0.85	250.98	1.59		1	100	1.00	6.75	1.00	251.9	0.99	Infin.	0.000	0.766	**Non-Liq.**	Non-Liq.	**0.00**
35.27	310.40	3.07	0.99	110	1.466	0.889	0.99	0.50	0.85	248.06	1.62		1	100	1.00	6.80	1.00	249.0	0.99	Infin.	0.000	0.766	**Non-Liq.**	Non-Liq.	**0.00**
35.43	294.50	3.05	1.03	110	1.470	0.888	1.04	0.50	0.85	234.64	1.65		1	100	1.01	6.85	1.00	237.1	0.99	Infin.	0.000	0.766	**Non-Liq.**	Non-Liq.	**0.00**
35.60	285.50	2.83	0.99	110	1.474	0.887	1.00	0.50	0.85	227.21	1.65		1	100	1.00	6.90	1.00	228.9	0.98	Infin.	0.000	0.766	**Non-Liq.**	Non-Liq.	**0.00**
35.76	280.39	2.74	0.98	110	1.478	0.886	0.98	0.50	0.85	222.80	1.65		1	100	1.00	6.95	1.00	224.7	0.98	Infin.	0.000	0.766	**Non-Liq.**	Non-Liq.	**0.00**
35.93	276.31	2.73	0.99	110	1.482	0.885	0.99	0.51	0.84	219.05	1.66		1	100	1.01	7.00	1.00	222.3	0.98	Infin.	0.000	0.765	**Non-Liq.**	Non-Liq.	**0.00**
36.09	271.84	2.66	0.98	110	1.485	0.883	0.99	0.51	0.84	215.14	1.66		1	100	1.01	7.05	1.00	218.7	0.98	Infin.	0.000	0.765	**Non-Liq.**	Non-Liq.	**0.00**
36.25	266.67	2.73	1.02	110	1.489	0.882	1.03	0.51	0.84	210.29	1.68		1	100	1.03	7.10	1.00	216.8	0.98	Infin.	0.000	0.765	**Non-Liq.**	Non-Liq.	**0.00**
36.42	266.74	3.17	1.19	110	1.493	0.881	1.19	0.53	0.83	209.00	1.73		1	100	1.06	7.15	1.00	222.4	0.98	Infin.	0.000	0.765	**Non-Liq.**	Non-Liq.	**0.00**
36.58	258.25	3.44	1.33	110	1.497	0.880	1.34	0.54	0.83	201.01	1.78		1	100	1.09	7.20	1.00	220.6	0.98	Infin.	0.000	0.764	**Non-Liq.**	Non-Liq.	**0.00**
36.75	253.87	3.88	1.53	110	1.501	0.878	1.54	0.56	0.82	196.21	1.83		1	100	1.13	7.25	1.00	223.1	0.98	Infin.	0.000	0.764	**Non-Liq.**	Non-Liq.	**0.00**
36.91	268.14	4.26	1.59	110	1.505	0.877	1.60	0.56	0.82	207.04	1.83		1	100	1.13	7.30	1.00	235.1	0.97	Infin.	0.000	0.764	**Non-Liq.**	Non-Liq.	**0.00**
37.07	272.86	5.01	1.84	110	1.509	0.876	1.85	0.57	0.82	209.36	1.88		1	100	1.17	7.35	1.00	245.8	0.97	Infin.	0.000	0.763	**Non-Liq.**	Non-Liq.	**0.00**
37.24	267.15	4.61	1.73	110	1.513	0.875	1.74	0.57	0.82	205.00	1.86		1	100	1.16	7.40	1.00	237.9	0.97	Infin.	0.000	0.763	**Non-Liq.**	Non-Liq.	**0.00**
37.40	258.14	4.98	1.93	110	1.517	0.873	1.94	0.58	0.81	196.71	1.91		1	100	1.20	7.45	1.00	237.1	0.97	Infin.	0.000	0.762	**Non-Liq.**	Non-Liq.	**0.00**
37.57	251.61	4.92	1.96	110	1.521	0.872	1.97	0.59	0.81	191.15	1.92		1	100	1.21	7.50	1.00	232.8	0.97	Infin.	0.000	0.762	**Non-Liq.**	Non-Liq.	**0.00**
37.73	253.20	5.10	2.01	110	1.525	0.871	2.02	0.59	0.81	191.89	1.93		1	100	1.22	7.55	1.00	235.4	0.97	Infin.	0.000	0.762	**Non-Liq.**	Non-Liq.	**0.00**
37.89	250.10	4.99	1.99	110	1.528	0.869	2.01	0.59	0.81	189.23	1.93		1	100	1.22	7.60	1.00	232.3	0.97	Infin.	0.000	0.761	**Non-Liq.**	Non-Liq.	**0.00**
38.06	236.10	4.60	1.95	110	1.532	0.868	1.96	0.59	0.80	178.13	1.94		1	100	1.23	7.65	1.00	220.2	0.96	Infin.	0.000	0.761	**Non-Liq.**	Non-Liq.	**0.00**
38.22	234.67	4.00	1.70	110	1.536	0.867	1.71	0.58	0.81	177.66	1.90		1	100	1.19	7.70	1.00	211.7	0.96	Infin.	0.000	0.760	**Non-Liq.**	Non-Liq.	**0.00**
38.39	251.51	3.44	1.37	110	1.540	0.865	1.38	0.55	0.81	192.25	1.80		1	100	1.11	7.75	1.00	214.0	0.96	Infin.	0.000	0.760	**Non-Liq.**	Non-Liq.	**0.00**
38.55	261.62	3.13	1.20	110	1.544	0.864	1.20	0.53	0.82	201.02	1.75		1	100	1.07	7.80	1.00	215.9	0.96	Infin.	0.000	0.759	**Non-Liq.**	Non-Liq.	**0.00**
38.71	270.23	2.71	1.00	110	1.548	0.863	1.01	0.51	0.82	209.01	1.68		1	100	1.02	7.85	1.00	214.8	0.96	Infin.	0.000	0.759	**Non-Liq.**	Non-Liq.	**0.00**
38.88	270.03	2.45	0.91	110	1.552	0.861	0.91	0.50	0.83	209.36	1.65		1	100	1.00	7.90	1.00	210.4	0.96	Infin.	0.000	0.758	**Non-Liq.**	Non-Liq.	**0.00**
39.04	285.58	1.88	0.66	110	1.556	0.860	0.66	0.50	0.82	221.38	1.53		1	100	1.00	7.95	1.00	222.2	0.96	Infin.	0.000	0.758	**Non-Liq.**	Non-Liq.	**0.00**
39.21	285.94	1.84	0.64	110	1.560	0.859	0.65	0.50	0.82	221.38	1.53		1	100	1.00	8.00	1.00	222.2	0.96	Infin.	0.000	0.757	**Non-Liq.**	Non-Liq.	**0.00**
39.37	298.71	2.11	0.71	110	1.564	0.857	0.71	0.50	0.82	231.03	1.54		1	100	1.00	8.05	1.00	231.9	0.95	Infin.	0.000	0.757	**Non-Liq.**	Non-Liq.	**0.00**
39.53	335.11	2.36	0.71	110	1.567	0.856	0.71	0.50	0.82	259.01	1.50		1	100	1.00	8.10	1.00	260.0	0.95	Infin.	0.000	0.756	**Non-Liq.**	Non-Liq.	**0.00**
39.70	334.95	4.67	1.39	110	1.571	0.854	1.40	0.53	0.81	255.80	1.73		1	100	1.06	8.15	1.00	271.7	0.95	Infin.	0.000	0.756	**Non-Liq.**	Non-Liq.	**0.00**
39.86	365.36	4.60	1.26	110	1.575	0.853	1.26	0.51	0.82	280.75	1.67		1	100	1.02	8.20	1.00	286.9	0.95	Infin.	0.000	0.755	**Non-Liq.**	Non-Liq.	**0.00**
40.03	354.98	4.90	1.38	110	1.579	0.852	1.39	0.52	0.81	271.07	1.71		1	100	1.05	8.25	1.00	284.5	0.95	Infin.	0.000	0.754	**Non-Liq.**	Non-Liq.	**0.00**
40.19	386.31	4.35	1.13	110	1.583	0.850	1.13	0.50	0.82	297.27	1.62		1	100	1.00	8.30	1.00	298.4	0.95	Infin.	0.000	0.754	**Non-Liq.**	Non-Liq.	**0.00**
40.35	312.02	3.03	0.97	110	1.587	0.849	0.98	0.50	0.82	239.57	1.63		1	100	1.00	8.35	1.00	240.5	0.95	Infin.	0.000	0.753	**Non-Liq.**	Non-Liq.	**0.00**
40.52	311.39	2.28	0.73	110	1.591	0.847	0.74	0.50	0.82	238.79	1.54		1	100	1.00	8.40	1.00	239.7	0.95	Infin.	0.000	0.752	**Non-Liq.**	Non-Liq.	**0.00**
40.68	294.45	1.66	0.56	110	1.595	0.846	0.57	0.50	0.81	225.45	1.48		1	100	1.00	8.45	1.00	226.3	0.94	Infin.	0.000	0.752	**Non-Liq.**	Non-Liq.	**0.00**
40.85	281.98	1.62	0.58	110	1.599	0.844	0.58	0.50	0.81	215.59	1.50		1	100	1.00	8.50	1.00	216.4	0.94	Infin.	0.000	0.751	**Non-Liq.**	Non-Liq.	**0.00**
41.01	243.47	1.88	0.77	110	1.603	0.843	0.78	0.50	0.81	185.75	1.64		1	100	1.00	8.55	1.00	186.4	0.94	Infin.	0.000	0.750	**Non-Liq.**	Non-Liq.	**0.00**
41.17	276.31	2.79	1.01	110	1.607	0.841	1.01	0.51	0.81	209.65	1.68		1	100	1.02	8.60	1.00	215.6	0.94	Infin.	0.000	0.750	**Non-Liq.**	Non-Liq.	**0.00**
41.34	272.69	3.15	1.16	110	1.610	0.840	1.16	0.53	0.80	205.34	1.73		1	100	1.06	8.65	1.00	218.0	0.94	Infin.	0.000	0.749	**Non-Liq.**	Non-Liq.	**0.00**
41.50	280.76	3.48	1.24	110	1.614	0.838	1.25	0.53	0.80	210.77	1.74		1	100	1.07	8.70	1.00	226.0	0.94	Infin.	0.000	0.748	**Non-Liq.**	Non-Liq.	**0.00**
41.67	325.03	3.18	0.98	110	1.618	0.837	0.98	0.50	0.81	247.17	1.62		1	100	1.00	8.75	1.00	248.1	0.94	Infin.	0.000	0.747	**Non-Liq.**	Non-Liq.	**0.00**
41.83	361.66	3.38	0.94	110	1.622	0.835	0.94	0.50	0.81	274.83	1.58		1	100	1.00	8.80	1.00	275.9	0.94	Infin.	0.000	0.747	**Non-Liq.**	Non-Liq.	**0.00**
41.99	372.69	3.26	0.87	110	1.626	0.834	0.88	0.50	0.81	282.91	1.55		1	100	1.00	8.85	1.00	284.0	0.93	Infin.	0.000	0.746	**Non-Liq.**	Non-Liq.	**0.00**
42.16	396.43	3.53	0.89	110	1.630	0.832	0.89	0.50	0.81	300.64	1.53		1	100	1.00	8.90	1.00	301.8	0.93	Infin.	0.000	0.745	**Non-Liq.**	Non-Liq.	**0.00**
42.32	442.33	3.55	0.80	110	1.634	0.831	0.81	0.50	0.80	335.19	1.47		1	100	1.00	8.95	1.00	336.4	0.93	Infin.	0.000	0.744	**Non-Liq.**	Non-Liq.	**0.00**
42.49	458.56	3.30	0.72	110	1.638	0.829	0.72	0.50	0.80	347.12	1.42		1	100	1.00	9.00	1.00	348.4	0.93	Infin.	0.000	0.743	**Non-Liq.**	Non-Liq.	**0.00**
42.65	440.28	2.98	0.68	110	1.642	0.827	0.68	0.50	0.80	332.83	1.42		1	100	1.00	9.05	1.00	334.1	0.93	Infin.	0.000	0.743	**Non-Liq.**	Non-Liq.	**0.00**
42.81	431.91	2.59	0.60	110	1.646	0.826	0.60	0.50	0.80	326.09	1.38		1	100	1.00	9.10	1.00	327.3	0.93	Infin.	0.000	0.742	**Non-Liq.**	Non-Liq.	**0.00**
42.98	428.57	2.24	0.52	110	1.649	0.824	0.52	0.50	0.80	323.17	1.34		1	100	1.00	9.15	1.00	324.4	0.93	Infin.	0.000	0.741	**Non-Liq.**	Non-Liq.	**0.00**

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor		Probab. P_L	Volumetric Strain (%)
43.14	428.50	2.17	0.51	110	1.653	0.823	0.51	0.50	0.80	322.73	1.33		1	100	1.00	9.20	1.00	323.9	0.93	Infin.	0.000	0.740	**Non-Liq.**	Non-Liq.		**0.00**
43.31	431.32	1.87	0.43	110	1.657	0.821	0.43	0.50	0.80	324.48	1.29		1	100	1.00	9.25	1.00	325.7	0.93	Infin.	0.000	0.739	**Non-Liq.**	Non-Liq.		**0.00**
43.47	442.46	2.46	0.56	110	1.661	0.820	0.56	0.50	0.80	332.50	1.35		1	100	1.00	9.30	1.00	333.7	0.92	Infin.	0.000	0.738	**Non-Liq.**	Non-Liq.		**0.00**
43.64	485.55	2.74	0.56	110	1.665	0.818	0.57	0.50	0.80	364.57	1.33		1	100	1.00	9.35	1.00	365.9	0.92	Infin.	0.000	0.737	**Non-Liq.**	Non-Liq.		**0.00**
43.80	480.46	2.91	0.61	110	1.669	0.816	0.61	0.50	0.80	360.31	1.36		1	100	1.00	9.40	1.00	361.7	0.92	Infin.	0.000	0.736	**Non-Liq.**	Non-Liq.		**0.00**
43.96	434.40	2.34	0.54	110	1.673	0.815	0.54	0.50	0.80	325.27	1.35		1	100	1.00	9.45	1.00	326.5	0.92	Infin.	0.000	0.735	**Non-Liq.**	Non-Liq.		**0.00**
44.13	424.26	2.47	0.58	110	1.677	0.813	0.58	0.50	0.79	317.27	1.38		1	100	1.00	9.50	1.00	318.5	0.92	Infin.	0.000	0.735	**Non-Liq.**	Non-Liq.		**0.00**
44.29	417.78	3.15	0.75	110	1.681	0.811	0.76	0.50	0.79	312.04	1.47		1	100	1.00	9.55	1.00	313.2	0.92	Infin.	0.000	0.734	**Non-Liq.**	Non-Liq.		**0.00**
44.46	434.65	2.76	0.64	110	1.685	0.810	0.64	0.50	0.79	324.31	1.40		1	100	1.00	9.60	1.00	325.5	0.92	Infin.	0.000	0.733	**Non-Liq.**	Non-Liq.		**0.00**
44.62	474.92	3.88	0.82	110	1.689	0.808	0.82	0.50	0.79	354.06	1.46		1	100	1.00	9.65	1.00	355.4	0.92	Infin.	0.000	0.732	**Non-Liq.**	Non-Liq.		**0.00**
44.78	477.42	3.92	0.82	110	1.692	0.807	0.82	0.50	0.79	355.52	1.46		1	100	1.00	9.70	1.00	356.8	0.92	Infin.	0.000	0.731	**Non-Liq.**	Non-Liq.		**0.00**
44.95	400.75	3.18	0.79	110	1.696	0.805	0.80	0.50	0.79	297.88	1.50		1	100	1.00	9.75	1.00	299.0	0.91	Infin.	0.000	0.730	**Non-Liq.**	Non-Liq.		**0.00**
45.11	375.01	3.32	0.89	110	1.700	0.803	0.89	0.50	0.79	278.34	1.56		1	100	1.00	9.80	1.00	279.4	0.91	Infin.	0.000	0.729	**Non-Liq.**	Non-Liq.		**0.00**
45.28	353.62	3.70	1.05	110	1.704	0.802	1.05	0.50	0.79	262.09	1.63		1	100	1.00	9.85	1.00	263.1	0.91	Infin.	0.000	0.728	**Non-Liq.**	Non-Liq.		**0.00**
45.44	350.76	3.99	1.14	110	1.708	0.800	1.14	0.51	0.78	258.98	1.66		1	100	1.01	9.90	1.00	262.3	0.91	Infin.	0.000	0.727	**Non-Liq.**	Non-Liq.		**0.00**
45.60	361.90	4.33	1.20	110	1.712	0.798	1.20	0.51	0.78	266.57	1.67		1	100	1.02	9.95	1.00	271.8	0.91	Infin.	0.000	0.726	**Non-Liq.**	Non-Liq.		**0.00**
45.77	370.34	4.64	1.25	110	1.716	0.797	1.26	0.51	0.78	272.10	1.68		1	100	1.02	####	1.00	279.3	0.91	Infin.	0.000	0.725	**Non-Liq.**	Non-Liq.		**0.00**
45.93	366.89	5.10	1.39	110	1.720	0.795	1.40	0.52	0.78	267.69	1.72		1	100	1.05	####	1.00	282.0	0.91	Infin.	0.000	0.724	**Non-Liq.**	Non-Liq.		**0.00**
46.10	356.56	4.91	1.38	110	1.724	0.793	1.38	0.52	0.77	259.60	1.72		1	100	1.05	####	1.00	274.4	0.91	Infin.	0.000	0.723	**Non-Liq.**	Non-Liq.		**0.00**
46.26	358.23	5.52	1.54	110	1.728	0.792	1.55	0.54	0.77	259.00	1.76		1	100	1.08	####	1.00	280.7	0.91	Infin.	0.000	0.722	**Non-Liq.**	Non-Liq.		**0.00**
46.42	364.21	5.48	1.51	110	1.731	0.790	1.51	0.53	0.77	263.52	1.75		1	100	1.07	####	1.00	283.3	0.91	Infin.	0.000	0.721	**Non-Liq.**	Non-Liq.		**0.00**
46.59	355.49	5.43	1.53	110	1.735	0.788	1.53	0.54	0.77	256.41	1.76		1	100	1.08	####	1.00	277.8	0.90	Infin.	0.000	0.720	**Non-Liq.**	Non-Liq.		**0.00**
46.75	363.06	4.83	1.33	110	1.739	0.787	1.34	0.52	0.77	263.74	1.71		1	100	1.04	####	1.00	275.9	0.90	Infin.	0.000	0.719	**Non-Liq.**	Non-Liq.		**0.00**
46.92	369.03	3.46	0.94	110	1.743	0.785	0.94	0.50	0.78	270.45	1.58		1	100	1.00	####	1.00	271.5	0.90	Infin.	0.000	0.717	**Non-Liq.**	Non-Liq.		**0.00**
47.08	367.25	3.54	0.96	110	1.747	0.783	0.97	0.50	0.78	268.84	1.59		1	100	1.00	####	1.00	269.8	0.90	Infin.	0.000	0.716	**Non-Liq.**	Non-Liq.		**0.00**
47.24	360.71	3.46	0.96	110	1.751	0.782	0.96	0.50	0.78	263.73	1.60		1	100	1.00	####	1.00	264.7	0.90	Infin.	0.000	0.715	**Non-Liq.**	Non-Liq.		**0.00**
47.41	359.57	3.90	1.08	110	1.755	0.780	1.09	0.50	0.78	262.60	1.64		1	100	1.00	####	1.00	263.6	0.90	Infin.	0.000	0.714	**Non-Liq.**	Non-Liq.		**0.00**
47.57	355.34	4.23	1.19	110	1.759	0.778	1.20	0.51	0.77	257.82	1.67		1	100	1.02	####	1.00	264.2	0.90	Infin.	0.000	0.713	**Non-Liq.**	Non-Liq.		**0.00**
47.74	345.82	4.41	1.28	110	1.763	0.777	1.28	0.52	0.77	249.35	1.71		1	100	1.04	####	1.00	261.0	0.90	Infin.	0.000	0.712	**Non-Liq.**	Non-Liq.		**0.00**
47.90	339.06	4.15	1.22	110	1.767	0.775	1.23	0.52	0.77	244.49	1.70		1	100	1.04	####	1.00	254.5	0.90	Infin.	0.000	0.711	**Non-Liq.**	Non-Liq.		**0.00**
48.06	331.05	4.03	1.22	110	1.770	0.773	1.23	0.52	0.77	238.19	1.70		1	100	1.04	####	1.00	248.9	0.90	Infin.	0.000	0.710	**Non-Liq.**	Non-Liq.		**0.00**
48.23	319.37	3.94	1.23	110	1.774	0.772	1.24	0.52	0.76	228.93	1.72		1	100	1.05	####	1.00	241.6	0.89	Infin.	0.000	0.709	**Non-Liq.**	Non-Liq.		**0.00**
48.39	303.85	3.75	1.23	110	1.778	0.770	1.24	0.53	0.76	216.98	1.74		1	100	1.06	####	1.00	231.2	0.89	Infin.	0.000	0.708	**Non-Liq.**	Non-Liq.		**0.00**
48.56	293.74	3.57	1.21	110	1.782	0.768	1.22	0.53	0.76	209.31	1.74		1	100	1.06	####	1.00	223.7	0.89	Infin.	0.000	0.707	**Non-Liq.**	Non-Liq.		**0.00**
48.72	291.29	3.33	1.14	110	1.786	0.767	1.15	0.52	0.76	207.88	1.72		1	100	1.05	####	1.00	219.7	0.89	Infin.	0.000	0.705	**Non-Liq.**	Non-Liq.		**0.00**
48.88	298.38	3.16	1.06	110	1.790	0.765	1.06	0.51	0.76	213.83	1.69		1	100	1.03	####	1.00	221.3	0.89	Infin.	0.000	0.704	**Non-Liq.**	Non-Liq.		**0.00**
49.05	325.89	3.09	0.95	110	1.794	0.763	0.95	0.50	0.77	235.25	1.63		1	100	1.00	####	1.00	236.1	0.89	Infin.	0.000	0.703	**Non-Liq.**	Non-Liq.		**0.00**
49.21	362.41	3.01	0.83	110	1.798	0.762	0.84	0.50	0.77	261.47	1.55		1	100	1.00	####	1.00	262.4	0.89	Infin.	0.000	0.702	**Non-Liq.**	Non-Liq.		**0.00**
49.38	375.59	3.02	0.80	110	1.802	0.760	0.81	0.50	0.77	270.73	1.53		1	100	1.00	####	1.00	271.7	0.89	Infin.	0.000	0.701	**Non-Liq.**	Non-Liq.		**0.00**
49.54	373.37	2.95	0.79	110	1.806	0.758	0.79	0.50	0.77	268.83	1.53		1	100	1.00	####	1.00	269.8	0.89	Infin.	0.000	0.700	**Non-Liq.**	Non-Liq.		**0.00**
49.70	359.81	2.88	0.80	110	1.810	0.757	0.80	0.50	0.76	258.74	1.54		1	100	1.00	####	1.00	259.7	0.89	Infin.	0.000	0.699	**Non-Liq.**	Non-Liq.		**0.00**
49.87	336.99	2.78	0.82	110	1.813	0.755	0.83	0.50	0.76	241.98	1.57		1	100	1.00	####	1.00	242.9	0.88	Infin.	0.000	0.698	**Non-Liq.**	Non-Liq.		**0.00**
50.03	346.15	2.56	0.74	110	1.817	0.753	0.74	0.50	0.76	248.32	1.53		1	100	1.00	####	1.00	249.3	0.88	Infin.	0.000	0.696	**Non-Liq.**	Non-Liq.		**0.00**
50.20	381.96	2.51	0.66	110	1.821	0.752	0.66	0.50	0.76	273.85	1.46		1	100	1.00	####	1.00	274.9	0.88	Infin.	0.000	0.695	**Non-Liq.**	Non-Liq.		**0.00**
50.36	392.72	2.85	0.73	110	1.825	0.750	0.73	0.50	0.76	281.30	1.49		1	100	1.00	####	1.00	282.4	0.88	Infin.	0.000	0.694	**Non-Liq.**	Non-Liq.		**0.00**
50.52	396.83	2.89	0.73	110	1.829	0.748	0.73	0.50	0.76	283.95	1.49		1	100	1.00	####	1.00	285.0	0.88	Infin.	0.000	0.693	**Non-Liq.**	Non-Liq.		**0.00**
50.69	396.75	3.02	0.76	110	1.833	0.747	0.76	0.50	0.76	283.59	1.50		1	100	1.00	####	1.00	284.6	0.88	Infin.	0.000	0.692	**Non-Liq.**	Non-Liq.		**0.00**
50.85	407.28	3.00	0.74	110	1.837	0.745	0.74	0.50	0.76	290.84	1.48		1	100	1.00	####	1.00	291.9	0.88	Infin.	0.000	0.691	**Non-Liq.**	Non-Liq.		**0.00**
51.02	402.29	3.32	0.83	110	1.841	0.743	0.83	0.50	0.76	286.95	1.52		1	100	1.00	####	1.00	288.0	0.88	Infin.	0.000	0.689	**Non-Liq.**	Non-Liq.		**0.00**
51.18	394.50	3.33	0.84	110	1.845	0.742	0.85	0.50	0.76	281.07	1.54		1	100	1.00	####	1.00	282.1	0.88	Infin.	0.000	0.688	**Non-Liq.**	Non-Liq.		**0.00**
51.35	393.59	3.17	0.80	110	1.849	0.740	0.81	0.50	0.76	280.12	1.52		1	100	1.00	####	1.00	281.2	0.88	Infin.	0.000	0.687	**Non-Liq.**	Non-Liq.		**0.00**
51.51	390.67	3.12	0.80	110	1.852	0.738	0.80	0.50	0.76	277.73	1.52		1	100	1.00	####	1.00	278.8	0.87	Infin.	0.000	0.686	**Non-Liq.**	Non-Liq.		**0.00**
51.67	388.71	2.96	0.76	110	1.856	0.737	0.76	0.50	0.75	276.04	1.51		1	100	1.00	####	1.00	277.1	0.87	Infin.	0.000	0.685	**Non-Liq.**	Non-Liq.		**0.00**
51.84	368.01	2.86	0.78	110	1.860	0.735	0.78	0.50	0.75	260.99	1.53		1	100	1.00	####	1.00	262.0	0.87	Infin.	0.000	0.684	**Non-Liq.**	Non-Liq.		**0.00**
52.00	352.83	2.71	0.77	110	1.864	0.733	0.77	0.50	0.75	249.91	1.54		1	100	1.00	####	1.00	250.8	0.87	Infin.	0.000	0.682	**Non-Liq.**	Non-Liq.		**0.00**
52.17	339.28	2.70	0.80	110	1.868	0.732	0.80	0.50	0.75	240.00	1.57		1	100	1.00	####	1.00	240.9	0.87	Infin.	0.000	0.681	**Non-Liq.**	Non-Liq.		**0.00**
52.33	334.38	2.52	0.75	110	1.872	0.730	0.76	0.50	0.75	236.27	1.55		1	100	1.00	####	1.00	237.2	0.87	Infin.	0.000	0.680	**Non-Liq.**	Non-Liq.		**0.00**
52.49	338.19	2.48	0.73	110	1.876	0.728	0.74	0.50	0.75	238.72	1.54		1	100	1.00	####	1.00	239.6	0.87	Infin.	0.000	0.679	**Non-Liq.**	Non-Liq.		**0.00**
52.66	343.61	2.50	0.73	110	1.880	0.727	0.73	0.50	0.75	242.32	1.53		1	100	1.00	####	1.00	243.2	0.87	Infin.	0.000	0.678	**Non-Liq.**	Non-Liq.		**0.00**
52.82	346.70	2.63	0.76	110	1.884	0.725	0.76	0.50	0.75	244.25	1.54		1	100	1.00	####	1.00	245.2	0.87	Infin.	0.000	0.677	**Non-Liq.**	Non-Liq.		**0.00**
52.99	356.95	2.69	0.75	110	1.888	0.724	0.76	0.50	0.75	251.25	1.53		1	100	1.00	####	1.00	252.2	0.87	Infin.	0.000	0.676	**Non-Liq.**	Non-Liq.		**0.00**
53.15	371.38	2.91	0.78	110	1.892	0.722	0.79	0.50	0.75	261.19	1.53		1	100	1.00	####	1.00	262.2	0.87	Infin.	0.000	0.674	**Non-Liq.**	Non-Liq.		**0.00**
53.31	388.05	3.41	0.88	110	1.895	0.720	0.88	0.50	0.75	272.69	1.56		1	100	1.00	####	1.00	273.7	0.86	Infin.	0.000	0.673	**Non-Liq.**	Non-Liq.		**0.00**
53.48	350.81	3.06	0.87	110	1.899	0.719	0.88	0.50	0.75	246.13	1.59		1	100	1.00	####	1.00	247.1	0.86	Infin.	0.000	0.672	**Non-Liq.**	Non-Liq.		**0.00**
53.64	345.68	2.79	0.81	110	1.903	0.717	0.81	0.50	0.75	242.26	1.57		1	100	1.00	####	1.00	243.2	0.86	Infin.	0.000	0.671	**Non-Liq.**	Non-Liq.		**0.00**
53.81	342.94	2.87	0.84	110	1.907	0.716	0.84	0.50	0.74	240.08	1.58		1	100	1.00	####	1.00	241.0	0.86	Infin.	0.000	0.670	**Non-Liq.**	Non-Liq.		**0.00**
53.97	347.41	2.83	0.81	110	1.911	0.714	0.82	0.50	0.74	242.98	1.57		1	100	1.00	####	1.00	243.9	0.86	Infin.	0.000	0.669	**Non-Liq.**	Non-Liq.		**0.00**
54.13	347.69	3.06	0.88	110	1.915	0.712	0.88	0.50	0.74	242.93	1.59		1	100	1.00	####	1.00	243.8	0.86	Infin.	0.000	0.667	**Non-Liq.**	Non-Liq.		**0.00**
54.30	347.55	3.09	0.89	110	1.919	0.711	0.89	0.50	0.74	242.58	1.60		1	100	1.00	####	1.00	243.5	0.86	Infin.	0.000	0.666	**Non-Liq.**	Non-Liq.		**0.00**
54.46	345.11	3.01	0.87	110	1.923	0.709	0.88	0.50	0.74	240.62	1.59		1	100	1.00	####	1.00	241.5	0.86	Infin.	0.000	0.665	**Non-Liq.**	Non-Liq.		**0.00**
54.63	336.26	2.94	0.87	110	1.927	0.708	0.88	0.50	0.74	234.17	1.60		1	100	1.00	####	1.00	235.0	0.86	Infin.	0.000	0.664	**Non-Liq.**	Non-Liq.		**0.00**
54.79	331.85	2.87	0.86	110	1.931	0.706	0.87	0.50	0.74	230.85	1.60		1	100	1.00	####	1.00	231.7	0.86	Infin.	0.000	0.663	**Non-Liq.**	Non-Liq.		**0.00**
54.95	330.23	2.82	0.85	110	1.934	0.705	0.86	0.50	0.74	229.48	1.60		1	100	1.00	####	1.00	230.3	0.86	Infin.	0.000	0.662	**Non-Liq.**	Non-Liq.		**0.00**
55.12	319.45	2.55	0.80	110	1.938	0.703	0.80	0.50	0.74	221.72	1.59		1	100	1.00	####	1.00	222.5	0.86	Infin.	0.000	0.661	**Non-Liq.**	Non-Liq.		**0.00**
55.28	307.70	2.09	0.68	110	1.942	0.701	0.68	0.50	0.74	213.29	1.55		1	100	1.00	####	1.00	214.1	0.85	Infin.	0.000	0.659	**Non-Liq.**	Non-Liq.		**0.00**
55.45	302.76	1.94	0.64	110	1.946	0.700	0.64	0.50	0.74	209.63	1.54		1	100	1.00	####	1.00	210.4	0.86	Infin.	0.000	0.658	**Non-Liq.**	Non-Liq.		**0.00**
55.61	284.61	1.51	0.53	110	1.950	0.698	0.53	0.50	0.74	196.79	1.51		1	100	1.00	####	1.00	197.5	0.85	Infin.	0.000	0.657	**Non-Liq.**	Non-Liq.		**0.00**
55.77	294.51	1.35	0.46	110	1.954	0.697	0.46	0.50	0.74	203.47	1.46		1	100	1.00	####	1.00	204.2	0.85	Infin.	0.000	0.656	**Non-Liq.**	Non-Liq.		**0.00**
55.94	280.07	1.03	0.37	110	1.958	0.695	0.37	0.50	0.74	193.23	1.42		1	100	1.00	####	1.00	194.0	0.85	Infin.	0.000	0.655	**Non-Liq.**	Non-Liq.		**0.00**
56.10	225.15	1.83	0.81	110	1.962	0.694	0.82	0.52	0.72	152.78	1.71		1	94	1.05	####	1.00	160.7	0.85	Infin.	0.000	0.654	**Non-Liq.**	Non-Liq.		**0.00**
56.27	117.85	2.59	2.20	110	1.966	0.692	2.23	0.68	0.65	71.73	2.25		1	63	1.80		1.00	129.2	0.88	0.281	0.248	0.653	**0.38**	96%		**1.14**
56.43	54.87	1.79	3.26	110	1.970	0.691	3.38	0.80	0.61	30.37	2.65		0						0.92			0.652	**Non-Liq.**	Non-Liq.		**0.00**
56.59	32.82	0.74	2.25	110	1.974	0.689	2.40	0.83	0.60	17.36	2.74		0						0.92			0.650	**Non-Liq.**	Non-Liq.		**0.00**
56.76	25.50	0.61	2.38	110	1.977	0.688	2.58	0.87	0.58	12.91	2.87		0						0.92			0.649	**Non-Liq.**	Non-Liq.		**0.00**
56.92	20.56	0.82	3.98	110	1.981	0.686	4.40	0.94	0.55	9.74	3.10		0						0.92			0.648	**Non-Liq.**	Non-Liq.		**0.00**
57.09	35.90	0.80	2.22	110	1.985	0.685	2.35	0.82	0.60	19.14	2.71		0						0.92			0.647	**Non-Liq.**	Non-Liq.		**0.00**
57.25	57.52	0.96	1.67	110	1.989	0.683	1.73	0.74	0.63	32.91	2.44		1	31	2.47		1.00	81.4	0.92	0.130	0.120	0.646	**0.19**	100%		**1.81**
57.41	35.14	0.94	2.68	110	1.993	0.682	2.84	0.84	0.59	18.42	2.77		0						0.92			0.645	**Non-Liq.**	Non-Liq.		**0.00**
57.58	22.41	0.81	3.61	110	1.997	0.680	3.97	0.92	0.56	10.75	3.04		0						0.92			0.644	**Non-Liq.**	Non-Liq.		**0.00**
57.74	20.05	0.55	2.73	110	2.001	0.679	3.04	0.91	0.56	9.53	3.02		0						0.92			0.643	**Non-Liq.**	Non-Liq.		**0.00**
57.91	18.79	0.54	2.88	110	2.005	0.678	3.23	0.93	0.55	8.78	3.06		0						0.92			0.642	**Non-Liq.**	Non-Liq.		**0.00**
58.07	18.85	0.57	3.00	110	2.009	0.676	3.36	0.93	0.55	8.77	3.07		0						0.92			0.641	**Non-Liq.**	Non-Liq.		**0.00**

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	**Liquefac. Safety Factor**	Probab. P_L	***Volumetric Strain (%)***
58.23	17.52	0.53	3.01	110	2.013	0.675	3.40	0.94	0.55	8.01	3.11		0						0.92			0.640	**Non-Liq.**	Non-Liq.	**0.00**
58.40	18.20	0.44	2.44	110	2.016	0.673	2.74	0.92	0.55	8.46	3.04		0						0.92			0.638	**Non-Liq.**	Non-Liq.	**0.00**
58.56	18.28	0.56	3.06	110	2.020	0.672	3.44	0.94	0.55	8.39	3.09		0						0.92			0.637	**Non-Liq.**	Non-Liq.	**0.00**
58.73	23.81	0.80	3.36	110	2.024	0.671	3.67	0.91	0.55	11.42	3.00		0						0.91			0.636	**Non-Liq.**	Non-Liq.	**0.00**
58.89	41.12	1.24	3.02	110	2.028	0.669	3.18	0.83	0.58	21.51	2.75		0						0.91			0.635	**Non-Liq.**	Non-Liq.	**0.00**
59.06	86.65	1.81	2.08	110	2.032	0.668	2.13	0.71	0.63	50.20	2.35		1	48	2.13		1.00	106.7	0.91	0.193	0.176	0.634	**0.28**	99%	**1.41**
59.22	119.37	1.93	1.62	110	2.036	0.666	1.64	0.66	0.65	72.21	2.16		1	63	1.57		1.00	113.4	0.87	0.216	0.188	0.633	**0.30**	98%	**1.32**
59.38	142.80	2.30	1.61	110	2.040	0.665	1.63	0.64	0.66	87.60	2.09		1	71	1.45		1.00	126.6	0.83	0.269	0.224	0.632	**0.35**	97%	**1.16**
59.55	118.50	3.06	2.58	110	2.044	0.664	2.62	0.70	0.63	69.37	2.31		1	62	1.98		1.00	137.6	0.87	0.322	0.281	0.631	**0.45**	94%	**1.04**
59.71	77.32	3.45	4.46	110	2.048	0.662	4.58	0.80	0.59	41.98	2.64		0						0.91			0.630	**Non-Liq.**	Non-Liq.	**0.00**
59.88	39.16	2.67	6.81	110	2.052	0.661	7.19	0.91	0.55	19.16	3.02		0						0.91			0.629	**Non-Liq.**	Non-Liq.	**0.00**
60.04	26.72	1.42	5.31	110	2.055	0.660	5.75	0.93	0.54	12.53	3.09		0						0.91			0.628	**Non-Liq.**	Non-Liq.	**0.00**
60.20	20.01	0.81	4.05	110	2.059	0.658	4.51	0.95	0.53	9.02	3.14		0						0.91			0.627	**Non-Liq.**	Non-Liq.	**0.00**
60.37	19.72	0.00	0.01	110	2.063	0.657	0.01	0.81	0.58	9.69	2.69		0		1.00				0.91			0.626	**Non-Liq.**	Non-Liq.	**0.00**
60.53	22.97	0.00	0.00	110	2.067	0.656	0.00	0.80	0.58	11.54	2.65		0		1.00				0.91			0.625	**Non-Liq.**	Non-Liq.	**0.00**

CPT-LIQUEFY.XLS - A SPREADSHEET FOR EMPIRICAL ESTIMATION OF LIQUEFACTION POTENTIAL USING CPT DATA
Developed 2003 by Shelton L. Stringer, GE, Earth Systems Southwest

Project: Oxnard High School No. 8
Job No: 301953-001
Date: 8/14/2018
Sounding: CPT-2A
Plot: 2

Methods: Liquefaction Analysis using 1998 NCEER workshop methods (Robertson & Wride)
Post-liquefaction Settlement Analysis from Tokimatsu & Seed (1987)
Dry Sand Settlement by Pradel, ASCE Journal of G&GE, Vol 124, No. 4

Total Liquefied Thickness (feet)
3.8

EARTHQUAKE INFORMATION:
Magnitude: 6.77 (7.5)
PGA, g: 0.97 (0.75)
MSF: 1.30
GWT, feet: 20.0
Design GWT, feet: 8.0

Induced CSR (M=7.5): = 0.65*PGA*(po/p'o)*rd/MSF
Clean Sand Qc1n = C_Q*K_C*K_H*Qc
SF = $CRR_{7.5}$*Kσ/CSR
Use Tokimatsu & Seed (0) or Ishihara &Yoshmine (1): 0
Unit Weight of unsaturated soils: 110 pcf
Unit Weight of saturated soils: 110 pcf
Limiting Ic for liquefiable soils: 2.60
Limiting Ic for K_H: 2.0
Required SF: 1.50
Min SF of Liquefiable Layers: 0.17
Avg SF of Liquefiable Layers: 0.03

Probab	Total Induced Subsidence (inches)
Avg	
5%	
Max	
100%	0.6

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Overide	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	*Volumetric Strain (%)*
0.16	8.00	0.09	1.13	110	0.009	1.000	1.13	0.81	1.70	12.84	2.68		0						1.00			0.485	**Non-Liq.**	Non-Liq.	**0.00**
0.33	11.37	0.11	0.97	110	0.018	1.000	0.97	0.76	1.70	18.24	2.52		1	6	2.86		1.00	52.1	1.00	0.093	0.093	0.485	**Non-Liq.**	Non-Liq.	**0.00**
0.49	14.06	0.14	1.00	110	0.027	1.000	1.00	0.74	1.70	22.55	2.44		1	15	2.50		1.00	56.3	1.00	0.097	0.097	0.485	**Non-Liq.**	Non-Liq.	**0.00**
0.66	15.85	0.14	0.90	110	0.036	1.000	0.90	0.72	1.70	25.41	2.38		1	20	2.22		1.00	56.4	1.00	0.097	0.097	0.485	**Non-Liq.**	Non-Liq.	**0.00**
0.82	15.82	0.14	0.88	110	0.045	1.000	0.89	0.72	1.70	25.35	2.37		1	20	2.21		1.00	55.9	1.00	0.096	0.096	0.485	**Non-Liq.**	Non-Liq.	**0.00**
0.98	15.42	0.12	0.78	110	0.054	1.000	0.79	0.72	1.70	24.69	2.36		1	19	2.15		1.00	53.1	1.00	0.094	0.094	0.485	**Non-Liq.**	Non-Liq.	**0.00**
1.15	12.24	0.10	0.81	110	0.063	0.999	0.81	0.74	1.70	19.57	2.45		1	9	2.55		1.00	49.8	1.00	0.092	0.092	0.484	**Non-Liq.**	Non-Liq.	**0.00**
1.31	12.24	0.10	0.81	110	0.072	0.999	0.81	0.74	1.70	19.55	2.45		1	9	2.55		1.00	49.8	1.00	0.092	0.092	0.484	**Non-Liq.**	Non-Liq.	**0.00**
1.48	10.64	0.13	1.17	110	0.081	0.999	1.18	0.78	1.70	16.97	2.59		1	3	3.25		1.00	55.1	1.00	0.096	0.096	0.484	**Non-Liq.**	Non-Liq.	**0.00**
1.64	11.63	0.20	1.72	110	0.090	0.998	1.73	0.80	1.70	18.54	2.64		0						1.00			0.484	**Non-Liq.**	Non-Liq.	**0.00**
1.80	19.13	0.29	1.53	110	0.099	0.998	1.53	0.74	1.70	30.58	2.43		1	28	2.45		1.00	74.9	1.00	0.119	0.119	0.484	**Non-Liq.**	Non-Liq.	**0.00**
1.97	35.11	0.52	1.48	110	0.108	0.998	1.48	0.67	1.70	56.24	2.21		1	53	1.70		1.00	95.4	1.00	0.161	0.161	0.484	**Non-Liq.**	Non-Liq.	**0.00**
2.13	43.24	0.60	1.40	110	0.117	0.997	1.40	0.65	1.70	69.29	2.13		1	62	1.50		1.00	104.3	1.00	0.185	0.185	0.483	**Non-Liq.**	Non-Liq.	**0.00**
2.30	43.08	0.62	1.43	110	0.126	0.997	1.44	0.65	1.70	69.02	2.13		1	61	1.52		1.00	105.0	1.00	0.188	0.188	0.483	**Non-Liq.**	Non-Liq.	**0.00**
2.46	41.08	0.60	1.46	110	0.135	0.996	1.46	0.65	1.70	65.79	2.16		1	59	1.56		1.00	102.9	1.00	0.181	0.181	0.483	**Non-Liq.**	Non-Liq.	**0.00**
2.62	38.58	0.56	1.46	110	0.144	0.996	1.46	0.66	1.70	61.76	2.18		1	57	1.61		1.00	99.6	1.00	0.172	0.172	0.483	**Non-Liq.**	Non-Liq.	**0.00**
2.79	35.25	0.53	1.50	110	0.153	0.996	1.50	0.67	1.70	56.39	2.22		1	53	1.70		1.00	96.1	1.00	0.163	0.163	0.483	**Non-Liq.**	Non-Liq.	**0.00**
2.95	32.60	0.49	1.50	110	0.162	0.995	1.51	0.68	1.70	52.12	2.24		1	50	1.78		1.00	92.6	1.00	0.154	0.154	0.482	**Non-Liq.**	Non-Liq.	**0.00**
3.12	29.61	0.45	1.52	110	0.171	0.995	1.53	0.69	1.70	47.30	2.28		1	46	1.88		1.00	89.0	1.00	0.146	0.146	0.482	**Non-Liq.**	Non-Liq.	**0.00**
3.28	26.41	0.40	1.51	110	0.180	0.994	1.52	0.70	1.70	42.15	2.32		1	41	2.01		1.00	84.6	1.00	0.136	0.136	0.482	**Non-Liq.**	Non-Liq.	**0.00**
3.44	23.64	0.34	1.44	110	0.189	0.994	1.45	0.71	1.70	37.68	2.34		1	36	2.10		1.00	79.2	1.00	0.126	0.126	0.482	**Non-Liq.**	Non-Liq.	**0.00**
3.61	21.08	0.29	1.36	110	0.198	0.994	1.37	0.72	1.70	33.55	2.37		1	32	2.20		1.00	73.8	1.00	0.117	0.117	0.482	**Non-Liq.**	Non-Liq.	**0.00**
3.77	18.23	0.30	1.67	110	0.208	0.993	1.69	0.75	1.70	28.96	2.48		1	25	2.65		1.00	76.6	1.00	0.122	0.122	0.482	**Non-Liq.**	Non-Liq.	**0.00**
3.94	15.34	0.30	1.98	110	0.217	0.993	2.00	0.78	1.70	24.30	2.58		1	18	3.21		1.00	78.0	1.00	0.124	0.124	0.481	**Non-Liq.**	Non-Liq.	**0.00**
4.10	12.99	0.35	2.73	110	0.226	0.993	2.77	0.83	1.70	20.51	2.72		0						1.00			0.481	**Non-Liq.**	Non-Liq.	**0.00**
4.27	11.82	0.38	3.20	110	0.235	0.992	3.26	0.85	1.70	18.62	2.80		0						1.00			0.481	**Non-Liq.**	Non-Liq.	**0.00**
4.43	10.34	0.34	3.30	110	0.244	0.992	3.38	0.87	1.70	16.22	2.86		0						1.00			0.481	**Non-Liq.**	Non-Liq.	**0.00**
4.59	11.89	0.24	2.04	110	0.253	0.991	2.08	0.81	1.70	18.70	2.68		0						1.00			0.481	**Non-Liq.**	Non-Liq.	**0.00**
4.76	26.79	0.25	0.93	110	0.262	0.991	0.94	0.67	1.70	42.63	2.19		1	41	1.65		1.00	70.3	1.00	0.112	0.112	0.480	**Non-Liq.**	Non-Liq.	**0.00**
4.92	35.67	0.30	0.84	110	0.271	0.991	0.85	0.63	1.70	56.88	2.06		1	53	1.39		1.00	79.2	1.00	0.126	0.126	0.480	**Non-Liq.**	Non-Liq.	**0.00**
5.09	41.25	0.36	0.88	110	0.280	0.990	0.89	0.61	1.70	65.83	2.02		1	59	1.33		1.00	87.7	1.00	0.143	0.143	0.480	**Non-Liq.**	Non-Liq.	**0.00**
5.25	44.28	0.41	0.92	110	0.289	0.990	0.93	0.61	1.70	70.69	2.01		1	62	1.31		1.00	92.7	1.00	0.154	0.154	0.480	**Non-Liq.**	Non-Liq.	**0.00**
5.41	46.60	0.44	0.94	110	0.298	0.989	0.95	0.61	1.70	74.40	2.00		1	65	1.30	1.00	1.00	96.8	1.00	0.164	0.164	0.480	**Non-Liq.**	Non-Liq.	**0.00**
5.58	50.22	0.47	0.93	110	0.307	0.989	0.94	0.60	1.70	80.20	1.97		1	68	1.26	1.05	1.00	101.4	1.00	0.177	0.177	0.479	**Non-Liq.**	Non-Liq.	**0.00**
5.74	54.67	0.47	0.87	110	0.316	0.989	0.87	0.58	1.70	87.34	1.92		1	71	1.21	1.10	1.00	105.9	1.00	0.190	0.190	0.479	**Non-Liq.**	Non-Liq.	**0.00**
5.91	56.65	0.48	0.85	110	0.325	0.988	0.86	0.58	1.70	90.50	1.90		1	73	1.19	1.15	1.00	108.2	1.00	0.198	0.198	0.479	**Non-Liq.**	Non-Liq.	**0.00**
6.07	56.48	0.50	0.89	110	0.334	0.988	0.90	0.58	1.70	90.22	1.92		1	73	1.20	1.20	1.00	109.0	1.00	0.201	0.201	0.479	**Non-Liq.**	Non-Liq.	**0.00**
6.23	58.52	0.53	0.91	110	0.343	0.988	0.92	0.58	1.70	93.48	1.91		1	74	1.20	1.25	1.00	112.4	1.00	0.212	0.212	0.479	**Non-Liq.**	Non-Liq.	**0.00**
6.40	61.73	0.57	0.92	110	0.352	0.987	0.93	0.58	1.70	98.62	1.90		1	76	1.18	1.30	1.00	117.2	1.00	0.230	0.230	0.479	**Non-Liq.**	Non-Liq.	**0.00**
6.56	65.05	0.55	0.84	110	0.361	0.987	0.85	0.56	1.70	103.94	1.85		1	78	1.15	1.35	1.00	119.6	1.00	0.239	0.239	0.478	**Non-Liq.**	Non-Liq.	**0.00**
6.73	67.42	0.56	0.83	110	0.370	0.986	0.84	0.56	1.70	107.74	1.84		1	80	1.13	1.40	1.00	122.6	1.00	0.251	0.251	0.478	**Non-Liq.**	Non-Liq.	**0.00**
6.89	72.04	0.64	0.89	110	0.379	0.986	0.89	0.56	1.70	115.15	1.83		1	83	1.13	1.45	1.00	130.6	1.00	0.287	0.287	0.478	**Non-Liq.**	Non-Liq.	**0.00**
7.05	79.98	0.56	0.70	110	0.388	0.986	0.71	0.53	1.70	127.76	1.73		1	87	1.06	1.50	1.00	135.9	1.00	0.314	0.314	0.478	**Non-Liq.**	Non-Liq.	**0.00**
7.22	84.69	0.74	0.87	110	0.397	0.985	0.88	0.54	1.70	135.25	1.77		1	89	1.09	1.55	1.00	147.6	1.00	0.379	0.379	0.478	**Non-Liq.**	Non-Liq.	**0.00**
7.38	84.27	0.71	0.84	110	0.406	0.985	0.84	0.54	1.67	132.75	1.77		1	89	1.08	1.60	1.00	144.4	1.00	0.360	0.360	0.478	**Non-Liq.**	Non-Liq.	**0.00**
7.55	88.99	0.71	0.80	110	0.415	0.985	0.81	0.53	1.64	137.62	1.74		1	90	1.07	1.65	1.00	147.5	1.00	0.378	0.378	0.477	**Non-Liq.**	Non-Liq.	**0.00**
7.71	88.99	0.71	0.80	110	0.424	0.984	0.81	0.53	1.63	136.17	1.75		1	90	1.07	1.70	1.00	146.2	1.00	0.371	0.371	0.477	**Non-Liq.**	Non-Liq.	**0.00**
7.87	97.16	0.72	0.74	110	0.433	0.984	0.74	0.52	1.59	145.34	1.70		1	92	1.04	1.75	1.00	151.8	1.00	0.405	0.405	0.477	**Non-Liq.**	Non-Liq.	**0.00**
8.04	104.13	0.76	0.73	110	0.442	0.984	0.73	0.51	1.56	153.24	1.68		1	95	1.03	1.80	1.00	157.7	1.00	0.445	0.445	0.477	**Non-Liq.**	Non-Liq.	**0.00**
8.20	109.72	0.85	0.77	110	0.451	0.983	0.78	0.51	1.55	159.96	1.68		1	96	1.03	1.85	1.00	164.9	1.00	Infin.	0.000	0.481	**Non-Liq.**	Non-Liq.	**0.00**
8.37	127.90	0.84	0.66	110	0.460	0.983	0.66	0.50	1.52	182.65	1.59		1	100	1.00	1.90	1.00	183.3	1.00	Infin.	0.000	0.486	**Non-Liq.**	Non-Liq.	**0.00**
8.53	139.29	1.12	0.80	110	0.469	0.982	0.80	0.50	1.50	197.04	1.63		1	100	1.00	1.95	1.00	197.8	1.00	Infin.	0.000	0.491	**Non-Liq.**	Non-Liq.	**0.00**
8.69	174.32	1.33	0.76	110	0.478	0.982	0.77	0.50	1.49	244.41	1.55		1	100	1.00	2.00	1.00	245.3	1.00	Infin.	0.000	0.496	**Non-Liq.**	Non-Liq.	**0.00**
8.86	197.20	1.54	0.78	110	0.487	0.982	0.78	0.50	1.47	273.99	1.52		1	100	1.00	2.05	1.00	275.0	1.00	Infin.	0.000	0.501	**Non-Liq.**	Non-Liq.	**0.00**
9.02	211.19	1.71	0.81	110	0.496	0.981	0.81	0.50	1.46	290.78	1.51		1	100	1.00	2.10	1.00	291.9	1.00	Infin.	0.000	0.506	**Non-Liq.**	Non-Liq.	**0.00**
9.19	221.47	1.88	0.85	110	0.505	0.981	0.85	0.50	1.45	302.22	1.52		1	100	1.00	2.15	1.00	303.4	1.00	Infin.	0.000	0.510	**Non-Liq.**	Non-Liq.	**0.00**
9.35	230.78	2.04	0.88	110	0.514	0.981	0.88	0.50	1.43	312.17	1.52		1	100	1.00	2.20	1.00	313.3	1.00	Infin.	0.000	0.515	**Non-Liq.**	Non-Liq.	**0.00**
9.51	234.50	2.16	0.92	110	0.523	0.980	0.92	0.50	1.42	314.45	1.53		1	100	1.00	2.25	1.00	315.6	1.00	Infin.	0.000	0.520	**Non-Liq.**	Non-Liq.	**0.00**
9.68	232.94	2.27	0.98	110	0.532	0.980	0.98	0.50	1.41	309.69	1.56		1	100	1.00	2.30	1.00	310.8	1.00	Infin.	0.000	0.524	**Non-Liq.**	Non-Liq.	**0.00**
9.84	231.57	2.35	1.01	110	0.541	0.980	1.02	0.50	1.40	305.27	1.57		1	100	1.00	2.35	1.00	306.4	1.00	Infin.	0.000	0.529	**Non-Liq.**	Non-Liq.	**0.00**
10.01	230.54	2.41	1.04	110	0.550	0.979	1.05	0.50	1.39	301.40	1.59		1	100	1.00	2.40	1.00	302.5	1.00	Infin.	0.000	0.533	**Non-Liq.**	Non-Liq.	**0.00**
10.17	237.18	2.50	1.05	110	0.559	0.979	1.06	0.50	1.38	307.58	1.58		1	100	1.00	2.45	1.00	308.7	1.00	Infin.	0.000	0.537	**Non-Liq.**	Non-Liq.	**0.00**
10.33	247.31	2.55	1.03	110	0.568	0.979	1.03	0.50	1.36	318.18	1.57		1	100	1.00	2.50	1.00	319.4	1.00	Infin.	0.000	0.541	**Non-Liq.**	Non-Liq.	**0.00**
10.50	243.77	2.52	1.03	110	0.577	0.978	1.04	0.50	1.35	311.14	1.58		1	100	1.00	2.55	1.00	312.3	1.00	Infin.	0.000	0.545	**Non-Liq.**	Non-Liq.	**0.00**
10.66	237.97	2.56	1.07	110	0.586	0.978	1.08	0.50	1.34	301.36	1.60		1	100	1.00	2.60	1.00	302.5	1.00	Infin.	0.000	0.550	**Non-Liq.**	Non-Liq.	**0.00**
10.83	236.70	2.58	1.09	110	0.595	0.978	1.09	0.50	1.33	297.46	1.61		1	100	1.00	2.65	1.00	298.6	1.00	Infin.	0.000	0.554	**Non-Liq.**	Non-Liq.	**0.00**
10.99	231.19	3.35	1.45	110	0.604	0.977	1.45	0.52	1.34	291.69	1.71		1	100	1.04	2.70	1.00	305.6	1.00	Infin.	0.000	0.557	**Non-Liq.**	Non-Liq.	**0.00**
11.15	223.52	4.80	2.15	110	0.614	0.977	2.15	0.56	1.36	286.52	1.85		1	100	1.15	2.75	1.00	330.3	1.00	Infin.	0.000	0.561	**Non-Liq.**	Non-Liq.	**0.00**
11.32	231.18	4.24	1.83	110	0.623	0.977	1.84	0.55	1.34	291.09	1.79		1	100	1.10	2.80	1.00	321.9	1.00	Infin.	0.000	0.565	**Non-Liq.**	Non-Liq.	**0.00**
11.48	277.74	3.56	1.28	110	0.632	0.976	1.29	0.50	1.29	339.00	1.63		1	100	1.00	2.85	1.00	340.3	1.00	Infin.	0.000	0.569	**Non-Liq.**	Non-Liq.	**0.00**
11.65	232.79	2.16	0.93	110	0.641	0.976	0.93	0.50	1.29	281.99	1.57		1	100	1.00	2.90	1.00	283.0	1.00	Infin.	0.000	0.572	**Non-Liq.**	Non-Liq.	**0.00**
11.81	242.50	1.85	0.76	110	0.650	0.975	0.76	0.50	1.28	291.73	1.49		1	100	1.00	2.95	1.00	292.8	1.00	Infin.	0.000	0.576	**Non-Liq.**	Non-Liq.	**0.00**
11.98	238.61	2.39	1.00	110	0.659	0.975	1.00	0.50	1.27	285.05	1.59		1	100	1.00	3.00	1.00	286.1	1.00	Infin.	0.000	0.580	**Non-Liq.**	Non-Liq.	**0.00**
12.14	226.91	2.22	0.98	110	0.668	0.975	0.98	0.50	1.26	269.19	1.60		1	100	1.00	3.05	1.00	270.2	1.00	Infin.	0.000	0.583	**Non-Liq.**	Non-Liq.	**0.00**
12.30	230.52	2.15	0.93	110	0.677	0.974	0.93	0.50	1.25	271.64	1.58		1	100	1.00	3.10	1.00	272.7	1.00	Infin.	0.000	0.587	**Non-Liq.**	Non-Liq.	**0.00**
12.47	221.89	1.76	0.79	110	0.686	0.974	0.80	0.50	1.24	259.71	1.54		1	100	1.00	3.15	1.00	260.7	1.00	Infin.	0.000	0.590	**Non-Liq.**	Non-Liq.	**0.00**
12.63	219.46	1.58	0.72	110	0.695	0.974	0.72	0.50	1.23	255.17	1.51		1	100	1.00	3.20	1.00	256.1	1.00	Infin.	0.000	0.593	**Non-Liq.**	Non-Liq.	**0.00**
12.80	210.68	1.41	0.67	110	0.704	0.973	0.67	0.50	1.23	243.34	1.51		1	100	1.00	3.25	1.00	244.3	1.00	Infin.	0.000	0.597	**Non-Liq.**	Non-Liq.	**0.00**

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	M=7.5 CSR	Induced Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
12.96	195.33	1.35	0.69	110	0.713	0.973	0.70	0.50	1.22	224.11	1.54		1	100	1.00	3.30	1.00	225.0	1.00	Infin.	0.000	0.600	**Non-Liq.**	Non-Liq.	0.00
13.12	189.89	1.37	0.72	110	0.722	0.973	0.72	0.50	1.21	216.47	1.57		1	100	1.00	3.35	1.00	217.3	1.00	Infin.	0.000	0.603	**Non-Liq.**	Non-Liq.	0.00
13.29	182.75	2.89	1.58	110	0.731	0.972	1.59	0.56	1.23	211.28	1.82		1	100	1.13	3.40	1.00	238.6	1.00	Infin.	0.000	0.606	**Non-Liq.**	Non-Liq.	0.00
13.45	189.66	3.51	1.85	110	0.740	0.972	1.86	0.57	1.23	218.84	1.87		1	100	1.16	3.45	1.00	255.0	1.00	Infin.	0.000	0.609	**Non-Liq.**	Non-Liq.	0.00
13.62	243.92	3.67	1.50	110	0.749	0.972	1.51	0.53	1.20	275.93	1.74		1	100	1.06	3.50	1.00	294.2	1.00	Infin.	0.000	0.612	**Non-Liq.**	Non-Liq.	0.00
13.78	196.55	3.12	1.59	110	0.758	0.971	1.59	0.55	1.20	222.44	1.81		1	100	1.12	3.55	1.00	249.0	1.00	Infin.	0.000	0.615	**Non-Liq.**	Non-Liq.	0.00
13.94	166.33	2.01	1.21	110	0.767	0.971	1.22	0.54	1.19	186.17	1.77		1	100	1.09	3.60	1.00	203.2	1.00	Infin.	0.000	0.618	**Non-Liq.**	Non-Liq.	0.00
14.11	168.09	2.05	1.22	110	0.776	0.971	1.22	0.54	1.18	186.97	1.77		1	100	1.09	3.65	1.00	204.2	1.00	Infin.	0.000	0.621	**Non-Liq.**	Non-Liq.	0.00
14.27	186.64	4.05	2.17	110	0.785	0.970	2.18	0.59	1.19	209.42	1.94		1	100	1.22	3.70	1.00	257.4	1.00	Infin.	0.000	0.624	**Non-Liq.**	Non-Liq.	0.00
14.44	201.80	4.71	2.33	110	0.794	0.970	2.34	0.59	1.18	225.11	1.94		1	100	1.23	3.75	1.00	278.4	1.00	Infin.	0.000	0.627	**Non-Liq.**	Non-Liq.	0.00
14.60	281.02	4.40	1.57	110	0.803	0.970	1.57	0.53	1.16	306.15	1.72		1	100	1.05	3.80	1.00	324.0	1.00	Infin.	0.000	0.629	**Non-Liq.**	Non-Liq.	0.00
14.76	344.71	3.37	0.98	110	0.812	0.969	0.98	0.50	1.14	371.03	1.51		1	100	1.00	3.85	1.00	372.4	1.00	Infin.	0.000	0.632	**Non-Liq.**	Non-Liq.	0.00
14.93	284.50	2.91	1.02	110	0.821	0.969	1.03	0.50	1.14	304.37	1.58		1	100	1.00	3.90	1.00	305.5	1.00	Infin.	0.000	0.635	**Non-Liq.**	Non-Liq.	0.00
15.09	313.45	2.95	0.94	110	0.830	0.969	0.94	0.50	1.13	333.60	1.52		1	100	1.00	3.95	1.00	334.8	1.00	Infin.	0.000	0.637	**Non-Liq.**	Non-Liq.	0.00
15.26	330.55	3.27	0.99	110	0.839	0.968	0.99	0.50	1.12	349.94	1.53		1	100	1.00	4.00	1.00	351.2	1.00	Infin.	0.000	0.640	**Non-Liq.**	Non-Liq.	0.00
15.42	347.21	3.40	0.98	110	0.848	0.968	0.98	0.50	1.12	365.65	1.51		1	100	1.00	4.05	1.00	367.0	1.00	Infin.	0.000	0.643	**Non-Liq.**	Non-Liq.	0.00
15.58	369.08	4.35	1.18	110	0.857	0.967	1.18	0.50	1.11	386.68	1.56		1	100	1.00	4.10	1.00	388.1	1.00	Infin.	0.000	0.645	**Non-Liq.**	Non-Liq.	0.00
15.75	398.50	4.30	1.08	110	0.866	0.967	1.08	0.50	1.11	415.38	1.52		1	100	1.00	4.15	1.00	416.9	1.00	Infin.	0.000	0.648	**Non-Liq.**	Non-Liq.	0.00
15.91	418.82	3.93	0.94	110	0.875	0.967	0.94	0.50	1.10	434.34	1.46		1	100	1.00	4.20	1.00	436.0	1.00	Infin.	0.000	0.650	**Non-Liq.**	Non-Liq.	0.00
16.08	410.39	4.19	1.02	110	0.884	0.966	1.02	0.50	1.09	423.39	1.49		1	100	1.00	4.25	1.00	425.0	1.00	Infin.	0.000	0.653	**Non-Liq.**	Non-Liq.	0.00
16.24	419.61	4.80	1.14	110	0.893	0.966	1.15	0.50	1.09	430.73	1.53		1	100	1.00	4.30	1.00	432.3	1.00	Infin.	0.000	0.655	**Non-Liq.**	Non-Liq.	0.00
16.40	443.67	4.84	1.09	110	0.902	0.966	1.09	0.50	1.08	453.18	1.50		1	100	1.00	4.35	1.00	454.9	1.00	Infin.	0.000	0.657	**Non-Liq.**	Non-Liq.	0.00
16.57	437.41	4.97	1.14	110	0.911	0.965	1.14	0.50	1.08	444.55	1.52		1	100	1.00	4.40	1.00	446.2	1.00	Infin.	0.000	0.660	**Non-Liq.**	Non-Liq.	0.00
16.73	435.84	4.65	1.07	110	0.920	0.965	1.07	0.50	1.07	440.77	1.50		1	100	1.00	4.45	1.00	442.4	1.00	Infin.	0.000	0.662	**Non-Liq.**	Non-Liq.	0.00
16.90	448.38	4.22	0.94	110	0.929	0.965	0.94	0.50	1.07	451.26	1.45		1	100	1.00	4.50	1.00	452.9	1.00	Infin.	0.000	0.664	**Non-Liq.**	Non-Liq.	0.00
17.06	457.41	3.79	0.83	110	0.938	0.964	0.83	0.50	1.06	458.14	1.40		1	100	1.00	4.55	1.00	459.8	1.00	Infin.	0.000	0.666	**Non-Liq.**	Non-Liq.	0.00
17.22	450.04	4.42	0.98	110	0.947	0.964	0.99	0.50	1.06	448.58	1.46		1	100	1.00	4.60	1.00	450.3	1.00	Infin.	0.000	0.669	**Non-Liq.**	Non-Liq.	0.00
17.39	437.15	4.09	0.94	110	0.956	0.963	0.94	0.50	1.05	433.64	1.45		1	100	1.00	4.65	1.00	435.3	1.00	Infin.	0.000	0.671	**Non-Liq.**	Non-Liq.	0.00
17.55	447.32	4.19	0.94	110	0.965	0.963	0.94	0.50	1.05	441.66	1.45		1	100	1.00	4.70	1.00	443.3	1.00	Infin.	0.000	0.673	**Non-Liq.**	Non-Liq.	0.00
17.72	476.04	4.81	1.01	110	0.974	0.963	1.01	0.50	1.04	467.89	1.46		1	100	1.00	4.75	1.00	469.6	1.00	Infin.	0.000	0.675	**Non-Liq.**	Non-Liq.	0.00
17.88	526.73	4.25	0.81	110	0.983	0.962	0.81	0.50	1.04	515.42	1.36		1	100	1.00	4.80	1.00	517.3	1.00	Infin.	0.000	0.677	**Non-Liq.**	Non-Liq.	0.00
18.04	498.22	4.85	0.97	110	0.992	0.962	0.98	0.50	1.03	485.24	1.44		1	100	1.00	4.85	1.00	487.1	1.00	Infin.	0.000	0.679	**Non-Liq.**	Non-Liq.	0.00
18.21	506.10	5.27	1.04	110	1.001	0.962	1.04	0.50	1.03	490.70	1.46		1	100	1.00	4.90	1.00	492.5	1.00	Infin.	0.000	0.681	**Non-Liq.**	Non-Liq.	0.00
18.37	512.17	6.70	1.31	110	1.010	0.961	1.31	0.50	1.02	494.36	1.55		1	100	1.00	4.95	1.00	496.2	1.00	Infin.	0.000	0.683	**Non-Liq.**	Non-Liq.	0.00
18.54	559.50	8.56	1.53	110	1.020	0.961	1.53	0.50	1.02	537.73	1.59		1	100	1.00	5.00	1.00	539.7	1.00	Infin.	0.000	0.685	**Non-Liq.**	Non-Liq.	0.00
18.70	562.50	8.26	1.47	110	1.029	0.960	1.47	0.50	1.01	538.24	1.57		1	100	1.00	5.05	1.00	540.2	1.00	Infin.	0.000	0.687	**Non-Liq.**	Non-Liq.	0.00
18.86	559.79	8.82	1.58	110	1.038	0.960	1.58	0.50	1.01	533.30	1.60		1	100	1.00	5.10	1.00	535.3	1.00	Infin.	0.000	0.689	**Non-Liq.**	Non-Liq.	0.00
19.03	547.34	8.23	1.50	110	1.047	0.960	1.51	0.50	1.01	519.15	1.59		1	100	1.00	5.15	1.00	521.1	1.00	Infin.	0.000	0.691	**Non-Liq.**	Non-Liq.	0.00
19.19	552.34	7.74	1.40	110	1.056	0.959	1.40	0.50	1.00	521.65	1.56		1	100	1.00	5.20	1.00	523.6	1.00	Infin.	0.000	0.692	**Non-Liq.**	Non-Liq.	0.00
19.36	492.99	7.25	1.47	110	1.065	0.959	1.47	0.50	1.00	463.51	1.60		1	100	1.00	5.25	1.00	465.2	1.00	Infin.	0.000	0.694	**Non-Liq.**	Non-Liq.	0.00
19.52	443.38	5.21	1.18	110	1.074	0.958	1.18	0.50	0.99	415.00	1.55		1	100	1.00	5.30	1.00	416.6	1.00	Infin.	0.000	0.696	**Non-Liq.**	Non-Liq.	0.00
19.69	430.83	4.17	0.97	110	1.083	0.958	0.97	0.50	0.99	401.53	1.49		1	100	1.00	5.35	1.00	403.0	1.00	Infin.	0.000	0.698	**Non-Liq.**	Non-Liq.	0.00
19.85	411.08	3.30	0.80	110	1.092	0.957	0.80	0.50	0.98	381.48	1.43		1	100	1.00	5.40	1.00	382.9	1.00	Infin.	0.000	0.699	**Non-Liq.**	Non-Liq.	0.00
20.01	393.49	2.98	0.76	110	1.101	0.957	0.76	0.50	0.98	363.61	1.43		1	100	1.00	5.45	1.00	365.0	1.00	Infin.	0.000	0.701	**Non-Liq.**	Non-Liq.	0.00
20.18	395.26	2.83	0.72	110	1.107	0.957	0.72	0.50	0.98	364.24	1.41		1	100	1.00	5.50	1.00	365.6	1.00	Infin.	0.000	0.703	**Non-Liq.**	Non-Liq.	0.00
20.34	374.51	2.35	0.63	110	1.111	0.956	0.63	0.50	0.98	344.46	1.38		1	100	1.00	5.55	1.00	345.7	1.00	Infin.	0.000	0.704	**Non-Liq.**	Non-Liq.	0.00
20.51	326.62	2.65	0.81	110	1.115	0.956	0.81	0.50	0.97	299.75	1.51		1	100	1.00	5.60	1.00	300.9	1.00	Infin.	0.000	0.706	**Non-Liq.**	Non-Liq.	0.00
20.67	282.57	2.55	0.90	110	1.118	0.955	0.91	0.50	0.97	258.73	1.58		1	100	1.00	5.65	1.00	259.7	1.00	Infin.	0.000	0.708	**Non-Liq.**	Non-Liq.	0.00
20.83	276.78	3.44	1.24	110	1.122	0.955	1.25	0.52	0.97	252.72	1.69		1	100	1.03	5.70	1.00	262.3	1.00	Infin.	0.000	0.709	**Non-Liq.**	Non-Liq.	0.00
21.00	278.21	2.80	1.01	110	1.126	0.954	1.01	0.50	0.97	253.83	1.62		1	100	1.00	5.75	1.00	254.8	1.00	Infin.	0.000	0.711	**Non-Liq.**	Non-Liq.	0.00
21.16	340.07	3.01	0.88	110	1.130	0.954	0.89	0.50	0.97	309.96	1.52		1	100	1.00	5.80	1.00	311.1	1.00	Infin.	0.000	0.712	**Non-Liq.**	Non-Liq.	0.00
21.33	368.76	2.98	0.81	110	1.134	0.954	0.81	0.50	0.97	335.61	1.47		1	100	1.00	5.85	1.00	336.9	1.00	Infin.	0.000	0.714	**Non-Liq.**	Non-Liq.	0.00
21.49	341.22	3.31	0.97	110	1.138	0.953	0.97	0.50	0.96	309.93	1.55		1	100	1.00	5.90	1.00	311.1	1.00	Infin.	0.000	0.715	**Non-Liq.**	Non-Liq.	0.00
21.65	390.12	3.77	0.97	110	1.142	0.953	0.97	0.50	0.96	353.89	1.52		1	100	1.00	5.95	1.00	355.2	1.00	Infin.	0.000	0.717	**Non-Liq.**	Non-Liq.	0.00
21.82	410.04	3.82	0.93	110	1.146	0.952	0.93	0.50	0.96	371.37	1.49		1	100	1.00	6.00	1.00	372.8	1.00	Infin.	0.000	0.718	**Non-Liq.**	Non-Liq.	0.00
21.98	384.92	3.63	0.94	110	1.150	0.952	0.95	0.50	0.96	347.96	1.51		1	100	1.00	6.05	1.00	349.3	1.00	Infin.	0.000	0.719	**Non-Liq.**	Non-Liq.	0.00
22.15	353.56	2.69	0.76	110	1.154	0.951	0.76	0.50	0.96	318.98	1.47		1	100	1.00	6.10	1.00	320.2	1.00	Infin.	0.000	0.721	**Non-Liq.**	Non-Liq.	0.00
22.31	330.47	2.03	0.62	110	1.158	0.951	0.62	0.50	0.96	297.58	1.42		1	100	1.00	6.15	1.00	298.7	1.00	Infin.	0.000	0.722	**Non-Liq.**	Non-Liq.	0.00
22.47	302.85	2.02	0.67	110	1.161	0.950	0.67	0.50	0.95	272.16	1.47		1	100	1.00	6.20	1.00	273.2	1.00	Infin.	0.000	0.724	**Non-Liq.**	Non-Liq.	0.00
22.64	277.81	2.78	1.00	110	1.165	0.950	1.01	0.50	0.95	249.15	1.63		1	100	1.00	6.25	1.00	250.1	1.00	Infin.	0.000	0.725	**Non-Liq.**	Non-Liq.	0.00
22.80	261.06	4.42	1.69	110	1.169	0.949	1.70	0.55	0.95	232.39	1.82		1	100	1.12	6.30	1.00	262.1	1.00	Infin.	0.000	0.726	**Non-Liq.**	Non-Liq.	0.00
22.97	275.05	5.35	1.94	110	1.173	0.949	1.95	0.57	0.94	244.17	1.86		1	100	1.15	6.35	1.00	282.3	1.00	Infin.	0.000	0.727	**Non-Liq.**	Non-Liq.	0.00
23.13	338.08	5.26	1.55	110	1.177	0.948	1.56	0.53	0.95	301.07	1.73		1	100	1.06	6.40	1.00	319.0	1.00	Infin.	0.000	0.729	**Non-Liq.**	Non-Liq.	0.00
23.29	290.23	4.56	1.57	110	1.181	0.948	1.58	0.54	0.94	257.48	1.77		1	100	1.09	6.45	1.00	280.5	1.00	Infin.	0.000	0.730	**Non-Liq.**	Non-Liq.	0.00
23.46	297.08	3.04	1.02	110	1.185	0.947	1.03	0.50	0.94	264.28	1.62		1	100	1.00	6.50	1.00	265.3	1.00	Infin.	0.000	0.731	**Non-Liq.**	Non-Liq.	0.00
23.62	303.30	2.81	0.92	110	1.189	0.947	0.93	0.50	0.94	269.39	1.58		1	100	1.00	6.55	1.00	270.4	1.00	Infin.	0.000	0.732	**Non-Liq.**	Non-Liq.	0.00
23.79	309.47	2.71	0.87	110	1.193	0.946	0.88	0.50	0.94	274.43	1.55		1	100	1.00	6.60	1.00	275.5	1.00	Infin.	0.000	0.733	**Non-Liq.**	Non-Liq.	0.00
23.95	314.79	2.69	0.86	110	1.197	0.946	0.86	0.50	0.94	278.71	1.54		1	100	1.00	6.65	1.00	279.8	1.00	Infin.	0.000	0.735	**Non-Liq.**	Non-Liq.	0.00
24.11	323.75	2.59	0.80	110	1.200	0.945	0.80	0.50	0.94	286.20	1.51		1	100	1.00	6.70	1.00	287.3	1.00	Infin.	0.000	0.736	**Non-Liq.**	Non-Liq.	0.00
24.28	334.53	2.78	0.83	110	1.204	0.945	0.83	0.50	0.94	295.29	1.52		1	100	1.00	6.75	1.00	296.4	1.00	Infin.	0.000	0.737	**Non-Liq.**	Non-Liq.	0.00
24.44	341.22	2.78	0.82	110	1.208	0.944	0.82	0.50	0.94	300.72	1.51		1	100	1.00	6.80	1.00	301.8	1.00	Infin.	0.000	0.738	**Non-Liq.**	Non-Liq.	0.00
24.61	345.28	2.16	0.62	110	1.212	0.943	0.63	0.50	0.93	303.82	1.42		1	100	1.00	6.85	1.00	305.0	1.00	Infin.	0.000	0.739	**Non-Liq.**	Non-Liq.	0.00
24.77	354.45	2.39	0.67	110	1.216	0.943	0.68	0.50	0.93	311.41	1.43		1	100	1.00	6.90	1.00	312.6	1.00	Infin.	0.000	0.740	**Non-Liq.**	Non-Liq.	0.00
24.93	357.66	2.44	0.68	110	1.220	0.942	0.68	0.50	0.93	313.74	1.44		1	100	1.00	6.95	1.00	314.9	1.00	Infin.	0.000	0.741	**Non-Liq.**	Non-Liq.	0.00
25.10	363.46	2.39	0.66	110	1.224	0.942	0.66	0.50	0.93	318.33	1.42		1	100	1.00	7.00	1.00	319.5	1.00	Infin.	0.000	0.742	**Non-Liq.**	Non-Liq.	0.00
25.26	370.76	2.17	0.59	110	1.228	0.941	0.59	0.50	0.93	324.22	1.38		1	100	1.00	7.05	1.00	325.4	1.00	Infin.	0.000	0.743	**Non-Liq.**	Non-Liq.	0.00
25.43	377.75	2.41	0.64	110	1.232	0.941	0.64	0.50	0.93	329.83	1.40		1	100	1.00	7.10	1.00	331.1	1.00	Infin.	0.000	0.744	**Non-Liq.**	Non-Liq.	0.00
25.59	391.33	2.46	0.63	110	1.236	0.940	0.63	0.50	0.93	341.18	1.38		1	100	1.00	7.15	1.00	342.5	1.00	Infin.	0.000	0.745	**Non-Liq.**	Non-Liq.	0.00
25.75	392.15	2.61	0.66	110	1.240	0.939	0.67	0.50	0.92	341.36	1.40		1	100	1.00	7.20	1.00	342.6	1.00	Infin.	0.000	0.746	**Non-Liq.**	Non-Liq.	0.00
25.92	382.77	2.62	0.68	110	1.243	0.939	0.69	0.50	0.92	332.64	1.42		1	100	1.00	7.25	1.00	333.9	1.00	Infin.	0.000	0.747	**Non-Liq.**	Non-Liq.	0.00
26.08	373.25	2.66	0.71	110	1.247	0.938	0.71	0.50	0.92	323.83	1.44		1	100	1.00	7.30	1.00	325.0	1.00	Infin.	0.000	0.747	**Non-Liq.**	Non-Liq.	0.00
26.25	363.79	2.44	0.67	110	1.251	0.938	0.67	0.50	0.92	315.10	1.43		1	100	1.00	7.35	1.00	316.3	1.00	Infin.	0.000	0.748	**Non-Liq.**	Non-Liq.	0.00
26.41	362.15	2.32	0.64	110	1.255	0.937	0.64	0.50	0.92	313.18	1.42		1	100	1.00	7.40	1.00	314.3	1.00	Infin.	0.000	0.749	**Non-Liq.**	Non-Liq.	0.00
26.57	366.11	2.55	0.70	110	1.259	0.936	0.70	0.50	0.92	316.12	1.44		1	100	1.00	7.45	1.00	317.3	1.00	Infin.	0.000	0.750	**Non-Liq.**	Non-Liq.	0.00
26.74	372.93	2.51	0.67	110	1.263	0.936	0.68	0.50	0.92	321.53	1.42		1	100	1.00	7.50	1.00	322.7	1.00	Infin.	0.000	0.751	**Non-Liq.**	Non-Liq.	0.00
26.90	383.15	3.06	0.80	110	1.267	0.935	0.80	0.50	0.91	329.86	1.47		1	100	1.00	7.55	1.00	331.1	1.00	Infin.	0.000	0.751	**Non-Liq.**	Non-Liq.	0.00
27.07	413.34	3.14	0.76	110	1.271	0.934	0.76	0.50	0.91	355.38	1.44		1	100	1.00	7.60	1.00	356.7	1.00	Infin.	0.000	0.752	**Non-Liq.**	Non-Liq.	0.00
27.23	409.32	4.09	1.00	110	1.275	0.934	1.00	0.50	0.91	351.37	1.53		1	100	1.00	7.65	1.00	352.7	1.00	Infin.	0.000	0.753	**Non-Liq.**	Non-Liq.	0.00
27.40	399.12	4.88	1.22	110	1.279	0.933	1.23	0.50	0.91	342.06	1.61		1	100	1.00	7.70	1.00	343.3	1.00	Infin.	0.000	0.754	**Non-Liq.**	Non-Liq.	0.00
27.56	379.94	3.65	0.96	110	1.282	0.932	0.96	0.50	0.91	325.07	1.54		1	100	1.00	7.75	1.00	326.3	1.00	Infin.	0.000	0.754	**Non-Liq.**	Non-Liq.	0.00
27.72	353.99	3.89	1.10	110	1.286	0.932	1.10	0.50	0.91	302.33	1.60		1	100	1.00	7.80	1.00	303.5	1.00	Infin.	0.000	0.755	**Non-Liq.**	Non-Liq.	0.00
27.89	386.19	3.37	0.87	110	1.290	0.931	0.88	0.50	0.91	329.43	1.50		1	100	1.00	7.85	1.00	330.7	1.00	Infin.	0.000	0.756	**Non-Liq.**	Non-Liq.	0.00

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff. Stress at Midpt. p'o (tsf)	rd	F	n	C_q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_c	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
28.05	410.07	4.19	1.02	110	1.294	0.930	1.03	0.50	0.90	349.34	1.54		1	100	1.00	7.90	1.00	350.6	1.00	Infin.	0.000	0.756	Non-Liq.	Non-Liq.	0.00
28.22	438.73	4.93	1.12	110	1.298	0.929	1.13	0.50	0.90	373.26	1.56		1	100	1.00	7.95	1.00	374.7	1.00	Infin.	0.000	0.757	Non-Liq.	Non-Liq.	0.00
28.38	454.65	5.10	1.12	110	1.302	0.929	1.13	0.50	0.90	386.27	1.55		1	100	1.00	8.00	1.00	387.7	1.00	Infin.	0.000	0.758	Non-Liq.	Non-Liq.	0.00
28.54	455.41	6.81	1.50	110	1.306	0.928	1.50	0.50	0.90	386.04	1.65		1	100	1.00	8.05	1.00	389.3	1.00	Infin.	0.000	0.758	Non-Liq.	Non-Liq.	0.00
28.71	557.48	6.50	1.17	110	1.310	0.927	1.17	0.50	0.90	472.46	1.51		1	100	1.00	8.10	1.00	474.2	1.00	Infin.	0.000	0.759	Non-Liq.	Non-Liq.	0.00
28.87	504.25	5.71	1.13	110	1.314	0.926	1.14	0.50	0.90	426.60	1.53		1	100	1.00	8.15	1.00	428.2	1.00	Infin.	0.000	0.759	Non-Liq.	Non-Liq.	0.00
29.04	452.21	4.48	0.99	110	1.318	0.926	0.99	0.50	0.90	381.89	1.51		1	100	1.00	8.20	1.00	383.3	1.00	Infin.	0.000	0.760	Non-Liq.	Non-Liq.	0.00
29.20	427.62	3.52	0.82	110	1.322	0.925	0.83	0.50	0.89	360.53	1.46		1	100	1.00	8.25	1.00	361.9	1.00	Infin.	0.000	0.760	Non-Liq.	Non-Liq.	0.00
29.36	419.70	3.00	0.71	110	1.325	0.924	0.72	0.50	0.89	353.30	1.42		1	100	1.00	8.30	1.00	354.6	1.00	Infin.	0.000	0.761	Non-Liq.	Non-Liq.	0.00
29.53	414.05	3.21	0.78	110	1.329	0.923	0.78	0.50	0.89	348.02	1.45		1	100	1.00	8.35	1.00	349.3	1.00	Infin.	0.000	0.761	Non-Liq.	Non-Liq.	0.00
29.69	430.08	5.15	1.20	110	1.333	0.923	1.20	0.50	0.89	361.00	1.59		1	100	1.00	8.40	1.00	362.3	1.00	Infin.	0.000	0.762	Non-Liq.	Non-Liq.	0.00
29.86	475.65	5.92	1.24	110	1.337	0.922	1.25	0.50	0.89	398.78	1.58		1	100	1.00	8.45	1.00	400.3	1.00	Infin.	0.000	0.762	Non-Liq.	Non-Liq.	0.00
30.02	487.87	5.66	1.16	110	1.341	0.921	1.16	0.50	0.89	408.46	1.55		1	100	1.00	8.50	1.00	410.0	1.00	Infin.	0.000	0.763	Non-Liq.	Non-Liq.	0.00
30.18	400.37	3.93	0.98	110	1.345	0.920	0.98	0.50	0.89	334.51	1.54		1	100	1.00	8.55	1.00	335.8	1.00	Infin.	0.000	0.763	Non-Liq.	Non-Liq.	0.00
30.35	403.47	3.24	0.80	110	1.349	0.919	0.80	0.50	0.89	336.62	1.47		1	100	1.00	8.60	1.00	337.9	1.00	Infin.	0.000	0.763	Non-Liq.	Non-Liq.	0.00
30.51	396.31	2.84	0.72	110	1.353	0.918	0.72	0.50	0.88	330.14	1.44		1	100	1.00	8.65	1.00	331.4	1.00	Infin.	0.000	0.764	Non-Liq.	Non-Liq.	0.00
30.68	386.15	2.45	0.63	110	1.357	0.918	0.64	0.50	0.88	321.18	1.41		1	100	1.00	8.70	1.00	322.4	1.00	Infin.	0.000	0.764	Non-Liq.	Non-Liq.	0.00
30.84	392.22	2.37	0.61	110	1.361	0.917	0.61	0.50	0.88	325.78	1.39		1	100	1.00	8.75	1.00	327.0	1.00	Infin.	0.000	0.764	Non-Liq.	Non-Liq.	0.00
31.00	405.26	2.42	0.60	110	1.364	0.916	0.60	0.50	0.88	336.16	1.37		1	100	1.00	8.80	1.00	337.4	1.00	Infin.	0.000	0.765	Non-Liq.	Non-Liq.	0.00
31.17	430.96	2.96	0.69	110	1.368	0.915	0.69	0.50	0.88	357.04	1.40		1	100	1.00	8.85	1.00	358.4	1.00	Infin.	0.000	0.765	Non-Liq.	Non-Liq.	0.00
31.33	477.81	2.81	0.59	110	1.372	0.914	0.59	0.50	0.88	395.41	1.32		1	100	1.00	8.85	1.00	396.9	1.00	Infin.	0.000	0.765	Non-Liq.	Non-Liq.	0.00
31.50	511.39	3.25	0.64	110	1.376	0.913	0.64	0.50	0.88	422.67	1.33		1	100	1.00	8.85	1.00	424.3	1.00	Infin.	0.000	0.765	Non-Liq.	Non-Liq.	0.00
31.66	526.85	3.67	0.70	110	1.380	0.912	0.70	0.50	0.88	434.87	1.35		1	100	1.00	8.85	1.00	436.5	1.00	Infin.	0.000	0.766	Non-Liq.	Non-Liq.	0.00
31.82	556.04	4.16	0.75	110	1.384	0.911	0.75	0.50	0.87	458.37	1.36		1	100	1.00	8.85	1.00	460.1	1.00	Infin.	0.000	0.766	Non-Liq.	Non-Liq.	0.00
31.99	549.66	4.48	0.82	110	1.388	0.910	0.82	0.50	0.87	452.46	1.39		1	100	1.00	8.85	1.00	454.1	1.00	Infin.	0.000	0.766	Non-Liq.	Non-Liq.	0.00
32.15	532.09	4.07	0.77	110	1.392	0.909	0.77	0.50	0.87	437.34	1.38		1	100	1.00	8.85	1.00	439.0	1.00	Infin.	0.000	0.766	Non-Liq.	Non-Liq.	0.00
32.32	480.94	3.60	0.75	110	1.396	0.908	0.75	0.50	0.87	394.63	1.40		1	100	1.00	8.85	1.00	396.1	1.00	Infin.	0.000	0.766	Non-Liq.	Non-Liq.	0.00
32.48	490.89	4.33	0.88	110	1.400	0.907	0.88	0.50	0.87	402.25	1.45		1	100	1.00	8.85	1.00	403.8	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
32.64	528.43	4.91	0.93	110	1.403	0.906	0.93	0.50	0.87	432.50	1.45		1	100	1.00	8.85	1.00	434.1	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
32.81	460.35	4.63	1.00	110	1.407	0.905	1.01	0.50	0.87	376.10	1.52		1	100	1.00	8.85	1.00	377.5	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
32.97	486.15	4.33	0.89	110	1.411	0.904	0.89	0.50	0.87	396.69	1.46		1	100	1.00	8.85	1.00	398.2	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
33.14	443.98	3.08	0.69	110	1.415	0.903	0.70	0.50	0.86	361.68	1.40		1	100	1.00	8.85	1.00	363.0	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
33.30	410.68	3.53	0.86	110	1.419	0.902	0.86	0.50	0.86	334.00	1.49		1	100	1.00	8.85	1.00	335.3	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
33.46	410.45	3.02	0.74	110	1.423	0.901	0.74	0.50	0.86	333.35	1.44		1	100	1.00	8.85	1.00	334.6	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
33.63	405.83	2.64	0.65	110	1.427	0.900	0.65	0.50	0.86	329.13	1.41		1	100	1.00	8.85	1.00	330.4	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
33.79	322.06	1.47	0.46	110	1.431	0.899	0.46	0.50	0.86	260.60	1.37		1	100	1.00	8.85	1.00	261.6	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
33.96	275.23	1.64	0.60	110	1.435	0.898	0.60	0.50	0.86	222.23	1.50		1	100	1.00	8.85	1.00	223.1	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
34.12	227.81	2.72	1.19	110	1.439	0.897	1.20	0.54	0.85	181.18	1.78		1	100	1.09	8.85	1.00	198.3	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
34.28	169.10	2.93	1.74	110	1.443	0.896	1.75	0.61	0.83	131.34	1.99		1	88	1.29	8.85	1.00	170.0	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
34.45	86.25	3.30	3.82	110	1.446	0.895	3.89	0.75	0.79	63.47	2.46		1	58	2.58		1.00	163.6	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
34.61	69.63	2.59	3.72	110	1.450	0.894	3.80	0.76	0.79	50.64	2.52		1	49	2.88		1.00	145.8	1.00	0.368	0.367	0.767	**0.48**	92%	**0.92**
34.78	43.14	2.39	5.53	110	1.454	0.893	5.73	0.85	0.76	30.06	2.81		0						1.00			0.767	Non-Liq.	Non-Liq.	0.00
34.94	30.65	2.97	9.69	110	1.458	0.892	10.17	0.94	0.74	20.42	3.10		0						1.00			0.766	Non-Liq.	Non-Liq.	0.00
35.10	41.47	3.52	8.49	110	1.462	0.890	8.80	0.90	0.75	28.30	2.96		0						0.99			0.766	Non-Liq.	Non-Liq.	0.00
35.27	65.17	3.19	4.90	110	1.466	0.889	5.01	0.80	0.77	46.41	2.63		0						0.99			0.766	Non-Liq.	Non-Liq.	0.00
35.43	88.65	2.38	2.68	110	1.470	0.888	2.73	0.71	0.79	65.24	2.34		1	59	2.09		1.00	136.3	0.99	0.315	0.312	0.766	**0.41**	95%	**1.07**
35.60	43.77	2.29	5.24	110	1.474	0.887	5.42	0.84	0.76	30.22	2.79		0						0.99			0.766	Non-Liq.	Non-Liq.	0.00
35.76	29.66	1.82	6.14	110	1.478	0.886	6.46	0.90	0.74	19.72	2.98		0						0.99			0.766	Non-Liq.	Non-Liq.	0.00
35.93	29.62	1.77	5.98	110	1.482	0.885	6.30	0.90	0.74	19.65	2.97		0						0.99			0.765	Non-Liq.	Non-Liq.	0.00
36.09	178.35	2.16	1.21	110	1.485	0.883	1.22	0.57	0.82	137.89	1.86		1	90	1.16	0.40	1.31	208.8	0.98	Infin.	0.000	0.765	Non-Liq.	Non-Liq.	0.00
36.25	241.23	1.79	0.74	110	1.489	0.882	0.75	0.50	0.84	190.98	1.62		1	100	1.00	0.40	1.31	249.9	0.98	Infin.	0.000	0.765	Non-Liq.	Non-Liq.	0.00
36.42	267.52	1.54	0.57	110	1.493	0.881	0.58	0.50	0.84	211.65	1.51		1	100	1.00	0.40	1.31	276.9	0.98	Infin.	0.000	0.765	Non-Liq.	Non-Liq.	0.00
36.58	307.90	1.25	0.41	110	1.497	0.880	0.41	0.50	0.84	243.45	1.36		1	100	1.00	0.40	1.31	318.6	0.98	Infin.	0.000	0.764	Non-Liq.	Non-Liq.	0.00
36.75	313.53	1.06	0.34	110	1.501	0.878	0.34	0.50	0.84	247.60	1.31		1	100	1.00	0.40	1.31	324.0	0.98	Infin.	0.000	0.764	Non-Liq.	Non-Liq.	0.00
36.91	259.68	0.86	0.33	110	1.505	0.877	0.33	0.50	0.84	204.60	1.38		1	100	1.00	0.40	1.31	267.7	0.97	Infin.	0.000	0.764	Non-Liq.	Non-Liq.	0.00
37.07	199.86	0.72	0.36	110	1.509	0.876	0.36	0.50	0.84	156.99	1.49		1	96	1.00	0.40	1.31	205.4	0.97	Infin.	0.000	0.763	Non-Liq.	Non-Liq.	0.00
37.24	136.61	0.99	0.72	110	1.513	0.875	0.73	0.55	0.82	104.86	1.81		1	79	1.11	0.40	1.31	152.8	0.97	0.412	0.400	0.763	**0.52**	89%	**0.75**
37.40	83.21	1.31	1.58	110	1.517	0.873	1.61	0.67	0.79	60.64	2.21		1	56	1.69		1.00	102.5	0.98	0.180	0.176	0.762	**0.23**	99%	**1.49**
37.57	44.38	1.10	2.47	110	1.521	0.872	2.56	0.78	0.75	30.55	2.57		1	28	3.13		1.00	95.7	0.98	0.162	0.159	0.762	**0.21**	99%	**1.59**
37.73	27.18	1.18	4.34	110	1.525	0.871	4.60	0.88	0.72	17.57	2.91		0						0.98			0.762	Non-Liq.	Non-Liq.	0.00
37.89	28.70	1.31	4.57	110	1.528	0.869	4.83	0.88	0.72	18.57	2.91		0						0.98			0.761	Non-Liq.	Non-Liq.	0.00
38.06	39.57	1.47	3.71	110	1.532	0.868	3.86	0.83	0.74	26.46	2.73		0						0.98			0.761	Non-Liq.	Non-Liq.	0.00
38.22	75.21	1.54	2.05	110	1.536	0.867	2.09	0.71	0.77	53.52	2.33		1	51	2.03		1.00	108.8	0.97	0.200	0.194	0.760	**0.26**	99%	**1.40**
38.39	174.70	1.55	0.88	110	1.540	0.865	0.89	0.54	0.82	133.49	1.78		1	89	1.09	0.35	1.36	198.1	0.96	Infin.	0.000	0.760	Non-Liq.	Non-Liq.	0.00
38.55	220.50	1.33	0.60	110	1.544	0.864	0.61	0.50	0.83	171.31	1.59		1	99	1.00	0.40	1.36	232.3	0.96	Infin.	0.000	0.759	Non-Liq.	Non-Liq.	0.00
38.71	247.95	1.28	0.52	110	1.548	0.863	0.52	0.50	0.83	192.54	1.51		1	100	1.00	0.45	1.36	261.1	0.96	Infin.	0.000	0.759	Non-Liq.	Non-Liq.	0.00
38.88	252.96	1.31	0.52	110	1.552	0.861	0.52	0.50	0.83	196.21	1.50		1	100	1.00	0.50	1.36	266.1	0.96	Infin.	0.000	0.758	Non-Liq.	Non-Liq.	0.00
39.04	230.96	1.38	0.60	110	1.556	0.860	0.60	0.50	0.82	178.81	1.58		1	100	1.00	0.55	1.36	242.5	0.96	Infin.	0.000	0.758	Non-Liq.	Non-Liq.	0.00
39.21	145.79	1.25	0.86	110	1.560	0.859	0.87	0.56	0.80	109.70	1.84		1	81	1.14	0.60	1.36	169.1	0.96	Infin.	0.000	0.757	Non-Liq.	Non-Liq.	0.00
39.37	85.88	1.67	1.94	110	1.564	0.857	1.98	0.69	0.76	60.91	2.27		1	56	1.85		1.00	112.5	0.97	0.212	0.205	0.757	**0.27**	99%	**1.35**
39.53	62.58	1.46	2.33	110	1.567	0.856	2.39	0.74	0.75	43.14	2.43		1	42	2.46		1.00	106.0	0.98	0.191	0.186	0.756	**0.25**	99%	**1.44**
39.70	41.74	1.21	2.90	110	1.571	0.854	3.01	0.80	0.73	27.65	2.65		0						0.98			0.756	Non-Liq.	Non-Liq.	0.00
39.86	15.02	0.92	6.14	110	1.575	0.853	6.86	0.99	0.67	8.58	3.27		0						0.97			0.755	Non-Liq.	Non-Liq.	0.00
40.03	11.69	1.18	10.11	110	1.579	0.852	11.69	1.00	0.67	6.40	3.51		0						0.97			0.754	Non-Liq.	Non-Liq.	0.00
40.19	18.75	1.87	9.99	110	1.583	0.850	10.91	1.00	0.67	10.84	3.32		0						0.97			0.754	Non-Liq.	Non-Liq.	0.00
40.36	94.45	2.16	2.29	110	1.587	0.849	2.33	0.69	0.75	66.23	2.29		1	60	1.91		1.00	126.7	0.98	0.269	0.258	0.753	**0.34**	97%	**1.18**
40.52	251.97	2.43	0.96	110	1.591	0.847	0.97	0.52	0.81	191.75	1.69		1	100	1.03	1.00	1.00	198.8	0.95	Infin.	0.000	0.752	Non-Liq.	Non-Liq.	0.00
40.68	313.15	2.26	0.72	110	1.595	0.846	0.73	0.50	0.81	239.85	1.54		1	100	1.00	1.00	1.00	240.7	0.94	Infin.	0.000	0.752	Non-Liq.	Non-Liq.	0.00
40.85	341.76	2.88	0.84	110	1.599	0.844	0.85	0.50	0.81	261.55	1.56		1	100	1.00	1.00	1.00	262.5	0.94	Infin.	0.000	0.751	Non-Liq.	Non-Liq.	0.00
41.01	354.79	3.52	0.99	110	1.603	0.843	1.00	0.50	0.81	271.24	1.60		1	100	1.00	1.00	1.00	272.3	0.94	Infin.	0.000	0.750	Non-Liq.	Non-Liq.	0.00
41.17	373.62	4.05	1.09	110	1.607	0.841	1.09	0.50	0.81	285.35	1.62		1	100	1.00	1.00	1.00	286.4	0.94	Infin.	0.000	0.750	Non-Liq.	Non-Liq.	0.00
41.34	386.97	4.10	1.06	110	1.610	0.840	1.06	0.50	0.81	295.23	1.60		1	100	1.00	1.00	1.00	296.3	0.94	Infin.	0.000	0.749	Non-Liq.	Non-Liq.	0.00
41.50	384.45	4.56	1.19	110	1.614	0.838	1.19	0.50	0.81	292.94	1.64		1	100	1.00	1.00	1.00	294.0	0.94	Infin.	0.000	0.748	Non-Liq.	Non-Liq.	0.00
41.67	388.83	3.67	0.94	110	1.618	0.837	0.95	0.50	0.81	295.93	1.56		1	100	1.00	1.00	1.00	297.0	0.94	Infin.	0.000	0.747	Non-Liq.	Non-Liq.	0.00
41.83	401.57	3.65	0.91	110	1.622	0.835	0.91	0.50	0.81	305.29	1.54		1	100	1.00	1.00	1.00	306.4	0.94	Infin.	0.000	0.747	Non-Liq.	Non-Liq.	0.00
41.99	345.90	3.80	1.10	110	1.626	0.834	1.10	0.50	0.81	262.37	1.64		1	100	1.00	1.00	1.00	262.9	0.93	Infin.	0.000	0.746	Non-Liq.	Non-Liq.	0.00
42.16	326.26	3.40	1.04	110	1.630	0.832	1.05	0.50	0.81	247.11	1.64		1	100	1.00	1.00	1.00	247.6	0.93	Infin.	0.000	0.745	Non-Liq.	Non-Liq.	0.00
42.32	340.48	3.88	1.14	110	1.634	0.831	1.14	0.51	0.80	257.02	1.66		1	100	1.01	1.00	1.00	260.8	0.93	Infin.	0.000	0.744	Non-Liq.	Non-Liq.	0.00
42.49	364.19	3.38	0.93	110	1.638	0.829	0.93	0.50	0.80	275.43	1.57		1	100	1.00	1.00	1.00	276.5	0.93	Infin.	0.000	0.743	Non-Liq.	Non-Liq.	0.00
42.65	390.03	3.10	0.79	110	1.642	0.827	0.80	0.50	0.80	294.70	1.50		1	100	1.00	1.00	1.00	295.8	0.93	Infin.	0.000	0.743	Non-Liq.	Non-Liq.	0.00
42.81	313.44	2.00	0.64	110	1.646	0.826	0.64	0.50	0.80	236.30	1.50		1	100	1.00	1.00	1.00	237.2	0.93	Infin.	0.000	0.742	Non-Liq.	Non-Liq.	0.00
42.98	261.49	1.86	0.66	110	1.649	0.824	0.67	0.50	0.80	211.83	1.55		1	100	1.00	1.00	1.00	212.6	0.93	Infin.	0.000	0.741	Non-Liq.	Non-Liq.	0.00

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff. Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
43.14	220.54	1.03	0.47	110	1.653	0.823	0.47	0.50	0.80	165.50	1.54		1	98	1.00	1.00	1.00	166.1	0.93	Infin.	0.000	0.740	**Non-Liq.**	Non-Liq.	**0.00**
43.31	170.25	0.75	0.44	110	1.657	0.821	0.44	0.50	0.80	127.32	1.62		1	87	1.00	1.00	1.00	127.8	0.93	0.274	0.254	0.739	**0.34**	97%	**1.16**
43.47	150.87	0.88	0.58	110	1.661	0.820	0.59	0.53	0.79	111.11	1.73		1	81	1.06	1.00	1.00	118.4	0.92	0.234	0.217	0.738	**0.29**	98%	**1.27**
43.64	112.32	0.90	0.80	110	1.665	0.818	0.81	0.59	0.77	80.14	1.93		1	68	1.22	1.00	1.00	98.0	0.94	0.168	0.158	0.737	**0.21**	99%	**1.55**
43.80	82.53	1.03	1.25	110	1.669	0.816	1.28	0.66	0.74	56.60	2.17		1	53	1.60		1.00	90.3	0.94	0.148	0.140	0.736	**0.19**	100%	**1.68**
43.96	68.72	1.03	1.49	110	1.673	0.815	1.53	0.69	0.73	46.10	2.29		1	45	1.91		1.00	88.2	0.96	0.144	0.138	0.735	**0.19**	100%	**1.71**
44.13	55.11	0.91	1.64	110	1.677	0.813	1.69	0.73	0.72	36.12	2.40		1	35	2.31		1.00	83.4	0.96	0.134	0.128	0.735	**0.17**	100%	**1.79**
44.29	41.85	0.92	2.19	110	1.681	0.811	2.28	0.78	0.70	26.42	2.59		1	22	3.24		1.00	85.6	0.96	0.138	0.133	0.734	**0.18**	100%	**1.75**
44.46	26.31	1.06	4.02	110	1.685	0.810	4.29	0.89	0.66	15.39	2.94		0						0.96			0.733	**Non-Liq.**	Non-Liq.	**0.00**
44.62	21.72	0.91	4.17	110	1.689	0.808	4.52	0.92	0.65	12.33	3.03		0						0.96			0.732	**Non-Liq.**	Non-Liq.	**0.00**
44.78	37.10	1.02	2.74	110	1.692	0.807	2.87	0.82	0.68	22.80	2.70		0						0.96			0.731	**Non-Liq.**	Non-Liq.	**0.00**
44.95	79.45	1.14	1.44	110	1.696	0.805	1.47	0.68	0.73	53.41	2.23		1	51	1.73		1.00	92.7	0.94	0.154	0.144	0.730	**0.20**	100%	**1.64**
45.11	124.52	1.08	0.86	110	1.700	0.803	0.88	0.58	0.76	88.02	1.92		1	72	1.21	0.70	1.10	116.3	0.91	0.226	0.207	0.729	**0.28**	98%	**1.30**
45.28	146.40	1.60	1.09	110	1.704	0.802	1.11	0.59	0.76	103.42	1.93		1	78	1.22	0.75	1.10	137.7	0.91	0.323	0.295	0.728	**0.40**	95%	**1.05**
45.44	147.64	1.68	1.14	110	1.708	0.800	1.15	0.59	0.75	104.02	1.94		1	78	1.23	0.80	1.10	139.6	0.91	0.333	0.304	0.727	**0.42**	95%	**1.03**
45.60	111.81	2.01	1.80	110	1.712	0.798	1.83	0.66	0.73	75.74	2.17		1	65	1.61		1.00	121.6	0.93	0.247	0.230	0.726	**0.32**	98%	**1.23**
45.77	107.68	2.34	2.17	110	1.716	0.797	2.21	0.68	0.72	72.03	2.25		1	63	1.79		1.00	128.7	0.93	0.278	0.259	0.725	**0.36**	97%	**1.15**
45.93	150.61	2.63	1.75	110	1.720	0.795	1.77	0.63	0.74	103.74	2.07		1	78	1.40		1.00	144.8	0.91	0.363	0.329	0.724	**0.45**	93%	**1.00**
46.10	249.00	2.59	1.04	110	1.724	0.793	1.05	0.53	0.77	180.59	1.73		1	100	1.06	1.00	1.00	192.4	0.91	Infin.	0.000	0.723	**Non-Liq.**	Non-Liq.	**0.00**
46.26	324.42	3.00	0.93	110	1.728	0.792	0.93	0.50	0.78	238.69	1.61		1	100	1.00	1.05	1.00	239.6	0.91	Infin.	0.000	0.722	**Non-Liq.**	Non-Liq.	**0.00**
46.42	376.79	3.64	0.96	110	1.731	0.790	0.97	0.50	0.78	277.11	1.58		1	100	1.00	1.10	1.00	278.1	0.91	Infin.	0.000	0.721	**Non-Liq.**	Non-Liq.	**0.00**
46.59	401.24	4.49	1.12	110	1.735	0.788	1.12	0.50	0.78	294.84	1.62		1	100	1.00	1.15	1.00	295.9	0.90	Infin.	0.000	0.720	**Non-Liq.**	Non-Liq.	**0.00**
46.75	410.01	4.98	1.21	110	1.739	0.787	1.22	0.50	0.78	300.97	1.64		1	100	1.00	1.20	1.00	302.1	0.90	Infin.	0.000	0.719	**Non-Liq.**	Non-Liq.	**0.00**
46.92	417.89	4.83	1.16	110	1.743	0.785	1.16	0.50	0.78	306.43	1.62		1	100	1.00	1.25	1.00	307.6	0.90	Infin.	0.000	0.717	**Non-Liq.**	Non-Liq.	**0.00**
47.08	432.83	4.59	1.06	110	1.747	0.783	1.06	0.50	0.78	317.08	1.58		1	100	1.00	1.30	1.00	318.3	0.90	Infin.	0.000	0.716	**Non-Liq.**	Non-Liq.	**0.00**
47.24	435.16	3.80	0.87	110	1.751	0.782	0.88	0.50	0.78	318.43	1.51		1	100	1.00	1.35	1.00	319.6	0.90	Infin.	0.000	0.715	**Non-Liq.**	Non-Liq.	**0.00**
47.41	434.87	4.29	0.99	110	1.755	0.780	0.99	0.50	0.78	317.86	1.55		1	100	1.00	1.40	1.00	319.0	0.90	Infin.	0.000	0.714	**Non-Liq.**	Non-Liq.	**0.00**
47.57	434.40	5.04	1.16	110	1.759	0.778	1.17	0.50	0.78	317.16	1.61		1	100	1.00	1.45	1.00	318.3	0.90	Infin.	0.000	0.713	**Non-Liq.**	Non-Liq.	**0.00**
47.74	430.64	5.51	1.28	110	1.763	0.777	1.28	0.50	0.77	313.70	1.65		1	100	1.00	1.50	1.00	315.3	0.90	Infin.	0.000	0.712	**Non-Liq.**	Non-Liq.	**0.00**
47.90	433.15	6.42	1.48	110	1.767	0.775	1.49	0.52	0.77	312.64	1.70		1	100	1.04	1.55	1.00	325.7	0.90	Infin.	0.000	0.711	**Non-Liq.**	Non-Liq.	**0.00**
48.06	428.46	6.61	1.54	110	1.770	0.773	1.55	0.52	0.76	308.02	1.72		1	100	1.05	1.60	1.00	324.6	0.90	Infin.	0.000	0.710	**Non-Liq.**	Non-Liq.	**0.00**
48.23	424.25	6.72	1.58	110	1.774	0.772	1.59	0.53	0.76	304.04	1.73		1	100	1.06	1.65	1.00	323.0	0.89	Infin.	0.000	0.709	**Non-Liq.**	Non-Liq.	**0.00**
48.39	419.06	6.65	1.59	110	1.778	0.770	1.59	0.53	0.76	299.75	1.73		1	100	1.06	1.70	1.00	319.3	0.89	Infin.	0.000	0.708	**Non-Liq.**	Non-Liq.	**0.00**
48.56	409.58	6.70	1.64	110	1.782	0.768	1.64	0.53	0.76	291.80	1.75		1	100	1.07	1.75	1.00	314.3	0.89	Infin.	0.000	0.707	**Non-Liq.**	Non-Liq.	**0.00**
48.72	401.26	6.55	1.63	110	1.786	0.767	1.64	0.54	0.76	285.28	1.76		1	100	1.08	1.80	1.00	308.3	0.89	Infin.	0.000	0.705	**Non-Liq.**	Non-Liq.	**0.00**
48.88	393.67	6.35	1.61	110	1.790	0.765	1.62	0.54	0.75	279.50	1.76		1	100	1.08	1.85	1.00	302.2	0.89	Infin.	0.000	0.704	**Non-Liq.**	Non-Liq.	**0.00**
49.05	386.90	6.22	1.61	110	1.794	0.763	1.62	0.54	0.75	274.18	1.76		1	100	1.08	1.90	1.00	297.2	0.89	Infin.	0.000	0.703	**Non-Liq.**	Non-Liq.	**0.00**
49.21	381.95	6.11	1.60	110	1.798	0.762	1.61	0.54	0.75	270.24	1.76		1	100	1.08	1.95	1.00	293.3	0.89	Infin.	0.000	0.702	**Non-Liq.**	Non-Liq.	**0.00**
49.38	382.17	6.15	1.61	110	1.802	0.760	1.62	0.54	0.75	269.99	1.77		1	100	1.08	2.00	1.00	293.4	0.89	Infin.	0.000	0.701	**Non-Liq.**	Non-Liq.	**0.00**
49.54	376.16	6.01	1.60	110	1.806	0.758	1.61	0.54	0.75	265.33	1.77		1	100	1.08	2.05	1.00	288.7	0.89	Infin.	0.000	0.700	**Non-Liq.**	Non-Liq.	**0.00**
49.70	367.77	5.85	1.59	110	1.810	0.757	1.60	0.54	0.75	258.87	1.77		1	100	1.09	2.10	1.00	282.6	0.89	Infin.	0.000	0.699	**Non-Liq.**	Non-Liq.	**0.00**
49.87	358.21	5.75	1.61	110	1.813	0.755	1.61	0.54	0.75	251.37	1.78		1	100	1.10	2.15	1.00	276.4	0.88	Infin.	0.000	0.698	**Non-Liq.**	Non-Liq.	**0.00**
50.03	351.53	5.60	1.59	110	1.817	0.753	1.60	0.54	0.75	246.26	1.79		1	100	1.10	2.20	1.00	271.2	0.88	Infin.	0.000	0.696	**Non-Liq.**	Non-Liq.	**0.00**
50.20	347.31	4.90	1.41	110	1.821	0.752	1.42	0.53	0.75	244.59	1.75		1	100	1.07	2.25	1.00	262.5	0.88	Infin.	0.000	0.695	**Non-Liq.**	Non-Liq.	**0.00**
50.36	345.77	5.05	1.46	110	1.825	0.750	1.47	0.54	0.75	242.68	1.76		1	100	1.08	2.30	1.00	262.8	0.88	Infin.	0.000	0.694	**Non-Liq.**	Non-Liq.	**0.00**
50.52	347.22	5.22	1.50	110	1.829	0.748	1.51	0.54	0.74	243.04	1.77		1	100	1.09	2.35	1.00	264.8	0.88	Infin.	0.000	0.693	**Non-Liq.**	Non-Liq.	**0.00**
50.69	346.06	5.37	1.55	110	1.833	0.747	1.56	0.54	0.74	241.42	1.78		1	100	1.09	2.40	1.00	265.2	0.88	Infin.	0.000	0.692	**Non-Liq.**	Non-Liq.	**0.00**
50.85	349.13	5.22	1.50	110	1.837	0.745	1.50	0.54	0.74	243.91	1.77		1	100	1.08	2.45	1.00	265.3	0.88	Infin.	0.000	0.691	**Non-Liq.**	Non-Liq.	**0.00**
51.02	348.56	4.86	1.39	110	1.841	0.743	1.40	0.53	0.75	244.21	1.74		1	100	1.07	2.50	1.00	261.6	0.88	Infin.	0.000	0.689	**Non-Liq.**	Non-Liq.	**0.00**
51.18	349.29	4.35	1.25	110	1.845	0.742	1.25	0.52	0.75	246.10	1.70		1	100	1.04	2.55	1.00	256.9	0.88	Infin.	0.000	0.688	**Non-Liq.**	Non-Liq.	**0.00**
51.35	348.08	4.19	1.20	110	1.849	0.740	1.21	0.52	0.75	245.42	1.69		1	100	1.03	2.60	1.00	254.3	0.88	Infin.	0.000	0.687	**Non-Liq.**	Non-Liq.	**0.00**
51.51	347.63	4.03	1.16	110	1.852	0.738	1.17	0.51	0.75	245.34	1.68		1	100	1.02	2.65	1.00	252.2	0.87	Infin.	0.000	0.686	**Non-Liq.**	Non-Liq.	**0.00**
51.67	345.96	4.21	1.22	110	1.856	0.737	1.22	0.52	0.75	243.12	1.70		1	100	1.04	2.65	1.00	253.0	0.87	Infin.	0.000	0.685	**Non-Liq.**	Non-Liq.	**0.00**
51.84	345.46	4.03	1.17	110	1.860	0.735	1.17	0.51	0.75	243.07	1.68		1	100	1.03	2.65	1.00	250.7	0.87	Infin.	0.000	0.684	**Non-Liq.**	Non-Liq.	**0.00**
52.00	342.27	3.60	1.05	110	1.864	0.733	1.06	0.50	0.75	241.88	1.65		1	100	1.00	2.65	1.00	243.9	0.87	Infin.	0.000	0.682	**Non-Liq.**	Non-Liq.	**0.00**
52.17	345.47	2.90	0.84	110	1.868	0.732	0.84	0.50	0.75	244.41	1.58		1	100	1.00	2.65	1.00	245.3	0.87	Infin.	0.000	0.681	**Non-Liq.**	Non-Liq.	**0.00**
52.33	353.60	2.51	0.71	110	1.872	0.730	0.71	0.50	0.75	249.93	1.52		1	100	1.00	2.65	1.00	250.9	0.87	Infin.	0.000	0.680	**Non-Liq.**	Non-Liq.	**0.00**
52.49	353.44	2.43	0.69	110	1.876	0.728	0.69	0.50	0.75	249.55	1.51		1	100	1.00	2.65	1.00	250.5	0.87	Infin.	0.000	0.679	**Non-Liq.**	Non-Liq.	**0.00**
52.66	329.04	2.54	0.77	110	1.880	0.727	0.77	0.50	0.75	231.99	1.57		1	100	1.00	2.65	1.00	232.9	0.87	Infin.	0.000	0.678	**Non-Liq.**	Non-Liq.	**0.00**
52.82	324.06	2.40	0.74	110	1.884	0.725	0.75	0.50	0.75	228.21	1.56		1	100	1.00	2.65	1.00	229.1	0.87	Infin.	0.000	0.677	**Non-Liq.**	Non-Liq.	**0.00**
52.99	357.49	2.12	0.59	110	1.888	0.724	0.60	0.50	0.75	251.63	1.46		1	100	1.00	2.65	1.00	252.6	0.87	Infin.	0.000	0.676	**Non-Liq.**	Non-Liq.	**0.00**
53.15	377.56	1.69	0.45	110	1.892	0.722	0.45	0.50	0.75	265.56	1.36		1	100	1.00	2.65	1.00	266.5	0.87	Infin.	0.000	0.674	**Non-Liq.**	Non-Liq.	**0.00**
53.31	383.09	1.73	0.45	110	1.895	0.720	0.45	0.50	0.75	269.18	1.36		1	100	1.00	2.65	1.00	270.2	0.86	Infin.	0.000	0.673	**Non-Liq.**	Non-Liq.	**0.00**
53.48	384.71	1.88	0.49	110	1.899	0.719	0.49	0.50	0.75	270.05	1.38		1	100	1.00	2.65	1.00	271.1	0.86	Infin.	0.000	0.672	**Non-Liq.**	Non-Liq.	**0.00**
53.64	382.98	1.55	0.41	110	1.903	0.717	0.41	0.50	0.75	268.55	1.33		1	100	1.00	2.65	1.00	269.6	0.86	Infin.	0.000	0.671	**Non-Liq.**	Non-Liq.	**0.00**
53.81	378.65	1.68	0.44	110	1.907	0.716	0.45	0.50	0.74	265.22	1.36		1	100	1.00	2.65	1.00	266.2	0.86	Infin.	0.000	0.670	**Non-Liq.**	Non-Liq.	**0.00**
53.97	364.32	1.45	0.40	110	1.911	0.714	0.40	0.50	0.74	254.87	1.34		1	100	1.00	2.65	1.00	255.8	0.86	Infin.	0.000	0.669	**Non-Liq.**	Non-Liq.	**0.00**
54.13	345.61	1.28	0.37	110	1.915	0.712	0.37	0.50	0.74	241.46	1.34		1	100	1.00	2.65	1.00	242.4	0.86	Infin.	0.000	0.667	**Non-Liq.**	Non-Liq.	**0.00**
54.30	328.15	1.38	0.42	110	1.919	0.711	0.42	0.50	0.74	228.96	1.40		1	100	1.00	2.65	1.00	229.8	0.86	Infin.	0.000	0.666	**Non-Liq.**	Non-Liq.	**0.00**
54.46	286.22	1.49	0.52	110	1.923	0.709	0.53	0.50	0.74	199.33	1.50		1	100	1.00	2.65	1.00	200.1	0.86	Infin.	0.000	0.665	**Non-Liq.**	Non-Liq.	**0.00**
54.63	215.92	2.04	0.94	110	1.927	0.708	0.95	0.54	0.72	146.37	1.77		1	93	1.09	2.65	1.00	159.6	0.86	0.458	0.393	0.664	**0.59**	85%	**0.57**
54.79	142.12	2.27	1.60	110	1.931	0.706	1.62	0.63	0.68	90.57	2.08		1	73	1.42		1.00	128.9	0.86	0.279	0.239	0.663	**0.36**	97%	**1.14**
54.95	95.61	2.50	2.61	110	1.934	0.705	2.66	0.72	0.65	57.33	2.37		1	54	2.21		1.00	126.7	0.89	0.269	0.240	0.662	**0.36**	97%	**1.16**
55.12	68.05	2.25	3.30	110	1.938	0.703	3.40	0.78	0.62	39.00	2.57		1	38	3.14		1.00	122.4	0.92	0.251	0.232	0.661	**0.35**	97%	**1.22**
55.28	52.93	1.90	3.59	110	1.942	0.701	3.73	0.81	0.61	29.39	2.69		0						0.92			0.659	**Non-Liq.**	Non-Liq.	**0.00**
55.45	46.61	2.06	4.41	110	1.946	0.700	4.61	0.85	0.60	25.19	2.80		0						0.92			0.658	**Non-Liq.**	Non-Liq.	**0.00**
55.61	110.59	2.63	2.38	110	1.950	0.698	2.42	0.70	0.65	67.05	2.30		1	60	1.94		1.00	129.9	0.89	0.284	0.252	0.657	**0.38**	96%	**1.13**
55.77	134.82	3.19	2.37	110	1.954	0.697	2.40	0.68	0.66	82.91	2.23		1	69	1.74		1.00	144.4	0.89	0.360	0.319	0.656	**0.49**	92%	**1.00**
55.94	157.81	3.55	2.25	110	1.958	0.695	2.28	0.66	0.67	98.35	2.16		1	76	1.58		1.00	155.1	0.85	0.427	0.363	0.655	**0.55**	87%	**0.67**
56.10	180.29	3.92	2.18	110	1.962	0.694	2.20	0.64	0.67	113.50	2.11		1	82	1.47		1.00	166.8	0.85	Infin.	0.000	0.654	**Non-Liq.**	Non-Liq.	**0.00**
56.27	192.22	4.13	2.15	110	1.966	0.692	2.17	0.63	0.68	121.48	2.08		1	85	1.43		1.00	173.3	0.85	Infin.	0.000	0.653	**Non-Liq.**	Non-Liq.	**0.00**
56.43	181.99	3.86	2.12	110	1.970	0.691	2.14	0.64	0.67	114.52	2.10		1	82	1.45		1.00	166.0	0.85	Infin.	0.000	0.652	**Non-Liq.**	Non-Liq.	**0.00**
56.59	157.22	3.50	2.23	110	1.974	0.689	2.26	0.66	0.66	97.46	2.16		1	76	1.58		1.00	153.6	0.85	0.417	0.354	0.650	**0.54**	88%	**0.71**
56.76	135.91	2.78	2.04	110	1.977	0.688	2.07	0.66	0.66	83.65	2.18		1	69	1.62		1.00	135.7	0.88	0.312	0.276	0.649	**0.42**	94%	**1.06**
56.92	120.38	2.34	1.94	110	1.981	0.686	1.97	0.67	0.66	73.50	2.21		1	64	1.68		1.00	123.7	0.88	0.256	0.226	0.648	**0.35**	97%	**1.20**
57.09	104.50	2.33	2.23	110	1.985	0.685	2.27	0.70	0.64	62.45	2.30		1	57	1.95		1.00	121.6	0.88	0.247	0.218	0.647	**0.34**	97%	**1.22**
57.25	69.37	1.60	2.31	110	1.989	0.683	2.38	0.75	0.62	39.77	2.46		1	39	2.57		1.00	102.2	0.92	0.179	0.165	0.646	**0.26**	99%	**1.48**
57.41	32.64	1.19	3.63	110	1.993	0.682	3.87	0.87	0.58	16.66	2.88		0						0.92			0.645	**Non-Liq.**	Non-Liq.	**0.00**
57.58	24.63	0.77	3.11	110	1.997	0.680	3.38	0.90	0.57	12.11	2.96		0						0.92			0.644	**Non-Liq.**	Non-Liq.	**0.00**
57.74	22.59	0.67	2.95	110	2.001	0.679	3.23	0.90	0.56	10.95	2.98		0						0.92			0.643	**Non-Liq.**	Non-Liq.	**0.00**
57.91	21.75	0.79	3.64	110	2.005	0.678	4.01	0.93	0.55	10.33	3.06		0						0.92			0.642	**Non-Liq.**	Non-Liq.	**0.00**
58.07	25.26	0.77	3.05	110	2.009	0.676	3.31	0.89	0.56	12.41	2.95		0						0.92			0.641	**Non-Liq.**	Non-Liq.	**0.00**

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff. Stress at Midpt. p'o (tsf)	rd	F	n	C_q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_c	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	*Volumetric Strain (%)*
58.23	28.61	0.75	2.63	110	2.013	0.675	2.83	0.86	0.57	14.43	2.85		0						0.92			0.640	**Non-Liq.**	Non-Liq.	**0.00**
58.40	24.43	0.68	2.77	110	2.016	0.673	3.02	0.89	0.56	11.94	2.94		0						0.92			0.638	**Non-Liq.**	Non-Liq.	**0.00**
58.56	36.91	0.77	2.09	110	2.020	0.672	2.21	0.81	0.59	19.49	2.68		0						0.92			0.637	**Non-Liq.**	Non-Liq.	**0.00**
58.73	23.45	0.91	3.86	110	2.024	0.671	4.23	0.92	0.55	11.13	3.05		0						0.91			0.636	**Non-Liq.**	Non-Liq.	**0.00**
58.89	18.11	1.14	6.28	110	2.028	0.669	7.07	1.00	0.52	7.93	3.30		0						0.91			0.635	**Non-Liq.**	Non-Liq.	**0.00**
59.06	65.03	1.57	2.41	110	2.032	0.668	2.48	0.76	0.61	36.29	2.50		1	35	2.78		1.00	100.8	0.91	0.175	0.160	0.634	**0.25**	99%	**1.50**
59.22	103.87	1.91	1.83	110	2.036	0.666	1.87	0.68	0.64	61.58	2.25		1	57	1.79		1.00	110.3	0.87	0.205	0.179	0.633	**0.28**	98%	**1.37**
59.38	65.03	1.50	2.30	110	2.040	0.665	2.38	0.75	0.61	36.27	2.49		1	35	2.72		1.00	98.5	0.91	0.169	0.154	0.632	**0.24**	99%	**1.53**
59.55	38.85	0.98	2.51	110	2.044	0.664	2.65	0.82	0.58	20.23	2.72		0						0.91			0.631	**Non-Liq.**	Non-Liq.	**0.00**
59.71	27.32	0.71	2.60	110	2.048	0.662	2.81	0.87	0.56	13.44	2.88		0						0.91			0.630	**Non-Liq.**	Non-Liq.	**0.00**
59.88	17.57	0.45	2.57	110	2.052	0.661	2.91	0.93	0.54	7.92	3.07		0						0.91			0.629	**Non-Liq.**	Non-Liq.	**0.00**
60.04	14.52	0.43	2.94	110	2.055	0.660	3.43	0.97	0.53	6.19	3.20		0						0.91			0.628	**Non-Liq.**	Non-Liq.	**0.00**
60.20	13.78	0.46	3.32	110	2.059	0.658	3.91	0.99	0.52	5.74	3.26		0						0.91			0.627	**Non-Liq.**	Non-Liq.	**0.00**
60.37	14.34	0.56	3.88	110	2.063	0.657	4.54	0.99	0.52	5.98	3.28		0						0.91			0.626	**Non-Liq.**	Non-Liq.	**0.00**
60.53	16.36	0.62	3.78	110	2.067	0.656	4.32	0.97	0.52	7.05	3.21		0						0.91			0.625	**Non-Liq.**	Non-Liq.	**0.00**
60.70	23.29	0.00	0.00	110	2.071	0.654	0.00	0.80	0.58	11.71	2.64		0		1.00				0.91			0.624	**Non-Liq.**	Non-Liq.	**0.00**
60.86	28.55	0.00	0.00	110	2.075	0.653	0.00	0.79	0.59	14.72	2.60		1	0	1.00		1.00	14.7	0.91	0.062	0.057	0.623	**0.09**	100%	**5.78**
61.02	34.53	0.00	0.00	110	2.079	0.652	0.00	0.78	0.59	18.16	2.56		1	6	1.00		1.00	18.2	0.91	0.065	0.059	0.622	**0.10**	100%	**5.00**

Project: Oxnard High School No. 8
Job No: 301953-001
Date: 8/14/2018
Sounding: CPT-3 Plot: 3

Methods: Liquefaction Analysis using 1998 NCEER workshop methods (Robertson & Wride)
Post-liquefaction Settlement Analysis from Tokimatsu & Seed (1987)
Dry Sand Settlement by Pradel, ASCE Journal of G&GE, Vol 124, No. 4

Total Liquefied Thickness (feet)
2.3

EARTHQUAKE INFORMATION:
Magnitude: 6.77 (7.5)
PGA, g: 0.97 (0.75)
MSF: 1.30
GWT, feet: 20.0
Design GWT, feet: 8.0

Induced CSR (M=7.5): = 0.65*PGA*(po/p'o)*rd/MSF
Clean Sand Qc1n = C_Q*K_C*K_H*Qc
SF = $CRR_{7.5}$*Kσ/CSR
Use Tokimatsu & Seed (0) or Ishihara &Yoshmine (1): 0
Unit Weight of unsaturated soils: 110 pcf
Unit Weight of saturated soils: 110 pcf
Limiting Ic for liquefiable soils: 2.60
Limiting Ic for K_H: 2.0
Required SF: 1.50
Min SF of Liquefiable Layers: 0.17
Avg SF of Liquefiable Layers: 0.02

Probab	Total Induced Subsidence (inches)
Avg	
5%	
Max	
100%	0.3

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
0.16	61.63	0.93	1.50	110	0.009	1.000	1.50	0.62	1.70	99.01	2.03		1	76	1.34		1.00	133.0	1.00	0.299	0.299	0.485	Non-Liq.	Non-Liq.	0.00
0.33	79.05	1.53	1.94	110	0.018	1.000	1.94	0.62	1.70	126.99	2.03		1	87	1.35		1.00	171.2	1.00	Infin.	0.000	0.485	Non-Liq.	Non-Liq.	0.00
0.49	78.13	1.93	2.46	110	0.027	1.000	2.46	0.64	1.70	125.50	2.12		1	86	1.48		1.00	186.4	1.00	Infin.	0.000	0.485	Non-Liq.	Non-Liq.	0.00
0.66	68.31	1.84	2.70	110	0.036	1.000	2.70	0.66	1.70	109.70	2.18		1	81	1.63		1.00	178.6	1.00	Infin.	0.000	0.485	Non-Liq.	Non-Liq.	0.00
0.82	54.87	1.52	2.77	110	0.045	1.000	2.77	0.68	1.70	88.09	2.26		1	72	1.82		1.00	159.9	1.00	0.460	0.460	0.485	Non-Liq.	Non-Liq.	0.00
0.98	47.14	1.21	2.56	110	0.054	1.000	2.57	0.69	1.70	75.66	2.28		1	65	1.88		1.00	142.1	1.00	0.347	0.347	0.485	Non-Liq.	Non-Liq.	0.00
1.15	39.47	1.02	2.57	110	0.063	0.999	2.58	0.71	1.70	63.32	2.33		1	58	2.06		1.00	130.5	1.00	0.287	0.287	0.484	Non-Liq.	Non-Liq.	0.00
1.31	39.47	1.02	2.57	110	0.072	0.999	2.58	0.71	1.70	63.30	2.33		1	58	2.06		1.00	130.5	1.00	0.287	0.287	0.484	Non-Liq.	Non-Liq.	0.00
1.48	31.24	0.82	2.63	110	0.081	0.999	2.64	0.73	1.70	50.07	2.41		1	48	2.37		1.00	118.7	1.00	0.236	0.236	0.484	Non-Liq.	Non-Liq.	0.00
1.64	24.89	0.66	2.65	110	0.090	0.998	2.66	0.75	1.70	39.85	2.49		1	39	2.72		1.00	108.3	1.00	0.198	0.198	0.484	Non-Liq.	Non-Liq.	0.00
1.80	19.86	0.33	1.65	110	0.099	0.998	1.66	0.74	1.70	31.75	2.44		1	29	2.48		1.00	78.7	1.00	0.125	0.125	0.484	Non-Liq.	Non-Liq.	0.00
1.97	20.55	0.42	2.06	110	0.108	0.998	2.07	0.75	1.70	32.85	2.49		1	31	2.70		1.00	88.6	1.00	0.145	0.145	0.484	Non-Liq.	Non-Liq.	0.00
2.13	20.42	0.47	2.29	110	0.117	0.997	2.30	0.76	1.70	32.62	2.52		1	30	2.85		1.00	93.0	1.00	0.155	0.155	0.483	Non-Liq.	Non-Liq.	0.00
2.30	19.65	0.48	2.45	110	0.126	0.997	2.46	0.77	1.70	31.37	2.55		1	29	3.02		1.00	94.8	1.00	0.159	0.159	0.483	Non-Liq.	Non-Liq.	0.00
2.46	18.16	0.52	2.85	110	0.135	0.996	2.87	0.79	1.70	28.96	2.62		0						1.00			0.483	Non-Liq.	Non-Liq.	0.00
2.62	15.20	0.57	3.77	110	0.144	0.996	3.81	0.83	1.70	24.19	2.76		0						1.00			0.483	Non-Liq.	Non-Liq.	0.00
2.79	13.95	0.57	4.06	110	0.153	0.996	4.10	0.85	1.70	22.17	2.81		0						1.00			0.483	Non-Liq.	Non-Liq.	0.00
2.95	11.38	0.56	4.92	110	0.162	0.995	4.99	0.89	1.70	18.02	2.93		0						1.00			0.482	Non-Liq.	Non-Liq.	0.00
3.12	12.18	0.59	4.85	110	0.171	0.995	4.92	0.88	1.70	19.30	2.90		0						1.00			0.482	Non-Liq.	Non-Liq.	0.00
3.28	12.71	0.60	4.68	110	0.180	0.994	4.75	0.87	1.70	20.13	2.88		0						1.00			0.482	Non-Liq.	Non-Liq.	0.00
3.44	11.57	0.62	5.32	110	0.189	0.994	5.41	0.89	1.70	18.29	2.95		0						1.00			0.482	Non-Liq.	Non-Liq.	0.00
3.61	11.06	0.51	4.57	110	0.198	0.994	4.65	0.88	1.70	17.45	2.92		0						1.00			0.482	Non-Liq.	Non-Liq.	0.00
3.77	20.97	0.48	2.28	110	0.208	0.993	2.30	0.76	1.70	33.36	2.51		1	31	2.81		1.00	93.8	1.00	0.157	0.157	0.482	Non-Liq.	Non-Liq.	0.00
3.94	29.22	0.55	1.88	110	0.217	0.993	1.90	0.71	1.70	46.60	2.34		1	45	2.09		1.00	97.6	1.00	0.166	0.166	0.481	Non-Liq.	Non-Liq.	0.00
4.10	37.87	0.68	1.79	110	0.226	0.993	1.80	0.68	1.70	60.49	2.24		1	56	1.78		1.00	107.4	1.00	0.195	0.195	0.481	Non-Liq.	Non-Liq.	0.00
4.27	45.79	0.82	1.80	110	0.235	0.992	1.81	0.66	1.70	73.20	2.18		1	64	1.62		1.00	118.8	1.00	0.236	0.236	0.481	Non-Liq.	Non-Liq.	0.00
4.43	52.76	0.97	1.84	110	0.244	0.992	1.85	0.65	1.70	84.38	2.14		1	70	1.54		1.00	129.9	1.00	0.284	0.284	0.481	Non-Liq.	Non-Liq.	0.00
4.59	58.36	1.00	1.72	110	0.253	0.991	1.73	0.64	1.70	93.37	2.09		1	74	1.44		1.00	134.3	1.00	0.305	0.305	0.481	Non-Liq.	Non-Liq.	0.00
4.76	62.10	1.17	1.89	110	0.262	0.991	1.90	0.64	1.70	99.36	2.10		1	77	1.46		1.00	144.7	1.00	0.362	0.362	0.480	Non-Liq.	Non-Liq.	0.00
4.92	64.35	1.31	2.03	110	0.271	0.991	2.04	0.64	1.70	102.96	2.11		1	78	1.48		1.00	152.2	1.00	0.408	0.408	0.480	Non-Liq.	Non-Liq.	0.00
5.09	68.21	1.45	2.13	110	0.280	0.990	2.14	0.64	1.70	109.15	2.11		1	80	1.47		1.00	160.8	1.00	Infin.	0.000	0.480	Non-Liq.	Non-Liq.	0.00
5.25	72.78	1.57	2.16	110	0.289	0.990	2.17	0.64	1.70	116.48	2.10		1	83	1.45		1.00	168.6	1.00	Infin.	0.000	0.480	Non-Liq.	Non-Liq.	0.00
5.41	77.81	1.63	2.10	110	0.298	0.989	2.11	0.63	1.70	124.55	2.07		1	86	1.40		1.00	174.2	1.00	Infin.	0.000	0.480	Non-Liq.	Non-Liq.	0.00
5.58	85.70	1.64	1.91	110	0.307	0.989	1.92	0.61	1.70	137.21	2.01		1	90	1.31		1.00	179.9	1.00	Infin.	0.000	0.479	Non-Liq.	Non-Liq.	0.00
5.74	100.29	1.65	1.65	110	0.316	0.989	1.65	0.58	1.70	160.64	1.91		1	96	1.20	1.00	1.00	193.9	1.00	Infin.	0.000	0.479	Non-Liq.	Non-Liq.	0.00
5.91	115.78	1.63	1.41	110	0.325	0.988	1.41	0.55	1.70	185.51	1.82		1	100	1.12	1.05	1.00	209.1	1.00	Infin.	0.000	0.479	Non-Liq.	Non-Liq.	0.00
6.07	127.60	1.61	1.26	110	0.334	0.988	1.27	0.54	1.70	204.49	1.76		1	100	1.08	1.10	1.00	221.2	1.00	Infin.	0.000	0.479	Non-Liq.	Non-Liq.	0.00
6.23	135.25	1.64	1.21	110	0.343	0.988	1.22	0.53	1.70	216.77	1.73		1	100	1.06	1.15	1.00	230.1	1.00	Infin.	0.000	0.479	Non-Liq.	Non-Liq.	0.00
6.40	142.84	1.69	1.18	110	0.352	0.987	1.19	0.52	1.70	228.95	1.71		1	100	1.04	1.20	1.00	239.3	1.00	Infin.	0.000	0.479	Non-Liq.	Non-Liq.	0.00
6.56	144.87	1.70	1.18	110	0.361	0.987	1.18	0.52	1.70	232.20	1.70		1	100	1.04	1.25	1.00	241.7	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
6.73	154.10	1.74	1.13	110	0.370	0.986	1.13	0.51	1.70	247.01	1.67		1	100	1.02	1.30	1.00	251.8	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
6.89	159.66	1.81	1.14	110	0.379	0.986	1.14	0.51	1.68	253.36	1.66		1	100	1.01	1.35	1.00	257.5	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.05	165.12	1.78	1.08	110	0.388	0.986	1.08	0.50	1.65	257.24	1.64		1	100	1.00	1.40	1.00	257.5	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.22	169.35	1.74	1.02	110	0.397	0.985	1.03	0.50	1.63	260.70	1.62		1	100	1.00	1.45	1.00	261.7	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.38	177.82	1.68	0.94	110	0.406	0.985	0.95	0.50	1.61	270.69	1.58		1	100	1.00	1.50	1.00	271.7	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.55	173.84	1.63	0.94	110	0.415	0.985	0.94	0.50	1.60	261.72	1.59		1	100	1.00	1.55	1.00	262.7	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
7.71	173.84	1.63	0.94	110	0.424	0.984	0.94	0.50	1.58	258.90	1.59		1	100	1.00	1.60	1.00	259.9	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
7.87	174.47	1.63	0.94	110	0.433	0.984	0.94	0.50	1.56	257.11	1.60		1	100	1.00	1.65	1.00	258.1	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
8.04	179.36	1.92	1.07	110	0.442	0.984	1.07	0.50	1.55	261.61	1.63		1	100	1.00	1.70	1.00	262.6	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
8.20	186.51	2.06	1.10	110	0.451	0.983	1.11	0.50	1.53	269.32	1.64		1	100	1.00	1.75	1.00	270.3	1.00	Infin.	0.000	0.481	Non-Liq.	Non-Liq.	0.00
8.37	187.62	1.80	0.96	110	0.460	0.983	0.96	0.50	1.52	268.24	1.59		1	100	1.00	1.80	1.00	269.2	1.00	Infin.	0.000	0.486	Non-Liq.	Non-Liq.	0.00
8.53	196.66	1.97	1.00	110	0.469	0.982	1.00	0.50	1.50	278.47	1.60		1	100	1.00	1.85	1.00	279.5	1.00	Infin.	0.000	0.491	Non-Liq.	Non-Liq.	0.00
8.69	203.40	2.06	1.01	110	0.478	0.982	1.01	0.50	1.49	285.29	1.59		1	100	1.00	1.90	1.00	286.4	1.00	Infin.	0.000	0.496	Non-Liq.	Non-Liq.	0.00
8.86	213.10	2.23	1.05	110	0.487	0.982	1.05	0.50	1.47	296.14	1.59		1	100	1.00	1.95	1.00	297.2	1.00	Infin.	0.000	0.501	Non-Liq.	Non-Liq.	0.00
9.02	211.76	2.34	1.10	110	0.496	0.981	1.11	0.50	1.46	291.57	1.62		1	100	1.00	2.00	1.00	292.7	1.00	Infin.	0.000	0.506	Non-Liq.	Non-Liq.	0.00
9.19	215.66	2.34	1.09	110	0.505	0.981	1.09	0.50	1.45	294.28	1.61		1	100	1.00	2.05	1.00	295.4	1.00	Infin.	0.000	0.510	Non-Liq.	Non-Liq.	0.00
9.35	219.54	2.54	1.16	110	0.514	0.981	1.16	0.50	1.43	296.93	1.63		1	100	1.00	2.10	1.00	298.0	1.00	Infin.	0.000	0.515	Non-Liq.	Non-Liq.	0.00
9.51	229.63	2.68	1.17	110	0.523	0.980	1.17	0.50	1.42	307.91	1.62		1	100	1.00	2.15	1.00	309.1	1.00	Infin.	0.000	0.520	Non-Liq.	Non-Liq.	0.00
9.68	235.06	2.79	1.18	110	0.532	0.980	1.19	0.50	1.41	312.51	1.62		1	100	1.00	2.20	1.00	313.7	1.00	Infin.	0.000	0.524	Non-Liq.	Non-Liq.	0.00
9.84	237.58	2.88	1.21	110	0.541	0.980	1.21	0.50	1.40	313.21	1.63		1	100	1.00	2.25	1.00	314.4	1.00	Infin.	0.000	0.529	Non-Liq.	Non-Liq.	0.00
10.01	233.01	2.93	1.26	110	0.550	0.979	1.26	0.50	1.39	305.09	1.65		1	100	1.00	2.30	1.00	306.7	1.00	Infin.	0.000	0.533	Non-Liq.	Non Liq.	0.00
10.17	237.10	2.96	1.25	110	0.559	0.979	1.25	0.50	1.38	307.65	1.64		1	100	1.00	2.35	1.00	308.3	1.00	Infin.	0.000	0.537	Non-Liq.	Non-Liq.	0.00
10.33	243.13	3.06	1.26	110	0.568	0.979	1.26	0.50	1.36	312.86	1.64		1	100	1.00	2.40	1.00	313.1	1.00	Infin.	0.000	0.541	Non-Liq.	Non-Liq.	0.00
10.50	243.55	3.17	1.30	110	0.577	0.978	1.30	0.50	1.36	311.64	1.65		1	100	1.01	2.45	1.00	314.7	1.00	Infin.	0.000	0.545	Non-Liq.	Non-Liq.	0.00
10.66	243.58	3.23	1.32	110	0.586	0.978	1.33	0.51	1.35	309.70	1.66		1	100	1.01	2.50	1.00	314.6	1.00	Infin.	0.000	0.550	Non-Liq.	Non-Liq.	0.00
10.83	251.39	3.25	1.29	110	0.595	0.978	1.30	0.50	1.33	316.43	1.65		1	100	1.00	2.55	1.00	318.3	1.00	Infin.	0.000	0.554	Non-Liq.	Non-Liq.	0.00
10.99	254.32	3.43	1.35	110	0.604	0.977	1.35	0.51	1.33	318.41	1.66		1	100	1.01	2.60	1.00	323.3	1.00	Infin.	0.000	0.557	Non-Liq.	Non-Liq.	0.00
11.15	250.44	3.64	1.45	110	0.614	0.977	1.46	0.52	1.32	312.74	1.69		1	100	1.03	2.65	1.00	324.1	1.00	Infin.	0.000	0.561	Non-Liq.	Non-Liq.	0.00
11.32	235.91	3.45	1.46	110	0.623	0.977	1.47	0.52	1.32	293.22	1.71		1	100	1.05	2.70	1.00	307.7	1.00	Infin.	0.000	0.565	Non-Liq.	Non-Liq.	0.00
11.48	231.44	3.34	1.44	110	0.632	0.976	1.45	0.52	1.31	285.58	1.71		1	100	1.05	2.75	1.00	300.1	1.00	Infin.	0.000	0.569	Non-Liq.	Non-Liq.	0.00
11.65	243.81	3.39	1.39	110	0.641	0.976	1.40	0.51	1.29	297.60	1.69		1	100	1.03	2.80	1.00	308.0	1.00	Infin.	0.000	0.572	Non-Liq.	Non-Liq.	0.00
11.81	248.76	3.18	1.28	110	0.650	0.975	1.28	0.51	1.28	300.06	1.66		1	100	1.01	2.85	1.00	303.9	1.00	Infin.	0.000	0.576	Non-Liq.	Non-Liq.	0.00
11.98	252.74	3.49	1.38	110	0.659	0.975	1.39	0.51	1.27	303.78	1.68		1	100	1.03	2.90	1.00	312.7	1.00	Infin.	0.000	0.580	Non-Liq.	Non-Liq.	0.00
12.14	246.32	3.71	1.51	110	0.668	0.975	1.51	0.52	1.27	295.51	1.72		1	100	1.05	2.95	1.00	311.7	1.00	Infin.	0.000	0.583	Non-Liq.	Non-Liq.	0.00
12.30	247.22	3.84	1.55	110	0.677	0.974	1.56	0.53	1.27	294.93	1.73		1	100	1.06	3.00	1.00	313.3	1.00	Infin.	0.000	0.587	Non-Liq.	Non-Liq.	0.00
12.47	246.81	3.92	1.59	110	0.686	0.974	1.59	0.53	1.26	292.77	1.74		1	100	1.07	3.05	1.00	313.0	1.00	Infin.	0.000	0.590	Non-Liq.	Non-Liq.	0.00
12.63	246.30	4.04	1.64	110	0.695	0.974	1.65	0.53	1.25	290.63	1.75		1	100	1.07	3.10	1.00	313.4	1.00	Infin.	0.000	0.593	Non-Liq.	Non-Liq.	0.00
12.80	244.00	4.09	1.67	110	0.704	0.973	1.68	0.54	1.25	286.30	1.76		1	100	1.08	3.15	1.00	310.9	1.00	Infin.	0.000	0.597	Non-Liq.	Non-Liq.	0.00

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	Induced EQ CRR	M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
12.96	243.85	4.05	1.66	110	0.713	0.973	1.67	0.54	1.24	284.13	1.76		1	100	1.08	3.20	1.00	308.4	1.00	Infin.	0.000	0.600	**Non-Liq.**	Non-Liq.	**0.00**
13.12	250.82	4.24	1.69	110	0.722	0.973	1.70	0.54	1.23	290.33	1.76		1	100	1.08	3.25	1.00	315.3	1.00	Infin.	0.000	0.603	**Non-Liq.**	Non-Liq.	**0.00**
13.29	254.86	4.23	1.66	110	0.731	0.972	1.66	0.53	1.22	292.76	1.76		1	100	1.08	3.30	1.00	316.1	1.00	Infin.	0.000	0.606	**Non-Liq.**	Non-Liq.	**0.00**
13.45	265.02	4.01	1.51	110	0.740	0.972	1.52	0.52	1.21	301.15	1.72		1	100	1.05	3.35	1.00	316.9	1.00	Infin.	0.000	0.609	**Non-Liq.**	Non-Liq.	**0.00**
13.62	296.24	3.54	1.19	110	0.749	0.972	1.20	0.50	1.19	331.97	1.61		1	100	1.00	3.40	1.00	333.2	1.00	Infin.	0.000	0.612	**Non-Liq.**	Non-Liq.	**0.00**
13.78	358.75	4.85	1.35	110	0.758	0.971	1.35	0.50	1.18	399.79	1.61		1	100	1.00	3.45	1.00	401.3	1.00	Infin.	0.000	0.615	**Non-Liq.**	Non-Liq.	**0.00**
13.94	401.73	4.27	1.06	110	0.767	0.971	1.07	0.50	1.17	445.14	1.49		1	100	1.00	3.45	1.00	446.8	1.00	Infin.	0.000	0.618	**Non-Liq.**	Non-Liq.	**0.00**
14.11	397.89	5.59	1.40	110	0.776	0.971	1.41	0.50	1.17	438.29	1.60		1	100	1.00	3.45	1.00	439.9	1.00	Infin.	0.000	0.621	**Non-Liq.**	Non-Liq.	**0.00**
14.27	408.46	4.70	1.15	110	0.785	0.970	1.15	0.50	1.16	447.36	1.52		1	100	1.00	3.45	1.00	449.0	1.00	Infin.	0.000	0.624	**Non-Liq.**	Non-Liq.	**0.00**
14.44	435.23	5.55	1.28	110	0.794	0.970	1.28	0.50	1.15	474.00	1.55		1	100	1.00	3.45	1.00	475.8	1.00	Infin.	0.000	0.627	**Non-Liq.**	Non-Liq.	**0.00**
14.60	389.69	5.04	1.29	110	0.803	0.970	1.30	0.50	1.15	421.92	1.58		1	100	1.00	3.45	1.00	423.5	1.00	Infin.	0.000	0.629	**Non-Liq.**	Non-Liq.	**0.00**
14.76	348.88	3.51	1.01	110	0.812	0.969	1.01	0.50	1.14	375.53	1.52		1	100	1.00	3.45	1.00	376.9	1.00	Infin.	0.000	0.632	**Non-Liq.**	Non-Liq.	**0.00**
14.93	347.64	3.21	0.92	110	0.821	0.969	0.93	0.50	1.14	372.12	1.49		1	100	1.00	3.45	1.00	373.5	1.00	Infin.	0.000	0.635	**Non-Liq.**	Non-Liq.	**0.00**
15.09	366.34	3.29	0.90	110	0.830	0.969	0.90	0.50	1.13	390.04	1.47		1	100	1.00	3.45	1.00	391.5	1.00	Infin.	0.000	0.637	**Non-Liq.**	Non-Liq.	**0.00**
15.26	355.46	3.76	1.06	110	0.839	0.968	1.06	0.50	1.12	376.38	1.53		1	100	1.00	3.45	1.00	377.8	1.00	Infin.	0.000	0.640	**Non-Liq.**	Non-Liq.	**0.00**
15.42	339.34	3.85	1.14	110	0.848	0.968	1.14	0.50	1.12	357.34	1.57		1	100	1.00	3.45	1.00	358.7	1.00	Infin.	0.000	0.643	**Non-Liq.**	Non-Liq.	**0.00**
15.58	338.34	4.27	1.26	110	0.857	0.967	1.27	0.50	1.11	354.40	1.61		1	100	1.00	3.45	1.00	355.7	1.00	Infin.	0.000	0.645	**Non-Liq.**	Non-Liq.	**0.00**
15.75	341.10	4.54	1.33	110	0.866	0.967	1.33	0.50	1.11	355.42	1.63		1	100	1.00	3.45	1.00	356.7	1.00	Infin.	0.000	0.648	**Non-Liq.**	Non-Liq.	**0.00**
15.91	335.06	4.41	1.32	110	0.875	0.967	1.32	0.50	1.10	347.30	1.63		1	100	1.00	3.45	1.00	348.6	1.00	Infin.	0.000	0.650	**Non-Liq.**	Non-Liq.	**0.00**
16.08	339.73	3.85	1.13	110	0.884	0.966	1.14	0.50	1.09	350.34	1.58		1	100	1.00	3.45	1.00	351.6	1.00	Infin.	0.000	0.653	**Non-Liq.**	Non-Liq.	**0.00**
16.24	339.17	3.94	1.16	110	0.893	0.966	1.16	0.50	1.09	347.98	1.59		1	100	1.00	3.45	1.00	349.3	1.00	Infin.	0.000	0.655	**Non-Liq.**	Non-Liq.	**0.00**
16.40	304.89	4.11	1.35	110	0.902	0.966	1.35	0.51	1.08	311.54	1.67		1	100	1.02	3.45	1.00	317.6	1.00	Infin.	0.000	0.657	**Non-Liq.**	Non-Liq.	**0.00**
16.57	240.39	3.63	1.51	110	0.911	0.965	1.51	0.54	1.08	245.31	1.77		1	100	1.08	3.45	1.00	267.0	1.00	Infin.	0.000	0.660	**Non-Liq.**	Non-Liq.	**0.00**
16.73	200.85	3.97	1.97	110	0.920	0.965	1.98	0.58	1.08	204.91	1.91		1	100	1.20	3.45	1.00	246.3	1.00	Infin.	0.000	0.662	**Non-Liq.**	Non-Liq.	**0.00**
16.90	186.05	3.36	1.80	110	0.929	0.965	1.81	0.58	1.08	188.60	1.90		1	100	1.19	3.45	1.00	225.2	1.00	Infin.	0.000	0.664	**Non-Liq.**	Non-Liq.	**0.00**
17.06	145.35	4.55	3.13	110	0.938	0.964	3.15	0.65	1.08	147.65	2.15		1	93	1.56		1.00	230.8	1.00	Infin.	0.000	0.666	**Non-Liq.**	Non-Liq.	**0.00**
17.22	137.21	1.70	1.24	110	0.947	0.964	1.25	0.57	1.06	137.16	1.87		1	90	1.16	1.00	1.00	160.3	1.00	Infin.	0.000	0.669	**Non-Liq.**	Non-Liq.	**0.00**
17.39	195.13	2.67	1.37	110	0.956	0.963	1.37	0.55	1.06	193.97	1.80		1	100	1.11	1.05	1.00	215.5	1.00	Infin.	0.000	0.671	**Non-Liq.**	Non-Liq.	**0.00**
17.55	375.11	3.14	0.84	110	0.965	0.963	0.84	0.50	1.05	370.21	1.46		1	100	1.00	1.10	1.00	371.6	1.00	Infin.	0.000	0.673	**Non-Liq.**	Non-Liq.	**0.00**
17.72	366.40	3.61	0.98	110	0.974	0.963	0.99	0.50	1.04	359.90	1.52		1	100	1.00	1.15	1.00	361.2	1.00	Infin.	0.000	0.675	**Non-Liq.**	Non-Liq.	**0.00**
17.88	334.19	2.48	0.74	110	0.983	0.962	0.75	0.50	1.04	326.66	1.45		1	100	1.00	1.20	1.00	327.9	1.00	Infin.	0.000	0.677	**Non-Liq.**	Non-Liq.	**0.00**
18.04	253.24	2.71	1.07	110	0.992	0.962	1.08	0.50	1.03	246.22	1.65		1	100	1.00	1.25	1.00	248.4	1.00	Infin.	0.000	0.679	**Non-Liq.**	Non-Liq.	**0.00**
18.21	169.29	2.90	1.71	110	1.001	0.962	1.72	0.58	1.03	164.25	1.92		1	97	1.21	1.30	1.00	199.5	1.00	Infin.	0.000	0.681	**Non-Liq.**	Non-Liq.	**0.00**
18.37	135.74	2.18	1.61	110	1.010	0.961	1.62	0.60	1.03	130.89	1.97		1	88	1.26	1.35	1.00	165.6	1.00	Infin.	0.000	0.683	**Non-Liq.**	Non-Liq.	**0.00**
18.54	258.73	2.13	0.82	110	1.020	0.961	0.83	0.50	1.02	248.14	1.56		1	100	1.00	1.40	1.00	249.1	1.00	Infin.	0.000	0.685	**Non-Liq.**	Non-Liq.	**0.00**
18.70	348.17	2.48	0.71	110	1.029	0.960	0.71	0.50	1.01	332.78	1.43		1	100	1.00	1.45	1.00	334.0	1.00	Infin.	0.000	0.687	**Non-Liq.**	Non-Liq.	**0.00**
18.86	379.90	3.61	0.95	110	1.038	0.960	0.95	0.50	1.01	361.60	1.51		1	100	1.00	1.50	1.00	363.0	1.00	Infin.	0.000	0.689	**Non-Liq.**	Non-Liq.	**0.00**
19.03	419.21	3.90	0.93	110	1.047	0.960	0.93	0.50	1.01	397.39	1.47		1	100	1.00	1.55	1.00	398.9	1.00	Infin.	0.000	0.691	**Non-Liq.**	Non-Liq.	**0.00**
19.19	396.96	4.58	1.15	110	1.056	0.959	1.16	0.50	1.00	374.62	1.57		1	100	1.00	1.60	1.00	376.0	1.00	Infin.	0.000	0.692	**Non-Liq.**	Non-Liq.	**0.00**
19.36	387.05	4.64	1.20	110	1.065	0.959	1.20	0.50	1.00	363.69	1.59		1	100	1.00	1.65	1.00	365.0	1.00	Infin.	0.000	0.694	**Non-Liq.**	Non-Liq.	**0.00**
19.52	368.81	4.55	1.23	110	1.074	0.958	1.24	0.50	0.99	345.03	1.61		1	100	1.00	1.70	1.00	346.3	1.00	Infin.	0.000	0.696	**Non-Liq.**	Non-Liq.	**0.00**
19.69	354.61	3.09	0.87	110	1.083	0.958	0.87	0.50	0.99	330.32	1.50		1	100	1.00	1.75	1.00	331.6	1.00	Infin.	0.000	0.698	**Non-Liq.**	Non-Liq.	**0.00**
19.85	342.37	2.52	0.74	110	1.092	0.957	0.74	0.50	0.98	317.55	1.46		1	100	1.00	1.80	1.00	318.7	1.00	Infin.	0.000	0.699	**Non-Liq.**	Non-Liq.	**0.00**
20.01	342.04	2.21	0.65	110	1.101	0.957	0.65	0.50	0.98	315.93	1.42		1	100	1.00	1.85	1.00	317.1	1.00	Infin.	0.000	0.701	**Non-Liq.**	Non-Liq.	**0.00**
20.18	348.47	2.02	0.58	110	1.107	0.957	0.58	0.50	0.98	321.00	1.38		1	100	1.00	1.90	1.00	322.2	1.00	Infin.	0.000	0.703	**Non-Liq.**	Non-Liq.	**0.00**
20.34	358.46	2.21	0.62	110	1.111	0.956	0.62	0.50	0.98	329.65	1.39		1	100	1.00	1.95	1.00	330.9	1.00	Infin.	0.000	0.704	**Non-Liq.**	Non-Liq.	**0.00**
20.51	366.69	2.31	0.63	110	1.115	0.956	0.63	0.50	0.97	336.65	1.39		1	100	1.00	2.00	1.00	337.9	1.00	Infin.	0.000	0.706	**Non-Liq.**	Non-Liq.	**0.00**
20.67	400.46	2.25	0.56	110	1.118	0.955	0.56	0.50	0.97	367.10	1.33		1	100	1.00	2.05	1.00	368.5	1.00	Infin.	0.000	0.708	**Non-Liq.**	Non-Liq.	**0.00**
20.83	398.65	2.07	0.52	110	1.122	0.955	0.52	0.50	0.97	364.80	1.31		1	100	1.00	2.10	1.00	366.2	1.00	Infin.	0.000	0.709	**Non-Liq.**	Non-Liq.	**0.00**
21.00	411.19	1.95	0.47	110	1.126	0.954	0.48	0.50	0.97	375.65	1.27		1	100	1.00	2.15	1.00	377.1	1.00	Infin.	0.000	0.711	**Non-Liq.**	Non-Liq.	**0.00**
21.16	402.69	3.64	0.90	110	1.130	0.954	0.91	0.50	0.97	367.22	1.48		1	100	1.00	2.20	1.00	368.6	1.00	Infin.	0.000	0.712	**Non-Liq.**	Non-Liq.	**0.00**
21.33	432.94	4.66	1.08	110	1.134	0.954	1.08	0.50	0.97	394.20	1.53		1	100	1.00	2.25	1.00	395.7	1.00	Infin.	0.000	0.714	**Non-Liq.**	Non-Liq.	**0.00**
21.49	469.69	5.29	1.13	110	1.138	0.953	1.13	0.50	0.96	427.01	1.52		1	100	1.00	2.30	1.00	428.6	1.00	Infin.	0.000	0.715	**Non-Liq.**	Non-Liq.	**0.00**
21.65	374.94	3.56	0.95	110	1.142	0.953	0.95	0.50	0.96	340.08	1.52		1	100	1.00	2.35	1.00	341.3	1.00	Infin.	0.000	0.717	**Non-Liq.**	Non-Liq.	**0.00**
21.82	335.23	2.37	0.71	110	1.146	0.952	0.71	0.50	0.96	303.43	1.46		1	100	1.00	2.40	1.00	304.6	1.00	Infin.	0.000	0.718	**Non-Liq.**	Non-Liq.	**0.00**
21.98	327.25	1.94	0.59	110	1.150	0.952	0.59	0.50	0.96	295.67	1.41		1	100	1.00	2.45	1.00	296.8	1.00	Infin.	0.000	0.719	**Non-Liq.**	Non-Liq.	**0.00**
22.15	329.21	1.70	0.51	110	1.154	0.951	0.52	0.50	0.96	296.94	1.37		1	100	1.00	2.50	1.00	298.1	1.00	Infin.	0.000	0.721	**Non-Liq.**	Non-Liq.	**0.00**
22.31	336.57	1.69	0.50	110	1.158	0.951	0.50	0.50	0.96	303.09	1.35		1	100	1.00	2.55	1.00	304.2	1.00	Infin.	0.000	0.722	**Non-Liq.**	Non-Liq.	**0.00**
22.47	342.42	1.62	0.47	110	1.161	0.950	0.48	0.50	0.95	307.85	1.33		1	100	1.00	2.60	1.00	309.0	1.00	Infin.	0.000	0.724	**Non-Liq.**	Non-Liq.	**0.00**
22.64	357.21	1.50	0.42	110	1.165	0.950	0.42	0.50	0.95	320.65	1.28		1	100	1.00	2.65	1.00	321.9	1.00	Infin.	0.000	0.725	**Non-Liq.**	Non-Liq.	**0.00**
22.80	365.13	1.60	0.44	110	1.169	0.949	0.44	0.50	0.95	327.23	1.29		1	100	1.00	2.70	1.00	328.5	1.00	Infin.	0.000	0.726	**Non-Liq.**	Non-Liq.	**0.00**
22.97	275.06	1.75	0.64	110	1.173	0.949	0.64	0.50	0.95	245.84	1.49		1	100	1.00	2.75	1.00	246.8	1.00	Infin.	0.000	0.727	**Non-Liq.**	Non-Liq.	**0.00**
23.13	359.31	1.67	0.47	110	1.177	0.948	0.47	0.50	0.95	320.93	1.31		1	100	1.00	2.80	1.00	322.1	1.00	Infin.	0.000	0.729	**Non-Liq.**	Non-Liq.	**0.00**
23.29	360.37	1.63	0.45	110	1.181	0.948	0.45	0.50	0.95	321.34	1.30		1	100	1.00	2.85	1.00	322.5	1.00	Infin.	0.000	0.730	**Non-Liq.**	Non-Liq.	**0.00**
23.46	371.26	1.97	0.53	110	1.185	0.947	0.53	0.50	0.94	330.53	1.34		1	100	1.00	2.90	1.00	331.8	1.00	Infin.	0.000	0.731	**Non-Liq.**	Non-Liq.	**0.00**
23.62	356.90	1.94	0.54	110	1.189	0.947	0.54	0.50	0.94	317.18	1.36		1	100	1.00	2.95	1.00	318.4	1.00	Infin.	0.000	0.732	**Non-Liq.**	Non-Liq.	**0.00**
23.79	361.74	2.11	0.58	110	1.193	0.946	0.58	0.50	0.94	320.97	1.38		1	100	1.00	3.00	1.00	322.2	1.00	Infin.	0.000	0.733	**Non-Liq.**	Non-Liq.	**0.00**
23.95	364.42	2.28	0.63	110	1.197	0.946	0.63	0.50	0.94	322.82	1.40		1	100	1.00	3.05	1.00	324.0	1.00	Infin.	0.000	0.735	**Non-Liq.**	Non-Liq.	**0.00**
24.11	368.01	2.35	0.64	110	1.200	0.945	0.64	0.50	0.94	325.48	1.40		1	100	1.00	3.10	1.00	326.7	1.00	Infin.	0.000	0.736	**Non-Liq.**	Non-Liq.	**0.00**
24.28	376.81	2.30	0.61	110	1.204	0.945	0.61	0.50	0.94	332.74	1.38		1	100	1.00	3.15	1.00	334.0	1.00	Infin.	0.000	0.737	**Non-Liq.**	Non-Liq.	**0.00**
24.44	395.44	2.76	0.70	110	1.208	0.944	0.70	0.50	0.94	348.68	1.41		1	100	1.00	3.20	1.00	350.0	1.00	Infin.	0.000	0.738	**Non-Liq.**	Non-Liq.	**0.00**
24.61	439.09	2.71	0.62	110	1.212	0.943	0.62	0.50	0.93	386.66	1.34		1	100	1.00	3.25	1.00	388.1	1.00	Infin.	0.000	0.739	**Non-Liq.**	Non-Liq.	**0.00**
24.77	490.41	3.14	0.64	110	1.216	0.943	0.64	0.50	0.93	431.28	1.32		1	100	1.00	3.30	1.00	432.9	1.00	Infin.	0.000	0.740	**Non-Liq.**	Non-Liq.	**0.00**
24.93	529.94	3.64	0.69	110	1.220	0.942	0.69	0.50	0.93	465.38	1.33		1	100	1.00	3.35	1.00	467.1	1.00	Infin.	0.000	0.741	**Non-Liq.**	Non-Liq.	**0.00**
25.10	499.75	2.73	0.55	110	1.224	0.942	0.55	0.50	0.93	438.10	1.27		1	100	1.00	3.40	1.00	439.7	1.00	Infin.	0.000	0.742	**Non-Liq.**	Non-Liq.	**0.00**
25.26	478.20	2.89	0.60	110	1.228	0.941	0.61	0.50	0.93	418.49	1.31		1	100	1.00	3.45	1.00	420.1	1.00	Infin.	0.000	0.743	**Non-Liq.**	Non-Liq.	**0.00**
25.43	506.69	3.13	0.62	110	1.232	0.941	0.62	0.50	0.93	442.78	1.30		1	100	1.00	3.50	1.00	444.4	1.00	Infin.	0.000	0.744	**Non-Liq.**	Non-Liq.	**0.00**
25.59	475.10	3.98	0.84	110	1.236	0.940	0.84	0.50	0.93	414.45	1.43		1	100	1.00	3.55	1.00	416.0	1.00	Infin.	0.000	0.745	**Non-Liq.**	Non-Liq.	**0.00**
25.75	412.87	3.59	0.87	110	1.240	0.939	0.87	0.50	0.92	359.45	1.48		1	100	1.00	3.60	1.00	360.8	1.00	Infin.	0.000	0.746	**Non-Liq.**	Non-Liq.	**0.00**
25.92	387.95	2.71	0.70	110	1.243	0.939	0.70	0.50	0.92	337.15	1.42		1	100	1.00	3.65	1.00	338.4	1.00	Infin.	0.000	0.747	**Non-Liq.**	Non-Liq.	**0.00**
26.08	382.12	2.49	0.65	110	1.247	0.938	0.65	0.50	0.92	331.55	1.40		1	100	1.00	3.65	1.00	332.8	1.00	Infin.	0.000	0.747	**Non-Liq.**	Non-Liq.	**0.00**
26.25	377.33	2.13	0.56	110	1.251	0.938	0.57	0.50	0.92	326.86	1.36		1	100	1.00	3.65	1.00	328.1	1.00	Infin.	0.000	0.748	**Non-Liq.**	Non-Liq.	**0.00**
26.41	378.71	2.10	0.56	110	1.255	0.937	0.56	0.50	0.92	327.55	1.36		1	100	1.00	3.65	1.00	328.8	1.00	Infin.	0.000	0.749	**Non-Liq.**	Non-Liq.	**0.00**
26.57	368.97	2.20	0.60	110	1.259	0.936	0.60	0.50	0.92	318.60	1.39		1	100	1.00	3.65	1.00	319.8	1.00	Infin.	0.000	0.750	**Non-Liq.**	Non-Liq.	**0.00**
26.74	347.99	2.18	0.63	110	1.263	0.936	0.63	0.50	0.92	299.95	1.42		1	100	1.00	3.65	1.00	301.1	1.00	Infin.	0.000	0.751	**Non-Liq.**	Non-Liq.	**0.00**
26.90	340.27	1.97	0.58	110	1.267	0.935	0.58	0.50	0.91	292.82	1.41		1	100	1.00	3.65	1.00	293.9	1.00	Infin.	0.000	0.751	**Non-Liq.**	Non-Liq.	**0.00**
27.07	342.93	1.87	0.55	110	1.271	0.934	0.55	0.50	0.91	294.66	1.39		1	100	1.00	3.65	1.00	295.8	1.00	Infin.	0.000	0.752	**Non-Liq.**	Non-Liq.	**0.00**
27.23	348.32	2.14	0.62	110	1.275	0.934	0.62	0.50	0.91	298.85	1.42		1	100	1.00	3.65	1.00	300.0	1.00	Infin.	0.000	0.753	**Non-Liq.**	Non-Liq.	**0.00**
27.40	349.36	2.35	0.67	110	1.279	0.933	0.68	0.50	0.91	299.28	1.45		1	100	1.00	3.65	1.00	300.4	1.00	Infin.	0.000	0.754	**Non-Liq.**	Non-Liq.	**0.00**
27.56	359.08	2.55	0.71	110	1.282	0.932	0.71	0.50	0.91	307.17	1.46		1	100	1.00	3.65	1.00	308.3	1.00	Infin.	0.000	0.754	**Non-Liq.**	Non-Liq.	**0.00**
27.72	348.61	2.28	0.65	110	1.286	0.932	0.66	0.50	0.91	297.72	1.44		1	100	1.00	3.65	1.00	298.8	1.00	Infin.	0.000	0.755	**Non-Liq.**	Non-Liq.	**0.00**
27.89	328.38	2.28	0.69	110	1.290	0.931	0.70	0.50	0.91	279.95	1.47		1	100	1.00	3.65	1.00	281.0	1.00	Infin.	0.000	0.756	**Non-Liq.**	Non-Liq.	**0.00**

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
28.05	318.21	2.37	0.75	110	1.294	0.930	0.75	0.50	0.90	270.83	1.51		1	100	1.00	3.65	1.00	271.8	1.00	Infin.	0.000	0.756	Non-Liq.	Non-Liq.	0.00
28.22	301.08	2.13	0.71	110	1.298	0.929	0.71	0.50	0.90	255.81	1.51		1	100	1.00	3.65	1.00	256.8	1.00	Infin.	0.000	0.757	Non-Liq.	Non-Liq.	0.00
28.38	284.36	2.03	0.71	110	1.302	0.929	0.72	0.50	0.90	241.17	1.53		1	100	1.00	3.65	1.00	242.1	1.00	Infin.	0.000	0.758	Non-Liq.	Non-Liq.	0.00
28.54	233.79	1.73	0.74	110	1.306	0.928	0.74	0.50	0.90	197.79	1.60		1	100	1.00	3.65	1.00	198.5	1.00	Infin.	0.000	0.758	Non-Liq.	Non-Liq.	0.00
28.71	198.59	1.43	0.72	110	1.310	0.927	0.72	0.50	0.90	167.50	1.65		1	98	1.00	3.65	1.00	168.5	1.00	Infin.	0.000	0.759	Non-Liq.	Non-Liq.	0.00
28.87	159.05	1.23	0.77	110	1.314	0.926	0.78	0.53	0.89	132.88	1.75		1	89	1.07	3.65	1.00	142.6	1.00	0.349	0.349	0.759	0.46	93%	1.00
29.04	114.83	1.31	1.14	110	1.318	0.926	1.15	0.60	0.88	94.08	1.97		1	74	1.26	3.65	1.00	119.2	1.00	0.238	0.238	0.760	0.31	98%	1.27
29.20	70.90	1.32	1.86	110	1.322	0.925	1.90	0.69	0.86	56.38	2.28		1	53	1.89		1.00	106.3	1.00	0.192	0.192	0.760	0.25	99%	1.44
29.36	37.97	1.25	3.30	110	1.325	0.924	3.42	0.81	0.83	28.87	2.67		0						1.00			0.761	Non-Liq.	Non-Liq.	0.00
29.53	27.93	1.04	3.72	110	1.329	0.923	3.91	0.85	0.82	20.70	2.81		0						1.00			0.761	Non-Liq.	Non-Liq.	0.00
29.69	18.87	0.73	3.87	110	1.333	0.923	4.16	0.90	0.81	13.46	2.98		0						1.00			0.762	Non-Liq.	Non-Liq.	0.00
29.86	13.89	0.49	3.53	110	1.337	0.922	3.90	0.93	0.80	9.54	3.08		0						1.00			0.762	Non-Liq.	Non-Liq.	0.00
30.02	9.76	0.66	6.75	110	1.341	0.921	7.83	1.00	0.79	6.28	3.41		0						1.00			0.763	Non-Liq.	Non-Liq.	0.00
30.18	57.63	0.77	1.33	110	1.345	0.920	1.36	0.69	0.85	45.11	2.26		1	44	1.84		1.00	83.0	1.00	0.133	0.133	0.763	0.17	100%	1.80
30.35	117.53	0.99	0.84	110	1.349	0.919	0.85	0.57	0.87	95.56	1.88		1	75	1.17	0.45	1.26	141.6	1.00	0.344	0.344	0.763	0.45	93%	1.01
30.51	114.11	1.23	1.08	110	1.353	0.918	1.09	0.60	0.86	92.04	1.96		1	73	1.25	0.50	1.26	146.0	1.00	0.369	0.369	0.764	0.48	92%	0.92
30.68	61.97	1.48	2.39	110	1.357	0.918	2.44	0.73	0.83	47.78	2.41		1	46	2.34		1.00	111.8	1.00	0.210	0.210	0.764	0.27	99%	1.36
30.84	26.16	1.22	4.64	110	1.361	0.917	4.90	0.88	0.80	18.78	2.91		0						1.00			0.764	Non-Liq.	Non-Liq.	0.00
31.00	14.26	0.26	1.81	110	1.364	0.916	2.00	0.88	0.80	9.74	2.91		0						1.00			0.765	Non-Liq.	Non-Liq.	0.00
31.17	13.19	0.23	1.73	110	1.368	0.915	1.93	0.89	0.80	8.89	2.94		0						1.00			0.765	Non-Liq.	Non-Liq.	0.00
31.33	12.49	0.36	2.88	110	1.372	0.914	3.24	0.93	0.78	8.24	3.08		0						1.00			0.765	Non-Liq.	Non-Liq.	0.00
31.50	17.25	0.69	3.98	110	1.376	0.913	4.33	0.92	0.79	11.79	3.03		0						1.00			0.765	Non-Liq.	Non-Liq.	0.00
31.66	38.57	0.92	2.37	110	1.380	0.912	2.46	0.78	0.81	28.56	2.58		1	25	3.20		1.00	91.5	1.00	0.151	0.151	0.766	0.20	100%	1.66
31.82	35.69	1.30	3.63	110	1.384	0.911	3.78	0.83	0.80	25.97	2.73		0						1.00			0.766	Non-Liq.	Non-Liq.	0.00
31.99	58.47	1.43	2.44	110	1.388	0.910	2.50	0.74	0.82	44.14	2.44		1	43	2.48		1.00	109.5	1.00	0.202	0.202	0.766	0.26	99%	1.39
32.15	153.79	1.76	1.14	110	1.392	0.909	1.15	0.57	0.85	123.10	1.88		1	85	1.17	1.00	1.00	145.0	1.00	0.363	0.363	0.766	0.47	92%	1.00
32.32	250.44	2.28	0.91	110	1.396	0.908	0.91	0.50	0.87	204.70	1.65		1	100	1.01	1.05	1.00	206.8	1.00	Infin.	0.000	0.766	Non-Liq.	Non-Liq.	0.00
32.48	286.97	2.91	1.02	110	1.400	0.907	1.02	0.50	0.87	234.50	1.65		1	100	1.00	1.10	1.00	236.0	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
32.64	309.86	3.53	1.14	110	1.403	0.906	1.14	0.51	0.87	252.58	1.67		1	100	1.01	1.15	1.00	257.2	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
32.81	322.36	3.86	1.20	110	1.407	0.905	1.20	0.51	0.86	262.31	1.67		1	100	1.02	1.20	1.00	268.2	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
32.97	328.44	4.15	1.26	110	1.411	0.904	1.27	0.51	0.86	266.57	1.69		1	100	1.03	1.20	1.00	275.1	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
33.14	330.70	3.81	1.15	110	1.415	0.903	1.16	0.50	0.86	268.83	1.65		1	100	1.00	1.20	1.00	271.1	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
33.30	324.34	3.31	1.02	110	1.419	0.902	1.02	0.50	0.86	263.54	1.62		1	100	1.00	1.20	1.00	264.5	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
33.46	306.20	3.39	1.11	110	1.423	0.901	1.11	0.51	0.86	247.92	1.66		1	100	1.01	1.20	1.00	251.7	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
33.63	287.68	3.87	1.35	110	1.427	0.900	1.35	0.53	0.85	230.75	1.75		1	100	1.07	1.20	1.00	247.7	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
33.79	277.70	4.63	1.67	110	1.431	0.899	1.68	0.56	0.85	220.68	1.83		1	100	1.13	1.20	1.00	250.3	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
33.96	267.02	5.00	1.87	110	1.435	0.898	1.88	0.57	0.84	210.82	1.88		1	100	1.17	1.20	1.00	248.3	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
34.12	262.99	4.90	1.86	110	1.439	0.897	1.87	0.57	0.84	207.23	1.89		1	100	1.18	1.20	1.00	244.7	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
34.28	254.98	4.12	1.61	110	1.443	0.896	1.62	0.56	0.84	201.34	1.85		1	100	1.14	1.20	1.00	230.7	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
34.45	255.22	3.88	1.52	110	1.446	0.895	1.53	0.56	0.84	201.61	1.82		1	100	1.13	1.20	1.00	227.7	0.99	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
34.61	235.40	3.66	1.56	110	1.450	0.894	1.56	0.57	0.84	185.03	1.86		1	100	1.15	1.20	1.00	213.7	0.99	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
34.78	213.23	3.63	1.70	110	1.454	0.893	1.72	0.58	0.83	166.27	1.92		1	98	1.21	1.20	1.00	201.2	0.99	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
34.94	232.64	3.28	1.41	110	1.458	0.892	1.42	0.56	0.84	182.78	1.83		1	100	1.13	1.20	1.00	206.9	0.99	Infin.	0.000	0.766	Non-Liq.	Non-Liq.	0.00
35.10	266.61	3.08	1.15	110	1.462	0.890	1.16	0.52	0.84	211.53	1.72		1	100	1.05	1.20	1.00	223.3	0.99	Infin.	0.000	0.766	Non-Liq.	Non-Liq.	0.00
35.27	275.08	2.85	1.04	110	1.466	0.889	1.04	0.51	0.85	218.93	1.68		1	100	1.02	1.20	1.00	224.4	0.99	Infin.	0.000	0.766	Non-Liq.	Non-Liq.	0.00
35.43	276.58	3.07	1.11	110	1.470	0.888	1.12	0.52	0.84	219.36	1.70		1	100	1.04	1.20	1.00	226.1	0.99	Infin.	0.000	0.766	Non-Liq.	Non-Liq.	0.00
35.60	260.34	3.57	1.37	110	1.474	0.887	1.38	0.54	0.83	204.30	1.79		1	100	1.10	1.20	1.00	225.0	0.98	Infin.	0.000	0.766	Non-Liq.	Non-Liq.	0.00
35.76	280.13	5.74	2.05	110	1.478	0.886	2.06	0.58	0.82	216.97	1.91		1	100	1.20	1.20	1.00	260.4	0.98	Infin.	0.000	0.766	Non-Liq.	Non-Liq.	0.00
35.93	323.56	6.58	2.03	110	1.482	0.885	2.04	0.57	0.83	251.42	1.87		1	100	1.16	1.20	1.00	292.6	0.98	Infin.	0.000	0.765	Non-Liq.	Non-Liq.	0.00
36.09	191.60	6.05	3.16	110	1.485	0.883	3.18	0.66	0.80	143.75	2.17		1	92	1.59		1.00	228.1	0.98	Infin.	0.000	0.765	Non-Liq.	Non-Liq.	0.00
36.25	264.99	3.90	1.47	110	1.489	0.882	1.48	0.55	0.83	206.32	1.81		1	100	1.11	1.00	1.00	230.4	0.98	Infin.	0.000	0.765	Non-Liq.	Non-Liq.	0.00
36.42	319.83	3.03	0.95	110	1.493	0.881	0.95	0.50	0.84	253.26	1.60		1	100	1.00	1.05	1.00	254.2	0.98	Infin.	0.000	0.765	Non-Liq.	Non-Liq.	0.00
36.58	332.93	3.09	0.93	110	1.497	0.880	0.93	0.50	0.84	263.34	1.59		1	100	1.00	1.10	1.00	264.3	0.98	Infin.	0.000	0.764	Non-Liq.	Non-Liq.	0.00
36.75	372.73	3.69	0.99	110	1.501	0.878	0.99	0.50	0.84	294.57	1.58		1	100	1.00	1.15	1.00	295.7	0.98	Infin.	0.000	0.764	Non-Liq.	Non-Liq.	0.00
36.91	404.69	4.23	1.05	110	1.505	0.877	1.05	0.50	0.84	319.52	1.57		1	100	1.00	1.20	1.00	320.7	0.97	Infin.	0.000	0.764	Non-Liq.	Non-Liq.	0.00
37.07	405.53	3.77	0.93	110	1.509	0.876	0.93	0.50	0.84	319.76	1.53		1	100	1.00	1.25	1.00	321.0	0.97	Infin.	0.000	0.763	Non-Liq.	Non-Liq.	0.00
37.24	398.38	4.78	1.20	110	1.513	0.875	1.20	0.50	0.84	313.70	1.62		1	100	1.00	1.30	1.00	314.9	0.97	Infin.	0.000	0.763	Non-Liq.	Non-Liq.	0.00
37.40	378.24	5.25	1.39	110	1.517	0.873	1.39	0.52	0.83	295.75	1.69		1	100	1.03	1.35	1.00	306.3	0.97	Infin.	0.000	0.762	Non-Liq.	Non-Liq.	0.00
37.57	281.40	4.91	1.75	110	1.521	0.872	1.75	0.56	0.81	215.59	1.85		1	100	1.15	1.40	1.00	248.4	0.97	Infin.	0.000	0.762	Non-Liq.	Non-Liq.	0.00
37.73	240.64	3.31	1.37	110	1.525	0.871	1.38	0.55	0.82	184.66	1.82		1	100	1.12	1.45	1.00	207.4	0.97	Infin.	0.000	0.762	Non-Liq.	Non-Liq.	0.00
37.89	240.96	2.46	1.02	110	1.528	0.869	1.03	0.52	0.82	186.65	1.72		1	100	1.05	1.50	1.00	196.8	0.97	Infin.	0.000	0.761	Non-Liq.	Non-Liq.	0.00
38.06	258.07	2.27	0.88	110	1.532	0.868	0.88	0.50	0.83	201.28	1.65		1	100	1.00	1.55	1.00	202.6	0.96	Infin.	0.000	0.761	Non-Liq.	Non-Liq.	0.00
38.22	239.78	2.30	0.96	110	1.536	0.867	0.97	0.52	0.82	185.59	1.70		1	100	1.04	1.60	1.00	193.5	0.96	Infin.	0.000	0.760	Non-Liq.	Non-Liq.	0.00
38.39	218.69	1.98	0.90	110	1.540	0.865	0.91	0.52	0.82	168.72	1.71		1	99	1.05	1.65	1.00	177.3	0.96	Infin.	0.000	0.760	Non-Liq.	Non-Liq.	0.00
38.55	264.47	1.94	0.73	110	1.544	0.864	0.74	0.50	0.83	205.71	1.59		1	100	1.00	1.70	1.00	206.5	0.96	Infin.	0.000	0.759	Non-Liq.	Non-Liq.	0.00
38.71	297.09	1.85	0.62	110	1.548	0.863	0.63	0.50	0.83	230.94	1.50		1	100	1.00	1.75	1.00	231.8	0.96	Infin.	0.000	0.759	Non-Liq.	Non-Liq.	0.00
38.88	312.92	1.80	0.57	110	1.552	0.861	0.58	0.50	0.83	243.00	1.46		1	100	1.00	1.80	1.00	243.9	0.96	Infin.	0.000	0.758	Non-Liq.	Non-Liq.	0.00
39.04	327.85	2.06	0.63	110	1.556	0.860	0.63	0.50	0.82	254.33	1.47		1	100	1.00	1.85	1.00	255.3	0.96	Infin.	0.000	0.758	Non-Liq.	Non-Liq.	0.00
39.21	337.25	2.27	0.67	110	1.560	0.859	0.67	0.50	0.82	261.32	1.49		1	100	1.00	1.90	1.00	262.3	0.96	Infin.	0.000	0.757	Non-Liq.	Non-Liq.	0.00
39.37	350.08	2.32	0.66	110	1.564	0.857	0.67	0.50	0.82	270.97	1.47		1	100	1.00	1.95	1.00	272.0	0.95	Infin.	0.000	0.757	Non-Liq.	Non-Liq.	0.00
39.53	354.11	2.14	0.60	110	1.567	0.856	0.61	0.50	0.82	273.76	1.44		1	100	1.00	2.00	1.00	274.8	0.95	Infin.	0.000	0.756	Non-Liq.	Non-Liq.	0.00
39.70	359.55	2.27	0.63	110	1.571	0.854	0.63	0.50	0.82	277.64	1.45		1	100	1.00	2.05	1.00	278.7	0.95	Infin.	0.000	0.756	Non-Liq.	Non-Liq.	0.00
39.86	355.78	2.53	0.71	110	1.575	0.853	0.72	0.50	0.82	274.37	1.49		1	100	1.00	2.10	1.00	275.4	0.95	Infin.	0.000	0.755	Non-Liq.	Non-Liq.	0.00
40.03	334.77	2.75	0.82	110	1.579	0.852	0.83	0.50	0.82	257.77	1.55		1	100	1.00	2.15	1.00	258.7	0.95	Infin.	0.000	0.754	Non-Liq.	Non-Liq.	0.00
40.19	342.17	2.95	0.86	110	1.583	0.850	0.86	0.50	0.82	263.17	1.56		1	100	1.00	2.20	1.00	264.2	0.95	Infin.	0.000	0.754	Non-Liq.	Non-Liq.	0.00
40.35	344.05	2.87	0.83	110	1.587	0.849	0.84	0.50	0.82	264.29	1.55		1	100	1.00	2.25	1.00	265.3	0.95	Infin.	0.000	0.753	Non-Liq.	Non-Liq.	0.00
40.52	335.17	2.88	0.86	110	1.591	0.847	0.86	0.50	0.82	257.12	1.57		1	100	1.00	2.30	1.00	258.1	0.95	Infin.	0.000	0.752	Non-Liq.	Non-Liq.	0.00
40.68	320.89	2.72	0.85	110	1.595	0.846	0.85	0.50	0.81	245.81	1.58		1	100	1.00	2.35	1.00	246.7	0.94	Infin.	0.000	0.752	Non-Liq.	Non-Liq.	0.00
40.85	339.05	1.89	0.56	110	1.599	0.844	0.56	0.50	0.81	259.47	1.43		1	100	1.00	2.40	1.00	260.4	0.94	Infin.	0.000	0.751	Non-Liq.	Non-Liq.	0.00
41.01	382.25	2.92	0.76	110	1.603	0.843	0.77	0.50	0.81	292.33	1.49		1	100	1.00	2.45	1.00	293.4	0.94	Infin.	0.000	0.750	Non-Liq.	Non-Liq.	0.00
41.17	403.21	3.03	0.75	110	1.607	0.841	0.76	0.50	0.81	308.04	1.47		1	100	1.00	2.50	1.00	309.2	0.94	Infin.	0.000	0.750	Non-Liq.	Non-Liq.	0.00
41.34	379.57	3.67	0.97	110	1.610	0.840	0.97	0.50	0.81	289.56	1.57		1	100	1.00	2.55	1.00	290.6	0.94	Infin.	0.000	0.749	Non-Liq.	Non-Liq.	0.00
41.50	396.71	3.17	0.80	110	1.614	0.838	0.80	0.50	0.81	302.32	1.50		1	100	1.00	2.60	1.00	303.4	0.94	Infin.	0.000	0.748	Non-Liq.	Non-Liq.	0.00
41.67	391.23	3.14	0.80	110	1.618	0.837	0.81	0.50	0.81	297.76	1.50		1	100	1.00	2.65	1.00	298.9	0.94	Infin.	0.000	0.747	Non-Liq.	Non-Liq.	0.00
41.83	390.72	3.06	0.78	110	1.622	0.835	0.79	0.50	0.81	297.01	1.50		1	100	1.00	2.70	1.00	298.1	0.94	Infin.	0.000	0.747	Non-Liq.	Non-Liq.	0.00
41.99	382.61	2.95	0.77	110	1.626	0.834	0.78	0.50	0.81	290.47	1.50		1	100	1.00	2.75	1.00	291.6	0.93	Infin.	0.000	0.746	Non-Liq.	Non-Liq.	0.00
42.16	380.43	2.84	0.75	110	1.630	0.832	0.75	0.50	0.81	288.46	1.49		1	100	1.00	2.80	1.00	289.5	0.93	Infin.	0.000	0.745	Non-Liq.	Non-Liq.	0.00
42.32	381.27	2.80	0.73	110	1.634	0.831	0.74	0.50	0.80	288.75	1.48		1	100	1.00	2.85	1.00	289.8	0.93	Infin.	0.000	0.744	Non-Liq.	Non-Liq.	0.00
42.49	383.78	2.53	0.66	110	1.638	0.829	0.66	0.50	0.80	290.31	1.45		1	100	1.00	2.90	1.00	291.4	0.93	Infin.	0.000	0.743	Non-Liq.	Non-Liq.	0.00
42.65	395.93	2.51	0.63	110	1.642	0.827	0.64	0.50	0.80	299.18	1.43		1	100	1.00	2.95	1.00	300.3	0.93	Infin.	0.000	0.743	Non-Liq.	Non-Liq.	0.00
42.81	401.54	2.69	0.67	110	1.646	0.826	0.67	0.50	0.80	303.07	1.44		1	100	1.00	3.00	1.00	304.2	0.93	Infin.	0.000	0.742	Non-Liq.	Non-Liq.	0.00
42.98	408.28	2.41	0.59	110	1.649	0.824	0.59	0.50	0.80	307.81	1.40		1	100	1.00	3.05	1.00	309.0	0.93	Infin.	0.000	0.741	Non-Liq.	Non-Liq.	0.00

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Overide	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
43.14	410.18	2.68	0.65	110	1.653	0.823	0.66	0.50	0.80	308.88	1.43		1	100	1.00	3.10	1.00	310.0	0.93	Infin.	0.000	0.740	**Non-Liq.**	Non-Liq.	**0.00**
43.31	413.71	2.73	0.66	110	1.657	0.821	0.66	0.50	0.80	311.18	1.43		1	100	1.00	3.15	1.00	312.3	0.93	Infin.	0.000	0.739	**Non-Liq.**	Non-Liq.	**0.00**
43.47	420.65	2.58	0.61	110	1.661	0.820	0.62	0.50	0.80	316.05	1.40		1	100	1.00	3.20	1.00	317.2	0.92	Infin.	0.000	0.738	**Non-Liq.**	Non-Liq.	**0.00**
43.64	425.34	3.15	0.74	110	1.665	0.818	0.74	0.50	0.80	319.21	1.46		1	100	1.00	3.25	1.00	320.4	0.92	Infin.	0.000	0.737	**Non-Liq.**	Non-Liq.	**0.00**
43.80	433.25	2.87	0.66	110	1.669	0.816	0.67	0.50	0.80	324.78	1.42		1	100	1.00	3.30	1.00	326.0	0.92	Infin.	0.000	0.736	**Non-Liq.**	Non-Liq.	**0.00**
43.96	445.49	2.84	0.64	110	1.673	0.815	0.64	0.50	0.80	333.60	1.40		1	100	1.00	3.35	1.00	334.8	0.92	Infin.	0.000	0.735	**Non-Liq.**	Non-Liq.	**0.00**
44.13	458.14	2.05	0.45	110	1.677	0.813	0.45	0.50	0.79	342.71	1.28		1	100	1.00	3.40	1.00	344.0	0.92	Infin.	0.000	0.735	**Non-Liq.**	Non-Liq.	**0.00**
44.29	407.19	2.23	0.55	110	1.681	0.811	0.55	0.50	0.79	304.10	1.38		1	100	1.00	3.45	1.00	305.2	0.92	Infin.	0.000	0.734	**Non-Liq.**	Non-Liq.	**0.00**
44.46	318.78	4.85	1.52	110	1.685	0.810	1.53	0.54	0.78	232.72	1.79		1	100	1.10	3.50	1.00	256.2	0.92	Infin.	0.000	0.733	**Non-Liq.**	Non-Liq.	**0.00**
44.62	311.01	4.70	1.51	110	1.689	0.808	1.52	0.55	0.77	226.57	1.79		1	100	1.10	3.55	1.00	250.2	0.92	Infin.	0.000	0.732	**Non-Liq.**	Non-Liq.	**0.00**
44.78	390.54	5.84	1.50	110	1.692	0.807	1.50	0.53	0.78	287.14	1.72		1	100	1.05	3.60	1.00	303.9	0.92	Infin.	0.000	0.731	**Non-Liq.**	Non-Liq.	**0.00**
44.95	419.57	5.18	1.23	110	1.696	0.805	1.24	0.50	0.79	311.92	1.64		1	100	1.00	3.65	1.00	313.1	0.91	Infin.	0.000	0.730	**Non-Liq.**	Non-Liq.	**0.00**
45.11	377.69	3.17	0.84	110	1.700	0.803	0.84	0.50	0.79	280.34	1.54		1	100	1.00	3.70	1.00	281.4	0.91	Infin.	0.000	0.729	**Non-Liq.**	Non-Liq.	**0.00**
45.28	407.75	4.13	1.01	110	1.704	0.802	1.02	0.50	0.79	302.40	1.58		1	100	1.00	3.75	1.00	303.5	0.91	Infin.	0.000	0.728	**Non-Liq.**	Non-Liq.	**0.00**
45.44	392.74	3.86	0.98	110	1.708	0.800	0.99	0.50	0.79	290.89	1.58		1	100	1.00	3.80	1.00	292.0	0.91	Infin.	0.000	0.727	**Non-Liq.**	Non-Liq.	**0.00**
45.60	382.50	3.90	1.02	110	1.712	0.798	1.02	0.50	0.79	282.94	1.60		1	100	1.00	3.85	1.00	284.0	0.91	Infin.	0.000	0.726	**Non-Liq.**	Non-Liq.	**0.00**
45.77	373.19	3.69	0.99	110	1.716	0.797	0.99	0.50	0.79	275.71	1.59		1	100	1.00	3.90	1.00	276.7	0.91	Infin.	0.000	0.725	**Non-Liq.**	Non-Liq.	**0.00**
45.93	367.93	3.54	0.96	110	1.720	0.795	0.97	0.50	0.78	271.49	1.59		1	100	1.00	3.90	1.00	272.5	0.91	Infin.	0.000	0.724	**Non-Liq.**	Non-Liq.	**0.00**
46.10	369.72	3.36	0.91	110	1.724	0.793	0.91	0.50	0.78	272.51	1.57		1	100	1.00	3.90	1.00	273.5	0.91	Infin.	0.000	0.723	**Non-Liq.**	Non-Liq.	**0.00**
46.26	381.32	3.27	0.86	110	1.728	0.792	0.86	0.50	0.78	280.78	1.54		1	100	1.00	3.90	1.00	281.8	0.91	Infin.	0.000	0.722	**Non-Liq.**	Non-Liq.	**0.00**
46.42	386.91	3.19	0.82	110	1.731	0.790	0.83	0.50	0.78	284.59	1.53		1	100	1.00	3.90	1.00	285.7	0.91	Infin.	0.000	0.721	**Non-Liq.**	Non-Liq.	**0.00**
46.59	380.97	3.15	0.83	110	1.735	0.788	0.83	0.50	0.78	279.88	1.53		1	100	1.00	3.90	1.00	280.9	0.90	Infin.	0.000	0.720	**Non-Liq.**	Non-Liq.	**0.00**
46.75	341.92	3.27	0.96	110	1.739	0.787	0.96	0.50	0.78	250.78	1.61		1	100	1.00	3.90	1.00	251.7	0.90	Infin.	0.000	0.719	**Non-Liq.**	Non-Liq.	**0.00**
46.92	315.47	3.20	1.01	110	1.743	0.785	1.02	0.50	0.78	230.52	1.65		1	100	1.01	3.90	1.00	232.8	0.90	Infin.	0.000	0.717	**Non-Liq.**	Non-Liq.	**0.00**
47.08	363.49	3.46	0.95	110	1.747	0.783	0.96	0.50	0.78	266.07	1.59		1	100	1.00	3.90	1.00	267.1	0.90	Infin.	0.000	0.716	**Non-Liq.**	Non-Liq.	**0.00**
47.24	379.91	4.34	1.14	110	1.751	0.782	1.15	0.50	0.78	277.81	1.64		1	100	1.00	3.90	1.00	277.9	0.90	Infin.	0.000	0.715	**Non-Liq.**	Non-Liq.	**0.00**
47.41	382.41	5.30	1.38	110	1.755	0.780	1.39	0.52	0.77	276.50	1.71		1	100	1.04	3.90	1.00	289.5	0.90	Infin.	0.000	0.714	**Non-Liq.**	Non-Liq.	**0.00**
47.57	369.25	5.87	1.59	110	1.759	0.778	1.60	0.54	0.76	264.21	1.77		1	100	1.08	3.90	1.00	287.4	0.90	Infin.	0.000	0.713	**Non-Liq.**	Non-Liq.	**0.00**
47.74	359.68	5.73	1.59	110	1.763	0.777	1.60	0.54	0.76	256.70	1.78		1	100	1.09	3.90	1.00	280.7	0.90	Infin.	0.000	0.712	**Non-Liq.**	Non-Liq.	**0.00**
47.90	383.68	4.97	1.29	110	1.767	0.775	1.30	0.51	0.77	277.49	1.68		1	100	1.03	3.90	1.00	285.9	0.90	Infin.	0.000	0.711	**Non-Liq.**	Non-Liq.	**0.00**
48.06	403.15	4.67	1.16	110	1.770	0.773	1.16	0.50	0.77	293.27	1.63		1	100	1.00	3.90	1.00	294.4	0.90	Infin.	0.000	0.710	**Non-Liq.**	Non-Liq.	**0.00**
48.23	405.14	3.95	0.97	110	1.774	0.772	0.98	0.50	0.77	294.40	1.57		1	100	1.00	3.90	1.00	295.5	0.89	Infin.	0.000	0.709	**Non-Liq.**	Non-Liq.	**0.00**
48.39	369.68	3.01	0.81	110	1.778	0.770	0.82	0.50	0.77	268.22	1.54		1	100	1.00	3.90	1.00	269.2	0.89	Infin.	0.000	0.708	**Non-Liq.**	Non-Liq.	**0.00**
48.56	336.91	2.26	0.67	110	1.782	0.768	0.67	0.50	0.77	244.06	1.51		1	100	1.00	3.90	1.00	245.0	0.89	Infin.	0.000	0.707	**Non-Liq.**	Non-Liq.	**0.00**
48.72	299.19	1.63	0.55	110	1.786	0.767	0.55	0.50	0.77	216.35	1.49		1	100	1.00	3.90	1.00	217.2	0.89	Infin.	0.000	0.705	**Non-Liq.**	Non-Liq.	**0.00**
48.88	236.26	1.38	0.58	110	1.790	0.765	0.59	0.50	0.77	170.38	1.58		1	99	1.00	3.90	1.00	171.0	0.89	Infin.	0.000	0.704	**Non-Liq.**	Non-Liq.	**0.00**
49.05	139.68	1.94	1.39	110	1.794	0.763	1.41	0.62	0.72	94.13	2.03		1	74	1.34		1.00	125.9	0.89	0.265	0.236	0.703	**0.34**	97%	**1.18**
49.21	65.30	2.32	3.55	110	1.798	0.762	3.65	0.78	0.66	39.62	2.58		1	38	3.23		1.00	128.1	0.94	0.276	0.260	0.702	**0.37**	96%	**1.15**
49.38	49.82	2.01	4.03	110	1.802	0.760	4.18	0.82	0.64	29.26	2.72		0						0.94			0.701	**Non-Liq.**	Non-Liq.	**0.00**
49.54	44.18	1.88	4.26	110	1.806	0.758	4.44	0.84	0.64	25.53	2.78		0						0.94			0.700	**Non-Liq.**	Non-Liq.	**0.00**
49.70	52.54	2.11	4.01	110	1.810	0.757	4.15	0.82	0.64	30.90	2.70		0						0.94			0.699	**Non-Liq.**	Non-Liq.	**0.00**
49.87	96.95	2.31	2.38	110	1.813	0.755	2.42	0.71	0.68	61.49	2.32		1	57	2.03		1.00	124.7	0.91	0.260	0.237	0.698	**0.34**	97%	**1.19**
50.03	125.29	2.02	1.61	110	1.817	0.753	1.64	0.64	0.71	82.44	2.11		1	69	1.48		1.00	122.2	0.91	0.250	0.227	0.696	**0.33**	98%	**1.22**
50.20	125.58	2.07	1.65	110	1.821	0.752	1.67	0.64	0.70	82.44	2.12		1	69	1.49		1.00	123.1	0.91	0.253	0.231	0.695	**0.33**	97%	**1.21**
50.36	128.65	2.24	1.74	110	1.825	0.750	1.77	0.65	0.70	84.23	2.13		1	70	1.51		1.00	127.4	0.91	0.272	0.248	0.694	**0.36**	97%	**1.16**
50.52	128.05	2.41	1.88	110	1.829	0.748	1.91	0.66	0.70	83.35	2.16		1	69	1.57		1.00	130.7	0.91	0.288	0.261	0.693	**0.38**	96%	**1.12**
50.69	127.87	2.55	1.99	110	1.833	0.747	2.02	0.66	0.70	82.85	2.18		1	69	1.61		1.00	133.4	0.91	0.301	0.273	0.692	**0.39**	96%	**1.09**
50.85	127.22	2.50	1.97	110	1.837	0.745	2.00	0.66	0.69	82.33	2.17		1	69	1.61		1.00	132.2	0.91	0.295	0.268	0.691	**0.39**	96%	**1.11**
51.02	120.78	2.43	2.02	110	1.841	0.743	2.05	0.67	0.69	77.65	2.20		1	66	1.67		1.00	129.4	0.91	0.282	0.255	0.689	**0.37**	96%	**1.14**
51.18	116.72	2.42	2.07	110	1.845	0.742	2.11	0.67	0.69	74.63	2.22		1	65	1.72		1.00	128.3	0.91	0.277	0.251	0.688	**0.36**	97%	**1.15**
51.35	117.01	2.42	2.07	110	1.849	0.740	2.10	0.67	0.69	74.72	2.22		1	65	1.72		1.00	128.4	0.91	0.277	0.250	0.687	**0.36**	97%	**1.15**
51.51	117.05	2.54	2.17	110	1.852	0.738	2.20	0.68	0.68	74.45	2.24		1	65	1.76		1.00	130.9	0.90	0.289	0.261	0.686	**0.38**	96%	**1.12**
51.67	118.36	2.51	2.12	110	1.856	0.737	2.15	0.68	0.68	75.32	2.22		1	65	1.73		1.00	130.3	0.90	0.286	0.258	0.685	**0.38**	96%	**1.13**
51.84	121.19	2.58	2.13	110	1.860	0.735	2.16	0.67	0.68	77.11	2.22		1	66	1.71		1.00	132.2	0.90	0.295	0.266	0.684	**0.39**	96%	**1.10**
52.00	128.21	2.29	1.78	110	1.864	0.733	1.81	0.65	0.69	82.58	2.14		1	69	1.54		1.00	127.2	0.90	0.271	0.245	0.682	**0.36**	97%	**1.16**
52.17	129.58	2.67	2.06	110	1.868	0.732	2.09	0.66	0.69	82.75	2.19		1	69	1.64		1.00	135.4	0.90	0.311	0.280	0.681	**0.41**	95%	**1.07**
52.33	98.86	2.96	2.99	110	1.872	0.730	3.05	0.73	0.66	60.52	2.40		1	56	2.31		1.00	139.7	0.90	0.333	0.300	0.680	**0.44**	94%	**1.02**
52.49	61.64	2.40	3.89	110	1.876	0.728	4.02	0.80	0.63	35.69	2.65		0						0.93			0.679	**Non-Liq.**	Non-Liq.	**0.00**
52.66	47.03	1.60	3.41	110	1.880	0.727	3.55	0.82	0.62	26.65	2.70		0						0.93			0.678	**Non-Liq.**	Non-Liq.	**0.00**
52.82	25.94	1.33	5.12	110	1.884	0.725	5.52	0.93	0.59	13.33	3.06		0						0.93			0.677	**Non-Liq.**	Non-Liq.	**0.00**
52.99	23.82	1.09	4.58	110	1.888	0.724	4.98	0.93	0.58	12.13	3.06		0						0.93			0.676	**Non-Liq.**	Non-Liq.	**0.00**
53.15	25.73	0.89	3.46	110	1.892	0.722	3.74	0.89	0.60	13.41	2.95		0						0.93			0.674	**Non-Liq.**	Non-Liq.	**0.00**
53.31	17.66	0.88	4.99	110	1.895	0.720	5.59	0.97	0.57	8.45	3.22		0						0.93			0.673	**Non-Liq.**	Non-Liq.	**0.00**
53.48	15.40	0.79	5.10	110	1.899	0.719	5.81	0.99	0.56	7.14	3.28		0						0.93			0.672	**Non-Liq.**	Non-Liq.	**0.00**
53.64	16.91	0.99	5.82	110	1.903	0.717	6.56	0.99	0.56	7.92	3.28		0						0.93			0.671	**Non-Liq.**	Non-Liq.	**0.00**
53.81	21.62	1.39	6.41	110	1.907	0.716	7.03	0.97	0.56	10.53	3.20		0						0.93			0.670	**Non-Liq.**	Non-Liq.	**0.00**
53.97	61.80	1.89	3.06	110	1.911	0.714	3.16	0.78	0.63	35.67	2.58		1	34	3.18		1.00	113.6	0.93	0.216	0.201	0.669	**0.30**	98%	**1.33**
54.13	169.40	2.67	1.58	110	1.915	0.712	1.60	0.61	0.70	110.04	2.02		1	81	1.32		1.00	145.4	0.86	0.366	0.315	0.667	**0.47**	92%	**0.91**
54.30	205.29	3.08	1.50	110	1.919	0.711	1.51	0.59	0.70	135.35	1.94		1	89	1.23	0.25	1.46	242.4	0.86	Infin.	0.000	0.666	**Non-Liq.**	Non-Liq.	**0.00**
54.46	216.51	3.54	1.63	110	1.923	0.709	1.65	0.59	0.70	142.34	1.95		1	91	1.24	0.25	1.46	257.6	0.86	Infin.	0.000	0.665	**Non-Liq.**	Non-Liq.	**0.00**
54.63	226.53	3.84	1.70	110	1.927	0.708	1.71	0.59	0.70	148.83	1.95		1	93	1.24	0.25	1.46	269.2	0.86	Infin.	0.000	0.664	**Non-Liq.**	Non-Liq.	**0.00**
54.79	253.78	4.49	1.77	110	1.931	0.706	1.78	0.59	0.70	167.28	1.93		1	98	1.22	0.25	1.46	297.4	0.86	Infin.	0.000	0.663	**Non-Liq.**	Non-Liq.	**0.00**
54.95	261.07	5.47	2.09	110	1.934	0.705	2.11	0.60	0.70	170.33	1.98		1	99	1.27	0.25	1.46	317.1	0.86	Infin.	0.000	0.662	**Non-Liq.**	Non-Liq.	**0.00**
55.12	254.36	6.20	2.44	110	1.938	0.703	2.46	0.62	0.69	163.85	2.04		1	97	1.36		1.00	222.6	0.86	Infin.	0.000	0.661	**Non-Liq.**	Non-Liq.	**0.00**
55.28	242.98	6.44	2.65	110	1.942	0.701	2.67	0.63	0.68	155.04	2.09		1	95	1.43		1.00	221.5	0.85	Infin.	0.000	0.659	**Non-Liq.**	Non-Liq.	**0.00**
55.45	210.76	5.98	2.84	110	1.946	0.700	2.86	0.65	0.67	132.53	2.15		1	89	1.56		1.00	206.2	0.85	Infin.	0.000	0.658	**Non-Liq.**	Non-Liq.	**0.00**
55.61	179.72	5.45	3.03	110	1.950	0.698	3.06	0.67	0.66	111.22	2.22		1	81	1.72		1.00	191.6	0.85	Infin.	0.000	0.657	**Non-Liq.**	Non-Liq.	**0.00**
55.77	154.42	4.96	3.21	110	1.954	0.697	3.26	0.69	0.65	94.09	2.29		1	74	1.92		1.00	180.2	0.85	Infin.	0.000	0.656	**Non-Liq.**	Non-Liq.	**0.00**
55.94	130.91	4.35	3.32	110	1.958	0.695	3.37	0.71	0.64	78.55	2.35		1	67	2.13		1.00	167.3	0.89	Infin.	0.000	0.655	**Non-Liq.**	Non-Liq.	**0.00**
56.10	111.46	3.85	3.45	110	1.962	0.694	3.52	0.73	0.64	65.80	2.42		1	59	2.39		1.00	157.1	0.89	0.441	0.390	0.654	**0.60**	85%	**0.62**
56.27	89.53	3.08	3.44	110	1.966	0.692	3.52	0.76	0.63	51.85	2.49		1	50	2.72		1.00	140.9	0.92	0.340	0.314	0.653	**0.48**	92%	**1.01**
56.43	70.63	2.41	3.41	110	1.970	0.691	3.51	0.78	0.62	39.99	2.57		1	39	3.15		1.00	125.9	0.92	0.266	0.245	0.652	**0.38**	96%	**1.17**
56.59	55.06	1.89	3.43	110	1.974	0.689	3.55	0.81	0.60	30.35	2.66		0						0.92			0.650	**Non-Liq.**	Non-Liq.	**0.00**
56.76	39.94	1.59	3.99	110	1.977	0.688	4.19	0.86	0.59	20.99	2.83		0						0.92			0.649	**Non-Liq.**	Non-Liq.	**0.00**
56.92	26.94	1.16	4.32	110	1.981	0.686	4.66	0.91	0.56	13.32	3.01		0						0.92			0.648	**Non-Liq.**	Non-Liq.	**0.00**
57.09	24.31	0.74	3.02	110	1.985	0.685	3.29	0.89	0.57	12.02	2.95		0						0.92			0.647	**Non-Liq.**	Non-Liq.	**0.00**
57.25	17.67	0.69	3.89	110	1.989	0.683	4.39	0.96	0.55	8.09	3.17		0						0.92			0.646	**Non-Liq.**	Non-Liq.	**0.00**
57.41	17.34	0.73	4.18	110	1.993	0.682	4.72	0.97	0.54	7.86	3.20		0						0.92			0.645	**Non-Liq.**	Non-Liq.	**0.00**
57.58	19.61	0.61	3.11	110	1.997	0.680	3.46	0.93	0.56	9.24	3.06		0						0.92			0.644	**Non-Liq.**	Non-Liq.	**0.00**
57.74	24.98	0.61	2.45	110	2.001	0.679	2.67	0.88	0.57	12.44	2.89		0						0.92			0.643	**Non-Liq.**	Non-Liq.	**0.00**
57.91	19.44	0.61	3.14	110	2.005	0.678	3.50	0.93	0.55	9.10	3.07		0						0.92			0.642	**Non-Liq.**	Non-Liq.	**0.00**
58.07	18.43	0.58	3.12	110	2.009	0.676	3.50	0.94	0.55	8.52	3.09		0						0.92			0.641	**Non-Liq.**	Non-Liq.	**0.00**

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_c	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	*Volumetric Strain (%)*
58.23	17.22	0.56	3.23	110	2.013	0.675	3.66	0.95	0.54	7.81	3.13		0						0.92			0.640	**Non-Liq.**	Non-Liq.	**0.00**
58.40	17.30	0.55	3.17	110	2.016	0.673	3.59	0.95	0.54	7.85	3.13		0						0.92			0.638	**Non-Liq.**	Non-Liq.	**0.00**
58.56	18.04	0.54	2.97	110	2.020	0.672	3.35	0.94	0.55	8.27	3.09		0						0.92			0.637	**Non-Liq.**	Non-Liq.	**0.00**
58.73	16.07	0.52	3.22	110	2.024	0.671	3.69	0.96	0.54	7.13	3.17		0						0.91			0.636	**Non-Liq.**	Non-Liq.	**0.00**
58.89	15.75	0.49	3.08	110	2.028	0.669	3.53	0.96	0.54	6.95	3.17		0						0.91			0.635	**Non-Liq.**	Non-Liq.	**0.00**
59.06	15.86	0.51	3.23	110	2.032	0.668	3.71	0.96	0.53	6.98	3.18		0						0.91			0.634	**Non-Liq.**	Non-Liq.	**0.00**
59.22	17.14	0.64	3.71	110	2.036	0.666	4.21	0.96	0.53	7.61	3.18		0						0.91			0.633	**Non-Liq.**	Non-Liq.	**0.00**
59.38	19.02	1.05	5.54	110	2.040	0.665	6.21	0.98	0.53	8.43	3.24		0						0.91			0.632	**Non-Liq.**	Non-Liq.	**0.00**
59.55	50.85	1.55	3.04	110	2.044	0.664	3.17	0.81	0.59	27.10	2.67		0						0.91			0.631	**Non-Liq.**	Non-Liq.	**0.00**
59.71	71.44	1.83	2.56	110	2.048	0.662	2.64	0.75	0.61	39.86	2.49		1	39	2.71		1.00	107.9	0.91	0.197	0.180	0.630	**0.28**	98%	**1.40**
59.88	152.33	2.73	1.79	110	2.052	0.661	1.81	0.64	0.65	92.95	2.11		1	74	1.47		1.00	136.5	0.83	0.316	0.263	0.629	**0.42**	95%	**1.05**
60.04	157.44	0.00	0.00	110	2.055	0.660	0.00	0.75	0.61	88.95	2.49		1	72	1.00		1.00	89.0	0.83	0.145	0.121	0.628	**0.19**	100%	**1.68**
60.20	137.47	0.00	0.00	110	2.059	0.658	0.00	0.75	0.61	77.55	2.48		1	66	1.00		1.00	77.6	0.87	0.123	0.107	0.627	**0.17**	100%	**1.88**

CPT-LIQUEFY.XLS - A SPREADSHEET FOR EMPIRICAL ESTIMATION OF LIQUEFACTION POTENTIAL USING CPT DATA
Developed 2003 by Shelton L. Stringer, GE, Earth Systems Southwest

Project: Oxnard High School No. 8
Job No: 301953-001
Date: 8/14/2018
Sounding: CPT-4
Plot: 4

Methods: Liquefaction Analysis using 1998 NCEER workshop methods (Robertson & Wride)
Post-liquefaction Settlement Analysis from Tokimatsu & Seed (1987)
Dry Sand Settlement by Pradel, ASCE Journal of G&GE, Vol 124, No. 4

Total Liquefied Thickness (feet)
7.2

EARTHQUAKE INFORMATION:
Magnitude: 6.77 (7.5)
PGA, g: 0.97 (0.75)
MSF: 1.30
GWT, feet: 20.0
Design GWT, feet: 8.0

Induced CSR (M=7.5): = 0.65*PGA*(po/p'o)*rd/MSF
Clean Sand Qc1n = C_Q*K_C*K_H*Qc
SF = $CRR_{7.5}$*Kσ/CSR
Use Tokimatsu & Seed (0) or Ishihara &Yoshmine (1): 0
Unit Weight of unsaturated soils: 110 pcf
Unit Weight of saturated soils: 110 pcf
Limiting Ic for liquefiable soils: 2.60
Limiting Ic for K_H: 2.0
Required SF: 1.50
Min SF of Liquefiable Layers: 0.18
Avg SF of Liquefiable Layers: 0.06

Probab Avg	Total Induced Subsidence (inches)
6%	Max
100%	1.2

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
0.16	92.62	1.11	1.20	110	0.009	1.000	1.20	0.56	1.70	148.81	1.84		1	93	1.13	0.25	1.00	168.8	1.00	Infin.	0.000	0.485	Non-Liq.	Non-Liq.	0.00
0.33	130.04	2.02	1.55	110	0.018	1.000	1.55	0.55	1.70	208.92	1.82		1	100	1.12	0.25	1.00	234.3	1.00	Infin.	0.000	0.485	Non-Liq.	Non-Liq.	0.00
0.49	152.39	3.01	1.98	110	0.027	1.000	1.98	0.57	1.70	244.82	1.86		1	100	1.16	0.25	1.00	282.8	1.00	Infin.	0.000	0.485	Non-Liq.	Non-Liq.	0.00
0.66	146.45	3.22	2.20	110	0.036	1.000	2.20	0.58	1.70	235.26	1.91		1	100	1.20	0.25	1.00	282.0	1.00	Infin.	0.000	0.485	Non-Liq.	Non-Liq.	0.00
0.82	125.63	2.97	2.36	110	0.045	1.000	2.36	0.60	1.70	201.79	1.97		1	100	1.27	0.25	1.00	255.7	1.00	Infin.	0.000	0.485	Non-Liq.	Non-Liq.	0.00
0.98	97.23	2.48	2.55	110	0.054	1.000	2.55	0.63	1.70	156.14	2.07		1	95	1.40		1.00	218.4	1.00	Infin.	0.000	0.485	Non-Liq.	Non-Liq.	0.00
1.15	63.94	1.59	2.49	110	0.063	0.999	2.50	0.66	1.70	102.64	2.18		1	78	1.61		1.00	165.7	1.00	Infin.	0.000	0.484	Non-Liq.	Non-Liq.	0.00
1.31	63.94	1.59	2.49	110	0.072	0.999	2.50	0.66	1.70	102.62	2.18		1	78	1.61		1.00	165.7	1.00	Infin.	0.000	0.484	Non-Liq.	Non-Liq.	0.00
1.48	41.59	1.09	2.61	110	0.081	0.999	2.62	0.70	1.70	66.70	2.32		1	60	2.02		1.00	134.8	1.00	0.308	0.308	0.484	Non-Liq.	Non-Liq.	0.00
1.64	28.11	0.74	2.64	110	0.090	0.998	2.64	0.74	1.70	45.02	2.45		1	44	2.52		1.00	113.6	1.00	0.216	0.216	0.484	Non-Liq.	Non-Liq.	0.00
1.80	20.76	0.53	2.55	110	0.099	0.998	2.57	0.77	1.70	33.20	2.54		1	31	2.98		1.00	98.9	1.00	0.170	0.170	0.484	Non-Liq.	Non-Liq.	0.00
1.97	21.63	0.56	2.58	110	0.108	0.998	2.60	0.77	1.70	34.58	2.53		1	33	2.92		1.00	101.1	1.00	0.176	0.176	0.484	Non-Liq.	Non-Liq.	0.00
2.13	34.59	0.78	2.25	110	0.117	0.997	2.26	0.71	1.70	55.39	2.34		1	52	2.07		1.00	114.6	1.00	0.220	0.220	0.483	Non-Liq.	Non-Liq.	0.00
2.30	34.08	0.89	2.61	110	0.126	0.997	2.62	0.72	1.70	54.56	2.39		1	52	2.25		1.00	123.0	1.00	0.253	0.253	0.483	Non-Liq.	Non-Liq.	0.00
2.46	31.06	0.81	2.60	110	0.135	0.996	2.61	0.73	1.70	49.69	2.41		1	48	2.37		1.00	117.7	1.00	0.231	0.231	0.483	Non-Liq.	Non-Liq.	0.00
2.62	26.71	0.71	2.65	110	0.144	0.996	2.67	0.75	1.70	42.69	2.47		1	42	2.62		1.00	111.6	1.00	0.209	0.209	0.483	Non-Liq.	Non-Liq.	0.00
2.79	24.66	0.64	2.61	110	0.153	0.996	2.62	0.76	1.70	39.38	2.49		1	38	2.72		1.00	107.1	1.00	0.194	0.194	0.483	Non-Liq.	Non-Liq.	0.00
2.95	22.66	0.59	2.60	110	0.162	0.995	2.62	0.76	1.70	36.15	2.52		1	35	2.86		1.00	103.4	1.00	0.183	0.183	0.482	Non-Liq.	Non-Liq.	0.00
3.12	21.79	0.57	2.60	110	0.171	0.995	2.62	0.77	1.70	34.74	2.53		1	33	2.93		1.00	101.7	1.00	0.178	0.178	0.482	Non-Liq.	Non-Liq.	0.00
3.28	20.52	0.55	2.69	110	0.180	0.994	2.72	0.78	1.70	32.68	2.56		1	30	3.10		1.00	101.3	1.00	0.177	0.177	0.482	Non-Liq.	Non-Liq.	0.00
3.44	18.85	0.54	2.86	110	0.189	0.994	2.89	0.79	1.70	29.98	2.61		0						1.00			0.482	Non-Liq.	Non-Liq.	0.00
3.61	16.96	0.52	3.05	110	0.198	0.994	3.09	0.81	1.70	26.93	2.66		0						1.00			0.482	Non-Liq.	Non-Liq.	0.00
3.77	15.22	0.50	3.30	110	0.208	0.993	3.34	0.82	1.70	24.12	2.72		0						1.00			0.482	Non-Liq.	Non-Liq.	0.00
3.94	13.60	0.54	3.97	110	0.217	0.993	4.03	0.85	1.70	21.50	2.81		0						1.00			0.481	Non-Liq.	Non-Liq.	0.00
4.10	13.10	0.56	4.31	110	0.226	0.993	4.38	0.86	1.70	20.69	2.85		0						1.00			0.481	Non-Liq.	Non-Liq.	0.00
4.27	13.76	0.61	4.45	110	0.235	0.992	4.52	0.86	1.70	21.73	2.84		0						1.00			0.481	Non-Liq.	Non-Liq.	0.00
4.43	12.78	0.63	4.94	110	0.244	0.992	5.03	0.88	1.70	20.14	2.90		0						1.00			0.481	Non-Liq.	Non-Liq.	0.00
4.59	9.82	0.62	6.32	110	0.253	0.991	6.49	0.93	1.70	15.37	3.06		0						1.00			0.481	Non-Liq.	Non-Liq.	0.00
4.76	9.11	0.58	6.39	110	0.262	0.991	6.58	0.93	1.70	14.22	3.09		0						1.00			0.480	Non-Liq.	Non-Liq.	0.00
4.92	9.64	0.67	6.94	110	0.271	0.991	7.14	0.94	1.70	15.05	3.09		0						1.00			0.480	Non-Liq.	Non-Liq.	0.00
5.09	11.05	0.51	4.60	110	0.280	0.990	4.72	0.89	1.70	17.31	2.93		0						1.00			0.480	Non-Liq.	Non-Liq.	0.00
5.25	26.79	0.51	1.91	110	0.289	0.990	1.93	0.72	1.70	42.58	2.38		1	41	2.22		1.00	94.7	1.00	0.159	0.159	0.480	Non-Liq.	Non-Liq.	0.00
5.41	43.87	0.61	1.40	110	0.298	0.989	1.41	0.65	1.70	70.01	2.12		1	62	1.50		1.00	105.0	1.00	0.188	0.188	0.480	Non-Liq.	Non-Liq.	0.00
5.58	61.57	0.87	1.42	110	0.307	0.989	1.42	0.61	1.70	98.44	2.02		1	76	1.32		1.00	130.2	1.00	0.285	0.285	0.479	Non-Liq.	Non-Liq.	0.00
5.74	81.48	1.27	1.55	110	0.316	0.989	1.56	0.60	1.70	130.42	1.96		1	88	1.25	1.00	1.00	163.4	1.00	Infin.	0.000	0.479	Non-Liq.	Non-Liq.	0.00
5.91	104.49	1.77	1.69	110	0.325	0.988	1.70	0.58	1.70	167.37	1.91		1	98	1.20	1.05	1.00	201.7	1.00	Infin.	0.000	0.479	Non-Liq.	Non-Liq.	0.00
6.07	121.74	2.26	1.85	110	0.334	0.988	1.86	0.58	1.70	195.08	1.90		1	100	1.19	1.10	1.00	232.8	1.00	Infin.	0.000	0.479	Non-Liq.	Non-Liq.	0.00
6.23	129.40	2.54	1.96	110	0.343	0.988	1.97	0.58	1.70	207.37	1.90		1	100	1.19	1.15	1.00	248.1	1.00	Infin.	0.000	0.479	Non-Liq.	Non-Liq.	0.00
6.40	133.71	2.63	1.97	110	0.352	0.987	1.98	0.58	1.70	214.28	1.90		1	100	1.18	1.20	1.00	254.9	1.00	Infin.	0.000	0.479	Non-Liq.	Non-Liq.	0.00
6.56	136.13	2.67	1.96	110	0.361	0.987	1.97	0.57	1.70	218.15	1.89		1	100	1.18	1.20	1.00	258.3	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
6.73	137.04	2.50	1.82	110	0.370	0.986	1.83	0.57	1.70	219.60	1.86		1	100	1.16	1.20	1.00	254.6	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
6.89	134.61	2.27	1.69	110	0.379	0.986	1.69	0.56	1.70	215.68	1.84		1	100	1.14	1.20	1.00	246.3	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.05	133.55	2.02	1.51	110	0.388	0.986	1.52	0.55	1.70	213.97	1.81		1	100	1.11	1.20	1.00	238.6	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.22	130.84	1.92	1.47	110	0.397	0.985	1.47	0.55	1.70	209.60	1.80		1	100	1.11	1.20	1.00	233.0	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.38	125.34	1.72	1.37	110	0.406	0.985	1.38	0.55	1.69	199.24	1.79		1	100	1.10	1.20	1.00	220.4	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.55	121.32	1.59	1.31	110	0.415	0.985	1.32	0.55	1.67	190.42	1.79		1	100	1.10	1.20	1.00	210.4	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
7.71	121.32	1.59	1.31	110	0.424	0.984	1.32	0.55	1.65	188.35	1.80		1	100	1.10	1.20	1.00	208.6	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
7.87	117.69	1.47	1.25	110	0.433	0.984	1.25	0.55	1.63	180.43	1.79		1	100	1.10	1.20	1.00	199.4	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
8.04	112.60	1.37	1.22	110	0.442	0.984	1.22	0.55	1.61	170.99	1.80		1	99	1.11	1.20	1.00	189.9	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
8.20	105.92	1.25	1.18	110	0.451	0.983	1.19	0.55	1.60	159.50	1.81		1	96	1.12	1.20	1.00	178.5	1.00	Infin.	0.000	0.481	Non-Liq.	Non-Liq.	0.00
8.37	94.02	1.10	1.17	110	0.460	0.983	1.18	0.56	1.60	141.18	1.85		1	91	1.14	1.20	1.00	161.8	1.00	Infin.	0.000	0.486	Non-Liq.	Non-Liq.	0.00
8.53	82.35	0.71	0.86	110	0.469	0.982	0.86	0.55	1.56	121.02	1.81		1	85	1.11	1.20	1.00	135.0	1.00	0.309	0.309	0.491	0.63	82%	1.05
8.69	75.19	0.69	0.91	110	0.478	0.982	0.92	0.56	1.56	110.51	1.85		1	81	1.15	1.20	1.00	127.3	1.00	0.272	0.272	0.496	0.55	88%	1.14
8.86	63.26	0.61	0.97	110	0.487	0.982	0.97	0.59	1.57	93.45	1.93		1	74	1.21	1.20	1.00	113.9	1.00	0.217	0.217	0.501	0.43	94%	1.30
9.02	59.99	0.57	0.95	110	0.496	0.981	0.96	0.59	1.56	87.95	1.94		1	71	1.23	1.20	1.00	108.8	1.00	0.200	0.200	0.506	0.39	96%	1.37
9.19	56.32	0.53	0.94	110	0.505	0.981	0.94	0.60	1.55	81.99	1.96		1	69	1.25	1.20	1.00	103.2	1.00	0.182	0.182	0.510	0.36	97%	1.45
9.35	53.37	0.45	0.85	110	0.514	0.981	0.86	0.60	1.54	76.78	1.96		1	66	1.25	1.20	1.00	96.4	1.00	0.163	0.163	0.515	0.32	98%	1.55
9.51	48.12	0.39	0.82	110	0.523	0.980	0.83	0.60	1.53	68.86	1.99		1	61	1.29	1.20	1.00	88.9	1.00	0.145	0.145	0.520	0.28	99%	1.66
9.68	43.46	0.35	0.81	110	0.532	0.980	0.82	0.62	1.53	61.93	2.03		1	57	1.34		1.00	82.7	1.00	0.133	0.133	0.524	0.25	99%	1.77
9.84	43.28	0.29	0.68	110	0.541	0.980	0.69	0.61	1.50	60.60	1.99		1	56	1.29	0.05	1.71	133.7	1.00	0.302	0.302	0.529	0.57	86%	1.07
10.01	40.37	0.42	1.04	110	0.550	0.979	1.05	0.64	1.52	57.28	2.12		1	54	1.48		1.00	84.9	1.00	0.137	0.137	0.533	0.26	99%	1.73
10.17	38.85	0.35	0.91	110	0.559	0.979	0.92	0.64	1.50	54.36	2.10		1	52	1.46		1.00	79.2	1.00	0.126	0.126	0.537	0.23	99%	1.83
10.33	35.99	0.37	1.03	110	0.568	0.979	1.05	0.66	1.50	50.33	2.16		1	48	1.58		1.00	79.3	1.00	0.126	0.126	0.541	0.23	99%	1.83
10.50	35.23	0.33	0.94	110	0.577	0.978	0.96	0.65	1.48	48.64	2.15		1	47	1.55		1.00	75.5	1.00	0.120	0.120	0.545	0.22	99%	1.90
10.66	32.68	0.32	0.98	110	0.586	0.978	0.99	0.66	1.48	44.89	2.19		1	44	1.64		1.00	73.5	1.00	0.117	0.117	0.550	0.21	99%	2.00
10.83	29.98	0.30	0.99	110	0.595	0.978	1.01	0.68	1.47	40.94	2.22		1	40	1.73		1.00	70.8	1.00	0.113	0.113	0.554	0.20	99%	2.00
10.99	26.35	0.27	1.02	110	0.604	0.977	1.04	0.69	1.47	35.85	2.28		1	34	1.89		1.00	67.7	1.00	0.109	0.109	0.557	0.20	100%	2.07
11.15	21.42	0.31	1.43	110	0.614	0.977	1.48	0.74	1.50	29.41	2.44		1	26	2.47		1.00	72.5	1.00	0.115	0.115	0.561	0.21	99%	2.00
11.32	14.65	0.21	1.40	110	0.623	0.977	1.46	0.78	1.51	20.05	2.57		1	10	3.16		1.00	63.4	1.00	0.104	0.104	0.565	0.18	100%	2.17
11.48	9.05	0.21	2.30	110	0.632	0.976	2.47	0.87	1.57	12.46	2.87		0						1.00			0.569	Non-Liq.	Non-Liq.	0.00
11.65	7.19	0.20	2.77	110	0.641	0.976	3.04	0.91	1.58	9.77	3.01		0						1.00			0.572	Non-Liq.	Non-Liq.	0.00
11.81	2.70	0.13	4.89	110	0.650	0.975	6.44	1.00	1.63	3.16	3.60		0						1.00			0.576	Non-Liq.	Non-Liq.	0.00
11.98	2.65	0.12	4.64	110	0.659	0.975	6.18	1.00	1.61	3.02	3.60		0						1.00			0.580	Non-Liq.	Non-Liq.	0.00
12.14	3.48	0.11	3.10	110	0.668	0.975	3.84	1.00	1.58	4.21	3.37		0						1.00			0.583	Non-Liq.	Non-Liq.	0.00
12.30	2.50	0.10	3.84	110	0.677	0.974	5.27	1.00	1.56	2.69	3.61		0						1.00			0.587	Non-Liq.	Non-Liq.	0.00
12.47	1.85	0.11	5.73	110	0.686	0.974	9.10	1.00	1.54	1.70	3.90		0						1.00			0.590	Non-Liq.	Non-Liq.	0.00
12.63	1.79	0.13	7.43	110	0.695	0.974	12.14	1.00	1.52	1.58	4.00		0						1.00			0.593	Non-Liq.	Non-Liq.	0.00
12.80	5.10	0.29	5.59	110	0.704	0.973	6.48	1.00	1.50	6.25	3.36		0						1.00			0.597	Non-Liq.	Non-Liq.	0.00

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	*Volumetric Strain (%)*
12.96	30.82	0.58	1.88	110	0.713	0.973	1.92	0.73	1.34	38.00	2.42		1	37	2.37		1.00	90.3	1.00	0.148	0.148	0.600	**0.25**	99%	**1.65**
13.12	81.21	1.11	1.36	110	0.722	0.973	1.37	0.61	1.26	96.14	2.01		1	75	1.32		1.00	126.7	1.00	0.269	0.269	0.603	**0.45**	93%	**1.16**
13.29	92.10	1.26	1.37	110	0.731	0.972	1.38	0.60	1.25	107.89	1.98		1	80	1.27	1.00	1.00	137.9	1.00	0.324	0.324	0.606	**0.53**	89%	**1.04**
13.45	131.97	1.30	0.99	110	0.740	0.972	0.99	0.54	1.21	150.49	1.77		1	94	1.09	1.05	1.00	164.4	1.00	Infin.	0.000	0.609	**Non-Liq.**	Non-Liq.	**0.00**
13.62	176.29	1.68	0.95	110	0.749	0.972	0.96	0.51	1.19	198.00	1.68		1	100	1.02	1.10	1.00	203.4	1.00	Infin.	0.000	0.612	**Non-Liq.**	Non-Liq.	**0.00**
13.78	208.26	2.28	1.09	110	0.758	0.971	1.10	0.51	1.19	232.55	1.68		1	100	1.02	1.15	1.00	238.3	1.00	Infin.	0.000	0.615	**Non-Liq.**	Non-Liq.	**0.00**
13.94	234.75	2.60	1.11	110	0.767	0.971	1.11	0.50	1.18	259.95	1.65		1	100	1.00	1.20	1.00	261.3	1.00	Infin.	0.000	0.618	**Non-Liq.**	Non-Liq.	**0.00**
14.11	244.80	2.82	1.15	110	0.776	0.971	1.16	0.50	1.17	269.60	1.65		1	100	1.00	1.25	1.00	271.7	1.00	Infin.	0.000	0.621	**Non-Liq.**	Non-Liq.	**0.00**
14.27	272.06	2.98	1.09	110	0.785	0.970	1.10	0.50	1.16	297.68	1.61		1	100	1.00	1.30	1.00	298.8	1.00	Infin.	0.000	0.624	**Non-Liq.**	Non-Liq.	**0.00**
14.44	294.29	3.35	1.14	110	0.794	0.970	1.14	0.50	1.15	320.23	1.60		1	100	1.00	1.35	1.00	321.4	1.00	Infin.	0.000	0.627	**Non-Liq.**	Non-Liq.	**0.00**
14.60	316.23	3.17	1.00	110	0.803	0.970	1.00	0.50	1.15	342.22	1.54		1	100	1.00	1.40	1.00	343.5	1.00	Infin.	0.000	0.629	**Non-Liq.**	Non-Liq.	**0.00**
14.76	316.63	3.35	1.06	110	0.812	0.969	1.06	0.50	1.14	340.73	1.56		1	100	1.00	1.45	1.00	342.0	1.00	Infin.	0.000	0.632	**Non-Liq.**	Non-Liq.	**0.00**
14.93	294.75	3.41	1.16	110	0.821	0.969	1.16	0.50	1.14	315.37	1.61		1	100	1.00	1.50	1.00	316.5	1.00	Infin.	0.000	0.635	**Non-Liq.**	Non-Liq.	**0.00**
15.09	278.02	3.48	1.25	110	0.830	0.969	1.25	0.50	1.13	296.09	1.65		1	100	1.01	1.55	1.00	299.0	1.00	Infin.	0.000	0.637	**Non-Liq.**	Non-Liq.	**0.00**
15.26	279.30	3.53	1.26	110	0.839	0.968	1.27	0.51	1.12	295.90	1.66		1	100	1.01	1.55	1.00	299.6	1.00	Infin.	0.000	0.640	**Non-Liq.**	Non-Liq.	**0.00**
15.42	288.00	3.58	1.24	110	0.848	0.968	1.25	0.50	1.12	303.25	1.65		1	100	1.00	1.55	1.00	304.4	1.00	Infin.	0.000	0.643	**Non-Liq.**	Non-Liq.	**0.00**
15.58	292.46	3.59	1.23	110	0.857	0.967	1.23	0.50	1.11	306.22	1.64		1	100	1.00	1.55	1.00	307.4	1.00	Infin.	0.000	0.645	**Non-Liq.**	Non-Liq.	**0.00**
15.75	272.56	3.89	1.43	110	0.866	0.967	1.43	0.52	1.11	285.01	1.71		1	100	1.04	1.55	1.00	298.8	1.00	Infin.	0.000	0.648	**Non-Liq.**	Non-Liq.	**0.00**
15.91	276.67	3.59	1.30	110	0.875	0.967	1.30	0.51	1.10	287.18	1.67		1	100	1.02	1.55	1.00	294.2	1.00	Infin.	0.000	0.650	**Non-Liq.**	Non-Liq.	**0.00**
16.08	273.17	3.92	1.44	110	0.884	0.966	1.44	0.52	1.10	282.65	1.71		1	100	1.05	1.55	1.00	297.2	1.00	Infin.	0.000	0.653	**Non-Liq.**	Non-Liq.	**0.00**
16.24	281.27	3.86	1.37	110	0.893	0.966	1.38	0.52	1.09	289.18	1.69		1	100	1.03	1.55	1.00	299.7	1.00	Infin.	0.000	0.655	**Non-Liq.**	Non-Liq.	**0.00**
16.40	308.06	4.92	1.60	110	0.902	0.966	1.60	0.53	1.09	315.65	1.72		1	100	1.05	1.55	1.00	334.0	1.00	Infin.	0.000	0.657	**Non-Liq.**	Non-Liq.	**0.00**
16.57	298.32	4.41	1.48	110	0.911	0.965	1.48	0.52	1.08	303.79	1.71		1	100	1.04	1.55	1.00	317.6	1.00	Infin.	0.000	0.660	**Non-Liq.**	Non-Liq.	**0.00**
16.73	317.60	4.08	1.28	110	0.920	0.965	1.29	0.50	1.07	320.96	1.64		1	100	1.00	1.55	1.00	321.4	1.00	Infin.	0.000	0.662	**Non-Liq.**	Non-Liq.	**0.00**
16.90	332.36	5.17	1.56	110	0.929	0.965	1.56	0.52	1.07	335.03	1.70		1	100	1.04	1.55	1.00	349.0	1.00	Infin.	0.000	0.664	**Non-Liq.**	Non-Liq.	**0.00**
17.06	338.43	6.36	1.88	110	0.938	0.964	1.88	0.54	1.07	340.25	1.76		1	100	1.08	1.55	1.00	369.5	1.00	Infin.	0.000	0.666	**Non-Liq.**	Non-Liq.	**0.00**
17.22	307.99	5.82	1.89	110	0.947	0.964	1.90	0.55	1.06	308.23	1.79		1	100	1.10	1.55	1.00	340.3	1.00	Infin.	0.000	0.669	**Non-Liq.**	Non-Liq.	**0.00**
17.39	269.28	4.43	1.64	110	0.956	0.963	1.65	0.54	1.06	267.85	1.78		1	100	1.09	1.55	1.00	292.8	1.00	Infin.	0.000	0.671	**Non-Liq.**	Non-Liq.	**0.00**
17.55	257.64	3.38	1.31	110	0.965	0.963	1.32	0.52	1.05	254.47	1.71		1	100	1.05	1.55	1.00	267.0	1.00	Infin.	0.000	0.673	**Non-Liq.**	Non-Liq.	**0.00**
17.72	229.45	3.27	1.42	110	0.974	0.963	1.43	0.54	1.05	225.75	1.77		1	100	1.09	1.55	1.00	246.1	1.00	Infin.	0.000	0.675	**Non-Liq.**	Non-Liq.	**0.00**
17.88	185.15	3.15	1.70	110	0.983	0.962	1.71	0.58	1.04	181.55	1.89		1	100	1.18	1.55	1.00	215.2	1.00	Infin.	0.000	0.677	**Non-Liq.**	Non-Liq.	**0.00**
18.04	157.27	2.43	1.54	110	0.992	0.962	1.55	0.58	1.04	153.30	1.91		1	95	1.20	1.55	1.00	184.1	1.00	Infin.	0.000	0.679	**Non-Liq.**	Non-Liq.	**0.00**
18.21	172.27	2.97	1.72	110	1.001	0.962	1.73	0.58	1.03	167.15	1.92		1	98	1.21	1.55	1.00	202.6	1.00	Infin.	0.000	0.681	**Non-Liq.**	Non-Liq.	**0.00**
18.37	148.03	3.30	2.23	110	1.010	0.961	2.24	0.62	1.03	142.99	2.05		1	92	1.37		1.00	195.6	1.00	Infin.	0.000	0.683	**Non-Liq.**	Non-Liq.	**0.00**
18.54	212.42	3.34	1.57	110	1.020	0.961	1.58	0.56	1.02	203.98	1.83		1	100	1.13	1.00	1.00	231.6	1.00	Infin.	0.000	0.685	**Non-Liq.**	Non-Liq.	**0.00**
18.70	249.14	2.81	1.13	110	1.029	0.960	1.13	0.51	1.01	237.92	1.68		1	100	1.02	1.05	1.00	244.5	1.00	Infin.	0.000	0.687	**Non-Liq.**	Non-Liq.	**0.00**
18.86	254.49	2.69	1.06	110	1.038	0.960	1.06	0.50	1.01	241.92	1.65		1	100	1.01	1.10	1.00	244.0	1.00	Infin.	0.000	0.689	**Non-Liq.**	Non-Liq.	**0.00**
19.03	249.73	2.74	1.10	110	1.047	0.960	1.10	0.51	1.01	236.35	1.67		1	100	1.02	1.15	1.00	241.6	1.00	Infin.	0.000	0.691	**Non-Liq.**	Non-Liq.	**0.00**
19.19	253.62	2.91	1.15	110	1.056	0.959	1.15	0.51	1.00	239.00	1.68		1	100	1.03	1.20	1.00	246.3	1.00	Infin.	0.000	0.692	**Non-Liq.**	Non-Liq.	**0.00**
19.36	260.64	3.02	1.16	110	1.065	0.959	1.16	0.51	1.00	244.56	1.68		1	100	1.02	1.25	1.00	251.5	1.00	Infin.	0.000	0.694	**Non-Liq.**	Non-Liq.	**0.00**
19.52	261.87	3.10	1.18	110	1.074	0.958	1.19	0.51	0.99	244.64	1.69		1	100	1.03	1.30	1.00	252.7	1.00	Infin.	0.000	0.696	**Non-Liq.**	Non-Liq.	**0.00**
19.69	270.64	2.97	1.10	110	1.083	0.958	1.10	0.50	0.99	251.84	1.65		1	100	1.01	1.35	1.00	254.3	1.00	Infin.	0.000	0.698	**Non-Liq.**	Non-Liq.	**0.00**
19.85	280.85	3.04	1.08	110	1.092	0.957	1.09	0.50	0.98	260.31	1.64		1	100	1.00	1.40	1.00	261.3	1.00	Infin.	0.000	0.699	**Non-Liq.**	Non-Liq.	**0.00**
20.01	294.22	3.15	1.07	110	1.101	0.957	1.07	0.50	0.98	271.62	1.62		1	100	1.00	1.45	1.00	272.6	1.00	Infin.	0.000	0.701	**Non-Liq.**	Non-Liq.	**0.00**
20.18	298.62	3.34	1.12	110	1.107	0.957	1.12	0.50	0.98	274.94	1.64		1	100	1.00	1.50	1.00	276.0	1.00	Infin.	0.000	0.703	**Non-Liq.**	Non-Liq.	**0.00**
20.34	302.63	3.48	1.15	110	1.111	0.956	1.15	0.50	0.98	278.14	1.64		1	100	1.00	1.55	1.00	278.4	1.00	Infin.	0.000	0.704	**Non-Liq.**	Non-Liq.	**0.00**
20.51	308.19	3.65	1.18	110	1.115	0.956	1.19	0.50	0.97	282.74	1.65		1	100	1.00	1.60	1.00	284.3	1.00	Infin.	0.000	0.706	**Non-Liq.**	Non-Liq.	**0.00**
20.67	305.25	4.01	1.31	110	1.118	0.955	1.32	0.51	0.97	279.36	1.69		1	100	1.03	1.65	1.00	288.4	1.00	Infin.	0.000	0.708	**Non-Liq.**	Non-Liq.	**0.00**
20.83	298.17	3.98	1.33	110	1.122	0.955	1.34	0.52	0.97	272.31	1.70		1	100	1.04	1.70	1.00	283.4	1.00	Infin.	0.000	0.709	**Non-Liq.**	Non-Liq.	**0.00**
21.00	287.29	3.36	1.17	110	1.126	0.954	1.17	0.51	0.97	262.03	1.66		1	100	1.01	1.75	1.00	266.4	1.00	Infin.	0.000	0.711	**Non-Liq.**	Non-Liq.	**0.00**
21.16	276.16	2.37	0.86	110	1.130	0.954	0.86	0.50	0.97	251.51	1.57		1	100	1.00	1.80	1.00	252.5	1.00	Infin.	0.000	0.712	**Non-Liq.**	Non-Liq.	**0.00**
21.33	269.03	2.09	0.78	110	1.134	0.954	0.78	0.50	0.97	244.57	1.55		1	100	1.00	1.85	1.00	245.5	1.00	Infin.	0.000	0.714	**Non-Liq.**	Non-Liq.	**0.00**
21.49	271.73	1.47	0.54	110	1.138	0.953	0.54	0.50	0.96	246.60	1.44		1	100	1.00	1.90	1.00	247.5	1.00	Infin.	0.000	0.715	**Non-Liq.**	Non-Liq.	**0.00**
21.65	275.51	1.48	0.54	110	1.142	0.953	0.54	0.50	0.96	249.62	1.43		1	100	1.00	1.95	1.00	250.6	1.00	Infin.	0.000	0.717	**Non-Liq.**	Non-Liq.	**0.00**
21.82	269.27	1.33	0.49	110	1.146	0.952	0.50	0.50	0.96	243.52	1.42		1	100	1.00	2.00	1.00	244.4	1.00	Infin.	0.000	0.718	**Non-Liq.**	Non-Liq.	**0.00**
21.98	254.35	1.56	0.61	110	1.150	0.952	0.61	0.50	0.96	229.58	1.50		1	100	1.00	2.05	1.00	230.4	1.00	Infin.	0.000	0.719	**Non-Liq.**	Non-Liq.	**0.00**
22.15	231.17	1.90	0.82	110	1.154	0.951	0.82	0.50	0.96	208.20	1.62		1	100	1.00	2.10	1.00	209.0	1.00	Infin.	0.000	0.721	**Non-Liq.**	Non-Liq.	**0.00**
22.31	179.26	2.62	1.46	110	1.158	0.951	1.47	0.57	0.95	159.91	1.88		1	96	1.17	2.15	1.00	187.7	1.00	Infin.	0.000	0.722	**Non-Liq.**	Non-Liq.	**0.00**
22.47	221.58	3.22	1.45	110	1.161	0.950	1.46	0.55	0.95	197.87	1.82		1	100	1.12	2.20	1.00	222.0	1.00	Infin.	0.000	0.724	**Non-Liq.**	Non-Liq.	**0.00**
22.64	225.46	3.74	1.66	110	1.165	0.950	1.67	0.56	0.95	200.74	1.86		1	100	1.15	2.25	1.00	231.7	1.00	Infin.	0.000	0.725	**Non-Liq.**	Non-Liq.	**0.00**
22.80	232.74	4.18	1.79	110	1.169	0.949	1.80	0.57	0.94	206.75	1.87		1	100	1.17	2.30	1.00	241.8	1.00	Infin.	0.000	0.726	**Non-Liq.**	Non-Liq.	**0.00**
22.97	236.02	4.51	1.91	110	1.173	0.949	1.92	0.58	0.94	209.15	1.89		1	100	1.18	2.35	1.00	248.2	1.00	Infin.	0.000	0.727	**Non-Liq.**	Non-Liq.	**0.00**
23.13	239.32	4.59	1.92	110	1.177	0.948	1.93	0.58	0.94	211.70	1.89		1	100	1.18	2.40	1.00	250.8	1.00	Infin.	0.000	0.729	**Non-Liq.**	Non-Liq.	**0.00**
23.29	244.53	4.64	1.90	110	1.181	0.948	1.91	0.57	0.94	215.98	1.88		1	100	1.17	2.45	1.00	254.0	1.00	Infin.	0.000	0.730	**Non-Liq.**	Non-Liq.	**0.00**
23.46	258.17	4.62	1.79	110	1.185	0.947	1.80	0.56	0.94	227.92	1.85		1	100	1.14	2.50	1.00	261.4	1.00	Infin.	0.000	0.731	**Non-Liq.**	Non-Liq.	**0.00**
23.62	286.18	4.32	1.51	110	1.189	0.947	1.51	0.54	0.94	253.05	1.76		1	100	1.08	2.55	1.00	274.0	1.00	Infin.	0.000	0.732	**Non-Liq.**	Non-Liq.	**0.00**
23.79	333.44	4.00	1.20	110	1.193	0.946	1.20	0.50	0.94	295.77	1.64		1	100	1.00	2.60	1.00	295.8	1.00	Infin.	0.000	0.733	**Non-Liq.**	Non-Liq.	**0.00**
23.95	392.53	3.80	0.97	110	1.197	0.946	0.97	0.50	0.94	347.80	1.52		1	100	1.00	2.65	1.00	349.1	1.00	Infin.	0.000	0.735	**Non-Liq.**	Non-Liq.	**0.00**
24.11	462.47	4.16	0.90	110	1.200	0.945	0.90	0.50	0.94	409.29	1.45		1	100	1.00	2.70	1.00	410.8	1.00	Infin.	0.000	0.736	**Non-Liq.**	Non-Liq.	**0.00**
24.28	467.10	5.33	1.14	110	1.204	0.945	1.14	0.50	0.94	412.73	1.54		1	100	1.00	2.75	1.00	414.3	1.00	Infin.	0.000	0.737	**Non-Liq.**	Non-Liq.	**0.00**
24.44	447.32	4.90	1.09	110	1.208	0.944	1.10	0.50	0.94	394.56	1.53		1	100	1.00	2.80	1.00	396.0	1.00	Infin.	0.000	0.738	**Non-Liq.**	Non-Liq.	**0.00**
24.61	439.29	6.79	1.54	110	1.212	0.943	1.55	0.51	0.93	386.46	1.66		1	100	1.01	2.85	1.00	392.9	1.00	Infin.	0.000	0.739	**Non-Liq.**	Non-Liq.	**0.00**
24.77	455.61	4.85	1.07	110	1.216	0.943	1.07	0.50	0.93	400.60	1.52		1	100	1.00	2.90	1.00	402.1	1.00	Infin.	0.000	0.740	**Non-Liq.**	Non-Liq.	**0.00**
24.93	451.26	5.70	1.26	110	1.220	0.942	1.27	0.50	0.93	396.12	1.58		1	100	1.00	2.95	1.00	397.6	1.00	Infin.	0.000	0.741	**Non-Liq.**	Non-Liq.	**0.00**
25.10	407.93	4.55	1.11	110	1.224	0.942	1.12	0.50	0.93	357.41	1.57		1	100	1.00	3.00	1.00	358.7	1.00	Infin.	0.000	0.742	**Non-Liq.**	Non-Liq.	**0.00**
25.26	378.75	4.01	1.06	110	1.228	0.941	1.06	0.50	0.93	331.23	1.57		1	100	1.00	3.05	1.00	332.5	1.00	Infin.	0.000	0.743	**Non-Liq.**	Non-Liq.	**0.00**
25.43	353.85	3.37	0.95	110	1.232	0.941	0.96	0.50	0.93	308.89	1.55		1	100	1.00	3.10	1.00	310.0	1.00	Infin.	0.000	0.744	**Non-Liq.**	Non-Liq.	**0.00**
25.59	340.03	2.76	0.81	110	1.236	0.940	0.81	0.50	0.93	296.31	1.51		1	100	1.00	3.15	1.00	297.4	1.00	Infin.	0.000	0.745	**Non-Liq.**	Non-Liq.	**0.00**
25.75	328.46	3.20	0.97	110	1.240	0.939	0.98	0.50	0.92	285.74	1.58		1	100	1.00	3.20	1.00	286.8	1.00	Infin.	0.000	0.746	**Non-Liq.**	Non-Liq.	**0.00**
25.92	319.84	3.29	1.03	110	1.243	0.939	1.03	0.50	0.92	277.77	1.60		1	100	1.00	3.20	1.00	278.8	1.00	Infin.	0.000	0.747	**Non-Liq.**	Non-Liq.	**0.00**
26.08	333.74	3.88	1.16	110	1.247	0.938	1.17	0.50	0.92	289.43	1.64		1	100	1.00	3.20	1.00	290.5	1.00	Infin.	0.000	0.747	**Non-Liq.**	Non-Liq.	**0.00**
26.25	351.56	3.87	1.10	110	1.251	0.938	1.10	0.50	0.92	304.47	1.60		1	100	1.00	3.20	1.00	305.6	1.00	Infin.	0.000	0.748	**Non-Liq.**	Non-Liq.	**0.00**
26.41	345.28	4.26	1.23	110	1.255	0.937	1.24	0.50	0.92	298.43	1.65		1	100	1.00	3.20	1.00	300.0	1.00	Infin.	0.000	0.749	**Non-Liq.**	Non-Liq.	**0.00**
26.57	347.75	3.84	1.10	110	1.259	0.936	1.11	0.50	0.92	300.21	1.61		1	100	1.00	3.20	1.00	301.3	1.00	Infin.	0.000	0.750	**Non-Liq.**	Non-Liq.	**0.00**
26.74	367.05	3.31	0.90	110	1.263	0.936	0.90	0.50	0.92	316.44	1.52		1	100	1.00	3.20	1.00	317.6	1.00	Infin.	0.000	0.751	**Non-Liq.**	Non-Liq.	**0.00**
26.90	372.59	3.04	0.82	110	1.267	0.935	0.82	0.50	0.91	320.74	1.49		1	100	1.00	3.20	1.00	321.9	1.00	Infin.	0.000	0.751	**Non-Liq.**	Non-Liq.	**0.00**
27.07	374.52	2.86	0.76	110	1.271	0.934	0.77	0.50	0.91	321.90	1.47		1	100	1.00	3.20	1.00	323.1	1.00	Infin.	0.000	0.752	**Non-Liq.**	Non-Liq.	**0.00**
27.23	377.61	3.03	0.80	110	1.275	0.934	0.80	0.50	0.91	324.07	1.48		1	100	1.00	3.20	1.00	325.3	1.00	Infin.	0.000	0.753	**Non-Liq.**	Non-Liq.	**0.00**
27.40	381.19	3.93	1.03	110	1.279	0.933	1.03	0.50	0.91	326.65	1.56		1	100	1.00	3.20	1.00	327.9	1.00	Infin.	0.000	0.754	**Non-Liq.**	Non-Liq.	**0.00**
27.56	399.40	5.08	1.27	110	1.282	0.932	1.28	0.50	0.91	341.78	1.62		1	100	1.00	3.20	1.00	343.1	1.00	Infin.	0.000	0.754	**Non-Liq.**	Non-Liq.	**0.00**
27.72	375.52	4.69	1.25	110	1.286	0.932	1.25	0.50	0.91	320.79	1.63		1	100	1.00	3.20	1.00	322.0	1.00	Infin.	0.000	0.755	**Non-Liq.**	Non-Liq.	**0.00**
27.89	347.76	3.01	0.86	110	1.290	0.931	0.87	0.50	0.91	296.54	1.53		1	100	1.00	3.20	1.00	297.6	1.00	Infin.	0.000	0.756	**Non-Liq.**	Non-Liq.	**0.00**

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
28.05	312.31	2.46	0.79	110	1.294	0.930	0.79	0.50	0.90	265.79	1.53		1	100	1.00	3.20	1.00	266.8	1.00	Infin.	0.000	0.756	Non-Liq.	Non-Liq.	0.00
28.22	307.37	2.94	0.96	110	1.298	0.929	0.96	0.50	0.90	261.17	1.60		1	100	1.00	3.20	1.00	262.2	1.00	Infin.	0.000	0.757	Non-Liq.	Non-Liq.	0.00
28.38	341.79	2.65	0.78	110	1.302	0.929	0.78	0.50	0.90	290.11	1.50		1	100	1.00	3.20	1.00	291.2	1.00	Infin.	0.000	0.758	Non-Liq.	Non-Liq.	0.00
28.54	292.80	2.77	0.95	110	1.306	0.928	0.95	0.50	0.90	247.99	1.61		1	100	1.00	3.20	1.00	248.9	1.00	Infin.	0.000	0.758	Non-Liq.	Non-Liq.	0.00
28.71	257.96	2.84	1.10	110	1.310	0.927	1.11	0.52	0.90	217.21	1.70		1	100	1.04	3.20	1.00	226.0	1.00	Infin.	0.000	0.759	Non-Liq.	Non-Liq.	0.00
28.87	193.75	1.91	0.99	110	1.314	0.926	0.99	0.53	0.89	162.04	1.75		1	97	1.07	3.20	1.00	174.6	1.00	Infin.	0.000	0.759	Non-Liq.	Non-Liq.	0.00
29.04	110.13	2.95	2.68	110	1.318	0.926	2.71	0.68	0.86	88.55	2.25		1	72	1.79		1.00	158.7	1.00	0.452	0.452	0.760	0.59	85%	0.61
29.20	64.38	2.45	3.80	110	1.322	0.925	3.88	0.77	0.84	50.25	2.53		1	48	2.93		1.00	147.0	1.00	0.376	0.376	0.760	0.49	91%	0.89
29.36	90.04	3.19	3.54	110	1.325	0.924	3.60	0.73	0.85	71.15	2.40		1	63	2.32		1.00	165.2	1.00	Infin.	0.000	0.761	Non-Liq.	Non-Liq.	0.00
29.53	118.08	3.29	2.78	110	1.329	0.923	2.82	0.68	0.86	94.48	2.24		1	74	1.77		1.00	167.5	1.00	Infin.	0.000	0.761	Non-Liq.	Non-Liq.	0.00
29.69	115.86	2.76	2.38	110	1.333	0.923	2.41	0.67	0.86	92.78	2.20		1	74	1.66		1.00	153.8	1.00	0.418	0.418	0.762	0.55	88%	0.72
29.86	274.31	1.51	0.55	110	1.337	0.922	0.55	0.50	0.89	229.50	1.47		1	100	1.00	0.30	1.41	322.9	1.00	Infin.	0.000	0.762	Non-Liq.	Non-Liq.	0.00
30.02	311.77	1.67	0.53	110	1.341	0.921	0.54	0.50	0.89	260.62	1.42		1	100	1.00	0.35	1.41	366.6	1.00	Infin.	0.000	0.763	Non-Liq.	Non-Liq.	0.00
30.18	315.95	1.19	0.38	110	1.345	0.920	0.38	0.50	0.89	263.74	1.32		1	100	1.00	0.40	1.41	371.0	1.00	Infin.	0.000	0.763	Non-Liq.	Non-Liq.	0.00
30.35	297.70	0.86	0.29	110	1.349	0.919	0.29	0.50	0.89	248.08	1.27		1	100	1.00	0.45	1.41	349.0	1.00	Infin.	0.000	0.763	Non-Liq.	Non-Liq.	0.00
30.51	257.40	1.00	0.39	110	1.353	0.918	0.39	0.50	0.88	214.03	1.40		1	100	1.00	0.50	1.41	301.1	1.00	Infin.	0.000	0.764	Non-Liq.	Non-Liq.	0.00
30.68	200.41	1.87	0.93	110	1.357	0.918	0.94	0.53	0.88	165.04	1.73		1	98	1.06	0.55	1.41	245.6	1.00	Infin.	0.000	0.764	Non-Liq.	Non-Liq.	0.00
30.84	117.72	2.01	1.71	110	1.361	0.917	1.73	0.63	0.85	93.75	2.09		1	74	1.44		1.00	134.7	1.00	0.307	0.307	0.764	0.40	95%	1.09
31.00	42.32	1.90	4.50	110	1.364	0.916	4.65	0.83	0.81	31.36	2.73		0						1.00			0.765	Non-Liq.	Non-Liq.	0.00
31.17	31.82	1.64	5.14	110	1.368	0.915	5.37	0.87	0.80	23.01	2.87		0						1.00			0.765	Non-Liq.	Non-Liq.	0.00
31.33	41.78	1.18	2.82	110	1.372	0.914	2.92	0.79	0.81	31.12	2.60		1	28	3.31		1.00	103.1	1.00	0.182	0.182	0.765	0.24	99%	1.48
31.50	54.16	1.35	2.48	110	1.376	0.913	2.55	0.75	0.82	40.98	2.47		1	40	2.62		1.00	107.2	1.00	0.194	0.194	0.765	0.25	99%	1.43
31.66	56.06	1.68	3.00	110	1.380	0.912	3.07	0.76	0.82	42.21	2.51		1	41	2.84		1.00	119.8	1.00	0.240	0.240	0.766	0.31	98%	1.26
31.82	60.54	2.05	3.38	110	1.384	0.911	3.46	0.77	0.81	45.52	2.53		1	44	2.90		1.00	132.1	1.00	0.294	0.294	0.766	0.38	96%	1.12
31.99	82.92	2.20	2.65	110	1.388	0.910	2.70	0.71	0.82	63.52	2.35		1	58	2.11		1.00	133.8	1.00	0.303	0.303	0.766	0.40	96%	1.10
32.15	148.83	1.99	1.34	110	1.392	0.909	1.35	0.59	0.85	118.52	1.94		1	84	1.23	1.00	1.00	146.5	1.00	0.372	0.372	0.766	0.49	92%	0.90
32.32	268.70	2.23	0.83	110	1.396	0.908	0.83	0.50	0.87	219.97	1.60		1	100	1.00	1.05	1.00	220.8	1.00	Infin.	0.000	0.766	Non-Liq.	Non-Liq.	0.00
32.48	308.62	2.97	0.96	110	1.400	0.907	0.97	0.50	0.87	252.47	1.61		1	100	1.00	1.10	1.00	253.4	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
32.64	309.13	3.57	1.16	110	1.403	0.906	1.16	0.51	0.87	251.87	1.67		1	100	1.02	1.15	1.00	257.4	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
32.81	309.47	4.46	1.44	110	1.407	0.905	1.45	0.53	0.86	250.13	1.75		1	100	1.07	1.20	1.00	268.7	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
32.97	308.84	5.13	1.66	110	1.411	0.904	1.67	0.55	0.85	248.16	1.80		1	100	1.11	1.25	1.00	275.4	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
33.14	317.27	5.82	1.84	110	1.415	0.903	1.84	0.56	0.85	253.92	1.83		1	100	1.13	1.30	1.00	287.4	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
33.30	316.07	6.46	2.04	110	1.419	0.902	2.05	0.57	0.85	251.67	1.87		1	100	1.16	1.35	1.00	293.2	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
33.46	306.67	6.63	2.16	110	1.423	0.901	2.17	0.58	0.84	243.15	1.90		1	100	1.19	1.40	1.00	289.5	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
33.63	295.70	6.52	2.20	110	1.427	0.900	2.21	0.58	0.84	233.68	1.91		1	100	1.20	1.45	1.00	282.0	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
33.79	287.84	6.15	2.14	110	1.431	0.899	2.15	0.58	0.84	227.15	1.91		1	100	1.20	1.50	1.00	273.3	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
33.96	286.58	5.47	1.91	110	1.435	0.898	1.92	0.57	0.84	226.60	1.87		1	100	1.16	1.55	1.00	264.5	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
34.12	285.14	4.97	1.74	110	1.439	0.897	1.75	0.56	0.84	225.74	1.84		1	100	1.14	1.55	1.00	257.8	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
34.28	290.96	4.93	1.70	110	1.443	0.896	1.70	0.56	0.84	230.34	1.83		1	100	1.13	1.55	1.00	260.3	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
34.45	290.25	5.14	1.77	110	1.446	0.895	1.78	0.56	0.84	229.07	1.84		1	100	1.14	1.55	1.00	261.8	0.99	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
34.61	288.91	4.35	1.51	110	1.450	0.894	1.51	0.54	0.84	228.85	1.79		1	100	1.10	1.55	1.00	252.1	0.99	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
34.78	290.18	4.30	1.48	110	1.454	0.893	1.49	0.54	0.84	229.67	1.78		1	100	1.09	1.55	1.00	251.9	0.99	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
34.94	286.57	4.37	1.53	110	1.458	0.892	1.53	0.55	0.84	226.16	1.79		1	100	1.10	1.55	1.00	250.3	0.99	Infin.	0.000	0.766	Non-Liq.	Non-Liq.	0.00
35.10	285.33	4.63	1.62	110	1.462	0.890	1.63	0.55	0.84	224.33	1.82		1	100	1.12	1.55	1.00	252.2	0.99	Infin.	0.000	0.766	Non-Liq.	Non-Liq.	0.00
35.27	282.90	4.65	1.64	110	1.466	0.889	1.65	0.56	0.83	221.92	1.83		1	100	1.13	1.55	1.00	250.7	0.99	Infin.	0.000	0.766	Non-Liq.	Non-Liq.	0.00
35.43	284.23	4.21	1.48	110	1.470	0.888	1.49	0.54	0.84	223.46	1.79		1	100	1.10	1.55	1.00	246.3	0.99	Infin.	0.000	0.766	Non-Liq.	Non-Liq.	0.00
35.60	291.38	3.88	1.33	110	1.474	0.887	1.34	0.53	0.84	229.77	1.74		1	100	1.07	1.55	1.00	246.2	0.98	Infin.	0.000	0.766	Non-Liq.	Non-Liq.	0.00
35.76	294.00	3.53	1.20	110	1.478	0.886	1.21	0.52	0.84	232.40	1.71		1	100	1.04	1.55	1.00	243.1	0.98	Infin.	0.000	0.766	Non-Liq.	Non-Liq.	0.00
35.93	283.22	2.96	1.05	110	1.482	0.885	1.05	0.51	0.84	224.32	1.67		1	100	1.02	1.55	1.00	229.3	0.98	Infin.	0.000	0.765	Non-Liq.	Non-Liq.	0.00
36.09	264.79	3.14	1.18	110	1.485	0.883	1.19	0.53	0.84	208.03	1.73		1	100	1.06	1.55	1.00	221.5	0.98	Infin.	0.000	0.765	Non-Liq.	Non-Liq.	0.00
36.25	239.70	2.92	1.22	110	1.489	0.882	1.23	0.54	0.83	187.17	1.77		1	100	1.09	1.55	1.00	204.4	0.98	Infin.	0.000	0.765	Non-Liq.	Non-Liq.	0.00
36.42	190.73	2.49	1.30	110	1.493	0.881	1.31	0.57	0.82	147.05	1.87		1	93	1.16	1.55	1.00	171.2	0.98	Infin.	0.000	0.765	Non-Liq.	Non-Liq.	0.00
36.58	172.32	1.04	0.60	110	1.497	0.880	0.61	0.51	0.84	135.25	1.67		1	89	1.02	1.55	1.00	138.5	0.98	0.327	0.319	0.764	0.42	95%	1.05
36.75	139.82	0.84	0.60	110	1.501	0.878	0.61	0.53	0.83	108.50	1.75		1	80	1.07	1.55	1.00	116.7	0.98	0.228	0.222	0.764	0.29	98%	1.30
36.91	130.14	1.01	0.77	110	1.505	0.877	0.78	0.56	0.82	99.75	1.85		1	77	1.14	1.55	1.00	114.3	0.97	0.219	0.213	0.764	0.28	99%	1.33
37.07	111.04	0.59	0.53	110	1.509	0.876	0.54	0.55	0.82	85.14	1.81		1	70	1.11	1.55	1.00	95.2	0.97	0.160	0.156	0.763	0.20	99%	1.60
37.24	70.92	1.49	2.10	110	1.513	0.875	2.14	0.71	0.78	50.84	2.35		1	49	2.12		1.00	107.6	0.99	0.196	0.193	0.763	0.25	99%	1.42
37.40	56.54	1.73	3.06	110	1.517	0.873	3.15	0.77	0.76	39.40	2.54		1	38	2.99		1.00	117.9	0.98	0.232	0.229	0.762	0.30	98%	1.28
37.57	26.06	1.68	6.46	110	1.521	0.872	6.86	0.92	0.72	16.60	3.05		0						0.98			0.762	Non-Liq.	Non-Liq.	0.00
37.73	18.93	1.02	5.39	110	1.525	0.871	5.87	0.94	0.71	11.65	3.12		0						0.98			0.762	Non-Liq.	Non-Liq.	0.00
37.89	12.92	0.63	4.91	110	1.528	0.869	5.57	0.98	0.70	7.50	3.26		0						0.98			0.761	Non-Liq.	Non-Liq.	0.00
38.06	14.23	0.52	3.65	110	1.532	0.868	4.09	0.95	0.70	8.45	3.13		0						0.98			0.761	Non-Liq.	Non-Liq.	0.00
38.22	18.57	0.45	2.40	110	1.536	0.867	2.61	0.88	0.72	11.59	2.91		0						0.98			0.760	Non-Liq.	Non-Liq.	0.00
38.39	10.40	0.40	3.83	110	1.540	0.865	4.49	1.00	0.69	5.76	3.29		0						0.98			0.760	Non-Liq.	Non-Liq.	0.00
38.55	8.61	0.33	3.87	110	1.544	0.864	4.71	1.00	0.69	4.58	3.39		0						0.98			0.759	Non-Liq.	Non-Liq.	0.00
38.71	9.61	0.33	3.43	110	1.548	0.863	4.09	1.00	0.68	5.21	3.31		0						0.98			0.759	Non-Liq.	Non-Liq.	0.00
38.88	9.33	0.35	3.71	110	1.552	0.861	4.45	1.00	0.68	5.01	3.34		0						0.98			0.758	Non-Liq.	Non-Liq.	0.00
39.04	8.70	0.42	4.84	110	1.556	0.860	5.89	1.00	0.68	4.59	3.44		0						0.98			0.758	Non-Liq.	Non-Liq.	0.00
39.21	12.90	0.44	3.42	110	1.560	0.859	3.89	0.96	0.69	7.39	3.17		0						0.98			0.757	Non-Liq.	Non-Liq.	0.00
39.37	17.45	0.56	3.19	110	1.564	0.857	3.50	0.91	0.70	10.51	3.02		0						0.98			0.757	Non-Liq.	Non-Liq.	0.00
39.53	20.31	0.80	3.94	110	1.567	0.856	4.27	0.91	0.70	12.38	3.01		0						0.98			0.756	Non-Liq.	Non-Liq.	0.00
39.70	31.28	0.98	3.12	110	1.571	0.854	3.29	0.84	0.72	20.13	2.78		0						0.98			0.756	Non-Liq.	Non-Liq.	0.00
39.86	28.06	0.97	3.45	110	1.575	0.853	3.65	0.86	0.71	17.76	2.85		0						0.97			0.755	Non-Liq.	Non-Liq.	0.00
40.03	65.29	1.25	1.91	110	1.579	0.852	1.95	0.72	0.75	45.20	2.36		1	44	2.16		1.00	97.7	0.97	0.167	0.163	0.754	0.22	99%	1.56
40.19	75.32	1.52	2.02	110	1.583	0.850	2.06	0.71	0.75	52.43	2.33		1	50	2.04		1.00	106.9	0.96	0.194	0.186	0.754	0.25	99%	1.43
40.35	68.28	1.42	2.08	110	1.587	0.849	2.12	0.72	0.75	47.09	2.37		1	46	2.20		1.00	103.6	0.97	0.183	0.178	0.753	0.24	99%	1.47
40.52	76.08	1.52	2.00	110	1.591	0.847	2.04	0.70	0.75	52.82	2.32		1	50	2.02		1.00	106.8	0.96	0.193	0.185	0.752	0.25	99%	1.43
40.68	80.77	1.39	1.72	110	1.595	0.846	1.75	0.69	0.75	56.49	2.26		1	53	1.82		1.00	102.7	0.96	0.181	0.173	0.752	0.23	99%	1.49
40.85	107.08	1.51	1.41	110	1.599	0.844	1.43	0.64	0.77	76.62	2.10		1	66	1.45		1.00	111.4	0.96	0.208	0.200	0.751	0.27	99%	1.37
41.01	126.77	2.12	1.67	110	1.603	0.843	1.69	0.64	0.77	90.84	2.09		1	73	1.44		1.00	131.1	0.94	0.290	0.273	0.750	0.36	97%	1.12
41.17	204.50	2.61	1.28	110	1.607	0.841	1.29	0.56	0.79	151.55	1.85		1	94	1.15	1.00	1.00	174.4	0.94	Infin.	0.000	0.750	Non-Liq.	Non-Liq.	0.00
41.34	221.25	3.11	1.41	110	1.610	0.840	1.42	0.57	0.79	163.68	1.86		1	97	1.15	1.05	1.00	189.4	0.94	Infin.	0.000	0.749	Non-Liq.	Non-Liq.	0.00
41.50	230.53	3.66	1.59	110	1.614	0.838	1.60	0.57	0.78	169.74	1.89		1	99	1.18	1.10	1.00	200.7	0.94	Infin.	0.000	0.748	Non-Liq.	Non-Liq.	0.00
41.67	236.49	4.16	1.76	110	1.618	0.837	1.77	0.58	0.78	173.29	1.92		1	100	1.20	1.15	1.00	209.5	0.94	Infin.	0.000	0.747	Non-Liq.	Non-Liq.	0.00
41.83	238.11	4.55	1.91	110	1.622	0.835	1.92	0.59	0.78	173.63	1.94		1	100	1.23	1.15	1.00	214.8	0.94	Infin.	0.000	0.747	Non-Liq.	Non-Liq.	0.00
41.99	239.78	3.88	1.62	110	1.626	0.834	1.63	0.57	0.78	175.95	1.88		1	100	1.17	1.15	1.00	207.4	0.93	Infin.	0.000	0.746	Non-Liq.	Non-Liq.	0.00
42.16	274.29	3.22	1.17	110	1.630	0.832	1.18	0.53	0.80	205.09	1.74		1	100	1.06	1.15	1.00	218.5	0.93	Infin.	0.000	0.745	Non-Liq.	Non-Liq.	0.00
42.32	291.71	2.41	0.83	110	1.634	0.831	0.83	0.50	0.80	220.63	1.60		1	100	1.00	1.15	1.00	221.5	0.93	Infin.	0.000	0.744	Non-Liq.	Non-Liq.	0.00
42.49	285.46	2.18	0.76	110	1.638	0.829	0.77	0.50	0.80	215.62	1.59		1	100	1.00	1.15	1.00	216.4	0.93	Infin.	0.000	0.743	Non-Liq.	Non-Liq.	0.00
42.65	273.88	2.74	1.00	110	1.642	0.827	1.01	0.51	0.80	205.39	1.68		1	100	1.03	1.15	1.00	211.6	0.93	Infin.	0.000	0.743	Non-Liq.	Non-Liq.	0.00
42.81	343.04	4.15	1.21	110	1.646	0.826	1.21	0.51	0.80	257.35	1.68		1	100	1.02	1.15	1.00	264.6	0.93	Infin.	0.000	0.742	Non-Liq.	Non-Liq.	0.00
42.98	408.63	5.08	1.24	110	1.649	0.824	1.25	0.50	0.80	307.99	1.64		1	100	1.00	1.15	1.00	308.4	0.93	Infin.	0.000	0.741	Non-Liq.	Non-Liq.	0.00

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff. Stress at Midpt. p'o (tsf)	rd	F	n	C_q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_c	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	**Liquefac. Safety Factor**	Probab. P_L	***Volumetric Strain (%)***
43.14	577.81	9.13	1.58	110	1.653	0.823	1.59	0.50	0.80	435.30	1.65		1	100	1.00	1.15	1.00	437.0	0.93	Infin.	0.000	0.740	**Non-Liq.**	Non-Liq.	**0.00**
43.31	597.92	9.45	1.58	110	1.657	0.821	1.58	0.50	0.80	450.30	1.64		1	100	1.00	1.15	1.00	452.0	0.93	Infin.	0.000	0.739	**Non-Liq.**	Non-Liq.	**0.00**
43.47	392.43	8.74	2.23	110	1.661	0.820	2.24	0.57	0.77	285.78	1.87		1	100	1.16	1.15	1.00	332.9	0.92	Infin.	0.000	0.738	**Non-Liq.**	Non-Liq.	**0.00**
43.64	395.33	5.19	1.31	110	1.665	0.818	1.32	0.51	0.79	295.31	1.67		1	100	1.02	1.15	1.00	302.0	0.92	Infin.	0.000	0.737	**Non-Liq.**	Non-Liq.	**0.00**
43.80	397.94	3.38	0.85	110	1.669	0.816	0.85	0.50	0.80	298.21	1.52		1	100	1.00	1.15	1.00	299.3	0.92	Infin.	0.000	0.736	**Non-Liq.**	Non-Liq.	**0.00**
43.96	401.09	1.69	0.42	110	1.673	0.815	0.42	0.50	0.80	300.23	1.30		1	100	1.00	1.15	1.00	301.4	0.92	Infin.	0.000	0.735	**Non-Liq.**	Non-Liq.	**0.00**
44.13	389.81	1.87	0.48	110	1.677	0.813	0.48	0.50	0.79	291.41	1.35		1	100	1.00	1.15	1.00	292.5	0.92	Infin.	0.000	0.735	**Non-Liq.**	Non-Liq.	**0.00**
44.29	358.36	1.92	0.53	110	1.681	0.811	0.54	0.50	0.79	267.48	1.41		1	100	1.00	1.15	1.00	268.5	0.92	Infin.	0.000	0.734	**Non-Liq.**	Non-Liq.	**0.00**
44.46	351.76	2.17	0.62	110	1.685	0.810	0.62	0.50	0.79	262.22	1.46		1	100	1.00	1.15	1.00	263.2	0.92	Infin.	0.000	0.733	**Non-Liq.**	Non-Liq.	**0.00**
44.62	367.06	3.54	0.96	110	1.689	0.808	0.97	0.50	0.79	273.36	1.59		1	100	1.00	1.15	1.00	274.4	0.92	Infin.	0.000	0.732	**Non-Liq.**	Non-Liq.	**0.00**
44.78	396.02	5.60	1.41	110	1.692	0.807	1.42	0.52	0.78	292.17	1.70		1	100	1.04	1.15	1.00	304.5	0.92	Infin.	0.000	0.731	**Non-Liq.**	Non-Liq.	**0.00**
44.95	497.62	0.00	0.00	110	1.696	0.805	0.00	0.80	0.68	320.55	2.66		0		1.00				0.96			0.730	**Non-Liq.**	Non-Liq.	**0.00**
45.11	534.51	0.00	0.00	110	1.700	0.803	0.00	0.81	0.68	342.84	2.68		0		1.00				0.96			0.729	**Non-Liq.**	Non-Liq.	**0.00**

CPT-LIQUEFY.XLS - A SPREADSHEET FOR EMPIRICAL ESTIMATION OF LIQUEFACTION POTENTIAL USING CPT DATA
Developed 2003 by Shelton L. Stringer, GE, Earth Systems Southwest

Project: Oxnard High School No. 8
Job No: 301953-001
Date: 8/14/2018
Sounding: CPT-5
Plot: 5

Methods: Liquefaction Analysis using 1998 NCEER workshop methods (Robertson & Wride)
Post-liquefaction Settlement Analysis from Tokimatsu & Seed (1987)
Dry Sand Settlement by Pradel, ASCE Journal of G&GE, Vol 124, No. 4

Total Liquefied Thickness (feet)
5.7

EARTHQUAKE INFORMATION:
Magnitude: 6.77 (7.5)
PGA, g: 0.97 (0.75)
MSF: 1.30
GWT, feet: 20.0
Design GWT, feet: 8.0

Induced CSR (M=7.5): = 0.65*PGA*(po/p'o)*rd/MSF
Clean Sand Qc1n = C_Q*K_C*K_H*Qc
SF = $CRR_{7.5}$*Kσ/CSR
Use Tokimatsu & Seed (0) or Ishihara &Yoshmine (1): 0
Unit Weight of unsaturated soils: 110 pcf
Unit Weight of saturated soils: 110 pcf
Limiting Ic for liquefiable soils: 2.60
Limiting Ic for K_H: 2.0
Required SF: 1.50
Min SF of Liquefiable Layers: 0.32
Avg SF of Liquefiable Layers: 0.06

Probab	Total Induced Subsidence (inches)
Avg	
4%	
Max	
98%	0.8

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
0.16	7.20	0.07	0.96	110	0.009	1.000	0.96	0.82	1.70	11.55	2.69		0						1.00			0.485	Non-Liq.	Non-Liq.	0.00
0.33	11.97	0.11	0.92	110	0.018	1.000	0.92	0.75	1.70	19.20	2.49		1	8	2.70		1.00	51.9	1.00	0.093	0.093	0.485	Non-Liq.	Non-Liq.	0.00
0.49	16.98	0.15	0.86	110	0.027	1.000	0.86	0.71	1.70	27.24	2.34		1	23	2.08		1.00	56.7	1.00	0.097	0.097	0.485	Non-Liq.	Non-Liq.	0.00
0.66	18.41	0.17	0.90	110	0.036	1.000	0.90	0.70	1.70	29.52	2.32		1	26	2.01		1.00	59.5	1.00	0.100	0.100	0.485	Non-Liq.	Non-Liq.	0.00
0.82	16.13	0.16	1.01	110	0.045	1.000	1.01	0.73	1.70	25.85	2.40		1	21	2.29		1.00	59.2	1.00	0.099	0.099	0.485	Non-Liq.	Non-Liq.	0.00
0.98	12.95	0.14	1.06	110	0.054	1.000	1.06	0.75	1.70	20.72	2.49		1	12	2.71		1.00	56.1	1.00	0.096	0.096	0.485	Non-Liq.	Non-Liq.	0.00
1.15	10.49	0.11	1.05	110	0.063	0.999	1.05	0.78	1.70	16.75	2.57		1	3	3.13		1.00	52.5	1.00	0.093	0.093	0.484	Non-Liq.	Non-Liq.	0.00
1.31	10.49	0.11	1.05	110	0.072	0.999	1.06	0.78	1.70	16.74	2.57		1	3	3.13		1.00	52.5	1.00	0.093	0.093	0.484	Non-Liq.	Non-Liq.	0.00
1.48	9.50	0.14	1.52	110	0.081	0.999	1.53	0.81	1.70	15.13	2.69		0						1.00			0.484	Non-Liq.	Non-Liq.	0.00
1.64	11.89	0.21	1.77	110	0.090	0.998	1.79	0.80	1.70	18.96	2.64		0						1.00			0.484	Non-Liq.	Non-Liq.	0.00
1.80	17.29	0.33	1.93	110	0.099	0.998	1.94	0.77	1.70	27.62	2.53		1	23	2.91		1.00	80.4	1.00	0.128	0.128	0.484	Non-Liq.	Non-Liq.	0.00
1.97	29.55	0.52	1.75	110	0.108	0.998	1.76	0.70	1.70	47.31	2.32		1	46	2.00		1.00	94.8	1.00	0.159	0.159	0.484	Non-Liq.	Non-Liq.	0.00
2.13	29.26	0.52	1.76	110	0.117	0.997	1.77	0.70	1.70	46.83	2.32		1	45	2.02		1.00	94.6	1.00	0.159	0.159	0.483	Non-Liq.	Non-Liq.	0.00
2.30	27.77	0.48	1.74	110	0.126	0.997	1.75	0.71	1.70	44.42	2.34		1	43	2.07		1.00	92.1	1.00	0.153	0.153	0.483	Non-Liq.	Non-Liq.	0.00
2.46	25.48	0.44	1.74	110	0.135	0.996	1.75	0.72	1.70	40.72	2.37		1	40	2.18		1.00	88.8	1.00	0.145	0.145	0.483	Non-Liq.	Non-Liq.	0.00
2.62	22.54	0.40	1.76	110	0.144	0.996	1.77	0.73	1.70	35.99	2.41		1	34	2.36		1.00	85.1	1.00	0.137	0.137	0.483	Non-Liq.	Non-Liq.	0.00
2.79	20.15	0.37	1.83	110	0.153	0.996	1.85	0.75	1.70	32.13	2.46		1	30	2.58		1.00	83.0	1.00	0.133	0.133	0.483	Non-Liq.	Non-Liq.	0.00
2.95	17.63	0.42	2.37	110	0.162	0.995	2.39	0.78	1.70	28.07	2.58		1	24	3.19		1.00	89.5	1.00	0.147	0.147	0.482	Non-Liq.	Non-Liq.	0.00
3.12	13.94	0.43	3.06	110	0.171	0.995	3.10	0.83	1.70	22.12	2.73		0						1.00			0.482	Non-Liq.	Non-Liq.	0.00
3.28	11.33	0.42	3.69	110	0.180	0.994	3.75	0.86	1.70	17.92	2.85		0						1.00			0.482	Non-Liq.	Non-Liq.	0.00
3.44	10.79	0.35	3.27	110	0.189	0.994	3.33	0.86	1.70	17.03	2.84		0						1.00			0.482	Non-Liq.	Non-Liq.	0.00
3.61	19.14	0.32	1.69	110	0.198	0.994	1.71	0.75	1.70	30.44	2.46		1	27	2.58		1.00	78.4	1.00	0.125	0.125	0.482	Non-Liq.	Non-Liq.	0.00
3.77	28.87	0.35	1.20	110	0.208	0.993	1.21	0.68	1.70	46.06	2.23		1	45	1.74		1.00	79.9	1.00	0.127	0.127	0.482	Non-Liq.	Non-Liq.	0.00
3.94	37.13	0.44	1.18	110	0.217	0.993	1.19	0.65	1.70	59.31	2.13		1	55	1.52		1.00	90.2	1.00	0.148	0.148	0.481	Non-Liq.	Non-Liq.	0.00
4.10	42.19	0.52	1.24	110	0.226	0.993	1.25	0.64	1.70	67.43	2.10		1	60	1.46		1.00	98.5	1.00	0.169	0.169	0.481	Non-Liq.	Non-Liq.	0.00
4.27	42.88	0.62	1.43	110	0.235	0.992	1.44	0.65	1.70	68.52	2.14		1	61	1.53		1.00	104.7	1.00	0.187	0.187	0.481	Non-Liq.	Non-Liq.	0.00
4.43	42.87	0.65	1.51	110	0.244	0.992	1.52	0.65	1.70	68.49	2.15		1	61	1.56		1.00	106.9	1.00	0.194	0.194	0.481	Non-Liq.	Non-Liq.	0.00
4.59	43.05	0.62	1.44	110	0.253	0.991	1.44	0.65	1.70	68.77	2.14		1	61	1.53		1.00	105.0	1.00	0.188	0.188	0.481	Non-Liq.	Non-Liq.	0.00
4.76	40.55	0.64	1.58	110	0.262	0.991	1.59	0.66	1.70	64.74	2.18		1	59	1.63		1.00	105.4	1.00	0.189	0.189	0.480	Non-Liq.	Non-Liq.	0.00
4.92	37.17	0.59	1.58	110	0.271	0.991	1.60	0.67	1.70	59.29	2.21		1	55	1.70		1.00	101.0	1.00	0.176	0.176	0.480	Non-Liq.	Non-Liq.	0.00
5.09	45.41	0.55	1.21	110	0.280	0.990	1.22	0.63	1.70	72.52	2.07		1	63	1.41		1.00	102.1	1.00	0.179	0.179	0.480	Non-Liq.	Non-Liq.	0.00
5.25	49.21	0.55	1.12	110	0.289	0.990	1.13	0.62	1.70	78.61	2.02		1	67	1.33		1.00	104.9	1.00	0.187	0.187	0.480	Non-Liq.	Non-Liq.	0.00
5.41	48.56	0.56	1.16	110	0.298	0.989	1.16	0.62	1.70	77.55	2.04		1	66	1.35		1.00	104.9	1.00	0.187	0.187	0.480	Non-Liq.	Non-Liq.	0.00
5.58	48.19	0.59	1.22	110	0.307	0.989	1.23	0.62	1.70	76.94	2.06		1	66	1.38		1.00	106.1	1.00	0.191	0.191	0.479	Non-Liq.	Non-Liq.	0.00
5.74	48.82	0.59	1.20	110	0.316	0.989	1.21	0.62	1.70	77.94	2.05		1	66	1.37		1.00	106.5	1.00	0.192	0.192	0.479	Non-Liq.	Non-Liq.	0.00
5.91	49.59	0.58	1.17	110	0.325	0.988	1.18	0.62	1.70	79.16	2.03		1	67	1.35		1.00	106.6	1.00	0.193	0.193	0.479	Non-Liq.	Non-Liq.	0.00
6.07	49.01	0.58	1.19	110	0.334	0.988	1.19	0.62	1.70	78.21	2.04		1	67	1.36		1.00	106.2	1.00	0.191	0.191	0.479	Non-Liq.	Non-Liq.	0.00
6.23	48.87	0.58	1.19	110	0.343	0.988	1.20	0.62	1.70	77.97	2.04		1	67	1.36		1.00	106.2	1.00	0.191	0.191	0.479	Non-Liq.	Non-Liq.	0.00
6.40	48.92	0.59	1.20	110	0.352	0.987	1.21	0.62	1.70	78.04	2.05		1	67	1.37		1.00	106.5	1.00	0.192	0.192	0.479	Non-Liq.	Non-Liq.	0.00
6.56	50.19	0.62	1.23	110	0.361	0.987	1.24	0.62	1.70	80.07	2.04		1	68	1.36		1.00	109.1	1.00	0.201	0.201	0.478	Non-Liq.	Non-Liq.	0.00
6.73	54.54	0.64	1.17	110	0.370	0.986	1.17	0.61	1.70	87.04	2.00		1	71	1.30		1.00	113.3	1.00	0.215	0.215	0.478	Non-Liq.	Non-Liq.	0.00
6.89	60.79	0.78	1.29	110	0.379	0.986	1.29	0.61	1.70	97.07	1.99		1	76	1.29	0.90	1.02	127.9	1.00	0.275	0.275	0.478	Non-Liq.	Non-Liq.	0.00
7.05	70.21	1.20	1.71	110	0.388	0.986	1.72	0.62	1.70	112.19	2.03		1	82	1.35		1.00	151.2	1.00	0.401	0.401	0.478	Non-Liq.	Non-Liq.	0.00
7.22	86.10	1.28	1.49	110	0.397	0.985	1.49	0.59	1.70	137.71	1.93		1	90	1.22	1.00	1.00	168.1	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.38	112.25	1.15	1.02	110	0.406	0.985	1.02	0.53	1.66	175.45	1.74		1	100	1.06	1.05	1.00	187.1	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.55	123.77	1.31	1.06	110	0.415	0.985	1.06	0.52	1.63	190.49	1.72		1	100	1.05	1.10	1.00	201.3	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
7.71	123.77	1.31	1.06	110	0.424	0.984	1.06	0.53	1.62	188.51	1.73		1	100	1.05	1.15	1.00	199.6	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
7.87	137.24	1.24	0.90	110	0.433	0.984	0.90	0.50	1.57	202.88	1.65		1	100	1.01	1.20	1.00	204.9	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
8.04	143.26	1.17	0.82	110	0.442	0.984	0.82	0.50	1.55	208.83	1.61		1	100	1.00	1.25	1.00	209.6	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
8.20	133.59	0.95	0.71	110	0.451	0.983	0.72	0.50	1.53	192.72	1.60		1	100	1.00	1.30	1.00	193.4	1.00	Infin.	0.000	0.481	Non-Liq.	Non-Liq.	0.00
8.37	119.63	0.65	0.54	110	0.460	0.983	0.54	0.50	1.52	170.80	1.56		1	99	1.00	1.35	1.00	171.4	1.00	Infin.	0.000	0.486	Non-Liq.	Non-Liq.	0.00
8.53	108.61	0.64	0.59	110	0.469	0.982	0.59	0.50	1.50	153.49	1.62		1	95	1.00	1.40	1.00	154.1	1.00	0.420	0.420	0.491	**0.86**	63%	0.66
8.69	97.77	0.53	0.54	110	0.478	0.982	0.54	0.50	1.49	136.81	1.64		1	90	1.00	1.45	1.00	136.9	1.00	0.318	0.318	0.496	**0.64**	81%	1.04
8.86	91.00	0.48	0.52	110	0.487	0.982	0.53	0.51	1.48	126.66	1.66		1	87	1.01	1.50	1.00	128.5	1.00	0.277	0.277	0.501	**0.55**	88%	1.13
9.02	88.06	0.54	0.61	110	0.496	0.981	0.62	0.52	1.48	122.80	1.71		1	85	1.05	1.55	1.00	128.8	1.00	0.279	0.279	0.506	**0.55**	88%	1.12
9.19	80.39	0.53	0.66	110	0.505	0.981	0.66	0.54	1.49	112.21	1.76		1	82	1.08	1.60	1.00	121.5	1.00	0.247	0.247	0.510	**0.48**	92%	1.21
9.35	57.91	0.50	0.87	110	0.514	0.981	0.88	0.59	1.53	83.01	1.94		1	69	1.23	1.65	1.00	102.3	1.00	0.180	0.180	0.515	**0.35**	97%	1.46
9.51	67.62	0.54	0.79	110	0.523	0.980	0.80	0.57	1.49	94.64	1.87		1	75	1.16	1.70	1.00	110.3	1.00	0.205	0.205	0.520	**0.39**	96%	1.35
9.68	67.40	0.52	0.77	110	0.532	0.980	0.78	0.57	1.48	93.34	1.87		1	74	1.16	1.75	1.00	108.5	1.00	0.199	0.199	0.524	**0.38**	96%	1.37
9.84	67.98	0.51	0.75	110	0.541	0.980	0.76	0.57	1.46	93.14	1.86		1	74	1.15	1.80	1.00	107.8	1.00	0.197	0.197	0.529	**0.37**	96%	1.38
10.01	65.93	0.45	0.68	110	0.550	0.979	0.69	0.56	1.44	89.29	1.85		1	72	1.15	1.85	1.00	102.7	1.00	0.181	0.181	0.533	**0.34**	97%	1.48
10.17	65.84	0.44	0.67	110	0.559	0.979	0.68	0.56	1.43	88.34	1.85		1	72	1.15	1.90	1.00	101.6	1.00	0.178	0.178	0.537	**0.33**	97%	1.47
10.33	64.79	0.46	0.70	110	0.568	0.979	0.71	0.57	1.42	86.44	1.87		1	71	1.16	1.95	1.00	100.8	1.00	0.175	0.175	0.541	**0.32**	98%	1.48
10.50	65.15	0.49	0.74	110	0.577	0.978	0.75	0.57	1.42	86.37	1.88		1	71	1.17	2.00	1.00	101.9	1.00	0.178	0.178	0.545	**0.33**	98%	1.47
10.66	65.57	0.48	0.74	110	0.586	0.978	0.74	0.57	1.40	86.12	1.88		1	71	1.17	2.05	1.00	101.4	1.00	0.177	0.177	0.550	**0.32**	98%	1.48
10.83	66.76	0.49	0.73	110	0.595	0.978	0.74	0.57	1.39	86.85	1.88		1	71	1.17	2.10	1.00	101.9	1.00	0.178	0.178	0.554	**0.32**	98%	1.47
10.99	69.51	0.50	0.72	110	0.604	0.977	0.73	0.57	1.37	89.46	1.86		1	72	1.16	2.15	1.00	103.8	1.00	0.184	0.184	0.557	**0.33**	97%	1.44
11.15	72.61	0.54	0.74	110	0.614	0.977	0.74	0.57	1.36	92.59	1.86		1	74	1.15	2.20	1.00	107.0	1.00	0.194	0.194	0.561	**0.35**	97%	1.40
11.32	77.76	0.57	0.73	110	0.623	0.977	0.73	0.56	1.34	98.03	1.83		1	76	1.13	2.25	1.00	111.4	1.00	0.209	0.209	0.565	**0.37**	96%	1.34
11.48	84.82	0.65	0.76	110	0.632	0.976	0.77	0.55	1.33	105.90	1.82		1	79	1.12	2.30	1.00	119.2	1.00	0.238	0.238	0.569	**0.42**	95%	1.24
11.65	92.40	0.51	0.55	110	0.641	0.976	0.56	0.52	1.30	112.72	1.72		1	82	1.05	2.35	1.00	118.6	1.00	0.235	0.235	0.572	**0.41**	95%	1.25
11.81	100.55	0.65	0.64	110	0.650	0.975	0.65	0.53	1.29	122.02	1.73		1	85	1.06	2.40	1.00	129.2	1.00	0.281	0.281	0.576	**0.49**	91%	1.13
11.98	108.89	0.74	0.67	110	0.659	0.975	0.68	0.52	1.28	131.02	1.71		1	88	1.05	2.45	1.00	137.7	1.00	0.323	0.323	0.580	**0.56**	87%	1.03
12.14	120.07	0.79	0.66	110	0.668	0.975	0.66	0.51	1.27	142.80	1.68		1	92	1.02	2.50	1.00	146.6	1.00	0.373	0.373	0.583	**0.64**	81%	0.86
12.30	132.01	0.89	0.68	110	0.677	0.974	0.68	0.50	1.25	155.55	1.66		1	95	1.01	2.55	1.00	157.3	1.00	0.442	0.442	0.587	**0.75**	72%	0.61
12.47	144.08	1.04	0.72	110	0.686	0.974	0.72	0.50	1.24	168.48	1.65		1	98	1.00	2.60	1.00	169.2	1.00	Infin.	0.000	0.590	Non-Liq.	Non-Liq.	0.00
12.63	152.23	1.19	0.78	110	0.695	0.974	0.79	0.50	1.24	177.08	1.65		1	100	1.01	2.65	1.00	178.9	1.00	Infin.	0.000	0.593	Non-Liq.	Non-Liq.	0.00
12.80	162.83	1.20	0.74	110	0.704	0.973	0.74	0.50	1.23	187.89	1.62		1	100	1.00	2.70	1.00	188.6	1.00	Infin.	0.000	0.597	Non-Liq.	Non-Liq.	0.00

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff. Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	Induced EQ CRR	M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
12.96	177.02	1.56	0.88	110	0.713	0.973	0.88	0.50	1.22	203.18	1.65		1	100	1.00	2.75	1.00	204.1	1.00	Infin.	0.000	0.600	**Non-Liq.**	Non-Liq.	**0.00**
13.12	188.21	1.70	0.90	110	0.722	0.973	0.90	0.50	1.21	214.55	1.64		1	100	1.00	2.80	1.00	215.4	1.00	Infin.	0.000	0.603	**Non-Liq.**	Non-Liq.	**0.00**
13.29	199.52	1.82	0.91	110	0.731	0.972	0.92	0.50	1.20	226.07	1.63		1	100	1.00	2.85	1.00	226.9	1.00	Infin.	0.000	0.606	**Non-Liq.**	Non-Liq.	**0.00**
13.45	206.33	1.96	0.95	110	0.740	0.972	0.95	0.50	1.20	232.38	1.63		1	100	1.00	2.90	1.00	233.2	1.00	Infin.	0.000	0.609	**Non-Liq.**	Non-Liq.	**0.00**
13.62	209.22	1.92	0.92	110	0.749	0.972	0.92	0.50	1.19	234.21	1.62		1	100	1.00	2.95	1.00	235.1	1.00	Infin.	0.000	0.612	**Non-Liq.**	Non-Liq.	**0.00**
13.78	216.92	2.11	0.97	110	0.758	0.971	0.98	0.50	1.18	241.40	1.63		1	100	1.00	3.00	1.00	242.3	1.00	Infin.	0.000	0.615	**Non-Liq.**	Non-Liq.	**0.00**
13.94	220.68	1.88	0.85	110	0.767	0.971	0.85	0.50	1.17	244.14	1.58		1	100	1.00	3.05	1.00	245.1	1.00	Infin.	0.000	0.618	**Non-Liq.**	Non-Liq.	**0.00**
14.11	225.50	2.72	1.21	110	0.776	0.971	1.21	0.51	1.17	249.15	1.69		1	100	1.03	3.10	1.00	257.6	1.00	Infin.	0.000	0.621	**Non-Liq.**	Non-Liq.	**0.00**
14.27	226.97	2.77	1.22	110	0.785	0.970	1.22	0.52	1.17	249.35	1.69		1	100	1.03	3.15	1.00	258.3	1.00	Infin.	0.000	0.624	**Non-Liq.**	Non-Liq.	**0.00**
14.44	260.76	3.44	1.32	110	0.794	0.970	1.32	0.51	1.16	284.70	1.68		1	100	1.03	3.20	1.00	293.3	1.00	Infin.	0.000	0.627	**Non-Liq.**	Non-Liq.	**0.00**
14.60	273.34	5.44	1.99	110	0.803	0.970	2.00	0.55	1.16	300.02	1.82		1	100	1.12	3.25	1.00	336.8	1.00	Infin.	0.000	0.629	**Non-Liq.**	Non-Liq.	**0.00**
14.76	293.55	5.65	1.92	110	0.812	0.969	1.93	0.54	1.15	319.57	1.79		1	100	1.10	3.30	1.00	352.3	1.00	Infin.	0.000	0.632	**Non-Liq.**	Non-Liq.	**0.00**
14.93	441.40	7.59	1.72	110	0.821	0.969	1.72	0.51	1.14	473.40	1.66		1	100	1.01	3.35	1.00	479.8	1.00	Infin.	0.000	0.635	**Non-Liq.**	Non-Liq.	**0.00**
15.09	347.82	7.25	2.09	110	0.830	0.969	2.09	0.54	1.14	374.13	1.78		1	100	1.09	3.40	1.00	410.8	1.00	Infin.	0.000	0.637	**Non-Liq.**	Non-Liq.	**0.00**
15.26	302.88	7.87	2.60	110	0.839	0.968	2.61	0.58	1.14	326.31	1.90		1	100	1.18	3.45	1.00	387.9	1.00	Infin.	0.000	0.640	**Non-Liq.**	Non-Liq.	**0.00**
15.42	275.99	6.43	2.33	110	0.848	0.968	2.34	0.57	1.13	295.07	1.88		1	100	1.17	3.50	1.00	346.0	1.00	Infin.	0.000	0.643	**Non-Liq.**	Non-Liq.	**0.00**
15.58	376.75	5.16	1.37	110	0.857	0.967	1.37	0.50	1.11	394.73	1.61		1	100	1.00	3.55	1.00	396.2	1.00	Infin.	0.000	0.645	**Non-Liq.**	Non-Liq.	**0.00**
15.75	321.62	5.68	1.76	110	0.866	0.967	1.77	0.53	1.11	337.17	1.74		1	100	1.07	3.60	1.00	361.3	1.00	Infin.	0.000	0.648	**Non-Liq.**	Non-Liq.	**0.00**
15.91	321.75	3.28	1.02	110	0.875	0.967	1.02	0.50	1.10	333.46	1.55		1	100	1.00	3.65	1.00	334.7	1.00	Infin.	0.000	0.650	**Non-Liq.**	Non-Liq.	**0.00**
16.08	344.32	3.11	0.90	110	0.884	0.966	0.90	0.50	1.09	355.08	1.49		1	100	1.00	3.70	1.00	356.4	1.00	Infin.	0.000	0.653	**Non-Liq.**	Non-Liq.	**0.00**
16.24	348.92	2.94	0.84	110	0.893	0.966	0.84	0.50	1.09	358.01	1.47		1	100	1.00	3.75	1.00	359.3	1.00	Infin.	0.000	0.655	**Non-Liq.**	Non-Liq.	**0.00**
16.40	351.59	2.77	0.79	110	0.902	0.966	0.79	0.50	1.08	358.94	1.44		1	100	1.00	3.80	1.00	360.3	1.00	Infin.	0.000	0.657	**Non-Liq.**	Non-Liq.	**0.00**
16.57	366.52	2.53	0.69	110	0.911	0.965	0.69	0.50	1.08	372.35	1.39		1	100	1.00	3.85	1.00	373.7	1.00	Infin.	0.000	0.660	**Non-Liq.**	Non-Liq.	**0.00**
16.73	381.08	3.05	0.80	110	0.920	0.965	0.80	0.50	1.07	385.27	1.43		1	100	1.00	3.90	1.00	386.7	1.00	Infin.	0.000	0.662	**Non-Liq.**	Non-Liq.	**0.00**
16.90	413.82	3.60	0.87	110	0.929	0.965	0.87	0.50	1.07	416.40	1.44		1	100	1.00	3.95	1.00	418.0	1.00	Infin.	0.000	0.664	**Non-Liq.**	Non-Liq.	**0.00**
17.06	452.15	4.24	0.94	110	0.938	0.964	0.94	0.50	1.06	452.86	1.44		1	100	1.00	4.00	1.00	454.6	1.00	Infin.	0.000	0.666	**Non-Liq.**	Non-Liq.	**0.00**
17.22	427.40	3.95	0.92	110	0.947	0.964	0.93	0.50	1.06	425.97	1.45		1	100	1.00	4.05	1.00	427.6	1.00	Infin.	0.000	0.669	**Non-Liq.**	Non-Liq.	**0.00**
17.39	404.51	3.69	0.91	110	0.956	0.963	0.91	0.50	1.05	401.19	1.46		1	100	1.00	4.10	1.00	402.7	1.00	Infin.	0.000	0.671	**Non-Liq.**	Non-Liq.	**0.00**
17.55	425.81	4.21	0.99	110	0.965	0.963	0.99	0.50	1.05	420.37	1.48		1	100	1.00	4.15	1.00	421.9	1.00	Infin.	0.000	0.673	**Non-Liq.**	Non-Liq.	**0.00**
17.72	438.64	4.22	0.96	110	0.974	0.963	0.96	0.50	1.04	431.05	1.47		1	100	1.00	4.20	1.00	432.7	1.00	Infin.	0.000	0.675	**Non-Liq.**	Non-Liq.	**0.00**
17.88	461.57	3.57	0.77	110	0.983	0.962	0.78	0.50	1.04	451.54	1.38		1	100	1.00	4.25	1.00	453.2	1.00	Infin.	0.000	0.677	**Non-Liq.**	Non-Liq.	**0.00**
18.04	498.99	4.53	0.91	110	0.992	0.962	0.91	0.50	1.03	485.99	1.42		1	100	1.00	4.30	1.00	487.8	1.00	Infin.	0.000	0.679	**Non-Liq.**	Non-Liq.	**0.00**
18.21	579.29	5.58	0.96	110	1.001	0.962	0.96	0.50	1.03	561.80	1.40		1	100	1.00	4.35	1.00	563.9	1.00	Infin.	0.000	0.681	**Non-Liq.**	Non-Liq.	**0.00**
18.37	590.35	3.67	0.62	110	1.010	0.961	0.62	0.50	1.02	569.97	1.24		1	100	1.00	4.40	1.00	572.1	1.00	Infin.	0.000	0.683	**Non-Liq.**	Non-Liq.	**0.00**
18.54	576.43	4.80	0.83	110	1.020	0.961	0.83	0.50	1.02	554.03	1.35		1	100	1.00	4.45	1.00	556.1	1.00	Infin.	0.000	0.685	**Non-Liq.**	Non-Liq.	**0.00**
18.70	606.56	5.65	0.93	110	1.029	0.960	0.93	0.50	1.01	580.47	1.38		1	100	1.00	4.50	1.00	582.6	1.00	Infin.	0.000	0.687	**Non-Liq.**	Non-Liq.	**0.00**
18.86	565.11	6.10	1.08	110	1.038	0.960	1.08	0.50	1.01	538.37	1.46		1	100	1.00	4.55	1.00	540.4	1.00	Infin.	0.000	0.689	**Non-Liq.**	Non-Liq.	**0.00**
19.03	544.74	8.59	1.58	110	1.047	0.960	1.58	0.50	1.01	516.68	1.61		1	100	1.00	4.60	1.00	518.6	1.00	Infin.	0.000	0.691	**Non-Liq.**	Non-Liq.	**0.00**
19.19	567.96	6.47	1.14	110	1.056	0.959	1.14	0.50	1.00	536.43	1.48		1	100	1.00	4.65	1.00	538.4	1.00	Infin.	0.000	0.692	**Non-Liq.**	Non-Liq.	**0.00**
19.36	526.36	6.42	1.22	110	1.065	0.959	1.22	0.50	1.00	494.95	1.52		1	100	1.00	4.70	1.00	496.8	1.00	Infin.	0.000	0.694	**Non-Liq.**	Non-Liq.	**0.00**
19.52	450.76	4.60	1.02	110	1.074	0.958	1.02	0.50	0.99	421.92	1.49		1	100	1.00	4.75	1.00	423.5	1.00	Infin.	0.000	0.696	**Non-Liq.**	Non-Liq.	**0.00**
19.69	418.45	3.90	0.93	110	1.083	0.958	0.94	0.50	0.99	389.97	1.48		1	100	1.00	4.80	1.00	391.4	1.00	Infin.	0.000	0.698	**Non-Liq.**	Non-Liq.	**0.00**
19.85	376.34	3.82	1.02	110	1.092	0.957	1.02	0.50	0.98	349.16	1.54		1	100	1.00	4.85	1.00	350.5	1.00	Infin.	0.000	0.699	**Non-Liq.**	Non-Liq.	**0.00**
20.01	355.23	3.87	1.09	110	1.101	0.957	1.09	0.50	0.98	328.16	1.58		1	100	1.00	4.90	1.00	329.4	1.00	Infin.	0.000	0.701	**Non-Liq.**	Non-Liq.	**0.00**
20.18	380.08	4.45	1.17	110	1.107	0.957	1.17	0.50	0.98	350.22	1.59		1	100	1.00	4.95	1.00	351.5	1.00	Infin.	0.000	0.703	**Non-Liq.**	Non-Liq.	**0.00**
20.34	440.83	4.85	1.10	110	1.111	0.956	1.10	0.50	0.98	405.64	1.53		1	100	1.00	5.00	1.00	407.2	1.00	Infin.	0.000	0.704	**Non-Liq.**	Non-Liq.	**0.00**
20.51	486.23	4.83	0.99	110	1.115	0.956	1.00	0.50	0.97	446.73	1.47		1	100	1.00	5.05	1.00	448.4	1.00	Infin.	0.000	0.706	**Non-Liq.**	Non-Liq.	**0.00**
20.67	520.20	4.75	0.91	110	1.118	0.955	0.92	0.50	0.97	477.17	1.42		1	100	1.00	5.10	1.00	479.0	1.00	Infin.	0.000	0.708	**Non-Liq.**	Non-Liq.	**0.00**
20.83	532.02	4.83	0.91	110	1.122	0.955	0.91	0.50	0.97	487.19	1.41		1	100	1.00	5.15	1.00	489.0	1.00	Infin.	0.000	0.709	**Non-Liq.**	Non-Liq.	**0.00**
21.00	551.58	5.24	0.95	110	1.126	0.954	0.95	0.50	0.97	504.26	1.42		1	100	1.00	5.20	1.00	506.1	1.00	Infin.	0.000	0.711	**Non-Liq.**	Non-Liq.	**0.00**
21.16	555.09	5.57	1.00	110	1.130	0.954	1.00	0.50	0.97	506.59	1.44		1	100	1.00	5.25	1.00	508.5	1.00	Infin.	0.000	0.712	**Non-Liq.**	Non-Liq.	**0.00**
21.33	541.40	4.23	0.78	110	1.134	0.954	0.78	0.50	0.97	493.22	1.36		1	100	1.00	5.30	1.00	495.1	1.00	Infin.	0.000	0.714	**Non-Liq.**	Non-Liq.	**0.00**
21.49	529.93	3.90	0.74	110	1.138	0.953	0.74	0.50	0.96	481.91	1.34		1	100	1.00	5.35	1.00	483.7	1.00	Infin.	0.000	0.715	**Non-Liq.**	Non-Liq.	**0.00**
21.65	514.51	3.55	0.69	110	1.142	0.953	0.69	0.50	0.96	467.06	1.33		1	100	1.00	5.40	1.00	468.8	1.00	Infin.	0.000	0.717	**Non-Liq.**	Non-Liq.	**0.00**
21.82	465.36	3.51	0.75	110	1.146	0.952	0.76	0.50	0.96	421.62	1.39		1	100	1.00	5.45	1.00	423.2	1.00	Infin.	0.000	0.718	**Non-Liq.**	Non-Liq.	**0.00**
21.98	477.52	3.41	0.71	110	1.150	0.952	0.72	0.50	0.96	431.92	1.36		1	100	1.00	5.50	1.00	433.5	1.00	Infin.	0.000	0.719	**Non-Liq.**	Non-Liq.	**0.00**
22.15	498.55	3.95	0.79	110	1.154	0.951	0.79	0.50	0.96	450.22	1.39		1	100	1.00	5.55	1.00	451.9	1.00	Infin.	0.000	0.721	**Non-Liq.**	Non-Liq.	**0.00**
22.31	488.77	4.36	0.89	110	1.158	0.951	0.89	0.50	0.96	440.62	1.43		1	100	1.00	5.60	1.00	442.3	1.00	Infin.	0.000	0.722	**Non-Liq.**	Non-Liq.	**0.00**
22.47	467.81	4.12	0.88	110	1.161	0.950	0.88	0.50	0.95	420.97	1.44		1	100	1.00	5.65	1.00	422.5	1.00	Infin.	0.000	0.724	**Non-Liq.**	Non-Liq.	**0.00**
22.64	430.22	3.45	0.80	110	1.165	0.950	0.80	0.50	0.95	386.41	1.43		1	100	1.00	5.70	1.00	387.9	1.00	Infin.	0.000	0.725	**Non-Liq.**	Non-Liq.	**0.00**
22.80	388.20	3.02	0.78	110	1.169	0.949	0.78	0.50	0.95	347.98	1.45		1	100	1.00	5.75	1.00	349.3	1.00	Infin.	0.000	0.726	**Non-Liq.**	Non-Liq.	**0.00**
22.97	382.78	2.72	0.71	110	1.173	0.949	0.71	0.50	0.95	342.53	1.42		1	100	1.00	5.80	1.00	343.8	1.00	Infin.	0.000	0.727	**Non-Liq.**	Non-Liq.	**0.00**
23.13	356.17	2.68	0.75	110	1.177	0.948	0.75	0.50	0.95	318.11	1.46		1	100	1.00	5.85	1.00	319.3	1.00	Infin.	0.000	0.729	**Non-Liq.**	Non-Liq.	**0.00**
23.29	356.43	2.35	0.66	110	1.181	0.948	0.66	0.50	0.95	317.81	1.42		1	100	1.00	5.90	1.00	319.0	1.00	Infin.	0.000	0.730	**Non-Liq.**	Non-Liq.	**0.00**
23.46	343.88	1.99	0.58	110	1.185	0.947	0.58	0.50	0.94	306.08	1.39		1	100	1.00	5.95	1.00	307.2	1.00	Infin.	0.000	0.731	**Non-Liq.**	Non-Liq.	**0.00**
23.62	344.88	1.60	0.46	110	1.189	0.947	0.47	0.50	0.94	306.46	1.33		1	100	1.00	6.00	1.00	307.6	1.00	Infin.	0.000	0.732	**Non-Liq.**	Non-Liq.	**0.00**
23.79	352.04	1.86	0.53	110	1.193	0.946	0.53	0.50	0.94	312.33	1.36		1	100	1.00	6.05	1.00	313.5	1.00	Infin.	0.000	0.733	**Non-Liq.**	Non-Liq.	**0.00**
23.95	379.12	2.56	0.68	110	1.197	0.946	0.68	0.50	0.94	335.89	1.41		1	100	1.00	6.10	1.00	337.1	1.00	Infin.	0.000	0.735	**Non-Liq.**	Non-Liq.	**0.00**
24.11	381.50	2.41	0.63	110	1.200	0.945	0.63	0.50	0.94	337.45	1.39		1	100	1.00	6.15	1.00	338.7	1.00	Infin.	0.000	0.736	**Non-Liq.**	Non-Liq.	**0.00**
24.28	382.45	2.59	0.68	110	1.204	0.945	0.68	0.50	0.94	337.74	1.41		1	100	1.00	6.20	1.00	339.0	1.00	Infin.	0.000	0.737	**Non-Liq.**	Non-Liq.	**0.00**
24.44	362.80	2.22	0.61	110	1.208	0.944	0.61	0.50	0.94	319.81	1.40		1	100	1.00	6.25	1.00	321.0	1.00	Infin.	0.000	0.738	**Non-Liq.**	Non-Liq.	**0.00**
24.61	345.67	1.84	0.53	110	1.212	0.943	0.53	0.50	0.93	304.16	1.37		1	100	1.00	6.30	1.00	305.3	1.00	Infin.	0.000	0.739	**Non-Liq.**	Non-Liq.	**0.00**
24.77	352.36	1.35	0.38	110	1.216	0.943	0.39	0.50	0.93	309.57	1.27		1	100	1.00	6.35	1.00	310.7	1.00	Infin.	0.000	0.740	**Non-Liq.**	Non-Liq.	**0.00**
24.93	361.66	1.81	0.50	110	1.220	0.942	0.50	0.50	0.93	317.26	1.34		1	100	1.00	6.40	1.00	318.4	1.00	Infin.	0.000	0.741	**Non-Liq.**	Non-Liq.	**0.00**
25.10	368.75	1.84	0.50	110	1.224	0.942	0.50	0.50	0.93	322.98	1.33		1	100	1.00	6.45	1.00	324.2	1.00	Infin.	0.000	0.742	**Non-Liq.**	Non-Liq.	**0.00**
25.26	366.01	1.90	0.52	110	1.228	0.941	0.52	0.50	0.93	320.06	1.35		1	100	1.00	6.50	1.00	321.3	1.00	Infin.	0.000	0.743	**Non-Liq.**	Non-Liq.	**0.00**
25.43	371.63	1.81	0.49	110	1.232	0.941	0.49	0.50	0.93	324.47	1.32		1	100	1.00	6.55	1.00	325.7	1.00	Infin.	0.000	0.744	**Non-Liq.**	Non-Liq.	**0.00**
25.59	377.11	1.91	0.51	110	1.236	0.940	0.51	0.50	0.93	328.74	1.33		1	100	1.00	6.60	1.00	330.0	1.00	Infin.	0.000	0.745	**Non-Liq.**	Non-Liq.	**0.00**
25.75	376.28	2.06	0.55	110	1.240	0.939	0.55	0.50	0.92	327.50	1.35		1	100	1.00	6.65	1.00	328.7	1.00	Infin.	0.000	0.746	**Non-Liq.**	Non-Liq.	**0.00**
25.92	388.18	2.48	0.64	110	1.243	0.939	0.64	0.50	0.92	337.36	1.39		1	100	1.00	6.70	1.00	338.6	1.00	Infin.	0.000	0.747	**Non-Liq.**	Non-Liq.	**0.00**
26.08	387.53	2.18	0.56	110	1.247	0.938	0.57	0.50	0.92	336.26	1.35		1	100	1.00	6.75	1.00	337.5	1.00	Infin.	0.000	0.747	**Non-Liq.**	Non-Liq.	**0.00**
26.25	390.12	1.95	0.50	110	1.251	0.938	0.50	0.50	0.92	337.98	1.32		1	100	1.00	6.80	1.00	339.2	1.00	Infin.	0.000	0.748	**Non-Liq.**	Non-Liq.	**0.00**
26.41	385.52	1.93	0.50	110	1.255	0.937	0.50	0.50	0.92	333.46	1.32		1	100	1.00	6.85	1.00	334.7	1.00	Infin.	0.000	0.749	**Non-Liq.**	Non-Liq.	**0.00**
26.57	386.49	1.78	0.46	110	1.259	0.936	0.46	0.50	0.92	333.78	1.30		1	100	1.00	6.90	1.00	335.0	1.00	Infin.	0.000	0.750	**Non-Liq.**	Non-Liq.	**0.00**
26.74	384.18	1.88	0.49	110	1.263	0.936	0.49	0.50	0.92	331.26	1.32		1	100	1.00	6.95	1.00	332.5	1.00	Infin.	0.000	0.751	**Non-Liq.**	Non-Liq.	**0.00**
26.90	381.61	1.93	0.51	110	1.267	0.935	0.51	0.50	0.91	328.53	1.33		1	100	1.00	7.00	1.00	329.8	1.00	Infin.	0.000	0.751	**Non-Liq.**	Non-Liq.	**0.00**
27.07	376.27	1.93	0.51	110	1.271	0.934	0.51	0.50	0.91	323.41	1.34		1	100	1.00	7.05	1.00	324.6	1.00	Infin.	0.000	0.752	**Non-Liq.**	Non-Liq.	**0.00**
27.23	373.66	1.90	0.51	110	1.275	0.934	0.51	0.50	0.91	320.67	1.34		1	100	1.00	7.10	1.00	321.9	1.00	Infin.	0.000	0.753	**Non-Liq.**	Non-Liq.	**0.00**
27.40	376.94	1.90	0.51	110	1.279	0.933	0.51	0.50	0.91	322.99	1.33		1	100	1.00	7.15	1.00	324.2	1.00	Infin.	0.000	0.754	**Non-Liq.**	Non-Liq.	**0.00**
27.56	386.83	3.91	1.01	110	1.282	0.932	1.01	0.50	0.91	330.99	1.55		1	100	1.00	7.20	1.00	332.2	1.00	Infin.	0.000	0.754	**Non-Liq.**	Non-Liq.	**0.00**
27.72	393.44	4.16	1.06	110	1.286	0.932	1.06	0.50	0.91	336.15	1.56		1	100	1.00	7.25	1.00	337.4	1.00	Infin.	0.000	0.755	**Non-Liq.**	Non-Liq.	**0.00**
27.89	437.24	5.53	1.26	110	1.290	0.931	1.27	0.50	0.91	373.12	1.60		1	100	1.00	7.30	1.00	374.5	1.00	Infin.	0.000	0.756	**Non-Liq.**	Non-Liq.	**0.00**

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_c	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
28.05	525.83	5.33	1.01	110	1.294	0.930	1.02	0.50	0.90	448.27	1.48		1	100	1.00	7.35	1.00	449.9	1.00	Infin.	0.000	0.756	Non-Liq.	Non-Liq.	0.00
28.22	485.02	4.40	0.91	110	1.298	0.929	0.91	0.50	0.90	412.76	1.46		1	100	1.00	7.40	1.00	414.3	1.00	Infin.	0.000	0.757	Non-Liq.	Non-Liq.	0.00
28.38	366.91	3.58	0.98	110	1.302	0.929	0.98	0.50	0.90	311.51	1.56		1	100	1.00	7.45	1.00	312.7	1.00	Infin.	0.000	0.758	Non-Liq.	Non-Liq.	0.00
28.54	359.69	4.34	1.21	110	1.306	0.928	1.21	0.50	0.90	304.90	1.63		1	100	1.00	7.50	1.00	306.0	1.00	Infin.	0.000	0.758	Non-Liq.	Non-Liq.	0.00
28.71	376.46	4.11	1.09	110	1.310	0.927	1.09	0.50	0.90	318.68	1.59		1	100	1.00	7.55	1.00	319.9	1.00	Infin.	0.000	0.759	Non-Liq.	Non-Liq.	0.00
28.87	396.64	4.96	1.25	110	1.314	0.926	1.25	0.50	0.90	335.32	1.62		1	100	1.00	7.60	1.00	336.6	1.00	Infin.	0.000	0.759	Non-Liq.	Non-Liq.	0.00
29.04	393.61	3.29	0.83	110	1.318	0.926	0.84	0.50	0.90	332.26	1.49		1	100	1.00	7.65	1.00	333.5	1.00	Infin.	0.000	0.760	Non-Liq.	Non-Liq.	0.00
29.20	387.79	2.93	0.76	110	1.322	0.925	0.76	0.50	0.89	326.84	1.46		1	100	1.00	7.70	1.00	328.1	1.00	Infin.	0.000	0.760	Non-Liq.	Non-Liq.	0.00
29.36	376.30	2.51	0.67	110	1.325	0.924	0.67	0.50	0.89	316.65	1.43		1	100	1.00	7.75	1.00	317.8	1.00	Infin.	0.000	0.761	Non-Liq.	Non-Liq.	0.00
29.53	377.25	2.25	0.60	110	1.329	0.923	0.60	0.50	0.89	316.99	1.39		1	100	1.00	7.80	1.00	318.2	1.00	Infin.	0.000	0.761	Non-Liq.	Non-Liq.	0.00
29.69	384.97	2.36	0.61	110	1.333	0.923	0.62	0.50	0.89	323.02	1.39		1	100	1.00	7.85	1.00	324.2	1.00	Infin.	0.000	0.762	Non-Liq.	Non-Liq.	0.00
29.86	387.70	2.46	0.64	110	1.337	0.922	0.64	0.50	0.89	324.84	1.40		1	100	1.00	7.90	1.00	326.1	1.00	Infin.	0.000	0.762	Non-Liq.	Non-Liq.	0.00
30.02	389.61	2.68	0.69	110	1.341	0.921	0.69	0.50	0.89	325.97	1.43		1	100	1.00	7.95	1.00	327.2	1.00	Infin.	0.000	0.763	Non-Liq.	Non-Liq.	0.00
30.18	389.44	2.61	0.67	110	1.345	0.920	0.67	0.50	0.89	325.35	1.42		1	100	1.00	8.00	1.00	326.6	1.00	Infin.	0.000	0.763	Non-Liq.	Non-Liq.	0.00
30.35	385.84	2.70	0.70	110	1.349	0.919	0.70	0.50	0.89	321.86	1.44		1	100	1.00	8.05	1.00	323.1	1.00	Infin.	0.000	0.763	Non-Liq.	Non-Liq.	0.00
30.51	373.85	2.74	0.73	110	1.353	0.918	0.74	0.50	0.88	311.37	1.46		1	100	1.00	8.10	1.00	312.5	1.00	Infin.	0.000	0.764	Non-Liq.	Non-Liq.	0.00
30.68	373.81	2.42	0.65	110	1.357	0.918	0.65	0.50	0.88	310.88	1.42		1	100	1.00	8.15	1.00	312.0	1.00	Infin.	0.000	0.764	Non-Liq.	Non-Liq.	0.00
30.84	390.03	2.25	0.58	110	1.361	0.917	0.58	0.50	0.88	323.95	1.37		1	100	1.00	8.20	1.00	325.2	1.00	Infin.	0.000	0.764	Non-Liq.	Non-Liq.	0.00
31.00	396.06	2.07	0.52	110	1.364	0.916	0.53	0.50	0.88	328.50	1.34		1	100	1.00	8.25	1.00	329.7	1.00	Infin.	0.000	0.765	Non-Liq.	Non-Liq.	0.00
31.17	382.13	2.25	0.59	110	1.368	0.915	0.59	0.50	0.88	316.45	1.39		1	100	1.00	8.30	1.00	317.6	1.00	Infin.	0.000	0.765	Non-Liq.	Non-Liq.	0.00
31.33	375.82	2.42	0.64	110	1.372	0.914	0.65	0.50	0.88	310.76	1.42		1	100	1.00	8.35	1.00	311.9	1.00	Infin.	0.000	0.765	Non-Liq.	Non-Liq.	0.00
31.50	391.03	2.99	0.77	110	1.376	0.913	0.77	0.50	0.88	322.92	1.46		1	100	1.00	8.40	1.00	324.1	1.00	Infin.	0.000	0.765	Non-Liq.	Non-Liq.	0.00
31.66	400.92	2.99	0.74	110	1.380	0.912	0.75	0.50	0.88	330.65	1.45		1	100	1.00	8.45	1.00	331.9	1.00	Infin.	0.000	0.766	Non-Liq.	Non-Liq.	0.00
31.82	406.82	3.52	0.87	110	1.384	0.911	0.87	0.50	0.87	335.05	1.50		1	100	1.00	8.45	1.00	336.3	1.00	Infin.	0.000	0.766	Non-Liq.	Non-Liq.	0.00
31.99	418.90	4.27	1.02	110	1.388	0.910	1.02	0.50	0.87	344.55	1.54		1	100	1.00	8.45	1.00	345.8	1.00	Infin.	0.000	0.766	Non-Liq.	Non-Liq.	0.00
32.15	377.63	3.97	1.05	110	1.392	0.909	1.05	0.50	0.87	310.05	1.58		1	100	1.00	8.45	1.00	311.2	1.00	Infin.	0.000	0.766	Non-Liq.	Non-Liq.	0.00
32.32	379.13	2.48	0.65	110	1.396	0.908	0.66	0.50	0.87	310.85	1.43		1	100	1.00	8.45	1.00	312.0	1.00	Infin.	0.000	0.766	Non-Liq.	Non-Liq.	0.00
32.48	383.08	2.56	0.67	110	1.400	0.907	0.67	0.50	0.87	313.66	1.43		1	100	1.00	8.45	1.00	314.8	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
32.64	374.12	2.93	0.78	110	1.403	0.906	0.79	0.50	0.87	305.87	1.49		1	100	1.00	8.45	1.00	307.0	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
32.81	381.30	3.49	0.92	110	1.407	0.905	0.92	0.50	0.87	311.32	1.53		1	100	1.00	8.45	1.00	312.5	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
32.97	408.55	3.13	0.77	110	1.411	0.904	0.77	0.50	0.87	333.19	1.46		1	100	1.00	8.45	1.00	334.4	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
33.14	382.63	3.51	0.92	110	1.415	0.903	0.92	0.50	0.86	311.54	1.53		1	100	1.00	8.45	1.00	312.7	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
33.30	380.84	3.52	0.93	110	1.419	0.902	0.93	0.50	0.86	309.65	1.54		1	100	1.00	8.45	1.00	310.8	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
33.46	373.57	2.42	0.65	110	1.423	0.901	0.65	0.50	0.86	303.30	1.43		1	100	1.00	8.45	1.00	304.4	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
33.63	348.56	2.29	0.66	110	1.427	0.900	0.66	0.50	0.86	282.52	1.46		1	100	1.00	8.45	1.00	283.6	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
33.79	339.90	1.86	0.55	110	1.431	0.899	0.55	0.50	0.86	275.10	1.41		1	100	1.00	8.45	1.00	276.1	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
33.96	325.76	1.16	0.36	110	1.435	0.898	0.36	0.50	0.86	263.24	1.30		1	100	1.00	8.45	1.00	264.2	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
34.12	318.65	1.04	0.33	110	1.439	0.897	0.33	0.50	0.86	257.12	1.29		1	100	1.00	8.45	1.00	258.1	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
34.28	302.21	0.98	0.32	110	1.443	0.896	0.33	0.50	0.86	243.46	1.31		1	100	1.00	8.45	1.00	244.4	1.00	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
34.45	271.69	0.85	0.31	110	1.446	0.895	0.31	0.50	0.86	218.46	1.34		1	100	1.00	8.45	1.00	219.3	0.99	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
34.61	230.31	1.74	0.76	110	1.450	0.894	0.76	0.50	0.85	184.75	1.63		1	100	1.00	8.45	1.00	185.4	0.99	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
34.78	172.13	2.62	1.52	110	1.454	0.893	1.53	0.59	0.83	133.65	1.94		1	89	1.23	8.45	1.00	165.6	0.99	Infin.	0.000	0.767	Non-Liq.	Non-Liq.	0.00
34.94	115.70	2.67	2.31	110	1.458	0.892	2.34	0.67	0.81	87.10	2.21		1	71	1.68		1.00	146.4	0.99	0.372	0.368	0.766	0.48	92%	0.91
35.10	77.37	2.49	3.21	110	1.462	0.890	3.28	0.74	0.79	56.46	2.44		1	53	2.49		1.00	140.7	0.99	0.339	0.336	0.766	0.44	94%	1.02
35.27	43.09	2.75	6.39	110	1.466	0.889	6.62	0.86	0.75	29.67	2.86		0						0.99			0.766	Non-Liq.	Non-Liq.	0.00
35.43	41.07	3.05	7.42	110	1.470	0.888	7.70	0.88	0.75	27.99	2.92		0						0.99			0.766	Non-Liq.	Non-Liq.	0.00
35.60	117.22	3.50	2.98	110	1.474	0.887	3.02	0.69	0.79	86.91	2.29		1	71	1.91		1.00	166.1	0.98	Infin.	0.000	0.766	Non-Liq.	Non-Liq.	0.00
35.76	102.95	2.85	2.77	110	1.478	0.886	2.81	0.70	0.79	75.92	2.30		1	65	1.96		1.00	149.1	0.99	0.389	0.384	0.766	0.50	91%	0.84
35.93	60.37	2.54	4.20	110	1.482	0.885	4.31	0.79	0.77	42.64	2.61		0						0.99			0.765	Non-Liq.	Non-Liq.	0.00
36.09	66.61	1.85	2.78	110	1.485	0.883	2.84	0.74	0.78	47.83	2.45		1	46	2.53		1.00	121.1	0.99	0.245	0.243	0.765	0.32	98%	1.24
36.25	123.04	2.42	1.97	110	1.489	0.882	1.99	0.65	0.80	92.00	2.14		1	73	1.53		1.00	140.7	0.98	0.339	0.332	0.765	0.43	94%	1.02
36.42	104.40	2.38	2.28	110	1.493	0.881	2.31	0.68	0.79	76.94	2.24		1	66	1.77		1.00	136.3	0.98	0.315	0.310	0.765	0.41	95%	1.07
36.58	92.52	2.48	2.68	110	1.497	0.880	2.72	0.71	0.78	67.30	2.33		1	60	2.05		1.00	138.1	0.98	0.325	0.319	0.764	0.42	95%	1.05
36.75	72.66	3.21	4.42	110	1.501	0.878	4.52	0.78	0.76	51.20	2.57		1	49	3.16		1.00	161.8	0.99	Infin.	0.000	0.764	Non-Liq.	Non-Liq.	0.00
36.91	123.36	4.33	3.51	110	1.505	0.877	3.55	0.71	0.78	89.76	2.33		1	72	2.05		1.00	184.4	0.97	Infin.	0.000	0.764	Non-Liq.	Non-Liq.	0.00
37.07	154.86	4.78	3.09	110	1.509	0.876	3.12	0.67	0.79	114.09	2.22		1	82	1.72		1.00	196.3	0.97	Infin.	0.000	0.763	Non-Liq.	Non-Liq.	0.00
37.24	152.31	3.58	2.35	110	1.513	0.875	2.38	0.65	0.79	113.04	2.13		1	82	1.52		1.00	171.8	0.97	Infin.	0.000	0.763	Non-Liq.	Non-Liq.	0.00
37.40	132.82	2.22	1.67	110	1.517	0.873	1.69	0.63	0.80	98.98	2.07		1	76	1.40		1.00	138.4	0.97	0.326	0.316	0.762	0.42	95%	1.05
37.57	105.83	2.40	2.26	110	1.521	0.872	2.30	0.68	0.78	77.06	2.24		1	66	1.76		1.00	135.9	0.98	0.314	0.306	0.762	0.40	95%	1.07
37.73	67.92	2.37	3.48	110	1.525	0.871	3.56	0.76	0.76	47.47	2.52		1	46	2.88		1.00	136.6	0.98	0.317	0.312	0.762	0.41	95%	1.07
37.89	210.25	2.15	1.02	110	1.528	0.869	1.03	0.54	0.82	161.91	1.76		1	97	1.08	0.60	1.15	201.7	0.97	Infin.	0.000	0.761	Non-Liq.	Non-Liq.	0.00
38.06	301.78	1.89	0.62	110	1.532	0.868	0.63	0.50	0.83	235.81	1.50		1	100	1.00	0.60	1.15	271.8	0.96	Infin.	0.000	0.761	Non-Liq.	Non-Liq.	0.00
38.22	341.56	2.23	0.65	110	1.536	0.867	0.66	0.50	0.83	266.71	1.47		1	100	1.00	0.60	1.15	307.4	0.96	Infin.	0.000	0.760	Non-Liq.	Non-Liq.	0.00
38.39	339.90	2.19	0.64	110	1.540	0.865	0.65	0.50	0.83	265.07	1.47		1	100	1.00	0.60	1.15	305.5	0.96	Infin.	0.000	0.760	Non-Liq.	Non-Liq.	0.00
38.55	347.24	2.08	0.60	110	1.544	0.864	0.60	0.50	0.83	270.47	1.44		1	100	1.00	0.60	1.15	311.8	0.96	Infin.	0.000	0.759	Non-Liq.	Non-Liq.	0.00
38.71	371.45	2.18	0.59	110	1.548	0.863	0.59	0.50	0.83	289.04	1.41		1	100	1.00	0.60	1.15	333.2	0.96	Infin.	0.000	0.759	Non-Liq.	Non-Liq.	0.00
38.88	396.18	1.74	0.44	110	1.552	0.861	0.44	0.50	0.83	307.98	1.31		1	100	1.00	0.65	1.15	355.0	0.96	Infin.	0.000	0.758	Non-Liq.	Non-Liq.	0.00
39.04	405.84	1.92	0.47	110	1.556	0.860	0.47	0.50	0.82	315.12	1.32		1	100	1.00	0.70	1.15	363.2	0.96	Infin.	0.000	0.758	Non-Liq.	Non-Liq.	0.00
39.21	400.44	2.26	0.57	110	1.560	0.859	0.57	0.50	0.82	310.52	1.38		1	100	1.00	0.70	1.15	357.9	0.96	Infin.	0.000	0.757	Non-Liq.	Non-Liq.	0.00
39.37	383.75	3.81	0.99	110	1.564	0.857	1.00	0.50	0.82	297.15	1.57		1	100	1.00	0.70	1.15	342.5	0.95	Infin.	0.000	0.757	Non-Liq.	Non-Liq.	0.00
39.53	290.03	4.33	1.49	110	1.567	0.856	1.50	0.55	0.81	219.94	1.79		1	100	1.10	0.70	1.15	279.6	0.95	Infin.	0.000	0.756	Non-Liq.	Non-Liq.	0.00
39.70	204.10	3.79	1.85	110	1.571	0.854	1.87	0.60	0.79	150.99	1.97		1	94	1.27	0.70	1.15	220.3	0.95	Infin.	0.000	0.756	Non-Liq.	Non-Liq.	0.00
39.86	126.34	3.03	2.39	110	1.575	0.853	2.42	0.67	0.77	90.32	2.21		1	73	1.68		1.00	151.9	0.95	0.406	0.386	0.755	0.51	90%	0.77
40.03	296.00	2.40	0.81	110	1.579	0.852	0.82	0.50	0.82	227.78	1.59		1	100	1.00	0.70	1.10	249.4	0.95	Infin.	0.000	0.754	Non-Liq.	Non-Liq.	0.00
40.19	353.59	2.39	0.68	110	1.583	0.850	0.68	0.50	0.82	271.99	1.48		1	100	1.00	0.70	1.10	297.8	0.95	Infin.	0.000	0.754	Non-Liq.	Non-Liq.	0.00
40.35	389.58	2.81	0.70	110	1.587	0.849	0.71	0.50	0.82	283.99	1.48		1	100	1.00	0.70	1.10	311.0	0.95	Infin.	0.000	0.753	Non-Liq.	Non-Liq.	0.00
40.52	358.58	2.73	0.76	110	1.591	0.847	0.76	0.50	0.82	275.16	1.51		1	100	1.00	0.70	1.10	301.3	0.95	Infin.	0.000	0.752	Non-Liq.	Non-Liq.	0.00
40.68	360.65	2.12	0.59	110	1.595	0.846	0.59	0.50	0.81	276.42	1.43		1	100	1.00	0.70	1.10	302.7	0.94	Infin.	0.000	0.752	Non-Liq.	Non-Liq.	0.00
40.85	364.14	2.43	0.67	110	1.599	0.844	0.67	0.50	0.81	278.76	1.46		1	100	1.00	0.70	1.10	305.3	0.94	Infin.	0.000	0.751	Non-Liq.	Non-Liq.	0.00
41.01	369.03	2.40	0.65	110	1.603	0.843	0.65	0.50	0.81	282.17	1.45		1	100	1.00	0.70	1.10	309.0	0.94	Infin.	0.000	0.750	Non-Liq.	Non-Liq.	0.00
41.17	370.72	2.34	0.63	110	1.607	0.841	0.63	0.50	0.81	283.12	1.44		1	100	1.00	0.70	1.10	310.0	0.94	Infin.	0.000	0.750	Non-Liq.	Non-Liq.	0.00
41.34	386.57	2.08	0.54	110	1.610	0.840	0.54	0.50	0.81	294.92	1.38		1	100	1.00	0.70	1.10	323.0	0.94	Infin.	0.000	0.749	Non-Liq.	Non-Liq.	0.00
41.50	407.71	2.69	0.66	110	1.614	0.838	0.66	0.50	0.81	310.74	1.43		1	100	1.00	0.70	1.10	340.3	0.94	Infin.	0.000	0.748	Non-Liq.	Non-Liq.	0.00
41.67	452.33	3.54	0.78	110	1.618	0.837	0.79	0.50	0.81	344.46	1.45		1	100	1.00	0.70	1.10	377.2	0.94	Infin.	0.000	0.747	Non-Liq.	Non-Liq.	0.00
41.83	466.57	3.92	0.84	110	1.622	0.835	0.84	0.50	0.81	354.91	1.47		1	100	1.00	0.70	1.10	388.6	0.94	Infin.	0.000	0.747	Non-Liq.	Non-Liq.	0.00
41.99	524.35	3.52	0.67	110	1.626	0.834	0.67	0.50	0.81	398.53	1.36		1	100	1.00	0.70	1.10	436.4	0.93	Infin.	0.000	0.746	Non-Liq.	Non-Liq.	0.00
42.16	610.77	2.62	0.43	110	1.630	0.832	0.43	0.50	0.81	463.86	1.17		1	100	1.00	0.70	1.10	508.0	0.93	Infin.	0.000	0.745	Non-Liq.	Non-Liq.	0.00
42.32	716.25	0.00	0.00	110	1.634	0.831	0.00	0.83	0.70	470.17	2.75		0		1.00				0.97			0.744	Non-Liq.	Non-Liq.	0.00
42.49	652.94	0.00	0.00	110	1.638	0.829	0.00	0.83	0.70	429.16	2.73		0		1.00				0.97			0.743	Non-Liq.	Non-Liq.	0.00
42.65	696.03	0.00	0.00	110	1.642	0.827	0.00	0.83	0.69	455.52	2.74		0		1.00				0.96			0.743	Non-Liq.	Non-Liq.	0.00

CPT-LIQUEFY.XLS - A SPREADSHEET FOR EMPIRICAL ESTIMATION OF LIQUEFACTION POTENTIAL USING CPT DATA

Developed 2003 by Shelton L. Stringer, GE, Earth Systems Southwest

Project: Oxnard High School No. 8
Job No: 301953-001
Date: 8/14/2018
Sounding: CPT-6A
Plot: 6

Methods: Liquefaction Analysis using 1998 NCEER workshop methods (Robertson & Wride)
Post-liquefaction Settlement Analysis from Tokimatsu & Seed (1987)
Dry Sand Settlement by Pradel, ASCE Journal of G&GE, Vol 124, No. 4

Total Liquefied Thickness (feet)
2.1

EARTHQUAKE INFORMATION:

Magnitude:	6.77	7.5
PGA, g:	0.97	0.75
MSF:	1.30	
GWT, feet:	20.0	
Design GWT, feet:	8.0	

Induced CSR (M=7.5): = 0.65*PGA*(po/p'o)*rd/MSF
Clean Sand Qc1n = C_Q*K_C*K_H*Qc
SF = $CRR_{7.5}$*Kσ/CSR
Use Tokimatsu & Seed (0) or Ishihara &Yoshmine (1): 0
Unit Weight of unsaturated soils: 110 pcf
Unit Weight of saturated soils: 110 pcf
Limiting Ic for liquefiable soils: 2.60
Limiting Ic for K_H: 2.0

Probab Avg	Total Induced Subsidence (inches)
3%	Required SF: 1.50
Max	Min SF of Liquefiable Layers: 0.27
99%	Avg SF of Liquefiable Layers: 0.02
	0.3

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	*Volumetric Strain (%)*
0.16	6.69	0.01	0.21	110	0.009	1.000	0.21	0.76	1.70	10.74	2.50		1	0	1.00		1.00	10.7	1.00	0.059	0.059	0.485	Non-Liq.	Non-Liq.	0.00
0.33	14.12	0.04	0.28	110	0.018	1.000	0.28	0.67	1.70	22.66	2.22		1	15	1.00		1.00	22.7	1.00	0.069	0.069	0.485	Non-Liq.	Non-Liq.	0.00
0.49	16.59	0.09	0.55	110	0.027	1.000	0.56	0.69	1.70	26.61	2.26		1	22	1.83		1.00	48.7	1.00	0.091	0.091	0.485	Non-Liq.	Non-Liq.	0.00
0.66	21.13	0.18	0.84	110	0.036	1.000	0.84	0.68	1.70	33.89	2.25		1	32	1.81		1.00	61.3	1.00	0.101	0.101	0.485	Non-Liq.	Non-Liq.	0.00
0.82	29.41	0.29	0.98	110	0.045	1.000	0.98	0.66	1.70	47.18	2.17		1	46	1.59		1.00	75.1	1.00	0.119	0.119	0.485	Non-Liq.	Non-Liq.	0.00
0.98	35.60	0.35	0.99	110	0.054	1.000	0.99	0.64	1.70	57.12	2.10		1	54	1.46		1.00	83.2	1.00	0.134	0.134	0.485	Non-Liq.	Non-Liq.	0.00
1.15	34.08	0.35	1.03	110	0.063	0.999	1.03	0.65	1.70	54.66	2.13		1	52	1.51		1.00	82.3	1.00	0.132	0.132	0.484	Non-Liq.	Non-Liq.	0.00
1.31	34.08	0.35	1.03	110	0.072	0.999	1.04	0.65	1.70	54.64	2.13		1	52	1.51		1.00	82.3	1.00	0.132	0.132	0.484	Non-Liq.	Non-Liq.	0.00
1.48	30.11	0.33	1.11	110	0.081	0.999	1.11	0.66	1.70	48.25	2.19		1	47	1.64		1.00	79.2	1.00	0.126	0.126	0.484	Non-Liq.	Non-Liq.	0.00
1.64	28.15	0.27	0.96	110	0.090	0.998	0.96	0.66	1.70	45.09	2.18		1	44	1.62		1.00	72.8	1.00	0.116	0.116	0.484	Non-Liq.	Non-Liq.	0.00
1.80	29.07	0.35	1.20	110	0.099	0.998	1.20	0.67	1.70	46.55	2.22		1	45	1.72		1.00	80.2	1.00	0.128	0.128	0.484	Non-Liq.	Non-Liq.	0.00
1.97	26.19	0.39	1.47	110	0.108	0.998	1.48	0.70	1.70	41.91	2.31		1	41	1.99		1.00	83.4	1.00	0.134	0.134	0.484	Non-Liq.	Non-Liq.	0.00
2.13	20.41	0.42	2.07	110	0.117	0.997	2.08	0.75	1.70	32.61	2.49		1	30	2.72		1.00	88.5	1.00	0.145	0.145	0.483	Non-Liq.	Non-Liq.	0.00
2.30	15.45	0.44	2.83	110	0.126	0.997	2.85	0.81	1.70	24.62	2.67		0						1.00			0.483	Non-Liq.	Non-Liq.	0.00
2.46	12.62	0.37	2.95	110	0.135	0.996	2.98	0.83	1.70	20.06	2.75		0						1.00			0.483	Non-Liq.	Non-Liq.	0.00
2.62	13.50	0.27	2.01	110	0.144	0.996	2.04	0.80	1.70	21.46	2.63		0						1.00			0.483	Non-Liq.	Non-Liq.	0.00
2.79	20.18	0.31	1.56	110	0.153	0.996	1.57	0.73	1.70	32.18	2.42		1	30	2.39		1.00	77.0	1.00	0.123	0.123	0.483	Non-Liq.	Non-Liq.	0.00
2.95	25.28	0.31	1.23	110	0.162	0.995	1.23	0.69	1.70	40.36	2.28		1	39	1.88		1.00	76.0	1.00	0.121	0.121	0.482	Non-Liq.	Non-Liq.	0.00
3.12	31.76	0.36	1.12	110	0.171	0.995	1.13	0.66	1.70	50.76	2.18		1	49	1.61		1.00	81.6	1.00	0.131	0.131	0.482	Non-Liq.	Non-Liq.	0.00
3.28	35.56	0.38	1.08	110	0.180	0.994	1.09	0.65	1.70	56.85	2.13		1	53	1.50		1.00	85.5	1.00	0.138	0.138	0.482	Non-Liq.	Non-Liq.	0.00
3.44	40.16	0.39	0.98	110	0.189	0.994	0.98	0.63	1.70	64.22	2.06		1	58	1.38		1.00	88.8	1.00	0.145	0.145	0.482	Non-Liq.	Non-Liq.	0.00
3.61	45.45	0.46	1.00	110	0.198	0.994	1.01	0.61	1.70	72.71	2.02		1	64	1.33		1.00	96.5	1.00	0.164	0.164	0.482	Non-Liq.	Non-Liq.	0.00
3.77	52.79	0.51	0.96	110	0.208	0.993	0.97	0.60	1.70	84.49	1.96		1	70	1.25	0.65	1.12	118.5	1.00	0.235	0.235	0.482	Non-Liq.	Non-Liq.	0.00
3.94	58.72	0.56	0.95	110	0.217	0.993	0.95	0.58	1.70	94.00	1.92		1	74	1.20	0.70	1.12	127.1	1.00	0.271	0.271	0.481	Non-Liq.	Non-Liq.	0.00
4.10	64.33	0.60	0.94	110	0.226	0.993	0.94	0.57	1.70	103.00	1.88		1	78	1.17	0.75	1.12	135.7	1.00	0.312	0.312	0.481	Non-Liq.	Non-Liq.	0.00
4.27	69.66	0.83	1.19	110	0.235	0.992	1.19	0.59	1.70	111.55	1.93		1	81	1.21	0.80	1.12	151.9	1.00	0.406	0.406	0.481	Non-Liq.	Non-Liq.	0.00
4.43	74.65	1.28	1.71	110	0.244	0.992	1.72	0.61	1.70	119.56	2.01		1	84	1.32		1.00	157.6	1.00	0.444	0.444	0.481	Non-Liq.	Non-Liq.	0.00
4.59	78.74	2.11	2.68	110	0.253	0.991	2.69	0.65	1.70	126.11	2.14		1	86	1.54		1.00	194.3	1.00	Infin.	0.000	0.481	Non-Liq.	Non-Liq.	0.00
4.76	95.41	2.01	2.11	110	0.262	0.991	2.12	0.61	1.70	152.88	2.01		1	94	1.31		1.00	200.9	1.00	Infin.	0.000	0.480	Non-Liq.	Non-Liq.	0.00
4.92	90.35	1.38	1.53	110	0.271	0.991	1.54	0.58	1.70	144.74	1.92		1	92	1.21	1.00	1.00	175.8	1.00	Infin.	0.000	0.480	Non-Liq.	Non-Liq.	0.00
5.09	73.79	0.57	0.78	110	0.280	0.990	0.78	0.54	1.70	118.12	1.79		1	84	1.10	1.05	1.00	130.0	1.00	0.285	0.285	0.480	Non-Liq.	Non-Liq.	0.00
5.25	64.99	0.41	0.63	110	0.289	0.990	0.63	0.54	1.70	103.96	1.78		1	78	1.09	1.10	1.00	113.6	1.00	0.216	0.216	0.480	Non-Liq.	Non-Liq.	0.00
5.41	60.11	0.48	0.80	110	0.298	0.989	0.81	0.57	1.70	96.11	1.87		1	75	1.16	1.15	1.00	111.7	1.00	0.210	0.210	0.480	Non-Liq.	Non-Liq.	0.00
5.58	57.62	0.71	1.23	110	0.307	0.989	1.24	0.61	1.70	92.09	2.00		1	73	1.30	1.20	1.00	120.0	1.00	0.241	0.241	0.479	Non-Liq.	Non-Liq.	0.00
5.74	60.32	0.70	1.16	110	0.316	0.989	1.16	0.60	1.70	96.42	1.97		1	75	1.26	1.25	1.00	121.7	1.00	0.247	0.247	0.479	Non-Liq.	Non-Liq.	0.00
5.91	59.79	0.67	1.11	110	0.325	0.988	1.12	0.60	1.70	95.55	1.96		1	75	1.25	1.30	1.00	119.7	1.00	0.239	0.239	0.479	Non-Liq.	Non-Liq.	0.00
6.07	56.99	0.42	0.74	110	0.334	0.988	0.75	0.57	1.70	91.04	1.86		1	73	1.16	1.35	1.00	105.8	1.00	0.190	0.190	0.479	Non-Liq.	Non-Liq.	0.00
6.23	64.88	0.50	0.77	110	0.343	0.988	0.77	0.56	1.70	103.70	1.83		1	78	1.13	1.40	1.00	117.4	1.00	0.230	0.230	0.479	Non-Liq.	Non-Liq.	0.00
6.40	81.28	0.52	0.64	110	0.352	0.987	0.64	0.52	1.70	130.04	1.70		1	88	1.04	1.45	1.00	135.6	1.00	0.312	0.312	0.479	Non-Liq.	Non-Liq.	0.00
6.56	88.72	0.58	0.65	110	0.361	0.987	0.66	0.51	1.70	141.98	1.68		1	91	1.02	1.50	1.00	145.7	1.00	0.368	0.368	0.478	Non-Liq.	Non-Liq.	0.00
6.73	90.02	0.70	0.78	110	0.370	0.986	0.78	0.52	1.70	144.05	1.72		1	92	1.05	1.55	1.00	151.9	1.00	0.406	0.406	0.478	Non-Liq.	Non-Liq.	0.00
6.89	95.98	0.75	0.78	110	0.379	0.986	0.79	0.52	1.70	153.61	1.70		1	95	1.04	1.60	1.00	160.1	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.05	106.17	0.82	0.77	110	0.388	0.986	0.77	0.51	1.67	166.59	1.67		1	98	1.02	1.65	1.00	170.1	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.22	120.42	0.87	0.72	110	0.397	0.985	0.72	0.50	1.63	185.20	1.62		1	100	1.00	1.70	1.00	185.9	1.00	Infin.	0.000	0.476	Non-Liq.	Non-Liq.	0.00
7.38	147.55	0.97	0.66	110	0.406	0.985	0.66	0.50	1.61	224.51	1.53		1	100	1.00	1.75	1.00	225.3	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.55	167.64	1.10	0.66	110	0.415	0.985	0.66	0.50	1.60	252.36	1.49		1	100	1.00	1.80	1.00	253.3	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
7.71	167.64	1.10	0.66	110	0.424	0.984	0.66	0.50	1.58	249.65	1.49		1	100	1.00	1.85	1.00	250.6	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
7.87	175.94	1.23	0.70	110	0.433	0.984	0.70	0.50	1.56	259.28	1.50		1	100	1.00	1.90	1.00	260.3	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
8.04	183.17	1.23	0.67	110	0.442	0.984	0.67	0.50	1.55	267.18	1.48		1	100	1.00	1.95	1.00	268.2	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
8.20	189.37	0.94	0.50	110	0.451	0.983	0.50	0.50	1.53	273.46	1.38		1	100	1.00	2.00	1.00	274.5	1.00	Infin.	0.000	0.481	Non-Liq.	Non-Liq.	0.00
8.37	193.49	1.24	0.64	110	0.460	0.983	0.64	0.50	1.52	276.65	1.45		1	100	1.00	2.05	1.00	277.7	1.00	Infin.	0.000	0.486	Non-Liq.	Non-Liq.	0.00
8.53	194.51	1.46	0.75	110	0.469	0.982	0.75	0.50	1.50	275.42	1.51		1	100	1.00	2.10	1.00	276.4	1.00	Infin.	0.000	0.491	Non-Liq.	Non-Liq.	0.00
8.69	195.90	1.50	0.77	110	0.478	0.982	0.77	0.50	1.49	274.75	1.51		1	100	1.00	2.15	1.00	275.8	1.00	Infin.	0.000	0.496	Non-Liq.	Non-Liq.	0.00
8.86	199.53	1.67	0.84	110	0.487	0.982	0.84	0.50	1.47	277.23	1.54		1	100	1.00	2.20	1.00	278.3	1.00	Infin.	0.000	0.501	Non-Liq.	Non-Liq.	0.00
9.02	202.65	1.56	0.77	110	0.496	0.981	0.77	0.50	1.46	279.00	1.51		1	100	1.00	2.25	1.00	280.0	1.00	Infin.	0.000	0.506	Non-Liq.	Non-Liq.	0.00
9.19	204.68	1.62	0.79	110	0.505	0.981	0.80	0.50	1.45	279.26	1.52		1	100	1.00	2.30	1.00	280.3	1.00	Infin.	0.000	0.510	Non-Liq.	Non-Liq.	0.00
9.35	192.88	1.56	0.81	110	0.514	0.981	0.81	0.50	1.43	260.79	1.54		1	100	1.00	2.35	1.00	261.8	1.00	Infin.	0.000	0.515	Non-Liq.	Non-Liq.	0.00
9.51	173.28	1.31	0.75	110	0.523	0.980	0.76	0.50	1.42	232.18	1.56		1	100	1.00	2.40	1.00	233.0	1.00	Infin.	0.000	0.520	Non-Liq.	Non-Liq.	0.00
9.68	160.53	1.12	0.70	110	0.532	0.980	0.70	0.50	1.41	213.20	1.56		1	100	1.00	2.45	1.00	214.0	1.00	Infin.	0.000	0.524	Non-Liq.	Non-Liq.	0.00
9.84	160.48	0.98	0.61	110	0.541	0.980	0.61	0.50	1.40	211.34	1.53		1	100	1.00	2.50	1.00	212.1	1.00	Infin.	0.000	0.529	Non-Liq.	Non-Liq.	0.00
10.01	167.93	0.95	0.57	110	0.550	0.979	0.57	0.50	1.39	219.35	1.49		1	100	1.00	2.55	1.00	220.2	1.00	Infin.	0.000	0.533	Non-Liq.	Non Liq.	0.00
10.17	179.44	1.12	0.62	110	0.559	0.979	0.62	0.50	1.38	232.52	1.50		1	100	1.00	2.60	1.00	233.4	1.00	Infin.	0.000	0.537	Non-Liq.	Non-Liq.	0.00
10.33	196.39	1.47	0.75	110	0.568	0.979	0.75	0.50	1.36	252.52	1.53		1	100	1.00	2.65	1.00	253.5	1.00	Infin.	0.000	0.541	Non-Liq.	Non-Liq.	0.00
10.50	212.87	1.68	0.79	110	0.577	0.978	0.79	0.50	1.35	271.61	1.52		1	100	1.00	2.70	1.00	272.6	1.00	Infin.	0.000	0.545	Non-Liq.	Non-Liq.	0.00
10.66	218.59	1.72	0.79	110	0.586	0.978	0.79	0.50	1.34	276.76	1.52		1	100	1.00	2.75	1.00	277.8	1.00	Infin.	0.000	0.550	Non-Liq.	Non-Liq.	0.00
10.83	219.09	1.46	0.67	110	0.595	0.978	0.67	0.50	1.33	275.28	1.47		1	100	1.00	2.80	1.00	276.3	1.00	Infin.	0.000	0.554	Non-Liq.	Non-Liq.	0.00
10.99	218.78	1.57	0.72	110	0.604	0.977	0.72	0.50	1.32	272.81	1.49		1	100	1.00	2.85	1.00	273.8	1.00	Infin.	0.000	0.557	Non-Liq.	Non-Liq.	0.00
11.15	227.29	1.90	0.84	110	0.614	0.977	0.84	0.50	1.31	281.35	1.53		1	100	1.00	2.90	1.00	282.4	1.00	Infin.	0.000	0.561	Non-Liq.	Non-Liq.	0.00
11.32	240.17	1.92	0.80	110	0.623	0.977	0.80	0.50	1.30	295.17	1.50		1	100	1.00	2.95	1.00	296.3	1.00	Infin.	0.000	0.565	Non-Liq.	Non-Liq.	0.00
11.48	222.62	1.81	0.81	110	0.632	0.976	0.82	0.50	1.29	271.57	1.53		1	100	1.00	3.00	1.00	272.6	1.00	Infin.	0.000	0.569	Non-Liq.	Non-Liq.	0.00
11.65	216.62	2.13	0.98	110	0.641	0.976	0.98	0.50	1.29	262.35	1.61		1	100	1.00	3.05	1.00	263.3	1.00	Infin.	0.000	0.572	Non-Liq.	Non-Liq.	0.00
11.81	220.47	2.23	1.01	110	0.650	0.975	1.01	0.50	1.28	265.16	1.61		1	100	1.00	3.10	1.00	266.1	1.00	Infin.	0.000	0.576	Non-Liq.	Non-Liq.	0.00
11.98	211.90	2.36	1.11	110	0.659	0.975	1.12	0.50	1.27	253.63	1.66		1	100	1.01	3.15	1.00	256.5	1.00	Infin.	0.000	0.580	Non-Liq.	Non-Liq.	0.00
12.14	218.21	2.15	0.99	110	0.668	0.975	0.99	0.50	1.26	258.84	1.61		1	100	1.00	3.20	1.00	259.8	1.00	Infin.	0.000	0.583	Non-Liq.	Non-Liq.	0.00
12.30	217.25	1.71	0.79	110	0.677	0.974	0.79	0.50	1.25	255.96	1.54		1	100	1.00	3.25	1.00	256.9	1.00	Infin.	0.000	0.587	Non-Liq.	Non-Liq.	0.00
12.47	227.19	1.31	0.58	110	0.686	0.974	0.58	0.50	1.24	265.93	1.43		1	100	1.00	3.30	1.00	266.9	1.00	Infin.	0.000	0.590	Non-Liq.	Non-Liq.	0.00
12.63	246.00	1.35	0.55	110	0.695	0.974	0.55	0.50	1.23	286.13	1.40		1	100	1.00	3.35	1.00	287.2	1.00	Infin.	0.000	0.593	Non-Liq.	Non-Liq.	0.00
12.80	271.55	2.19	0.81	110	0.704	0.973	0.81	0.50	1.23	313.89	1.49		1	100	1.00	3.40	1.00	315.1	1.00	Infin.	0.000	0.597	Non-Liq.	Non-Liq.	0.00

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_c	H (ft)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
12.96	298.70	2.19	0.73	110	0.713	0.973	0.74	0.50	1.22	343.15	1.43		1	100	1.00	3.45	1.00	344.4	1.00	Infin.	0.000	0.600	Non-Liq.	Non-Liq.	0.00
13.12	297.19	2.53	0.85	110	0.722	0.973	0.85	0.50	1.21	339.26	1.49		1	100	1.00	3.50	1.00	340.5	1.00	Infin.	0.000	0.603	Non-Liq.	Non-Liq.	0.00
13.29	297.26	2.68	0.90	110	0.731	0.972	0.90	0.50	1.20	337.23	1.51		1	100	1.00	3.55	1.00	338.5	1.00	Infin.	0.000	0.606	Non-Liq.	Non-Liq.	0.00
13.45	299.77	2.66	0.89	110	0.740	0.972	0.89	0.50	1.20	337.99	1.50		1	100	1.00	3.60	1.00	339.3	1.00	Infin.	0.000	0.609	Non-Liq.	Non-Liq.	0.00
13.62	299.47	2.65	0.88	110	0.749	0.972	0.89	0.50	1.19	335.60	1.50		1	100	1.00	3.65	1.00	336.9	1.00	Infin.	0.000	0.612	Non-Liq.	Non-Liq.	0.00
13.78	293.58	3.11	1.06	110	0.758	0.971	1.06	0.50	1.18	327.01	1.57		1	100	1.00	3.70	1.00	328.2	1.00	Infin.	0.000	0.615	Non-Liq.	Non-Liq.	0.00
13.94	298.13	3.07	1.03	110	0.767	0.971	1.03	0.50	1.17	330.12	1.56		1	100	1.00	3.75	1.00	331.4	1.00	Infin.	0.000	0.618	Non-Liq.	Non-Liq.	0.00
14.11	301.85	3.04	1.01	110	0.776	0.971	1.01	0.50	1.17	332.29	1.55		1	100	1.00	3.80	1.00	333.5	1.00	Infin.	0.000	0.621	Non-Liq.	Non-Liq.	0.00
14.27	298.45	3.68	1.23	110	0.785	0.970	1.24	0.50	1.16	326.64	1.62		1	100	1.00	3.85	1.00	327.9	1.00	Infin.	0.000	0.624	Non-Liq.	Non-Liq.	0.00
14.44	300.98	2.74	0.91	110	0.794	0.970	0.91	0.50	1.15	327.53	1.52		1	100	1.00	3.90	1.00	328.8	1.00	Infin.	0.000	0.627	Non-Liq.	Non-Liq.	0.00
14.60	315.50	2.80	0.89	110	0.803	0.970	0.89	0.50	1.15	341.43	1.50		1	100	1.00	3.95	1.00	342.7	1.00	Infin.	0.000	0.629	Non-Liq.	Non-Liq.	0.00
14.76	313.59	3.04	0.97	110	0.812	0.969	0.97	0.50	1.14	337.45	1.53		1	100	1.00	4.00	1.00	338.7	1.00	Infin.	0.000	0.632	Non-Liq.	Non-Liq.	0.00
14.93	322.37	3.47	1.08	110	0.821	0.969	1.08	0.50	1.14	345.00	1.56		1	100	1.00	4.05	1.00	346.3	1.00	Infin.	0.000	0.635	Non-Liq.	Non-Liq.	0.00
15.09	336.14	3.51	1.04	110	0.830	0.969	1.05	0.50	1.13	357.81	1.54		1	100	1.00	4.10	1.00	359.1	1.00	Infin.	0.000	0.637	Non-Liq.	Non-Liq.	0.00
15.26	323.66	3.11	0.96	110	0.839	0.968	0.96	0.50	1.12	342.62	1.52		1	100	1.00	4.15	1.00	343.9	1.00	Infin.	0.000	0.640	Non-Liq.	Non-Liq.	0.00
15.42	317.94	3.08	0.97	110	0.848	0.968	0.97	0.50	1.12	334.75	1.53		1	100	1.00	4.20	1.00	336.0	1.00	Infin.	0.000	0.643	Non-Liq.	Non-Liq.	0.00
15.58	320.07	3.08	0.96	110	0.857	0.967	0.96	0.50	1.11	335.21	1.53		1	100	1.00	4.25	1.00	336.5	1.00	Infin.	0.000	0.645	Non-Liq.	Non-Liq.	0.00
15.75	310.52	2.97	0.96	110	0.866	0.967	0.96	0.50	1.11	323.47	1.54		1	100	1.00	4.30	1.00	324.7	1.00	Infin.	0.000	0.648	Non-Liq.	Non-Liq.	0.00
15.91	314.10	3.02	0.96	110	0.875	0.967	0.96	0.50	1.10	325.51	1.54		1	100	1.00	4.35	1.00	326.7	1.00	Infin.	0.000	0.650	Non-Liq.	Non-Liq.	0.00
16.08	315.60	2.97	0.94	110	0.884	0.966	0.94	0.50	1.09	325.39	1.53		1	100	1.00	4.40	1.00	326.6	1.00	Infin.	0.000	0.653	Non-Liq.	Non-Liq.	0.00
16.24	327.26	2.77	0.85	110	0.893	0.966	0.85	0.50	1.09	335.73	1.49		1	100	1.00	4.45	1.00	337.0	1.00	Infin.	0.000	0.655	Non-Liq.	Non-Liq.	0.00
16.40	328.11	2.94	0.89	110	0.902	0.966	0.90	0.50	1.08	334.91	1.51		1	100	1.00	4.50	1.00	336.2	1.00	Infin.	0.000	0.657	Non-Liq.	Non-Liq.	0.00
16.57	357.30	2.93	0.82	110	0.911	0.965	0.82	0.50	1.08	362.96	1.45		1	100	1.00	4.55	1.00	364.3	1.00	Infin.	0.000	0.660	Non-Liq.	Non-Liq.	0.00
16.73	379.84	3.02	0.80	110	0.920	0.965	0.80	0.50	1.07	384.01	1.43		1	100	1.00	4.60	1.00	385.4	1.00	Infin.	0.000	0.662	Non-Liq.	Non-Liq.	0.00
16.90	393.42	4.35	1.11	110	0.929	0.965	1.11	0.50	1.07	395.83	1.54		1	100	1.00	4.65	1.00	397.3	1.00	Infin.	0.000	0.664	Non-Liq.	Non-Liq.	0.00
17.06	393.65	3.67	0.93	110	0.938	0.964	0.93	0.50	1.06	394.14	1.48		1	100	1.00	4.70	1.00	395.6	1.00	Infin.	0.000	0.666	Non-Liq.	Non-Liq.	0.00
17.22	403.88	3.66	0.91	110	0.947	0.964	0.91	0.50	1.06	402.47	1.46		1	100	1.00	4.75	1.00	404.0	1.00	Infin.	0.000	0.669	Non-Liq.	Non-Liq.	0.00
17.39	384.75	3.06	0.80	110	0.956	0.963	0.80	0.50	1.05	381.54	1.43		1	100	1.00	4.80	1.00	383.0	1.00	Infin.	0.000	0.671	Non-Liq.	Non-Liq.	0.00
17.55	418.46	2.70	0.64	110	0.965	0.963	0.65	0.50	1.05	413.10	1.34		1	100	1.00	4.85	1.00	414.6	1.00	Infin.	0.000	0.673	Non-Liq.	Non-Liq.	0.00
17.72	426.59	3.76	0.88	110	0.974	0.963	0.88	0.50	1.04	419.18	1.44		1	100	1.00	4.90	1.00	420.8	1.00	Infin.	0.000	0.675	Non-Liq.	Non-Liq.	0.00
17.88	438.49	4.30	0.98	110	0.983	0.962	0.98	0.50	1.04	428.91	1.47		1	100	1.00	4.95	1.00	430.5	1.00	Infin.	0.000	0.677	Non-Liq.	Non-Liq.	0.00
18.04	459.63	3.50	0.76	110	0.992	0.962	0.76	0.50	1.03	447.58	1.37		1	100	1.00	5.00	1.00	449.3	1.00	Infin.	0.000	0.679	Non-Liq.	Non-Liq.	0.00
18.21	446.70	3.76	0.84	110	1.001	0.962	0.84	0.50	1.03	432.99	1.42		1	100	1.00	5.05	1.00	434.6	1.00	Infin.	0.000	0.681	Non-Liq.	Non-Liq.	0.00
18.37	433.53	3.52	0.81	110	1.010	0.961	0.81	0.50	1.02	418.31	1.41		1	100	1.00	5.10	1.00	419.9	1.00	Infin.	0.000	0.683	Non-Liq.	Non-Liq.	0.00
18.54	420.70	4.05	0.96	110	1.020	0.961	0.96	0.50	1.02	404.09	1.48		1	100	1.00	5.15	1.00	405.6	1.00	Infin.	0.000	0.685	Non-Liq.	Non-Liq.	0.00
18.70	427.38	4.04	0.95	110	1.029	0.960	0.95	0.50	1.01	408.71	1.47		1	100	1.00	5.20	1.00	410.2	1.00	Infin.	0.000	0.687	Non-Liq.	Non-Liq.	0.00
18.86	433.11	4.37	1.01	110	1.038	0.960	1.01	0.50	1.01	412.39	1.49		1	100	1.00	5.20	1.00	413.9	1.00	Infin.	0.000	0.689	Non-Liq.	Non-Liq.	0.00
19.03	406.01	4.03	0.99	110	1.047	0.960	0.99	0.50	1.01	384.84	1.51		1	100	1.00	5.20	1.00	386.3	1.00	Infin.	0.000	0.691	Non-Liq.	Non-Liq.	0.00
19.19	382.11	4.15	1.09	110	1.056	0.959	1.09	0.50	1.00	360.57	1.55		1	100	1.00	5.20	1.00	361.9	1.00	Infin.	0.000	0.692	Non-Liq.	Non-Liq.	0.00
19.36	381.05	4.09	1.07	110	1.065	0.959	1.08	0.50	1.00	358.03	1.55		1	100	1.00	5.20	1.00	359.4	1.00	Infin.	0.000	0.694	Non-Liq.	Non-Liq.	0.00
19.52	379.85	4.12	1.08	110	1.074	0.958	1.09	0.50	0.99	355.39	1.56		1	100	1.00	5.20	1.00	356.7	1.00	Infin.	0.000	0.696	Non-Liq.	Non-Liq.	0.00
19.69	382.89	4.14	1.08	110	1.083	0.958	1.08	0.50	0.99	356.74	1.55		1	100	1.00	5.20	1.00	358.1	1.00	Infin.	0.000	0.698	Non-Liq.	Non-Liq.	0.00
19.85	384.60	3.97	1.03	110	1.092	0.957	1.04	0.50	0.98	356.85	1.54		1	100	1.00	5.20	1.00	358.2	1.00	Infin.	0.000	0.699	Non-Liq.	Non-Liq.	0.00
20.01	377.72	4.35	1.15	110	1.101	0.957	1.16	0.50	0.98	349.00	1.58		1	100	1.00	5.20	1.00	350.3	1.00	Infin.	0.000	0.701	Non-Liq.	Non-Liq.	0.00
20.18	371.25	4.23	1.14	110	1.107	0.957	1.14	0.50	0.98	342.06	1.58		1	100	1.00	5.20	1.00	343.3	1.00	Infin.	0.000	0.703	Non-Liq.	Non-Liq.	0.00
20.34	361.72	4.14	1.14	110	1.111	0.956	1.15	0.50	0.98	332.66	1.59		1	100	1.00	5.20	1.00	333.9	1.00	Infin.	0.000	0.704	Non-Liq.	Non-Liq.	0.00
20.51	347.60	4.05	1.16	110	1.115	0.956	1.17	0.50	0.97	319.07	1.61		1	100	1.00	5.20	1.00	320.3	1.00	Infin.	0.000	0.706	Non-Liq.	Non-Liq.	0.00
20.67	339.34	3.76	1.11	110	1.118	0.955	1.11	0.50	0.97	310.92	1.60		1	100	1.00	5.20	1.00	312.1	1.00	Infin.	0.000	0.708	Non-Liq.	Non-Liq.	0.00
20.83	332.14	3.55	1.07	110	1.122	0.955	1.07	0.50	0.97	303.76	1.59		1	100	1.00	5.20	1.00	304.9	1.00	Infin.	0.000	0.709	Non-Liq.	Non-Liq.	0.00
21.00	334.56	3.14	0.94	110	1.126	0.954	0.94	0.50	0.97	305.47	1.55		1	100	1.00	5.20	1.00	306.6	1.00	Infin.	0.000	0.711	Non-Liq.	Non-Liq.	0.00
21.16	327.20	2.80	0.86	110	1.130	0.954	0.86	0.50	0.97	298.19	1.52		1	100	1.00	5.20	1.00	299.3	1.00	Infin.	0.000	0.712	Non-Liq.	Non-Liq.	0.00
21.33	310.59	2.46	0.79	110	1.134	0.954	0.80	0.50	0.97	282.51	1.51		1	100	1.00	5.20	1.00	283.6	1.00	Infin.	0.000	0.714	Non-Liq.	Non-Liq.	0.00
21.49	293.79	1.87	0.63	110	1.138	0.953	0.64	0.50	0.96	266.71	1.46		1	100	1.00	5.20	1.00	267.7	1.00	Infin.	0.000	0.715	Non-Liq.	Non-Liq.	0.00
21.65	272.37	1.43	0.52	110	1.142	0.953	0.53	0.50	0.96	246.76	1.43		1	100	1.00	5.20	1.00	247.7	1.00	Infin.	0.000	0.717	Non-Liq.	Non-Liq.	0.00
21.82	224.93	2.27	1.01	110	1.146	0.952	1.01	0.51	0.96	203.01	1.69		1	100	1.03	5.20	1.00	210.1	1.00	Infin.	0.000	0.718	Non-Liq.	Non-Liq.	0.00
21.98	164.58	3.51	2.13	110	1.150	0.952	2.15	0.62	0.95	146.76	2.03		1	93	1.34		1.00	196.2	1.00	Infin.	0.000	0.719	Non-Liq.	Non-Liq.	0.00
22.15	113.74	3.46	3.04	110	1.154	0.951	3.07	0.68	0.94	100.30	2.25		1	77	1.81		1.00	181.0	1.00	Infin.	0.000	0.721	Non-Liq.	Non-Liq.	0.00
22.31	96.23	3.59	3.73	110	1.158	0.951	3.78	0.72	0.94	84.24	2.37		1	70	2.19		1.00	184.7	1.00	Infin.	0.000	0.722	Non-Liq.	Non-Liq.	0.00
22.47	51.22	2.75	5.37	110	1.161	0.950	5.50	0.81	0.93	43.86	2.68		0				1.00		1.00			0.724	Non-Liq.	Non-Liq.	0.00
22.64	53.23	1.95	3.66	110	1.165	0.950	3.74	0.77	0.93	45.67	2.55		1	44	3.02		1.00	138.0	1.00	0.324	0.324	0.725	**0.45**	93%	**1.05**
22.80	95.82	1.58	1.65	110	1.169	0.949	1.67	0.64	0.94	83.90	2.11		1	70	1.48		1.00	124.3	1.00	0.258	0.258	0.726	**0.36**	97%	**1.20**
22.97	193.72	2.53	1.30	110	1.173	0.949	1.31	0.55	0.94	171.87	1.82		1	99	1.12	1.00	1.00	193.5	1.00	Infin.	0.000	0.727	Non-Liq.	Non-Liq.	0.00
23.13	228.65	2.09	0.91	110	1.177	0.948	0.92	0.51	0.95	203.73	1.66		1	100	1.01	1.05	1.00	206.2	1.00	Infin.	0.000	0.729	Non-Liq.	Non-Liq.	0.00
23.29	278.92	2.84	1.02	110	1.181	0.948	1.02	0.50	0.95	248.47	1.63		1	100	1.00	1.10	1.00	249.4	1.00	Infin.	0.000	0.730	Non-Liq.	Non-Liq.	0.00
23.46	376.36	2.41	0.64	110	1.185	0.947	0.64	0.50	0.94	335.09	1.40		1	100	1.00	1.15	1.00	336.3	1.00	Infin.	0.000	0.731	Non-Liq.	Non-Liq.	0.00
23.62	310.45	2.46	0.79	110	1.189	0.947	0.80	0.50	0.94	275.76	1.52		1	100	1.00	1.20	1.00	276.8	1.00	Infin.	0.000	0.732	Non-Liq.	Non-Liq.	0.00
23.79	306.26	2.29	0.75	110	1.193	0.946	0.75	0.50	0.94	271.58	1.51		1	100	1.00	1.25	1.00	272.6	1.00	Infin.	0.000	0.733	Non-Liq.	Non-Liq.	0.00
23.95	308.85	2.26	0.73	110	1.197	0.946	0.74	0.50	0.94	273.43	1.50		1	100	1.00	1.30	1.00	274.5	1.00	Infin.	0.000	0.735	Non-Liq.	Non-Liq.	0.00
24.11	306.71	2.22	0.72	110	1.200	0.945	0.73	0.50	0.94	271.08	1.50		1	100	1.00	1.35	1.00	272.1	1.00	Infin.	0.000	0.736	Non-Liq.	Non-Liq.	0.00
24.28	307.77	2.19	0.71	110	1.204	0.945	0.72	0.50	0.94	271.58	1.49		1	100	1.00	1.40	1.00	272.6	1.00	Infin.	0.000	0.737	Non-Liq.	Non-Liq.	0.00
24.44	305.26	1.72	0.56	110	1.208	0.944	0.57	0.50	0.94	268.92	1.42		1	100	1.00	1.45	1.00	269.9	1.00	Infin.	0.000	0.738	Non-Liq.	Non-Liq.	0.00
24.61	305.26	1.99	0.65	110	1.212	0.943	0.65	0.50	0.93	268.48	1.47		1	100	1.00	1.50	1.00	269.5	1.00	Infin.	0.000	0.739	Non-Liq.	Non-Liq.	0.00
24.77	310.72	2.04	0.66	110	1.216	0.943	0.66	0.50	0.93	272.86	1.47		1	100	1.00	1.50	1.00	273.9	1.00	Infin.	0.000	0.740	Non-Liq.	Non-Liq.	0.00
24.93	312.81	1.96	0.63	110	1.220	0.942	0.63	0.50	0.93	274.26	1.45		1	100	1.00	1.50	1.00	275.3	1.00	Infin.	0.000	0.741	Non-Liq.	Non-Liq.	0.00
25.10	329.09	2.01	0.61	110	1.224	0.942	0.61	0.50	0.93	288.12	1.43		1	100	1.00	1.50	1.00	289.2	1.00	Infin.	0.000	0.742	Non-Liq.	Non-Liq.	0.00
25.26	344.97	1.95	0.57	110	1.228	0.941	0.57	0.50	0.93	301.80	1.39		1	100	1.00	1.50	1.00	302.7	1.00	Infin.	0.000	0.743	Non-Liq.	Non-Liq.	0.00
25.43	351.08	2.30	0.65	110	1.232	0.941	0.66	0.50	0.93	306.47	1.43		1	100	1.00	1.50	1.00	307.6	1.00	Infin.	0.000	0.744	Non-Liq.	Non-Liq.	0.00
25.59	363.90	2.26	0.62	110	1.236	0.940	0.62	0.50	0.93	317.19	1.40		1	100	1.00	1.50	1.00	318.4	1.00	Infin.	0.000	0.745	Non-Liq.	Non-Liq.	0.00
25.75	366.29	2.65	0.72	110	1.240	0.939	0.72	0.50	0.92	318.77	1.45		1	100	1.00	1.50	1.00	320.0	1.00	Infin.	0.000	0.746	Non-Liq.	Non-Liq.	0.00
25.92	360.95	2.59	0.72	110	1.243	0.939	0.72	0.50	0.92	313.61	1.45		1	100	1.00	1.50	1.00	314.8	1.00	Infin.	0.000	0.747	Non-Liq.	Non-Liq.	0.00
26.08	355.58	2.62	0.74	110	1.247	0.938	0.74	0.50	0.92	308.45	1.47		1	100	1.00	1.50	1.00	309.6	1.00	Infin.	0.000	0.747	Non-Liq.	Non-Liq.	0.00
26.25	351.54	2.85	0.81	110	1.251	0.938	0.81	0.50	0.92	304.45	1.50		1	100	1.00	1.50	1.00	305.6	1.00	Infin.	0.000	0.748	Non-Liq.	Non-Liq.	0.00
26.41	345.76	2.67	0.77	110	1.255	0.937	0.77	0.50	0.92	298.96	1.49		1	100	1.00	1.50	1.00	300.1	1.00	Infin.	0.000	0.749	Non-Liq.	Non-Liq.	0.00
26.57	331.98	2.56	0.77	110	1.259	0.936	0.77	0.50	0.92	286.55	1.50		1	100	1.00	1.50	1.00	287.6	1.00	Infin.	0.000	0.750	Non-Liq.	Non-Liq.	0.00
26.74	322.29	2.19	0.68	110	1.263	0.936	0.68	0.50	0.92	277.72	1.47		1	100	1.00	1.50	1.00	278.8	1.00	Infin.	0.000	0.751	Non-Liq.	Non-Liq.	0.00
26.90	314.01	1.96	0.62	110	1.267	0.935	0.63	0.50	0.91	270.14	1.45		1	100	1.00	1.50	1.00	271.1	1.00	Infin.	0.000	0.751	Non-Liq.	Non-Liq.	0.00
27.07	312.94	1.77	0.57	110	1.271	0.934	0.57	0.50	0.91	268.79	1.43		1	100	1.00	1.50	1.00	269.8	1.00	Infin.	0.000	0.752	Non-Liq.	Non-Liq.	0.00
27.23	297.68	2.06	0.69	110	1.275	0.934	0.69	0.50	0.91	255.24	1.50		1	100	1.00	1.50	1.00	256.2	1.00	Infin.	0.000	0.753	Non-Liq.	Non-Liq.	0.00
27.40	274.32	1.97	0.72	110	1.279	0.933	0.72	0.50	0.91	234.76	1.54		1	100	1.00	1.50	1.00	235.6	1.00	Infin.	0.000	0.754	Non-Liq.	Non-Liq.	0.00
27.56	243.92	1.79	0.73	110	1.282	0.932	0.74	0.50	0.91	208.30	1.58		1	100	1.00	1.50	1.00	209.1	1.00	Infin.	0.000	0.754	Non-Liq.	Non-Liq.	0.00
27.72	203.86	2.06	1.01	110	1.286	0.932	1.02	0.53	0.90	172.64	1.74		1	99	1.06	1.50	1.00	184.4	1.00	Infin.	0.000	0.755	Non-Liq.	Non-Liq.	0.00
27.89	128.56	2.20	1.71	110	1.290	0.931	1.73	0.62	0.88	106.29	2.05		1	79	1.37		1.00	146.0	1.00	0.370	0.370	0.756	**0.49**	91%	**0.91**

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_c	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	M=7.5 CSR	Induced Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
28.05	101.99	2.28	2.23	110	1.294	0.930	2.26	0.67	0.87	83.14	2.21		1	69	1.69		1.00	140.6	1.00	0.338	0.338	0.756	**0.45**	93%	**1.02**
28.22	51.11	1.80	3.51	110	1.298	0.929	3.60	0.78	0.85	40.13	2.58		1	39	3.19		1.00	128.0	1.00	0.275	0.275	0.757	**0.36**	97%	**1.16**
28.38	52.32	1.72	3.29	110	1.302	0.929	3.37	0.77	0.85	41.07	2.55		1	40	3.03		1.00	124.6	1.00	0.260	0.260	0.758	**0.34**	97%	**1.20**
28.54	56.72	1.37	2.42	110	1.306	0.928	2.47	0.74	0.86	44.85	2.43		1	44	2.44		1.00	109.6	1.00	0.202	0.202	0.758	**0.27**	99%	**1.39**
28.71	70.59	1.56	2.21	110	1.310	0.927	2.25	0.71	0.86	56.31	2.33		1	53	2.05		1.00	115.3	1.00	0.223	0.223	0.759	**0.29**	98%	**1.32**
28.87	114.33	1.68	1.47	110	1.314	0.926	1.49	0.62	0.87	93.36	2.05		1	74	1.37		1.00	127.5	1.00	0.273	0.273	0.759	**0.36**	97%	**1.17**
29.04	212.27	1.59	0.75	110	1.318	0.926	0.76	0.50	0.90	178.67	1.64		1	100	1.00	1.00	1.00	178.6	1.00	Infin.	0.000	0.760	**Non-Liq.**	Non-Liq.	**0.00**
29.20	270.62	2.46	0.91	110	1.322	0.925	0.91	0.50	0.89	227.75	1.62		1	100	1.00	1.05	1.00	228.6	1.00	Infin.	0.000	0.760	**Non-Liq.**	Non-Liq.	**0.00**
29.36	330.54	2.18	0.66	110	1.325	0.924	0.66	0.50	0.89	278.01	1.46		1	100	1.00	1.10	1.00	279.0	1.00	Infin.	0.000	0.761	**Non-Liq.**	Non-Liq.	**0.00**
29.53	349.39	1.96	0.56	110	1.329	0.923	0.56	0.50	0.89	293.49	1.39		1	100	1.00	1.15	1.00	294.6	1.00	Infin.	0.000	0.761	**Non-Liq.**	Non-Liq.	**0.00**
29.69	360.66	1.80	0.50	110	1.333	0.923	0.50	0.50	0.89	302.55	1.35		1	100	1.00	1.20	1.00	303.7	1.00	Infin.	0.000	0.762	**Non-Liq.**	Non-Liq.	**0.00**
29.86	367.26	1.69	0.46	110	1.337	0.922	0.46	0.50	0.89	307.65	1.32		1	100	1.00	1.25	1.00	308.8	1.00	Infin.	0.000	0.762	**Non-Liq.**	Non-Liq.	**0.00**
30.02	360.19	1.58	0.44	110	1.341	0.921	0.44	0.50	0.89	301.27	1.32		1	100	1.00	1.30	1.00	302.4	1.00	Infin.	0.000	0.763	**Non-Liq.**	Non-Liq.	**0.00**
30.18	364.67	1.25	0.34	110	1.345	0.920	0.34	0.50	0.89	304.58	1.24		1	100	1.00	1.35	1.00	305.7	1.00	Infin.	0.000	0.763	**Non-Liq.**	Non-Liq.	**0.00**
30.35	376.58	1.54	0.41	110	1.349	0.919	0.41	0.50	0.89	314.11	1.28		1	100	1.00	1.40	1.00	315.3	1.00	Infin.	0.000	0.763	**Non-Liq.**	Non-Liq.	**0.00**
30.51	377.16	1.63	0.43	110	1.353	0.918	0.43	0.50	0.88	314.13	1.30		1	100	1.00	1.45	1.00	315.3	1.00	Infin.	0.000	0.764	**Non-Liq.**	Non-Liq.	**0.00**
30.68	333.76	1.64	0.49	110	1.357	0.918	0.49	0.50	0.88	277.45	1.37		1	100	1.00	1.50	1.00	278.5	1.00	Infin.	0.000	0.764	**Non-Liq.**	Non-Liq.	**0.00**
30.84	317.96	1.81	0.57	110	1.361	0.917	0.57	0.50	0.88	263.88	1.43		1	100	1.00	1.55	1.00	264.9	1.00	Infin.	0.000	0.764	**Non-Liq.**	Non-Liq.	**0.00**
31.00	293.92	1.53	0.52	110	1.364	0.916	0.52	0.50	0.88	243.49	1.43		1	100	1.00	1.60	1.00	244.4	1.00	Infin.	0.000	0.765	**Non-Liq.**	Non-Liq.	**0.00**
31.17	298.19	1.57	0.53	110	1.368	0.915	0.53	0.50	0.88	246.69	1.43		1	100	1.00	1.65	1.00	247.6	1.00	Infin.	0.000	0.765	**Non-Liq.**	Non-Liq.	**0.00**
31.33	299.06	1.55	0.52	110	1.372	0.914	0.52	0.50	0.88	247.06	1.43		1	100	1.00	1.70	1.00	248.0	1.00	Infin.	0.000	0.765	**Non-Liq.**	Non-Liq.	**0.00**
31.50	301.92	1.67	0.55	110	1.376	0.913	0.55	0.50	0.88	249.07	1.44		1	100	1.00	1.75	1.00	250.0	1.00	Infin.	0.000	0.765	**Non-Liq.**	Non-Liq.	**0.00**
31.66	296.78	1.60	0.54	110	1.380	0.912	0.54	0.50	0.88	244.47	1.44		1	100	1.00	1.80	1.00	245.4	1.00	Infin.	0.000	0.766	**Non-Liq.**	Non-Liq.	**0.00**
31.82	282.25	1.66	0.59	110	1.384	0.911	0.59	0.50	0.87	232.11	1.48		1	100	1.00	1.85	1.00	233.0	1.00	Infin.	0.000	0.766	**Non-Liq.**	Non-Liq.	**0.00**
31.99	283.26	2.04	0.72	110	1.388	0.910	0.73	0.50	0.87	232.61	1.54		1	100	1.00	1.90	1.00	233.5	1.00	Infin.	0.000	0.766	**Non-Liq.**	Non-Liq.	**0.00**
32.15	279.05	2.52	0.90	110	1.392	0.909	0.91	0.50	0.87	228.81	1.62		1	100	1.00	1.95	1.00	229.7	1.00	Infin.	0.000	0.766	**Non-Liq.**	Non-Liq.	**0.00**
32.32	264.05	3.05	1.15	110	1.396	0.908	1.16	0.52	0.87	214.79	1.72		1	100	1.05	2.00	1.00	226.1	1.00	Infin.	0.000	0.766	**Non-Liq.**	Non-Liq.	**0.00**
32.48	250.59	3.28	1.31	110	1.400	0.907	1.32	0.54	0.86	202.48	1.77		1	100	1.09	2.05	1.00	221.2	1.00	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
32.64	244.23	3.15	1.29	110	1.403	0.906	1.30	0.54	0.86	196.97	1.78		1	100	1.09	2.10	1.00	215.6	1.00	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
32.81	239.79	3.02	1.26	110	1.407	0.905	1.27	0.54	0.86	193.10	1.78		1	100	1.09	2.15	1.00	211.1	1.00	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
32.97	240.83	2.74	1.14	110	1.411	0.904	1.14	0.53	0.86	194.23	1.74		1	100	1.07	2.20	1.00	207.7	1.00	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
33.14	267.29	2.26	0.85	110	1.415	0.903	0.85	0.50	0.86	217.28	1.61		1	100	1.00	2.25	1.00	218.1	1.00	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
33.30	269.49	1.86	0.69	110	1.419	0.902	0.69	0.50	0.86	218.78	1.55		1	100	1.00	2.30	1.00	219.6	1.00	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
33.46	270.31	2.15	0.80	110	1.423	0.901	0.80	0.50	0.86	219.14	1.59		1	100	1.00	2.35	1.00	220.0	1.00	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
33.63	241.91	2.18	0.90	110	1.427	0.900	0.90	0.51	0.86	195.27	1.67		1	100	1.01	2.40	1.00	198.8	1.00	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
33.79	219.65	2.12	0.96	110	1.431	0.899	0.97	0.52	0.85	176.09	1.72		1	100	1.05	2.45	1.00	185.7	1.00	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
33.96	236.69	2.44	1.03	110	1.435	0.898	1.04	0.52	0.85	189.61	1.72		1	100	1.05	2.50	1.00	199.7	1.00	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
34.12	253.42	2.64	1.04	110	1.439	0.897	1.05	0.52	0.85	203.12	1.70		1	100	1.04	2.55	1.00	211.6	1.00	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
34.28	273.96	3.02	1.10	110	1.443	0.896	1.11	0.52	0.85	219.46	1.70		1	100	1.03	2.60	1.00	227.9	1.00	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
34.45	296.13	3.44	1.16	110	1.446	0.895	1.17	0.51	0.85	237.10	1.69		1	100	1.03	2.65	1.00	245.4	0.99	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
34.61	315.65	3.90	1.24	110	1.450	0.894	1.24	0.52	0.85	252.37	1.69		1	100	1.03	2.70	1.00	261.8	0.99	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
34.78	329.54	4.18	1.27	110	1.454	0.893	1.28	0.52	0.85	263.22	1.69		1	100	1.03	2.75	1.00	272.6	0.99	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
34.94	341.71	4.12	1.21	110	1.458	0.892	1.21	0.51	0.85	273.33	1.66		1	100	1.01	2.80	1.00	277.8	0.99	Infin.	0.000	0.766	**Non-Liq.**	Non-Liq.	**0.00**
35.10	357.73	3.87	1.08	110	1.462	0.890	1.08	0.50	0.85	286.45	1.61		1	100	1.00	2.85	1.00	287.5	0.99	Infin.	0.000	0.766	**Non-Liq.**	Non-Liq.	**0.00**
35.27	368.55	3.45	0.94	110	1.466	0.889	0.94	0.50	0.85	294.76	1.56		1	100	1.00	2.90	1.00	295.9	0.99	Infin.	0.000	0.766	**Non-Liq.**	Non-Liq.	**0.00**
35.43	371.34	3.32	0.89	110	1.470	0.888	0.90	0.50	0.85	296.60	1.54		1	100	1.00	2.95	1.00	297.7	0.99	Infin.	0.000	0.766	**Non-Liq.**	Non-Liq.	**0.00**
35.60	374.83	3.14	0.84	110	1.474	0.887	0.84	0.50	0.85	299.00	1.52		1	100	1.00	3.00	1.00	300.1	0.98	Infin.	0.000	0.766	**Non-Liq.**	Non-Liq.	**0.00**
35.76	374.45	2.75	0.73	110	1.478	0.886	0.74	0.50	0.85	298.29	1.47		1	100	1.00	3.05	1.00	299.4	0.98	Infin.	0.000	0.766	**Non-Liq.**	Non-Liq.	**0.00**
35.93	379.11	2.45	0.65	110	1.482	0.885	0.65	0.50	0.85	301.62	1.43		1	100	1.00	3.10	1.00	302.7	0.98	Infin.	0.000	0.765	**Non-Liq.**	Non-Liq.	**0.00**
36.09	370.12	2.21	0.60	110	1.485	0.883	0.60	0.50	0.84	294.05	1.41		1	100	1.00	3.15	1.00	295.1	0.98	Infin.	0.000	0.765	**Non-Liq.**	Non-Liq.	**0.00**
36.25	350.96	2.32	0.66	110	1.489	0.882	0.66	0.50	0.84	278.40	1.46		1	100	1.00	3.20	1.00	279.4	0.98	Infin.	0.000	0.765	**Non-Liq.**	Non-Liq.	**0.00**
36.42	332.11	2.24	0.67	110	1.493	0.881	0.68	0.50	0.84	263.03	1.49		1	100	1.00	3.25	1.00	264.0	0.98	Infin.	0.000	0.765	**Non-Liq.**	Non-Liq.	**0.00**
36.58	320.02	4.38	1.37	110	1.497	0.880	1.38	0.53	0.83	250.73	1.73		1	100	1.06	3.30	1.00	266.2	0.98	Infin.	0.000	0.764	**Non-Liq.**	Non-Liq.	**0.00**
36.75	314.68	4.59	1.46	110	1.501	0.878	1.47	0.54	0.83	245.47	1.76		1	100	1.08	3.35	1.00	265.3	0.98	Infin.	0.000	0.764	**Non-Liq.**	Non-Liq.	**0.00**
36.91	323.64	4.64	1.43	110	1.505	0.877	1.44	0.53	0.83	252.50	1.74		1	100	1.07	3.40	1.00	270.5	0.97	Infin.	0.000	0.764	**Non-Liq.**	Non-Liq.	**0.00**
37.07	352.97	4.40	1.25	110	1.509	0.876	1.25	0.51	0.83	277.26	1.67		1	100	1.02	3.45	1.00	283.2	0.97	Infin.	0.000	0.763	**Non-Liq.**	Non-Liq.	**0.00**
37.24	339.32	4.58	1.35	110	1.513	0.875	1.36	0.52	0.83	265.01	1.71		1	100	1.04	3.50	1.00	277.9	0.97	Infin.	0.000	0.763	**Non-Liq.**	Non-Liq.	**0.00**
37.40	311.75	3.95	1.27	110	1.517	0.873	1.27	0.52	0.83	243.01	1.71		1	100	1.05	3.55	1.00	255.1	0.97	Infin.	0.000	0.762	**Non-Liq.**	Non-Liq.	**0.00**
37.57	316.65	3.97	1.25	110	1.521	0.872	1.26	0.52	0.83	246.71	1.70		1	100	1.04	3.60	1.00	257.7	0.97	Infin.	0.000	0.762	**Non-Liq.**	Non-Liq.	**0.00**
37.73	324.98	4.11	1.27	110	1.525	0.871	1.27	0.52	0.83	253.00	1.70		1	100	1.04	3.65	1.00	263.7	0.97	Infin.	0.000	0.762	**Non-Liq.**	Non-Liq.	**0.00**
37.89	313.50	4.12	1.31	110	1.528	0.869	1.32	0.53	0.82	243.07	1.72		1	100	1.05	3.70	1.00	257.1	0.97	Infin.	0.000	0.761	**Non-Liq.**	Non-Liq.	**0.00**
38.06	336.26	4.69	1.39	110	1.532	0.868	1.40	0.53	0.82	260.39	1.73		1	100	1.06	3.75	1.00	275.8	0.96	Infin.	0.000	0.761	**Non-Liq.**	Non-Liq.	**0.00**
38.22	355.50	7.68	2.16	110	1.536	0.867	2.17	0.57	0.81	270.57	1.87		1	100	1.16	3.80	1.00	315.7	0.96	Infin.	0.000	0.760	**Non-Liq.**	Non-Liq.	**0.00**
38.39	365.48	7.76	2.12	110	1.540	0.865	2.13	0.57	0.81	278.20	1.86		1	100	1.15	3.85	1.00	321.5	0.96	Infin.	0.000	0.760	**Non-Liq.**	Non-Liq.	**0.00**
38.55	420.69	8.65	2.06	110	1.544	0.864	2.06	0.55	0.81	321.61	1.81		1	100	1.12	3.90	1.00	360.0	0.96	Infin.	0.000	0.759	**Non-Liq.**	Non-Liq.	**0.00**
38.71	390.62	7.43	1.90	110	1.548	0.863	1.91	0.55	0.81	298.48	1.80		1	100	1.11	3.95	1.00	331.8	0.96	Infin.	0.000	0.759	**Non-Liq.**	Non-Liq.	**0.00**
38.88	316.05	7.07	2.24	110	1.552	0.861	2.25	0.58	0.80	237.81	1.91		1	100	1.20	4.00	1.00	287.2	0.96	Infin.	0.000	0.758	**Non-Liq.**	Non-Liq.	**0.00**
39.04	282.97	4.44	1.57	110	1.556	0.860	1.58	0.55	0.81	214.87	1.82		1	100	1.12	4.05	1.00	241.6	0.96	Infin.	0.000	0.758	**Non-Liq.**	Non-Liq.	**0.00**
39.21	275.95	3.83	1.39	110	1.560	0.859	1.39	0.54	0.81	210.08	1.78		1	100	1.09	4.10	1.00	230.8	0.96	Infin.	0.000	0.757	**Non-Liq.**	Non-Liq.	**0.00**
39.37	269.76	4.26	1.58	110	1.564	0.857	1.59	0.56	0.80	203.82	1.83		1	100	1.13	4.15	1.00	231.8	0.95	Infin.	0.000	0.757	**Non-Liq.**	Non-Liq.	**0.00**
39.53	267.47	4.03	1.51	110	1.567	0.856	1.51	0.55	0.80	202.11	1.82		1	100	1.12	4.20	1.00	227.7	0.95	Infin.	0.000	0.756	**Non-Liq.**	Non-Liq.	**0.00**
39.70	286.57	4.17	1.45	110	1.571	0.854	1.46	0.54	0.81	217.15	1.79		1	100	1.10	4.25	1.00	239.5	0.95	Infin.	0.000	0.756	**Non-Liq.**	Non-Liq.	**0.00**
39.86	266.83	3.87	1.45	110	1.575	0.853	1.46	0.55	0.80	201.34	1.81		1	100	1.11	4.30	1.00	225.1	0.95	Infin.	0.000	0.755	**Non-Liq.**	Non-Liq.	**0.00**
40.03	266.44	3.65	1.37	110	1.579	0.852	1.38	0.55	0.80	201.22	1.79		1	100	1.10	4.35	1.00	222.2	0.95	Infin.	0.000	0.754	**Non-Liq.**	Non-Liq.	**0.00**
40.19	264.65	3.64	1.38	110	1.583	0.850	1.38	0.55	0.80	199.50	1.79		1	100	1.10	4.40	1.00	220.9	0.95	Infin.	0.000	0.754	**Non-Liq.**	Non-Liq.	**0.00**
40.35	262.76	3.62	1.38	110	1.587	0.849	1.38	0.55	0.80	197.73	1.80		1	100	1.10	4.45	1.00	219.3	0.95	Infin.	0.000	0.753	**Non-Liq.**	Non-Liq.	**0.00**
40.52	263.40	3.68	1.40	110	1.591	0.847	1.40	0.55	0.80	197.84	1.80		1	100	1.11	4.50	1.00	220.0	0.95	Infin.	0.000	0.752	**Non-Liq.**	Non-Liq.	**0.00**
40.68	268.30	2.97	1.11	110	1.595	0.846	1.11	0.52	0.81	203.34	1.72		1	100	1.05	4.55	1.00	214.4	0.94	Infin.	0.000	0.752	**Non-Liq.**	Non-Liq.	**0.00**
40.85	273.61	3.26	1.19	110	1.599	0.844	1.20	0.53	0.80	206.64	1.74		1	100	1.06	4.60	1.00	220.5	0.94	Infin.	0.000	0.751	**Non-Liq.**	Non-Liq.	**0.00**
41.01	279.17	3.44	1.23	110	1.603	0.843	1.24	0.53	0.80	210.44	1.74		1	100	1.07	4.65	1.00	225.4	0.94	Infin.	0.000	0.750	**Non-Liq.**	Non-Liq.	**0.00**
41.17	277.56	3.52	1.27	110	1.607	0.841	1.27	0.53	0.80	208.63	1.76		1	100	1.08	4.70	1.00	225.1	0.94	Infin.	0.000	0.750	**Non-Liq.**	Non-Liq.	**0.00**
41.34	264.17	3.63	1.38	110	1.610	0.840	1.38	0.55	0.79	197.18	1.80		1	100	1.11	4.75	1.00	218.8	0.94	Infin.	0.000	0.749	**Non-Liq.**	Non-Liq.	**0.00**
41.50	267.65	3.48	1.30	110	1.614	0.838	1.31	0.54	0.80	200.10	1.78		1	100	1.09	4.80	1.00	218.7	0.94	Infin.	0.000	0.748	**Non-Liq.**	Non-Liq.	**0.00**
41.67	269.53	3.45	1.28	110	1.618	0.837	1.29	0.54	0.80	201.42	1.77		1	100	1.08	4.85	1.00	219.2	0.94	Infin.	0.000	0.747	**Non-Liq.**	Non-Liq.	**0.00**
41.83	264.07	3.42	1.30	110	1.622	0.835	1.30	0.54	0.79	196.79	1.78		1	100	1.09	4.90	1.00	215.7	0.94	Infin.	0.000	0.747	**Non-Liq.**	Non-Liq.	**0.00**
41.99	253.52	3.32	1.31	110	1.626	0.834	1.32	0.55	0.79	188.24	1.80		1	100	1.10	4.95	1.00	208.4	0.93	Infin.	0.000	0.746	**Non-Liq.**	Non-Liq.	**0.00**
42.16	253.46	3.37	1.33	110	1.630	0.832	1.34	0.55	0.79	187.81	1.80		1	100	1.11	5.00	1.00	208.7	0.93	Infin.	0.000	0.745	**Non-Liq.**	Non-Liq.	**0.00**
42.32	248.94	3.31	1.33	110	1.634	0.831	1.34	0.55	0.79	184.04	1.81		1	100	1.11	5.05	1.00	205.4	0.93	Infin.	0.000	0.744	**Non-Liq.**	Non-Liq.	**0.00**
42.49	240.19	3.20	1.33	110	1.638	0.829	1.34	0.55	0.79	177.01	1.82		1	100	1.12	5.10	1.00	199.2	0.93	Infin.	0.000	0.743	**Non-Liq.**	Non-Liq.	**0.00**
42.65	239.26	3.01	1.26	110	1.642	0.827	1.27	0.55	0.79	176.50	1.80		1	100	1.11	5.15	1.00	196.2	0.93	Infin.	0.000	0.743	**Non-Liq.**	Non-Liq.	**0.00**
42.81	235.68	3.23	1.37	110	1.646	0.826	1.38	0.56	0.78	172.84	1.84		1	100	1.13	5.20	1.00	196.6	0.93	Infin.	0.000	0.742	**Non-Liq.**	Non-Liq.	**0.00**
42.98	234.20	2.85	1.22	110	1.649	0.824	1.23	0.55	0.78	172.36	1.80		1	99	1.11	5.25	1.00	191.3	0.93	Infin.	0.000	0.741	**Non-Liq.**	Non-Liq.	**0.00**

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_σ	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	*Volumetric Strain (%)*
43.14	238.08	3.09	1.30	110	1.653	0.823	1.31	0.55	0.78	174.63	1.81		1	100	1.12	5.30	1.00	195.8	0.93	Infin.	0.000	0.740	**Non-Liq.**	Non-Liq.	**0.00**
43.31	216.71	3.13	1.45	110	1.657	0.821	1.46	0.57	0.77	157.24	1.88		1	96	1.17	5.35	1.00	184.8	0.93	Infin.	0.000	0.739	**Non-Liq.**	Non-Liq.	**0.00**
43.47	215.92	2.85	1.32	110	1.661	0.820	1.33	0.56	0.78	157.06	1.85		1	96	1.15	5.40	1.00	180.7	0.92	Infin.	0.000	0.738	**Non-Liq.**	Non-Liq.	**0.00**
43.64	228.43	2.91	1.27	110	1.665	0.818	1.28	0.55	0.78	166.65	1.82		1	98	1.12	5.45	1.00	188.0	0.92	Infin.	0.000	0.737	**Non-Liq.**	Non-Liq.	**0.00**
43.80	245.66	2.77	1.13	110	1.669	0.816	1.14	0.54	0.78	180.61	1.76		1	100	1.08	5.50	1.00	195.6	0.92	Infin.	0.000	0.736	**Non-Liq.**	Non-Liq.	**0.00**
43.96	253.66	2.83	1.12	110	1.673	0.815	1.12	0.53	0.78	186.64	1.75		1	100	1.07	5.55	1.00	200.4	0.92	Infin.	0.000	0.735	**Non-Liq.**	Non-Liq.	**0.00**
44.13	255.03	2.26	0.89	110	1.677	0.813	0.89	0.51	0.79	189.39	1.67		1	100	1.02	5.60	1.00	193.6	0.92	Infin.	0.000	0.735	**Non-Liq.**	Non-Liq.	**0.00**
44.29	249.25	2.48	0.99	110	1.681	0.811	1.00	0.52	0.79	183.72	1.72		1	100	1.05	5.65	1.00	193.3	0.92	Infin.	0.000	0.734	**Non-Liq.**	Non-Liq.	**0.00**
44.46	256.60	2.83	1.10	110	1.685	0.810	1.11	0.53	0.78	188.29	1.74		1	100	1.06	5.70	1.00	201.3	0.92	Infin.	0.000	0.733	**Non-Liq.**	Non-Liq.	**0.00**
44.62	265.56	3.34	1.26	110	1.689	0.808	1.26	0.54	0.78	193.76	1.77		1	100	1.09	5.75	1.00	211.6	0.92	Infin.	0.000	0.732	**Non-Liq.**	Non-Liq.	**0.00**
44.78	290.32	3.34	1.15	110	1.692	0.807	1.16	0.52	0.78	213.36	1.72		1	100	1.05	5.75	1.00	224.7	0.92	Infin.	0.000	0.731	**Non-Liq.**	Non-Liq.	**0.00**
44.95	335.88	3.42	1.02	110	1.696	0.805	1.02	0.50	0.79	249.45	1.63		1	100	1.00	5.75	1.00	250.4	0.91	Infin.	0.000	0.730	**Non-Liq.**	Non-Liq.	**0.00**
45.11	394.83	2.84	0.72	110	1.700	0.803	0.72	0.50	0.79	293.12	1.47		1	100	1.00	5.75	1.00	294.2	0.91	Infin.	0.000	0.729	**Non-Liq.**	Non-Liq.	**0.00**
45.28	449.80	3.22	0.72	110	1.704	0.802	0.72	0.50	0.79	333.72	1.43		1	100	1.00	5.75	1.00	335.0	0.91	Infin.	0.000	0.728	**Non-Liq.**	Non-Liq.	**0.00**
45.44	447.17	4.13	0.92	110	1.708	0.800	0.93	0.50	0.79	331.38	1.52		1	100	1.00	5.75	1.00	332.6	0.91	Infin.	0.000	0.727	**Non-Liq.**	Non-Liq.	**0.00**
45.60	452.93	3.89	0.86	110	1.712	0.798	0.86	0.50	0.79	335.27	1.49		1	100	1.00	5.75	1.00	336.5	0.91	Infin.	0.000	0.726	**Non-Liq.**	Non-Liq.	**0.00**
45.77	475.52	3.64	0.77	110	1.716	0.797	0.77	0.50	0.79	351.66	1.44		1	100	1.00	5.75	1.00	353.0	0.91	Infin.	0.000	0.725	**Non-Liq.**	Non-Liq.	**0.00**
45.93	444.46	2.97	0.67	110	1.720	0.795	0.67	0.50	0.78	328.23	1.42		1	100	1.00	5.75	1.00	329.5	0.91	Infin.	0.000	0.724	**Non-Liq.**	Non-Liq.	**0.00**
46.10	446.58	2.40	0.54	110	1.724	0.793	0.54	0.50	0.78	329.42	1.35		1	100	1.00	5.75	1.00	330.7	0.91	Infin.	0.000	0.723	**Non-Liq.**	Non-Liq.	**0.00**
46.26	425.00	2.48	0.58	110	1.728	0.792	0.59	0.50	0.78	313.09	1.39		1	100	1.00	5.75	1.00	314.3	0.91	Infin.	0.000	0.722	**Non-Liq.**	Non-Liq.	**0.00**
46.42	414.92	2.66	0.64	110	1.731	0.790	0.64	0.50	0.78	305.28	1.42		1	100	1.00	5.75	1.00	306.4	0.91	Infin.	0.000	0.721	**Non-Liq.**	Non-Liq.	**0.00**
46.59	394.40	2.71	0.69	110	1.735	0.788	0.69	0.50	0.78	289.79	1.46		1	100	1.00	5.75	1.00	290.9	0.90	Infin.	0.000	0.720	**Non-Liq.**	Non-Liq.	**0.00**
46.75	375.24	2.77	0.74	110	1.739	0.787	0.74	0.50	0.78	275.34	1.50		1	100	1.00	5.75	1.00	276.4	0.90	Infin.	0.000	0.719	**Non-Liq.**	Non-Liq.	**0.00**
46.92	360.27	2.57	0.71	110	1.743	0.785	0.72	0.50	0.78	264.00	1.50		1	100	1.00	5.75	1.00	265.0	0.90	Infin.	0.000	0.717	**Non-Liq.**	Non-Liq.	**0.00**
47.08	348.31	2.26	0.65	110	1.747	0.783	0.65	0.50	0.78	254.91	1.48		1	100	1.00	5.75	1.00	255.9	0.90	Infin.	0.000	0.716	**Non-Liq.**	Non-Liq.	**0.00**
47.24	321.44	1.84	0.57	110	1.751	0.782	0.58	0.50	0.78	234.88	1.47		1	100	1.00	5.75	1.00	235.8	0.90	Infin.	0.000	0.715	**Non-Liq.**	Non-Liq.	**0.00**
47.41	279.99	1.88	0.67	110	1.755	0.780	0.68	0.50	0.78	204.20	1.56		1	100	1.00	5.75	1.00	205.0	0.90	Infin.	0.000	0.714	**Non-Liq.**	Non-Liq.	**0.00**
47.57	223.67	1.59	0.71	110	1.759	0.778	0.71	0.50	0.77	162.29	1.66		1	97	1.01	5.75	1.00	164.1	0.90	Infin.	0.000	0.713	**Non-Liq.**	Non-Liq.	**0.00**
47.74	164.82	2.03	1.23	110	1.763	0.777	1.25	0.59	0.74	114.21	1.93		1	82	1.22	5.75	1.00	139.7	0.90	0.334	0.299	0.712	**0.42**	95%	**1.03**
47.90	121.59	2.53	2.08	110	1.767	0.775	2.11	0.67	0.71	80.43	2.20		1	68	1.66		1.00	133.7	0.92	0.302	0.279	0.711	**0.39**	96%	**1.09**
48.06	91.32	2.37	2.60	110	1.770	0.773	2.65	0.72	0.69	58.48	2.37		1	55	2.18		1.00	127.5	0.92	0.273	0.251	0.710	**0.35**	97%	**1.16**
48.23	116.79	2.86	2.45	110	1.774	0.772	2.48	0.69	0.70	76.18	2.27		1	66	1.84		1.00	140.3	0.92	0.337	0.310	0.709	**0.44**	94%	**1.02**
48.39	231.35	2.98	1.29	110	1.778	0.770	1.30	0.56	0.75	162.37	1.83		1	97	1.13	1.00	1.00	184.6	0.89	Infin.	0.000	0.708	**Non-Liq.**	Non-Liq.	**0.00**
48.56	280.33	2.88	1.03	110	1.782	0.768	1.03	0.52	0.76	201.01	1.70		1	100	1.04	1.05	1.00	209.2	0.89	Infin.	0.000	0.707	**Non-Liq.**	Non-Liq.	**0.00**
48.72	300.38	2.56	0.85	110	1.786	0.767	0.86	0.50	0.77	217.21	1.62		1	100	1.00	1.10	1.00	218.0	0.89	Infin.	0.000	0.705	**Non-Liq.**	Non-Liq.	**0.00**
48.88	311.53	2.58	0.83	110	1.790	0.765	0.83	0.50	0.77	225.07	1.60		1	100	1.00	1.15	1.00	225.9	0.89	Infin.	0.000	0.704	**Non-Liq.**	Non-Liq.	**0.00**
49.05	325.26	2.50	0.77	110	1.794	0.763	0.77	0.50	0.77	234.79	1.56		1	100	1.00	1.20	1.00	235.7	0.89	Infin.	0.000	0.703	**Non-Liq.**	Non-Liq.	**0.00**
49.21	339.47	2.81	0.83	110	1.798	0.762	0.83	0.50	0.77	244.84	1.57		1	100	1.00	1.25	1.00	245.8	0.89	Infin.	0.000	0.702	**Non-Liq.**	Non-Liq.	**0.00**
49.38	344.98	3.24	0.94	110	1.802	0.760	0.94	0.50	0.77	248.56	1.61		1	100	1.00	1.30	1.00	249.5	0.89	Infin.	0.000	0.701	**Non-Liq.**	Non-Liq.	**0.00**
49.54	351.47	3.83	1.09	110	1.806	0.758	1.09	0.50	0.76	252.53	1.65		1	100	1.00	1.35	1.00	254.5	0.89	Infin.	0.000	0.700	**Non-Liq.**	Non-Liq.	**0.00**
49.70	357.74	3.92	1.10	110	1.810	0.757	1.10	0.50	0.76	256.89	1.65		1	100	1.00	1.40	1.00	258.4	0.89	Infin.	0.000	0.699	**Non-Liq.**	Non-Liq.	**0.00**
49.87	374.88	3.72	0.99	110	1.813	0.755	1.00	0.50	0.76	269.33	1.60		1	100	1.00	1.45	1.00	270.3	0.88	Infin.	0.000	0.698	**Non-Liq.**	Non-Liq.	**0.00**
50.03	395.53	3.14	0.79	110	1.817	0.753	0.80	0.50	0.76	283.93	1.51		1	100	1.00	1.50	1.00	285.0	0.88	Infin.	0.000	0.696	**Non-Liq.**	Non-Liq.	**0.00**
50.20	406.66	2.61	0.64	110	1.821	0.752	0.64	0.50	0.76	291.65	1.44		1	100	1.00	1.50	1.00	292.7	0.88	Infin.	0.000	0.695	**Non-Liq.**	Non-Liq.	**0.00**
50.36	421.58	2.63	0.62	110	1.825	0.750	0.63	0.50	0.76	302.07	1.42		1	100	1.00	1.50	1.00	303.2	0.88	Infin.	0.000	0.694	**Non-Liq.**	Non-Liq.	**0.00**
50.52	433.35	2.55	0.59	110	1.829	0.748	0.59	0.50	0.76	310.20	1.39		1	100	1.00	1.50	1.00	311.4	0.88	Infin.	0.000	0.693	**Non-Liq.**	Non-Liq.	**0.00**
50.69	439.99	2.57	0.58	110	1.833	0.747	0.59	0.50	0.76	314.64	1.39		1	100	1.00	1.50	1.00	315.8	0.88	Infin.	0.000	0.692	**Non-Liq.**	Non-Liq.	**0.00**
50.85	441.89	2.61	0.59	110	1.837	0.745	0.59	0.50	0.76	315.66	1.39		1	100	1.00	1.50	1.00	316.8	0.88	Infin.	0.000	0.691	**Non-Liq.**	Non-Liq.	**0.00**
51.02	455.49	2.77	0.61	110	1.841	0.743	0.61	0.50	0.76	325.07	1.39		1	100	1.00	1.50	1.00	326.3	0.88	Infin.	0.000	0.689	**Non-Liq.**	Non-Liq.	**0.00**
51.18	472.21	3.30	0.70	110	1.845	0.742	0.70	0.50	0.76	336.69	1.42		1	100	1.00	1.50	1.00	338.0	0.88	Infin.	0.000	0.688	**Non-Liq.**	Non-Liq.	**0.00**
51.35	504.84	3.77	0.75	110	1.849	0.740	0.75	0.50	0.76	359.67	1.43		1	100	1.00	1.50	1.00	361.0	0.88	Infin.	0.000	0.687	**Non-Liq.**	Non-Liq.	**0.00**
51.51	459.09	4.28	0.93	110	1.852	0.738	0.94	0.50	0.76	326.60	1.53		1	100	1.00	1.50	1.00	327.8	0.87	Infin.	0.000	0.686	**Non-Liq.**	Non-Liq.	**0.00**
51.67	422.99	4.23	1.00	110	1.856	0.737	1.00	0.50	0.75	300.50	1.57		1	100	1.00	1.50	1.00	301.6	0.87	Infin.	0.000	0.685	**Non-Liq.**	Non-Liq.	**0.00**
51.84	454.99	5.33	1.17	110	1.860	0.735	1.18	0.50	0.75	322.99	1.61		1	100	1.00	1.50	1.00	324.2	0.87	Infin.	0.000	0.684	**Non-Liq.**	Non-Liq.	**0.00**
52.00	493.38	5.94	1.20	110	1.864	0.733	1.21	0.50	0.75	349.99	1.60		1	100	1.00	1.50	1.00	351.3	0.87	Infin.	0.000	0.682	**Non-Liq.**	Non-Liq.	**0.00**
52.17	477.89	5.21	1.09	110	1.868	0.732	1.09	0.50	0.75	338.60	1.57		1	100	1.00	1.50	1.00	339.9	0.87	Infin.	0.000	0.681	**Non-Liq.**	Non-Liq.	**0.00**
52.33	440.86	3.78	0.86	110	1.872	0.730	0.86	0.50	0.75	311.93	1.51		1	100	1.00	1.50	1.00	313.1	0.87	Infin.	0.000	0.680	**Non-Liq.**	Non-Liq.	**0.00**
52.49	459.07	3.21	0.70	110	1.876	0.728	0.70	0.50	0.75	324.53	1.43		1	100	1.00	1.50	1.00	325.7	0.87	Infin.	0.000	0.679	**Non-Liq.**	Non-Liq.	**0.00**
52.66	325.12	2.21	0.68	110	1.880	0.727	0.68	0.50	0.75	229.21	1.53		1	100	1.00	1.50	1.00	230.1	0.87	Infin.	0.000	0.678	**Non-Liq.**	Non-Liq.	**0.00**
52.82	240.31	2.13	0.89	110	1.884	0.725	0.89	0.52	0.74	166.81	1.71		1	98	1.05	1.50	1.00	175.1	0.87	Infin.	0.000	0.677	**Non-Liq.**	Non-Liq.	**0.00**
52.99	196.52	2.05	1.05	110	1.888	0.724	1.06	0.56	0.72	133.20	1.83		1	89	1.13	1.50	1.00	151.2	0.87	0.401	0.348	0.676	**0.51**	90%	**0.77**
53.15	141.14	1.74	1.23	110	1.892	0.722	1.25	0.61	0.70	92.47	2.00		1	74	1.30	1.50	1.00	120.5	0.87	0.243	0.210	0.674	**0.31**	98%	**1.24**
53.31	110.78	1.92	1.73	110	1.895	0.720	1.76	0.66	0.68	69.84	2.19		1	62	1.64		1.00	114.7	0.90	0.220	0.197	0.673	**0.29**	98%	**1.31**
53.48	75.09	1.81	2.41	110	1.899	0.719	2.47	0.74	0.65	44.95	2.43		1	44	2.44		1.00	109.6	0.93	0.202	0.188	0.672	**0.28**	99%	**1.38**
53.64	58.78	1.67	2.83	110	1.903	0.717	2.93	0.78	0.63	34.03	2.57		1	32	3.14		1.00	107.0	0.93	0.194	0.180	0.671	**0.27**	99%	**1.42**
53.81	71.04	1.45	2.05	110	1.907	0.716	2.10	0.73	0.65	42.53	2.40		1	41	2.32		1.00	98.7	0.93	0.170	0.157	0.670	**0.24**	99%	**1.53**
53.97	81.60	1.36	1.67	110	1.911	0.714	1.71	0.70	0.66	49.93	2.29		1	48	1.92		1.00	95.8	0.93	0.162	0.150	0.669	**0.22**	99%	**1.58**
54.13	70.69	1.16	1.64	110	1.915	0.712	1.69	0.71	0.66	42.65	2.34		1	41	2.09		1.00	89.0	0.93	0.146	0.135	0.667	**0.20**	99%	**1.69**
54.30	44.26	1.08	2.45	110	1.919	0.711	2.56	0.80	0.62	24.87	2.64		0						0.93			0.666	**Non-Liq.**	Non-Liq.	**0.00**
54.46	37.41	1.01	2.69	110	1.923	0.709	2.84	0.83	0.61	20.46	2.73		0						0.93			0.665	**Non-Liq.**	Non-Liq.	**0.00**
54.63	29.79	1.23	4.12	110	1.927	0.708	4.40	0.89	0.59	15.43	2.95		0						0.93			0.664	**Non-Liq.**	Non-Liq.	**0.00**
54.79	31.13	1.67	5.36	110	1.931	0.706	5.72	0.91	0.58	15.96	3.01		0						0.93			0.663	**Non-Liq.**	Non-Liq.	**0.00**
54.95	44.13	1.70	3.85	110	1.934	0.705	4.02	0.84	0.60	24.02	2.77		0						0.93			0.662	**Non-Liq.**	Non-Liq.	**0.00**
55.12	95.31	2.21	2.32	110	1.938	0.703	2.37	0.71	0.65	57.43	2.34		1	54	2.08		1.00	119.4	0.89	0.238	0.212	0.661	**0.32**	98%	**1.25**
55.28	136.83	2.52	1.84	110	1.942	0.701	1.87	0.65	0.67	85.88	2.14		1	71	1.53		1.00	131.8	0.85	0.293	0.250	0.659	**0.38**	96%	**1.11**
55.45	185.97	2.78	1.49	110	1.946	0.700	1.51	0.60	0.69	120.71	1.97		1	85	1.26	0.45	1.26	192.9	0.85	Infin.	0.000	0.658	**Non-Liq.**	Non-Liq.	**0.00**
55.61	219.92	3.19	1.45	110	1.950	0.698	1.47	0.58	0.70	144.48	1.91		1	92	1.20	0.45	1.26	218.4	0.85	Infin.	0.000	0.657	**Non-Liq.**	Non-Liq.	**0.00**
55.77	244.90	3.67	1.50	110	1.954	0.697	1.51	0.57	0.70	161.53	1.88		1	97	1.17	0.45	1.26	239.9	0.85	Infin.	0.000	0.656	**Non-Liq.**	Non-Liq.	**0.00**
55.94	256.05	3.99	1.56	110	1.958	0.695	1.57	0.57	0.70	168.76	1.88		1	99	1.17	0.45	1.26	250.5	0.85	Infin.	0.000	0.655	**Non-Liq.**	Non-Liq.	**0.00**
56.10	257.95	4.20	1.63	110	1.962	0.694	1.64	0.58	0.70	169.41	1.90		1	99	1.19	0.45	1.26	254.1	0.85	Infin.	0.000	0.654	**Non-Liq.**	Non-Liq.	**0.00**
56.27	260.48	4.35	1.67	110	1.966	0.692	1.68	0.58	0.70	170.70	1.90		1	99	1.19	0.45	1.26	257.2	0.85	Infin.	0.000	0.653	**Non-Liq.**	Non-Liq.	**0.00**
56.43	262.97	4.01	1.52	110	1.970	0.691	1.54	0.57	0.70	173.23	1.87		1	100	1.16	0.45	1.26	254.4	0.85	Infin.	0.000	0.652	**Non-Liq.**	Non-Liq.	**0.00**
56.59	252.09	3.88	1.54	110	1.974	0.689	1.55	0.57	0.70	165.32	1.89		1	98	1.18	0.45	1.26	245.7	0.85	Infin.	0.000	0.650	**Non-Liq.**	Non-Liq.	**0.00**
56.76	232.68	3.79	1.63	110	1.977	0.688	1.64	0.59	0.69	151.04	1.93		1	94	1.22	0.45	1.26	232.8	0.85	Infin.	0.000	0.649	**Non-Liq.**	Non-Liq.	**0.00**
56.92	183.02	3.54	1.93	110	1.981	0.686	1.95	0.63	0.67	115.43	2.06		1	83	1.39		1.00	161.0	0.85	Infin.	0.000	0.648	**Non-Liq.**	Non-Liq.	**0.00**
57.09	160.88	2.83	1.76	110	1.985	0.685	1.78	0.63	0.67	100.96	2.08		1	77	1.41		1.00	142.7	0.85	0.350	0.296	0.647	**0.46**	93%	**1.00**
57.25	152.41	2.48	1.63	110	1.989	0.683	1.65	0.63	0.67	95.58	2.07		1	75	1.40		1.00	134.1	0.84	0.304	0.257	0.646	**0.40**	95%	**1.08**
57.41	121.85	2.08	1.70	110	1.993	0.682	1.73	0.66	0.66	74.74	2.16		1	65	1.58		1.00	118.0	0.88	0.233	0.205	0.645	**0.32**	98%	**1.27**
57.58	78.30	1.74	2.23	110	1.997	0.680	2.28	0.73	0.63	45.38	2.40		1	44	2.33		1.00	105.7	0.92	0.190	0.174	0.644	**0.27**	99%	**1.43**
57.74	46.88	1.34	2.86	110	2.001	0.679	2.99	0.81	0.60	25.32	2.67		0						0.92			0.643	**Non-Liq.**	Non-Liq.	**0.00**
57.91	32.55	1.03	3.17	110	2.005	0.678	3.38	0.86	0.58	16.63	2.85		0						0.92			0.642	**Non-Liq.**	Non-Liq.	**0.00**
58.07	26.44	0.80	3.01	110	2.009	0.676	3.26	0.88	0.57	13.10	2.92		0						0.92			0.641	**Non-Liq.**	Non-Liq.	**0.00**

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff. Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	**Liquefac. Safety Factor**	Probab. P_L	***Volumetric Strain (%)***
58.23	32.25	0.58	1.80	110	2.013	0.675	1.92	0.82	0.59	16.89	2.70		0						0.92			0.640	**Non-Liq.**	Non-Liq.	**0.00**
58.40	30.59	0.70	2.28	110	2.016	0.673	2.44	0.84	0.58	15.67	2.79		0						0.92			0.638	**Non-Liq.**	Non-Liq.	**0.00**
58.56	19.12	0.58	3.04	110	2.020	0.672	3.40	0.93	0.55	8.86	3.07		0						0.92			0.637	**Non-Liq.**	Non-Liq.	**0.00**
58.73	20.40	0.44	2.17	110	2.024	0.671	2.41	0.89	0.56	9.72	2.95		0						0.91			0.636	**Non-Liq.**	Non-Liq.	**0.00**
58.89	29.72	0.45	1.52	110	2.028	0.669	1.63	0.82	0.59	15.38	2.70		0						0.91			0.635	**Non-Liq.**	Non-Liq.	**0.00**
59.06	18.72	0.48	2.57	110	2.032	0.668	2.89	0.92	0.55	8.65	3.04		0						0.91			0.634	**Non-Liq.**	Non-Liq.	**0.00**
59.22	15.04	0.45	2.97	110	2.036	0.666	3.44	0.96	0.53	6.54	3.18		0						0.91			0.633	**Non-Liq.**	Non-Liq.	**0.00**
59.38	14.96	0.42	2.81	110	2.040	0.665	3.25	0.96	0.53	6.50	3.17		0						0.91			0.632	**Non-Liq.**	Non-Liq.	**0.00**
59.55	14.95	0.43	2.89	110	2.044	0.664	3.35	0.96	0.53	6.47	3.18		0						0.91			0.631	**Non-Liq.**	Non-Liq.	**0.00**
59.71	15.06	0.48	3.17	110	2.048	0.662	3.67	0.97	0.53	6.49	3.20		0						0.91			0.630	**Non-Liq.**	Non-Liq.	**0.00**
59.88	16.51	0.00	0.01	110	2.052	0.661	0.01	0.83	0.58	7.89	2.74		0		1.00				0.91			0.629	**Non-Liq.**	Non-Liq.	**0.00**
60.04	19.45	0.00	0.01	110	2.055	0.660	0.01	0.82	0.58	9.57	2.69		0		1.00				0.91			0.628	**Non-Liq.**	Non-Liq.	**0.00**
60.20	26.53	0.00	0.00	110	2.059	0.658	0.00	0.79	0.59	13.65	2.61		0		1.00				0.91			0.627	**Non-Liq.**	Non-Liq.	**0.00**

CPT-LIQUEFY.XLS - A SPREADSHEET FOR EMPIRICAL ESTIMATION OF LIQUEFACTION POTENTIAL USING CPT DATA

Developed 2003 by Shelton L. Stringer, GE, Earth Systems Southwest

Project: Oxnard High School No. 8
Job No: 301953-001
Date: 8/14/2018
Sounding: CPT-7
Plot: 7

Methods: Liquefaction Analysis using 1998 NCEER workshop methods (Robertson & Wride)
Post-liquefaction Settlement Analysis from Tokimatsu & Seed (1987)
Dry Sand Settlement by Pradel, ASCE Journal of G&GE, Vol 124, No. 4

Total Liquefied Thickness (feet)
3.1

EARTHQUAKE INFORMATION:

Magnitude:	6.77	7.5
PGA, g:	0.97	0.75
MSF:	1.30	
GWT, feet:	20.0	
Design GWT, feet:	8.0	

Induced CSR (M=7.5): = 0.65*PGA*(po/p'o)*rd/MSF
Clean Sand Qc1n = C_Q*K_C*K_H*Qc
SF = $CRR_{7.5}$*Kσ/CSR
Use Tokimatsu & Seed (0) or Ishihara &Yoshmine (1): 0
Unit Weight of unsaturated soils: 110 pcf
Required SF: 1.50
Unit Weight of saturated soils: 110 pcf
Min SF of Liquefiable Layers: 0.25
Limiting Ic for liquefiable soils: 2.60
Limiting Ic for K_H: 2.0
Avg SF of Liquefiable Layers: 0.04

Probab	Total Induced Subsidence (inches)
Avg	2%
Max	99%
	0.4

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
0.16	7.32	0.09	1.28	110	0.009	1.000	1.29	0.83	1.70	11.75	2.74		0						1.00			0.485	Non-Liq.	Non-Liq.	0.00
0.33	12.26	0.12	1.00	110	0.018	1.000	1.00	0.76	1.70	19.67	2.50		1	9	2.75		1.00	54.0	1.00	0.095	0.095	0.485	Non-Liq.	Non-Liq.	0.00
0.49	14.26	0.15	1.02	110	0.027	1.000	1.03	0.74	1.70	22.87	2.44		1	16	2.50		1.00	57.1	1.00	0.097	0.097	0.485	Non-Liq.	Non-Liq.	0.00
0.66	13.52	0.15	1.09	110	0.036	1.000	1.10	0.75	1.70	21.67	2.48		1	13	2.66		1.00	57.7	1.00	0.098	0.098	0.485	Non-Liq.	Non-Liq.	0.00
0.82	11.35	0.14	1.22	110	0.045	1.000	1.22	0.78	1.70	18.16	2.57		1	6	3.14		1.00	57.0	1.00	0.097	0.097	0.485	Non-Liq.	Non-Liq.	0.00
0.98	9.04	0.12	1.33	110	0.054	1.000	1.34	0.81	1.70	14.44	2.67		0						1.00			0.485	Non-Liq.	Non-Liq.	0.00
1.15	7.13	0.08	1.07	110	0.063	0.999	1.08	0.82	1.70	11.36	2.72		0						1.00			0.484	Non-Liq.	Non-Liq.	0.00
1.31	7.13	0.08	1.07	110	0.072	0.999	1.08	0.82	1.70	11.34	2.72		0						1.00			0.484	Non-Liq.	Non-Liq.	0.00
1.48	6.14	0.08	1.27	110	0.081	0.999	1.29	0.85	1.70	9.74	2.82		0						1.00			0.484	Non-Liq.	Non-Liq.	0.00
1.64	6.75	0.14	2.01	110	0.090	0.998	2.04	0.87	1.70	10.70	2.88		0						1.00			0.484	Non-Liq.	Non-Liq.	0.00
1.80	12.03	0.25	2.04	110	0.099	0.998	2.05	0.81	1.70	19.17	2.67		0						1.00			0.484	Non-Liq.	Non-Liq.	0.00
1.97	26.83	0.46	1.71	110	0.108	0.998	1.72	0.71	1.70	42.94	2.34		1	42	2.10		1.00	90.0	1.00	0.148	0.148	0.484	Non-Liq.	Non-Liq.	0.00
2.13	27.70	0.58	2.10	110	0.117	0.997	2.11	0.72	1.70	44.32	2.39		1	43	2.27		1.00	100.6	1.00	0.175	0.175	0.483	Non-Liq.	Non-Liq.	0.00
2.30	30.71	0.62	2.02	110	0.126	0.997	2.02	0.71	1.70	49.14	2.34		1	47	2.10		1.00	103.0	1.00	0.182	0.182	0.483	Non-Liq.	Non-Liq.	0.00
2.46	35.14	0.59	1.69	110	0.135	0.996	1.70	0.68	1.70	56.25	2.25		1	53	1.80		1.00	101.0	1.00	0.176	0.176	0.483	Non-Liq.	Non-Liq.	0.00
2.62	34.66	0.52	1.49	110	0.144	0.996	1.49	0.67	1.70	55.46	2.22		1	52	1.71		1.00	95.1	1.00	0.160	0.160	0.483	Non-Liq.	Non-Liq.	0.00
2.79	30.29	0.43	1.42	110	0.153	0.996	1.43	0.68	1.70	48.42	2.25		1	47	1.81		1.00	87.5	1.00	0.142	0.142	0.483	Non-Liq.	Non-Liq.	0.00
2.95	25.72	0.37	1.42	110	0.162	0.995	1.43	0.70	1.70	41.07	2.31		1	40	1.98		1.00	81.4	1.00	0.130	0.130	0.482	Non-Liq.	Non-Liq.	0.00
3.12	22.47	0.33	1.49	110	0.171	0.995	1.50	0.72	1.70	35.83	2.37		1	34	2.19		1.00	78.6	1.00	0.125	0.125	0.482	Non-Liq.	Non-Liq.	0.00
3.28	20.80	0.31	1.47	110	0.180	0.994	1.48	0.73	1.70	33.13	2.40		1	31	2.29		1.00	76.0	1.00	0.121	0.121	0.482	Non-Liq.	Non-Liq.	0.00
3.44	20.45	0.30	1.47	110	0.189	0.994	1.48	0.73	1.70	32.55	2.40		1	30	2.32		1.00	75.4	1.00	0.120	0.120	0.482	Non-Liq.	Non-Liq.	0.00
3.61	20.73	0.30	1.45	110	0.198	0.994	1.47	0.73	1.70	32.99	2.39		1	31	2.29		1.00	75.5	1.00	0.120	0.120	0.482	Non-Liq.	Non-Liq.	0.00
3.77	19.90	0.31	1.58	110	0.208	0.993	1.59	0.74	1.70	31.64	2.43		1	29	2.44		1.00	77.1	1.00	0.123	0.123	0.482	Non-Liq.	Non-Liq.	0.00
3.94	17.21	0.35	2.05	110	0.217	0.993	2.08	0.77	1.70	27.31	2.55		1	23	3.03		1.00	82.8	1.00	0.133	0.133	0.481	Non-Liq.	Non-Liq.	0.00
4.10	11.84	0.37	3.08	110	0.226	0.993	3.14	0.85	1.70	18.66	2.79		0						1.00			0.481	Non-Liq.	Non-Liq.	0.00
4.27	7.47	0.32	4.24	110	0.235	0.992	4.38	0.92	1.70	11.63	3.04		0						1.00			0.481	Non-Liq.	Non-Liq.	0.00
4.43	7.87	0.27	3.41	110	0.244	0.992	3.51	0.90	1.70	12.25	2.96		0						1.00			0.481	Non-Liq.	Non-Liq.	0.00
4.59	13.03	0.25	1.89	110	0.253	0.991	1.93	0.80	1.70	20.53	2.63		0						1.00			0.481	Non-Liq.	Non-Liq.	0.00
4.76	17.56	0.20	1.13	110	0.262	0.991	1.15	0.73	1.70	27.80	2.40		1	24	2.30		1.00	63.9	1.00	0.104	0.104	0.480	Non-Liq.	Non-Liq.	0.00
4.92	25.00	0.25	0.99	110	0.271	0.991	1.00	0.68	1.70	39.74	2.23		1	39	1.75		1.00	69.6	1.00	0.111	0.111	0.480	Non-Liq.	Non-Liq.	0.00
5.09	28.21	0.27	0.97	110	0.280	0.990	0.98	0.66	1.70	44.88	2.18		1	44	1.63		1.00	73.1	1.00	0.116	0.116	0.480	Non-Liq.	Non-Liq.	0.00
5.25	26.74	0.32	1.19	110	0.289	0.990	1.20	0.68	1.70	42.50	2.25		1	41	1.81		1.00	76.9	1.00	0.122	0.122	0.480	Non-Liq.	Non-Liq.	0.00
5.41	27.54	0.33	1.20	110	0.298	0.989	1.21	0.68	1.70	43.77	2.25		1	43	1.79		1.00	78.2	1.00	0.124	0.124	0.480	Non-Liq.	Non-Liq.	0.00
5.58	30.42	0.33	1.08	110	0.307	0.989	1.10	0.66	1.70	48.39	2.18		1	47	1.63		1.00	78.9	1.00	0.126	0.126	0.479	Non-Liq.	Non-Liq.	0.00
5.74	35.07	0.33	0.95	110	0.316	0.989	0.96	0.64	1.70	55.84	2.10		1	53	1.46		1.00	81.3	1.00	0.130	0.130	0.479	Non-Liq.	Non-Liq.	0.00
5.91	42.76	0.43	0.99	110	0.325	0.988	1.00	0.62	1.70	68.19	2.04		1	61	1.36		1.00	92.6	1.00	0.154	0.154	0.479	Non-Liq.	Non-Liq.	0.00
6.07	59.96	0.60	1.00	110	0.334	0.988	1.01	0.59	1.70	95.81	1.93		1	75	1.22	1.00	1.00	116.9	1.00	0.228	0.228	0.479	Non-Liq.	Non-Liq.	0.00
6.23	82.48	0.78	0.94	110	0.343	0.988	0.94	0.55	1.70	131.98	1.80		1	88	1.11	1.05	1.00	146.8	1.00	0.374	0.374	0.479	Non-Liq.	Non-Liq.	0.00
6.40	98.15	0.89	0.91	110	0.352	0.987	0.91	0.53	1.70	157.14	1.74		1	96	1.06	1.10	1.00	167.6	1.00	Infin.	0.000	0.479	Non-Liq.	Non-Liq.	0.00
6.56	106.99	1.01	0.94	110	0.361	0.987	0.95	0.52	1.70	171.33	1.72		1	99	1.05	1.15	1.00	180.9	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
6.73	112.07	1.09	0.97	110	0.370	0.986	0.98	0.52	1.70	179.48	1.72		1	100	1.05	1.20	1.00	188.9	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
6.89	112.25	1.18	1.05	110	0.379	0.986	1.05	0.53	1.70	179.76	1.74		1	100	1.06	1.25	1.00	191.9	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.05	111.68	1.25	1.12	110	0.388	0.986	1.13	0.54	1.70	178.82	1.76		1	100	1.08	1.30	1.00	193.6	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.22	113.57	1.36	1.19	110	0.397	0.985	1.20	0.54	1.70	181.71	1.78		1	100	1.09	1.35	1.00	198.6	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.38	110.25	1.39	1.26	110	0.406	0.985	1.27	0.55	1.69	175.63	1.80		1	100	1.11	1.40	1.00	195.5	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.55	100.97	1.35	1.34	110	0.415	0.985	1.34	0.56	1.69	160.87	1.85		1	97	1.14	1.45	1.00	184.6	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
7.71	100.97	1.35	1.34	110	0.424	0.984	1.34	0.56	1.67	159.07	1.85		1	96	1.15	1.50	1.00	183.0	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
7.87	95.77	1.34	1.40	110	0.433	0.984	1.40	0.57	1.67	150.26	1.88		1	94	1.17	1.55	1.00	176.7	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
8.04	92.93	1.31	1.41	110	0.442	0.984	1.42	0.58	1.65	144.62	1.90		1	92	1.19	1.60	1.00	172.1	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
8.20	90.79	1.03	1.14	110	0.451	0.983	1.14	0.56	1.61	137.80	1.85		1	90	1.14	1.65	1.00	157.8	1.00	0.446	0.446	0.481	**0.93**	56%	**0.57**
8.37	87.38	1.00	1.14	110	0.460	0.983	1.15	0.57	1.60	131.65	1.86		1	88	1.15	1.70	1.00	152.6	1.00	0.410	0.410	0.486	**0.84**	64%	**0.69**
8.53	82.47	0.96	1.17	110	0.469	0.982	1.18	0.57	1.60	123.63	1.89		1	86	1.18	1.75	1.00	146.1	1.00	0.370	0.370	0.491	**0.75**	72%	**0.85**
8.69	86.06	1.00	1.17	110	0.478	0.982	1.17	0.57	1.57	127.32	1.88		1	87	1.17	1.80	1.00	149.3	1.00	0.390	0.390	0.496	**0.79**	69%	**0.78**
8.86	93.45	1.08	1.15	110	0.487	0.982	1.16	0.56	1.55	136.07	1.85		1	90	1.15	1.85	1.00	156.8	1.00	0.439	0.439	0.501	**0.88**	61%	**0.60**
9.02	102.02	1.14	1.12	110	0.496	0.981	1.13	0.55	1.52	146.04	1.82		1	93	1.12	1.90	1.00	164.7	1.00	Infin.	0.000	0.506	Non-Liq.	Non-Liq.	0.00
9.19	107.28	1.17	1.09	110	0.505	0.981	1.10	0.55	1.50	151.44	1.80		1	94	1.11	1.95	1.00	168.7	1.00	Infin.	0.000	0.510	Non-Liq.	Non-Liq.	0.00
9.35	109.34	1.18	1.07	110	0.514	0.981	1.08	0.55	1.48	152.59	1.80		1	94	1.10	2.00	1.00	169.1	1.00	Infin.	0.000	0.515	Non-Liq.	Non-Liq.	0.00
9.51	111.98	1.16	1.04	110	0.523	0.980	1.04	0.54	1.47	154.35	1.78		1	95	1.09	2.05	1.00	169.5	1.00	Infin.	0.000	0.520	Non-Liq.	Non-Liq.	0.00
9.68	118.26	1.20	1.01	110	0.532	0.980	1.02	0.54	1.45	160.83	1.76		1	97	1.08	2.10	1.00	174.2	1.00	Infin.	0.000	0.524	Non-Liq.	Non-Liq.	0.00
9.84	127.36	1.25	0.98	110	0.541	0.980	0.99	0.53	1.42	170.74	1.73		1	99	1.06	2.15	1.00	181.7	1.00	Infin.	0.000	0.529	Non-Liq.	Non-Liq.	0.00
10.01	137.13	1.33	0.97	110	0.550	0.979	0.97	0.52	1.41	181.45	1.71		1	100	1.04	2.20	1.00	190.2	1.00	Infin.	0.000	0.533	Non-Liq.	Non-Liq.	0.00
10.17	144.79	1.41	0.98	110	0.559	0.979	0.98	0.52	1.39	189.61	1.70		1	100	1.04	2.25	1.00	197.4	1.00	Infin.	0.000	0.537	Non-Liq.	Non-Liq.	0.00
10.33	155.29	1.57	1.01	110	0.568	0.979	1.02	0.52	1.38	201.47	1.69		1	100	1.03	2.30	1.00	208.8	1.00	Infin.	0.000	0.541	Non-Liq.	Non-Liq.	0.00
10.50	160.35	1.65	1.03	110	0.577	0.978	1.03	0.51	1.37	206.27	1.69		1	100	1.03	2.35	1.00	213.4	1.00	Infin.	0.000	0.545	Non-Liq.	Non-Liq.	0.00
10.66	162.80	1.74	1.07	110	0.586	0.978	1.07	0.52	1.36	208.10	1.70		1	100	1.04	2.40	1.00	216.7	1.00	Infin.	0.000	0.550	Non-Liq.	Non-Liq.	0.00
10.83	163.62	1.48	0.90	110	0.595	0.978	0.91	0.50	1.34	205.78	1.65		1	100	1.00	2.45	1.00	207.4	1.00	Infin.	0.000	0.554	Non-Liq.	Non-Liq.	0.00
10.99	165.03	1.59	0.96	110	0.604	0.977	0.96	0.51	1.33	206.59	1.67		1	100	1.02	2.50	1.00	210.8	1.00	Infin.	0.000	0.557	Non-Liq.	Non-Liq.	0.00
11.15	165.44	1.62	0.98	110	0.614	0.977	0.98	0.51	1.32	205.76	1.68		1	100	1.02	2.55	1.00	210.9	1.00	Infin.	0.000	0.561	Non-Liq.	Non-Liq.	0.00
11.32	170.54	1.67	0.98	110	0.623	0.977	0.98	0.51	1.31	210.31	1.67		1	100	1.02	2.60	1.00	214.5	1.00	Infin.	0.000	0.565	Non-Liq.	Non-Liq.	0.00
11.48	193.35	1.66	0.86	110	0.632	0.976	0.86	0.50	1.29	235.76	1.59		1	100	1.00	2.65	1.00	236.6	1.00	Infin.	0.000	0.569	Non-Liq.	Non-Liq.	0.00
11.65	234.30	1.88	0.80	110	0.641	0.976	0.81	0.50	1.29	283.83	1.52		1	100	1.00	2.70	1.00	284.9	1.00	Infin.	0.000	0.572	Non-Liq.	Non-Liq.	0.00
11.81	311.45	1.81	0.58	110	0.650	0.975	0.58	0.50	1.28	374.90	1.33		1	100	1.00	2.75	1.00	376.3	1.00	Infin.	0.000	0.576	Non-Liq.	Non-Liq.	0.00
11.98	345.03	2.01	0.58	110	0.659	0.975	0.58	0.50	1.27	412.54	1.30		1	100	1.00	2.80	1.00	414.1	1.00	Infin.	0.000	0.580	Non-Liq.	Non-Liq.	0.00
12.14	350.57	2.01	0.57	110	0.668	0.975	0.58	0.50	1.26	416.32	1.30		1	100	1.00	2.85	1.00	417.9	1.00	Infin.	0.000	0.583	Non-Liq.	Non-Liq.	0.00
12.30	323.89	2.04	0.63	110	0.677	0.974	0.63	0.50	1.25	381.99	1.35		1	100	1.00	2.90	1.00	383.4	1.00	Infin.	0.000	0.587	Non-Liq.	Non-Liq.	0.00
12.47	284.79	2.15	0.75	110	0.686	0.974	0.76	0.50	1.24	333.56	1.45		1	100	1.00	2.95	1.00	334.8	1.00	Infin.	0.000	0.590	Non-Liq.	Non-Liq.	0.00
12.63	272.50	2.15	0.79	110	0.695	0.974	0.79	0.50	1.23	317.04	1.48		1	100	1.00	3.00	1.00	318.2	1.00	Infin.	0.000	0.593	Non-Liq.	Non-Liq.	0.00
12.80	284.55	2.13	0.75	110	0.704	0.973	0.75	0.50	1.23	328.95	1.45		1	100	1.00	3.05	1.00	330.2	1.00	Infin.	0.000	0.597	Non-Liq.	Non-Liq.	0.00

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_c	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
12.96	288.27	2.12	0.73	110	0.713	0.973	0.74	0.50	1.22	331.14	1.44		1	100	1.00	3.10	1.00	332.4	1.00	Infin.	0.000	0.600	Non-Liq.	Non-Liq.	0.00
13.12	289.02	2.14	0.74	110	0.722	0.973	0.74	0.50	1.21	329.91	1.45		1	100	1.00	3.15	1.00	331.1	1.00	Infin.	0.000	0.603	Non-Liq.	Non-Liq.	0.00
13.29	293.05	2.33	0.80	110	0.731	0.972	0.80	0.50	1.20	332.44	1.47		1	100	1.00	3.15	1.00	333.7	1.00	Infin.	0.000	0.606	Non-Liq.	Non-Liq.	0.00
13.45	289.11	2.34	0.81	110	0.740	0.972	0.81	0.50	1.20	325.94	1.48		1	100	1.00	3.15	1.00	327.2	1.00	Infin.	0.000	0.609	Non-Liq.	Non-Liq.	0.00
13.62	286.16	2.38	0.83	110	0.749	0.972	0.83	0.50	1.19	320.65	1.49		1	100	1.00	3.15	1.00	321.8	1.00	Infin.	0.000	0.612	Non-Liq.	Non-Liq.	0.00
13.78	285.79	2.45	0.86	110	0.758	0.971	0.86	0.50	1.18	318.31	1.51		1	100	1.00	3.15	1.00	319.5	1.00	Infin.	0.000	0.615	Non-Liq.	Non-Liq.	0.00
13.94	290.46	3.11	1.07	110	0.767	0.971	1.07	0.50	1.17	321.61	1.58		1	100	1.00	3.15	1.00	322.8	1.00	Infin.	0.000	0.618	Non-Liq.	Non-Liq.	0.00
14.11	293.63	3.14	1.07	110	0.776	0.971	1.07	0.50	1.17	323.22	1.58		1	100	1.00	3.15	1.00	324.4	1.00	Infin.	0.000	0.621	Non-Liq.	Non-Liq.	0.00
14.27	305.18	2.93	0.96	110	0.785	0.970	0.96	0.50	1.16	334.02	1.53		1	100	1.00	3.15	1.00	335.3	1.00	Infin.	0.000	0.624	Non-Liq.	Non-Liq.	0.00
14.44	274.68	2.47	0.90	110	0.794	0.970	0.90	0.50	1.15	298.83	1.54		1	100	1.00	3.15	1.00	299.9	1.00	Infin.	0.000	0.627	Non-Liq.	Non-Liq.	0.00
14.60	264.68	1.89	0.71	110	0.803	0.970	0.72	0.50	1.15	286.29	1.48		1	100	1.00	3.15	1.00	287.4	1.00	Infin.	0.000	0.629	Non-Liq.	Non-Liq.	0.00
14.76	260.78	1.87	0.72	110	0.812	0.969	0.72	0.50	1.14	280.48	1.48		1	100	1.00	3.15	1.00	281.5	1.00	Infin.	0.000	0.632	Non-Liq.	Non-Liq.	0.00
14.93	254.73	1.85	0.73	110	0.821	0.969	0.73	0.50	1.14	272.43	1.50		1	100	1.00	3.15	1.00	273.4	1.00	Infin.	0.000	0.635	Non-Liq.	Non-Liq.	0.00
15.09	243.62	1.72	0.71	110	0.830	0.969	0.71	0.50	1.13	259.08	1.50		1	100	1.00	3.15	1.00	260.0	1.00	Infin.	0.000	0.637	Non-Liq.	Non-Liq.	0.00
15.26	247.90	1.73	0.70	110	0.839	0.968	0.70	0.50	1.12	262.22	1.50		1	100	1.00	3.15	1.00	263.2	1.00	Infin.	0.000	0.640	Non-Liq.	Non-Liq.	0.00
15.42	243.67	1.34	0.55	110	0.848	0.968	0.55	0.50	1.12	256.34	1.43		1	100	1.00	3.15	1.00	257.3	1.00	Infin.	0.000	0.643	Non-Liq.	Non-Liq.	0.00
15.58	240.87	1.85	0.77	110	0.857	0.967	0.77	0.50	1.11	252.04	1.54		1	100	1.00	3.15	1.00	253.0	1.00	Infin.	0.000	0.645	Non-Liq.	Non-Liq.	0.00
15.75	227.67	1.80	0.79	110	0.866	0.967	0.79	0.50	1.11	236.93	1.57		1	100	1.00	3.15	1.00	237.8	1.00	Infin.	0.000	0.648	Non-Liq.	Non-Liq.	0.00
15.91	215.03	1.51	0.70	110	0.875	0.967	0.71	0.50	1.10	222.56	1.55		1	100	1.00	3.15	1.00	223.4	1.00	Infin.	0.000	0.650	Non-Liq.	Non-Liq.	0.00
16.08	169.50	0.84	0.50	110	0.884	0.966	0.50	0.50	1.09	174.33	1.53		1	100	1.00	3.15	1.00	175.0	1.00	Infin.	0.000	0.653	Non-Liq.	Non-Liq.	0.00
16.24	113.63	0.81	0.71	110	0.893	0.966	0.72	0.54	1.10	116.73	1.77		1	83	1.08	3.15	1.00	127.1	1.00	0.271	0.271	0.655	0.41	95%	1.16
16.40	74.42	0.94	1.26	110	0.902	0.966	1.28	0.63	1.11	76.80	2.07		1	66	1.40		1.00	107.3	1.00	0.195	0.195	0.657	0.30	98%	1.41
16.57	41.55	1.04	2.51	110	0.911	0.965	2.57	0.74	1.12	42.93	2.46		1	42	2.56		1.00	109.7	1.00	0.203	0.203	0.660	0.31	98%	1.38
16.73	20.49	1.00	4.87	110	0.920	0.965	5.10	0.87	1.13	20.90	2.89		0						1.00			0.662	Non-Liq.	Non-Liq.	0.00
16.90	17.66	0.87	4.92	110	0.929	0.965	5.19	0.89	1.12	17.75	2.95		0						1.00			0.664	Non-Liq.	Non-Liq.	0.00
17.06	17.13	0.80	4.64	110	0.938	0.964	4.91	0.89	1.11	17.03	2.94		0						1.00			0.666	Non-Liq.	Non-Liq.	0.00
17.22	45.69	0.87	1.91	110	0.947	0.964	1.95	0.71	1.08	45.77	2.36		1	44	2.14		1.00	98.1	1.00	0.168	0.168	0.669	0.25	99%	1.54
17.39	85.88	0.98	1.14	110	0.956	0.963	1.15	0.61	1.06	85.36	2.00		1	70	1.30		1.00	111.2	1.00	0.208	0.208	0.671	0.31	98%	1.36
17.55	131.32	1.21	0.92	110	0.965	0.963	0.93	0.55	1.05	129.57	1.80		1	88	1.11	1.00	1.00	144.3	1.00	0.360	0.360	0.673	0.53	89%	1.00
17.72	175.08	1.51	0.86	110	0.974	0.963	0.87	0.52	1.04	171.70	1.69		1	99	1.03	1.05	1.00	178.1	1.00	Infin.	0.000	0.675	Non-Liq.	Non-Liq.	0.00
17.88	212.23	1.86	0.88	110	0.983	0.962	0.88	0.50	1.04	207.10	1.64		1	100	1.00	1.10	1.00	207.9	1.00	Infin.	0.000	0.677	Non-Liq.	Non-Liq.	0.00
18.04	246.62	1.63	0.66	110	0.992	0.962	0.66	0.50	1.03	239.71	1.51		1	100	1.00	1.10	1.00	240.6	1.00	Infin.	0.000	0.679	Non-Liq.	Non-Liq.	0.00
18.21	274.39	2.22	0.81	110	1.001	0.962	0.81	0.50	1.03	265.59	1.54		1	100	1.00	1.10	1.00	266.6	1.00	Infin.	0.000	0.681	Non-Liq.	Non-Liq.	0.00
18.37	300.69	2.46	0.82	110	1.010	0.961	0.82	0.50	1.02	289.83	1.52		1	100	1.00	1.10	1.00	290.9	1.00	Infin.	0.000	0.683	Non-Liq.	Non-Liq.	0.00
18.54	310.01	2.49	0.80	110	1.020	0.961	0.81	0.50	1.02	297.51	1.50		1	100	1.00	1.10	1.00	298.6	1.00	Infin.	0.000	0.685	Non-Liq.	Non-Liq.	0.00
18.70	331.14	2.83	0.85	110	1.029	0.960	0.86	0.50	1.01	316.45	1.51		1	100	1.00	1.10	1.00	317.6	1.00	Infin.	0.000	0.687	Non-Liq.	Non-Liq.	0.00
18.86	350.78	3.15	0.90	110	1.038	0.960	0.90	0.50	1.01	333.81	1.51		1	100	1.00	1.10	1.00	335.1	1.00	Infin.	0.000	0.689	Non-Liq.	Non-Liq.	0.00
19.03	364.85	3.25	0.89	110	1.047	0.960	0.89	0.50	1.01	345.73	1.50		1	100	1.00	1.10	1.00	347.0	1.00	Infin.	0.000	0.691	Non-Liq.	Non-Liq.	0.00
19.19	366.79	3.32	0.91	110	1.056	0.959	0.91	0.50	1.00	346.08	1.50		1	100	1.00	1.10	1.00	347.4	1.00	Infin.	0.000	0.692	Non-Liq.	Non-Liq.	0.00
19.36	364.13	3.25	0.89	110	1.065	0.959	0.89	0.50	1.00	342.09	1.50		1	100	1.00	1.10	1.00	343.4	1.00	Infin.	0.000	0.694	Non-Liq.	Non-Liq.	0.00
19.52	351.02	3.25	0.92	110	1.074	0.958	0.93	0.50	0.99	328.34	1.52		1	100	1.00	1.10	1.00	329.6	1.00	Infin.	0.000	0.696	Non-Liq.	Non-Liq.	0.00
19.69	348.92	2.58	0.74	110	1.083	0.958	0.74	0.50	0.99	325.00	1.45		1	100	1.00	1.10	1.00	326.2	1.00	Infin.	0.000	0.698	Non-Liq.	Non-Liq.	0.00
19.85	359.19	3.47	0.97	110	1.092	0.957	0.97	0.50	0.98	333.20	1.53		1	100	1.00	1.10	1.00	334.4	1.00	Infin.	0.000	0.699	Non-Liq.	Non-Liq.	0.00
20.01	376.67	4.05	1.08	110	1.101	0.957	1.08	0.50	0.98	348.02	1.56		1	100	1.00	1.10	1.00	349.3	1.00	Infin.	0.000	0.701	Non-Liq.	Non-Liq.	0.00
20.18	404.77	4.12	1.02	110	1.107	0.957	1.02	0.50	0.98	373.03	1.52		1	100	1.00	1.10	1.00	374.4	1.00	Infin.	0.000	0.703	Non-Liq.	Non-Liq.	0.00
20.34	377.36	4.95	1.31	110	1.111	0.956	1.32	0.50	0.98	347.09	1.63		1	100	1.00	1.10	1.00	348.4	1.00	Infin.	0.000	0.704	Non-Liq.	Non-Liq.	0.00
20.51	335.46	4.86	1.45	110	1.115	0.956	1.45	0.52	0.97	307.62	1.70		1	100	1.04	1.10	1.00	319.6	1.00	Infin.	0.000	0.706	Non-Liq.	Non-Liq.	0.00
20.67	292.50	6.92	2.37	110	1.118	0.955	2.37	0.58	0.97	266.67	1.91		1	100	1.20	1.10	1.00	320.0	1.00	Infin.	0.000	0.708	Non-Liq.	Non-Liq.	0.00
20.83	287.91	3.88	1.35	110	1.122	0.955	1.35	0.52	0.97	262.84	1.71		1	100	1.05	1.10	1.00	275.8	1.00	Infin.	0.000	0.709	Non-Liq.	Non-Liq.	0.00
21.00	326.82	2.70	0.82	110	1.126	0.954	0.83	0.50	0.97	298.36	1.51		1	100	1.00	1.10	1.00	299.5	1.00	Infin.	0.000	0.711	Non-Liq.	Non-Liq.	0.00
21.16	125.71	3.38	2.69	110	1.130	0.954	2.71	0.66	0.96	112.72	2.18		1	82	1.62		1.00	182.1	1.00	Infin.	0.000	0.712	Non-Liq.	Non-Liq.	0.00
21.33	116.66	3.47	2.97	110	1.134	0.954	3.00	0.68	0.95	104.17	2.23		1	79	1.75		1.00	182.7	1.00	Infin.	0.000	0.714	Non-Liq.	Non-Liq.	0.00
21.49	242.49	3.92	1.62	110	1.138	0.953	1.63	0.55	0.96	219.08	1.82		1	100	1.12	1.00	1.00	247.1	1.00	Infin.	0.000	0.715	Non-Liq.	Non-Liq.	0.00
21.65	336.70	4.03	1.20	110	1.142	0.953	1.20	0.50	0.96	305.29	1.63		1	100	1.00	1.05	1.00	306.4	1.00	Infin.	0.000	0.717	Non-Liq.	Non-Liq.	0.00
21.82	383.91	3.24	0.84	110	1.146	0.952	0.85	0.50	0.96	347.64	1.48		1	100	1.00	1.10	1.00	348.9	1.00	Infin.	0.000	0.718	Non-Liq.	Non-Liq.	0.00
21.98	357.67	2.57	0.72	110	1.150	0.952	0.72	0.50	0.96	323.25	1.44		1	100	1.00	1.15	1.00	324.5	1.00	Infin.	0.000	0.719	Non-Liq.	Non-Liq.	0.00
22.15	353.56	1.87	0.53	110	1.154	0.951	0.53	0.50	0.96	318.98	1.35		1	100	1.00	1.20	1.00	320.2	1.00	Infin.	0.000	0.721	Non-Liq.	Non-Liq.	0.00
22.31	349.51	1.82	0.52	110	1.158	0.951	0.52	0.50	0.96	314.78	1.35		1	100	1.00	1.25	1.00	316.0	1.00	Infin.	0.000	0.722	Non-Liq.	Non-Liq.	0.00
22.47	344.99	1.95	0.56	110	1.161	0.950	0.57	0.50	0.95	310.17	1.38		1	100	1.00	1.30	1.00	311.3	1.00	Infin.	0.000	0.724	Non-Liq.	Non-Liq.	0.00
22.64	338.66	2.25	0.67	110	1.165	0.950	0.67	0.50	0.95	303.95	1.44		1	100	1.00	1.35	1.00	305.1	1.00	Infin.	0.000	0.725	Non-Liq.	Non-Liq.	0.00
22.80	324.89	2.52	0.78	110	1.169	0.949	0.78	0.50	0.95	291.06	1.50		1	100	1.00	1.40	1.00	292.1	1.00	Infin.	0.000	0.726	Non-Liq.	Non-Liq.	0.00
22.97	321.85	2.86	0.89	110	1.173	0.949	0.89	0.50	0.95	287.84	1.55		1	100	1.00	1.40	1.00	288.9	1.00	Infin.	0.000	0.727	Non-Liq.	Non-Liq.	0.00
23.13	325.14	3.11	0.96	110	1.177	0.948	0.96	0.50	0.95	290.31	1.57		1	100	1.00	1.40	1.00	291.4	1.00	Infin.	0.000	0.729	Non-Liq.	Non-Liq.	0.00
23.29	321.77	3.23	1.00	110	1.181	0.948	1.01	0.50	0.95	286.81	1.59		1	100	1.00	1.40	1.00	287.9	1.00	Infin.	0.000	0.730	Non-Liq.	Non-Liq.	0.00
23.46	319.42	3.46	1.08	110	1.185	0.947	1.09	0.50	0.94	284.23	1.62		1	100	1.00	1.40	1.00	285.3	1.00	Infin.	0.000	0.731	Non-Liq.	Non-Liq.	0.00
23.62	320.77	3.46	1.08	110	1.189	0.947	1.08	0.50	0.94	284.96	1.61		1	100	1.00	1.40	1.00	286.0	1.00	Infin.	0.000	0.732	Non-Liq.	Non-Liq.	0.00
23.79	324.18	3.64	1.12	110	1.193	0.946	1.13	0.50	0.94	287.53	1.62		1	100	1.00	1.40	1.00	288.6	1.00	Infin.	0.000	0.733	Non-Liq.	Non-Liq.	0.00
23.95	329.34	3.59	1.09	110	1.197	0.946	1.09	0.50	0.94	291.64	1.61		1	100	1.00	1.40	1.00	292.7	1.00	Infin.	0.000	0.735	Non-Liq.	Non-Liq.	0.00
24.11	336.72	2.85	0.85	110	1.200	0.945	0.85	0.50	0.94	297.71	1.52		1	100	1.00	1.40	1.00	298.8	1.00	Infin.	0.000	0.736	Non-Liq.	Non-Liq.	0.00
24.28	342.31	2.38	0.69	110	1.204	0.945	0.70	0.50	0.94	302.18	1.45		1	100	1.00	1.40	1.00	303.3	1.00	Infin.	0.000	0.737	Non-Liq.	Non-Liq.	0.00
24.44	363.48	2.12	0.58	110	1.208	0.944	0.58	0.50	0.94	320.41	1.38		1	100	1.00	1.40	1.00	321.6	1.00	Infin.	0.000	0.738	Non-Liq.	Non-Liq.	0.00
24.61	368.92	1.84	0.50	110	1.212	0.943	0.50	0.50	0.93	324.69	1.33		1	100	1.00	1.40	1.00	325.9	1.00	Infin.	0.000	0.739	Non-Liq.	Non-Liq.	0.00
24.77	350.00	2.34	0.67	110	1.216	0.943	0.67	0.50	0.93	307.49	1.43		1	100	1.00	1.40	1.00	308.6	1.00	Infin.	0.000	0.740	Non-Liq.	Non-Liq.	0.00
24.93	320.76	2.58	0.80	110	1.220	0.942	0.81	0.50	0.93	281.26	1.52		1	100	1.00	1.40	1.00	282.3	1.00	Infin.	0.000	0.741	Non-Liq.	Non-Liq.	0.00
25.10	290.38	2.75	0.95	110	1.224	0.942	0.95	0.50	0.93	254.11	1.60		1	100	1.00	1.40	1.00	255.1	1.00	Infin.	0.000	0.742	Non-Liq.	Non-Liq.	0.00
25.26	261.78	2.66	1.02	110	1.228	0.941	1.02	0.50	0.93	246.15	1.63		1	100	1.00	1.40	1.00	247.1	1.00	Infin.	0.000	0.743	Non-Liq.	Non-Liq.	0.00
25.43	270.13	2.52	0.93	110	1.232	0.941	0.94	0.50	0.93	235.55	1.62		1	100	1.00	1.40	1.00	236.4	1.00	Infin.	0.000	0.744	Non-Liq.	Non-Liq.	0.00
25.59	259.39	2.62	1.01	110	1.236	0.940	1.01	0.51	0.92	225.59	1.66		1	100	1.01	1.40	1.00	228.5	1.00	Infin.	0.000	0.745	Non-Liq.	Non-Liq.	0.00
25.75	232.66	2.59	1.11	110	1.240	0.939	1.12	0.52	0.92	201.29	1.72		1	100	1.05	1.40	1.00	212.8	1.00	Infin.	0.000	0.746	Non-Liq.	Non-Liq.	0.00
25.92	153.15	2.60	1.70	110	1.243	0.939	1.71	0.60	0.91	130.23	1.99		1	88	1.28	1.40	1.00	167.9	1.00	Infin.	0.000	0.747	Non-Liq.	Non-Liq.	0.00
26.08	77.71	1.98	2.55	110	1.247	0.938	2.59	0.71	0.89	64.33	2.33		1	59	2.05		1.00	131.9	1.00	0.293	0.293	0.747	0.39	96%	1.12
26.25	33.55	1.53	4.55	110	1.251	0.938	4.72	0.84	0.87	26.49	2.79		0						1.00			0.748	Non-Liq.	Non-Liq.	0.00
26.41	22.88	0.79	3.47	110	1.255	0.937	3.67	0.86	0.86	17.64	2.85		0						1.00			0.749	Non-Liq.	Non-Liq.	0.00
26.57	18.15	0.50	2.75	110	1.259	0.936	2.95	0.87	0.86	13.72	2.88		0						1.00			0.750	Non-Liq.	Non-Liq.	0.00
26.74	18.25	0.55	3.03	110	1.263	0.936	3.26	0.88	0.86	13.74	2.91		0						1.00			0.751	Non-Liq.	Non-Liq.	0.00
26.90	17.74	0.85	4.80	110	1.267	0.935	5.17	0.92	0.85	13.19	3.04		0						1.00			0.751	Non-Liq.	Non-Liq.	0.00
27.07	23.20	1.17	5.05	110	1.271	0.934	5.34	0.90	0.85	17.59	2.96		0						1.00			0.752	Non-Liq.	Non-Liq.	0.00
27.23	36.59	1.63	4.44	110	1.275	0.934	4.60	0.84	0.86	28.57	2.76		0						1.00			0.753	Non-Liq.	Non-Liq.	0.00
27.40	72.79	1.23	1.69	110	1.279	0.933	1.72	0.68	0.88	59.44	2.24		1	55	1.76		1.00	104.4	1.00	0.186	0.186	0.754	0.25	99%	1.46
27.56	107.63	1.36	1.26	110	1.282	0.932	1.28	0.61	0.89	89.34	2.02		1	72	1.32		1.00	118.1	1.00	0.233	0.233	0.754	0.31	98%	1.28
27.72	139.45	1.46	1.05	110	1.286	0.932	1.06	0.57	0.89	116.81	1.88		1	83	1.17	1.00	1.00	136.8	1.00	0.318	0.318	0.755	0.42	95%	1.06
27.89	170.39	1.41	0.83	110	1.290	0.931	0.83	0.53	0.90	143.88	1.74		1	92	1.06	1.05	1.00	153.6	1.00	0.417	0.417	0.756	0.55	88%	0.73

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_D	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	M=7.5 CSR	Induced Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
28.05	178.25	1.31	0.74	110	1.294	0.930	0.74	0.52	0.90	150.76	1.69		1	94	1.03	1.10	1.00	156.1	1.00	0.434	0.434	0.756	**0.57**	86%	**0.67**
28.22	181.74	1.30	0.71	110	1.298	0.929	0.72	0.51	0.90	153.64	1.68		1	95	1.02	1.15	1.00	157.5	1.00	0.443	0.443	0.757	**0.59**	85%	**0.63**
28.38	186.28	1.33	0.71	110	1.302	0.929	0.72	0.51	0.90	157.35	1.67		1	96	1.01	1.20	1.00	160.3	1.00	Infin.	0.000	0.758	**Non-Liq.**	Non-Liq.	**0.00**
28.54	196.98	1.43	0.73	110	1.306	0.928	0.73	0.50	0.90	166.32	1.65		1	98	1.01	1.25	1.00	168.0	1.00	Infin.	0.000	0.758	**Non-Liq.**	Non-Liq.	**0.00**
28.71	209.17	1.48	0.71	110	1.310	0.927	0.71	0.50	0.90	176.57	1.63		1	100	1.00	1.30	1.00	177.2	1.00	Infin.	0.000	0.759	**Non-Liq.**	Non-Liq.	**0.00**
28.87	214.42	1.53	0.71	110	1.314	0.926	0.72	0.50	0.90	180.76	1.62		1	100	1.00	1.35	1.00	181.4	1.00	Infin.	0.000	0.759	**Non-Liq.**	Non-Liq.	**0.00**
29.04	222.85	1.72	0.77	110	1.318	0.926	0.78	0.50	0.90	187.63	1.63		1	100	1.00	1.40	1.00	188.3	1.00	Infin.	0.000	0.760	**Non-Liq.**	Non-Liq.	**0.00**
29.20	230.47	3.36	1.46	110	1.322	0.925	1.47	0.56	0.88	191.40	1.83		1	100	1.13	1.45	1.00	216.3	1.00	Infin.	0.000	0.760	**Non-Liq.**	Non-Liq.	**0.00**
29.36	237.69	3.39	1.42	110	1.325	0.924	1.43	0.55	0.88	197.33	1.81		1	100	1.11	1.50	1.00	220.6	1.00	Infin.	0.000	0.761	**Non-Liq.**	Non-Liq.	**0.00**
29.53	254.47	3.24	1.27	110	1.329	0.923	1.28	0.53	0.89	211.82	1.75		1	100	1.07	1.55	1.00	228.1	1.00	Infin.	0.000	0.761	**Non-Liq.**	Non-Liq.	**0.00**
29.69	245.50	3.18	1.29	110	1.333	0.923	1.30	0.54	0.88	203.76	1.77		1	100	1.08	1.60	1.00	221.8	1.00	Infin.	0.000	0.762	**Non-Liq.**	Non-Liq.	**0.00**
29.86	248.87	2.73	1.10	110	1.337	0.922	1.10	0.52	0.89	207.09	1.71		1	100	1.04	1.65	1.00	217.2	1.00	Infin.	0.000	0.762	**Non-Liq.**	Non-Liq.	**0.00**
30.02	247.02	3.01	1.22	110	1.341	0.921	1.23	0.53	0.88	204.68	1.75		1	100	1.07	1.70	1.00	219.8	1.00	Infin.	0.000	0.763	**Non-Liq.**	Non-Liq.	**0.00**
30.18	244.70	3.20	1.31	110	1.345	0.920	1.32	0.54	0.88	202.04	1.77		1	100	1.09	1.75	1.00	220.8	1.00	Infin.	0.000	0.763	**Non-Liq.**	Non-Liq.	**0.00**
30.35	244.48	3.08	1.26	110	1.349	0.919	1.27	0.54	0.88	201.72	1.76		1	100	1.08	1.80	1.00	218.7	1.00	Infin.	0.000	0.763	**Non-Liq.**	Non-Liq.	**0.00**
30.51	237.74	3.15	1.33	110	1.353	0.918	1.33	0.54	0.87	195.44	1.79		1	100	1.10	1.85	1.00	215.5	1.00	Infin.	0.000	0.764	**Non-Liq.**	Non-Liq.	**0.00**
30.68	224.10	2.76	1.23	110	1.357	0.918	1.24	0.54	0.87	183.96	1.78		1	100	1.09	1.90	1.00	202.0	1.00	Infin.	0.000	0.764	**Non-Liq.**	Non-Liq.	**0.00**
30.84	259.52	1.36	0.53	110	1.361	0.917	0.53	0.50	0.88	215.17	1.48		1	100	1.00	1.95	1.00	216.0	1.00	Infin.	0.000	0.764	**Non-Liq.**	Non-Liq.	**0.00**
31.00	304.23	2.26	0.74	110	1.364	0.916	0.75	0.50	0.88	252.07	1.53		1	100	1.00	2.00	1.00	253.0	1.00	Infin.	0.000	0.765	**Non-Liq.**	Non-Liq.	**0.00**
31.17	162.49	2.09	1.29	110	1.368	0.915	1.30	0.58	0.86	131.26	1.90		1	88	1.19	2.05	1.00	156.5	1.00	0.437	0.437	0.765	**0.57**	86%	**0.66**
31.33	321.89	2.01	0.63	110	1.372	0.914	0.63	0.50	0.88	266.01	1.46		1	100	1.00	2.10	1.00	267.0	1.00	Infin.	0.000	0.765	**Non-Liq.**	Non-Liq.	**0.00**
31.50	318.50	1.97	0.62	110	1.376	0.913	0.62	0.50	0.88	262.82	1.46		1	100	1.00	2.15	1.00	263.8	1.00	Infin.	0.000	0.765	**Non-Liq.**	Non-Liq.	**0.00**
31.66	313.67	1.90	0.60	110	1.380	0.912	0.61	0.50	0.88	258.44	1.46		1	100	1.00	2.20	1.00	259.4	1.00	Infin.	0.000	0.766	**Non-Liq.**	Non-Liq.	**0.00**
31.82	300.42	1.85	0.62	110	1.384	0.911	0.62	0.50	0.87	247.13	1.48		1	100	1.00	2.25	1.00	248.0	1.00	Infin.	0.000	0.766	**Non-Liq.**	Non-Liq.	**0.00**
31.99	281.46	1.96	0.70	110	1.388	0.910	0.70	0.50	0.87	231.13	1.54		1	100	1.00	2.30	1.00	232.0	1.00	Infin.	0.000	0.766	**Non-Liq.**	Non-Liq.	**0.00**
32.15	265.77	2.01	0.76	110	1.392	0.909	0.76	0.50	0.87	217.87	1.58		1	100	1.00	2.35	1.00	218.7	1.00	Infin.	0.000	0.766	**Non-Liq.**	Non-Liq.	**0.00**
32.32	254.71	2.22	0.87	110	1.396	0.908	0.88	0.50	0.87	208.46	1.64		1	100	1.00	2.40	1.00	209.2	1.00	Infin.	0.000	0.766	**Non-Liq.**	Non-Liq.	**0.00**
32.48	258.16	2.21	0.86	110	1.400	0.907	0.86	0.50	0.87	211.00	1.63		1	100	1.00	2.45	1.00	211.8	1.00	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
32.64	281.06	1.84	0.66	110	1.403	0.906	0.66	0.50	0.87	229.50	1.52		1	100	1.00	2.50	1.00	230.4	1.00	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
32.81	311.55	1.75	0.56	110	1.407	0.905	0.56	0.50	0.87	254.16	1.44		1	100	1.00	2.55	1.00	255.1	1.00	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
32.97	355.20	1.77	0.50	110	1.411	0.904	0.50	0.50	0.87	289.53	1.36		1	100	1.00	2.60	1.00	290.6	1.00	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
33.14	376.15	1.82	0.48	110	1.415	0.903	0.48	0.50	0.86	306.25	1.34		1	100	1.00	2.65	1.00	307.4	1.00	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
33.30	382.53	1.72	0.45	110	1.419	0.902	0.45	0.50	0.86	311.03	1.31		1	100	1.00	2.70	1.00	312.2	1.00	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
33.46	385.73	1.70	0.44	110	1.423	0.901	0.44	0.50	0.86	313.21	1.30		1	100	1.00	2.75	1.00	314.4	1.00	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
33.63	388.54	1.78	0.46	110	1.427	0.900	0.46	0.50	0.86	315.06	1.31		1	100	1.00	2.80	1.00	316.2	1.00	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
33.79	373.85	1.92	0.51	110	1.431	0.899	0.52	0.50	0.86	302.69	1.36		1	100	1.00	2.85	1.00	303.8	1.00	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
33.96	360.84	2.35	0.65	110	1.435	0.898	0.65	0.50	0.86	291.71	1.44		1	100	1.00	2.90	1.00	292.8	1.00	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
34.12	336.62	1.68	0.50	110	1.439	0.897	0.50	0.50	0.86	271.68	1.39		1	100	1.00	2.95	1.00	272.7	1.00	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
34.28	305.48	2.24	0.73	110	1.443	0.896	0.74	0.50	0.86	246.11	1.53		1	100	1.00	3.00	1.00	247.0	1.00	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
34.45	270.74	2.54	0.94	110	1.446	0.895	0.94	0.50	0.85	217.56	1.65		1	100	1.00	3.05	1.00	218.5	0.99	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
34.61	265.04	2.75	1.04	110	1.450	0.894	1.04	0.51	0.85	211.86	1.69		1	100	1.03	3.10	1.00	218.7	0.99	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
34.78	265.84	2.71	1.02	110	1.454	0.893	1.03	0.51	0.85	212.34	1.68		1	100	1.02	3.15	1.00	218.2	0.99	Infin.	0.000	0.767	**Non-Liq.**	Non-Liq.	**0.00**
34.94	292.81	2.65	0.91	110	1.458	0.892	0.91	0.50	0.85	234.57	1.61		1	100	1.00	3.20	1.00	235.4	0.99	Infin.	0.000	0.766	**Non-Liq.**	Non-Liq.	**0.00**
35.10	308.71	2.64	0.85	110	1.462	0.890	0.86	0.50	0.85	247.04	1.58		1	100	1.00	3.25	1.00	248.0	0.99	Infin.	0.000	0.766	**Non-Liq.**	Non-Liq.	**0.00**
35.27	337.12	3.28	0.97	110	1.466	0.889	0.98	0.50	0.85	269.52	1.59		1	100	1.00	3.30	1.00	270.5	0.99	Infin.	0.000	0.766	**Non-Liq.**	Non-Liq.	**0.00**
35.43	331.83	3.25	0.98	110	1.470	0.888	0.98	0.50	0.85	264.91	1.60		1	100	1.00	3.35	1.00	265.9	0.99	Infin.	0.000	0.766	**Non-Liq.**	Non-Liq.	**0.00**
35.60	342.49	4.15	1.21	110	1.474	0.887	1.22	0.51	0.85	272.40	1.67		1	100	1.01	3.40	1.00	277.4	0.98	Infin.	0.000	0.766	**Non-Liq.**	Non-Liq.	**0.00**
35.76	363.18	4.86	1.34	110	1.478	0.886	1.34	0.51	0.84	287.98	1.69		1	100	1.03	3.45	1.00	297.1	0.98	Infin.	0.000	0.766	**Non-Liq.**	Non-Liq.	**0.00**
35.93	393.50	4.20	1.07	110	1.482	0.885	1.07	0.50	0.85	313.11	1.58		1	100	1.00	3.50	1.00	314.3	0.98	Infin.	0.000	0.765	**Non-Liq.**	Non-Liq.	**0.00**
36.09	486.11	3.26	0.67	110	1.485	0.883	0.67	0.50	0.84	386.57	1.37		1	100	1.00	3.55	1.00	388.0	0.98	Infin.	0.000	0.765	**Non-Liq.**	Non-Liq.	**0.00**
36.25	452.81	3.01	0.66	110	1.489	0.882	0.67	0.50	0.84	359.53	1.39		1	100	1.00	3.60	1.00	360.9	0.98	Infin.	0.000	0.765	**Non-Liq.**	Non-Liq.	**0.00**
36.42	475.07	3.03	0.64	110	1.493	0.881	0.64	0.50	0.84	376.77	1.36		1	100	1.00	3.65	1.00	378.2	0.98	Infin.	0.000	0.765	**Non-Liq.**	Non-Liq.	**0.00**
36.58	497.46	2.63	0.53	110	1.497	0.880	0.53	0.50	0.84	394.06	1.29		1	100	1.00	3.70	1.00	395.5	0.98	Infin.	0.000	0.764	**Non-Liq.**	Non-Liq.	**0.00**
36.75	519.74	2.73	0.52	110	1.501	0.878	0.53	0.50	0.84	411.23	1.27		1	100	1.00	3.75	1.00	412.8	0.98	Infin.	0.000	0.764	**Non-Liq.**	Non-Liq.	**0.00**
36.91	525.93	2.68	0.51	110	1.505	0.877	0.51	0.50	0.84	415.60	1.26		1	100	1.00	3.80	1.00	417.1	0.97	Infin.	0.000	0.764	**Non-Liq.**	Non-Liq.	**0.00**
37.07	555.81	2.96	0.53	110	1.509	0.876	0.53	0.50	0.84	438.70	1.26		1	100	1.00	3.85	1.00	440.3	0.97	Infin.	0.000	0.763	**Non-Liq.**	Non-Liq.	**0.00**
37.24	576.13	3.26	0.57	110	1.513	0.875	0.57	0.50	0.84	454.20	1.27		1	100	1.00	3.90	1.00	455.9	0.97	Infin.	0.000	0.763	**Non-Liq.**	Non-Liq.	**0.00**
37.40	579.03	2.97	0.51	110	1.517	0.873	0.51	0.50	0.84	455.90	1.23		1	100	1.00	3.95	1.00	457.6	0.97	Infin.	0.000	0.762	**Non-Liq.**	Non-Liq.	**0.00**
37.57	555.02	2.54	0.46	110	1.521	0.872	0.46	0.50	0.83	436.38	1.21		1	100	1.00	4.00	1.00	438.0	0.97	Infin.	0.000	0.762	**Non-Liq.**	Non-Liq.	**0.00**
37.73	538.68	2.11	0.39	110	1.525	0.871	0.39	0.50	0.83	422.95	1.17		1	100	1.00	4.05	1.00	424.5	0.97	Infin.	0.000	0.762	**Non-Liq.**	Non-Liq.	**0.00**
37.89	534.75	2.52	0.47	110	1.528	0.869	0.47	0.50	0.83	419.32	1.23		1	100	1.00	4.10	1.00	420.9	0.97	Infin.	0.000	0.761	**Non-Liq.**	Non-Liq.	**0.00**
38.06	523.23	3.08	0.59	110	1.532	0.868	0.59	0.50	0.83	409.73	1.31		1	100	1.00	4.15	1.00	411.3	0.96	Infin.	0.000	0.761	**Non-Liq.**	Non-Liq.	**0.00**
38.22	482.86	4.31	0.89	110	1.536	0.867	0.90	0.50	0.83	377.54	1.47		1	100	1.00	4.20	1.00	379.0	0.96	Infin.	0.000	0.760	**Non-Liq.**	Non-Liq.	**0.00**
38.39	499.56	3.91	0.78	110	1.540	0.865	0.78	0.50	0.83	390.14	1.42		1	100	1.00	4.25	1.00	391.6	0.96	Infin.	0.000	0.760	**Non-Liq.**	Non-Liq.	**0.00**
38.55	504.10	3.38	0.67	110	1.544	0.864	0.67	0.50	0.83	393.20	1.36		1	100	1.00	4.30	1.00	394.7	0.96	Infin.	0.000	0.759	**Non-Liq.**	Non-Liq.	**0.00**
38.71	443.92	3.01	0.68	110	1.548	0.863	0.68	0.50	0.83	345.67	1.41		1	100	1.00	4.35	1.00	347.0	0.96	Infin.	0.000	0.759	**Non-Liq.**	Non-Liq.	**0.00**
38.88	474.86	3.10	0.65	110	1.552	0.861	0.65	0.50	0.83	369.38	1.37		1	100	1.00	4.40	1.00	370.8	0.96	Infin.	0.000	0.758	**Non-Liq.**	Non-Liq.	**0.00**
39.04	482.80	3.73	0.77	110	1.556	0.860	0.77	0.50	0.82	375.10	1.43		1	100	1.00	4.45	1.00	376.5	0.96	Infin.	0.000	0.758	**Non-Liq.**	Non-Liq.	**0.00**
39.21	449.71	3.94	0.88	110	1.560	0.859	0.88	0.50	0.82	348.87	1.49		1	100	1.00	4.50	1.00	350.2	0.96	Infin.	0.000	0.757	**Non-Liq.**	Non-Liq.	**0.00**
39.37	400.90	3.48	0.87	110	1.564	0.857	0.87	0.50	0.82	310.48	1.52		1	100	1.00	4.55	1.00	311.6	0.95	Infin.	0.000	0.757	**Non-Liq.**	Non-Liq.	**0.00**
39.53	328.20	3.74	1.14	110	1.567	0.856	1.15	0.51	0.82	252.87	1.67		1	100	1.01	4.60	1.00	257.5	0.95	Infin.	0.000	0.756	**Non-Liq.**	Non-Liq.	**0.00**
39.70	242.12	2.76	1.14	110	1.571	0.854	1.15	0.54	0.81	183.97	1.76		1	100	1.08	4.65	1.00	198.8	0.95	Infin.	0.000	0.756	**Non-Liq.**	Non-Liq.	**0.00**
39.86	241.13	3.50	1.45	110	1.575	0.853	1.46	0.56	0.80	181.19	1.84		1	100	1.14	4.70	1.00	206.7	0.95	Infin.	0.000	0.755	**Non-Liq.**	Non-Liq.	**0.00**
40.03	216.57	3.02	1.39	110	1.579	0.852	1.40	0.57	0.80	161.99	1.86		1	97	1.15	4.75	1.00	187.5	0.95	Infin.	0.000	0.754	**Non-Liq.**	Non-Liq.	**0.00**
40.19	226.70	2.34	1.03	110	1.583	0.850	1.04	0.53	0.81	171.70	1.75		1	99	1.07	4.80	1.00	184.4	0.95	Infin.	0.000	0.754	**Non-Liq.**	Non-Liq.	**0.00**
40.35	302.13	1.99	0.66	110	1.587	0.849	0.66	0.50	0.82	231.94	1.52		1	100	1.00	4.85	1.00	232.8	0.95	Infin.	0.000	0.753	**Non-Liq.**	Non-Liq.	**0.00**
40.52	323.21	1.80	0.56	110	1.591	0.847	0.56	0.50	0.82	247.90	1.45		1	100	1.00	4.90	1.00	248.8	0.95	Infin.	0.000	0.752	**Non-Liq.**	Non-Liq.	**0.00**
40.68	290.82	1.95	0.67	110	1.595	0.846	0.67	0.50	0.81	222.66	1.54		1	100	1.00	4.95	1.00	223.5	0.94	Infin.	0.000	0.752	**Non-Liq.**	Non-Liq.	**0.00**
40.85	234.61	2.52	1.08	110	1.599	0.844	1.08	0.53	0.80	176.69	1.75		1	100	1.07	5.00	1.00	190.3	0.94	Infin.	0.000	0.751	**Non-Liq.**	Non-Liq.	**0.00**
41.01	223.18	3.14	1.41	110	1.603	0.843	1.42	0.56	0.79	165.64	1.86		1	98	1.15	5.05	1.00	191.2	0.94	Infin.	0.000	0.750	**Non-Liq.**	Non-Liq.	**0.00**
41.17	246.49	3.45	1.40	110	1.607	0.841	1.41	0.56	0.79	183.54	1.82		1	100	1.12	5.10	1.00	207.2	0.94	Infin.	0.000	0.750	**Non-Liq.**	Non-Liq.	**0.00**
41.34	236.31	3.97	1.68	110	1.610	0.840	1.69	0.58	0.78	174.01	1.90		1	100	1.19	5.15	1.00	207.6	0.94	Infin.	0.000	0.749	**Non-Liq.**	Non-Liq.	**0.00**
41.50	209.85	2.42	1.15	110	1.614	0.838	1.16	0.55	0.79	155.90	1.81		1	95	1.12	5.20	1.00	174.5	0.94	Infin.	0.000	0.748	**Non-Liq.**	Non-Liq.	**0.00**
41.67	228.87	2.31	1.01	110	1.618	0.837	1.01	0.53	0.80	171.46	1.74		1	99	1.07	5.25	1.00	183.4	0.94	Infin.	0.000	0.747	**Non-Liq.**	Non-Liq.	**0.00**
41.83	272.51	1.92	0.70	110	1.622	0.835	0.71	0.50	0.81	206.78	1.57		1	100	1.00	5.30	1.00	207.6	0.94	Infin.	0.000	0.747	**Non-Liq.**	Non-Liq.	**0.00**
41.99	324.45	1.75	0.54	110	1.626	0.834	0.54	0.50	0.81	246.13	1.44		1	100	1.00	5.35	1.00	247.0	0.93	Infin.	0.000	0.746	**Non-Liq.**	Non-Liq.	**0.00**
42.16	358.84	1.94	0.54	110	1.630	0.832	0.54	0.50	0.81	272.02	1.41		1	100	1.00	5.40	1.00	273.0	0.93	Infin.	0.000	0.745	**Non-Liq.**	Non-Liq.	**0.00**
42.32	372.30	2.11	0.57	110	1.634	0.831	0.57	0.50	0.80	281.93	1.41		1	100	1.00	5.45	1.00	283.0	0.93	Infin.	0.000	0.744	**Non-Liq.**	Non-Liq.	**0.00**
42.49	381.00	2.00	0.52	110	1.638	0.829	0.53	0.50	0.80	288.20	1.38		1	100	1.00	5.50	1.00	289.3	0.93	Infin.	0.000	0.743	**Non-Liq.**	Non-Liq.	**0.00**
42.65	390.56	2.06	0.53	110	1.642	0.827	0.53	0.50	0.80	295.10	1.37		1	100	1.00	5.55	1.00	296.2	0.93	Infin.	0.000	0.743	**Non-Liq.**	Non-Liq.	**0.00**
42.81	394.48	2.14	0.54	110	1.646	0.826	0.54	0.50	0.80	297.72	1.38		1	100	1.00	5.55	1.00	298.8	0.93	Infin.	0.000	0.742	**Non-Liq.**	Non-Liq.	**0.00**
42.98	391.94	2.30	0.59	110	1.649	0.824	0.59	0.50	0.80	295.44	1.41		1	100	1.00	5.55	1.00	296.5	0.93	Infin.	0.000	0.741	**Non-Liq.**	Non-Liq.	**0.00**

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
43.14	388.72	2.40	0.62	110	1.653	0.823	0.62	0.50	0.80	292.66	1.43		1	100	1.00	5.55	1.00	293.8	0.93	Infin.	0.000	0.740	**Non-Liq.**	Non-Liq.	**0.00**
43.31	387.56	2.49	0.64	110	1.657	0.821	0.65	0.50	0.80	291.43	1.44		1	100	1.00	5.55	1.00	292.5	0.93	Infin.	0.000	0.739	**Non-Liq.**	Non-Liq.	**0.00**
43.47	388.39	2.43	0.62	110	1.661	0.820	0.63	0.50	0.80	291.71	1.43		1	100	1.00	5.55	1.00	292.8	0.92	Infin.	0.000	0.738	**Non-Liq.**	Non-Liq.	**0.00**
43.64	394.80	2.34	0.59	110	1.665	0.818	0.60	0.50	0.80	296.20	1.41		1	100	1.00	5.55	1.00	297.3	0.92	Infin.	0.000	0.737	**Non-Liq.**	Non-Liq.	**0.00**
43.80	409.10	2.46	0.60	110	1.669	0.816	0.60	0.50	0.80	306.61	1.40		1	100	1.00	5.55	1.00	307.8	0.92	Infin.	0.000	0.736	**Non-Liq.**	Non-Liq.	**0.00**
43.96	411.66	2.41	0.59	110	1.673	0.815	0.59	0.50	0.80	308.17	1.39		1	100	1.00	5.55	1.00	309.3	0.92	Infin.	0.000	0.735	**Non-Liq.**	Non-Liq.	**0.00**
44.13	423.11	2.33	0.55	110	1.677	0.813	0.55	0.50	0.79	316.41	1.37		1	100	1.00	5.55	1.00	317.6	0.92	Infin.	0.000	0.735	**Non-Liq.**	Non-Liq.	**0.00**
44.29	427.48	3.38	0.79	110	1.681	0.811	0.79	0.50	0.79	319.31	1.48		1	100	1.00	5.55	1.00	320.5	0.92	Infin.	0.000	0.734	**Non-Liq.**	Non-Liq.	**0.00**
44.46	465.12	8.79	1.89	110	1.685	0.810	1.90	0.54	0.78	341.03	1.77		1	100	1.08	5.55	1.00	370.8	0.92	Infin.	0.000	0.733	**Non-Liq.**	Non-Liq.	**0.00**
44.62	532.93	7.53	1.41	110	1.689	0.808	1.42	0.50	0.79	397.46	1.62		1	100	1.00	5.55	1.00	399.0	0.92	Infin.	0.000	0.732	**Non-Liq.**	Non-Liq.	**0.00**
44.78	591.21	6.48	1.10	110	1.692	0.807	1.10	0.50	0.79	440.56	1.51		1	100	1.00	5.55	1.00	442.2	0.92	Infin.	0.000	0.731	**Non-Liq.**	Non-Liq.	**0.00**
44.95	507.18	5.63	1.11	110	1.696	0.805	1.11	0.50	0.79	377.32	1.55		1	100	1.00	5.55	1.00	378.7	0.91	Infin.	0.000	0.730	**Non-Liq.**	Non-Liq.	**0.00**
45.11	476.27	2.22	0.47	110	1.700	0.803	0.47	0.50	0.79	353.84	1.28		1	100	1.00	5.55	1.00	355.2	0.91	Infin.	0.000	0.729	**Non-Liq.**	Non-Liq.	**0.00**
45.28	485.36	1.77	0.36	110	1.704	0.802	0.37	0.50	0.79	360.20	1.20		1	100	1.00	5.55	1.00	361.5	0.91	Infin.	0.000	0.728	**Non-Liq.**	Non-Liq.	**0.00**
45.44	498.42	2.45	0.49	110	1.708	0.800	0.49	0.50	0.79	369.50	1.28		1	100	1.00	5.55	1.00	370.9	0.91	Infin.	0.000	0.727	**Non-Liq.**	Non-Liq.	**0.00**
45.60	485.91	5.77	1.19	110	1.712	0.798	1.19	0.50	0.79	359.78	1.59		1	100	1.00	5.55	1.00	361.1	0.91	Infin.	0.000	0.726	**Non-Liq.**	Non-Liq.	**0.00**
45.77	460.62	7.80	1.69	110	1.716	0.797	1.70	0.53	0.78	336.16	1.73		1	100	1.06	5.55	1.00	357.1	0.91	Infin.	0.000	0.725	**Non-Liq.**	Non-Liq.	**0.00**
45.93	491.30	0.00	0.00	110	1.720	0.795	0.00	0.80	0.68	313.04	2.66		0		1.00				0.95			0.724	**Non-Liq.**	Non-Liq.	**0.00**
46.10	606.17	0.00	0.00	110	1.724	0.793	0.00	0.82	0.67	382.66	2.71		0		1.00				0.95			0.723	**Non-Liq.**	Non-Liq.	**0.00**
46.26	616.78	0.00	0.00	110	1.728	0.792	0.00	0.82	0.67	388.36	2.72		0		1.00				0.95			0.722	**Non-Liq.**	Non-Liq.	**0.00**

Liquefaction Analysis – Groundwater at 20 feet

CPT-LIQUEFY.XLS - A SPREADSHEET FOR EMPIRICAL ESTIMATION OF LIQUEFACTION POTENTIAL USING CPT DATA
Developed 2003 by Shelton L. Stringer, GE, Earth Systems Southwest

Project: Oxnard High School No. 8
Job No: 301953-001
Date: 8/14/2018
Sounding: CPT-1
Plot: 1

Methods: Liquefaction Analysis using 1998 NCEER workshop methods (Robertson & Wride)
Post-liquefaction Settlement Analysis from Tokimatsu & Seed (1987)
Dry Sand Settlement by Pradel, ASCE Journal of G&GE, Vol 124, No. 4

Total Liquefied Thickness (feet)
1.1

EARTHQUAKE INFORMATION:

Magnitude:	6.77	7.5
PGA, g:	0.97	0.75
MSF:	1.30	
GWT, feet:	20.0	
Design GWT, feet:	20.0	

Induced CSR (M=7.5): = 0.65*PGA*(po/p'o)*rd/MSF
Clean Sand Qc1n = C_Q*K_C*K_H*Qc
SF = $CRR_{7.5}$*Kσ/CSR
Use Tokimatsu & Seed (0) or Ishihara &Yoshmine (1): 0
Unit Weight of unsaturated soils: 110 pcf
Unit Weight of saturated soils: 110 pcf
Limiting Ic for liquefiable soils: 2.60
Limiting Ic for K_H: 2.0
Required SF: 1.50
Min SF of Liquefiable Layers: 0.63
Avg SF of Liquefiable Layers: 0.03

Probab	Total
Avg	Induced
1%	Subsidence
Max	(inches)
99%	0.1

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ M=7.5 CRR	Induced EQ M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	*Volumetric Strain (%)*
0.16	82.43	1.01	1.22	110	0.009	1.000	1.22	0.57	1.70	132.43	1.88		1	88	1.17	0.05	1.00	154.7	1.00	0.424	0.424	0.485	**Non-Liq.**	Non-Liq.	**0.00**
0.33	77.94	1.37	1.76	110	0.018	1.000	1.76	0.61	1.70	125.21	2.01		1	86	1.31		1.00	164.0	1.00	Infin.	0.000	0.485	**Non-Liq.**	Non-Liq.	**0.00**
0.49	66.43	1.48	2.23	110	0.027	1.000	2.23	0.65	1.70	106.70	2.13		1	80	1.51		1.00	161.4	1.00	Infin.	0.000	0.485	**Non-Liq.**	Non-Liq.	**0.00**
0.66	56.46	1.33	2.35	110	0.036	1.000	2.35	0.67	1.70	90.66	2.20		1	73	1.65		1.00	150.0	1.00	0.394	0.394	0.485	**Non-Liq.**	Non-Liq.	**0.00**
0.82	50.54	1.16	2.30	110	0.045	1.000	2.30	0.67	1.70	81.14	2.22		1	68	1.72		1.00	139.9	1.00	0.334	0.334	0.485	**Non-Liq.**	Non-Liq.	**0.00**
0.98	45.66	1.04	2.28	110	0.054	1.000	2.28	0.68	1.70	73.28	2.25		1	64	1.80		1.00	132.1	1.00	0.294	0.294	0.485	**Non-Liq.**	Non-Liq.	**0.00**
1.15	40.24	0.94	2.33	110	0.063	0.999	2.33	0.70	1.70	64.56	2.30		1	59	1.94		1.00	125.2	1.00	0.263	0.263	0.484	**Non-Liq.**	Non-Liq.	**0.00**
1.31	40.24	0.94	2.33	110	0.072	0.999	2.33	0.70	1.70	64.54	2.30		1	59	1.94		1.00	125.2	1.00	0.263	0.263	0.484	**Non-Liq.**	Non-Liq.	**0.00**
1.48	34.62	0.81	2.34	110	0.081	0.999	2.35	0.71	1.70	55.50	2.35		1	52	2.11		1.00	117.0	1.00	0.229	0.229	0.484	**Non-Liq.**	Non-Liq.	**0.00**
1.64	31.09	0.64	2.05	110	0.090	0.998	2.06	0.71	1.70	49.81	2.34		1	48	2.10		1.00	104.5	1.00	0.186	0.186	0.484	**Non-Liq.**	Non-Liq.	**0.00**
1.80	30.58	0.62	2.01	110	0.099	0.998	2.02	0.71	1.70	48.98	2.34		1	47	2.10		1.00	102.7	1.00	0.181	0.181	0.484	**Non-Liq.**	Non-Liq.	**0.00**
1.97	32.03	0.75	2.33	110	0.108	0.998	2.34	0.72	1.70	51.29	2.37		1	49	2.20		1.00	112.8	1.00	0.213	0.213	0.484	**Non-Liq.**	Non-Liq.	**0.00**
2.13	31.02	0.74	2.40	110	0.117	0.997	2.41	0.73	1.70	49.65	2.39		1	48	2.27		1.00	112.8	1.00	0.214	0.214	0.483	**Non-Liq.**	Non-Liq.	**0.00**
2.30	29.95	0.70	2.34	110	0.126	0.997	2.35	0.73	1.70	47.92	2.39		1	46	2.29		1.00	109.8	1.00	0.203	0.203	0.483	**Non-Liq.**	Non-Liq.	**0.00**
2.46	29.19	0.66	2.26	110	0.135	0.996	2.27	0.73	1.70	46.69	2.39		1	45	2.29		1.00	106.7	1.00	0.193	0.193	0.483	**Non-Liq.**	Non-Liq.	**0.00**
2.62	29.17	0.63	2.17	110	0.144	0.996	2.18	0.72	1.70	46.64	2.38		1	45	2.24		1.00	104.4	1.00	0.186	0.186	0.483	**Non-Liq.**	Non-Liq.	**0.00**
2.79	29.42	0.62	2.12	110	0.153	0.996	2.13	0.72	1.70	47.03	2.37		1	46	2.20		1.00	103.6	1.00	0.183	0.183	0.483	**Non-Liq.**	Non-Liq.	**0.00**
2.95	29.77	0.62	2.08	110	0.162	0.995	2.09	0.72	1.70	47.57	2.36		1	46	2.17		1.00	103.3	1.00	0.182	0.182	0.482	**Non-Liq.**	Non-Liq.	**0.00**
3.12	29.70	0.60	2.02	110	0.171	0.995	2.04	0.72	1.70	47.45	2.36		1	46	2.14		1.00	101.7	1.00	0.178	0.178	0.482	**Non-Liq.**	Non-Liq.	**0.00**
3.28	28.88	0.57	1.96	110	0.180	0.994	1.98	0.72	1.70	46.11	2.36		1	45	2.15		1.00	99.1	1.00	0.170	0.170	0.482	**Non-Liq.**	Non-Liq.	**0.00**
3.44	26.80	0.52	1.95	110	0.189	0.994	1.97	0.72	1.70	42.76	2.38		1	42	2.24		1.00	95.7	1.00	0.162	0.162	0.482	**Non-Liq.**	Non-Liq.	**0.00**
3.61	26.96	0.49	1.80	110	0.198	0.994	1.81	0.72	1.70	43.00	2.36		1	42	2.15		1.00	92.3	1.00	0.153	0.153	0.482	**Non-Liq.**	Non-Liq.	**0.00**
3.77	29.75	0.49	1.63	110	0.208	0.993	1.65	0.70	1.70	47.47	2.30		1	46	1.94		1.00	92.2	1.00	0.153	0.153	0.482	**Non-Liq.**	Non-Liq.	**0.00**
3.94	32.57	0.49	1.50	110	0.217	0.993	1.51	0.68	1.70	51.99	2.24		1	50	1.78		1.00	92.7	1.00	0.154	0.154	0.481	**Non-Liq.**	Non-Liq.	**0.00**
4.10	34.78	0.51	1.46	110	0.226	0.993	1.47	0.67	1.70	55.52	2.21		1	52	1.70		1.00	94.6	1.00	0.159	0.159	0.481	**Non-Liq.**	Non-Liq.	**0.00**
4.27	36.24	0.53	1.47	110	0.235	0.992	1.48	0.67	1.70	57.85	2.20		1	54	1.67		1.00	96.7	1.00	0.164	0.164	0.481	**Non-Liq.**	Non-Liq.	**0.00**
4.43	38.86	0.57	1.47	110	0.244	0.992	1.48	0.66	1.70	62.05	2.18		1	57	1.62		1.00	100.3	1.00	0.174	0.174	0.481	**Non-Liq.**	Non-Liq.	**0.00**
4.59	44.03	0.63	1.44	110	0.253	0.991	1.45	0.65	1.70	70.34	2.13		1	62	1.51		1.00	106.4	1.00	0.192	0.192	0.481	**Non-Liq.**	Non-Liq.	**0.00**
4.76	50.25	0.69	1.36	110	0.262	0.991	1.37	0.63	1.70	80.32	2.07		1	68	1.41		1.00	112.9	1.00	0.214	0.214	0.480	**Non-Liq.**	Non-Liq.	**0.00**
4.92	56.32	0.74	1.31	110	0.271	0.991	1.31	0.61	1.70	90.06	2.02		1	72	1.33		1.00	119.7	1.00	0.239	0.239	0.480	**Non-Liq.**	Non-Liq.	**0.00**
5.09	62.37	0.74	1.19	110	0.280	0.990	1.19	0.60	1.70	99.77	1.96		1	77	1.25	0.55	1.19	148.2	1.00	0.383	0.383	0.480	**Non-Liq.**	Non-Liq.	**0.00**
5.25	67.00	0.84	1.26	110	0.289	0.990	1.27	0.59	1.70	107.19	1.95		1	80	1.25	0.60	1.19	158.4	1.00	0.449	0.449	0.480	**Non-Liq.**	Non-Liq.	**0.00**
5.41	67.37	0.89	1.32	110	0.298	0.989	1.32	0.60	1.70	107.77	1.97		1	80	1.26	0.65	1.19	160.8	1.00	Infin.	0.000	0.480	**Non-Liq.**	Non-Liq.	**0.00**
5.58	67.34	0.91	1.35	110	0.307	0.989	1.36	0.60	1.70	107.71	1.97		1	80	1.27	0.70	1.19	162.0	1.00	Infin.	0.000	0.479	**Non-Liq.**	Non-Liq.	**0.00**
5.74	67.46	0.93	1.37	110	0.316	0.989	1.38	0.60	1.70	107.89	1.98		1	80	1.27	0.75	1.19	162.9	1.00	Infin.	0.000	0.479	**Non-Liq.**	Non-Liq.	**0.00**
5.91	67.82	0.93	1.37	110	0.325	0.988	1.38	0.60	1.70	108.45	1.98		1	80	1.27	0.80	1.19	163.5	1.00	Infin.	0.000	0.479	**Non-Liq.**	Non-Liq.	**0.00**
6.07	65.23	0.93	1.42	110	0.334	0.988	1.43	0.61	1.70	104.28	2.00		1	79	1.30	0.85	1.19	160.7	1.00	Infin.	0.000	0.479	**Non-Liq.**	Non-Liq.	**0.00**
6.23	63.78	0.93	1.46	110	0.343	0.988	1.47	0.61	1.70	101.93	2.01		1	78	1.32		1.00	134.5	1.00	0.306	0.306	0.479	**Non-Liq.**	Non-Liq.	**0.00**
6.40	65.72	0.95	1.45	110	0.352	0.987	1.45	0.61	1.70	105.03	2.00		1	79	1.30		1.00	136.9	1.00	0.319	0.319	0.479	**Non-Liq.**	Non-Liq.	**0.00**
6.56	71.05	1.00	1.40	110	0.361	0.987	1.41	0.60	1.70	113.58	1.97		1	82	1.26	1.00	1.00	143.8	1.00	0.357	0.357	0.478	**Non-Liq.**	Non-Liq.	**0.00**
6.73	77.49	1.08	1.39	110	0.370	0.986	1.40	0.59	1.70	123.92	1.94		1	86	1.23	1.05	1.00	152.7	1.00	0.411	0.411	0.478	**Non-Liq.**	Non-Liq.	**0.00**
6.89	86.69	1.16	1.34	110	0.379	0.986	1.34	0.58	1.70	138.69	1.89		1	90	1.18	1.10	1.00	164.5	1.00	Infin.	0.000	0.478	**Non-Liq.**	Non-Liq.	**0.00**
7.05	98.48	1.28	1.30	110	0.388	0.986	1.31	0.56	1.70	157.61	1.85		1	96	1.14	1.15	1.00	180.6	1.00	Infin.	0.000	0.478	**Non-Liq.**	Non-Liq.	**0.00**
7.22	114.53	1.41	1.23	110	0.397	0.985	1.23	0.54	1.70	183.39	1.78		1	100	1.09	1.20	1.00	201.2	1.00	Infin.	0.000	0.478	**Non-Liq.**	Non-Liq.	**0.00**
7.38	122.82	1.49	1.21	110	0.406	0.985	1.21	0.54	1.67	193.40	1.76		1	100	1.08	1.25	1.00	209.5	1.00	Infin.	0.000	0.478	**Non-Liq.**	Non-Liq.	**0.00**
7.55	128.68	1.53	1.19	110	0.415	0.985	1.19	0.53	1.65	199.45	1.75		1	100	1.07	1.30	1.00	214.1	1.00	Infin.	0.000	0.477	**Non-Liq.**	Non-Liq.	**0.00**
7.71	128.68	1.53	1.19	110	0.424	0.984	1.19	0.53	1.63	197.34	1.75		1	100	1.07	1.35	1.00	212.2	1.00	Infin.	0.000	0.477	**Non-Liq.**	Non-Liq.	**0.00**
7.87	134.06	1.56	1.17	110	0.433	0.984	1.17	0.53	1.60	202.54	1.74		1	100	1.06	1.40	1.00	215.9	1.00	Infin.	0.000	0.477	**Non-Liq.**	Non-Liq.	**0.00**
8.04	139.69	1.63	1.16	110	0.442	0.984	1.17	0.53	1.58	208.28	1.73		1	100	1.06	1.45	1.00	220.8	1.00	Infin.	0.000	0.477	**Non-Liq.**	Non-Liq.	**0.00**
8.20	147.04	1.72	1.17	110	0.451	0.983	1.17	0.52	1.56	216.44	1.72		1	100	1.05	1.50	1.00	228.1	1.00	Infin.	0.000	0.477	**Non-Liq.**	Non-Liq.	**0.00**
8.37	151.94	1.71	1.12	110	0.460	0.983	1.13	0.52	1.54	220.33	1.70		1	100	1.04	1.55	1.00	229.4	1.00	Infin.	0.000	0.476	**Non-Liq.**	Non-Liq.	**0.00**
8.53	158.05	1.80	1.14	110	0.469	0.982	1.14	0.52	1.52	226.66	1.69		1	100	1.03	1.60	1.00	235.3	1.00	Infin.	0.000	0.476	**Non-Liq.**	Non-Liq.	**0.00**
8.69	163.87	1.92	1.17	110	0.478	0.982	1.18	0.52	1.51	232.90	1.70		1	100	1.04	1.65	1.00	242.3	1.00	Infin.	0.000	0.476	**Non-Liq.**	Non-Liq.	**0.00**
8.86	169.68	2.08	1.22	110	0.487	0.982	1.23	0.52	1.50	239.19	1.70		1	100	1.04	1.70	1.00	249.8	1.00	Infin.	0.000	0.476	**Non-Liq.**	Non-Liq.	**0.00**
9.02	174.27	2.26	1.30	110	0.496	0.981	1.30	0.52	1.49	244.08	1.72		1	100	1.05	1.75	1.00	257.2	1.00	Infin.	0.000	0.476	**Non-Liq.**	Non-Liq.	**0.00**
9.19	179.31	2.32	1.29	110	0.505	0.981	1.30	0.52	1.47	248.52	1.71		1	100	1.05	1.80	1.00	261.0	1.00	Infin.	0.000	0.476	**Non-Liq.**	Non-Liq.	**0.00**
9.35	181.08	2.35	1.30	110	0.514	0.981	1.30	0.52	1.46	248.69	1.71		1	100	1.05	1.85	1.00	261.3	1.00	Infin.	0.000	0.475	**Non-Liq.**	Non-Liq.	**0.00**
9.51	191.53	2.42	1.26	110	0.523	0.980	1.27	0.52	1.44	259.55	1.69		1	100	1.03	1.90	1.00	269.1	1.00	Infin.	0.000	0.475	**Non-Liq.**	Non-Liq.	**0.00**
9.68	202.38	2.57	1.27	110	0.532	0.980	1.27	0.51	1.42	271.29	1.68		1	100	1.03	1.95	1.00	279.3	1.00	Infin.	0.000	0.475	**Non-Liq.**	Non-Liq.	**0.00**
9.84	214.08	2.69	1.26	110	0.541	0.980	1.26	0.51	1.41	283.70	1.67		1	100	1.02	2.00	1.00	289.1	1.00	Infin.	0.000	0.475	**Non-Liq.**	Non-Liq.	**0.00**
10.01	227.79	2.91	1.28	110	0.550	0.979	1.28	0.51	1.39	298.89	1.66		1	100	1.01	2.05	1.00	302.9	1.00	Infin.	0.000	0.475	**Non-Liq.**	Non-Liq.	**0.00**
10.17	242.24	3.22	1.33	110	0.559	0.979	1.33	0.51	1.38	315.27	1.66		1	100	1.01	2.10	1.00	319.4	1.00	Infin.	0.000	0.475	**Non-Liq.**	Non-Liq.	**0.00**
10.33	244.06	3.47	1.42	110	0.568	0.979	1.43	0.51	1.37	316.43	1.68		1	100	1.03	2.15	1.00	325.7	1.00	Infin.	0.000	0.474	**Non-Liq.**	Non-Liq.	**0.00**
10.50	249.05	3.55	1.43	110	0.577	0.978	1.43	0.51	1.36	320.21	1.68		1	100	1.02	2.20	1.00	329.2	1.00	Infin.	0.000	0.474	**Non-Liq.**	Non-Liq.	**0.00**
10.66	254.87	3.69	1.45	110	0.586	0.978	1.45	0.51	1.35	325.19	1.68		1	100	1.03	2.25	1.00	334.7	1.00	Infin.	0.000	0.474	**Non-Liq.**	Non-Liq.	**0.00**
10.83	256.89	3.79	1.48	110	0.595	0.978	1.48	0.51	1.34	325.57	1.69		1	100	1.03	2.30	1.00	336.5	1.00	Infin.	0.000	0.474	**Non-Liq.**	Non-Liq.	**0.00**
10.99	258.54	3.96	1.53	110	0.604	0.977	1.53	0.52	1.34	325.83	1.70		1	100	1.04	2.35	1.00	339.6	1.00	Infin.	0.000	0.474	**Non-Liq.**	Non-Liq.	**0.00**
11.15	252.91	3.87	1.53	110	0.614	0.977	1.53	0.52	1.33	316.61	1.71		1	100	1.04	2.40	1.00	331.4	1.00	Infin.	0.000	0.474	**Non-Liq.**	Non-Liq.	**0.00**
11.32	241.86	3.70	1.53	110	0.623	0.977	1.53	0.52	1.32	301.06	1.72		1	100	1.05	2.45	1.00	317.7	1.00	Infin.	0.000	0.473	**Non-Liq.**	Non-Liq.	**0.00**
11.48	235.08	3.50	1.49	110	0.632	0.976	1.49	0.52	1.31	290.38	1.72		1	100	1.05	2.50	1.00	306.4	1.00	Infin.	0.000	0.473	**Non-Liq.**	Non-Liq.	**0.00**
11.65	233.08	3.34	1.43	110	0.641	0.976	1.44	0.52	1.30	285.38	1.71		1	100	1.05	2.55	1.00	299.4	1.00	Infin.	0.000	0.473	**Non-Liq.**	Non-Liq.	**0.00**
11.81	236.89	2.82	1.19	110	0.650	0.975	1.19	0.50	1.28	285.24	1.65		1	100	1.00	2.60	1.00	286.6	1.00	Infin.	0.000	0.473	**Non-Liq.**	Non-Liq.	**0.00**
11.98	239.86	3.05	1.27	110	0.659	0.975	1.27	0.51	1.27	287.65	1.67		1	100	1.02	2.65	1.00	293.1	1.00	Infin.	0.000	0.473	**Non-Liq.**	Non-Liq.	**0.00**
12.14	232.44	3.13	1.35	110	0.668	0.975	1.35	0.52	1.27	277.93	1.70		1	100	1.04	2.70	1.00	288.9	1.00	Infin.	0.000	0.473	**Non-Liq.**	Non-Liq.	**0.00**
12.30	231.56	3.17	1.37	110	0.677	0.974	1.37	0.52	1.26	275.23	1.70		1	100	1.04	2.70	1.00	287.5	1.00	Infin.	0.000	0.472	**Non-Liq.**	Non-Liq.	**0.00**
12.47	226.67	3.06	1.35	110	0.686	0.974	1.35	0.52	1.25	267.63	1.71		1	100	1.04	2.70	1.00	280.0	1.00	Infin.	0.000	0.472	**Non-Liq.**	Non-Liq.	**0.00**
12.63	224.32	3.05	1.36	110	0.695	0.974	1.36	0.52	1.25	263.26	1.71		1	100	1.05	2.70	1.00	276.6	1.00	Infin.	0.000	0.472	**Non-Liq.**	Non-Liq.	**0.00**
12.80	219.31	3.06	1.39	110	0.704	0.973	1.40	0.53	1.24	256.14	1.73		1	100	1.06	2.70	1.00	272.0	1.00	Infin.	0.000	0.472	**Non-Liq.**	Non-Liq.	**0.00**

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_c	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	Induced EQ CRR	M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
12.96	214.97	3.04	1.41	110	0.713	0.973	1.42	0.53	1.23	249.70	1.74		1	100	1.07	2.70	1.00	267.1	1.00	Infin.	0.000	0.472	Non-Liq.	Non-Liq.	0.00
13.12	210.39	2.92	1.39	110	0.722	0.973	1.39	0.53	1.23	242.78	1.74		1	100	1.07	2.70	1.00	260.0	1.00	Infin.	0.000	0.472	Non-Liq.	Non-Liq.	0.00
13.29	202.73	2.85	1.41	110	0.731	0.972	1.41	0.54	1.22	232.77	1.76		1	100	1.08	2.70	1.00	251.7	1.00	Infin.	0.000	0.471	Non-Liq.	Non-Liq.	0.00
13.45	202.03	2.75	1.36	110	0.740	0.972	1.36	0.53	1.21	230.22	1.75		1	100	1.07	2.70	1.00	247.7	1.00	Infin.	0.000	0.471	Non-Liq.	Non-Liq.	0.00
13.62	202.36	2.74	1.36	110	0.749	0.972	1.36	0.53	1.20	229.11	1.75		1	100	1.07	2.70	1.00	246.5	1.00	Infin.	0.000	0.471	Non-Liq.	Non-Liq.	0.00
13.78	210.84	2.87	1.36	110	0.758	0.971	1.37	0.53	1.19	237.04	1.74		1	100	1.07	2.70	1.00	253.8	1.00	Infin.	0.000	0.471	Non-Liq.	Non-Liq.	0.00
13.94	228.51	2.41	1.05	110	0.767	0.971	1.06	0.50	1.17	252.83	1.64		1	100	1.00	2.70	1.00	253.8	1.00	Infin.	0.000	0.471	Non-Liq.	Non-Liq.	0.00
14.11	285.52	2.69	0.94	110	0.776	0.971	0.94	0.50	1.17	314.27	1.54		1	100	1.00	2.70	1.00	315.4	1.00	Infin.	0.000	0.471	Non-Liq.	Non-Liq.	0.00
14.27	292.87	2.62	0.89	110	0.785	0.970	0.90	0.50	1.16	320.51	1.52		1	100	1.00	2.70	1.00	321.7	1.00	Infin.	0.000	0.470	Non-Liq.	Non-Liq.	0.00
14.44	251.89	2.37	0.94	110	0.794	0.970	0.94	0.50	1.15	273.97	1.58		1	100	1.00	2.70	1.00	275.0	1.00	Infin.	0.000	0.470	Non-Liq.	Non-Liq.	0.00
14.60	209.49	2.12	1.01	110	0.803	0.970	1.02	0.51	1.15	226.74	1.66		1	100	1.01	2.70	1.00	229.5	1.00	Infin.	0.000	0.470	Non-Liq.	Non-Liq.	0.00
14.76	185.30	1.81	0.97	110	0.812	0.969	0.98	0.51	1.15	199.73	1.68		1	100	1.03	2.70	1.00	205.8	1.00	Infin.	0.000	0.470	Non-Liq.	Non-Liq.	0.00
14.93	177.04	1.72	0.97	110	0.821	0.969	0.97	0.52	1.14	189.90	1.70		1	100	1.04	2.70	1.00	197.4	1.00	Infin.	0.000	0.470	Non-Liq.	Non-Liq.	0.00
15.09	163.66	1.53	0.94	110	0.830	0.969	0.94	0.52	1.13	174.67	1.71		1	100	1.05	2.70	1.00	183.4	1.00	Infin.	0.000	0.470	Non-Liq.	Non-Liq.	0.00
15.26	131.77	1.43	1.09	110	0.839	0.968	1.10	0.56	1.14	140.77	1.83		1	91	1.13	2.70	1.00	159.1	1.00	0.454	0.454	0.469	Non-Liq.	Non-Liq.	0.00
15.42	90.92	1.82	2.00	110	0.848	0.968	2.02	0.64	1.15	98.18	2.12		1	76	1.50		1.00	147.1	1.00	0.376	0.376	0.469	Non-Liq.	Non-Liq.	0.00
15.58	71.71	1.75	2.45	110	0.857	0.967	2.48	0.69	1.16	77.37	2.26		1	66	1.82		1.00	141.2	1.00	0.342	0.342	0.469	Non-Liq.	Non-Liq.	0.00
15.75	110.76	2.45	2.21	110	0.866	0.967	2.22	0.64	1.14	118.01	2.10		1	84	1.46		1.00	171.7	1.00	Infin.	0.000	0.469	Non-Liq.	Non-Liq.	0.00
15.91	111.12	2.74	2.46	110	0.875	0.967	2.48	0.65	1.13	117.85	2.14		1	84	1.52		1.00	179.7	1.00	Infin.	0.000	0.469	Non-Liq.	Non-Liq.	0.00
16.08	114.52	2.87	2.51	110	0.884	0.966	2.52	0.65	1.12	120.66	2.14		1	85	1.52		1.00	183.7	1.00	Infin.	0.000	0.468	Non-Liq.	Non-Liq.	0.00
16.24	142.13	2.72	1.91	110	0.893	0.966	1.92	0.60	1.11	147.88	1.99		1	93	1.28	1.00	1.00	190.7	1.00	Infin.	0.000	0.468	Non-Liq.	Non-Liq.	0.00
16.40	171.27	2.46	1.44	110	0.902	0.966	1.45	0.56	1.09	176.09	1.84		1	100	1.14	1.05	1.00	201.7	1.00	Infin.	0.000	0.468	Non-Liq.	Non-Liq.	0.00
16.57	179.24	2.28	1.27	110	0.911	0.965	1.28	0.55	1.08	182.87	1.79		1	100	1.10	1.10	1.00	202.3	1.00	Infin.	0.000	0.468	Non-Liq.	Non-Liq.	0.00
16.73	203.64	2.08	1.02	110	0.920	0.965	1.03	0.51	1.07	205.87	1.69		1	100	1.03	1.15	1.00	213.0	1.00	Infin.	0.000	0.468	Non-Liq.	Non-Liq.	0.00
16.90	253.20	2.34	0.92	110	0.929	0.965	0.93	0.50	1.07	254.42	1.59		1	100	1.00	1.20	1.00	255.4	1.00	Infin.	0.000	0.468	Non-Liq.	Non-Liq.	0.00
17.06	288.82	2.54	0.88	110	0.938	0.964	0.88	0.50	1.06	288.93	1.54		1	100	1.00	1.25	1.00	290.0	1.00	Infin.	0.000	0.467	Non-Liq.	Non-Liq.	0.00
17.22	315.97	2.96	0.94	110	0.947	0.964	0.94	0.50	1.06	314.66	1.54		1	100	1.00	1.30	1.00	315.8	1.00	Infin.	0.000	0.467	Non-Liq.	Non-Liq.	0.00
17.39	322.57	2.98	0.92	110	0.956	0.963	0.93	0.50	1.05	319.73	1.53		1	100	1.00	1.35	1.00	320.9	1.00	Infin.	0.000	0.467	Non-Liq.	Non-Liq.	0.00
17.55	346.12	4.11	1.19	110	0.965	0.963	1.19	0.50	1.05	341.52	1.60		1	100	1.00	1.40	1.00	342.8	1.00	Infin.	0.000	0.467	Non-Liq.	Non-Liq.	0.00
17.72	402.20	6.00	1.49	110	0.974	0.963	1.50	0.50	1.04	395.22	1.65		1	100	1.00	1.45	1.00	396.7	1.00	Infin.	0.000	0.467	Non-Liq.	Non-Liq.	0.00
17.88	358.55	6.07	1.69	110	0.983	0.962	1.70	0.52	1.04	351.16	1.72		1	100	1.05	1.50	1.00	370.5	1.00	Infin.	0.000	0.467	Non-Liq.	Non-Liq.	0.00
18.04	345.21	4.98	1.44	110	0.992	0.962	1.45	0.51	1.03	336.13	1.67		1	100	1.02	1.55	1.00	343.7	1.00	Infin.	0.000	0.466	Non-Liq.	Non-Liq.	0.00
18.21	360.17	4.43	1.23	110	1.001	0.962	1.23	0.50	1.03	348.93	1.61		1	100	1.00	1.60	1.00	350.2	1.00	Infin.	0.000	0.466	Non-Liq.	Non-Liq.	0.00
18.37	359.99	3.79	1.05	110	1.010	0.961	1.06	0.50	1.02	347.18	1.55		1	100	1.00	1.65	1.00	348.5	1.00	Infin.	0.000	0.466	Non-Liq.	Non-Liq.	0.00
18.54	354.62	3.03	0.86	110	1.020	0.961	0.86	0.50	1.02	340.46	1.49		1	100	1.00	1.70	1.00	341.7	1.00	Infin.	0.000	0.466	Non-Liq.	Non-Liq.	0.00
18.70	344.24	2.99	0.87	110	1.029	0.960	0.87	0.50	1.01	329.01	1.50		1	100	1.00	1.75	1.00	330.2	1.00	Infin.	0.000	0.466	Non-Liq.	Non-Liq.	0.00
18.86	332.45	3.04	0.91	110	1.038	0.960	0.92	0.50	1.01	316.31	1.53		1	100	1.00	1.80	1.00	317.5	1.00	Infin.	0.000	0.465	Non-Liq.	Non-Liq.	0.00
19.03	327.71	2.96	0.90	110	1.047	0.960	0.91	0.50	1.01	310.43	1.53		1	100	1.00	1.85	1.00	311.6	1.00	Infin.	0.000	0.465	Non-Liq.	Non-Liq.	0.00
19.19	307.45	2.73	0.89	110	1.056	0.959	0.89	0.50	1.00	289.93	1.54		1	100	1.00	1.90	1.00	291.0	1.00	Infin.	0.000	0.465	Non-Liq.	Non-Liq.	0.00
19.36	274.72	2.45	0.89	110	1.065	0.959	0.89	0.50	1.00	257.85	1.58		1	100	1.00	1.95	1.00	258.8	1.00	Infin.	0.000	0.465	Non-Liq.	Non-Liq.	0.00
19.52	271.54	4.15	1.53	110	1.074	0.958	1.53	0.54	0.99	253.63	1.76		1	100	1.08	2.00	1.00	275.2	0.99	Infin.	0.000	0.465	Non-Liq.	Non-Liq.	0.00
19.69	279.83	3.92	1.40	110	1.083	0.958	1.41	0.53	0.99	260.29	1.73		1	100	1.06	2.05	1.00	276.0	0.99	Infin.	0.000	0.464	Non-Liq.	Non-Liq.	0.00
19.85	285.99	4.02	1.41	110	1.092	0.957	1.41	0.53	0.98	264.88	1.72		1	100	1.05	2.10	1.00	280.2	0.99	Infin.	0.000	0.464	Non-Liq.	Non-Liq.	0.00
20.01	315.42	2.61	0.83	110	1.101	0.957	0.83	0.50	0.98	291.27	1.52		1	100	1.00	2.15	1.00	292.4	0.98	Infin.	0.000	0.464	Non-Liq.	Non-Liq.	0.00
20.18	326.56	2.81	0.86	110	1.107	0.957	0.86	0.50	0.98	300.76	1.52		1	100	1.00	2.20	1.00	301.9	0.98	Infin.	0.000	0.465	Non-Liq.	Non-Liq.	0.00
20.34	329.89	2.62	0.79	110	1.111	0.956	0.80	0.50	0.98	303.30	1.49		1	100	1.00	2.25	1.00	304.4	0.98	Infin.	0.000	0.467	Non-Liq.	Non-Liq.	0.00
20.51	327.47	2.66	0.81	110	1.115	0.956	0.82	0.50	0.97	300.53	1.50		1	100	1.00	2.30	1.00	301.7	0.98	Infin.	0.000	0.469	Non-Liq.	Non-Liq.	0.00
20.67	324.48	2.31	0.71	110	1.118	0.955	0.71	0.50	0.97	297.26	1.47		1	100	1.00	2.35	1.00	298.4	0.98	Infin.	0.000	0.471	Non-Liq.	Non-Liq.	0.00
20.83	329.51	1.82	0.55	110	1.122	0.955	0.55	0.50	0.97	301.35	1.38		1	100	1.00	2.40	1.00	302.5	0.98	Infin.	0.000	0.473	Non-Liq.	Non-Liq.	0.00
21.00	283.15	1.71	0.61	110	1.126	0.954	0.61	0.50	0.97	258.35	1.46		1	100	1.00	2.45	1.00	259.3	0.98	Infin.	0.000	0.474	Non-Liq.	Non-Liq.	0.00
21.16	276.58	1.11	0.40	110	1.130	0.954	0.40	0.50	0.97	251.90	1.35		1	100	1.00	2.50	1.00	252.8	0.97	Infin.	0.000	0.476	Non-Liq.	Non-Liq.	0.00
21.33	265.97	1.09	0.41	110	1.134	0.954	0.41	0.50	0.97	241.77	1.37		1	100	1.00	2.55	1.00	242.7	0.97	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
21.49	250.21	1.40	0.56	110	1.138	0.953	0.56	0.50	0.96	226.99	1.48		1	100	1.00	2.60	1.00	227.8	0.97	Infin.	0.000	0.480	Non-Liq.	Non-Liq.	0.00
21.65	261.15	1.64	0.63	110	1.142	0.953	0.63	0.50	0.96	236.55	1.50		1	100	1.00	2.65	1.00	237.4	0.97	Infin.	0.000	0.482	Non-Liq.	Non-Liq.	0.00
21.82	300.85	1.72	0.57	110	1.146	0.952	0.57	0.50	0.96	272.20	1.42		1	100	1.00	2.70	1.00	273.2	0.97	Infin.	0.000	0.483	Non-Liq.	Non-Liq.	0.00
21.98	283.46	1.98	0.70	110	1.150	0.952	0.70	0.50	0.96	255.97	1.50		1	100	1.00	2.75	1.00	256.9	0.97	Infin.	0.000	0.485	Non-Liq.	Non-Liq.	0.00
22.15	299.30	1.41	0.47	110	1.154	0.951	0.47	0.50	0.96	269.87	1.37		1	100	1.00	2.80	1.00	270.9	0.97	Infin.	0.000	0.487	Non-Liq.	Non-Liq.	0.00
22.31	305.84	1.24	0.41	110	1.158	0.951	0.41	0.50	0.96	275.32	1.32		1	100	1.00	2.85	1.00	276.3	0.96	Infin.	0.000	0.489	Non-Liq.	Non-Liq.	0.00
22.47	317.96	1.63	0.51	110	1.161	0.950	0.51	0.50	0.95	285.79	1.38		1	100	1.00	2.90	1.00	286.9	0.96	Infin.	0.000	0.490	Non-Liq.	Non-Liq.	0.00
22.64	329.92	1.81	0.55	110	1.165	0.950	0.55	0.50	0.95	296.08	1.39		1	100	1.00	2.95	1.00	297.2	0.96	Infin.	0.000	0.492	Non-Liq.	Non-Liq.	0.00
22.80	349.36	1.91	0.55	110	1.169	0.949	0.55	0.50	0.95	313.06	1.37		1	100	1.00	3.00	1.00	314.2	0.96	Infin.	0.000	0.494	Non-Liq.	Non-Liq.	0.00
22.97	347.80	2.37	0.68	110	1.173	0.949	0.68	0.50	0.95	311.13	1.44		1	100	1.00	3.05	1.00	312.3	0.96	Infin.	0.000	0.495	Non-Liq.	Non-Liq.	0.00
23.13	355.41	2.55	0.72	110	1.177	0.948	0.72	0.50	0.95	317.43	1.45		1	100	1.00	3.10	1.00	318.6	0.96	Infin.	0.000	0.497	Non-Liq.	Non-Liq.	0.00
23.29	348.90	2.53	0.73	110	1.181	0.948	0.73	0.50	0.95	311.08	1.46		1	100	1.00	3.15	1.00	312.2	0.96	Infin.	0.000	0.498	Non-Liq.	Non-Liq.	0.00
23.46	332.91	2.12	0.64	110	1.185	0.947	0.64	0.50	0.94	296.28	1.43		1	100	1.00	3.20	1.00	297.4	0.96	Infin.	0.000	0.500	Non-Liq.	Non-Liq.	0.00
23.62	334.85	1.98	0.59	110	1.189	0.947	0.59	0.50	0.94	297.52	1.41		1	100	1.00	3.25	1.00	298.6	0.95	Infin.	0.000	0.502	Non-Liq.	Non-Liq.	0.00
23.79	354.63	1.92	0.54	110	1.193	0.946	0.54	0.50	0.94	314.64	1.36		1	100	1.00	3.30	1.00	315.8	0.95	Infin.	0.000	0.503	Non-Liq.	Non-Liq.	0.00
23.95	324.76	1.60	0.49	110	1.197	0.946	0.49	0.50	0.94	287.57	1.36		1	100	1.00	3.35	1.00	288.6	0.95	Infin.	0.000	0.505	Non-Liq.	Non-Liq.	0.00
24.11	341.67	1.26	0.37	110	1.200	0.945	0.37	0.50	0.94	302.11	1.27		1	100	1.00	3.40	1.00	303.2	0.95	Infin.	0.000	0.506	Non-Liq.	Non-Liq.	0.00
24.28	335.98	1.14	0.34	110	1.204	0.945	0.34	0.50	0.94	296.57	1.25		1	100	1.00	3.45	1.00	297.7	0.95	Infin.	0.000	0.508	Non-Liq.	Non-Liq.	0.00
24.44	335.54	1.25	0.37	110	1.208	0.944	0.38	0.50	0.94	295.70	1.28		1	100	1.00	3.50	1.00	296.8	0.95	Infin.	0.000	0.509	Non-Liq.	Non-Liq.	0.00
24.61	340.03	1.44	0.42	110	1.212	0.943	0.42	0.50	0.93	299.18	1.31		1	100	1.00	3.55	1.00	300.3	0.95	Infin.	0.000	0.511	Non-Liq.	Non-Liq.	0.00
24.77	343.51	2.18	0.64	110	1.216	0.943	0.64	0.50	0.93	301.77	1.42		1	100	1.00	3.60	1.00	302.9	0.95	Infin.	0.000	0.512	Non-Liq.	Non-Liq.	0.00
24.93	350.49	2.01	0.57	110	1.220	0.942	0.58	0.50	0.93	307.42	1.39		1	100	1.00	3.65	1.00	308.6	0.94	Infin.	0.000	0.514	Non-Liq.	Non-Liq.	0.00
25.10	344.14	2.05	0.60	110	1.224	0.942	0.60	0.50	0.93	301.35	1.41		1	100	1.00	3.70	1.00	302.5	0.94	Infin.	0.000	0.515	Non-Liq.	Non-Liq.	0.00
25.26	336.49	3.71	1.10	110	1.228	0.941	1.11	0.50	0.93	294.16	1.61		1	100	1.00	3.75	1.00	295.3	0.94	Infin.	0.000	0.516	Non-Liq.	Non-Liq.	0.00
25.43	347.63	2.78	0.80	110	1.232	0.941	0.80	0.50	0.93	303.44	1.50		1	100	1.00	3.80	1.00	304.6	0.94	Infin.	0.000	0.518	Non-Liq.	Non-Liq.	0.00
25.59	382.52	2.64	0.69	110	1.236	0.940	0.69	0.50	0.93	333.48	1.42		1	100	1.00	3.85	1.00	334.7	0.94	Infin.	0.000	0.519	Non-Liq.	Non-Liq.	0.00
25.75	360.83	2.44	0.68	110	1.240	0.939	0.68	0.50	0.92	314.01	1.43		1	100	1.00	3.90	1.00	315.2	0.94	Infin.	0.000	0.520	Non-Liq.	Non-Liq.	0.00
25.92	365.07	2.04	0.56	110	1.243	0.939	0.56	0.50	0.92	317.21	1.37		1	100	1.00	3.95	1.00	318.4	0.94	Infin.	0.000	0.522	Non-Liq.	Non-Liq.	0.00
26.08	363.26	2.01	0.55	110	1.247	0.938	0.56	0.50	0.92	315.13	1.37		1	100	1.00	4.00	1.00	316.3	0.94	Infin.	0.000	0.523	Non-Liq.	Non-Liq.	0.00
26.25	360.99	2.10	0.58	110	1.251	0.938	0.58	0.50	0.92	312.66	1.39		1	100	1.00	4.05	1.00	313.8	0.94	Infin.	0.000	0.524	Non-Liq.	Non-Liq.	0.00
26.41	395.59	1.87	0.47	110	1.255	0.937	0.48	0.50	0.92	342.20	1.30		1	100	1.00	4.10	1.00	343.5	0.93	Infin.	0.000	0.526	Non-Liq.	Non-Liq.	0.00
26.57	390.21	2.16	0.55	110	1.259	0.936	0.55	0.50	0.92	337.00	1.35		1	100	1.00	4.15	1.00	338.3	0.93	Infin.	0.000	0.527	Non-Liq.	Non-Liq.	0.00
26.74	369.74	2.08	0.56	110	1.263	0.936	0.57	0.50	0.92	318.77	1.37		1	100	1.00	4.20	1.00	320.0	0.93	Infin.	0.000	0.528	Non-Liq.	Non-Liq.	0.00
26.90	365.49	1.74	0.48	110	1.267	0.935	0.48	0.50	0.91	314.60	1.32		1	100	1.00	4.25	1.00	315.8	0.93	Infin.	0.000	0.529	Non-Liq.	Non-Liq.	0.00
27.07	355.65	1.92	0.54	110	1.271	0.934	0.54	0.50	0.91	305.63	1.37		1	100	1.00	4.30	1.00	306.8	0.93	Infin.	0.000	0.531	Non-Liq.	Non-Liq.	0.00
27.23	353.49	1.57	0.44	110	1.275	0.934	0.44	0.50	0.91	303.30	1.32		1	100	1.00	4.35	1.00	304.4	0.93	Infin.	0.000	0.532	Non-Liq.	Non-Liq.	0.00
27.40	346.49	1.68	0.48	110	1.279	0.933	0.49	0.50	0.91	296.81	1.35		1	100	1.00	4.40	1.00	297.9	0.93	Infin.	0.000	0.533	Non-Liq.	Non-Liq.	0.00
27.56	345.45	1.99	0.58	110	1.282	0.932	0.58	0.50	0.91	295.46	1.40		1	100	1.00	4.45	1.00	296.6	0.93	Infin.	0.000	0.534	Non-Liq.	Non-Liq.	0.00
27.72	320.92	1.75	0.55	110	1.286	0.932	0.55	0.50	0.91	273.99	1.41		1	100	1.00	4.50	1.00	275.0	0.92	Infin.	0.000	0.535	Non-Liq.	Non-Liq.	0.00
27.89	307.08	1.60	0.52	110	1.290	0.931	0.52	0.50	0.91	261.72	1.41		1	100	1.00	4.55	1.00	262.7	0.92	Infin.	0.000	0.536	Non-Liq.	Non-Liq.	0.00

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Overide	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	M=7.5 CSR	Induced Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
28.05	279.88	1.58	0.56	110	1.294	0.930	0.57	0.50	0.90	238.08	1.46		1	100	1.00	4.60	1.00	239.0	0.92	Infin.	0.000	0.538	**Non-Liq.**	Non-Liq.	**0.00**
28.22	242.13	3.57	1.47	110	1.298	0.929	1.48	0.55	0.89	203.34	1.81		1	100	1.12	4.65	1.00	227.7	0.92	Infin.	0.000	0.539	**Non-Liq.**	Non-Liq.	**0.00**
28.38	259.83	3.41	1.31	110	1.302	0.929	1.32	0.53	0.90	218.73	1.75		1	100	1.07	4.70	1.00	235.7	0.92	Infin.	0.000	0.540	**Non-Liq.**	Non-Liq.	**0.00**
28.54	290.00	2.93	1.01	110	1.306	0.928	1.01	0.50	0.90	245.61	1.63		1	100	1.00	4.75	1.00	246.5	0.92	Infin.	0.000	0.541	**Non-Liq.**	Non-Liq.	**0.00**
28.71	202.32	2.56	1.27	110	1.310	0.927	1.28	0.55	0.89	168.83	1.82		1	99	1.12	4.80	1.00	189.7	0.92	Infin.	0.000	0.542	**Non-Liq.**	Non-Liq.	**0.00**
28.87	189.41	1.37	0.72	110	1.314	0.926	0.73	0.51	0.90	159.28	1.67		1	96	1.01	4.85	1.00	162.2	0.92	Infin.	0.000	0.543	**Non-Liq.**	Non-Liq.	**0.00**
29.04	186.12	1.39	0.74	110	1.318	0.926	0.75	0.51	0.89	156.09	1.68		1	95	1.03	4.90	1.00	160.7	0.92	Infin.	0.000	0.544	**Non-Liq.**	Non-Liq.	**0.00**
29.20	187.42	1.54	0.82	110	1.322	0.925	0.83	0.52	0.89	156.67	1.71		1	95	1.04	4.95	1.00	164.1	0.91	Infin.	0.000	0.545	**Non-Liq.**	Non-Liq.	**0.00**
29.36	174.10	1.68	0.96	110	1.325	0.924	0.97	0.54	0.88	144.51	1.78		1	92	1.09	5.00	1.00	158.6	0.91	0.451	0.412	0.546	**0.76**	72%	**0.57**
29.53	162.50	1.73	1.07	110	1.329	0.923	1.07	0.56	0.88	134.10	1.84		1	89	1.13	5.05	1.00	152.5	0.91	0.410	0.374	0.547	**0.68**	78%	**0.71**
29.69	156.88	1.76	1.12	110	1.333	0.923	1.13	0.57	0.88	128.96	1.86		1	87	1.16	5.10	1.00	149.6	0.91	0.391	0.357	0.548	**0.65**	80%	**0.78**
29.86	154.45	1.73	1.12	110	1.337	0.922	1.13	0.57	0.88	126.69	1.87		1	87	1.16	5.15	1.00	147.5	0.91	0.378	0.344	0.549	**0.63**	82%	**0.83**
30.02	155.22	1.86	1.20	110	1.341	0.921	1.21	0.57	0.87	126.93	1.89		1	87	1.18	5.20	1.00	150.1	0.91	0.394	0.359	0.550	**0.65**	80%	**0.77**
30.18	159.05	1.71	1.08	110	1.345	0.920	1.09	0.56	0.87	130.24	1.85		1	88	1.14	5.25	1.00	149.5	0.91	0.391	0.355	0.551	**0.64**	81%	**0.78**
30.35	160.50	1.73	1.08	110	1.349	0.919	1.09	0.56	0.87	131.25	1.85		1	88	1.14	5.30	1.00	150.4	0.91	0.396	0.360	0.551	**0.65**	80%	**0.76**
30.51	177.29	1.78	1.00	110	1.353	0.918	1.01	0.55	0.87	145.44	1.79		1	92	1.10	5.35	1.00	160.6	0.91	Infin.	0.000	0.552	**Non-Liq.**	Non-Liq.	**0.00**
30.68	188.18	1.86	0.99	110	1.357	0.918	1.00	0.54	0.87	154.46	1.77		1	95	1.08	5.40	1.00	168.0	0.91	Infin.	0.000	0.553	**Non-Liq.**	Non-Liq.	**0.00**
30.84	196.86	2.12	1.08	110	1.361	0.917	1.09	0.54	0.87	161.22	1.78		1	97	1.09	5.45	1.00	176.9	0.90	Infin.	0.000	0.554	**Non-Liq.**	Non-Liq.	**0.00**
31.00	210.21	3.25	1.55	110	1.364	0.916	1.56	0.57	0.86	170.70	1.88		1	99	1.17	5.50	1.00	200.2	0.90	Infin.	0.000	0.555	**Non-Liq.**	Non-Liq.	**0.00**
31.17	210.66	3.44	1.63	110	1.368	0.915	1.64	0.58	0.86	170.54	1.90		1	99	1.19	5.55	1.00	202.9	0.90	Infin.	0.000	0.556	**Non-Liq.**	Non-Liq.	**0.00**
31.33	214.79	3.75	1.75	110	1.372	0.914	1.76	0.58	0.86	173.38	1.91		1	100	1.20	5.60	1.00	209.2	0.90	Infin.	0.000	0.556	**Non-Liq.**	Non-Liq.	**0.00**
31.50	227.93	4.18	1.83	110	1.376	0.913	1.84	0.58	0.86	183.75	1.91		1	100	1.20	5.65	1.00	221.6	0.90	Infin.	0.000	0.557	**Non-Liq.**	Non-Liq.	**0.00**
31.66	244.07	4.52	1.85	110	1.380	0.912	1.86	0.58	0.86	196.76	1.90		1	100	1.19	5.70	1.00	234.4	0.90	Infin.	0.000	0.558	**Non-Liq.**	Non-Liq.	**0.00**
31.82	246.01	4.47	1.82	110	1.384	0.911	1.83	0.57	0.86	198.13	1.89		1	100	1.18	5.75	1.00	234.6	0.90	Infin.	0.000	0.559	**Non-Liq.**	Non-Liq.	**0.00**
31.99	244.38	4.40	1.80	110	1.388	0.910	1.81	0.57	0.86	196.51	1.89		1	100	1.18	5.80	1.00	232.4	0.90	Infin.	0.000	0.559	**Non-Liq.**	Non-Liq.	**0.00**
32.15	229.90	4.32	1.88	110	1.392	0.909	1.89	0.58	0.85	184.00	1.92		1	100	1.21	5.85	1.00	223.5	0.90	Infin.	0.000	0.560	**Non-Liq.**	Non-Liq.	**0.00**
32.32	206.06	3.87	1.88	110	1.396	0.908	1.89	0.59	0.85	164.10	1.95		1	97	1.24	5.90	1.00	204.8	0.90	Infin.	0.000	0.561	**Non-Liq.**	Non-Liq.	**0.00**
32.48	204.67	2.85	1.39	110	1.400	0.907	1.40	0.56	0.85	164.05	1.86		1	97	1.15	5.95	1.00	189.2	0.89	Infin.	0.000	0.561	**Non-Liq.**	Non-Liq.	**0.00**
32.64	203.20	2.51	1.24	110	1.403	0.906	1.25	0.55	0.86	163.10	1.82		1	97	1.12	6.00	1.00	183.6	0.89	Infin.	0.000	0.562	**Non-Liq.**	Non-Liq.	**0.00**
32.81	212.73	2.19	1.03	110	1.407	0.905	1.04	0.53	0.86	171.59	1.75		1	99	1.07	6.05	1.00	184.3	0.89	Infin.	0.000	0.563	**Non-Liq.**	Non-Liq.	**0.00**
32.97	233.49	2.13	0.91	110	1.411	0.904	0.92	0.51	0.86	189.28	1.68		1	100	1.02	6.10	1.00	194.5	0.89	Infin.	0.000	0.563	**Non-Liq.**	Non-Liq.	**0.00**
33.14	254.97	2.22	0.87	110	1.415	0.903	0.88	0.50	0.86	207.21	1.64		1	100	1.00	6.15	1.00	208.0	0.89	Infin.	0.000	0.564	**Non-Liq.**	Non-Liq.	**0.00**
33.30	276.58	2.38	0.86	110	1.419	0.902	0.87	0.50	0.86	224.56	1.61		1	100	1.00	6.20	1.00	225.4	0.89	Infin.	0.000	0.565	**Non-Liq.**	Non-Liq.	**0.00**
33.46	326.02	2.80	0.86	110	1.423	0.901	0.86	0.50	0.86	264.54	1.56		1	100	1.00	6.25	1.00	265.5	0.89	Infin.	0.000	0.565	**Non-Liq.**	Non-Liq.	**0.00**
33.63	367.65	3.43	0.93	110	1.427	0.900	0.94	0.50	0.86	298.06	1.55		1	100	1.00	6.30	1.00	299.2	0.89	Infin.	0.000	0.566	**Non-Liq.**	Non-Liq.	**0.00**
33.79	402.25	3.96	0.99	110	1.431	0.899	0.99	0.50	0.86	325.77	1.55		1	100	1.00	6.35	1.00	327.0	0.89	Infin.	0.000	0.566	**Non-Liq.**	Non-Liq.	**0.00**
33.96	373.21	2.74	0.73	110	1.435	0.898	0.74	0.50	0.86	301.75	1.47		1	100	1.00	6.40	1.00	302.9	0.89	Infin.	0.000	0.567	**Non-Liq.**	Non-Liq.	**0.00**
34.12	367.69	2.68	0.73	110	1.439	0.897	0.73	0.50	0.86	296.87	1.47		1	100	1.00	6.45	1.00	298.0	0.88	Infin.	0.000	0.567	**Non-Liq.**	Non-Liq.	**0.00**
34.28	347.49	2.00	0.58	110	1.443	0.896	0.58	0.50	0.86	280.11	1.42		1	100	1.00	6.50	1.00	281.2	0.88	Infin.	0.000	0.568	**Non-Liq.**	Non-Liq.	**0.00**
34.45	363.15	2.39	0.66	110	1.446	0.895	0.66	0.50	0.86	292.39	1.45		1	100	1.00	6.55	1.00	293.5	0.88	Infin.	0.000	0.568	**Non-Liq.**	Non-Liq.	**0.00**
34.61	354.73	2.83	0.80	110	1.450	0.894	0.80	0.50	0.85	285.19	1.51		1	100	1.00	6.60	1.00	286.3	0.88	Infin.	0.000	0.569	**Non-Liq.**	Non-Liq.	**0.00**
34.78	326.42	3.00	0.92	110	1.454	0.893	0.92	0.50	0.85	261.98	1.58		1	100	1.00	6.65	1.00	263.0	0.88	Infin.	0.000	0.569	**Non-Liq.**	Non-Liq.	**0.00**
34.94	311.03	2.62	0.84	110	1.458	0.892	0.85	0.50	0.85	249.24	1.57		1	100	1.00	6.70	1.00	250.2	0.88	Infin.	0.000	0.570	**Non-Liq.**	Non-Liq.	**0.00**
35.10	313.61	2.84	0.90	110	1.462	0.890	0.91	0.50	0.85	250.98	1.59		1	100	1.00	6.75	1.00	251.9	0.88	Infin.	0.000	0.570	**Non-Liq.**	Non-Liq.	**0.00**
35.27	310.40	3.07	0.99	110	1.466	0.889	0.99	0.50	0.85	248.06	1.62		1	100	1.00	6.80	1.00	249.0	0.88	Infin.	0.000	0.570	**Non-Liq.**	Non-Liq.	**0.00**
35.43	294.50	3.05	1.03	110	1.470	0.888	1.04	0.50	0.85	234.64	1.65		1	100	1.01	6.85	1.00	237.1	0.88	Infin.	0.000	0.571	**Non-Liq.**	Non-Liq.	**0.00**
35.60	285.50	2.83	0.99	110	1.474	0.887	1.00	0.50	0.85	227.21	1.65		1	100	1.00	6.90	1.00	228.9	0.88	Infin.	0.000	0.571	**Non-Liq.**	Non-Liq.	**0.00**
35.76	280.39	2.74	0.98	110	1.478	0.886	0.98	0.50	0.85	222.80	1.65		1	100	1.00	6.95	1.00	224.7	0.87	Infin.	0.000	0.572	**Non-Liq.**	Non-Liq.	**0.00**
35.93	276.31	2.73	0.99	110	1.482	0.885	0.99	0.51	0.84	219.05	1.66		1	100	1.01	7.00	1.00	222.3	0.87	Infin.	0.000	0.572	**Non-Liq.**	Non-Liq.	**0.00**
36.09	271.84	2.66	0.98	110	1.485	0.883	0.99	0.51	0.84	215.14	1.66		1	100	1.01	7.05	1.00	218.7	0.87	Infin.	0.000	0.572	**Non-Liq.**	Non-Liq.	**0.00**
36.25	266.67	2.73	1.02	110	1.489	0.882	1.03	0.51	0.84	210.29	1.68		1	100	1.03	7.10	1.00	216.8	0.87	Infin.	0.000	0.573	**Non-Liq.**	Non-Liq.	**0.00**
36.42	266.74	3.17	1.19	110	1.493	0.881	1.19	0.53	0.83	209.00	1.73		1	100	1.06	7.15	1.00	222.4	0.87	Infin.	0.000	0.573	**Non-Liq.**	Non-Liq.	**0.00**
36.58	258.25	3.44	1.33	110	1.497	0.880	1.34	0.54	0.83	201.01	1.78		1	100	1.09	7.20	1.00	220.6	0.87	Infin.	0.000	0.573	**Non-Liq.**	Non-Liq.	**0.00**
36.75	253.87	3.88	1.53	110	1.501	0.878	1.54	0.56	0.82	196.21	1.83		1	100	1.13	7.25	1.00	223.1	0.87	Infin.	0.000	0.573	**Non-Liq.**	Non-Liq.	**0.00**
36.91	268.14	4.26	1.59	110	1.505	0.877	1.60	0.56	0.82	207.04	1.83		1	100	1.13	7.30	1.00	235.1	0.87	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
37.07	272.86	5.01	1.84	110	1.509	0.876	1.85	0.57	0.82	209.36	1.88		1	100	1.17	7.35	1.00	245.8	0.87	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
37.24	267.15	4.61	1.73	110	1.513	0.875	1.74	0.57	0.82	205.00	1.86		1	100	1.16	7.40	1.00	237.9	0.87	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
37.40	258.14	4.98	1.93	110	1.517	0.873	1.94	0.58	0.81	196.71	1.91		1	100	1.20	7.45	1.00	237.1	0.87	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
37.57	251.61	4.92	1.96	110	1.521	0.872	1.97	0.59	0.81	191.15	1.92		1	100	1.21	7.50	1.00	232.8	0.86	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
37.73	253.20	5.10	2.01	110	1.525	0.871	2.02	0.59	0.81	191.89	1.93		1	100	1.22	7.55	1.00	235.4	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
37.89	250.10	4.99	1.99	110	1.528	0.869	2.01	0.59	0.81	189.23	1.93		1	100	1.22	7.60	1.00	232.3	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
38.06	236.10	4.60	1.95	110	1.532	0.868	1.96	0.59	0.80	178.13	1.94		1	100	1.23	7.65	1.00	220.2	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
38.22	234.67	4.00	1.70	110	1.536	0.867	1.71	0.58	0.81	177.66	1.90		1	100	1.19	7.70	1.00	211.7	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
38.39	251.51	3.44	1.37	110	1.540	0.865	1.38	0.55	0.81	192.25	1.80		1	100	1.11	7.75	1.00	214.0	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
38.55	261.62	3.13	1.20	110	1.544	0.864	1.20	0.53	0.82	201.02	1.75		1	100	1.07	7.80	1.00	215.9	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
38.71	270.23	2.71	1.00	110	1.548	0.863	1.01	0.51	0.82	209.01	1.68		1	100	1.02	7.85	1.00	214.8	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
38.88	270.03	2.45	0.91	110	1.552	0.861	0.91	0.50	0.83	209.36	1.65		1	100	1.00	7.90	1.00	210.4	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
39.04	285.58	1.88	0.66	110	1.556	0.860	0.66	0.50	0.82	221.38	1.53		1	100	1.00	7.95	1.00	222.2	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
39.21	285.94	1.84	0.64	110	1.560	0.859	0.65	0.50	0.82	221.38	1.53		1	100	1.00	8.00	1.00	222.2	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
39.37	298.71	2.11	0.71	110	1.564	0.857	0.71	0.50	0.82	231.03	1.54		1	100	1.00	8.05	1.00	231.9	0.86	Infin.	0.000	0.576	**Non-Liq.**	Non-Liq.	**0.00**
39.53	335.11	2.36	0.71	110	1.567	0.856	0.71	0.50	0.82	259.01	1.50		1	100	1.00	8.10	1.00	260.0	0.85	Infin.	0.000	0.576	**Non-Liq.**	Non-Liq.	**0.00**
39.70	334.95	4.67	1.39	110	1.571	0.854	1.40	0.53	0.81	255.80	1.73		1	100	1.06	8.15	1.00	271.7	0.85	Infin.	0.000	0.576	**Non-Liq.**	Non-Liq.	**0.00**
39.86	365.36	4.60	1.26	110	1.575	0.853	1.26	0.51	0.82	280.75	1.67		1	100	1.02	8.20	1.00	286.9	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
40.03	354.98	4.90	1.38	110	1.579	0.852	1.39	0.52	0.81	271.07	1.71		1	100	1.05	8.25	1.00	284.5	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
40.19	386.31	4.35	1.13	110	1.583	0.850	1.13	0.50	0.82	297.27	1.62		1	100	1.00	8.30	1.00	298.4	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
40.35	312.02	3.03	0.97	110	1.587	0.849	0.98	0.50	0.82	239.57	1.63		1	100	1.00	8.35	1.00	240.5	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
40.52	311.39	2.28	0.73	110	1.591	0.847	0.74	0.50	0.82	238.79	1.54		1	100	1.00	8.40	1.00	239.7	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
40.68	294.45	1.66	0.56	110	1.595	0.846	0.57	0.50	0.81	225.45	1.48		1	100	1.00	8.45	1.00	226.3	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
40.85	281.98	1.62	0.58	110	1.599	0.844	0.58	0.50	0.81	215.59	1.50		1	100	1.00	8.50	1.00	216.4	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
41.01	243.47	1.88	0.77	110	1.603	0.843	0.78	0.50	0.81	185.75	1.64		1	100	1.00	8.55	1.00	186.4	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
41.17	276.31	2.79	1.01	110	1.607	0.841	1.01	0.51	0.81	209.65	1.68		1	100	1.02	8.60	1.00	215.6	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
41.34	272.69	3.15	1.16	110	1.610	0.840	1.16	0.53	0.80	205.34	1.73		1	100	1.06	8.65	1.00	218.0	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
41.50	280.76	3.48	1.24	110	1.614	0.838	1.25	0.53	0.80	210.77	1.74		1	100	1.07	8.70	1.00	226.0	0.84	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
41.67	325.03	3.18	0.98	110	1.618	0.837	0.98	0.50	0.81	247.17	1.62		1	100	1.00	8.75	1.00	248.1	0.84	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
41.83	361.66	3.38	0.94	110	1.622	0.835	0.94	0.50	0.81	274.83	1.58		1	100	1.00	8.80	1.00	275.9	0.84	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
41.99	372.69	3.26	0.87	110	1.626	0.834	0.88	0.50	0.81	282.91	1.55		1	100	1.00	8.85	1.00	284.0	0.84	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
42.16	396.43	3.53	0.89	110	1.630	0.832	0.89	0.50	0.81	300.64	1.53		1	100	1.00	8.90	1.00	301.8	0.84	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
42.32	442.33	3.55	0.80	110	1.634	0.831	0.81	0.50	0.80	335.19	1.47		1	100	1.00	8.95	1.00	336.4	0.84	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
42.49	458.56	3.30	0.72	110	1.638	0.829	0.72	0.50	0.80	347.12	1.42		1	100	1.00	9.00	1.00	348.4	0.84	Infin.	0.000	0.573	**Non-Liq.**	Non-Liq.	**0.00**
42.65	440.28	2.98	0.68	110	1.642	0.827	0.68	0.50	0.80	332.83	1.42		1	100	1.00	9.05	1.00	334.1	0.84	Infin.	0.000	0.573	**Non-Liq.**	Non-Liq.	**0.00**
42.81	431.91	2.59	0.60	110	1.646	0.826	0.60	0.50	0.80	326.09	1.38		1	100	1.00	9.10	1.00	327.3	0.84	Infin.	0.000	0.573	**Non-Liq.**	Non-Liq.	**0.00**
42.98	428.57	2.24	0.52	110	1.649	0.824	0.52	0.50	0.80	323.17	1.34		1	100	1.00	9.15	1.00	324.4	0.84	Infin.	0.000	0.573	**Non-Liq.**	Non-Liq.	**0.00**

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_c	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	M=7.5 CSR	Induced Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
43.14	428.50	2.17	0.51	110	1.653	0.823	0.51	0.50	0.80	322.73	1.33		1	100	1.00	9.20	1.00	323.9	0.84	Infin.	0.000	0.572	**Non-Liq.**	Non-Liq.	**0.00**
43.31	431.32	1.87	0.43	110	1.657	0.821	0.43	0.50	0.80	324.48	1.29		1	100	1.00	9.25	1.00	325.7	0.84	Infin.	0.000	0.572	**Non-Liq.**	Non-Liq.	**0.00**
43.47	442.46	2.46	0.56	110	1.661	0.820	0.56	0.50	0.80	332.50	1.35		1	100	1.00	9.30	1.00	333.7	0.83	Infin.	0.000	0.572	**Non-Liq.**	Non-Liq.	**0.00**
43.64	485.55	2.74	0.56	110	1.665	0.818	0.57	0.50	0.80	364.57	1.33		1	100	1.00	9.35	1.00	365.9	0.83	Infin.	0.000	0.572	**Non-Liq.**	Non-Liq.	**0.00**
43.80	480.46	2.91	0.61	110	1.669	0.816	0.61	0.50	0.80	360.31	1.36		1	100	1.00	9.40	1.00	361.7	0.83	Infin.	0.000	0.571	**Non-Liq.**	Non-Liq.	**0.00**
43.96	434.40	2.34	0.54	110	1.673	0.815	0.54	0.50	0.80	325.27	1.35		1	100	1.00	9.45	1.00	326.5	0.83	Infin.	0.000	0.571	**Non-Liq.**	Non-Liq.	**0.00**
44.13	424.26	2.47	0.58	110	1.677	0.813	0.58	0.50	0.79	317.27	1.38		1	100	1.00	9.50	1.00	318.5	0.83	Infin.	0.000	0.571	**Non-Liq.**	Non-Liq.	**0.00**
44.29	417.78	3.15	0.75	110	1.681	0.811	0.76	0.50	0.79	312.04	1.47		1	100	1.00	9.55	1.00	313.2	0.83	Infin.	0.000	0.570	**Non-Liq.**	Non-Liq.	**0.00**
44.46	434.65	2.76	0.64	110	1.685	0.810	0.64	0.50	0.79	324.31	1.40		1	100	1.00	9.60	1.00	325.5	0.83	Infin.	0.000	0.570	**Non-Liq.**	Non-Liq.	**0.00**
44.62	474.92	3.88	0.82	110	1.689	0.808	0.82	0.50	0.79	354.06	1.46		1	100	1.00	9.65	1.00	355.4	0.83	Infin.	0.000	0.569	**Non-Liq.**	Non-Liq.	**0.00**
44.78	477.42	3.92	0.82	110	1.692	0.807	0.82	0.50	0.79	355.52	1.46		1	100	1.00	9.70	1.00	356.8	0.83	Infin.	0.000	0.569	**Non-Liq.**	Non-Liq.	**0.00**
44.95	400.75	3.18	0.79	110	1.696	0.805	0.80	0.50	0.79	297.88	1.50		1	100	1.00	9.75	1.00	299.0	0.83	Infin.	0.000	0.569	**Non-Liq.**	Non-Liq.	**0.00**
45.11	375.01	3.32	0.89	110	1.700	0.803	0.89	0.50	0.79	278.34	1.56		1	100	1.00	9.80	1.00	279.4	0.83	Infin.	0.000	0.568	**Non-Liq.**	Non-Liq.	**0.00**
45.28	353.62	3.70	1.05	110	1.704	0.802	1.05	0.50	0.79	262.09	1.63		1	100	1.00	9.85	1.00	263.1	0.83	Infin.	0.000	0.568	**Non-Liq.**	Non-Liq.	**0.00**
45.44	350.76	3.99	1.14	110	1.708	0.800	1.14	0.51	0.78	258.98	1.66		1	100	1.01	9.90	1.00	262.3	0.83	Infin.	0.000	0.567	**Non-Liq.**	Non-Liq.	**0.00**
45.60	361.90	4.33	1.20	110	1.712	0.798	1.20	0.51	0.78	266.57	1.67		1	100	1.02	9.95	1.00	271.8	0.82	Infin.	0.000	0.567	**Non-Liq.**	Non-Liq.	**0.00**
45.77	370.34	4.64	1.25	110	1.716	0.797	1.26	0.51	0.78	272.10	1.68		1	100	1.02	####	1.00	279.3	0.82	Infin.	0.000	0.567	**Non-Liq.**	Non-Liq.	**0.00**
45.93	366.89	5.10	1.39	110	1.720	0.795	1.40	0.52	0.78	267.69	1.72		1	100	1.05	####	1.00	282.0	0.82	Infin.	0.000	0.566	**Non-Liq.**	Non-Liq.	**0.00**
46.10	356.56	4.91	1.38	110	1.724	0.793	1.38	0.52	0.77	259.60	1.72		1	100	1.05	####	1.00	274.4	0.82	Infin.	0.000	0.566	**Non-Liq.**	Non-Liq.	**0.00**
46.26	358.23	5.52	1.54	110	1.728	0.792	1.55	0.54	0.77	259.00	1.76		1	100	1.08	####	1.00	280.7	0.82	Infin.	0.000	0.565	**Non-Liq.**	Non-Liq.	**0.00**
46.42	364.21	5.48	1.51	110	1.731	0.790	1.51	0.53	0.77	263.52	1.75		1	100	1.07	####	1.00	283.3	0.82	Infin.	0.000	0.565	**Non-Liq.**	Non-Liq.	**0.00**
46.59	355.49	5.43	1.53	110	1.735	0.788	1.53	0.54	0.77	256.41	1.76		1	100	1.08	####	1.00	277.8	0.82	Infin.	0.000	0.564	**Non-Liq.**	Non-Liq.	**0.00**
46.75	363.06	4.83	1.33	110	1.739	0.787	1.34	0.52	0.77	263.74	1.71		1	100	1.04	####	1.00	275.9	0.82	Infin.	0.000	0.564	**Non-Liq.**	Non-Liq.	**0.00**
46.92	369.03	3.46	0.94	110	1.743	0.785	0.94	0.50	0.78	270.45	1.58		1	100	1.00	####	1.00	271.5	0.82	Infin.	0.000	0.563	**Non-Liq.**	Non-Liq.	**0.00**
47.08	367.25	3.54	0.96	110	1.747	0.783	0.97	0.50	0.78	268.84	1.59		1	100	1.00	####	1.00	269.8	0.82	Infin.	0.000	0.563	**Non-Liq.**	Non-Liq.	**0.00**
47.24	360.71	3.46	0.96	110	1.751	0.782	0.96	0.50	0.78	263.73	1.60		1	100	1.00	####	1.00	264.7	0.82	Infin.	0.000	0.562	**Non-Liq.**	Non-Liq.	**0.00**
47.41	359.57	3.90	1.08	110	1.755	0.780	1.09	0.50	0.78	262.60	1.64		1	100	1.00	####	1.00	263.6	0.82	Infin.	0.000	0.562	**Non-Liq.**	Non-Liq.	**0.00**
47.57	355.34	4.23	1.19	110	1.759	0.778	1.20	0.51	0.77	257.82	1.67		1	100	1.02	####	1.00	264.2	0.82	Infin.	0.000	0.561	**Non-Liq.**	Non-Liq.	**0.00**
47.74	345.82	4.41	1.28	110	1.763	0.777	1.28	0.52	0.77	249.35	1.71		1	100	1.04	####	1.00	261.0	0.82	Infin.	0.000	0.561	**Non-Liq.**	Non-Liq.	**0.00**
47.90	339.06	4.15	1.22	110	1.767	0.775	1.23	0.52	0.77	244.49	1.70		1	100	1.04	####	1.00	254.5	0.81	Infin.	0.000	0.560	**Non-Liq.**	Non-Liq.	**0.00**
48.06	331.05	4.03	1.22	110	1.770	0.773	1.23	0.52	0.77	238.19	1.70		1	100	1.04	####	1.00	248.9	0.81	Infin.	0.000	0.560	**Non-Liq.**	Non-Liq.	**0.00**
48.23	319.37	3.94	1.23	110	1.774	0.772	1.24	0.52	0.76	228.93	1.72		1	100	1.05	####	1.00	241.6	0.81	Infin.	0.000	0.559	**Non-Liq.**	Non-Liq.	**0.00**
48.39	303.85	3.75	1.23	110	1.778	0.770	1.24	0.53	0.76	216.98	1.74		1	100	1.06	####	1.00	231.2	0.81	Infin.	0.000	0.559	**Non-Liq.**	Non-Liq.	**0.00**
48.56	293.74	3.57	1.21	110	1.782	0.768	1.22	0.53	0.76	209.31	1.74		1	100	1.06	####	1.00	223.7	0.81	Infin.	0.000	0.558	**Non-Liq.**	Non-Liq.	**0.00**
48.72	291.29	3.33	1.14	110	1.786	0.767	1.15	0.52	0.76	207.88	1.72		1	100	1.05	####	1.00	219.7	0.81	Infin.	0.000	0.558	**Non-Liq.**	Non-Liq.	**0.00**
48.88	298.38	3.16	1.06	110	1.790	0.765	1.06	0.51	0.76	213.83	1.69		1	100	1.03	####	1.00	221.3	0.81	Infin.	0.000	0.557	**Non-Liq.**	Non-Liq.	**0.00**
49.05	325.89	3.09	0.95	110	1.794	0.763	0.95	0.50	0.77	235.25	1.63		1	100	1.00	####	1.00	236.1	0.81	Infin.	0.000	0.556	**Non-Liq.**	Non-Liq.	**0.00**
49.21	362.41	3.01	0.83	110	1.798	0.762	0.84	0.50	0.77	261.47	1.55		1	100	1.00	####	1.00	262.4	0.81	Infin.	0.000	0.556	**Non-Liq.**	Non-Liq.	**0.00**
49.38	375.59	3.02	0.80	110	1.802	0.760	0.81	0.50	0.77	270.73	1.53		1	100	1.00	####	1.00	271.7	0.81	Infin.	0.000	0.555	**Non-Liq.**	Non-Liq.	**0.00**
49.54	373.37	2.95	0.79	110	1.806	0.758	0.79	0.50	0.77	268.83	1.53		1	100	1.00	####	1.00	269.8	0.81	Infin.	0.000	0.555	**Non-Liq.**	Non-Liq.	**0.00**
49.70	359.81	2.88	0.80	110	1.810	0.757	0.80	0.50	0.76	258.74	1.54		1	100	1.00	####	1.00	259.7	0.81	Infin.	0.000	0.554	**Non-Liq.**	Non-Liq.	**0.00**
49.87	336.99	2.78	0.82	110	1.813	0.755	0.83	0.50	0.76	241.98	1.57		1	100	1.00	####	1.00	242.9	0.81	Infin.	0.000	0.553	**Non-Liq.**	Non-Liq.	**0.00**
50.03	346.15	2.56	0.74	110	1.817	0.753	0.74	0.50	0.76	248.32	1.53		1	100	1.00	####	1.00	249.3	0.81	Infin.	0.000	0.553	**Non-Liq.**	Non-Liq.	**0.00**
50.20	381.96	2.51	0.66	110	1.821	0.752	0.66	0.50	0.76	273.85	1.46		1	100	1.00	####	1.00	274.9	0.80	Infin.	0.000	0.552	**Non-Liq.**	Non-Liq.	**0.00**
50.36	392.72	2.85	0.73	110	1.825	0.750	0.73	0.50	0.76	281.30	1.49		1	100	1.00	####	1.00	282.4	0.80	Infin.	0.000	0.552	**Non-Liq.**	Non-Liq.	**0.00**
50.52	396.83	2.89	0.73	110	1.829	0.748	0.73	0.50	0.76	283.95	1.49		1	100	1.00	####	1.00	285.0	0.80	Infin.	0.000	0.551	**Non-Liq.**	Non-Liq.	**0.00**
50.69	396.75	3.02	0.76	110	1.833	0.747	0.76	0.50	0.76	283.59	1.50		1	100	1.00	####	1.00	284.6	0.80	Infin.	0.000	0.550	**Non-Liq.**	Non-Liq.	**0.00**
50.85	407.28	3.00	0.74	110	1.837	0.745	0.74	0.50	0.76	290.84	1.48		1	100	1.00	####	1.00	291.9	0.80	Infin.	0.000	0.550	**Non-Liq.**	Non-Liq.	**0.00**
51.02	402.29	3.32	0.83	110	1.841	0.743	0.83	0.50	0.76	286.95	1.52		1	100	1.00	####	1.00	288.0	0.80	Infin.	0.000	0.549	**Non-Liq.**	Non-Liq.	**0.00**
51.18	394.50	3.33	0.84	110	1.845	0.742	0.85	0.50	0.76	281.07	1.54		1	100	1.00	####	1.00	282.1	0.80	Infin.	0.000	0.549	**Non-Liq.**	Non-Liq.	**0.00**
51.35	393.59	3.17	0.80	110	1.849	0.740	0.81	0.50	0.76	280.12	1.52		1	100	1.00	####	1.00	281.2	0.80	Infin.	0.000	0.548	**Non-Liq.**	Non-Liq.	**0.00**
51.51	390.67	3.12	0.80	110	1.852	0.738	0.80	0.50	0.76	277.73	1.52		1	100	1.00	####	1.00	278.8	0.80	Infin.	0.000	0.547	**Non-Liq.**	Non-Liq.	**0.00**
51.67	388.71	2.96	0.76	110	1.856	0.737	0.76	0.50	0.75	276.04	1.51		1	100	1.00	####	1.00	277.1	0.80	Infin.	0.000	0.547	**Non-Liq.**	Non-Liq.	**0.00**
51.84	368.01	2.86	0.78	110	1.860	0.735	0.78	0.50	0.75	260.99	1.53		1	100	1.00	####	1.00	262.0	0.80	Infin.	0.000	0.546	**Non-Liq.**	Non-Liq.	**0.00**
52.00	352.83	2.71	0.77	110	1.864	0.733	0.77	0.50	0.75	249.91	1.54		1	100	1.00	####	1.00	250.8	0.80	Infin.	0.000	0.545	**Non-Liq.**	Non-Liq.	**0.00**
52.17	339.28	2.70	0.80	110	1.868	0.732	0.80	0.50	0.75	240.00	1.57		1	100	1.00	####	1.00	240.9	0.80	Infin.	0.000	0.545	**Non-Liq.**	Non-Liq.	**0.00**
52.33	334.38	2.52	0.75	110	1.872	0.730	0.76	0.50	0.75	236.27	1.55		1	100	1.00	####	1.00	237.2	0.80	Infin.	0.000	0.544	**Non-Liq.**	Non-Liq.	**0.00**
52.49	338.19	2.48	0.73	110	1.876	0.728	0.74	0.50	0.75	238.72	1.54		1	100	1.00	####	1.00	239.6	0.80	Infin.	0.000	0.543	**Non-Liq.**	Non-Liq.	**0.00**
52.66	343.61	2.50	0.73	110	1.880	0.727	0.73	0.50	0.75	242.32	1.53		1	100	1.00	####	1.00	243.2	0.79	Infin.	0.000	0.543	**Non-Liq.**	Non-Liq.	**0.00**
52.82	346.70	2.63	0.76	110	1.884	0.725	0.76	0.50	0.75	244.25	1.54		1	100	1.00	####	1.00	245.2	0.79	Infin.	0.000	0.542	**Non-Liq.**	Non-Liq.	**0.00**
52.99	356.95	2.69	0.75	110	1.888	0.724	0.76	0.50	0.75	251.25	1.53		1	100	1.00	####	1.00	252.2	0.79	Infin.	0.000	0.542	**Non-Liq.**	Non-Liq.	**0.00**
53.15	371.38	2.91	0.78	110	1.892	0.722	0.79	0.50	0.75	261.19	1.53		1	100	1.00	####	1.00	262.2	0.79	Infin.	0.000	0.541	**Non-Liq.**	Non-Liq.	**0.00**
53.31	388.05	3.41	0.88	110	1.895	0.720	0.88	0.50	0.75	272.69	1.56		1	100	1.00	####	1.00	273.7	0.79	Infin.	0.000	0.540	**Non-Liq.**	Non-Liq.	**0.00**
53.48	350.81	3.06	0.87	110	1.899	0.719	0.88	0.50	0.75	246.13	1.59		1	100	1.00	####	1.00	247.1	0.79	Infin.	0.000	0.540	**Non-Liq.**	Non-Liq.	**0.00**
53.64	345.68	2.79	0.81	110	1.903	0.717	0.81	0.50	0.75	242.26	1.57		1	100	1.00	####	1.00	243.2	0.79	Infin.	0.000	0.539	**Non-Liq.**	Non-Liq.	**0.00**
53.81	342.94	2.87	0.84	110	1.907	0.716	0.84	0.50	0.74	240.08	1.58		1	100	1.00	####	1.00	241.0	0.79	Infin.	0.000	0.538	**Non-Liq.**	Non-Liq.	**0.00**
53.97	347.41	2.83	0.81	110	1.911	0.714	0.82	0.50	0.74	242.98	1.57		1	100	1.00	####	1.00	243.9	0.79	Infin.	0.000	0.538	**Non-Liq.**	Non-Liq.	**0.00**
54.13	347.69	3.06	0.88	110	1.915	0.712	0.88	0.50	0.74	242.93	1.59		1	100	1.00	####	1.00	243.8	0.79	Infin.	0.000	0.537	**Non-Liq.**	Non-Liq.	**0.00**
54.30	347.55	3.09	0.89	110	1.919	0.711	0.89	0.50	0.74	242.58	1.60		1	100	1.00	####	1.00	243.5	0.79	Infin.	0.000	0.536	**Non-Liq.**	Non-Liq.	**0.00**
54.46	345.11	3.01	0.87	110	1.923	0.709	0.88	0.50	0.74	240.62	1.59		1	100	1.00	####	1.00	241.5	0.79	Infin.	0.000	0.536	**Non-Liq.**	Non-Liq.	**0.00**
54.63	336.26	2.94	0.87	110	1.927	0.708	0.88	0.50	0.74	234.17	1.60		1	100	1.00	####	1.00	235.0	0.79	Infin.	0.000	0.535	**Non-Liq.**	Non-Liq.	**0.00**
54.79	331.85	2.87	0.86	110	1.931	0.706	0.87	0.50	0.74	230.85	1.60		1	100	1.00	####	1.00	231.7	0.79	Infin.	0.000	0.534	**Non-Liq.**	Non-Liq.	**0.00**
54.95	330.23	2.82	0.85	110	1.934	0.705	0.86	0.50	0.74	229.48	1.60		1	100	1.00	####	1.00	230.3	0.79	Infin.	0.000	0.534	**Non-Liq.**	Non-Liq.	**0.00**
55.12	319.45	2.55	0.80	110	1.938	0.703	0.80	0.50	0.74	221.72	1.59		1	100	1.00	####	1.00	222.5	0.78	Infin.	0.000	0.533	**Non-Liq.**	Non-Liq.	**0.00**
55.28	307.70	2.09	0.68	110	1.942	0.701	0.68	0.50	0.74	213.29	1.55		1	100	1.00	####	1.00	214.1	0.78	Infin.	0.000	0.532	**Non-Liq.**	Non-Liq.	**0.00**
55.45	302.76	1.94	0.64	110	1.946	0.700	0.64	0.50	0.74	209.83	1.54		1	100	1.00	####	1.00	210.4	0.78	Infin.	0.000	0.532	**Non-Liq.**	Non-Liq.	**0.00**
55.61	284.61	1.51	0.53	110	1.950	0.698	0.53	0.50	0.74	196.79	1.51		1	100	1.00	####	1.00	197.5	0.78	Infin.	0.000	0.531	**Non-Liq.**	Non-Liq.	**0.00**
55.77	294.51	1.35	0.46	110	1.954	0.697	0.46	0.50	0.74	203.47	1.46		1	100	1.00	####	1.00	204.2	0.78	Infin.	0.000	0.530	**Non-Liq.**	Non-Liq.	**0.00**
55.94	280.07	1.03	0.37	110	1.958	0.695	0.37	0.50	0.74	193.23	1.42		1	100	1.00	####	1.00	194.0	0.78	Infin.	0.000	0.530	**Non-Liq.**	Non-Liq.	**0.00**
56.10	225.15	1.83	0.81	110	1.962	0.694	0.82	0.52	0.72	152.78	1.71		1	94	1.05	####	1.00	160.7	0.78	Infin.	0.000	0.529	**Non-Liq.**	Non-Liq.	**0.00**
56.27	117.85	2.59	2.20	110	1.966	0.692	2.23	0.68	0.65	71.73	2.25		1	63	1.80		1.00	129.2	0.83	0.281	0.233	0.528	**0.44**	94%	**1.12**
56.43	54.87	1.79	3.26	110	1.970	0.691	3.38	0.80	0.61	30.37	2.65		0						0.88			0.528	**Non-Liq.**	Non-Liq.	**0.00**
56.59	32.82	0.74	2.25	110	1.974	0.689	2.40	0.83	0.60	17.36	2.74		0						0.88			0.527	**Non-Liq.**	Non-Liq.	**0.00**
56.76	25.50	0.61	2.38	110	1.977	0.688	2.58	0.87	0.58	12.91	2.87		0						0.88			0.526	**Non-Liq.**	Non-Liq.	**0.00**
56.92	20.56	0.82	3.98	110	1.981	0.686	4.40	0.94	0.55	9.74	3.10		0						0.88			0.526	**Non-Liq.**	Non-Liq.	**0.00**
57.09	35.90	0.80	2.22	110	1.985	0.685	2.35	0.82	0.60	19.14	2.71		0						0.88			0.525	**Non-Liq.**	Non-Liq.	**0.00**
57.25	57.52	0.96	1.67	110	1.989	0.683	1.73	0.74	0.63	32.91	2.44		1	31	2.47		1.00	81.4	0.88	0.130	0.115	0.524	**0.22**	99%	**1.79**
57.41	35.14	0.94	2.68	110	1.993	0.682	2.84	0.84	0.59	18.42	2.77		0						0.88			0.524	**Non-Liq.**	Non-Liq.	**0.00**
57.58	22.41	0.81	3.61	110	1.997	0.680	3.97	0.92	0.56	10.75	3.04		0						0.88			0.523	**Non-Liq.**	Non-Liq.	**0.00**
57.74	20.05	0.55	2.73	110	2.001	0.679	3.04	0.91	0.56	9.53	3.02		0						0.88			0.523	**Non-Liq.**	Non-Liq.	**0.00**
57.91	18.79	0.54	2.88	110	2.005	0.678	3.23	0.93	0.55	8.78	3.06		0						0.88			0.522	**Non-Liq.**	Non-Liq.	**0.00**
58.07	18.85	0.57	3.00	110	2.009	0.676	3.36	0.93	0.55	8.77	3.07		0						0.88			0.521	**Non-Liq.**	Non-Liq.	**0.00**

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff. Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	*Volumetric Strain (%)*
58.23	17.52	0.53	3.01	110	2.013	0.675	3.40	0.94	0.55	8.01	3.11		0						0.88			0.521	**Non-Liq.**	Non-Liq.	**0.00**
58.40	18.20	0.44	2.44	110	2.016	0.673	2.74	0.92	0.55	8.46	3.04		0						0.88			0.520	**Non-Liq.**	Non-Liq.	**0.00**
58.56	18.28	0.56	3.06	110	2.020	0.672	3.44	0.94	0.55	8.39	3.09		0						0.88			0.519	**Non-Liq.**	Non-Liq.	**0.00**
58.73	23.81	0.80	3.36	110	2.024	0.671	3.67	0.91	0.55	11.42	3.00		0						0.88			0.519	**Non-Liq.**	Non-Liq.	**0.00**
58.89	41.12	1.24	3.02	110	2.028	0.669	3.18	0.83	0.58	21.51	2.75		0						0.88			0.518	**Non-Liq.**	Non-Liq.	**0.00**
59.06	86.65	1.81	2.08	110	2.032	0.668	2.13	0.71	0.63	50.20	2.35		1	48	2.13		1.00	106.7	0.88	0.193	0.169	0.517	**0.33**	98%	**1.40**
59.22	119.37	1.93	1.62	110	2.036	0.666	1.64	0.66	0.65	72.21	2.16		1	63	1.57		1.00	113.4	0.82	0.216	0.177	0.517	**0.34**	97%	**1.31**
59.38	142.80	2.30	1.61	110	2.040	0.665	1.63	0.64	0.66	87.60	2.09		1	71	1.45		1.00	126.6	0.77	0.269	0.207	0.516	**0.40**	95%	**1.15**
59.55	118.50	3.06	2.58	110	2.044	0.664	2.62	0.70	0.63	69.37	2.31		1	62	1.98		1.00	137.6	0.82	0.322	0.265	0.516	**0.51**	90%	**1.03**
59.71	77.32	3.45	4.46	110	2.048	0.662	4.58	0.80	0.59	41.98	2.64		0						0.88			0.515	**Non-Liq.**	Non-Liq.	**0.00**
59.88	39.16	2.67	6.81	110	2.052	0.661	7.19	0.91	0.55	19.16	3.02		0						0.88			0.514	**Non-Liq.**	Non-Liq.	**0.00**
60.04	26.72	1.42	5.31	110	2.055	0.660	5.75	0.93	0.54	12.53	3.09		0						0.88			0.514	**Non-Liq.**	Non-Liq.	**0.00**
60.20	20.01	0.81	4.05	110	2.059	0.658	4.51	0.95	0.53	9.02	3.14		0						0.88			0.513	**Non-Liq.**	Non-Liq.	**0.00**
60.37	19.72	0.00	0.01	110	2.063	0.657	0.01	0.81	0.58	9.69	2.69		0		1.00				0.87			0.512	**Non-Liq.**	Non-Liq.	**0.00**
60.53	22.97	0.00	0.00	110	2.067	0.656	0.00	0.80	0.58	11.54	2.65		0		1.00				0.87			0.512	**Non-Liq.**	Non-Liq.	**0.00**

CPT-LIQUEFY.XLS - A SPREADSHEET FOR EMPIRICAL ESTIMATION OF LIQUEFACTION POTENTIAL USING CPT DATA
Developed 2003 by Shelton L. Stringer, GE, Earth Systems Southwest

Project: Oxnard High School No. 8
Job No: 301953-001
Date: 8/14/2018
Sounding: CPT-2A
Plot: 2

Methods: Liquefaction Analysis using 1998 NCEER workshop methods (Robertson & Wride)
Post-liquefaction Settlement Analysis from Tokimatsu & Seed (1987)
Dry Sand Settlement by Pradel, ASCE Journal of G&GE, Vol 124, No. 4

Total Liquefied Thickness (feet)
3.8

EARTHQUAKE INFORMATION:
Magnitude: 6.77 (7.5)
PGA, g: 0.97 (0.75)
MSF: 1.30
GWT, feet: 20.0
Design GWT, feet: 20.0

Induced CSR (M=7.5): = 0.65*PGA*(po/p'o)*rd/MSF
Clean Sand Qc1n = C_Q*K_C*K_H*Qc
SF = $CRR_{7.5}$*Kσ/CSR
Use Tokimatsu & Seed (0) or Ishihara &Yoshmine (1): 0
Unit Weight of unsaturated soils: 110 pcf
Unit Weight of saturated soils: 110 pcf
Limiting Ic for liquefiable soils: 2.60
Limiting Ic for K_H: 2.0
Required SF: 1.50
Min SF of Liquefiable Layers: 0.21
Avg SF of Liquefiable Layers: 0.05

Probab	Total Induced Subsidence (inches)
Avg	
5%	
Max	
100%	0.6

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff. Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
0.16	8.00	0.09	1.13	110	0.009	1.000	1.13	0.81	1.70	12.84	2.68		0						1.00			0.485	Non-Liq.	Non-Liq.	0.00
0.33	11.37	0.11	0.97	110	0.018	1.000	0.97	0.76	1.70	18.24	2.52		1	6	2.86		1.00	52.1	1.00	0.093	0.093	0.485	Non-Liq.	Non-Liq.	0.00
0.49	14.06	0.14	1.00	110	0.027	1.000	1.00	0.74	1.70	22.55	2.44		1	15	2.50		1.00	56.3	1.00	0.097	0.097	0.485	Non-Liq.	Non-Liq.	0.00
0.66	15.85	0.14	0.90	110	0.036	1.000	0.90	0.72	1.70	25.41	2.38		1	20	2.22		1.00	56.4	1.00	0.097	0.097	0.485	Non-Liq.	Non-Liq.	0.00
0.82	15.82	0.14	0.88	110	0.045	1.000	0.89	0.72	1.70	25.35	2.37		1	20	2.21		1.00	55.9	1.00	0.096	0.096	0.485	Non-Liq.	Non-Liq.	0.00
0.98	15.42	0.12	0.78	110	0.054	1.000	0.79	0.72	1.70	24.69	2.36		1	19	2.15		1.00	53.1	1.00	0.094	0.094	0.485	Non-Liq.	Non-Liq.	0.00
1.15	12.24	0.10	0.81	110	0.063	0.999	0.81	0.74	1.70	19.57	2.45		1	9	2.55		1.00	49.8	1.00	0.092	0.092	0.484	Non-Liq.	Non-Liq.	0.00
1.31	12.24	0.10	0.81	110	0.072	0.999	0.81	0.74	1.70	19.55	2.45		1	9	2.55		1.00	49.8	1.00	0.092	0.092	0.484	Non-Liq.	Non-Liq.	0.00
1.48	10.64	0.13	1.17	110	0.081	0.999	1.18	0.78	1.70	16.97	2.59		1	3	3.25		1.00	55.1	1.00	0.096	0.096	0.484	Non-Liq.	Non-Liq.	0.00
1.64	11.63	0.20	1.72	110	0.090	0.998	1.73	0.80	1.70	18.54	2.64		0						1.00			0.484	Non-Liq.	Non-Liq.	0.00
1.80	19.13	0.29	1.53	110	0.099	0.998	1.53	0.74	1.70	30.58	2.43		1	28	2.45		1.00	74.9	1.00	0.119	0.119	0.484	Non-Liq.	Non-Liq.	0.00
1.97	35.11	0.52	1.48	110	0.108	0.998	1.48	0.67	1.70	56.24	2.21		1	53	1.70		1.00	95.4	1.00	0.161	0.161	0.484	Non-Liq.	Non-Liq.	0.00
2.13	43.24	0.60	1.40	110	0.117	0.997	1.40	0.65	1.70	69.29	2.13		1	62	1.50		1.00	104.3	1.00	0.185	0.185	0.483	Non-Liq.	Non-Liq.	0.00
2.30	43.08	0.62	1.43	110	0.126	0.997	1.44	0.65	1.70	69.02	2.13		1	61	1.52		1.00	105.0	1.00	0.188	0.188	0.483	Non-Liq.	Non-Liq.	0.00
2.46	41.08	0.60	1.46	110	0.135	0.996	1.46	0.65	1.70	65.79	2.16		1	59	1.56		1.00	102.9	1.00	0.181	0.181	0.483	Non-Liq.	Non-Liq.	0.00
2.62	38.58	0.56	1.46	110	0.144	0.996	1.46	0.66	1.70	61.76	2.18		1	57	1.61		1.00	99.6	1.00	0.172	0.172	0.483	Non-Liq.	Non-Liq.	0.00
2.79	35.25	0.53	1.50	110	0.153	0.996	1.50	0.67	1.70	56.39	2.22		1	53	1.70		1.00	96.1	1.00	0.163	0.163	0.483	Non-Liq.	Non-Liq.	0.00
2.95	32.60	0.49	1.50	110	0.162	0.995	1.51	0.68	1.70	52.12	2.24		1	50	1.78		1.00	92.6	1.00	0.154	0.154	0.482	Non-Liq.	Non-Liq.	0.00
3.12	29.61	0.45	1.52	110	0.171	0.995	1.53	0.69	1.70	47.30	2.28		1	46	1.88		1.00	89.0	1.00	0.146	0.146	0.482	Non-Liq.	Non-Liq.	0.00
3.28	26.41	0.40	1.51	110	0.180	0.994	1.52	0.70	1.70	42.15	2.32		1	41	2.01		1.00	84.6	1.00	0.136	0.136	0.482	Non-Liq.	Non-Liq.	0.00
3.44	23.64	0.34	1.44	110	0.189	0.994	1.45	0.71	1.70	37.68	2.34		1	36	2.10		1.00	79.2	1.00	0.126	0.126	0.482	Non-Liq.	Non-Liq.	0.00
3.61	21.08	0.29	1.36	110	0.198	0.994	1.37	0.72	1.70	33.55	2.37		1	32	2.20		1.00	73.8	1.00	0.117	0.117	0.482	Non-Liq.	Non-Liq.	0.00
3.77	18.23	0.30	1.67	110	0.208	0.993	1.69	0.75	1.70	28.96	2.48		1	25	2.65		1.00	76.6	1.00	0.122	0.122	0.482	Non-Liq.	Non-Liq.	0.00
3.94	15.34	0.30	1.98	110	0.217	0.993	2.00	0.78	1.70	24.30	2.58		1	18	3.21		1.00	78.0	1.00	0.124	0.124	0.481	Non-Liq.	Non-Liq.	0.00
4.10	12.99	0.35	2.73	110	0.226	0.993	2.77	0.83	1.70	20.51	2.72		0						1.00			0.481	Non-Liq.	Non-Liq.	0.00
4.27	11.82	0.38	3.20	110	0.235	0.992	3.26	0.85	1.70	18.62	2.80		0						1.00			0.481	Non-Liq.	Non-Liq.	0.00
4.43	10.34	0.34	3.30	110	0.244	0.992	3.38	0.87	1.70	16.22	2.86		0						1.00			0.481	Non-Liq.	Non-Liq.	0.00
4.59	11.89	0.24	2.04	110	0.253	0.991	2.08	0.81	1.70	18.70	2.68		0						1.00			0.481	Non-Liq.	Non-Liq.	0.00
4.76	26.79	0.25	0.93	110	0.262	0.991	0.94	0.67	1.70	42.63	2.19		1	41	1.65		1.00	70.3	1.00	0.112	0.112	0.480	Non-Liq.	Non-Liq.	0.00
4.92	35.67	0.30	0.84	110	0.271	0.991	0.85	0.63	1.70	56.88	2.06		1	53	1.39		1.00	79.2	1.00	0.126	0.126	0.480	Non-Liq.	Non-Liq.	0.00
5.09	41.25	0.36	0.88	110	0.280	0.990	0.89	0.61	1.70	65.83	2.02		1	59	1.33		1.00	87.7	1.00	0.143	0.143	0.480	Non-Liq.	Non-Liq.	0.00
5.25	44.28	0.41	0.92	110	0.289	0.990	0.93	0.61	1.70	70.69	2.01		1	62	1.31		1.00	92.7	1.00	0.154	0.154	0.480	Non-Liq.	Non-Liq.	0.00
5.41	46.60	0.44	0.94	110	0.298	0.989	0.95	0.61	1.70	74.40	2.00		1	65	1.30	1.00	1.00	96.8	1.00	0.164	0.164	0.480	Non-Liq.	Non-Liq.	0.00
5.58	50.22	0.47	0.93	110	0.307	0.989	0.94	0.60	1.70	80.20	1.97		1	68	1.26	1.05	1.00	101.4	1.00	0.177	0.177	0.479	Non-Liq.	Non-Liq.	0.00
5.74	54.67	0.47	0.87	110	0.316	0.989	0.87	0.58	1.70	87.34	1.92		1	71	1.21	1.10	1.00	105.9	1.00	0.190	0.190	0.479	Non-Liq.	Non-Liq.	0.00
5.91	56.65	0.48	0.85	110	0.325	0.988	0.86	0.58	1.70	90.50	1.90		1	73	1.19	1.15	1.00	108.2	1.00	0.198	0.198	0.479	Non-Liq.	Non-Liq.	0.00
6.07	56.48	0.50	0.89	110	0.334	0.988	0.90	0.58	1.70	90.22	1.92		1	73	1.20	1.20	1.00	109.0	1.00	0.201	0.201	0.479	Non-Liq.	Non-Liq.	0.00
6.23	58.52	0.53	0.91	110	0.343	0.988	0.92	0.58	1.70	93.48	1.91		1	74	1.20	1.25	1.00	112.4	1.00	0.212	0.212	0.479	Non-Liq.	Non-Liq.	0.00
6.40	61.73	0.57	0.92	110	0.352	0.987	0.93	0.58	1.70	98.62	1.90		1	76	1.18	1.30	1.00	117.2	1.00	0.230	0.230	0.479	Non-Liq.	Non-Liq.	0.00
6.56	65.05	0.55	0.84	110	0.361	0.987	0.85	0.56	1.70	103.94	1.85		1	78	1.15	1.35	1.00	119.6	1.00	0.239	0.239	0.478	Non-Liq.	Non-Liq.	0.00
6.73	67.42	0.56	0.83	110	0.370	0.986	0.84	0.56	1.70	107.74	1.84		1	80	1.13	1.40	1.00	122.6	1.00	0.251	0.251	0.478	Non-Liq.	Non-Liq.	0.00
6.89	72.04	0.64	0.89	110	0.379	0.986	0.89	0.56	1.70	115.15	1.83		1	83	1.13	1.45	1.00	130.6	1.00	0.287	0.287	0.478	Non-Liq.	Non-Liq.	0.00
7.05	79.98	0.56	0.70	110	0.388	0.986	0.71	0.53	1.70	127.76	1.73		1	87	1.06	1.50	1.00	135.9	1.00	0.314	0.314	0.478	Non-Liq.	Non-Liq.	0.00
7.22	84.69	0.74	0.87	110	0.397	0.985	0.88	0.54	1.70	135.25	1.77		1	89	1.09	1.55	1.00	147.6	1.00	0.379	0.379	0.478	Non-Liq.	Non-Liq.	0.00
7.38	84.27	0.71	0.84	110	0.406	0.985	0.84	0.54	1.67	132.75	1.77		1	89	1.08	1.60	1.00	144.4	1.00	0.360	0.360	0.478	Non-Liq.	Non-Liq.	0.00
7.55	88.99	0.71	0.80	110	0.415	0.985	0.81	0.53	1.64	137.62	1.74		1	90	1.07	1.65	1.00	147.5	1.00	0.378	0.378	0.477	Non-Liq.	Non-Liq.	0.00
7.71	88.99	0.71	0.80	110	0.424	0.984	0.81	0.53	1.63	136.17	1.75		1	90	1.07	1.70	1.00	146.2	1.00	0.371	0.371	0.477	Non-Liq.	Non-Liq.	0.00
7.87	97.16	0.72	0.74	110	0.433	0.984	0.74	0.52	1.59	145.34	1.70		1	92	1.04	1.75	1.00	151.8	1.00	0.405	0.405	0.477	Non-Liq.	Non-Liq.	0.00
8.04	104.13	0.76	0.73	110	0.442	0.984	0.73	0.51	1.56	153.24	1.68		1	95	1.03	1.80	1.00	157.7	1.00	0.445	0.445	0.477	Non-Liq.	Non-Liq.	0.00
8.20	109.72	0.85	0.77	110	0.451	0.983	0.78	0.51	1.55	159.96	1.68		1	96	1.03	1.85	1.00	164.9	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
8.37	127.90	0.84	0.66	110	0.460	0.983	0.66	0.50	1.52	182.65	1.59		1	100	1.00	1.90	1.00	183.3	1.00	Infin.	0.000	0.476	Non-Liq.	Non-Liq.	0.00
8.53	139.29	1.12	0.80	110	0.469	0.982	0.80	0.50	1.50	197.04	1.63		1	100	1.00	1.95	1.00	197.8	1.00	Infin.	0.000	0.476	Non-Liq.	Non-Liq.	0.00
8.69	174.32	1.33	0.76	110	0.478	0.982	0.77	0.50	1.49	244.41	1.55		1	100	1.00	2.00	1.00	245.3	1.00	Infin.	0.000	0.476	Non-Liq.	Non-Liq.	0.00
8.86	197.20	1.54	0.78	110	0.487	0.982	0.78	0.50	1.47	273.99	1.52		1	100	1.00	2.05	1.00	275.0	1.00	Infin.	0.000	0.476	Non-Liq.	Non-Liq.	0.00
9.02	211.19	1.71	0.81	110	0.496	0.981	0.81	0.50	1.46	290.78	1.51		1	100	1.00	2.10	1.00	291.9	1.00	Infin.	0.000	0.476	Non-Liq.	Non-Liq.	0.00
9.19	221.47	1.88	0.85	110	0.505	0.981	0.85	0.50	1.45	302.22	1.52		1	100	1.00	2.15	1.00	303.4	1.00	Infin.	0.000	0.476	Non-Liq.	Non-Liq.	0.00
9.35	230.78	2.04	0.88	110	0.514	0.981	0.88	0.50	1.43	312.17	1.52		1	100	1.00	2.20	1.00	313.3	1.00	Infin.	0.000	0.475	Non-Liq.	Non-Liq.	0.00
9.51	234.50	2.16	0.92	110	0.523	0.980	0.92	0.50	1.42	314.45	1.53		1	100	1.00	2.25	1.00	315.6	1.00	Infin.	0.000	0.475	Non-Liq.	Non-Liq.	0.00
9.68	232.94	2.27	0.98	110	0.532	0.980	0.98	0.50	1.41	309.69	1.56		1	100	1.00	2.30	1.00	310.8	1.00	Infin.	0.000	0.475	Non-Liq.	Non-Liq.	0.00
9.84	231.57	2.35	1.01	110	0.541	0.980	1.02	0.50	1.40	305.27	1.57		1	100	1.00	2.35	1.00	306.4	1.00	Infin.	0.000	0.475	Non-Liq.	Non-Liq.	0.00
10.01	230.54	2.41	1.04	110	0.550	0.979	1.05	0.50	1.39	301.40	1.59		1	100	1.00	2.40	1.00	302.5	1.00	Infin.	0.000	0.475	Non-Liq.	Non-Liq.	0.00
10.17	237.18	2.50	1.05	110	0.559	0.979	1.06	0.50	1.38	307.58	1.58		1	100	1.00	2.45	1.00	308.7	1.00	Infin.	0.000	0.475	Non-Liq.	Non-Liq.	0.00
10.33	247.31	2.55	1.03	110	0.568	0.979	1.03	0.50	1.36	318.18	1.57		1	100	1.00	2.50	1.00	319.4	1.00	Infin.	0.000	0.474	Non-Liq.	Non-Liq.	0.00
10.50	243.77	2.52	1.03	110	0.577	0.978	1.04	0.50	1.35	311.14	1.58		1	100	1.00	2.55	1.00	312.3	1.00	Infin.	0.000	0.474	Non-Liq.	Non-Liq.	0.00
10.66	237.97	2.56	1.07	110	0.586	0.978	1.08	0.50	1.34	301.36	1.60		1	100	1.00	2.60	1.00	302.5	1.00	Infin.	0.000	0.474	Non-Liq.	Non-Liq.	0.00
10.83	236.70	2.58	1.09	110	0.595	0.978	1.09	0.50	1.33	297.46	1.61		1	100	1.00	2.65	1.00	298.6	1.00	Infin.	0.000	0.474	Non-Liq.	Non-Liq.	0.00
10.99	231.19	3.35	1.45	110	0.604	0.977	1.45	0.52	1.34	291.69	1.71		1	100	1.04	2.70	1.00	305.6	1.00	Infin.	0.000	0.474	Non-Liq.	Non-Liq.	0.00
11.15	223.52	4.80	2.15	110	0.614	0.977	2.15	0.56	1.36	286.52	1.85		1	100	1.15	2.75	1.00	330.3	1.00	Infin.	0.000	0.474	Non-Liq.	Non-Liq.	0.00
11.32	231.18	4.24	1.83	110	0.623	0.977	1.84	0.55	1.34	291.09	1.79		1	100	1.10	2.80	1.00	321.9	1.00	Infin.	0.000	0.473	Non-Liq.	Non-Liq.	0.00
11.48	277.74	3.56	1.28	110	0.632	0.976	1.29	0.50	1.29	339.00	1.63		1	100	1.00	2.85	1.00	340.3	1.00	Infin.	0.000	0.473	Non-Liq.	Non-Liq.	0.00
11.65	232.79	2.16	0.93	110	0.641	0.976	0.93	0.50	1.29	281.99	1.57		1	100	1.00	2.90	1.00	283.0	1.00	Infin.	0.000	0.473	Non-Liq.	Non-Liq.	0.00
11.81	242.50	1.85	0.76	110	0.650	0.975	0.76	0.50	1.28	291.73	1.49		1	100	1.00	2.95	1.00	292.8	1.00	Infin.	0.000	0.473	Non-Liq.	Non-Liq.	0.00
11.98	238.61	2.39	1.00	110	0.659	0.975	1.00	0.50	1.27	285.05	1.59		1	100	1.00	3.00	1.00	286.1	1.00	Infin.	0.000	0.473	Non-Liq.	Non-Liq.	0.00
12.14	226.91	2.22	0.98	110	0.668	0.975	0.98	0.50	1.26	269.19	1.60		1	100	1.00	3.05	1.00	270.2	1.00	Infin.	0.000	0.473	Non-Liq.	Non-Liq.	0.00
12.30	230.52	2.15	0.93	110	0.677	0.974	0.93	0.50	1.25	271.64	1.58		1	100	1.00	3.10	1.00	272.7	1.00	Infin.	0.000	0.472	Non-Liq.	Non-Liq.	0.00
12.47	221.89	1.76	0.79	110	0.686	0.974	0.80	0.50	1.24	259.71	1.54		1	100	1.00	3.15	1.00	260.7	1.00	Infin.	0.000	0.472	Non-Liq.	Non-Liq.	0.00
12.63	219.46	1.58	0.72	110	0.695	0.974	0.72	0.50	1.23	255.17	1.51		1	100	1.00	3.20	1.00	256.1	1.00	Infin.	0.000	0.472	Non-Liq.	Non-Liq.	0.00
12.80	210.68	1.41	0.67	110	0.704	0.973	0.67	0.50	1.23	243.34	1.51		1	100	1.00	3.25	1.00	244.3	1.00	Infin.	0.000	0.472	Non-Liq.	Non-Liq.	0.00

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	M=7.5 CSR	Induced Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
12.96	195.33	1.35	0.69	110	0.713	0.973	0.70	0.50	1.22	224.11	1.54		1	100	1.00	3.30	1.00	225.0	1.00	Infin.	0.000	0.472	**Non-Liq.**	Non-Liq.	**0.00**
13.12	189.89	1.37	0.72	110	0.722	0.973	0.72	0.50	1.21	216.47	1.57		1	100	1.00	3.35	1.00	217.3	1.00	Infin.	0.000	0.472	**Non-Liq.**	Non-Liq.	**0.00**
13.29	182.75	2.89	1.58	110	0.731	0.972	1.59	0.56	1.23	211.28	1.82		1	100	1.13	3.40	1.00	238.6	1.00	Infin.	0.000	0.471	**Non-Liq.**	Non-Liq.	**0.00**
13.45	189.66	3.51	1.85	110	0.740	0.972	1.86	0.57	1.23	218.84	1.87		1	100	1.16	3.45	1.00	255.0	1.00	Infin.	0.000	0.471	**Non-Liq.**	Non-Liq.	**0.00**
13.62	243.92	3.67	1.50	110	0.749	0.972	1.51	0.53	1.20	275.93	1.74		1	100	1.06	3.50	1.00	294.2	1.00	Infin.	0.000	0.471	**Non-Liq.**	Non-Liq.	**0.00**
13.78	196.55	3.12	1.59	110	0.758	0.971	1.59	0.55	1.20	222.44	1.81		1	100	1.12	3.55	1.00	249.0	1.00	Infin.	0.000	0.471	**Non-Liq.**	Non-Liq.	**0.00**
13.94	166.33	2.01	1.21	110	0.767	0.971	1.22	0.54	1.19	186.17	1.77		1	100	1.09	3.60	1.00	203.2	1.00	Infin.	0.000	0.471	**Non-Liq.**	Non-Liq.	**0.00**
14.11	168.09	2.05	1.22	110	0.776	0.971	1.22	0.54	1.18	186.97	1.77		1	100	1.09	3.65	1.00	204.2	1.00	Infin.	0.000	0.471	**Non-Liq.**	Non-Liq.	**0.00**
14.27	186.64	4.05	2.17	110	0.785	0.970	2.18	0.59	1.19	209.42	1.94		1	100	1.22	3.70	1.00	257.4	1.00	Infin.	0.000	0.470	**Non-Liq.**	Non-Liq.	**0.00**
14.44	201.80	4.71	2.33	110	0.794	0.970	2.34	0.59	1.18	225.11	1.94		1	100	1.23	3.75	1.00	278.4	1.00	Infin.	0.000	0.470	**Non-Liq.**	Non-Liq.	**0.00**
14.60	281.02	4.40	1.57	110	0.803	0.970	1.57	0.53	1.16	306.15	1.72		1	100	1.05	3.80	1.00	324.0	1.00	Infin.	0.000	0.470	**Non-Liq.**	Non-Liq.	**0.00**
14.76	344.71	3.37	0.98	110	0.812	0.969	0.98	0.50	1.14	371.03	1.51		1	100	1.00	3.85	1.00	372.4	1.00	Infin.	0.000	0.470	**Non-Liq.**	Non-Liq.	**0.00**
14.93	284.50	2.91	1.02	110	0.821	0.969	1.03	0.50	1.14	304.37	1.58		1	100	1.00	3.90	1.00	305.5	1.00	Infin.	0.000	0.470	**Non-Liq.**	Non-Liq.	**0.00**
15.09	313.45	2.95	0.94	110	0.830	0.969	0.94	0.50	1.13	333.60	1.52		1	100	1.00	3.95	1.00	334.8	1.00	Infin.	0.000	0.470	**Non-Liq.**	Non-Liq.	**0.00**
15.26	330.55	3.27	0.99	110	0.839	0.968	0.99	0.50	1.12	349.94	1.53		1	100	1.00	4.00	1.00	351.2	1.00	Infin.	0.000	0.469	**Non-Liq.**	Non-Liq.	**0.00**
15.42	347.21	3.40	0.98	110	0.848	0.968	0.98	0.50	1.12	365.65	1.51		1	100	1.00	4.05	1.00	367.0	1.00	Infin.	0.000	0.469	**Non-Liq.**	Non-Liq.	**0.00**
15.58	369.08	4.35	1.18	110	0.857	0.967	1.18	0.50	1.11	386.68	1.56		1	100	1.00	4.10	1.00	388.1	1.00	Infin.	0.000	0.469	**Non-Liq.**	Non-Liq.	**0.00**
15.75	398.50	4.30	1.08	110	0.866	0.967	1.08	0.50	1.11	415.38	1.52		1	100	1.00	4.15	1.00	416.9	1.00	Infin.	0.000	0.469	**Non-Liq.**	Non-Liq.	**0.00**
15.91	418.82	3.93	0.94	110	0.875	0.967	0.94	0.50	1.10	434.34	1.46		1	100	1.00	4.20	1.00	436.0	1.00	Infin.	0.000	0.469	**Non-Liq.**	Non-Liq.	**0.00**
16.08	410.39	4.19	1.02	110	0.884	0.966	1.02	0.50	1.09	423.39	1.49		1	100	1.00	4.25	1.00	425.0	1.00	Infin.	0.000	0.468	**Non-Liq.**	Non-Liq.	**0.00**
16.24	419.61	4.80	1.14	110	0.893	0.966	1.15	0.50	1.09	430.73	1.53		1	100	1.00	4.30	1.00	432.3	1.00	Infin.	0.000	0.468	**Non-Liq.**	Non-Liq.	**0.00**
16.40	443.67	4.84	1.09	110	0.902	0.966	1.09	0.50	1.08	453.18	1.50		1	100	1.00	4.35	1.00	454.9	1.00	Infin.	0.000	0.468	**Non-Liq.**	Non-Liq.	**0.00**
16.57	437.41	4.97	1.14	110	0.911	0.965	1.14	0.50	1.08	444.55	1.52		1	100	1.00	4.40	1.00	446.2	1.00	Infin.	0.000	0.468	**Non-Liq.**	Non-Liq.	**0.00**
16.73	435.84	4.65	1.07	110	0.920	0.965	1.07	0.50	1.07	440.77	1.50		1	100	1.00	4.45	1.00	442.4	1.00	Infin.	0.000	0.468	**Non-Liq.**	Non-Liq.	**0.00**
16.90	448.38	4.22	0.94	110	0.929	0.965	0.94	0.50	1.07	451.26	1.45		1	100	1.00	4.50	1.00	452.9	1.00	Infin.	0.000	0.468	**Non-Liq.**	Non-Liq.	**0.00**
17.06	457.41	3.79	0.83	110	0.938	0.964	0.83	0.50	1.06	458.14	1.40		1	100	1.00	4.55	1.00	459.8	1.00	Infin.	0.000	0.467	**Non-Liq.**	Non-Liq.	**0.00**
17.22	450.04	4.42	0.98	110	0.947	0.964	0.99	0.50	1.06	448.58	1.46		1	100	1.00	4.60	1.00	450.3	1.00	Infin.	0.000	0.467	**Non-Liq.**	Non-Liq.	**0.00**
17.39	437.15	4.09	0.94	110	0.956	0.963	0.94	0.50	1.05	433.64	1.45		1	100	1.00	4.65	1.00	435.3	1.00	Infin.	0.000	0.467	**Non-Liq.**	Non-Liq.	**0.00**
17.55	447.32	4.19	0.94	110	0.965	0.963	0.94	0.50	1.05	441.66	1.45		1	100	1.00	4.70	1.00	443.3	1.00	Infin.	0.000	0.467	**Non-Liq.**	Non-Liq.	**0.00**
17.72	476.04	4.81	1.01	110	0.974	0.963	1.01	0.50	1.04	467.89	1.46		1	100	1.00	4.75	1.00	469.6	1.00	Infin.	0.000	0.467	**Non-Liq.**	Non-Liq.	**0.00**
17.88	526.73	4.25	0.81	110	0.983	0.962	0.81	0.50	1.04	515.42	1.36		1	100	1.00	4.80	1.00	517.3	1.00	Infin.	0.000	0.467	**Non-Liq.**	Non-Liq.	**0.00**
18.04	498.22	4.85	0.97	110	0.992	0.962	0.98	0.50	1.03	485.24	1.44		1	100	1.00	4.85	1.00	487.1	1.00	Infin.	0.000	0.466	**Non-Liq.**	Non-Liq.	**0.00**
18.21	506.10	5.27	1.04	110	1.001	0.962	1.04	0.50	1.03	490.70	1.46		1	100	1.00	4.90	1.00	492.5	1.00	Infin.	0.000	0.466	**Non-Liq.**	Non-Liq.	**0.00**
18.37	512.17	6.70	1.31	110	1.010	0.961	1.31	0.50	1.02	494.36	1.55		1	100	1.00	4.95	1.00	496.2	1.00	Infin.	0.000	0.466	**Non-Liq.**	Non-Liq.	**0.00**
18.54	559.50	8.56	1.53	110	1.020	0.961	1.53	0.50	1.02	537.73	1.59		1	100	1.00	5.00	1.00	539.7	1.00	Infin.	0.000	0.466	**Non-Liq.**	Non-Liq.	**0.00**
18.70	562.50	8.26	1.47	110	1.029	0.960	1.47	0.50	1.01	538.24	1.57		1	100	1.00	5.05	1.00	540.2	1.00	Infin.	0.000	0.466	**Non-Liq.**	Non-Liq.	**0.00**
18.86	559.79	8.82	1.58	110	1.038	0.960	1.58	0.50	1.01	533.30	1.60		1	100	1.00	5.10	1.00	535.3	1.00	Infin.	0.000	0.465	**Non-Liq.**	Non-Liq.	**0.00**
19.03	547.34	8.23	1.50	110	1.047	0.960	1.51	0.50	1.01	519.15	1.59		1	100	1.00	5.15	1.00	521.1	1.00	Infin.	0.000	0.465	**Non-Liq.**	Non-Liq.	**0.00**
19.19	552.34	7.74	1.40	110	1.056	0.959	1.40	0.50	1.00	521.65	1.56		1	100	1.00	5.20	1.00	523.6	1.00	Infin.	0.000	0.465	**Non-Liq.**	Non-Liq.	**0.00**
19.36	492.99	7.25	1.47	110	1.065	0.959	1.47	0.50	1.00	463.51	1.60		1	100	1.00	5.25	1.00	465.2	1.00	Infin.	0.000	0.465	**Non-Liq.**	Non-Liq.	**0.00**
19.52	443.38	5.21	1.18	110	1.074	0.958	1.18	0.50	0.99	415.00	1.55		1	100	1.00	5.30	1.00	416.6	0.99	Infin.	0.000	0.465	**Non-Liq.**	Non-Liq.	**0.00**
19.69	430.83	4.17	0.97	110	1.083	0.958	0.97	0.50	0.99	401.53	1.49		1	100	1.00	5.35	1.00	403.0	0.99	Infin.	0.000	0.464	**Non-Liq.**	Non-Liq.	**0.00**
19.85	411.08	3.30	0.80	110	1.092	0.957	0.80	0.50	0.98	381.48	1.43		1	100	1.00	5.40	1.00	382.9	0.99	Infin.	0.000	0.464	**Non-Liq.**	Non-Liq.	**0.00**
20.01	393.49	2.98	0.76	110	1.101	0.957	0.76	0.50	0.98	363.61	1.43		1	100	1.00	5.45	1.00	365.0	0.98	Infin.	0.000	0.464	**Non-Liq.**	Non-Liq.	**0.00**
20.18	395.26	2.83	0.72	110	1.107	0.957	0.72	0.50	0.98	364.24	1.41		1	100	1.00	5.50	1.00	365.6	0.98	Infin.	0.000	0.465	**Non-Liq.**	Non-Liq.	**0.00**
20.34	374.51	2.35	0.63	110	1.111	0.956	0.63	0.50	0.98	344.46	1.38		1	100	1.00	5.55	1.00	345.7	0.98	Infin.	0.000	0.467	**Non-Liq.**	Non-Liq.	**0.00**
20.51	326.62	2.65	0.81	110	1.115	0.956	0.81	0.50	0.97	299.75	1.51		1	100	1.00	5.60	1.00	300.9	0.98	Infin.	0.000	0.469	**Non-Liq.**	Non-Liq.	**0.00**
20.67	282.57	2.55	0.90	110	1.118	0.955	0.91	0.50	0.97	258.73	1.58		1	100	1.00	5.65	1.00	259.7	0.98	Infin.	0.000	0.471	**Non-Liq.**	Non-Liq.	**0.00**
20.83	276.78	3.44	1.24	110	1.122	0.955	1.25	0.52	0.97	252.72	1.69		1	100	1.03	5.70	1.00	262.3	0.98	Infin.	0.000	0.473	**Non-Liq.**	Non-Liq.	**0.00**
21.00	278.21	2.80	1.01	110	1.126	0.954	1.01	0.50	0.97	253.83	1.62		1	100	1.00	5.75	1.00	254.8	0.98	Infin.	0.000	0.474	**Non-Liq.**	Non-Liq.	**0.00**
21.16	340.07	3.01	0.88	110	1.130	0.954	0.89	0.50	0.97	309.96	1.52		1	100	1.00	5.80	1.00	311.1	0.97	Infin.	0.000	0.476	**Non-Liq.**	Non-Liq.	**0.00**
21.33	368.76	2.98	0.81	110	1.134	0.954	0.81	0.50	0.97	335.61	1.47		1	100	1.00	5.85	1.00	336.9	0.97	Infin.	0.000	0.478	**Non-Liq.**	Non-Liq.	**0.00**
21.49	341.22	3.31	0.97	110	1.138	0.953	0.97	0.50	0.96	309.93	1.55		1	100	1.00	5.90	1.00	311.1	0.97	Infin.	0.000	0.480	**Non-Liq.**	Non-Liq.	**0.00**
21.65	390.12	3.77	0.97	110	1.142	0.953	0.97	0.50	0.96	353.89	1.52		1	100	1.00	5.95	1.00	355.2	0.97	Infin.	0.000	0.482	**Non-Liq.**	Non-Liq.	**0.00**
21.82	410.04	3.82	0.93	110	1.146	0.952	0.93	0.50	0.96	371.37	1.49		1	100	1.00	6.00	1.00	372.8	0.97	Infin.	0.000	0.483	**Non-Liq.**	Non-Liq.	**0.00**
21.98	384.92	3.63	0.94	110	1.150	0.952	0.95	0.50	0.96	347.96	1.51		1	100	1.00	6.05	1.00	349.3	0.97	Infin.	0.000	0.485	**Non-Liq.**	Non-Liq.	**0.00**
22.15	353.56	2.69	0.76	110	1.154	0.951	0.76	0.50	0.96	318.98	1.47		1	100	1.00	6.10	1.00	320.2	0.97	Infin.	0.000	0.487	**Non-Liq.**	Non-Liq.	**0.00**
22.31	330.47	2.03	0.62	110	1.158	0.951	0.62	0.50	0.96	297.58	1.42		1	100	1.00	6.15	1.00	298.7	0.96	Infin.	0.000	0.489	**Non-Liq.**	Non-Liq.	**0.00**
22.47	302.85	2.02	0.67	110	1.161	0.950	0.67	0.50	0.95	272.16	1.47		1	100	1.00	6.20	1.00	273.2	0.96	Infin.	0.000	0.490	**Non-Liq.**	Non-Liq.	**0.00**
22.64	277.81	2.78	1.00	110	1.165	0.950	1.01	0.50	0.95	249.15	1.63		1	100	1.00	6.25	1.00	250.1	0.96	Infin.	0.000	0.492	**Non-Liq.**	Non-Liq.	**0.00**
22.80	261.06	4.42	1.69	110	1.169	0.949	1.70	0.55	0.95	232.39	1.82		1	100	1.12	6.30	1.00	262.1	0.96	Infin.	0.000	0.494	**Non-Liq.**	Non-Liq.	**0.00**
22.97	275.05	5.35	1.94	110	1.173	0.949	1.95	0.57	0.94	244.17	1.86		1	100	1.15	6.35	1.00	282.3	0.96	Infin.	0.000	0.495	**Non-Liq.**	Non-Liq.	**0.00**
23.13	338.08	5.26	1.55	110	1.177	0.948	1.56	0.53	0.95	301.07	1.73		1	100	1.06	6.40	1.00	319.0	0.96	Infin.	0.000	0.497	**Non-Liq.**	Non-Liq.	**0.00**
23.29	290.23	4.56	1.57	110	1.181	0.948	1.58	0.54	0.94	257.48	1.77		1	100	1.09	6.45	1.00	280.5	0.96	Infin.	0.000	0.498	**Non-Liq.**	Non-Liq.	**0.00**
23.46	297.08	3.04	1.02	110	1.185	0.947	1.03	0.50	0.94	264.28	1.62		1	100	1.00	6.50	1.00	265.3	0.96	Infin.	0.000	0.500	**Non-Liq.**	Non-Liq.	**0.00**
23.62	303.30	2.81	0.92	110	1.189	0.947	0.93	0.50	0.94	269.39	1.58		1	100	1.00	6.55	1.00	270.4	0.95	Infin.	0.000	0.502	**Non-Liq.**	Non-Liq.	**0.00**
23.79	309.47	2.71	0.87	110	1.193	0.946	0.88	0.50	0.94	274.43	1.55		1	100	1.00	6.60	1.00	275.5	0.95	Infin.	0.000	0.503	**Non-Liq.**	Non-Liq.	**0.00**
23.95	314.79	2.69	0.86	110	1.197	0.946	0.86	0.50	0.94	278.71	1.54		1	100	1.00	6.65	1.00	279.8	0.95	Infin.	0.000	0.505	**Non-Liq.**	Non-Liq.	**0.00**
24.11	323.75	2.59	0.80	110	1.200	0.945	0.80	0.50	0.94	286.20	1.51		1	100	1.00	6.70	1.00	287.3	0.95	Infin.	0.000	0.506	**Non-Liq.**	Non-Liq.	**0.00**
24.28	334.53	2.78	0.83	110	1.204	0.945	0.83	0.50	0.94	295.29	1.52		1	100	1.00	6.75	1.00	296.4	0.95	Infin.	0.000	0.508	**Non-Liq.**	Non-Liq.	**0.00**
24.44	341.22	2.78	0.82	110	1.208	0.944	0.82	0.50	0.94	300.72	1.51		1	100	1.00	6.80	1.00	301.8	0.95	Infin.	0.000	0.509	**Non-Liq.**	Non-Liq.	**0.00**
24.61	345.28	2.16	0.62	110	1.212	0.943	0.63	0.50	0.93	303.82	1.42		1	100	1.00	6.85	1.00	305.0	0.95	Infin.	0.000	0.511	**Non-Liq.**	Non-Liq.	**0.00**
24.77	354.45	2.39	0.67	110	1.216	0.943	0.68	0.50	0.93	311.41	1.43		1	100	1.00	6.90	1.00	312.6	0.95	Infin.	0.000	0.512	**Non-Liq.**	Non-Liq.	**0.00**
24.93	357.66	2.44	0.68	110	1.220	0.942	0.68	0.50	0.93	313.74	1.44		1	100	1.00	6.95	1.00	314.9	0.94	Infin.	0.000	0.514	**Non-Liq.**	Non-Liq.	**0.00**
25.10	363.46	2.39	0.66	110	1.224	0.942	0.66	0.50	0.93	318.33	1.42		1	100	1.00	7.00	1.00	319.5	0.94	Infin.	0.000	0.515	**Non-Liq.**	Non-Liq.	**0.00**
25.26	370.76	2.17	0.59	110	1.228	0.941	0.59	0.50	0.93	324.22	1.38		1	100	1.00	7.05	1.00	325.4	0.94	Infin.	0.000	0.516	**Non-Liq.**	Non-Liq.	**0.00**
25.43	377.75	2.41	0.64	110	1.232	0.941	0.64	0.50	0.93	329.83	1.40		1	100	1.00	7.10	1.00	331.1	0.94	Infin.	0.000	0.518	**Non-Liq.**	Non-Liq.	**0.00**
25.59	391.33	2.46	0.63	110	1.236	0.940	0.63	0.50	0.93	341.18	1.38		1	100	1.00	7.15	1.00	342.5	0.94	Infin.	0.000	0.519	**Non-Liq.**	Non-Liq.	**0.00**
25.75	392.15	2.61	0.66	110	1.240	0.939	0.67	0.50	0.92	341.36	1.40		1	100	1.00	7.20	1.00	342.6	0.94	Infin.	0.000	0.520	**Non-Liq.**	Non-Liq.	**0.00**
25.92	382.77	2.62	0.68	110	1.243	0.939	0.69	0.50	0.92	332.64	1.42		1	100	1.00	7.25	1.00	333.9	0.94	Infin.	0.000	0.522	**Non-Liq.**	Non-Liq.	**0.00**
26.08	373.25	2.66	0.71	110	1.247	0.938	0.71	0.50	0.92	323.83	1.44		1	100	1.00	7.30	1.00	325.0	0.94	Infin.	0.000	0.523	**Non-Liq.**	Non-Liq.	**0.00**
26.25	363.79	2.44	0.67	110	1.251	0.938	0.67	0.50	0.92	315.10	1.43		1	100	1.00	7.35	1.00	316.3	0.94	Infin.	0.000	0.524	**Non-Liq.**	Non-Liq.	**0.00**
26.41	362.15	2.32	0.64	110	1.255	0.937	0.64	0.50	0.92	313.18	1.42		1	100	1.00	7.40	1.00	314.3	0.93	Infin.	0.000	0.526	**Non-Liq.**	Non-Liq.	**0.00**
26.57	366.11	2.55	0.70	110	1.259	0.936	0.70	0.50	0.92	316.12	1.44		1	100	1.00	7.45	1.00	317.3	0.93	Infin.	0.000	0.527	**Non-Liq.**	Non-Liq.	**0.00**
26.74	372.93	2.51	0.67	110	1.263	0.936	0.68	0.50	0.92	321.53	1.42		1	100	1.00	7.50	1.00	322.7	0.93	Infin.	0.000	0.528	**Non-Liq.**	Non-Liq.	**0.00**
26.90	383.15	3.06	0.80	110	1.267	0.935	0.80	0.50	0.91	329.86	1.47		1	100	1.00	7.55	1.00	331.1	0.93	Infin.	0.000	0.529	**Non-Liq.**	Non-Liq.	**0.00**
27.07	413.34	3.14	0.76	110	1.271	0.934	0.76	0.50	0.91	355.38	1.44		1	100	1.00	7.60	1.00	356.7	0.93	Infin.	0.000	0.531	**Non-Liq.**	Non-Liq.	**0.00**
27.23	409.32	4.09	1.00	110	1.275	0.934	1.00	0.50	0.91	351.37	1.53		1	100	1.00	7.65	1.00	352.7	0.93	Infin.	0.000	0.532	**Non-Liq.**	Non-Liq.	**0.00**
27.40	399.12	4.88	1.22	110	1.279	0.933	1.23	0.50	0.91	342.06	1.61		1	100	1.00	7.70	1.00	343.3	0.93	Infin.	0.000	0.533	**Non-Liq.**	Non-Liq.	**0.00**
27.56	379.94	3.65	0.96	110	1.282	0.932	0.96	0.50	0.91	325.07	1.54		1	100	1.00	7.75	1.00	326.3	0.93	Infin.	0.000	0.534	**Non-Liq.**	Non-Liq.	**0.00**
27.72	353.99	3.89	1.10	110	1.286	0.932	1.10	0.50	0.91	302.33	1.60		1	100	1.00	7.80	1.00	303.5	0.92	Infin.	0.000	0.535	**Non-Liq.**	Non-Liq.	**0.00**
27.89	386.19	3.37	0.87	110	1.290	0.931	0.88	0.50	0.91	329.43	1.50		1	100	1.00	7.85	1.00	330.7	0.92	Infin.	0.000	0.536	**Non-Liq.**	Non-Liq.	**0.00**

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
28.05	410.07	4.19	1.02	110	1.294	0.930	1.03	0.50	0.90	349.34	1.54		1	100	1.00	7.90	1.00	350.6	0.92	Infin.	0.000	0.538	Non-Liq.	Non-Liq.	0.00
28.22	438.73	4.93	1.12	110	1.298	0.929	1.13	0.50	0.90	373.26	1.56		1	100	1.00	7.95	1.00	374.7	0.92	Infin.	0.000	0.539	Non-Liq.	Non-Liq.	0.00
28.38	454.65	5.10	1.12	110	1.302	0.929	1.13	0.50	0.90	386.27	1.55		1	100	1.00	8.00	1.00	387.7	0.92	Infin.	0.000	0.540	Non-Liq.	Non-Liq.	0.00
28.54	455.41	6.81	1.50	110	1.306	0.928	1.50	0.50	0.90	386.04	1.65		1	100	1.00	8.05	1.00	389.3	0.92	Infin.	0.000	0.541	Non-Liq.	Non-Liq.	0.00
28.71	557.48	6.50	1.17	110	1.310	0.927	1.17	0.50	0.90	472.46	1.51		1	100	1.00	8.10	1.00	474.2	0.92	Infin.	0.000	0.542	Non-Liq.	Non-Liq.	0.00
28.87	504.25	5.71	1.13	110	1.314	0.926	1.14	0.50	0.90	426.60	1.53		1	100	1.00	8.15	1.00	428.2	0.92	Infin.	0.000	0.543	Non-Liq.	Non-Liq.	0.00
29.04	452.21	4.48	0.99	110	1.318	0.926	0.99	0.50	0.90	381.89	1.51		1	100	1.00	8.20	1.00	383.3	0.92	Infin.	0.000	0.544	Non-Liq.	Non-Liq.	0.00
29.20	427.62	3.52	0.82	110	1.322	0.925	0.83	0.50	0.89	360.53	1.46		1	100	1.00	8.25	1.00	361.9	0.91	Infin.	0.000	0.545	Non-Liq.	Non-Liq.	0.00
29.36	419.70	3.00	0.71	110	1.325	0.924	0.72	0.50	0.89	353.30	1.42		1	100	1.00	8.30	1.00	354.6	0.91	Infin.	0.000	0.546	Non-Liq.	Non-Liq.	0.00
29.53	414.05	3.21	0.78	110	1.329	0.923	0.78	0.50	0.89	348.02	1.45		1	100	1.00	8.35	1.00	349.3	0.91	Infin.	0.000	0.547	Non-Liq.	Non-Liq.	0.00
29.69	430.08	5.15	1.20	110	1.333	0.923	1.20	0.50	0.89	361.00	1.59		1	100	1.00	8.40	1.00	362.3	0.91	Infin.	0.000	0.548	Non-Liq.	Non-Liq.	0.00
29.86	475.65	5.92	1.24	110	1.337	0.922	1.25	0.50	0.89	398.78	1.58		1	100	1.00	8.45	1.00	400.3	0.91	Infin.	0.000	0.549	Non-Liq.	Non-Liq.	0.00
30.02	487.87	5.66	1.16	110	1.341	0.921	1.16	0.50	0.89	408.46	1.55		1	100	1.00	8.50	1.00	410.0	0.91	Infin.	0.000	0.550	Non-Liq.	Non-Liq.	0.00
30.18	400.37	3.93	0.98	110	1.345	0.920	0.98	0.50	0.89	334.51	1.54		1	100	1.00	8.55	1.00	335.8	0.91	Infin.	0.000	0.551	Non-Liq.	Non-Liq.	0.00
30.35	403.47	3.24	0.80	110	1.349	0.919	0.80	0.50	0.89	336.62	1.47		1	100	1.00	8.60	1.00	337.9	0.91	Infin.	0.000	0.551	Non-Liq.	Non-Liq.	0.00
30.51	396.31	2.84	0.72	110	1.353	0.918	0.72	0.50	0.88	330.14	1.44		1	100	1.00	8.65	1.00	331.4	0.91	Infin.	0.000	0.552	Non-Liq.	Non-Liq.	0.00
30.68	386.15	2.45	0.63	110	1.357	0.918	0.64	0.50	0.88	321.18	1.41		1	100	1.00	8.70	1.00	322.4	0.91	Infin.	0.000	0.553	Non-Liq.	Non-Liq.	0.00
30.84	392.22	2.37	0.61	110	1.361	0.917	0.61	0.50	0.88	325.78	1.39		1	100	1.00	8.75	1.00	327.0	0.90	Infin.	0.000	0.554	Non-Liq.	Non-Liq.	0.00
31.00	405.26	2.42	0.60	110	1.364	0.916	0.60	0.50	0.88	336.16	1.37		1	100	1.00	8.80	1.00	337.4	0.90	Infin.	0.000	0.555	Non-Liq.	Non-Liq.	0.00
31.17	430.96	2.96	0.69	110	1.368	0.915	0.69	0.50	0.88	357.04	1.40		1	100	1.00	8.85	1.00	358.4	0.90	Infin.	0.000	0.556	Non-Liq.	Non-Liq.	0.00
31.33	477.81	2.81	0.59	110	1.372	0.914	0.59	0.50	0.88	395.41	1.32		1	100	1.00	8.85	1.00	396.9	0.90	Infin.	0.000	0.556	Non-Liq.	Non-Liq.	0.00
31.50	511.39	3.25	0.64	110	1.376	0.913	0.64	0.50	0.88	422.67	1.33		1	100	1.00	8.85	1.00	424.3	0.90	Infin.	0.000	0.557	Non-Liq.	Non-Liq.	0.00
31.66	526.85	3.67	0.70	110	1.380	0.912	0.70	0.50	0.88	434.87	1.35		1	100	1.00	8.85	1.00	436.5	0.90	Infin.	0.000	0.558	Non-Liq.	Non-Liq.	0.00
31.82	556.04	4.16	0.75	110	1.384	0.911	0.75	0.50	0.87	458.37	1.36		1	100	1.00	8.85	1.00	460.1	0.90	Infin.	0.000	0.559	Non-Liq.	Non-Liq.	0.00
31.99	549.66	4.48	0.82	110	1.388	0.910	0.82	0.50	0.87	452.46	1.39		1	100	1.00	8.85	1.00	454.1	0.90	Infin.	0.000	0.559	Non-Liq.	Non-Liq.	0.00
32.15	532.09	4.07	0.77	110	1.392	0.909	0.77	0.50	0.87	437.34	1.38		1	100	1.00	8.85	1.00	439.0	0.90	Infin.	0.000	0.560	Non-Liq.	Non-Liq.	0.00
32.32	480.94	3.60	0.75	110	1.396	0.908	0.75	0.50	0.87	394.63	1.40		1	100	1.00	8.85	1.00	396.1	0.90	Infin.	0.000	0.561	Non-Liq.	Non-Liq.	0.00
32.48	490.89	4.33	0.88	110	1.400	0.907	0.88	0.50	0.87	402.25	1.45		1	100	1.00	8.85	1.00	403.8	0.89	Infin.	0.000	0.561	Non-Liq.	Non-Liq.	0.00
32.64	528.43	4.91	0.93	110	1.403	0.906	0.93	0.50	0.87	432.50	1.45		1	100	1.00	8.85	1.00	434.1	0.89	Infin.	0.000	0.562	Non-Liq.	Non-Liq.	0.00
32.81	460.35	4.63	1.00	110	1.407	0.905	1.01	0.50	0.87	376.10	1.52		1	100	1.00	8.85	1.00	377.5	0.89	Infin.	0.000	0.563	Non-Liq.	Non-Liq.	0.00
32.97	486.15	4.33	0.89	110	1.411	0.904	0.89	0.50	0.87	396.69	1.46		1	100	1.00	8.85	1.00	398.2	0.89	Infin.	0.000	0.563	Non-Liq.	Non-Liq.	0.00
33.14	443.98	3.08	0.69	110	1.415	0.903	0.70	0.50	0.86	361.68	1.40		1	100	1.00	8.85	1.00	363.0	0.89	Infin.	0.000	0.564	Non-Liq.	Non-Liq.	0.00
33.30	410.68	3.53	0.86	110	1.419	0.902	0.86	0.50	0.86	334.00	1.49		1	100	1.00	8.85	1.00	335.3	0.89	Infin.	0.000	0.565	Non-Liq.	Non-Liq.	0.00
33.46	410.45	3.02	0.74	110	1.423	0.901	0.74	0.50	0.86	333.35	1.44		1	100	1.00	8.85	1.00	334.6	0.89	Infin.	0.000	0.565	Non-Liq.	Non-Liq.	0.00
33.63	405.83	2.64	0.65	110	1.427	0.900	0.65	0.50	0.86	329.13	1.41		1	100	1.00	8.85	1.00	330.4	0.89	Infin.	0.000	0.566	Non-Liq.	Non-Liq.	0.00
33.79	322.06	1.47	0.46	110	1.431	0.899	0.46	0.50	0.86	260.60	1.37		1	100	1.00	8.85	1.00	261.6	0.89	Infin.	0.000	0.566	Non-Liq.	Non-Liq.	0.00
33.96	275.23	1.64	0.60	110	1.435	0.898	0.60	0.50	0.86	222.23	1.50		1	100	1.00	8.85	1.00	223.1	0.89	Infin.	0.000	0.567	Non-Liq.	Non-Liq.	0.00
34.12	227.81	2.72	1.19	110	1.439	0.897	1.20	0.54	0.85	181.18	1.78		1	100	1.09	8.85	1.00	198.3	0.88	Infin.	0.000	0.567	Non-Liq.	Non-Liq.	0.00
34.28	169.10	2.93	1.74	110	1.443	0.896	1.75	0.61	0.83	131.34	1.99		1	88	1.29	8.85	1.00	170.0	0.88	Infin.	0.000	0.568	Non-Liq.	Non-Liq.	0.00
34.45	86.25	3.30	3.82	110	1.446	0.895	3.89	0.75	0.79	63.47	2.46		1	58	2.58		1.00	163.6	0.91	Infin.	0.000	0.568	Non-Liq.	Non-Liq.	0.00
34.61	69.63	2.59	3.72	110	1.450	0.894	3.80	0.76	0.79	50.64	2.52		1	49	2.88		1.00	145.8	0.94	0.368	0.346	0.569	0.61	84%	0.88
34.78	43.14	2.39	5.53	110	1.454	0.893	5.73	0.85	0.76	30.06	2.81		0						0.94			0.569	Non-Liq.	Non-Liq.	0.00
34.94	30.65	2.97	9.69	110	1.458	0.892	10.17	0.94	0.74	20.42	3.10		0						0.94			0.570	Non-Liq.	Non-Liq.	0.00
35.10	41.47	3.52	8.49	110	1.462	0.890	8.80	0.90	0.75	28.30	2.96		0						0.94			0.570	Non-Liq.	Non-Liq.	0.00
35.27	65.17	3.19	4.90	110	1.466	0.889	5.01	0.80	0.77	46.41	2.63		0						0.94			0.570	Non-Liq.	Non-Liq.	0.00
35.43	88.65	2.38	2.68	110	1.470	0.888	2.73	0.71	0.79	65.24	2.34		1	59	2.09		1.00	136.3	0.91	0.315	0.286	0.571	0.50	91%	1.05
35.60	43.77	2.29	5.24	110	1.474	0.887	5.42	0.84	0.76	30.22	2.79		0						0.94			0.571	Non-Liq.	Non-Liq.	0.00
35.76	29.66	1.82	6.14	110	1.478	0.886	6.46	0.90	0.74	19.72	2.98		0						0.94			0.572	Non-Liq.	Non-Liq.	0.00
35.93	29.62	1.77	5.98	110	1.482	0.885	6.30	0.90	0.74	19.65	2.97		0						0.93			0.572	Non-Liq.	Non-Liq.	0.00
36.09	178.35	2.16	1.21	110	1.485	0.883	1.22	0.57	0.82	137.89	1.86		1	90	1.16	0.40	1.31	208.8	0.87	Infin.	0.000	0.572	Non-Liq.	Non-Liq.	0.00
36.25	241.23	1.79	0.74	110	1.489	0.882	0.75	0.50	0.84	190.98	1.62		1	100	1.00	0.40	1.31	249.9	0.87	Infin.	0.000	0.573	Non-Liq.	Non-Liq.	0.00
36.42	267.52	1.54	0.57	110	1.493	0.881	0.58	0.50	0.84	211.65	1.51		1	100	1.00	0.40	1.31	276.9	0.87	Infin.	0.000	0.573	Non-Liq.	Non-Liq.	0.00
36.58	307.90	1.25	0.41	110	1.497	0.880	0.41	0.50	0.84	243.45	1.36		1	100	1.00	0.40	1.31	318.6	0.87	Infin.	0.000	0.573	Non-Liq.	Non-Liq.	0.00
36.75	313.53	1.06	0.34	110	1.501	0.878	0.34	0.50	0.84	247.60	1.31		1	100	1.00	0.40	1.31	324.0	0.87	Infin.	0.000	0.573	Non-Liq.	Non-Liq.	0.00
36.91	259.68	0.86	0.33	110	1.505	0.877	0.33	0.50	0.84	204.60	1.38		1	100	1.00	0.40	1.31	267.7	0.87	Infin.	0.000	0.574	Non-Liq.	Non-Liq.	0.00
37.07	199.86	0.72	0.36	110	1.509	0.876	0.36	0.50	0.84	156.99	1.49		1	96	1.00	0.40	1.31	205.4	0.87	Infin.	0.000	0.574	Non-Liq.	Non-Liq.	0.00
37.24	136.61	0.99	0.72	110	1.513	0.875	0.73	0.55	0.82	104.86	1.81		1	79	1.11	0.40	1.31	152.8	0.87	0.412	0.357	0.574	0.62	83%	0.71
37.40	83.21	1.31	1.58	110	1.517	0.873	1.61	0.67	0.79	60.64	2.21		1	56	1.69		1.00	102.5	0.90	0.180	0.162	0.574	0.28	98%	1.46
37.57	44.38	1.10	2.47	110	1.521	0.872	2.56	0.78	0.75	30.55	2.57		1	28	3.13		1.00	95.7	0.93	0.162	0.150	0.574	0.26	99%	1.56
37.73	27.18	1.18	4.34	110	1.525	0.871	4.60	0.88	0.72	17.57	2.91		0						0.93			0.575	Non-Liq.	Non-Liq.	0.00
37.89	28.70	1.31	4.57	110	1.528	0.869	4.83	0.88	0.72	18.57	2.91		0						0.93			0.575	Non-Liq.	Non-Liq.	0.00
38.06	39.57	1.47	3.71	110	1.532	0.868	3.86	0.83	0.74	26.46	2.73		0						0.93			0.575	Non-Liq.	Non-Liq.	0.00
38.22	75.21	1.54	2.05	110	1.536	0.867	2.09	0.71	0.77	53.52	2.33		1	51	2.03		1.00	108.8	0.89	0.200	0.179	0.575	0.31	98%	1.38
38.39	174.70	1.55	0.88	110	1.540	0.865	0.89	0.54	0.82	133.49	1.78		1	89	1.09	0.35	1.36	198.1	0.86	Infin.	0.000	0.575	Non-Liq.	Non-Liq.	0.00
38.55	220.50	1.33	0.60	110	1.544	0.864	0.61	0.50	0.83	171.31	1.59		1	99	1.00	0.40	1.36	232.3	0.86	Infin.	0.000	0.575	Non-Liq.	Non-Liq.	0.00
38.71	247.95	1.28	0.52	110	1.548	0.863	0.52	0.50	0.83	192.54	1.51		1	100	1.00	0.45	1.36	261.1	0.86	Infin.	0.000	0.575	Non-Liq.	Non-Liq.	0.00
38.88	252.96	1.31	0.52	110	1.552	0.861	0.52	0.50	0.83	196.21	1.50		1	100	1.00	0.50	1.36	266.1	0.86	Infin.	0.000	0.575	Non-Liq.	Non-Liq.	0.00
39.04	230.96	1.38	0.60	110	1.556	0.860	0.60	0.50	0.82	178.81	1.58		1	100	1.00	0.55	1.36	242.5	0.86	Infin.	0.000	0.575	Non-Liq.	Non-Liq.	0.00
39.21	145.79	1.25	0.86	110	1.560	0.859	0.87	0.56	0.80	109.70	1.84		1	81	1.14	0.60	1.36	169.1	0.86	Infin.	0.000	0.575	Non-Liq.	Non-Liq.	0.00
39.37	85.88	1.67	1.94	110	1.564	0.857	1.98	0.69	0.76	60.91	2.27		1	56	1.85		1.00	112.5	0.89	0.212	0.189	0.576	0.33	98%	1.33
39.53	62.58	1.46	2.33	110	1.567	0.856	2.39	0.74	0.75	43.14	2.43		1	42	2.46		1.00	106.0	0.92	0.191	0.176	0.576	0.31	98%	1.42
39.70	41.74	1.21	2.90	110	1.571	0.854	3.01	0.80	0.73	27.65	2.65		0						0.92			0.576	Non-Liq.	Non-Liq.	0.00
39.86	15.02	0.92	6.14	110	1.575	0.853	6.86	0.99	0.67	8.58	3.27		0						0.92			0.575	Non-Liq.	Non-Liq.	0.00
40.03	11.69	1.18	10.11	110	1.579	0.852	11.69	1.00	0.67	6.40	3.51		0						0.92			0.575	Non-Liq.	Non-Liq.	0.00
40.19	18.75	1.87	9.99	110	1.583	0.850	10.91	1.00	0.67	10.84	3.32		0						0.92			0.575	Non-Liq.	Non-Liq.	0.00
40.35	94.45	2.16	2.29	110	1.587	0.849	2.33	0.69	0.75	66.23	2.29		1	60	1.91		1.00	126.7	0.89	0.269	0.238	0.575	0.41	95%	1.16
40.52	251.97	2.43	0.96	110	1.591	0.847	0.97	0.52	0.81	191.75	1.69		1	100	1.03	1.00	1.00	198.8	0.85	Infin.	0.000	0.575	Non-Liq.	Non-Liq.	0.00
40.68	313.15	2.26	0.72	110	1.595	0.846	0.73	0.50	0.81	239.85	1.54		1	100	1.00	1.00	1.00	240.7	0.85	Infin.	0.000	0.575	Non-Liq.	Non-Liq.	0.00
40.85	341.76	2.88	0.84	110	1.599	0.844	0.85	0.50	0.81	261.55	1.56		1	100	1.00	1.00	1.00	262.5	0.85	Infin.	0.000	0.575	Non-Liq.	Non-Liq.	0.00
41.01	354.79	3.52	0.99	110	1.603	0.843	1.00	0.50	0.81	271.24	1.60		1	100	1.00	1.00	1.00	272.3	0.85	Infin.	0.000	0.575	Non-Liq.	Non-Liq.	0.00
41.17	373.62	4.05	1.09	110	1.607	0.841	1.09	0.50	0.81	285.35	1.62		1	100	1.00	1.00	1.00	286.4	0.85	Infin.	0.000	0.575	Non-Liq.	Non-Liq.	0.00
41.34	386.97	4.10	1.06	110	1.610	0.840	1.06	0.50	0.81	295.23	1.60		1	100	1.00	1.00	1.00	296.3	0.85	Infin.	0.000	0.575	Non-Liq.	Non-Liq.	0.00
41.50	384.45	4.56	1.19	110	1.614	0.838	1.19	0.50	0.81	292.94	1.64		1	100	1.00	1.00	1.00	294.0	0.84	Infin.	0.000	0.575	Non-Liq.	Non-Liq.	0.00
41.67	388.83	3.67	0.94	110	1.618	0.837	0.95	0.50	0.81	295.93	1.56		1	100	1.00	1.00	1.00	297.0	0.84	Infin.	0.000	0.574	Non-Liq.	Non-Liq.	0.00
41.83	401.57	3.65	0.91	110	1.622	0.835	0.91	0.50	0.81	305.29	1.54		1	100	1.00	1.00	1.00	306.4	0.84	Infin.	0.000	0.574	Non-Liq.	Non-Liq.	0.00
41.99	345.90	3.80	1.10	110	1.626	0.834	1.10	0.50	0.81	262.37	1.64		1	100	1.00	1.00	1.00	262.9	0.84	Infin.	0.000	0.574	Non-Liq.	Non-Liq.	0.00
42.16	326.26	3.40	1.04	110	1.630	0.832	1.05	0.50	0.81	247.11	1.64		1	100	1.00	1.00	1.00	247.6	0.84	Infin.	0.000	0.574	Non-Liq.	Non-Liq.	0.00
42.32	340.48	3.88	1.14	110	1.634	0.831	1.14	0.51	0.80	257.02	1.66		1	100	1.01	1.00	1.00	260.8	0.84	Infin.	0.000	0.574	Non-Liq.	Non-Liq.	0.00
42.49	364.19	3.38	0.93	110	1.638	0.829	0.93	0.50	0.80	275.43	1.57		1	100	1.00	1.00	1.00	276.5	0.84	Infin.	0.000	0.573	Non-Liq.	Non-Liq.	0.00
42.65	390.03	3.10	0.79	110	1.642	0.827	0.80	0.50	0.80	294.70	1.50		1	100	1.00	1.00	1.00	295.8	0.84	Infin.	0.000	0.573	Non-Liq.	Non-Liq.	0.00
42.81	313.44	2.00	0.64	110	1.646	0.826	0.64	0.50	0.80	236.30	1.50		1	100	1.00	1.00	1.00	237.2	0.84	Infin.	0.000	0.573	Non-Liq.	Non-Liq.	0.00
42.98	281.49	1.86	0.66	110	1.649	0.824	0.67	0.50	0.80	211.83	1.55		1	100	1.00	1.00	1.00	212.6	0.84	Infin.	0.000	0.573	Non-Liq.	Non-Liq.	0.00

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	*Volumetric Strain (%)*
43.14	220.54	1.03	0.47	110	1.653	0.823	0.47	0.50	0.80	165.50	1.54		1	98	1.00	1.00	1.00	166.1	0.84	Infin.	0.000	0.572	**Non-Liq.**	Non-Liq.	**0.00**
43.31	170.25	0.75	0.44	110	1.657	0.821	0.44	0.50	0.80	127.32	1.62		1	87	1.00	1.00	1.00	127.8	0.84	0.274	0.229	0.572	**0.40**	95%	**1.14**
43.47	150.87	0.88	0.58	110	1.661	0.820	0.59	0.53	0.79	111.11	1.73		1	81	1.06	1.00	1.00	118.4	0.83	0.234	0.196	0.572	**0.34**	97%	**1.25**
43.64	112.32	0.90	0.80	110	1.665	0.818	0.81	0.59	0.77	80.14	1.93		1	68	1.22	1.00	1.00	98.0	0.87	0.168	0.146	0.572	**0.26**	99%	**1.53**
43.80	82.53	1.03	1.25	110	1.669	0.816	1.28	0.66	0.74	56.60	2.17		1	53	1.60		1.00	90.3	0.87	0.148	0.129	0.571	**0.23**	99%	**1.65**
43.96	68.72	1.03	1.49	110	1.673	0.815	1.53	0.69	0.73	46.10	2.29		1	45	1.91		1.00	88.2	0.91	0.144	0.131	0.571	**0.23**	99%	**1.68**
44.13	55.11	0.91	1.64	110	1.677	0.813	1.69	0.73	0.72	36.12	2.40		1	35	2.31		1.00	83.4	0.91	0.134	0.122	0.571	**0.21**	99%	**1.76**
44.29	41.85	0.92	2.19	110	1.681	0.811	2.28	0.78	0.70	26.42	2.59		1	22	3.24		1.00	85.6	0.91	0.138	0.126	0.570	**0.22**	99%	**1.73**
44.46	26.31	1.06	4.02	110	1.685	0.810	4.29	0.89	0.66	15.39	2.94		0						0.91			0.570	**Non-Liq.**	Non-Liq.	**0.00**
44.62	21.72	0.91	4.17	110	1.689	0.808	4.52	0.92	0.65	12.33	3.03		0						0.91			0.569	**Non-Liq.**	Non-Liq.	**0.00**
44.78	37.10	1.02	2.74	110	1.692	0.807	2.87	0.82	0.68	22.80	2.70		0						0.91			0.569	**Non-Liq.**	Non-Liq.	**0.00**
44.95	79.45	1.14	1.44	110	1.696	0.805	1.47	0.68	0.73	53.41	2.23		1	51	1.73		1.00	92.7	0.87	0.154	0.134	0.569	**0.24**	99%	**1.61**
45.11	124.52	1.08	0.86	110	1.700	0.803	0.88	0.58	0.76	88.02	1.92		1	72	1.21	0.70	1.10	116.3	0.83	0.226	0.187	0.568	**0.33**	98%	**1.28**
45.28	146.40	1.60	1.09	110	1.704	0.802	1.11	0.59	0.76	103.42	1.93		1	78	1.22	0.75	1.10	137.7	0.83	0.323	0.267	0.568	**0.47**	92%	**1.03**
45.44	147.64	1.68	1.14	110	1.708	0.800	1.15	0.59	0.75	104.02	1.94		1	78	1.23	0.80	1.10	139.6	0.83	0.333	0.275	0.567	**0.48**	92%	**1.01**
45.60	111.81	2.01	1.80	110	1.712	0.798	1.83	0.66	0.73	75.74	2.17		1	65	1.61		1.00	121.6	0.87	0.247	0.214	0.567	**0.38**	96%	**1.21**
45.77	107.68	2.34	2.17	110	1.716	0.797	2.21	0.68	0.72	72.03	2.25		1	63	1.79		1.00	128.7	0.86	0.278	0.241	0.567	**0.42**	94%	**1.13**
45.93	150.61	2.63	1.75	110	1.720	0.795	1.77	0.63	0.74	103.74	2.07		1	78	1.40		1.00	144.8	0.82	0.363	0.298	0.566	**0.53**	89%	**1.00**
46.10	249.00	2.59	1.04	110	1.724	0.793	1.05	0.53	0.77	180.59	1.73		1	100	1.06	1.00	1.00	192.4	0.82	Infin.	0.000	0.566	**Non-Liq.**	Non-Liq.	**0.00**
46.26	324.42	3.00	0.93	110	1.728	0.792	0.93	0.50	0.78	238.69	1.61		1	100	1.00	1.05	1.00	239.6	0.82	Infin.	0.000	0.565	**Non-Liq.**	Non-Liq.	**0.00**
46.42	376.79	3.64	0.96	110	1.731	0.790	0.97	0.50	0.78	277.11	1.58		1	100	1.00	1.10	1.00	278.1	0.82	Infin.	0.000	0.565	**Non-Liq.**	Non-Liq.	**0.00**
46.59	401.24	4.49	1.12	110	1.735	0.788	1.12	0.50	0.78	294.84	1.62		1	100	1.00	1.15	1.00	295.9	0.82	Infin.	0.000	0.564	**Non-Liq.**	Non-Liq.	**0.00**
46.75	410.01	4.98	1.21	110	1.739	0.787	1.22	0.50	0.78	300.97	1.64		1	100	1.00	1.20	1.00	302.1	0.82	Infin.	0.000	0.564	**Non-Liq.**	Non-Liq.	**0.00**
46.92	417.89	4.83	1.16	110	1.743	0.785	1.16	0.50	0.78	306.43	1.62		1	100	1.00	1.25	1.00	307.6	0.82	Infin.	0.000	0.563	**Non-Liq.**	Non-Liq.	**0.00**
47.08	432.83	4.59	1.06	110	1.747	0.783	1.06	0.50	0.78	317.08	1.58		1	100	1.00	1.30	1.00	318.3	0.82	Infin.	0.000	0.563	**Non-Liq.**	Non-Liq.	**0.00**
47.24	435.16	3.80	0.87	110	1.751	0.782	0.88	0.50	0.78	318.43	1.51		1	100	1.00	1.35	1.00	319.6	0.82	Infin.	0.000	0.562	**Non-Liq.**	Non-Liq.	**0.00**
47.41	434.87	4.29	0.99	110	1.755	0.780	0.99	0.50	0.78	317.86	1.55		1	100	1.00	1.40	1.00	319.0	0.82	Infin.	0.000	0.562	**Non-Liq.**	Non-Liq.	**0.00**
47.57	434.40	5.04	1.16	110	1.759	0.778	1.17	0.50	0.78	317.16	1.61		1	100	1.00	1.45	1.00	318.3	0.82	Infin.	0.000	0.561	**Non-Liq.**	Non-Liq.	**0.00**
47.74	430.64	5.51	1.28	110	1.763	0.777	1.28	0.50	0.77	313.70	1.65		1	100	1.00	1.50	1.00	315.3	0.82	Infin.	0.000	0.561	**Non-Liq.**	Non-Liq.	**0.00**
47.90	433.15	6.42	1.48	110	1.767	0.775	1.49	0.52	0.77	312.64	1.70		1	100	1.04	1.55	1.00	325.7	0.81	Infin.	0.000	0.560	**Non-Liq.**	Non-Liq.	**0.00**
48.06	428.46	6.61	1.54	110	1.770	0.773	1.55	0.52	0.76	308.02	1.72		1	100	1.05	1.60	1.00	324.6	0.81	Infin.	0.000	0.560	**Non-Liq.**	Non-Liq.	**0.00**
48.23	424.25	6.72	1.58	110	1.774	0.772	1.59	0.53	0.76	304.04	1.73		1	100	1.06	1.65	1.00	323.0	0.81	Infin.	0.000	0.559	**Non-Liq.**	Non-Liq.	**0.00**
48.39	419.06	6.65	1.59	110	1.778	0.770	1.59	0.53	0.76	299.75	1.73		1	100	1.06	1.70	1.00	319.3	0.81	Infin.	0.000	0.559	**Non-Liq.**	Non-Liq.	**0.00**
48.56	409.58	6.70	1.64	110	1.782	0.768	1.64	0.53	0.76	291.80	1.75		1	100	1.07	1.75	1.00	314.3	0.81	Infin.	0.000	0.558	**Non-Liq.**	Non-Liq.	**0.00**
48.72	401.26	6.55	1.63	110	1.786	0.767	1.64	0.54	0.76	285.28	1.76		1	100	1.08	1.80	1.00	308.3	0.81	Infin.	0.000	0.558	**Non-Liq.**	Non-Liq.	**0.00**
48.88	393.67	6.35	1.61	110	1.790	0.765	1.62	0.54	0.75	279.50	1.76		1	100	1.08	1.85	1.00	302.2	0.81	Infin.	0.000	0.557	**Non-Liq.**	Non-Liq.	**0.00**
49.05	386.90	6.22	1.61	110	1.794	0.763	1.62	0.54	0.75	274.18	1.76		1	100	1.08	1.90	1.00	297.2	0.81	Infin.	0.000	0.556	**Non-Liq.**	Non-Liq.	**0.00**
49.21	381.95	6.11	1.60	110	1.798	0.762	1.61	0.54	0.75	270.24	1.76		1	100	1.08	1.95	1.00	293.3	0.81	Infin.	0.000	0.556	**Non-Liq.**	Non-Liq.	**0.00**
49.38	382.17	6.15	1.61	110	1.802	0.760	1.62	0.54	0.75	269.99	1.77		1	100	1.08	2.00	1.00	293.4	0.81	Infin.	0.000	0.555	**Non-Liq.**	Non-Liq.	**0.00**
49.54	376.16	6.01	1.60	110	1.806	0.758	1.61	0.54	0.75	265.33	1.77		1	100	1.08	2.05	1.00	288.7	0.81	Infin.	0.000	0.555	**Non-Liq.**	Non-Liq.	**0.00**
49.70	367.77	5.85	1.59	110	1.810	0.757	1.60	0.54	0.75	258.87	1.77		1	100	1.09	2.10	1.00	282.6	0.81	Infin.	0.000	0.554	**Non-Liq.**	Non-Liq.	**0.00**
49.87	358.21	5.75	1.61	110	1.813	0.755	1.61	0.54	0.75	251.37	1.78		1	100	1.10	2.15	1.00	276.4	0.81	Infin.	0.000	0.553	**Non-Liq.**	Non-Liq.	**0.00**
50.03	351.53	5.60	1.59	110	1.817	0.753	1.60	0.54	0.75	246.26	1.79		1	100	1.10	2.20	1.00	271.2	0.81	Infin.	0.000	0.553	**Non-Liq.**	Non-Liq.	**0.00**
50.20	347.31	4.90	1.41	110	1.821	0.752	1.42	0.53	0.75	244.59	1.75		1	100	1.07	2.25	1.00	262.5	0.80	Infin.	0.000	0.552	**Non-Liq.**	Non-Liq.	**0.00**
50.36	345.77	5.05	1.46	110	1.825	0.750	1.47	0.54	0.75	242.68	1.76		1	100	1.08	2.30	1.00	262.8	0.80	Infin.	0.000	0.552	**Non-Liq.**	Non-Liq.	**0.00**
50.52	347.22	5.22	1.50	110	1.829	0.748	1.51	0.54	0.74	243.04	1.77		1	100	1.09	2.35	1.00	264.8	0.80	Infin.	0.000	0.551	**Non-Liq.**	Non-Liq.	**0.00**
50.69	346.06	5.37	1.55	110	1.833	0.747	1.56	0.54	0.74	241.42	1.78		1	100	1.09	2.40	1.00	265.2	0.80	Infin.	0.000	0.550	**Non-Liq.**	Non-Liq.	**0.00**
50.85	349.13	5.22	1.50	110	1.837	0.745	1.50	0.54	0.74	243.91	1.77		1	100	1.08	2.45	1.00	265.3	0.80	Infin.	0.000	0.550	**Non-Liq.**	Non-Liq.	**0.00**
51.02	348.56	4.86	1.39	110	1.841	0.743	1.40	0.53	0.75	244.21	1.74		1	100	1.07	2.50	1.00	261.6	0.80	Infin.	0.000	0.549	**Non-Liq.**	Non-Liq.	**0.00**
51.18	349.29	4.35	1.25	110	1.845	0.742	1.25	0.52	0.75	246.10	1.70		1	100	1.04	2.55	1.00	256.9	0.80	Infin.	0.000	0.549	**Non-Liq.**	Non-Liq.	**0.00**
51.35	348.08	4.19	1.20	110	1.849	0.740	1.21	0.52	0.75	245.42	1.69		1	100	1.03	2.60	1.00	254.3	0.80	Infin.	0.000	0.548	**Non-Liq.**	Non-Liq.	**0.00**
51.51	347.63	4.03	1.16	110	1.852	0.738	1.17	0.51	0.75	245.34	1.68		1	100	1.02	2.65	1.00	252.2	0.80	Infin.	0.000	0.547	**Non-Liq.**	Non-Liq.	**0.00**
51.67	345.96	4.21	1.22	110	1.856	0.737	1.22	0.52	0.75	243.12	1.70		1	100	1.04	2.65	1.00	253.0	0.80	Infin.	0.000	0.547	**Non-Liq.**	Non-Liq.	**0.00**
51.84	345.46	4.03	1.17	110	1.860	0.735	1.17	0.51	0.75	243.07	1.68		1	100	1.03	2.65	1.00	250.7	0.80	Infin.	0.000	0.546	**Non-Liq.**	Non-Liq.	**0.00**
52.00	342.27	3.60	1.05	110	1.864	0.733	1.06	0.50	0.75	241.88	1.65		1	100	1.00	2.65	1.00	243.9	0.80	Infin.	0.000	0.545	**Non-Liq.**	Non-Liq.	**0.00**
52.17	345.47	2.90	0.84	110	1.868	0.732	0.84	0.50	0.75	244.41	1.58		1	100	1.00	2.65	1.00	245.3	0.80	Infin.	0.000	0.545	**Non-Liq.**	Non-Liq.	**0.00**
52.33	353.60	2.51	0.71	110	1.872	0.730	0.71	0.50	0.75	249.93	1.52		1	100	1.00	2.65	1.00	250.9	0.80	Infin.	0.000	0.544	**Non-Liq.**	Non-Liq.	**0.00**
52.49	353.44	2.43	0.69	110	1.876	0.728	0.69	0.50	0.75	249.55	1.51		1	100	1.00	2.65	1.00	250.5	0.80	Infin.	0.000	0.543	**Non-Liq.**	Non-Liq.	**0.00**
52.66	329.04	2.54	0.77	110	1.880	0.727	0.77	0.50	0.75	231.99	1.57		1	100	1.00	2.65	1.00	232.9	0.79	Infin.	0.000	0.543	**Non-Liq.**	Non-Liq.	**0.00**
52.82	324.06	2.40	0.74	110	1.884	0.725	0.75	0.50	0.75	228.21	1.56		1	100	1.00	2.65	1.00	229.1	0.79	Infin.	0.000	0.542	**Non-Liq.**	Non-Liq.	**0.00**
52.99	357.49	2.12	0.59	110	1.888	0.724	0.60	0.50	0.75	251.63	1.46		1	100	1.00	2.65	1.00	252.6	0.79	Infin.	0.000	0.542	**Non-Liq.**	Non-Liq.	**0.00**
53.15	377.56	1.69	0.45	110	1.892	0.722	0.45	0.50	0.75	265.56	1.36		1	100	1.00	2.65	1.00	266.5	0.79	Infin.	0.000	0.541	**Non-Liq.**	Non-Liq.	**0.00**
53.31	383.09	1.73	0.45	110	1.895	0.720	0.45	0.50	0.75	269.18	1.36		1	100	1.00	2.65	1.00	270.2	0.79	Infin.	0.000	0.540	**Non-Liq.**	Non-Liq.	**0.00**
53.48	384.71	1.88	0.49	110	1.899	0.719	0.49	0.50	0.75	270.05	1.38		1	100	1.00	2.65	1.00	271.1	0.79	Infin.	0.000	0.540	**Non-Liq.**	Non-Liq.	**0.00**
53.64	382.98	1.55	0.41	110	1.903	0.717	0.41	0.50	0.75	268.55	1.33		1	100	1.00	2.65	1.00	269.6	0.79	Infin.	0.000	0.539	**Non-Liq.**	Non-Liq.	**0.00**
53.81	378.65	1.68	0.44	110	1.907	0.716	0.45	0.50	0.74	265.22	1.36		1	100	1.00	2.65	1.00	266.2	0.79	Infin.	0.000	0.538	**Non-Liq.**	Non-Liq.	**0.00**
53.97	364.32	1.45	0.40	110	1.911	0.714	0.40	0.50	0.74	254.87	1.34		1	100	1.00	2.65	1.00	255.8	0.79	Infin.	0.000	0.538	**Non-Liq.**	Non-Liq.	**0.00**
54.13	345.61	1.28	0.37	110	1.915	0.712	0.37	0.50	0.74	241.46	1.34		1	100	1.00	2.65	1.00	242.4	0.79	Infin.	0.000	0.537	**Non-Liq.**	Non-Liq.	**0.00**
54.30	328.15	1.38	0.42	110	1.919	0.711	0.42	0.50	0.74	228.96	1.40		1	100	1.00	2.65	1.00	229.8	0.79	Infin.	0.000	0.536	**Non-Liq.**	Non-Liq.	**0.00**
54.46	286.22	1.49	0.52	110	1.923	0.709	0.53	0.50	0.74	199.33	1.50		1	100	1.00	2.65	1.00	200.1	0.79	Infin.	0.000	0.536	**Non-Liq.**	Non-Liq.	**0.00**
54.63	215.92	2.04	0.94	110	1.927	0.708	0.95	0.54	0.72	146.37	1.77		1	93	1.09	2.65	1.00	159.6	0.79	0.458	0.361	0.535	**0.67**	79%	**0.55**
54.79	142.12	2.27	1.60	110	1.931	0.706	1.62	0.63	0.68	90.57	2.08		1	73	1.42		1.00	128.9	0.79	0.279	0.219	0.534	**0.41**	95%	**1.13**
54.95	95.61	2.50	2.61	110	1.934	0.705	2.66	0.72	0.65	57.33	2.37		1	54	2.21		1.00	126.7	0.83	0.269	0.225	0.534	**0.42**	95%	**1.15**
55.12	68.05	2.25	3.30	110	1.938	0.703	3.40	0.78	0.62	39.00	2.57		1	38	3.14		1.00	122.4	0.89	0.251	0.222	0.533	**0.42**	95%	**1.20**
55.28	52.93	1.90	3.59	110	1.942	0.701	3.73	0.81	0.61	29.39	2.69		0						0.89			0.532	**Non-Liq.**	Non-Liq.	**0.00**
55.45	46.61	2.06	4.41	110	1.946	0.700	4.61	0.85	0.60	25.19	2.80		0						0.89			0.532	**Non-Liq.**	Non-Liq.	**0.00**
55.61	110.59	2.63	2.38	110	1.950	0.698	2.42	0.70	0.65	67.05	2.30		1	60	1.94		1.00	129.9	0.83	0.284	0.236	0.531	**0.44**	94%	**1.11**
55.77	134.82	3.19	2.37	110	1.954	0.697	2.40	0.68	0.66	82.91	2.23		1	69	1.74		1.00	144.4	0.83	0.360	0.299	0.530	**0.56**	87%	**1.00**
55.94	157.81	3.55	2.25	110	1.958	0.695	2.28	0.66	0.67	98.35	2.16		1	76	1.58		1.00	155.1	0.78	0.427	0.334	0.530	**0.63**	82%	**0.65**
56.10	180.29	3.92	2.18	110	1.962	0.694	2.20	0.64	0.67	113.50	2.11		1	82	1.47		1.00	166.8	0.78	Infin.	0.000	0.529	**Non-Liq.**	Non-Liq.	**0.00**
56.27	192.22	4.13	2.15	110	1.966	0.692	2.17	0.63	0.68	121.48	2.08		1	85	1.43		1.00	173.3	0.78	Infin.	0.000	0.528	**Non-Liq.**	Non-Liq.	**0.00**
56.43	181.99	3.86	2.12	110	1.970	0.691	2.14	0.64	0.67	114.52	2.10		1	82	1.45		1.00	166.0	0.78	Infin.	0.000	0.528	**Non-Liq.**	Non-Liq.	**0.00**
56.59	157.22	3.50	2.23	110	1.974	0.689	2.26	0.66	0.66	97.46	2.16		1	76	1.58		1.00	153.6	0.78	0.417	0.325	0.527	**0.62**	83%	**0.68**
56.76	135.91	2.78	2.04	110	1.977	0.688	2.07	0.66	0.66	83.65	2.18		1	69	1.62		1.00	135.7	0.83	0.312	0.259	0.526	**0.49**	91%	**1.05**
56.92	120.38	2.34	1.94	110	1.981	0.686	1.97	0.67	0.66	73.50	2.21		1	64	1.68		1.00	123.7	0.83	0.256	0.212	0.526	**0.40**	95%	**1.18**
57.09	104.50	2.33	2.23	110	1.985	0.685	2.27	0.70	0.64	62.45	2.30		1	57	1.95		1.00	121.6	0.83	0.247	0.205	0.525	**0.39**	96%	**1.21**
57.25	69.37	1.60	2.31	110	1.989	0.683	2.38	0.75	0.62	39.77	2.46		1	39	2.57		1.00	102.2	0.88	0.179	0.158	0.524	**0.30**	98%	**1.46**
57.41	32.64	1.19	3.63	110	1.993	0.682	3.87	0.87	0.58	16.66	2.88		0						0.88			0.524	**Non-Liq.**	Non-Liq.	**0.00**
57.58	24.63	0.77	3.11	110	1.997	0.680	3.38	0.90	0.57	12.11	2.96		0						0.88			0.523	**Non-Liq.**	Non-Liq.	**0.00**
57.74	22.59	0.67	2.95	110	2.001	0.679	3.23	0.90	0.56	10.95	2.98		0						0.88			0.523	**Non-Liq.**	Non-Liq.	**0.00**
57.91	21.75	0.79	3.64	110	2.005	0.678	4.01	0.93	0.55	10.33	3.06		0						0.88			0.522	**Non-Liq.**	Non-Liq.	**0.00**
58.07	25.26	0.77	3.05	110	2.009	0.676	3.31	0.89	0.56	12.41	2.95		0						0.88			0.521	**Non-Liq.**	Non-Liq.	**0.00**

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_c	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	*Volumetric Strain (%)*
58.23	28.61	0.75	2.63	110	2.013	0.675	2.83	0.86	0.57	14.43	2.85		0						0.88			0.521	**Non-Liq.**	Non-Liq.	**0.00**
58.40	24.43	0.68	2.77	110	2.016	0.673	3.02	0.89	0.56	11.94	2.94		0						0.88			0.520	**Non-Liq.**	Non-Liq.	**0.00**
58.56	36.91	0.77	2.09	110	2.020	0.672	2.21	0.81	0.59	19.49	2.68		0						0.88			0.519	**Non-Liq.**	Non-Liq.	**0.00**
58.73	23.45	0.91	3.86	110	2.024	0.671	4.23	0.92	0.55	11.13	3.05		0						0.88			0.519	**Non-Liq.**	Non-Liq.	**0.00**
58.89	18.11	1.14	6.28	110	2.028	0.669	7.07	1.00	0.52	7.93	3.30		0						0.88			0.518	**Non-Liq.**	Non-Liq.	**0.00**
59.06	65.03	1.57	2.41	110	2.032	0.668	2.48	0.76	0.61	36.29	2.50		1	35	2.78		1.00	100.8	0.88	0.175	0.154	0.517	**0.30**	98%	**1.48**
59.22	103.87	1.91	1.83	110	2.036	0.666	1.87	0.68	0.64	61.58	2.25		1	57	1.79		1.00	110.3	0.82	0.205	0.168	0.517	**0.33**	98%	**1.35**
59.38	65.03	1.50	2.30	110	2.040	0.665	2.38	0.75	0.61	36.27	2.49		1	35	2.72		1.00	98.5	0.88	0.169	0.148	0.516	**0.29**	98%	**1.51**
59.55	38.85	0.98	2.51	110	2.044	0.664	2.65	0.82	0.58	20.23	2.72		0						0.88			0.516	**Non-Liq.**	Non-Liq.	**0.00**
59.71	27.32	0.71	2.60	110	2.048	0.662	2.81	0.87	0.56	13.44	2.88		0						0.88			0.515	**Non-Liq.**	Non-Liq.	**0.00**
59.88	17.57	0.45	2.57	110	2.052	0.661	2.91	0.93	0.54	7.92	3.07		0						0.88			0.514	**Non-Liq.**	Non-Liq.	**0.00**
60.04	14.52	0.43	2.94	110	2.055	0.660	3.43	0.97	0.53	6.19	3.20		0						0.88			0.514	**Non-Liq.**	Non-Liq.	**0.00**
60.20	13.78	0.46	3.32	110	2.059	0.658	3.91	0.99	0.52	5.74	3.26		0						0.88			0.513	**Non-Liq.**	Non-Liq.	**0.00**
60.37	14.34	0.56	3.88	110	2.063	0.657	4.54	0.99	0.52	5.98	3.28		0						0.87			0.512	**Non-Liq.**	Non-Liq.	**0.00**
60.53	16.36	0.62	3.78	110	2.067	0.656	4.32	0.97	0.52	7.05	3.21		0						0.87			0.512	**Non-Liq.**	Non-Liq.	**0.00**
60.70	23.29	0.00	0.00	110	2.071	0.654	0.00	0.80	0.58	11.71	2.64		0		1.00				0.87			0.511	**Non-Liq.**	Non-Liq.	**0.00**
60.86	28.55	0.00	0.00	110	2.075	0.653	0.00	0.79	0.59	14.72	2.60		1	0	1.00		1.00	14.7	0.87	0.062	0.054	0.511	**0.11**	100%	**5.46**
61.02	34.53	0.00	0.00	110	2.079	0.652	0.00	0.78	0.59	18.16	2.56		1	6	1.00		1.00	18.2	0.87	0.065	0.057	0.510	**0.11**	100%	**5.00**

CPT-LIQUEFY.XLS - A SPREADSHEET FOR EMPIRICAL ESTIMATION OF LIQUEFACTION POTENTIAL USING CPT DATA
Developed 2003 by Shelton L. Stringer, GE, Earth Systems Southwest

Project: Oxnard High School No. 8
Job No: 301953-001
Date: 8/14/2018
Sounding: CPT-3
Plot: 3

Methods: Liquefaction Analysis using 1998 NCEER workshop methods (Robertson & Wride)
Post-liquefaction Settlement Analysis from Tokimatsu & Seed (1987)
Dry Sand Settlement by Pradel, ASCE Journal of G&GE, Vol 124, No. 4

Total Liquefied Thickness (feet)
2.3

EARTHQUAKE INFORMATION:

Magnitude:	6.77	7.5
PGA, g:	0.97	0.75
MSF:	1.30	
GWT, feet:	20.0	
Design GWT, feet:	20.0	

Induced CSR (M=7.5): = 0.65*PGA*(po/p'o)*rd/MSF
Clean Sand Qc1n = C_Q*K_C*K_H*Qc
SF = $CRR_{7.5}$*Kσ/CSR
Use Tokimatsu & Seed (0) or Ishihara &Yoshmine (1): 0
Unit Weight of unsaturated soils: 110 pcf
Unit Weight of saturated soils: 110 pcf
Limiting Ic for liquefiable soils: 2.60
Limiting Ic for K_H: 2.0

Probab	Total Induced Subsidence (inches)
Avg	4%
Max	100%
	0.3

Required SF: 1.50
Min SF of Liquefiable Layers: 0.23
Avg SF of Liquefiable Layers: 0.03

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (feet)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	*Volumetric Strain (%)*
0.16	61.63	0.93	1.50	110	0.009	1.000	1.50	0.62	1.70	99.01	2.03		1	76	1.34		1.00	133.0	1.00	0.299	0.299	0.485	Non-Liq.	Non-Liq.	0.00
0.33	79.05	1.53	1.94	110	0.018	1.000	1.94	0.62	1.70	126.99	2.03		1	87	1.35		1.00	171.2	1.00	Infin.	0.000	0.485	Non-Liq.	Non-Liq.	0.00
0.49	78.13	1.93	2.46	110	0.027	1.000	2.46	0.64	1.70	125.50	2.12		1	86	1.48		1.00	186.4	1.00	Infin.	0.000	0.485	Non-Liq.	Non-Liq.	0.00
0.66	68.31	1.84	2.70	110	0.036	1.000	2.70	0.66	1.70	109.70	2.18		1	81	1.63		1.00	178.6	1.00	Infin.	0.000	0.485	Non-Liq.	Non-Liq.	0.00
0.82	54.87	1.52	2.77	110	0.045	1.000	2.77	0.68	1.70	88.09	2.26		1	72	1.82		1.00	159.9	1.00	0.460	0.460	0.485	Non-Liq.	Non-Liq.	0.00
0.98	47.14	1.21	2.56	110	0.054	1.000	2.57	0.69	1.70	75.66	2.28		1	65	1.88		1.00	142.1	1.00	0.347	0.347	0.485	Non-Liq.	Non-Liq.	0.00
1.15	39.47	1.02	2.57	110	0.063	0.999	2.58	0.71	1.70	63.32	2.33		1	58	2.06		1.00	130.5	1.00	0.287	0.287	0.484	Non-Liq.	Non-Liq.	0.00
1.31	39.47	1.02	2.57	110	0.072	0.999	2.58	0.71	1.70	63.30	2.33		1	58	2.06		1.00	130.5	1.00	0.287	0.287	0.484	Non-Liq.	Non-Liq.	0.00
1.48	31.24	0.82	2.63	110	0.081	0.999	2.64	0.73	1.70	50.07	2.41		1	48	2.37		1.00	118.7	1.00	0.236	0.236	0.484	Non-Liq.	Non-Liq.	0.00
1.64	24.89	0.66	2.65	110	0.090	0.998	2.66	0.75	1.70	39.85	2.49		1	39	2.72		1.00	108.3	1.00	0.198	0.198	0.484	Non-Liq.	Non-Liq.	0.00
1.80	19.86	0.33	1.65	110	0.099	0.998	1.66	0.74	1.70	31.75	2.44		1	29	2.48		1.00	78.7	1.00	0.125	0.125	0.484	Non-Liq.	Non-Liq.	0.00
1.97	20.55	0.42	2.06	110	0.108	0.998	2.07	0.75	1.70	32.85	2.49		1	31	2.70		1.00	88.6	1.00	0.145	0.145	0.484	Non-Liq.	Non-Liq.	0.00
2.13	20.42	0.47	2.29	110	0.117	0.997	2.30	0.76	1.70	32.62	2.52		1	30	2.85		1.00	93.0	1.00	0.155	0.155	0.483	Non-Liq.	Non-Liq.	0.00
2.30	19.65	0.48	2.45	110	0.126	0.997	2.46	0.77	1.70	31.37	2.55		1	29	3.02		1.00	94.8	1.00	0.159	0.159	0.483	Non-Liq.	Non-Liq.	0.00
2.46	18.16	0.52	2.85	110	0.135	0.996	2.87	0.79	1.70	28.96	2.62		0						1.00			0.483	Non-Liq.	Non-Liq.	0.00
2.62	15.20	0.57	3.77	110	0.144	0.996	3.81	0.83	1.70	24.19	2.76		0						1.00			0.483	Non-Liq.	Non-Liq.	0.00
2.79	13.95	0.57	4.06	110	0.153	0.996	4.10	0.85	1.70	22.17	2.81		0						1.00			0.483	Non-Liq.	Non-Liq.	0.00
2.95	11.38	0.56	4.92	110	0.162	0.995	4.99	0.89	1.70	18.02	2.93		0						1.00			0.482	Non-Liq.	Non-Liq.	0.00
3.12	12.18	0.59	4.85	110	0.171	0.995	4.92	0.88	1.70	19.30	2.90		0						1.00			0.482	Non-Liq.	Non-Liq.	0.00
3.28	12.71	0.60	4.68	110	0.180	0.994	4.75	0.87	1.70	20.13	2.88		0						1.00			0.482	Non-Liq.	Non-Liq.	0.00
3.44	11.57	0.62	5.32	110	0.189	0.994	5.41	0.89	1.70	18.29	2.95		0						1.00			0.482	Non-Liq.	Non-Liq.	0.00
3.61	11.06	0.51	4.57	110	0.198	0.994	4.65	0.88	1.70	17.45	2.92		0						1.00			0.482	Non-Liq.	Non-Liq.	0.00
3.77	20.97	0.48	2.28	110	0.208	0.993	2.30	0.76	1.70	33.36	2.51		1	31	2.81		1.00	93.8	1.00	0.157	0.157	0.482	Non-Liq.	Non-Liq.	0.00
3.94	29.22	0.55	1.88	110	0.217	0.993	1.90	0.71	1.70	46.60	2.34		1	45	2.09		1.00	97.6	1.00	0.166	0.166	0.481	Non-Liq.	Non-Liq.	0.00
4.10	37.87	0.68	1.79	110	0.226	0.993	1.80	0.68	1.70	60.49	2.24		1	56	1.78		1.00	107.4	1.00	0.195	0.195	0.481	Non-Liq.	Non-Liq.	0.00
4.27	45.79	0.82	1.80	110	0.235	0.992	1.81	0.66	1.70	73.20	2.18		1	64	1.62		1.00	118.8	1.00	0.236	0.236	0.481	Non-Liq.	Non-Liq.	0.00
4.43	52.76	0.97	1.84	110	0.244	0.992	1.85	0.65	1.70	84.38	2.14		1	70	1.54		1.00	129.9	1.00	0.284	0.284	0.481	Non-Liq.	Non-Liq.	0.00
4.59	58.36	1.00	1.72	110	0.253	0.991	1.73	0.64	1.70	93.37	2.09		1	74	1.44		1.00	134.3	1.00	0.305	0.305	0.481	Non-Liq.	Non-Liq.	0.00
4.76	62.10	1.17	1.89	110	0.262	0.991	1.90	0.64	1.70	99.36	2.10		1	77	1.46		1.00	144.7	1.00	0.362	0.362	0.480	Non-Liq.	Non-Liq.	0.00
4.92	64.35	1.31	2.03	110	0.271	0.991	2.04	0.64	1.70	102.96	2.11		1	78	1.48		1.00	152.2	1.00	0.408	0.408	0.480	Non-Liq.	Non-Liq.	0.00
5.09	68.21	1.45	2.13	110	0.280	0.990	2.14	0.64	1.70	109.15	2.11		1	80	1.47		1.00	160.8	1.00	Infin.	0.000	0.480	Non-Liq.	Non-Liq.	0.00
5.25	72.78	1.57	2.16	110	0.289	0.990	2.17	0.64	1.70	116.48	2.10		1	83	1.45		1.00	168.6	1.00	Infin.	0.000	0.480	Non-Liq.	Non-Liq.	0.00
5.41	77.81	1.63	2.10	110	0.298	0.989	2.11	0.63	1.70	124.55	2.07		1	86	1.40		1.00	174.2	1.00	Infin.	0.000	0.480	Non-Liq.	Non-Liq.	0.00
5.58	85.70	1.64	1.91	110	0.307	0.989	1.92	0.61	1.70	137.21	2.01		1	90	1.31		1.00	179.9	1.00	Infin.	0.000	0.479	Non-Liq.	Non-Liq.	0.00
5.74	100.29	1.65	1.65	110	0.316	0.989	1.65	0.58	1.70	160.64	1.91		1	96	1.20	1.00	1.00	193.9	1.00	Infin.	0.000	0.479	Non-Liq.	Non-Liq.	0.00
5.91	115.78	1.63	1.41	110	0.325	0.988	1.41	0.55	1.70	185.51	1.82		1	100	1.12	1.05	1.00	209.1	1.00	Infin.	0.000	0.479	Non-Liq.	Non-Liq.	0.00
6.07	127.60	1.61	1.26	110	0.334	0.988	1.27	0.54	1.70	204.49	1.76		1	100	1.08	1.10	1.00	221.2	1.00	Infin.	0.000	0.479	Non-Liq.	Non-Liq.	0.00
6.23	135.25	1.64	1.21	110	0.343	0.988	1.22	0.53	1.70	216.77	1.73		1	100	1.06	1.15	1.00	230.1	1.00	Infin.	0.000	0.479	Non-Liq.	Non-Liq.	0.00
6.40	142.84	1.69	1.18	110	0.352	0.987	1.19	0.52	1.70	228.95	1.71		1	100	1.04	1.20	1.00	239.3	1.00	Infin.	0.000	0.479	Non-Liq.	Non-Liq.	0.00
6.56	144.87	1.70	1.18	110	0.361	0.987	1.18	0.52	1.70	232.20	1.70		1	100	1.04	1.25	1.00	241.7	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
6.73	154.10	1.74	1.13	110	0.370	0.986	1.13	0.51	1.70	247.01	1.67		1	100	1.02	1.30	1.00	251.8	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
6.89	159.66	1.81	1.14	110	0.379	0.986	1.14	0.51	1.68	253.36	1.66		1	100	1.01	1.35	1.00	257.5	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.05	165.12	1.78	1.08	110	0.388	0.986	1.08	0.50	1.65	257.24	1.64		1	100	1.00	1.40	1.00	257.5	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.22	169.35	1.74	1.02	110	0.397	0.985	1.03	0.50	1.63	260.70	1.62		1	100	1.00	1.45	1.00	261.7	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.38	177.82	1.68	0.94	110	0.406	0.985	0.95	0.50	1.61	270.69	1.58		1	100	1.00	1.50	1.00	271.7	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.55	173.84	1.63	0.94	110	0.415	0.985	0.94	0.50	1.60	261.72	1.59		1	100	1.00	1.55	1.00	262.7	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
7.71	173.84	1.63	0.94	110	0.424	0.984	0.94	0.50	1.58	258.90	1.59		1	100	1.00	1.60	1.00	259.9	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
7.87	174.47	1.63	0.94	110	0.433	0.984	0.94	0.50	1.56	257.11	1.60		1	100	1.00	1.65	1.00	258.1	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
8.04	179.36	1.92	1.07	110	0.442	0.984	1.07	0.50	1.55	261.61	1.63		1	100	1.00	1.70	1.00	262.6	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
8.20	186.51	2.06	1.10	110	0.451	0.983	1.11	0.50	1.53	269.32	1.64		1	100	1.00	1.75	1.00	270.3	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
8.37	187.62	1.80	0.96	110	0.460	0.983	0.96	0.50	1.52	268.24	1.59		1	100	1.00	1.80	1.00	269.2	1.00	Infin.	0.000	0.476	Non-Liq.	Non-Liq.	0.00
8.53	196.66	1.97	1.00	110	0.469	0.982	1.00	0.50	1.50	278.47	1.60		1	100	1.00	1.85	1.00	279.5	1.00	Infin.	0.000	0.476	Non-Liq.	Non-Liq.	0.00
8.69	203.40	2.06	1.01	110	0.478	0.982	1.01	0.50	1.49	285.29	1.59		1	100	1.00	1.90	1.00	286.4	1.00	Infin.	0.000	0.476	Non-Liq.	Non-Liq.	0.00
8.86	213.10	2.23	1.05	110	0.487	0.982	1.05	0.50	1.47	296.14	1.59		1	100	1.00	1.95	1.00	297.2	1.00	Infin.	0.000	0.476	Non-Liq.	Non-Liq.	0.00
9.02	211.76	2.34	1.10	110	0.496	0.981	1.11	0.50	1.46	291.57	1.62		1	100	1.00	2.00	1.00	292.7	1.00	Infin.	0.000	0.476	Non-Liq.	Non-Liq.	0.00
9.19	215.66	2.34	1.09	110	0.505	0.981	1.09	0.50	1.45	294.28	1.61		1	100	1.00	2.05	1.00	295.4	1.00	Infin.	0.000	0.476	Non-Liq.	Non-Liq.	0.00
9.35	219.54	2.54	1.16	110	0.514	0.981	1.16	0.50	1.43	296.93	1.63		1	100	1.00	2.10	1.00	298.0	1.00	Infin.	0.000	0.475	Non-Liq.	Non-Liq.	0.00
9.51	229.63	2.68	1.17	110	0.523	0.980	1.17	0.50	1.42	307.91	1.62		1	100	1.00	2.15	1.00	309.1	1.00	Infin.	0.000	0.475	Non-Liq.	Non-Liq.	0.00
9.68	235.06	2.79	1.18	110	0.532	0.980	1.19	0.50	1.41	312.51	1.62		1	100	1.00	2.20	1.00	313.7	1.00	Infin.	0.000	0.475	Non-Liq.	Non-Liq.	0.00
9.84	237.58	2.88	1.21	110	0.541	0.980	1.21	0.50	1.40	313.21	1.63		1	100	1.00	2.25	1.00	314.4	1.00	Infin.	0.000	0.475	Non-Liq.	Non-Liq.	0.00
10.01	233.01	2.93	1.26	110	0.550	0.979	1.26	0.50	1.39	305.09	1.65		1	100	1.00	2.30	1.00	306.7	1.00	Infin.	0.000	0.475	Non-Liq.	Non-Liq.	0.00
10.17	237.10	2.96	1.25	110	0.559	0.979	1.25	0.50	1.38	307.65	1.64		1	100	1.00	2.35	1.00	308.3	1.00	Infin.	0.000	0.475	Non-Liq.	Non-Liq.	0.00
10.33	243.13	3.06	1.26	110	0.568	0.979	1.26	0.50	1.36	312.86	1.64		1	100	1.00	2.40	1.00	313.1	1.00	Infin.	0.000	0.474	Non-Liq.	Non-Liq.	0.00
10.50	243.55	3.17	1.30	110	0.577	0.978	1.30	0.50	1.36	311.64	1.65		1	100	1.01	2.45	1.00	314.7	1.00	Infin.	0.000	0.474	Non-Liq.	Non-Liq.	0.00
10.66	243.58	3.23	1.32	110	0.586	0.978	1.33	0.51	1.35	309.70	1.66		1	100	1.01	2.50	1.00	314.6	1.00	Infin.	0.000	0.474	Non-Liq.	Non-Liq.	0.00
10.83	251.39	3.25	1.29	110	0.595	0.978	1.30	0.50	1.33	316.43	1.65		1	100	1.00	2.55	1.00	318.3	1.00	Infin.	0.000	0.474	Non-Liq.	Non-Liq.	0.00
10.99	254.32	3.43	1.35	110	0.604	0.977	1.35	0.51	1.33	318.41	1.66		1	100	1.01	2.60	1.00	323.3	1.00	Infin.	0.000	0.474	Non-Liq.	Non-Liq.	0.00
11.15	250.44	3.64	1.45	110	0.614	0.977	1.46	0.52	1.32	312.74	1.69		1	100	1.03	2.65	1.00	324.1	1.00	Infin.	0.000	0.474	Non-Liq.	Non-Liq.	0.00
11.32	235.91	3.45	1.46	110	0.623	0.977	1.47	0.52	1.32	293.22	1.71		1	100	1.05	2.70	1.00	307.7	1.00	Infin.	0.000	0.473	Non-Liq.	Non-Liq.	0.00
11.48	231.44	3.34	1.44	110	0.632	0.976	1.45	0.52	1.31	285.58	1.71		1	100	1.05	2.75	1.00	300.1	1.00	Infin.	0.000	0.473	Non-Liq.	Non-Liq.	0.00
11.65	243.81	3.39	1.39	110	0.641	0.976	1.40	0.51	1.29	297.60	1.69		1	100	1.03	2.80	1.00	308.0	1.00	Infin.	0.000	0.473	Non-Liq.	Non-Liq.	0.00
11.81	248.76	3.18	1.28	110	0.650	0.975	1.28	0.51	1.28	300.06	1.66		1	100	1.01	2.85	1.00	303.9	1.00	Infin.	0.000	0.473	Non-Liq.	Non-Liq.	0.00
11.98	252.74	3.49	1.38	110	0.659	0.975	1.39	0.51	1.27	303.78	1.68		1	100	1.03	2.90	1.00	312.7	1.00	Infin.	0.000	0.473	Non-Liq.	Non-Liq.	0.00
12.14	246.32	3.71	1.51	110	0.668	0.975	1.51	0.52	1.27	295.51	1.72		1	100	1.05	2.95	1.00	311.7	1.00	Infin.	0.000	0.473	Non-Liq.	Non-Liq.	0.00
12.30	247.22	3.84	1.55	110	0.677	0.974	1.56	0.53	1.27	294.93	1.73		1	100	1.06	3.00	1.00	313.3	1.00	Infin.	0.000	0.472	Non-Liq.	Non-Liq.	0.00
12.47	246.81	3.92	1.59	110	0.686	0.974	1.59	0.53	1.26	292.77	1.74		1	100	1.07	3.05	1.00	313.0	1.00	Infin.	0.000	0.472	Non-Liq.	Non-Liq.	0.00
12.63	246.30	4.04	1.64	110	0.695	0.974	1.65	0.53	1.25	290.63	1.75		1	100	1.07	3.10	1.00	313.4	1.00	Infin.	0.000	0.472	Non-Liq.	Non-Liq.	0.00
12.80	244.00	4.09	1.67	110	0.704	0.973	1.68	0.54	1.25	286.30	1.76		1	100	1.08	3.15	1.00	310.9	1.00	Infin.	0.000	0.472	Non-Liq.	Non-Liq.	0.00

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	Induced EQ	M=7.5 CRR	M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
12.96	243.85	4.05	1.66	110	0.713	0.973	1.67	0.54	1.24	284.13	1.76		1	100	1.08	3.20	1.00	308.4	1.00	Infin.	0.000	0.472		**Non-Liq.**	Non-Liq.	**0.00**
13.12	250.82	4.24	1.69	110	0.722	0.973	1.70	0.54	1.23	290.33	1.76		1	100	1.08	3.25	1.00	315.3	1.00	Infin.	0.000	0.472		**Non-Liq.**	Non-Liq.	**0.00**
13.29	254.86	4.23	1.66	110	0.731	0.972	1.66	0.53	1.22	292.76	1.76		1	100	1.08	3.30	1.00	316.1	1.00	Infin.	0.000	0.471		**Non-Liq.**	Non-Liq.	**0.00**
13.45	265.02	4.01	1.51	110	0.740	0.972	1.52	0.52	1.21	301.15	1.72		1	100	1.05	3.35	1.00	316.9	1.00	Infin.	0.000	0.471		**Non-Liq.**	Non-Liq.	**0.00**
13.62	296.24	3.54	1.19	110	0.749	0.972	1.20	0.50	1.19	331.97	1.61		1	100	1.00	3.40	1.00	333.2	1.00	Infin.	0.000	0.471		**Non-Liq.**	Non-Liq.	**0.00**
13.78	358.75	4.85	1.35	110	0.758	0.971	1.35	0.50	1.18	399.79	1.61		1	100	1.00	3.45	1.00	401.3	1.00	Infin.	0.000	0.471		**Non-Liq.**	Non-Liq.	**0.00**
13.94	401.73	4.27	1.06	110	0.767	0.971	1.07	0.50	1.17	445.14	1.49		1	100	1.00	3.45	1.00	446.8	1.00	Infin.	0.000	0.471		**Non-Liq.**	Non-Liq.	**0.00**
14.11	397.89	5.59	1.40	110	0.776	0.971	1.41	0.50	1.17	438.29	1.60		1	100	1.00	3.45	1.00	439.9	1.00	Infin.	0.000	0.471		**Non-Liq.**	Non-Liq.	**0.00**
14.27	408.46	4.70	1.15	110	0.785	0.970	1.15	0.50	1.16	447.36	1.52		1	100	1.00	3.45	1.00	449.0	1.00	Infin.	0.000	0.470		**Non-Liq.**	Non-Liq.	**0.00**
14.44	435.23	5.55	1.28	110	0.794	0.970	1.28	0.50	1.15	474.00	1.55		1	100	1.00	3.45	1.00	475.8	1.00	Infin.	0.000	0.470		**Non-Liq.**	Non-Liq.	**0.00**
14.60	389.69	5.04	1.29	110	0.803	0.970	1.30	0.50	1.15	421.92	1.58		1	100	1.00	3.45	1.00	423.5	1.00	Infin.	0.000	0.470		**Non-Liq.**	Non-Liq.	**0.00**
14.76	348.88	3.51	1.01	110	0.812	0.969	1.01	0.50	1.14	375.53	1.52		1	100	1.00	3.45	1.00	376.9	1.00	Infin.	0.000	0.470		**Non-Liq.**	Non-Liq.	**0.00**
14.93	347.64	3.21	0.92	110	0.821	0.969	0.93	0.50	1.14	372.12	1.49		1	100	1.00	3.45	1.00	373.5	1.00	Infin.	0.000	0.470		**Non-Liq.**	Non-Liq.	**0.00**
15.09	366.34	3.29	0.90	110	0.830	0.969	0.90	0.50	1.13	390.04	1.47		1	100	1.00	3.45	1.00	391.5	1.00	Infin.	0.000	0.470		**Non-Liq.**	Non-Liq.	**0.00**
15.26	355.46	3.76	1.06	110	0.839	0.968	1.06	0.50	1.12	376.38	1.53		1	100	1.00	3.45	1.00	377.8	1.00	Infin.	0.000	0.469		**Non-Liq.**	Non-Liq.	**0.00**
15.42	339.34	3.85	1.14	110	0.848	0.968	1.14	0.50	1.12	357.34	1.57		1	100	1.00	3.45	1.00	358.7	1.00	Infin.	0.000	0.469		**Non-Liq.**	Non-Liq.	**0.00**
15.58	338.34	4.27	1.26	110	0.857	0.967	1.27	0.50	1.11	354.40	1.61		1	100	1.00	3.45	1.00	355.7	1.00	Infin.	0.000	0.469		**Non-Liq.**	Non-Liq.	**0.00**
15.75	341.10	4.54	1.33	110	0.866	0.967	1.33	0.50	1.11	355.42	1.63		1	100	1.00	3.45	1.00	356.7	1.00	Infin.	0.000	0.469		**Non-Liq.**	Non-Liq.	**0.00**
15.91	335.06	4.41	1.32	110	0.875	0.967	1.32	0.50	1.10	347.30	1.63		1	100	1.00	3.45	1.00	348.6	1.00	Infin.	0.000	0.469		**Non-Liq.**	Non-Liq.	**0.00**
16.08	339.73	3.85	1.13	110	0.884	0.966	1.14	0.50	1.09	350.34	1.58		1	100	1.00	3.45	1.00	351.6	1.00	Infin.	0.000	0.468		**Non-Liq.**	Non-Liq.	**0.00**
16.24	339.17	3.94	1.16	110	0.893	0.966	1.16	0.50	1.09	347.98	1.59		1	100	1.00	3.45	1.00	349.3	1.00	Infin.	0.000	0.468		**Non-Liq.**	Non-Liq.	**0.00**
16.40	304.89	4.11	1.35	110	0.902	0.966	1.35	0.51	1.08	311.54	1.67		1	100	1.02	3.45	1.00	317.6	1.00	Infin.	0.000	0.468		**Non-Liq.**	Non-Liq.	**0.00**
16.57	240.39	3.63	1.51	110	0.911	0.965	1.51	0.54	1.08	245.31	1.77		1	100	1.08	3.45	1.00	267.0	1.00	Infin.	0.000	0.468		**Non-Liq.**	Non-Liq.	**0.00**
16.73	200.85	3.97	1.97	110	0.920	0.965	1.98	0.58	1.08	204.91	1.91		1	100	1.20	3.45	1.00	246.3	1.00	Infin.	0.000	0.468		**Non-Liq.**	Non-Liq.	**0.00**
16.90	186.05	3.36	1.80	110	0.929	0.965	1.81	0.58	1.08	188.60	1.90		1	100	1.19	3.45	1.00	225.2	1.00	Infin.	0.000	0.468		**Non-Liq.**	Non-Liq.	**0.00**
17.06	145.35	4.55	3.13	110	0.938	0.964	3.15	0.65	1.08	147.65	2.15		1	93	1.56		1.00	230.8	1.00	Infin.	0.000	0.467		**Non-Liq.**	Non-Liq.	**0.00**
17.22	137.21	1.70	1.24	110	0.947	0.964	1.25	0.57	1.06	137.16	1.87		1	90	1.16	1.00	1.00	160.3	1.00	Infin.	0.000	0.467		**Non-Liq.**	Non-Liq.	**0.00**
17.39	195.13	2.67	1.37	110	0.956	0.963	1.37	0.55	1.06	193.97	1.80		1	100	1.11	1.05	1.00	215.5	1.00	Infin.	0.000	0.467		**Non-Liq.**	Non-Liq.	**0.00**
17.55	375.11	3.14	0.84	110	0.965	0.963	0.84	0.50	1.05	370.21	1.46		1	100	1.00	1.10	1.00	371.6	1.00	Infin.	0.000	0.467		**Non-Liq.**	Non-Liq.	**0.00**
17.72	366.40	3.61	0.98	110	0.974	0.963	0.99	0.50	1.04	359.90	1.52		1	100	1.00	1.15	1.00	361.2	1.00	Infin.	0.000	0.467		**Non-Liq.**	Non-Liq.	**0.00**
17.88	334.19	2.48	0.74	110	0.983	0.962	0.75	0.50	1.04	326.66	1.45		1	100	1.00	1.20	1.00	327.9	1.00	Infin.	0.000	0.467		**Non-Liq.**	Non-Liq.	**0.00**
18.04	253.24	2.71	1.07	110	0.992	0.962	1.08	0.50	1.03	246.22	1.65		1	100	1.00	1.25	1.00	248.4	1.00	Infin.	0.000	0.466		**Non-Liq.**	Non-Liq.	**0.00**
18.21	169.29	2.90	1.71	110	1.001	0.962	1.72	0.58	1.03	164.25	1.92		1	97	1.21	1.30	1.00	199.5	1.00	Infin.	0.000	0.466		**Non-Liq.**	Non-Liq.	**0.00**
18.37	135.74	2.18	1.61	110	1.010	0.961	1.62	0.60	1.03	130.89	1.97		1	88	1.26	1.35	1.00	165.6	1.00	Infin.	0.000	0.466		**Non-Liq.**	Non-Liq.	**0.00**
18.54	258.73	2.13	0.82	110	1.020	0.961	0.83	0.50	1.02	248.14	1.56		1	100	1.00	1.40	1.00	249.1	1.00	Infin.	0.000	0.466		**Non-Liq.**	Non-Liq.	**0.00**
18.70	348.17	2.48	0.71	110	1.029	0.960	0.71	0.50	1.01	332.78	1.43		1	100	1.00	1.45	1.00	334.0	1.00	Infin.	0.000	0.466		**Non-Liq.**	Non-Liq.	**0.00**
18.86	379.90	3.61	0.95	110	1.038	0.960	0.95	0.50	1.01	361.60	1.51		1	100	1.00	1.50	1.00	363.0	1.00	Infin.	0.000	0.465		**Non-Liq.**	Non-Liq.	**0.00**
19.03	419.21	3.90	0.93	110	1.047	0.960	0.93	0.50	1.01	397.39	1.47		1	100	1.00	1.55	1.00	398.9	1.00	Infin.	0.000	0.465		**Non-Liq.**	Non-Liq.	**0.00**
19.19	396.96	4.58	1.15	110	1.056	0.959	1.16	0.50	1.00	374.62	1.57		1	100	1.00	1.60	1.00	376.0	1.00	Infin.	0.000	0.465		**Non-Liq.**	Non-Liq.	**0.00**
19.36	387.05	4.64	1.20	110	1.065	0.959	1.20	0.50	1.00	363.69	1.59		1	100	1.00	1.65	1.00	365.0	1.00	Infin.	0.000	0.465		**Non-Liq.**	Non-Liq.	**0.00**
19.52	368.81	4.55	1.23	110	1.074	0.958	1.24	0.50	0.99	345.03	1.61		1	100	1.00	1.70	1.00	346.3	0.99	Infin.	0.000	0.465		**Non-Liq.**	Non-Liq.	**0.00**
19.69	354.61	3.09	0.87	110	1.083	0.958	0.87	0.50	0.99	330.32	1.50		1	100	1.00	1.75	1.00	331.6	0.99	Infin.	0.000	0.464		**Non-Liq.**	Non-Liq.	**0.00**
19.85	342.37	2.52	0.74	110	1.092	0.957	0.74	0.50	0.98	317.55	1.46		1	100	1.00	1.80	1.00	318.7	0.99	Infin.	0.000	0.464		**Non-Liq.**	Non-Liq.	**0.00**
20.01	342.04	2.21	0.65	110	1.101	0.957	0.65	0.50	0.98	315.93	1.42		1	100	1.00	1.85	1.00	317.1	0.98	Infin.	0.000	0.464		**Non-Liq.**	Non-Liq.	**0.00**
20.18	348.47	2.02	0.58	110	1.107	0.957	0.58	0.50	0.98	321.00	1.38		1	100	1.00	1.90	1.00	322.2	0.98	Infin.	0.000	0.465		**Non-Liq.**	Non-Liq.	**0.00**
20.34	358.46	2.21	0.62	110	1.111	0.956	0.62	0.50	0.98	329.65	1.39		1	100	1.00	1.95	1.00	330.9	0.98	Infin.	0.000	0.467		**Non-Liq.**	Non-Liq.	**0.00**
20.51	366.69	2.31	0.63	110	1.115	0.956	0.63	0.50	0.97	336.65	1.39		1	100	1.00	2.00	1.00	337.9	0.98	Infin.	0.000	0.469		**Non-Liq.**	Non-Liq.	**0.00**
20.67	400.46	2.25	0.56	110	1.118	0.955	0.56	0.50	0.97	367.10	1.33		1	100	1.00	2.05	1.00	368.5	0.98	Infin.	0.000	0.471		**Non-Liq.**	Non-Liq.	**0.00**
20.83	398.65	2.07	0.52	110	1.122	0.955	0.52	0.50	0.97	364.80	1.31		1	100	1.00	2.10	1.00	366.2	0.98	Infin.	0.000	0.473		**Non-Liq.**	Non-Liq.	**0.00**
21.00	411.19	1.95	0.47	110	1.126	0.954	0.48	0.50	0.97	375.65	1.27		1	100	1.00	2.15	1.00	377.1	0.98	Infin.	0.000	0.474		**Non-Liq.**	Non-Liq.	**0.00**
21.16	402.69	3.64	0.90	110	1.130	0.954	0.91	0.50	0.97	367.22	1.48		1	100	1.00	2.20	1.00	368.6	0.97	Infin.	0.000	0.476		**Non-Liq.**	Non-Liq.	**0.00**
21.33	432.94	4.66	1.08	110	1.134	0.954	1.08	0.50	0.97	394.20	1.53		1	100	1.00	2.25	1.00	395.7	0.97	Infin.	0.000	0.478		**Non-Liq.**	Non-Liq.	**0.00**
21.49	469.69	5.29	1.13	110	1.138	0.953	1.13	0.50	0.96	427.01	1.52		1	100	1.00	2.30	1.00	428.6	0.97	Infin.	0.000	0.480		**Non-Liq.**	Non-Liq.	**0.00**
21.65	374.94	3.56	0.95	110	1.142	0.953	0.95	0.50	0.96	340.08	1.52		1	100	1.00	2.35	1.00	341.3	0.97	Infin.	0.000	0.482		**Non-Liq.**	Non-Liq.	**0.00**
21.82	335.23	2.37	0.71	110	1.146	0.952	0.71	0.50	0.96	303.43	1.46		1	100	1.00	2.40	1.00	304.6	0.97	Infin.	0.000	0.483		**Non-Liq.**	Non-Liq.	**0.00**
21.98	327.25	1.94	0.59	110	1.150	0.952	0.59	0.50	0.96	295.67	1.41		1	100	1.00	2.45	1.00	296.8	0.97	Infin.	0.000	0.485		**Non-Liq.**	Non-Liq.	**0.00**
22.15	329.21	1.70	0.51	110	1.154	0.951	0.52	0.50	0.96	296.94	1.37		1	100	1.00	2.50	1.00	298.1	0.97	Infin.	0.000	0.487		**Non-Liq.**	Non-Liq.	**0.00**
22.31	336.57	1.69	0.50	110	1.158	0.951	0.50	0.50	0.96	303.09	1.35		1	100	1.00	2.55	1.00	304.2	0.96	Infin.	0.000	0.489		**Non-Liq.**	Non-Liq.	**0.00**
22.47	342.42	1.62	0.47	110	1.161	0.950	0.48	0.50	0.95	307.85	1.33		1	100	1.00	2.60	1.00	309.0	0.96	Infin.	0.000	0.490		**Non-Liq.**	Non-Liq.	**0.00**
22.64	357.21	1.50	0.42	110	1.165	0.950	0.42	0.50	0.95	320.65	1.28		1	100	1.00	2.65	1.00	321.9	0.96	Infin.	0.000	0.492		**Non-Liq.**	Non-Liq.	**0.00**
22.80	365.13	1.60	0.44	110	1.169	0.949	0.44	0.50	0.95	327.23	1.29		1	100	1.00	2.70	1.00	328.5	0.96	Infin.	0.000	0.494		**Non-Liq.**	Non-Liq.	**0.00**
22.97	275.06	1.75	0.64	110	1.173	0.949	0.64	0.50	0.95	245.84	1.49		1	100	1.00	2.75	1.00	246.8	0.96	Infin.	0.000	0.495		**Non-Liq.**	Non-Liq.	**0.00**
23.13	359.31	1.67	0.47	110	1.177	0.948	0.47	0.50	0.95	320.93	1.31		1	100	1.00	2.80	1.00	322.1	0.96	Infin.	0.000	0.497		**Non-Liq.**	Non-Liq.	**0.00**
23.29	360.37	1.63	0.45	110	1.181	0.948	0.45	0.50	0.95	321.34	1.30		1	100	1.00	2.85	1.00	322.5	0.96	Infin.	0.000	0.498		**Non-Liq.**	Non-Liq.	**0.00**
23.46	371.26	1.97	0.53	110	1.185	0.947	0.53	0.50	0.94	330.53	1.34		1	100	1.00	2.90	1.00	331.8	0.96	Infin.	0.000	0.500		**Non-Liq.**	Non-Liq.	**0.00**
23.62	356.90	1.94	0.54	110	1.189	0.947	0.54	0.50	0.94	317.18	1.36		1	100	1.00	2.95	1.00	318.4	0.95	Infin.	0.000	0.502		**Non-Liq.**	Non-Liq.	**0.00**
23.79	361.74	2.11	0.58	110	1.193	0.946	0.58	0.50	0.94	320.97	1.38		1	100	1.00	3.00	1.00	322.2	0.95	Infin.	0.000	0.503		**Non-Liq.**	Non-Liq.	**0.00**
23.95	364.42	2.28	0.63	110	1.197	0.946	0.63	0.50	0.94	322.82	1.40		1	100	1.00	3.05	1.00	324.0	0.95	Infin.	0.000	0.505		**Non-Liq.**	Non-Liq.	**0.00**
24.11	368.01	2.35	0.64	110	1.200	0.945	0.64	0.50	0.94	325.48	1.40		1	100	1.00	3.10	1.00	326.7	0.95	Infin.	0.000	0.506		**Non-Liq.**	Non-Liq.	**0.00**
24.28	376.81	2.30	0.61	110	1.204	0.945	0.61	0.50	0.94	332.74	1.38		1	100	1.00	3.15	1.00	334.0	0.95	Infin.	0.000	0.508		**Non-Liq.**	Non-Liq.	**0.00**
24.44	395.44	2.76	0.70	110	1.208	0.944	0.70	0.50	0.94	348.68	1.41		1	100	1.00	3.20	1.00	350.0	0.95	Infin.	0.000	0.509		**Non-Liq.**	Non-Liq.	**0.00**
24.61	439.09	2.71	0.62	110	1.212	0.943	0.62	0.50	0.93	386.66	1.34		1	100	1.00	3.25	1.00	388.1	0.95	Infin.	0.000	0.511		**Non-Liq.**	Non-Liq.	**0.00**
24.77	490.41	3.14	0.64	110	1.216	0.943	0.64	0.50	0.93	431.28	1.32		1	100	1.00	3.30	1.00	432.9	0.95	Infin.	0.000	0.512		**Non-Liq.**	Non-Liq.	**0.00**
24.93	529.94	3.64	0.69	110	1.220	0.942	0.69	0.50	0.93	465.38	1.33		1	100	1.00	3.35	1.00	467.1	0.94	Infin.	0.000	0.514		**Non-Liq.**	Non-Liq.	**0.00**
25.10	499.75	2.73	0.55	110	1.224	0.942	0.55	0.50	0.93	438.10	1.27		1	100	1.00	3.40	1.00	439.7	0.94	Infin.	0.000	0.515		**Non-Liq.**	Non-Liq.	**0.00**
25.26	478.20	2.89	0.60	110	1.228	0.941	0.61	0.50	0.93	418.49	1.31		1	100	1.00	3.45	1.00	420.1	0.94	Infin.	0.000	0.516		**Non-Liq.**	Non-Liq.	**0.00**
25.43	506.69	3.13	0.62	110	1.232	0.941	0.62	0.50	0.93	442.78	1.30		1	100	1.00	3.50	1.00	444.4	0.94	Infin.	0.000	0.518		**Non-Liq.**	Non-Liq.	**0.00**
25.59	475.10	3.98	0.84	110	1.236	0.940	0.84	0.50	0.93	414.45	1.43		1	100	1.00	3.55	1.00	416.0	0.94	Infin.	0.000	0.519		**Non-Liq.**	Non-Liq.	**0.00**
25.75	412.87	3.59	0.87	110	1.240	0.939	0.87	0.50	0.92	359.45	1.48		1	100	1.00	3.60	1.00	360.8	0.94	Infin.	0.000	0.520		**Non-Liq.**	Non-Liq.	**0.00**
25.92	387.95	2.71	0.70	110	1.243	0.939	0.70	0.50	0.92	337.15	1.42		1	100	1.00	3.65	1.00	338.4	0.94	Infin.	0.000	0.522		**Non-Liq.**	Non-Liq.	**0.00**
26.08	382.12	2.49	0.65	110	1.247	0.938	0.65	0.50	0.92	331.55	1.40		1	100	1.00	3.65	1.00	332.8	0.94	Infin.	0.000	0.523		**Non-Liq.**	Non-Liq.	**0.00**
26.25	377.33	2.13	0.56	110	1.251	0.938	0.57	0.50	0.92	326.86	1.36		1	100	1.00	3.65	1.00	328.1	0.94	Infin.	0.000	0.524		**Non-Liq.**	Non-Liq.	**0.00**
26.41	378.71	2.10	0.56	110	1.255	0.937	0.56	0.50	0.92	327.55	1.36		1	100	1.00	3.65	1.00	328.8	0.93	Infin.	0.000	0.526		**Non-Liq.**	Non-Liq.	**0.00**
26.57	368.97	2.20	0.60	110	1.259	0.936	0.60	0.50	0.92	318.60	1.39		1	100	1.00	3.65	1.00	319.8	0.93	Infin.	0.000	0.527		**Non-Liq.**	Non-Liq.	**0.00**
26.74	347.99	2.18	0.63	110	1.263	0.936	0.63	0.50	0.92	299.95	1.42		1	100	1.00	3.65	1.00	301.1	0.93	Infin.	0.000	0.528		**Non-Liq.**	Non-Liq.	**0.00**
26.90	340.27	1.97	0.58	110	1.267	0.935	0.58	0.50	0.91	292.82	1.41		1	100	1.00	3.65	1.00	293.9	0.93	Infin.	0.000	0.529		**Non-Liq.**	Non-Liq.	**0.00**
27.07	342.93	1.87	0.55	110	1.271	0.934	0.55	0.50	0.91	294.66	1.39		1	100	1.00	3.65	1.00	295.8	0.93	Infin.	0.000	0.531		**Non-Liq.**	Non-Liq.	**0.00**
27.23	348.32	2.14	0.62	110	1.275	0.934	0.62	0.50	0.91	298.85	1.42		1	100	1.00	3.65	1.00	300.0	0.93	Infin.	0.000	0.532		**Non-Liq.**	Non-Liq.	**0.00**
27.40	349.36	2.35	0.67	110	1.279	0.933	0.68	0.50	0.91	299.28	1.45		1	100	1.00	3.65	1.00	300.4	0.93	Infin.	0.000	0.533		**Non-Liq.**	Non-Liq.	**0.00**
27.56	359.08	2.55	0.71	110	1.282	0.932	0.71	0.50	0.91	307.17	1.46		1	100	1.00	3.65	1.00	308.3	0.93	Infin.	0.000	0.534		**Non-Liq.**	Non-Liq.	**0.00**
27.72	348.61	2.28	0.65	110	1.286	0.932	0.66	0.50	0.91	297.72	1.44		1	100	1.00	3.65	1.00	298.8	0.92	Infin.	0.000	0.535		**Non-Liq.**	Non-Liq.	**0.00**
27.89	328.38	2.28	0.69	110	1.290	0.931	0.70	0.50	0.91	279.95	1.47		1	100	1.00	3.65	1.00	281.0	0.92	Infin.	0.000	0.536		**Non-Liq.**	Non-Liq.	**0.00**

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	M=7.5 CSR	Induced Liquefac. Safety Factor	Probab. P_L	*Volumetric Strain (%)*
28.05	318.21	2.37	0.75	110	1.294	0.930	0.75	0.50	0.90	270.83	1.51		1	100	1.00	3.65	1.00	271.8	0.92	Infin.	0.000	0.538	**Non-Liq.**	Non-Liq.	**0.00**
28.22	301.08	2.13	0.71	110	1.298	0.929	0.71	0.50	0.90	255.81	1.51		1	100	1.00	3.65	1.00	256.8	0.92	Infin.	0.000	0.539	**Non-Liq.**	Non-Liq.	**0.00**
28.38	284.36	2.03	0.71	110	1.302	0.929	0.72	0.50	0.90	241.17	1.53		1	100	1.00	3.65	1.00	242.1	0.92	Infin.	0.000	0.540	**Non-Liq.**	Non-Liq.	**0.00**
28.54	233.79	1.73	0.74	110	1.306	0.928	0.74	0.50	0.90	197.79	1.60		1	100	1.00	3.65	1.00	198.5	0.92	Infin.	0.000	0.541	**Non-Liq.**	Non-Liq.	**0.00**
28.71	198.59	1.43	0.72	110	1.310	0.927	0.72	0.50	0.90	167.50	1.65		1	98	1.00	3.65	1.00	168.5	0.92	Infin.	0.000	0.542	**Non-Liq.**	Non-Liq.	**0.00**
28.87	159.05	1.23	0.77	110	1.314	0.926	0.78	0.53	0.89	132.88	1.75		1	89	1.07	3.65	1.00	142.6	0.92	0.349	0.320	0.543	**0.59**	85%	**1.00**
29.04	114.83	1.31	1.14	110	1.318	0.926	1.15	0.60	0.88	94.08	1.97		1	74	1.26	3.65	1.00	119.2	0.92	0.238	0.218	0.544	**0.40**	95%	**1.24**
29.20	70.90	1.32	1.86	110	1.322	0.925	1.90	0.69	0.86	56.38	2.28		1	53	1.89		1.00	106.3	0.94	0.192	0.179	0.545	**0.33**	98%	**1.41**
29.36	37.97	1.25	3.30	110	1.325	0.924	3.42	0.81	0.83	28.87	2.67		0						0.96			0.546	**Non-Liq.**	Non-Liq.	**0.00**
29.53	27.93	1.04	3.72	110	1.329	0.923	3.91	0.85	0.82	20.70	2.81		0						0.96			0.547	**Non-Liq.**	Non-Liq.	**0.00**
29.69	18.87	0.73	3.87	110	1.333	0.923	4.16	0.90	0.81	13.46	2.98		0						0.95			0.548	**Non-Liq.**	Non-Liq.	**0.00**
29.86	13.89	0.49	3.53	110	1.337	0.922	3.90	0.93	0.80	9.54	3.08		0						0.95			0.549	**Non-Liq.**	Non-Liq.	**0.00**
30.02	9.76	0.66	6.75	110	1.341	0.921	7.83	1.00	0.79	6.28	3.41		0						0.95			0.550	**Non-Liq.**	Non-Liq.	**0.00**
30.18	57.63	0.77	1.33	110	1.345	0.920	1.36	0.69	0.85	45.11	2.26		1	44	1.84		1.00	83.0	0.95	0.133	0.127	0.551	**0.23**	99%	**1.77**
30.35	117.53	0.99	0.84	110	1.349	0.919	0.85	0.57	0.87	95.56	1.88		1	75	1.17	0.45	1.26	141.6	0.91	0.344	0.312	0.551	**0.57**	87%	**1.00**
30.51	114.11	1.23	1.08	110	1.353	0.918	1.09	0.60	0.86	92.04	1.96		1	73	1.25	0.50	1.26	146.0	0.91	0.369	0.335	0.552	**0.61**	84%	**0.87**
30.68	61.97	1.48	2.39	110	1.357	0.918	2.44	0.73	0.83	47.78	2.41		1	46	2.34		1.00	111.8	0.95	0.210	0.200	0.553	**0.36**	97%	**1.34**
30.84	26.16	1.22	4.64	110	1.361	0.917	4.90	0.88	0.80	18.78	2.91		0						0.95			0.554	**Non-Liq.**	Non-Liq.	**0.00**
31.00	14.26	0.26	1.81	110	1.364	0.916	2.00	0.88	0.80	9.74	2.91		0						0.95			0.555	**Non-Liq.**	Non-Liq.	**0.00**
31.17	13.19	0.23	1.73	110	1.368	0.915	1.93	0.89	0.80	8.89	2.94		0						0.95			0.556	**Non-Liq.**	Non-Liq.	**0.00**
31.33	12.49	0.36	2.88	110	1.372	0.914	3.24	0.93	0.78	8.24	3.08		0						0.95			0.556	**Non-Liq.**	Non-Liq.	**0.00**
31.50	17.25	0.69	3.98	110	1.376	0.913	4.33	0.92	0.79	11.79	3.03		0						0.95			0.557	**Non-Liq.**	Non-Liq.	**0.00**
31.66	38.57	0.92	2.37	110	1.380	0.912	2.46	0.78	0.81	28.56	2.58		1	25	3.20		1.00	91.5	0.95	0.151	0.143	0.558	**0.26**	99%	**1.63**
31.82	35.69	1.30	3.63	110	1.384	0.911	3.78	0.83	0.80	25.97	2.73		0						0.95			0.559	**Non-Liq.**	Non-Liq.	**0.00**
31.99	58.47	1.43	2.44	110	1.388	0.910	2.50	0.74	0.82	44.14	2.44		1	43	2.48		1.00	109.5	0.95	0.202	0.191	0.559	**0.34**	97%	**1.37**
32.15	153.79	1.76	1.14	110	1.392	0.909	1.15	0.57	0.85	123.10	1.88		1	85	1.17	1.00	1.00	145.0	0.90	0.363	0.326	0.560	**0.58**	86%	**1.00**
32.32	250.44	2.28	0.91	110	1.396	0.908	0.91	0.50	0.87	204.70	1.65		1	100	1.01	1.05	1.00	206.8	0.90	Infin.	0.000	0.561	**Non-Liq.**	Non-Liq.	**0.00**
32.48	286.97	2.91	1.02	110	1.400	0.907	1.02	0.50	0.87	234.50	1.65		1	100	1.00	1.10	1.00	236.0	0.89	Infin.	0.000	0.561	**Non-Liq.**	Non-Liq.	**0.00**
32.64	309.86	3.53	1.14	110	1.403	0.906	1.14	0.51	0.87	252.58	1.67		1	100	1.01	1.15	1.00	257.2	0.89	Infin.	0.000	0.562	**Non-Liq.**	Non-Liq.	**0.00**
32.81	322.36	3.86	1.20	110	1.407	0.905	1.20	0.51	0.86	262.31	1.67		1	100	1.02	1.20	1.00	268.2	0.89	Infin.	0.000	0.563	**Non-Liq.**	Non-Liq.	**0.00**
32.97	328.44	4.15	1.26	110	1.411	0.904	1.27	0.51	0.86	266.57	1.69		1	100	1.03	1.20	1.00	275.1	0.89	Infin.	0.000	0.563	**Non-Liq.**	Non-Liq.	**0.00**
33.14	330.70	3.81	1.15	110	1.415	0.903	1.16	0.50	0.86	268.83	1.65		1	100	1.00	1.20	1.00	271.1	0.89	Infin.	0.000	0.564	**Non-Liq.**	Non-Liq.	**0.00**
33.30	324.34	3.31	1.02	110	1.419	0.902	1.02	0.50	0.86	263.54	1.62		1	100	1.00	1.20	1.00	264.5	0.89	Infin.	0.000	0.565	**Non-Liq.**	Non-Liq.	**0.00**
33.46	306.20	3.39	1.11	110	1.423	0.901	1.11	0.51	0.86	247.92	1.66		1	100	1.01	1.20	1.00	251.7	0.89	Infin.	0.000	0.565	**Non-Liq.**	Non-Liq.	**0.00**
33.63	287.68	3.87	1.35	110	1.427	0.900	1.35	0.53	0.85	230.75	1.75		1	100	1.07	1.20	1.00	247.7	0.89	Infin.	0.000	0.566	**Non-Liq.**	Non-Liq.	**0.00**
33.79	277.70	4.63	1.67	110	1.431	0.899	1.68	0.56	0.85	220.68	1.83		1	100	1.13	1.20	1.00	250.3	0.89	Infin.	0.000	0.566	**Non-Liq.**	Non-Liq.	**0.00**
33.96	267.02	5.00	1.87	110	1.435	0.898	1.88	0.57	0.84	210.82	1.88		1	100	1.17	1.20	1.00	248.3	0.89	Infin.	0.000	0.567	**Non-Liq.**	Non-Liq.	**0.00**
34.12	262.99	4.90	1.86	110	1.439	0.897	1.87	0.57	0.84	207.23	1.89		1	100	1.18	1.20	1.00	244.7	0.88	Infin.	0.000	0.567	**Non-Liq.**	Non-Liq.	**0.00**
34.28	254.98	4.12	1.61	110	1.443	0.896	1.62	0.56	0.84	201.34	1.85		1	100	1.14	1.20	1.00	230.7	0.88	Infin.	0.000	0.568	**Non-Liq.**	Non-Liq.	**0.00**
34.45	255.22	3.88	1.52	110	1.446	0.895	1.53	0.56	0.84	201.61	1.82		1	100	1.13	1.20	1.00	227.7	0.88	Infin.	0.000	0.568	**Non-Liq.**	Non-Liq.	**0.00**
34.61	235.40	3.66	1.56	110	1.450	0.894	1.56	0.57	0.84	185.03	1.86		1	100	1.15	1.20	1.00	213.7	0.88	Infin.	0.000	0.569	**Non-Liq.**	Non-Liq.	**0.00**
34.78	213.23	3.63	1.70	110	1.454	0.893	1.72	0.58	0.83	166.27	1.92		1	98	1.21	1.20	1.00	201.2	0.88	Infin.	0.000	0.569	**Non-Liq.**	Non-Liq.	**0.00**
34.94	232.64	3.28	1.41	110	1.458	0.892	1.42	0.56	0.84	182.78	1.83		1	100	1.13	1.20	1.00	206.9	0.88	Infin.	0.000	0.570	**Non-Liq.**	Non-Liq.	**0.00**
35.10	266.61	3.08	1.15	110	1.462	0.890	1.16	0.52	0.84	211.53	1.72		1	100	1.05	1.20	1.00	223.3	0.88	Infin.	0.000	0.570	**Non-Liq.**	Non-Liq.	**0.00**
35.27	275.08	2.85	1.04	110	1.466	0.889	1.04	0.51	0.85	218.93	1.68		1	100	1.02	1.20	1.00	224.4	0.88	Infin.	0.000	0.570	**Non-Liq.**	Non-Liq.	**0.00**
35.43	276.58	3.07	1.11	110	1.470	0.888	1.12	0.52	0.84	219.36	1.70		1	100	1.04	1.20	1.00	228.1	0.88	Infin.	0.000	0.571	**Non-Liq.**	Non-Liq.	**0.00**
35.60	260.34	3.57	1.37	110	1.474	0.887	1.38	0.54	0.83	204.30	1.79		1	100	1.10	1.20	1.00	225.0	0.88	Infin.	0.000	0.571	**Non-Liq.**	Non-Liq.	**0.00**
35.76	280.13	5.74	2.05	110	1.478	0.886	2.06	0.58	0.82	216.97	1.91		1	100	1.20	1.20	1.00	260.4	0.87	Infin.	0.000	0.572	**Non-Liq.**	Non-Liq.	**0.00**
35.93	323.56	6.58	2.03	110	1.482	0.885	2.04	0.57	0.83	251.42	1.87		1	100	1.16	1.20	1.00	292.6	0.87	Infin.	0.000	0.572	**Non-Liq.**	Non-Liq.	**0.00**
36.09	191.60	6.05	3.16	110	1.485	0.883	3.18	0.66	0.80	143.75	2.17		1	92	1.59		1.00	228.1	0.87	Infin.	0.000	0.572	**Non-Liq.**	Non-Liq.	**0.00**
36.25	264.99	3.90	1.47	110	1.489	0.882	1.48	0.55	0.83	206.32	1.81		1	100	1.11	1.00	1.00	230.4	0.87	Infin.	0.000	0.573	**Non-Liq.**	Non-Liq.	**0.00**
36.42	319.83	3.03	0.95	110	1.493	0.881	0.95	0.50	0.84	253.26	1.60		1	100	1.00	1.05	1.00	254.2	0.87	Infin.	0.000	0.573	**Non-Liq.**	Non-Liq.	**0.00**
36.58	332.93	3.09	0.93	110	1.497	0.880	0.93	0.50	0.84	263.34	1.59		1	100	1.00	1.10	1.00	264.3	0.87	Infin.	0.000	0.573	**Non-Liq.**	Non-Liq.	**0.00**
36.75	372.73	3.69	0.99	110	1.501	0.878	0.99	0.50	0.84	294.57	1.58		1	100	1.00	1.15	1.00	295.7	0.87	Infin.	0.000	0.573	**Non-Liq.**	Non-Liq.	**0.00**
36.91	404.69	4.23	1.05	110	1.505	0.877	1.05	0.50	0.84	319.52	1.57		1	100	1.00	1.20	1.00	320.7	0.87	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
37.07	405.53	3.77	0.93	110	1.509	0.876	0.93	0.50	0.84	319.76	1.53		1	100	1.00	1.25	1.00	321.0	0.87	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
37.24	398.38	4.78	1.20	110	1.513	0.875	1.20	0.50	0.84	313.70	1.62		1	100	1.00	1.30	1.00	314.9	0.87	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
37.40	378.24	5.25	1.39	110	1.517	0.873	1.39	0.52	0.83	295.75	1.69		1	100	1.03	1.35	1.00	306.3	0.87	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
37.57	281.40	4.91	1.75	110	1.521	0.872	1.75	0.56	0.81	215.59	1.85		1	100	1.15	1.40	1.00	248.4	0.86	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
37.73	240.64	3.31	1.37	110	1.525	0.871	1.38	0.55	0.82	184.66	1.82		1	100	1.12	1.45	1.00	207.4	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
37.89	240.96	2.46	1.02	110	1.528	0.869	1.03	0.52	0.82	186.65	1.72		1	100	1.05	1.50	1.00	196.8	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
38.06	258.07	2.27	0.88	110	1.532	0.868	0.88	0.50	0.83	201.28	1.65		1	100	1.00	1.55	1.00	202.6	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
38.22	239.78	2.30	0.96	110	1.536	0.867	0.97	0.52	0.82	185.59	1.70		1	100	1.04	1.60	1.00	193.5	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
38.39	218.69	1.98	0.90	110	1.540	0.865	0.91	0.52	0.82	168.72	1.71		1	99	1.05	1.65	1.00	177.3	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
38.55	264.47	1.94	0.73	110	1.544	0.864	0.74	0.50	0.83	205.71	1.59		1	100	1.00	1.70	1.00	206.5	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
38.71	297.09	1.85	0.62	110	1.548	0.863	0.63	0.50	0.83	230.94	1.50		1	100	1.00	1.75	1.00	231.8	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
38.88	312.92	1.80	0.57	110	1.552	0.861	0.58	0.50	0.83	243.00	1.46		1	100	1.00	1.80	1.00	243.9	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
39.04	327.85	2.06	0.63	110	1.556	0.860	0.63	0.50	0.82	254.33	1.47		1	100	1.00	1.85	1.00	255.3	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
39.21	337.25	2.27	0.67	110	1.560	0.859	0.67	0.50	0.82	261.32	1.49		1	100	1.00	1.90	1.00	262.3	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
39.37	350.08	2.32	0.66	110	1.564	0.857	0.67	0.50	0.82	270.97	1.47		1	100	1.00	1.95	1.00	272.0	0.86	Infin.	0.000	0.576	**Non-Liq.**	Non-Liq.	**0.00**
39.53	354.11	2.14	0.60	110	1.567	0.856	0.61	0.50	0.82	273.76	1.44		1	100	1.00	2.00	1.00	274.8	0.85	Infin.	0.000	0.576	**Non-Liq.**	Non-Liq.	**0.00**
39.70	359.55	2.27	0.63	110	1.571	0.854	0.63	0.50	0.82	277.64	1.45		1	100	1.00	2.05	1.00	278.7	0.85	Infin.	0.000	0.576	**Non-Liq.**	Non-Liq.	**0.00**
39.86	355.78	2.53	0.71	110	1.575	0.853	0.72	0.50	0.82	274.37	1.49		1	100	1.00	2.10	1.00	275.4	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
40.03	334.77	2.75	0.82	110	1.579	0.852	0.83	0.50	0.82	257.77	1.55		1	100	1.00	2.15	1.00	258.7	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
40.19	342.17	2.95	0.86	110	1.583	0.850	0.86	0.50	0.82	263.17	1.56		1	100	1.00	2.20	1.00	264.2	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
40.35	344.05	2.87	0.83	110	1.587	0.849	0.84	0.50	0.82	264.29	1.55		1	100	1.00	2.25	1.00	265.3	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
40.52	335.17	2.88	0.86	110	1.591	0.847	0.86	0.50	0.82	257.12	1.57		1	100	1.00	2.30	1.00	258.1	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
40.68	320.89	2.72	0.85	110	1.595	0.846	0.85	0.50	0.81	245.81	1.58		1	100	1.00	2.35	1.00	246.7	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
40.85	339.05	1.89	0.56	110	1.599	0.844	0.56	0.50	0.81	259.47	1.43		1	100	1.00	2.40	1.00	260.4	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
41.01	382.25	2.92	0.76	110	1.603	0.843	0.77	0.50	0.81	292.33	1.49		1	100	1.00	2.45	1.00	293.4	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
41.17	403.21	3.03	0.75	110	1.607	0.841	0.76	0.50	0.81	308.04	1.47		1	100	1.00	2.50	1.00	309.2	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
41.34	379.57	3.67	0.97	110	1.610	0.840	0.97	0.50	0.81	289.56	1.57		1	100	1.00	2.55	1.00	290.6	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
41.50	396.71	3.17	0.80	110	1.614	0.838	0.80	0.50	0.81	302.32	1.50		1	100	1.00	2.60	1.00	303.4	0.84	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
41.67	391.23	3.14	0.80	110	1.618	0.837	0.81	0.50	0.81	297.76	1.50		1	100	1.00	2.65	1.00	298.9	0.84	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
41.83	390.72	3.06	0.78	110	1.622	0.835	0.79	0.50	0.81	297.01	1.50		1	100	1.00	2.70	1.00	298.1	0.84	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
41.99	382.61	2.95	0.77	110	1.626	0.834	0.78	0.50	0.81	290.47	1.50		1	100	1.00	2.75	1.00	291.6	0.84	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
42.16	380.43	2.84	0.75	110	1.630	0.832	0.75	0.50	0.81	288.46	1.49		1	100	1.00	2.80	1.00	289.5	0.84	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
42.32	381.27	2.80	0.73	110	1.634	0.831	0.74	0.50	0.80	288.75	1.48		1	100	1.00	2.85	1.00	289.8	0.84	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
42.49	383.78	2.53	0.66	110	1.638	0.829	0.66	0.50	0.80	290.31	1.45		1	100	1.00	2.90	1.00	291.4	0.84	Infin.	0.000	0.573	**Non-Liq.**	Non-Liq.	**0.00**
42.65	395.93	2.51	0.63	110	1.642	0.827	0.64	0.50	0.80	299.18	1.43		1	100	1.00	2.95	1.00	300.3	0.84	Infin.	0.000	0.573	**Non-Liq.**	Non-Liq.	**0.00**
42.81	401.54	2.69	0.67	110	1.646	0.826	0.67	0.50	0.80	303.07	1.44		1	100	1.00	3.00	1.00	304.2	0.84	Infin.	0.000	0.573	**Non-Liq.**	Non-Liq.	**0.00**
42.98	408.28	2.41	0.59	110	1.649	0.824	0.59	0.50	0.80	307.81	1.40		1	100	1.00	3.05	1.00	309.0	0.84	Infin.	0.000	0.573	**Non-Liq.**	Non-Liq.	**0.00**

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_c	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
43.14	410.18	2.68	0.65	110	1.653	0.823	0.66	0.50	0.80	308.88	1.43		1	100	1.00	3.10	1.00	310.0	0.84	Infin.	0.000	0.572	Non-Liq.	Non-Liq.	0.00
43.31	413.71	2.73	0.66	110	1.657	0.821	0.66	0.50	0.80	311.18	1.43		1	100	1.00	3.15	1.00	312.3	0.84	Infin.	0.000	0.572	Non-Liq.	Non-Liq.	0.00
43.47	420.65	2.58	0.61	110	1.661	0.820	0.62	0.50	0.80	316.05	1.40		1	100	1.00	3.20	1.00	317.2	0.83	Infin.	0.000	0.572	Non-Liq.	Non-Liq.	0.00
43.64	425.34	3.15	0.74	110	1.665	0.818	0.74	0.50	0.80	319.21	1.46		1	100	1.00	3.25	1.00	320.4	0.83	Infin.	0.000	0.572	Non-Liq.	Non-Liq.	0.00
43.80	433.25	2.87	0.66	110	1.669	0.816	0.67	0.50	0.80	324.78	1.42		1	100	1.00	3.30	1.00	326.0	0.83	Infin.	0.000	0.571	Non-Liq.	Non-Liq.	0.00
43.96	445.49	2.84	0.64	110	1.673	0.815	0.64	0.50	0.80	333.60	1.40		1	100	1.00	3.35	1.00	334.8	0.83	Infin.	0.000	0.571	Non-Liq.	Non-Liq.	0.00
44.13	458.14	2.05	0.45	110	1.677	0.813	0.45	0.50	0.79	342.71	1.28		1	100	1.00	3.40	1.00	344.0	0.83	Infin.	0.000	0.571	Non-Liq.	Non-Liq.	0.00
44.29	407.19	2.23	0.55	110	1.681	0.811	0.55	0.50	0.79	304.10	1.38		1	100	1.00	3.45	1.00	305.2	0.83	Infin.	0.000	0.570	Non-Liq.	Non-Liq.	0.00
44.46	318.78	4.85	1.52	110	1.685	0.810	1.53	0.54	0.78	232.72	1.79		1	100	1.10	3.50	1.00	256.2	0.83	Infin.	0.000	0.570	Non-Liq.	Non-Liq.	0.00
44.62	311.01	4.70	1.51	110	1.689	0.808	1.52	0.55	0.77	226.57	1.79		1	100	1.10	3.55	1.00	250.2	0.83	Infin.	0.000	0.569	Non-Liq.	Non-Liq.	0.00
44.78	390.54	5.84	1.50	110	1.692	0.807	1.50	0.53	0.78	287.14	1.72		1	100	1.05	3.60	1.00	303.9	0.83	Infin.	0.000	0.569	Non-Liq.	Non-Liq.	0.00
44.95	419.57	5.18	1.23	110	1.696	0.805	1.24	0.50	0.79	311.92	1.64		1	100	1.00	3.65	1.00	313.1	0.83	Infin.	0.000	0.569	Non-Liq.	Non-Liq.	0.00
45.11	377.69	3.17	0.84	110	1.700	0.803	0.84	0.50	0.79	280.34	1.54		1	100	1.00	3.70	1.00	281.4	0.83	Infin.	0.000	0.568	Non-Liq.	Non-Liq.	0.00
45.28	407.75	4.13	1.01	110	1.704	0.802	1.02	0.50	0.79	302.40	1.58		1	100	1.00	3.75	1.00	303.5	0.83	Infin.	0.000	0.568	Non-Liq.	Non-Liq.	0.00
45.44	392.74	3.86	0.98	110	1.708	0.800	0.99	0.50	0.79	290.89	1.58		1	100	1.00	3.80	1.00	292.0	0.83	Infin.	0.000	0.567	Non-Liq.	Non-Liq.	0.00
45.60	382.50	3.90	1.02	110	1.712	0.798	1.02	0.50	0.79	282.94	1.60		1	100	1.00	3.85	1.00	284.0	0.82	Infin.	0.000	0.567	Non-Liq.	Non-Liq.	0.00
45.77	373.19	3.69	0.99	110	1.716	0.797	0.99	0.50	0.79	275.71	1.59		1	100	1.00	3.90	1.00	276.7	0.82	Infin.	0.000	0.567	Non-Liq.	Non-Liq.	0.00
45.93	367.93	3.54	0.96	110	1.720	0.795	0.97	0.50	0.78	271.49	1.59		1	100	1.00	3.90	1.00	272.5	0.82	Infin.	0.000	0.566	Non-Liq.	Non-Liq.	0.00
46.10	369.72	3.36	0.91	110	1.724	0.793	0.91	0.50	0.78	272.51	1.57		1	100	1.00	3.90	1.00	273.5	0.82	Infin.	0.000	0.566	Non-Liq.	Non-Liq.	0.00
46.26	381.32	3.27	0.86	110	1.728	0.792	0.86	0.50	0.78	280.78	1.54		1	100	1.00	3.90	1.00	281.8	0.82	Infin.	0.000	0.565	Non-Liq.	Non-Liq.	0.00
46.42	386.91	3.19	0.82	110	1.731	0.790	0.83	0.50	0.78	284.59	1.53		1	100	1.00	3.90	1.00	285.7	0.82	Infin.	0.000	0.565	Non-Liq.	Non-Liq.	0.00
46.59	380.97	3.15	0.83	110	1.735	0.788	0.83	0.50	0.78	279.88	1.53		1	100	1.00	3.90	1.00	280.9	0.82	Infin.	0.000	0.564	Non-Liq.	Non-Liq.	0.00
46.75	341.92	3.27	0.96	110	1.739	0.787	0.96	0.50	0.78	250.78	1.61		1	100	1.00	3.90	1.00	251.7	0.82	Infin.	0.000	0.564	Non-Liq.	Non-Liq.	0.00
46.92	315.47	3.20	1.01	110	1.743	0.785	1.02	0.50	0.78	230.52	1.65		1	100	1.01	3.90	1.00	232.8	0.82	Infin.	0.000	0.563	Non-Liq.	Non-Liq.	0.00
47.08	363.49	3.46	0.95	110	1.747	0.783	0.96	0.50	0.78	266.07	1.59		1	100	1.00	3.90	1.00	267.1	0.82	Infin.	0.000	0.563	Non-Liq.	Non-Liq.	0.00
47.24	379.91	4.34	1.14	110	1.751	0.782	1.15	0.50	0.78	277.81	1.64		1	100	1.00	3.90	1.00	277.9	0.82	Infin.	0.000	0.562	Non-Liq.	Non-Liq.	0.00
47.41	382.41	5.30	1.38	110	1.755	0.780	1.39	0.52	0.77	276.50	1.71		1	100	1.04	3.90	1.00	289.5	0.82	Infin.	0.000	0.562	Non-Liq.	Non-Liq.	0.00
47.57	369.25	5.87	1.59	110	1.759	0.778	1.60	0.54	0.76	264.21	1.77		1	100	1.08	3.90	1.00	287.4	0.82	Infin.	0.000	0.561	Non-Liq.	Non-Liq.	0.00
47.74	359.68	5.73	1.59	110	1.763	0.777	1.60	0.54	0.76	256.70	1.78		1	100	1.09	3.90	1.00	280.7	0.82	Infin.	0.000	0.561	Non-Liq.	Non-Liq.	0.00
47.90	383.68	4.97	1.29	110	1.767	0.775	1.30	0.51	0.77	277.49	1.68		1	100	1.03	3.90	1.00	285.9	0.81	Infin.	0.000	0.560	Non-Liq.	Non-Liq.	0.00
48.06	403.15	4.67	1.16	110	1.770	0.773	1.16	0.50	0.77	293.27	1.63		1	100	1.00	3.90	1.00	294.4	0.81	Infin.	0.000	0.560	Non-Liq.	Non-Liq.	0.00
48.23	405.14	3.95	0.97	110	1.774	0.772	0.98	0.50	0.77	294.40	1.57		1	100	1.00	3.90	1.00	295.5	0.81	Infin.	0.000	0.559	Non-Liq.	Non-Liq.	0.00
48.39	369.68	3.01	0.81	110	1.778	0.770	0.82	0.50	0.77	268.22	1.54		1	100	1.00	3.90	1.00	269.2	0.81	Infin.	0.000	0.559	Non-Liq.	Non-Liq.	0.00
48.56	336.91	2.26	0.67	110	1.782	0.768	0.67	0.50	0.77	244.06	1.51		1	100	1.00	3.90	1.00	245.0	0.81	Infin.	0.000	0.558	Non-Liq.	Non-Liq.	0.00
48.72	299.19	1.63	0.55	110	1.786	0.767	0.55	0.50	0.77	216.35	1.49		1	100	1.00	3.90	1.00	217.2	0.81	Infin.	0.000	0.558	Non-Liq.	Non-Liq.	0.00
48.88	236.26	1.38	0.58	110	1.790	0.765	0.59	0.50	0.77	170.38	1.58		1	99	1.00	3.90	1.00	171.0	0.81	Infin.	0.000	0.557	Non-Liq.	Non-Liq.	0.00
49.05	139.68	1.94	1.39	110	1.794	0.763	1.41	0.62	0.72	94.13	2.03		1	74	1.34		1.00	125.9	0.81	0.265	0.215	0.556	**0.39**	96%	**1.16**
49.21	65.30	2.32	3.55	110	1.798	0.762	3.65	0.78	0.66	39.62	2.58		1	38	3.23		1.00	128.1	0.90	0.276	0.248	0.556	**0.45**	93%	**1.14**
49.38	49.82	2.01	4.03	110	1.802	0.760	4.18	0.82	0.64	29.26	2.72		0						0.90			0.555	**Non-Liq.**	Non-Liq.	**0.00**
49.54	44.18	1.88	4.26	110	1.806	0.758	4.44	0.84	0.64	25.53	2.78		0						0.90			0.555	**Non-Liq.**	Non-Liq.	**0.00**
49.70	52.54	2.11	4.01	110	1.810	0.757	4.15	0.82	0.64	30.90	2.70		0						0.90			0.554	**Non-Liq.**	Non-Liq.	**0.00**
49.87	96.95	2.31	2.38	110	1.813	0.755	2.42	0.71	0.68	61.49	2.32		1	57	2.03		1.00	124.7	0.85	0.260	0.222	0.553	**0.40**	95%	**1.18**
50.03	125.29	2.02	1.61	110	1.817	0.753	1.64	0.64	0.71	82.44	2.11		1	69	1.48		1.00	122.2	0.85	0.250	0.212	0.553	**0.38**	96%	**1.21**
50.20	125.58	2.07	1.65	110	1.821	0.752	1.67	0.64	0.70	82.44	2.12		1	69	1.49		1.00	123.1	0.85	0.253	0.215	0.552	**0.39**	96%	**1.19**
50.36	128.65	2.24	1.74	110	1.825	0.750	1.77	0.65	0.70	84.23	2.13		1	70	1.51		1.00	127.4	0.85	0.272	0.231	0.552	**0.42**	95%	**1.14**
50.52	128.05	2.41	1.88	110	1.829	0.748	1.91	0.66	0.70	83.35	2.16		1	69	1.57		1.00	130.7	0.85	0.288	0.244	0.551	**0.44**	94%	**1.11**
50.69	127.87	2.55	1.99	110	1.833	0.747	2.02	0.66	0.70	82.85	2.18		1	69	1.61		1.00	133.4	0.85	0.301	0.255	0.550	**0.46**	93%	**1.08**
50.85	127.22	2.50	1.97	110	1.837	0.745	2.00	0.66	0.69	82.33	2.17		1	69	1.61		1.00	132.2	0.85	0.295	0.250	0.550	**0.45**	93%	**1.09**
51.02	120.78	2.43	2.02	110	1.841	0.743	2.05	0.67	0.69	77.65	2.20		1	66	1.67		1.00	129.4	0.85	0.282	0.239	0.549	**0.43**	94%	**1.12**
51.18	116.72	2.42	2.07	110	1.845	0.742	2.11	0.67	0.69	74.63	2.22		1	65	1.72		1.00	128.3	0.85	0.277	0.234	0.549	**0.43**	94%	**1.13**
51.35	117.01	2.42	2.07	110	1.849	0.740	2.10	0.67	0.69	74.72	2.22		1	65	1.72		1.00	128.4	0.85	0.277	0.234	0.548	**0.43**	94%	**1.13**
51.51	117.05	2.54	2.17	110	1.852	0.738	2.20	0.68	0.68	74.45	2.24		1	65	1.76		1.00	130.9	0.85	0.289	0.244	0.547	**0.45**	94%	**1.10**
51.67	118.36	2.51	2.12	110	1.856	0.737	2.15	0.68	0.68	75.32	2.22		1	65	1.73		1.00	130.3	0.84	0.286	0.241	0.547	**0.44**	94%	**1.11**
51.84	121.19	2.58	2.13	110	1.860	0.735	2.16	0.67	0.68	77.11	2.22		1	66	1.71		1.00	132.2	0.84	0.295	0.249	0.546	**0.46**	93%	**1.09**
52.00	128.21	2.29	1.78	110	1.864	0.733	1.81	0.65	0.69	82.58	2.14		1	69	1.54		1.00	127.2	0.84	0.271	0.229	0.545	**0.42**	95%	**1.15**
52.17	129.58	2.67	2.06	110	1.868	0.732	2.09	0.66	0.69	82.75	2.19		1	69	1.64		1.00	135.4	0.84	0.311	0.262	0.545	**0.48**	92%	**1.06**
52.33	98.86	2.96	2.99	110	1.872	0.730	3.05	0.73	0.66	60.52	2.40		1	56	2.31		1.00	139.7	0.84	0.333	0.281	0.544	**0.52**	90%	**1.01**
52.49	61.64	2.40	3.89	110	1.876	0.728	4.02	0.80	0.63	35.69	2.65		0						0.89			0.543	**Non-Liq.**	Non-Liq.	**0.00**
52.66	47.03	1.60	3.41	110	1.880	0.727	3.55	0.82	0.62	26.65	2.70		0						0.89			0.543	**Non-Liq.**	Non-Liq.	**0.00**
52.82	25.94	1.33	5.12	110	1.884	0.725	5.52	0.93	0.59	13.33	3.06		0						0.89			0.542	**Non-Liq.**	Non-Liq.	**0.00**
52.99	23.82	1.09	4.58	110	1.888	0.724	4.98	0.93	0.58	12.13	3.06		0						0.89			0.542	**Non-Liq.**	Non-Liq.	**0.00**
53.15	25.73	0.89	3.46	110	1.892	0.722	3.74	0.89	0.60	13.41	2.95		0						0.89			0.541	**Non-Liq.**	Non-Liq.	**0.00**
53.31	17.66	0.88	4.99	110	1.895	0.720	5.59	0.97	0.57	8.45	3.22		0						0.89			0.540	**Non-Liq.**	Non-Liq.	**0.00**
53.48	15.40	0.79	5.10	110	1.899	0.719	5.81	0.99	0.56	7.14	3.28		0						0.89			0.540	**Non-Liq.**	Non-Liq.	**0.00**
53.64	16.91	0.99	5.82	110	1.903	0.717	6.56	0.99	0.56	7.92	3.28		0						0.89			0.539	**Non-Liq.**	Non-Liq.	**0.00**
53.81	21.62	1.39	6.41	110	1.907	0.716	7.03	0.97	0.56	10.53	3.20		0						0.89			0.538	**Non-Liq.**	Non-Liq.	**0.00**
53.97	61.80	1.89	3.06	110	1.911	0.714	3.16	0.78	0.63	35.67	2.58		1	34	3.18		1.00	113.6	0.89	0.216	0.192	0.538	**0.36**	97%	**1.31**
54.13	169.40	2.67	1.58	110	1.915	0.712	1.60	0.61	0.70	110.04	2.02		1	81	1.32		1.00	145.4	0.79	0.366	0.289	0.537	**0.54**	89%	**0.88**
54.30	205.29	3.08	1.50	110	1.919	0.711	1.51	0.59	0.70	135.35	1.94		1	89	1.23	0.25	1.46	242.4	0.79	Infin.	0.000	0.536	**Non-Liq.**	Non-Liq.	**0.00**
54.46	216.51	3.54	1.63	110	1.923	0.709	1.65	0.59	0.70	142.34	1.95		1	91	1.24	0.25	1.46	257.6	0.79	Infin.	0.000	0.536	**Non-Liq.**	Non-Liq.	**0.00**
54.63	226.53	3.84	1.70	110	1.927	0.708	1.71	0.59	0.70	148.83	1.95		1	93	1.24	0.25	1.46	269.2	0.79	Infin.	0.000	0.535	**Non-Liq.**	Non-Liq.	**0.00**
54.79	253.78	4.49	1.77	110	1.931	0.706	1.78	0.59	0.70	167.28	1.93		1	98	1.22	0.25	1.46	297.4	0.79	Infin.	0.000	0.534	**Non-Liq.**	Non-Liq.	**0.00**
54.95	261.07	5.47	2.09	110	1.934	0.705	2.11	0.60	0.70	170.33	1.98		1	99	1.27	0.25	1.46	317.1	0.79	Infin.	0.000	0.534	**Non-Liq.**	Non-Liq.	**0.00**
55.12	254.36	6.20	2.44	110	1.938	0.703	2.46	0.62	0.69	163.85	2.04		1	97	1.36		1.00	222.6	0.78	Infin.	0.000	0.533	**Non-Liq.**	Non-Liq.	**0.00**
55.28	242.98	6.44	2.65	110	1.942	0.701	2.67	0.63	0.68	155.04	2.09		1	95	1.43		1.00	221.5	0.78	Infin.	0.000	0.532	**Non-Liq.**	Non-Liq.	**0.00**
55.45	210.76	5.98	2.84	110	1.946	0.700	2.86	0.65	0.67	132.53	2.15		1	89	1.56		1.00	206.2	0.78	Infin.	0.000	0.532	**Non-Liq.**	Non-Liq.	**0.00**
55.61	179.72	5.45	3.03	110	1.950	0.698	3.06	0.67	0.66	111.22	2.22		1	81	1.72		1.00	191.6	0.78	Infin.	0.000	0.531	**Non-Liq.**	Non-Liq.	**0.00**
55.77	154.42	4.96	3.21	110	1.954	0.697	3.26	0.69	0.65	94.09	2.29		1	74	1.92		1.00	180.2	0.78	Infin.	0.000	0.530	**Non-Liq.**	Non-Liq.	**0.00**
55.94	130.91	4.35	3.32	110	1.958	0.695	3.37	0.71	0.64	78.55	2.35		1	67	2.13		1.00	167.3	0.83	Infin.	0.000	0.530	**Non-Liq.**	Non-Liq.	**0.00**
56.10	111.46	3.85	3.45	110	1.962	0.694	3.52	0.73	0.64	65.80	2.42		1	59	2.39		1.00	157.1	0.83	0.441	0.366	0.529	**0.69**	77%	**0.60**
56.27	89.53	3.08	3.44	110	1.966	0.692	3.52	0.76	0.63	51.85	2.49		1	50	2.72		1.00	140.9	0.88	0.340	0.301	0.528	**0.57**	87%	**1.00**
56.43	70.63	2.41	3.41	110	1.970	0.691	3.51	0.78	0.62	39.99	2.57		1	39	3.15		1.00	125.9	0.88	0.266	0.235	0.528	**0.44**	94%	**1.16**
56.59	55.06	1.89	3.43	110	1.974	0.689	3.55	0.81	0.60	30.35	2.66		0						0.88			0.527	**Non-Liq.**	Non-Liq.	**0.00**
56.76	39.94	1.59	3.99	110	1.977	0.688	4.19	0.86	0.59	20.99	2.83		0						0.88			0.526	**Non-Liq.**	Non-Liq.	**0.00**
56.92	26.94	1.16	4.32	110	1.981	0.686	4.66	0.91	0.56	13.32	3.01		0						0.88			0.526	**Non-Liq.**	Non-Liq.	**0.00**
57.09	24.31	0.74	3.02	110	1.985	0.685	3.29	0.89	0.57	12.02	2.95		0						0.88			0.525	**Non-Liq.**	Non-Liq.	**0.00**
57.25	17.67	0.69	3.89	110	1.989	0.683	4.39	0.96	0.55	8.09	3.17		0						0.88			0.524	**Non-Liq.**	Non-Liq.	**0.00**
57.41	17.34	0.73	4.18	110	1.993	0.682	4.72	0.97	0.54	7.86	3.20		0						0.88			0.524	**Non-Liq.**	Non-Liq.	**0.00**
57.58	19.61	0.61	3.11	110	1.997	0.680	3.46	0.93	0.56	9.24	3.06		0						0.88			0.523	**Non-Liq.**	Non-Liq.	**0.00**
57.74	24.98	0.61	2.45	110	2.001	0.679	2.67	0.88	0.57	12.44	2.89		0						0.88			0.523	**Non-Liq.**	Non-Liq.	**0.00**
57.91	19.44	0.61	3.14	110	2.005	0.678	3.50	0.93	0.55	9.10	3.07		0						0.88			0.522	**Non-Liq.**	Non-Liq.	**0.00**
58.07	18.43	0.58	3.12	110	2.009	0.676	3.50	0.94	0.55	8.52	3.09		0						0.88			0.521	**Non-Liq.**	Non-Liq.	**0.00**

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	*Volumetric Strain (%)*
58.23	17.22	0.56	3.23	110	2.013	0.675	3.66	0.95	0.54	7.81	3.13		0						0.88			0.521	**Non-Liq.**	Non-Liq.	**0.00**
58.40	17.30	0.55	3.17	110	2.016	0.673	3.59	0.95	0.54	7.85	3.13		0						0.88			0.520	**Non-Liq.**	Non-Liq.	**0.00**
58.56	18.04	0.54	2.97	110	2.020	0.672	3.35	0.94	0.55	8.27	3.09		0						0.88			0.519	**Non-Liq.**	Non-Liq.	**0.00**
58.73	16.07	0.52	3.22	110	2.024	0.671	3.69	0.96	0.54	7.13	3.17		0						0.88			0.519	**Non-Liq.**	Non-Liq.	**0.00**
58.89	15.75	0.49	3.08	110	2.028	0.669	3.53	0.96	0.54	6.95	3.17		0						0.88			0.518	**Non-Liq.**	Non-Liq.	**0.00**
59.06	15.86	0.51	3.23	110	2.032	0.668	3.71	0.96	0.53	6.98	3.18		0						0.88			0.517	**Non-Liq.**	Non-Liq.	**0.00**
59.22	17.14	0.64	3.71	110	2.036	0.666	4.21	0.96	0.53	7.61	3.18		0						0.88			0.517	**Non-Liq.**	Non-Liq.	**0.00**
59.38	19.02	1.05	5.54	110	2.040	0.665	6.21	0.98	0.53	8.43	3.24		0						0.88			0.516	**Non-Liq.**	Non-Liq.	**0.00**
59.55	50.85	1.55	3.04	110	2.044	0.664	3.17	0.81	0.59	27.10	2.67		0						0.88			0.516	**Non-Liq.**	Non-Liq.	**0.00**
59.71	71.44	1.83	2.56	110	2.048	0.662	2.64	0.75	0.61	39.86	2.49		1	39	2.71		1.00	107.9	0.88	0.197	0.172	0.515	**0.33**	97%	**1.38**
59.88	152.33	2.73	1.79	110	2.052	0.661	1.81	0.64	0.65	92.95	2.11		1	74	1.47		1.00	136.5	0.77	0.316	0.243	0.514	**0.47**	92%	**1.04**
60.04	157.44	0.00	0.00	110	2.055	0.660	0.00	0.75	0.61	88.95	2.49		1	72	1.00		1.00	89.0	0.77	0.145	0.112	0.514	**0.22**	99%	**1.66**
60.20	137.47	0.00	0.00	110	2.059	0.658	0.00	0.75	0.61	77.55	2.48		1	66	1.00		1.00	77.6	0.82	0.123	0.101	0.513	**0.20**	100%	**1.86**

CPT-LIQUEFY.XLS - A SPREADSHEET FOR EMPIRICAL ESTIMATION OF LIQUEFACTION POTENTIAL USING CPT DATA
Developed 2003 by Shelton L. Stringer, GE, Earth Systems Southwest

Project: Oxnard High School No. 8
Job No: 301953-001
Date: 8/14/2018
Sounding: CPT-4
Plot: 4

Methods: Liquefaction Analysis using 1998 NCEER workshop methods (Robertson & Wride)
Post-liquefaction Settlement Analysis from Tokimatsu & Seed (1987)
Dry Sand Settlement by Pradel, ASCE Journal of G&GE, Vol 124, No. 4

Total Liquefied Thickness (feet)
3.8

EARTHQUAKE INFORMATION:
Magnitude: 6.77 (7.5)
PGA, g: 0.97 (0.75)
MSF: 1.30
GWT, feet: 20.0
Design GWT, feet: 20.0

Induced CSR (M=7.5): = 0.65*PGA*(po/p'o)*rd/MSF
Clean Sand Qc1n = C_Q*K_C*K_H*Qc
SF = $CRR_{7.5}$*Kσ/CSR
Use Tokimatsu & Seed (0) or Ishihara &Yoshmine (1): 0
Unit Weight of unsaturated soils: 110 pcf
Unit Weight of saturated soils: 110 pcf
Limiting Ic for liquefiable soils: 2.60
Limiting Ic for K_H: 2.0
Required SF: 1.50
Min SF of Liquefiable Layers: 0.24
Avg SF of Liquefiable Layers: 0.05

Probab	Total Induced Subsidence (inches)
Avg	3%
Max	99%
	0.5

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
0.16	92.62	1.11	1.20	110	0.009	1.000	1.20	0.56	1.70	148.81	1.84		1	93	1.13	0.25	1.00	168.8	1.00	Infin.	0.000	0.485	Non-Liq.	Non-Liq.	0.00
0.33	130.04	2.02	1.55	110	0.018	1.000	1.55	0.55	1.70	208.92	1.82		1	100	1.12	0.25	1.00	234.3	1.00	Infin.	0.000	0.485	Non-Liq.	Non-Liq.	0.00
0.49	152.39	3.01	1.98	110	0.027	1.000	1.98	0.57	1.70	244.82	1.86		1	100	1.16	0.25	1.00	282.8	1.00	Infin.	0.000	0.485	Non-Liq.	Non-Liq.	0.00
0.66	146.45	3.22	2.20	110	0.036	1.000	2.20	0.58	1.70	235.26	1.91		1	100	1.20	0.25	1.00	282.0	1.00	Infin.	0.000	0.485	Non-Liq.	Non-Liq.	0.00
0.82	125.63	2.97	2.36	110	0.045	1.000	2.36	0.60	1.70	201.79	1.97		1	100	1.27	0.25	1.00	255.7	1.00	Infin.	0.000	0.485	Non-Liq.	Non-Liq.	0.00
0.98	97.23	2.48	2.55	110	0.054	1.000	2.55	0.63	1.70	156.14	2.07		1	95	1.40		1.00	218.4	1.00	Infin.	0.000	0.485	Non-Liq.	Non-Liq.	0.00
1.15	63.94	1.59	2.49	110	0.063	0.999	2.50	0.66	1.70	102.64	2.18		1	78	1.61		1.00	165.7	1.00	Infin.	0.000	0.484	Non-Liq.	Non-Liq.	0.00
1.31	63.94	1.59	2.49	110	0.072	0.999	2.50	0.66	1.70	102.62	2.18		1	78	1.61		1.00	165.7	1.00	Infin.	0.000	0.484	Non-Liq.	Non-Liq.	0.00
1.48	41.59	1.09	2.61	110	0.081	0.999	2.62	0.70	1.70	66.70	2.32		1	60	2.02		1.00	134.8	1.00	0.308	0.308	0.484	Non-Liq.	Non-Liq.	0.00
1.64	28.11	0.74	2.64	110	0.090	0.998	2.64	0.74	1.70	45.02	2.45		1	44	2.52		1.00	113.6	1.00	0.216	0.216	0.484	Non-Liq.	Non-Liq.	0.00
1.80	20.76	0.53	2.55	110	0.099	0.998	2.57	0.77	1.70	33.20	2.54		1	31	2.98		1.00	98.9	1.00	0.170	0.170	0.484	Non-Liq.	Non-Liq.	0.00
1.97	21.63	0.56	2.58	110	0.108	0.998	2.60	0.77	1.70	34.58	2.53		1	33	2.92		1.00	101.1	1.00	0.176	0.176	0.484	Non-Liq.	Non-Liq.	0.00
2.13	34.59	0.78	2.25	110	0.117	0.997	2.26	0.71	1.70	55.39	2.34		1	52	2.07		1.00	114.6	1.00	0.220	0.220	0.483	Non-Liq.	Non-Liq.	0.00
2.30	34.08	0.89	2.61	110	0.126	0.997	2.62	0.72	1.70	54.56	2.39		1	52	2.25		1.00	123.0	1.00	0.253	0.253	0.483	Non-Liq.	Non-Liq.	0.00
2.46	31.06	0.81	2.60	110	0.135	0.996	2.61	0.73	1.70	49.69	2.41		1	48	2.37		1.00	117.7	1.00	0.231	0.231	0.483	Non-Liq.	Non-Liq.	0.00
2.62	26.71	0.71	2.65	110	0.144	0.996	2.67	0.75	1.70	42.69	2.47		1	42	2.62		1.00	111.6	1.00	0.209	0.209	0.483	Non-Liq.	Non-Liq.	0.00
2.79	24.66	0.64	2.61	110	0.153	0.996	2.62	0.76	1.70	39.38	2.49		1	38	2.72		1.00	107.1	1.00	0.194	0.194	0.483	Non-Liq.	Non-Liq.	0.00
2.95	22.66	0.59	2.60	110	0.162	0.995	2.62	0.76	1.70	36.15	2.52		1	35	2.86		1.00	103.4	1.00	0.183	0.183	0.482	Non-Liq.	Non-Liq.	0.00
3.12	21.79	0.57	2.60	110	0.171	0.995	2.62	0.77	1.70	34.74	2.53		1	33	2.93		1.00	101.7	1.00	0.178	0.178	0.482	Non-Liq.	Non-Liq.	0.00
3.28	20.52	0.55	2.69	110	0.180	0.994	2.72	0.78	1.70	32.68	2.56		1	30	3.10		1.00	101.3	1.00	0.177	0.177	0.482	Non-Liq.	Non-Liq.	0.00
3.44	18.85	0.54	2.86	110	0.189	0.994	2.89	0.79	1.70	29.98	2.61		0						1.00			0.482	Non-Liq.	Non-Liq.	0.00
3.61	16.96	0.52	3.05	110	0.198	0.994	3.09	0.81	1.70	26.93	2.66		0						1.00			0.482	Non-Liq.	Non-Liq.	0.00
3.77	15.22	0.50	3.30	110	0.208	0.993	3.34	0.82	1.70	24.12	2.72		0						1.00			0.482	Non-Liq.	Non-Liq.	0.00
3.94	13.60	0.54	3.97	110	0.217	0.993	4.03	0.85	1.70	21.50	2.81		0						1.00			0.481	Non-Liq.	Non-Liq.	0.00
4.10	13.10	0.56	4.31	110	0.226	0.993	4.38	0.86	1.70	20.69	2.85		0						1.00			0.481	Non-Liq.	Non-Liq.	0.00
4.27	13.76	0.61	4.45	110	0.235	0.992	4.52	0.86	1.70	21.73	2.84		0						1.00			0.481	Non-Liq.	Non-Liq.	0.00
4.43	12.78	0.63	4.94	110	0.244	0.992	5.03	0.88	1.70	20.14	2.90		0						1.00			0.481	Non-Liq.	Non-Liq.	0.00
4.59	9.82	0.62	6.32	110	0.253	0.991	6.49	0.93	1.70	15.37	3.06		0						1.00			0.481	Non-Liq.	Non-Liq.	0.00
4.76	9.11	0.58	6.39	110	0.262	0.991	6.58	0.93	1.70	14.22	3.09		0						1.00			0.480	Non-Liq.	Non-Liq.	0.00
4.92	9.64	0.67	6.94	110	0.271	0.991	7.14	0.94	1.70	15.05	3.09		0						1.00			0.480	Non-Liq.	Non-Liq.	0.00
5.09	11.05	0.51	4.60	110	0.280	0.990	4.72	0.89	1.70	17.31	2.93		0						1.00			0.480	Non-Liq.	Non-Liq.	0.00
5.25	26.79	0.51	1.91	110	0.289	0.990	1.93	0.72	1.70	42.58	2.38		1	41	2.22		1.00	94.7	1.00	0.159	0.159	0.480	Non-Liq.	Non-Liq.	0.00
5.41	43.87	0.61	1.40	110	0.298	0.989	1.41	0.65	1.70	70.01	2.12		1	62	1.50		1.00	105.0	1.00	0.188	0.188	0.480	Non-Liq.	Non-Liq.	0.00
5.58	61.57	0.87	1.42	110	0.307	0.989	1.42	0.61	1.70	98.44	2.02		1	76	1.32		1.00	130.2	1.00	0.285	0.285	0.479	Non-Liq.	Non-Liq.	0.00
5.74	81.48	1.27	1.55	110	0.316	0.989	1.56	0.60	1.70	130.42	1.96		1	88	1.25	1.00	1.00	163.4	1.00	Infin.	0.000	0.479	Non-Liq.	Non-Liq.	0.00
5.91	104.49	1.77	1.69	110	0.325	0.988	1.70	0.58	1.70	167.37	1.91		1	98	1.20	1.05	1.00	201.7	1.00	Infin.	0.000	0.479	Non-Liq.	Non-Liq.	0.00
6.07	121.74	2.26	1.85	110	0.334	0.988	1.86	0.58	1.70	195.08	1.90		1	100	1.19	1.10	1.00	232.8	1.00	Infin.	0.000	0.479	Non-Liq.	Non-Liq.	0.00
6.23	129.40	2.54	1.96	110	0.343	0.988	1.97	0.58	1.70	207.37	1.90		1	100	1.19	1.15	1.00	248.1	1.00	Infin.	0.000	0.479	Non-Liq.	Non-Liq.	0.00
6.40	133.71	2.63	1.97	110	0.352	0.987	1.98	0.58	1.70	214.28	1.90		1	100	1.18	1.20	1.00	254.9	1.00	Infin.	0.000	0.479	Non-Liq.	Non-Liq.	0.00
6.56	136.13	2.67	1.96	110	0.361	0.987	1.97	0.57	1.70	218.15	1.89		1	100	1.18	1.20	1.00	258.3	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
6.73	137.04	2.50	1.82	110	0.370	0.986	1.83	0.57	1.70	219.60	1.86		1	100	1.16	1.20	1.00	254.6	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
6.89	134.61	2.27	1.69	110	0.379	0.986	1.69	0.56	1.70	215.68	1.84		1	100	1.14	1.20	1.00	246.3	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.05	133.55	2.02	1.51	110	0.388	0.986	1.52	0.55	1.70	213.97	1.81		1	100	1.11	1.20	1.00	238.6	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.22	130.84	1.92	1.47	110	0.397	0.985	1.47	0.55	1.70	209.60	1.80		1	100	1.11	1.20	1.00	233.0	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.38	125.34	1.72	1.37	110	0.406	0.985	1.38	0.55	1.69	199.24	1.79		1	100	1.10	1.20	1.00	220.4	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.55	121.32	1.59	1.31	110	0.415	0.985	1.32	0.55	1.67	190.42	1.79		1	100	1.10	1.20	1.00	210.4	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
7.71	121.32	1.59	1.31	110	0.424	0.984	1.32	0.55	1.65	188.35	1.80		1	100	1.10	1.20	1.00	208.6	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
7.87	117.69	1.47	1.25	110	0.433	0.984	1.25	0.55	1.63	180.43	1.79		1	100	1.10	1.20	1.00	199.4	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
8.04	112.60	1.37	1.22	110	0.442	0.984	1.22	0.55	1.61	170.99	1.80		1	99	1.11	1.20	1.00	189.9	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
8.20	105.92	1.25	1.18	110	0.451	0.983	1.19	0.55	1.60	159.50	1.81		1	96	1.12	1.20	1.00	178.5	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
8.37	94.02	1.10	1.17	110	0.460	0.983	1.18	0.56	1.60	141.18	1.85		1	91	1.14	1.20	1.00	161.8	1.00	Infin.	0.000	0.476	Non-Liq.	Non-Liq.	0.00
8.53	82.35	0.71	0.86	110	0.469	0.982	0.86	0.55	1.56	121.02	1.81		1	85	1.11	1.20	1.00	135.0	1.00	0.309	0.309	0.476	Non-Liq.	Non-Liq.	0.00
8.69	75.19	0.69	0.91	110	0.478	0.982	0.92	0.56	1.56	110.51	1.85		1	81	1.15	1.20	1.00	127.3	1.00	0.272	0.272	0.476	Non-Liq.	Non-Liq.	0.00
8.86	63.26	0.61	0.97	110	0.487	0.982	0.97	0.59	1.57	93.45	1.93		1	74	1.21	1.20	1.00	113.9	1.00	0.217	0.217	0.476	Non-Liq.	Non-Liq.	0.00
9.02	59.99	0.57	0.95	110	0.496	0.981	0.96	0.59	1.56	87.95	1.94		1	71	1.23	1.20	1.00	108.8	1.00	0.200	0.200	0.476	Non-Liq.	Non-Liq.	0.00
9.19	56.32	0.53	0.94	110	0.505	0.981	0.94	0.60	1.55	81.99	1.96		1	69	1.25	1.20	1.00	103.2	1.00	0.182	0.182	0.476	Non-Liq.	Non-Liq.	0.00
9.35	53.37	0.45	0.85	110	0.514	0.981	0.86	0.60	1.54	76.78	1.96		1	66	1.25	1.20	1.00	96.4	1.00	0.163	0.163	0.475	Non-Liq.	Non-Liq.	0.00
9.51	48.12	0.39	0.82	110	0.523	0.980	0.83	0.60	1.53	68.86	1.99		1	61	1.29	1.20	1.00	88.9	1.00	0.145	0.145	0.475	Non-Liq.	Non-Liq.	0.00
9.68	43.46	0.35	0.81	110	0.532	0.980	0.82	0.62	1.53	61.93	2.03		1	57	1.34		1.00	82.7	1.00	0.133	0.133	0.475	Non-Liq.	Non-Liq.	0.00
9.84	43.28	0.29	0.68	110	0.541	0.980	0.69	0.61	1.50	60.60	1.99		1	56	1.29	0.05	1.71	133.7	1.00	0.302	0.302	0.475	Non-Liq.	Non-Liq.	0.00
10.01	40.37	0.42	1.04	110	0.550	0.979	1.05	0.64	1.52	57.28	2.12		1	54	1.48		1.00	84.9	1.00	0.137	0.137	0.475	Non-Liq.	Non-Liq.	0.00
10.17	38.85	0.35	0.91	110	0.559	0.979	0.92	0.64	1.50	54.36	2.10		1	52	1.46		1.00	79.2	1.00	0.126	0.126	0.475	Non-Liq.	Non-Liq.	0.00
10.33	35.99	0.37	1.03	110	0.568	0.979	1.05	0.66	1.50	50.33	2.16		1	48	1.58		1.00	79.3	1.00	0.126	0.126	0.474	Non-Liq.	Non-Liq.	0.00
10.50	35.23	0.33	0.94	110	0.577	0.978	0.96	0.65	1.48	48.64	2.15		1	47	1.55		1.00	75.5	1.00	0.120	0.120	0.474	Non-Liq.	Non-Liq.	0.00
10.66	32.68	0.32	0.98	110	0.586	0.978	0.99	0.66	1.48	44.89	2.19		1	44	1.64		1.00	73.5	1.00	0.117	0.117	0.474	Non-Liq.	Non-Liq.	0.00
10.83	29.98	0.30	0.99	110	0.595	0.978	1.01	0.68	1.47	40.94	2.22		1	40	1.73		1.00	70.8	1.00	0.113	0.113	0.474	Non-Liq.	Non-Liq.	0.00
10.99	26.35	0.27	1.02	110	0.604	0.977	1.04	0.69	1.47	35.85	2.28		1	34	1.89		1.00	67.7	1.00	0.109	0.109	0.474	Non-Liq.	Non-Liq.	0.00
11.15	21.42	0.31	1.43	110	0.614	0.977	1.48	0.74	1.50	29.41	2.44		1	26	2.47		1.00	72.5	1.00	0.115	0.115	0.474	Non-Liq.	Non-Liq.	0.00
11.32	14.65	0.21	1.40	110	0.623	0.977	1.46	0.78	1.51	20.05	2.57		1	10	3.16		1.00	63.4	1.00	0.104	0.104	0.473	Non-Liq.	Non-Liq.	0.00
11.48	9.05	0.21	2.30	110	0.632	0.976	2.47	0.87	1.57	12.46	2.87		0						1.00			0.473	Non-Liq.	Non-Liq.	0.00
11.65	7.19	0.20	2.77	110	0.641	0.976	3.04	0.91	1.58	9.77	3.01		0						1.00			0.473	Non-Liq.	Non-Liq.	0.00
11.81	2.70	0.13	4.89	110	0.650	0.975	6.44	1.00	1.63	3.16	3.60		0						1.00			0.473	Non-Liq.	Non-Liq.	0.00
11.98	2.65	0.12	4.64	110	0.659	0.975	6.18	1.00	1.61	3.02	3.60		0						1.00			0.473	Non-Liq.	Non-Liq.	0.00
12.14	3.48	0.11	3.10	110	0.668	0.975	3.84	1.00	1.58	4.21	3.37		0						1.00			0.473	Non-Liq.	Non-Liq.	0.00
12.30	2.50	0.10	3.84	110	0.677	0.974	5.27	1.00	1.56	2.69	3.61		0						1.00			0.472	Non-Liq.	Non-Liq.	0.00
12.47	1.85	0.11	5.73	110	0.686	0.974	9.10	1.00	1.54	1.70	3.90		0						1.00			0.472	Non-Liq.	Non-Liq.	0.00
12.63	1.79	0.13	7.43	110	0.695	0.974	12.14	1.00	1.52	1.58	4.00		0						1.00			0.472	Non-Liq.	Non-Liq.	0.00
12.80	5.10	0.29	5.59	110	0.704	0.973	6.48	1.00	1.50	6.25	3.36		0						1.00			0.472	Non-Liq.	Non-Liq.	0.00

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_c	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	Induced EQ CRR	M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
12.96	30.82	0.58	1.88	110	0.713	0.973	1.92	0.73	1.34	38.00	2.42		1	37	2.37		1.00	90.3	1.00	0.148	0.148	0.472	Non-Liq.	Non-Liq.	0.00
13.12	81.21	1.11	1.36	110	0.722	0.973	1.37	0.61	1.26	96.14	2.01		1	75	1.32		1.00	126.7	1.00	0.269	0.269	0.472	Non-Liq.	Non-Liq.	0.00
13.29	92.10	1.26	1.37	110	0.731	0.972	1.38	0.60	1.25	107.89	1.98		1	80	1.27	1.00	1.00	137.9	1.00	0.324	0.324	0.471	Non-Liq.	Non-Liq.	0.00
13.45	131.97	1.30	0.99	110	0.740	0.972	0.99	0.54	1.21	150.49	1.77		1	94	1.09	1.05	1.00	164.4	1.00	Infin.	0.000	0.471	Non-Liq.	Non-Liq.	0.00
13.62	176.29	1.68	0.95	110	0.749	0.972	0.96	0.51	1.19	198.00	1.68		1	100	1.02	1.10	1.00	203.4	1.00	Infin.	0.000	0.471	Non-Liq.	Non-Liq.	0.00
13.78	208.26	2.28	1.09	110	0.758	0.971	1.10	0.51	1.19	232.55	1.68		1	100	1.02	1.15	1.00	238.3	1.00	Infin.	0.000	0.471	Non-Liq.	Non-Liq.	0.00
13.94	234.75	2.60	1.11	110	0.767	0.971	1.11	0.50	1.18	259.95	1.65		1	100	1.00	1.20	1.00	261.3	1.00	Infin.	0.000	0.471	Non-Liq.	Non-Liq.	0.00
14.11	244.80	2.82	1.15	110	0.776	0.971	1.16	0.50	1.17	269.60	1.65		1	100	1.00	1.25	1.00	271.7	1.00	Infin.	0.000	0.471	Non-Liq.	Non-Liq.	0.00
14.27	272.06	2.98	1.09	110	0.785	0.970	1.10	0.50	1.16	297.68	1.61		1	100	1.00	1.30	1.00	298.8	1.00	Infin.	0.000	0.470	Non-Liq.	Non-Liq.	0.00
14.44	294.29	3.35	1.14	110	0.794	0.970	1.14	0.50	1.15	320.23	1.60		1	100	1.00	1.35	1.00	321.4	1.00	Infin.	0.000	0.470	Non-Liq.	Non-Liq.	0.00
14.60	316.23	3.17	1.00	110	0.803	0.970	1.00	0.50	1.15	342.22	1.54		1	100	1.00	1.40	1.00	343.5	1.00	Infin.	0.000	0.470	Non-Liq.	Non-Liq.	0.00
14.76	316.63	3.35	1.06	110	0.812	0.969	1.06	0.50	1.14	340.73	1.56		1	100	1.00	1.45	1.00	342.0	1.00	Infin.	0.000	0.470	Non-Liq.	Non-Liq.	0.00
14.93	294.75	3.41	1.16	110	0.821	0.969	1.16	0.50	1.14	315.37	1.61		1	100	1.00	1.50	1.00	316.5	1.00	Infin.	0.000	0.470	Non-Liq.	Non-Liq.	0.00
15.09	278.02	3.48	1.25	110	0.830	0.969	1.25	0.50	1.13	296.09	1.65		1	100	1.01	1.55	1.00	299.0	1.00	Infin.	0.000	0.470	Non-Liq.	Non-Liq.	0.00
15.26	279.30	3.53	1.26	110	0.839	0.968	1.27	0.51	1.12	295.90	1.66		1	100	1.01	1.55	1.00	299.6	1.00	Infin.	0.000	0.469	Non-Liq.	Non-Liq.	0.00
15.42	288.00	3.58	1.24	110	0.848	0.968	1.25	0.50	1.12	303.25	1.65		1	100	1.00	1.55	1.00	304.4	1.00	Infin.	0.000	0.469	Non-Liq.	Non-Liq.	0.00
15.58	292.46	3.59	1.23	110	0.857	0.967	1.23	0.50	1.11	306.22	1.64		1	100	1.00	1.55	1.00	307.4	1.00	Infin.	0.000	0.469	Non-Liq.	Non-Liq.	0.00
15.75	272.56	3.89	1.43	110	0.866	0.967	1.43	0.52	1.11	285.01	1.71		1	100	1.04	1.55	1.00	298.8	1.00	Infin.	0.000	0.469	Non-Liq.	Non-Liq.	0.00
15.91	276.67	3.59	1.30	110	0.875	0.967	1.30	0.51	1.10	287.18	1.67		1	100	1.02	1.55	1.00	294.2	1.00	Infin.	0.000	0.469	Non-Liq.	Non-Liq.	0.00
16.08	273.17	3.92	1.44	110	0.884	0.966	1.44	0.52	1.10	282.65	1.71		1	100	1.05	1.55	1.00	297.2	1.00	Infin.	0.000	0.468	Non-Liq.	Non-Liq.	0.00
16.24	281.27	3.86	1.37	110	0.893	0.966	1.38	0.52	1.09	289.18	1.69		1	100	1.03	1.55	1.00	299.7	1.00	Infin.	0.000	0.468	Non-Liq.	Non-Liq.	0.00
16.40	308.06	4.92	1.60	110	0.902	0.966	1.60	0.53	1.09	315.65	1.72		1	100	1.05	1.55	1.00	334.0	1.00	Infin.	0.000	0.468	Non-Liq.	Non-Liq.	0.00
16.57	298.32	4.41	1.48	110	0.911	0.965	1.48	0.52	1.08	303.79	1.71		1	100	1.04	1.55	1.00	317.6	1.00	Infin.	0.000	0.468	Non-Liq.	Non-Liq.	0.00
16.73	317.60	4.08	1.28	110	0.920	0.965	1.29	0.50	1.07	320.96	1.64		1	100	1.00	1.55	1.00	321.4	1.00	Infin.	0.000	0.468	Non-Liq.	Non-Liq.	0.00
16.90	332.36	5.17	1.56	110	0.929	0.965	1.56	0.52	1.07	335.03	1.70		1	100	1.04	1.55	1.00	349.0	1.00	Infin.	0.000	0.468	Non-Liq.	Non-Liq.	0.00
17.06	338.43	6.36	1.88	110	0.938	0.964	1.88	0.54	1.07	340.25	1.76		1	100	1.08	1.55	1.00	369.5	1.00	Infin.	0.000	0.467	Non-Liq.	Non-Liq.	0.00
17.22	307.99	5.82	1.89	110	0.947	0.964	1.90	0.55	1.06	308.23	1.79		1	100	1.10	1.55	1.00	340.3	1.00	Infin.	0.000	0.467	Non-Liq.	Non-Liq.	0.00
17.39	269.28	4.43	1.64	110	0.956	0.963	1.65	0.54	1.06	267.85	1.78		1	100	1.09	1.55	1.00	292.8	1.00	Infin.	0.000	0.467	Non-Liq.	Non-Liq.	0.00
17.55	257.64	3.38	1.31	110	0.965	0.963	1.32	0.52	1.05	254.47	1.71		1	100	1.05	1.55	1.00	267.0	1.00	Infin.	0.000	0.467	Non-Liq.	Non-Liq.	0.00
17.72	229.45	3.27	1.42	110	0.974	0.963	1.43	0.54	1.05	225.75	1.77		1	100	1.09	1.55	1.00	246.1	1.00	Infin.	0.000	0.467	Non-Liq.	Non-Liq.	0.00
17.88	185.15	3.15	1.70	110	0.983	0.962	1.71	0.58	1.04	181.55	1.89		1	100	1.18	1.55	1.00	215.2	1.00	Infin.	0.000	0.467	Non-Liq.	Non-Liq.	0.00
18.04	157.27	2.43	1.54	110	0.992	0.962	1.55	0.58	1.04	153.30	1.91		1	95	1.20	1.55	1.00	184.1	1.00	Infin.	0.000	0.466	Non-Liq.	Non-Liq.	0.00
18.21	172.27	2.97	1.72	110	1.001	0.962	1.73	0.58	1.03	167.15	1.92		1	98	1.21	1.55	1.00	202.6	1.00	Infin.	0.000	0.466	Non-Liq.	Non-Liq.	0.00
18.37	148.03	3.30	2.23	110	1.010	0.961	2.24	0.62	1.03	142.99	2.05		1	92	1.37		1.00	195.6	1.00	Infin.	0.000	0.466	Non-Liq.	Non-Liq.	0.00
18.54	212.42	3.34	1.57	110	1.020	0.961	1.58	0.56	1.02	203.98	1.83		1	100	1.13	1.00	1.00	231.6	1.00	Infin.	0.000	0.466	Non-Liq.	Non-Liq.	0.00
18.70	249.14	2.81	1.13	110	1.029	0.960	1.13	0.51	1.01	237.92	1.68		1	100	1.02	1.05	1.00	244.5	1.00	Infin.	0.000	0.466	Non-Liq.	Non-Liq.	0.00
18.86	254.49	2.69	1.06	110	1.038	0.960	1.06	0.50	1.01	241.92	1.65		1	100	1.01	1.10	1.00	244.0	1.00	Infin.	0.000	0.465	Non-Liq.	Non-Liq.	0.00
19.03	249.73	2.74	1.10	110	1.047	0.960	1.10	0.51	1.01	236.35	1.67		1	100	1.02	1.15	1.00	241.6	1.00	Infin.	0.000	0.465	Non-Liq.	Non-Liq.	0.00
19.19	253.62	2.91	1.15	110	1.056	0.959	1.15	0.51	1.00	239.00	1.68		1	100	1.03	1.20	1.00	246.3	1.00	Infin.	0.000	0.465	Non-Liq.	Non-Liq.	0.00
19.36	260.64	3.02	1.16	110	1.065	0.959	1.16	0.51	1.00	244.56	1.68		1	100	1.02	1.25	1.00	251.5	1.00	Infin.	0.000	0.465	Non-Liq.	Non-Liq.	0.00
19.52	261.87	3.10	1.18	110	1.074	0.958	1.19	0.51	0.99	244.64	1.69		1	100	1.03	1.30	1.00	252.7	0.99	Infin.	0.000	0.465	Non-Liq.	Non-Liq.	0.00
19.69	270.64	2.97	1.10	110	1.083	0.958	1.10	0.50	0.99	251.84	1.65		1	100	1.01	1.35	1.00	254.3	0.99	Infin.	0.000	0.464	Non-Liq.	Non-Liq.	0.00
19.85	280.85	3.04	1.08	110	1.092	0.957	1.09	0.50	0.98	260.31	1.64		1	100	1.00	1.40	1.00	261.3	0.99	Infin.	0.000	0.464	Non-Liq.	Non-Liq.	0.00
20.01	294.22	3.15	1.07	110	1.101	0.957	1.07	0.50	0.98	271.62	1.62		1	100	1.00	1.45	1.00	272.6	0.98	Infin.	0.000	0.464	Non-Liq.	Non-Liq.	0.00
20.18	298.62	3.34	1.12	110	1.107	0.957	1.12	0.50	0.98	274.94	1.64		1	100	1.00	1.50	1.00	276.0	0.98	Infin.	0.000	0.465	Non-Liq.	Non-Liq.	0.00
20.34	302.63	3.48	1.15	110	1.111	0.956	1.15	0.50	0.98	278.14	1.64		1	100	1.00	1.55	1.00	278.4	0.98	Infin.	0.000	0.467	Non-Liq.	Non-Liq.	0.00
20.51	308.19	3.65	1.18	110	1.115	0.956	1.19	0.50	0.97	282.74	1.65		1	100	1.00	1.60	1.00	284.3	0.98	Infin.	0.000	0.469	Non-Liq.	Non-Liq.	0.00
20.67	305.25	4.01	1.31	110	1.118	0.955	1.32	0.51	0.97	279.36	1.69		1	100	1.03	1.65	1.00	288.4	0.98	Infin.	0.000	0.471	Non-Liq.	Non-Liq.	0.00
20.83	298.17	3.98	1.33	110	1.122	0.955	1.34	0.52	0.97	272.31	1.70		1	100	1.04	1.70	1.00	283.4	0.98	Infin.	0.000	0.473	Non-Liq.	Non-Liq.	0.00
21.00	287.29	3.36	1.17	110	1.126	0.954	1.17	0.51	0.97	262.03	1.66		1	100	1.01	1.75	1.00	266.4	0.98	Infin.	0.000	0.474	Non-Liq.	Non-Liq.	0.00
21.16	276.16	2.37	0.86	110	1.130	0.954	0.86	0.50	0.97	251.51	1.57		1	100	1.00	1.80	1.00	252.5	0.97	Infin.	0.000	0.476	Non-Liq.	Non-Liq.	0.00
21.33	269.03	2.09	0.78	110	1.134	0.954	0.78	0.50	0.97	244.57	1.55		1	100	1.00	1.85	1.00	245.5	0.97	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
21.49	271.73	1.47	0.54	110	1.138	0.953	0.54	0.50	0.96	246.60	1.44		1	100	1.00	1.90	1.00	247.5	0.97	Infin.	0.000	0.480	Non-Liq.	Non-Liq.	0.00
21.65	275.51	1.48	0.54	110	1.142	0.953	0.54	0.50	0.96	249.62	1.43		1	100	1.00	1.95	1.00	250.6	0.97	Infin.	0.000	0.482	Non-Liq.	Non-Liq.	0.00
21.82	269.27	1.33	0.49	110	1.146	0.952	0.50	0.50	0.96	243.52	1.42		1	100	1.00	2.00	1.00	244.4	0.97	Infin.	0.000	0.483	Non-Liq.	Non-Liq.	0.00
21.98	254.35	1.56	0.61	110	1.150	0.952	0.61	0.50	0.96	229.58	1.50		1	100	1.00	2.05	1.00	230.4	0.97	Infin.	0.000	0.485	Non-Liq.	Non-Liq.	0.00
22.15	231.17	1.90	0.82	110	1.154	0.951	0.82	0.50	0.96	208.20	1.62		1	100	1.00	2.10	1.00	209.0	0.97	Infin.	0.000	0.487	Non-Liq.	Non-Liq.	0.00
22.31	179.26	2.62	1.46	110	1.158	0.951	1.47	0.57	0.95	159.91	1.88		1	96	1.17	2.15	1.00	187.7	0.96	Infin.	0.000	0.489	Non-Liq.	Non-Liq.	0.00
22.47	221.58	3.22	1.45	110	1.161	0.950	1.46	0.55	0.95	197.87	1.82		1	100	1.12	2.20	1.00	222.0	0.96	Infin.	0.000	0.490	Non-Liq.	Non-Liq.	0.00
22.64	225.46	3.74	1.66	110	1.165	0.950	1.67	0.56	0.95	200.74	1.86		1	100	1.15	2.25	1.00	231.7	0.96	Infin.	0.000	0.492	Non-Liq.	Non-Liq.	0.00
22.80	232.74	4.18	1.79	110	1.169	0.949	1.80	0.57	0.94	206.75	1.87		1	100	1.17	2.30	1.00	241.8	0.96	Infin.	0.000	0.494	Non-Liq.	Non-Liq.	0.00
22.97	236.02	4.51	1.91	110	1.173	0.949	1.92	0.58	0.94	209.15	1.89		1	100	1.18	2.35	1.00	248.2	0.96	Infin.	0.000	0.495	Non-Liq.	Non-Liq.	0.00
23.13	239.32	4.59	1.92	110	1.177	0.948	1.93	0.58	0.94	211.70	1.89		1	100	1.18	2.40	1.00	250.8	0.96	Infin.	0.000	0.497	Non-Liq.	Non-Liq.	0.00
23.29	244.53	4.64	1.90	110	1.181	0.948	1.91	0.57	0.94	215.98	1.88		1	100	1.17	2.45	1.00	254.0	0.96	Infin.	0.000	0.498	Non-Liq.	Non-Liq.	0.00
23.46	258.17	4.62	1.79	110	1.185	0.947	1.80	0.56	0.94	227.92	1.85		1	100	1.14	2.50	1.00	261.4	0.96	Infin.	0.000	0.500	Non-Liq.	Non-Liq.	0.00
23.62	286.18	4.32	1.51	110	1.189	0.947	1.51	0.54	0.94	253.05	1.76		1	100	1.08	2.55	1.00	274.0	0.95	Infin.	0.000	0.502	Non-Liq.	Non-Liq.	0.00
23.79	333.44	4.00	1.20	110	1.193	0.946	1.20	0.50	0.94	295.77	1.64		1	100	1.00	2.60	1.00	295.8	0.95	Infin.	0.000	0.503	Non-Liq.	Non-Liq.	0.00
23.95	392.53	3.80	0.97	110	1.197	0.946	0.97	0.50	0.94	347.80	1.52		1	100	1.00	2.65	1.00	349.1	0.95	Infin.	0.000	0.505	Non-Liq.	Non-Liq.	0.00
24.11	462.47	4.16	0.90	110	1.200	0.945	0.90	0.50	0.94	409.29	1.45		1	100	1.00	2.70	1.00	410.8	0.95	Infin.	0.000	0.506	Non-Liq.	Non-Liq.	0.00
24.28	467.10	5.33	1.14	110	1.204	0.945	1.14	0.50	0.94	412.73	1.54		1	100	1.00	2.75	1.00	414.3	0.95	Infin.	0.000	0.508	Non-Liq.	Non-Liq.	0.00
24.44	447.32	4.90	1.09	110	1.208	0.944	1.10	0.50	0.94	394.56	1.53		1	100	1.00	2.80	1.00	396.0	0.95	Infin.	0.000	0.509	Non-Liq.	Non-Liq.	0.00
24.61	439.29	6.79	1.54	110	1.212	0.943	1.55	0.51	0.93	386.46	1.66		1	100	1.01	2.85	1.00	392.9	0.95	Infin.	0.000	0.511	Non-Liq.	Non-Liq.	0.00
24.77	455.61	4.85	1.07	110	1.216	0.943	1.07	0.50	0.93	400.60	1.52		1	100	1.00	2.90	1.00	402.1	0.95	Infin.	0.000	0.512	Non-Liq.	Non-Liq.	0.00
24.93	451.26	5.70	1.26	110	1.220	0.942	1.27	0.50	0.93	396.12	1.58		1	100	1.00	2.95	1.00	397.6	0.94	Infin.	0.000	0.514	Non-Liq.	Non-Liq.	0.00
25.10	407.93	4.55	1.11	110	1.224	0.942	1.12	0.50	0.93	357.41	1.57		1	100	1.00	3.00	1.00	358.7	0.94	Infin.	0.000	0.515	Non-Liq.	Non-Liq.	0.00
25.26	378.75	4.01	1.06	110	1.228	0.941	1.06	0.50	0.93	331.23	1.57		1	100	1.00	3.05	1.00	332.5	0.94	Infin.	0.000	0.516	Non-Liq.	Non-Liq.	0.00
25.43	353.85	3.37	0.95	110	1.232	0.941	0.96	0.50	0.93	308.89	1.55		1	100	1.00	3.10	1.00	310.0	0.94	Infin.	0.000	0.518	Non-Liq.	Non-Liq.	0.00
25.59	340.03	2.76	0.81	110	1.236	0.940	0.81	0.50	0.93	296.31	1.51		1	100	1.00	3.15	1.00	297.4	0.94	Infin.	0.000	0.519	Non-Liq.	Non-Liq.	0.00
25.75	328.46	3.20	0.97	110	1.240	0.939	0.98	0.50	0.92	285.74	1.58		1	100	1.00	3.20	1.00	286.8	0.94	Infin.	0.000	0.520	Non-Liq.	Non-Liq.	0.00
25.92	319.84	3.29	1.03	110	1.243	0.939	1.03	0.50	0.92	277.77	1.60		1	100	1.00	3.20	1.00	278.8	0.94	Infin.	0.000	0.522	Non-Liq.	Non-Liq.	0.00
26.08	333.74	3.88	1.16	110	1.247	0.938	1.17	0.50	0.92	289.43	1.64		1	100	1.00	3.20	1.00	290.5	0.94	Infin.	0.000	0.523	Non-Liq.	Non-Liq.	0.00
26.25	351.56	3.87	1.10	110	1.251	0.938	1.10	0.50	0.92	304.47	1.60		1	100	1.00	3.20	1.00	305.6	0.94	Infin.	0.000	0.524	Non-Liq.	Non-Liq.	0.00
26.41	345.28	4.26	1.23	110	1.255	0.937	1.24	0.50	0.92	298.43	1.65		1	100	1.00	3.20	1.00	300.0	0.93	Infin.	0.000	0.526	Non-Liq.	Non-Liq.	0.00
26.57	347.75	3.84	1.10	110	1.259	0.936	1.11	0.50	0.92	300.21	1.61		1	100	1.00	3.20	1.00	301.3	0.93	Infin.	0.000	0.527	Non-Liq.	Non-Liq.	0.00
26.74	367.05	3.31	0.90	110	1.263	0.936	0.90	0.50	0.92	316.44	1.52		1	100	1.00	3.20	1.00	317.6	0.93	Infin.	0.000	0.528	Non-Liq.	Non-Liq.	0.00
26.90	372.59	3.04	0.82	110	1.267	0.935	0.82	0.50	0.91	320.74	1.49		1	100	1.00	3.20	1.00	321.9	0.93	Infin.	0.000	0.529	Non-Liq.	Non-Liq.	0.00
27.07	374.52	2.86	0.76	110	1.271	0.934	0.77	0.50	0.91	321.90	1.47		1	100	1.00	3.20	1.00	323.1	0.93	Infin.	0.000	0.531	Non-Liq.	Non-Liq.	0.00
27.23	377.61	3.03	0.80	110	1.275	0.934	0.80	0.50	0.91	324.07	1.48		1	100	1.00	3.20	1.00	325.3	0.93	Infin.	0.000	0.532	Non-Liq.	Non-Liq.	0.00
27.40	381.19	3.93	1.03	110	1.279	0.933	1.03	0.50	0.91	326.65	1.56		1	100	1.00	3.20	1.00	327.9	0.93	Infin.	0.000	0.533	Non-Liq.	Non-Liq.	0.00
27.56	399.40	5.08	1.27	110	1.282	0.932	1.28	0.50	0.91	341.78	1.62		1	100	1.00	3.20	1.00	343.1	0.93	Infin.	0.000	0.534	Non-Liq.	Non-Liq.	0.00
27.72	375.52	4.69	1.25	110	1.286	0.932	1.25	0.50	0.91	320.79	1.63		1	100	1.00	3.20	1.00	322.0	0.92	Infin.	0.000	0.535	Non-Liq.	Non-Liq.	0.00
27.89	347.76	3.01	0.86	110	1.290	0.931	0.87	0.50	0.91	296.54	1.53		1	100	1.00	3.20	1.00	297.6	0.92	Infin.	0.000	0.536	Non-Liq.	Non-Liq.	0.00

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Overide	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_c	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
28.05	312.31	2.46	0.79	110	1.294	0.930	0.79	0.50	0.90	265.79	1.53		1	100	1.00	3.20	1.00	266.8	0.92	Infin.	0.000	0.538	Non-Liq.	Non-Liq.	0.00
28.22	307.37	2.94	0.96	110	1.298	0.929	0.96	0.50	0.90	261.17	1.60		1	100	1.00	3.20	1.00	262.2	0.92	Infin.	0.000	0.539	Non-Liq.	Non-Liq.	0.00
28.38	341.79	2.65	0.78	110	1.302	0.929	0.78	0.50	0.90	290.11	1.50		1	100	1.00	3.20	1.00	291.2	0.92	Infin.	0.000	0.540	Non-Liq.	Non-Liq.	0.00
28.54	292.80	2.77	0.95	110	1.306	0.928	0.95	0.50	0.90	247.99	1.61		1	100	1.00	3.20	1.00	248.9	0.92	Infin.	0.000	0.541	Non-Liq.	Non-Liq.	0.00
28.71	257.96	2.84	1.10	110	1.310	0.927	1.11	0.52	0.90	217.21	1.70		1	100	1.04	3.20	1.00	226.0	0.92	Infin.	0.000	0.542	Non-Liq.	Non-Liq.	0.00
28.87	193.75	1.91	0.99	110	1.314	0.926	0.99	0.53	0.89	162.04	1.75		1	97	1.07	3.20	1.00	174.6	0.92	Infin.	0.000	0.543	Non-Liq.	Non-Liq.	0.00
29.04	110.13	2.95	2.68	110	1.318	0.926	2.71	0.68	0.86	88.55	2.25		1	72	1.79		1.00	158.7	0.92	0.452	0.414	0.544	0.76	71%	0.57
29.20	64.38	2.45	3.80	110	1.322	0.925	3.88	0.77	0.84	50.25	2.53		1	48	2.93		1.00	147.0	0.96	0.376	0.359	0.545	0.66	80%	0.84
29.36	90.04	3.19	3.54	110	1.325	0.924	3.60	0.73	0.85	71.15	2.40		1	63	2.32		1.00	165.2	0.93	Infin.	0.000	0.546	Non-Liq.	Non-Liq.	0.00
29.53	118.08	3.29	2.78	110	1.329	0.923	2.82	0.68	0.86	94.48	2.24		1	74	1.77		1.00	167.5	0.91	Infin.	0.000	0.547	Non-Liq.	Non-Liq.	0.00
29.69	115.86	2.76	2.38	110	1.333	0.923	2.41	0.67	0.86	92.78	2.20		1	74	1.66		1.00	153.8	0.91	0.418	0.381	0.548	0.70	77%	0.68
29.86	274.31	1.51	0.55	110	1.337	0.922	0.55	0.50	0.89	229.50	1.47		1	100	1.00	0.30	1.41	322.9	0.91	Infin.	0.000	0.549	Non-Liq.	Non-Liq.	0.00
30.02	311.77	1.67	0.53	110	1.341	0.921	0.54	0.50	0.89	260.62	1.42		1	100	1.00	0.35	1.41	366.6	0.91	Infin.	0.000	0.550	Non-Liq.	Non-Liq.	0.00
30.18	315.95	1.19	0.38	110	1.345	0.920	0.38	0.50	0.89	263.74	1.32		1	100	1.00	0.40	1.41	371.0	0.91	Infin.	0.000	0.551	Non-Liq.	Non-Liq.	0.00
30.35	297.70	0.86	0.29	110	1.349	0.919	0.29	0.50	0.89	248.08	1.27		1	100	1.00	0.45	1.41	349.0	0.91	Infin.	0.000	0.551	Non-Liq.	Non-Liq.	0.00
30.51	257.40	1.00	0.39	110	1.353	0.918	0.39	0.50	0.88	214.03	1.40		1	100	1.00	0.50	1.41	301.1	0.91	Infin.	0.000	0.552	Non-Liq.	Non-Liq.	0.00
30.68	200.41	1.87	0.93	110	1.357	0.918	0.94	0.53	0.88	165.04	1.73		1	98	1.06	0.55	1.41	245.6	0.91	Infin.	0.000	0.553	Non-Liq.	Non-Liq.	0.00
30.84	117.72	2.01	1.71	110	1.361	0.917	1.73	0.63	0.85	93.75	2.09		1	74	1.44		1.00	134.7	0.90	0.307	0.278	0.554	0.50	91%	1.06
31.00	42.32	1.90	4.50	110	1.364	0.916	4.65	0.83	0.81	31.36	2.73		0						0.95			0.555	Non-Liq.	Non-Liq.	0.00
31.17	31.82	1.64	5.14	110	1.368	0.915	5.37	0.87	0.80	23.01	2.87		0						0.95			0.556	Non-Liq.	Non-Liq.	0.00
31.33	41.78	1.18	2.82	110	1.372	0.914	2.92	0.79	0.81	31.12	2.60		1	28	3.31		1.00	103.1	0.95	0.182	0.173	0.556	0.31	98%	1.45
31.50	54.16	1.35	2.48	110	1.376	0.913	2.55	0.75	0.82	40.98	2.47		1	40	2.62		1.00	107.2	0.95	0.194	0.185	0.557	0.33	97%	1.40
31.66	56.06	1.68	3.00	110	1.380	0.912	3.07	0.76	0.82	42.21	2.51		1	41	2.84		1.00	119.8	0.95	0.240	0.227	0.558	0.41	95%	1.24
31.82	60.54	2.05	3.38	110	1.384	0.911	3.46	0.77	0.81	45.52	2.53		1	44	2.90		1.00	132.1	0.95	0.294	0.279	0.559	0.50	91%	1.09
31.99	82.92	2.20	2.65	110	1.388	0.910	2.70	0.71	0.82	63.52	2.35		1	58	2.11		1.00	133.8	0.92	0.303	0.279	0.559	0.50	91%	1.07
32.15	148.83	1.99	1.34	110	1.392	0.909	1.35	0.59	0.85	118.52	1.94		1	84	1.23	1.00	1.00	146.5	0.90	0.372	0.334	0.560	0.60	85%	0.86
32.32	268.70	2.23	0.83	110	1.396	0.908	0.83	0.50	0.87	219.97	1.60		1	100	1.00	1.05	1.00	220.8	0.90	Infin.	0.000	0.561	Non-Liq.	Non-Liq.	0.00
32.48	308.62	2.97	0.96	110	1.400	0.907	0.97	0.50	0.87	252.47	1.61		1	100	1.00	1.10	1.00	253.4	0.89	Infin.	0.000	0.561	Non-Liq.	Non-Liq.	0.00
32.64	309.13	3.57	1.16	110	1.403	0.906	1.16	0.51	0.87	251.87	1.67		1	100	1.02	1.15	1.00	257.4	0.89	Infin.	0.000	0.562	Non-Liq.	Non-Liq.	0.00
32.81	309.47	4.46	1.44	110	1.407	0.905	1.45	0.53	0.86	250.13	1.75		1	100	1.07	1.20	1.00	268.7	0.89	Infin.	0.000	0.563	Non-Liq.	Non-Liq.	0.00
32.97	308.84	5.13	1.66	110	1.411	0.904	1.67	0.55	0.85	248.16	1.80		1	100	1.11	1.25	1.00	275.4	0.89	Infin.	0.000	0.563	Non-Liq.	Non-Liq.	0.00
33.14	317.27	5.82	1.84	110	1.415	0.903	1.84	0.56	0.85	253.92	1.83		1	100	1.13	1.30	1.00	287.4	0.89	Infin.	0.000	0.564	Non-Liq.	Non-Liq.	0.00
33.30	316.07	6.46	2.04	110	1.419	0.902	2.05	0.57	0.85	251.67	1.87		1	100	1.16	1.35	1.00	293.2	0.89	Infin.	0.000	0.565	Non-Liq.	Non-Liq.	0.00
33.46	306.67	6.63	2.16	110	1.423	0.901	2.17	0.58	0.84	243.15	1.90		1	100	1.19	1.40	1.00	289.5	0.89	Infin.	0.000	0.565	Non-Liq.	Non-Liq.	0.00
33.63	295.70	6.52	2.20	110	1.427	0.900	2.21	0.58	0.84	233.68	1.91		1	100	1.20	1.45	1.00	282.0	0.89	Infin.	0.000	0.566	Non-Liq.	Non-Liq.	0.00
33.79	287.84	6.15	2.14	110	1.431	0.899	2.15	0.58	0.84	227.15	1.91		1	100	1.20	1.50	1.00	273.3	0.89	Infin.	0.000	0.566	Non-Liq.	Non-Liq.	0.00
33.96	286.58	5.47	1.91	110	1.435	0.898	1.92	0.57	0.84	226.60	1.87		1	100	1.16	1.55	1.00	264.5	0.89	Infin.	0.000	0.567	Non-Liq.	Non-Liq.	0.00
34.12	285.14	4.97	1.74	110	1.439	0.897	1.75	0.56	0.84	225.74	1.84		1	100	1.14	1.55	1.00	257.8	0.88	Infin.	0.000	0.567	Non-Liq.	Non-Liq.	0.00
34.28	290.96	4.93	1.70	110	1.443	0.896	1.70	0.56	0.84	230.34	1.83		1	100	1.13	1.55	1.00	260.3	0.88	Infin.	0.000	0.568	Non-Liq.	Non-Liq.	0.00
34.45	290.25	5.14	1.77	110	1.446	0.895	1.78	0.56	0.84	229.07	1.84		1	100	1.14	1.55	1.00	261.8	0.88	Infin.	0.000	0.568	Non-Liq.	Non-Liq.	0.00
34.61	288.91	4.35	1.51	110	1.450	0.894	1.51	0.54	0.84	228.85	1.79		1	100	1.10	1.55	1.00	252.1	0.88	Infin.	0.000	0.569	Non-Liq.	Non-Liq.	0.00
34.78	290.18	4.30	1.48	110	1.454	0.893	1.49	0.54	0.84	229.67	1.78		1	100	1.09	1.55	1.00	251.9	0.88	Infin.	0.000	0.569	Non-Liq.	Non-Liq.	0.00
34.94	286.57	4.37	1.53	110	1.458	0.892	1.53	0.55	0.84	226.16	1.79		1	100	1.10	1.55	1.00	250.3	0.88	Infin.	0.000	0.570	Non-Liq.	Non-Liq.	0.00
35.10	285.33	4.63	1.62	110	1.462	0.890	1.63	0.55	0.84	224.33	1.82		1	100	1.12	1.55	1.00	252.2	0.88	Infin.	0.000	0.570	Non-Liq.	Non-Liq.	0.00
35.27	282.90	4.65	1.64	110	1.466	0.889	1.65	0.56	0.83	221.92	1.83		1	100	1.13	1.55	1.00	250.7	0.88	Infin.	0.000	0.570	Non-Liq.	Non-Liq.	0.00
35.43	284.23	4.21	1.48	110	1.470	0.888	1.49	0.54	0.84	223.46	1.79		1	100	1.10	1.55	1.00	246.3	0.88	Infin.	0.000	0.571	Non-Liq.	Non-Liq.	0.00
35.60	291.38	3.88	1.33	110	1.474	0.887	1.34	0.53	0.84	229.77	1.74		1	100	1.07	1.55	1.00	246.2	0.88	Infin.	0.000	0.571	Non-Liq.	Non-Liq.	0.00
35.76	294.00	3.53	1.20	110	1.478	0.886	1.21	0.52	0.84	232.40	1.71		1	100	1.04	1.55	1.00	243.1	0.87	Infin.	0.000	0.572	Non-Liq.	Non-Liq.	0.00
35.93	283.22	2.96	1.05	110	1.482	0.885	1.05	0.51	0.84	224.32	1.67		1	100	1.02	1.55	1.00	229.3	0.87	Infin.	0.000	0.572	Non-Liq.	Non-Liq.	0.00
36.09	264.79	3.14	1.18	110	1.485	0.883	1.19	0.53	0.84	208.03	1.73		1	100	1.06	1.55	1.00	221.5	0.87	Infin.	0.000	0.572	Non-Liq.	Non-Liq.	0.00
36.25	239.70	2.92	1.22	110	1.489	0.882	1.23	0.54	0.83	187.17	1.77		1	100	1.09	1.55	1.00	204.4	0.87	Infin.	0.000	0.573	Non-Liq.	Non-Liq.	0.00
36.42	190.73	2.49	1.30	110	1.493	0.881	1.31	0.57	0.82	147.05	1.87		1	93	1.16	1.55	1.00	171.2	0.87	Infin.	0.000	0.573	Non-Liq.	Non-Liq.	0.00
36.58	172.32	1.04	0.60	110	1.497	0.880	0.61	0.51	0.84	135.25	1.67		1	89	1.02	1.55	1.00	138.5	0.87	0.327	0.285	0.573	0.50	91%	1.03
36.75	139.82	0.84	0.60	110	1.501	0.878	0.61	0.53	0.83	108.50	1.75		1	80	1.07	1.55	1.00	116.7	0.87	0.228	0.198	0.573	0.35	97%	1.28
36.91	130.14	1.01	0.77	110	1.505	0.877	0.78	0.56	0.82	99.75	1.85		1	77	1.14	1.55	1.00	114.3	0.87	0.219	0.190	0.574	0.33	97%	1.31
37.07	111.04	0.59	0.53	110	1.509	0.876	0.54	0.55	0.82	85.14	1.81		1	70	1.11	1.55	1.00	95.2	0.87	0.160	0.139	0.574	0.24	99%	1.57
37.24	70.92	1.49	2.10	110	1.513	0.875	2.14	0.71	0.78	50.84	2.35		1	49	2.12		1.00	107.6	0.93	0.196	0.182	0.574	0.32	98%	1.39
37.40	56.54	1.73	3.06	110	1.517	0.873	3.15	0.77	0.76	39.40	2.54		1	38	2.99		1.00	117.9	0.93	0.232	0.216	0.574	0.38	96%	1.26
37.57	26.06	1.68	6.46	110	1.521	0.872	6.86	0.92	0.72	16.60	3.05		0						0.93			0.574	Non-Liq.	Non-Liq.	0.00
37.73	18.93	1.02	5.39	110	1.525	0.871	5.87	0.94	0.71	11.65	3.12		0						0.93			0.575	Non-Liq.	Non-Liq.	0.00
37.89	12.92	0.63	4.91	110	1.528	0.869	5.57	0.98	0.70	7.50	3.26		0						0.93			0.575	Non-Liq.	Non-Liq.	0.00
38.06	14.23	0.52	3.65	110	1.532	0.868	4.09	0.95	0.70	8.45	3.13		0						0.93			0.575	Non-Liq.	Non-Liq.	0.00
38.22	18.57	0.45	2.40	110	1.536	0.867	2.61	0.88	0.72	11.59	2.91		0						0.93			0.575	Non-Liq.	Non-Liq.	0.00
38.39	10.40	0.40	3.83	110	1.540	0.865	4.49	1.00	0.69	5.76	3.29		0						0.93			0.575	Non-Liq.	Non-Liq.	0.00
38.55	8.61	0.33	3.87	110	1.544	0.864	4.71	1.00	0.69	4.58	3.39		0						0.93			0.575	Non-Liq.	Non-Liq.	0.00
38.71	9.61	0.33	3.43	110	1.548	0.863	4.09	1.00	0.68	5.21	3.31		0						0.93			0.575	Non-Liq.	Non-Liq.	0.00
38.88	9.33	0.35	3.71	110	1.552	0.861	4.45	1.00	0.68	5.01	3.34		0						0.93			0.575	Non-Liq.	Non-Liq.	0.00
39.04	8.70	0.42	4.84	110	1.556	0.860	5.89	1.00	0.68	4.59	3.44		0						0.93			0.575	Non-Liq.	Non-Liq.	0.00
39.21	12.90	0.44	3.42	110	1.560	0.859	3.89	0.96	0.69	7.39	3.17		0						0.93			0.575	Non-Liq.	Non-Liq.	0.00
39.37	17.45	0.56	3.19	110	1.564	0.857	3.50	0.91	0.70	10.51	3.02		0						0.92			0.576	Non-Liq.	Non-Liq.	0.00
39.53	20.31	0.80	3.94	110	1.567	0.856	4.27	0.91	0.70	12.38	3.01		0						0.92			0.576	Non-Liq.	Non-Liq.	0.00
39.70	31.28	0.98	3.12	110	1.571	0.854	3.29	0.84	0.72	20.13	2.78		0						0.92			0.576	Non-Liq.	Non-Liq.	0.00
39.86	28.06	0.97	3.45	110	1.575	0.853	3.65	0.86	0.71	17.76	2.85		0						0.92			0.575	Non-Liq.	Non-Liq.	0.00
40.03	65.29	1.25	1.91	110	1.579	0.852	1.95	0.72	0.75	45.20	2.36		1	44	2.16		1.00	97.7	0.92	0.167	0.154	0.575	0.27	99%	1.53
40.19	75.32	1.52	2.02	110	1.583	0.850	2.06	0.71	0.75	52.43	2.33		1	50	2.04		1.00	106.9	0.89	0.194	0.172	0.575	0.30	98%	1.40
40.35	68.28	1.42	2.08	110	1.587	0.849	2.12	0.72	0.75	47.09	2.37		1	46	2.20		1.00	103.6	0.92	0.183	0.169	0.575	0.29	98%	1.45
40.52	76.08	1.52	2.00	110	1.591	0.847	2.04	0.70	0.75	52.82	2.32		1	50	2.02		1.00	106.8	0.88	0.193	0.171	0.575	0.30	98%	1.40
40.68	80.77	1.39	1.72	110	1.595	0.846	1.75	0.69	0.75	56.49	2.26		1	53	1.82		1.00	102.7	0.88	0.181	0.160	0.575	0.28	99%	1.46
40.85	107.08	1.51	1.41	110	1.599	0.844	1.43	0.64	0.77	76.62	2.10		1	66	1.45		1.00	111.4	0.88	0.208	0.184	0.575	0.32	98%	1.34
41.01	126.77	2.12	1.67	110	1.603	0.843	1.69	0.64	0.77	90.84	2.09		1	73	1.44		1.00	131.1	0.85	0.290	0.245	0.575	0.43	94%	1.11
41.17	204.50	2.61	1.28	110	1.607	0.841	1.29	0.56	0.79	151.55	1.85		1	94	1.15	1.00	1.00	174.4	0.85	Infin.	0.000	0.575	Non-Liq.	Non-Liq.	0.00
41.34	221.25	3.11	1.41	110	1.610	0.840	1.42	0.57	0.79	163.68	1.86		1	97	1.15	1.05	1.00	189.4	0.85	Infin.	0.000	0.575	Non-Liq.	Non-Liq.	0.00
41.50	230.53	3.66	1.59	110	1.614	0.838	1.60	0.57	0.78	169.74	1.89		1	99	1.18	1.10	1.00	200.7	0.84	Infin.	0.000	0.575	Non-Liq.	Non-Liq.	0.00
41.67	236.49	4.16	1.76	110	1.618	0.837	1.77	0.58	0.78	173.29	1.92		1	100	1.20	1.15	1.00	209.5	0.84	Infin.	0.000	0.574	Non-Liq.	Non-Liq.	0.00
41.83	238.11	4.55	1.91	110	1.622	0.835	1.92	0.59	0.78	173.63	1.94		1	100	1.23	1.15	1.00	214.8	0.84	Infin.	0.000	0.574	Non-Liq.	Non-Liq.	0.00
41.99	239.78	3.88	1.62	110	1.626	0.834	1.63	0.57	0.78	175.95	1.88		1	100	1.17	1.15	1.00	207.4	0.84	Infin.	0.000	0.574	Non-Liq.	Non-Liq.	0.00
42.16	274.29	3.22	1.17	110	1.630	0.832	1.18	0.53	0.80	205.09	1.74		1	100	1.06	1.15	1.00	218.5	0.84	Infin.	0.000	0.574	Non-Liq.	Non-Liq.	0.00
42.32	291.71	2.41	0.83	110	1.634	0.831	0.83	0.50	0.80	220.63	1.60		1	100	1.00	1.15	1.00	221.5	0.84	Infin.	0.000	0.574	Non-Liq.	Non-Liq.	0.00
42.49	285.46	2.18	0.76	110	1.638	0.829	0.77	0.50	0.80	215.62	1.59		1	100	1.00	1.15	1.00	216.4	0.84	Infin.	0.000	0.573	Non-Liq.	Non-Liq.	0.00
42.65	273.88	2.74	1.00	110	1.642	0.827	1.01	0.51	0.80	205.39	1.68		1	100	1.03	1.15	1.00	211.6	0.84	Infin.	0.000	0.573	Non-Liq.	Non-Liq.	0.00
42.81	343.04	4.15	1.21	110	1.646	0.826	1.21	0.51	0.80	257.35	1.68		1	100	1.02	1.15	1.00	264.6	0.84	Infin.	0.000	0.573	Non-Liq.	Non-Liq.	0.00
42.98	408.63	5.08	1.24	110	1.649	0.824	1.25	0.50	0.80	307.99	1.64		1	100	1.00	1.15	1.00	308.4	0.84	Infin.	0.000	0.573	Non-Liq.	Non-Liq.	0.00

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	**Liquefac. Safety Factor**	Probab. P_L	***Volumetric Strain (%)***
43.14	577.81	9.13	1.58	110	1.653	0.823	1.59	0.50	0.80	435.30	1.65		1	100	1.00	1.15	1.00	437.0	0.84	Infin.	0.000	0.572	**Non-Liq.**	Non-Liq.	**0.00**
43.31	597.92	9.45	1.58	110	1.657	0.821	1.58	0.50	0.80	450.30	1.64		1	100	1.00	1.15	1.00	452.0	0.84	Infin.	0.000	0.572	**Non-Liq.**	Non-Liq.	**0.00**
43.47	392.43	8.74	2.23	110	1.661	0.820	2.24	0.57	0.77	285.78	1.87		1	100	1.16	1.15	1.00	332.9	0.83	Infin.	0.000	0.572	**Non-Liq.**	Non-Liq.	**0.00**
43.64	395.33	5.19	1.31	110	1.665	0.818	1.32	0.51	0.79	295.31	1.67		1	100	1.02	1.15	1.00	302.0	0.83	Infin.	0.000	0.572	**Non-Liq.**	Non-Liq.	**0.00**
43.80	397.94	3.38	0.85	110	1.669	0.816	0.85	0.50	0.80	298.21	1.52		1	100	1.00	1.15	1.00	299.3	0.83	Infin.	0.000	0.571	**Non-Liq.**	Non-Liq.	**0.00**
43.96	401.09	1.69	0.42	110	1.673	0.815	0.42	0.50	0.80	300.23	1.30		1	100	1.00	1.15	1.00	301.4	0.83	Infin.	0.000	0.571	**Non-Liq.**	Non-Liq.	**0.00**
44.13	389.81	1.87	0.48	110	1.677	0.813	0.48	0.50	0.79	291.41	1.35		1	100	1.00	1.15	1.00	292.5	0.83	Infin.	0.000	0.571	**Non-Liq.**	Non-Liq.	**0.00**
44.29	358.36	1.92	0.53	110	1.681	0.811	0.54	0.50	0.79	267.48	1.41		1	100	1.00	1.15	1.00	268.5	0.83	Infin.	0.000	0.570	**Non-Liq.**	Non-Liq.	**0.00**
44.46	351.76	2.17	0.62	110	1.685	0.810	0.62	0.50	0.79	262.22	1.46		1	100	1.00	1.15	1.00	263.2	0.83	Infin.	0.000	0.570	**Non-Liq.**	Non-Liq.	**0.00**
44.62	367.06	3.54	0.96	110	1.689	0.808	0.97	0.50	0.79	273.36	1.59		1	100	1.00	1.15	1.00	274.4	0.83	Infin.	0.000	0.569	**Non-Liq.**	Non-Liq.	**0.00**
44.78	396.02	5.60	1.41	110	1.692	0.807	1.42	0.52	0.78	292.17	1.70		1	100	1.04	1.15	1.00	304.5	0.83	Infin.	0.000	0.569	**Non-Liq.**	Non-Liq.	**0.00**
44.95	497.62	0.00	0.00	110	1.696	0.805	0.00	0.80	0.68	320.55	2.66		0		1.00				0.91			0.569	**Non-Liq.**	Non-Liq.	**0.00**
45.11	534.51	0.00	0.00	110	1.700	0.803	0.00	0.81	0.68	342.84	2.68		0		1.00				0.91			0.568	**Non-Liq.**	Non-Liq.	**0.00**

CPT-LIQUEFY.XLS - A SPREADSHEET FOR EMPIRICAL ESTIMATION OF LIQUEFACTION POTENTIAL USING CPT DATA
Developed 2003 by Shelton L. Stringer, GE, Earth Systems Southwest

Project: Oxnard High School No. 8
Job No: 301953-001
Date: 8/14/2018
Sounding: CPT-5
Plot: 5

Methods: Liquefaction Analysis using 1998 NCEER workshop methods (Robertson & Wride)
Post-liquefaction Settlement Analysis from Tokimatsu & Seed (1987)
Dry Sand Settlement by Pradel, ASCE Journal of G&GE, Vol 124, No. 4

Total Liquefied Thickness (feet)
1.8

EARTHQUAKE INFORMATION:
Magnitude: 6.77 (7.5)
PGA, g: 0.97 (0.75)
MSF: 1.30
GWT, feet: 20.0
Design GWT, feet: 20.0

Induced CSR (M=7.5): = 0.65*PGA*(po/p'o)*rd/MSF
Clean Sand Qc1n = C_Q*K_C*K_H*Qc
SF = $CRR_{7.5}$*Kσ/CSR
Use Tokimatsu & Seed (0) or Ishihara &Yoshmine (1): 0
Unit Weight of unsaturated soils: 110 pcf
Unit Weight of saturated soils: 110 pcf
Limiting Ic for liquefiable soils: 2.60
Limiting Ic for K_H: 2.0
Required SF: 1.50
Min SF of Liquefiable Layers: 0.40
Avg SF of Liquefiable Layers: 0.03

Probab	Total Induced Subsidence (inches)
Avg	0
1%	0
Max	0
95%	0.2

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff. Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	*Volumetric Strain (%)*
0.16	7.20	0.07	0.96	110	0.009	1.000	0.96	0.82	1.70	11.55	2.69		0						1.00			0.485	Non-Liq.	Non-Liq.	0.00
0.33	11.97	0.11	0.92	110	0.018	1.000	0.92	0.75	1.70	19.20	2.49		1	8	2.70		1.00	51.9	1.00	0.093	0.093	0.485	Non-Liq.	Non-Liq.	0.00
0.49	16.98	0.15	0.86	110	0.027	1.000	0.86	0.71	1.70	27.24	2.34		1	23	2.08		1.00	56.7	1.00	0.097	0.097	0.485	Non-Liq.	Non-Liq.	0.00
0.66	18.41	0.17	0.90	110	0.036	1.000	0.90	0.70	1.70	29.52	2.32		1	26	2.01		1.00	59.5	1.00	0.100	0.100	0.485	Non-Liq.	Non-Liq.	0.00
0.82	16.13	0.16	1.01	110	0.045	1.000	1.01	0.73	1.70	25.85	2.40		1	21	2.29		1.00	59.2	1.00	0.099	0.099	0.485	Non-Liq.	Non-Liq.	0.00
0.98	12.95	0.14	1.06	110	0.054	1.000	1.06	0.75	1.70	20.72	2.49		1	12	2.71		1.00	56.1	1.00	0.096	0.096	0.485	Non-Liq.	Non-Liq.	0.00
1.15	10.49	0.11	1.05	110	0.063	0.999	1.05	0.78	1.70	16.75	2.57		1	3	3.13		1.00	52.5	1.00	0.093	0.093	0.484	Non-Liq.	Non-Liq.	0.00
1.31	10.49	0.11	1.05	110	0.072	0.999	1.06	0.78	1.70	16.74	2.57		1	3	3.13		1.00	52.5	1.00	0.093	0.093	0.484	Non-Liq.	Non-Liq.	0.00
1.48	9.50	0.14	1.52	110	0.081	0.999	1.53	0.81	1.70	15.13	2.69		0						1.00			0.484	Non-Liq.	Non-Liq.	0.00
1.64	11.89	0.21	1.77	110	0.090	0.998	1.79	0.80	1.70	18.96	2.64		0						1.00			0.484	Non-Liq.	Non-Liq.	0.00
1.80	17.29	0.33	1.93	110	0.099	0.998	1.94	0.77	1.70	27.62	2.53		1	23	2.91		1.00	80.4	1.00	0.128	0.128	0.484	Non-Liq.	Non-Liq.	0.00
1.97	29.55	0.52	1.75	110	0.108	0.998	1.76	0.70	1.70	47.31	2.32		1	46	2.00		1.00	94.8	1.00	0.159	0.159	0.484	Non-Liq.	Non-Liq.	0.00
2.13	29.26	0.52	1.76	110	0.117	0.997	1.77	0.70	1.70	46.83	2.32		1	45	2.02		1.00	94.6	1.00	0.159	0.159	0.483	Non-Liq.	Non-Liq.	0.00
2.30	27.77	0.48	1.74	110	0.126	0.997	1.75	0.71	1.70	44.42	2.34		1	43	2.07		1.00	92.1	1.00	0.153	0.153	0.483	Non-Liq.	Non-Liq.	0.00
2.46	25.48	0.44	1.74	110	0.135	0.996	1.75	0.72	1.70	40.72	2.37		1	40	2.18		1.00	88.8	1.00	0.145	0.145	0.483	Non-Liq.	Non-Liq.	0.00
2.62	22.54	0.40	1.76	110	0.144	0.996	1.77	0.73	1.70	35.99	2.41		1	34	2.36		1.00	85.1	1.00	0.137	0.137	0.483	Non-Liq.	Non-Liq.	0.00
2.79	20.15	0.37	1.83	110	0.153	0.996	1.85	0.75	1.70	32.13	2.46		1	30	2.58		1.00	83.0	1.00	0.133	0.133	0.483	Non-Liq.	Non-Liq.	0.00
2.95	17.63	0.42	2.37	110	0.162	0.995	2.39	0.78	1.70	28.07	2.58		1	24	3.19		1.00	89.5	1.00	0.147	0.147	0.482	Non-Liq.	Non-Liq.	0.00
3.12	13.94	0.43	3.06	110	0.171	0.995	3.10	0.83	1.70	22.12	2.73		0						1.00			0.482	Non-Liq.	Non-Liq.	0.00
3.28	11.33	0.42	3.69	110	0.180	0.994	3.75	0.86	1.70	17.92	2.85		0						1.00			0.482	Non-Liq.	Non-Liq.	0.00
3.44	10.79	0.35	3.27	110	0.189	0.994	3.33	0.86	1.70	17.03	2.84		0						1.00			0.482	Non-Liq.	Non-Liq.	0.00
3.61	19.14	0.32	1.69	110	0.198	0.994	1.71	0.75	1.70	30.44	2.46		1	27	2.58		1.00	78.4	1.00	0.125	0.125	0.482	Non-Liq.	Non-Liq.	0.00
3.77	28.87	0.35	1.20	110	0.208	0.993	1.21	0.68	1.70	46.06	2.23		1	45	1.74		1.00	79.9	1.00	0.127	0.127	0.482	Non-Liq.	Non-Liq.	0.00
3.94	37.13	0.44	1.18	110	0.217	0.993	1.19	0.65	1.70	59.31	2.13		1	55	1.52		1.00	90.2	1.00	0.148	0.148	0.481	Non-Liq.	Non-Liq.	0.00
4.10	42.19	0.52	1.24	110	0.226	0.993	1.25	0.64	1.70	67.43	2.10		1	60	1.46		1.00	98.5	1.00	0.169	0.169	0.481	Non-Liq.	Non-Liq.	0.00
4.27	42.88	0.62	1.43	110	0.235	0.992	1.44	0.65	1.70	68.52	2.14		1	61	1.53		1.00	104.7	1.00	0.187	0.187	0.481	Non-Liq.	Non-Liq.	0.00
4.43	42.87	0.65	1.51	110	0.244	0.992	1.52	0.65	1.70	68.49	2.15		1	61	1.56		1.00	106.9	1.00	0.194	0.194	0.481	Non-Liq.	Non-Liq.	0.00
4.59	43.05	0.62	1.44	110	0.253	0.991	1.44	0.65	1.70	68.77	2.14		1	61	1.53		1.00	105.0	1.00	0.188	0.188	0.481	Non-Liq.	Non-Liq.	0.00
4.76	40.55	0.64	1.58	110	0.262	0.991	1.59	0.66	1.70	64.74	2.18		1	59	1.63		1.00	105.4	1.00	0.189	0.189	0.480	Non-Liq.	Non-Liq.	0.00
4.92	37.17	0.59	1.58	110	0.271	0.991	1.60	0.67	1.70	59.29	2.21		1	55	1.70		1.00	101.0	1.00	0.176	0.176	0.480	Non-Liq.	Non-Liq.	0.00
5.09	45.41	0.55	1.21	110	0.280	0.990	1.22	0.63	1.70	72.52	2.07		1	63	1.41		1.00	102.1	1.00	0.179	0.179	0.480	Non-Liq.	Non-Liq.	0.00
5.25	49.21	0.55	1.12	110	0.289	0.990	1.13	0.62	1.70	78.61	2.02		1	67	1.33		1.00	104.9	1.00	0.187	0.187	0.480	Non-Liq.	Non-Liq.	0.00
5.41	48.56	0.56	1.16	110	0.298	0.989	1.16	0.62	1.70	77.55	2.04		1	66	1.35		1.00	104.9	1.00	0.187	0.187	0.480	Non-Liq.	Non-Liq.	0.00
5.58	48.19	0.59	1.22	110	0.307	0.989	1.23	0.62	1.70	76.94	2.06		1	66	1.38		1.00	106.1	1.00	0.191	0.191	0.479	Non-Liq.	Non-Liq.	0.00
5.74	48.82	0.59	1.20	110	0.316	0.989	1.21	0.62	1.70	77.94	2.05		1	66	1.37		1.00	106.5	1.00	0.192	0.192	0.479	Non-Liq.	Non-Liq.	0.00
5.91	49.59	0.58	1.17	110	0.325	0.988	1.18	0.62	1.70	79.16	2.03		1	67	1.35		1.00	106.6	1.00	0.193	0.193	0.479	Non-Liq.	Non-Liq.	0.00
6.07	49.01	0.58	1.19	110	0.334	0.988	1.19	0.62	1.70	78.21	2.04		1	67	1.36		1.00	106.2	1.00	0.191	0.191	0.479	Non-Liq.	Non-Liq.	0.00
6.23	48.87	0.58	1.19	110	0.343	0.988	1.20	0.62	1.70	77.97	2.04		1	67	1.36		1.00	106.2	1.00	0.191	0.191	0.479	Non-Liq.	Non-Liq.	0.00
6.40	48.92	0.59	1.20	110	0.352	0.987	1.21	0.62	1.70	78.04	2.05		1	67	1.37		1.00	106.5	1.00	0.192	0.192	0.479	Non-Liq.	Non-Liq.	0.00
6.56	50.19	0.62	1.23	110	0.361	0.987	1.24	0.62	1.70	80.07	2.04		1	68	1.36		1.00	109.1	1.00	0.201	0.201	0.478	Non-Liq.	Non-Liq.	0.00
6.73	54.54	0.64	1.17	110	0.370	0.986	1.17	0.61	1.70	87.04	2.00		1	71	1.30		1.00	113.3	1.00	0.215	0.215	0.478	Non-Liq.	Non-Liq.	0.00
6.89	60.79	0.78	1.29	110	0.379	0.986	1.29	0.61	1.70	97.07	1.99		1	76	1.29	0.90	1.02	127.9	1.00	0.275	0.275	0.478	Non-Liq.	Non-Liq.	0.00
7.05	70.21	1.20	1.71	110	0.388	0.986	1.72	0.62	1.70	112.19	2.03		1	82	1.35		1.00	151.2	1.00	0.401	0.401	0.478	Non-Liq.	Non-Liq.	0.00
7.22	86.10	1.28	1.49	110	0.397	0.985	1.49	0.59	1.70	137.71	1.93		1	90	1.22	1.00	1.00	168.1	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.38	112.25	1.15	1.02	110	0.406	0.985	1.02	0.53	1.66	175.45	1.74		1	100	1.06	1.05	1.00	187.1	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.55	123.77	1.31	1.06	110	0.415	0.985	1.06	0.52	1.63	190.49	1.72		1	100	1.05	1.10	1.00	201.3	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
7.71	123.77	1.31	1.06	110	0.424	0.984	1.06	0.53	1.62	188.51	1.73		1	100	1.05	1.15	1.00	199.6	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
7.87	137.24	1.24	0.90	110	0.433	0.984	0.90	0.50	1.57	202.88	1.65		1	100	1.01	1.20	1.00	204.9	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
8.04	143.26	1.17	0.82	110	0.442	0.984	0.82	0.50	1.55	208.83	1.61		1	100	1.00	1.25	1.00	209.6	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
8.20	133.59	0.95	0.71	110	0.451	0.983	0.72	0.50	1.53	192.72	1.60		1	100	1.00	1.30	1.00	193.4	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
8.37	119.63	0.65	0.54	110	0.460	0.983	0.54	0.50	1.52	170.80	1.56		1	99	1.00	1.35	1.00	171.4	1.00	Infin.	0.000	0.476	Non-Liq.	Non-Liq.	0.00
8.53	108.61	0.64	0.59	110	0.469	0.982	0.59	0.50	1.50	153.49	1.62		1	95	1.00	1.40	1.00	154.1	1.00	0.420	0.420	0.476	Non-Liq.	Non-Liq.	0.00
8.69	97.77	0.53	0.54	110	0.478	0.982	0.54	0.50	1.49	136.81	1.64		1	90	1.00	1.45	1.00	136.9	1.00	0.318	0.318	0.476	Non-Liq.	Non-Liq.	0.00
8.86	91.00	0.48	0.52	110	0.487	0.982	0.53	0.51	1.48	126.66	1.66		1	87	1.01	1.50	1.00	128.5	1.00	0.277	0.277	0.476	Non-Liq.	Non-Liq.	0.00
9.02	88.06	0.54	0.61	110	0.496	0.981	0.62	0.52	1.48	122.80	1.71		1	85	1.05	1.55	1.00	128.8	1.00	0.279	0.279	0.476	Non-Liq.	Non-Liq.	0.00
9.19	80.39	0.53	0.66	110	0.505	0.981	0.66	0.54	1.49	112.21	1.76		1	82	1.08	1.60	1.00	121.5	1.00	0.247	0.247	0.476	Non-Liq.	Non-Liq.	0.00
9.35	57.91	0.50	0.87	110	0.514	0.981	0.88	0.59	1.53	83.01	1.94		1	69	1.23	1.65	1.00	102.3	1.00	0.180	0.180	0.475	Non-Liq.	Non-Liq.	0.00
9.51	67.62	0.54	0.79	110	0.523	0.980	0.80	0.57	1.49	94.64	1.87		1	75	1.16	1.70	1.00	110.3	1.00	0.205	0.205	0.475	Non-Liq.	Non-Liq.	0.00
9.68	67.40	0.52	0.77	110	0.532	0.980	0.78	0.57	1.48	93.34	1.87		1	74	1.16	1.75	1.00	108.5	1.00	0.199	0.199	0.475	Non-Liq.	Non-Liq.	0.00
9.84	67.98	0.51	0.75	110	0.541	0.980	0.76	0.57	1.46	93.14	1.86		1	74	1.15	1.80	1.00	107.8	1.00	0.197	0.197	0.475	Non-Liq.	Non-Liq.	0.00
10.01	65.93	0.45	0.68	110	0.550	0.979	0.69	0.56	1.44	89.29	1.85		1	72	1.15	1.85	1.00	102.7	1.00	0.181	0.181	0.475	Non-Liq.	Non-Liq.	0.00
10.17	65.84	0.44	0.67	110	0.559	0.979	0.68	0.56	1.43	88.34	1.85		1	72	1.15	1.90	1.00	101.6	1.00	0.178	0.178	0.475	Non-Liq.	Non-Liq.	0.00
10.33	64.79	0.46	0.70	110	0.568	0.979	0.71	0.57	1.42	86.44	1.87		1	71	1.16	1.95	1.00	100.8	1.00	0.175	0.175	0.474	Non-Liq.	Non-Liq.	0.00
10.50	65.15	0.49	0.74	110	0.577	0.978	0.75	0.57	1.42	86.37	1.88		1	71	1.17	2.00	1.00	101.9	1.00	0.178	0.178	0.474	Non-Liq.	Non-Liq.	0.00
10.66	65.57	0.48	0.74	110	0.586	0.978	0.74	0.57	1.40	86.12	1.88		1	71	1.17	2.05	1.00	101.4	1.00	0.177	0.177	0.474	Non-Liq.	Non-Liq.	0.00
10.83	66.76	0.49	0.73	110	0.595	0.978	0.74	0.57	1.39	86.85	1.88		1	71	1.17	2.10	1.00	101.9	1.00	0.178	0.178	0.474	Non-Liq.	Non-Liq.	0.00
10.99	69.51	0.50	0.72	110	0.604	0.977	0.73	0.57	1.37	89.46	1.86		1	72	1.16	2.15	1.00	103.8	1.00	0.184	0.184	0.474	Non-Liq.	Non-Liq.	0.00
11.15	72.61	0.54	0.74	110	0.614	0.977	0.74	0.57	1.36	92.59	1.86		1	74	1.15	2.20	1.00	107.0	1.00	0.194	0.194	0.474	Non-Liq.	Non-Liq.	0.00
11.32	77.76	0.57	0.73	110	0.623	0.977	0.73	0.56	1.34	98.03	1.83		1	76	1.13	2.25	1.00	111.4	1.00	0.209	0.209	0.473	Non-Liq.	Non-Liq.	0.00
11.48	84.82	0.65	0.76	110	0.632	0.976	0.77	0.55	1.33	105.90	1.82		1	79	1.12	2.30	1.00	119.2	1.00	0.238	0.238	0.473	Non-Liq.	Non-Liq.	0.00
11.65	92.40	0.51	0.55	110	0.641	0.976	0.56	0.52	1.30	112.72	1.72		1	82	1.05	2.35	1.00	118.6	1.00	0.235	0.235	0.473	Non-Liq.	Non-Liq.	0.00
11.81	100.55	0.65	0.64	110	0.650	0.975	0.65	0.53	1.29	122.02	1.73		1	85	1.06	2.40	1.00	129.2	1.00	0.281	0.281	0.473	Non-Liq.	Non-Liq.	0.00
11.98	108.89	0.74	0.67	110	0.659	0.975	0.68	0.52	1.28	131.02	1.71		1	88	1.05	2.45	1.00	137.7	1.00	0.323	0.323	0.473	Non-Liq.	Non-Liq.	0.00
12.14	120.07	0.79	0.66	110	0.668	0.975	0.66	0.51	1.27	142.80	1.68		1	92	1.02	2.50	1.00	146.6	1.00	0.373	0.373	0.473	Non-Liq.	Non-Liq.	0.00
12.30	132.01	0.89	0.68	110	0.677	0.974	0.68	0.50	1.25	155.55	1.66		1	95	1.01	2.55	1.00	157.3	1.00	0.442	0.442	0.472	Non-Liq.	Non-Liq.	0.00
12.47	144.08	1.04	0.72	110	0.686	0.974	0.72	0.50	1.24	168.48	1.65		1	98	1.00	2.60	1.00	169.2	1.00	Infin.	0.000	0.472	Non-Liq.	Non-Liq.	0.00
12.63	152.23	1.19	0.78	110	0.695	0.974	0.79	0.50	1.24	177.08	1.65		1	100	1.01	2.65	1.00	178.9	1.00	Infin.	0.000	0.472	Non-Liq.	Non-Liq.	0.00
12.80	162.83	1.20	0.74	110	0.704	0.973	0.74	0.50	1.23	187.89	1.62		1	100	1.00	2.70	1.00	188.6	1.00	Infin.	0.000	0.472	Non-Liq.	Non-Liq.	0.00

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	K_σ	$CRR_{7.5}$	Induced EQ CRR	M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
12.96	177.02	1.56	0.88	110	0.713	0.973	0.88	0.50	1.22	203.18	1.65		1	100	1.00	2.75	1.00	204.1	1.00	Infin.	0.000	0.472	Non-Liq.	Non-Liq.	0.00
13.12	188.21	1.70	0.90	110	0.722	0.973	0.90	0.50	1.21	214.55	1.64		1	100	1.00	2.80	1.00	215.4	1.00	Infin.	0.000	0.472	Non-Liq.	Non-Liq.	0.00
13.29	199.52	1.82	0.91	110	0.731	0.972	0.92	0.50	1.20	226.07	1.63		1	100	1.00	2.85	1.00	226.9	1.00	Infin.	0.000	0.471	Non-Liq.	Non-Liq.	0.00
13.45	206.33	1.96	0.95	110	0.740	0.972	0.95	0.50	1.20	232.38	1.63		1	100	1.00	2.90	1.00	233.2	1.00	Infin.	0.000	0.471	Non-Liq.	Non-Liq.	0.00
13.62	209.22	1.92	0.92	110	0.749	0.972	0.92	0.50	1.19	234.21	1.62		1	100	1.00	2.95	1.00	235.1	1.00	Infin.	0.000	0.471	Non-Liq.	Non-Liq.	0.00
13.78	216.92	2.11	0.97	110	0.758	0.971	0.98	0.50	1.18	241.40	1.63		1	100	1.00	3.00	1.00	242.3	1.00	Infin.	0.000	0.471	Non-Liq.	Non-Liq.	0.00
13.94	220.68	1.88	0.85	110	0.767	0.971	0.85	0.50	1.17	244.14	1.58		1	100	1.00	3.05	1.00	245.1	1.00	Infin.	0.000	0.471	Non-Liq.	Non-Liq.	0.00
14.11	225.50	2.72	1.21	110	0.776	0.971	1.21	0.51	1.17	249.15	1.69		1	100	1.03	3.10	1.00	257.6	1.00	Infin.	0.000	0.471	Non-Liq.	Non-Liq.	0.00
14.27	226.97	2.77	1.22	110	0.785	0.970	1.22	0.52	1.17	249.35	1.69		1	100	1.03	3.15	1.00	258.3	1.00	Infin.	0.000	0.470	Non-Liq.	Non-Liq.	0.00
14.44	260.76	3.44	1.32	110	0.794	0.970	1.32	0.51	1.16	284.70	1.68		1	100	1.03	3.20	1.00	293.3	1.00	Infin.	0.000	0.470	Non-Liq.	Non-Liq.	0.00
14.60	273.34	5.44	1.99	110	0.803	0.970	2.00	0.55	1.16	300.02	1.82		1	100	1.12	3.25	1.00	336.8	1.00	Infin.	0.000	0.470	Non-Liq.	Non-Liq.	0.00
14.76	293.55	5.65	1.92	110	0.812	0.969	1.93	0.54	1.15	319.57	1.79		1	100	1.10	3.30	1.00	352.3	1.00	Infin.	0.000	0.470	Non-Liq.	Non-Liq.	0.00
14.93	441.40	7.59	1.72	110	0.821	0.969	1.72	0.51	1.14	473.40	1.66		1	100	1.01	3.35	1.00	479.8	1.00	Infin.	0.000	0.470	Non-Liq.	Non-Liq.	0.00
15.09	347.82	7.25	2.09	110	0.830	0.969	2.09	0.54	1.14	374.13	1.78		1	100	1.09	3.40	1.00	410.8	1.00	Infin.	0.000	0.470	Non-Liq.	Non-Liq.	0.00
15.26	302.88	7.87	2.60	110	0.839	0.968	2.61	0.58	1.14	326.31	1.90		1	100	1.18	3.45	1.00	387.9	1.00	Infin.	0.000	0.469	Non-Liq.	Non-Liq.	0.00
15.42	275.99	6.43	2.33	110	0.848	0.968	2.34	0.57	1.13	295.07	1.88		1	100	1.17	3.50	1.00	346.0	1.00	Infin.	0.000	0.469	Non-Liq.	Non-Liq.	0.00
15.58	376.75	5.16	1.37	110	0.857	0.967	1.37	0.50	1.11	394.73	1.61		1	100	1.00	3.55	1.00	396.2	1.00	Infin.	0.000	0.469	Non-Liq.	Non-Liq.	0.00
15.75	321.62	5.68	1.76	110	0.866	0.967	1.77	0.53	1.11	337.17	1.74		1	100	1.07	3.60	1.00	361.3	1.00	Infin.	0.000	0.469	Non-Liq.	Non-Liq.	0.00
15.91	321.75	3.28	1.02	110	0.875	0.967	1.02	0.50	1.10	333.46	1.55		1	100	1.00	3.65	1.00	334.7	1.00	Infin.	0.000	0.469	Non-Liq.	Non-Liq.	0.00
16.08	344.32	3.11	0.90	110	0.884	0.966	0.90	0.50	1.09	355.08	1.49		1	100	1.00	3.70	1.00	356.4	1.00	Infin.	0.000	0.468	Non-Liq.	Non-Liq.	0.00
16.24	348.92	2.94	0.84	110	0.893	0.966	0.84	0.50	1.09	358.01	1.47		1	100	1.00	3.75	1.00	359.3	1.00	Infin.	0.000	0.468	Non-Liq.	Non-Liq.	0.00
16.40	351.59	2.77	0.79	110	0.902	0.966	0.79	0.50	1.08	358.94	1.44		1	100	1.00	3.80	1.00	360.3	1.00	Infin.	0.000	0.468	Non-Liq.	Non-Liq.	0.00
16.57	366.52	2.53	0.69	110	0.911	0.965	0.69	0.50	1.08	372.35	1.39		1	100	1.00	3.85	1.00	373.7	1.00	Infin.	0.000	0.468	Non-Liq.	Non-Liq.	0.00
16.73	381.08	3.05	0.80	110	0.920	0.965	0.80	0.50	1.07	385.27	1.43		1	100	1.00	3.90	1.00	386.7	1.00	Infin.	0.000	0.468	Non-Liq.	Non-Liq.	0.00
16.90	413.82	3.60	0.87	110	0.929	0.965	0.87	0.50	1.07	416.40	1.44		1	100	1.00	3.95	1.00	418.0	1.00	Infin.	0.000	0.468	Non-Liq.	Non-Liq.	0.00
17.06	452.15	4.24	0.94	110	0.938	0.964	0.94	0.50	1.06	452.86	1.44		1	100	1.00	4.00	1.00	454.6	1.00	Infin.	0.000	0.467	Non-Liq.	Non-Liq.	0.00
17.22	427.40	3.95	0.92	110	0.947	0.964	0.93	0.50	1.06	425.97	1.45		1	100	1.00	4.05	1.00	427.6	1.00	Infin.	0.000	0.467	Non-Liq.	Non-Liq.	0.00
17.39	404.51	3.69	0.91	110	0.956	0.963	0.91	0.50	1.05	401.19	1.46		1	100	1.00	4.10	1.00	402.7	1.00	Infin.	0.000	0.467	Non-Liq.	Non-Liq.	0.00
17.55	425.81	4.21	0.99	110	0.965	0.963	0.99	0.50	1.05	420.37	1.48		1	100	1.00	4.15	1.00	421.9	1.00	Infin.	0.000	0.467	Non-Liq.	Non-Liq.	0.00
17.72	438.64	4.22	0.96	110	0.974	0.963	0.96	0.50	1.04	431.05	1.47		1	100	1.00	4.20	1.00	432.7	1.00	Infin.	0.000	0.467	Non-Liq.	Non-Liq.	0.00
17.88	461.57	3.57	0.77	110	0.983	0.962	0.78	0.50	1.04	451.54	1.38		1	100	1.00	4.25	1.00	453.2	1.00	Infin.	0.000	0.467	Non-Liq.	Non-Liq.	0.00
18.04	498.99	4.53	0.91	110	0.992	0.962	0.91	0.50	1.03	485.99	1.42		1	100	1.00	4.30	1.00	487.8	1.00	Infin.	0.000	0.466	Non-Liq.	Non-Liq.	0.00
18.21	579.29	5.58	0.96	110	1.001	0.962	0.96	0.50	1.03	561.80	1.40		1	100	1.00	4.35	1.00	563.9	1.00	Infin.	0.000	0.466	Non-Liq.	Non-Liq.	0.00
18.37	590.35	3.67	0.62	110	1.010	0.961	0.62	0.50	1.02	569.97	1.24		1	100	1.00	4.40	1.00	572.1	1.00	Infin.	0.000	0.466	Non-Liq.	Non-Liq.	0.00
18.54	576.43	4.80	0.83	110	1.020	0.961	0.83	0.50	1.02	554.03	1.35		1	100	1.00	4.45	1.00	556.1	1.00	Infin.	0.000	0.466	Non-Liq.	Non-Liq.	0.00
18.70	606.56	5.65	0.93	110	1.029	0.960	0.93	0.50	1.01	580.47	1.38		1	100	1.00	4.50	1.00	582.6	1.00	Infin.	0.000	0.466	Non-Liq.	Non-Liq.	0.00
18.86	565.11	6.10	1.08	110	1.038	0.960	1.08	0.50	1.01	538.37	1.46		1	100	1.00	4.55	1.00	540.4	1.00	Infin.	0.000	0.465	Non-Liq.	Non-Liq.	0.00
19.03	544.74	8.59	1.58	110	1.047	0.960	1.58	0.50	1.01	516.68	1.61		1	100	1.00	4.60	1.00	518.6	1.00	Infin.	0.000	0.465	Non-Liq.	Non-Liq.	0.00
19.19	567.96	6.47	1.14	110	1.056	0.959	1.14	0.50	1.00	536.43	1.48		1	100	1.00	4.65	1.00	538.4	1.00	Infin.	0.000	0.465	Non-Liq.	Non-Liq.	0.00
19.36	526.36	6.42	1.22	110	1.065	0.959	1.22	0.50	1.00	494.95	1.52		1	100	1.00	4.70	1.00	496.8	1.00	Infin.	0.000	0.465	Non-Liq.	Non-Liq.	0.00
19.52	450.76	4.60	1.02	110	1.074	0.958	1.02	0.50	0.99	421.92	1.49		1	100	1.00	4.75	1.00	423.5	0.99	Infin.	0.000	0.465	Non-Liq.	Non-Liq.	0.00
19.69	418.45	3.90	0.93	110	1.083	0.958	0.94	0.50	0.99	389.97	1.48		1	100	1.00	4.80	1.00	391.4	0.99	Infin.	0.000	0.464	Non-Liq.	Non-Liq.	0.00
19.85	376.34	3.82	1.02	110	1.092	0.957	1.02	0.50	0.98	349.16	1.54		1	100	1.00	4.85	1.00	350.5	0.99	Infin.	0.000	0.464	Non-Liq.	Non-Liq.	0.00
20.01	355.23	3.87	1.09	110	1.101	0.957	1.09	0.50	0.98	328.16	1.58		1	100	1.00	4.90	1.00	329.4	0.98	Infin.	0.000	0.464	Non-Liq.	Non-Liq.	0.00
20.18	380.08	4.45	1.17	110	1.107	0.957	1.17	0.50	0.98	350.22	1.59		1	100	1.00	4.95	1.00	351.5	0.98	Infin.	0.000	0.465	Non-Liq.	Non-Liq.	0.00
20.34	440.83	4.85	1.10	110	1.111	0.956	1.10	0.50	0.98	405.64	1.53		1	100	1.00	5.00	1.00	407.2	0.98	Infin.	0.000	0.467	Non-Liq.	Non-Liq.	0.00
20.51	486.23	4.83	0.99	110	1.115	0.956	1.00	0.50	0.97	446.73	1.47		1	100	1.00	5.05	1.00	448.4	0.98	Infin.	0.000	0.469	Non-Liq.	Non-Liq.	0.00
20.67	520.20	4.75	0.91	110	1.118	0.955	0.92	0.50	0.97	477.17	1.42		1	100	1.00	5.10	1.00	479.0	0.98	Infin.	0.000	0.471	Non-Liq.	Non-Liq.	0.00
20.83	532.02	4.83	0.91	110	1.122	0.955	0.91	0.50	0.97	487.19	1.41		1	100	1.00	5.15	1.00	489.0	0.98	Infin.	0.000	0.473	Non-Liq.	Non-Liq.	0.00
21.00	551.58	5.24	0.95	110	1.126	0.954	0.95	0.50	0.97	504.26	1.42		1	100	1.00	5.20	1.00	506.1	0.98	Infin.	0.000	0.474	Non-Liq.	Non-Liq.	0.00
21.16	555.09	5.57	1.00	110	1.130	0.954	1.00	0.50	0.97	506.59	1.44		1	100	1.00	5.25	1.00	508.5	0.97	Infin.	0.000	0.476	Non-Liq.	Non-Liq.	0.00
21.33	541.40	4.23	0.78	110	1.134	0.954	0.78	0.50	0.97	493.22	1.36		1	100	1.00	5.30	1.00	495.1	0.97	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
21.49	529.93	3.90	0.74	110	1.138	0.953	0.74	0.50	0.96	481.91	1.34		1	100	1.00	5.35	1.00	483.7	0.97	Infin.	0.000	0.480	Non-Liq.	Non-Liq.	0.00
21.65	514.51	3.55	0.69	110	1.142	0.953	0.69	0.50	0.96	467.06	1.33		1	100	1.00	5.40	1.00	468.8	0.97	Infin.	0.000	0.482	Non-Liq.	Non-Liq.	0.00
21.82	465.36	3.51	0.75	110	1.146	0.952	0.76	0.50	0.96	421.62	1.39		1	100	1.00	5.45	1.00	423.2	0.97	Infin.	0.000	0.483	Non-Liq.	Non-Liq.	0.00
21.98	477.52	3.41	0.71	110	1.150	0.952	0.72	0.50	0.96	431.92	1.36		1	100	1.00	5.50	1.00	433.5	0.97	Infin.	0.000	0.485	Non-Liq.	Non-Liq.	0.00
22.15	498.55	3.95	0.79	110	1.154	0.951	0.79	0.50	0.96	450.22	1.39		1	100	1.00	5.55	1.00	451.9	0.97	Infin.	0.000	0.487	Non-Liq.	Non-Liq.	0.00
22.31	488.77	4.36	0.89	110	1.158	0.951	0.89	0.50	0.96	440.62	1.43		1	100	1.00	5.60	1.00	442.3	0.96	Infin.	0.000	0.489	Non-Liq.	Non-Liq.	0.00
22.47	467.81	4.12	0.88	110	1.161	0.950	0.88	0.50	0.95	420.97	1.44		1	100	1.00	5.65	1.00	422.5	0.96	Infin.	0.000	0.490	Non-Liq.	Non-Liq.	0.00
22.64	430.22	3.45	0.80	110	1.165	0.950	0.80	0.50	0.95	386.41	1.43		1	100	1.00	5.70	1.00	387.9	0.96	Infin.	0.000	0.492	Non-Liq.	Non-Liq.	0.00
22.80	388.20	3.02	0.78	110	1.169	0.949	0.78	0.50	0.95	347.98	1.45		1	100	1.00	5.75	1.00	349.3	0.96	Infin.	0.000	0.494	Non-Liq.	Non-Liq.	0.00
22.97	382.78	2.72	0.71	110	1.173	0.949	0.71	0.50	0.95	342.53	1.42		1	100	1.00	5.80	1.00	343.8	0.96	Infin.	0.000	0.495	Non-Liq.	Non-Liq.	0.00
23.13	356.17	2.68	0.75	110	1.177	0.948	0.75	0.50	0.95	318.11	1.46		1	100	1.00	5.85	1.00	319.3	0.96	Infin.	0.000	0.497	Non-Liq.	Non-Liq.	0.00
23.29	356.43	2.35	0.66	110	1.181	0.948	0.66	0.50	0.95	317.81	1.42		1	100	1.00	5.90	1.00	319.0	0.96	Infin.	0.000	0.498	Non-Liq.	Non-Liq.	0.00
23.46	343.88	1.99	0.58	110	1.185	0.947	0.58	0.50	0.94	306.08	1.39		1	100	1.00	5.95	1.00	307.2	0.96	Infin.	0.000	0.500	Non-Liq.	Non-Liq.	0.00
23.62	344.88	1.60	0.46	110	1.189	0.947	0.47	0.50	0.94	306.46	1.33		1	100	1.00	6.00	1.00	307.6	0.95	Infin.	0.000	0.502	Non-Liq.	Non-Liq.	0.00
23.79	352.04	1.86	0.53	110	1.193	0.946	0.53	0.50	0.94	312.33	1.36		1	100	1.00	6.05	1.00	313.5	0.95	Infin.	0.000	0.503	Non-Liq.	Non-Liq.	0.00
23.95	379.12	2.56	0.68	110	1.197	0.946	0.68	0.50	0.94	335.89	1.41		1	100	1.00	6.10	1.00	337.1	0.95	Infin.	0.000	0.505	Non-Liq.	Non-Liq.	0.00
24.11	381.50	2.41	0.63	110	1.200	0.945	0.63	0.50	0.94	337.45	1.39		1	100	1.00	6.15	1.00	338.7	0.95	Infin.	0.000	0.506	Non-Liq.	Non-Liq.	0.00
24.28	382.45	2.59	0.68	110	1.204	0.945	0.68	0.50	0.94	337.74	1.41		1	100	1.00	6.20	1.00	339.0	0.95	Infin.	0.000	0.508	Non-Liq.	Non-Liq.	0.00
24.44	362.80	2.22	0.61	110	1.208	0.944	0.61	0.50	0.94	319.81	1.40		1	100	1.00	6.25	1.00	321.0	0.95	Infin.	0.000	0.509	Non-Liq.	Non-Liq.	0.00
24.61	345.67	1.84	0.53	110	1.212	0.943	0.53	0.50	0.93	304.16	1.37		1	100	1.00	6.30	1.00	305.3	0.95	Infin.	0.000	0.511	Non-Liq.	Non-Liq.	0.00
24.77	352.36	1.35	0.38	110	1.216	0.943	0.39	0.50	0.93	309.57	1.27		1	100	1.00	6.35	1.00	310.7	0.95	Infin.	0.000	0.512	Non-Liq.	Non-Liq.	0.00
24.93	361.66	1.81	0.50	110	1.220	0.942	0.50	0.50	0.93	317.26	1.34		1	100	1.00	6.40	1.00	318.4	0.94	Infin.	0.000	0.514	Non-Liq.	Non-Liq.	0.00
25.10	368.75	1.84	0.50	110	1.224	0.942	0.50	0.50	0.93	322.98	1.33		1	100	1.00	6.45	1.00	324.2	0.94	Infin.	0.000	0.515	Non-Liq.	Non-Liq.	0.00
25.26	366.01	1.90	0.52	110	1.228	0.941	0.52	0.50	0.93	320.06	1.35		1	100	1.00	6.50	1.00	321.3	0.94	Infin.	0.000	0.516	Non-Liq.	Non-Liq.	0.00
25.43	371.63	1.81	0.49	110	1.232	0.941	0.49	0.50	0.93	324.47	1.32		1	100	1.00	6.55	1.00	325.7	0.94	Infin.	0.000	0.518	Non-Liq.	Non-Liq.	0.00
25.59	377.11	1.91	0.51	110	1.236	0.940	0.51	0.50	0.93	328.74	1.33		1	100	1.00	6.60	1.00	330.0	0.94	Infin.	0.000	0.519	Non-Liq.	Non-Liq.	0.00
25.75	376.28	2.06	0.55	110	1.240	0.939	0.55	0.50	0.92	327.50	1.35		1	100	1.00	6.65	1.00	328.7	0.94	Infin.	0.000	0.520	Non-Liq.	Non-Liq.	0.00
25.92	388.18	2.48	0.64	110	1.243	0.939	0.64	0.50	0.92	337.36	1.39		1	100	1.00	6.70	1.00	338.6	0.94	Infin.	0.000	0.522	Non-Liq.	Non-Liq.	0.00
26.08	387.53	2.18	0.56	110	1.247	0.938	0.57	0.50	0.92	336.26	1.35		1	100	1.00	6.75	1.00	337.5	0.94	Infin.	0.000	0.523	Non-Liq.	Non-Liq.	0.00
26.25	390.12	1.95	0.50	110	1.251	0.938	0.50	0.50	0.92	337.98	1.32		1	100	1.00	6.80	1.00	339.2	0.94	Infin.	0.000	0.524	Non-Liq.	Non-Liq.	0.00
26.41	385.52	1.93	0.50	110	1.255	0.937	0.50	0.50	0.92	333.46	1.32		1	100	1.00	6.85	1.00	334.7	0.93	Infin.	0.000	0.526	Non-Liq.	Non-Liq.	0.00
26.57	386.49	1.78	0.46	110	1.259	0.936	0.46	0.50	0.92	333.78	1.30		1	100	1.00	6.90	1.00	335.0	0.93	Infin.	0.000	0.527	Non-Liq.	Non-Liq.	0.00
26.74	384.18	1.88	0.49	110	1.263	0.936	0.49	0.50	0.92	331.26	1.32		1	100	1.00	6.95	1.00	332.5	0.93	Infin.	0.000	0.528	Non-Liq.	Non-Liq.	0.00
26.90	381.61	1.93	0.51	110	1.267	0.935	0.51	0.50	0.91	328.53	1.33		1	100	1.00	7.00	1.00	329.8	0.93	Infin.	0.000	0.529	Non-Liq.	Non-Liq.	0.00
27.07	376.27	1.93	0.51	110	1.271	0.934	0.51	0.50	0.91	323.41	1.34		1	100	1.00	7.05	1.00	324.6	0.93	Infin.	0.000	0.531	Non-Liq.	Non-Liq.	0.00
27.23	373.66	1.90	0.51	110	1.275	0.934	0.51	0.50	0.91	320.67	1.34		1	100	1.00	7.10	1.00	321.9	0.93	Infin.	0.000	0.532	Non-Liq.	Non-Liq.	0.00
27.40	376.94	1.90	0.51	110	1.279	0.933	0.51	0.50	0.91	322.99	1.33		1	100	1.00	7.15	1.00	324.2	0.93	Infin.	0.000	0.533	Non-Liq.	Non-Liq.	0.00
27.56	386.83	3.91	1.01	110	1.282	0.932	1.01	0.50	0.91	330.99	1.55		1	100	1.00	7.20	1.00	332.2	0.93	Infin.	0.000	0.534	Non-Liq.	Non-Liq.	0.00
27.72	393.44	4.16	1.06	110	1.286	0.932	1.06	0.50	0.91	336.15	1.56		1	100	1.00	7.25	1.00	337.4	0.92	Infin.	0.000	0.535	Non-Liq.	Non-Liq.	0.00
27.89	437.24	5.53	1.26	110	1.290	0.931	1.27	0.50	0.91	373.12	1.60		1	100	1.00	7.30	1.00	374.5	0.92	Infin.	0.000	0.536	Non-Liq.	Non-Liq.	0.00

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
28.05	525.83	5.33	1.01	110	1.294	0.930	1.02	0.50	0.90	448.27	1.48		1	100	1.00	7.35	1.00	449.9	0.92	Infin.	0.000	0.538	Non-Liq.	Non-Liq.	0.00
28.22	485.02	4.40	0.91	110	1.298	0.929	0.91	0.50	0.90	412.76	1.46		1	100	1.00	7.40	1.00	414.3	0.92	Infin.	0.000	0.539	Non-Liq.	Non-Liq.	0.00
28.38	366.91	3.58	0.98	110	1.302	0.929	0.98	0.50	0.90	311.51	1.56		1	100	1.00	7.45	1.00	312.7	0.92	Infin.	0.000	0.540	Non-Liq.	Non-Liq.	0.00
28.54	359.69	4.34	1.21	110	1.306	0.928	1.21	0.50	0.90	304.90	1.63		1	100	1.00	7.50	1.00	306.0	0.92	Infin.	0.000	0.541	Non-Liq.	Non-Liq.	0.00
28.71	376.46	4.11	1.09	110	1.310	0.927	1.09	0.50	0.90	318.68	1.59		1	100	1.00	7.55	1.00	319.9	0.92	Infin.	0.000	0.542	Non-Liq.	Non-Liq.	0.00
28.87	396.64	4.96	1.25	110	1.314	0.926	1.25	0.50	0.90	335.32	1.62		1	100	1.00	7.60	1.00	336.6	0.92	Infin.	0.000	0.543	Non-Liq.	Non-Liq.	0.00
29.04	393.61	3.29	0.83	110	1.318	0.926	0.84	0.50	0.90	332.26	1.49		1	100	1.00	7.65	1.00	333.5	0.92	Infin.	0.000	0.544	Non-Liq.	Non-Liq.	0.00
29.20	387.79	2.93	0.76	110	1.322	0.925	0.76	0.50	0.89	326.84	1.46		1	100	1.00	7.70	1.00	328.1	0.91	Infin.	0.000	0.545	Non-Liq.	Non-Liq.	0.00
29.36	376.30	2.51	0.67	110	1.325	0.924	0.67	0.50	0.89	316.65	1.43		1	100	1.00	7.75	1.00	317.8	0.91	Infin.	0.000	0.546	Non-Liq.	Non-Liq.	0.00
29.53	377.25	2.25	0.60	110	1.329	0.923	0.60	0.50	0.89	316.99	1.39		1	100	1.00	7.80	1.00	318.2	0.91	Infin.	0.000	0.547	Non-Liq.	Non-Liq.	0.00
29.69	384.97	2.36	0.61	110	1.333	0.923	0.62	0.50	0.89	323.02	1.39		1	100	1.00	7.85	1.00	324.2	0.91	Infin.	0.000	0.548	Non-Liq.	Non-Liq.	0.00
29.86	387.70	2.46	0.64	110	1.337	0.922	0.64	0.50	0.89	324.84	1.40		1	100	1.00	7.90	1.00	326.1	0.91	Infin.	0.000	0.549	Non-Liq.	Non-Liq.	0.00
30.02	389.61	2.68	0.69	110	1.341	0.921	0.69	0.50	0.89	325.97	1.43		1	100	1.00	7.95	1.00	327.2	0.91	Infin.	0.000	0.550	Non-Liq.	Non-Liq.	0.00
30.18	389.44	2.61	0.67	110	1.345	0.920	0.67	0.50	0.89	325.35	1.42		1	100	1.00	8.00	1.00	326.6	0.91	Infin.	0.000	0.551	Non-Liq.	Non-Liq.	0.00
30.35	385.84	2.70	0.70	110	1.349	0.919	0.70	0.50	0.89	321.86	1.44		1	100	1.00	8.05	1.00	323.1	0.91	Infin.	0.000	0.551	Non-Liq.	Non-Liq.	0.00
30.51	373.85	2.74	0.73	110	1.353	0.918	0.74	0.50	0.88	311.37	1.46		1	100	1.00	8.10	1.00	312.5	0.91	Infin.	0.000	0.552	Non-Liq.	Non-Liq.	0.00
30.68	373.81	2.42	0.65	110	1.357	0.918	0.65	0.50	0.88	310.88	1.42		1	100	1.00	8.15	1.00	312.0	0.91	Infin.	0.000	0.553	Non-Liq.	Non-Liq.	0.00
30.84	390.03	2.25	0.58	110	1.361	0.917	0.58	0.50	0.88	323.95	1.37		1	100	1.00	8.20	1.00	325.2	0.90	Infin.	0.000	0.554	Non-Liq.	Non-Liq.	0.00
31.00	396.06	2.07	0.52	110	1.364	0.916	0.53	0.50	0.88	328.50	1.34		1	100	1.00	8.25	1.00	329.7	0.90	Infin.	0.000	0.555	Non-Liq.	Non-Liq.	0.00
31.17	382.13	2.25	0.59	110	1.368	0.915	0.59	0.50	0.88	316.45	1.39		1	100	1.00	8.30	1.00	317.6	0.90	Infin.	0.000	0.556	Non-Liq.	Non-Liq.	0.00
31.33	375.82	2.42	0.64	110	1.372	0.914	0.65	0.50	0.88	310.76	1.42		1	100	1.00	8.35	1.00	311.9	0.90	Infin.	0.000	0.556	Non-Liq.	Non-Liq.	0.00
31.50	391.03	2.99	0.77	110	1.376	0.913	0.77	0.50	0.88	322.92	1.46		1	100	1.00	8.40	1.00	324.1	0.90	Infin.	0.000	0.557	Non-Liq.	Non-Liq.	0.00
31.66	400.92	2.99	0.74	110	1.380	0.912	0.75	0.50	0.88	330.65	1.45		1	100	1.00	8.45	1.00	331.9	0.90	Infin.	0.000	0.558	Non-Liq.	Non-Liq.	0.00
31.82	406.82	3.52	0.87	110	1.384	0.911	0.87	0.50	0.87	335.05	1.50		1	100	1.00	8.45	1.00	336.3	0.90	Infin.	0.000	0.559	Non-Liq.	Non-Liq.	0.00
31.99	418.90	4.27	1.02	110	1.388	0.910	1.02	0.50	0.87	344.55	1.54		1	100	1.00	8.45	1.00	345.8	0.90	Infin.	0.000	0.559	Non-Liq.	Non-Liq.	0.00
32.15	377.63	3.97	1.05	110	1.392	0.909	1.05	0.50	0.87	310.05	1.58		1	100	1.00	8.45	1.00	311.2	0.90	Infin.	0.000	0.560	Non-Liq.	Non-Liq.	0.00
32.32	379.13	2.48	0.65	110	1.396	0.908	0.66	0.50	0.87	310.85	1.43		1	100	1.00	8.45	1.00	312.0	0.90	Infin.	0.000	0.561	Non-Liq.	Non-Liq.	0.00
32.48	383.08	2.56	0.67	110	1.400	0.907	0.67	0.50	0.87	313.66	1.43		1	100	1.00	8.45	1.00	314.8	0.89	Infin.	0.000	0.561	Non-Liq.	Non-Liq.	0.00
32.64	374.12	2.93	0.78	110	1.403	0.906	0.79	0.50	0.87	305.87	1.49		1	100	1.00	8.45	1.00	307.0	0.89	Infin.	0.000	0.562	Non-Liq.	Non-Liq.	0.00
32.81	381.30	3.49	0.92	110	1.407	0.905	0.92	0.50	0.87	311.32	1.53		1	100	1.00	8.45	1.00	312.5	0.89	Infin.	0.000	0.563	Non-Liq.	Non-Liq.	0.00
32.97	408.55	3.13	0.77	110	1.411	0.904	0.77	0.50	0.87	333.19	1.46		1	100	1.00	8.45	1.00	334.4	0.89	Infin.	0.000	0.563	Non-Liq.	Non-Liq.	0.00
33.14	382.63	3.51	0.92	110	1.415	0.903	0.92	0.50	0.86	311.54	1.53		1	100	1.00	8.45	1.00	312.7	0.89	Infin.	0.000	0.564	Non-Liq.	Non-Liq.	0.00
33.30	380.84	3.52	0.93	110	1.419	0.902	0.93	0.50	0.86	309.65	1.54		1	100	1.00	8.45	1.00	310.8	0.89	Infin.	0.000	0.565	Non-Liq.	Non-Liq.	0.00
33.46	373.57	2.42	0.65	110	1.423	0.901	0.65	0.50	0.86	303.30	1.43		1	100	1.00	8.45	1.00	304.4	0.89	Infin.	0.000	0.565	Non-Liq.	Non-Liq.	0.00
33.63	348.56	2.29	0.66	110	1.427	0.900	0.66	0.50	0.86	282.52	1.46		1	100	1.00	8.45	1.00	283.6	0.89	Infin.	0.000	0.566	Non-Liq.	Non-Liq.	0.00
33.79	339.90	1.86	0.55	110	1.431	0.899	0.55	0.50	0.86	275.10	1.41		1	100	1.00	8.45	1.00	276.1	0.89	Infin.	0.000	0.566	Non-Liq.	Non-Liq.	0.00
33.96	325.76	1.16	0.36	110	1.435	0.898	0.36	0.50	0.86	263.24	1.30		1	100	1.00	8.45	1.00	264.2	0.89	Infin.	0.000	0.567	Non-Liq.	Non-Liq.	0.00
34.12	318.65	1.04	0.33	110	1.439	0.897	0.33	0.50	0.86	257.12	1.29		1	100	1.00	8.45	1.00	258.1	0.88	Infin.	0.000	0.567	Non-Liq.	Non-Liq.	0.00
34.28	302.21	0.98	0.32	110	1.443	0.896	0.33	0.50	0.86	243.46	1.31		1	100	1.00	8.45	1.00	244.4	0.88	Infin.	0.000	0.568	Non-Liq.	Non-Liq.	0.00
34.45	271.69	0.85	0.31	110	1.446	0.895	0.31	0.50	0.86	218.46	1.34		1	100	1.00	8.45	1.00	219.3	0.88	Infin.	0.000	0.568	Non-Liq.	Non-Liq.	0.00
34.61	230.31	1.74	0.76	110	1.450	0.894	0.76	0.50	0.85	184.75	1.63		1	100	1.00	8.45	1.00	185.4	0.88	Infin.	0.000	0.569	Non-Liq.	Non-Liq.	0.00
34.78	172.13	2.62	1.52	110	1.454	0.893	1.53	0.59	0.83	133.65	1.94		1	89	1.23	8.45	1.00	165.6	0.88	Infin.	0.000	0.569	Non-Liq.	Non-Liq.	0.00
34.94	115.70	2.67	2.31	110	1.458	0.892	2.34	0.67	0.81	87.10	2.21		1	71	1.68		1.00	146.4	0.88	0.372	0.327	0.570	**0.57**	86%	**0.86**
35.10	77.37	2.49	3.21	110	1.462	0.890	3.28	0.74	0.79	56.46	2.44		1	53	2.49		1.00	140.7	0.91	0.339	0.308	0.570	**0.54**	88%	**1.00**
35.27	43.09	2.75	6.39	110	1.466	0.889	6.62	0.86	0.75	29.67	2.86		0						0.94			0.570	**Non-Liq.**	Non-Liq.	**0.00**
35.43	41.07	3.05	7.42	110	1.470	0.888	7.70	0.88	0.75	27.99	2.92		0						0.94			0.571	**Non-Liq.**	Non-Liq.	**0.00**
35.60	117.22	3.50	2.98	110	1.474	0.887	3.02	0.69	0.79	86.91	2.29		1	71	1.91		1.00	166.1	0.88	Infin.	0.000	0.571	**Non-Liq.**	Non-Liq.	**0.00**
35.76	102.95	2.85	2.77	110	1.478	0.886	2.81	0.70	0.79	75.92	2.30		1	65	1.96		1.00	149.1	0.90	0.389	0.351	0.572	**0.61**	83%	**0.80**
35.93	60.37	2.54	4.20	110	1.482	0.885	4.31	0.79	0.77	42.64	2.61		0						0.93			0.572	**Non-Liq.**	Non-Liq.	**0.00**
36.09	66.61	1.85	2.78	110	1.485	0.883	2.84	0.74	0.78	47.83	2.45		1	46	2.53		1.00	121.1	0.93	0.245	0.229	0.572	**0.40**	95%	**1.22**
36.25	123.04	2.42	1.97	110	1.489	0.882	1.99	0.65	0.80	92.00	2.14		1	73	1.53		1.00	140.7	0.87	0.339	0.296	0.573	**0.52**	90%	**1.00**
36.42	104.40	2.38	2.28	110	1.493	0.881	2.31	0.68	0.79	76.94	2.24		1	66	1.77		1.00	136.3	0.90	0.315	0.284	0.573	**0.50**	91%	**1.05**
36.58	92.52	2.48	2.68	110	1.497	0.880	2.72	0.71	0.78	67.30	2.33		1	60	2.05		1.00	138.1	0.90	0.325	0.293	0.573	**0.51**	90%	**1.03**
36.75	72.66	3.21	4.42	110	1.501	0.878	4.52	0.78	0.76	51.20	2.57		1	49	3.16		1.00	161.8	0.93	Infin.	0.000	0.573	**Non-Liq.**	Non-Liq.	**0.00**
36.91	123.36	4.33	3.51	110	1.505	0.877	3.55	0.71	0.78	89.76	2.33		1	72	2.05		1.00	184.4	0.87	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
37.07	154.86	4.78	3.09	110	1.509	0.876	3.12	0.67	0.79	114.09	2.22		1	82	1.72		1.00	196.3	0.87	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
37.24	152.31	3.58	2.35	110	1.513	0.875	2.38	0.65	0.79	113.04	2.13		1	82	1.52		1.00	171.8	0.87	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
37.40	132.82	2.22	1.67	110	1.517	0.873	1.69	0.63	0.80	98.98	2.07		1	76	1.40		1.00	138.4	0.87	0.326	0.283	0.574	**0.49**	91%	**1.03**
37.57	105.83	2.40	2.26	110	1.521	0.872	2.30	0.68	0.78	77.06	2.24		1	66	1.76		1.00	135.9	0.90	0.314	0.281	0.574	**0.49**	91%	**1.05**
37.73	67.92	2.37	3.48	110	1.525	0.871	3.56	0.76	0.76	47.47	2.52		1	46	2.88		1.00	136.6	0.93	0.317	0.295	0.575	**0.51**	90%	**1.05**
37.89	210.25	2.15	1.02	110	1.528	0.869	1.03	0.54	0.82	161.91	1.76		1	97	1.08	0.60	1.15	201.7	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
38.06	301.78	1.89	0.62	110	1.532	0.868	0.63	0.50	0.83	235.81	1.50		1	100	1.00	0.60	1.15	271.8	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
38.22	341.56	2.23	0.65	110	1.536	0.867	0.66	0.50	0.83	266.71	1.47		1	100	1.00	0.60	1.15	307.4	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
38.39	339.90	2.19	0.64	110	1.540	0.865	0.65	0.50	0.83	265.07	1.47		1	100	1.00	0.60	1.15	305.5	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
38.55	347.24	2.08	0.60	110	1.544	0.864	0.60	0.50	0.83	270.47	1.44		1	100	1.00	0.60	1.15	311.8	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
38.71	371.45	2.18	0.59	110	1.548	0.863	0.59	0.50	0.83	289.04	1.41		1	100	1.00	0.60	1.15	333.2	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
38.88	396.18	1.74	0.44	110	1.552	0.861	0.44	0.50	0.83	307.98	1.31		1	100	1.00	0.65	1.15	355.0	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
39.04	405.84	1.92	0.47	110	1.556	0.860	0.47	0.50	0.82	315.12	1.32		1	100	1.00	0.70	1.15	363.2	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
39.21	400.44	2.26	0.57	110	1.560	0.859	0.57	0.50	0.82	310.52	1.38		1	100	1.00	0.70	1.15	357.9	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
39.37	383.75	3.81	0.99	110	1.564	0.857	1.00	0.50	0.82	297.15	1.57		1	100	1.00	0.70	1.15	342.5	0.86	Infin.	0.000	0.576	**Non-Liq.**	Non-Liq.	**0.00**
39.53	290.03	4.33	1.49	110	1.567	0.856	1.50	0.55	0.81	219.94	1.79		1	100	1.10	0.70	1.15	279.6	0.85	Infin.	0.000	0.576	**Non-Liq.**	Non-Liq.	**0.00**
39.70	204.10	3.79	1.85	110	1.571	0.854	1.87	0.60	0.79	150.99	1.97		1	94	1.27	0.70	1.15	220.3	0.85	Infin.	0.000	0.576	**Non-Liq.**	Non-Liq.	**0.00**
39.86	126.34	3.03	2.39	110	1.575	0.853	2.42	0.67	0.77	90.32	2.21		1	73	1.68		1.00	151.9	0.85	0.406	0.346	0.575	**0.60**	84%	**0.73**
40.03	296.00	2.40	0.81	110	1.579	0.852	0.82	0.50	0.82	227.78	1.59		1	100	1.00	0.70	1.10	249.4	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
40.19	353.59	2.39	0.68	110	1.583	0.850	0.68	0.50	0.82	271.99	1.48		1	100	1.00	0.70	1.10	297.8	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
40.35	369.58	2.61	0.70	110	1.587	0.849	0.71	0.50	0.82	283.99	1.48		1	100	1.00	0.70	1.10	311.0	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
40.52	358.58	2.73	0.76	110	1.591	0.847	0.76	0.50	0.82	275.16	1.51		1	100	1.00	0.70	1.10	301.3	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
40.68	360.65	2.12	0.59	110	1.595	0.846	0.59	0.50	0.81	276.42	1.43		1	100	1.00	0.70	1.10	302.7	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
40.85	364.14	2.43	0.67	110	1.599	0.844	0.67	0.50	0.81	278.76	1.46		1	100	1.00	0.70	1.10	305.3	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
41.01	369.03	2.40	0.65	110	1.603	0.843	0.65	0.50	0.81	282.17	1.45		1	100	1.00	0.70	1.10	309.0	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
41.17	370.72	2.34	0.63	110	1.607	0.841	0.63	0.50	0.81	283.12	1.44		1	100	1.00	0.70	1.10	310.0	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
41.34	386.57	2.08	0.54	110	1.610	0.840	0.54	0.50	0.81	294.92	1.38		1	100	1.00	0.70	1.10	323.0	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
41.50	407.71	2.69	0.66	110	1.614	0.838	0.66	0.50	0.81	310.74	1.43		1	100	1.00	0.70	1.10	340.3	0.84	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
41.67	452.33	3.54	0.78	110	1.618	0.837	0.79	0.50	0.81	344.46	1.45		1	100	1.00	0.70	1.10	377.2	0.84	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
41.83	466.57	3.92	0.84	110	1.622	0.835	0.84	0.50	0.81	354.91	1.47		1	100	1.00	0.70	1.10	388.6	0.84	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
41.99	524.35	3.52	0.67	110	1.626	0.834	0.67	0.50	0.81	398.53	1.36		1	100	1.00	0.70	1.10	436.4	0.84	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
42.16	610.77	2.62	0.43	110	1.630	0.832	0.43	0.50	0.81	463.86	1.17		1	100	1.00	0.70	1.10	508.0	0.84	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
42.32	716.25	0.00	0.00	110	1.634	0.831	0.00	0.83	0.70	470.17	2.75		0		1.00				0.92			0.574	**Non-Liq.**	Non-Liq.	**0.00**
42.49	652.94	0.00	0.00	110	1.638	0.829	0.00	0.83	0.70	429.16	2.73		0		1.00				0.92			0.573	**Non-Liq.**	Non-Liq.	**0.00**
42.65	696.03	0.00	0.00	110	1.642	0.827	0.00	0.83	0.69	455.52	2.74		0		1.00				0.92			0.573	**Non-Liq.**	Non-Liq.	**0.00**

CPT-LIQUEFY.XLS - A SPREADSHEET FOR EMPIRICAL ESTIMATION OF LIQUEFACTION POTENTIAL USING CPT DATA
Developed 2003 by Shelton L. Stringer, GE, Earth Systems Southwest

Project: Oxnard High School No. 8
Job No: 301953-001
Date: 8/14/2018
Sounding: CPT-6A
Plot: 6

Methods: Liquefaction Analysis using 1998 NCEER workshop methods (Robertson & Wride)
Post-liquefaction Settlement Analysis from Tokimatsu & Seed (1987)
Dry Sand Settlement by Pradel, ASCE Journal of G&GE, Vol 124, No. 4

Total Liquefied Thickness (feet)
2.1

EARTHQUAKE INFORMATION:
Magnitude: 6.77 (7.5)
PGA, g: 0.97 (0.75)
MSF: 1.30
GWT, feet: 20.0
Design GWT, feet: 20.0

Induced CSR (M=7.5): = 0.65*PGA*(po/p'o)*rd/MSF
Clean Sand Qc1n = C_Q*K_C*K_H*Qc
SF = $CRR_{7.5}$*Kσ/CSR
Use Tokimatsu & Seed (0) or Ishihara &Yoshmine (1): 0
Unit Weight of unsaturated soils: 110 pcf
Unit Weight of saturated soils: 110 pcf
Limiting Ic for liquefiable soils: 2.60
Limiting Ic for K_H: 2.0
Required SF: 1.50
Min SF of Liquefiable Layers: 0.36
Avg SF of Liquefiable Layers: 0.03

Probab	Total Induced Subsidence (inches)
Avg	0
3%	0
Max	0
99%	0.3

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	*Volumetric Strain (%)*
0.16	6.69	0.01	0.21	110	0.009	1.000	0.21	0.76	1.70	10.74	2.50		1	0	1.00		1.00	10.7	1.00	0.059	0.059	0.485	Non-Liq.	Non-Liq.	0.00
0.33	14.12	0.04	0.28	110	0.018	1.000	0.28	0.67	1.70	22.66	2.22		1	15	1.00		1.00	22.7	1.00	0.069	0.069	0.485	Non-Liq.	Non-Liq.	0.00
0.49	16.59	0.09	0.55	110	0.027	1.000	0.56	0.69	1.70	26.61	2.26		1	22	1.83		1.00	48.7	1.00	0.091	0.091	0.485	Non-Liq.	Non-Liq.	0.00
0.66	21.13	0.18	0.84	110	0.036	1.000	0.84	0.68	1.70	33.89	2.25		1	32	1.81		1.00	61.3	1.00	0.101	0.101	0.485	Non-Liq.	Non-Liq.	0.00
0.82	29.41	0.29	0.98	110	0.045	1.000	0.98	0.66	1.70	47.18	2.17		1	46	1.59		1.00	75.1	1.00	0.119	0.119	0.485	Non-Liq.	Non-Liq.	0.00
0.98	35.60	0.35	0.99	110	0.054	1.000	0.99	0.64	1.70	57.12	2.10		1	54	1.46		1.00	83.2	1.00	0.134	0.134	0.485	Non-Liq.	Non-Liq.	0.00
1.15	34.08	0.35	1.03	110	0.063	0.999	1.03	0.65	1.70	54.66	2.13		1	52	1.51		1.00	82.3	1.00	0.132	0.132	0.484	Non-Liq.	Non-Liq.	0.00
1.31	34.08	0.35	1.03	110	0.072	0.999	1.04	0.65	1.70	54.64	2.13		1	52	1.51		1.00	82.3	1.00	0.132	0.132	0.484	Non-Liq.	Non-Liq.	0.00
1.48	30.11	0.33	1.11	110	0.081	0.999	1.11	0.66	1.70	48.25	2.19		1	47	1.64		1.00	79.2	1.00	0.126	0.126	0.484	Non-Liq.	Non-Liq.	0.00
1.64	28.15	0.27	0.96	110	0.090	0.998	0.96	0.66	1.70	45.09	2.18		1	44	1.62		1.00	72.8	1.00	0.116	0.116	0.484	Non-Liq.	Non-Liq.	0.00
1.80	29.07	0.35	1.20	110	0.099	0.998	1.20	0.67	1.70	46.55	2.22		1	45	1.72		1.00	80.2	1.00	0.128	0.128	0.484	Non-Liq.	Non-Liq.	0.00
1.97	26.19	0.39	1.47	110	0.108	0.998	1.48	0.70	1.70	41.91	2.31		1	41	1.99		1.00	83.4	1.00	0.134	0.134	0.484	Non-Liq.	Non-Liq.	0.00
2.13	20.41	0.42	2.07	110	0.117	0.997	2.08	0.75	1.70	32.61	2.49		1	30	2.72		1.00	88.5	1.00	0.145	0.145	0.483	Non-Liq.	Non-Liq.	0.00
2.30	15.45	0.44	2.83	110	0.126	0.997	2.85	0.81	1.70	24.62	2.67		0						1.00			0.483	Non-Liq.	Non-Liq.	0.00
2.46	12.62	0.37	2.95	110	0.135	0.996	2.98	0.83	1.70	20.06	2.75		0						1.00			0.483	Non-Liq.	Non-Liq.	0.00
2.62	13.50	0.27	2.01	110	0.144	0.996	2.04	0.80	1.70	21.46	2.63		0						1.00			0.483	Non-Liq.	Non-Liq.	0.00
2.79	20.18	0.31	1.56	110	0.153	0.996	1.57	0.73	1.70	32.18	2.42		1	30	2.39		1.00	77.0	1.00	0.123	0.123	0.483	Non-Liq.	Non-Liq.	0.00
2.95	25.28	0.31	1.23	110	0.162	0.995	1.23	0.69	1.70	40.36	2.28		1	39	1.88		1.00	76.0	1.00	0.121	0.121	0.482	Non-Liq.	Non-Liq.	0.00
3.12	31.76	0.36	1.12	110	0.171	0.995	1.13	0.66	1.70	50.76	2.18		1	49	1.61		1.00	81.6	1.00	0.131	0.131	0.482	Non-Liq.	Non-Liq.	0.00
3.28	35.56	0.38	1.08	110	0.180	0.994	1.09	0.65	1.70	56.85	2.13		1	53	1.50		1.00	85.5	1.00	0.138	0.138	0.482	Non-Liq.	Non-Liq.	0.00
3.44	40.16	0.39	0.98	110	0.189	0.994	0.98	0.63	1.70	64.22	2.06		1	58	1.38		1.00	88.8	1.00	0.145	0.145	0.482	Non-Liq.	Non-Liq.	0.00
3.61	45.45	0.46	1.00	110	0.198	0.994	1.01	0.61	1.70	72.71	2.02		1	64	1.33		1.00	96.5	1.00	0.164	0.164	0.482	Non-Liq.	Non-Liq.	0.00
3.77	52.79	0.51	0.96	110	0.208	0.993	0.97	0.60	1.70	84.49	1.96		1	70	1.25	0.65	1.12	118.5	1.00	0.235	0.235	0.482	Non-Liq.	Non-Liq.	0.00
3.94	58.72	0.56	0.95	110	0.217	0.993	0.95	0.58	1.70	94.00	1.92		1	74	1.20	0.70	1.12	127.1	1.00	0.271	0.271	0.481	Non-Liq.	Non-Liq.	0.00
4.10	64.33	0.60	0.94	110	0.226	0.993	0.94	0.57	1.70	103.00	1.88		1	78	1.17	0.75	1.12	135.7	1.00	0.312	0.312	0.481	Non-Liq.	Non-Liq.	0.00
4.27	69.66	0.83	1.19	110	0.235	0.992	1.19	0.59	1.70	111.55	1.93		1	81	1.21	0.80	1.12	151.9	1.00	0.406	0.406	0.481	Non-Liq.	Non-Liq.	0.00
4.43	74.65	1.28	1.71	110	0.244	0.992	1.72	0.61	1.70	119.56	2.01		1	84	1.32		1.00	157.6	1.00	0.444	0.444	0.481	Non-Liq.	Non-Liq.	0.00
4.59	78.74	2.11	2.68	110	0.253	0.991	2.69	0.65	1.70	126.11	2.14		1	86	1.54		1.00	194.3	1.00	Infin.	0.000	0.481	Non-Liq.	Non-Liq.	0.00
4.76	95.41	2.01	2.11	110	0.262	0.991	2.12	0.61	1.70	152.88	2.01		1	94	1.31		1.00	200.9	1.00	Infin.	0.000	0.480	Non-Liq.	Non-Liq.	0.00
4.92	90.35	1.38	1.53	110	0.271	0.991	1.54	0.58	1.70	144.74	1.92		1	92	1.21	1.00	1.00	175.8	1.00	Infin.	0.000	0.480	Non-Liq.	Non-Liq.	0.00
5.09	73.79	0.57	0.78	110	0.280	0.990	0.78	0.54	1.70	118.12	1.79		1	84	1.10	1.05	1.00	130.0	1.00	0.285	0.285	0.480	Non-Liq.	Non-Liq.	0.00
5.25	64.99	0.41	0.63	110	0.289	0.990	0.63	0.54	1.70	103.96	1.78		1	78	1.09	1.10	1.00	113.6	1.00	0.216	0.216	0.480	Non-Liq.	Non-Liq.	0.00
5.41	60.11	0.48	0.80	110	0.298	0.989	0.81	0.57	1.70	96.11	1.87		1	75	1.16	1.15	1.00	111.7	1.00	0.210	0.210	0.480	Non-Liq.	Non-Liq.	0.00
5.58	57.62	0.71	1.23	110	0.307	0.989	1.24	0.61	1.70	92.09	2.00		1	73	1.30	1.20	1.00	120.0	1.00	0.241	0.241	0.479	Non-Liq.	Non-Liq.	0.00
5.74	60.32	0.70	1.16	110	0.316	0.989	1.16	0.60	1.70	96.42	1.97		1	75	1.26	1.25	1.00	121.7	1.00	0.247	0.247	0.479	Non-Liq.	Non-Liq.	0.00
5.91	59.79	0.67	1.11	110	0.325	0.988	1.12	0.60	1.70	95.55	1.96		1	75	1.25	1.30	1.00	119.7	1.00	0.239	0.239	0.479	Non-Liq.	Non-Liq.	0.00
6.07	56.99	0.42	0.74	110	0.334	0.988	0.75	0.57	1.70	91.04	1.86		1	73	1.16	1.35	1.00	105.8	1.00	0.190	0.190	0.479	Non-Liq.	Non-Liq.	0.00
6.23	64.88	0.50	0.77	110	0.343	0.988	0.77	0.56	1.70	103.70	1.83		1	78	1.13	1.40	1.00	117.4	1.00	0.230	0.230	0.479	Non-Liq.	Non-Liq.	0.00
6.40	81.28	0.52	0.64	110	0.352	0.987	0.64	0.52	1.70	130.04	1.70		1	88	1.04	1.45	1.00	135.6	1.00	0.312	0.312	0.479	Non-Liq.	Non-Liq.	0.00
6.56	88.72	0.58	0.65	110	0.361	0.987	0.66	0.51	1.70	141.98	1.68		1	91	1.02	1.50	1.00	145.7	1.00	0.368	0.368	0.478	Non-Liq.	Non-Liq.	0.00
6.73	90.02	0.70	0.78	110	0.370	0.986	0.78	0.52	1.70	144.05	1.72		1	92	1.05	1.55	1.00	151.9	1.00	0.406	0.406	0.478	Non-Liq.	Non-Liq.	0.00
6.89	95.98	0.75	0.78	110	0.379	0.986	0.79	0.52	1.70	153.61	1.70		1	95	1.04	1.60	1.00	160.1	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.05	106.17	0.82	0.77	110	0.388	0.986	0.77	0.51	1.67	166.59	1.67		1	98	1.02	1.65	1.00	170.1	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.22	120.42	0.87	0.72	110	0.397	0.985	0.72	0.50	1.63	185.20	1.62		1	100	1.00	1.70	1.00	185.9	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.38	147.55	0.97	0.66	110	0.406	0.985	0.66	0.50	1.61	224.51	1.53		1	100	1.00	1.75	1.00	225.3	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.55	167.64	1.10	0.66	110	0.415	0.985	0.66	0.50	1.60	252.36	1.49		1	100	1.00	1.80	1.00	253.3	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
7.71	167.64	1.10	0.66	110	0.424	0.984	0.66	0.50	1.58	249.65	1.49		1	100	1.00	1.85	1.00	250.6	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
7.87	175.94	1.23	0.70	110	0.433	0.984	0.70	0.50	1.56	259.28	1.50		1	100	1.00	1.90	1.00	260.3	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
8.04	183.17	1.23	0.67	110	0.442	0.984	0.67	0.50	1.55	267.18	1.48		1	100	1.00	1.95	1.00	268.2	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
8.20	189.37	0.94	0.50	110	0.451	0.983	0.50	0.50	1.53	273.46	1.38		1	100	1.00	2.00	1.00	274.5	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
8.37	193.49	1.24	0.64	110	0.460	0.983	0.64	0.50	1.52	276.65	1.45		1	100	1.00	2.05	1.00	277.7	1.00	Infin.	0.000	0.476	Non-Liq.	Non-Liq.	0.00
8.53	194.51	1.46	0.75	110	0.469	0.982	0.75	0.50	1.50	275.42	1.51		1	100	1.00	2.10	1.00	276.4	1.00	Infin.	0.000	0.476	Non-Liq.	Non-Liq.	0.00
8.69	195.90	1.50	0.77	110	0.478	0.982	0.77	0.50	1.49	274.75	1.51		1	100	1.00	2.15	1.00	275.8	1.00	Infin.	0.000	0.476	Non-Liq.	Non-Liq.	0.00
8.86	199.53	1.67	0.84	110	0.487	0.982	0.84	0.50	1.47	277.23	1.54		1	100	1.00	2.20	1.00	278.3	1.00	Infin.	0.000	0.476	Non-Liq.	Non-Liq.	0.00
9.02	202.65	1.56	0.77	110	0.496	0.981	0.77	0.50	1.46	279.00	1.51		1	100	1.00	2.25	1.00	280.0	1.00	Infin.	0.000	0.476	Non-Liq.	Non-Liq.	0.00
9.19	204.68	1.62	0.79	110	0.505	0.981	0.80	0.50	1.45	279.26	1.52		1	100	1.00	2.30	1.00	280.3	1.00	Infin.	0.000	0.476	Non-Liq.	Non-Liq.	0.00
9.35	192.88	1.56	0.81	110	0.514	0.981	0.81	0.50	1.43	260.79	1.54		1	100	1.00	2.35	1.00	261.8	1.00	Infin.	0.000	0.475	Non-Liq.	Non-Liq.	0.00
9.51	173.28	1.31	0.75	110	0.523	0.980	0.76	0.50	1.42	232.18	1.56		1	100	1.00	2.40	1.00	233.0	1.00	Infin.	0.000	0.475	Non-Liq.	Non-Liq.	0.00
9.68	160.53	1.12	0.70	110	0.532	0.980	0.70	0.50	1.41	213.20	1.56		1	100	1.00	2.45	1.00	214.0	1.00	Infin.	0.000	0.475	Non-Liq.	Non-Liq.	0.00
9.84	160.48	0.98	0.61	110	0.541	0.980	0.61	0.50	1.40	211.34	1.53		1	100	1.00	2.50	1.00	212.1	1.00	Infin.	0.000	0.475	Non-Liq.	Non-Liq.	0.00
10.01	167.93	0.95	0.57	110	0.550	0.979	0.57	0.50	1.39	219.35	1.49		1	100	1.00	2.55	1.00	220.2	1.00	Infin.	0.000	0.475	Non-Liq.	Non-Liq.	0.00
10.17	179.44	1.12	0.62	110	0.559	0.979	0.62	0.50	1.38	232.52	1.50		1	100	1.00	2.60	1.00	233.4	1.00	Infin.	0.000	0.475	Non-Liq.	Non-Liq.	0.00
10.33	196.39	1.47	0.75	110	0.568	0.979	0.75	0.50	1.36	252.52	1.53		1	100	1.00	2.65	1.00	253.5	1.00	Infin.	0.000	0.474	Non-Liq.	Non-Liq.	0.00
10.50	212.87	1.68	0.79	110	0.577	0.978	0.79	0.50	1.35	271.61	1.52		1	100	1.00	2.70	1.00	272.6	1.00	Infin.	0.000	0.474	Non-Liq.	Non-Liq.	0.00
10.66	218.59	1.72	0.79	110	0.586	0.978	0.79	0.50	1.34	276.76	1.52		1	100	1.00	2.75	1.00	277.8	1.00	Infin.	0.000	0.474	Non-Liq.	Non-Liq.	0.00
10.83	219.09	1.46	0.67	110	0.595	0.978	0.67	0.50	1.33	275.28	1.47		1	100	1.00	2.80	1.00	276.3	1.00	Infin.	0.000	0.474	Non-Liq.	Non-Liq.	0.00
10.99	218.78	1.57	0.72	110	0.604	0.977	0.72	0.50	1.32	272.81	1.49		1	100	1.00	2.85	1.00	273.8	1.00	Infin.	0.000	0.474	Non-Liq.	Non-Liq.	0.00
11.15	227.29	1.90	0.84	110	0.614	0.977	0.84	0.50	1.31	281.35	1.53		1	100	1.00	2.90	1.00	282.4	1.00	Infin.	0.000	0.474	Non-Liq.	Non-Liq.	0.00
11.32	240.17	1.92	0.80	110	0.623	0.977	0.80	0.50	1.30	295.17	1.50		1	100	1.00	2.95	1.00	296.3	1.00	Infin.	0.000	0.473	Non-Liq.	Non-Liq.	0.00
11.48	222.62	1.81	0.81	110	0.632	0.976	0.82	0.50	1.29	271.57	1.53		1	100	1.00	3.00	1.00	272.6	1.00	Infin.	0.000	0.473	Non-Liq.	Non-Liq.	0.00
11.65	216.62	2.13	0.98	110	0.641	0.976	0.98	0.50	1.29	262.35	1.61		1	100	1.00	3.05	1.00	263.3	1.00	Infin.	0.000	0.473	Non-Liq.	Non-Liq.	0.00
11.81	220.47	2.23	1.01	110	0.650	0.975	1.01	0.50	1.28	265.16	1.61		1	100	1.00	3.10	1.00	266.1	1.00	Infin.	0.000	0.473	Non-Liq.	Non-Liq.	0.00
11.98	211.90	2.36	1.11	110	0.659	0.975	1.12	0.50	1.27	253.63	1.66		1	100	1.01	3.15	1.00	256.5	1.00	Infin.	0.000	0.473	Non-Liq.	Non-Liq.	0.00
12.14	218.21	2.15	0.99	110	0.668	0.975	0.99	0.50	1.26	258.84	1.61		1	100	1.00	3.20	1.00	259.8	1.00	Infin.	0.000	0.473	Non-Liq.	Non-Liq.	0.00
12.30	217.25	1.71	0.79	110	0.677	0.974	0.79	0.50	1.25	255.96	1.54		1	100	1.00	3.25	1.00	256.9	1.00	Infin.	0.000	0.472	Non-Liq.	Non-Liq.	0.00
12.47	227.19	1.31	0.58	110	0.686	0.974	0.58	0.50	1.24	265.93	1.43		1	100	1.00	3.30	1.00	266.9	1.00	Infin.	0.000	0.472	Non-Liq.	Non-Liq.	0.00
12.63	246.00	1.35	0.55	110	0.695	0.974	0.55	0.50	1.23	286.13	1.40		1	100	1.00	3.35	1.00	287.2	1.00	Infin.	0.000	0.472	Non-Liq.	Non-Liq.	0.00
12.80	271.55	2.19	0.81	110	0.704	0.973	0.81	0.50	1.23	313.89	1.49		1	100	1.00	3.40	1.00	315.1	1.00	Infin.	0.000	0.472	Non-Liq.	Non-Liq.	0.00

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_c	H (m)	K_H	Clean Sand Qc1n	$K\sigma$	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
12.96	298.70	2.19	0.73	110	0.713	0.973	0.74	0.50	1.22	343.15	1.43		1	100	1.00	3.45	1.00	344.4	1.00	Infin.	0.000	0.472	Non-Liq.	Non-Liq.	0.00
13.12	297.19	2.53	0.85	110	0.722	0.973	0.85	0.50	1.21	339.26	1.49		1	100	1.00	3.50	1.00	340.5	1.00	Infin.	0.000	0.472	Non-Liq.	Non-Liq.	0.00
13.29	297.26	2.68	0.90	110	0.731	0.972	0.90	0.50	1.20	337.23	1.51		1	100	1.00	3.55	1.00	338.5	1.00	Infin.	0.000	0.471	Non-Liq.	Non-Liq.	0.00
13.45	299.77	2.66	0.89	110	0.740	0.972	0.89	0.50	1.20	337.99	1.50		1	100	1.00	3.60	1.00	339.3	1.00	Infin.	0.000	0.471	Non-Liq.	Non-Liq.	0.00
13.62	299.47	2.65	0.88	110	0.749	0.972	0.89	0.50	1.19	335.60	1.50		1	100	1.00	3.65	1.00	336.9	1.00	Infin.	0.000	0.471	Non-Liq.	Non-Liq.	0.00
13.78	293.58	3.11	1.06	110	0.758	0.971	1.06	0.50	1.18	327.01	1.57		1	100	1.00	3.70	1.00	328.2	1.00	Infin.	0.000	0.471	Non-Liq.	Non-Liq.	0.00
13.94	298.13	3.07	1.03	110	0.767	0.971	1.03	0.50	1.17	330.12	1.56		1	100	1.00	3.75	1.00	331.4	1.00	Infin.	0.000	0.471	Non-Liq.	Non-Liq.	0.00
14.11	301.85	3.04	1.01	110	0.776	0.971	1.01	0.50	1.17	332.29	1.55		1	100	1.00	3.80	1.00	333.5	1.00	Infin.	0.000	0.471	Non-Liq.	Non-Liq.	0.00
14.27	298.45	3.68	1.23	110	0.785	0.970	1.24	0.50	1.16	326.64	1.62		1	100	1.00	3.85	1.00	327.9	1.00	Infin.	0.000	0.470	Non-Liq.	Non-Liq.	0.00
14.44	300.98	2.74	0.91	110	0.794	0.970	0.91	0.50	1.15	327.53	1.52		1	100	1.00	3.90	1.00	328.8	1.00	Infin.	0.000	0.470	Non-Liq.	Non-Liq.	0.00
14.60	315.50	2.80	0.89	110	0.803	0.970	0.89	0.50	1.15	341.43	1.50		1	100	1.00	3.95	1.00	342.7	1.00	Infin.	0.000	0.470	Non-Liq.	Non-Liq.	0.00
14.76	313.59	3.04	0.97	110	0.812	0.969	0.97	0.50	1.14	337.45	1.53		1	100	1.00	4.00	1.00	338.7	1.00	Infin.	0.000	0.470	Non-Liq.	Non-Liq.	0.00
14.93	322.37	3.47	1.08	110	0.821	0.969	1.08	0.50	1.14	345.00	1.56		1	100	1.00	4.05	1.00	346.3	1.00	Infin.	0.000	0.470	Non-Liq.	Non-Liq.	0.00
15.09	336.14	3.51	1.04	110	0.830	0.969	1.05	0.50	1.13	357.81	1.54		1	100	1.00	4.10	1.00	359.1	1.00	Infin.	0.000	0.470	Non-Liq.	Non-Liq.	0.00
15.26	323.66	3.11	0.96	110	0.839	0.968	0.96	0.50	1.12	342.62	1.52		1	100	1.00	4.15	1.00	343.9	1.00	Infin.	0.000	0.469	Non-Liq.	Non-Liq.	0.00
15.42	317.94	3.08	0.97	110	0.848	0.968	0.97	0.50	1.12	334.75	1.53		1	100	1.00	4.20	1.00	336.0	1.00	Infin.	0.000	0.469	Non-Liq.	Non-Liq.	0.00
15.58	320.07	3.08	0.96	110	0.857	0.967	0.96	0.50	1.11	335.21	1.53		1	100	1.00	4.25	1.00	336.5	1.00	Infin.	0.000	0.469	Non-Liq.	Non-Liq.	0.00
15.75	310.52	2.97	0.96	110	0.866	0.967	0.96	0.50	1.11	323.47	1.54		1	100	1.00	4.30	1.00	324.7	1.00	Infin.	0.000	0.469	Non-Liq.	Non-Liq.	0.00
15.91	314.10	3.02	0.96	110	0.875	0.967	0.96	0.50	1.10	325.51	1.54		1	100	1.00	4.35	1.00	326.7	1.00	Infin.	0.000	0.469	Non-Liq.	Non-Liq.	0.00
16.08	315.60	2.97	0.94	110	0.884	0.966	0.94	0.50	1.09	325.39	1.53		1	100	1.00	4.40	1.00	326.6	1.00	Infin.	0.000	0.468	Non-Liq.	Non-Liq.	0.00
16.24	327.26	2.77	0.85	110	0.893	0.966	0.85	0.50	1.09	335.73	1.49		1	100	1.00	4.45	1.00	337.0	1.00	Infin.	0.000	0.468	Non-Liq.	Non-Liq.	0.00
16.40	328.11	2.94	0.89	110	0.902	0.966	0.90	0.50	1.08	334.91	1.51		1	100	1.00	4.50	1.00	336.2	1.00	Infin.	0.000	0.468	Non-Liq.	Non-Liq.	0.00
16.57	357.30	2.93	0.82	110	0.911	0.965	0.82	0.50	1.08	362.96	1.45		1	100	1.00	4.55	1.00	364.3	1.00	Infin.	0.000	0.468	Non-Liq.	Non-Liq.	0.00
16.73	379.84	3.02	0.80	110	0.920	0.965	0.80	0.50	1.07	384.01	1.43		1	100	1.00	4.60	1.00	385.4	1.00	Infin.	0.000	0.468	Non-Liq.	Non-Liq.	0.00
16.90	393.42	4.35	1.11	110	0.929	0.965	1.11	0.50	1.07	395.83	1.54		1	100	1.00	4.65	1.00	397.3	1.00	Infin.	0.000	0.468	Non-Liq.	Non-Liq.	0.00
17.06	393.65	3.67	0.93	110	0.938	0.964	0.93	0.50	1.06	394.14	1.48		1	100	1.00	4.70	1.00	395.6	1.00	Infin.	0.000	0.467	Non-Liq.	Non-Liq.	0.00
17.22	403.88	3.66	0.91	110	0.947	0.964	0.91	0.50	1.06	402.47	1.46		1	100	1.00	4.75	1.00	404.0	1.00	Infin.	0.000	0.467	Non-Liq.	Non-Liq.	0.00
17.39	384.75	3.06	0.80	110	0.956	0.963	0.80	0.50	1.05	381.54	1.43		1	100	1.00	4.80	1.00	383.0	1.00	Infin.	0.000	0.467	Non-Liq.	Non-Liq.	0.00
17.55	418.46	2.70	0.64	110	0.965	0.963	0.65	0.50	1.05	413.10	1.34		1	100	1.00	4.85	1.00	414.6	1.00	Infin.	0.000	0.467	Non-Liq.	Non-Liq.	0.00
17.72	426.59	3.76	0.88	110	0.974	0.963	0.88	0.50	1.04	419.18	1.44		1	100	1.00	4.90	1.00	420.8	1.00	Infin.	0.000	0.467	Non-Liq.	Non-Liq.	0.00
17.88	438.49	4.30	0.98	110	0.983	0.962	0.98	0.50	1.04	428.91	1.47		1	100	1.00	4.95	1.00	430.5	1.00	Infin.	0.000	0.467	Non-Liq.	Non-Liq.	0.00
18.04	459.63	3.50	0.76	110	0.992	0.962	0.76	0.50	1.03	447.58	1.37		1	100	1.00	5.00	1.00	449.3	1.00	Infin.	0.000	0.466	Non-Liq.	Non-Liq.	0.00
18.21	446.70	3.76	0.84	110	1.001	0.962	0.84	0.50	1.03	432.99	1.42		1	100	1.00	5.05	1.00	434.6	1.00	Infin.	0.000	0.466	Non-Liq.	Non-Liq.	0.00
18.37	433.53	3.52	0.81	110	1.010	0.961	0.81	0.50	1.02	418.31	1.41		1	100	1.00	5.10	1.00	419.9	1.00	Infin.	0.000	0.466	Non-Liq.	Non-Liq.	0.00
18.54	420.70	4.05	0.96	110	1.020	0.961	0.96	0.50	1.02	404.09	1.48		1	100	1.00	5.15	1.00	405.6	1.00	Infin.	0.000	0.466	Non-Liq.	Non-Liq.	0.00
18.70	427.38	4.04	0.95	110	1.029	0.960	0.95	0.50	1.01	408.71	1.47		1	100	1.00	5.20	1.00	410.2	1.00	Infin.	0.000	0.466	Non-Liq.	Non-Liq.	0.00
18.86	433.11	4.37	1.01	110	1.038	0.960	1.01	0.50	1.01	412.39	1.49		1	100	1.00	5.20	1.00	413.9	1.00	Infin.	0.000	0.465	Non-Liq.	Non-Liq.	0.00
19.03	406.01	4.03	0.99	110	1.047	0.960	0.99	0.50	1.01	384.84	1.51		1	100	1.00	5.20	1.00	386.3	1.00	Infin.	0.000	0.465	Non-Liq.	Non-Liq.	0.00
19.19	382.11	4.15	1.09	110	1.056	0.959	1.09	0.50	1.00	360.57	1.55		1	100	1.00	5.20	1.00	361.9	1.00	Infin.	0.000	0.465	Non-Liq.	Non-Liq.	0.00
19.36	381.05	4.09	1.07	110	1.065	0.959	1.08	0.50	1.00	358.03	1.55		1	100	1.00	5.20	1.00	359.4	1.00	Infin.	0.000	0.465	Non-Liq.	Non-Liq.	0.00
19.52	379.85	4.12	1.08	110	1.074	0.958	1.09	0.50	0.99	355.39	1.56		1	100	1.00	5.20	1.00	356.7	0.99	Infin.	0.000	0.465	Non-Liq.	Non-Liq.	0.00
19.69	382.89	4.14	1.08	110	1.083	0.958	1.08	0.50	0.99	356.74	1.55		1	100	1.00	5.20	1.00	358.1	0.99	Infin.	0.000	0.464	Non-Liq.	Non-Liq.	0.00
19.85	384.60	3.97	1.03	110	1.092	0.957	1.04	0.50	0.98	356.85	1.54		1	100	1.00	5.20	1.00	358.2	0.99	Infin.	0.000	0.464	Non-Liq.	Non-Liq.	0.00
20.01	377.72	4.35	1.15	110	1.101	0.957	1.16	0.50	0.98	349.00	1.58		1	100	1.00	5.20	1.00	350.3	0.98	Infin.	0.000	0.464	Non-Liq.	Non-Liq.	0.00
20.18	371.25	4.23	1.14	110	1.107	0.957	1.14	0.50	0.98	342.06	1.58		1	100	1.00	5.20	1.00	343.3	0.98	Infin.	0.000	0.465	Non-Liq.	Non-Liq.	0.00
20.34	361.72	4.14	1.14	110	1.111	0.956	1.15	0.50	0.98	332.66	1.59		1	100	1.00	5.20	1.00	333.9	0.98	Infin.	0.000	0.467	Non-Liq.	Non-Liq.	0.00
20.51	347.60	4.05	1.16	110	1.115	0.956	1.17	0.50	0.97	319.07	1.61		1	100	1.00	5.20	1.00	320.3	0.98	Infin.	0.000	0.469	Non-Liq.	Non-Liq.	0.00
20.67	339.34	3.76	1.11	110	1.118	0.955	1.11	0.50	0.97	310.92	1.60		1	100	1.00	5.20	1.00	312.1	0.98	Infin.	0.000	0.471	Non-Liq.	Non-Liq.	0.00
20.83	332.14	3.55	1.07	110	1.122	0.955	1.07	0.50	0.97	303.76	1.59		1	100	1.00	5.20	1.00	304.9	0.98	Infin.	0.000	0.473	Non-Liq.	Non-Liq.	0.00
21.00	334.58	3.14	0.94	110	1.126	0.954	0.94	0.50	0.97	305.47	1.55		1	100	1.00	5.20	1.00	306.6	0.98	Infin.	0.000	0.474	Non-Liq.	Non-Liq.	0.00
21.16	327.20	2.80	0.86	110	1.130	0.954	0.86	0.50	0.97	298.19	1.52		1	100	1.00	5.20	1.00	299.3	0.97	Infin.	0.000	0.476	Non-Liq.	Non-Liq.	0.00
21.33	310.59	2.46	0.79	110	1.134	0.954	0.80	0.50	0.97	282.51	1.51		1	100	1.00	5.20	1.00	283.6	0.97	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
21.49	293.79	1.87	0.63	110	1.138	0.953	0.64	0.50	0.96	266.71	1.46		1	100	1.00	5.20	1.00	267.7	0.97	Infin.	0.000	0.480	Non-Liq.	Non-Liq.	0.00
21.65	272.37	1.43	0.52	110	1.142	0.953	0.53	0.50	0.96	246.76	1.43		1	100	1.00	5.20	1.00	247.7	0.97	Infin.	0.000	0.482	Non-Liq.	Non-Liq.	0.00
21.82	224.93	2.27	1.01	110	1.146	0.952	1.01	0.51	0.96	203.01	1.69		1	100	1.03	5.20	1.00	210.1	0.97	Infin.	0.000	0.483	Non-Liq.	Non-Liq.	0.00
21.98	164.58	3.51	2.13	110	1.150	0.952	2.15	0.62	0.95	146.76	2.03		1	93	1.34		1.00	196.2	0.97	Infin.	0.000	0.485	Non-Liq.	Non-Liq.	0.00
22.15	113.74	3.46	3.04	110	1.154	0.951	3.07	0.68	0.94	100.30	2.25		1	77	1.81		1.00	181.0	0.97	Infin.	0.000	0.487	Non-Liq.	Non-Liq.	0.00
22.31	96.23	3.59	3.73	110	1.158	0.951	3.78	0.72	0.94	84.24	2.37		1	70	2.19		1.00	184.7	0.97	Infin.	0.000	0.489	Non-Liq.	Non-Liq.	0.00
22.47	51.22	2.75	5.37	110	1.161	0.950	5.50	0.81	0.93	43.86	2.68		0						0.98			0.490	Non-Liq.	Non-Liq.	0.00
22.64	53.23	1.95	3.66	110	1.165	0.950	3.74	0.77	0.93	45.67	2.55		1	44	3.02		1.00	138.0	0.98	0.324	0.318	0.492	**0.65**	81%	**1.02**
22.80	95.82	1.58	1.65	110	1.169	0.949	1.67	0.64	0.94	83.90	2.11		1	70	1.48		1.00	124.3	0.97	0.258	0.251	0.494	**0.51**	90%	**1.17**
22.97	193.72	2.53	1.30	110	1.173	0.949	1.31	0.55	0.94	171.87	1.82		1	99	1.12	1.00	1.00	193.5	0.96	Infin.	0.000	0.495	Non-Liq.	Non-Liq.	0.00
23.13	228.65	2.09	0.91	110	1.177	0.948	0.92	0.51	0.95	203.73	1.66		1	100	1.01	1.05	1.00	206.2	0.96	Infin.	0.000	0.497	Non-Liq.	Non-Liq.	0.00
23.29	278.92	2.84	1.02	110	1.181	0.948	1.02	0.50	0.95	248.47	1.63		1	100	1.00	1.10	1.00	249.4	0.96	Infin.	0.000	0.498	Non-Liq.	Non-Liq.	0.00
23.46	376.36	2.41	0.64	110	1.185	0.947	0.64	0.50	0.94	335.09	1.40		1	100	1.00	1.15	1.00	336.3	0.96	Infin.	0.000	0.500	Non-Liq.	Non-Liq.	0.00
23.62	310.45	2.46	0.79	110	1.189	0.947	0.80	0.50	0.94	275.76	1.52		1	100	1.00	1.20	1.00	276.8	0.95	Infin.	0.000	0.502	Non-Liq.	Non-Liq.	0.00
23.79	306.26	2.29	0.75	110	1.193	0.946	0.75	0.50	0.94	271.58	1.51		1	100	1.00	1.25	1.00	272.6	0.95	Infin.	0.000	0.503	Non-Liq.	Non-Liq.	0.00
23.95	308.85	2.26	0.73	110	1.197	0.946	0.74	0.50	0.94	273.43	1.50		1	100	1.00	1.30	1.00	274.5	0.95	Infin.	0.000	0.505	Non-Liq.	Non-Liq.	0.00
24.11	306.71	2.22	0.72	110	1.200	0.945	0.73	0.50	0.94	271.08	1.50		1	100	1.00	1.35	1.00	272.1	0.95	Infin.	0.000	0.506	Non-Liq.	Non-Liq.	0.00
24.28	307.77	2.19	0.71	110	1.204	0.945	0.72	0.50	0.94	271.58	1.49		1	100	1.00	1.40	1.00	272.6	0.95	Infin.	0.000	0.508	Non-Liq.	Non-Liq.	0.00
24.44	305.26	1.72	0.56	110	1.208	0.944	0.57	0.50	0.94	268.92	1.42		1	100	1.00	1.45	1.00	269.9	0.95	Infin.	0.000	0.509	Non-Liq.	Non-Liq.	0.00
24.61	305.26	1.99	0.65	110	1.212	0.943	0.65	0.50	0.93	268.48	1.47		1	100	1.00	1.50	1.00	269.5	0.95	Infin.	0.000	0.511	Non-Liq.	Non-Liq.	0.00
24.77	310.72	2.04	0.66	110	1.216	0.943	0.66	0.50	0.93	272.86	1.47		1	100	1.00	1.50	1.00	273.9	0.95	Infin.	0.000	0.512	Non-Liq.	Non-Liq.	0.00
24.93	312.81	1.96	0.63	110	1.220	0.942	0.63	0.50	0.93	274.26	1.45		1	100	1.00	1.50	1.00	275.3	0.94	Infin.	0.000	0.514	Non-Liq.	Non-Liq.	0.00
25.10	329.09	2.01	0.61	110	1.224	0.942	0.61	0.50	0.93	288.12	1.43		1	100	1.00	1.50	1.00	289.2	0.94	Infin.	0.000	0.515	Non-Liq.	Non-Liq.	0.00
25.26	344.97	1.95	0.57	110	1.228	0.941	0.57	0.50	0.93	301.60	1.39		1	100	1.00	1.50	1.00	302.7	0.94	Infin.	0.000	0.516	Non-Liq.	Non-Liq.	0.00
25.43	351.08	2.30	0.65	110	1.232	0.941	0.66	0.50	0.93	306.47	1.43		1	100	1.00	1.50	1.00	307.6	0.94	Infin.	0.000	0.518	Non-Liq.	Non-Liq.	0.00
25.59	363.90	2.26	0.62	110	1.236	0.940	0.62	0.50	0.93	317.19	1.40		1	100	1.00	1.50	1.00	318.4	0.94	Infin.	0.000	0.519	Non-Liq.	Non-Liq.	0.00
25.75	366.29	2.65	0.72	110	1.240	0.939	0.72	0.50	0.92	318.77	1.45		1	100	1.00	1.50	1.00	320.0	0.94	Infin.	0.000	0.520	Non-Liq.	Non-Liq.	0.00
25.92	360.95	2.59	0.72	110	1.243	0.939	0.72	0.50	0.92	313.61	1.45		1	100	1.00	1.50	1.00	314.8	0.94	Infin.	0.000	0.522	Non-Liq.	Non-Liq.	0.00
26.08	355.58	2.62	0.74	110	1.247	0.938	0.74	0.50	0.92	308.45	1.47		1	100	1.00	1.50	1.00	309.6	0.94	Infin.	0.000	0.523	Non-Liq.	Non-Liq.	0.00
26.25	351.54	2.85	0.81	110	1.251	0.938	0.81	0.50	0.92	304.45	1.50		1	100	1.00	1.50	1.00	305.6	0.94	Infin.	0.000	0.524	Non-Liq.	Non-Liq.	0.00
26.41	345.76	2.67	0.77	110	1.255	0.937	0.77	0.50	0.92	298.96	1.49		1	100	1.00	1.50	1.00	300.1	0.93	Infin.	0.000	0.526	Non-Liq.	Non-Liq.	0.00
26.57	331.98	2.56	0.77	110	1.259	0.936	0.77	0.50	0.92	286.55	1.50		1	100	1.00	1.50	1.00	287.6	0.93	Infin.	0.000	0.527	Non-Liq.	Non-Liq.	0.00
26.74	322.29	2.19	0.68	110	1.263	0.936	0.68	0.50	0.92	277.72	1.47		1	100	1.00	1.50	1.00	278.8	0.93	Infin.	0.000	0.528	Non-Liq.	Non-Liq.	0.00
26.90	314.01	1.96	0.62	110	1.267	0.935	0.63	0.50	0.91	270.14	1.45		1	100	1.00	1.50	1.00	271.1	0.93	Infin.	0.000	0.529	Non-Liq.	Non-Liq.	0.00
27.07	312.94	1.77	0.57	110	1.271	0.934	0.57	0.50	0.91	268.79	1.43		1	100	1.00	1.50	1.00	269.8	0.93	Infin.	0.000	0.531	Non-Liq.	Non-Liq.	0.00
27.23	297.68	2.06	0.69	110	1.275	0.934	0.69	0.50	0.91	255.24	1.50		1	100	1.00	1.50	1.00	256.2	0.93	Infin.	0.000	0.532	Non-Liq.	Non-Liq.	0.00
27.40	274.32	1.97	0.72	110	1.279	0.933	0.72	0.50	0.91	234.76	1.54		1	100	1.00	1.50	1.00	235.6	0.93	Infin.	0.000	0.533	Non-Liq.	Non-Liq.	0.00
27.56	243.92	1.79	0.73	110	1.282	0.932	0.74	0.50	0.91	208.30	1.58		1	100	1.00	1.50	1.00	209.1	0.93	Infin.	0.000	0.534	Non-Liq.	Non-Liq.	0.00
27.72	203.86	2.06	1.01	110	1.286	0.932	1.02	0.53	0.90	172.64	1.74		1	99	1.06	1.50	1.00	184.4	0.92	Infin.	0.000	0.535	Non-Liq.	Non-Liq.	0.00
27.89	128.56	2.20	1.71	110	1.290	0.931	1.73	0.62	0.88	106.29	2.05		1	79	1.37		1.00	146.0	0.92	0.370	0.341	0.536	**0.64**	82%	**0.86**

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	M=7.5 CSR	Induced Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
28.05	101.99	2.28	2.23	110	1.294	0.930	2.26	0.67	0.87	83.14	2.21		1	69	1.69		1.00	140.6	0.94	0.338	0.318	0.538	**0.59**	85%	**1.00**
28.22	51.11	1.80	3.51	110	1.298	0.929	3.60	0.78	0.85	40.13	2.58		1	39	3.19		1.00	128.0	0.96	0.275	0.264	0.539	**0.49**	91%	**1.14**
28.38	52.32	1.72	3.29	110	1.302	0.929	3.37	0.77	0.85	41.07	2.55		1	40	3.03		1.00	124.6	0.96	0.260	0.249	0.540	**0.46**	93%	**1.18**
28.54	56.72	1.37	2.42	110	1.306	0.928	2.47	0.74	0.86	44.85	2.43		1	44	2.44		1.00	109.6	0.96	0.202	0.194	0.541	**0.36**	97%	**1.36**
28.71	70.59	1.56	2.21	110	1.310	0.927	2.25	0.71	0.86	56.31	2.33		1	53	2.05		1.00	115.3	0.94	0.223	0.209	0.542	**0.39**	96%	**1.29**
28.87	114.33	1.68	1.47	110	1.314	0.926	1.49	0.62	0.87	93.36	2.05		1	74	1.37		1.00	127.5	0.92	0.273	0.250	0.543	**0.46**	93%	**1.14**
29.04	212.27	1.59	0.75	110	1.318	0.926	0.76	0.50	0.90	178.67	1.64		1	100	1.00	1.00	1.00	178.6	0.92	Infin.	0.000	0.544	**Non-Liq.**	Non-Liq.	**0.00**
29.20	270.62	2.46	0.91	110	1.322	0.925	0.91	0.50	0.89	227.75	1.62		1	100	1.00	1.05	1.00	228.6	0.91	Infin.	0.000	0.545	**Non-Liq.**	Non-Liq.	**0.00**
29.36	330.54	2.18	0.66	110	1.325	0.924	0.66	0.50	0.89	278.01	1.46		1	100	1.00	1.10	1.00	279.0	0.91	Infin.	0.000	0.546	**Non-Liq.**	Non-Liq.	**0.00**
29.53	349.39	1.96	0.56	110	1.329	0.923	0.56	0.50	0.89	293.49	1.39		1	100	1.00	1.15	1.00	294.6	0.91	Infin.	0.000	0.547	**Non-Liq.**	Non-Liq.	**0.00**
29.69	360.66	1.80	0.50	110	1.333	0.923	0.50	0.50	0.89	302.55	1.35		1	100	1.00	1.20	1.00	303.7	0.91	Infin.	0.000	0.548	**Non-Liq.**	Non-Liq.	**0.00**
29.86	367.26	1.69	0.46	110	1.337	0.922	0.46	0.50	0.89	307.65	1.32		1	100	1.00	1.25	1.00	308.8	0.91	Infin.	0.000	0.549	**Non-Liq.**	Non-Liq.	**0.00**
30.02	360.19	1.58	0.44	110	1.341	0.921	0.44	0.50	0.89	301.27	1.32		1	100	1.00	1.30	1.00	302.4	0.91	Infin.	0.000	0.550	**Non-Liq.**	Non-Liq.	**0.00**
30.18	364.67	1.25	0.34	110	1.345	0.920	0.34	0.50	0.89	304.58	1.24		1	100	1.00	1.35	1.00	305.7	0.91	Infin.	0.000	0.551	**Non-Liq.**	Non-Liq.	**0.00**
30.35	376.58	1.54	0.41	110	1.349	0.919	0.41	0.50	0.89	314.11	1.28		1	100	1.00	1.40	1.00	315.3	0.91	Infin.	0.000	0.551	**Non-Liq.**	Non-Liq.	**0.00**
30.51	377.16	1.63	0.43	110	1.353	0.918	0.43	0.50	0.88	314.13	1.30		1	100	1.00	1.45	1.00	315.3	0.91	Infin.	0.000	0.552	**Non-Liq.**	Non-Liq.	**0.00**
30.68	333.76	1.64	0.49	110	1.357	0.918	0.49	0.50	0.88	277.45	1.37		1	100	1.00	1.50	1.00	278.5	0.91	Infin.	0.000	0.553	**Non-Liq.**	Non-Liq.	**0.00**
30.84	317.96	1.81	0.57	110	1.361	0.917	0.57	0.50	0.88	263.88	1.43		1	100	1.00	1.55	1.00	264.9	0.90	Infin.	0.000	0.554	**Non-Liq.**	Non-Liq.	**0.00**
31.00	293.92	1.53	0.52	110	1.364	0.916	0.52	0.50	0.88	243.49	1.43		1	100	1.00	1.60	1.00	244.4	0.90	Infin.	0.000	0.555	**Non-Liq.**	Non-Liq.	**0.00**
31.17	298.19	1.57	0.53	110	1.368	0.915	0.53	0.50	0.88	246.69	1.43		1	100	1.00	1.65	1.00	247.6	0.90	Infin.	0.000	0.556	**Non-Liq.**	Non-Liq.	**0.00**
31.33	299.06	1.55	0.52	110	1.372	0.914	0.52	0.50	0.88	247.06	1.43		1	100	1.00	1.70	1.00	248.0	0.90	Infin.	0.000	0.556	**Non-Liq.**	Non-Liq.	**0.00**
31.50	301.92	1.67	0.55	110	1.376	0.913	0.55	0.50	0.88	249.07	1.44		1	100	1.00	1.75	1.00	250.0	0.90	Infin.	0.000	0.557	**Non-Liq.**	Non-Liq.	**0.00**
31.66	296.78	1.60	0.54	110	1.380	0.912	0.54	0.50	0.88	244.47	1.44		1	100	1.00	1.80	1.00	245.4	0.90	Infin.	0.000	0.558	**Non-Liq.**	Non-Liq.	**0.00**
31.82	282.25	1.66	0.59	110	1.384	0.911	0.59	0.50	0.87	232.11	1.48		1	100	1.00	1.85	1.00	233.0	0.90	Infin.	0.000	0.559	**Non-Liq.**	Non-Liq.	**0.00**
31.99	283.26	2.04	0.72	110	1.388	0.910	0.73	0.50	0.87	232.61	1.54		1	100	1.00	1.90	1.00	233.5	0.90	Infin.	0.000	0.559	**Non-Liq.**	Non-Liq.	**0.00**
32.15	279.05	2.52	0.90	110	1.392	0.909	0.91	0.50	0.87	228.81	1.62		1	100	1.00	1.95	1.00	229.7	0.90	Infin.	0.000	0.560	**Non-Liq.**	Non-Liq.	**0.00**
32.32	264.05	3.05	1.15	110	1.396	0.908	1.16	0.52	0.87	214.79	1.72		1	100	1.05	2.00	1.00	226.1	0.90	Infin.	0.000	0.561	**Non-Liq.**	Non-Liq.	**0.00**
32.48	250.59	3.28	1.31	110	1.400	0.907	1.32	0.54	0.86	202.48	1.77		1	100	1.09	2.05	1.00	221.2	0.89	Infin.	0.000	0.561	**Non-Liq.**	Non-Liq.	**0.00**
32.64	244.23	3.15	1.29	110	1.403	0.906	1.30	0.54	0.86	196.97	1.78		1	100	1.09	2.10	1.00	215.6	0.89	Infin.	0.000	0.562	**Non-Liq.**	Non-Liq.	**0.00**
32.81	239.79	3.02	1.26	110	1.407	0.905	1.27	0.54	0.86	193.10	1.78		1	100	1.09	2.15	1.00	211.1	0.89	Infin.	0.000	0.563	**Non-Liq.**	Non-Liq.	**0.00**
32.97	240.83	2.74	1.14	110	1.411	0.904	1.14	0.53	0.86	194.23	1.74		1	100	1.07	2.20	1.00	207.7	0.89	Infin.	0.000	0.563	**Non-Liq.**	Non-Liq.	**0.00**
33.14	267.29	2.26	0.85	110	1.415	0.903	0.85	0.50	0.86	217.28	1.61		1	100	1.00	2.25	1.00	218.1	0.89	Infin.	0.000	0.564	**Non-Liq.**	Non-Liq.	**0.00**
33.30	269.49	1.86	0.69	110	1.419	0.902	0.69	0.50	0.86	218.78	1.55		1	100	1.00	2.30	1.00	219.6	0.89	Infin.	0.000	0.565	**Non-Liq.**	Non-Liq.	**0.00**
33.46	270.31	2.15	0.80	110	1.423	0.901	0.80	0.50	0.86	219.14	1.59		1	100	1.00	2.35	1.00	220.0	0.89	Infin.	0.000	0.565	**Non-Liq.**	Non-Liq.	**0.00**
33.63	241.91	2.18	0.90	110	1.427	0.900	0.90	0.51	0.86	195.27	1.67		1	100	1.01	2.40	1.00	198.8	0.89	Infin.	0.000	0.566	**Non-Liq.**	Non-Liq.	**0.00**
33.79	219.65	2.12	0.96	110	1.431	0.899	0.97	0.52	0.85	176.09	1.72		1	100	1.05	2.45	1.00	185.7	0.89	Infin.	0.000	0.566	**Non-Liq.**	Non-Liq.	**0.00**
33.96	236.69	2.44	1.03	110	1.435	0.898	1.04	0.52	0.85	189.61	1.72		1	100	1.05	2.50	1.00	199.7	0.89	Infin.	0.000	0.567	**Non-Liq.**	Non-Liq.	**0.00**
34.12	253.42	2.64	1.04	110	1.439	0.897	1.05	0.52	0.85	203.12	1.70		1	100	1.04	2.55	1.00	211.6	0.88	Infin.	0.000	0.567	**Non-Liq.**	Non-Liq.	**0.00**
34.28	273.96	3.02	1.10	110	1.443	0.896	1.11	0.52	0.85	219.46	1.70		1	100	1.03	2.60	1.00	227.9	0.88	Infin.	0.000	0.568	**Non-Liq.**	Non-Liq.	**0.00**
34.45	296.13	3.44	1.16	110	1.446	0.895	1.17	0.51	0.85	237.10	1.69		1	100	1.03	2.65	1.00	245.4	0.88	Infin.	0.000	0.568	**Non-Liq.**	Non-Liq.	**0.00**
34.61	315.65	3.90	1.24	110	1.450	0.894	1.24	0.52	0.85	252.37	1.69		1	100	1.03	2.70	1.00	261.8	0.88	Infin.	0.000	0.569	**Non-Liq.**	Non-Liq.	**0.00**
34.78	329.54	4.18	1.27	110	1.454	0.893	1.28	0.52	0.85	263.22	1.69		1	100	1.03	2.75	1.00	272.6	0.88	Infin.	0.000	0.569	**Non-Liq.**	Non-Liq.	**0.00**
34.94	341.71	4.12	1.21	110	1.458	0.892	1.21	0.51	0.85	273.33	1.66		1	100	1.01	2.80	1.00	277.8	0.88	Infin.	0.000	0.570	**Non-Liq.**	Non-Liq.	**0.00**
35.10	357.73	3.87	1.08	110	1.462	0.890	1.08	0.50	0.85	286.45	1.61		1	100	1.00	2.85	1.00	287.5	0.88	Infin.	0.000	0.570	**Non-Liq.**	Non-Liq.	**0.00**
35.27	368.55	3.45	0.94	110	1.466	0.889	0.94	0.50	0.85	294.76	1.56		1	100	1.00	2.90	1.00	295.9	0.88	Infin.	0.000	0.570	**Non-Liq.**	Non-Liq.	**0.00**
35.43	371.34	3.32	0.89	110	1.470	0.888	0.90	0.50	0.85	296.60	1.54		1	100	1.00	2.95	1.00	297.7	0.88	Infin.	0.000	0.571	**Non-Liq.**	Non-Liq.	**0.00**
35.60	374.83	3.14	0.84	110	1.474	0.887	0.84	0.50	0.85	299.00	1.52		1	100	1.00	3.00	1.00	300.1	0.88	Infin.	0.000	0.571	**Non-Liq.**	Non-Liq.	**0.00**
35.76	374.45	2.75	0.73	110	1.478	0.886	0.74	0.50	0.85	298.29	1.47		1	100	1.00	3.05	1.00	299.4	0.87	Infin.	0.000	0.572	**Non-Liq.**	Non-Liq.	**0.00**
35.93	379.11	2.45	0.65	110	1.482	0.885	0.65	0.50	0.85	301.62	1.43		1	100	1.00	3.10	1.00	302.7	0.87	Infin.	0.000	0.572	**Non-Liq.**	Non-Liq.	**0.00**
36.09	370.12	2.21	0.60	110	1.485	0.883	0.60	0.50	0.84	294.05	1.41		1	100	1.00	3.15	1.00	295.1	0.87	Infin.	0.000	0.572	**Non-Liq.**	Non-Liq.	**0.00**
36.25	350.96	2.32	0.66	110	1.489	0.882	0.66	0.50	0.84	278.40	1.46		1	100	1.00	3.20	1.00	279.4	0.87	Infin.	0.000	0.573	**Non-Liq.**	Non-Liq.	**0.00**
36.42	332.11	2.24	0.67	110	1.493	0.881	0.68	0.50	0.84	263.03	1.49		1	100	1.00	3.25	1.00	264.0	0.87	Infin.	0.000	0.573	**Non-Liq.**	Non-Liq.	**0.00**
36.58	320.02	4.38	1.37	110	1.497	0.880	1.38	0.53	0.83	250.73	1.73		1	100	1.06	3.30	1.00	266.2	0.87	Infin.	0.000	0.573	**Non-Liq.**	Non-Liq.	**0.00**
36.75	314.68	4.59	1.46	110	1.501	0.878	1.47	0.54	0.83	245.47	1.76		1	100	1.08	3.35	1.00	265.3	0.87	Infin.	0.000	0.573	**Non-Liq.**	Non-Liq.	**0.00**
36.91	323.64	4.64	1.43	110	1.505	0.877	1.44	0.53	0.83	252.50	1.74		1	100	1.07	3.40	1.00	270.5	0.87	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
37.07	352.97	4.40	1.25	110	1.509	0.876	1.25	0.51	0.83	277.26	1.67		1	100	1.02	3.45	1.00	283.2	0.87	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
37.24	339.32	4.58	1.35	110	1.513	0.875	1.36	0.52	0.83	265.01	1.71		1	100	1.04	3.50	1.00	277.9	0.87	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
37.40	311.75	3.95	1.27	110	1.517	0.873	1.27	0.52	0.83	243.01	1.71		1	100	1.05	3.55	1.00	255.1	0.87	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
37.57	316.65	3.97	1.25	110	1.521	0.872	1.26	0.52	0.83	246.71	1.70		1	100	1.04	3.60	1.00	257.7	0.86	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
37.73	324.98	4.11	1.27	110	1.525	0.871	1.27	0.52	0.83	253.00	1.70		1	100	1.04	3.65	1.00	263.7	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
37.89	313.50	4.12	1.31	110	1.528	0.869	1.32	0.53	0.82	243.07	1.72		1	100	1.05	3.70	1.00	257.1	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
38.06	336.26	4.69	1.39	110	1.532	0.868	1.40	0.53	0.82	260.39	1.73		1	100	1.06	3.75	1.00	275.8	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
38.22	355.50	7.68	2.16	110	1.536	0.867	2.17	0.57	0.81	270.57	1.87		1	100	1.16	3.80	1.00	315.7	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
38.39	365.48	7.76	2.12	110	1.540	0.865	2.13	0.57	0.81	278.20	1.86		1	100	1.15	3.85	1.00	321.5	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
38.55	420.69	8.65	2.06	110	1.544	0.864	2.06	0.55	0.81	321.61	1.81		1	100	1.12	3.90	1.00	360.0	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
38.71	390.62	7.43	1.90	110	1.548	0.863	1.91	0.55	0.81	298.48	1.80		1	100	1.11	3.95	1.00	331.8	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
38.88	316.05	7.07	2.24	110	1.552	0.861	2.25	0.58	0.80	237.81	1.91		1	100	1.20	4.00	1.00	287.2	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
39.04	282.97	4.44	1.57	110	1.556	0.860	1.58	0.55	0.81	214.87	1.82		1	100	1.12	4.05	1.00	241.6	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
39.21	275.95	3.83	1.39	110	1.560	0.859	1.39	0.54	0.81	210.08	1.78		1	100	1.09	4.10	1.00	230.8	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
39.37	269.76	4.26	1.58	110	1.564	0.857	1.59	0.56	0.80	203.82	1.83		1	100	1.13	4.15	1.00	231.8	0.86	Infin.	0.000	0.576	**Non-Liq.**	Non-Liq.	**0.00**
39.53	267.47	4.03	1.51	110	1.567	0.856	1.51	0.55	0.80	202.11	1.82		1	100	1.12	4.20	1.00	227.7	0.85	Infin.	0.000	0.576	**Non-Liq.**	Non-Liq.	**0.00**
39.70	286.57	4.17	1.45	110	1.571	0.854	1.46	0.54	0.81	217.15	1.79		1	100	1.10	4.25	1.00	239.5	0.85	Infin.	0.000	0.576	**Non-Liq.**	Non-Liq.	**0.00**
39.86	266.83	3.87	1.45	110	1.575	0.853	1.46	0.55	0.80	201.34	1.81		1	100	1.11	4.30	1.00	225.1	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
40.03	266.44	3.65	1.37	110	1.579	0.852	1.38	0.55	0.80	201.22	1.79		1	100	1.10	4.35	1.00	222.2	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
40.19	264.65	3.64	1.38	110	1.583	0.850	1.38	0.55	0.80	199.50	1.79		1	100	1.10	4.40	1.00	220.9	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
40.35	262.76	3.62	1.38	110	1.587	0.849	1.38	0.55	0.80	197.73	1.80		1	100	1.10	4.45	1.00	219.3	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
40.52	263.40	3.68	1.40	110	1.591	0.847	1.40	0.55	0.80	197.84	1.80		1	100	1.11	4.50	1.00	220.0	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
40.68	268.30	2.97	1.11	110	1.595	0.846	1.11	0.52	0.81	203.34	1.72		1	100	1.05	4.55	1.00	214.4	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
40.85	273.61	3.26	1.19	110	1.599	0.844	1.20	0.53	0.80	206.64	1.74		1	100	1.06	4.60	1.00	220.5	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
41.01	279.17	3.44	1.23	110	1.603	0.843	1.24	0.53	0.80	210.44	1.74		1	100	1.07	4.65	1.00	225.4	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
41.17	277.56	3.52	1.27	110	1.607	0.841	1.27	0.53	0.80	208.63	1.76		1	100	1.08	4.70	1.00	225.1	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
41.34	264.17	3.63	1.38	110	1.610	0.840	1.38	0.55	0.79	197.18	1.80		1	100	1.11	4.75	1.00	218.8	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
41.50	267.65	3.48	1.30	110	1.614	0.838	1.31	0.54	0.80	200.10	1.78		1	100	1.09	4.80	1.00	218.7	0.84	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
41.67	269.53	3.45	1.28	110	1.618	0.837	1.29	0.54	0.80	201.42	1.77		1	100	1.08	4.85	1.00	219.2	0.84	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
41.83	264.07	3.42	1.30	110	1.622	0.835	1.30	0.54	0.79	196.79	1.78		1	100	1.09	4.90	1.00	215.7	0.84	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
41.99	253.52	3.32	1.31	110	1.626	0.834	1.32	0.55	0.79	188.24	1.80		1	100	1.10	4.95	1.00	208.4	0.84	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
42.16	253.46	3.37	1.33	110	1.630	0.832	1.34	0.55	0.79	187.81	1.80		1	100	1.11	5.00	1.00	208.7	0.84	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
42.32	248.94	3.31	1.33	110	1.634	0.831	1.34	0.55	0.79	184.04	1.81		1	100	1.11	5.05	1.00	205.4	0.84	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
42.49	240.19	3.20	1.33	110	1.638	0.829	1.34	0.55	0.79	177.01	1.82		1	100	1.12	5.10	1.00	199.2	0.84	Infin.	0.000	0.573	**Non-Liq.**	Non-Liq.	**0.00**
42.65	239.26	3.01	1.26	110	1.642	0.827	1.27	0.55	0.79	176.50	1.80		1	100	1.11	5.15	1.00	196.2	0.84	Infin.	0.000	0.573	**Non-Liq.**	Non-Liq.	**0.00**
42.81	235.68	3.23	1.37	110	1.646	0.826	1.38	0.56	0.78	172.84	1.84		1	100	1.13	5.20	1.00	196.6	0.84	Infin.	0.000	0.573	**Non-Liq.**	Non-Liq.	**0.00**
42.98	234.20	2.85	1.22	110	1.649	0.824	1.23	0.55	0.78	172.36	1.80		1	99	1.11	5.25	1.00	191.3	0.84	Infin.	0.000	0.573	**Non-Liq.**	Non-Liq.	**0.00**

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_q	Corrected Qc1n	Ic	Overide	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_c	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
43.14	238.08	3.09	1.30	110	1.653	0.823	1.31	0.55	0.78	174.63	1.81		1	100	1.12	5.30	1.00	195.8	0.84	Infin.	0.000	0.572	**Non-Liq.**	Non-Liq.	**0.00**
43.31	216.71	3.13	1.45	110	1.657	0.821	1.46	0.57	0.77	157.24	1.88		1	96	1.17	5.35	1.00	184.8	0.84	Infin.	0.000	0.572	**Non-Liq.**	Non-Liq.	**0.00**
43.47	215.92	2.85	1.32	110	1.661	0.820	1.33	0.56	0.78	157.06	1.85		1	96	1.15	5.40	1.00	180.7	0.83	Infin.	0.000	0.572	**Non-Liq.**	Non-Liq.	**0.00**
43.64	228.43	2.91	1.27	110	1.665	0.818	1.28	0.55	0.78	166.65	1.82		1	98	1.12	5.45	1.00	188.0	0.83	Infin.	0.000	0.572	**Non-Liq.**	Non-Liq.	**0.00**
43.80	245.66	2.77	1.13	110	1.669	0.816	1.14	0.54	0.78	180.61	1.76		1	100	1.08	5.50	1.00	195.6	0.83	Infin.	0.000	0.571	**Non-Liq.**	Non-Liq.	**0.00**
43.96	253.66	2.83	1.12	110	1.673	0.815	1.12	0.53	0.78	186.64	1.75		1	100	1.07	5.55	1.00	200.4	0.83	Infin.	0.000	0.571	**Non-Liq.**	Non-Liq.	**0.00**
44.13	255.03	2.26	0.89	110	1.677	0.813	0.89	0.51	0.79	189.39	1.67		1	100	1.02	5.60	1.00	193.6	0.83	Infin.	0.000	0.571	**Non-Liq.**	Non-Liq.	**0.00**
44.29	249.25	2.48	0.99	110	1.681	0.811	1.00	0.52	0.79	183.72	1.72		1	100	1.05	5.65	1.00	193.3	0.83	Infin.	0.000	0.570	**Non-Liq.**	Non-Liq.	**0.00**
44.46	256.60	2.83	1.10	110	1.685	0.810	1.11	0.53	0.78	188.29	1.74		1	100	1.06	5.70	1.00	201.3	0.83	Infin.	0.000	0.570	**Non-Liq.**	Non-Liq.	**0.00**
44.62	265.56	3.34	1.26	110	1.689	0.808	1.26	0.54	0.78	193.76	1.77		1	100	1.09	5.75	1.00	211.6	0.83	Infin.	0.000	0.569	**Non-Liq.**	Non-Liq.	**0.00**
44.78	290.32	3.34	1.15	110	1.692	0.807	1.16	0.52	0.78	213.36	1.72		1	100	1.05	5.75	1.00	224.7	0.83	Infin.	0.000	0.569	**Non-Liq.**	Non-Liq.	**0.00**
44.95	335.88	3.42	1.02	110	1.696	0.805	1.02	0.50	0.79	249.45	1.63		1	100	1.00	5.75	1.00	250.4	0.83	Infin.	0.000	0.569	**Non-Liq.**	Non-Liq.	**0.00**
45.11	394.83	2.84	0.72	110	1.700	0.803	0.72	0.50	0.79	293.12	1.47		1	100	1.00	5.75	1.00	294.2	0.83	Infin.	0.000	0.568	**Non-Liq.**	Non-Liq.	**0.00**
45.28	449.80	3.22	0.72	110	1.704	0.802	0.72	0.50	0.79	333.72	1.43		1	100	1.00	5.75	1.00	335.0	0.83	Infin.	0.000	0.568	**Non-Liq.**	Non-Liq.	**0.00**
45.44	447.17	4.13	0.92	110	1.708	0.800	0.93	0.50	0.79	331.38	1.52		1	100	1.00	5.75	1.00	332.6	0.83	Infin.	0.000	0.567	**Non-Liq.**	Non-Liq.	**0.00**
45.60	452.93	3.89	0.86	110	1.712	0.798	0.86	0.50	0.79	335.27	1.49		1	100	1.00	5.75	1.00	336.5	0.82	Infin.	0.000	0.567	**Non-Liq.**	Non-Liq.	**0.00**
45.77	475.52	3.64	0.77	110	1.716	0.797	0.77	0.50	0.79	351.66	1.44		1	100	1.00	5.75	1.00	353.0	0.82	Infin.	0.000	0.567	**Non-Liq.**	Non-Liq.	**0.00**
45.93	444.46	2.97	0.67	110	1.720	0.795	0.67	0.50	0.78	328.23	1.42		1	100	1.00	5.75	1.00	329.5	0.82	Infin.	0.000	0.566	**Non-Liq.**	Non-Liq.	**0.00**
46.10	446.58	2.40	0.54	110	1.724	0.793	0.54	0.50	0.78	329.42	1.35		1	100	1.00	5.75	1.00	330.7	0.82	Infin.	0.000	0.566	**Non-Liq.**	Non-Liq.	**0.00**
46.26	425.00	2.48	0.58	110	1.728	0.792	0.59	0.50	0.78	313.09	1.39		1	100	1.00	5.75	1.00	314.3	0.82	Infin.	0.000	0.565	**Non-Liq.**	Non-Liq.	**0.00**
46.42	414.92	2.66	0.64	110	1.731	0.790	0.64	0.50	0.78	305.28	1.42		1	100	1.00	5.75	1.00	306.4	0.82	Infin.	0.000	0.565	**Non-Liq.**	Non-Liq.	**0.00**
46.59	394.40	2.71	0.69	110	1.735	0.788	0.69	0.50	0.78	289.79	1.46		1	100	1.00	5.75	1.00	290.9	0.82	Infin.	0.000	0.564	**Non-Liq.**	Non-Liq.	**0.00**
46.75	375.24	2.77	0.74	110	1.739	0.787	0.74	0.50	0.78	275.34	1.50		1	100	1.00	5.75	1.00	276.4	0.82	Infin.	0.000	0.564	**Non-Liq.**	Non-Liq.	**0.00**
46.92	360.27	2.57	0.71	110	1.743	0.785	0.72	0.50	0.78	264.00	1.50		1	100	1.00	5.75	1.00	265.0	0.82	Infin.	0.000	0.563	**Non-Liq.**	Non-Liq.	**0.00**
47.08	348.31	2.26	0.65	110	1.747	0.783	0.65	0.50	0.78	254.91	1.48		1	100	1.00	5.75	1.00	255.9	0.82	Infin.	0.000	0.563	**Non-Liq.**	Non-Liq.	**0.00**
47.24	321.44	1.84	0.57	110	1.751	0.782	0.58	0.50	0.78	234.88	1.47		1	100	1.00	5.75	1.00	235.8	0.82	Infin.	0.000	0.562	**Non-Liq.**	Non-Liq.	**0.00**
47.41	279.99	1.88	0.67	110	1.755	0.780	0.68	0.50	0.78	204.20	1.56		1	100	1.00	5.75	1.00	205.0	0.82	Infin.	0.000	0.562	**Non-Liq.**	Non-Liq.	**0.00**
47.57	223.67	1.59	0.71	110	1.759	0.778	0.71	0.50	0.77	162.29	1.66		1	97	1.01	5.75	1.00	164.1	0.82	Infin.	0.000	0.561	**Non-Liq.**	Non-Liq.	**0.00**
47.74	164.82	2.03	1.23	110	1.763	0.777	1.25	0.59	0.74	114.21	1.93		1	82	1.22	5.75	1.00	139.7	0.82	0.334	0.272	0.561	**0.48**	92%	**1.01**
47.90	121.59	2.53	2.08	110	1.767	0.775	2.11	0.67	0.71	80.43	2.20		1	68	1.66		1.00	133.7	0.86	0.302	0.259	0.560	**0.46**	93%	**1.08**
48.06	91.32	2.37	2.60	110	1.770	0.773	2.65	0.72	0.69	58.48	2.37		1	55	2.18		1.00	127.5	0.86	0.273	0.234	0.560	**0.42**	95%	**1.14**
48.23	116.79	2.86	2.45	110	1.774	0.772	2.48	0.69	0.70	76.18	2.27		1	66	1.84		1.00	140.3	0.86	0.337	0.289	0.559	**0.52**	90%	**1.01**
48.39	231.35	2.98	1.29	110	1.778	0.770	1.30	0.56	0.75	162.37	1.83		1	97	1.13	1.00	1.00	184.6	0.81	Infin.	0.000	0.559	**Non-Liq.**	Non-Liq.	**0.00**
48.56	280.33	2.88	1.03	110	1.782	0.768	1.03	0.52	0.76	201.01	1.70		1	100	1.04	1.05	1.00	209.2	0.81	Infin.	0.000	0.558	**Non-Liq.**	Non-Liq.	**0.00**
48.72	300.38	2.56	0.85	110	1.786	0.767	0.86	0.50	0.77	217.21	1.62		1	100	1.00	1.10	1.00	218.0	0.81	Infin.	0.000	0.558	**Non-Liq.**	Non-Liq.	**0.00**
48.88	311.53	2.58	0.83	110	1.790	0.765	0.83	0.50	0.77	225.07	1.60		1	100	1.00	1.15	1.00	225.9	0.81	Infin.	0.000	0.557	**Non-Liq.**	Non-Liq.	**0.00**
49.05	325.26	2.50	0.77	110	1.794	0.763	0.77	0.50	0.77	234.79	1.56		1	100	1.00	1.20	1.00	235.7	0.81	Infin.	0.000	0.556	**Non-Liq.**	Non-Liq.	**0.00**
49.21	339.47	2.81	0.83	110	1.798	0.762	0.83	0.50	0.77	244.84	1.57		1	100	1.00	1.25	1.00	245.8	0.81	Infin.	0.000	0.556	**Non-Liq.**	Non-Liq.	**0.00**
49.38	344.98	3.24	0.94	110	1.802	0.760	0.94	0.50	0.77	248.56	1.61		1	100	1.00	1.30	1.00	249.5	0.81	Infin.	0.000	0.555	**Non-Liq.**	Non-Liq.	**0.00**
49.54	351.47	3.83	1.09	110	1.806	0.758	1.09	0.50	0.76	252.53	1.65		1	100	1.00	1.35	1.00	254.5	0.81	Infin.	0.000	0.555	**Non-Liq.**	Non-Liq.	**0.00**
49.70	357.74	3.92	1.10	110	1.810	0.757	1.10	0.50	0.76	256.89	1.65		1	100	1.00	1.40	1.00	258.4	0.81	Infin.	0.000	0.554	**Non-Liq.**	Non-Liq.	**0.00**
49.87	374.88	3.72	0.99	110	1.813	0.755	1.00	0.50	0.76	269.33	1.60		1	100	1.00	1.45	1.00	270.3	0.81	Infin.	0.000	0.553	**Non-Liq.**	Non-Liq.	**0.00**
50.03	395.53	3.14	0.79	110	1.817	0.753	0.80	0.50	0.76	283.93	1.51		1	100	1.00	1.50	1.00	285.0	0.81	Infin.	0.000	0.553	**Non-Liq.**	Non-Liq.	**0.00**
50.20	406.66	2.61	0.64	110	1.821	0.752	0.64	0.50	0.76	291.65	1.44		1	100	1.00	1.50	1.00	292.7	0.80	Infin.	0.000	0.552	**Non-Liq.**	Non-Liq.	**0.00**
50.36	421.58	2.63	0.62	110	1.825	0.750	0.63	0.50	0.76	302.07	1.42		1	100	1.00	1.50	1.00	303.2	0.80	Infin.	0.000	0.552	**Non-Liq.**	Non-Liq.	**0.00**
50.52	433.35	2.55	0.59	110	1.829	0.748	0.59	0.50	0.76	310.20	1.39		1	100	1.00	1.50	1.00	311.4	0.80	Infin.	0.000	0.551	**Non-Liq.**	Non-Liq.	**0.00**
50.69	439.99	2.57	0.58	110	1.833	0.747	0.59	0.50	0.76	314.64	1.39		1	100	1.00	1.50	1.00	315.8	0.80	Infin.	0.000	0.550	**Non-Liq.**	Non-Liq.	**0.00**
50.85	441.89	2.61	0.59	110	1.837	0.745	0.59	0.50	0.76	315.66	1.39		1	100	1.00	1.50	1.00	316.8	0.80	Infin.	0.000	0.550	**Non-Liq.**	Non-Liq.	**0.00**
51.02	455.49	2.77	0.61	110	1.841	0.743	0.61	0.50	0.76	325.07	1.39		1	100	1.00	1.50	1.00	326.3	0.80	Infin.	0.000	0.549	**Non-Liq.**	Non-Liq.	**0.00**
51.18	472.21	3.30	0.70	110	1.845	0.742	0.70	0.50	0.76	336.69	1.42		1	100	1.00	1.50	1.00	338.0	0.80	Infin.	0.000	0.549	**Non-Liq.**	Non-Liq.	**0.00**
51.35	504.84	3.77	0.75	110	1.849	0.740	0.75	0.50	0.76	359.67	1.43		1	100	1.00	1.50	1.00	361.0	0.80	Infin.	0.000	0.548	**Non-Liq.**	Non-Liq.	**0.00**
51.51	459.09	4.28	0.93	110	1.852	0.738	0.94	0.50	0.76	326.60	1.53		1	100	1.00	1.50	1.00	327.8	0.80	Infin.	0.000	0.547	**Non-Liq.**	Non-Liq.	**0.00**
51.67	422.99	4.23	1.00	110	1.856	0.737	1.00	0.50	0.75	300.50	1.57		1	100	1.00	1.50	1.00	301.6	0.80	Infin.	0.000	0.547	**Non-Liq.**	Non-Liq.	**0.00**
51.84	454.99	5.33	1.17	110	1.860	0.735	1.18	0.50	0.75	322.99	1.61		1	100	1.00	1.50	1.00	324.2	0.80	Infin.	0.000	0.546	**Non-Liq.**	Non-Liq.	**0.00**
52.00	493.38	5.94	1.20	110	1.864	0.733	1.21	0.50	0.75	349.99	1.60		1	100	1.00	1.50	1.00	351.3	0.80	Infin.	0.000	0.545	**Non-Liq.**	Non-Liq.	**0.00**
52.17	477.89	5.21	1.09	110	1.868	0.732	1.09	0.50	0.75	338.60	1.57		1	100	1.00	1.50	1.00	339.9	0.80	Infin.	0.000	0.545	**Non-Liq.**	Non-Liq.	**0.00**
52.33	440.86	3.78	0.86	110	1.872	0.730	0.86	0.50	0.75	311.93	1.51		1	100	1.00	1.50	1.00	313.1	0.80	Infin.	0.000	0.544	**Non-Liq.**	Non-Liq.	**0.00**
52.49	459.07	3.21	0.70	110	1.876	0.728	0.70	0.50	0.75	324.53	1.43		1	100	1.00	1.50	1.00	325.7	0.80	Infin.	0.000	0.543	**Non-Liq.**	Non-Liq.	**0.00**
52.66	325.12	2.21	0.68	110	1.880	0.727	0.68	0.50	0.75	229.21	1.53		1	100	1.00	1.50	1.00	230.1	0.79	Infin.	0.000	0.543	**Non-Liq.**	Non-Liq.	**0.00**
52.82	240.31	2.13	0.89	110	1.884	0.725	0.89	0.52	0.74	166.81	1.71		1	98	1.05	1.50	1.00	175.1	0.79	Infin.	0.000	0.542	**Non-Liq.**	Non-Liq.	**0.00**
52.99	196.52	2.05	1.05	110	1.888	0.724	1.06	0.56	0.72	133.20	1.83		1	89	1.13	1.50	1.00	151.2	0.79	0.401	0.318	0.542	**0.59**	85%	**0.74**
53.15	141.14	1.74	1.23	110	1.892	0.722	1.25	0.61	0.70	92.47	2.00		1	74	1.30	1.50	1.00	120.5	0.79	0.243	0.192	0.541	**0.36**	97%	**1.22**
53.31	110.78	1.92	1.73	110	1.895	0.720	1.76	0.66	0.68	69.84	2.19		1	62	1.64		1.00	114.7	0.84	0.220	0.185	0.540	**0.34**	97%	**1.30**
53.48	75.09	1.81	2.41	110	1.899	0.719	2.47	0.74	0.65	44.95	2.43		1	44	2.44		1.00	109.6	0.89	0.202	0.180	0.540	**0.33**	97%	**1.36**
53.64	58.78	1.67	2.83	110	1.903	0.717	2.93	0.78	0.63	34.03	2.57		1	32	3.14		1.00	107.0	0.89	0.194	0.172	0.539	**0.32**	98%	**1.40**
53.81	71.04	1.45	2.05	110	1.907	0.716	2.10	0.73	0.65	42.53	2.40		1	41	2.32		1.00	98.7	0.89	0.170	0.151	0.538	**0.28**	99%	**1.51**
53.97	81.60	1.36	1.67	110	1.911	0.714	1.71	0.70	0.66	49.93	2.29		1	48	1.92		1.00	95.8	0.89	0.162	0.144	0.538	**0.27**	99%	**1.56**
54.13	70.69	1.16	1.64	110	1.915	0.712	1.69	0.71	0.66	42.65	2.34		1	41	2.09		1.00	89.0	0.89	0.146	0.129	0.537	**0.24**	99%	**1.66**
54.30	44.26	1.08	2.45	110	1.919	0.711	2.56	0.80	0.62	24.87	2.64		0						0.89			0.536	**Non-Liq.**	Non-Liq.	**0.00**
54.46	37.41	1.01	2.69	110	1.923	0.709	2.84	0.83	0.61	20.46	2.73		0						0.89			0.536	**Non-Liq.**	Non-Liq.	**0.00**
54.63	29.79	1.23	4.12	110	1.927	0.708	4.40	0.89	0.59	15.43	2.95		0						0.89			0.535	**Non-Liq.**	Non-Liq.	**0.00**
54.79	31.13	1.67	5.36	110	1.931	0.706	5.72	0.91	0.58	15.96	3.01		0						0.89			0.534	**Non-Liq.**	Non-Liq.	**0.00**
54.95	44.13	1.70	3.85	110	1.934	0.705	4.02	0.84	0.60	24.02	2.77		0						0.89			0.534	**Non-Liq.**	Non-Liq.	**0.00**
55.12	95.31	2.21	2.32	110	1.938	0.703	2.37	0.71	0.65	57.43	2.34		1	54	2.08		1.00	119.4	0.83	0.238	0.199	0.533	**0.37**	96%	**1.24**
55.28	136.83	2.52	1.84	110	1.942	0.701	1.87	0.65	0.67	85.88	2.14		1	71	1.53		1.00	131.8	0.78	0.293	0.230	0.532	**0.43**	94%	**1.09**
55.45	185.97	2.78	1.49	110	1.946	0.700	1.51	0.60	0.69	120.71	1.97		1	85	1.26	0.45	1.26	192.9	0.78	Infin.	0.000	0.532	**Non-Liq.**	Non-Liq.	**0.00**
55.61	219.92	3.19	1.45	110	1.950	0.698	1.47	0.58	0.70	144.48	1.91		1	92	1.20	0.45	1.26	218.4	0.78	Infin.	0.000	0.531	**Non-Liq.**	Non-Liq.	**0.00**
55.77	244.90	3.67	1.50	110	1.954	0.697	1.51	0.57	0.70	161.53	1.88		1	97	1.17	0.45	1.26	239.9	0.78	Infin.	0.000	0.530	**Non-Liq.**	Non-Liq.	**0.00**
55.94	256.05	3.99	1.56	110	1.958	0.695	1.57	0.57	0.70	168.76	1.88		1	99	1.17	0.45	1.26	250.5	0.78	Infin.	0.000	0.530	**Non-Liq.**	Non-Liq.	**0.00**
56.10	257.95	4.20	1.63	110	1.962	0.694	1.64	0.58	0.70	169.41	1.90		1	99	1.19	0.45	1.26	254.1	0.78	Infin.	0.000	0.529	**Non-Liq.**	Non-Liq.	**0.00**
56.27	260.48	4.35	1.67	110	1.966	0.692	1.68	0.58	0.70	170.70	1.90		1	99	1.19	0.45	1.26	257.2	0.78	Infin.	0.000	0.528	**Non-Liq.**	Non-Liq.	**0.00**
56.43	262.97	4.01	1.52	110	1.970	0.691	1.54	0.57	0.70	173.23	1.87		1	100	1.16	0.45	1.26	254.4	0.78	Infin.	0.000	0.528	**Non-Liq.**	Non-Liq.	**0.00**
56.59	252.09	3.88	1.54	110	1.974	0.689	1.55	0.57	0.70	165.32	1.89		1	98	1.18	0.45	1.26	245.7	0.78	Infin.	0.000	0.527	**Non-Liq.**	Non-Liq.	**0.00**
56.76	232.68	3.79	1.63	110	1.977	0.688	1.64	0.59	0.69	151.04	1.93		1	94	1.22	0.45	1.26	232.8	0.78	Infin.	0.000	0.526	**Non-Liq.**	Non-Liq.	**0.00**
56.92	183.02	3.54	1.93	110	1.981	0.686	1.95	0.63	0.67	115.43	2.06		1	83	1.39		1.00	161.0	0.78	Infin.	0.000	0.526	**Non-Liq.**	Non-Liq.	**0.00**
57.09	160.88	2.83	1.76	110	1.985	0.685	1.78	0.63	0.67	100.96	2.08		1	77	1.41		1.00	142.7	0.78	0.350	0.272	0.525	**0.52**	90%	**1.00**
57.25	152.41	2.48	1.63	110	1.989	0.683	1.65	0.63	0.67	95.58	2.07		1	75	1.40		1.00	134.1	0.78	0.304	0.236	0.524	**0.45**	93%	**1.07**
57.41	121.85	2.08	1.70	110	1.993	0.682	1.73	0.66	0.66	74.74	2.16		1	65	1.58		1.00	118.0	0.83	0.233	0.193	0.524	**0.37**	96%	**1.25**
57.58	78.30	1.74	2.23	110	1.997	0.680	2.28	0.73	0.63	45.38	2.40		1	44	2.33		1.00	105.7	0.88	0.190	0.167	0.523	**0.32**	98%	**1.41**
57.74	46.88	1.34	2.86	110	2.001	0.679	2.99	0.81	0.60	25.32	2.67		0						0.88			0.523	**Non-Liq.**	Non-Liq.	**0.00**
57.91	32.55	1.03	3.17	110	2.005	0.678	3.38	0.86	0.58	16.63	2.85		0						0.88			0.522	**Non-Liq.**	Non-Liq.	**0.00**
58.07	26.44	0.80	3.01	110	2.009	0.676	3.26	0.88	0.57	13.10	2.92		0						0.88			0.521	**Non-Liq.**	Non-Liq.	**0.00**

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_D	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_c	H (m)	K_H	Clean Sand Qc1n	$K\sigma$	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	**Liquefac. Safety Factor**	Probab. P_L	***Volumetric Strain (%)***
58.23	32.25	0.58	1.80	110	2.013	0.675	1.92	0.82	0.59	16.89	2.70		0						0.88			0.521	**Non-Liq.**	Non-Liq.	**0.00**
58.40	30.59	0.70	2.28	110	2.016	0.673	2.44	0.84	0.58	15.67	2.79		0						0.88			0.520	**Non-Liq.**	Non-Liq.	**0.00**
58.56	19.12	0.58	3.04	110	2.020	0.672	3.40	0.93	0.55	8.86	3.07		0						0.88			0.519	**Non-Liq.**	Non-Liq.	**0.00**
58.73	20.40	0.44	2.17	110	2.024	0.671	2.41	0.89	0.56	9.72	2.95		0						0.88			0.519	**Non-Liq.**	Non-Liq.	**0.00**
58.89	29.72	0.45	1.52	110	2.028	0.669	1.63	0.82	0.59	15.38	2.70		0						0.88			0.518	**Non-Liq.**	Non-Liq.	**0.00**
59.06	18.72	0.48	2.57	110	2.032	0.668	2.89	0.92	0.55	8.65	3.04		0						0.88			0.517	**Non-Liq.**	Non-Liq.	**0.00**
59.22	15.04	0.45	2.97	110	2.036	0.666	3.44	0.96	0.53	6.54	3.18		0						0.88			0.517	**Non-Liq.**	Non-Liq.	**0.00**
59.38	14.96	0.42	2.81	110	2.040	0.665	3.25	0.96	0.53	6.50	3.17		0						0.88			0.516	**Non-Liq.**	Non-Liq.	**0.00**
59.55	14.95	0.43	2.89	110	2.044	0.664	3.35	0.96	0.53	6.47	3.18		0						0.88			0.516	**Non-Liq.**	Non-Liq.	**0.00**
59.71	15.06	0.48	3.17	110	2.048	0.662	3.67	0.97	0.53	6.49	3.20		0						0.88			0.515	**Non-Liq.**	Non-Liq.	**0.00**
59.88	16.51	0.00	0.01	110	2.052	0.661	0.01	0.83	0.58	7.89	2.74		0		1.00				0.88			0.514	**Non-Liq.**	Non-Liq.	**0.00**
60.04	19.45	0.00	0.01	110	2.055	0.660	0.01	0.82	0.58	9.57	2.69		0		1.00				0.88			0.514	**Non-Liq.**	Non-Liq.	**0.00**
60.20	26.53	0.00	0.00	110	2.059	0.658	0.00	0.79	0.59	13.65	2.61		0		1.00				0.88			0.513	**Non-Liq.**	Non-Liq.	**0.00**

CPT-LIQUEFY.XLS - A SPREADSHEET FOR EMPIRICAL ESTIMATION OF LIQUEFACTION POTENTIAL USING CPT DATA
Developed 2003 by Shelton L. Stringer, GE, Earth Systems Southwest

Project: Oxnard High School No. 8
Job No: 301953-001
Date: 8/14/2018
Sounding: CPT-7
Plot: 7

Methods: Liquefaction Analysis using 1998 NCEER workshop methods (Robertson & Wride)
Post-liquefaction Settlement Analysis from Tokimatsu & Seed (1987)
Dry Sand Settlement by Pradel, ASCE Journal of G&GE, Vol 124, No. 4

Total Liquefied Thickness (feet)
1.3

EARTHQUAKE INFORMATION:
Magnitude: 6.77 (7.5)
PGA, g: 0.97 (0.75)
MSF: 1.30
GWT, feet: 20.0
Design GWT, feet: 20.0

Induced CSR (M=7.5): = 0.65*PGA*(po/p'o)*rd/MSF
Clean Sand Qc1n = C_Q*K_C*K_H*Qc
SF = $CRR_{7.5}$*Kσ/CSR
Use Tokimatsu & Seed (0) or Ishihara &Yoshmine (1): 0
Unit Weight of unsaturated soils: 110 pcf
Unit Weight of saturated soils: 110 pcf
Limiting Ic for liquefiable soils: 2.60
Limiting Ic for K_H: 2.0
Required SF: 1.50
Min SF of Liquefiable Layers: 0.33
Avg SF of Liquefiable Layers: 0.03

Probab	Total Induced Subsidence (inches)
Avg	0
1%	0
Max	0
97%	0.1

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff. Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
0.16	7.32	0.09	1.28	110	0.009	1.000	1.29	0.83	1.70	11.75	2.74		0						1.00			0.485			
0.33	12.26	0.12	1.00	110	0.018	1.000	1.00	0.76	1.70	19.67	2.50		1	9	2.75		1.00	54.0	1.00	0.095	0.095	0.485	Non-Liq.	Non-Liq.	0.00
0.49	14.26	0.15	1.02	110	0.027	1.000	1.03	0.74	1.70	22.87	2.44		1	16	2.50		1.00	57.1	1.00	0.097	0.097	0.485	Non-Liq.	Non-Liq.	0.00
0.66	13.52	0.15	1.09	110	0.036	1.000	1.10	0.75	1.70	21.67	2.48		1	13	2.66		1.00	57.7	1.00	0.098	0.098	0.485	Non-Liq.	Non-Liq.	0.00
0.82	11.35	0.14	1.22	110	0.045	1.000	1.22	0.78	1.70	18.16	2.57		1	6	3.14		1.00	57.0	1.00	0.097	0.097	0.485	Non-Liq.	Non-Liq.	0.00
0.98	9.04	0.12	1.33	110	0.054	1.000	1.34	0.81	1.70	14.44	2.67		0						1.00			0.485	Non-Liq.	Non-Liq.	0.00
1.15	7.13	0.08	1.07	110	0.063	0.999	1.08	0.82	1.70	11.36	2.72		0						1.00			0.484	Non-Liq.	Non-Liq.	0.00
1.31	7.13	0.08	1.07	110	0.072	0.999	1.08	0.82	1.70	11.34	2.72		0						1.00			0.484	Non-Liq.	Non-Liq.	0.00
1.48	6.14	0.08	1.27	110	0.081	0.999	1.29	0.85	1.70	9.74	2.82		0						1.00			0.484	Non-Liq.	Non-Liq.	0.00
1.64	6.75	0.14	2.01	110	0.090	0.998	2.04	0.87	1.70	10.70	2.88		0						1.00			0.484	Non-Liq.	Non-Liq.	0.00
1.80	12.03	0.25	2.04	110	0.099	0.998	2.05	0.81	1.70	19.17	2.67		0						1.00			0.484	Non-Liq.	Non-Liq.	0.00
1.97	26.83	0.46	1.71	110	0.108	0.998	1.72	0.71	1.70	42.94	2.34		1	42	2.10		1.00	90.0	1.00	0.148	0.148	0.484	Non-Liq.	Non-Liq.	0.00
2.13	27.70	0.58	2.10	110	0.117	0.997	2.11	0.72	1.70	44.32	2.39		1	43	2.27		1.00	100.6	1.00	0.175	0.175	0.483	Non-Liq.	Non-Liq.	0.00
2.30	30.71	0.62	2.02	110	0.126	0.997	2.02	0.71	1.70	49.14	2.34		1	47	2.10		1.00	103.0	1.00	0.182	0.182	0.483	Non-Liq.	Non-Liq.	0.00
2.46	35.14	0.59	1.69	110	0.135	0.996	1.70	0.68	1.70	56.25	2.25		1	53	1.80		1.00	101.0	1.00	0.176	0.176	0.483	Non-Liq.	Non-Liq.	0.00
2.62	34.66	0.52	1.49	110	0.144	0.996	1.49	0.67	1.70	55.46	2.22		1	52	1.71		1.00	95.1	1.00	0.160	0.160	0.483	Non-Liq.	Non-Liq.	0.00
2.79	30.29	0.43	1.42	110	0.153	0.996	1.43	0.68	1.70	48.42	2.25		1	47	1.81		1.00	87.5	1.00	0.142	0.142	0.483	Non-Liq.	Non-Liq.	0.00
2.95	25.72	0.37	1.42	110	0.162	0.995	1.43	0.70	1.70	41.07	2.31		1	40	1.98		1.00	81.4	1.00	0.130	0.130	0.482	Non-Liq.	Non-Liq.	0.00
3.12	22.47	0.33	1.49	110	0.171	0.995	1.50	0.72	1.70	35.83	2.37		1	34	2.19		1.00	78.6	1.00	0.125	0.125	0.482	Non-Liq.	Non-Liq.	0.00
3.28	20.80	0.31	1.47	110	0.180	0.994	1.48	0.73	1.70	33.13	2.40		1	31	2.29		1.00	76.0	1.00	0.121	0.121	0.482	Non-Liq.	Non-Liq.	0.00
3.44	20.45	0.30	1.47	110	0.189	0.994	1.48	0.73	1.70	32.55	2.40		1	30	2.32		1.00	75.4	1.00	0.120	0.120	0.482	Non-Liq.	Non-Liq.	0.00
3.61	20.73	0.30	1.45	110	0.198	0.994	1.47	0.73	1.70	32.99	2.39		1	31	2.29		1.00	75.5	1.00	0.120	0.120	0.482	Non-Liq.	Non-Liq.	0.00
3.77	19.90	0.31	1.58	110	0.208	0.993	1.59	0.74	1.70	31.64	2.43		1	29	2.44		1.00	77.1	1.00	0.123	0.123	0.482	Non-Liq.	Non-Liq.	0.00
3.94	17.21	0.35	2.05	110	0.217	0.993	2.08	0.77	1.70	27.31	2.55		1	23	3.03		1.00	82.8	1.00	0.133	0.133	0.481	Non-Liq.	Non-Liq.	0.00
4.10	11.84	0.37	3.08	110	0.226	0.993	3.14	0.85	1.70	18.66	2.79		0						1.00			0.481	Non-Liq.	Non-Liq.	0.00
4.27	7.47	0.32	4.24	110	0.235	0.992	4.38	0.92	1.70	11.63	3.04		0						1.00			0.481	Non-Liq.	Non-Liq.	0.00
4.43	7.87	0.27	3.41	110	0.244	0.992	3.51	0.90	1.70	12.25	2.96		0						1.00			0.481	Non-Liq.	Non-Liq.	0.00
4.59	13.03	0.25	1.89	110	0.253	0.991	1.93	0.80	1.70	20.53	2.63		0						1.00			0.481	Non-Liq.	Non-Liq.	0.00
4.76	17.56	0.20	1.13	110	0.262	0.991	1.15	0.73	1.70	27.80	2.40		1	24	2.30		1.00	63.9	1.00	0.104	0.104	0.480	Non-Liq.	Non-Liq.	0.00
4.92	25.00	0.25	0.99	110	0.271	0.991	1.00	0.68	1.70	39.74	2.23		1	39	1.75		1.00	69.6	1.00	0.111	0.111	0.480	Non-Liq.	Non-Liq.	0.00
5.09	28.21	0.27	0.97	110	0.280	0.990	0.98	0.66	1.70	44.88	2.18		1	44	1.63		1.00	73.1	1.00	0.116	0.116	0.480	Non-Liq.	Non-Liq.	0.00
5.25	26.74	0.32	1.19	110	0.289	0.990	1.20	0.68	1.70	42.50	2.25		1	41	1.81		1.00	76.9	1.00	0.122	0.122	0.480	Non-Liq.	Non-Liq.	0.00
5.41	27.54	0.33	1.20	110	0.298	0.989	1.21	0.68	1.70	43.77	2.25		1	43	1.79		1.00	78.2	1.00	0.124	0.124	0.480	Non-Liq.	Non-Liq.	0.00
5.58	30.42	0.33	1.08	110	0.307	0.989	1.10	0.66	1.70	48.39	2.18		1	47	1.63		1.00	78.9	1.00	0.126	0.126	0.479	Non-Liq.	Non-Liq.	0.00
5.74	35.07	0.33	0.95	110	0.316	0.989	0.96	0.64	1.70	55.84	2.10		1	53	1.46		1.00	81.3	1.00	0.130	0.130	0.479	Non-Liq.	Non-Liq.	0.00
5.91	42.76	0.43	0.99	110	0.325	0.988	1.00	0.62	1.70	68.19	2.04		1	61	1.36		1.00	92.6	1.00	0.154	0.154	0.479	Non-Liq.	Non-Liq.	0.00
6.07	59.96	0.60	1.00	110	0.334	0.988	1.01	0.59	1.70	95.81	1.93		1	75	1.22	1.00	1.00	116.9	1.00	0.228	0.228	0.479	Non-Liq.	Non-Liq.	0.00
6.23	82.48	0.78	0.94	110	0.343	0.988	0.94	0.55	1.70	131.98	1.80		1	88	1.11	1.05	1.00	146.8	1.00	0.374	0.374	0.479	Non-Liq.	Non-Liq.	0.00
6.40	98.15	0.89	0.91	110	0.352	0.987	0.91	0.53	1.70	157.14	1.74		1	96	1.06	1.10	1.00	167.6	1.00	Infin.	0.000	0.479	Non-Liq.	Non-Liq.	0.00
6.56	106.99	1.01	0.94	110	0.361	0.987	0.95	0.52	1.70	171.33	1.72		1	99	1.05	1.15	1.00	180.9	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
6.73	112.07	1.09	0.97	110	0.370	0.986	0.98	0.52	1.70	179.48	1.72		1	100	1.05	1.20	1.00	188.9	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
6.89	112.25	1.18	1.05	110	0.379	0.986	1.05	0.53	1.70	179.76	1.74		1	100	1.06	1.25	1.00	191.9	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.05	111.68	1.25	1.12	110	0.388	0.986	1.13	0.54	1.70	178.82	1.76		1	100	1.08	1.30	1.00	193.6	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.22	113.57	1.36	1.19	110	0.397	0.985	1.20	0.54	1.70	181.71	1.78		1	100	1.09	1.35	1.00	198.6	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.38	110.25	1.39	1.26	110	0.406	0.985	1.27	0.55	1.69	175.63	1.80		1	100	1.11	1.40	1.00	195.5	1.00	Infin.	0.000	0.478	Non-Liq.	Non-Liq.	0.00
7.55	100.97	1.35	1.34	110	0.415	0.985	1.34	0.56	1.69	160.87	1.85		1	97	1.14	1.45	1.00	184.6	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
7.71	100.97	1.35	1.34	110	0.424	0.984	1.34	0.56	1.67	159.07	1.85		1	96	1.15	1.50	1.00	183.0	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
7.87	95.77	1.34	1.40	110	0.433	0.984	1.40	0.57	1.67	150.26	1.88		1	94	1.17	1.55	1.00	176.7	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
8.04	92.93	1.31	1.41	110	0.442	0.984	1.42	0.58	1.65	144.62	1.90		1	92	1.19	1.60	1.00	172.1	1.00	Infin.	0.000	0.477	Non-Liq.	Non-Liq.	0.00
8.20	90.79	1.03	1.14	110	0.451	0.983	1.14	0.56	1.61	137.80	1.85		1	90	1.14	1.65	1.00	157.8	1.00	0.446	0.446	0.477	Non-Liq.	Non-Liq.	0.00
8.37	87.38	1.00	1.14	110	0.460	0.983	1.15	0.57	1.60	131.65	1.86		1	88	1.15	1.70	1.00	152.6	1.00	0.410	0.410	0.476	Non-Liq.	Non-Liq.	0.00
8.53	82.47	0.96	1.17	110	0.469	0.982	1.18	0.57	1.60	123.63	1.89		1	86	1.18	1.75	1.00	146.1	1.00	0.370	0.370	0.476	Non-Liq.	Non-Liq.	0.00
8.69	86.06	1.00	1.17	110	0.478	0.982	1.17	0.57	1.57	127.32	1.88		1	87	1.17	1.80	1.00	149.3	1.00	0.390	0.390	0.476	Non-Liq.	Non-Liq.	0.00
8.86	93.45	1.08	1.15	110	0.487	0.982	1.16	0.56	1.55	136.07	1.85		1	90	1.15	1.85	1.00	156.8	1.00	0.439	0.439	0.476	Non-Liq.	Non-Liq.	0.00
9.02	102.02	1.14	1.12	110	0.496	0.981	1.13	0.55	1.52	146.04	1.82		1	93	1.12	1.90	1.00	164.7	1.00	Infin.	0.000	0.476	Non-Liq.	Non-Liq.	0.00
9.19	107.28	1.17	1.09	110	0.505	0.981	1.10	0.55	1.50	151.44	1.80		1	94	1.11	1.95	1.00	168.7	1.00	Infin.	0.000	0.476	Non-Liq.	Non-Liq.	0.00
9.35	109.34	1.18	1.07	110	0.514	0.981	1.08	0.55	1.48	152.59	1.80		1	94	1.10	2.00	1.00	169.1	1.00	Infin.	0.000	0.475	Non-Liq.	Non-Liq.	0.00
9.51	111.98	1.16	1.04	110	0.523	0.980	1.04	0.54	1.47	154.35	1.78		1	95	1.09	2.05	1.00	169.5	1.00	Infin.	0.000	0.475	Non-Liq.	Non-Liq.	0.00
9.68	118.26	1.20	1.01	110	0.532	0.980	1.02	0.54	1.45	160.83	1.76		1	97	1.08	2.10	1.00	174.2	1.00	Infin.	0.000	0.475	Non-Liq.	Non-Liq.	0.00
9.84	127.36	1.25	0.98	110	0.541	0.980	0.99	0.53	1.42	170.74	1.73		1	99	1.06	2.15	1.00	181.7	1.00	Infin.	0.000	0.475	Non-Liq.	Non-Liq.	0.00
10.01	137.13	1.33	0.97	110	0.550	0.979	0.97	0.52	1.41	181.45	1.71		1	100	1.04	2.20	1.00	190.2	1.00	Infin.	0.000	0.475	Non-Liq.	Non-Liq.	0.00
10.17	144.79	1.41	0.98	110	0.559	0.979	0.98	0.52	1.39	189.61	1.70		1	100	1.04	2.25	1.00	197.4	1.00	Infin.	0.000	0.475	Non-Liq.	Non-Liq.	0.00
10.33	155.29	1.57	1.01	110	0.568	0.979	1.02	0.52	1.38	201.47	1.69		1	100	1.03	2.30	1.00	208.8	1.00	Infin.	0.000	0.474	Non-Liq.	Non-Liq.	0.00
10.50	160.35	1.65	1.03	110	0.577	0.978	1.03	0.51	1.37	206.27	1.69		1	100	1.03	2.35	1.00	213.4	1.00	Infin.	0.000	0.474	Non-Liq.	Non-Liq.	0.00
10.66	162.80	1.74	1.07	110	0.586	0.978	1.07	0.52	1.36	208.10	1.70		1	100	1.04	2.40	1.00	216.7	1.00	Infin.	0.000	0.474	Non-Liq.	Non-Liq.	0.00
10.83	163.62	1.48	0.90	110	0.595	0.978	0.91	0.50	1.34	205.78	1.65		1	100	1.00	2.45	1.00	207.4	1.00	Infin.	0.000	0.474	Non-Liq.	Non-Liq.	0.00
10.99	165.03	1.59	0.96	110	0.604	0.977	0.96	0.51	1.33	206.59	1.67		1	100	1.02	2.50	1.00	210.8	1.00	Infin.	0.000	0.474	Non-Liq.	Non-Liq.	0.00
11.15	165.44	1.62	0.98	110	0.614	0.977	0.98	0.51	1.32	205.76	1.68		1	100	1.02	2.55	1.00	210.9	1.00	Infin.	0.000	0.474	Non-Liq.	Non-Liq.	0.00
11.32	170.54	1.67	0.98	110	0.623	0.977	0.98	0.51	1.31	210.31	1.67		1	100	1.02	2.60	1.00	214.5	1.00	Infin.	0.000	0.473	Non-Liq.	Non-Liq.	0.00
11.48	193.35	1.66	0.86	110	0.632	0.976	0.86	0.50	1.29	235.76	1.59		1	100	1.00	2.65	1.00	236.6	1.00	Infin.	0.000	0.473	Non-Liq.	Non-Liq.	0.00
11.65	234.30	1.88	0.80	110	0.641	0.976	0.81	0.50	1.29	283.83	1.52		1	100	1.00	2.70	1.00	284.9	1.00	Infin.	0.000	0.473	Non-Liq.	Non-Liq.	0.00
11.81	311.45	1.81	0.58	110	0.650	0.975	0.58	0.50	1.28	374.90	1.33		1	100	1.00	2.75	1.00	376.3	1.00	Infin.	0.000	0.473	Non-Liq.	Non-Liq.	0.00
11.98	345.03	2.01	0.58	110	0.659	0.975	0.58	0.50	1.27	412.54	1.30		1	100	1.00	2.80	1.00	414.1	1.00	Infin.	0.000	0.473	Non-Liq.	Non-Liq.	0.00
12.14	350.57	2.01	0.57	110	0.668	0.975	0.58	0.50	1.26	416.32	1.30		1	100	1.00	2.85	1.00	417.9	1.00	Infin.	0.000	0.473	Non-Liq.	Non-Liq.	0.00
12.30	323.89	2.04	0.63	110	0.677	0.974	0.63	0.50	1.25	381.99	1.35		1	100	1.00	2.90	1.00	383.4	1.00	Infin.	0.000	0.472	Non-Liq.	Non-Liq.	0.00
12.47	284.79	2.15	0.75	110	0.686	0.974	0.76	0.50	1.24	333.56	1.45		1	100	1.00	2.95	1.00	334.8	1.00	Infin.	0.000	0.472	Non-Liq.	Non-Liq.	0.00
12.63	272.50	2.15	0.79	110	0.695	0.974	0.79	0.50	1.23	317.04	1.48		1	100	1.00	3.00	1.00	318.2	1.00	Infin.	0.000	0.472	Non-Liq.	Non-Liq.	0.00
12.80	284.55	2.13	0.75	110	0.704	0.973	0.75	0.50	1.23	328.95	1.45		1	100	1.00	3.05	1.00	330.2	1.00	Infin.	0.000	0.472	Non-Liq.	Non-Liq.	0.00

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
12.96	288.27	2.12	0.73	110	0.713	0.973	0.74	0.50	1.22	331.14	1.44		1	100	1.00	3.10	1.00	332.4	1.00	Infin.	0.000	0.472	**Non-Liq.**	Non-Liq.	**0.00**
13.12	289.02	2.14	0.74	110	0.722	0.973	0.74	0.50	1.21	329.91	1.45		1	100	1.00	3.15	1.00	331.1	1.00	Infin.	0.000	0.472	**Non-Liq.**	Non-Liq.	**0.00**
13.29	293.05	2.33	0.80	110	0.731	0.972	0.80	0.50	1.20	332.44	1.47		1	100	1.00	3.15	1.00	333.7	1.00	Infin.	0.000	0.471	**Non-Liq.**	Non-Liq.	**0.00**
13.45	289.11	2.34	0.81	110	0.740	0.972	0.81	0.50	1.20	325.94	1.48		1	100	1.00	3.15	1.00	327.2	1.00	Infin.	0.000	0.471	**Non-Liq.**	Non-Liq.	**0.00**
13.62	286.16	2.38	0.83	110	0.749	0.972	0.83	0.50	1.19	320.65	1.49		1	100	1.00	3.15	1.00	321.8	1.00	Infin.	0.000	0.471	**Non-Liq.**	Non-Liq.	**0.00**
13.78	285.79	2.45	0.86	110	0.758	0.971	0.86	0.50	1.18	318.31	1.51		1	100	1.00	3.15	1.00	319.5	1.00	Infin.	0.000	0.471	**Non-Liq.**	Non-Liq.	**0.00**
13.94	290.46	3.11	1.07	110	0.767	0.971	1.07	0.50	1.17	321.61	1.58		1	100	1.00	3.15	1.00	322.8	1.00	Infin.	0.000	0.471	**Non-Liq.**	Non-Liq.	**0.00**
14.11	293.63	3.14	1.07	110	0.776	0.971	1.07	0.50	1.17	323.22	1.58		1	100	1.00	3.15	1.00	324.4	1.00	Infin.	0.000	0.471	**Non-Liq.**	Non-Liq.	**0.00**
14.27	305.18	2.93	0.96	110	0.785	0.970	0.96	0.50	1.16	334.02	1.53		1	100	1.00	3.15	1.00	335.3	1.00	Infin.	0.000	0.470	**Non-Liq.**	Non-Liq.	**0.00**
14.44	274.68	2.47	0.90	110	0.794	0.970	0.90	0.50	1.15	298.83	1.54		1	100	1.00	3.15	1.00	299.9	1.00	Infin.	0.000	0.470	**Non-Liq.**	Non-Liq.	**0.00**
14.60	264.68	1.89	0.71	110	0.803	0.970	0.72	0.50	1.15	286.29	1.48		1	100	1.00	3.15	1.00	287.4	1.00	Infin.	0.000	0.470	**Non-Liq.**	Non-Liq.	**0.00**
14.76	260.78	1.87	0.72	110	0.812	0.969	0.72	0.50	1.14	280.48	1.48		1	100	1.00	3.15	1.00	281.5	1.00	Infin.	0.000	0.470	**Non-Liq.**	Non-Liq.	**0.00**
14.93	254.73	1.85	0.73	110	0.821	0.969	0.73	0.50	1.14	272.43	1.50		1	100	1.00	3.15	1.00	273.4	1.00	Infin.	0.000	0.470	**Non-Liq.**	Non-Liq.	**0.00**
15.09	243.62	1.72	0.71	110	0.830	0.969	0.71	0.50	1.13	259.08	1.50		1	100	1.00	3.15	1.00	260.0	1.00	Infin.	0.000	0.470	**Non-Liq.**	Non-Liq.	**0.00**
15.26	247.90	1.73	0.70	110	0.839	0.968	0.70	0.50	1.12	262.22	1.50		1	100	1.00	3.15	1.00	263.2	1.00	Infin.	0.000	0.469	**Non-Liq.**	Non-Liq.	**0.00**
15.42	243.67	1.34	0.55	110	0.848	0.968	0.55	0.50	1.12	256.34	1.43		1	100	1.00	3.15	1.00	257.3	1.00	Infin.	0.000	0.469	**Non-Liq.**	Non-Liq.	**0.00**
15.58	240.87	1.85	0.77	110	0.857	0.967	0.77	0.50	1.11	252.04	1.54		1	100	1.00	3.15	1.00	253.0	1.00	Infin.	0.000	0.469	**Non-Liq.**	Non-Liq.	**0.00**
15.75	227.67	1.80	0.79	110	0.866	0.967	0.79	0.50	1.11	236.93	1.57		1	100	1.00	3.15	1.00	237.8	1.00	Infin.	0.000	0.469	**Non-Liq.**	Non-Liq.	**0.00**
15.91	215.03	1.51	0.70	110	0.875	0.967	0.71	0.50	1.10	222.56	1.55		1	100	1.00	3.15	1.00	223.4	1.00	Infin.	0.000	0.469	**Non-Liq.**	Non-Liq.	**0.00**
16.08	169.50	0.84	0.50	110	0.884	0.966	0.50	0.50	1.09	174.33	1.53		1	100	1.00	3.15	1.00	175.0	1.00	Infin.	0.000	0.468	**Non-Liq.**	Non-Liq.	**0.00**
16.24	113.63	0.81	0.71	110	0.893	0.966	0.72	0.54	1.10	116.73	1.77		1	83	1.08	3.15	1.00	127.1	1.00	0.271	0.271	0.468	**Non-Liq.**	Non-Liq.	**0.00**
16.40	74.42	0.94	1.26	110	0.902	0.966	1.28	0.63	1.11	76.80	2.07		1	66	1.40		1.00	107.3	1.00	0.195	0.195	0.468	**Non-Liq.**	Non-Liq.	**0.00**
16.57	41.55	1.04	2.51	110	0.911	0.965	2.57	0.74	1.12	42.93	2.46		1	42	2.56		1.00	109.7	1.00	0.203	0.203	0.468	**Non-Liq.**	Non-Liq.	**0.00**
16.73	20.49	1.00	4.87	110	0.920	0.965	5.10	0.87	1.13	20.90	2.89		0						1.00			0.468	**Non-Liq.**	Non-Liq.	**0.00**
16.90	17.66	0.87	4.92	110	0.929	0.965	5.19	0.89	1.12	17.75	2.95		0						1.00			0.468	**Non-Liq.**	Non-Liq.	**0.00**
17.06	17.13	0.80	4.64	110	0.938	0.964	4.91	0.89	1.11	17.03	2.94		0						1.00			0.467	**Non-Liq.**	Non-Liq.	**0.00**
17.22	45.69	0.87	1.91	110	0.947	0.964	1.95	0.71	1.08	45.77	2.36		1	44	2.14		1.00	98.1	1.00	0.168	0.168	0.467	**Non-Liq.**	Non-Liq.	**0.00**
17.39	85.88	0.98	1.14	110	0.956	0.963	1.15	0.61	1.06	85.36	2.00		1	70	1.30		1.00	111.2	1.00	0.208	0.208	0.467	**Non-Liq.**	Non-Liq.	**0.00**
17.55	131.32	1.21	0.92	110	0.965	0.963	0.93	0.55	1.05	129.57	1.80		1	88	1.11	1.00	1.00	144.3	1.00	0.360	0.360	0.467	**Non-Liq.**	Non-Liq.	**0.00**
17.72	175.08	1.51	0.86	110	0.974	0.963	0.87	0.52	1.04	171.70	1.69		1	99	1.03	1.05	1.00	178.1	1.00	Infin.	0.000	0.467	**Non-Liq.**	Non-Liq.	**0.00**
17.88	212.23	1.86	0.88	110	0.983	0.962	0.88	0.50	1.04	207.10	1.64		1	100	1.00	1.10	1.00	207.9	1.00	Infin.	0.000	0.467	**Non-Liq.**	Non-Liq.	**0.00**
18.04	246.62	1.63	0.66	110	0.992	0.962	0.66	0.50	1.03	239.71	1.51		1	100	1.00	1.10	1.00	240.6	1.00	Infin.	0.000	0.466	**Non-Liq.**	Non-Liq.	**0.00**
18.21	274.39	2.22	0.81	110	1.001	0.962	0.81	0.50	1.03	265.59	1.54		1	100	1.00	1.10	1.00	266.6	1.00	Infin.	0.000	0.466	**Non-Liq.**	Non-Liq.	**0.00**
18.37	300.69	2.46	0.82	110	1.010	0.961	0.82	0.50	1.02	289.83	1.52		1	100	1.00	1.10	1.00	290.9	1.00	Infin.	0.000	0.466	**Non-Liq.**	Non-Liq.	**0.00**
18.54	310.01	2.49	0.80	110	1.020	0.961	0.81	0.50	1.02	297.51	1.50		1	100	1.00	1.10	1.00	298.6	1.00	Infin.	0.000	0.466	**Non-Liq.**	Non-Liq.	**0.00**
18.70	331.14	2.83	0.85	110	1.029	0.960	0.86	0.50	1.01	316.45	1.51		1	100	1.00	1.10	1.00	317.6	1.00	Infin.	0.000	0.466	**Non-Liq.**	Non-Liq.	**0.00**
18.86	350.78	3.15	0.90	110	1.038	0.960	0.90	0.50	1.01	333.81	1.51		1	100	1.00	1.10	1.00	335.1	1.00	Infin.	0.000	0.465	**Non-Liq.**	Non-Liq.	**0.00**
19.03	364.85	3.25	0.89	110	1.047	0.960	0.89	0.50	1.01	345.73	1.50		1	100	1.00	1.10	1.00	347.0	1.00	Infin.	0.000	0.465	**Non-Liq.**	Non-Liq.	**0.00**
19.19	366.79	3.32	0.91	110	1.056	0.959	0.91	0.50	1.00	346.08	1.50		1	100	1.00	1.10	1.00	347.4	1.00	Infin.	0.000	0.465	**Non-Liq.**	Non-Liq.	**0.00**
19.36	364.13	3.25	0.89	110	1.065	0.959	0.89	0.50	1.00	342.09	1.50		1	100	1.00	1.10	1.00	343.4	1.00	Infin.	0.000	0.465	**Non-Liq.**	Non-Liq.	**0.00**
19.52	351.02	3.25	0.92	110	1.074	0.958	0.93	0.50	0.99	328.34	1.52		1	100	1.00	1.10	1.00	329.6	0.99	Infin.	0.000	0.465	**Non-Liq.**	Non-Liq.	**0.00**
19.69	348.92	2.58	0.74	110	1.083	0.958	0.74	0.50	0.99	325.00	1.45		1	100	1.00	1.10	1.00	326.2	0.99	Infin.	0.000	0.464	**Non-Liq.**	Non-Liq.	**0.00**
19.85	359.19	3.47	0.97	110	1.092	0.957	0.97	0.50	0.98	333.20	1.53		1	100	1.00	1.10	1.00	334.4	0.99	Infin.	0.000	0.464	**Non-Liq.**	Non-Liq.	**0.00**
20.01	376.67	4.05	1.08	110	1.101	0.957	1.08	0.50	0.98	348.02	1.56		1	100	1.00	1.10	1.00	349.3	0.98	Infin.	0.000	0.464	**Non-Liq.**	Non-Liq.	**0.00**
20.18	404.77	4.12	1.02	110	1.107	0.957	1.02	0.50	0.98	373.03	1.52		1	100	1.00	1.10	1.00	374.4	0.98	Infin.	0.000	0.465	**Non-Liq.**	Non-Liq.	**0.00**
20.34	377.36	4.95	1.31	110	1.111	0.956	1.32	0.50	0.98	347.09	1.63		1	100	1.00	1.10	1.00	348.4	0.98	Infin.	0.000	0.467	**Non-Liq.**	Non-Liq.	**0.00**
20.51	335.46	4.86	1.45	110	1.115	0.956	1.45	0.52	0.97	307.62	1.70		1	100	1.04	1.10	1.00	319.6	0.98	Infin.	0.000	0.469	**Non-Liq.**	Non-Liq.	**0.00**
20.67	292.50	6.92	2.37	110	1.118	0.955	2.37	0.58	0.97	266.67	1.91		1	100	1.20	1.10	1.00	320.0	0.98	Infin.	0.000	0.471	**Non-Liq.**	Non-Liq.	**0.00**
20.83	287.91	3.88	1.35	110	1.122	0.955	1.35	0.52	0.97	262.84	1.71		1	100	1.05	1.10	1.00	275.8	0.98	Infin.	0.000	0.473	**Non-Liq.**	Non-Liq.	**0.00**
21.00	326.82	2.70	0.82	110	1.126	0.954	0.83	0.50	0.97	298.36	1.51		1	100	1.00	1.10	1.00	299.5	0.98	Infin.	0.000	0.474	**Non-Liq.**	Non-Liq.	**0.00**
21.16	125.71	3.38	2.69	110	1.130	0.954	2.71	0.66	0.96	112.72	2.18		1	82	1.62		1.00	182.1	0.97	Infin.	0.000	0.476	**Non-Liq.**	Non-Liq.	**0.00**
21.33	116.66	3.47	2.97	110	1.134	0.954	3.00	0.68	0.95	104.17	2.23		1	79	1.75		1.00	182.7	0.97	Infin.	0.000	0.478	**Non-Liq.**	Non-Liq.	**0.00**
21.49	242.49	3.92	1.62	110	1.138	0.953	1.63	0.55	0.96	219.08	1.82		1	100	1.12	1.00	1.00	247.1	0.97	Infin.	0.000	0.480	**Non-Liq.**	Non-Liq.	**0.00**
21.65	336.70	4.03	1.20	110	1.142	0.953	1.20	0.50	0.96	305.29	1.63		1	100	1.00	1.05	1.00	306.4	0.97	Infin.	0.000	0.482	**Non-Liq.**	Non-Liq.	**0.00**
21.82	383.91	3.24	0.84	110	1.146	0.952	0.85	0.50	0.96	347.64	1.48		1	100	1.00	1.10	1.00	348.9	0.97	Infin.	0.000	0.483	**Non-Liq.**	Non-Liq.	**0.00**
21.98	357.67	2.57	0.72	110	1.150	0.952	0.72	0.50	0.96	323.25	1.44		1	100	1.00	1.15	1.00	324.5	0.97	Infin.	0.000	0.485	**Non-Liq.**	Non-Liq.	**0.00**
22.15	353.56	1.87	0.53	110	1.154	0.951	0.53	0.50	0.96	318.98	1.35		1	100	1.00	1.20	1.00	320.2	0.97	Infin.	0.000	0.487	**Non-Liq.**	Non-Liq.	**0.00**
22.31	349.51	1.82	0.52	110	1.158	0.951	0.52	0.50	0.96	314.78	1.35		1	100	1.00	1.25	1.00	316.0	0.96	Infin.	0.000	0.489	**Non-Liq.**	Non-Liq.	**0.00**
22.47	344.99	1.95	0.56	110	1.161	0.950	0.57	0.50	0.95	310.17	1.38		1	100	1.00	1.30	1.00	311.3	0.96	Infin.	0.000	0.490	**Non-Liq.**	Non-Liq.	**0.00**
22.64	338.66	2.25	0.67	110	1.165	0.950	0.67	0.50	0.95	303.95	1.44		1	100	1.00	1.35	1.00	305.1	0.96	Infin.	0.000	0.492	**Non-Liq.**	Non-Liq.	**0.00**
22.80	324.89	2.52	0.78	110	1.169	0.949	0.78	0.50	0.95	291.06	1.50		1	100	1.00	1.40	1.00	292.1	0.96	Infin.	0.000	0.494	**Non-Liq.**	Non-Liq.	**0.00**
22.97	321.85	2.86	0.89	110	1.173	0.949	0.89	0.50	0.95	287.84	1.55		1	100	1.00	1.40	1.00	288.9	0.96	Infin.	0.000	0.495	**Non-Liq.**	Non-Liq.	**0.00**
23.13	325.14	3.11	0.96	110	1.177	0.948	0.96	0.50	0.95	290.31	1.57		1	100	1.00	1.40	1.00	291.4	0.96	Infin.	0.000	0.497	**Non-Liq.**	Non-Liq.	**0.00**
23.29	321.77	3.23	1.00	110	1.181	0.948	1.01	0.50	0.95	286.81	1.59		1	100	1.00	1.40	1.00	287.9	0.96	Infin.	0.000	0.498	**Non-Liq.**	Non-Liq.	**0.00**
23.46	319.42	3.46	1.08	110	1.185	0.947	1.09	0.50	0.94	284.23	1.62		1	100	1.00	1.40	1.00	285.3	0.96	Infin.	0.000	0.500	**Non-Liq.**	Non-Liq.	**0.00**
23.62	320.77	3.46	1.08	110	1.189	0.947	1.08	0.50	0.94	284.96	1.61		1	100	1.00	1.40	1.00	286.0	0.95	Infin.	0.000	0.502	**Non-Liq.**	Non-Liq.	**0.00**
23.79	324.18	3.64	1.12	110	1.193	0.946	1.13	0.50	0.94	287.53	1.62		1	100	1.00	1.40	1.00	288.6	0.95	Infin.	0.000	0.503	**Non-Liq.**	Non-Liq.	**0.00**
23.95	329.34	3.59	1.09	110	1.197	0.946	1.09	0.50	0.94	291.64	1.61		1	100	1.00	1.40	1.00	292.7	0.95	Infin.	0.000	0.505	**Non-Liq.**	Non-Liq.	**0.00**
24.11	336.72	2.85	0.85	110	1.200	0.945	0.85	0.50	0.94	297.71	1.52		1	100	1.00	1.40	1.00	298.8	0.95	Infin.	0.000	0.506	**Non-Liq.**	Non-Liq.	**0.00**
24.28	342.31	2.38	0.69	110	1.204	0.945	0.70	0.50	0.94	302.18	1.45		1	100	1.00	1.40	1.00	303.3	0.95	Infin.	0.000	0.508	**Non-Liq.**	Non-Liq.	**0.00**
24.44	363.48	2.12	0.58	110	1.208	0.944	0.58	0.50	0.94	320.41	1.38		1	100	1.00	1.40	1.00	321.6	0.95	Infin.	0.000	0.509	**Non-Liq.**	Non-Liq.	**0.00**
24.61	368.92	1.84	0.50	110	1.212	0.943	0.50	0.50	0.93	324.69	1.33		1	100	1.00	1.40	1.00	325.9	0.95	Infin.	0.000	0.511	**Non-Liq.**	Non-Liq.	**0.00**
24.77	350.00	2.34	0.67	110	1.216	0.943	0.67	0.50	0.93	307.49	1.43		1	100	1.00	1.40	1.00	308.6	0.95	Infin.	0.000	0.512	**Non-Liq.**	Non-Liq.	**0.00**
24.93	320.76	2.58	0.80	110	1.220	0.942	0.81	0.50	0.93	281.26	1.52		1	100	1.00	1.40	1.00	282.3	0.94	Infin.	0.000	0.514	**Non-Liq.**	Non-Liq.	**0.00**
25.10	290.38	2.75	0.95	110	1.224	0.942	0.95	0.50	0.93	254.11	1.60		1	100	1.00	1.40	1.00	255.1	0.94	Infin.	0.000	0.515	**Non-Liq.**	Non-Liq.	**0.00**
25.26	281.78	2.86	1.02	110	1.228	0.941	1.02	0.50	0.93	246.15	1.63		1	100	1.00	1.40	1.00	247.1	0.94	Infin.	0.000	0.516	**Non-Liq.**	Non-Liq.	**0.00**
25.43	270.13	2.52	0.93	110	1.232	0.941	0.94	0.50	0.93	235.55	1.62		1	100	1.00	1.40	1.00	236.4	0.94	Infin.	0.000	0.518	**Non-Liq.**	Non-Liq.	**0.00**
25.59	259.39	2.62	1.01	110	1.236	0.940	1.01	0.51	0.92	225.59	1.66		1	100	1.01	1.40	1.00	228.5	0.94	Infin.	0.000	0.519	**Non-Liq.**	Non-Liq.	**0.00**
25.75	232.66	2.59	1.11	110	1.240	0.939	1.12	0.52	0.92	201.29	1.72		1	100	1.05	1.40	1.00	212.8	0.94	Infin.	0.000	0.520	**Non-Liq.**	Non-Liq.	**0.00**
25.92	153.15	2.60	1.70	110	1.243	0.939	1.71	0.60	0.91	130.23	1.99		1	88	1.28	1.40	1.00	167.9	0.94	Infin.	0.000	0.522	**Non-Liq.**	Non-Liq.	**0.00**
26.08	77.71	1.98	2.55	110	1.247	0.938	2.59	0.71	0.89	64.33	2.33		1	59	2.05		1.00	131.9	0.95	0.293	0.279	0.523	**0.53**	89%	**1.09**
26.25	33.55	1.53	4.55	110	1.251	0.938	4.72	0.84	0.87	26.49	2.79		0						0.97			0.524	**Non-Liq.**	Non-Liq.	**0.00**
26.41	22.88	0.79	3.47	110	1.255	0.937	3.67	0.86	0.86	17.64	2.85		0						0.97			0.526	**Non-Liq.**	Non-Liq.	**0.00**
26.57	18.15	0.50	2.75	110	1.259	0.936	2.95	0.87	0.86	13.72	2.88		0						0.97			0.527	**Non-Liq.**	Non-Liq.	**0.00**
26.74	18.25	0.55	3.03	110	1.263	0.936	3.26	0.88	0.86	13.74	2.91		0						0.97			0.528	**Non-Liq.**	Non-Liq.	**0.00**
26.90	17.74	0.85	4.80	110	1.267	0.935	5.17	0.92	0.85	13.19	3.04		0						0.96			0.529	**Non-Liq.**	Non-Liq.	**0.00**
27.07	23.20	1.17	5.05	110	1.271	0.934	5.34	0.90	0.85	17.59	2.96		0						0.96			0.531	**Non-Liq.**	Non-Liq.	**0.00**
27.23	36.59	1.63	4.44	110	1.275	0.934	4.60	0.84	0.86	28.57	2.76		0						0.96			0.532	**Non-Liq.**	Non-Liq.	**0.00**
27.40	72.79	1.23	1.69	110	1.279	0.933	1.72	0.68	0.88	59.44	2.24		1	55	1.76		1.00	104.4	0.94	0.186	0.176	0.533	**0.33**	97%	**1.43**
27.56	107.63	1.36	1.26	110	1.282	0.932	1.28	0.61	0.89	89.34	2.02		1	72	1.32		1.00	118.1	0.93	0.233	0.216	0.534	**0.40**	95%	**1.25**
27.72	139.45	1.46	1.05	110	1.286	0.932	1.06	0.57	0.89	116.81	1.88		1	83	1.17	1.00	1.00	136.8	0.92	0.318	0.294	0.535	**0.55**	88%	**1.04**
27.89	170.39	1.41	0.83	110	1.290	0.931	0.83	0.53	0.90	143.88	1.74		1	92	1.06	1.05	1.00	153.6	0.92	0.417	0.385	0.536	**0.72**	75%	**0.68**

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
28.05	178.25	1.31	0.74	110	1.294	0.930	0.74	0.52	0.90	150.76	1.69		1	94	1.03	1.10	1.00	156.1	0.92	0.434	0.400	0.538	**0.74**	73%	**0.63**
28.22	181.74	1.30	0.71	110	1.298	0.929	0.72	0.51	0.90	153.64	1.68		1	95	1.02	1.15	1.00	157.5	0.92	0.443	0.408	0.539	**0.76**	71%	**0.60**
28.38	186.28	1.33	0.71	110	1.302	0.929	0.72	0.51	0.90	157.35	1.67		1	96	1.01	1.20	1.00	160.3	0.92	Infin.	0.000	0.540	**Non-Liq.**	Non-Liq.	**0.00**
28.54	196.98	1.43	0.73	110	1.306	0.928	0.73	0.50	0.90	166.32	1.65		1	98	1.01	1.25	1.00	168.0	0.92	Infin.	0.000	0.541	**Non-Liq.**	Non-Liq.	**0.00**
28.71	209.17	1.48	0.71	110	1.310	0.927	0.71	0.50	0.90	176.57	1.63		1	100	1.00	1.30	1.00	177.2	0.92	Infin.	0.000	0.542	**Non-Liq.**	Non-Liq.	**0.00**
28.87	214.42	1.53	0.71	110	1.314	0.926	0.72	0.50	0.90	180.76	1.62		1	100	1.00	1.35	1.00	181.4	0.92	Infin.	0.000	0.543	**Non-Liq.**	Non-Liq.	**0.00**
29.04	222.85	1.72	0.77	110	1.318	0.926	0.78	0.50	0.90	187.63	1.63		1	100	1.00	1.40	1.00	188.3	0.92	Infin.	0.000	0.544	**Non-Liq.**	Non-Liq.	**0.00**
29.20	230.47	3.36	1.46	110	1.322	0.925	1.47	0.56	0.88	191.40	1.83		1	100	1.13	1.45	1.00	216.3	0.91	Infin.	0.000	0.545	**Non-Liq.**	Non-Liq.	**0.00**
29.36	237.69	3.39	1.42	110	1.325	0.924	1.43	0.55	0.88	197.33	1.81		1	100	1.11	1.50	1.00	220.6	0.91	Infin.	0.000	0.546	**Non-Liq.**	Non-Liq.	**0.00**
29.53	254.47	3.24	1.27	110	1.329	0.923	1.28	0.53	0.89	211.82	1.75		1	100	1.07	1.55	1.00	228.1	0.91	Infin.	0.000	0.547	**Non-Liq.**	Non-Liq.	**0.00**
29.69	245.50	3.18	1.29	110	1.333	0.923	1.30	0.54	0.88	203.76	1.77		1	100	1.08	1.60	1.00	221.8	0.91	Infin.	0.000	0.548	**Non-Liq.**	Non-Liq.	**0.00**
29.86	248.87	2.73	1.10	110	1.337	0.922	1.10	0.52	0.89	207.09	1.71		1	100	1.04	1.65	1.00	217.2	0.91	Infin.	0.000	0.549	**Non-Liq.**	Non-Liq.	**0.00**
30.02	247.02	3.01	1.22	110	1.341	0.921	1.23	0.53	0.88	204.68	1.75		1	100	1.07	1.70	1.00	219.8	0.91	Infin.	0.000	0.550	**Non-Liq.**	Non-Liq.	**0.00**
30.18	244.70	3.20	1.31	110	1.345	0.920	1.32	0.54	0.88	202.04	1.77		1	100	1.09	1.75	1.00	220.8	0.91	Infin.	0.000	0.551	**Non-Liq.**	Non-Liq.	**0.00**
30.35	244.48	3.08	1.26	110	1.349	0.919	1.27	0.54	0.88	201.72	1.76		1	100	1.08	1.80	1.00	218.7	0.91	Infin.	0.000	0.551	**Non-Liq.**	Non-Liq.	**0.00**
30.51	237.74	3.15	1.33	110	1.353	0.918	1.33	0.54	0.87	195.44	1.79		1	100	1.10	1.85	1.00	215.5	0.91	Infin.	0.000	0.552	**Non-Liq.**	Non-Liq.	**0.00**
30.68	224.10	2.76	1.23	110	1.357	0.918	1.24	0.54	0.87	183.96	1.78		1	100	1.09	1.90	1.00	202.0	0.91	Infin.	0.000	0.553	**Non-Liq.**	Non-Liq.	**0.00**
30.84	259.52	1.36	0.53	110	1.361	0.917	0.53	0.50	0.88	215.17	1.48		1	100	1.00	1.95	1.00	216.0	0.90	Infin.	0.000	0.554	**Non-Liq.**	Non-Liq.	**0.00**
31.00	304.23	2.26	0.74	110	1.364	0.916	0.75	0.50	0.88	252.07	1.53		1	100	1.00	2.00	1.00	253.0	0.90	Infin.	0.000	0.555	**Non-Liq.**	Non-Liq.	**0.00**
31.17	162.49	2.09	1.29	110	1.368	0.915	1.30	0.58	0.86	131.26	1.90		1	88	1.19	2.05	1.00	156.5	0.90	0.437	0.394	0.556	**0.71**	76%	**0.62**
31.33	321.89	2.01	0.63	110	1.372	0.914	0.63	0.50	0.88	266.01	1.46		1	100	1.00	2.10	1.00	267.0	0.90	Infin.	0.000	0.556	**Non-Liq.**	Non-Liq.	**0.00**
31.50	318.50	1.97	0.62	110	1.376	0.913	0.62	0.50	0.88	262.82	1.46		1	100	1.00	2.15	1.00	263.8	0.90	Infin.	0.000	0.557	**Non-Liq.**	Non-Liq.	**0.00**
31.66	313.67	1.90	0.60	110	1.380	0.912	0.61	0.50	0.88	258.44	1.46		1	100	1.00	2.20	1.00	259.4	0.90	Infin.	0.000	0.558	**Non-Liq.**	Non-Liq.	**0.00**
31.82	300.42	1.85	0.62	110	1.384	0.911	0.62	0.50	0.87	247.13	1.48		1	100	1.00	2.25	1.00	248.0	0.90	Infin.	0.000	0.559	**Non-Liq.**	Non-Liq.	**0.00**
31.99	281.46	1.96	0.70	110	1.388	0.910	0.70	0.50	0.87	231.13	1.54		1	100	1.00	2.30	1.00	232.0	0.90	Infin.	0.000	0.559	**Non-Liq.**	Non-Liq.	**0.00**
32.15	265.77	2.01	0.76	110	1.392	0.909	0.76	0.50	0.87	217.87	1.58		1	100	1.00	2.35	1.00	218.7	0.90	Infin.	0.000	0.560	**Non-Liq.**	Non-Liq.	**0.00**
32.32	254.71	2.22	0.87	110	1.396	0.908	0.88	0.50	0.87	208.46	1.64		1	100	1.00	2.40	1.00	209.2	0.90	Infin.	0.000	0.561	**Non-Liq.**	Non-Liq.	**0.00**
32.48	258.16	2.21	0.86	110	1.400	0.907	0.86	0.50	0.87	211.00	1.63		1	100	1.00	2.45	1.00	211.8	0.89	Infin.	0.000	0.561	**Non-Liq.**	Non-Liq.	**0.00**
32.64	281.06	1.84	0.66	110	1.403	0.906	0.66	0.50	0.87	229.50	1.52		1	100	1.00	2.50	1.00	230.4	0.89	Infin.	0.000	0.562	**Non-Liq.**	Non-Liq.	**0.00**
32.81	311.55	1.75	0.56	110	1.407	0.905	0.56	0.50	0.87	254.16	1.44		1	100	1.00	2.55	1.00	255.1	0.89	Infin.	0.000	0.563	**Non-Liq.**	Non-Liq.	**0.00**
32.97	355.20	1.77	0.50	110	1.411	0.904	0.50	0.50	0.87	289.53	1.36		1	100	1.00	2.60	1.00	290.6	0.89	Infin.	0.000	0.563	**Non-Liq.**	Non-Liq.	**0.00**
33.14	376.15	1.82	0.48	110	1.415	0.903	0.48	0.50	0.86	306.25	1.34		1	100	1.00	2.65	1.00	307.4	0.89	Infin.	0.000	0.564	**Non-Liq.**	Non-Liq.	**0.00**
33.30	382.53	1.72	0.45	110	1.419	0.902	0.45	0.50	0.86	311.03	1.31		1	100	1.00	2.70	1.00	312.2	0.89	Infin.	0.000	0.565	**Non-Liq.**	Non-Liq.	**0.00**
33.46	385.73	1.70	0.44	110	1.423	0.901	0.44	0.50	0.86	313.21	1.30		1	100	1.00	2.75	1.00	314.4	0.89	Infin.	0.000	0.565	**Non-Liq.**	Non-Liq.	**0.00**
33.63	388.54	1.78	0.46	110	1.427	0.900	0.46	0.50	0.86	315.06	1.31		1	100	1.00	2.80	1.00	316.2	0.89	Infin.	0.000	0.566	**Non-Liq.**	Non-Liq.	**0.00**
33.79	373.85	1.92	0.51	110	1.431	0.899	0.52	0.50	0.86	302.69	1.36		1	100	1.00	2.85	1.00	303.8	0.89	Infin.	0.000	0.566	**Non-Liq.**	Non-Liq.	**0.00**
33.96	360.84	2.35	0.65	110	1.435	0.898	0.65	0.50	0.86	291.71	1.44		1	100	1.00	2.90	1.00	292.8	0.89	Infin.	0.000	0.567	**Non-Liq.**	Non-Liq.	**0.00**
34.12	336.62	1.68	0.50	110	1.439	0.897	0.50	0.50	0.86	271.68	1.39		1	100	1.00	2.95	1.00	272.7	0.88	Infin.	0.000	0.567	**Non-Liq.**	Non-Liq.	**0.00**
34.28	305.48	2.24	0.73	110	1.443	0.896	0.74	0.50	0.86	246.11	1.53		1	100	1.00	3.00	1.00	247.0	0.88	Infin.	0.000	0.568	**Non-Liq.**	Non-Liq.	**0.00**
34.45	270.74	2.54	0.94	110	1.446	0.895	0.94	0.50	0.85	217.56	1.65		1	100	1.00	3.05	1.00	218.5	0.88	Infin.	0.000	0.568	**Non-Liq.**	Non-Liq.	**0.00**
34.61	265.04	2.75	1.04	110	1.450	0.894	1.04	0.51	0.85	211.86	1.69		1	100	1.03	3.10	1.00	218.7	0.88	Infin.	0.000	0.569	**Non-Liq.**	Non-Liq.	**0.00**
34.78	265.84	2.71	1.02	110	1.454	0.893	1.03	0.51	0.85	212.34	1.68		1	100	1.02	3.15	1.00	218.2	0.88	Infin.	0.000	0.569	**Non-Liq.**	Non-Liq.	**0.00**
34.94	292.81	2.65	0.91	110	1.458	0.892	0.91	0.50	0.85	234.57	1.61		1	100	1.00	3.20	1.00	235.4	0.88	Infin.	0.000	0.570	**Non-Liq.**	Non-Liq.	**0.00**
35.10	308.71	2.64	0.85	110	1.462	0.890	0.86	0.50	0.85	247.04	1.58		1	100	1.00	3.25	1.00	248.0	0.88	Infin.	0.000	0.570	**Non-Liq.**	Non-Liq.	**0.00**
35.27	337.12	3.28	0.97	110	1.466	0.889	0.98	0.50	0.85	269.52	1.59		1	100	1.00	3.30	1.00	270.5	0.88	Infin.	0.000	0.570	**Non-Liq.**	Non-Liq.	**0.00**
35.43	331.83	3.25	0.98	110	1.470	0.888	0.98	0.50	0.85	264.91	1.60		1	100	1.00	3.35	1.00	265.9	0.88	Infin.	0.000	0.571	**Non-Liq.**	Non-Liq.	**0.00**
35.60	342.49	4.15	1.21	110	1.474	0.887	1.22	0.51	0.85	272.40	1.67		1	100	1.01	3.40	1.00	277.4	0.88	Infin.	0.000	0.571	**Non-Liq.**	Non-Liq.	**0.00**
35.76	363.18	4.86	1.34	110	1.478	0.886	1.34	0.51	0.84	287.98	1.69		1	100	1.03	3.45	1.00	297.1	0.87	Infin.	0.000	0.572	**Non-Liq.**	Non-Liq.	**0.00**
35.93	393.50	4.20	1.07	110	1.482	0.885	1.07	0.50	0.85	313.11	1.58		1	100	1.00	3.50	1.00	314.3	0.87	Infin.	0.000	0.572	**Non-Liq.**	Non-Liq.	**0.00**
36.09	486.11	3.26	0.67	110	1.485	0.883	0.67	0.50	0.84	386.57	1.37		1	100	1.00	3.55	1.00	388.0	0.87	Infin.	0.000	0.572	**Non-Liq.**	Non-Liq.	**0.00**
36.25	452.81	3.01	0.66	110	1.489	0.882	0.67	0.50	0.84	359.53	1.39		1	100	1.00	3.60	1.00	360.9	0.87	Infin.	0.000	0.573	**Non-Liq.**	Non-Liq.	**0.00**
36.42	475.07	3.03	0.64	110	1.493	0.881	0.64	0.50	0.84	376.77	1.36		1	100	1.00	3.65	1.00	378.2	0.87	Infin.	0.000	0.573	**Non-Liq.**	Non-Liq.	**0.00**
36.58	497.46	2.63	0.53	110	1.497	0.880	0.53	0.50	0.84	394.06	1.29		1	100	1.00	3.70	1.00	395.5	0.87	Infin.	0.000	0.573	**Non-Liq.**	Non-Liq.	**0.00**
36.75	519.74	2.73	0.52	110	1.501	0.878	0.53	0.50	0.84	411.23	1.27		1	100	1.00	3.75	1.00	412.8	0.87	Infin.	0.000	0.573	**Non-Liq.**	Non-Liq.	**0.00**
36.91	525.93	2.68	0.51	110	1.505	0.877	0.51	0.50	0.84	415.60	1.26		1	100	1.00	3.80	1.00	417.1	0.87	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
37.07	555.81	2.96	0.53	110	1.509	0.876	0.53	0.50	0.84	438.70	1.26		1	100	1.00	3.85	1.00	440.3	0.87	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
37.24	576.13	3.26	0.57	110	1.513	0.875	0.57	0.50	0.84	454.20	1.27		1	100	1.00	3.90	1.00	455.9	0.87	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
37.40	579.03	2.97	0.51	110	1.517	0.873	0.51	0.50	0.84	455.90	1.23		1	100	1.00	3.95	1.00	457.6	0.87	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
37.57	555.02	2.54	0.46	110	1.521	0.872	0.46	0.50	0.83	436.38	1.21		1	100	1.00	4.00	1.00	438.0	0.86	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
37.73	538.68	2.11	0.39	110	1.525	0.871	0.39	0.50	0.83	422.95	1.17		1	100	1.00	4.05	1.00	424.5	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
37.89	534.75	2.52	0.47	110	1.528	0.869	0.47	0.50	0.83	419.32	1.23		1	100	1.00	4.10	1.00	420.9	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
38.06	523.23	3.08	0.59	110	1.532	0.868	0.59	0.50	0.83	409.73	1.31		1	100	1.00	4.15	1.00	411.3	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
38.22	482.86	4.31	0.89	110	1.536	0.867	0.90	0.50	0.83	377.54	1.47		1	100	1.00	4.20	1.00	379.0	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
38.39	499.56	3.91	0.78	110	1.540	0.865	0.78	0.50	0.83	390.14	1.42		1	100	1.00	4.25	1.00	391.6	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
38.55	504.10	3.38	0.67	110	1.544	0.864	0.67	0.50	0.83	393.20	1.36		1	100	1.00	4.30	1.00	394.7	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
38.71	443.92	3.01	0.68	110	1.548	0.863	0.68	0.50	0.83	345.67	1.41		1	100	1.00	4.35	1.00	347.0	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
38.88	474.86	3.10	0.65	110	1.552	0.861	0.65	0.50	0.83	369.38	1.37		1	100	1.00	4.40	1.00	370.8	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
39.04	482.80	3.73	0.77	110	1.556	0.860	0.77	0.50	0.82	375.10	1.43		1	100	1.00	4.45	1.00	376.5	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
39.21	449.71	3.94	0.88	110	1.560	0.859	0.88	0.50	0.82	348.87	1.49		1	100	1.00	4.50	1.00	350.2	0.86	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
39.37	400.90	3.48	0.87	110	1.564	0.857	0.87	0.50	0.82	310.48	1.52		1	100	1.00	4.55	1.00	311.6	0.86	Infin.	0.000	0.576	**Non-Liq.**	Non-Liq.	**0.00**
39.53	328.20	3.74	1.14	110	1.567	0.856	1.15	0.51	0.82	252.87	1.67		1	100	1.01	4.60	1.00	257.5	0.85	Infin.	0.000	0.576	**Non-Liq.**	Non-Liq.	**0.00**
39.70	242.12	2.76	1.14	110	1.571	0.854	1.15	0.54	0.81	183.97	1.76		1	100	1.08	4.65	1.00	198.8	0.85	Infin.	0.000	0.576	**Non-Liq.**	Non-Liq.	**0.00**
39.86	241.13	3.50	1.45	110	1.575	0.853	1.46	0.56	0.80	181.19	1.84		1	100	1.14	4.70	1.00	206.7	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
40.03	216.57	3.02	1.39	110	1.579	0.852	1.40	0.57	0.80	161.99	1.86		1	97	1.15	4.75	1.00	187.5	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
40.19	226.70	2.34	1.03	110	1.583	0.850	1.04	0.53	0.81	171.70	1.75		1	99	1.07	4.80	1.00	184.4	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
40.35	302.13	1.99	0.66	110	1.587	0.849	0.66	0.50	0.82	231.94	1.52		1	100	1.00	4.85	1.00	232.8	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
40.52	323.21	1.80	0.56	110	1.591	0.847	0.56	0.50	0.82	247.90	1.45		1	100	1.00	4.90	1.00	248.8	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
40.68	290.82	1.95	0.67	110	1.595	0.846	0.67	0.50	0.81	222.66	1.54		1	100	1.00	4.95	1.00	223.5	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
40.85	234.61	2.52	1.08	110	1.599	0.844	1.08	0.53	0.80	176.69	1.75		1	100	1.07	5.00	1.00	190.3	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
41.01	223.18	3.14	1.41	110	1.603	0.843	1.42	0.56	0.79	165.64	1.86		1	98	1.15	5.05	1.00	191.2	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
41.17	246.49	3.45	1.40	110	1.607	0.841	1.41	0.56	0.79	183.54	1.82		1	100	1.12	5.10	1.00	207.2	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
41.34	236.31	3.97	1.68	110	1.610	0.840	1.69	0.58	0.78	174.01	1.90		1	100	1.19	5.15	1.00	207.6	0.85	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
41.50	209.85	2.42	1.15	110	1.614	0.838	1.16	0.55	0.79	155.90	1.81		1	95	1.12	5.20	1.00	174.5	0.84	Infin.	0.000	0.575	**Non-Liq.**	Non-Liq.	**0.00**
41.67	228.87	2.31	1.01	110	1.618	0.837	1.01	0.53	0.80	171.46	1.74		1	99	1.07	5.25	1.00	183.4	0.84	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
41.83	272.51	1.92	0.70	110	1.622	0.835	0.71	0.50	0.81	206.78	1.57		1	100	1.00	5.30	1.00	207.6	0.84	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
41.99	324.45	1.75	0.54	110	1.626	0.834	0.54	0.50	0.81	246.13	1.44		1	100	1.00	5.35	1.00	247.0	0.84	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
42.16	358.84	1.94	0.54	110	1.630	0.832	0.54	0.50	0.81	272.02	1.41		1	100	1.00	5.40	1.00	273.0	0.84	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
42.32	372.30	2.11	0.57	110	1.634	0.831	0.57	0.50	0.80	281.93	1.41		1	100	1.00	5.45	1.00	283.0	0.84	Infin.	0.000	0.574	**Non-Liq.**	Non-Liq.	**0.00**
42.49	381.00	2.00	0.52	110	1.638	0.829	0.53	0.50	0.80	288.20	1.38		1	100	1.00	5.50	1.00	289.3	0.84	Infin.	0.000	0.573	**Non-Liq.**	Non-Liq.	**0.00**
42.65	390.56	2.06	0.53	110	1.642	0.827	0.53	0.50	0.80	295.10	1.37		1	100	1.00	5.55	1.00	296.2	0.84	Infin.	0.000	0.573	**Non-Liq.**	Non-Liq.	**0.00**
42.81	394.48	2.14	0.54	110	1.646	0.826	0.54	0.50	0.80	297.72	1.38		1	100	1.00	5.55	1.00	298.8	0.84	Infin.	0.000	0.573	**Non-Liq.**	Non-Liq.	**0.00**
42.98	391.94	2.30	0.59	110	1.649	0.824	0.59	0.50	0.80	295.44	1.41		1	100	1.00	5.55	1.00	296.5	0.84	Infin.	0.000	0.573	**Non-Liq.**	Non-Liq.	**0.00**

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Overide	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_c	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	Induced EQ CRR	M=7.5 CSR	**Liquefac. Safety Factor**	Probab. P_L	***Volumetric Strain (%)***
43.14	388.72	2.40	0.62	110	1.653	0.823	0.62	0.50	0.80	292.66	1.43		1	100	1.00	5.55	1.00	293.8	0.84	Infin.	0.000	0.572	**Non-Liq.**	Non-Liq.	**0.00**
43.31	387.56	2.49	0.64	110	1.657	0.821	0.65	0.50	0.80	291.43	1.44		1	100	1.00	5.55	1.00	292.5	0.84	Infin.	0.000	0.572	**Non-Liq.**	Non-Liq.	**0.00**
43.47	388.39	2.43	0.62	110	1.661	0.820	0.63	0.50	0.80	291.71	1.43		1	100	1.00	5.55	1.00	292.8	0.83	Infin.	0.000	0.572	**Non-Liq.**	Non-Liq.	**0.00**
43.64	394.80	2.34	0.59	110	1.665	0.818	0.60	0.50	0.80	296.20	1.41		1	100	1.00	5.55	1.00	297.3	0.83	Infin.	0.000	0.572	**Non-Liq.**	Non-Liq.	**0.00**
43.80	409.10	2.46	0.60	110	1.669	0.816	0.60	0.50	0.80	306.61	1.40		1	100	1.00	5.55	1.00	307.8	0.83	Infin.	0.000	0.571	**Non-Liq.**	Non-Liq.	**0.00**
43.96	411.66	2.41	0.59	110	1.673	0.815	0.59	0.50	0.80	308.17	1.39		1	100	1.00	5.55	1.00	309.3	0.83	Infin.	0.000	0.571	**Non-Liq.**	Non-Liq.	**0.00**
44.13	423.11	2.33	0.55	110	1.677	0.813	0.55	0.50	0.79	316.41	1.37		1	100	1.00	5.55	1.00	317.6	0.83	Infin.	0.000	0.571	**Non-Liq.**	Non-Liq.	**0.00**
44.29	427.48	3.38	0.79	110	1.681	0.811	0.79	0.50	0.79	319.31	1.48		1	100	1.00	5.55	1.00	320.5	0.83	Infin.	0.000	0.570	**Non-Liq.**	Non-Liq.	**0.00**
44.46	465.12	8.79	1.89	110	1.685	0.810	1.90	0.54	0.78	341.03	1.77		1	100	1.08	5.55	1.00	370.8	0.83	Infin.	0.000	0.570	**Non-Liq.**	Non-Liq.	**0.00**
44.62	532.93	7.53	1.41	110	1.689	0.808	1.42	0.50	0.79	397.46	1.62		1	100	1.00	5.55	1.00	399.0	0.83	Infin.	0.000	0.569	**Non-Liq.**	Non-Liq.	**0.00**
44.78	591.21	6.48	1.10	110	1.692	0.807	1.10	0.50	0.79	440.56	1.51		1	100	1.00	5.55	1.00	442.2	0.83	Infin.	0.000	0.569	**Non-Liq.**	Non-Liq.	**0.00**
44.95	507.18	5.63	1.11	110	1.696	0.805	1.11	0.50	0.79	377.32	1.55		1	100	1.00	5.55	1.00	378.7	0.83	Infin.	0.000	0.569	**Non-Liq.**	Non-Liq.	**0.00**
45.11	476.27	2.22	0.47	110	1.700	0.803	0.47	0.50	0.79	353.84	1.28		1	100	1.00	5.55	1.00	355.2	0.83	Infin.	0.000	0.568	**Non-Liq.**	Non-Liq.	**0.00**
45.28	485.36	1.77	0.36	110	1.704	0.802	0.37	0.50	0.79	360.20	1.20		1	100	1.00	5.55	1.00	361.5	0.83	Infin.	0.000	0.568	**Non-Liq.**	Non-Liq.	**0.00**
45.44	498.42	2.45	0.49	110	1.708	0.800	0.49	0.50	0.79	369.50	1.28		1	100	1.00	5.55	1.00	370.9	0.83	Infin.	0.000	0.567	**Non-Liq.**	Non-Liq.	**0.00**
45.60	485.91	5.77	1.19	110	1.712	0.798	1.19	0.50	0.79	359.78	1.59		1	100	1.00	5.55	1.00	361.1	0.82	Infin.	0.000	0.567	**Non-Liq.**	Non-Liq.	**0.00**
45.77	460.62	7.80	1.69	110	1.716	0.797	1.70	0.53	0.78	336.16	1.73		1	100	1.06	5.55	1.00	357.1	0.82	Infin.	0.000	0.567	**Non-Liq.**	Non-Liq.	**0.00**
45.93	491.30	0.00	0.00	110	1.720	0.795	0.00	0.80	0.68	313.04	2.66		0		1.00				0.91			0.566	**Non-Liq.**	Non-Liq.	**0.00**
46.10	606.17	0.00	0.00	110	1.724	0.793	0.00	0.82	0.67	382.66	2.71		0		1.00				0.91			0.566	**Non-Liq.**	Non-Liq.	**0.00**
46.26	616.78	0.00	0.00	110	1.728	0.792	0.00	0.82	0.67	388.36	2.72		0		1.00				0.91			0.565	**Non-Liq.**	Non-Liq.	**0.00**

Seismically Induced Settlement of Dry Sand Analysis – Groundwater at 8 feet

CPT-LIQUEFY.XLS - A SPREADSHEET FOR EMPIRICAL ESTIMATION OF LIQUEFACTION POTENTIAL USING CPT DATA
Developed 2003 by Shelton L. Stringer, GE, Earth Systems Southwest

Project: Oxnard High School No. 8
Job No: 301953-001
Date: 8/14/2018
Sounding: CPT-1
Plot: 1

Methods: Liquefaction Analysis using 1998 NCEER workshop methods (Robertson & Wride)
Post-liquefaction Settlement Analysis from Tokimatsu & Seed (1987)
Dry Sand Settlement by Pradel, ASCE Journal of G&GE, Vol 124, No. 4

Total Liquefied Thickness (feet)
0.0

EARTHQUAKE INFORMATION:

Magnitude:	6.77	7.5
PGA, g:	0.65	0.50
MSF:	1.30	
GWT, feet:	20.0	
Design GWT, feet:	8.0	

Induced CSR (M=7.5): = 0.65*PGA*(po/p'o)*rd/MSF
Clean Sand Qc1n = C_Q*K_C*K_H*Qc
SF = $CRR_{7.5}$*Kσ/CSR

Unit Weight of unsaturated soils: 100 pcf
Unit Weight of saturated soils: 110 pcf
Limiting Ic for liquefiable soils: 2.60
Limiting Ic for K_H: 2.0

Use Tokimatsu & Seed (0) or Ishihara &Yoshmine (1): 0
Required SF: 1.50
Min SF of Liquefiable Layers: 0.00
Avg SF of Liquefiable Layers: 0.00

Probab	Total
Avg	Induced
0%	Subsidence
Max	(inches)
0%	0.1

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	*Volumetric Strain (%)*
0.16	82.43	1.01	1.22	100	0.008	1.000	1.22	0.57	1.70	132.44	1.88		1	88	1.17	0.05	1.00	154.7	1.00	0.424	0.424	0.323	Non-Liq.	Non-Liq.	0.00
0.33	77.94	1.37	1.76	100	0.016	1.000	1.76	0.61	1.70	125.21	2.01		1	86	1.31		1.00	164.0	1.00	Infin.	0.000	0.323	Non-Liq.	Non-Liq.	0.00
0.49	66.43	1.48	2.23	100	0.025	1.000	2.23	0.65	1.70	106.70	2.13		1	80	1.51		1.00	161.4	1.00	Infin.	0.000	0.323	Non-Liq.	Non-Liq.	0.00
0.66	56.46	1.33	2.35	100	0.033	1.000	2.35	0.67	1.70	90.67	2.20		1	73	1.65		1.00	150.0	1.00	0.394	0.394	0.323	Non-Liq.	Non-Liq.	0.00
0.82	50.54	1.16	2.30	100	0.041	1.000	2.30	0.67	1.70	81.14	2.22		1	68	1.72		1.00	139.9	1.00	0.334	0.334	0.323	Non-Liq.	Non-Liq.	0.00
0.98	45.66	1.04	2.28	100	0.049	1.000	2.28	0.68	1.70	73.29	2.25		1	64	1.80		1.00	132.1	1.00	0.294	0.294	0.323	Non-Liq.	Non-Liq.	0.00
1.15	40.24	0.94	2.33	100	0.057	0.999	2.33	0.70	1.70	64.57	2.30		1	59	1.94		1.00	125.2	1.00	0.263	0.263	0.323	Non-Liq.	Non-Liq.	0.00
1.31	40.24	0.94	2.33	100	0.066	0.999	2.33	0.70	1.70	64.55	2.30		1	59	1.94		1.00	125.2	1.00	0.263	0.263	0.323	Non-Liq.	Non-Liq.	0.00
1.48	34.62	0.81	2.34	100	0.074	0.999	2.34	0.71	1.70	55.51	2.35		1	52	2.11		1.00	117.0	1.00	0.229	0.229	0.323	Non-Liq.	Non-Liq.	0.00
1.64	31.09	0.64	2.05	100	0.082	0.998	2.06	0.71	1.70	49.82	2.34		1	48	2.10		1.00	104.5	1.00	0.186	0.186	0.323	Non-Liq.	Non-Liq.	0.00
1.80	30.58	0.62	2.01	100	0.090	0.998	2.02	0.71	1.70	48.99	2.34		1	47	2.10		1.00	102.7	1.00	0.181	0.181	0.323	Non-Liq.	Non-Liq.	0.00
1.97	32.03	0.75	2.33	100	0.098	0.998	2.34	0.72	1.70	51.31	2.37		1	49	2.20		1.00	112.8	1.00	0.213	0.213	0.322	Non-Liq.	Non-Liq.	0.00
2.13	31.02	0.74	2.40	100	0.107	0.997	2.41	0.72	1.70	49.67	2.39		1	48	2.27		1.00	112.8	1.00	0.214	0.214	0.322	Non-Liq.	Non-Liq.	0.00
2.30	29.95	0.70	2.34	100	0.115	0.997	2.35	0.73	1.70	47.94	2.39		1	46	2.29		1.00	109.8	1.00	0.203	0.203	0.322	Non-Liq.	Non-Liq.	0.00
2.46	29.19	0.66	2.26	100	0.123	0.996	2.27	0.73	1.70	46.70	2.39		1	45	2.28		1.00	106.7	1.00	0.193	0.193	0.322	Non-Liq.	Non-Liq.	0.00
2.62	29.17	0.63	2.17	100	0.131	0.996	2.18	0.72	1.70	46.66	2.38		1	45	2.24		1.00	104.4	1.00	0.186	0.186	0.322	Non-Liq.	Non-Liq.	0.00
2.79	29.42	0.62	2.12	100	0.139	0.996	2.13	0.72	1.70	47.05	2.37		1	46	2.20		1.00	103.6	1.00	0.183	0.183	0.322	Non-Liq.	Non-Liq.	0.00
2.95	29.77	0.62	2.08	100	0.148	0.995	2.09	0.72	1.70	47.60	2.36		1	46	2.17		1.00	103.3	1.00	0.182	0.182	0.322	Non-Liq.	Non-Liq.	0.00
3.12	29.70	0.60	2.02	100	0.156	0.995	2.03	0.71	1.70	47.47	2.36		1	46	2.14		1.00	101.7	1.00	0.178	0.178	0.322	Non-Liq.	Non-Liq.	0.00
3.28	28.88	0.57	1.96	100	0.164	0.994	1.97	0.72	1.70	46.14	2.36		1	45	2.15		1.00	99.1	1.00	0.170	0.170	0.321	Non-Liq.	Non-Liq.	0.00
3.44	26.80	0.52	1.95	100	0.172	0.994	1.96	0.72	1.70	42.79	2.38		1	42	2.24		1.00	95.7	1.00	0.162	0.162	0.321	Non-Liq.	Non-Liq.	0.00
3.61	26.96	0.49	1.80	100	0.180	0.994	1.81	0.72	1.70	43.03	2.36		1	42	2.15		1.00	92.3	1.00	0.153	0.153	0.321	Non-Liq.	Non-Liq.	0.00
3.77	29.75	0.49	1.63	100	0.189	0.993	1.64	0.70	1.70	47.50	2.30		1	46	1.94		1.00	92.2	1.00	0.153	0.153	0.321	Non-Liq.	Non-Liq.	0.00
3.94	32.57	0.49	1.50	100	0.197	0.993	1.51	0.68	1.70	52.02	2.24		1	50	1.78		1.00	92.7	1.00	0.154	0.154	0.321	Non-Liq.	Non-Liq.	0.00
4.10	34.78	0.51	1.46	100	0.205	0.993	1.47	0.67	1.70	55.56	2.21		1	52	1.70		1.00	94.6	1.00	0.159	0.159	0.321	Non-Liq.	Non-Liq.	0.00
4.27	36.24	0.53	1.47	100	0.213	0.992	1.48	0.67	1.70	57.89	2.20		1	54	1.67		1.00	96.7	1.00	0.164	0.164	0.321	Non-Liq.	Non-Liq.	0.00
4.43	38.86	0.57	1.47	100	0.221	0.992	1.48	0.66	1.70	62.08	2.18		1	57	1.62		1.00	100.3	1.00	0.174	0.174	0.321	Non-Liq.	Non-Liq.	0.00
4.59	44.03	0.63	1.44	100	0.230	0.991	1.45	0.65	1.70	70.38	2.13		1	62	1.51		1.00	106.5	1.00	0.192	0.192	0.320	Non-Liq.	Non-Liq.	0.00
4.76	50.25	0.69	1.36	100	0.238	0.991	1.37	0.63	1.70	80.36	2.07		1	68	1.40		1.00	112.9	1.00	0.214	0.214	0.320	Non-Liq.	Non-Liq.	0.00
4.92	56.32	0.74	1.31	100	0.246	0.991	1.31	0.61	1.70	90.10	2.02		1	73	1.33		1.00	119.7	1.00	0.240	0.240	0.320	Non-Liq.	Non-Liq.	0.00
5.09	62.37	0.74	1.19	110	0.255	0.990	1.19	0.60	1.70	99.81	1.96		1	77	1.25	0.55	1.19	148.2	1.00	0.383	0.383	0.320	Non-Liq.	Non-Liq.	0.00
5.25	67.00	0.84	1.26	110	0.264	0.990	1.26	0.59	1.70	107.23	1.95		1	80	1.24	0.60	1.19	158.4	1.00	0.450	0.450	0.320	Non-Liq.	Non-Liq.	0.00
5.41	67.37	0.89	1.32	110	0.273	0.989	1.32	0.60	1.70	107.81	1.97		1	80	1.26	0.65	1.19	160.9	1.00	Infin.	0.000	0.320	Non-Liq.	Non-Liq.	0.00
5.58	67.34	0.91	1.35	110	0.282	0.989	1.36	0.60	1.70	107.75	1.97		1	80	1.27	0.70	1.19	162.0	1.00	Infin.	0.000	0.320	Non-Liq.	Non-Liq.	0.00
5.74	67.46	0.93	1.37	110	0.291	0.989	1.38	0.60	1.70	107.93	1.98		1	80	1.27	0.75	1.19	162.9	1.00	Infin.	0.000	0.320	Non-Liq.	Non-Liq.	0.00
5.91	67.82	0.93	1.37	110	0.300	0.988	1.38	0.60	1.70	108.49	1.98		1	80	1.27	0.80	1.19	163.5	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
6.07	65.23	0.93	1.42	110	0.309	0.988	1.42	0.61	1.70	104.32	2.00		1	79	1.30	0.85	1.19	160.7	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
6.23	63.78	0.93	1.46	110	0.318	0.988	1.47	0.61	1.70	101.97	2.01		1	78	1.32		1.00	134.5	1.00	0.306	0.306	0.319	Non-Liq.	Non-Liq.	0.00
6.40	65.72	0.95	1.45	110	0.327	0.987	1.45	0.61	1.70	105.07	2.00		1	79	1.30		1.00	136.9	1.00	0.319	0.319	0.319	Non-Liq.	Non-Liq.	0.00
6.56	71.05	1.00	1.40	110	0.336	0.987	1.41	0.60	1.70	113.62	1.97		1	82	1.26	1.00	1.00	143.9	1.00	0.357	0.357	0.319	Non-Liq.	Non-Liq.	0.00
6.73	77.49	1.08	1.39	110	0.345	0.986	1.40	0.59	1.70	123.96	1.94		1	86	1.23	1.05	1.00	152.8	1.00	0.412	0.412	0.319	Non-Liq.	Non-Liq.	0.00
6.89	86.69	1.16	1.34	110	0.354	0.986	1.34	0.58	1.70	138.72	1.89		1	90	1.18	1.10	1.00	164.5	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
7.05	98.48	1.28	1.30	110	0.363	0.986	1.31	0.56	1.70	157.65	1.85		1	96	1.14	1.15	1.00	180.6	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
7.22	114.53	1.41	1.23	110	0.372	0.985	1.23	0.54	1.70	183.43	1.78		1	100	1.09	1.20	1.00	201.3	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
7.38	122.82	1.49	1.21	110	0.381	0.985	1.21	0.53	1.70	196.73	1.76		1	100	1.08	1.25	1.00	212.5	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
7.55	128.68	1.53	1.19	110	0.390	0.985	1.19	0.53	1.70	205.54	1.74		1	100	1.06	1.30	1.00	219.4	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
7.71	128.68	1.53	1.19	110	0.399	0.984	1.19	0.53	1.68	203.25	1.74		1	100	1.07	1.35	1.00	217.4	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
7.87	134.06	1.56	1.17	110	0.408	0.984	1.17	0.53	1.65	208.44	1.73		1	100	1.06	1.40	1.00	221.0	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
8.04	139.69	1.63	1.16	110	0.417	0.984	1.17	0.52	1.63	214.20	1.72		1	100	1.05	1.45	1.00	225.9	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00

CPT-LIQUEFY.XLS - A SPREADSHEET FOR EMPIRICAL ESTIMATION OF LIQUEFACTION POTENTIAL USING CPT DATA
Developed 2003 by Shelton L. Stringer, GE, Earth Systems Southwest

Project: Oxnard High School No. 8
Job No: 301953-001
Date: 8/14/2018
Sounding: CPT-2A
Plot: 2

Methods: Liquefaction Analysis using 1998 NCEER workshop methods (Robertson & Wride)
Post-liquefaction Settlement Analysis from Tokimatsu & Seed (1987)
Dry Sand Settlement by Pradel, ASCE Journal of G&GE, Vol 124, No. 4

Total Liquefied Thickness (feet)
0.0

EARTHQUAKE INFORMATION:
Magnitude: 6.77 (7.5)
PGA, g: 0.65 (0.50)
MSF: 1.30
GWT, feet: 20.0
Design GWT, feet: 8.0

Induced CSR (M=7.5): = 0.65*PGA*(po/p'o)*rd/MSF
Clean Sand Qc1n = C_Q*K_C*K_H*Qc
SF = $CRR_{7.5}$*$K\sigma$/CSR

Use Tokimatsu & Seed (0) or Ishihara &Yoshmine (1): 0
Unit Weight of unsaturated soils: 100 pcf
Unit Weight of saturated soils: 110 pcf
Limiting Ic for liquefiable soils: 2.60
Limiting Ic for K_H: 2.0
Required SF: 1.50
Min SF of Liquefiable Layers: 0.00
Avg SF of Liquefiable Layers: 0.00

Probab	Total Induced Subsidence (inches)
Avg	
0%	
Max	
0%	0.1

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	*Volumetric Strain (%)*
0.16	8.00	0.09	1.13	100	0.008	1.000	1.13	0.81	1.70	12.84	2.68		0						1.00			0.323	Non-Liq.	Non-Liq.	0.00
0.33	11.37	0.11	0.97	100	0.016	1.000	0.97	0.76	1.70	18.24	2.52		1	6	2.85		1.00	52.1	1.00	0.093	0.093	0.323	Non-Liq.	Non-Liq.	0.00
0.49	14.06	0.14	1.00	100	0.025	1.000	1.00	0.74	1.70	22.55	2.44		1	15	2.50		1.00	56.3	1.00	0.097	0.097	0.323	Non-Liq.	Non-Liq.	0.00
0.66	15.85	0.14	0.90	100	0.033	1.000	0.90	0.72	1.70	25.42	2.38		1	20	2.22		1.00	56.4	1.00	0.097	0.097	0.323	Non-Liq.	Non-Liq.	0.00
0.82	15.82	0.14	0.88	100	0.041	1.000	0.89	0.72	1.70	25.35	2.37		1	20	2.21		1.00	55.9	1.00	0.096	0.096	0.323	Non-Liq.	Non-Liq.	0.00
0.98	15.42	0.12	0.78	100	0.049	1.000	0.79	0.72	1.70	24.70	2.36		1	19	2.15		1.00	53.1	1.00	0.094	0.094	0.323	Non-Liq.	Non-Liq.	0.00
1.15	12.24	0.10	0.81	100	0.057	0.999	0.81	0.74	1.70	19.58	2.45		1	9	2.55		1.00	49.8	1.00	0.092	0.092	0.323	Non-Liq.	Non-Liq.	0.00
1.31	12.24	0.10	0.81	100	0.066	0.999	0.81	0.74	1.70	19.56	2.45		1	9	2.55		1.00	49.8	1.00	0.092	0.092	0.323	Non-Liq.	Non-Liq.	0.00
1.48	10.64	0.13	1.17	100	0.074	0.999	1.18	0.78	1.70	16.98	2.59		1	3	3.25		1.00	55.1	1.00	0.096	0.096	0.323	Non-Liq.	Non-Liq.	0.00
1.64	11.63	0.20	1.72	100	0.082	0.998	1.73	0.80	1.70	18.56	2.64		0						1.00			0.323	Non-Liq.	Non-Liq.	0.00
1.80	19.13	0.29	1.53	100	0.090	0.998	1.53	0.74	1.70	30.59	2.43		1	28	2.45		1.00	74.9	1.00	0.119	0.119	0.323	Non-Liq.	Non-Liq.	0.00
1.97	35.11	0.52	1.48	100	0.098	0.998	1.48	0.67	1.70	56.26	2.21		1	53	1.70		1.00	95.4	1.00	0.161	0.161	0.322	Non-Liq.	Non-Liq.	0.00
2.13	43.24	0.60	1.40	100	0.107	0.997	1.40	0.65	1.70	69.31	2.13		1	62	1.50		1.00	104.3	1.00	0.185	0.185	0.322	Non-Liq.	Non-Liq.	0.00
2.30	43.08	0.62	1.43	100	0.115	0.997	1.44	0.65	1.70	69.04	2.13		1	61	1.52		1.00	105.0	1.00	0.188	0.188	0.322	Non-Liq.	Non-Liq.	0.00
2.46	41.08	0.60	1.46	100	0.123	0.996	1.46	0.65	1.70	65.81	2.16		1	59	1.56		1.00	102.9	1.00	0.181	0.181	0.322	Non-Liq.	Non-Liq.	0.00
2.62	38.58	0.56	1.46	100	0.131	0.996	1.46	0.66	1.70	61.78	2.18		1	57	1.61		1.00	99.6	1.00	0.172	0.172	0.322	Non-Liq.	Non-Liq.	0.00
2.79	35.25	0.53	1.50	100	0.139	0.996	1.50	0.67	1.70	56.42	2.21		1	53	1.70		1.00	96.1	1.00	0.163	0.163	0.322	Non-Liq.	Non-Liq.	0.00
2.95	32.60	0.49	1.50	100	0.148	0.995	1.51	0.68	1.70	52.14	2.24		1	50	1.78		1.00	92.6	1.00	0.154	0.154	0.322	Non-Liq.	Non-Liq.	0.00
3.12	29.61	0.45	1.52	100	0.156	0.995	1.52	0.69	1.70	47.33	2.28		1	46	1.88		1.00	89.0	1.00	0.146	0.146	0.322	Non-Liq.	Non-Liq.	0.00
3.28	26.41	0.40	1.51	100	0.164	0.994	1.52	0.70	1.70	42.17	2.32		1	41	2.01		1.00	84.6	1.00	0.136	0.136	0.321	Non-Liq.	Non-Liq.	0.00
3.44	23.64	0.34	1.44	100	0.172	0.994	1.45	0.71	1.70	37.71	2.34		1	36	2.10		1.00	79.2	1.00	0.126	0.126	0.321	Non-Liq.	Non-Liq.	0.00
3.61	21.08	0.29	1.36	100	0.180	0.994	1.37	0.72	1.70	33.58	2.37		1	32	2.20		1.00	73.8	1.00	0.117	0.117	0.321	Non-Liq.	Non-Liq.	0.00
3.77	18.23	0.30	1.67	100	0.189	0.993	1.69	0.75	1.70	28.99	2.47		1	25	2.64		1.00	76.6	1.00	0.122	0.122	0.321	Non-Liq.	Non-Liq.	0.00
3.94	15.34	0.30	1.98	100	0.197	0.993	2.00	0.78	1.70	24.33	2.58		1	18	3.21		1.00	78.0	1.00	0.124	0.124	0.321	Non-Liq.	Non-Liq.	0.00
4.10	12.99	0.35	2.73	100	0.205	0.993	2.77	0.83	1.70	20.54	2.72		0						1.00			0.321	Non-Liq.	Non-Liq.	0.00
4.27	11.82	0.38	3.20	100	0.213	0.992	3.26	0.85	1.70	18.65	2.80		0						1.00			0.321	Non-Liq.	Non-Liq.	0.00
4.43	10.34	0.34	3.30	100	0.221	0.992	3.37	0.86	1.70	16.26	2.86		0						1.00			0.321	Non-Liq.	Non-Liq.	0.00
4.59	11.89	0.24	2.04	100	0.230	0.991	2.08	0.81	1.70	18.74	2.68		0						1.00			0.320	Non-Liq.	Non-Liq.	0.00
4.76	26.79	0.25	0.93	100	0.238	0.991	0.94	0.67	1.70	42.66	2.19		1	41	1.65		1.00	70.3	1.00	0.112	0.112	0.320	Non-Liq.	Non-Liq.	0.00
4.92	35.67	0.30	0.84	100	0.246	0.991	0.85	0.63	1.70	56.92	2.06		1	53	1.39		1.00	79.2	1.00	0.126	0.126	0.320	Non-Liq.	Non-Liq.	0.00
5.09	41.25	0.36	0.88	110	0.255	0.990	0.89	0.61	1.70	65.87	2.02		1	60	1.33		1.00	87.7	1.00	0.143	0.143	0.320	Non-Liq.	Non-Liq.	0.00
5.25	44.28	0.41	0.92	110	0.264	0.990	0.92	0.61	1.70	70.72	2.01		1	62	1.31		1.00	92.7	1.00	0.154	0.154	0.320	Non-Liq.	Non-Liq.	0.00
5.41	46.60	0.44	0.94	110	0.273	0.989	0.95	0.61	1.70	74.44	2.00		1	65	1.30	1.00	1.00	96.8	1.00	0.164	0.164	0.320	Non-Liq.	Non-Liq.	0.00
5.58	50.22	0.47	0.93	110	0.282	0.989	0.94	0.60	1.70	80.24	1.97		1	68	1.26	1.05	1.00	101.4	1.00	0.177	0.177	0.320	Non-Liq.	Non-Liq.	0.00
5.74	54.67	0.47	0.87	110	0.291	0.989	0.87	0.58	1.70	87.38	1.92		1	71	1.21	1.10	1.00	105.9	1.00	0.190	0.190	0.320	Non-Liq.	Non-Liq.	0.00
5.91	56.65	0.48	0.85	110	0.300	0.988	0.86	0.58	1.70	90.54	1.90		1	73	1.19	1.15	1.00	108.2	1.00	0.198	0.198	0.319	Non-Liq.	Non-Liq.	0.00
6.07	56.48	0.50	0.89	110	0.309	0.988	0.90	0.58	1.70	90.26	1.92		1	73	1.20	1.20	1.00	109.1	1.00	0.201	0.201	0.319	Non-Liq.	Non-Liq.	0.00
6.23	58.52	0.53	0.91	110	0.318	0.988	0.92	0.58	1.70	93.52	1.91		1	74	1.20	1.25	1.00	112.4	1.00	0.212	0.212	0.319	Non-Liq.	Non-Liq.	0.00
6.40	61.73	0.57	0.92	110	0.327	0.987	0.93	0.58	1.70	98.66	1.89		1	76	1.18	1.30	1.00	117.3	1.00	0.230	0.230	0.319	Non-Liq.	Non-Liq.	0.00
6.56	65.05	0.55	0.84	110	0.336	0.987	0.85	0.56	1.70	103.98	1.85		1	78	1.15	1.35	1.00	119.7	1.00	0.239	0.239	0.319	Non-Liq.	Non-Liq.	0.00
6.73	67.42	0.56	0.83	110	0.345	0.986	0.83	0.56	1.70	107.78	1.84		1	80	1.13	1.40	1.00	122.6	1.00	0.252	0.252	0.319	Non-Liq.	Non-Liq.	0.00
6.89	72.04	0.64	0.89	110	0.354	0.986	0.89	0.56	1.70	115.18	1.83		1	83	1.13	1.45	1.00	130.7	1.00	0.287	0.287	0.319	Non-Liq.	Non-Liq.	0.00
7.05	79.98	0.56	0.70	110	0.363	0.986	0.71	0.53	1.70	127.93	1.73		1	87	1.06	1.50	1.00	136.1	1.00	0.314	0.314	0.319	Non-Liq.	Non-Liq.	0.00
7.22	84.69	0.74	0.87	110	0.372	0.985	0.88	0.54	1.70	135.48	1.77		1	89	1.09	1.55	1.00	147.8	1.00	0.380	0.380	0.318	Non-Liq.	Non-Liq.	0.00
7.38	84.27	0.71	0.84	110	0.381	0.985	0.84	0.54	1.70	134.79	1.76		1	89	1.08	1.60	1.00	146.2	1.00	0.370	0.370	0.318	Non-Liq.	Non-Liq.	0.00
7.55	88.99	0.71	0.80	110	0.390	0.985	0.81	0.53	1.69	141.78	1.73		1	91	1.06	1.65	1.00	151.0	1.00	0.400	0.400	0.318	Non-Liq.	Non-Liq.	0.00
7.71	88.99	0.71	0.80	110	0.399	0.984	0.81	0.53	1.67	140.22	1.74		1	91	1.06	1.70	1.00	149.6	1.00	0.392	0.392	0.318	Non-Liq.	Non-Liq.	0.00
7.87	97.16	0.72	0.74	110	0.408	0.984	0.74	0.52	1.63	149.46	1.69		1	94	1.03	1.75	1.00	155.1	1.00	0.427	0.427	0.318	Non-Liq.	Non-Liq.	0.00
8.04	104.13	0.76	0.73	110	0.417	0.984	0.73	0.51	1.61	157.45	1.67		1	96	1.02	1.80	1.00	161.0	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00

CPT-LIQUEFY.XLS - A SPREADSHEET FOR EMPIRICAL ESTIMATION OF LIQUEFACTION POTENTIAL USING CPT DATA
Developed 2003 by Shelton L. Stringer, GE, Earth Systems Southwest

Project: Oxnard High School No. 8
Job No: 301953-001
Date: 8/14/2018
Sounding: CPT-3
Plot: 3

Methods: Liquefaction Analysis using 1998 NCEER workshop methods (Robertson & Wride)
Post-liquefaction Settlement Analysis from Tokimatsu & Seed (1987)
Dry Sand Settlement by Pradel, ASCE Journal of G&GE, Vol 124, No. 4

Total Liquefied Thickness (feet)
0.0

EARTHQUAKE INFORMATION:

Magnitude:	6.77	7.5
PGA, g:	0.65	0.50
MSF:	1.30	
GWT, feet:	20.0	
Design GWT, feet:	8.0	

Induced CSR (M=7.5): = 0.65*PGA*(po/p'o)*rd/MSF
Clean Sand Qc1n = C_Q*K_C*K_H*Qc
SF = $CRR_{7.5}$*Kσ/CSR
Use Tokimatsu & Seed (0) or Ishihara &Yoshmine (1): 0
Unit Weight of unsaturated soils: 100 pcf
Unit Weight of saturated soils: 110 pcf
Limiting Ic for liquefiable soils: 2.60
Limiting Ic for K_H: 2.0
Required SF: 1.50
Min SF of Liquefiable Layers: 0.00
Avg SF of Liquefiable Layers: 0.00

Probab	Total Induced Subsidence (inches)
Avg	
0%	
Max	
0%	0.0

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	**Liquefac. Safety Factor**	Probab. P_L	***Volumetric Strain (%)***
0.16	61.63	0.93	1.50	100	0.008	1.000	1.50	0.62	1.70	99.01	2.03		1	76	1.34		1.00	133.0	1.00	0.299	0.299	0.323	**Non-Liq.**	Non-Liq.	**0.00**
0.33	79.05	1.53	1.94	100	0.016	1.000	1.94	0.62	1.70	126.99	2.03		1	87	1.35		1.00	171.2	1.00	Infin.	0.000	0.323	**Non-Liq.**	Non-Liq.	**0.00**
0.49	78.13	1.93	2.46	100	0.025	1.000	2.46	0.64	1.70	125.50	2.12		1	86	1.48		1.00	186.4	1.00	Infin.	0.000	0.323	**Non-Liq.**	Non-Liq.	**0.00**
0.66	68.31	1.84	2.70	100	0.033	1.000	2.70	0.66	1.70	109.71	2.18		1	81	1.63		1.00	178.6	1.00	Infin.	0.000	0.323	**Non-Liq.**	Non-Liq.	**0.00**
0.82	54.87	1.52	2.77	100	0.041	1.000	2.77	0.68	1.70	88.10	2.26		1	72	1.82		1.00	159.9	1.00	0.460	0.460	0.323	**Non-Liq.**	Non-Liq.	**0.00**
0.98	47.14	1.21	2.56	100	0.049	1.000	2.57	0.69	1.70	75.67	2.28		1	65	1.88		1.00	142.1	1.00	0.347	0.347	0.323	**Non-Liq.**	Non-Liq.	**0.00**
1.15	39.47	1.02	2.57	100	0.057	0.999	2.58	0.71	1.70	63.33	2.33		1	58	2.06		1.00	130.5	1.00	0.287	0.287	0.323	**Non-Liq.**	Non-Liq.	**0.00**
1.31	39.47	1.02	2.57	100	0.066	0.999	2.58	0.71	1.70	63.32	2.33		1	58	2.06		1.00	130.5	1.00	0.287	0.287	0.323	**Non-Liq.**	Non-Liq.	**0.00**
1.48	31.24	0.82	2.63	100	0.074	0.999	2.64	0.73	1.70	50.08	2.41		1	48	2.37		1.00	118.7	1.00	0.236	0.236	0.323	**Non-Liq.**	Non-Liq.	**0.00**
1.64	24.89	0.66	2.65	100	0.082	0.998	2.66	0.75	1.70	39.86	2.49		1	39	2.72		1.00	108.3	1.00	0.198	0.198	0.323	**Non-Liq.**	Non-Liq.	**0.00**
1.80	19.86	0.33	1.65	100	0.090	0.998	1.66	0.74	1.70	31.77	2.44		1	29	2.48		1.00	78.7	1.00	0.125	0.125	0.323	**Non-Liq.**	Non-Liq.	**0.00**
1.97	20.55	0.42	2.06	100	0.098	0.998	2.07	0.75	1.70	32.86	2.49		1	31	2.70		1.00	88.6	1.00	0.145	0.145	0.322	**Non-Liq.**	Non-Liq.	**0.00**
2.13	20.42	0.47	2.29	100	0.107	0.997	2.30	0.76	1.70	32.64	2.52		1	30	2.85		1.00	93.0	1.00	0.155	0.155	0.322	**Non-Liq.**	Non-Liq.	**0.00**
2.30	19.65	0.48	2.45	100	0.115	0.997	2.46	0.77	1.70	31.39	2.55		1	29	3.02		1.00	94.8	1.00	0.159	0.159	0.322	**Non-Liq.**	Non-Liq.	**0.00**
2.46	18.16	0.52	2.85	100	0.123	0.996	2.87	0.79	1.70	28.98	2.62		0						1.00			0.322	**Non-Liq.**	Non-Liq.	**0.00**
2.62	15.20	0.57	3.77	100	0.131	0.996	3.80	0.83	1.70	24.21	2.76		0						1.00			0.322	**Non-Liq.**	Non-Liq.	**0.00**
2.79	13.95	0.57	4.06	100	0.139	0.996	4.10	0.85	1.70	22.19	2.81		0						1.00			0.322	**Non-Liq.**	Non-Liq.	**0.00**
2.95	11.38	0.56	4.92	100	0.148	0.995	4.99	0.89	1.70	18.05	2.93		0						1.00			0.322	**Non-Liq.**	Non-Liq.	**0.00**
3.12	12.18	0.59	4.85	100	0.156	0.995	4.92	0.88	1.70	19.32	2.90		0						1.00			0.322	**Non-Liq.**	Non-Liq.	**0.00**
3.28	12.71	0.60	4.68	100	0.164	0.994	4.74	0.87	1.70	20.16	2.88		0						1.00			0.321	**Non-Liq.**	Non-Liq.	**0.00**
3.44	11.57	0.62	5.32	100	0.172	0.994	5.40	0.89	1.70	18.31	2.95		0						1.00			0.321	**Non-Liq.**	Non-Liq.	**0.00**
3.61	11.06	0.51	4.57	100	0.180	0.994	4.64	0.88	1.70	17.48	2.92		0						1.00			0.321	**Non-Liq.**	Non-Liq.	**0.00**
3.77	20.97	0.48	2.28	100	0.189	0.993	2.30	0.76	1.70	33.39	2.51		1	31	2.81		1.00	93.8	1.00	0.157	0.157	0.321	**Non-Liq.**	Non-Liq.	**0.00**
3.94	29.22	0.55	1.88	100	0.197	0.993	1.90	0.71	1.70	46.63	2.34		1	45	2.09		1.00	97.6	1.00	0.166	0.166	0.321	**Non-Liq.**	Non-Liq.	**0.00**
4.10	37.87	0.68	1.79	100	0.205	0.993	1.80	0.68	1.70	60.52	2.24		1	56	1.77		1.00	107.4	1.00	0.195	0.195	0.321	**Non-Liq.**	Non-Liq.	**0.00**
4.27	45.79	0.82	1.80	100	0.213	0.992	1.81	0.66	1.70	73.23	2.18		1	64	1.62		1.00	118.8	1.00	0.236	0.236	0.321	**Non-Liq.**	Non-Liq.	**0.00**
4.43	52.76	0.97	1.84	100	0.221	0.992	1.85	0.65	1.70	84.42	2.14		1	70	1.54		1.00	129.9	1.00	0.284	0.284	0.321	**Non-Liq.**	Non-Liq.	**0.00**
4.59	58.36	1.00	1.72	100	0.230	0.991	1.73	0.64	1.70	93.40	2.09		1	74	1.44		1.00	134.3	1.00	0.306	0.306	0.320	**Non-Liq.**	Non-Liq.	**0.00**
4.76	62.10	1.17	1.89	100	0.238	0.991	1.90	0.64	1.70	99.40	2.10		1	77	1.46		1.00	144.7	1.00	0.362	0.362	0.320	**Non-Liq.**	Non-Liq.	**0.00**
4.92	64.35	1.31	2.03	100	0.246	0.991	2.04	0.64	1.70	103.00	2.11		1	78	1.48		1.00	152.2	1.00	0.408	0.408	0.320	**Non-Liq.**	Non-Liq.	**0.00**
5.09	68.21	1.45	2.13	110	0.255	0.990	2.14	0.64	1.70	109.19	2.11		1	80	1.47		1.00	160.8	1.00	Infin.	0.000	0.320	**Non-Liq.**	Non-Liq.	**0.00**
5.25	72.78	1.57	2.16	110	0.264	0.990	2.17	0.64	1.70	116.52	2.10		1	83	1.45		1.00	168.6	1.00	Infin.	0.000	0.320	**Non-Liq.**	Non-Liq.	**0.00**
5.41	77.81	1.63	2.10	110	0.273	0.989	2.11	0.63	1.70	124.59	2.07		1	86	1.40		1.00	174.2	1.00	Infin.	0.000	0.320	**Non-Liq.**	Non-Liq.	**0.00**
5.58	85.70	1.64	1.91	110	0.282	0.989	1.92	0.61	1.70	137.25	2.01		1	90	1.31		1.00	179.9	1.00	Infin.	0.000	0.320	**Non-Liq.**	Non-Liq.	**0.00**
5.74	100.29	1.65	1.65	110	0.291	0.989	1.65	0.58	1.70	160.68	1.91		1	97	1.20	1.00	1.00	193.9	1.00	Infin.	0.000	0.320	**Non-Liq.**	Non-Liq.	**0.00**
5.91	115.78	1.63	1.41	110	0.300	0.988	1.41	0.55	1.70	185.55	1.82		1	100	1.12	1.05	1.00	209.1	1.00	Infin.	0.000	0.319	**Non-Liq.**	Non-Liq.	**0.00**
6.07	127.60	1.61	1.26	110	0.309	0.988	1.27	0.54	1.70	204.53	1.76		1	100	1.08	1.10	1.00	221.2	1.00	Infin.	0.000	0.319	**Non-Liq.**	Non-Liq.	**0.00**
6.23	135.25	1.64	1.21	110	0.318	0.988	1.22	0.53	1.70	216.81	1.73		1	100	1.06	1.15	1.00	230.1	1.00	Infin.	0.000	0.319	**Non-Liq.**	Non-Liq.	**0.00**
6.40	142.84	1.69	1.18	110	0.327	0.987	1.19	0.52	1.70	228.99	1.71		1	100	1.04	1.20	1.00	239.3	1.00	Infin.	0.000	0.319	**Non-Liq.**	Non-Liq.	**0.00**
6.56	144.87	1.70	1.18	110	0.336	0.987	1.18	0.52	1.70	232.24	1.70		1	100	1.04	1.25	1.00	241.8	1.00	Infin.	0.000	0.319	**Non-Liq.**	Non-Liq.	**0.00**
6.73	154.10	1.74	1.13	110	0.345	0.986	1.13	0.51	1.70	247.05	1.67		1	100	1.02	1.30	1.00	251.9	1.00	Infin.	0.000	0.319	**Non-Liq.**	Non-Liq.	**0.00**
6.89	159.66	1.81	1.14	110	0.354	0.986	1.14	0.51	1.70	255.97	1.66		1	100	1.01	1.35	1.00	259.7	1.00	Infin.	0.000	0.319	**Non-Liq.**	Non-Liq.	**0.00**
7.05	165.12	1.78	1.08	110	0.363	0.986	1.08	0.50	1.70	264.73	1.63		1	100	1.00	1.40	1.00	265.7	1.00	Infin.	0.000	0.319	**Non-Liq.**	Non-Liq.	**0.00**
7.22	169.35	1.74	1.02	110	0.372	0.985	1.03	0.50	1.69	269.21	1.61		1	100	1.00	1.45	1.00	270.2	1.00	Infin.	0.000	0.318	**Non-Liq.**	Non-Liq.	**0.00**
7.38	177.82	1.68	0.94	110	0.381	0.985	0.95	0.50	1.67	279.33	1.57		1	100	1.00	1.50	1.00	280.4	1.00	Infin.	0.000	0.318	**Non-Liq.**	Non-Liq.	**0.00**
7.55	173.84	1.63	0.94	110	0.390	0.985	0.94	0.50	1.65	269.88	1.58		1	100	1.00	1.55	1.00	270.9	1.00	Infin.	0.000	0.318	**Non-Liq.**	Non-Liq.	**0.00**
7.71	173.84	1.63	0.94	110	0.399	0.984	0.94	0.50	1.63	266.80	1.59		1	100	1.00	1.60	1.00	267.8	1.00	Infin.	0.000	0.318	**Non-Liq.**	Non-Liq.	**0.00**
7.87	174.47	1.63	0.94	110	0.408	0.984	0.94	0.50	1.61	264.78	1.59		1	100	1.00	1.65	1.00	265.8	1.00	Infin.	0.000	0.318	**Non-Liq.**	Non-Liq.	**0.00**
8.04	179.36	1.92	1.07	110	0.417	0.984	1.07	0.50	1.59	269.25	1.63		1	100	1.00	1.70	1.00	270.3	1.00	Infin.	0.000	0.318	**Non-Liq.**	Non-Liq.	**0.00**

CPT-LIQUEFY.XLS - A SPREADSHEET FOR EMPIRICAL ESTIMATION OF LIQUEFACTION POTENTIAL USING CPT DATA
Developed 2003 by Shelton L. Stringer, GE, Earth Systems Southwest

Project: Oxnard High School No. 8
Job No: 301953-001
Date: 8/14/2018
Sounding: CPT-4
Plot: 4

Methods: Liquefaction Analysis using 1998 NCEER workshop methods (Robertson & Wride)
Post-liquefaction Settlement Analysis from Tokimatsu & Seed (1987)
Dry Sand Settlement by Pradel, ASCE Journal of G&GE, Vol 124, No. 4

Total Liquefied Thickness (feet)
0.0

EARTHQUAKE INFORMATION:
Magnitude: 6.77 (7.5)
PGA, g: 0.65 (0.50)
MSF: 1.30
GWT, feet: 20.0
Design GWT, feet: 8.0

Induced CSR (M=7.5): = 0.65*PGA*(po/p'o)*rd/MSF
Clean Sand Qc1n = C_Q*K_C*K_H*Qc
SF = $CRR_{7.5}$*Kσ/CSR
Use Tokimatsu & Seed (0) or Ishihara &Yoshmine (1): 0
Unit Weight of unsaturated soils: 100 pcf
Unit Weight of saturated soils: 110 pcf
Limiting Ic for liquefiable soils: 2.60
Limiting Ic for K_H: 2.0
Required SF: 1.50
Min SF of Liquefiable Layers: 0.00
Avg SF of Liquefiable Layers: 0.00

Probab	Total Induced Subsidence (inches)
Avg	0.0
0%	
Max	
0%	0.0

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff. Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	*Volumetric Strain (%)*
0.16	92.62	1.11	1.20	100	0.008	1.000	1.20	0.56	1.70	148.81	1.84		1	93	1.13	0.25	1.00	168.8	1.00	Infin.	0.000	0.323	Non-Liq.	Non-Liq.	0.00
0.33	130.04	2.02	1.55	100	0.016	1.000	1.55	0.55	1.70	208.92	1.82		1	100	1.12	0.25	1.00	234.3	1.00	Infin.	0.000	0.323	Non-Liq.	Non-Liq.	0.00
0.49	152.39	3.01	1.98	100	0.025	1.000	1.98	0.57	1.70	244.82	1.86		1	100	1.16	0.25	1.00	282.8	1.00	Infin.	0.000	0.323	Non-Liq.	Non-Liq.	0.00
0.66	146.45	3.22	2.20	100	0.033	1.000	2.20	0.58	1.70	235.26	1.91		1	100	1.20	0.25	1.00	282.0	1.00	Infin.	0.000	0.323	Non-Liq.	Non-Liq.	0.00
0.82	125.63	2.97	2.36	100	0.041	1.000	2.36	0.60	1.70	201.80	1.97		1	100	1.27	0.25	1.00	255.7	1.00	Infin.	0.000	0.323	Non-Liq.	Non-Liq.	0.00
0.98	97.23	2.48	2.55	100	0.049	1.000	2.55	0.63	1.70	156.15	2.07		1	95	1.40		1.00	218.4	1.00	Infin.	0.000	0.323	Non-Liq.	Non-Liq.	0.00
1.15	63.94	1.59	2.49	100	0.057	0.999	2.50	0.66	1.70	102.65	2.18		1	78	1.61		1.00	165.7	1.00	Infin.	0.000	0.323	Non-Liq.	Non-Liq.	0.00
1.31	63.94	1.59	2.49	100	0.066	0.999	2.50	0.66	1.70	102.63	2.18		1	78	1.61		1.00	165.7	1.00	Infin.	0.000	0.323	Non-Liq.	Non-Liq.	0.00
1.48	41.59	1.09	2.61	100	0.074	0.999	2.62	0.70	1.70	66.71	2.32		1	60	2.02		1.00	134.8	1.00	0.308	0.308	0.323	Non-Liq.	Non-Liq.	0.00
1.64	28.11	0.74	2.64	100	0.082	0.998	2.64	0.74	1.70	45.04	2.45		1	44	2.52		1.00	113.6	1.00	0.216	0.216	0.323	Non-Liq.	Non-Liq.	0.00
1.80	20.76	0.53	2.55	100	0.090	0.998	2.56	0.77	1.70	33.21	2.54		1	31	2.98		1.00	98.9	1.00	0.170	0.170	0.323	Non-Liq.	Non-Liq.	0.00
1.97	21.63	0.56	2.58	100	0.098	0.998	2.60	0.77	1.70	34.60	2.53		1	33	2.92		1.00	101.1	1.00	0.176	0.176	0.322	Non-Liq.	Non-Liq.	0.00
2.13	34.59	0.78	2.25	100	0.107	0.997	2.26	0.71	1.70	55.41	2.34		1	52	2.07		1.00	114.6	1.00	0.220	0.220	0.322	Non-Liq.	Non-Liq.	0.00
2.30	34.08	0.89	2.61	100	0.115	0.997	2.62	0.72	1.70	54.58	2.39		1	52	2.25		1.00	123.0	1.00	0.253	0.253	0.322	Non-Liq.	Non-Liq.	0.00
2.46	31.06	0.81	2.60	100	0.123	0.996	2.61	0.73	1.70	49.71	2.41		1	48	2.37		1.00	117.7	1.00	0.231	0.231	0.322	Non-Liq.	Non-Liq.	0.00
2.62	26.71	0.71	2.65	100	0.131	0.996	2.67	0.75	1.70	42.71	2.47		1	42	2.61		1.00	111.6	1.00	0.209	0.209	0.322	Non-Liq.	Non-Liq.	0.00
2.79	24.66	0.64	2.61	100	0.139	0.996	2.62	0.75	1.70	39.40	2.49		1	38	2.72		1.00	107.1	1.00	0.194	0.194	0.322	Non-Liq.	Non-Liq.	0.00
2.95	22.66	0.59	2.60	100	0.148	0.995	2.62	0.76	1.70	36.17	2.52		1	35	2.86		1.00	103.3	1.00	0.183	0.183	0.322	Non-Liq.	Non-Liq.	0.00
3.12	21.79	0.57	2.60	100	0.156	0.995	2.62	0.77	1.70	34.76	2.53		1	33	2.93		1.00	101.7	1.00	0.178	0.178	0.322	Non-Liq.	Non-Liq.	0.00
3.28	20.52	0.55	2.69	100	0.164	0.994	2.72	0.78	1.70	32.71	2.56		1	30	3.10		1.00	101.3	1.00	0.177	0.177	0.321	Non-Liq.	Non-Liq.	0.00
3.44	18.85	0.54	2.86	100	0.172	0.994	2.89	0.79	1.70	30.01	2.61		0						1.00			0.321	Non-Liq.	Non-Liq.	0.00
3.61	16.96	0.52	3.05	100	0.180	0.994	3.09	0.81	1.70	26.96	2.66		0						1.00			0.321	Non-Liq.	Non-Liq.	0.00
3.77	15.22	0.50	3.30	100	0.189	0.993	3.34	0.82	1.70	24.15	2.72		0						1.00			0.321	Non-Liq.	Non-Liq.	0.00
3.94	13.60	0.54	3.97	100	0.197	0.993	4.03	0.85	1.70	21.54	2.81		0						1.00			0.321	Non-Liq.	Non-Liq.	0.00
4.10	13.10	0.56	4.31	100	0.205	0.993	4.37	0.86	1.70	20.72	2.85		0						1.00			0.321	Non-Liq.	Non-Liq.	0.00
4.27	13.76	0.61	4.45	100	0.213	0.992	4.52	0.86	1.70	21.77	2.84		0						1.00			0.321	Non-Liq.	Non-Liq.	0.00
4.43	12.78	0.63	4.94	100	0.221	0.992	5.02	0.88	1.70	20.18	2.89		0						1.00			0.321	Non-Liq.	Non-Liq.	0.00
4.59	9.82	0.62	6.32	100	0.230	0.991	6.48	0.92	1.70	15.41	3.06		0						1.00			0.320	Non-Liq.	Non-Liq.	0.00
4.76	9.11	0.58	6.39	100	0.238	0.991	6.56	0.93	1.70	14.26	3.08		0						1.00			0.320	Non-Liq.	Non-Liq.	0.00
4.92	9.64	0.67	6.94	100	0.246	0.991	7.12	0.93	1.70	15.09	3.09		0						1.00			0.320	Non-Liq.	Non-Liq.	0.00
5.09	11.05	0.51	4.60	110	0.255	0.990	4.71	0.89	1.70	17.35	2.93		0						1.00			0.320	Non-Liq.	Non-Liq.	0.00
5.25	26.79	0.51	1.91	110	0.264	0.990	1.93	0.72	1.70	42.62	2.38		1	41	2.22		1.00	94.7	1.00	0.159	0.159	0.320	Non-Liq.	Non-Liq.	0.00
5.41	43.87	0.61	1.40	110	0.273	0.989	1.41	0.65	1.70	70.05	2.12		1	62	1.50		1.00	105.1	1.00	0.188	0.188	0.320	Non-Liq.	Non-Liq.	0.00
5.58	61.57	0.87	1.42	110	0.282	0.989	1.42	0.61	1.70	98.48	2.02		1	76	1.32		1.00	130.2	1.00	0.285	0.285	0.320	Non-Liq.	Non-Liq.	0.00
5.74	81.48	1.27	1.55	110	0.291	0.989	1.56	0.60	1.70	130.45	1.96		1	88	1.25	1.00	1.00	163.5	1.00	Infin.	0.000	0.320	Non-Liq.	Non-Liq.	0.00
5.91	104.49	1.77	1.69	110	0.300	0.988	1.70	0.58	1.70	167.41	1.91		1	98	1.20	1.05	1.00	201.7	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
6.07	121.74	2.26	1.85	110	0.309	0.988	1.86	0.58	1.70	195.12	1.90		1	100	1.19	1.10	1.00	232.8	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
6.23	129.40	2.54	1.96	110	0.318	0.988	1.97	0.58	1.70	207.41	1.90		1	100	1.19	1.15	1.00	248.1	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
6.40	133.71	2.63	1.97	110	0.327	0.987	1.97	0.58	1.70	214.32	1.90		1	100	1.18	1.20	1.00	254.9	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
6.56	136.13	2.67	1.96	110	0.336	0.987	1.97	0.57	1.70	218.19	1.89		1	100	1.18	1.20	1.00	258.3	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
6.73	137.04	2.50	1.82	110	0.345	0.986	1.83	0.57	1.70	219.64	1.86		1	100	1.16	1.20	1.00	254.7	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
6.89	134.61	2.27	1.69	110	0.354	0.986	1.69	0.56	1.70	215.72	1.84		1	100	1.14	1.20	1.00	246.3	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
7.05	133.55	2.02	1.51	110	0.363	0.986	1.52	0.55	1.70	214.01	1.81		1	100	1.11	1.20	1.00	238.6	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
7.22	130.84	1.92	1.47	110	0.372	0.985	1.47	0.55	1.70	209.64	1.80		1	100	1.11	1.20	1.00	233.0	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
7.38	125.34	1.72	1.37	110	0.381	0.985	1.38	0.55	1.70	200.78	1.79		1	100	1.10	1.20	1.00	221.8	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
7.55	121.32	1.59	1.31	110	0.390	0.985	1.32	0.54	1.70	194.31	1.79		1	100	1.10	1.20	1.00	213.9	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
7.71	121.32	1.59	1.31	110	0.399	0.984	1.32	0.54	1.70	194.14	1.79		1	100	1.10	1.20	1.00	213.8	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
7.87	117.69	1.47	1.25	110	0.408	0.984	1.25	0.54	1.68	185.85	1.78		1	100	1.09	1.20	1.00	204.2	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
8.04	112.60	1.37	1.22	110	0.417	0.984	1.22	0.55	1.66	176.05	1.79		1	100	1.10	1.20	1.00	194.4	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00

CPT-LIQUEFY.XLS - A SPREADSHEET FOR EMPIRICAL ESTIMATION OF LIQUEFACTION POTENTIAL USING CPT DATA
Developed 2003 by Shelton L. Stringer, GE, Earth Systems Southwest

Project: Oxnard High School No. 8
Job No: 301953-001
Date: 8/14/2018
Sounding: CPT-5
Plot: 5

Methods: Liquefaction Analysis using 1998 NCEER workshop methods (Robertson & Wride)
Post-liquefaction Settlement Analysis from Tokimatsu & Seed (1987)
Dry Sand Settlement by Pradel, ASCE Journal of G&GE, Vol 124, No. 4

Total Liquefied Thickness (feet)
0.0

EARTHQUAKE INFORMATION:

Magnitude:	6.77	7.5
PGA, g:	0.65	0.50
MSF:	1.30	
GWT, feet:	20.0	
Design GWT, feet:	8.0	

Induced CSR (M=7.5): = 0.65*PGA*(po/p'o)*rd/MSF
Clean Sand Qc1n = C_Q*K_C*K_H*Qc
SF = $CRR_{7.5}$*Kσ/CSR
Use Tokimatsu & Seed (0) or Ishihara &Yoshmine (1): 0
Unit Weight of unsaturated soils: 100 pcf
Unit Weight of saturated soils: 110 pcf
Limiting Ic for liquefiable soils: 2.60
Limiting Ic for K_H: 2.0
Required SF: 1.50
Min SF of Liquefiable Layers: 0.00
Avg SF of Liquefiable Layers: 0.00

Probab Avg	Total Induced Subsidence (inches)
0%	Max
0%	0.1

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	*Volumetric Strain (%)*
0.16	7.20	0.07	0.96	100	0.008	1.000	0.96	0.82	1.70	11.56	2.69		0						1.00			0.323	Non-Liq.	Non-Liq.	0.00
0.33	11.97	0.11	0.92	100	0.016	1.000	0.92	0.75	1.70	19.21	2.49		1	8	2.70		1.00	51.9	1.00	0.093	0.093	0.323	Non-Liq.	Non-Liq.	0.00
0.49	16.98	0.15	0.86	100	0.025	1.000	0.86	0.71	1.70	27.24	2.34		1	23	2.08		1.00	56.7	1.00	0.097	0.097	0.323	Non-Liq.	Non-Liq.	0.00
0.66	18.41	0.17	0.90	100	0.033	1.000	0.90	0.70	1.70	29.53	2.32		1	26	2.01		1.00	59.5	1.00	0.100	0.100	0.323	Non-Liq.	Non-Liq.	0.00
0.82	16.13	0.16	1.01	100	0.041	1.000	1.01	0.73	1.70	25.85	2.39		1	21	2.29		1.00	59.2	1.00	0.099	0.099	0.323	Non-Liq.	Non-Liq.	0.00
0.98	12.95	0.14	1.06	100	0.049	1.000	1.06	0.75	1.70	20.73	2.49		1	12	2.71		1.00	56.1	1.00	0.096	0.096	0.323	Non-Liq.	Non-Liq.	0.00
1.15	10.49	0.11	1.05	100	0.057	0.999	1.05	0.78	1.70	16.76	2.57		1	3	3.13		1.00	52.5	1.00	0.093	0.093	0.323	Non-Liq.	Non-Liq.	0.00
1.31	10.49	0.11	1.05	100	0.066	0.999	1.06	0.78	1.70	16.75	2.57		1	3	3.13		1.00	52.5	1.00	0.093	0.093	0.323	Non-Liq.	Non-Liq.	0.00
1.48	9.50	0.14	1.52	100	0.074	0.999	1.53	0.81	1.70	15.15	2.69		0						1.00			0.323	Non-Liq.	Non-Liq.	0.00
1.64	11.89	0.21	1.77	100	0.082	0.998	1.79	0.80	1.70	18.97	2.64		0						1.00			0.323	Non-Liq.	Non-Liq.	0.00
1.80	17.29	0.33	1.93	100	0.090	0.998	1.94	0.77	1.70	27.64	2.53		1	23	2.91		1.00	80.4	1.00	0.128	0.128	0.323	Non-Liq.	Non-Liq.	0.00
1.97	29.55	0.52	1.75	100	0.098	0.998	1.76	0.70	1.70	47.32	2.32		1	46	2.00		1.00	94.8	1.00	0.159	0.159	0.322	Non-Liq.	Non-Liq.	0.00
2.13	29.26	0.52	1.76	100	0.107	0.997	1.77	0.70	1.70	46.84	2.32		1	45	2.02		1.00	94.6	1.00	0.159	0.159	0.322	Non-Liq.	Non-Liq.	0.00
2.30	27.77	0.48	1.74	100	0.115	0.997	1.75	0.71	1.70	44.44	2.34		1	43	2.07		1.00	92.1	1.00	0.153	0.153	0.322	Non-Liq.	Non-Liq.	0.00
2.46	25.48	0.44	1.74	100	0.123	0.996	1.75	0.72	1.70	40.74	2.37		1	40	2.18		1.00	88.8	1.00	0.145	0.145	0.322	Non-Liq.	Non-Liq.	0.00
2.62	22.54	0.40	1.76	100	0.131	0.996	1.77	0.73	1.70	36.01	2.41		1	34	2.36		1.00	85.1	1.00	0.137	0.137	0.322	Non-Liq.	Non-Liq.	0.00
2.79	20.15	0.37	1.83	100	0.139	0.996	1.84	0.75	1.70	32.15	2.46		1	30	2.58		1.00	83.0	1.00	0.133	0.133	0.322	Non-Liq.	Non-Liq.	0.00
2.95	17.63	0.42	2.37	100	0.148	0.995	2.39	0.78	1.70	28.09	2.58		1	24	3.19		1.00	89.5	1.00	0.147	0.147	0.322	Non-Liq.	Non-Liq.	0.00
3.12	13.94	0.43	3.06	100	0.156	0.995	3.10	0.83	1.70	22.15	2.73		0						1.00			0.322	Non-Liq.	Non-Liq.	0.00
3.28	11.33	0.42	3.69	100	0.164	0.994	3.74	0.86	1.70	17.94	2.85		0						1.00			0.321	Non-Liq.	Non-Liq.	0.00
3.44	10.79	0.35	3.27	100	0.172	0.994	3.32	0.86	1.70	17.06	2.84		0						1.00			0.321	Non-Liq.	Non-Liq.	0.00
3.61	19.14	0.32	1.69	100	0.180	0.994	1.70	0.75	1.70	30.46	2.46		1	28	2.57		1.00	78.4	1.00	0.125	0.125	0.321	Non-Liq.	Non-Liq.	0.00
3.77	28.87	0.35	1.20	100	0.189	0.993	1.21	0.68	1.70	46.09	2.23		1	45	1.73		1.00	79.9	1.00	0.127	0.127	0.321	Non-Liq.	Non-Liq.	0.00
3.94	37.13	0.44	1.18	100	0.197	0.993	1.19	0.65	1.70	59.34	2.13		1	55	1.52		1.00	90.2	1.00	0.148	0.148	0.321	Non-Liq.	Non-Liq.	0.00
4.10	42.19	0.52	1.24	100	0.205	0.993	1.25	0.64	1.70	67.46	2.10		1	60	1.46		1.00	98.5	1.00	0.169	0.169	0.321	Non-Liq.	Non-Liq.	0.00
4.27	42.88	0.62	1.43	100	0.213	0.992	1.44	0.65	1.70	68.56	2.14		1	61	1.53		1.00	104.7	1.00	0.187	0.187	0.321	Non-Liq.	Non-Liq.	0.00
4.43	42.87	0.65	1.51	100	0.221	0.992	1.52	0.65	1.70	68.53	2.15		1	61	1.56		1.00	106.9	1.00	0.194	0.194	0.321	Non-Liq.	Non-Liq.	0.00
4.59	43.05	0.62	1.44	100	0.230	0.991	1.44	0.65	1.70	68.80	2.14		1	61	1.53		1.00	105.0	1.00	0.188	0.188	0.320	Non-Liq.	Non-Liq.	0.00
4.76	40.55	0.64	1.58	100	0.238	0.991	1.59	0.66	1.70	64.77	2.18		1	59	1.63		1.00	105.4	1.00	0.189	0.189	0.320	Non-Liq.	Non-Liq.	0.00
4.92	37.17	0.59	1.58	100	0.246	0.991	1.60	0.67	1.70	59.33	2.21		1	55	1.70		1.00	101.0	1.00	0.176	0.176	0.320	Non-Liq.	Non-Liq.	0.00
5.09	45.41	0.55	1.21	110	0.255	0.990	1.22	0.63	1.70	72.56	2.07		1	64	1.41		1.00	102.1	1.00	0.179	0.179	0.320	Non-Liq.	Non-Liq.	0.00
5.25	49.21	0.55	1.12	110	0.264	0.990	1.13	0.62	1.70	78.65	2.02		1	67	1.33		1.00	104.9	1.00	0.187	0.187	0.320	Non-Liq.	Non-Liq.	0.00
5.41	48.56	0.56	1.16	110	0.273	0.989	1.16	0.62	1.70	77.59	2.04		1	66	1.35		1.00	104.9	1.00	0.187	0.187	0.320	Non-Liq.	Non-Liq.	0.00
5.58	48.19	0.59	1.22	110	0.282	0.989	1.23	0.62	1.70	76.98	2.06		1	66	1.38		1.00	106.1	1.00	0.191	0.191	0.320	Non-Liq.	Non-Liq.	0.00
5.74	48.82	0.59	1.20	110	0.291	0.989	1.21	0.62	1.70	77.98	2.05		1	67	1.37		1.00	106.5	1.00	0.192	0.192	0.320	Non-Liq.	Non-Liq.	0.00
5.91	49.59	0.58	1.17	110	0.300	0.988	1.18	0.62	1.70	79.20	2.03		1	67	1.35		1.00	106.6	1.00	0.193	0.193	0.319	Non-Liq.	Non-Liq.	0.00
6.07	49.01	0.58	1.19	110	0.309	0.988	1.19	0.62	1.70	78.25	2.04		1	67	1.36		1.00	106.2	1.00	0.192	0.192	0.319	Non-Liq.	Non-Liq.	0.00
6.23	48.87	0.58	1.19	110	0.318	0.988	1.20	0.62	1.70	78.01	2.04		1	67	1.36		1.00	106.2	1.00	0.191	0.191	0.319	Non-Liq.	Non-Liq.	0.00
6.40	48.92	0.59	1.20	110	0.327	0.987	1.21	0.62	1.70	78.08	2.05		1	67	1.36		1.00	106.6	1.00	0.193	0.193	0.319	Non-Liq.	Non-Liq.	0.00
6.56	50.19	0.62	1.23	110	0.336	0.987	1.24	0.62	1.70	80.11	2.04		1	68	1.36		1.00	109.1	1.00	0.201	0.201	0.319	Non-Liq.	Non-Liq.	0.00
6.73	54.54	0.64	1.17	110	0.345	0.986	1.17	0.61	1.70	87.08	2.00		1	71	1.30		1.00	113.3	1.00	0.215	0.215	0.319	Non-Liq.	Non-Liq.	0.00
6.89	60.79	0.78	1.29	110	0.354	0.986	1.29	0.61	1.70	97.11	1.99		1	76	1.29	0.90	1.02	128.0	1.00	0.275	0.275	0.319	Non-Liq.	Non-Liq.	0.00
7.05	70.21	1.20	1.71	110	0.363	0.986	1.72	0.62	1.70	112.23	2.03		1	82	1.35		1.00	151.2	1.00	0.401	0.401	0.319	Non-Liq.	Non-Liq.	0.00
7.22	86.10	1.28	1.49	110	0.372	0.985	1.49	0.59	1.70	137.75	1.93		1	90	1.22	1.00	1.00	168.1	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
7.38	112.25	1.15	1.02	110	0.381	0.985	1.02	0.53	1.70	179.75	1.73		1	100	1.06	1.05	1.00	190.8	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
7.55	123.77	1.31	1.06	110	0.390	0.985	1.06	0.52	1.68	196.22	1.71		1	100	1.05	1.10	1.00	206.2	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
7.71	123.77	1.31	1.06	110	0.399	0.984	1.06	0.52	1.66	194.07	1.72		1	100	1.05	1.15	1.00	204.3	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
7.87	137.24	1.24	0.90	110	0.408	0.984	0.90	0.50	1.61	208.49	1.65		1	100	1.00	1.20	1.00	209.3	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
8.04	143.26	1.17	0.82	110	0.417	0.984	0.82	0.50	1.59	214.93	1.61		1	100	1.00	1.25	1.00	215.7	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00

CPT-LIQUEFY.XLS - A SPREADSHEET FOR EMPIRICAL ESTIMATION OF LIQUEFACTION POTENTIAL USING CPT DATA
Developed 2003 by Shelton L. Stringer, GE, Earth Systems Southwest

Project: Oxnard High School No. 8
Job No: 301953-001
Date: 8/14/2018
Sounding: CPT-6A
Plot: 6

Methods: Liquefaction Analysis using 1998 NCEER workshop methods (Robertson & Wride)
Post-liquefaction Settlement Analysis from Tokimatsu & Seed (1987)
Dry Sand Settlement by Pradel, ASCE Journal of G&GE, Vol 124, No. 4

Total Liquefied Thickness (feet)
0.0

EARTHQUAKE INFORMATION:
Magnitude: 6.77 (7.5)
PGA, g: 0.65 (0.50)
MSF: 1.30
GWT, feet: 20.0
Design GWT, feet: 8.0

Induced CSR (M=7.5): = 0.65*PGA*(po/p'o)*rd/MSF
Clean Sand Qc1n = C_Q*K_C*K_H*Qc
SF = $CRR_{7.5}$*Kσ/CSR
Use Tokimatsu & Seed (0) or Ishihara &Yoshmine (1): 0
Unit Weight of unsaturated soils: 100 pcf
Unit Weight of saturated soils: 110 pcf
Limiting Ic for liquefiable soils: 2.60
Limiting Ic for K_H: 2.0
Required SF: 1.50
Min SF of Liquefiable Layers: 0.00
Avg SF of Liquefiable Layers: 0.00

Probab	Total Induced Subsidence (inches)
Avg	0%
Max	0%

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	*Volumetric Strain (%)*
0.16	6.69	0.01	0.21	100	0.008	1.000	0.21	0.76	1.70	10.74	2.50		1	0	1.00		1.00	10.7	1.00	0.059	0.059	0.323	**Non-Liq.**	Non-Liq.	**0.00**
0.33	14.12	0.04	0.28	100	0.016	1.000	0.28	0.67	1.70	22.66	2.22		1	15	1.00		1.00	22.7	1.00	0.069	0.069	0.323	**Non-Liq.**	Non-Liq.	**0.00**
0.49	16.59	0.09	0.55	100	0.025	1.000	0.56	0.69	1.70	26.62	2.26		1	22	1.83		1.00	48.7	1.00	0.091	0.091	0.323	**Non-Liq.**	Non-Liq.	**0.00**
0.66	21.13	0.18	0.84	100	0.033	1.000	0.84	0.68	1.70	33.90	2.25		1	32	1.81		1.00	61.3	1.00	0.101	0.101	0.323	**Non-Liq.**	Non-Liq.	**0.00**
0.82	29.41	0.29	0.98	100	0.041	1.000	0.98	0.66	1.70	47.19	2.17		1	46	1.59		1.00	75.1	1.00	0.119	0.119	0.323	**Non-Liq.**	Non-Liq.	**0.00**
0.98	35.60	0.35	0.99	100	0.049	1.000	0.99	0.64	1.70	57.12	2.10		1	54	1.46		1.00	83.2	1.00	0.134	0.134	0.323	**Non-Liq.**	Non-Liq.	**0.00**
1.15	34.08	0.35	1.03	100	0.057	0.999	1.03	0.65	1.70	54.67	2.13		1	52	1.51		1.00	82.4	1.00	0.132	0.132	0.323	**Non-Liq.**	Non-Liq.	**0.00**
1.31	34.08	0.35	1.03	100	0.066	0.999	1.03	0.65	1.70	54.65	2.13		1	52	1.51		1.00	82.3	1.00	0.132	0.132	0.323	**Non-Liq.**	Non-Liq.	**0.00**
1.48	30.11	0.33	1.11	100	0.074	0.999	1.11	0.66	1.70	48.26	2.19		1	47	1.64		1.00	79.2	1.00	0.126	0.126	0.323	**Non-Liq.**	Non-Liq.	**0.00**
1.64	28.15	0.27	0.96	100	0.082	0.998	0.96	0.66	1.70	45.10	2.18		1	44	1.62		1.00	72.8	1.00	0.116	0.116	0.323	**Non-Liq.**	Non-Liq.	**0.00**
1.80	29.07	0.35	1.20	100	0.090	0.998	1.20	0.67	1.70	46.56	2.22		1	45	1.72		1.00	80.2	1.00	0.128	0.128	0.323	**Non-Liq.**	Non-Liq.	**0.00**
1.97	26.19	0.39	1.47	100	0.098	0.998	1.48	0.70	1.70	41.92	2.31		1	41	1.99		1.00	83.3	1.00	0.134	0.134	0.322	**Non-Liq.**	Non-Liq.	**0.00**
2.13	20.41	0.42	2.07	100	0.107	0.997	2.08	0.75	1.70	32.62	2.49		1	30	2.71		1.00	88.5	1.00	0.145	0.145	0.322	**Non-Liq.**	Non-Liq.	**0.00**
2.30	15.45	0.44	2.83	100	0.115	0.997	2.85	0.81	1.70	24.64	2.67		0						1.00			0.322	**Non-Liq.**	Non-Liq.	**0.00**
2.46	12.62	0.37	2.95	100	0.123	0.996	2.98	0.83	1.70	20.08	2.75		0						1.00			0.322	**Non-Liq.**	Non-Liq.	**0.00**
2.62	13.50	0.27	2.01	100	0.131	0.996	2.03	0.80	1.70	21.48	2.63		0						1.00			0.322	**Non-Liq.**	Non-Liq.	**0.00**
2.79	20.18	0.31	1.56	100	0.139	0.996	1.57	0.73	1.70	32.20	2.42		1	30	2.39		1.00	77.0	1.00	0.123	0.123	0.322	**Non-Liq.**	Non-Liq.	**0.00**
2.95	25.28	0.31	1.23	100	0.148	0.995	1.23	0.69	1.70	40.38	2.28		1	39	1.88		1.00	76.0	1.00	0.121	0.121	0.322	**Non-Liq.**	Non-Liq.	**0.00**
3.12	31.76	0.36	1.12	100	0.156	0.995	1.13	0.66	1.70	50.78	2.17		1	49	1.61		1.00	81.6	1.00	0.131	0.131	0.322	**Non-Liq.**	Non-Liq.	**0.00**
3.28	35.56	0.38	1.08	100	0.164	0.994	1.08	0.65	1.70	56.87	2.13		1	53	1.50		1.00	85.5	1.00	0.138	0.138	0.321	**Non-Liq.**	Non-Liq.	**0.00**
3.44	40.16	0.39	0.98	100	0.172	0.994	0.98	0.63	1.70	64.25	2.06		1	58	1.38		1.00	88.8	1.00	0.145	0.145	0.321	**Non-Liq.**	Non-Liq.	**0.00**
3.61	45.45	0.46	1.00	100	0.180	0.994	1.01	0.61	1.70	72.74	2.02		1	64	1.33		1.00	96.5	1.00	0.164	0.164	0.321	**Non-Liq.**	Non-Liq.	**0.00**
3.77	52.79	0.51	0.96	100	0.189	0.993	0.97	0.60	1.70	84.52	1.96		1	70	1.25	0.65	1.12	118.5	1.00	0.235	0.235	0.321	**Non-Liq.**	Non-Liq.	**0.00**
3.94	58.72	0.56	0.95	100	0.197	0.993	0.95	0.58	1.70	94.04	1.92		1	74	1.20	0.70	1.12	127.1	1.00	0.271	0.271	0.321	**Non-Liq.**	Non-Liq.	**0.00**
4.10	64.33	0.60	0.94	100	0.205	0.993	0.94	0.57	1.70	103.04	1.88		1	78	1.17	0.75	1.12	135.7	1.00	0.313	0.313	0.321	**Non-Liq.**	Non-Liq.	**0.00**
4.27	69.66	0.83	1.19	100	0.213	0.992	1.19	0.59	1.70	111.59	1.92		1	81	1.21	0.80	1.12	151.9	1.00	0.406	0.406	0.321	**Non-Liq.**	Non-Liq.	**0.00**
4.43	74.65	1.28	1.71	100	0.221	0.992	1.72	0.61	1.70	119.59	2.01		1	84	1.32		1.00	157.6	1.00	0.444	0.444	0.321	**Non-Liq.**	Non-Liq.	**0.00**
4.59	78.74	2.11	2.68	100	0.230	0.991	2.69	0.65	1.70	126.15	2.14		1	86	1.54		1.00	194.3	1.00	Infin.	0.000	0.320	**Non-Liq.**	Non-Liq.	**0.00**
4.76	95.41	2.01	2.11	100	0.238	0.991	2.12	0.61	1.70	152.92	2.01		1	94	1.31		1.00	200.9	1.00	Infin.	0.000	0.320	**Non-Liq.**	Non-Liq.	**0.00**
4.92	90.35	1.38	1.53	100	0.246	0.991	1.53	0.58	1.70	144.78	1.92		1	92	1.21	1.00	1.00	175.8	1.00	Infin.	0.000	0.320	**Non-Liq.**	Non-Liq.	**0.00**
5.09	73.79	0.57	0.78	110	0.255	0.990	0.78	0.54	1.70	118.16	1.79		1	84	1.10	1.05	1.00	130.1	1.00	0.285	0.285	0.320	**Non-Liq.**	Non-Liq.	**0.00**
5.25	64.99	0.41	0.63	110	0.264	0.990	0.63	0.54	1.70	104.00	1.78		1	78	1.09	1.10	1.00	113.7	1.00	0.217	0.217	0.320	**Non-Liq.**	Non-Liq.	**0.00**
5.41	60.11	0.48	0.80	110	0.273	0.989	0.81	0.57	1.70	96.15	1.87		1	75	1.16	1.15	1.00	111.7	1.00	0.210	0.210	0.320	**Non-Liq.**	Non-Liq.	**0.00**
5.58	57.62	0.71	1.23	110	0.282	0.989	1.24	0.61	1.70	92.13	2.00		1	73	1.30	1.20	1.00	120.0	1.00	0.241	0.241	0.320	**Non-Liq.**	Non-Liq.	**0.00**
5.74	60.32	0.70	1.16	110	0.291	0.989	1.16	0.60	1.70	96.45	1.97		1	75	1.26	1.25	1.00	121.7	1.00	0.248	0.248	0.320	**Non-Liq.**	Non-Liq.	**0.00**
5.91	59.79	0.67	1.11	110	0.300	0.988	1.12	0.60	1.70	95.59	1.96		1	75	1.25	1.30	1.00	119.7	1.00	0.239	0.239	0.319	**Non-Liq.**	Non-Liq.	**0.00**
6.07	56.99	0.42	0.74	110	0.309	0.988	0.75	0.57	1.70	91.07	1.86		1	73	1.16	1.35	1.00	105.8	1.00	0.190	0.190	0.319	**Non-Liq.**	Non-Liq.	**0.00**
6.23	64.88	0.50	0.77	110	0.318	0.988	0.77	0.56	1.70	103.74	1.83		1	78	1.13	1.40	1.00	117.4	1.00	0.231	0.231	0.319	**Non-Liq.**	Non-Liq.	**0.00**
6.40	81.28	0.52	0.64	110	0.327	0.987	0.64	0.52	1.70	130.08	1.70		1	88	1.04	1.45	1.00	135.6	1.00	0.312	0.312	0.319	**Non-Liq.**	Non-Liq.	**0.00**
6.56	88.72	0.58	0.65	110	0.336	0.987	0.66	0.51	1.70	142.02	1.68		1	91	1.02	1.50	1.00	145.7	1.00	0.368	0.368	0.319	**Non-Liq.**	Non-Liq.	**0.00**
6.73	90.02	0.70	0.78	110	0.345	0.986	0.78	0.52	1.70	144.09	1.72		1	92	1.05	1.55	1.00	151.9	1.00	0.406	0.406	0.319	**Non-Liq.**	Non-Liq.	**0.00**
6.89	95.98	0.75	0.78	110	0.354	0.986	0.79	0.52	1.70	153.65	1.70		1	95	1.04	1.60	1.00	160.1	1.00	Infin.	0.000	0.319	**Non-Liq.**	Non-Liq.	**0.00**
7.05	106.17	0.82	0.77	110	0.363	0.986	0.77	0.51	1.70	170.01	1.66		1	99	1.01	1.65	1.00	172.8	1.00	Infin.	0.000	0.319	**Non-Liq.**	Non-Liq.	**0.00**
7.22	120.42	0.87	0.72	110	0.372	0.985	0.72	0.50	1.69	191.26	1.61		1	100	1.00	1.70	1.00	192.0	1.00	Infin.	0.000	0.318	**Non-Liq.**	Non-Liq.	**0.00**
7.38	147.55	0.97	0.66	110	0.381	0.985	0.66	0.50	1.67	231.68	1.52		1	100	1.00	1.75	1.00	232.5	1.00	Infin.	0.000	0.318	**Non-Liq.**	Non-Liq.	**0.00**
7.55	167.64	1.10	0.66	110	0.390	0.985	0.66	0.50	1.65	260.23	1.48		1	100	1.00	1.80	1.00	261.2	1.00	Infin.	0.000	0.318	**Non-Liq.**	Non-Liq.	**0.00**
7.71	167.64	1.10	0.66	110	0.399	0.984	0.66	0.50	1.63	257.26	1.48		1	100	1.00	1.85	1.00	258.2	1.00	Infin.	0.000	0.318	**Non-Liq.**	Non-Liq.	**0.00**
7.87	175.94	1.23	0.70	110	0.408	0.984	0.70	0.50	1.61	267.01	1.49		1	100	1.00	1.90	1.00	268.0	1.00	Infin.	0.000	0.318	**Non-Liq.**	Non-Liq.	**0.00**
8.04	183.17	1.23	0.67	110	0.417	0.984	0.67	0.50	1.59	274.98	1.47		1	100	1.00	1.95	1.00	276.0	1.00	Infin.	0.000	0.318	**Non-Liq.**	Non-Liq.	**0.00**

CPT-LIQUEFY.XLS - A SPREADSHEET FOR EMPIRICAL ESTIMATION OF LIQUEFACTION POTENTIAL USING CPT DATA
Developed 2003 by Shelton L. Stringer, GE, Earth Systems Southwest

Project: Oxnard High School No. 8
Job No: 301953-001
Date: 8/14/2018
Sounding: CPT-7
Plot: 7

Methods: Liquefaction Analysis using 1998 NCEER workshop methods (Robertson & Wride)
Post-liquefaction Settlement Analysis from Tokimatsu & Seed (1987)
Dry Sand Settlement by Pradel, ASCE Journal of G&GE, Vol 124, No. 4

Total Liquefied Thickness (feet)
0.0

EARTHQUAKE INFORMATION:

Magnitude:	6.77	7.5
PGA, g:	0.65	0.50
MSF:	1.30	
GWT, feet:	20.0	
Design GWT, feet:	8.0	

Induced CSR (M=7.5): = 0.65*PGA*(po/p'o)*rd/MSF
Clean Sand Qc1n = C_Q*K_C*K_H*Qc
SF = $CRR_{7.5}$*Kσ/CSR
Use Tokimatsu & Seed (0) or Ishihara &Yoshmine (1): 0
Unit Weight of unsaturated soils: 100 pcf
Unit Weight of saturated soils: 110 pcf
Limiting Ic for liquefiable soils: 2.60
Limiting Ic for K_H: 2.0
Required SF: 1.50
Min SF of Liquefiable Layers: 0.00
Avg SF of Liquefiable Layers: 0.00

Probab	Total Induced Subsidence (inches)
Avg	0.2
0%	
Max	
0%	

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	*Volumetric Strain (%)*
0.16	7.32	0.09	1.28	100	0.008	1.000	1.29	0.83	1.70	11.75	2.74		0						1.00			0.323	**Non-Liq.**	Non-Liq.	**0.00**
0.33	12.26	0.12	1.00	100	0.016	1.000	1.00	0.76	1.70	19.67	2.50		1	9	2.75		1.00	54.0	1.00	0.095	0.095	0.323	**Non-Liq.**	Non-Liq.	**0.00**
0.49	14.26	0.15	1.02	100	0.025	1.000	1.03	0.74	1.70	22.87	2.44		1	16	2.50		1.00	57.1	1.00	0.097	0.097	0.323	**Non-Liq.**	Non-Liq.	**0.00**
0.66	13.52	0.15	1.09	100	0.033	1.000	1.10	0.75	1.70	21.67	2.48		1	13	2.66		1.00	57.7	1.00	0.098	0.098	0.323	**Non-Liq.**	Non-Liq.	**0.00**
0.82	11.35	0.14	1.22	100	0.041	1.000	1.22	0.78	1.70	18.17	2.57		1	6	3.14		1.00	57.0	1.00	0.097	0.097	0.323	**Non-Liq.**	Non-Liq.	**0.00**
0.98	9.04	0.12	1.33	100	0.049	1.000	1.33	0.81	1.70	14.45	2.67		0						1.00			0.323	**Non-Liq.**	Non-Liq.	**0.00**
1.15	7.13	0.08	1.07	100	0.057	0.999	1.07	0.82	1.70	11.36	2.72		0						1.00			0.323	**Non-Liq.**	Non-Liq.	**0.00**
1.31	7.13	0.08	1.07	100	0.066	0.999	1.08	0.82	1.70	11.35	2.72		0						1.00			0.323	**Non-Liq.**	Non-Liq.	**0.00**
1.48	6.14	0.08	1.27	100	0.074	0.999	1.29	0.85	1.70	9.75	2.81		0						1.00			0.323	**Non-Liq.**	Non-Liq.	**0.00**
1.64	6.75	0.14	2.01	100	0.082	0.998	2.04	0.87	1.70	10.71	2.88		0						1.00			0.323	**Non-Liq.**	Non-Liq.	**0.00**
1.80	12.03	0.25	2.04	100	0.090	0.998	2.05	0.81	1.70	19.18	2.67		0						1.00			0.323	**Non-Liq.**	Non-Liq.	**0.00**
1.97	26.83	0.46	1.71	100	0.098	0.998	1.72	0.71	1.70	42.95	2.34		1	42	2.10		1.00	90.0	1.00	0.148	0.148	0.322	**Non-Liq.**	Non-Liq.	**0.00**
2.13	27.70	0.58	2.10	100	0.107	0.997	2.11	0.72	1.70	44.34	2.39		1	43	2.27		1.00	100.6	1.00	0.175	0.175	0.322	**Non-Liq.**	Non-Liq.	**0.00**
2.30	30.71	0.62	2.02	100	0.115	0.997	2.02	0.71	1.70	49.16	2.34		1	47	2.10		1.00	103.0	1.00	0.182	0.182	0.322	**Non-Liq.**	Non-Liq.	**0.00**
2.46	35.14	0.59	1.69	100	0.123	0.996	1.70	0.68	1.70	56.27	2.25		1	53	1.80		1.00	101.0	1.00	0.176	0.176	0.322	**Non-Liq.**	Non-Liq.	**0.00**
2.62	34.66	0.52	1.49	100	0.131	0.996	1.49	0.67	1.70	55.48	2.22		1	52	1.71		1.00	95.1	1.00	0.160	0.160	0.322	**Non-Liq.**	Non-Liq.	**0.00**
2.79	30.29	0.43	1.42	100	0.139	0.996	1.43	0.68	1.70	48.45	2.25		1	47	1.81		1.00	87.5	1.00	0.142	0.142	0.322	**Non-Liq.**	Non-Liq.	**0.00**
2.95	25.72	0.37	1.42	100	0.148	0.995	1.43	0.70	1.70	41.09	2.31		1	40	1.98		1.00	81.4	1.00	0.130	0.130	0.322	**Non-Liq.**	Non-Liq.	**0.00**
3.12	22.47	0.33	1.49	100	0.156	0.995	1.50	0.72	1.70	35.85	2.37		1	34	2.19		1.00	78.6	1.00	0.125	0.125	0.322	**Non-Liq.**	Non-Liq.	**0.00**
3.28	20.80	0.31	1.47	100	0.164	0.994	1.48	0.73	1.70	33.16	2.39		1	31	2.29		1.00	76.0	1.00	0.121	0.121	0.321	**Non-Liq.**	Non-Liq.	**0.00**
3.44	20.45	0.30	1.47	100	0.172	0.994	1.48	0.73	1.70	32.58	2.40		1	30	2.31		1.00	75.4	1.00	0.120	0.120	0.321	**Non-Liq.**	Non-Liq.	**0.00**
3.61	20.73	0.30	1.45	100	0.180	0.994	1.46	0.73	1.70	33.02	2.39		1	31	2.29		1.00	75.5	1.00	0.120	0.120	0.321	**Non-Liq.**	Non-Liq.	**0.00**
3.77	19.90	0.31	1.58	100	0.189	0.993	1.59	0.74	1.70	31.67	2.43		1	29	2.44		1.00	77.1	1.00	0.123	0.123	0.321	**Non-Liq.**	Non-Liq.	**0.00**
3.94	17.21	0.35	2.05	100	0.197	0.993	2.07	0.77	1.70	27.34	2.55		1	23	3.03		1.00	82.8	1.00	0.133	0.133	0.321	**Non-Liq.**	Non-Liq.	**0.00**
4.10	11.84	0.37	3.08	100	0.205	0.993	3.14	0.84	1.70	18.70	2.79		0						1.00			0.321	**Non-Liq.**	Non-Liq.	**0.00**
4.27	7.47	0.32	4.24	100	0.213	0.992	4.37	0.92	1.70	11.66	3.04		0						1.00			0.321	**Non-Liq.**	Non-Liq.	**0.00**
4.43	7.87	0.27	3.41	100	0.221	0.992	3.50	0.90	1.70	12.29	2.96		0						1.00			0.321	**Non-Liq.**	Non-Liq.	**0.00**
4.59	13.03	0.25	1.89	100	0.230	0.991	1.92	0.80	1.70	20.57	2.63		0						1.00			0.320	**Non-Liq.**	Non-Liq.	**0.00**
4.76	17.56	0.20	1.13	100	0.238	0.991	1.15	0.73	1.70	27.83	2.40		1	24	2.30		1.00	63.9	1.00	0.104	0.104	0.320	**Non-Liq.**	Non-Liq.	**0.00**
4.92	25.00	0.25	0.99	100	0.246	0.991	1.00	0.68	1.70	39.77	2.23		1	39	1.75		1.00	69.6	1.00	0.111	0.111	0.320	**Non-Liq.**	Non-Liq.	**0.00**
5.09	28.21	0.27	0.97	110	0.255	0.990	0.98	0.66	1.70	44.92	2.18		1	44	1.63		1.00	73.1	1.00	0.116	0.116	0.320	**Non-Liq.**	Non-Liq.	**0.00**
5.25	26.74	0.32	1.19	110	0.264	0.990	1.20	0.68	1.70	42.54	2.25		1	41	1.81		1.00	76.9	1.00	0.122	0.122	0.320	**Non-Liq.**	Non-Liq.	**0.00**
5.41	27.54	0.33	1.20	110	0.273	0.989	1.21	0.68	1.70	43.81	2.25		1	43	1.78		1.00	78.2	1.00	0.124	0.124	0.320	**Non-Liq.**	Non-Liq.	**0.00**
5.58	30.42	0.33	1.08	110	0.282	0.989	1.09	0.66	1.70	48.43	2.18		1	47	1.63		1.00	78.9	1.00	0.126	0.126	0.320	**Non-Liq.**	Non-Liq.	**0.00**
5.74	35.07	0.33	0.95	110	0.291	0.989	0.96	0.64	1.70	55.88	2.10		1	53	1.45		1.00	81.3	1.00	0.130	0.130	0.320	**Non-Liq.**	Non-Liq.	**0.00**
5.91	42.76	0.43	0.99	110	0.300	0.988	1.00	0.62	1.70	68.22	2.04		1	61	1.36		1.00	92.6	1.00	0.154	0.154	0.319	**Non-Liq.**	Non-Liq.	**0.00**
6.07	59.96	0.60	1.00	110	0.309	0.988	1.01	0.59	1.70	95.85	1.93		1	75	1.21	1.00	1.00	116.9	1.00	0.229	0.229	0.319	**Non-Liq.**	Non-Liq.	**0.00**
6.23	82.48	0.78	0.94	110	0.318	0.988	0.94	0.55	1.70	132.02	1.80		1	88	1.11	1.05	1.00	146.9	1.00	0.375	0.375	0.319	**Non-Liq.**	Non-Liq.	**0.00**
6.40	98.15	0.89	0.91	110	0.327	0.987	0.91	0.53	1.70	157.18	1.74		1	96	1.06	1.10	1.00	167.6	1.00	Infin.	0.000	0.319	**Non-Liq.**	Non-Liq.	**0.00**
6.56	106.99	1.01	0.94	110	0.336	0.987	0.95	0.52	1.70	171.37	1.72		1	99	1.05	1.15	1.00	180.9	1.00	Infin.	0.000	0.319	**Non-Liq.**	Non-Liq.	**0.00**
6.73	112.07	1.09	0.97	110	0.345	0.986	0.98	0.52	1.70	179.52	1.72		1	100	1.05	1.20	1.00	188.9	1.00	Infin.	0.000	0.319	**Non-Liq.**	Non-Liq.	**0.00**
6.89	112.25	1.18	1.05	110	0.354	0.986	1.05	0.53	1.70	179.79	1.74		1	100	1.06	1.25	1.00	191.9	1.00	Infin.	0.000	0.319	**Non-Liq.**	Non-Liq.	**0.00**
7.05	111.68	1.25	1.12	110	0.363	0.986	1.13	0.54	1.70	178.86	1.76		1	100	1.08	1.30	1.00	193.7	1.00	Infin.	0.000	0.319	**Non-Liq.**	Non-Liq.	**0.00**
7.22	113.57	1.36	1.19	110	0.372	0.985	1.20	0.54	1.70	181.89	1.77		1	100	1.09	1.35	1.00	198.7	1.00	Infin.	0.000	0.318	**Non-Liq.**	Non-Liq.	**0.00**
7.38	110.25	1.39	1.26	110	0.381	0.985	1.27	0.55	1.70	176.54	1.80		1	100	1.11	1.40	1.00	196.3	1.00	Infin.	0.000	0.318	**Non-Liq.**	Non-Liq.	**0.00**
7.55	100.97	1.35	1.34	110	0.390	0.985	1.34	0.56	1.70	161.61	1.85		1	97	1.14	1.45	1.00	185.3	1.00	Infin.	0.000	0.318	**Non-Liq.**	Non-Liq.	**0.00**
7.71	100.97	1.35	1.34	110	0.399	0.984	1.34	0.56	1.70	161.60	1.85		1	97	1.14	1.50	1.00	185.3	1.00	Infin.	0.000	0.318	**Non-Liq.**	Non-Liq.	**0.00**
7.87	95.77	1.34	1.40	110	0.408	0.984	1.40	0.57	1.70	153.23	1.88		1	95	1.17	1.55	1.00	179.4	1.00	Infin.	0.000	0.318	**Non-Liq.**	Non-Liq.	**0.00**
8.04	92.93	1.31	1.41	110	0.417	0.984	1.42	0.57	1.70	148.65	1.89		1	93	1.18	1.60	1.00	175.7	1.00	Infin.	0.000	0.318	**Non-Liq.**	Non-Liq.	**0.00**

Seismically Induced Settlement of Dry Sand Analysis – Groundwater at 20 feet

CPT-LIQUEFY.XLS - A SPREADSHEET FOR EMPIRICAL ESTIMATION OF LIQUEFACTION POTENTIAL USING CPT DATA
Developed 2003 by Shelton L. Stringer, GE, Earth Systems Southwest

Project: Oxnard High School No. 8
Job No: 301953-001
Date: 8/14/2018
Sounding: CPT-1
Plot: 1

Methods: Liquefaction Analysis using 1998 NCEER workshop methods (Robertson & Wride)
Post-liquefaction Settlement Analysis from Tokimatsu & Seed (1987)
Dry Sand Settlement by Pradel, ASCE Journal of G&GE, Vol 124, No. 4

Total Liquefied Thickness (feet)
0.0

EARTHQUAKE INFORMATION:

Magnitude:	6.77	7.5
PGA, g:	0.65	0.50
MSF:	1.30	
GWT, feet:	20.0	
Design GWT, feet:	20.0	

Induced CSR (M=7.5): = 0.65*PGA*(po/p'o)*rd/MSF
Clean Sand Qc1n = C_Q*K_C*K_H*Qc
SF = $CRR_{7.5}$*Kσ/CSR
Use Tokimatsu & Seed (0) or Ishihara &Yoshmine (1): 0
Unit Weight of unsaturated soils: 110 pcf
Unit Weight of saturated soils: 110 pcf
Limiting Ic for liquefiable soils: 2.60
Limiting Ic for K_H: 2.0
Required SF: 1.50
Min SF of Liquefiable Layers: 0.00
Avg SF of Liquefiable Layers: 0.00

Probab	Total Induced Subsidence (inches)
Avg	0.1
0%	
Max	
0%	

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	*Volumetric Strain (%)*
0.16	82.43	1.01	1.22	110	0.009	1.000	1.22	0.57	1.70	132.43	1.88		1	88	1.17	0.05	1.00	154.7	1.00	0.424	0.424	0.323	Non-Liq.	Non-Liq.	0.00
0.33	77.94	1.37	1.76	110	0.018	1.000	1.76	0.61	1.70	125.21	2.01		1	86	1.31		1.00	164.0	1.00	Infin.	0.000	0.323	Non-Liq.	Non-Liq.	0.00
0.49	66.43	1.48	2.23	110	0.027	1.000	2.23	0.65	1.70	106.70	2.13		1	80	1.51		1.00	161.4	1.00	Infin.	0.000	0.323	Non-Liq.	Non-Liq.	0.00
0.66	56.46	1.33	2.35	110	0.036	1.000	2.35	0.67	1.70	90.66	2.20		1	73	1.65		1.00	150.0	1.00	0.394	0.394	0.323	Non-Liq.	Non-Liq.	0.00
0.82	50.54	1.16	2.30	110	0.045	1.000	2.30	0.67	1.70	81.14	2.22		1	68	1.72		1.00	139.9	1.00	0.334	0.334	0.323	Non-Liq.	Non-Liq.	0.00
0.98	45.66	1.04	2.28	110	0.054	1.000	2.28	0.68	1.70	73.28	2.25		1	64	1.80		1.00	132.1	1.00	0.294	0.294	0.323	Non-Liq.	Non-Liq.	0.00
1.15	40.24	0.94	2.33	110	0.063	0.999	2.33	0.70	1.70	64.56	2.30		1	59	1.94		1.00	125.2	1.00	0.263	0.263	0.323	Non-Liq.	Non-Liq.	0.00
1.31	40.24	0.94	2.33	110	0.072	0.999	2.33	0.70	1.70	64.54	2.30		1	59	1.94		1.00	125.2	1.00	0.263	0.263	0.323	Non-Liq.	Non-Liq.	0.00
1.48	34.62	0.81	2.34	110	0.081	0.999	2.35	0.71	1.70	55.50	2.35		1	52	2.11		1.00	117.0	1.00	0.229	0.229	0.323	Non-Liq.	Non-Liq.	0.00
1.64	31.09	0.64	2.05	110	0.090	0.998	2.06	0.71	1.70	49.81	2.34		1	48	2.10		1.00	104.5	1.00	0.186	0.186	0.323	Non-Liq.	Non-Liq.	0.00
1.80	30.58	0.62	2.01	110	0.099	0.998	2.02	0.71	1.70	48.98	2.34		1	47	2.10		1.00	102.7	1.00	0.181	0.181	0.323	Non-Liq.	Non-Liq.	0.00
1.97	32.03	0.75	2.33	110	0.108	0.998	2.34	0.72	1.70	51.29	2.37		1	49	2.20		1.00	112.8	1.00	0.213	0.213	0.322	Non-Liq.	Non-Liq.	0.00
2.13	31.02	0.74	2.40	110	0.117	0.997	2.41	0.73	1.70	49.65	2.39		1	48	2.27		1.00	112.8	1.00	0.214	0.214	0.322	Non-Liq.	Non-Liq.	0.00
2.30	29.95	0.70	2.34	110	0.126	0.997	2.35	0.73	1.70	47.92	2.39		1	46	2.29		1.00	109.8	1.00	0.203	0.203	0.322	Non-Liq.	Non-Liq.	0.00
2.46	29.19	0.66	2.26	110	0.135	0.996	2.27	0.73	1.70	46.69	2.39		1	45	2.29		1.00	106.7	1.00	0.193	0.193	0.322	Non-Liq.	Non-Liq.	0.00
2.62	29.17	0.63	2.17	110	0.144	0.996	2.18	0.72	1.70	46.64	2.38		1	45	2.24		1.00	104.4	1.00	0.186	0.186	0.322	Non-Liq.	Non-Liq.	0.00
2.79	29.42	0.62	2.12	110	0.153	0.996	2.13	0.72	1.70	47.03	2.37		1	46	2.20		1.00	103.6	1.00	0.183	0.183	0.322	Non-Liq.	Non-Liq.	0.00
2.95	29.77	0.62	2.08	110	0.162	0.995	2.09	0.72	1.70	47.57	2.36		1	46	2.17		1.00	103.3	1.00	0.182	0.182	0.322	Non-Liq.	Non-Liq.	0.00
3.12	29.70	0.60	2.02	110	0.171	0.995	2.04	0.72	1.70	47.45	2.36		1	46	2.14		1.00	101.7	1.00	0.178	0.178	0.322	Non-Liq.	Non-Liq.	0.00
3.28	28.88	0.57	1.96	110	0.180	0.994	1.98	0.72	1.70	46.11	2.36		1	45	2.15		1.00	99.1	1.00	0.170	0.170	0.321	Non-Liq.	Non-Liq.	0.00
3.44	26.80	0.52	1.95	110	0.189	0.994	1.97	0.72	1.70	42.76	2.38		1	42	2.24		1.00	95.7	1.00	0.162	0.162	0.321	Non-Liq.	Non-Liq.	0.00
3.61	26.96	0.49	1.80	110	0.198	0.994	1.81	0.72	1.70	43.00	2.36		1	42	2.15		1.00	92.3	1.00	0.153	0.153	0.321	Non-Liq.	Non-Liq.	0.00
3.77	29.75	0.49	1.63	110	0.208	0.993	1.65	0.70	1.70	47.47	2.30		1	46	1.94		1.00	92.2	1.00	0.153	0.153	0.321	Non-Liq.	Non-Liq.	0.00
3.94	32.57	0.49	1.50	110	0.217	0.993	1.51	0.68	1.70	51.99	2.24		1	50	1.78		1.00	92.7	1.00	0.154	0.154	0.321	Non-Liq.	Non-Liq.	0.00
4.10	34.78	0.51	1.46	110	0.226	0.993	1.47	0.67	1.70	55.52	2.21		1	52	1.70		1.00	94.6	1.00	0.159	0.159	0.321	Non-Liq.	Non-Liq.	0.00
4.27	36.24	0.53	1.47	110	0.235	0.992	1.48	0.67	1.70	57.85	2.20		1	54	1.67		1.00	96.7	1.00	0.164	0.164	0.321	Non-Liq.	Non-Liq.	0.00
4.43	38.86	0.57	1.47	110	0.244	0.992	1.48	0.66	1.70	62.05	2.18		1	57	1.62		1.00	100.3	1.00	0.174	0.174	0.321	Non-Liq.	Non-Liq.	0.00
4.59	44.03	0.63	1.44	110	0.253	0.991	1.45	0.65	1.70	70.34	2.13		1	62	1.51		1.00	106.4	1.00	0.192	0.192	0.320	Non-Liq.	Non-Liq.	0.00
4.76	50.25	0.69	1.36	110	0.262	0.991	1.37	0.63	1.70	80.32	2.07		1	68	1.41		1.00	112.9	1.00	0.214	0.214	0.320	Non-Liq.	Non-Liq.	0.00
4.92	56.32	0.74	1.31	110	0.271	0.991	1.31	0.61	1.70	90.06	2.02		1	72	1.33		1.00	119.7	1.00	0.239	0.239	0.320	Non-Liq.	Non-Liq.	0.00
5.09	62.37	0.74	1.19	110	0.280	0.990	1.19	0.60	1.70	99.77	1.96		1	77	1.25	0.55	1.19	148.2	1.00	0.383	0.383	0.320	Non-Liq.	Non-Liq.	0.00
5.25	67.00	0.84	1.26	110	0.289	0.990	1.27	0.59	1.70	107.19	1.95		1	80	1.25	0.60	1.19	158.4	1.00	0.449	0.449	0.320	Non-Liq.	Non-Liq.	0.00
5.41	67.37	0.89	1.32	110	0.298	0.989	1.32	0.60	1.70	107.77	1.97		1	80	1.26	0.65	1.19	160.8	1.00	Infin.	0.000	0.320	Non-Liq.	Non-Liq.	0.00
5.58	67.34	0.91	1.35	110	0.307	0.989	1.36	0.60	1.70	107.71	1.97		1	80	1.27	0.70	1.19	162.0	1.00	Infin.	0.000	0.320	Non-Liq.	Non-Liq.	0.00
5.74	67.46	0.93	1.37	110	0.316	0.989	1.38	0.60	1.70	107.89	1.98		1	80	1.27	0.75	1.19	162.9	1.00	Infin.	0.000	0.320	Non-Liq.	Non-Liq.	0.00
5.91	67.82	0.93	1.37	110	0.325	0.988	1.38	0.60	1.70	108.45	1.98		1	80	1.27	0.80	1.19	163.5	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
6.07	65.23	0.93	1.42	110	0.334	0.988	1.43	0.61	1.70	104.28	2.00		1	79	1.30	0.85	1.19	160.7	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
6.23	63.78	0.93	1.46	110	0.343	0.988	1.47	0.61	1.70	101.93	2.01		1	78	1.32		1.00	134.5	1.00	0.306	0.306	0.319	Non-Liq.	Non-Liq.	0.00
6.40	65.72	0.95	1.45	110	0.352	0.987	1.45	0.61	1.70	105.03	2.00		1	79	1.30		1.00	136.9	1.00	0.319	0.319	0.319	Non-Liq.	Non-Liq.	0.00
6.56	71.05	1.00	1.40	110	0.361	0.987	1.41	0.60	1.70	113.58	1.97		1	82	1.26	1.00	1.00	143.8	1.00	0.357	0.357	0.319	Non-Liq.	Non-Liq.	0.00
6.73	77.49	1.08	1.39	110	0.370	0.986	1.40	0.59	1.70	123.92	1.94		1	86	1.23	1.05	1.00	152.7	1.00	0.411	0.411	0.319	Non-Liq.	Non-Liq.	0.00
6.89	86.69	1.16	1.34	110	0.379	0.986	1.34	0.58	1.70	138.69	1.89		1	90	1.18	1.10	1.00	164.5	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
7.05	98.48	1.28	1.30	110	0.388	0.986	1.31	0.56	1.70	157.61	1.85		1	96	1.14	1.15	1.00	180.6	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
7.22	114.53	1.41	1.23	110	0.397	0.985	1.23	0.54	1.70	183.39	1.78		1	100	1.09	1.20	1.00	201.2	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
7.38	122.82	1.49	1.21	110	0.406	0.985	1.21	0.54	1.67	193.40	1.76		1	100	1.08	1.25	1.00	209.5	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
7.55	128.68	1.53	1.19	110	0.415	0.985	1.19	0.53	1.65	199.45	1.75		1	100	1.07	1.30	1.00	214.1	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
7.71	128.68	1.53	1.19	110	0.424	0.984	1.19	0.53	1.63	197.34	1.75		1	100	1.07	1.35	1.00	212.2	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
7.87	134.06	1.56	1.17	110	0.433	0.984	1.17	0.53	1.60	202.54	1.74		1	100	1.06	1.40	1.00	215.9	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
8.04	139.69	1.63	1.16	110	0.442	0.984	1.17	0.53	1.58	208.28	1.73		1	100	1.06	1.45	1.00	220.8	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
8.20	147.04	1.72	1.17	110	0.451	0.983	1.17	0.52	1.56	216.44	1.72		1	100	1.05	1.50	1.00	228.1	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
8.37	151.94	1.71	1.12	110	0.460	0.983	1.13	0.52	1.54	220.33	1.70		1	100	1.04	1.55	1.00	229.4	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
8.53	158.05	1.80	1.14	110	0.469	0.982	1.14	0.52	1.52	226.66	1.69		1	100	1.03	1.60	1.00	235.3	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
8.69	163.87	1.92	1.17	110	0.478	0.982	1.18	0.52	1.51	232.90	1.70		1	100	1.04	1.65	1.00	242.3	1.00	Infin.	0.000	0.317	Non-Liq.	Non-Liq.	0.00
8.86	169.68	2.08	1.22	110	0.487	0.982	1.23	0.52	1.50	239.19	1.70		1	100	1.04	1.70	1.00	249.8	1.00	Infin.	0.000	0.317	Non-Liq.	Non-Liq.	0.00
9.02	174.27	2.26	1.30	110	0.496	0.981	1.30	0.52	1.49	244.08	1.72		1	100	1.05	1.75	1.00	257.2	1.00	Infin.	0.000	0.317	Non-Liq.	Non-Liq.	0.00
9.19	179.31	2.32	1.29	110	0.505	0.981	1.30	0.52	1.47	248.52	1.71		1	100	1.05	1.80	1.00	261.0	1.00	Infin.	0.000	0.317	Non-Liq.	Non-Liq.	0.00
9.35	181.08	2.35	1.30	110	0.514	0.981	1.30	0.52	1.46	248.69	1.71		1	100	1.05	1.85	1.00	261.3	1.00	Infin.	0.000	0.317	Non-Liq.	Non-Liq.	0.00
9.51	191.53	2.42	1.26	110	0.523	0.980	1.27	0.52	1.44	259.55	1.69		1	100	1.03	1.90	1.00	269.1	1.00	Infin.	0.000	0.317	Non-Liq.	Non-Liq.	0.00
9.68	202.38	2.57	1.27	110	0.532	0.980	1.27	0.51	1.42	271.29	1.68		1	100	1.03	1.95	1.00	279.3	1.00	Infin.	0.000	0.317	Non-Liq.	Non-Liq.	0.00
9.84	214.08	2.69	1.26	110	0.541	0.980	1.26	0.51	1.41	283.70	1.67		1	100	1.02	2.00	1.00	289.1	1.00	Infin.	0.000	0.317	Non-Liq.	Non-Liq.	0.00
10.01	227.79	2.91	1.28	110	0.550	0.979	1.28	0.51	1.39	298.89	1.66		1	100	1.01	2.05	1.00	302.9	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
10.17	242.24	3.22	1.33	110	0.559	0.979	1.33	0.51	1.38	315.27	1.66		1	100	1.01	2.10	1.00	319.4	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
10.33	244.06	3.47	1.42	110	0.568	0.979	1.43	0.51	1.37	316.43	1.68		1	100	1.03	2.15	1.00	325.7	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
10.50	249.05	3.55	1.43	110	0.577	0.978	1.43	0.51	1.36	320.21	1.68		1	100	1.02	2.20	1.00	329.2	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
10.66	254.87	3.69	1.45	110	0.586	0.978	1.45	0.51	1.35	325.19	1.68		1	100	1.03	2.25	1.00	334.7	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
10.83	256.89	3.79	1.48	110	0.595	0.978	1.48	0.51	1.34	325.57	1.69		1	100	1.03	2.30	1.00	336.5	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
10.99	258.54	3.96	1.53	110	0.604	0.977	1.53	0.52	1.34	325.83	1.70		1	100	1.04	2.35	1.00	339.6	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
11.15	252.91	3.87	1.53	110	0.614	0.977	1.53	0.52	1.33	316.61	1.71		1	100	1.04	2.40	1.00	331.4	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
11.32	241.86	3.70	1.53	110	0.623	0.977	1.53	0.52	1.32	301.06	1.72		1	100	1.05	2.45	1.00	317.7	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
11.48	235.08	3.50	1.49	110	0.632	0.976	1.49	0.52	1.31	290.38	1.72		1	100	1.05	2.50	1.00	306.4	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
11.65	233.08	3.34	1.43	110	0.641	0.976	1.44	0.52	1.30	285.38	1.71		1	100	1.05	2.55	1.00	299.4	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
11.81	236.89	2.82	1.19	110	0.650	0.975	1.19	0.50	1.28	285.24	1.65		1	100	1.00	2.60	1.00	286.6	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
11.98	239.86	3.05	1.27	110	0.659	0.975	1.27	0.51	1.27	287.65	1.67		1	100	1.02	2.65	1.00	293.1	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
12.14	232.44	3.13	1.35	110	0.668	0.975	1.35	0.52	1.27	277.93	1.70		1	100	1.04	2.70	1.00	288.9	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
12.30	231.56	3.17	1.37	110	0.677	0.974	1.37	0.52	1.26	275.23	1.70		1	100	1.04	2.70	1.00	287.5	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
12.47	226.67	3.06	1.35	110	0.686	0.974	1.35	0.52	1.25	267.63	1.71		1	100	1.04	2.70	1.00	280.0	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
12.63	224.32	3.05	1.36	110	0.695	0.974	1.36	0.52	1.25	263.26	1.71		1	100	1.05	2.70	1.00	276.6	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
12.80	219.31	3.06	1.39	110	0.704	0.973	1.40	0.53	1.24	256.14	1.73		1	100	1.06	2.70	1.00	272.0	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff. Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
12.96	214.97	3.04	1.41	110	0.713	0.973	1.42	0.53	1.23	249.70	1.74		1	100	1.07	2.70	1.00	267.1	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.12	210.39	2.92	1.39	110	0.722	0.973	1.39	0.53	1.23	242.78	1.74		1	100	1.07	2.70	1.00	260.0	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.29	202.73	2.85	1.41	110	0.731	0.972	1.41	0.54	1.22	232.77	1.76		1	100	1.08	2.70	1.00	251.7	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.45	202.03	2.75	1.36	110	0.740	0.972	1.36	0.53	1.21	230.22	1.75		1	100	1.07	2.70	1.00	247.7	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.62	202.36	2.74	1.36	110	0.749	0.972	1.36	0.53	1.20	229.11	1.75		1	100	1.07	2.70	1.00	246.5	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.78	210.84	2.87	1.36	110	0.758	0.971	1.37	0.53	1.19	237.04	1.74		1	100	1.07	2.70	1.00	253.8	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.94	228.51	2.41	1.05	110	0.767	0.971	1.06	0.50	1.17	252.83	1.64		1	100	1.00	2.70	1.00	253.8	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
14.11	285.52	2.69	0.94	110	0.776	0.971	0.94	0.50	1.17	314.27	1.54		1	100	1.00	2.70	1.00	315.4	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
14.27	292.87	2.62	0.89	110	0.785	0.970	0.90	0.50	1.16	320.51	1.52		1	100	1.00	2.70	1.00	321.7	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
14.44	251.89	2.37	0.94	110	0.794	0.970	0.94	0.50	1.15	273.97	1.58		1	100	1.00	2.70	1.00	275.0	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
14.60	209.49	2.12	1.01	110	0.803	0.970	1.02	0.51	1.15	226.74	1.66		1	100	1.01	2.70	1.00	229.5	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
14.76	185.30	1.81	0.97	110	0.812	0.969	0.98	0.51	1.15	199.73	1.68		1	100	1.03	2.70	1.00	205.8	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
14.93	177.04	1.72	0.97	110	0.821	0.969	0.97	0.52	1.14	189.90	1.70		1	100	1.04	2.70	1.00	197.4	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.09	163.66	1.53	0.94	110	0.830	0.969	0.94	0.52	1.13	174.67	1.71		1	100	1.05	2.70	1.00	183.4	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.26	131.77	1.43	1.09	110	0.839	0.968	1.10	0.56	1.14	140.77	1.83		1	91	1.13	2.70	1.00	159.1	1.00	0.454	0.454	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.42	90.92	1.82	2.00	110	0.848	0.968	2.02	0.64	1.15	98.18	2.12		1	76	1.50		1.00	147.1	1.00	0.376	0.376	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.58	71.71	1.75	2.45	110	0.857	0.967	2.48	0.69	1.16	77.37	2.26		1	66	1.82		1.00	141.2	1.00	0.342	0.342	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.75	110.76	2.45	2.21	110	0.866	0.967	2.22	0.64	1.14	118.01	2.10		1	84	1.46		1.00	171.7	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.91	111.12	2.74	2.46	110	0.875	0.967	2.48	0.65	1.13	117.85	2.14		1	84	1.52		1.00	179.7	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.08	114.52	2.87	2.51	110	0.884	0.966	2.52	0.65	1.12	120.66	2.14		1	85	1.52		1.00	183.7	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.24	142.13	2.72	1.91	110	0.893	0.966	1.92	0.60	1.11	147.88	1.99		1	93	1.28	1.00	1.00	190.7	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.40	171.27	2.46	1.44	110	0.902	0.966	1.45	0.56	1.09	176.09	1.84		1	100	1.14	1.05	1.00	201.7	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.57	179.24	2.28	1.27	110	0.911	0.965	1.28	0.55	1.08	182.87	1.79		1	100	1.10	1.10	1.00	202.3	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.73	203.64	2.08	1.02	110	0.920	0.965	1.03	0.51	1.07	205.87	1.69		1	100	1.03	1.15	1.00	213.0	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.90	253.20	2.34	0.92	110	0.929	0.965	0.93	0.50	1.07	254.42	1.59		1	100	1.00	1.20	1.00	255.4	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
17.06	288.82	2.54	0.88	110	0.938	0.964	0.88	0.50	1.06	288.93	1.54		1	100	1.00	1.25	1.00	290.0	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
17.22	315.97	2.96	0.94	110	0.947	0.964	0.94	0.50	1.06	314.66	1.54		1	100	1.00	1.30	1.00	315.8	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
17.39	322.57	2.98	0.92	110	0.956	0.963	0.93	0.50	1.05	319.73	1.53		1	100	1.00	1.35	1.00	320.9	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
17.55	346.12	4.11	1.19	110	0.965	0.963	1.19	0.50	1.05	341.52	1.60		1	100	1.00	1.40	1.00	342.8	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
17.72	402.20	6.00	1.49	110	0.974	0.963	1.50	0.50	1.04	395.22	1.65		1	100	1.00	1.45	1.00	396.7	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
17.88	358.55	6.07	1.69	110	0.983	0.962	1.70	0.52	1.04	351.16	1.72		1	100	1.05	1.50	1.00	370.5	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
18.04	345.21	4.98	1.44	110	0.992	0.962	1.45	0.51	1.03	336.13	1.67		1	100	1.02	1.55	1.00	343.7	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
18.21	360.17	4.43	1.23	110	1.001	0.962	1.23	0.50	1.03	348.93	1.61		1	100	1.00	1.60	1.00	350.2	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
18.37	359.99	3.79	1.05	110	1.010	0.961	1.06	0.50	1.02	347.18	1.55		1	100	1.00	1.65	1.00	348.5	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
18.54	354.62	3.03	0.86	110	1.020	0.961	0.86	0.50	1.02	340.46	1.49		1	100	1.00	1.70	1.00	341.7	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
18.70	344.24	2.99	0.87	110	1.029	0.960	0.87	0.50	1.01	329.01	1.50		1	100	1.00	1.75	1.00	330.2	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
18.86	332.45	3.04	0.91	110	1.038	0.960	0.92	0.50	1.01	316.31	1.53		1	100	1.00	1.80	1.00	317.5	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.03	327.71	2.96	0.90	110	1.047	0.960	0.91	0.50	1.01	310.43	1.53		1	100	1.00	1.85	1.00	311.6	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.19	307.45	2.73	0.89	110	1.056	0.959	0.89	0.50	1.00	289.93	1.54		1	100	1.00	1.90	1.00	291.0	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.36	274.72	2.45	0.89	110	1.065	0.959	0.89	0.50	1.00	257.85	1.58		1	100	1.00	1.95	1.00	258.8	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.52	271.54	4.15	1.53	110	1.074	0.958	1.53	0.54	0.99	253.63	1.76		1	100	1.08	2.00	1.00	275.2	0.99	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.69	279.83	3.92	1.40	110	1.083	0.958	1.41	0.53	0.99	260.29	1.73		1	100	1.06	2.05	1.00	276.0	0.99	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.85	285.99	4.02	1.41	110	1.092	0.957	1.41	0.53	0.98	264.88	1.72		1	100	1.05	2.10	1.00	280.2	0.99	Infin.	0.000	0.309	**Non-Liq.**	Non-Liq.	**0.00**
20.01	315.42	2.61	0.83	110	1.101	0.957	0.83	0.50	0.98	291.27	1.52		1	100	1.00	2.15	1.00	292.4	0.98	Infin.	0.000	0.309	**Non-Liq.**	Non-Liq.	**0.00**

CPT-LIQUEFY.XLS - A SPREADSHEET FOR EMPIRICAL ESTIMATION OF LIQUEFACTION POTENTIAL USING CPT DATA
Developed 2003 by Shelton L. Stringer, GE, Earth Systems Southwest

Project: Oxnard High School No. 8
Job No: 301953-001
Date: 8/14/2018
Sounding: CPT-2A
Plot: 2

Methods: Liquefaction Analysis using 1998 NCEER workshop methods (Robertson & Wride)
Post-liquefaction Settlement Analysis from Tokimatsu & Seed (1987)
Dry Sand Settlement by Pradel, ASCE Journal of G&GE, Vol 124, No. 4

Total Liquefied Thickness (feet)
0.0

EARTHQUAKE INFORMATION:

Magnitude:	6.77	7.5
PGA, g:	0.65	0.50
MSF:	1.30	
GWT, feet:	20.0	
Design GWT, feet:	20.0	

Induced CSR (M=7.5): = 0.65*PGA*(po/p'o)*rd/MSF
Clean Sand Qc1n = C_Q*K_C*K_H*Qc
SF = $CRR_{7.5}$*Kσ/CSR
Use Tokimatsu & Seed (0) or Ishihara &Yoshmine (1): 0
Unit Weight of unsaturated soils: 110 pcf
Unit Weight of saturated soils: 110 pcf
Limiting Ic for liquefiable soils: 2.60
Limiting Ic for K_H: 2.0
Required SF: 1.50
Min SF of Liquefiable Layers: 0.00
Avg SF of Liquefiable Layers: 0.00

Probab Avg 0%	Total Induced Subsidence (inches)
Max 0%	0.2

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	*Volumetric Strain (%)*
0.16	8.00	0.09	1.13	110	0.009	1.000	1.13	0.81	1.70	12.84	2.68		0						1.00			0.323	Non-Liq.	Non-Liq.	0.00
0.33	11.37	0.11	0.97	110	0.018	1.000	0.97	0.76	1.70	18.24	2.52		1	6	2.86		1.00	52.1	1.00	0.093	0.093	0.323	Non-Liq.	Non-Liq.	0.00
0.49	14.06	0.14	1.00	110	0.027	1.000	1.00	0.74	1.70	22.55	2.44		1	15	2.50		1.00	56.3	1.00	0.097	0.097	0.323	Non-Liq.	Non-Liq.	0.00
0.66	15.85	0.14	0.90	110	0.036	1.000	0.90	0.72	1.70	25.41	2.38		1	20	2.22		1.00	56.4	1.00	0.097	0.097	0.323	Non-Liq.	Non-Liq.	0.00
0.82	15.82	0.14	0.88	110	0.045	1.000	0.89	0.72	1.70	25.35	2.37		1	20	2.21		1.00	55.9	1.00	0.096	0.096	0.323	Non-Liq.	Non-Liq.	0.00
0.98	15.42	0.12	0.78	110	0.054	1.000	0.79	0.72	1.70	24.69	2.36		1	19	2.15		1.00	53.1	1.00	0.094	0.094	0.323	Non-Liq.	Non-Liq.	0.00
1.15	12.24	0.10	0.81	110	0.063	0.999	0.81	0.74	1.70	19.57	2.45		1	9	2.55		1.00	49.8	1.00	0.092	0.092	0.323	Non-Liq.	Non-Liq.	0.00
1.31	12.24	0.10	0.81	110	0.072	0.999	0.81	0.74	1.70	19.55	2.45		1	9	2.55		1.00	49.8	1.00	0.092	0.092	0.323	Non-Liq.	Non-Liq.	0.00
1.48	10.64	0.13	1.17	110	0.081	0.999	1.18	0.78	1.70	16.97	2.59		1	3	3.25		1.00	55.1	1.00	0.096	0.096	0.323	Non-Liq.	Non-Liq.	0.00
1.64	11.63	0.20	1.72	110	0.090	0.998	1.73	0.80	1.70	18.54	2.64		0						1.00			0.323	Non-Liq.	Non-Liq.	0.00
1.80	19.13	0.29	1.53	110	0.099	0.998	1.53	0.74	1.70	30.58	2.43		1	28	2.45		1.00	74.9	1.00	0.119	0.119	0.323	Non-Liq.	Non-Liq.	0.00
1.97	35.11	0.52	1.48	110	0.108	0.998	1.48	0.67	1.70	56.24	2.21		1	53	1.70		1.00	95.4	1.00	0.161	0.161	0.322	Non-Liq.	Non-Liq.	0.00
2.13	43.24	0.60	1.40	110	0.117	0.997	1.40	0.65	1.70	69.29	2.13		1	62	1.50		1.00	104.3	1.00	0.185	0.185	0.322	Non-Liq.	Non-Liq.	0.00
2.30	43.08	0.62	1.43	110	0.126	0.997	1.44	0.65	1.70	69.02	2.13		1	61	1.52		1.00	105.0	1.00	0.188	0.188	0.322	Non-Liq.	Non-Liq.	0.00
2.46	41.08	0.60	1.46	110	0.135	0.996	1.46	0.65	1.70	65.79	2.16		1	59	1.56		1.00	102.9	1.00	0.181	0.181	0.322	Non-Liq.	Non-Liq.	0.00
2.62	38.58	0.56	1.46	110	0.144	0.996	1.46	0.66	1.70	61.76	2.18		1	57	1.61		1.00	99.6	1.00	0.172	0.172	0.322	Non-Liq.	Non-Liq.	0.00
2.79	35.25	0.53	1.50	110	0.153	0.996	1.50	0.67	1.70	56.39	2.22		1	53	1.70		1.00	96.1	1.00	0.163	0.163	0.322	Non-Liq.	Non-Liq.	0.00
2.95	32.60	0.49	1.50	110	0.162	0.995	1.51	0.68	1.70	52.12	2.24		1	50	1.78		1.00	92.6	1.00	0.154	0.154	0.322	Non-Liq.	Non-Liq.	0.00
3.12	29.61	0.45	1.52	110	0.171	0.995	1.53	0.69	1.70	47.30	2.28		1	46	1.88		1.00	89.0	1.00	0.146	0.146	0.322	Non-Liq.	Non-Liq.	0.00
3.28	26.41	0.40	1.51	110	0.180	0.994	1.52	0.70	1.70	42.15	2.32		1	41	2.01		1.00	84.6	1.00	0.136	0.136	0.321	Non-Liq.	Non-Liq.	0.00
3.44	23.64	0.34	1.44	110	0.189	0.994	1.45	0.71	1.70	37.68	2.34		1	36	2.10		1.00	79.2	1.00	0.126	0.126	0.321	Non-Liq.	Non-Liq.	0.00
3.61	21.08	0.29	1.36	110	0.198	0.994	1.37	0.72	1.70	33.55	2.37		1	32	2.20		1.00	73.8	1.00	0.117	0.117	0.321	Non-Liq.	Non-Liq.	0.00
3.77	18.23	0.30	1.67	110	0.208	0.993	1.69	0.75	1.70	28.96	2.48		1	25	2.65		1.00	76.6	1.00	0.122	0.122	0.321	Non-Liq.	Non-Liq.	0.00
3.94	15.34	0.30	1.98	110	0.217	0.993	2.00	0.78	1.70	24.30	2.58		1	18	3.21		1.00	78.0	1.00	0.124	0.124	0.321	Non-Liq.	Non-Liq.	0.00
4.10	12.99	0.35	2.73	110	0.226	0.993	2.77	0.83	1.70	20.51	2.72		0						1.00			0.321	Non-Liq.	Non-Liq.	0.00
4.27	11.82	0.38	3.20	110	0.235	0.992	3.26	0.85	1.70	18.62	2.80		0						1.00			0.321	Non-Liq.	Non-Liq.	0.00
4.43	10.34	0.34	3.30	110	0.244	0.992	3.38	0.87	1.70	16.22	2.86		0						1.00			0.321	Non-Liq.	Non-Liq.	0.00
4.59	11.89	0.24	2.04	110	0.253	0.991	2.08	0.81	1.70	18.70	2.68		0						1.00			0.320	Non-Liq.	Non-Liq.	0.00
4.76	26.79	0.25	0.93	110	0.262	0.991	0.94	0.67	1.70	42.63	2.19		1	41	1.65		1.00	70.3	1.00	0.112	0.112	0.320	Non-Liq.	Non-Liq.	0.00
4.92	35.67	0.30	0.84	110	0.271	0.991	0.85	0.63	1.70	56.88	2.06		1	53	1.39		1.00	79.2	1.00	0.126	0.126	0.320	Non-Liq.	Non-Liq.	0.00
5.09	41.25	0.36	0.88	110	0.280	0.990	0.89	0.61	1.70	65.83	2.02		1	59	1.33		1.00	87.7	1.00	0.143	0.143	0.320	Non-Liq.	Non-Liq.	0.00
5.25	44.28	0.41	0.92	110	0.289	0.990	0.93	0.61	1.70	70.69	2.01		1	62	1.31		1.00	92.7	1.00	0.154	0.154	0.320	Non-Liq.	Non-Liq.	0.00
5.41	46.60	0.44	0.94	110	0.298	0.989	0.95	0.61	1.70	74.40	2.00		1	65	1.30	1.00	1.00	96.8	1.00	0.164	0.164	0.320	Non-Liq.	Non-Liq.	0.00
5.58	50.22	0.47	0.93	110	0.307	0.989	0.94	0.60	1.70	80.20	1.97		1	68	1.26	1.05	1.00	101.4	1.00	0.177	0.177	0.320	Non-Liq.	Non-Liq.	0.00
5.74	54.67	0.47	0.87	110	0.316	0.989	0.87	0.58	1.70	87.34	1.92		1	71	1.21	1.10	1.00	105.9	1.00	0.190	0.190	0.320	Non-Liq.	Non-Liq.	0.00
5.91	56.65	0.48	0.85	110	0.325	0.988	0.86	0.58	1.70	90.50	1.90		1	73	1.19	1.15	1.00	108.2	1.00	0.198	0.198	0.319	Non-Liq.	Non-Liq.	0.00
6.07	56.48	0.50	0.89	110	0.334	0.988	0.90	0.58	1.70	90.22	1.92		1	73	1.20	1.20	1.00	109.0	1.00	0.201	0.201	0.319	Non-Liq.	Non-Liq.	0.00
6.23	58.52	0.53	0.91	110	0.343	0.988	0.92	0.58	1.70	93.48	1.91		1	74	1.20	1.25	1.00	112.4	1.00	0.212	0.212	0.319	Non-Liq.	Non-Liq.	0.00
6.40	61.73	0.57	0.92	110	0.352	0.987	0.93	0.58	1.70	98.62	1.90		1	76	1.18	1.30	1.00	117.2	1.00	0.230	0.230	0.319	Non-Liq.	Non-Liq.	0.00
6.56	65.05	0.55	0.84	110	0.361	0.987	0.85	0.56	1.70	103.94	1.85		1	78	1.15	1.35	1.00	119.6	1.00	0.239	0.239	0.319	Non-Liq.	Non-Liq.	0.00
6.73	67.42	0.56	0.83	110	0.370	0.986	0.84	0.56	1.70	107.74	1.84		1	80	1.13	1.40	1.00	122.6	1.00	0.251	0.251	0.319	Non-Liq.	Non-Liq.	0.00
6.89	72.04	0.64	0.89	110	0.379	0.986	0.89	0.56	1.70	115.15	1.83		1	83	1.13	1.45	1.00	130.6	1.00	0.287	0.287	0.319	Non-Liq.	Non-Liq.	0.00
7.05	79.98	0.56	0.70	110	0.388	0.986	0.71	0.53	1.70	127.76	1.73		1	87	1.06	1.50	1.00	135.9	1.00	0.314	0.314	0.319	Non-Liq.	Non-Liq.	0.00
7.22	84.69	0.74	0.87	110	0.397	0.985	0.88	0.54	1.70	135.25	1.77		1	89	1.09	1.55	1.00	147.6	1.00	0.379	0.379	0.318	Non-Liq.	Non-Liq.	0.00
7.38	84.27	0.71	0.84	110	0.406	0.985	0.84	0.54	1.67	132.75	1.77		1	89	1.08	1.60	1.00	144.4	1.00	0.360	0.360	0.318	Non-Liq.	Non-Liq.	0.00
7.55	88.99	0.71	0.80	110	0.415	0.985	0.81	0.53	1.64	137.62	1.74		1	90	1.07	1.65	1.00	147.5	1.00	0.378	0.378	0.318	Non-Liq.	Non-Liq.	0.00
7.71	88.99	0.71	0.80	110	0.424	0.984	0.81	0.53	1.63	136.17	1.75		1	90	1.07	1.70	1.00	146.2	1.00	0.371	0.371	0.318	Non-Liq.	Non-Liq.	0.00
7.87	97.16	0.72	0.74	110	0.433	0.984	0.74	0.52	1.59	145.34	1.70		1	92	1.04	1.75	1.00	151.8	1.00	0.405	0.405	0.318	Non-Liq.	Non-Liq.	0.00
8.04	104.13	0.76	0.73	110	0.442	0.984	0.73	0.51	1.56	153.24	1.68		1	95	1.03	1.80	1.00	157.7	1.00	0.445	0.445	0.318	Non-Liq.	Non-Liq.	0.00
8.20	109.72	0.85	0.77	110	0.451	0.983	0.78	0.51	1.55	159.96	1.68		1	96	1.03	1.85	1.00	164.9	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
8.37	127.90	0.84	0.66	110	0.460	0.983	0.66	0.50	1.52	182.65	1.59		1	100	1.00	1.90	1.00	183.3	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
8.53	139.29	1.12	0.80	110	0.469	0.982	0.80	0.50	1.50	197.04	1.63		1	100	1.00	1.95	1.00	197.8	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
8.69	174.32	1.33	0.76	110	0.478	0.982	0.77	0.50	1.49	244.41	1.55		1	100	1.00	2.00	1.00	245.3	1.00	Infin.	0.000	0.317	Non-Liq.	Non-Liq.	0.00
8.86	197.20	1.54	0.78	110	0.487	0.982	0.78	0.50	1.47	273.99	1.52		1	100	1.00	2.05	1.00	275.0	1.00	Infin.	0.000	0.317	Non-Liq.	Non-Liq.	0.00
9.02	211.19	1.71	0.81	110	0.496	0.981	0.81	0.50	1.46	290.78	1.51		1	100	1.00	2.10	1.00	291.9	1.00	Infin.	0.000	0.317	Non-Liq.	Non-Liq.	0.00
9.19	221.47	1.88	0.85	110	0.505	0.981	0.85	0.50	1.45	302.22	1.52		1	100	1.00	2.15	1.00	303.4	1.00	Infin.	0.000	0.317	Non-Liq.	Non-Liq.	0.00
9.35	230.78	2.04	0.88	110	0.514	0.981	0.88	0.50	1.43	312.17	1.52		1	100	1.00	2.20	1.00	313.3	1.00	Infin.	0.000	0.317	Non-Liq.	Non-Liq.	0.00
9.51	234.50	2.16	0.92	110	0.523	0.980	0.92	0.50	1.42	314.45	1.53		1	100	1.00	2.25	1.00	315.6	1.00	Infin.	0.000	0.317	Non-Liq.	Non-Liq.	0.00
9.68	232.94	2.27	0.98	110	0.532	0.980	0.98	0.50	1.41	309.69	1.56		1	100	1.00	2.30	1.00	310.8	1.00	Infin.	0.000	0.317	Non-Liq.	Non-Liq.	0.00
9.84	231.57	2.35	1.01	110	0.541	0.980	1.02	0.50	1.40	305.27	1.57		1	100	1.00	2.35	1.00	306.4	1.00	Infin.	0.000	0.317	Non-Liq.	Non-Liq.	0.00
10.01	230.54	2.41	1.04	110	0.550	0.979	1.05	0.50	1.39	301.40	1.59		1	100	1.00	2.40	1.00	302.5	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
10.17	237.18	2.50	1.05	110	0.559	0.979	1.06	0.50	1.38	307.58	1.58		1	100	1.00	2.45	1.00	308.7	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
10.33	247.31	2.55	1.03	110	0.568	0.979	1.03	0.50	1.36	318.18	1.57		1	100	1.00	2.50	1.00	319.4	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
10.50	243.77	2.52	1.03	110	0.577	0.978	1.04	0.50	1.35	311.14	1.58		1	100	1.00	2.55	1.00	312.3	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
10.66	237.97	2.56	1.07	110	0.586	0.978	1.08	0.50	1.34	301.36	1.60		1	100	1.00	2.60	1.00	302.5	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
10.83	236.70	2.58	1.09	110	0.595	0.978	1.09	0.50	1.33	297.46	1.61		1	100	1.00	2.65	1.00	298.6	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
10.99	231.19	3.35	1.45	110	0.604	0.977	1.45	0.52	1.34	291.69	1.71		1	100	1.04	2.70	1.00	305.6	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
11.15	223.52	4.80	2.15	110	0.614	0.977	2.15	0.56	1.36	286.52	1.85		1	100	1.15	2.75	1.00	330.3	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
11.32	231.18	4.24	1.83	110	0.623	0.977	1.84	0.55	1.34	291.09	1.79		1	100	1.10	2.80	1.00	321.9	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
11.48	277.74	3.56	1.28	110	0.632	0.976	1.29	0.50	1.29	339.00	1.63		1	100	1.00	2.85	1.00	340.3	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
11.65	232.79	2.16	0.93	110	0.641	0.976	0.93	0.50	1.29	281.99	1.57		1	100	1.00	2.90	1.00	283.0	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
11.81	242.50	1.85	0.76	110	0.650	0.975	0.76	0.50	1.28	291.73	1.49		1	100	1.00	2.95	1.00	292.8	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
11.98	238.61	2.39	1.00	110	0.659	0.975	1.00	0.50	1.27	285.05	1.59		1	100	1.00	3.00	1.00	286.1	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
12.14	226.91	2.22	0.98	110	0.668	0.975	0.98	0.50	1.26	269.19	1.60		1	100	1.00	3.05	1.00	270.2	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
12.30	230.52	2.15	0.93	110	0.677	0.974	0.93	0.50	1.25	271.64	1.58		1	100	1.00	3.10	1.00	272.7	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
12.47	221.89	1.76	0.79	110	0.686	0.974	0.80	0.50	1.24	259.71	1.54		1	100	1.00	3.15	1.00	260.7	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
12.63	219.46	1.58	0.72	110	0.695	0.974	0.72	0.50	1.23	255.17	1.51		1	100	1.00	3.20	1.00	256.1	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
12.80	210.68	1.41	0.67	110	0.704	0.973	0.67	0.50	1.23	243.34	1.51		1	100	1.00	3.25	1.00	244.3	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff. Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
12.96	195.33	1.35	0.69	110	0.713	0.973	0.70	0.50	1.22	224.11	1.54		1	100	1.00	3.30	1.00	225.0	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.12	189.89	1.37	0.72	110	0.722	0.973	0.72	0.50	1.21	216.47	1.57		1	100	1.00	3.35	1.00	217.3	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.29	182.75	2.89	1.58	110	0.731	0.972	1.59	0.56	1.23	211.28	1.82		1	100	1.13	3.40	1.00	238.6	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.45	189.66	3.51	1.85	110	0.740	0.972	1.86	0.57	1.23	218.84	1.87		1	100	1.16	3.45	1.00	255.0	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.62	243.92	3.67	1.50	110	0.749	0.972	1.51	0.53	1.20	275.93	1.74		1	100	1.06	3.50	1.00	294.2	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.78	196.55	3.12	1.59	110	0.758	0.971	1.59	0.55	1.20	222.44	1.81		1	100	1.12	3.55	1.00	249.0	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.94	166.33	2.01	1.21	110	0.767	0.971	1.22	0.54	1.19	186.17	1.77		1	100	1.09	3.60	1.00	203.2	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
14.11	168.09	2.05	1.22	110	0.776	0.971	1.22	0.54	1.18	186.97	1.77		1	100	1.09	3.65	1.00	204.2	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
14.27	186.64	4.05	2.17	110	0.785	0.970	2.18	0.59	1.19	209.42	1.94		1	100	1.22	3.70	1.00	257.4	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
14.44	201.80	4.71	2.33	110	0.794	0.970	2.34	0.59	1.18	225.11	1.94		1	100	1.23	3.75	1.00	278.4	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
14.60	281.02	4.40	1.57	110	0.803	0.970	1.57	0.53	1.16	306.15	1.72		1	100	1.05	3.80	1.00	324.0	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
14.76	344.71	3.37	0.98	110	0.812	0.969	0.98	0.50	1.14	371.03	1.51		1	100	1.00	3.85	1.00	372.4	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
14.93	284.50	2.91	1.02	110	0.821	0.969	1.03	0.50	1.14	304.37	1.58		1	100	1.00	3.90	1.00	305.5	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.09	313.45	2.95	0.94	110	0.830	0.969	0.94	0.50	1.13	333.60	1.52		1	100	1.00	3.95	1.00	334.8	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.26	330.55	3.27	0.99	110	0.839	0.968	0.99	0.50	1.12	349.94	1.53		1	100	1.00	4.00	1.00	351.2	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.42	347.21	3.40	0.98	110	0.848	0.968	0.98	0.50	1.12	365.65	1.51		1	100	1.00	4.05	1.00	367.0	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.58	369.08	4.35	1.18	110	0.857	0.967	1.18	0.50	1.11	386.68	1.56		1	100	1.00	4.10	1.00	388.1	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.75	398.50	4.30	1.08	110	0.866	0.967	1.08	0.50	1.11	415.38	1.52		1	100	1.00	4.15	1.00	416.9	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.91	418.62	3.93	0.94	110	0.875	0.967	0.94	0.50	1.10	434.34	1.46		1	100	1.00	4.20	1.00	436.0	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.08	410.39	4.19	1.02	110	0.884	0.966	1.02	0.50	1.09	423.39	1.49		1	100	1.00	4.25	1.00	425.0	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.24	419.61	4.80	1.14	110	0.893	0.966	1.15	0.50	1.09	430.73	1.53		1	100	1.00	4.30	1.00	432.3	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.40	443.67	4.84	1.09	110	0.902	0.966	1.09	0.50	1.08	453.18	1.50		1	100	1.00	4.35	1.00	454.9	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.57	437.41	4.97	1.14	110	0.911	0.965	1.14	0.50	1.08	444.55	1.52		1	100	1.00	4.40	1.00	446.2	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.73	435.84	4.65	1.07	110	0.920	0.965	1.07	0.50	1.07	440.77	1.50		1	100	1.00	4.45	1.00	442.4	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.90	448.38	4.22	0.94	110	0.929	0.965	0.94	0.50	1.07	451.26	1.45		1	100	1.00	4.50	1.00	452.9	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
17.06	457.41	3.79	0.83	110	0.938	0.964	0.83	0.50	1.06	458.14	1.40		1	100	1.00	4.55	1.00	459.8	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
17.22	450.04	4.42	0.98	110	0.947	0.964	0.99	0.50	1.06	448.58	1.46		1	100	1.00	4.60	1.00	450.3	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
17.39	437.15	4.09	0.94	110	0.956	0.963	0.94	0.50	1.05	433.64	1.45		1	100	1.00	4.65	1.00	435.3	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
17.55	447.32	4.19	0.94	110	0.965	0.963	0.94	0.50	1.05	441.66	1.45		1	100	1.00	4.70	1.00	443.3	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
17.72	476.04	4.81	1.01	110	0.974	0.963	1.01	0.50	1.04	467.89	1.46		1	100	1.00	4.75	1.00	469.6	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
17.88	526.73	4.25	0.81	110	0.983	0.962	0.81	0.50	1.04	515.42	1.36		1	100	1.00	4.80	1.00	517.3	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
18.04	498.22	4.85	0.97	110	0.992	0.962	0.98	0.50	1.03	485.24	1.44		1	100	1.00	4.85	1.00	487.1	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
18.21	506.10	5.27	1.04	110	1.001	0.962	1.04	0.50	1.03	490.70	1.46		1	100	1.00	4.90	1.00	492.5	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
18.37	512.17	6.70	1.31	110	1.010	0.961	1.31	0.50	1.02	494.36	1.55		1	100	1.00	4.95	1.00	496.2	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
18.54	559.50	8.56	1.53	110	1.020	0.961	1.53	0.50	1.02	537.73	1.59		1	100	1.00	5.00	1.00	539.7	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
18.70	562.50	8.26	1.47	110	1.029	0.960	1.47	0.50	1.01	538.24	1.57		1	100	1.00	5.05	1.00	540.2	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
18.86	559.79	8.82	1.58	110	1.038	0.960	1.58	0.50	1.01	533.30	1.60		1	100	1.00	5.10	1.00	535.3	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.03	547.34	8.23	1.50	110	1.047	0.960	1.51	0.50	1.01	519.15	1.59		1	100	1.00	5.15	1.00	521.1	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.19	552.34	7.74	1.40	110	1.056	0.959	1.40	0.50	1.00	521.65	1.56		1	100	1.00	5.20	1.00	523.6	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.36	492.99	7.25	1.47	110	1.065	0.959	1.47	0.50	1.00	463.51	1.60		1	100	1.00	5.25	1.00	465.2	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.52	443.38	5.21	1.18	110	1.074	0.958	1.18	0.50	0.99	415.00	1.55		1	100	1.00	5.30	1.00	416.6	0.99	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.69	430.83	4.17	0.97	110	1.083	0.958	0.97	0.50	0.99	401.53	1.49		1	100	1.00	5.35	1.00	403.0	0.99	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.85	411.08	3.30	0.80	110	1.092	0.957	0.80	0.50	0.98	381.48	1.43		1	100	1.00	5.40	1.00	382.9	0.99	Infin.	0.000	0.309	**Non-Liq.**	Non-Liq.	**0.00**
20.01	393.49	2.98	0.76	110	1.101	0.957	0.76	0.50	0.98	363.61	1.43		1	100	1.00	5.45	1.00	365.0	0.98	Infin.	0.000	0.309	**Non-Liq.**	Non-Liq.	**0.00**

CPT-LIQUEFY.XLS - A SPREADSHEET FOR EMPIRICAL ESTIMATION OF LIQUEFACTION POTENTIAL USING CPT DATA
Developed 2003 by Shelton L. Stringer, GE, Earth Systems Southwest

Project: Oxnard High School No. 8
Job No: 301953-001
Date: 8/14/2018
Sounding: CPT-3
Plot: 3

Methods: Liquefaction Analysis using 1998 NCEER workshop methods (Robertson & Wride)
Post-liquefaction Settlement Analysis from Tokimatsu & Seed (1987)
Dry Sand Settlement by Pradel, ASCE Journal of G&GE, Vol 124, No. 4

Total Liquefied Thickness (feet)
0.0

EARTHQUAKE INFORMATION:
Magnitude: 6.77 (7.5)
PGA, g: 0.65 (0.50)
MSF: 1.30
GWT, feet: 20.0
Design GWT, feet: 20.0

Induced CSR (M=7.5): = 0.65*PGA*(po/p'o)*rd/MSF
Clean Sand Qc1n = C_Q*K_C*K_H*Qc
SF = $CRR_{7.5}$*Kσ/CSR

Use Tokimatsu & Seed (0) or Ishihara &Yoshmine (1): 0
Unit Weight of unsaturated soils: 110 pcf
Unit Weight of saturated soils: 110 pcf
Limiting Ic for liquefiable soils: 2.60
Limiting Ic for K_H: 2.0
Required SF: 1.50
Min SF of Liquefiable Layers: 0.00
Avg SF of Liquefiable Layers: 0.00

Probab	Total Induced Subsidence (inches)
Avg	0
0%	
Max	0
0%	0.1

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	*Volumetric Strain (%)*
0.16	61.63	0.93	1.50	110	0.009	1.000	1.50	0.62	1.70	99.01	2.03		1	76	1.34		1.00	133.0	1.00	0.299	0.299	0.323	Non-Liq.	Non-Liq.	0.00
0.33	79.05	1.53	1.94	110	0.018	1.000	1.94	0.62	1.70	126.99	2.03		1	87	1.35		1.00	171.2	1.00	Infin.	0.000	0.323	Non-Liq.	Non-Liq.	0.00
0.49	78.13	1.93	2.46	110	0.027	1.000	2.46	0.64	1.70	125.50	2.12		1	86	1.48		1.00	186.4	1.00	Infin.	0.000	0.323	Non-Liq.	Non-Liq.	0.00
0.66	68.31	1.84	2.70	110	0.036	1.000	2.70	0.66	1.70	109.70	2.18		1	81	1.63		1.00	178.6	1.00	Infin.	0.000	0.323	Non-Liq.	Non-Liq.	0.00
0.82	54.87	1.52	2.77	110	0.045	1.000	2.77	0.68	1.70	88.09	2.26		1	72	1.82		1.00	159.9	1.00	0.460	0.460	0.323	Non-Liq.	Non-Liq.	0.00
0.98	47.14	1.21	2.56	110	0.054	1.000	2.57	0.69	1.70	75.66	2.28		1	65	1.88		1.00	142.1	1.00	0.347	0.347	0.323	Non-Liq.	Non-Liq.	0.00
1.15	39.47	1.02	2.57	110	0.063	0.999	2.58	0.71	1.70	63.32	2.33		1	58	2.06		1.00	130.5	1.00	0.287	0.287	0.323	Non-Liq.	Non-Liq.	0.00
1.31	39.47	1.02	2.57	110	0.072	0.999	2.58	0.71	1.70	63.30	2.33		1	58	2.06		1.00	130.5	1.00	0.287	0.287	0.323	Non-Liq.	Non-Liq.	0.00
1.48	31.24	0.82	2.63	110	0.081	0.999	2.64	0.73	1.70	50.07	2.41		1	48	2.37		1.00	118.7	1.00	0.236	0.236	0.323	Non-Liq.	Non-Liq.	0.00
1.64	24.89	0.66	2.65	110	0.090	0.998	2.66	0.75	1.70	39.85	2.49		1	39	2.72		1.00	108.3	1.00	0.198	0.198	0.323	Non-Liq.	Non-Liq.	0.00
1.80	19.86	0.33	1.65	110	0.099	0.998	1.66	0.74	1.70	31.75	2.44		1	29	2.48		1.00	78.7	1.00	0.125	0.125	0.323	Non-Liq.	Non-Liq.	0.00
1.97	20.55	0.42	2.06	110	0.108	0.998	2.07	0.75	1.70	32.85	2.49		1	31	2.70		1.00	88.6	1.00	0.145	0.145	0.322	Non-Liq.	Non-Liq.	0.00
2.13	20.42	0.47	2.29	110	0.117	0.997	2.30	0.76	1.70	32.62	2.52		1	30	2.85		1.00	93.0	1.00	0.155	0.155	0.322	Non-Liq.	Non-Liq.	0.00
2.30	19.65	0.48	2.45	110	0.126	0.997	2.46	0.77	1.70	31.37	2.55		1	29	3.02		1.00	94.8	1.00	0.159	0.159	0.322	Non-Liq.	Non-Liq.	0.00
2.46	18.16	0.52	2.85	110	0.135	0.996	2.87	0.79	1.70	28.96	2.62		0						1.00			0.322	Non-Liq.	Non-Liq.	0.00
2.62	15.20	0.57	3.77	110	0.144	0.996	3.81	0.83	1.70	24.19	2.76		0						1.00			0.322	Non-Liq.	Non-Liq.	0.00
2.79	13.95	0.57	4.06	110	0.153	0.996	4.10	0.85	1.70	22.17	2.81		0						1.00			0.322	Non-Liq.	Non-Liq.	0.00
2.95	11.38	0.56	4.92	110	0.162	0.995	4.99	0.89	1.70	18.02	2.93		0						1.00			0.322	Non-Liq.	Non-Liq.	0.00
3.12	12.18	0.59	4.85	110	0.171	0.995	4.92	0.88	1.70	19.30	2.90		0						1.00			0.322	Non-Liq.	Non-Liq.	0.00
3.28	12.71	0.60	4.68	110	0.180	0.994	4.75	0.87	1.70	20.13	2.88		0						1.00			0.321	Non-Liq.	Non-Liq.	0.00
3.44	11.57	0.62	5.32	110	0.189	0.994	5.41	0.89	1.70	18.29	2.95		0						1.00			0.321	Non-Liq.	Non-Liq.	0.00
3.61	11.06	0.51	4.57	110	0.198	0.994	4.65	0.88	1.70	17.45	2.92		0						1.00			0.321	Non-Liq.	Non-Liq.	0.00
3.77	20.97	0.48	2.28	110	0.208	0.993	2.30	0.76	1.70	33.36	2.51		1	31	2.81		1.00	93.8	1.00	0.157	0.157	0.321	Non-Liq.	Non-Liq.	0.00
3.94	29.22	0.55	1.88	110	0.217	0.993	1.90	0.71	1.70	46.60	2.34		1	45	2.09		1.00	97.6	1.00	0.166	0.166	0.321	Non-Liq.	Non-Liq.	0.00
4.10	37.87	0.68	1.79	110	0.226	0.993	1.80	0.68	1.70	60.49	2.24		1	56	1.78		1.00	107.4	1.00	0.195	0.195	0.321	Non-Liq.	Non-Liq.	0.00
4.27	45.79	0.82	1.80	110	0.235	0.992	1.81	0.66	1.70	73.20	2.18		1	64	1.62		1.00	118.8	1.00	0.236	0.236	0.321	Non-Liq.	Non-Liq.	0.00
4.43	52.76	0.97	1.84	110	0.244	0.992	1.85	0.65	1.70	84.38	2.14		1	70	1.54		1.00	129.9	1.00	0.284	0.284	0.321	Non-Liq.	Non-Liq.	0.00
4.59	58.36	1.00	1.72	110	0.253	0.991	1.73	0.64	1.70	93.37	2.09		1	74	1.44		1.00	134.3	1.00	0.305	0.305	0.320	Non-Liq.	Non-Liq.	0.00
4.76	62.10	1.17	1.89	110	0.262	0.991	1.90	0.64	1.70	99.36	2.10		1	77	1.46		1.00	144.7	1.00	0.362	0.362	0.320	Non-Liq.	Non-Liq.	0.00
4.92	64.35	1.31	2.03	110	0.271	0.991	2.04	0.64	1.70	102.96	2.11		1	78	1.48		1.00	152.2	1.00	0.408	0.408	0.320	Non-Liq.	Non-Liq.	0.00
5.09	68.21	1.45	2.13	110	0.280	0.990	2.14	0.64	1.70	109.15	2.11		1	80	1.47		1.00	160.8	1.00	Infin.	0.000	0.320	Non-Liq.	Non-Liq.	0.00
5.25	72.78	1.57	2.16	110	0.289	0.990	2.17	0.64	1.70	116.48	2.10		1	83	1.45		1.00	168.6	1.00	Infin.	0.000	0.320	Non-Liq.	Non-Liq.	0.00
5.41	77.81	1.63	2.10	110	0.298	0.989	2.11	0.63	1.70	124.55	2.07		1	86	1.40		1.00	174.2	1.00	Infin.	0.000	0.320	Non-Liq.	Non-Liq.	0.00
5.58	85.70	1.64	1.91	110	0.307	0.989	1.92	0.61	1.70	137.21	2.01		1	90	1.31		1.00	179.9	1.00	Infin.	0.000	0.320	Non-Liq.	Non-Liq.	0.00
5.74	100.29	1.65	1.65	110	0.316	0.989	1.65	0.58	1.70	160.64	1.91		1	96	1.20	1.00	1.00	193.9	1.00	Infin.	0.000	0.320	Non-Liq.	Non-Liq.	0.00
5.91	115.78	1.63	1.41	110	0.325	0.988	1.41	0.55	1.70	185.51	1.82		1	100	1.12	1.05	1.00	209.1	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
6.07	127.60	1.61	1.26	110	0.334	0.988	1.27	0.54	1.70	204.49	1.76		1	100	1.08	1.10	1.00	221.2	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
6.23	135.25	1.64	1.21	110	0.343	0.988	1.22	0.53	1.70	216.77	1.73		1	100	1.06	1.15	1.00	230.1	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
6.40	142.84	1.69	1.18	110	0.352	0.987	1.19	0.52	1.70	228.95	1.71		1	100	1.04	1.20	1.00	239.3	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
6.56	144.87	1.70	1.18	110	0.361	0.987	1.18	0.52	1.70	232.20	1.70		1	100	1.04	1.25	1.00	241.7	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
6.73	154.10	1.74	1.13	110	0.370	0.986	1.13	0.51	1.70	247.01	1.67		1	100	1.02	1.30	1.00	251.8	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
6.89	159.66	1.81	1.14	110	0.379	0.986	1.14	0.51	1.68	253.36	1.66		1	100	1.01	1.35	1.00	257.5	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
7.05	165.12	1.78	1.08	110	0.388	0.986	1.08	0.50	1.65	257.24	1.64		1	100	1.00	1.40	1.00	257.5	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
7.22	169.35	1.74	1.02	110	0.397	0.985	1.03	0.50	1.63	260.70	1.62		1	100	1.00	1.45	1.00	261.7	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
7.38	177.82	1.68	0.94	110	0.406	0.985	0.95	0.50	1.61	270.69	1.58		1	100	1.00	1.50	1.00	271.7	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
7.55	173.84	1.63	0.94	110	0.415	0.985	0.94	0.50	1.60	261.72	1.59		1	100	1.00	1.55	1.00	262.7	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
7.71	173.84	1.63	0.94	110	0.424	0.984	0.94	0.50	1.58	258.90	1.59		1	100	1.00	1.60	1.00	259.9	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
7.87	174.47	1.63	0.94	110	0.433	0.984	0.94	0.50	1.56	257.11	1.60		1	100	1.00	1.65	1.00	258.1	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
8.04	179.36	1.92	1.07	110	0.442	0.984	1.07	0.50	1.55	261.61	1.63		1	100	1.00	1.70	1.00	262.6	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
8.20	186.51	2.06	1.10	110	0.451	0.983	1.11	0.50	1.53	269.32	1.64		1	100	1.00	1.75	1.00	270.3	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
8.37	187.62	1.80	0.96	110	0.460	0.983	0.96	0.50	1.52	268.24	1.59		1	100	1.00	1.80	1.00	269.2	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
8.53	196.66	1.97	1.00	110	0.469	0.982	1.00	0.50	1.50	278.47	1.60		1	100	1.00	1.85	1.00	279.5	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
8.69	203.40	2.06	1.01	110	0.478	0.982	1.01	0.50	1.49	285.29	1.59		1	100	1.00	1.90	1.00	286.4	1.00	Infin.	0.000	0.317	Non-Liq.	Non-Liq.	0.00
8.86	213.10	2.23	1.05	110	0.487	0.982	1.05	0.50	1.47	296.14	1.59		1	100	1.00	1.95	1.00	297.2	1.00	Infin.	0.000	0.317	Non-Liq.	Non-Liq.	0.00
9.02	211.76	2.34	1.10	110	0.496	0.981	1.11	0.50	1.46	291.57	1.62		1	100	1.00	2.00	1.00	292.7	1.00	Infin.	0.000	0.317	Non-Liq.	Non-Liq.	0.00
9.19	215.66	2.34	1.09	110	0.505	0.981	1.09	0.50	1.45	294.28	1.61		1	100	1.00	2.05	1.00	295.4	1.00	Infin.	0.000	0.317	Non-Liq.	Non-Liq.	0.00
9.35	219.54	2.54	1.16	110	0.514	0.981	1.16	0.50	1.43	296.93	1.63		1	100	1.00	2.10	1.00	298.0	1.00	Infin.	0.000	0.317	Non-Liq.	Non-Liq.	0.00
9.51	229.63	2.68	1.17	110	0.523	0.980	1.17	0.50	1.42	307.91	1.62		1	100	1.00	2.15	1.00	309.1	1.00	Infin.	0.000	0.317	Non-Liq.	Non-Liq.	0.00
9.68	235.06	2.79	1.18	110	0.532	0.980	1.19	0.50	1.41	312.51	1.62		1	100	1.00	2.20	1.00	313.7	1.00	Infin.	0.000	0.317	Non-Liq.	Non-Liq.	0.00
9.84	237.58	2.88	1.21	110	0.541	0.980	1.21	0.50	1.40	313.21	1.63		1	100	1.00	2.25	1.00	314.4	1.00	Infin.	0.000	0.317	Non-Liq.	Non-Liq.	0.00
10.01	233.01	2.93	1.26	110	0.550	0.979	1.26	0.50	1.39	305.09	1.65		1	100	1.00	2.30	1.00	306.7	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
10.17	237.10	2.96	1.25	110	0.559	0.979	1.25	0.50	1.38	307.65	1.64		1	100	1.00	2.35	1.00	308.3	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
10.33	243.13	3.06	1.26	110	0.568	0.979	1.26	0.50	1.36	312.86	1.64		1	100	1.00	2.40	1.00	313.1	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
10.50	243.55	3.17	1.30	110	0.577	0.978	1.30	0.50	1.36	311.64	1.65		1	100	1.01	2.45	1.00	314.7	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
10.66	243.58	3.23	1.32	110	0.586	0.978	1.33	0.51	1.35	309.70	1.66		1	100	1.01	2.50	1.00	314.6	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
10.83	251.39	3.25	1.29	110	0.595	0.978	1.30	0.50	1.33	316.43	1.65		1	100	1.00	2.55	1.00	318.3	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
10.99	254.32	3.43	1.35	110	0.604	0.977	1.35	0.51	1.33	318.41	1.66		1	100	1.01	2.60	1.00	323.3	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
11.15	250.44	3.64	1.45	110	0.614	0.977	1.46	0.52	1.32	312.74	1.69		1	100	1.03	2.65	1.00	324.1	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
11.32	235.91	3.45	1.46	110	0.623	0.977	1.47	0.52	1.32	293.22	1.71		1	100	1.05	2.70	1.00	307.7	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
11.48	231.44	3.34	1.44	110	0.632	0.976	1.45	0.52	1.31	285.58	1.71		1	100	1.05	2.75	1.00	300.1	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
11.65	243.81	3.39	1.39	110	0.641	0.976	1.40	0.51	1.29	297.60	1.69		1	100	1.03	2.80	1.00	308.0	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
11.81	248.76	3.18	1.28	110	0.650	0.975	1.28	0.51	1.28	300.06	1.66		1	100	1.01	2.85	1.00	303.9	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
11.98	252.74	3.49	1.38	110	0.659	0.975	1.39	0.51	1.27	303.78	1.68		1	100	1.03	2.90	1.00	312.7	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
12.14	246.32	3.71	1.51	110	0.668	0.975	1.51	0.52	1.27	295.51	1.72		1	100	1.05	2.95	1.00	311.7	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
12.30	247.22	3.84	1.55	110	0.677	0.974	1.56	0.53	1.27	294.93	1.73		1	100	1.06	3.00	1.00	313.3	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
12.47	246.81	3.92	1.59	110	0.686	0.974	1.59	0.53	1.26	292.77	1.74		1	100	1.07	3.05	1.00	313.0	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
12.63	246.30	4.04	1.64	110	0.695	0.974	1.65	0.53	1.25	290.63	1.75		1	100	1.07	3.10	1.00	313.4	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
12.80	244.00	4.09	1.67	110	0.704	0.973	1.68	0.54	1.25	286.30	1.76		1	100	1.08	3.15	1.00	310.9	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_σ	H (m)	K_H	Clean Sand Qc1n	K_σ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	*Volumetric Strain (%)*
12.96	243.85	4.05	1.66	110	0.713	0.973	1.67	0.54	1.24	284.13	1.76		1	100	1.08	3.20	1.00	308.4	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.12	250.82	4.24	1.69	110	0.722	0.973	1.70	0.54	1.23	290.33	1.76		1	100	1.08	3.25	1.00	315.3	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.29	254.86	4.23	1.66	110	0.731	0.972	1.66	0.53	1.22	292.76	1.76		1	100	1.08	3.30	1.00	316.1	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.45	265.02	4.01	1.51	110	0.740	0.972	1.52	0.52	1.21	301.15	1.72		1	100	1.05	3.35	1.00	316.9	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.62	296.24	3.54	1.19	110	0.749	0.972	1.20	0.50	1.19	331.97	1.61		1	100	1.00	3.40	1.00	333.2	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.78	358.75	4.85	1.35	110	0.758	0.971	1.35	0.50	1.18	399.79	1.61		1	100	1.00	3.45	1.00	401.3	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.94	401.73	4.27	1.06	110	0.767	0.971	1.07	0.50	1.17	445.14	1.49		1	100	1.00	3.45	1.00	446.8	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
14.11	397.89	5.59	1.40	110	0.776	0.971	1.41	0.50	1.17	438.29	1.60		1	100	1.00	3.45	1.00	439.9	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
14.27	408.46	4.70	1.15	110	0.785	0.970	1.15	0.50	1.16	447.36	1.52		1	100	1.00	3.45	1.00	449.0	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
14.44	435.23	5.55	1.28	110	0.794	0.970	1.28	0.50	1.15	474.00	1.55		1	100	1.00	3.45	1.00	475.8	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
14.60	389.69	5.04	1.29	110	0.803	0.970	1.30	0.50	1.15	421.92	1.58		1	100	1.00	3.45	1.00	423.5	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
14.76	348.88	3.51	1.01	110	0.812	0.969	1.01	0.50	1.14	375.53	1.52		1	100	1.00	3.45	1.00	376.9	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
14.93	347.64	3.21	0.92	110	0.821	0.969	0.93	0.50	1.14	372.12	1.49		1	100	1.00	3.45	1.00	373.5	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.09	366.34	3.29	0.90	110	0.830	0.969	0.90	0.50	1.13	390.04	1.47		1	100	1.00	3.45	1.00	391.5	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.26	355.46	3.76	1.06	110	0.839	0.968	1.06	0.50	1.12	376.38	1.53		1	100	1.00	3.45	1.00	377.8	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.42	339.34	3.85	1.14	110	0.848	0.968	1.14	0.50	1.12	357.34	1.57		1	100	1.00	3.45	1.00	358.7	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.58	338.34	4.27	1.26	110	0.857	0.967	1.27	0.50	1.11	354.40	1.61		1	100	1.00	3.45	1.00	355.7	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.75	341.10	4.54	1.33	110	0.866	0.967	1.33	0.50	1.11	355.42	1.63		1	100	1.00	3.45	1.00	356.7	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.91	335.06	4.41	1.32	110	0.875	0.967	1.32	0.50	1.10	347.30	1.63		1	100	1.00	3.45	1.00	348.6	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.08	339.73	3.85	1.13	110	0.884	0.966	1.14	0.50	1.09	350.34	1.58		1	100	1.00	3.45	1.00	351.6	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.24	339.17	3.94	1.16	110	0.893	0.966	1.16	0.50	1.09	347.98	1.59		1	100	1.00	3.45	1.00	349.3	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.40	304.89	4.11	1.35	110	0.902	0.966	1.35	0.51	1.08	311.54	1.67		1	100	1.02	3.45	1.00	317.6	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.57	240.39	3.63	1.51	110	0.911	0.965	1.51	0.54	1.08	245.31	1.77		1	100	1.08	3.45	1.00	267.0	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.73	200.85	3.97	1.97	110	0.920	0.965	1.98	0.58	1.08	204.91	1.91		1	100	1.20	3.45	1.00	246.3	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.90	186.05	3.36	1.80	110	0.929	0.965	1.81	0.58	1.08	188.60	1.90		1	100	1.19	3.45	1.00	225.2	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
17.06	145.35	4.55	3.13	110	0.938	0.964	3.15	0.65	1.08	147.65	2.15		1	93	1.56		1.00	230.8	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
17.22	137.21	1.70	1.24	110	0.947	0.964	1.25	0.57	1.06	137.16	1.87		1	90	1.16	1.00	1.00	160.3	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
17.39	195.13	2.67	1.37	110	0.956	0.963	1.37	0.55	1.06	193.97	1.80		1	100	1.11	1.05	1.00	215.5	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
17.55	375.11	3.14	0.84	110	0.965	0.963	0.84	0.50	1.05	370.21	1.46		1	100	1.00	1.10	1.00	371.6	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
17.72	366.40	3.61	0.98	110	0.974	0.963	0.99	0.50	1.04	359.90	1.52		1	100	1.00	1.15	1.00	361.2	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
17.88	334.19	2.48	0.74	110	0.983	0.962	0.75	0.50	1.04	326.66	1.45		1	100	1.00	1.20	1.00	327.9	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
18.04	253.24	2.71	1.07	110	0.992	0.962	1.08	0.50	1.03	246.22	1.65		1	100	1.00	1.25	1.00	248.4	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
18.21	169.29	2.90	1.71	110	1.001	0.962	1.72	0.58	1.03	164.25	1.92		1	97	1.21	1.30	1.00	199.5	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
18.37	135.74	2.18	1.61	110	1.010	0.961	1.62	0.60	1.03	130.89	1.97		1	88	1.26	1.35	1.00	165.6	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
18.54	258.73	2.13	0.82	110	1.020	0.961	0.83	0.50	1.02	248.14	1.56		1	100	1.00	1.40	1.00	249.1	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
18.70	348.17	2.48	0.71	110	1.029	0.960	0.71	0.50	1.01	332.78	1.43		1	100	1.00	1.45	1.00	334.0	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
18.86	379.90	3.61	0.95	110	1.038	0.960	0.95	0.50	1.01	361.60	1.51		1	100	1.00	1.50	1.00	363.0	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.03	419.21	3.90	0.93	110	1.047	0.960	0.93	0.50	1.01	397.39	1.47		1	100	1.00	1.55	1.00	398.9	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.19	396.96	4.58	1.15	110	1.056	0.959	1.16	0.50	1.00	374.62	1.57		1	100	1.00	1.60	1.00	376.0	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.36	387.05	4.64	1.20	110	1.065	0.959	1.20	0.50	1.00	363.69	1.59		1	100	1.00	1.65	1.00	365.0	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.52	368.81	4.55	1.23	110	1.074	0.958	1.24	0.50	0.99	345.03	1.61		1	100	1.00	1.70	1.00	346.3	0.99	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.69	354.61	3.09	0.87	110	1.083	0.958	0.87	0.50	0.99	330.32	1.50		1	100	1.00	1.75	1.00	331.6	0.99	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.85	342.37	2.52	0.74	110	1.092	0.957	0.74	0.50	0.98	317.55	1.46		1	100	1.00	1.80	1.00	318.7	0.99	Infin.	0.000	0.309	**Non-Liq.**	Non-Liq.	**0.00**
20.01	342.04	2.21	0.65	110	1.101	0.957	0.65	0.50	0.98	315.93	1.42		1	100	1.00	1.85	1.00	317.1	0.98	Infin.	0.000	0.309	**Non-Liq.**	Non-Liq.	**0.00**

CPT-LIQUEFY.XLS - A SPREADSHEET FOR EMPIRICAL ESTIMATION OF LIQUEFACTION POTENTIAL USING CPT DATA
Developed 2003 by Shelton L. Stringer, GE, Earth Systems Southwest

Project: Oxnard High School No. 8
Job No: 301953-001
Date: 8/14/2018
Sounding: CPT-4
Plot: 4

Methods: Liquefaction Analysis using 1998 NCEER workshop methods (Robertson & Wride)
Post-liquefaction Settlement Analysis from Tokimatsu & Seed (1987)
Dry Sand Settlement by Pradel, ASCE Journal of G&GE, Vol 124, No. 4

Total Liquefied Thickness (feet)
0.0

EARTHQUAKE INFORMATION:
Magnitude: 6.77 (7.5)
PGA, g: 0.65 (0.50)
MSF: 1.30
GWT, feet: 20.0
Design GWT, feet: 20.0

Induced CSR (M=7.5): = 0.65*PGA*(po/p'o)*rd/MSF
Clean Sand Qc1n = C_Q*K_C*K_H*Qc
SF = $CRR_{7.5}$*Kσ/CSR

Unit Weight of unsaturated soils: 110 pcf
Unit Weight of saturated soils: 110 pcf
Limiting Ic for liquefiable soils: 2.60
Limiting Ic for K_H: 2.0

Use Tokimatsu & Seed (0) or Ishihara &Yoshmine (1): 0
Required SF: 1.50
Min SF of Liquefiable Layers: 0.00
Avg SF of Liquefiable Layers: 0.00

Probab	Total Induced Subsidence (inches)
Avg	0
0%	
Max	0.2
0%	

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	*Volumetric Strain (%)*
0.16	92.62	1.11	1.20	110	0.009	1.000	1.20	0.56	1.70	148.81	1.84		1	93	1.13	0.25	1.00	168.8	1.00	Infin.	0.000	0.323	Non-Liq.	Non-Liq.	0.00
0.33	130.04	2.02	1.55	110	0.018	1.000	1.55	0.55	1.70	208.92	1.82		1	100	1.12	0.25	1.00	234.3	1.00	Infin.	0.000	0.323	Non-Liq.	Non-Liq.	0.00
0.49	152.39	3.01	1.98	110	0.027	1.000	1.98	0.57	1.70	244.82	1.86		1	100	1.16	0.25	1.00	282.8	1.00	Infin.	0.000	0.323	Non-Liq.	Non-Liq.	0.00
0.66	146.45	3.22	2.20	110	0.036	1.000	2.20	0.58	1.70	235.26	1.91		1	100	1.20	0.25	1.00	282.0	1.00	Infin.	0.000	0.323	Non-Liq.	Non-Liq.	0.00
0.82	125.63	2.97	2.36	110	0.045	1.000	2.36	0.60	1.70	201.79	1.97		1	100	1.27	0.25	1.00	255.7	1.00	Infin.	0.000	0.323	Non-Liq.	Non-Liq.	0.00
0.98	97.23	2.48	2.55	110	0.054	1.000	2.55	0.63	1.70	156.14	2.07		1	95	1.40		1.00	218.4	1.00	Infin.	0.000	0.323	Non-Liq.	Non-Liq.	0.00
1.15	63.94	1.59	2.49	110	0.063	0.999	2.50	0.66	1.70	102.64	2.18		1	78	1.61		1.00	165.7	1.00	Infin.	0.000	0.323	Non-Liq.	Non-Liq.	0.00
1.31	63.94	1.59	2.49	110	0.072	0.999	2.50	0.66	1.70	102.62	2.18		1	78	1.61		1.00	165.7	1.00	Infin.	0.000	0.323	Non-Liq.	Non-Liq.	0.00
1.48	41.59	1.09	2.61	110	0.081	0.999	2.62	0.70	1.70	66.70	2.32		1	60	2.02		1.00	134.8	1.00	0.308	0.308	0.323	Non-Liq.	Non-Liq.	0.00
1.64	28.11	0.74	2.64	110	0.090	0.998	2.64	0.74	1.70	45.02	2.45		1	44	2.52		1.00	113.6	1.00	0.216	0.216	0.323	Non-Liq.	Non-Liq.	0.00
1.80	20.76	0.53	2.55	110	0.099	0.998	2.57	0.77	1.70	33.20	2.54		1	31	2.98		1.00	98.9	1.00	0.170	0.170	0.323	Non-Liq.	Non-Liq.	0.00
1.97	21.63	0.56	2.58	110	0.108	0.998	2.60	0.77	1.70	34.58	2.53		1	33	2.92		1.00	101.1	1.00	0.176	0.176	0.322	Non-Liq.	Non-Liq.	0.00
2.13	34.59	0.78	2.25	110	0.117	0.997	2.26	0.71	1.70	55.39	2.34		1	52	2.07		1.00	114.6	1.00	0.220	0.220	0.322	Non-Liq.	Non-Liq.	0.00
2.30	34.08	0.89	2.61	110	0.126	0.997	2.62	0.72	1.70	54.56	2.39		1	52	2.25		1.00	123.0	1.00	0.253	0.253	0.322	Non-Liq.	Non-Liq.	0.00
2.46	31.06	0.81	2.60	110	0.135	0.996	2.61	0.73	1.70	49.69	2.41		1	48	2.37		1.00	117.7	1.00	0.231	0.231	0.322	Non-Liq.	Non-Liq.	0.00
2.62	26.71	0.71	2.65	110	0.144	0.996	2.67	0.75	1.70	42.69	2.47		1	42	2.62		1.00	111.6	1.00	0.209	0.209	0.322	Non-Liq.	Non-Liq.	0.00
2.79	24.66	0.64	2.61	110	0.153	0.996	2.62	0.76	1.70	39.38	2.49		1	38	2.72		1.00	107.1	1.00	0.194	0.194	0.322	Non-Liq.	Non-Liq.	0.00
2.95	22.66	0.59	2.60	110	0.162	0.995	2.62	0.76	1.70	36.15	2.52		1	35	2.86		1.00	103.4	1.00	0.183	0.183	0.322	Non-Liq.	Non-Liq.	0.00
3.12	21.79	0.57	2.60	110	0.171	0.995	2.62	0.77	1.70	34.74	2.53		1	33	2.93		1.00	101.7	1.00	0.178	0.178	0.322	Non-Liq.	Non-Liq.	0.00
3.28	20.52	0.55	2.69	110	0.180	0.994	2.72	0.78	1.70	32.68	2.56		1	30	3.10		1.00	101.3	1.00	0.177	0.177	0.321	Non-Liq.	Non-Liq.	0.00
3.44	18.85	0.54	2.86	110	0.189	0.994	2.89	0.79	1.70	29.98	2.61		0						1.00			0.321	Non-Liq.	Non-Liq.	0.00
3.61	16.96	0.52	3.05	110	0.198	0.994	3.09	0.81	1.70	26.93	2.66		0						1.00			0.321	Non-Liq.	Non-Liq.	0.00
3.77	15.22	0.50	3.30	110	0.208	0.993	3.34	0.82	1.70	24.12	2.72		0						1.00			0.321	Non-Liq.	Non-Liq.	0.00
3.94	13.60	0.54	3.97	110	0.217	0.993	4.03	0.85	1.70	21.50	2.81		0						1.00			0.321	Non-Liq.	Non-Liq.	0.00
4.10	13.10	0.56	4.31	110	0.226	0.993	4.38	0.86	1.70	20.69	2.85		0						1.00			0.321	Non-Liq.	Non-Liq.	0.00
4.27	13.76	0.61	4.45	110	0.235	0.992	4.52	0.86	1.70	21.73	2.84		0						1.00			0.321	Non-Liq.	Non-Liq.	0.00
4.43	12.78	0.63	4.94	110	0.244	0.992	5.03	0.88	1.70	20.14	2.90		0						1.00			0.321	Non-Liq.	Non-Liq.	0.00
4.59	9.82	0.62	6.32	110	0.253	0.991	6.49	0.93	1.70	15.37	3.06		0						1.00			0.320	Non-Liq.	Non-Liq.	0.00
4.76	9.11	0.58	6.39	110	0.262	0.991	6.58	0.93	1.70	14.22	3.09		0						1.00			0.320	Non-Liq.	Non-Liq.	0.00
4.92	9.64	0.67	6.94	110	0.271	0.991	7.14	0.94	1.70	15.05	3.09		0						1.00			0.320	Non-Liq.	Non-Liq.	0.00
5.09	11.05	0.51	4.60	110	0.280	0.990	4.72	0.89	1.70	17.31	2.93		0						1.00			0.320	Non-Liq.	Non-Liq.	0.00
5.25	26.79	0.51	1.91	110	0.289	0.990	1.93	0.72	1.70	42.58	2.38		1	41	2.22		1.00	94.7	1.00	0.159	0.159	0.320	Non-Liq.	Non-Liq.	0.00
5.41	43.87	0.61	1.40	110	0.298	0.989	1.41	0.65	1.70	70.01	2.12		1	62	1.50		1.00	105.0	1.00	0.188	0.188	0.320	Non-Liq.	Non-Liq.	0.00
5.58	61.57	0.87	1.42	110	0.307	0.989	1.42	0.61	1.70	98.44	2.02		1	76	1.32		1.00	130.2	1.00	0.285	0.285	0.320	Non-Liq.	Non-Liq.	0.00
5.74	81.48	1.27	1.55	110	0.316	0.989	1.56	0.60	1.70	130.42	1.96		1	88	1.25	1.00	1.00	163.4	1.00	Infin.	0.000	0.320	Non-Liq.	Non-Liq.	0.00
5.91	104.49	1.77	1.69	110	0.325	0.988	1.70	0.58	1.70	167.37	1.91		1	98	1.20	1.05	1.00	201.7	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
6.07	121.74	2.26	1.85	110	0.334	0.988	1.86	0.58	1.70	195.08	1.90		1	100	1.19	1.10	1.00	232.8	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
6.23	129.40	2.54	1.96	110	0.343	0.988	1.97	0.58	1.70	207.37	1.90		1	100	1.19	1.15	1.00	248.1	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
6.40	133.71	2.63	1.97	110	0.352	0.987	1.98	0.58	1.70	214.28	1.90		1	100	1.18	1.20	1.00	254.9	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
6.56	136.13	2.67	1.96	110	0.361	0.987	1.97	0.57	1.70	218.15	1.89		1	100	1.18	1.20	1.00	258.3	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
6.73	137.04	2.50	1.82	110	0.370	0.986	1.83	0.57	1.70	219.60	1.86		1	100	1.16	1.20	1.00	254.6	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
6.89	134.61	2.27	1.69	110	0.379	0.986	1.69	0.56	1.70	215.68	1.84		1	100	1.14	1.20	1.00	246.3	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
7.05	133.55	2.02	1.51	110	0.388	0.986	1.52	0.55	1.70	213.97	1.81		1	100	1.11	1.20	1.00	238.6	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
7.22	130.84	1.92	1.47	110	0.397	0.985	1.47	0.55	1.70	209.60	1.80		1	100	1.11	1.20	1.00	233.0	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
7.38	125.34	1.72	1.37	110	0.406	0.985	1.38	0.55	1.69	199.24	1.79		1	100	1.10	1.20	1.00	220.4	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
7.55	121.32	1.59	1.31	110	0.415	0.985	1.32	0.55	1.67	190.42	1.79		1	100	1.10	1.20	1.00	210.4	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
7.71	121.32	1.59	1.31	110	0.424	0.984	1.32	0.55	1.65	188.35	1.80		1	100	1.10	1.20	1.00	208.6	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
7.87	117.69	1.47	1.25	110	0.433	0.984	1.25	0.55	1.63	180.43	1.79		1	100	1.10	1.20	1.00	199.4	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
8.04	112.60	1.37	1.22	110	0.442	0.984	1.22	0.55	1.61	170.99	1.80		1	99	1.11	1.20	1.00	189.9	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
8.20	105.92	1.25	1.18	110	0.451	0.983	1.19	0.55	1.60	159.50	1.81		1	96	1.12	1.20	1.00	178.5	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
8.37	94.02	1.10	1.17	110	0.460	0.983	1.18	0.56	1.60	141.18	1.85		1	91	1.14	1.20	1.00	161.8	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
8.53	82.35	0.71	0.86	110	0.469	0.982	0.86	0.55	1.56	121.02	1.81		1	85	1.11	1.20	1.00	135.0	1.00	0.309	0.309	0.318	Non-Liq.	Non-Liq.	0.00
8.69	75.19	0.69	0.91	110	0.478	0.982	0.92	0.56	1.56	110.51	1.85		1	81	1.15	1.20	1.00	127.3	1.00	0.272	0.272	0.317	Non-Liq.	Non-Liq.	0.00
8.86	63.26	0.61	0.97	110	0.487	0.982	0.97	0.59	1.57	93.45	1.93		1	74	1.21	1.20	1.00	113.9	1.00	0.217	0.217	0.317	Non-Liq.	Non-Liq.	0.00
9.02	59.99	0.57	0.95	110	0.496	0.981	0.96	0.59	1.56	87.95	1.94		1	71	1.23	1.20	1.00	108.8	1.00	0.200	0.200	0.317	Non-Liq.	Non-Liq.	0.00
9.19	56.32	0.53	0.94	110	0.505	0.981	0.94	0.60	1.55	81.99	1.96		1	69	1.25	1.20	1.00	103.2	1.00	0.182	0.182	0.317	Non-Liq.	Non-Liq.	0.00
9.35	53.37	0.45	0.85	110	0.514	0.981	0.86	0.60	1.54	76.78	1.96		1	66	1.25	1.20	1.00	96.4	1.00	0.163	0.163	0.317	Non-Liq.	Non-Liq.	0.00
9.51	48.12	0.39	0.82	110	0.523	0.980	0.83	0.60	1.53	68.86	1.99		1	61	1.29	1.20	1.00	88.9	1.00	0.145	0.145	0.317	Non-Liq.	Non-Liq.	0.00
9.68	43.46	0.35	0.81	110	0.532	0.980	0.82	0.62	1.53	61.93	2.03		1	57	1.34		1.00	82.7	1.00	0.133	0.133	0.317	Non-Liq.	Non-Liq.	0.00
9.84	43.28	0.29	0.68	110	0.541	0.980	0.69	0.61	1.50	60.60	1.99		1	56	1.29	0.05	1.71	133.7	1.00	0.302	0.302	0.317	Non-Liq.	Non-Liq.	0.00
10.01	40.37	0.42	1.04	110	0.550	0.979	1.05	0.64	1.52	57.28	2.12		1	54	1.48		1.00	84.9	1.00	0.137	0.137	0.316	Non-Liq.	Non-Liq.	0.00
10.17	38.85	0.35	0.91	110	0.559	0.979	0.92	0.64	1.50	54.36	2.10		1	52	1.46		1.00	79.2	1.00	0.126	0.126	0.316	Non-Liq.	Non-Liq.	0.00
10.33	35.99	0.37	1.03	110	0.568	0.979	1.05	0.66	1.50	50.33	2.16		1	48	1.58		1.00	79.3	1.00	0.126	0.126	0.316	Non-Liq.	Non-Liq.	0.00
10.50	35.23	0.33	0.94	110	0.577	0.978	0.96	0.65	1.48	48.64	2.15		1	47	1.55		1.00	75.5	1.00	0.120	0.120	0.316	Non-Liq.	Non-Liq.	0.00
10.66	32.68	0.32	0.98	110	0.586	0.978	0.99	0.66	1.48	44.89	2.19		1	44	1.64		1.00	73.5	1.00	0.117	0.117	0.316	Non-Liq.	Non-Liq.	0.00
10.83	29.98	0.30	0.99	110	0.595	0.978	1.01	0.68	1.47	40.94	2.22		1	40	1.73		1.00	70.8	1.00	0.113	0.113	0.316	Non-Liq.	Non-Liq.	0.00
10.99	26.35	0.27	1.02	110	0.604	0.977	1.04	0.69	1.47	35.85	2.28		1	34	1.89		1.00	67.7	1.00	0.109	0.109	0.316	Non-Liq.	Non-Liq.	0.00
11.15	21.42	0.31	1.43	110	0.614	0.977	1.48	0.74	1.50	29.41	2.44		1	26	2.47		1.00	72.5	1.00	0.115	0.115	0.316	Non-Liq.	Non-Liq.	0.00
11.32	14.65	0.21	1.40	110	0.623	0.977	1.46	0.78	1.51	20.05	2.57		1	10	3.16		1.00	63.4	1.00	0.104	0.104	0.316	Non-Liq.	Non-Liq.	0.00
11.48	9.05	0.21	2.30	110	0.632	0.976	2.47	0.87	1.57	12.46	2.87		0						1.00			0.315	Non-Liq.	Non-Liq.	0.00
11.65	7.19	0.20	2.77	110	0.641	0.976	3.04	0.91	1.58	9.77	3.01		0						1.00			0.315	Non-Liq.	Non-Liq.	0.00
11.81	2.70	0.13	4.89	110	0.650	0.975	6.44	1.00	1.63	3.16	3.60		0						1.00			0.315	Non-Liq.	Non-Liq.	0.00
11.98	2.65	0.12	4.64	110	0.659	0.975	6.18	1.00	1.61	3.02	3.60		0						1.00			0.315	Non-Liq.	Non-Liq.	0.00
12.14	3.48	0.11	3.10	110	0.668	0.975	3.84	1.00	1.58	4.21	3.37		0						1.00			0.315	Non-Liq.	Non-Liq.	0.00
12.30	2.50	0.10	3.84	110	0.677	0.974	5.27	1.00	1.56	2.69	3.61		0						1.00			0.315	Non-Liq.	Non-Liq.	0.00
12.47	1.85	0.11	5.73	110	0.686	0.974	9.10	1.00	1.54	1.70	3.90		0						1.00			0.315	Non-Liq.	Non-Liq.	0.00
12.63	1.79	0.13	7.43	110	0.695	0.974	12.14	1.00	1.52	1.58	4.00		0						1.00			0.315	Non-Liq.	Non-Liq.	0.00
12.80	5.10	0.29	5.59	110	0.704	0.973	6.48	1.00	1.50	6.25	3.36		0						1.00			0.315	Non-Liq.	Non-Liq.	0.00

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_c	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	Induced EQ CRR	M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
12.96	30.62	0.58	1.88	110	0.713	0.973	1.92	0.73	1.34	38.00	2.42		1	37	2.37		1.00	90.3	1.00	0.148	0.148	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.12	81.21	1.11	1.36	110	0.722	0.973	1.37	0.61	1.26	96.14	2.01		1	75	1.32		1.00	126.7	1.00	0.269	0.269	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.29	92.10	1.26	1.37	110	0.731	0.972	1.38	0.60	1.25	107.89	1.98		1	80	1.27	1.00	1.00	137.9	1.00	0.324	0.324	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.45	131.97	1.30	0.99	110	0.740	0.972	0.99	0.54	1.21	150.49	1.77		1	94	1.09	1.05	1.00	164.4	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.62	176.29	1.68	0.95	110	0.749	0.972	0.96	0.51	1.19	198.00	1.68		1	100	1.02	1.10	1.00	203.4	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.78	208.26	2.28	1.09	110	0.758	0.971	1.10	0.51	1.19	232.55	1.68		1	100	1.02	1.15	1.00	238.3	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.94	234.75	2.60	1.11	110	0.767	0.971	1.11	0.50	1.18	259.95	1.65		1	100	1.00	1.20	1.00	261.3	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
14.11	244.80	2.82	1.15	110	0.776	0.971	1.16	0.50	1.17	269.60	1.65		1	100	1.00	1.25	1.00	271.7	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
14.27	272.06	2.98	1.09	110	0.785	0.970	1.10	0.50	1.16	297.68	1.61		1	100	1.00	1.30	1.00	298.8	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
14.44	294.29	3.35	1.14	110	0.794	0.970	1.14	0.50	1.15	320.23	1.60		1	100	1.00	1.35	1.00	321.4	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
14.60	316.23	3.17	1.00	110	0.803	0.970	1.00	0.50	1.15	342.22	1.54		1	100	1.00	1.40	1.00	343.5	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
14.76	316.63	3.35	1.06	110	0.812	0.969	1.06	0.50	1.14	340.73	1.56		1	100	1.00	1.45	1.00	342.0	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
14.93	294.75	3.41	1.16	110	0.821	0.969	1.16	0.50	1.14	315.37	1.61		1	100	1.00	1.50	1.00	316.5	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.09	278.02	3.48	1.25	110	0.830	0.969	1.25	0.50	1.13	296.09	1.65		1	100	1.01	1.55	1.00	299.0	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.26	279.30	3.53	1.26	110	0.839	0.968	1.27	0.51	1.12	295.90	1.66		1	100	1.01	1.55	1.00	299.6	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.42	288.00	3.58	1.24	110	0.848	0.968	1.25	0.50	1.12	303.25	1.65		1	100	1.00	1.55	1.00	304.4	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.58	292.46	3.59	1.23	110	0.857	0.967	1.23	0.50	1.11	306.22	1.64		1	100	1.00	1.55	1.00	307.4	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.75	272.56	3.89	1.43	110	0.866	0.967	1.43	0.52	1.11	285.01	1.71		1	100	1.04	1.55	1.00	298.8	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.91	276.67	3.59	1.30	110	0.875	0.967	1.30	0.51	1.10	287.18	1.67		1	100	1.02	1.55	1.00	294.2	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.08	273.17	3.92	1.44	110	0.884	0.966	1.44	0.52	1.10	282.65	1.71		1	100	1.05	1.55	1.00	297.2	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.24	281.27	3.86	1.37	110	0.893	0.966	1.38	0.52	1.09	289.18	1.69		1	100	1.03	1.55	1.00	299.7	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.40	308.06	4.92	1.60	110	0.902	0.966	1.60	0.53	1.09	315.65	1.72		1	100	1.05	1.55	1.00	334.0	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.57	298.32	4.41	1.48	110	0.911	0.965	1.48	0.52	1.08	303.79	1.71		1	100	1.04	1.55	1.00	317.6	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.73	317.60	4.08	1.28	110	0.920	0.965	1.29	0.50	1.07	320.96	1.64		1	100	1.00	1.55	1.00	321.4	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.90	332.36	5.17	1.56	110	0.929	0.965	1.56	0.52	1.07	335.03	1.70		1	100	1.04	1.55	1.00	349.0	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
17.06	338.43	6.36	1.88	110	0.938	0.964	1.88	0.54	1.07	340.25	1.76		1	100	1.08	1.55	1.00	369.5	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
17.22	307.99	5.82	1.89	110	0.947	0.964	1.90	0.55	1.06	308.23	1.79		1	100	1.10	1.55	1.00	340.3	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
17.39	269.28	4.43	1.64	110	0.956	0.963	1.65	0.54	1.06	267.85	1.78		1	100	1.09	1.55	1.00	292.8	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
17.55	257.64	3.38	1.31	110	0.965	0.963	1.32	0.52	1.05	254.47	1.71		1	100	1.05	1.55	1.00	267.0	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
17.72	229.45	3.27	1.42	110	0.974	0.963	1.43	0.54	1.05	225.75	1.77		1	100	1.09	1.55	1.00	246.1	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
17.88	185.15	3.15	1.70	110	0.983	0.962	1.71	0.58	1.04	181.55	1.89		1	100	1.18	1.55	1.00	215.2	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
18.04	157.27	2.43	1.54	110	0.992	0.962	1.55	0.58	1.04	153.30	1.91		1	95	1.20	1.55	1.00	184.1	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
18.21	172.27	2.97	1.72	110	1.001	0.962	1.73	0.58	1.03	167.15	1.92		1	98	1.21	1.55	1.00	202.6	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
18.37	148.03	3.30	2.23	110	1.010	0.961	2.24	0.62	1.03	142.99	2.05		1	92	1.37		1.00	195.6	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
18.54	212.42	3.34	1.57	110	1.020	0.961	1.58	0.56	1.02	203.98	1.83		1	100	1.13	1.00	1.00	231.6	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
18.70	249.14	2.81	1.13	110	1.029	0.960	1.13	0.51	1.01	237.92	1.68		1	100	1.02	1.05	1.00	244.5	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
18.86	254.49	2.69	1.06	110	1.038	0.960	1.06	0.50	1.01	241.92	1.65		1	100	1.01	1.10	1.00	244.0	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.03	249.73	2.74	1.10	110	1.047	0.960	1.10	0.51	1.01	236.35	1.67		1	100	1.02	1.15	1.00	241.6	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.19	253.62	2.91	1.15	110	1.056	0.959	1.15	0.51	1.00	239.00	1.68		1	100	1.03	1.20	1.00	246.3	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.36	260.64	3.02	1.16	110	1.065	0.959	1.16	0.51	1.00	244.56	1.68		1	100	1.02	1.25	1.00	251.5	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.52	261.87	3.10	1.18	110	1.074	0.958	1.19	0.51	0.99	244.64	1.69		1	100	1.03	1.30	1.00	252.7	0.99	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.69	270.64	2.97	1.10	110	1.083	0.958	1.10	0.50	0.99	251.84	1.65		1	100	1.01	1.35	1.00	254.3	0.99	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.85	280.85	3.04	1.08	110	1.092	0.957	1.09	0.50	0.98	260.31	1.64		1	100	1.00	1.40	1.00	261.3	0.99	Infin.	0.000	0.309	**Non-Liq.**	Non-Liq.	**0.00**
20.01	294.22	3.15	1.07	110	1.101	0.957	1.07	0.50	0.98	271.62	1.62		1	100	1.00	1.45	1.00	272.6	0.98	Infin.	0.000	0.309	**Non-Liq.**	Non-Liq.	**0.00**

CPT-LIQUEFY.XLS - A SPREADSHEET FOR EMPIRICAL ESTIMATION OF LIQUEFACTION POTENTIAL USING CPT DATA
Developed 2003 by Shelton L. Stringer, GE, Earth Systems Southwest

Project: Oxnard High School No. 8
Job No: 301953-001
Date: 8/14/2018
Sounding: CPT-5
Plot: 5

Methods: Liquefaction Analysis using 1998 NCEER workshop methods (Robertson & Wride)
Post-liquefaction Settlement Analysis from Tokimatsu & Seed (1987)
Dry Sand Settlement by Pradel, ASCE Journal of G&GE, Vol 124, No. 4

Total Liquefied Thickness (feet)
0.0

EARTHQUAKE INFORMATION:
Magnitude: 6.77 (7.5)
PGA, g: 0.65 (0.50)
MSF: 1.30
GWT, feet: 20.0
Design GWT, feet: 20.0

Induced CSR (M=7.5): = 0.65*PGA*(po/p'o)*rd/MSF
Clean Sand Qc1n = C_Q*K_C*K_H*Qc
SF = $CRR_{7.5}$*Kσ/CSR
Use Tokimatsu & Seed (0) or Ishihara &Yoshmine (1): 0
Unit Weight of unsaturated soils: 110 pcf
Unit Weight of saturated soils: 110 pcf
Limiting Ic for liquefiable soils: 2.60
Limiting Ic for K_H: 2.0
Required SF: 1.50
Min SF of Liquefiable Layers: 0.00
Avg SF of Liquefiable Layers: 0.00

Probab Avg	Total Induced Subsidence (inches)
0%	Max
0%	0.2

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
0.16	7.20	0.07	0.96	110	0.009	1.000	0.96	0.82	1.70	11.55	2.69		0						1.00			0.323	Non-Liq.	Non-Liq.	0.00
0.33	11.97	0.11	0.92	110	0.018	1.000	0.92	0.75	1.70	19.20	2.49		1	8	2.70		1.00	51.9	1.00	0.093	0.093	0.323	Non-Liq.	Non-Liq.	0.00
0.49	16.98	0.15	0.86	110	0.027	1.000	0.86	0.71	1.70	27.24	2.34		1	23	2.08		1.00	56.7	1.00	0.097	0.097	0.323	Non-Liq.	Non-Liq.	0.00
0.66	18.41	0.17	0.90	110	0.036	1.000	0.90	0.70	1.70	29.52	2.32		1	26	2.01		1.00	59.5	1.00	0.100	0.100	0.323	Non-Liq.	Non-Liq.	0.00
0.82	16.13	0.16	1.01	110	0.045	1.000	1.01	0.73	1.70	25.85	2.40		1	21	2.29		1.00	59.2	1.00	0.099	0.099	0.323	Non-Liq.	Non-Liq.	0.00
0.98	12.95	0.14	1.06	110	0.054	1.000	1.06	0.75	1.70	20.72	2.49		1	12	2.71		1.00	56.1	1.00	0.096	0.096	0.323	Non-Liq.	Non-Liq.	0.00
1.15	10.49	0.11	1.05	110	0.063	0.999	1.05	0.78	1.70	16.75	2.57		1	3	3.13		1.00	52.5	1.00	0.093	0.093	0.323	Non-Liq.	Non-Liq.	0.00
1.31	10.49	0.11	1.05	110	0.072	0.999	1.06	0.78	1.70	16.74	2.57		1	3	3.13		1.00	52.5	1.00	0.093	0.093	0.323	Non-Liq.	Non-Liq.	0.00
1.48	9.50	0.14	1.52	110	0.081	0.999	1.53	0.81	1.70	15.13	2.69		0						1.00			0.323	Non-Liq.	Non-Liq.	0.00
1.64	11.89	0.21	1.77	110	0.090	0.998	1.79	0.80	1.70	18.96	2.64		0						1.00			0.323	Non-Liq.	Non-Liq.	0.00
1.80	17.29	0.33	1.93	110	0.099	0.998	1.94	0.77	1.70	27.62	2.53		1	23	2.91		1.00	80.4	1.00	0.128	0.128	0.323	Non-Liq.	Non-Liq.	0.00
1.97	29.55	0.52	1.75	110	0.108	0.998	1.76	0.70	1.70	47.31	2.32		1	46	2.00		1.00	94.8	1.00	0.159	0.159	0.322	Non-Liq.	Non-Liq.	0.00
2.13	29.26	0.52	1.76	110	0.117	0.997	1.77	0.70	1.70	46.83	2.32		1	45	2.02		1.00	94.6	1.00	0.159	0.159	0.322	Non-Liq.	Non-Liq.	0.00
2.30	27.77	0.48	1.74	110	0.126	0.997	1.75	0.71	1.70	44.42	2.34		1	43	2.07		1.00	92.1	1.00	0.153	0.153	0.322	Non-Liq.	Non-Liq.	0.00
2.46	25.48	0.44	1.74	110	0.135	0.996	1.75	0.72	1.70	40.72	2.37		1	40	2.18		1.00	88.8	1.00	0.145	0.145	0.322	Non-Liq.	Non-Liq.	0.00
2.62	22.54	0.40	1.76	110	0.144	0.996	1.77	0.73	1.70	35.99	2.41		1	34	2.36		1.00	85.1	1.00	0.137	0.137	0.322	Non-Liq.	Non-Liq.	0.00
2.79	20.15	0.37	1.83	110	0.153	0.996	1.85	0.75	1.70	32.13	2.46		1	30	2.58		1.00	83.0	1.00	0.133	0.133	0.322	Non-Liq.	Non-Liq.	0.00
2.95	17.63	0.42	2.37	110	0.162	0.995	2.39	0.78	1.70	28.07	2.58		1	24	3.19		1.00	89.5	1.00	0.147	0.147	0.322	Non-Liq.	Non-Liq.	0.00
3.12	13.94	0.43	3.06	110	0.171	0.995	3.10	0.83	1.70	22.12	2.73		0						1.00			0.322	Non-Liq.	Non-Liq.	0.00
3.28	11.33	0.42	3.69	110	0.180	0.994	3.75	0.86	1.70	17.92	2.85		0						1.00			0.321	Non-Liq.	Non-Liq.	0.00
3.44	10.79	0.35	3.27	110	0.189	0.994	3.33	0.86	1.70	17.03	2.84		0						1.00			0.321	Non-Liq.	Non-Liq.	0.00
3.61	19.14	0.32	1.69	110	0.198	0.994	1.71	0.75	1.70	30.44	2.46		1	27	2.58		1.00	78.4	1.00	0.125	0.125	0.321	Non-Liq.	Non-Liq.	0.00
3.77	28.87	0.35	1.20	110	0.208	0.993	1.21	0.68	1.70	46.06	2.23		1	45	1.74		1.00	79.9	1.00	0.127	0.127	0.321	Non-Liq.	Non-Liq.	0.00
3.94	37.13	0.44	1.18	110	0.217	0.993	1.19	0.65	1.70	59.31	2.13		1	55	1.52		1.00	90.2	1.00	0.148	0.148	0.321	Non-Liq.	Non-Liq.	0.00
4.10	42.19	0.52	1.24	110	0.226	0.993	1.25	0.64	1.70	67.43	2.10		1	60	1.46		1.00	98.5	1.00	0.169	0.169	0.321	Non-Liq.	Non-Liq.	0.00
4.27	42.88	0.62	1.43	110	0.235	0.992	1.44	0.65	1.70	68.52	2.14		1	61	1.53		1.00	104.7	1.00	0.187	0.187	0.321	Non-Liq.	Non-Liq.	0.00
4.43	42.87	0.65	1.51	110	0.244	0.992	1.52	0.65	1.70	68.49	2.15		1	61	1.56		1.00	106.9	1.00	0.194	0.194	0.321	Non-Liq.	Non-Liq.	0.00
4.59	43.05	0.62	1.44	110	0.253	0.991	1.44	0.65	1.70	68.77	2.14		1	61	1.53		1.00	105.0	1.00	0.188	0.188	0.320	Non-Liq.	Non-Liq.	0.00
4.76	40.55	0.64	1.58	110	0.262	0.991	1.59	0.66	1.70	64.74	2.18		1	59	1.63		1.00	105.4	1.00	0.189	0.189	0.320	Non-Liq.	Non-Liq.	0.00
4.92	37.17	0.59	1.58	110	0.271	0.991	1.60	0.67	1.70	59.29	2.21		1	55	1.70		1.00	101.0	1.00	0.176	0.176	0.320	Non-Liq.	Non-Liq.	0.00
5.09	45.41	0.55	1.21	110	0.280	0.990	1.22	0.63	1.70	72.52	2.07		1	63	1.41		1.00	102.1	1.00	0.179	0.179	0.320	Non-Liq.	Non-Liq.	0.00
5.25	49.21	0.55	1.12	110	0.289	0.990	1.13	0.62	1.70	78.61	2.02		1	67	1.33		1.00	104.9	1.00	0.187	0.187	0.320	Non-Liq.	Non-Liq.	0.00
5.41	48.56	0.56	1.16	110	0.298	0.989	1.16	0.62	1.70	77.55	2.04		1	66	1.35		1.00	104.9	1.00	0.187	0.187	0.320	Non-Liq.	Non-Liq.	0.00
5.58	48.19	0.59	1.22	110	0.307	0.989	1.23	0.62	1.70	76.94	2.06		1	66	1.38		1.00	106.1	1.00	0.191	0.191	0.320	Non-Liq.	Non-Liq.	0.00
5.74	48.82	0.59	1.20	110	0.316	0.989	1.21	0.62	1.70	77.94	2.05		1	66	1.37		1.00	106.5	1.00	0.192	0.192	0.320	Non-Liq.	Non-Liq.	0.00
5.91	49.59	0.58	1.17	110	0.325	0.988	1.18	0.62	1.70	79.16	2.03		1	67	1.35		1.00	106.6	1.00	0.193	0.193	0.319	Non-Liq.	Non-Liq.	0.00
6.07	49.01	0.58	1.19	110	0.334	0.988	1.19	0.62	1.70	78.21	2.04		1	67	1.36		1.00	106.2	1.00	0.191	0.191	0.319	Non-Liq.	Non-Liq.	0.00
6.23	48.87	0.58	1.19	110	0.343	0.988	1.20	0.62	1.70	77.97	2.04		1	67	1.36		1.00	106.2	1.00	0.191	0.191	0.319	Non-Liq.	Non-Liq.	0.00
6.40	48.92	0.59	1.20	110	0.352	0.987	1.21	0.62	1.70	78.04	2.05		1	67	1.37		1.00	106.5	1.00	0.192	0.192	0.319	Non-Liq.	Non-Liq.	0.00
6.56	50.19	0.62	1.23	110	0.361	0.987	1.24	0.62	1.70	80.07	2.04		1	68	1.36		1.00	109.1	1.00	0.201	0.201	0.319	Non-Liq.	Non-Liq.	0.00
6.73	54.54	0.64	1.17	110	0.370	0.986	1.17	0.61	1.70	87.04	2.00		1	71	1.30		1.00	113.3	1.00	0.215	0.215	0.319	Non-Liq.	Non-Liq.	0.00
6.89	60.79	0.78	1.29	110	0.379	0.986	1.29	0.61	1.70	97.07	1.99		1	76	1.29	0.90	1.02	127.9	1.00	0.275	0.275	0.319	Non-Liq.	Non-Liq.	0.00
7.05	70.21	1.20	1.71	110	0.388	0.986	1.72	0.62	1.70	112.19	2.03		1	82	1.35		1.00	151.2	1.00	0.401	0.401	0.319	Non-Liq.	Non-Liq.	0.00
7.22	86.10	1.28	1.49	110	0.397	0.985	1.49	0.59	1.70	137.71	1.93		1	90	1.22	1.00	1.00	168.1	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
7.38	112.25	1.15	1.02	110	0.406	0.985	1.02	0.53	1.66	175.45	1.74		1	100	1.06	1.05	1.00	187.1	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
7.55	123.77	1.31	1.06	110	0.415	0.985	1.06	0.52	1.63	190.49	1.72		1	100	1.05	1.10	1.00	201.3	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
7.71	123.77	1.31	1.06	110	0.424	0.984	1.06	0.53	1.62	188.51	1.73		1	100	1.05	1.15	1.00	199.6	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
7.87	137.24	1.24	0.90	110	0.433	0.984	0.90	0.50	1.57	202.88	1.65		1	100	1.01	1.20	1.00	204.9	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
8.04	143.26	1.17	0.82	110	0.442	0.984	0.82	0.50	1.55	208.83	1.61		1	100	1.00	1.25	1.00	209.6	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
8.20	133.59	0.95	0.71	110	0.451	0.983	0.72	0.50	1.53	192.72	1.60		1	100	1.00	1.30	1.00	193.4	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
8.37	119.63	0.65	0.54	110	0.460	0.983	0.54	0.50	1.52	170.80	1.56		1	99	1.00	1.35	1.00	171.4	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
8.53	108.61	0.64	0.59	110	0.469	0.982	0.59	0.50	1.50	153.49	1.62		1	95	1.00	1.40	1.00	154.1	1.00	0.420	0.420	0.318	Non-Liq.	Non-Liq.	0.00
8.69	97.77	0.53	0.54	110	0.478	0.982	0.54	0.50	1.49	136.81	1.64		1	90	1.00	1.45	1.00	136.9	1.00	0.318	0.318	0.317	Non-Liq.	Non-Liq.	0.00
8.86	91.00	0.48	0.52	110	0.487	0.982	0.53	0.51	1.48	126.66	1.66		1	87	1.01	1.50	1.00	128.5	1.00	0.277	0.277	0.317	Non-Liq.	Non-Liq.	0.00
9.02	88.06	0.54	0.61	110	0.496	0.981	0.62	0.52	1.48	122.80	1.71		1	85	1.05	1.55	1.00	128.8	1.00	0.279	0.279	0.317	Non-Liq.	Non-Liq.	0.00
9.19	80.39	0.53	0.66	110	0.505	0.981	0.66	0.54	1.49	112.21	1.76		1	82	1.08	1.60	1.00	121.5	1.00	0.247	0.247	0.317	Non-Liq.	Non-Liq.	0.00
9.35	57.91	0.50	0.87	110	0.514	0.981	0.88	0.59	1.53	83.01	1.94		1	69	1.23	1.65	1.00	102.3	1.00	0.180	0.180	0.317	Non-Liq.	Non-Liq.	0.00
9.51	67.62	0.54	0.79	110	0.523	0.980	0.80	0.57	1.49	94.64	1.87		1	75	1.16	1.70	1.00	110.3	1.00	0.205	0.205	0.317	Non-Liq.	Non-Liq.	0.00
9.68	67.40	0.52	0.77	110	0.532	0.980	0.78	0.57	1.48	93.34	1.87		1	74	1.16	1.75	1.00	108.5	1.00	0.199	0.199	0.317	Non-Liq.	Non-Liq.	0.00
9.84	67.98	0.51	0.75	110	0.541	0.980	0.76	0.57	1.46	93.14	1.86		1	74	1.15	1.80	1.00	107.8	1.00	0.197	0.197	0.317	Non-Liq.	Non-Liq.	0.00
10.01	65.93	0.45	0.68	110	0.550	0.979	0.69	0.56	1.44	89.29	1.85		1	72	1.15	1.85	1.00	102.7	1.00	0.181	0.181	0.316	Non-Liq.	Non-Liq.	0.00
10.17	65.84	0.44	0.67	110	0.559	0.979	0.68	0.56	1.43	88.34	1.85		1	72	1.15	1.90	1.00	101.6	1.00	0.178	0.178	0.316	Non-Liq.	Non-Liq.	0.00
10.33	64.79	0.46	0.70	110	0.568	0.979	0.71	0.57	1.42	86.44	1.87		1	71	1.16	1.95	1.00	100.8	1.00	0.175	0.175	0.316	Non-Liq.	Non-Liq.	0.00
10.50	65.15	0.49	0.74	110	0.577	0.978	0.75	0.57	1.42	86.37	1.88		1	71	1.17	2.00	1.00	101.9	1.00	0.178	0.178	0.316	Non-Liq.	Non-Liq.	0.00
10.66	65.57	0.48	0.74	110	0.586	0.978	0.74	0.57	1.40	86.12	1.88		1	71	1.17	2.05	1.00	101.4	1.00	0.177	0.177	0.316	Non-Liq.	Non-Liq.	0.00
10.83	66.76	0.49	0.73	110	0.595	0.978	0.74	0.57	1.39	86.85	1.88		1	71	1.17	2.10	1.00	101.9	1.00	0.178	0.178	0.316	Non-Liq.	Non-Liq.	0.00
10.99	69.51	0.50	0.72	110	0.604	0.977	0.73	0.57	1.37	89.46	1.86		1	72	1.16	2.15	1.00	103.8	1.00	0.184	0.184	0.316	Non-Liq.	Non-Liq.	0.00
11.15	72.61	0.54	0.74	110	0.614	0.977	0.74	0.57	1.36	92.59	1.86		1	74	1.15	2.20	1.00	107.0	1.00	0.194	0.194	0.316	Non-Liq.	Non-Liq.	0.00
11.32	77.76	0.57	0.73	110	0.623	0.977	0.73	0.56	1.34	98.03	1.83		1	76	1.13	2.25	1.00	111.4	1.00	0.209	0.209	0.316	Non-Liq.	Non-Liq.	0.00
11.48	84.82	0.65	0.76	110	0.632	0.976	0.77	0.55	1.33	105.90	1.82		1	79	1.12	2.30	1.00	119.2	1.00	0.238	0.238	0.315	Non-Liq.	Non-Liq.	0.00
11.65	92.40	0.51	0.55	110	0.641	0.976	0.56	0.52	1.30	112.72	1.72		1	82	1.05	2.35	1.00	118.6	1.00	0.235	0.235	0.315	Non-Liq.	Non-Liq.	0.00
11.81	100.55	0.65	0.64	110	0.650	0.975	0.65	0.53	1.29	122.02	1.73		1	85	1.06	2.40	1.00	129.2	1.00	0.281	0.281	0.315	Non-Liq.	Non-Liq.	0.00
11.98	108.89	0.74	0.67	110	0.659	0.975	0.68	0.52	1.28	131.02	1.71		1	88	1.05	2.45	1.00	137.7	1.00	0.323	0.323	0.315	Non-Liq.	Non-Liq.	0.00
12.14	120.07	0.79	0.66	110	0.668	0.975	0.66	0.51	1.27	142.80	1.68		1	92	1.02	2.50	1.00	146.6	1.00	0.373	0.373	0.315	Non-Liq.	Non-Liq.	0.00
12.30	132.01	0.89	0.68	110	0.677	0.974	0.68	0.50	1.25	155.55	1.66		1	95	1.01	2.55	1.00	157.3	1.00	0.442	0.442	0.315	Non-Liq.	Non-Liq.	0.00
12.47	144.08	1.04	0.72	110	0.686	0.974	0.72	0.50	1.24	168.48	1.65		1	98	1.00	2.60	1.00	169.2	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
12.63	152.23	1.19	0.78	110	0.695	0.974	0.79	0.50	1.24	177.08	1.65		1	100	1.01	2.65	1.00	178.9	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
12.80	162.83	1.20	0.74	110	0.704	0.973	0.74	0.50	1.23	187.89	1.62		1	100	1.00	2.70	1.00	188.6	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Overide	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	Induced EQ CRR	M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
12.96	177.02	1.56	0.88	110	0.713	0.973	0.88	0.50	1.22	203.18	1.65		1	100	1.00	2.75	1.00	204.1	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.12	188.21	1.70	0.90	110	0.722	0.973	0.90	0.50	1.21	214.55	1.64		1	100	1.00	2.80	1.00	215.4	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.29	199.52	1.82	0.91	110	0.731	0.972	0.92	0.50	1.20	226.07	1.63		1	100	1.00	2.85	1.00	226.9	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.45	206.33	1.96	0.95	110	0.740	0.972	0.95	0.50	1.20	232.38	1.63		1	100	1.00	2.90	1.00	233.2	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.62	209.22	1.92	0.92	110	0.749	0.972	0.92	0.50	1.19	234.21	1.62		1	100	1.00	2.95	1.00	235.1	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.78	216.92	2.11	0.97	110	0.758	0.971	0.98	0.50	1.18	241.40	1.63		1	100	1.00	3.00	1.00	242.3	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.94	220.68	1.88	0.85	110	0.767	0.971	0.85	0.50	1.17	244.14	1.58		1	100	1.00	3.05	1.00	245.1	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
14.11	225.50	2.72	1.21	110	0.776	0.971	1.21	0.51	1.17	249.15	1.69		1	100	1.03	3.10	1.00	257.6	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
14.27	226.97	2.77	1.22	110	0.785	0.970	1.22	0.52	1.17	249.35	1.69		1	100	1.03	3.15	1.00	258.3	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
14.44	260.76	3.44	1.32	110	0.794	0.970	1.32	0.51	1.16	284.70	1.68		1	100	1.03	3.20	1.00	293.3	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
14.60	273.34	5.44	1.99	110	0.803	0.970	2.00	0.55	1.16	300.02	1.82		1	100	1.12	3.25	1.00	336.8	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
14.76	293.55	5.65	1.92	110	0.812	0.969	1.93	0.54	1.15	319.57	1.79		1	100	1.10	3.30	1.00	352.3	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
14.93	441.40	7.59	1.72	110	0.821	0.969	1.72	0.51	1.14	473.40	1.66		1	100	1.01	3.35	1.00	479.8	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.09	347.82	7.25	2.09	110	0.830	0.969	2.09	0.54	1.14	374.13	1.78		1	100	1.09	3.40	1.00	410.8	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.26	302.88	7.87	2.60	110	0.839	0.968	2.61	0.58	1.14	326.31	1.90		1	100	1.18	3.45	1.00	387.9	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.42	275.99	6.43	2.33	110	0.848	0.968	2.34	0.57	1.13	295.07	1.88		1	100	1.17	3.50	1.00	346.0	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.58	376.75	5.16	1.37	110	0.857	0.967	1.37	0.50	1.11	394.73	1.61		1	100	1.00	3.55	1.00	396.2	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.75	321.62	5.68	1.76	110	0.866	0.967	1.77	0.53	1.11	337.17	1.74		1	100	1.07	3.60	1.00	361.3	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.91	321.75	3.28	1.02	110	0.875	0.967	1.02	0.50	1.10	333.46	1.55		1	100	1.00	3.65	1.00	334.7	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.08	344.32	3.11	0.90	110	0.884	0.966	0.90	0.50	1.09	355.08	1.49		1	100	1.00	3.70	1.00	356.4	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.24	348.92	2.94	0.84	110	0.893	0.966	0.84	0.50	1.09	358.01	1.47		1	100	1.00	3.75	1.00	359.3	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.40	351.59	2.77	0.79	110	0.902	0.966	0.79	0.50	1.08	358.94	1.44		1	100	1.00	3.80	1.00	360.3	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.57	366.52	2.53	0.69	110	0.911	0.965	0.69	0.50	1.08	372.35	1.39		1	100	1.00	3.85	1.00	373.7	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.73	381.08	3.05	0.80	110	0.920	0.965	0.80	0.50	1.07	385.27	1.43		1	100	1.00	3.90	1.00	386.7	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.90	413.82	3.60	0.87	110	0.929	0.965	0.87	0.50	1.07	416.40	1.44		1	100	1.00	3.95	1.00	418.0	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
17.06	452.15	4.24	0.94	110	0.938	0.964	0.94	0.50	1.06	452.86	1.44		1	100	1.00	4.00	1.00	454.6	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
17.22	427.40	3.95	0.92	110	0.947	0.964	0.93	0.50	1.06	425.97	1.45		1	100	1.00	4.05	1.00	427.6	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
17.39	404.51	3.69	0.91	110	0.956	0.963	0.91	0.50	1.05	401.19	1.46		1	100	1.00	4.10	1.00	402.7	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
17.55	425.81	4.21	0.99	110	0.965	0.963	0.99	0.50	1.05	420.37	1.48		1	100	1.00	4.15	1.00	421.9	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
17.72	438.64	4.22	0.96	110	0.974	0.963	0.96	0.50	1.04	431.05	1.47		1	100	1.00	4.20	1.00	432.7	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
17.88	461.57	3.57	0.77	110	0.983	0.962	0.78	0.50	1.04	451.54	1.38		1	100	1.00	4.25	1.00	453.2	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
18.04	498.99	4.53	0.91	110	0.992	0.962	0.91	0.50	1.03	485.99	1.42		1	100	1.00	4.30	1.00	487.8	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
18.21	579.29	5.58	0.96	110	1.001	0.962	0.96	0.50	1.03	561.80	1.40		1	100	1.00	4.35	1.00	563.9	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
18.37	590.35	3.67	0.62	110	1.010	0.961	0.62	0.50	1.02	569.97	1.24		1	100	1.00	4.40	1.00	572.1	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
18.54	576.43	4.80	0.83	110	1.020	0.961	0.83	0.50	1.02	554.03	1.35		1	100	1.00	4.45	1.00	556.1	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
18.70	606.56	5.65	0.93	110	1.029	0.960	0.93	0.50	1.01	580.47	1.38		1	100	1.00	4.50	1.00	582.6	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
18.86	565.11	6.10	1.08	110	1.038	0.960	1.08	0.50	1.01	538.37	1.46		1	100	1.00	4.55	1.00	540.4	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.03	544.74	8.59	1.58	110	1.047	0.960	1.58	0.50	1.01	516.68	1.61		1	100	1.00	4.60	1.00	518.6	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.19	567.96	6.47	1.14	110	1.056	0.959	1.14	0.50	1.00	536.43	1.48		1	100	1.00	4.65	1.00	538.4	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.36	526.36	6.42	1.22	110	1.065	0.959	1.22	0.50	1.00	494.95	1.52		1	100	1.00	4.70	1.00	496.8	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.52	450.76	4.60	1.02	110	1.074	0.958	1.02	0.50	0.99	421.92	1.49		1	100	1.00	4.75	1.00	423.5	0.99	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.69	418.45	3.90	0.93	110	1.083	0.958	0.94	0.50	0.99	389.97	1.48		1	100	1.00	4.80	1.00	391.4	0.99	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.85	376.34	3.82	1.02	110	1.092	0.957	1.02	0.50	0.98	349.16	1.54		1	100	1.00	4.85	1.00	350.5	0.99	Infin.	0.000	0.309	**Non-Liq.**	Non-Liq.	**0.00**
20.01	355.23	3.87	1.09	110	1.101	0.957	1.09	0.50	0.98	328.16	1.58		1	100	1.00	4.90	1.00	329.4	0.98	Infin.	0.000	0.309	**Non-Liq.**	Non-Liq.	**0.00**

CPT-LIQUEFY.XLS - A SPREADSHEET FOR EMPIRICAL ESTIMATION OF LIQUEFACTION POTENTIAL USING CPT DATA
Developed 2003 by Shelton L. Stringer, GE, Earth Systems Southwest

Project: Oxnard High School No. 8
Job No: 301953-001
Date: 8/14/2018
Sounding: CPT-6A
Plot: 6

Methods: Liquefaction Analysis using 1998 NCEER workshop methods (Robertson & Wride)
Post-liquefaction Settlement Analysis from Tokimatsu & Seed (1987)
Dry Sand Settlement by Pradel, ASCE Journal of G&GE, Vol 124, No. 4

Total Liquefied Thickness (feet)
0.0

EARTHQUAKE INFORMATION:
Magnitude: 6.77 (7.5)
PGA, g: 0.65 (0.50)
MSF: 1.30
GWT, feet: 20.0
Design GWT, feet: 20.0

Induced CSR (M=7.5): = 0.65*PGA*(po/p'o)*rd/MSF
Clean Sand Qc1n = C_Q*K_C*K_H*Qc
SF = $CRR_{7.5}$*Kσ/CSR
Use Tokimatsu & Seed (0) or Ishihara &Yoshmine (1): 0
Unit Weight of unsaturated soils: 110 pcf
Unit Weight of saturated soils: 110 pcf
Limiting Ic for liquefiable soils: 2.60
Limiting Ic for K_H: 2.0

Probab Avg	Total Induced Subsidence (inches)
0%	Max
Required SF: 1.50	0.1
Min SF of Liquefiable Layers: 0.00	0%
Avg SF of Liquefiable Layers: 0.00	

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Overide	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
0.16	6.69	0.01	0.21	110	0.009	1.000	0.21	0.76	1.70	10.74	2.50		1	0	1.00		1.00	10.7	1.00	0.059	0.059	0.323	Non-Liq.	Non-Liq.	0.00
0.33	14.12	0.04	0.28	110	0.018	1.000	0.28	0.67	1.70	22.66	2.22		1	15	1.00		1.00	22.7	1.00	0.069	0.069	0.323	Non-Liq.	Non-Liq.	0.00
0.49	16.59	0.09	0.55	110	0.027	1.000	0.56	0.69	1.70	26.61	2.26		1	22	1.83		1.00	48.7	1.00	0.091	0.091	0.323	Non-Liq.	Non-Liq.	0.00
0.66	21.13	0.18	0.84	110	0.036	1.000	0.84	0.68	1.70	33.89	2.25		1	32	1.81		1.00	61.3	1.00	0.101	0.101	0.323	Non-Liq.	Non-Liq.	0.00
0.82	29.41	0.29	0.98	110	0.045	1.000	0.98	0.66	1.70	47.18	2.17		1	46	1.59		1.00	75.1	1.00	0.119	0.119	0.323	Non-Liq.	Non-Liq.	0.00
0.98	35.60	0.35	0.99	110	0.054	1.000	0.99	0.64	1.70	57.12	2.10		1	54	1.46		1.00	83.2	1.00	0.134	0.134	0.323	Non-Liq.	Non-Liq.	0.00
1.15	34.08	0.35	1.03	110	0.063	0.999	1.03	0.65	1.70	54.66	2.13		1	52	1.51		1.00	82.3	1.00	0.132	0.132	0.323	Non-Liq.	Non-Liq.	0.00
1.31	34.08	0.35	1.03	110	0.072	0.999	1.04	0.65	1.70	54.64	2.13		1	52	1.51		1.00	82.3	1.00	0.132	0.132	0.323	Non-Liq.	Non-Liq.	0.00
1.48	30.11	0.33	1.11	110	0.081	0.999	1.11	0.66	1.70	48.25	2.19		1	47	1.64		1.00	79.2	1.00	0.126	0.126	0.323	Non-Liq.	Non-Liq.	0.00
1.64	28.15	0.27	0.96	110	0.090	0.998	0.96	0.66	1.70	45.09	2.18		1	44	1.62		1.00	72.8	1.00	0.116	0.116	0.323	Non-Liq.	Non-Liq.	0.00
1.80	29.07	0.35	1.20	110	0.099	0.998	1.20	0.67	1.70	46.55	2.22		1	45	1.72		1.00	80.2	1.00	0.128	0.128	0.323	Non-Liq.	Non-Liq.	0.00
1.97	26.19	0.39	1.47	110	0.108	0.998	1.48	0.70	1.70	41.91	2.31		1	41	1.99		1.00	83.4	1.00	0.134	0.134	0.322	Non-Liq.	Non-Liq.	0.00
2.13	20.41	0.42	2.07	110	0.117	0.997	2.08	0.75	1.70	32.61	2.49		1	30	2.72		1.00	88.5	1.00	0.145	0.145	0.322	Non-Liq.	Non-Liq.	0.00
2.30	15.45	0.44	2.83	110	0.126	0.997	2.85	0.81	1.70	24.62	2.67		0						1.00			0.322	Non-Liq.	Non-Liq.	0.00
2.46	12.62	0.37	2.95	110	0.135	0.996	2.98	0.83	1.70	20.06	2.75		0						1.00			0.322	Non-Liq.	Non-Liq.	0.00
2.62	13.50	0.27	2.01	110	0.144	0.996	2.04	0.80	1.70	21.46	2.63		0						1.00			0.322	Non-Liq.	Non-Liq.	0.00
2.79	20.18	0.31	1.56	110	0.153	0.996	1.57	0.73	1.70	32.18	2.42		1	30	2.39		1.00	77.0	1.00	0.123	0.123	0.322	Non-Liq.	Non-Liq.	0.00
2.95	25.28	0.31	1.23	110	0.162	0.995	1.23	0.69	1.70	40.36	2.28		1	39	1.88		1.00	76.0	1.00	0.121	0.121	0.322	Non-Liq.	Non-Liq.	0.00
3.12	31.76	0.36	1.12	110	0.171	0.995	1.13	0.66	1.70	50.76	2.18		1	49	1.61		1.00	81.6	1.00	0.131	0.131	0.322	Non-Liq.	Non-Liq.	0.00
3.28	35.56	0.38	1.08	110	0.180	0.994	1.09	0.65	1.70	56.85	2.13		1	53	1.50		1.00	85.5	1.00	0.138	0.138	0.321	Non-Liq.	Non-Liq.	0.00
3.44	40.16	0.39	0.98	110	0.189	0.994	0.98	0.63	1.70	64.22	2.06		1	58	1.38		1.00	88.8	1.00	0.145	0.145	0.321	Non-Liq.	Non-Liq.	0.00
3.61	45.45	0.46	1.00	110	0.198	0.994	1.01	0.61	1.70	72.71	2.02		1	64	1.33		1.00	96.5	1.00	0.164	0.164	0.321	Non-Liq.	Non-Liq.	0.00
3.77	52.79	0.51	0.96	110	0.208	0.993	0.97	0.60	1.70	84.49	1.96		1	70	1.25	0.65	1.12	118.5	1.00	0.235	0.235	0.321	Non-Liq.	Non-Liq.	0.00
3.94	58.72	0.56	0.95	110	0.217	0.993	0.95	0.58	1.70	94.00	1.92		1	74	1.20	0.70	1.12	127.1	1.00	0.271	0.271	0.321	Non-Liq.	Non-Liq.	0.00
4.10	64.33	0.60	0.94	110	0.226	0.993	0.94	0.57	1.70	103.00	1.88		1	78	1.17	0.75	1.12	135.7	1.00	0.312	0.312	0.321	Non-Liq.	Non-Liq.	0.00
4.27	69.66	0.83	1.19	110	0.235	0.992	1.19	0.59	1.70	111.55	1.93		1	81	1.21	0.80	1.12	151.9	1.00	0.406	0.406	0.321	Non-Liq.	Non-Liq.	0.00
4.43	74.65	1.28	1.71	110	0.244	0.992	1.72	0.61	1.70	119.56	2.01		1	84	1.32		1.00	157.6	1.00	0.444	0.444	0.321	Non-Liq.	Non-Liq.	0.00
4.59	78.74	2.11	2.68	110	0.253	0.991	2.69	0.65	1.70	126.11	2.14		1	86	1.54		1.00	194.3	1.00	Infin.	0.000	0.320	Non-Liq.	Non-Liq.	0.00
4.76	95.41	2.01	2.11	110	0.262	0.991	2.12	0.61	1.70	152.88	2.01		1	94	1.31		1.00	200.9	1.00	Infin.	0.000	0.320	Non-Liq.	Non-Liq.	0.00
4.92	90.35	1.38	1.53	110	0.271	0.991	1.54	0.58	1.70	144.74	1.92		1	92	1.21	1.00	1.00	175.8	1.00	Infin.	0.000	0.320	Non-Liq.	Non-Liq.	0.00
5.09	73.79	0.57	0.78	110	0.280	0.990	0.78	0.54	1.70	118.12	1.79		1	84	1.10	1.05	1.00	130.0	1.00	0.285	0.285	0.320	Non-Liq.	Non-Liq.	0.00
5.25	64.99	0.41	0.63	110	0.289	0.990	0.63	0.54	1.70	103.96	1.78		1	78	1.09	1.10	1.00	113.6	1.00	0.216	0.216	0.320	Non-Liq.	Non-Liq.	0.00
5.41	60.11	0.48	0.80	110	0.298	0.989	0.81	0.57	1.70	96.11	1.87		1	75	1.16	1.15	1.00	111.7	1.00	0.210	0.210	0.320	Non-Liq.	Non-Liq.	0.00
5.58	57.62	0.71	1.23	110	0.307	0.989	1.24	0.61	1.70	92.09	2.00		1	73	1.30	1.20	1.00	120.0	1.00	0.241	0.241	0.320	Non-Liq.	Non-Liq.	0.00
5.74	60.32	0.70	1.16	110	0.316	0.989	1.16	0.60	1.70	96.42	1.97		1	75	1.26	1.25	1.00	121.7	1.00	0.247	0.247	0.320	Non-Liq.	Non-Liq.	0.00
5.91	59.79	0.67	1.11	110	0.325	0.988	1.12	0.60	1.70	95.55	1.96		1	75	1.25	1.30	1.00	119.7	1.00	0.239	0.239	0.319	Non-Liq.	Non-Liq.	0.00
6.07	56.99	0.42	0.74	110	0.334	0.988	0.75	0.57	1.70	91.04	1.86		1	73	1.16	1.35	1.00	105.8	1.00	0.190	0.190	0.319	Non-Liq.	Non-Liq.	0.00
6.23	64.88	0.50	0.77	110	0.343	0.988	0.77	0.56	1.70	103.70	1.83		1	78	1.13	1.40	1.00	117.4	1.00	0.230	0.230	0.319	Non-Liq.	Non-Liq.	0.00
6.40	81.28	0.52	0.64	110	0.352	0.987	0.64	0.52	1.70	130.04	1.70		1	88	1.04	1.45	1.00	135.6	1.00	0.312	0.312	0.319	Non-Liq.	Non-Liq.	0.00
6.56	88.72	0.58	0.65	110	0.361	0.987	0.66	0.51	1.70	141.98	1.68		1	91	1.02	1.50	1.00	145.7	1.00	0.368	0.368	0.319	Non-Liq.	Non-Liq.	0.00
6.73	90.02	0.70	0.78	110	0.370	0.986	0.78	0.52	1.70	144.05	1.72		1	92	1.05	1.55	1.00	151.9	1.00	0.406	0.406	0.319	Non-Liq.	Non-Liq.	0.00
6.89	95.98	0.75	0.78	110	0.379	0.986	0.79	0.52	1.70	153.61	1.70		1	95	1.04	1.60	1.00	160.1	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
7.05	106.17	0.82	0.77	110	0.388	0.986	0.77	0.51	1.67	166.59	1.67		1	98	1.02	1.65	1.00	170.1	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
7.22	120.42	0.87	0.72	110	0.397	0.985	0.72	0.50	1.63	185.20	1.62		1	100	1.00	1.70	1.00	185.9	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
7.38	147.55	0.97	0.66	110	0.406	0.985	0.66	0.50	1.61	224.51	1.53		1	100	1.00	1.75	1.00	225.3	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
7.55	167.64	1.10	0.66	110	0.415	0.985	0.66	0.50	1.60	252.36	1.49		1	100	1.00	1.80	1.00	253.3	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
7.71	167.64	1.10	0.66	110	0.424	0.984	0.66	0.50	1.58	249.65	1.49		1	100	1.00	1.85	1.00	250.6	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
7.87	175.94	1.23	0.70	110	0.433	0.984	0.70	0.50	1.56	259.28	1.50		1	100	1.00	1.90	1.00	260.3	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
8.04	183.17	1.23	0.67	110	0.442	0.984	0.67	0.50	1.55	267.18	1.48		1	100	1.00	1.95	1.00	268.2	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
8.20	189.37	0.94	0.50	110	0.451	0.983	0.50	0.50	1.53	273.46	1.38		1	100	1.00	2.00	1.00	274.5	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
8.37	193.49	1.24	0.64	110	0.460	0.983	0.64	0.50	1.52	276.65	1.45		1	100	1.00	2.05	1.00	277.7	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
8.53	194.51	1.46	0.75	110	0.469	0.982	0.75	0.50	1.50	275.42	1.51		1	100	1.00	2.10	1.00	276.4	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
8.69	195.90	1.50	0.77	110	0.478	0.982	0.77	0.50	1.49	274.75	1.51		1	100	1.00	2.15	1.00	275.8	1.00	Infin.	0.000	0.317	Non-Liq.	Non-Liq.	0.00
8.86	199.53	1.67	0.84	110	0.487	0.982	0.84	0.50	1.47	277.23	1.54		1	100	1.00	2.20	1.00	278.3	1.00	Infin.	0.000	0.317	Non-Liq.	Non-Liq.	0.00
9.02	202.65	1.56	0.77	110	0.496	0.981	0.77	0.50	1.46	279.00	1.51		1	100	1.00	2.25	1.00	280.0	1.00	Infin.	0.000	0.317	Non-Liq.	Non-Liq.	0.00
9.19	204.68	1.62	0.79	110	0.505	0.981	0.80	0.50	1.45	279.26	1.52		1	100	1.00	2.30	1.00	280.3	1.00	Infin.	0.000	0.317	Non-Liq.	Non-Liq.	0.00
9.35	192.88	1.56	0.81	110	0.514	0.981	0.81	0.50	1.43	260.79	1.54		1	100	1.00	2.35	1.00	261.8	1.00	Infin.	0.000	0.317	Non-Liq.	Non-Liq.	0.00
9.51	173.28	1.31	0.75	110	0.523	0.980	0.76	0.50	1.42	232.18	1.56		1	100	1.00	2.40	1.00	233.0	1.00	Infin.	0.000	0.317	Non-Liq.	Non-Liq.	0.00
9.68	160.53	1.12	0.70	110	0.532	0.980	0.70	0.50	1.41	213.20	1.56		1	100	1.00	2.45	1.00	214.0	1.00	Infin.	0.000	0.317	Non-Liq.	Non-Liq.	0.00
9.84	160.48	0.98	0.61	110	0.541	0.980	0.61	0.50	1.40	211.34	1.53		1	100	1.00	2.50	1.00	212.1	1.00	Infin.	0.000	0.317	Non-Liq.	Non-Liq.	0.00
10.01	167.93	0.95	0.57	110	0.550	0.979	0.57	0.50	1.39	219.35	1.49		1	100	1.00	2.55	1.00	220.2	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
10.17	179.44	1.12	0.62	110	0.559	0.979	0.62	0.50	1.38	232.52	1.50		1	100	1.00	2.60	1.00	233.4	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
10.33	196.39	1.47	0.75	110	0.568	0.979	0.75	0.50	1.36	252.52	1.53		1	100	1.00	2.65	1.00	253.5	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
10.50	212.87	1.68	0.79	110	0.577	0.978	0.79	0.50	1.35	271.61	1.52		1	100	1.00	2.70	1.00	272.6	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
10.66	218.59	1.72	0.79	110	0.586	0.978	0.79	0.50	1.34	276.76	1.52		1	100	1.00	2.75	1.00	277.8	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
10.83	219.09	1.46	0.67	110	0.595	0.978	0.67	0.50	1.33	275.28	1.47		1	100	1.00	2.80	1.00	276.3	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
10.99	218.78	1.57	0.72	110	0.604	0.977	0.72	0.50	1.32	272.81	1.49		1	100	1.00	2.85	1.00	273.8	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
11.15	227.29	1.90	0.84	110	0.614	0.977	0.84	0.50	1.31	281.35	1.53		1	100	1.00	2.90	1.00	282.4	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
11.32	240.17	1.92	0.80	110	0.623	0.977	0.80	0.50	1.30	295.17	1.50		1	100	1.00	2.95	1.00	296.3	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
11.48	222.62	1.81	0.81	110	0.632	0.976	0.82	0.50	1.29	271.57	1.53		1	100	1.00	3.00	1.00	272.6	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
11.65	216.62	2.13	0.98	110	0.641	0.976	0.98	0.50	1.29	262.35	1.61		1	100	1.00	3.05	1.00	263.3	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
11.81	220.47	2.23	1.01	110	0.650	0.975	1.01	0.50	1.28	265.16	1.61		1	100	1.00	3.10	1.00	266.1	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
11.98	211.90	2.36	1.11	110	0.659	0.975	1.12	0.50	1.27	253.63	1.66		1	100	1.01	3.15	1.00	256.5	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
12.14	218.21	2.15	0.99	110	0.668	0.975	0.99	0.50	1.26	258.84	1.61		1	100	1.00	3.20	1.00	259.8	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
12.30	217.25	1.71	0.79	110	0.677	0.974	0.79	0.50	1.25	255.96	1.54		1	100	1.00	3.25	1.00	256.9	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
12.47	227.19	1.31	0.58	110	0.686	0.974	0.58	0.50	1.24	265.93	1.43		1	100	1.00	3.30	1.00	266.9	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
12.63	246.00	1.35	0.55	110	0.695	0.974	0.55	0.50	1.23	286.13	1.40		1	100	1.00	3.35	1.00	287.2	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
12.80	271.55	2.19	0.81	110	0.704	0.973	0.81	0.50	1.23	313.89	1.49		1	100	1.00	3.40	1.00	315.1	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	Induced EQ CRR	M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	*Volumetric Strain (%)*
12.96	298.70	2.19	0.73	110	0.713	0.973	0.74	0.50	1.22	343.15	1.43		1	100	1.00	3.45	1.00	344.4	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.12	297.19	2.53	0.85	110	0.722	0.973	0.85	0.50	1.21	339.26	1.49		1	100	1.00	3.50	1.00	340.5	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.29	297.26	2.68	0.90	110	0.731	0.972	0.90	0.50	1.20	337.23	1.51		1	100	1.00	3.55	1.00	338.5	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.45	299.77	2.66	0.89	110	0.740	0.972	0.89	0.50	1.20	337.99	1.50		1	100	1.00	3.60	1.00	339.3	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.62	299.47	2.65	0.88	110	0.749	0.972	0.89	0.50	1.19	335.60	1.50		1	100	1.00	3.65	1.00	336.9	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.78	293.58	3.11	1.06	110	0.758	0.971	1.06	0.50	1.18	327.01	1.57		1	100	1.00	3.70	1.00	328.2	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.94	298.13	3.07	1.03	110	0.767	0.971	1.03	0.50	1.17	330.12	1.56		1	100	1.00	3.75	1.00	331.4	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
14.11	301.85	3.04	1.01	110	0.776	0.971	1.01	0.50	1.17	332.29	1.55		1	100	1.00	3.80	1.00	333.5	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
14.27	298.45	3.68	1.23	110	0.785	0.970	1.24	0.50	1.16	326.64	1.62		1	100	1.00	3.85	1.00	327.9	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
14.44	300.98	2.74	0.91	110	0.794	0.970	0.91	0.50	1.15	327.53	1.52		1	100	1.00	3.90	1.00	328.8	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
14.60	315.50	2.80	0.89	110	0.803	0.970	0.89	0.50	1.15	341.43	1.50		1	100	1.00	3.95	1.00	342.7	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
14.76	313.59	3.04	0.97	110	0.812	0.969	0.97	0.50	1.14	337.45	1.53		1	100	1.00	4.00	1.00	338.7	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
14.93	322.37	3.47	1.08	110	0.821	0.969	1.08	0.50	1.14	345.00	1.56		1	100	1.00	4.05	1.00	346.3	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.09	336.14	3.51	1.04	110	0.830	0.969	1.05	0.50	1.13	357.81	1.54		1	100	1.00	4.10	1.00	359.1	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.26	323.66	3.11	0.96	110	0.839	0.968	0.96	0.50	1.12	342.62	1.52		1	100	1.00	4.15	1.00	343.9	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.42	317.94	3.08	0.97	110	0.848	0.968	0.97	0.50	1.12	334.75	1.53		1	100	1.00	4.20	1.00	336.0	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.58	320.07	3.08	0.96	110	0.857	0.967	0.96	0.50	1.11	335.21	1.53		1	100	1.00	4.25	1.00	336.5	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.75	310.52	2.97	0.96	110	0.866	0.967	0.96	0.50	1.11	323.47	1.54		1	100	1.00	4.30	1.00	324.7	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.91	314.10	3.02	0.96	110	0.875	0.967	0.96	0.50	1.10	325.51	1.54		1	100	1.00	4.35	1.00	326.7	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.08	315.60	2.97	0.94	110	0.884	0.966	0.94	0.50	1.09	325.39	1.53		1	100	1.00	4.40	1.00	326.6	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.24	327.26	2.77	0.85	110	0.893	0.966	0.85	0.50	1.09	335.73	1.49		1	100	1.00	4.45	1.00	337.0	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.40	328.11	2.94	0.89	110	0.902	0.966	0.90	0.50	1.08	334.91	1.51		1	100	1.00	4.50	1.00	336.2	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.57	357.30	2.93	0.82	110	0.911	0.965	0.82	0.50	1.08	362.96	1.45		1	100	1.00	4.55	1.00	364.3	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.73	379.84	3.02	0.80	110	0.920	0.965	0.80	0.50	1.07	384.01	1.43		1	100	1.00	4.60	1.00	385.4	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.90	393.42	4.35	1.11	110	0.929	0.965	1.11	0.50	1.07	395.83	1.54		1	100	1.00	4.65	1.00	397.3	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
17.06	393.65	3.67	0.93	110	0.938	0.964	0.93	0.50	1.06	394.14	1.48		1	100	1.00	4.70	1.00	395.6	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
17.22	403.88	3.66	0.91	110	0.947	0.964	0.91	0.50	1.06	402.47	1.46		1	100	1.00	4.75	1.00	404.0	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
17.39	384.75	3.06	0.80	110	0.956	0.963	0.80	0.50	1.05	381.54	1.43		1	100	1.00	4.80	1.00	383.0	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
17.55	418.46	2.70	0.64	110	0.965	0.963	0.65	0.50	1.05	413.10	1.34		1	100	1.00	4.85	1.00	414.6	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
17.72	426.59	3.76	0.88	110	0.974	0.963	0.88	0.50	1.04	419.18	1.44		1	100	1.00	4.90	1.00	420.8	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
17.88	438.49	4.30	0.98	110	0.983	0.962	0.98	0.50	1.04	428.91	1.47		1	100	1.00	4.95	1.00	430.5	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
18.04	459.63	3.50	0.76	110	0.992	0.962	0.76	0.50	1.03	447.58	1.37		1	100	1.00	5.00	1.00	449.3	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
18.21	446.70	3.76	0.84	110	1.001	0.962	0.84	0.50	1.03	432.99	1.42		1	100	1.00	5.05	1.00	434.6	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
18.37	433.53	3.52	0.81	110	1.010	0.961	0.81	0.50	1.02	418.31	1.41		1	100	1.00	5.10	1.00	419.9	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
18.54	420.70	4.05	0.96	110	1.020	0.961	0.96	0.50	1.02	404.09	1.48		1	100	1.00	5.15	1.00	405.6	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
18.70	427.38	4.04	0.95	110	1.029	0.960	0.95	0.50	1.01	408.71	1.47		1	100	1.00	5.20	1.00	410.2	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
18.86	433.11	4.37	1.01	110	1.038	0.960	1.01	0.50	1.01	412.39	1.49		1	100	1.00	5.20	1.00	413.9	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.03	406.01	4.03	0.99	110	1.047	0.960	0.99	0.50	1.01	384.84	1.51		1	100	1.00	5.20	1.00	386.3	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.19	382.11	4.15	1.09	110	1.056	0.959	1.09	0.50	1.00	360.57	1.55		1	100	1.00	5.20	1.00	361.9	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.36	381.05	4.09	1.07	110	1.065	0.959	1.08	0.50	1.00	358.03	1.55		1	100	1.00	5.20	1.00	359.4	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.52	379.85	4.12	1.08	110	1.074	0.958	1.09	0.50	0.99	355.39	1.56		1	100	1.00	5.20	1.00	356.7	0.99	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.69	382.89	4.14	1.08	110	1.083	0.958	1.08	0.50	0.99	356.74	1.55		1	100	1.00	5.20	1.00	358.1	0.99	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.85	384.60	3.97	1.03	110	1.092	0.957	1.04	0.50	0.98	356.85	1.54		1	100	1.00	5.20	1.00	358.2	0.99	Infin.	0.000	0.309	**Non-Liq.**	Non-Liq.	**0.00**
20.01	377.72	4.35	1.15	110	1.101	0.957	1.16	0.50	0.98	349.00	1.58		1	100	1.00	5.20	1.00	350.3	0.98	Infin.	0.000	0.309	**Non-Liq.**	Non-Liq.	**0.00**

CPT-LIQUEFY.XLS - A SPREADSHEET FOR EMPIRICAL ESTIMATION OF LIQUEFACTION POTENTIAL USING CPT DATA
Developed 2003 by Shelton L. Stringer, GE, Earth Systems Southwest

Project: Oxnard High School No. 8
Job No: 301953-001
Date: 8/14/2018
Sounding: CPT-7
Plot: 7

Methods: Liquefaction Analysis using 1998 NCEER workshop methods (Robertson & Wride)
Post-liquefaction Settlement Analysis from Tokimatsu & Seed (1987)
Dry Sand Settlement by Pradel, ASCE Journal of G&GE, Vol 124, No. 4

Total Liquefied Thickness (feet)
0.0

EARTHQUAKE INFORMATION:
Magnitude: 6.77 (7.5)
PGA, g: 0.65 (0.50)
MSF: 1.30
GWT, feet: 20.0
Design GWT, feet: 20.0

Induced CSR (M=7.5): = 0.65*PGA*(po/p'o)*rd/MSF
Clean Sand Qc1n = C_Q*K_C*K_H*Qc
SF = $CRR_{7.5}$*Kσ/CSR
Use Tokimatsu & Seed (0) or Ishihara &Yoshmine (1): 0
Unit Weight of unsaturated soils: 110 pcf
Unit Weight of saturated soils: 110 pcf
Limiting Ic for liquefiable soils: 2.60
Limiting Ic for K_H: 2.0

Probab	Total Induced Subsidence (inches)
Avg	0%
Max	0%

Required SF: 1.50
Min SF of Liquefiable Layers: 0.00
Avg SF of Liquefiable Layers: 0.00

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff.Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_C	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
0.16	7.32	0.09	1.28	110	0.009	1.000	1.29	0.83	1.70	11.75	2.74		0						1.00			0.323	Non-Liq.	Non-Liq.	0.00
0.33	12.26	0.12	1.00	110	0.018	1.000	1.00	0.76	1.70	19.67	2.50		1	9	2.75		1.00	54.0	1.00	0.095	0.095	0.323	Non-Liq.	Non-Liq.	0.00
0.49	14.26	0.15	1.02	110	0.027	1.000	1.03	0.74	1.70	22.87	2.44		1	16	2.50		1.00	57.1	1.00	0.097	0.097	0.323	Non-Liq.	Non-Liq.	0.00
0.66	13.52	0.15	1.09	110	0.036	1.000	1.10	0.75	1.70	21.67	2.48		1	13	2.66		1.00	57.7	1.00	0.098	0.098	0.323	Non-Liq.	Non-Liq.	0.00
0.82	11.35	0.14	1.22	110	0.045	1.000	1.22	0.78	1.70	18.16	2.57		1	6	3.14		1.00	57.0	1.00	0.097	0.097	0.323	Non-Liq.	Non-Liq.	0.00
0.98	9.04	0.12	1.33	110	0.054	1.000	1.34	0.81	1.70	14.44	2.67		0						1.00			0.323	Non-Liq.	Non-Liq.	0.00
1.15	7.13	0.08	1.07	110	0.063	0.999	1.08	0.82	1.70	11.36	2.72		0						1.00			0.323	Non-Liq.	Non-Liq.	0.00
1.31	7.13	0.08	1.07	110	0.072	0.999	1.08	0.82	1.70	11.34	2.72		0						1.00			0.323	Non-Liq.	Non-Liq.	0.00
1.48	6.14	0.08	1.27	110	0.081	0.999	1.29	0.85	1.70	9.74	2.82		0						1.00			0.323	Non-Liq.	Non-Liq.	0.00
1.64	6.75	0.14	2.01	110	0.090	0.998	2.04	0.87	1.70	10.70	2.88		0						1.00			0.323	Non-Liq.	Non-Liq.	0.00
1.80	12.03	0.25	2.04	110	0.099	0.998	2.05	0.81	1.70	19.17	2.67		0						1.00			0.323	Non-Liq.	Non-Liq.	0.00
1.97	26.83	0.46	1.71	110	0.108	0.998	1.72	0.71	1.70	42.94	2.34		1	42	2.10		1.00	90.0	1.00	0.148	0.148	0.322	Non-Liq.	Non-Liq.	0.00
2.13	27.70	0.58	2.10	110	0.117	0.997	2.11	0.72	1.70	44.32	2.39		1	43	2.27		1.00	100.6	1.00	0.175	0.175	0.322	Non-Liq.	Non-Liq.	0.00
2.30	30.71	0.62	2.02	110	0.126	0.997	2.02	0.71	1.70	49.14	2.34		1	47	2.10		1.00	103.0	1.00	0.182	0.182	0.322	Non-Liq.	Non-Liq.	0.00
2.46	35.14	0.59	1.69	110	0.135	0.996	1.70	0.68	1.70	56.25	2.25		1	53	1.80		1.00	101.0	1.00	0.176	0.176	0.322	Non-Liq.	Non-Liq.	0.00
2.62	34.66	0.52	1.49	110	0.144	0.996	1.49	0.67	1.70	55.46	2.22		1	52	1.71		1.00	95.1	1.00	0.160	0.160	0.322	Non-Liq.	Non-Liq.	0.00
2.79	30.29	0.43	1.42	110	0.153	0.996	1.43	0.68	1.70	48.42	2.25		1	47	1.81		1.00	87.5	1.00	0.142	0.142	0.322	Non-Liq.	Non-Liq.	0.00
2.95	25.72	0.37	1.42	110	0.162	0.995	1.43	0.70	1.70	41.07	2.31		1	40	1.98		1.00	81.4	1.00	0.130	0.130	0.322	Non-Liq.	Non-Liq.	0.00
3.12	22.47	0.33	1.49	110	0.171	0.995	1.50	0.72	1.70	35.83	2.37		1	34	2.19		1.00	78.6	1.00	0.125	0.125	0.322	Non-Liq.	Non-Liq.	0.00
3.28	20.80	0.31	1.47	110	0.180	0.994	1.48	0.73	1.70	33.13	2.40		1	31	2.29		1.00	76.0	1.00	0.121	0.121	0.321	Non-Liq.	Non-Liq.	0.00
3.44	20.45	0.30	1.47	110	0.189	0.994	1.48	0.73	1.70	32.55	2.40		1	30	2.32		1.00	75.4	1.00	0.120	0.120	0.321	Non-Liq.	Non-Liq.	0.00
3.61	20.73	0.30	1.45	110	0.198	0.994	1.47	0.73	1.70	32.99	2.39		1	31	2.29		1.00	75.5	1.00	0.120	0.120	0.321	Non-Liq.	Non-Liq.	0.00
3.77	19.90	0.31	1.58	110	0.208	0.993	1.59	0.74	1.70	31.64	2.43		1	29	2.44		1.00	77.1	1.00	0.123	0.123	0.321	Non-Liq.	Non-Liq.	0.00
3.94	17.21	0.35	2.05	110	0.217	0.993	2.08	0.77	1.70	27.31	2.55		1	23	3.03		1.00	82.8	1.00	0.133	0.133	0.321	Non-Liq.	Non-Liq.	0.00
4.10	11.84	0.37	3.08	110	0.226	0.993	3.14	0.85	1.70	18.66	2.79		0						1.00			0.321	Non-Liq.	Non-Liq.	0.00
4.27	7.47	0.32	4.24	110	0.235	0.992	4.38	0.92	1.70	11.63	3.04		0						1.00			0.321	Non-Liq.	Non-Liq.	0.00
4.43	7.87	0.27	3.41	110	0.244	0.992	3.51	0.90	1.70	12.25	2.96		0						1.00			0.321	Non-Liq.	Non-Liq.	0.00
4.59	13.03	0.25	1.89	110	0.253	0.991	1.93	0.80	1.70	20.53	2.63		0						1.00			0.320	Non-Liq.	Non-Liq.	0.00
4.76	17.56	0.20	1.13	110	0.262	0.991	1.15	0.73	1.70	27.80	2.40		1	24	2.30		1.00	63.9	1.00	0.104	0.104	0.320	Non-Liq.	Non-Liq.	0.00
4.92	25.00	0.25	0.99	110	0.271	0.991	1.00	0.68	1.70	39.74	2.23		1	39	1.75		1.00	69.6	1.00	0.111	0.111	0.320	Non-Liq.	Non-Liq.	0.00
5.09	28.21	0.27	0.97	110	0.280	0.990	0.98	0.66	1.70	44.88	2.18		1	44	1.63		1.00	73.1	1.00	0.116	0.116	0.320	Non-Liq.	Non-Liq.	0.00
5.25	26.74	0.32	1.19	110	0.289	0.990	1.20	0.68	1.70	42.50	2.25		1	41	1.81		1.00	76.9	1.00	0.122	0.122	0.320	Non-Liq.	Non-Liq.	0.00
5.41	27.54	0.33	1.20	110	0.298	0.989	1.21	0.68	1.70	43.77	2.25		1	43	1.79		1.00	78.2	1.00	0.124	0.124	0.320	Non-Liq.	Non-Liq.	0.00
5.58	30.42	0.33	1.08	110	0.307	0.989	1.10	0.66	1.70	48.39	2.18		1	47	1.63		1.00	78.9	1.00	0.126	0.126	0.320	Non-Liq.	Non-Liq.	0.00
5.74	35.07	0.33	0.95	110	0.316	0.989	0.96	0.64	1.70	55.84	2.10		1	53	1.46		1.00	81.3	1.00	0.130	0.130	0.320	Non-Liq.	Non-Liq.	0.00
5.91	42.76	0.43	0.99	110	0.325	0.988	1.00	0.62	1.70	68.19	2.04		1	61	1.36		1.00	92.6	1.00	0.154	0.154	0.319	Non-Liq.	Non-Liq.	0.00
6.07	59.96	0.60	1.00	110	0.334	0.988	1.01	0.59	1.70	95.81	1.93		1	75	1.22	1.00	1.00	116.9	1.00	0.228	0.228	0.319	Non-Liq.	Non-Liq.	0.00
6.23	82.48	0.78	0.94	110	0.343	0.988	0.94	0.55	1.70	131.98	1.80		1	88	1.11	1.05	1.00	146.8	1.00	0.374	0.374	0.319	Non-Liq.	Non-Liq.	0.00
6.40	98.15	0.89	0.91	110	0.352	0.987	0.91	0.53	1.70	157.14	1.74		1	96	1.06	1.10	1.00	167.6	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
6.56	106.99	1.01	0.94	110	0.361	0.987	0.95	0.52	1.70	171.33	1.72		1	99	1.05	1.15	1.00	180.9	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
6.73	112.07	1.09	0.97	110	0.370	0.986	0.98	0.52	1.70	179.48	1.72		1	100	1.05	1.20	1.00	188.9	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
6.89	112.25	1.18	1.05	110	0.379	0.986	1.05	0.53	1.70	179.76	1.74		1	100	1.06	1.25	1.00	191.9	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
7.05	111.68	1.25	1.12	110	0.388	0.986	1.13	0.54	1.70	178.82	1.76		1	100	1.08	1.30	1.00	193.6	1.00	Infin.	0.000	0.319	Non-Liq.	Non-Liq.	0.00
7.22	113.57	1.36	1.19	110	0.397	0.985	1.20	0.54	1.70	181.71	1.78		1	100	1.09	1.35	1.00	198.6	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
7.38	110.25	1.39	1.26	110	0.406	0.985	1.27	0.55	1.69	175.63	1.80		1	100	1.11	1.40	1.00	195.5	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
7.55	100.97	1.35	1.34	110	0.415	0.985	1.34	0.56	1.69	160.87	1.85		1	97	1.14	1.45	1.00	184.6	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
7.71	100.97	1.35	1.34	110	0.424	0.984	1.34	0.56	1.67	159.07	1.85		1	96	1.15	1.50	1.00	183.0	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
7.87	95.77	1.34	1.40	110	0.433	0.984	1.40	0.57	1.67	150.26	1.88		1	94	1.17	1.55	1.00	176.7	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
8.04	92.93	1.31	1.41	110	0.442	0.984	1.42	0.58	1.65	144.62	1.90		1	92	1.19	1.60	1.00	172.1	1.00	Infin.	0.000	0.318	Non-Liq.	Non-Liq.	0.00
8.20	90.79	1.03	1.14	110	0.451	0.983	1.14	0.56	1.61	137.80	1.85		1	90	1.14	1.65	1.00	157.8	1.00	0.446	0.446	0.318	Non-Liq.	Non-Liq.	0.00
8.37	87.38	1.00	1.14	110	0.460	0.983	1.15	0.57	1.60	131.65	1.86		1	88	1.15	1.70	1.00	152.6	1.00	0.410	0.410	0.318	Non-Liq.	Non-Liq.	0.00
8.53	82.47	0.96	1.17	110	0.469	0.982	1.18	0.57	1.60	123.63	1.89		1	86	1.18	1.75	1.00	146.1	1.00	0.370	0.370	0.318	Non-Liq.	Non-Liq.	0.00
8.69	86.06	1.00	1.17	110	0.478	0.982	1.17	0.57	1.57	127.32	1.88		1	87	1.17	1.80	1.00	149.3	1.00	0.390	0.390	0.317	Non-Liq.	Non-Liq.	0.00
8.86	93.45	1.08	1.15	110	0.487	0.982	1.16	0.56	1.55	136.07	1.85		1	90	1.15	1.85	1.00	156.8	1.00	0.439	0.439	0.317	Non-Liq.	Non-Liq.	0.00
9.02	102.02	1.14	1.12	110	0.496	0.981	1.13	0.55	1.52	146.04	1.82		1	93	1.12	1.90	1.00	164.7	1.00	Infin.	0.000	0.317	Non-Liq.	Non-Liq.	0.00
9.19	107.28	1.17	1.09	110	0.505	0.981	1.10	0.55	1.50	151.44	1.80		1	94	1.11	1.95	1.00	168.7	1.00	Infin.	0.000	0.317	Non-Liq.	Non-Liq.	0.00
9.35	109.34	1.18	1.07	110	0.514	0.981	1.08	0.55	1.48	152.59	1.80		1	94	1.10	2.00	1.00	169.1	1.00	Infin.	0.000	0.317	Non-Liq.	Non-Liq.	0.00
9.51	111.98	1.16	1.04	110	0.523	0.980	1.04	0.54	1.47	154.35	1.78		1	95	1.09	2.05	1.00	169.5	1.00	Infin.	0.000	0.317	Non-Liq.	Non-Liq.	0.00
9.68	118.26	1.20	1.01	110	0.532	0.980	1.02	0.54	1.45	160.83	1.76		1	97	1.08	2.10	1.00	174.2	1.00	Infin.	0.000	0.317	Non-Liq.	Non-Liq.	0.00
9.84	127.36	1.25	0.98	110	0.541	0.980	0.99	0.53	1.42	170.74	1.73		1	99	1.06	2.15	1.00	181.7	1.00	Infin.	0.000	0.317	Non-Liq.	Non-Liq.	0.00
10.01	137.13	1.33	0.97	110	0.550	0.979	0.97	0.52	1.41	181.45	1.71		1	100	1.04	2.20	1.00	190.2	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
10.17	144.79	1.41	0.98	110	0.559	0.979	0.98	0.52	1.39	189.61	1.70		1	100	1.04	2.25	1.00	197.4	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
10.33	155.29	1.57	1.01	110	0.568	0.979	1.02	0.52	1.38	201.47	1.69		1	100	1.03	2.30	1.00	208.8	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
10.50	160.35	1.65	1.03	110	0.577	0.978	1.03	0.51	1.37	206.27	1.69		1	100	1.03	2.35	1.00	213.4	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
10.66	162.80	1.74	1.07	110	0.586	0.978	1.07	0.52	1.36	208.10	1.70		1	100	1.04	2.40	1.00	216.7	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
10.83	163.62	1.48	0.90	110	0.595	0.978	0.91	0.50	1.34	205.78	1.65		1	100	1.00	2.45	1.00	207.4	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
10.99	165.03	1.59	0.96	110	0.604	0.977	0.96	0.51	1.33	206.59	1.67		1	100	1.02	2.50	1.00	210.8	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
11.15	165.44	1.62	0.98	110	0.614	0.977	0.98	0.51	1.32	205.76	1.68		1	100	1.02	2.55	1.00	210.9	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
11.32	170.54	1.67	0.98	110	0.623	0.977	0.98	0.51	1.31	210.31	1.67		1	100	1.02	2.60	1.00	214.5	1.00	Infin.	0.000	0.316	Non-Liq.	Non-Liq.	0.00
11.48	193.35	1.66	0.86	110	0.632	0.976	0.86	0.50	1.29	235.76	1.59		1	100	1.00	2.65	1.00	236.6	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
11.65	234.30	1.88	0.80	110	0.641	0.976	0.81	0.50	1.29	283.83	1.52		1	100	1.00	2.70	1.00	284.9	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
11.81	311.45	1.81	0.58	110	0.650	0.975	0.58	0.50	1.28	374.90	1.33		1	100	1.00	2.75	1.00	376.3	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
11.98	345.03	2.01	0.58	110	0.659	0.975	0.58	0.50	1.27	412.54	1.30		1	100	1.00	2.80	1.00	414.1	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
12.14	350.57	2.01	0.57	110	0.668	0.975	0.58	0.50	1.26	416.32	1.30		1	100	1.00	2.85	1.00	417.9	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
12.30	323.89	2.04	0.63	110	0.677	0.974	0.63	0.50	1.25	381.99	1.35		1	100	1.00	2.90	1.00	383.4	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
12.47	284.79	2.15	0.75	110	0.686	0.974	0.76	0.50	1.24	333.56	1.45		1	100	1.00	2.95	1.00	334.8	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
12.63	272.50	2.15	0.79	110	0.695	0.974	0.79	0.50	1.23	317.04	1.48		1	100	1.00	3.00	1.00	318.2	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00
12.80	284.55	2.13	0.75	110	0.704	0.973	0.75	0.50	1.23	328.95	1.45		1	100	1.00	3.05	1.00	330.2	1.00	Infin.	0.000	0.315	Non-Liq.	Non-Liq.	0.00

Layer Depth (feet)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio %	Total Unit Wt. (pcf)	Eff. Stress at Midpt. p'o (tsf)	rd	F	n	C_Q	Corrected Qc1n	Ic	Override	Liquef. Suscept (0 or 1)	Rel. Dens. Dr (%)	K_c	H (m)	K_H	Clean Sand Qc1n	Kσ	$CRR_{7.5}$	EQ CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Probab. P_L	Volumetric Strain (%)
12.96	288.27	2.12	0.73	110	0.713	0.973	0.74	0.50	1.22	331.14	1.44		1	100	1.00	3.10	1.00	332.4	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.12	289.02	2.14	0.74	110	0.722	0.973	0.74	0.50	1.21	329.91	1.45		1	100	1.00	3.15	1.00	331.1	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.29	293.05	2.33	0.80	110	0.731	0.972	0.80	0.50	1.20	332.44	1.47		1	100	1.00	3.15	1.00	333.7	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.45	289.11	2.34	0.81	110	0.740	0.972	0.81	0.50	1.20	325.94	1.48		1	100	1.00	3.15	1.00	327.2	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.62	286.16	2.38	0.83	110	0.749	0.972	0.83	0.50	1.19	320.65	1.49		1	100	1.00	3.15	1.00	321.8	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.78	285.79	2.45	0.86	110	0.758	0.971	0.86	0.50	1.18	318.31	1.51		1	100	1.00	3.15	1.00	319.5	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
13.94	290.46	3.11	1.07	110	0.767	0.971	1.07	0.50	1.17	321.61	1.58		1	100	1.00	3.15	1.00	322.8	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
14.11	293.63	3.14	1.07	110	0.776	0.971	1.07	0.50	1.17	323.22	1.58		1	100	1.00	3.15	1.00	324.4	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
14.27	305.18	2.93	0.96	110	0.785	0.970	0.96	0.50	1.16	334.02	1.53		1	100	1.00	3.15	1.00	335.3	1.00	Infin.	0.000	0.314	**Non-Liq.**	Non-Liq.	**0.00**
14.44	274.68	2.47	0.90	110	0.794	0.970	0.90	0.50	1.15	298.83	1.54		1	100	1.00	3.15	1.00	299.9	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
14.60	264.68	1.89	0.71	110	0.803	0.970	0.72	0.50	1.15	286.29	1.48		1	100	1.00	3.15	1.00	287.4	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
14.76	260.78	1.87	0.72	110	0.812	0.969	0.72	0.50	1.14	280.48	1.48		1	100	1.00	3.15	1.00	281.5	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
14.93	254.73	1.85	0.73	110	0.821	0.969	0.73	0.50	1.14	272.43	1.50		1	100	1.00	3.15	1.00	273.4	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.09	243.62	1.72	0.71	110	0.830	0.969	0.71	0.50	1.13	259.08	1.50		1	100	1.00	3.15	1.00	260.0	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.26	247.90	1.73	0.70	110	0.839	0.968	0.70	0.50	1.12	262.22	1.50		1	100	1.00	3.15	1.00	263.2	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.42	243.67	1.34	0.55	110	0.848	0.968	0.55	0.50	1.12	256.34	1.43		1	100	1.00	3.15	1.00	257.3	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.58	240.87	1.85	0.77	110	0.857	0.967	0.77	0.50	1.11	252.04	1.54		1	100	1.00	3.15	1.00	253.0	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.75	227.67	1.80	0.79	110	0.866	0.967	0.79	0.50	1.11	236.93	1.57		1	100	1.00	3.15	1.00	237.8	1.00	Infin.	0.000	0.313	**Non-Liq.**	Non-Liq.	**0.00**
15.91	215.03	1.51	0.70	110	0.875	0.967	0.71	0.50	1.10	222.56	1.55		1	100	1.00	3.15	1.00	223.4	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.08	169.50	0.84	0.50	110	0.884	0.966	0.50	0.50	1.09	174.33	1.53		1	100	1.00	3.15	1.00	175.0	1.00	Infin.	0.000	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.24	113.63	0.81	0.71	110	0.893	0.966	0.72	0.54	1.10	116.73	1.77		1	83	1.08	3.15	1.00	127.1	1.00	0.271	0.271	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.40	74.42	0.94	1.26	110	0.902	0.966	1.28	0.63	1.11	76.80	2.07		1	66	1.40		1.00	107.3	1.00	0.195	0.195	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.57	41.55	1.04	2.51	110	0.911	0.965	2.57	0.74	1.12	42.93	2.46		1	42	2.56		1.00	109.7	1.00	0.203	0.203	0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.73	20.49	1.00	4.87	110	0.920	0.965	5.10	0.87	1.13	20.90	2.89		0						1.00			0.312	**Non-Liq.**	Non-Liq.	**0.00**
16.90	17.66	0.87	4.92	110	0.929	0.965	5.19	0.89	1.12	17.75	2.95		0						1.00			0.312	**Non-Liq.**	Non-Liq.	**0.00**
17.06	17.13	0.80	4.64	110	0.938	0.964	4.91	0.89	1.11	17.03	2.94		0						1.00			0.312	**Non-Liq.**	Non-Liq.	**0.00**
17.22	45.69	0.87	1.91	110	0.947	0.964	1.95	0.71	1.08	45.77	2.36		1	44	2.14		1.00	98.1	1.00	0.168	0.168	0.311	**Non-Liq.**	Non-Liq.	**0.00**
17.39	85.88	0.98	1.14	110	0.956	0.963	1.15	0.61	1.06	85.36	2.00		1	70	1.30		1.00	111.2	1.00	0.208	0.208	0.311	**Non-Liq.**	Non-Liq.	**0.00**
17.55	131.32	1.21	0.92	110	0.965	0.963	0.93	0.55	1.05	129.57	1.80		1	88	1.11	1.00	1.00	144.3	1.00	0.360	0.360	0.311	**Non-Liq.**	Non-Liq.	**0.00**
17.72	175.08	1.51	0.86	110	0.974	0.963	0.87	0.52	1.04	171.70	1.69		1	99	1.03	1.05	1.00	178.1	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
17.88	212.23	1.86	0.88	110	0.983	0.962	0.88	0.50	1.04	207.10	1.64		1	100	1.00	1.10	1.00	207.9	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
18.04	246.62	1.63	0.66	110	0.992	0.962	0.66	0.50	1.03	239.71	1.51		1	100	1.00	1.10	1.00	240.6	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
18.21	274.39	2.22	0.81	110	1.001	0.962	0.81	0.50	1.03	265.59	1.54		1	100	1.00	1.10	1.00	266.6	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
18.37	300.69	2.46	0.82	110	1.010	0.961	0.82	0.50	1.02	289.83	1.52		1	100	1.00	1.10	1.00	290.9	1.00	Infin.	0.000	0.311	**Non-Liq.**	Non-Liq.	**0.00**
18.54	310.01	2.49	0.80	110	1.020	0.961	0.81	0.50	1.02	297.51	1.50		1	100	1.00	1.10	1.00	298.6	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
18.70	331.14	2.83	0.85	110	1.029	0.960	0.86	0.50	1.01	316.45	1.51		1	100	1.00	1.10	1.00	317.6	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
18.86	350.78	3.15	0.90	110	1.038	0.960	0.90	0.50	1.01	333.81	1.51		1	100	1.00	1.10	1.00	335.1	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.03	364.85	3.25	0.89	110	1.047	0.960	0.89	0.50	1.01	345.73	1.50		1	100	1.00	1.10	1.00	347.0	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.19	366.79	3.32	0.91	110	1.056	0.959	0.91	0.50	1.00	346.08	1.50		1	100	1.00	1.10	1.00	347.4	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.36	364.13	3.25	0.89	110	1.065	0.959	0.89	0.50	1.00	342.09	1.50		1	100	1.00	1.10	1.00	343.4	1.00	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.52	351.02	3.25	0.92	110	1.074	0.958	0.93	0.50	0.99	328.34	1.52		1	100	1.00	1.10	1.00	329.6	0.99	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.69	348.92	2.58	0.74	110	1.083	0.958	0.74	0.50	0.99	325.00	1.45		1	100	1.00	1.10	1.00	326.2	0.99	Infin.	0.000	0.310	**Non-Liq.**	Non-Liq.	**0.00**
19.85	359.19	3.47	0.97	110	1.092	0.957	0.97	0.50	0.98	333.20	1.53		1	100	1.00	1.10	1.00	334.4	0.99	Infin.	0.000	0.309	**Non-Liq.**	Non-Liq.	**0.00**
20.01	376.67	4.05	1.08	110	1.101	0.957	1.08	0.50	0.98	348.02	1.56		1	100	1.00	1.10	1.00	349.3	0.98	Infin.	0.000	0.309	**Non-Liq.**	Non-Liq.	**0.00**

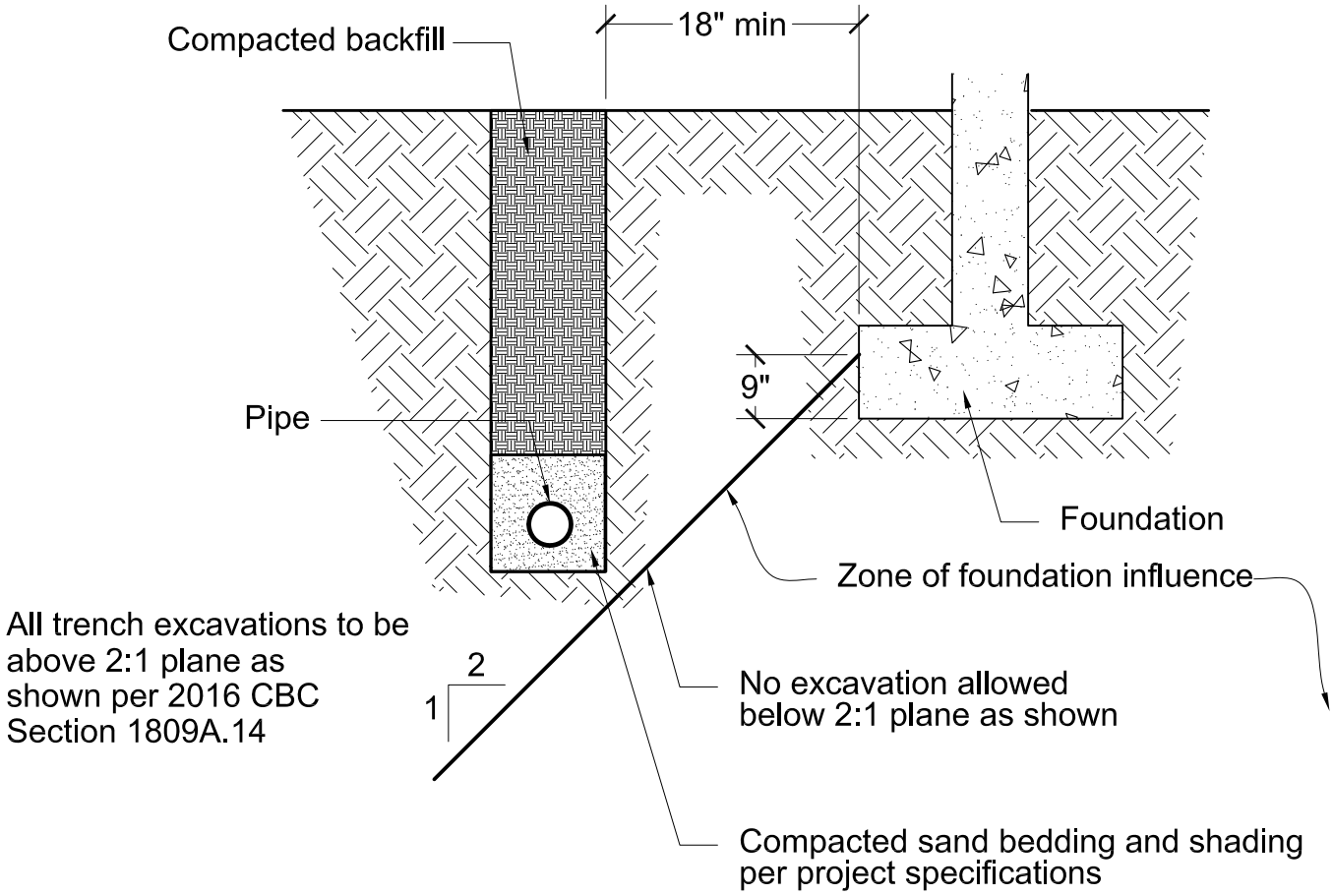
APPENDIX E

Typical Detail A: Title 24 Pipe Placed Parallel to Foundations

TYPICAL DETAIL A
TITLE 24
PIPE PLACED PARALLEL TO FOUNDATIONS

OXNARD HIGH SCHOOL NO. 8

Northeast of Camino Del Sol and North Rose Avenue
Oxnard, California



SCHEMATIC ONLY
NOT TO SCALE

Earth Systems

2049 Preisker Lane, Suite E
Santa Maria, California 93454

(805) 928-2991 • FAX (805) 928-9253
E-mail: esp@earthsystems.com

ESP File No.: 301953-002

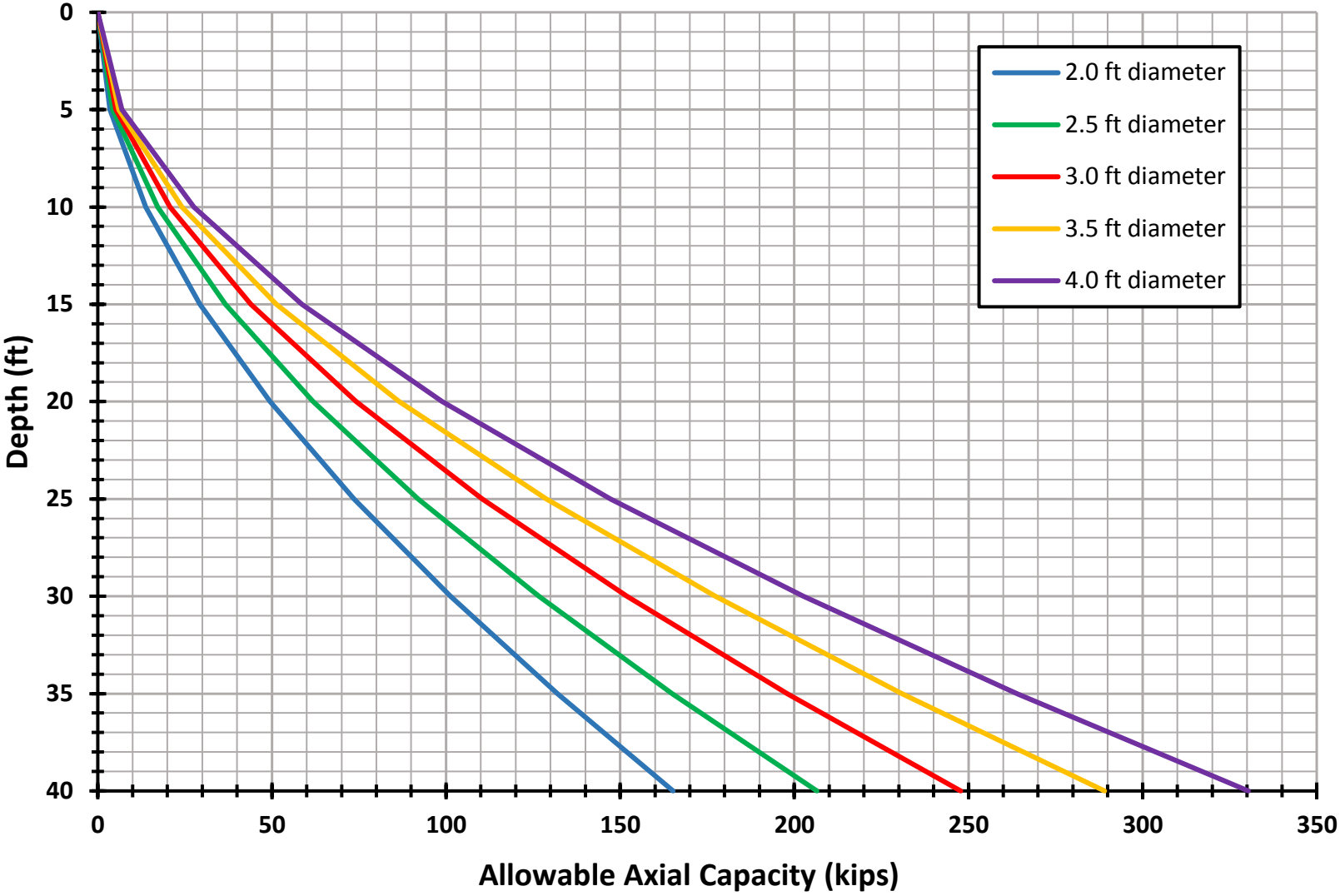
APPENDIX F

Allowable Axial Capacity for CIDH Piles in Compression Chart

Tremie Method

Oxnard High School No. 8

Allowable Axial Capacity for CIDH Piles in Compression



RECOMMENDED PROCEDURE FOR TREMIE-PLACED CONCRETE IN CAISSON (DRILLED SHAFT) FOUNDATION CONSTRUCTION

The following are general guidelines only, and may be subject to modification by the architect/engineer and/or geotechnical engineer.

1. Concrete should be placed in caisson excavations by means of a tremie when the depth of water in the excavation cannot be limited to a maximum of 2 inches, or when the freefall of the concrete would result in the concrete striking the rebar or excavation walls as it falls.

2. The concrete should be pumped to the tremie pipe or, a hopper with a tremie pipe attached should be used. An "elephant's trunk" should not be used to place concrete under water; however, an elephant's trunk may be used to direct the fall of the concrete in dry excavations. The elephant's trunk should be of sufficient length to prevent the concrete from striking the rebar or excavation walls as it falls.

3. Concrete for dry excavations should be designed for, and placed at, a slump of 4 to 6 inches. Concrete to be placed below water should be designed for, and placed at, a slump of 7 to 9 inches.

4. The tremie pipe should consist of rigid steel pipe with tight couplings. The tremie pipe should be 4 to 6 inches in diameter and should be longer than the deepest caisson excavation.

5. The tremie pipe should be lowered with caution through the center of the reinforcing to within 1 foot of the bottom of the excavation; the tremie should not be allowed to penetrate into the muck on the bottom of the hole

6. The pump hose and tremie pipe should be "slicked" with Portland cement slurry. No clay, bentonite, or other material should be used unless approved by the architect/engineer and geotechnical engineer.

7. Pumping of the concrete should begin immediately after the reinforcing and the tremie pipe have been placed in the excavation and the excavation has been inspected. The tremie pipe should not be raised until the concrete surface in the caisson excavation is at least 5 feet above the bottom of the tremie pipe. The bottom of the tremie pipe should then be kept at least 5 feet below the top of the concrete until the pour is completed.

8. The concrete should be pumped until all muck, laitance, and unsuitable concrete has been lifted above the top-of-caisson elevation. All muck, laitance, and unsuitable concrete should be immediately removed from the excavation.

9. Concrete poured at a 6-inch or greater slump should *not* be vibrated during the pour, unless directed by the architect/engineer. When vibration is required, it should *not* be started until the concrete pour is completed and the muck, laitance and unsuitable concrete have been removed. At a minimum, the upper 10 feet of the concrete should then be vibrated. Additional concrete may be added as necessary during vibration. The vibrator should not be allowed to contact the reinforcing.

10. During the pour, if the tremie pipe has to be removed from the concrete, (e.g., to allow removal of casing), it should be reset at the top of the concrete. The tremie should then be purged, as directed by the inspector, and then immediately lowered to at least 5 feet below the top of the concrete as the concrete is being pumped. All degraded concrete should be lifted with the continuing pour and removed from the top of the caisson.

B HISTORICAL AERIAL PHOTOGRAPHS

Oxnard High School #8
1853 Camino Del Sol
Oxnard, CA 93030

Inquiry Number: 5046760.9
September 12, 2017

The EDR Aerial Photo Decade Package

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

09/12/17

Client Name:

Oxnard High School #8
1853 Camino Del Sol
Oxnard, CA 93030
EDR Inquiry # 5046760.9

Tetra Tech, Inc.
5383 Hollister Avenue, Suite 130
Santa Barbara, CA 93111
Contact: Jason Dane

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

Search Results:

Year	Scale	Details	Source
2012	1"=500'	Flight Year: 2012	USDA/NAIP
2010	1"=500'	Flight Year: 2010	USDA/NAIP
2009	1"=500'	Flight Year: 2009	USDA/NAIP
2005	1"=500'	Flight Year: 2005	USDA/NAIP
1994	1"=500'	Acquisition Date: September 03, 1994	USGS/DOQQ
1985	1"=500'	Flight Date: August 06, 1985	USDA
1978	1"=500'	Flight Date: September 21, 1978	USDA
1967	1"=500'	Flight Date: August 13, 1967	USGS
1959	1"=500'	Flight Date: October 04, 1959	USDA
1947	1"=500'	Flight Date: August 15, 1947	USGS
1938	1"=500'	Flight Date: May 09, 1938	USDA
1927	1"=500'	Flight Date: January 01, 1927	USGS

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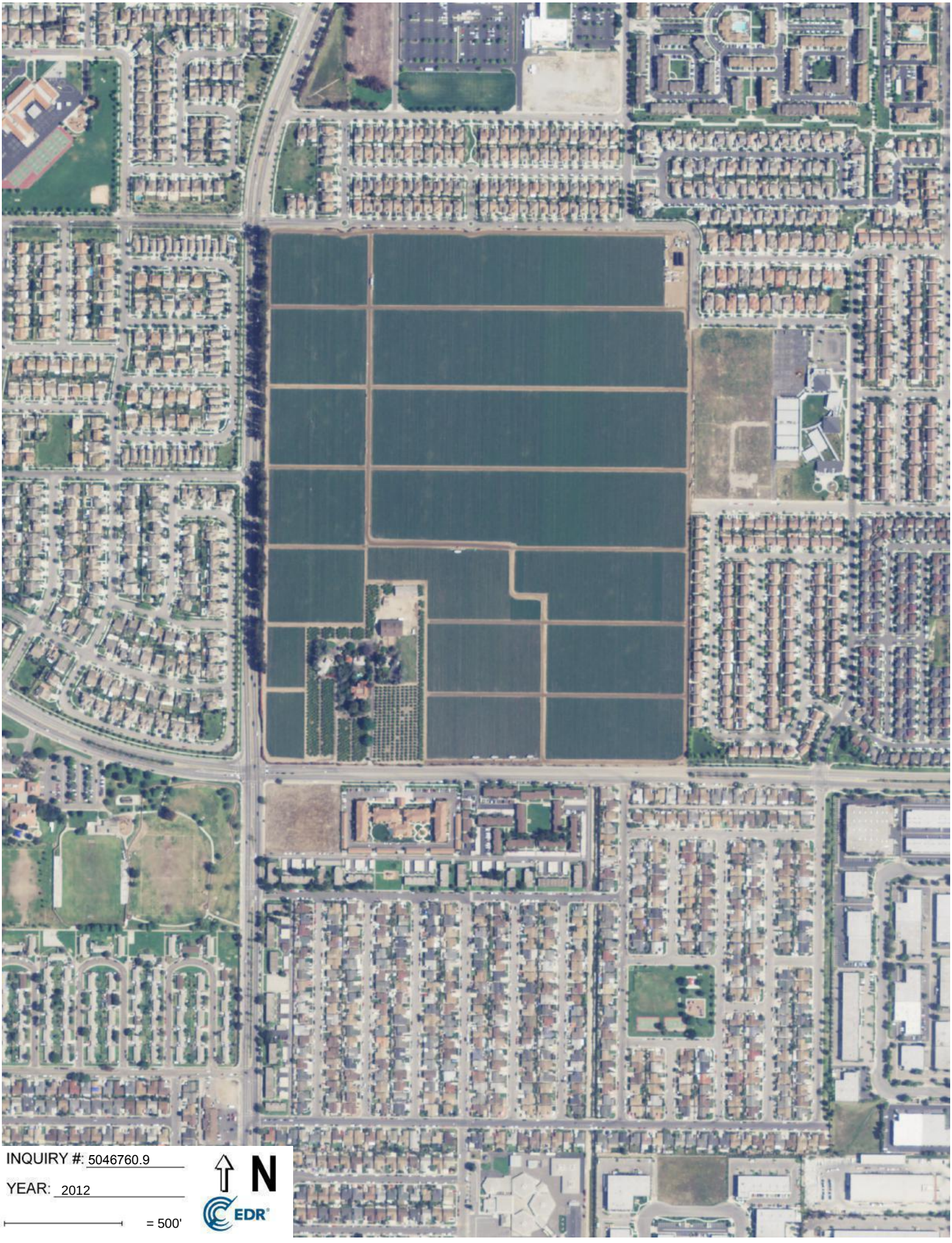
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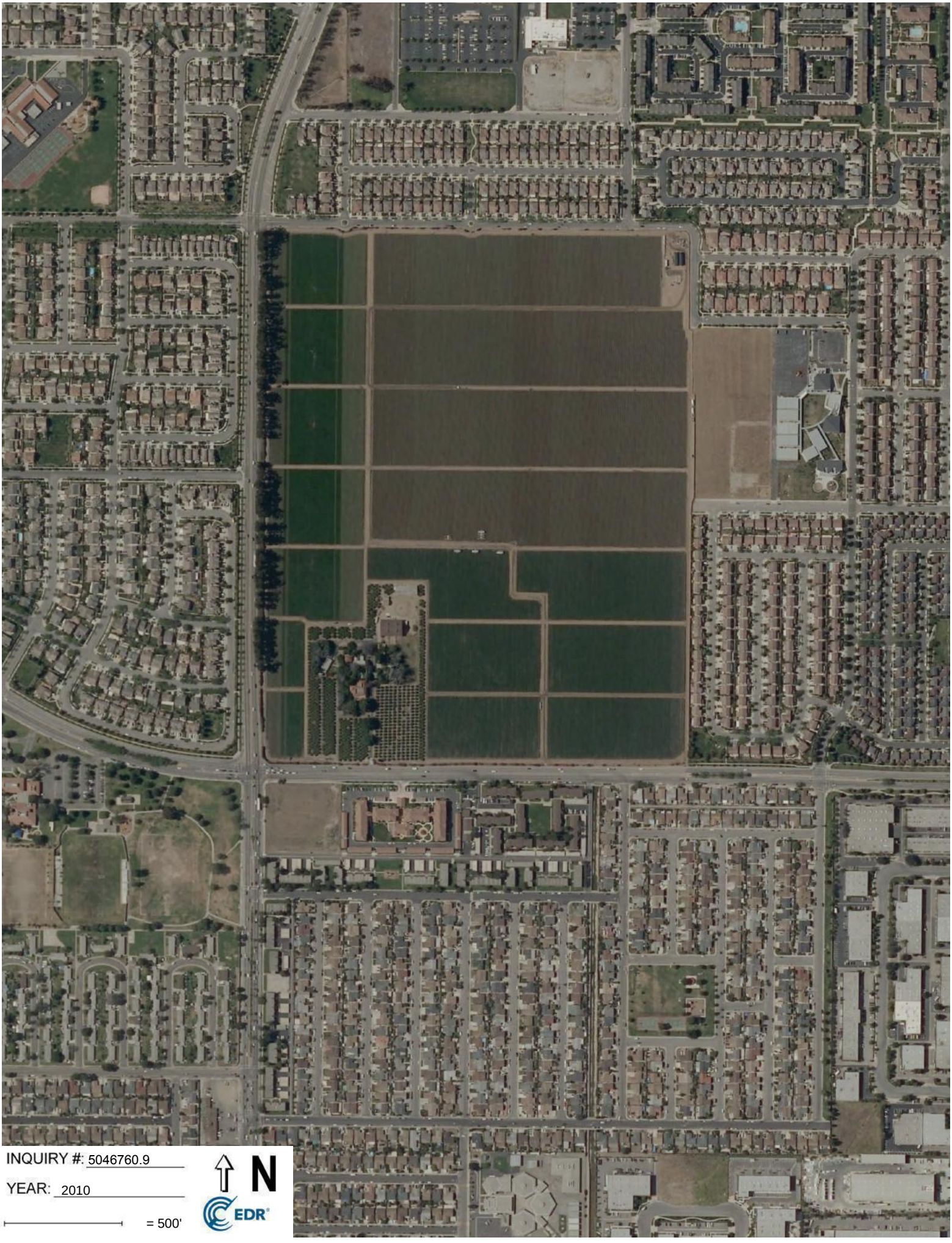
EDR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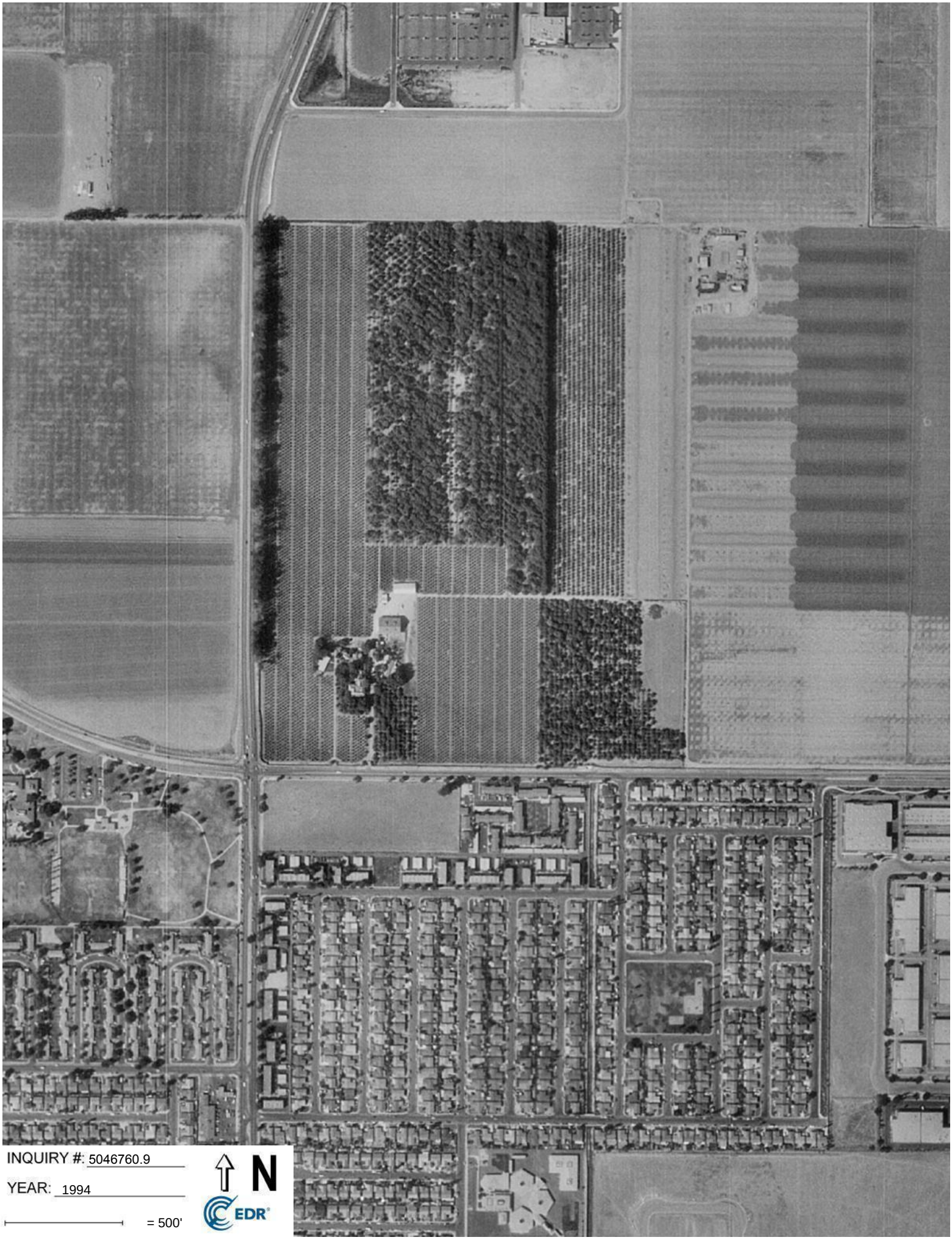
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EDR


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EDR

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YEAR: 1959

= 500'

N

EDR

INQUIRY #: 5046760.9

YEAR: 1947

= 500'

N

EDR

INQUIRY #: 5046760.9

YEAR: 1938

= 500'

N

EDR

INQUIRY #: 5046760.9

YEAR: 1927

= 500'

N

EDR

C USGS ANALYSES OUTPUT

USGS Design Maps Summary Report

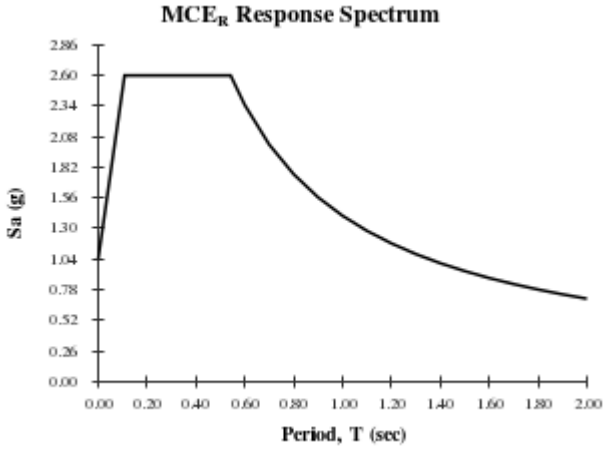
User–Specified Input

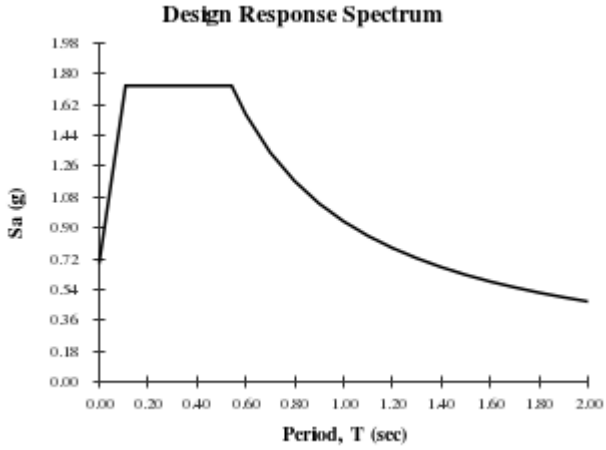
Report Title	High School No. 8 Wed May 16, 2018 02:09:37 UTC
Building Code Reference Document	ASCE 7-10 Standard (which utilizes USGS hazard data available in 2008)
Site Coordinates	34.2077°N, 119.1554°W
Site Soil Classification	Site Class D – "Stiff Soil"
Risk Category	I/II/III

USGS–Provided Output

S_S =	2.596 g	S_{MS} =	2.596 g	S_{DS} =	1.731 g
S_1 =	0.938 g	S_{M1} =	1.407 g	S_{D1} =	0.938 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





For PGA_M, T_L, C_{RS}, and C_{R1} values, please view the detailed report.

Design Maps Detailed Report

ASCE 7-10 Standard (34.2077°N, 119.1554°W)

Site Class D – "Stiff Soil", Risk Category I/II/III

Section 11.4.1 — Mapped Acceleration Parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_S) and 1.3 (to obtain S_1). Maps in the 2010 ASCE-7 Standard are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 11.4.3.

From Figure 22-1 [1]	S_S = 2.596 g
From Figure 22-2 [2]	S_1 = 0.938 g

Section 11.4.2 — Site Class

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class D, based on the site soil properties in accordance with Chapter 20.

Table 20.3–1 Site Classification

Site Class	$\bar{v}_s$	$\bar{N}$ or $\bar{N}_{ch}$	$\bar{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: • Plasticity index PI > 20, • Moisture content w ≥ 40%, and • Undrained shear strength $\bar{s}_u$ < 500 psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 11.4.3 — Site Coefficients and Risk–Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameters

Table 11.4–1: Site Coefficient F_a

Site Class	Mapped MCE $_R$ Spectral Response Acceleration Parameter at Short Period				
	$S_S \leq 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S \geq 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_S

For Site Class = D and S_s = 2.596 g, F_a = 1.000

Table 11.4–2: Site Coefficient F_v

Site Class	Mapped MCE $_R$ Spectral Response Acceleration Parameter at 1–s Period				
	$S_1 \leq 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \geq 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_1

For Site Class = D and S_1 = 0.938 g, F_v = 1.500

Equation (11.4–1): $S_{MS} = F_a S_S = 1.000 \times 2.596 = 2.596$ g

Equation (11.4–2): $S_{M1} = F_v S_1 = 1.500 \times 0.938 = 1.407$ g

Section 11.4.4 — Design Spectral Acceleration Parameters

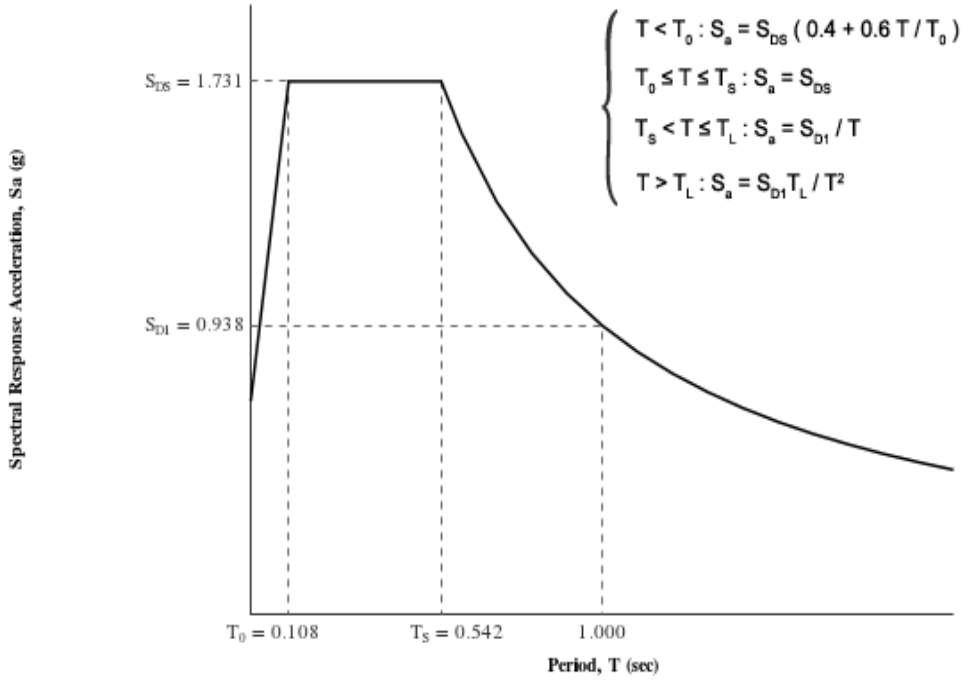
Equation (11.4–3): $S_{DS} = ⅔ S_{MS} = ⅔ \times 2.596 = 1.731$ g

Equation (11.4–4): $S_{D1} = ⅔ S_{M1} = ⅔ \times 1.407 = 0.938$ g

Section 11.4.5 — Design Response Spectrum

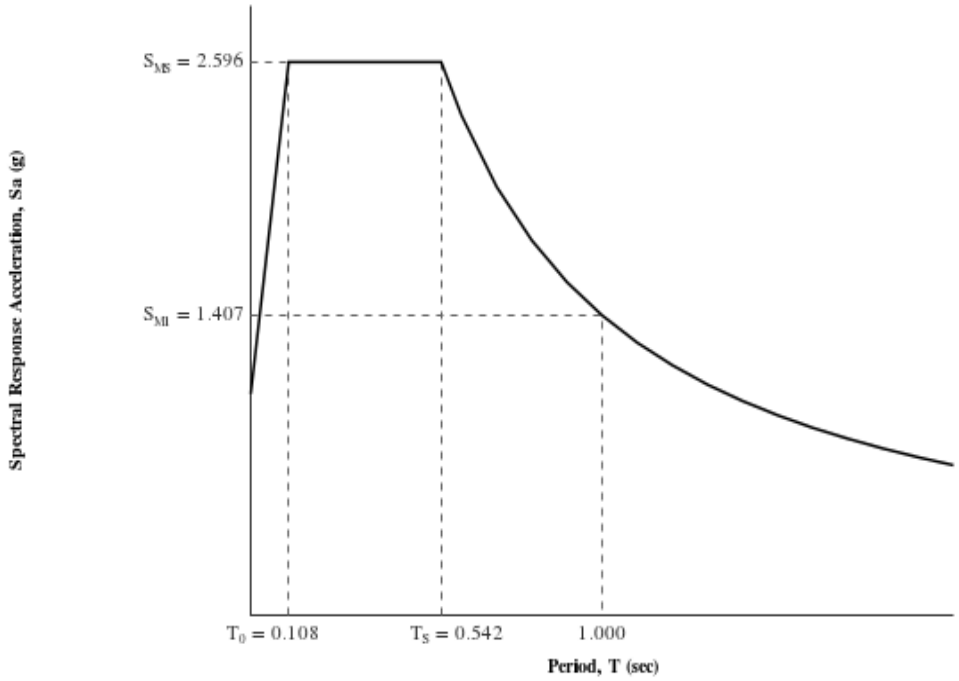
From Figure 22-12 [3] $T_L = 8$ seconds

Figure 11.4–1: Design Response Spectrum



Section 11.4.6 — Risk-Targeted Maximum Considered Earthquake (MCE_R) Response Spectrum

The MCE_R Response Spectrum is determined by multiplying the design response spectrum above by 1.5.



Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

From Figure 22-7 [4] PGA = 1.020

Equation (11.8–1): $PGA_M = F_{PGA}PGA = 1.000 \times 1.020 = 1.02$ g

Table 11.8–1: Site Coefficient F_{PGA}

Site Class	Mapped MCE Geometric Mean Peak Ground Acceleration, PGA				
	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA ≥ 0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of PGA

For Site Class = D and PGA = 1.020 g, F_{PGA} = 1.000

Section 21.2.1.1 — Method 1 (from Chapter 21 – Site-Specific Ground Motion Procedures for Seismic Design)

From Figure 22-17 [5] C_{RS} = 0.910

From Figure 22-18 [6] C_{R1} = 0.909

Section 11.6 — Seismic Design Category

Table 11.6-1 Seismic Design Category Based on Short Period Response Acceleration Parameter

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
$S_{DS} < 0.167g$	A	A	A
$0.167g \le S_{DS} < 0.33g$	B	B	C
$0.33g \le S_{DS} < 0.50g$	C	C	D
$0.50g \le S_{DS}$	D	D	D

For Risk Category = I and S_{DS} = 1.731 g, Seismic Design Category = D

Table 11.6-2 Seismic Design Category Based on 1-S Period Response Acceleration Parameter

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
$S_{D1} < 0.067g$	A	A	A
$0.067g \le S_{D1} < 0.133g$	B	B	C
$0.133g \le S_{D1} < 0.20g$	C	C	D
$0.20g \le S_{D1}$	D	D	D

For Risk Category = I and S_{D1} = 0.938 g, Seismic Design Category = D

Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is **E** for buildings in Risk Categories I, II, and III, and **F** for those in Risk Category IV, irrespective of the above.

Seismic Design Category ≡ "the more severe design category in accordance with Table 11.6-1 or 11.6-2" = E

Note: See Section 11.6 for alternative approaches to calculating Seismic Design Category.

References

1. *Figure 22-1*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. *Figure 22-2*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. *Figure 22-12*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. *Figure 22-7*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. *Figure 22-17*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. *Figure 22-18*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf

U.S. Geological Survey - Earthquake Hazards Program

Unified Hazard Tool

Please do not use this tool to obtain ground motion parameter values for the design code reference documents covered by the U.S. Seismic Design Maps web tools (e.g., the International Building Code and the ASCE 7 or 41 Standard). The values returned by the two applications are not identical.

Input

Edition

Dynamic: Conterminous U.S. 2014 (v4.1.

Spectral Period

Peak ground acceleration

Latitude

Decimal degrees

34.2077

Time Horizon

Return period in years

2475

Longitude

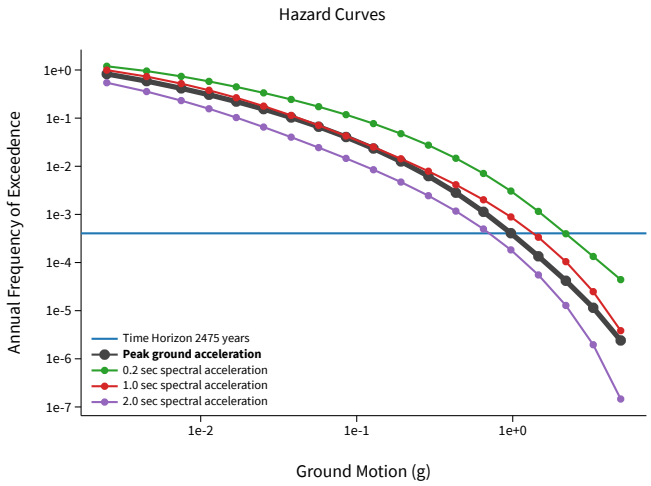
Decimal degrees, negative values for western longitudes

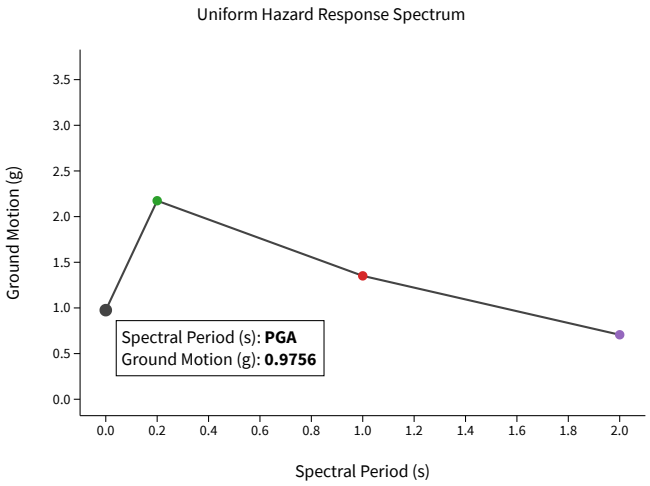
-119.1554

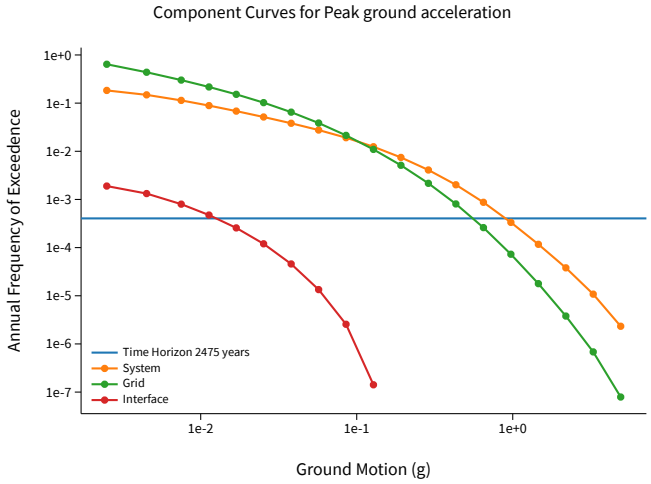
Site Class

259 m/s (Site class D)

Hazard Curve





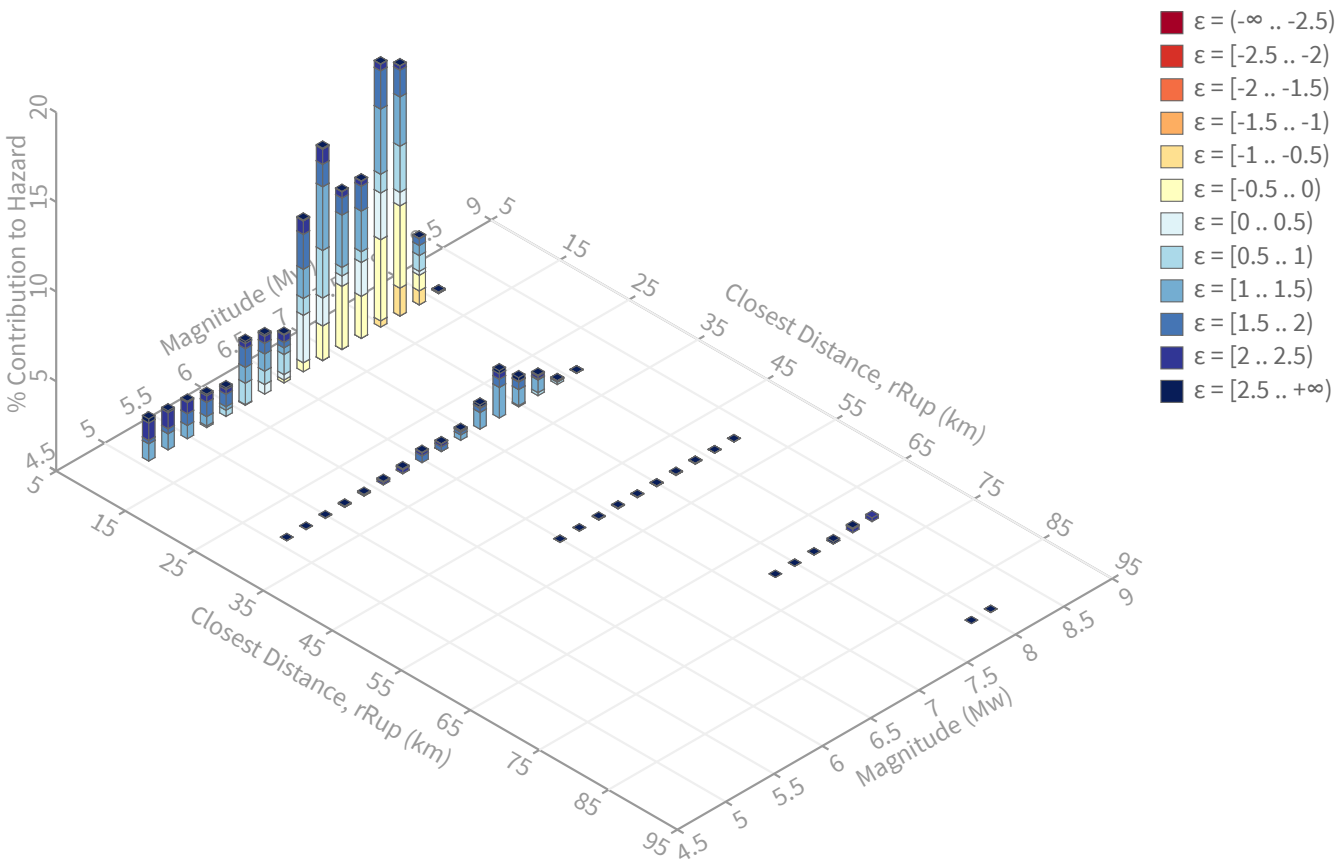


View Raw Data

Deaggregation

Component

Total



Summary statistics for, Deaggregation: Total

Deaggregation targets

Return period: 2475 yrs
Exceedance rate: 0.0004040404 yr^{-1}
PGA ground motion: 0.97556941 g

Recovered targets

Return period: 2817.403 yrs
Exceedance rate: 0.0003549368 yr^{-1}

Totals

Binned: 100 %
Residual: 0 %
Trace: 0.11 %

Mean (for all sources)

r: 10.79 km
m: 7.01
ε_0: 0.93 σ

Mode (largest r-m bin)

r: 9.19 km
m: 7.53
ε_0: 0.57 σ
Contribution: 14.68 %

Mode (largest ε_0 bin)

r: 9.02 km
m: 7.68
ε_0: -0.22 σ
Contribution: 4.59 %

Discretization

r: min = 0.0, max = 1000.0, Δ = 20.0 km
m: min = 4.4, max = 9.4, Δ = 0.2
ε: min = -3.0, max = 3.0, Δ = 0.5 σ

Epsilon keys

ε0: [-∞ .. -2.5)
ε1: [-2.5 .. -2.0)
ε2: [-2.0 .. -1.5)
ε3: [-1.5 .. -1.0)
ε4: [-1.0 .. -0.5)
ε5: [-0.5 .. 0.0)
ε6: [0.0 .. 0.5)
ε7: [0.5 .. 1.0)
ε8: [1.0 .. 1.5)
ε9: [1.5 .. 2.0)
ε10: [2.0 .. 2.5)
ε11: [2.5 .. +∞]

Deaggregation Contributors

Source Set ↳ Source	Type	r	m	ε_0	lon	lat	az	%
UC33brAvg_FM32	System							42.71
Simi-Santa Rosa [6]		5.61	6.98	0.59	119.102°W	34.222°N	71.68	10.00
Oak Ridge (Onshore) [0]		6.66	7.36	0.50	119.167°W	34.261°N	350.11	9.57
Oak Ridge (Offshore) [5]		11.12	6.87	1.03	119.273°W	34.240°N	288.48	5.05
Oak Ridge (Onshore) [1]		9.81	7.55	0.61	119.113°W	34.285°N	24.35	3.72
Ventura-Pitas Point [3]		10.11	7.51	0.59	119.195°W	34.290°N	338.13	3.62
Red Mountain [0]		20.69	7.13	1.42	119.304°W	34.347°N	318.73	1.76
Malibu Coast (Extension) alt 2 [3]		15.26	7.54	1.00	119.168°W	34.070°N	184.32	1.41
Ventura-Pitas Point [2]		10.11	7.18	0.76	119.195°W	34.290°N	338.13	1.05
UC33brAvg_FM31	System							39.83
Simi-Santa Rosa [6]		5.61	7.01	0.59	119.102°W	34.222°N	71.68	10.81
Oak Ridge (Onshore) [0]		6.66	7.43	0.48	119.167°W	34.261°N	350.11	9.71
Ventura-Pitas Point [3]		10.11	7.58	0.56	119.195°W	34.290°N	338.13	4.28
Oak Ridge (Onshore) [1]		9.81	7.65	0.58	119.113°W	34.285°N	24.35	3.48
Red Mountain [0]		20.69	7.23	1.36	119.304°W	34.347°N	318.73	1.97
Ventura-Pitas Point [2]		10.11	6.71	1.00	119.195°W	34.290°N	338.13	1.57
Channel Islands Thrust [0]		16.31	6.87	1.50	119.265°W	34.044°N	209.01	1.47
Malibu Coast (Extension) alt 1 [5]		15.26	7.33	1.10	119.172°W	34.068°N	185.62	1.11
UC33brAvg_FM31 (opt)	Grid							8.80
PointSourceFinite: -119.155, 34.248		6.56	5.73	1.36	119.155°W	34.248°N	0.00	1.20
PointSourceFinite: -119.155, 34.248		6.56	5.73	1.36	119.155°W	34.248°N	0.00	1.20
PointSourceFinite: -119.155, 34.257		7.21	5.72	1.43	119.155°W	34.257°N	0.00	1.07
PointSourceFinite: -119.155, 34.257		7.21	5.72	1.43	119.155°W	34.257°N	0.00	1.07
UC33brAvg_FM32 (opt)	Grid							8.66
PointSourceFinite: -119.155, 34.248		6.56	5.73	1.36	119.155°W	34.248°N	0.00	1.21
PointSourceFinite: -119.155, 34.248		6.56	5.73	1.36	119.155°W	34.248°N	0.00	1.21
PointSourceFinite: -119.155, 34.257		7.21	5.72	1.43	119.155°W	34.257°N	0.00	1.07
PointSourceFinite: -119.155, 34.257		7.21	5.72	1.43	119.155°W	34.257°N	0.00	1.07