Report of Geotechnical Investigation

Proposed Newberry Springs Substation SC2 Site

Eldorado Lugo-Mohave Series Capacitor Upgrade Project
East of Pisgah Substation
San Bernardino County, California

Prepared for:

Beta Engineering
Pineville, Louisiana 71360

Project 4953-18-0131.02

July 27, 2018

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July 27, 2018
Wood Project 4953-18-0131.02

Mr. Nicholas Mulheim
Beta Engineering
4725 Highway 28 East
Pineville, Louisiana 71360

Subject: Letter of Transmittal
Report of Geotechnical Investigation
Proposed Newberry Springs Substation SC2 Site
Eldorado Lugo-Mohave Series Capacitor Upgrade Project
East of Pisgah Substation
San Bernardino County, California

Dear Mr. Mulheim:

We, Wood Environment & Infrastructure Solutions, Inc. (Wood – formerly Amec Foster Wheeler), are pleased to submit this report presenting the results of our geotechnical investigation for the Eldorado-Lugo-Mohave Capacitor Upgrade – Newberry Springs Substation SC2 site, northeast of Pisgah Substation in San Bernardino County, California.

The scope of our services was based on our agreement dated January 31, 2018 with revision 1 dated April 15, 2018, and our telecon of June 26, 2018.

The results of our investigation, including our prior subsurface explorations and laboratory testing, and design recommendations are presented in this report. Please note that you or your representative should submit copies of this report to the appropriate governmental agencies.

It has been a pleasure to be of professional service to you. Please contact us if you have any questions or if we can be of further assistance.

Sincerely,

Wood Environment & Infrastructure Solutions, Inc.

Eung Jin Jung, Ph.D.
Associate Engineer

Rosalind Munro
Principal Engineering Geologist

Reviewed by:

Marshall Lew, Ph.D.
Principal Engineer

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(Electronic copies submitted)

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1.0 Scope

This report provides the results of our geotechnical investigation for the Eldorado-Lugo-Mohave Capacitor Upgrade – Newberry Springs Substation SC2 site, northeast of Pisgah Substation in San Bernardino County, California. The location of the site is illustrated on Figure 1, Site Vicinity Map.

We previously explored the site in 2017 and presented the boring logs and results of our laboratory testing in a data report for Southern California Edison dated December 5, 2017 (Wood predecessor company Amec Foster Wheeler Project No. 4953-17-0222). We also prepared a geotechnical foundation design parameters report for the site dated May 22, 2018 (Wood Project No. 4953-18-0131.02). This report supersedes the May 22, 2018 report.

The recommendations presented in this report were developed using the geotechnical information from that investigation. We acknowledge that we have reviewed the field data and the results of the laboratory tests from the previous investigation and we concur with the data findings.

The scope of this investigation did not include the assessment of general site environmental conditions for the presence of contaminants in the soils and groundwater of the site.

Our recommendations are based on the results of our previous field exploration, laboratory tests, and field permeability tests. The results of our previous field explorations and laboratory tests, which form the basis of our recommendations, are presented in Appendices A, B, and C.

Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical consultants practicing in this or similar localities. No other warranty, express or implied, is made as to the professional advice included in this report. This report has been prepared for Beta Engineering and their design consultants to be used solely in the proposed Newberry Springs Substation. This report has not been prepared for use by other parties, and may not contain sufficient information for purpose of other parties or other uses.

2.0 Site Conditions and Project Description

The project site is unimproved land with unpaved roads and has sparse vegetation with scattered cobbles and boulders up to one foot in diameter.

It is currently planned to construct series capacitor platform structures, typical equipment supporting structures (bus supports, switch stands, etc.), deadend structures, circuit breakers, buildings, and other miscellaneous equipment at the Newberry Springs site shown on Figure 1. We understand that series capacitor platform structures are planned to be supported on mat foundations, typical equipment support structures are planned to be supported on drilled shafts, the deadend structures are planned to be supported on 5- to 6-foot diameter drilled shafts, and the circuit breakers, buildings and other miscellaneous equipment are planned to be supported on spread footings.

As indicated in your RFQ dated January 2, 2018, the series capacitor platform structures (Foundation Type 1) will be supported on mat (slab) foundations. The dead load bearing pressure at the bottom of the foundation is expected to be less than 500 pounds per square foot (psf). Under short term loading conditions, such as wind and seismic loads, the maximum bearing pressure is expected to be less than 2,000 psf.

Typical equipment support structures such as bus supports, switch stands, etc. (Foundation Type 2) will be supported on drilled shafts with diameters ranging from 2½ to 4 feet and lengths ranging from 8 to 15 feet. This foundation type will have very small applied axial dead loads (ranging from 2 to 4 kips). The lateral loads and moments applied to the top of the drilled shaft will be short term loads resulting from wind or seismic forces. Lateral loads will range from 1 to 5 kips. Moments will range from 20 to 60 ft-kips.

The deadend structures (Foundation Type 3) may be supported on drilled shafts with diameters ranging from 5 to 6 feet and lengths ranging from 15 to 20 feet. Axial loads applied to the top of the foundation will be approximately 200 kips (tension or compression). Lateral loads applied to the top of the drilled shaft will range from 20 to 40 kips and applied moments will range from 500 to 1,000 ft-kips.

The circuit breakers, buildings, and other miscellaneous equipment (Foundation Type 4) may be supported on spread footings (slabs). The dead load bearing pressure at the bottom of the foundations are expected to be less than 500 psf. Under short term loading conditions such as wind or seismic loads, the maximum bearing pressures are expected to be less than 1,500 psf.

3.0 Field Explorations and Laboratory Tests

The geotechnical conditions at the site were explored by excavation of eleven hollow-stem auger borings at the locations shown on Figure 2, Boring Location Map. The number, depths, and locations of the borings were provided by SCE. The explorations were performed on October 31 through November 3, 2017 by our predecessor company Amec Foster Wheeler.

The hollow-stem auger borings (designated BELP-1 through BELP-11) were drilled with a track-mounted hollow-stem auger rig to depths of 16 to 16½, and 50½ to 51½ feet below ground surface (bgs) with one boring terminated at 39 feet due to refusal. The borings were sampled with a standard penetration test (SPT) sampler and California Modified ring sampler at approximately 5-foot intervals, generally alternating between the sampler types. The number, depths, and locations of the borings were provided by SCE. A summary of the methodology of the exploratory borings drilled for the project and the logs of the borings are presented in Appendix A.

Soil samples collected from the borings were transported to the Amec Foster Wheeler laboratory, and were reviewed by Amec Foster Wheeler staff. The laboratory testing program was developed by SCE based on review of the field boring logs. Laboratory testing was performed by AP Engineering and Testing, Inc., LaBelle Marvin, Inc., and HDR. The types of tests performed are listed below:

- Moisture and density
- Direct shear
- Grain size distribution
- Collapse
- Expansion index
- Compaction
- R-value (performed by LaBelle Marvin, Inc.)
- Corrosion (performed by HDR)

All testing was performed in general accordance with applicable ASTM specifications at the time of testing. Details of the laboratory testing program and the test results are presented in Appendix B.

The field permeability tests were performed on November 2, 2017 at the two locations shown on Figure 2, Boring Location Map. The borings for the permeability tests, designated PT-1 and PT-2, were drilled to a depth of 5 feet bgs using 8-inch diameter hollow-stem auger drilling equipment. The soils encountered in the two borings were poorly graded sand.

A summary of the methodology and the calculations for the field permeability tests are presented in Appendix C. The calculated infiltration rates from the two field permeability tests are 4.4 and 5.1 inch/hour. No safety factor has been applied.

4.0 Geology

4.1 Geologic Setting

The site is located in the Mojave Desert Geomorphic Province, a broad interior region of isolated mountain ranges separated by expanses of desert plains [California Geological Survey (CGS), 2002.]

4.2 Geologic Materials

The site is mapped as older intermediate alluvial fan deposits of late and middle Pleistocene age (Phelps et al., 2012). The alluvial deposits underlying the site consist predominantly of poorly graded sand with variable amounts of gravel and cobbles. Cobbles are anticipated to be more abundant in the subsurface than identified in the borings and boulders may be present as well.

4.3 Groundwater

Groundwater was not encountered to the maximum depth drilled of 51½ feet bgs.

4.4 Geologic-Seismic Hazards

Surface Fault Rupture

The site is not within a currently established Alquist-Priolo Earthquake Fault Zone (A-P Zone) for surface fault rupture hazard (CGS, 2003a and 2003b). An A-P Zone is an area which requires investigation to evaluate whether the potential for surface fault rupture is present near an active fault (CGS, 2018b). As defined by the A-P Zone Act, an active fault is defined as a fault with surface displacement within the last 11,700 years (Holocene). The closest established A-P Zone is located approximately 1.1 miles west of the site for a section of the Lavic Lake fault zone (CGS, 2003a and 2003b). There are no known active faults with the potential for surface fault rupture located directly beneath or projecting toward the site. Therefore, the potential for surface rupture due to fault plane displacement propagating to the surface at the site during the design life of the proposed development is considered low.

Seismicity

The site could be subjected to strong ground shaking in the event of an earthquake, this hazard is common in Southern California and the effects of ground shaking can be mitigated by proper engineering design and construction in conformance with current building codes and engineering practices.

Liquefaction and Seismically-Induced Settlement

Liquefaction potential is greatest where the groundwater level is shallow, and submerged loose, fine sands occur within a depth of about 50 feet or less. Liquefaction potential decreases as grain size and clay and gravel content increase. As ground acceleration and shaking duration increase during an earthquake, liquefaction potential increases. Groundwater was not encountered to the maximum depth drilled of 51½ feet bgs. Therefore, the potential for liquefaction of the subsurface materials is considered to be low.

Seismically-induced settlement is often caused by loose to medium-dense granular soils densified during ground shaking. Uniform settlement beneath a given structure would cause minimal damage; however, because of variations in distribution, density, and confining conditions of the soils, seismically-induced settlement is generally non-uniform and can cause serious structural damage. Dry and partially saturated soils as well as saturated granular soils are subject to seismically-induced settlement. There is a potential for seismically induced settlement in the upper 3 to 5 feet, however, the potential can be mitigated by following the recommendations of Section 5.7.

Collapsible Soils

Conditions in arid and semi-arid climates favor the formation of collapsible soils. Collapsible soils are soils susceptible to large volumetric stains when they become saturated. The soils underneath the project site possess moderate to high collapse potential based on the laboratory test results. There is a potential for collapsible soils, however, the potential can be mitigated by following the recommendations of Section 5.7.

Slope Stability

The relatively flat-lying topography at the site precludes both stability problems and the potential for lurching (earth movement at right angles to a cliff or steep slope during ground shaking).

Expansive and Corrosive Soils

The alluvial soils at the site are non-expansive.

The corrosion test results performed for us by HDR presented in our 2017 Amec Foster Wheeler report indicate that the on-site soils range from mildly corrosive to ferrous metals at present moisture content, aggressive to copper, and that the potential for sulfate attack on portland cement concrete is considered severe. We understand that an additional separate soil corrosivity study for the site has been prepared by HDR for SCE.

Tsunamis, Inundation, Seiches, and Flooding

The site is not located near the ocean. Therefore, tsunamis (seismic sea waves) are not considered a hazard at the site.

The site is not located within a potential inundation area for an earthquake-induced dam failure. The site is not located downslope of any large bodies of water that could adversely affect the site in the event of earthquake-induced seiches (wave oscillations in an enclosed or semi-enclosed body of water.)

The site is in the vicinity of active washes and there is the potential for flooding. The potential for flooding can be mitigated by proper civil design.

Subsidence

The site is not within an area of known subsidence associated with fluid withdrawal (groundwater or petroleum) or peat oxidation. The potential for subsidence to adversely impact the site is considered low.

Oil Wells and Methane Gas

The site is not located within the limits of an oil field. There are no known oil wells on the site. Plugged and abandoned oil exploration holes are not known to be located near the site. Therefore, the potential for methane and other volatile gases to occur beneath the site is low.

Volcanic Eruption

The site is within one mile of the lava flows from the young volcanic Pisgah Crater so the potential exists for the site being impacted by cinders or lava flow if an eruption occurred. However, there was no evidence of that occurring in the late to middle Pleistocene as no cinder or lava was encountered in the late to middle Pleistocene-age alluvial deposits within the 50 feet depth of our recent borings. According to the USGS, the last lava flow was between approximately 18,000 and 22,000 years ago.

5.0 Recommendations

Because of the presence of collapsible soils underneath the project site, settlement from wetting should be considered for foundation design. With the possible introduction of additional moisture into the subsurface, which can occur due to water impoundment from improper drainage, rainfall, pipe leaks, or irrigation, significant settlement may occur if foundations are placed directly on the existing site soils.

To mitigate the potential for unacceptable settlement, we recommend that remedial grading be performed to provide at least 3 feet of properly compacted fill below footings. The upper 5 feet of the existing site soils (or 3 feet below bottom of footing, whichever is deeper) should be removed and replaced with properly compacted fill. The lateral extent of removal and replacement should be equal to the removal depth below footings.

5.1 Foundation Design Parameters

Foundation design parameters for the site are presented in the following table. The design parameters were estimated based on field data and laboratory test results.

Foundation Design Parameters

Soil Condition	Total Unit weight, pcf	Moisture Content (%)	Friction Angle, ϕ (degree)	Cohesion, c (psf)	Vertical Subgrade Modulus (pci)	Lateral Subgrade Modulus (pci)
Well Graded Sand/ Poorly Graded Sand/Poorly Graded Sand with Silt/ Silty Sand	110	4	33	0	200	150

By: GA 2/9/18
Checked by: EJJ 2/12/18

5.2 Drilled Cast-In-Place Concrete Piles

Downdrag loads may develop in drilled cast-in-place concrete piles due to settlement of hydro-collapsible soils. However, if the upper 5 feet of the existing soils, measured from the design grade, are replaced as properly compacted fill, downdrag loads should be negligible.

Axial Capacities

We have estimated the axial capacities of drilled cast-in-place concrete piles based on the strength characteristics of the on-site soils. The ultimate downward and upward friction capacities of 30-, 36-, and 48-inch diameter drilled piles for typical equipment support structures and 60- and 72-inch diameter drilled piles for the deadend structures are presented on Figure 3. We recommend the piles be designed for skin friction only. It may be prudent to neglect the upper one foot of pile embedment.

The capacities are dead-plus-live load capacities; a one-third increase to the allowable values may be used when considering wind or seismic loads.

Settlement

We estimate the static settlement of the proposed structure supported on conventional drilled cast-in-place concrete piles in the manner recommended to be less than ½ inch with a differential settlement of ¼ inch or less between adjacent supports.

Lateral Loads

Lateral loads may be resisted by the piles and by the passive resistance of the soils against pile caps. The resistance of the piles and the passive resistance of the soils against pile caps may be combined without reduction in determining the total lateral resistance.

We have computed the lateral capacities of the drilled piles using the computer program LPILE Plus by ENSOFT, Inc. Resistance of the soils adjacent to 30-, 36-, 48-, 60-, and 72-inch-diameter drilled piles are shown in the following tables for top of pile deflections of ¼, ½, ¾, and 1 inches. These resistances have been calculated assuming free-head pile conditions. The minimum pile length may be taken as the length required to reach the depth of zero moment given in the tables below. Lateral loads provided below are ultimate values.

Lateral Load Design Data
30-inch diameter Drilled Concrete Pile

	Pile Head Deflection (inches)			
	¼	**½**	**¾**	**1**
Pile Head Condition	**Free**			
Lateral Load (kips)	41	62	79	95
Maximum Moment (inch-kips)	2,422	4,039	5,511	6,902
Depth to Maximum Moment (ft)	8	9	9½	10
Depth to Zero Moment (ft)	22½	24	24½	25½

Lateral Load Design Data
36-inch diameter Drilled Concrete Pile

	Pile Head Deflection (inches)			
	¼	**½**	**¾**	**1**
Pile Head Condition	**Free**			
Lateral Load (kips)	60	90	115	137
Maximum Moment (inch-kips)	4,003	6,618	8964	11,200
Depth to Maximum Moment (ft)	9	10	10½	11
Depth to Zero Moment (ft)	25½	27	28	29

Lateral Load Design Data
48-inch diameter Drilled Concrete Pile

	Pile Head Deflection (inches)			
	¼	½	¾	1
Pile Head Condition	**Free**			
Lateral Load (kips)	108	164	207	246
Maximum Moment (inch-kips)	8,667	14,500	19,500	24,100
Depth to Maximum Moment (ft)	10½	12	12½	13
Depth to Zero Moment (ft)	31	33	34½	35½

Lateral Load Design Data
60-inch diameter Drilled Concrete Pile

	Pile Head Deflection (inches)			
	¼	½	¾	1
Pile Head Condition	**Free**			
Lateral Load (kips)	165	260	328	388
Maximum Moment (inch-kips)	15,100	26,900	36,000	44,300
Depth to Maximum Moment (ft)	13	14	14½	15
Depth to Zero Moment (ft)	36½	38½	39½	41½

Lateral Load Design Data
72-inch diameter Drilled Concrete Pile

	Pile Head Deflection (inches)			
	¼	½	¾	1
Pile Head Condition	**Free**			
Lateral Load (kips)	230	377	479	565
Maximum Moment (inch-kips)	23,600	44,000	59,300	72,900
Depth to Maximum Moment (ft)	14	16	16½	17
Depth to Zero Moment (ft)	43	44½	46	48

By: GA 2/9/2018
Checked by: EJJ 2/12/2018

Drilled Pile Installation

Observations of caving potential could not be made during our field explorations due to the hollow-stem auger drilling method used. However, due to the non-cohesive nature of the subsurface soils, caving should be anticipated during pile excavation. Therefore, provisions to reduce the potential for caving, such as the use of casing and/or drilling mud, may be necessary when drilling the piles and placing concrete.

Although it is not anticipated, piles spaced less than five diameters on center should be drilled and filled alternately, with the concrete permitted to set at least 8 hours before drilling an adjacent hole. The pile installation should be completed the same day that the drilling is performed. A collar should be placed around the mouth of the shaft after drilling to prevent soils from entering the excavation, and the pile shafts should be covered until concrete is placed.

Concrete should be pumped from the bottom up through a rigid pipe extending to the bottom of the drilled excavation, with the pipe being slowly withdrawn as the concrete level rises. The discharge end of the pipe should be at least 5 feet below the surface of the concrete at all times during placement. The concrete pump pressure should be at least 200 pounds per square inch. The discharge pipe should be kept full of concrete during the entire placement operation and should not be removed from the concrete until all of the concrete is placed and fresh concrete appears at the top of the pile. The volume of concrete pumped into the hole should be recorded and compared to design volume.

Only competent drilling contractors with experience in the installation of drilled cast-in-place piles in similar soil conditions should be considered for the pile construction. The drilling of the pile excavations and the placing of the concrete should be observed continuously by personnel of our firm to verify that the desired diameter and depth of piles are achieved.

5.3 Shallow Foundations

As indicated, the maximum loading on the mat to support series capacitor platform structures will be less than 2,000 pounds per square foot when considering wind or seismic loading. The maximum loading on the spread footing to support the circuit breakers, buildings and other miscellaneous equipment will be less than 1,500 pounds per square foot when considering wind or seismic loading. Accordingly, the mat foundations and spread footings, underlain by compacted fill after recommended over-excavation described in Section 5.7 and established at least 1½ feet below the lowest adjacent grade or floor level, may be designed to impose an allowable net dead-plus-live load bearing pressure of up to 2,500 pounds per square foot. Since this allowable bearing value is governed by settlement considerations and the minimum mat foundation size would be governed by the size of the foundation, no increase in the above bearing value is allowed for additional mat/footing width or depth unless additional settlement can be tolerated.

The bearing value is a net value, and the weight of concrete in the foundation may be taken as 50 pounds per cubic foot. A one-third increase in the bearing value may be used when considering wind or seismic loads.

Lateral Loads

Lateral loads may be resisted by friction of the soil acting against the mat foundations and spread footings and by the passive resistance of the soils.

A coefficient of friction of 0.4 may be used between the mat foundation and the supporting soils. The passive resistance of soils can be assumed to be equal to the pressure developed by a fluid with a density of 250 pounds per cubic foot.

A one-third increase in the passive value may be used for wind or seismic loads. The frictional resistance and the passive resistance of the soils may be combined without reduction in determining the total lateral resistance.

Settlement

Based on the expected loads provided to us, we estimate the static settlement of the proposed structures supported on mat foundation and spread footings in the manner recommended to be less than ½ and ¾ inch, respectively. Differential settlement is expected to be about ½ inch or less. Due to wetting of the upper 10 feet of soils, which is unlikely to happen, we estimate the settlement we estimate the settlement to be up to 1½ to 1¾ inches.

5.4 Ultimate Values

The allowable values in the preceding sections are for use with loadings determined by a conventional working stress design. When considering an ultimate design approach, the allowable values may be multiplied by the following factors:

Design Item	Ultimate Design Factor*
Bearing Value	3.0
Lateral Pile Capacity	1.0
Passive Pressure	1.5
Coefficient of Friction	1.5

*Ultimate axial pile capacities are presented in Figure 3.

In no event, however, should pile lengths be less than those required to support dead-plus-live loads when using the working stress design method.

5.5 Modulus of Subgrade Reaction

A modulus of subgrade reaction presented in the Foundation Design Parameters table on page 7 may be assumed for the onsite soils for both gravity and seismic analysis of the foundation. These values are a unit value for use with a 1-foot-square area. The modulus should be reduced in accordance with the following equation when used with larger mat foundations:

$$K_R = K\left[\frac{B+1}{2B}\right]^2$$

where:	K	=	unit subgrade modulus
	K_R	=	reduced subgrade modulus
	B	=	spread foundation/mat width

5.6 Seismic Design Parameters

We have determined the seismic design parameters in accordance with the provisions of the 2016 California Building Code and ASCE 7-10 Standard (ASCE, 2010) using the United States Geological Survey (USGS) Seismic Design Maps Web Application. The CBC Site Class was determined to be Site Class "C" based on the results of our explorations and a review of the local soil and geologic conditions. The mapped seismic parameters are presented in the following table:

Parameter	Mapped Value
S_S (0.2 second period, Site Class B)	1.229g
S_1 (1.0 second period, Site Class B)	0.441g
Site Class	C
F_a	1.0
F_v	1.359
$S_{MS} = F_aS_S$ (0.2 second period)	1.222g
$S_{M1} = F_vS_1$ (1.0 second period)	0.599g
$S_{DS} = 2/3 \times S_{MS}$ (0.2 second period)	0.814g
$S_{D1} = 2/3 \times S_{M1}$ (1.0 second period)	0.400g

By: GA 7/6/18   Checked: EJJ 7/9/18

5.7 Grading

Site Preparation/Removals

The top 2 feet below existing grade shall be removed and stockpiled for all graded areas. In structural areas, over-excavation of a minimum of 5 feet below finish grade and a minimum of 2 feet below finish grade in nonstructural areas is recommended for the site. In structural areas, additional over-excavation and stockpiling should be performed, if needed, to ensure that a minimum of 3 feet of compacted fill is present beneath spread or mat foundations.

During over-excavation, the exposed soils should be carefully observed for the removal of all loose and unsuitable deposits, including cobbles and rock fragments greater than 3 inches in diameter.

After removals/over-excavation, the exposed soils should be scarified to a depth of 6 inches, brought to near-optimum moisture content, and rolled with heavy compaction equipment. The removed/over-excavated soils used for fill should be compacted to at least 90% of the maximum dry density obtainable by the ASTM Designation D1557 method of compaction. In areas to support structures the upper 12 inches should be compacted to a minimum of 95% relative compaction.

Good drainage of surface water should be provided by adequately sloping all surfaces. Such drainage will be important to minimize infiltration of water beneath foundations and pavement.

Excavation and Temporary Slopes

Where excavations are deeper than about 4 feet, the sides of the excavations should be sloped back at 1:1 (horizontal to vertical) or shored for safety. Unshored excavations should not extend below a plane drawn at 1½:1 (horizontal to vertical) extending downward from adjacent existing footings. We would be pleased to present data for design of shoring if required.

Excavations should be observed by personnel of our firm so that any necessary modifications based on variations in the soil conditions can be made. All applicable safety requirements and regulations, including OSHA regulations, should be met.

Compaction

Any required fill should be placed in loose lifts not more than 8-inches-thick and compacted. The fill should be compacted to at least 90% of the maximum density obtainable by the ASTM D1557-12 test method. In areas to support structures the upper 12 inches should be compacted to a minimum of 95% relative compaction. The moisture content of the on-site soils at the time of compaction should vary no more than 2% below or above optimum moisture content.

Material for Fill

The on-site soils, less any debris or organic matter, can be used in required fills. Rock fragments and cobbles larger than 3 inches in diameter should not be used in the fill unless site specific criteria are developed and implemented. Rock fragments and cobbles greater than 3 inches in diameter should only be allowed in nonstructural areas where future piles and other foundation excavation would not be performed. They should need special placement and compaction procedures.

5.8 Paved, Gravel, and Dirt Road Construction

For asphalt paving, the required paving and base thicknesses will depend on the expected wheel loads and volume of traffic (Traffic Index or TI). Assuming that the paving subgrade is prepared as recommended in the grading section, the minimum recommended paving thicknesses are presented in the following table.

Assumed Traffic Index	Asphalt Concrete (Inches)	Base Course (Inches)
4 (Automobile Parking)	3	4
5 (Driveways with Light Truck Traffic)	3	4
6 (Driveways with Heavy Truck Traffic)	4	4

The asphalt paving sections were determined using the Caltrans design method assuming R-value of 74 obtained from our laboratory test results. We can determine the recommended paving and base course thicknesses for other Traffic Indices if required. Careful inspection is recommended to verify that the recommended thicknesses or greater are achieved, and that proper construction procedures are followed.

For gravel and dirt roads, the areas should be prepared in accordance with Site Preparation/Removals (Section 5.7). The roadways should be over-excavated a minimum of 12 inches below subgrade or to competent native materials, whichever is greater, and replaced with 12 inches of compacted fill compacted to a minimum of 95% of the maximum density obtainable by the ASTM D1557-12 test method. For gravel roads, the roadways should be underlain by 6 inches of Class 2 base compacted to 95% relative compaction. 6 inches of Class 2 base layer is not required for dirt roads.

5.9 Infiltration

The results of our field permeability tests indicate that infiltration is feasible within the soil layers tested. The infiltration system should be designed by the project civil engineer depending on the volume of water expected to be discharged into the infiltration system. This procedure is described under the Percolation Test Procedure Section VII.3.8 in the Orange County Technical Guidance Document Appendices, which is used by San Bernardino County as their Infiltration Rate Evaluation Protocol (OC TGD).

The infiltration rates were calculated according to the procedure described in Appendix VII (OC TGD). A summary of the methodology and the calculations are presented in Appendix C. The calculated infiltration rates from the two field permeability tests are 4.4 and 5.1 inch/hour. No safety factor has been applied.

5.10 Geotechnical Observation

The reworking of the upper soils and the compaction of all required fill should be observed and tested by the geotechnical consultant. The observation and testing should include:

- Observe the clearing and grubbing operations for proper removal of unsuitable materials.
- Observe pile excavations prior to placement of reinforcement.
- Observe the fill and backfill for uniformity during placement.
- Test backfill for field density and compaction to determine the percentage of compaction achieved during backfill placement.
- Observe and probe foundation materials to confirm that suitable bearing materials are present at the design foundation depths.

The governmental agencies having jurisdiction over the project should be notified prior to commencement of grading so that the necessary grading permits may be obtained and arrangements may be made for the required inspection(s).

Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical consultants practicing in this or similar localities. No other warranty, express or implied, is made as to the professional advice included in this report.

The recommendations provided in this report are based upon our understanding of the described project information and on our interpretation of the data collected during our prior subsurface explorations. We have made our recommendations based upon experience with similar subsurface conditions under similar loading conditions. The recommendations apply to the specific project discussed in this report; therefore, any change in the structure configuration, loads, location, or the site grades should be provided to us so that we can review our conclusions and recommendations and make any necessary modifications.

The recommendations provided in this report are also based upon the assumption that the necessary geotechnical observations and testing during construction will be performed by representatives of our firm. The field observation services are considered a continuation of the geotechnical investigation and essential to verify that the actual soil conditions are as expected. This also provides for the procedure whereby the client can be advised of unexpected or changed conditions that would require modifications of our original recommendations. If another firm is retained for the geotechnical observation services, our professional responsibility and liability would be limited to the extent that we would not be the geotechnical engineer of record.

6.0 References

Amec Foster Wheeler, 2017, Geotechnical Data Report, Proposed Newberry Springs Site 2 500kV Midline Capacitor Project, Part of Eldorado-Lugo-Mohave Series Capacitor Project, East of Pisgah Substation, San Bernardino County, California, Project No. 4953-17-0222, dated December 5, 2018.

California Geological Survey, 2002, California Geomorphic Provinces, Note 36.

California Geological Survey, 2003a, State of California Earthquake Fault Zones, Hector Quadrangle, Revised Official Map Effective: May 1, 2003.

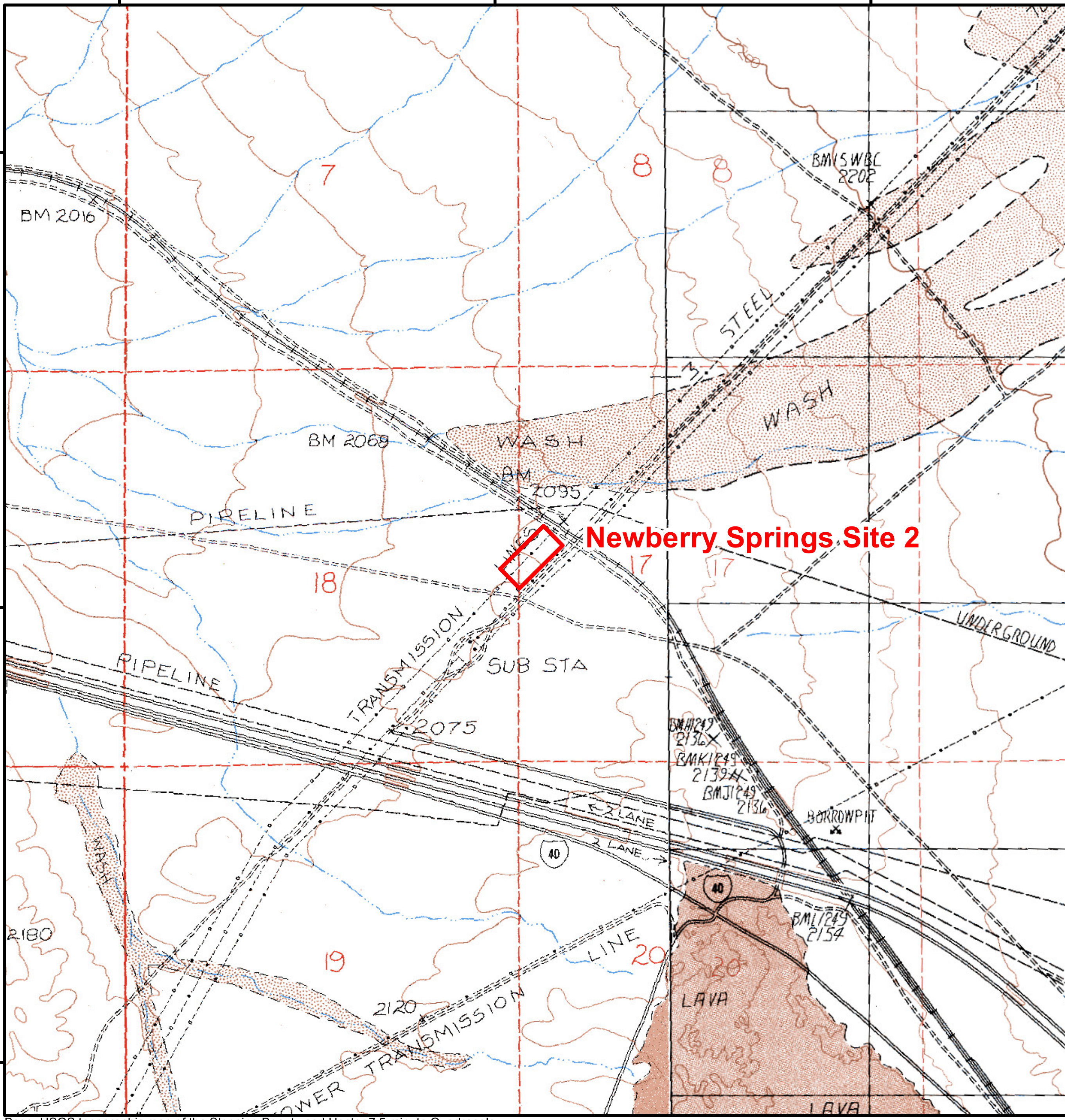
California Geological Survey, 2003b, State of California Earthquake Fault Zones, Sleeping Beauty Quadrangle, Official Map Effective: May 1, 2003.

Phelps, G.A., Bedford, D.R., Lidke, D.J., Miller, D.M., and Schmidt, K.M., 2012, Preliminary Surficial Geologic Map of the Newberry Springs 30′ x 60′ Quadrangle, U.S. Geological Survey Open File Report 2011-1044, scale 1:100,000.

Wood, 2018, Geotechnical Foundation Design Parameters, Eldorado Lugo-Mohave Series Capacitor Upgrade Project, Newberry Springs Substation SC2 Site, East of Pisgah Substation, San Bernardino County, California, Project No. 4953-18-0131.02.

Figure 1

Site Vicinity Map

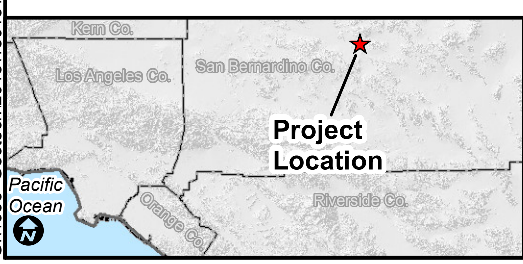


Base: USGS topographic map of the Sleeping Beauty and Hector 7.5 minute Quadrangle

0 1,000 2,000 4,000 Feet

0 0.2 0.4 0.8 Miles

N E S W



wood.

Wood
Environment & Infrastructure Solutions, Inc.
6001 Rickenbacker Road
Los Angeles, California 90040
T 323.889.5300 F 323.721.6700

Proposed Newberry Springs Site 2 500 kV Midline Capcitor Project
Part of the Eldorado-Lugo-Mohave Series Capacitor Project
Near Pisgah, San Bernardino County, California

LAT:	34.7850
LON:	-116.3821
SCALE:	1:24,000
DRAWN:	PER
CHECK:	XXX
DATE:	7/6/2018

SITE VICINITY MAP

FIGURE: 1

PROJECT: 4953-18-0131

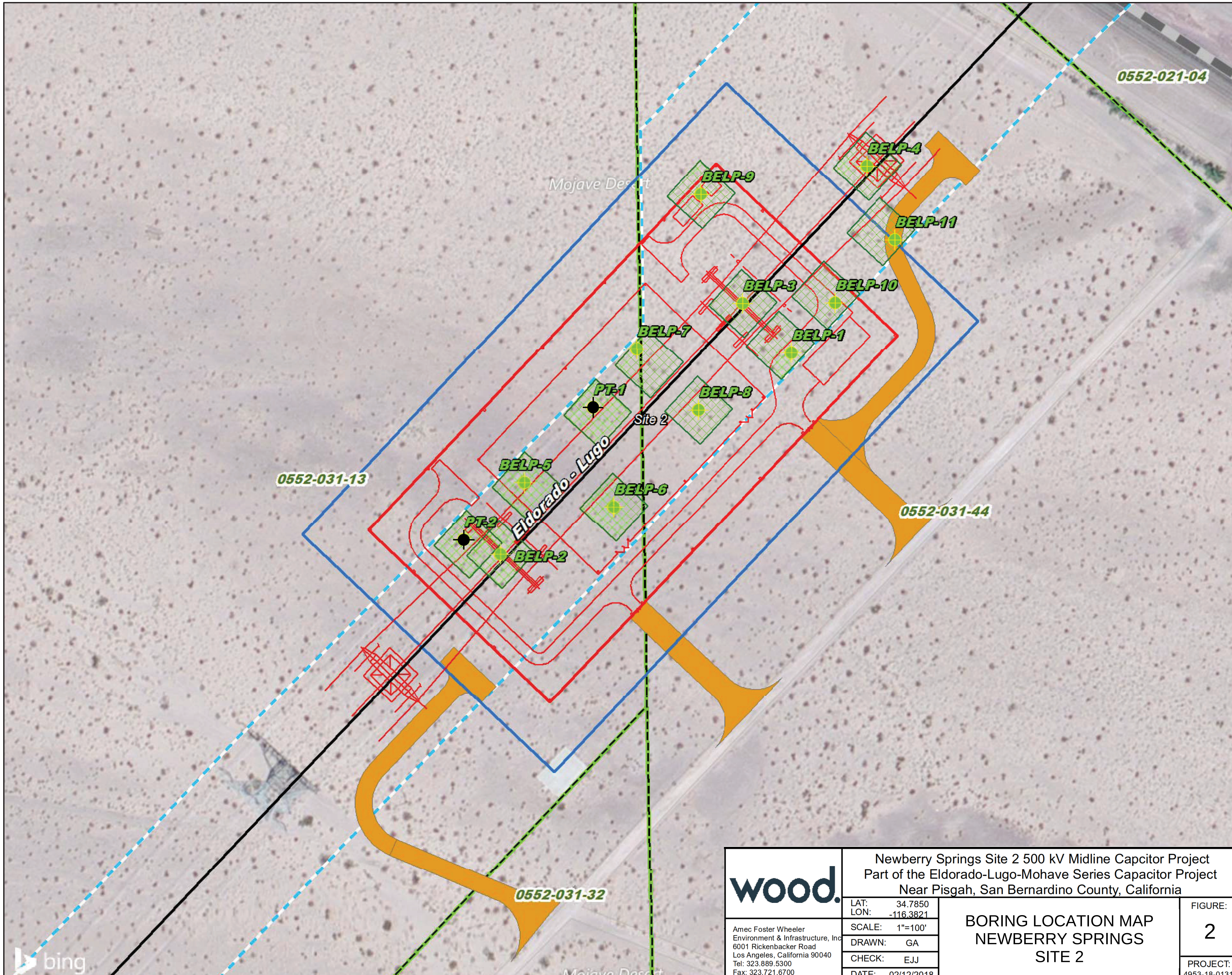
G:\4953 Geotech\2018\180131 Beta Newberry Ludlow Mohave\GIS\4953180131 Figure 1 Site Vicinity Map Site2.mxd

Figure 2

Boring Location Map

ELDORADO MOHAVE LUGO SERIES CAPACITOR PROJECT

Geotechnical: Capacitor Site 2



Legend

- Soil Boring Locations
- Boring Staging Disturbance Areas (50'x50')
- Transmission Existing Lines
- Capacitor Footprint
- Access Road Area
- Grading Limit
- Right of Way
- Property Boundary
- Permeability Test Locations (PT-2)

0 37.5 75 150 Feet

1 in = 100 feet

Date: 2/27/2017
File Name: ELMSC_Capacitor_Site2_Geotech_20170227.mxd
Version #: 01
Created By: J. Le
Real Properties Geospatial Analysis

Features depicted herein are planning level accuracy, and intended for informational purposes only. Distances and locations may be distorted at this scale. Always consult with the proper legal documents or agencies regarding such features. Real Properties Department

SOUTHERN CALIFORNIA EDISON

wood.

Amec Foster Wheeler
Environment & Infrastructure, Inc
6001 Rickenbacker Road
Los Angeles, California 90040
Tel: 323.889.5300
Fax: 323.721.6700

Newberry Springs Site 2 500 kV Midline Capcitor Project
Part of the Eldorado-Lugo-Mohave Series Capacitor Project
Near Pisgah, San Bernardino County, California

LAT:	34.7850
LON:	-116.3821
SCALE:	1"=100'
DRAWN:	GA
CHECK:	EJJ
DATE:	02/12/2018

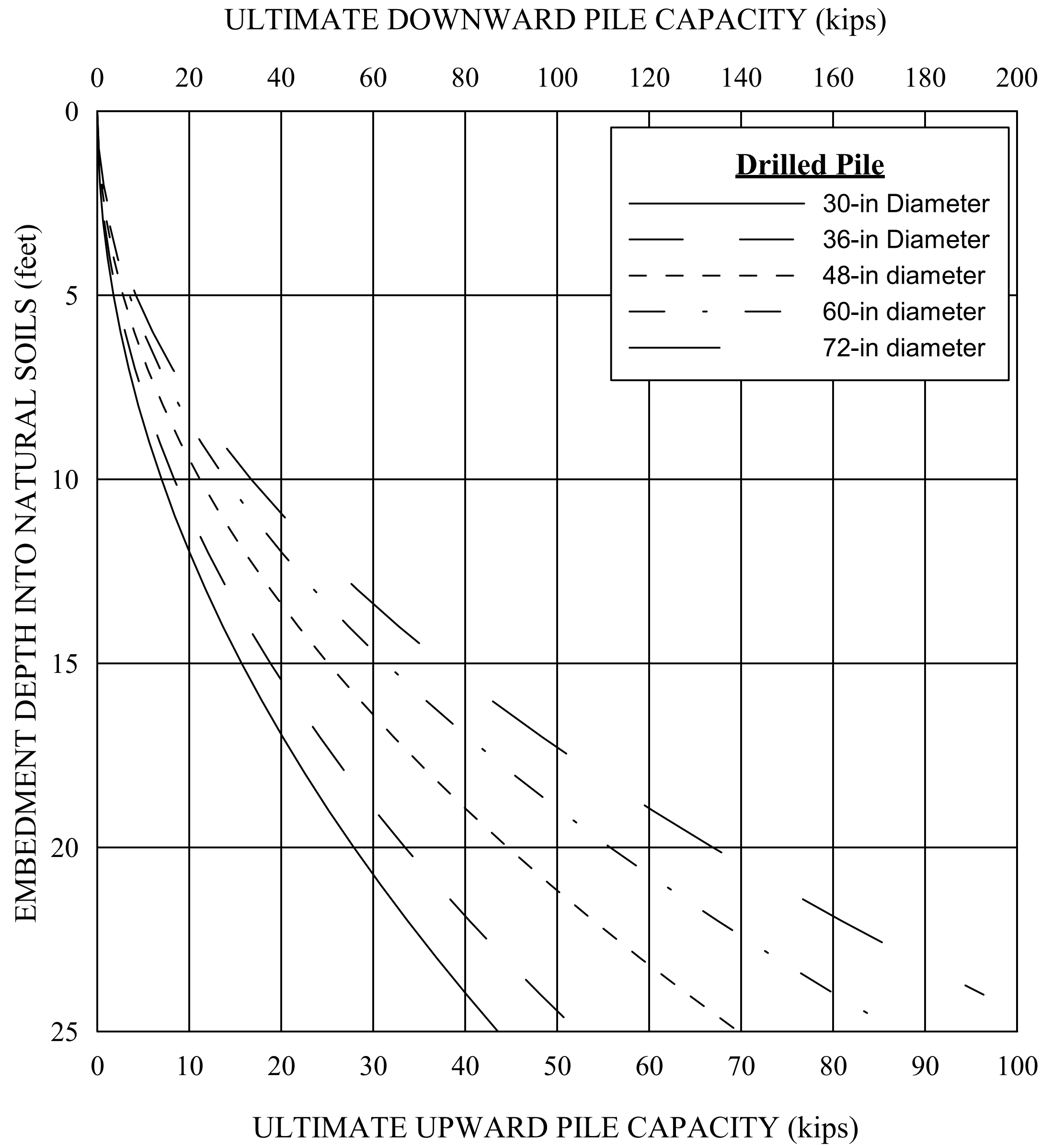
BORING LOCATION MAP
NEWBERRY SPRINGS
SITE 2

FIGURE: 2

PROJECT: 4953-18-0131

Figure 3

Drilled Shaft Capacities



NOTES:

(1) The allowable capacities can be obtained by dividing the indicated value by 2.

(2) The indicated values refer to the total of dead plus live loads; a one-third increase may be used when considering wind or seismic loads analyses.

(3) The indicated values are based on the strength of the soils; the actual pile capacities may be limited to lesser values by the strength of the existing piles.

(4) The capacities shown are based on skin friction only.

(5) It may be prudent to neglect the upper one foot of pile embedment.

Prepared/Date: GA 2/9/2018
Checked/Date: EJJ 2/12/2018

SCE Capacitor Upgrade Project Newberry Springs Site San Bernardino County, California	wood.	DRILLED PILE CAPACITIES Project No. 4953-18-0131 Figure 3

Appendix A

Boring Logs

APPENDIX A
FIELD EXPLORATIONS

The geotechnical conditions at the site were explored by the excavation of eleven borings at the locations shown on Figure 2, Boring Location Map. The logs of the borings are presented in Figures A-1.1 through A-1.11. Prior to drilling, the boring locations were marked in the field and Underground Services Alert was notified to mark the location of known utilities. A geophysical survey of each of the proposed boring locations was performed by our subcontractor GEOVision to identify possible buried utilities in the vicinity. As an added precaution, the upper five feet of the borings was hand augered.

The borings were drilled using track-mounted hollow-stem auger drilling equipment. The hollow stem borings were drilled to depths of 16, 16½ and 50½ to 51½ feet below the existing grade with one hole stopped at 39 feet due to refusal. The diameter of the borings was 8 inches. Groundwater was not encountered to the maximum depth drilled of 51½ feet below the existing grade.

The soils encountered were logged in the field by our technician and relatively undisturbed and bulk samples were obtained for laboratory inspection and testing. The depths at which samples were obtained are indicated on the left side of the boring logs. Relatively undisturbed samples were obtained using California Modified ring samplers. The number of blows required to drive the samplers 12 inches using a 140 pound hammer falling 30 inches is indicated on the boring logs. In addition to obtaining undisturbed samples, standard penetration tests (SPT) were performed. The number of blows required to drive the samplers 18 inches using a 140 pound hammer falling 30 inches is indicated on the boring logs. The soils are classified in the accordance with the Unified Soil Classification System described on Figure A-2.

BORING BELP-1

DATE DRILLED: November 2, 2017
EQUIPMENT USED: Hollow Stem Auger
HOLE DIAMETER (in.): 8
ELEVATION (ft.): 2,088**

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT** (blows/ft)	SAMPLE LOC.	USCS	DESCRIPTION
	0						SP-SM	POORLY GRADED SAND with SILT - medium dense, moist, light brown, fine to coarse grained, few silt, uncemented (6% Passing No. 200 Sieve) Bulk sample from 0 to 5-feet
2085			1.2	108	19			
	5		2.0	108	37			Medium dense, light orange brown, fine to medium grained, little coarse
2080			4.6	102	90			Very dense, brown with white caliche cementation
								Becomes coarser
	10		2.9	118	92/11"			Brown, fine to coarse grained, 24% fine gravel, partial caliche cementation (10% Passing No. 200 Sieve) Becomes coarser with gravel and small cobbles
2075							SP	POORLY GRADED SAND with GRAVEL - very dense, moist, brown, fine to coarse grained, up to 40% fine gravel
	15	66						
								END OF BORING AT 16½ FEET
2070								
	20							
2065								
	25							
2060								
	30							
2055								
	35							
2050								
	40							

NOTES:
Groundwater was not encountered. Boring was backfilled with soil cuttings, and tamped

*Number of blows required to drive the Modified California sampler 12-inches using a 140-pound automatic hammer falling 30-inches.
**Approximate elevations were based on topographic map from SCE.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

B12SOIL_CRANDALL(ELE) C:\USERS\PUBLIC\DOCUMENTS\BENTLEY\GINT\LIBRARIES\LIBRARY AMEC JUNE2012.GLB
P:\4953 GEOTECH\2017-PROJ\170222 SCE NEWBERRY SPRINGS SITE 2\3.2 ALL FIELD NOTES\GINT\4953-17-0222_BORING_LOGS.GPJ 11/30/17

Field Tech: AR
Prepared By: KSH
Checked By: GA

BORING BELP-2

DATE DRILLED: November 1, 2017
EQUIPMENT USED: Hollow Stem Auger
HOLE DIAMETER (in.): 8
ELEVATION (ft.): 2,081**

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT** (blows/ft)	USCS	DESCRIPTION
2080	0					SM	SILTY SAND with GRAVEL - very dense, moist, light brown, fine to coarse grained, little silt, 27% gravel, uncemented (13% Passing No. 200 Sieve) Bulk sample from 0 to 5-feet
					50/2"		No recovery Reddish brown with some caliche
2075	5		4.6	111	57	SM	SILTY SAND with GRAVEL - dense, moist, light orange brown, little silt, up to 50% fine to coarse grained, fine to coarse gravel, uncemented
			7.0	87	50/4"		Trace silt
							8 to 10-inch cobble
2070	10		4.9	106	50/4"	SP-SM	POORLY GRADED SAND with SILT and GRAVEL - very dense, moist, light orange brown, fine to coarse grained (9% Passing No. 200 Sieve)
2065	15	55					Small bag sample from 15 to 20-feet
2060	20				50/3"	SP	No recovery POORLY GRADED SAND with GRAVEL - very dense, moist, light brown, fine to coarse grained, trace silt, up to 35% gravel, 5 to 10% 3 to 6-inch cobbles
2055	25	86				SP-SM	POORLY GRADED SAND with SILT - very dense, moist, fine to coarse grained, few silt, 14% gravel (9% Passing No. 200 Sieve)
2050	30				50/4"		No recovery, small bag sample from bit
2045	35	62/6"					
	40						

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared By: KSH
Checked By: GA

BORING BELP-2 (Continued)

DATE DRILLED: November 1, 2017
EQUIPMENT USED: Hollow Stem Auger
HOLE DIAMETER (in.): 8
ELEVATION (ft.): 2,081**

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT** (blows/ft)	SAMPLE LOC.	USCS	DESCRIPTION
2040								Gravel and cobble layer
			3.0	120	50/5"		SP	POORLY GRADED SAND with GRAVEL - very dense, moist, light pinkish brown, fine grained, some medium to coarse, up to 35% fine gravel, 5% 3 to 6-inch cobbles
2035	45	63/6"						
2030	50				75/6"			No recovery, small bag sample from bit END OF BORING AT 50½ FEET
2025	55							
2020	60							
2015	65							
2010	70							
2005	75							
	80							

NOTES:
Groundwater was not encountered. Boring was backfilled with soil cuttings, and tamped

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: AR
Prepared By: KSH
Checked By: GA

BORING BELP-3

DATE DRILLED: November 2, 2017
EQUIPMENT USED: Hollow Stem Auger
HOLE DIAMETER (in.): 8
ELEVATION (ft.): 2,086**

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT** (blows/ft)	SAMPLE LOC.	USCS	DESCRIPTION
2085							SP-SM	POORLY GRADED SAND with SILT - medium dense, moist light brown, fine to coarse grained, up to 5% gravel, few silt, uncemented Bulk sample from 0 to 5-feet
			1.1	108	19			
2080	5		1.3	106	17			Fine grained, some medium, trace coarse, 5% fine gravel
			2.2	112	98/10"		GP-GM	POORLY GRADED GRAVEL with SILT and SAND - very dense, moist, light brown, 51% fine to coarse gravel, fine to coarse sand, few silt, 2 to 5% 3 to 6-inch cobbles (8% Passing No. 200 Sieve)
2075	10		5.8	109	72/6"			Light pinkish brown, 10% fine gravel
							SC	CLAYEY SAND - very dense, moist, orange brown, fine to medium grained, some clay
	15							Small bag sample from 15 to 20-feet
2070		91/11"					SM	SILTY SAND with GRAVEL - very dense, moist, light gray brown, fine to coarse grained, up to 30% gravel, little silt, partial caliche cementation
2065	20		2.5	98	50/2"			Little medium sand, few coarse, up to 30% gravel
2060	25	70					SP-SM	POORLY GRADED SAND with SILT and GRAVEL - very dense, moist, light gray brown, fine grained, little medium, few coarse, 38% gravel (10% Passing No. 200 Sieve)
2055	30		6.9	96	50/4"			Little coarse sand, trace coarse gravel
								Coarse gravel layer, no cobbles
2050	35	50/4"						33% gravel (10% Passing No. 200 Sieve)
	40							

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared By: KSH
Checked By: GA

BORING BELP-3 (Continued)

DATE DRILLED: November 2, 2017
EQUIPMENT USED: Hollow Stem Auger
HOLE DIAMETER (in.): 8
ELEVATION (ft.): 2,086**

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT** (blows/ft)	SAMPLE LOC.	Description
					82/6"		No recovery
2045							Up to 30% gravel, 2 to 5% 3 to 6-inch cobbles
2040	45	73/6"					33% gravel (10% Passing No. 200 Sieve)
2035	50	98/9"					Up to 20% gravel
							END OF BORING AT 51½ FEET
2030	55						
2025	60						
2020	65						
2015	70						
2010	75						
	80						

NOTES:
Groundwater was not encountered. Boring was backfilled with soil cuttings, and tamped

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

B12SOIL_CRANDALL(ELE) C:\USERS\PUBLIC\DOCUMENTS\BENTLEY\GINT\LIBRARIES\LIBRARY AMEC JUNE2012.GLB
P:\4953 GEOTECH\2017-PROJ\170222 SCE NEWBERRY SPRINGS SITE 2\3.2 ALL FIELD NOTES\GINT\4953-17-0222_BORING_LOGS.GPJ 11/30/17

Field Tech: AR
Prepared By: KSH
Checked By: GA

BORING BELP-4

DATE DRILLED: November 3, 2017
EQUIPMENT USED: Hollow Stem Auger
HOLE DIAMETER (in.): 8
ELEVATION (ft.): 2,089**

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT** (blows/ft)	SAMPLE LOC.	USCS	DESCRIPTION
							SP-SM	POORLY GRADED SAND with SILT - medium dense, moist, light brown, fine grained, little medium, few silt, uncemented (6% Passing No. 200 Sieve) Bulk sample from 0 to 5-feet
			1.9	112	34			
2085								4 to 6-inch cobble
	5		3.5	110	43			Light pinkish brown, fine grained, little medium to coarse, less than 5% fine gravel, caliche
			3.9	109	85			Very dense, light brown, few medium to coarse sand, up to 20% fine to coarse gravel
2080								
	10		4.1	106	95/9"			Light pinkish brown, trace medium to coarse sand, 23% gravel (9% Passing No. 200 Sieve)
2075								
	15	53/6"					SM	SILTY SAND - very dense, moist, light brown, slightly finer layer with trace clay, 14% gravel (17% Passing No. 200 Sieve) Small bag sample from 15 to 20-feet
							SP-SM	POORYL GRADED SAND with SILT
								6 to 8-inch cobble
2070								
	20		3.6	100	50/4"		SP-SM	POORLY GRADED SAND with SILT and GRAVEL - very dense, moist, brown, some medium to coarse sand, 20% gravel, 5% 3 to 6-inch cobbles
2065								
	25	98/11"					SP-SM	POORLY GRADED SAND with SILT and GRAVEL - very dense, moist, brown, fine to coarse grained, 26% fine to coarse gravel, few silt (8% Passing No. 200 Sieve)
2060								
	30		3.8	108	50/6"			Light brown
2055								
	35	50/4.5"						24% gravel (8% Passing No. 200 Sieve)
								8 to 10-inch cobble
2050								
	40							

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

B12SOIL_CRANDALL(ELE) C:\USERS\PUBLIC\DOCUMENTS\BENTLEY\GINT\LIBRARIES\LIBRARY AMEC JUNE2012.GLB
P:\4953 GEOTECH\2017-PROJ\170222 SCE NEWBERRY SPRINGS SITE 2\3.2 ALL FIELD NOTES\GINT\4953-17-0222_BORING_LOGS.GPJ 11/30/17

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared By: KSH
Checked By: GA

Proposed Newberry Springs Site 2
500kV Midline Capacitor Project

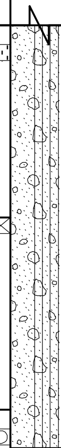
amec foster wheeler

LOG OF BORING
Project: 4953-17-0222
Figure: A-1.4a

BORING BELP-4 (Continued)

DATE DRILLED: November 3, 2017
EQUIPMENT USED: Hollow Stem Auger
HOLE DIAMETER (in.): 8
ELEVATION (ft.): 2,089**

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT** (blows/ft)	SAMPLE LOC.	DESCRIPTION
			4.3	110	50/5"		Up to 35% gravel, 10% 3 to 6-inch cobbles
2045	45	100/5"					
2040	50				50/5"		No recovery, small bag sample from bit
							END OF BORING AT 51 FEET
2035	55						
2030	60						
2025	65						
2020	70						
2015	75						
2010	80						



NOTES:
Groundwater was not encountered. Boring was backfilled with soil cuttings, and tamped

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: AR
Prepared By: KSH
Checked By: GA

BORING BELP-5

DATE DRILLED: November 1, 2017
EQUIPMENT USED: Hollow Stem Auger
HOLE DIAMETER (in.): 8
ELEVATION (ft.): 2,081**

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT** (blows/ft)	SAMPLE LOC.	USCS	DESCRIPTION
2080	0						SM	SILTY SAND with GRAVEL - very dense, moist, light pinkish brown, fine grained, little medium to coarse, up to 15% fine to coarse gravel, 5% 4 to 5-inch cobbles white calice cementation Bulk sample from 0 to 5-feet
			4.6	114	79			25% gravel (16% Passing No. 200 Sieve)
2075	5		4.3	104	50/4"			Uncemented, some medium to coarse sand, up to 40% fine to coarse gravel, 5 to 10% 3 to 6-inch cobbles
			3.1	113	50/3"			Few medium to coarse sand
2070	10	85					SP-SM	POORLY GRADED SAND with SILT and GRAVEL - very dense, moist, light pinkish brown, fine grained, few medium to coarse, 38% gravel (11% Passing No. 200 Sieve) 8 to 10-inch cobble
2065	15				50/3"			No recovery Small bag sample from 15 to 20-feet Coarse gravel/cobble layer
								Coarse gravel/cobble layer
2060	20	50/4"						Up to 30% gravel, 2 to 5% 3 to 6-inch cobbles
2055	25		2.6	108	50/3"			Little medium to coarse sand, 15 to 25% fine to coarse gravel
2050	30	50/5"					SP-SM	POORLY GRADED SAND with SILT - up to 5% gravel
							SP-SM	POORLY GRADED SAND with SILT and GRAVEL - up to 20% gravel
2045	35				50/2"			
	40							

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared By: KSH
Checked By: GA

BORING BELP-5 (Continued)

DATE DRILLED: November 1, 2017
EQUIPMENT USED: Hollow Stem Auger
HOLE DIAMETER (in.): 8
ELEVATION (ft.): 2,081**

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT** (blows/ft)	SAMPLE LOC.	USCS	DESCRIPTION
2040		65				X	SP-SM	POORLY GRADED SAND with SILT - very dense, moist, light brown with gray caliche stringers, fine to medium grained, few silt, 5% gravel
							SP	POORLY GRADED SAND with GRAVEL - very dense, moist, fine to medium grained, up to 30% gravel
2035	45				50/2"			No recovery
2030	50	67/6"				X		
								END OF BORING AT 51 FEET
2025	55							
2020	60							
2015	65							
2010	70							
2005	75							
	80							

NOTES:
Groundwater was not encountered. Boring was backfilled with soil cuttings, and tamped

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: AR
Prepared By: KSH
Checked By: GA

BORING BELP-6

DATE DRILLED: October 31, 2017
EQUIPMENT USED: Hollow Stem Auger
HOLE DIAMETER (in.): 8
ELEVATION (ft.): 2,083**

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT** (blows/ft)	SAMPLE LOC.	USCS	DESCRIPTION
	0						SP-SM	POORLY GRADED SAND with SILT and GRAVEL - very dense, moist, fine to medium grained, some coarse, 25% gravel, 2 to 5% 3 to 8-inch cobbles, few silt (12% Passing No. 200 Sieve) Bulk sample from 0 to 5-feet
2080			3.0	105	50/5"			
								10 to 15% 3 to 6-inch cobbles
	5		3.9	109	52/6"			light pinkish brown, fine grained, few medium to coarse, 15 to 25% fine gravel, some caliche
2075			5.2	112	86			
	10		2.3	104	97/8"			Fine to coarse grained, uncemented Less gravel
2070								
	15							Small bag sample from 15 to 20-feet
		66/6"					SM	SILTY SAND with GRAVEL - very dense, moist, light pinkish brown, fine grained, few medium to coarse, 23% gravel, little silt (14% Passing No. 200 Sieve) Coarse gravel/small cobble layer
2065								
	20				50/4"		SP	No recovery POORLY GRADED SAND with GRAVEL - very dense, moist, light brown, fine to medium grained, some coarse, up to 40% gravel, 5 to 10% 3 to 6-inch cobbles
					59/6"			No recovery, small bag sample from bit
2060								
	25				50/4"			
2055								Coarse gravel/small cobble layer
	30		2.1	99	50/3"		SP-SM	POORLY GRADED SAND with SILT and GRAVEL - very dense, moist, light pinkish brown, fine to medium grained, little coarse, 15 to 25% fine to coarse gravel, few silt
2050								
	35	50/5"						
2045								
	40							

(CONTINUED ON FOLLOWING FIGURE)

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Field Tech: AR
Prepared By: KSH
Checked By: GA

Proposed Newberry Springs Site 2
500kV Midline Capacitor Project

amec foster wheeler

LOG OF BORING
Project: 4953-17-0222 Figure: A-1.6a

BORING BELP-6 (Continued)

DATE DRILLED: October 31, 2017
EQUIPMENT USED: Hollow Stem Auger
HOLE DIAMETER (in.): 8
ELEVATION (ft.): 2,083**

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT** (blows/ft)	SAMPLE LOC.	DESCRIPTION
					50/2"		No recovery Some coarse sand, 20 to 30% gravel, 5 to 10% 3 to 6-inch cobbles
					50/3"		No recovery, small bag sample from bit and two disturbed rings Coarse gravel/small cobble layer
2040							
	45	59/6"					
2035							
	50	57/6"					No recovery END OF BORING AT 50½ FEET NOTES: Groundwater was not encountered. Boring was backfilled with soil cuttings, and tamped
2030							
	55						
2025							
	60						
2020							
	65						
2015							
	70						
2010							
	75						
2005							
	80						

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Field Tech: AR
Prepared By: KSH
Checked By: GA

BORING BELP-7

DATE DRILLED: October 31, 2017
EQUIPMENT USED: Hollow Stem Auger
HOLE DIAMETER (in.): 8
ELEVATION (ft.): 2,087**

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT** (blows/ft)	SAMPLE LOC.	USCS	DESCRIPTION
2085							SP-SM	POORLY GRADED SAND with SILT - medium dense, moist, light orange brown, fine to medium grained, little coarse, 1% gravel, few silt, uncemented (8% Passing No. 200 Sieve) Bulk sample from 0 to 5-feet
			1.9	107	27			
								4-inch cobble
	5							
			1.3	103	36		SM	No recovery SILTY SAND - dense, moist, light brown, fine to coarse grained, 5 to 10% fine to coarse gravel, little silt
2080							GP	POORLY GRADED GRAVEL with SAND - coarse gravel, some small cobbles
							SP	POORLY GRADED SAND with GRAVEL - up to 30% gravel, 2 to 5% 3 to 5-inch cobbles
	10				50/6"			No recovery very dense, up to 30% gravel, 2 to 5% 3 to 5-inch cobbles
2075								
	15	50/5"						Small bag sample from 15 to 20-feet 2-inch gravel in sample
2070								
	20		3.4	116	96		SW	WELL GRADED SAND with GRAVEL - very dense, moist, light orange brown, up to 30% fine to coarse gravel
2065								3 to 4-inch cobble
	25	43					SW	WELL GRADED SAND - dense, moist, light orange brown, few silt
							SM	SILTY SAND - dense, moist, light orange brown, fine to coarse grained, 5% gravel, little silt (17% Passing No. 200 Sieve)
2060							SW	WELL GRADED SAND with GRAVEL - very dense, moist, light orange brown, 30 to 45% fine to coarse gravel
								Coarse gravel/small cobble layer
	30		3.3	110	62/6"		SP	POORLY GRADED SAND - very dense, moist, light pinkish brown, fine grained, little medium, trace coarse, 5 to 10% fine gravel
2055								
	35	50/3"						
2050								Coarse gravel/small cobble layer
	40							

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(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared By: KSH
Checked By: GA

BORING BELP-7 (Continued)

DATE DRILLED: October 31, 2017
EQUIPMENT USED: Hollow Stem Auger
HOLE DIAMETER (in.): 8
ELEVATION (ft.): 2,087**

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT** (blows/ft)	SAMPLE LOC.	DESCRIPTION
					50/3"		Some medium to coarse sand, 15 to 25% gravel
2045							Coarse gravel layer
	45	50/3"					
2040							
	50				67/6"		No recovery, small bag sample from bit END OF BORING AT 50½ FEET
2035							NOTES: Groundwater was not encountered. Boring was backfilled with soil cuttings, and tamped
	55						
2030							
	60						
2025							
	65						
2020							
	70						
2015							
	75						
2010							
	80						

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: AR
Prepared By: KSH
Checked By: GA

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P:\4953 GEOTECH\2017-PROJ\170222 SCE NEWBERRY SPRINGS SITE 2\3.2 ALL FIELD NOTES\GINT\4953-17-0222_BORING_LOGS.GPJ 11/30/17

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BORING BELP-8

DATE DRILLED: October 31, 2017
EQUIPMENT USED: Hollow Stem Auger
HOLE DIAMETER (in.): 8
ELEVATION (ft.): 2,087**

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT** (blows/ft)	SAMPLE LOC.
2085						
			1.8	107	35	
	5				53/6"	
2080						
			3.5	112	61/6"	
	10				50/2"	
2075						
	15	45				
2070						
	20				50/3"	
2065						
	25	57/6"				
2060						
	30				65/6"	
2055						
	35	63/6"				
2050						
	40					

USCS	DESCRIPTION
SP-SM	POORLY GRADED SAND with SILT - medium dense, dry to moist, light pinkish brown, fine to medium grained, trace coarse, 4% fine gravel, few silt, uncemented (8% Passing No. 200 Sieve) Bulk sample from 0 to 5-feet
	8 to 10-inch cobble
	Very dense, some coarse sand, up to 35% gravel No recovery, small bag sample from bit
	5 to 10% 3 to 6-inch cobbles
	No recovery
	Some gray caliche cementation, 5 to 10% gravel
SM	SILTY SAND with GRAVEL - dense, moist, light pinkish brown, fine to coarse grained, 19% gravel, little silt (19% Passing No. 200 Sieve)
	No recovery Up to 20% gravel, 2 to 5% 3 to 6-inch cobbles
	Light brown, fine to medium grained, some coarse, up to 40% gravel, 2 to 5% 6 to 8-inch cobbles More abundant gravel and cobbles
	Less gravel and cobbles
	No recovery
SP	POORLY GRADED SAND - very dense, moist, light pinkish brown, fine to coarse grained, less gravel and cobbles
	3 to 6-inch cobbles
	10 to 20% gravel

Field Tech: AR
Prepared By: KSH
Checked By: GA

(CONTINUED ON FOLLOWING FIGURE)

BORING BELP-8 (Continued)

DATE DRILLED: October 31, 2017
EQUIPMENT USED: Hollow Stem Auger
HOLE DIAMETER (in.): 8
ELEVATION (ft.): 2,087**

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT** (blows/ft)	SAMPLE LOC.	DESCRIPTION
					50/2"		No recovery, small bag sample from bit 5 to 10% 3 to 6-inch cobbles, up to 25% gravel
2045							
	45	49/6"					
2040							Coarse gravel layer
	50				50/4"		No recovery END OF BORING AT 51 FEET
2035							NOTES: Groundwater was not encountered. Boring was backfilled with soil cuttings, and tamped
	55						
2030							
	60						
2025							
	65						
2020							
	70						
2015							
	75						
2010							
	80						

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: AR
Prepared By: KSH
Checked By: GA

BORING BELP-9

DATE DRILLED: November 2, 2017
EQUIPMENT USED: Hollow Stem Auger
HOLE DIAMETER (in.): 8
ELEVATION (ft.): 2,088**

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT** (blows/ft)	SAMPLE LOC.	USCS	DESCRIPTION
	0						SP-SM	POORLY GRADED SAND with SILT - medium dense, moist, light orange brown, fine to coarse grained, few silt, uncemented (8% Passing No. 200 Sieve) Bulk sample from 0 to 5-feet
2085			1.2	110	21			
	5							
			5.9	114	71			Dense, white caliche cementation, dark orange brown, fine to medium grained, little coarse, up to 15% fine gravel
2080			5.4	113	64			Fine grained, little medium to coarse
	10		3.5	105	50/3"			Very dense, less caliche, uncemented, some medium to coarse sand, up to 10% fine to coarse gravel
2075								
	15	37						Small bag sample from 15 to 20-feet
							SM	SILTY SAND - very dense, moist, dark orange brown, fine to coarse grained, little silt, 2% gravel (24% Passing No. 200 Sieve)
2070								
	20		4.5	112	50/2"		SP	POORLY GRADED SAND with GRAVEL - very dense, moist, light pinkish brown, fine to medium grained, little coarse, up to 20% gravel, 2 to 5% 3 to 6-inch cobbles
2065								
	25	83/9"						
2060								
	30		4.2	105	50/2"		SP	POORLY GRADED SAND - very dense, moist, light pinkish brown, less than 5% fine to coarse gravel
							GP	POORLY GRADED GRAVEL with SAND - very dense, moist, light pinkish brown, coarse gravel/small cobble layer
2055							SP	POORLY GRADED SAND - very dense, moist, light pinkish brown, less than 5% fine to coarse gravel,
	35	50/3"						
2050								
	40							

END OF BORING AT 39 FEET
Terminated because of large boulder

NOTES:
Groundwater was not encountered. Boring was backfilled with soil cuttings, and tamped

Field Tech: AR
Prepared By: KSH
Checked By: GA

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

BORING BELP-10

DATE DRILLED: November 2, 2017
EQUIPMENT USED: Hollow Stem Auger
HOLE DIAMETER (in.): 8
ELEVATION (ft.): 2,090**

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT** (blows/ft)	SAMPLE LOC.	USCS	DESCRIPTION
	0						SP-SM	POORLY GRADED SAND with SILT - loose, moist, light brown, fine grained, few medium, some coarse, 2 to 5% fine gravel, uncemented (7% Passing No. 200 Sieve) Bulk sample from 0 to 5-feet
			1.2	107	14			
2085	5							
			1.2	106	19			Medium dense
			1.9	110	39			Light orange brown, few coarse sand Some caliche cementation
2080	10							
			5.3	107	66			Dense, caliche, fine grained, little medium to coarse, up to 35% gravel, 2 to 5% 3 to 6-inch cobbles
2075	15	53/6"					SP-SM	POORLY GRADED SAND with SILT and GRAVEL - very dense, moist, light orange brown, fine to medium grained, few silt, 32% gravel, 2 to 5% 3 to 6-inch cobbles (10% Passing No. 200 Sieve) Small bag sample from 15 to 20-feet Coarse gravel/small cobble layer
2070	20		4.0	116	50/3"			Light brown, fine to medium grained, some coarse, up to 35% gravel, 5 to 10% 3 to 6-inch cobbles
2065	25	46					SW	WELL GRADED SAND with GRAVEL - dense, moist, light brown, up to 50% gravel
2060	30				53/6"			Very dense, some caliche No recovery, small bag sample from bit
2055	35	50/4"						
	40							

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared By: KSH
Checked By: GA

Proposed Newberry Springs Site 2
500kV Midline Capacitor Project

amec foster wheeler

LOG OF BORING

Project: 4953-17-0222 Figure: A-1.10a

BORING BELP-10 (Continued)

DATE DRILLED: November 2, 2017
EQUIPMENT USED: Hollow Stem Auger
HOLE DIAMETER (in.): 8
ELEVATION (ft.): 2,090**

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT** (blows/ft)	SAMPLE LOC.	USCS	DESCRIPTION
					71/6"	○	SW	No recovery, small bag sample from bit WELL GRADED SAND - very dense, moist, light orange brown, up to 20% gravel, 5% 3 to 6-inch cobbles, some caliche
2045	45	67/6"				⊠		
2040	50				83/6"	○		No recovery, cobble in bit END OF BORING AT 50½ FEET NOTES: Groundwater was not encountered. Boring was backfilled with soil cuttings, and tamped
2035	55							
2030	60							
2025	65							
2020	70							
2015	75							
	80							

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Field Tech: AR
Prepared By: KSH
Checked By: GA

BORING BELP-11

DATE DRILLED: November 3, 2017
EQUIPMENT USED: Hollow Stem Auger
HOLE DIAMETER (in.): 8
ELEVATION (ft.): 2,090**

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT** (blows/ft)	SAMPLE LOC.	USCS	DESCRIPTION
	0						SP-SM	POORLY GRADED SAND with SILT - medium dense, moist, light orange brown, fine grained, some medium to coarse, few silt, uncemented (7% Passing No. 200 Sieve) Bulk sample from 0 to 5-feet
			1.5	109	29	⊡		
2085	5							Medium dense, trace clay
			2.1	113	41	⊡		4% gravel (8% Passing No. 200 Sieve)
							SP-SM	POORLY GRADED SAND with SILT and GRAVEL - very dense, caliche, up to 35% gravel, 10% 3 to 6-inch cobbles
			3.9	109	97/11"	⊡		
2080	10							
			7.8	102	50/4"	⊡		Partial caliche cementation, little medium to coarse sand, 15% fine gravel
2075	15							
		50/3"				⊠		
								END OF BORING AT 16 FEET
2070	20							
2065	25							
2060	30							
2055	35							
	40							

NOTES:
Groundwater was not encountered. Boring was backfilled with soil cuttings, and tamped

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: AR
Prepared By: KSH
Checked By: GA

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COARSE GRAINED SOILS (More than 50% of material is LARGER than No. 200 sieve size)	GRAVELS (More than 50% of coarse fraction is LARGER than the No. 4 sieve size)	CLEAN GRAVELS (Little or no fines)	GW	Well graded gravels, gravel - sand mixtures, little or no fines.
			GP	Poorly graded gravels or grave - sand mixtures, little or no fines.
		GRAVELS WITH FINES (Appreciable amount of fines)	GM	Silty gravels, gravel - sand - silt mixtures.
			GC	Clayey gravels, gravel - sand - clay mixtures.
	SANDS (More than 50% of coarse fraction is SMALLER than the No. 4 Sieve Size)	CLEAN SANDS (Little or no fines)	SW	Well graded sands, gravelly sands, little or no fines.
			SP	Poorly graded sands or gravelly sands, little or no fines.
		SANDS WITH FINES (Appreciable amount of fines)	SM	Silty sands, sand - silt mixtures
			SC	Clayey sands, sand - clay mixtures.
FINE GRAINED SOILS (More than 50% of material is SMALLER than No. 200 sieve size)	SILTS AND CLAYS (Liquid limit LESS than 50)		ML	Inorganic silts and very fine sands, rock flour, silty of clayey fine sands or clayey silts and with slight plasticity.
			CL	Inorganic lays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
			OL	Organic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS (Liquid limit GREATER than 50)		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.
HIGHLY ORGANIC SOILS			PT	Peat and other highly organic soils.

BOUNDARY CLASSIFICATIONS: Soils possessing characteristics of two groups are designated by combinations of group symbols.

SILT OR CLAY	SAND			GRAVEL		Cobbles	Boulders
	Fine	Medium	Coarse	Fine	Coarse		

No.200 No.40 No.10 No.4 3/4" 3" 12"

U.S. STANDARD SIEVE SIZE

Reference: The Unified Soil Classification System, Corps of Engineers, U.S. Army Technical Memorandum No. 3-357, Vol. 1, March, 1953 (Revised April, 1960)

Undisturbed Sample	Auger Cuttings
Split Spoon Sample	Bulk Sample
Rock Core	Crandall Sampler
Dilatometer	Modified California Sampler
Packer	No Recovery
Water Table at time of drilling	Water Table after drilling

Correlation of Penetration Resistance
with Relative Density and Consistency

SAND & GRAVEL		SILT & CLAY	
No. of Blows	Relative Density	No. of Blows	Consistency
0 - 4	Very Loose	0 - 1	Very Soft
5 - 10	Loose	2 - 4	Soft
11 - 30	Medium Dense	5 - 8	Medium Stiff
31 - 50	Dense	9 - 15	Stiff
Over 50	Very Dense	16 - 30	Very Stiff
		Over 30	Hard

KEY TO SYMBOLS AND DESCRIPTIONS

amec foster wheeler

Figure A-2

Appendix B

Laboratory Test Results

APPENDIX B
LABORATORY TESTING

Soil samples collected from the borings were transported to the Amec Foster Wheeler laboratory and were reviewed by our staff. The laboratory testing program was developed by SCE based on review of the field boring logs. Laboratory testing was performed by AP Engineering and Testing, Inc., HDR, and LaBelle Marvin, Inc.

Direct shear tests were performed on twenty selected undisturbed samples to determine the strength of the soils in accordance with ASTM D 3080 test method. The tests were performed after soaking the samples to near-saturated moisture content and at various surcharge pressures. The peak and ultimate strength values obtained from the direct shear tests, along with associated friction angles and cohesions are presented on Figures B-1.1 through B-1.20.

To determine the particle size distribution of the soils and to aid in classifying the soils, mechanical analyses were performed on twenty-eight selected samples in accordance with the ASTM D 6913 test method. The results of the mechanical analyses are presented on the boring logs and Figures B-2.1 through B-2.13.

The optimum moisture content and maximum dry density of the near-surface soils were determined by performing compaction tests on eleven bulk samples obtained in the field. The tests were performed in accordance with the ASTM Designation D 1557 test method. The results of the tests are presented on Figures B-3.1 through B-3.11.

Collapse testing was performed on six selected samples in accordance with the ASTM D 4546-14, Method B test method. The results of the tests are presented on Figures B-4.1 through B-4.6.

R-value testing was performed on one selected sample to determine R-value of site soils by LaBelle and Marvin, Inc. The results of the test are shown on Figures B-5.1 and 5.2.

Chemical testing was performed on seventeen selected samples to determine corrosivity of site soils by HDR. The results are presented on Figures B-6.1 through B-6.4.

The Expansion Index of the soils was determined by testing one sample in accordance with ASTM Designation D4829. The result of the test is shown on Figure A-7.1.

The field moisture content and dry density of the soils encountered were determined by performing tests on the undisturbed samples. The results of the tests are shown on the left side of the boring logs in Appendix A and on Figures 8.1 through 8.11.

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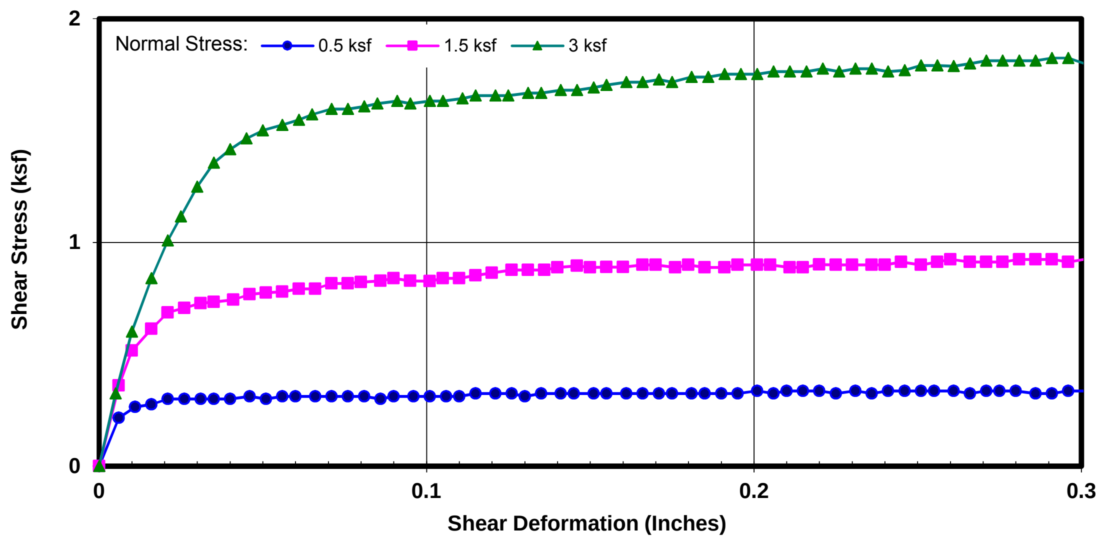
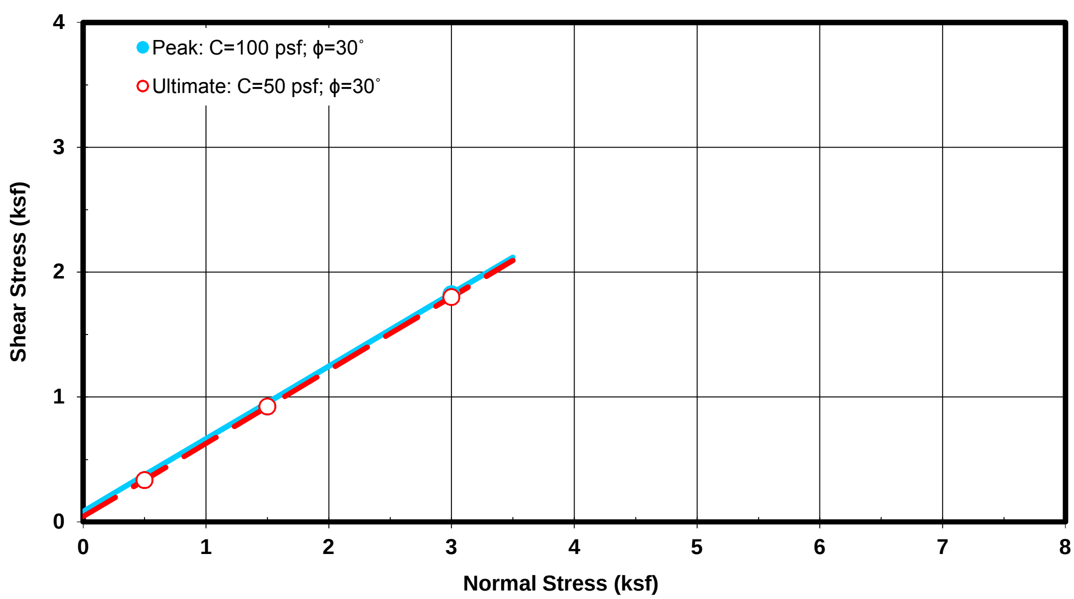
DIRECT SHEAR TEST RESULTS
ASTM D 3080

Project Name:	SCE Newberry Springs Site 2	**Tested By:**	NG	**Date:**	11/22/17
Project No.:	4953170222	**Computed By:**	JP	**Date:**	11/25/17
Boring No.:	BELP-1	**Checked by:**	AP	**Date:**	11/27/17
Sample No.:	1 **Depth (ft):** 0-5				
Sample Type:	Remolded to 90% RC at opt. MC				
Soil Description:	Poorly-Graded Sand w/silt				
Test Condition:	Inundated **Shear Type:** Regular				

Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Initial Moisture Content (%)	Final Moisture Content (%)	Initial Degree Saturation (%)	Final Degree Saturation (%)	Normal Stress (ksf)	Peak Shear Stress (ksf)	Ultimate Shear Stress (ksf)
113.6	102.9	10.4	21.2	44	90	0.5	0.336	0.336
						1.5	0.924	0.924
						3	1.824	1.800





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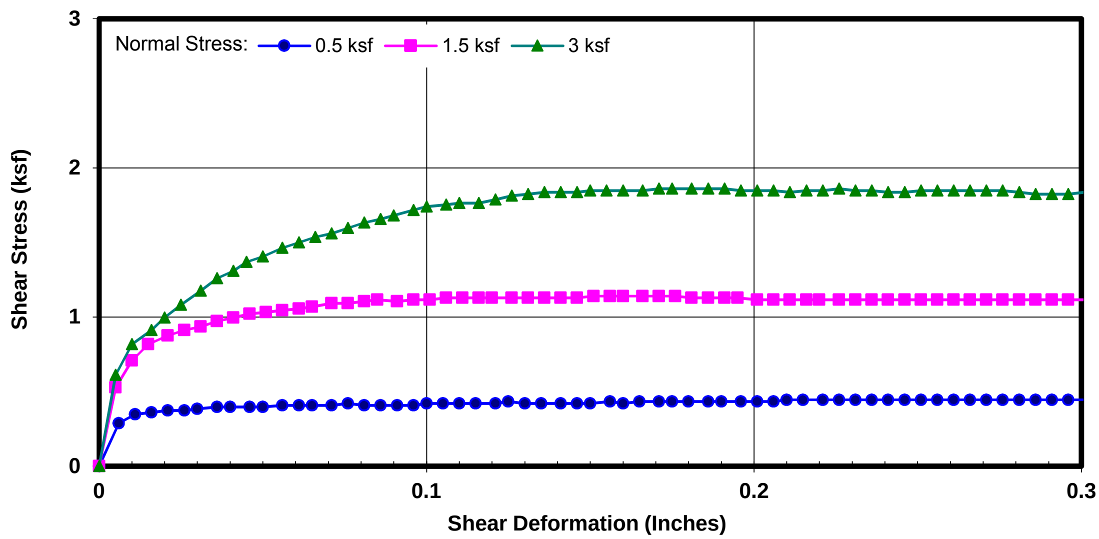
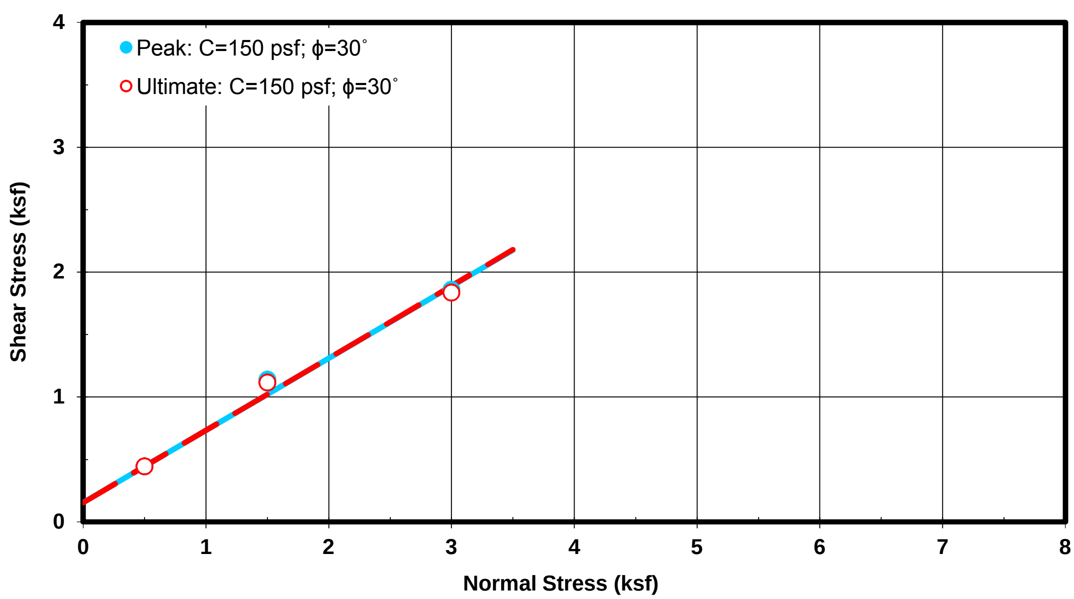
DIRECT SHEAR TEST RESULTS
ASTM D 3080

Project Name: SCE Newberry Springs Site 2
Tested By: NG **Date:** 11/18/17
Project No.: 4953170222
Computed By: JP **Date:** 11/25/17
Boring No.: BELP-1
Checked by: AP **Date:** 11/27/17
Sample No.: 4 **Depth (ft):** 7.5-8.5
Sample Type: Mod. Cal.
Soil Description: Poorly-Graded Sand w/silt
Test Condition: Inundated **Shear Type:** Regular

Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Initial Moisture Content (%)	Final Moisture Content (%)	Initial Degree Saturation (%)	Final Degree Saturation (%)	Normal Stress (ksf)	Peak Shear Stress (ksf)	Ultimate Shear Stress (ksf)
108.0	103.3	4.6	21.1	20	90	0.5	0.444	0.444
						1.5	1.140	1.116
						3	1.860	1.836





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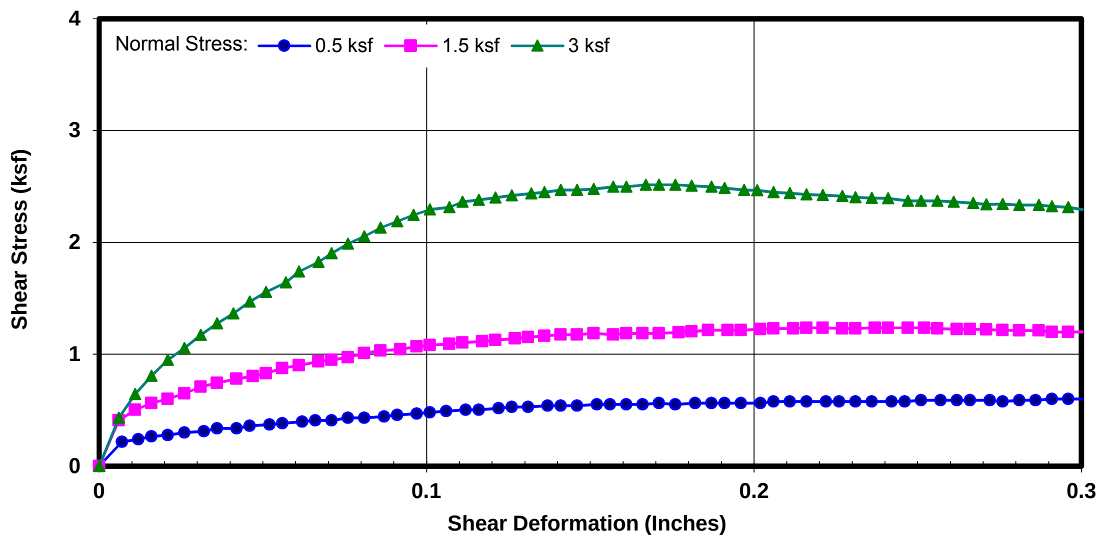
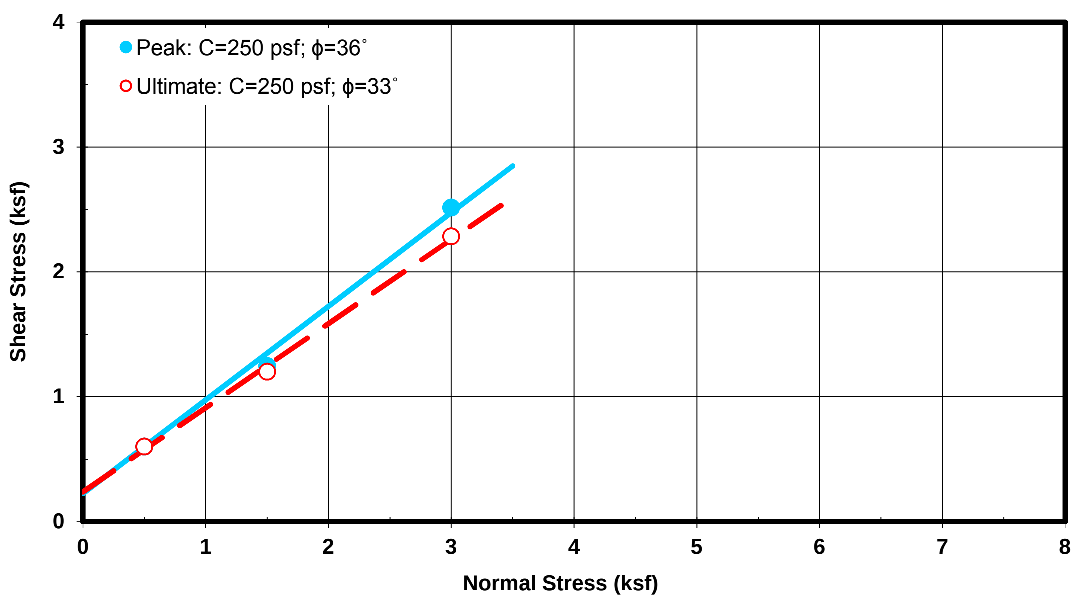
DIRECT SHEAR TEST RESULTS
ASTM D 3080

Project Name: SCE Newberry Springs Site 2
Project No.: 4953170222
Boring No.: BELP-2
Sample No.: 4 **Depth (ft):** 7.5-8
Sample Type: Mod. Cal.
Soil Description: Silty Sand w/gravel
Test Condition: Inundated **Shear Type:** Regular

Tested By: NG **Date:** 11/18/17
Computed By: JP **Date:** 11/25/17
Checked by: AP **Date:** 11/27/17

Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Initial Moisture Content (%)	Final Moisture Content (%)	Initial Degree Saturation (%)	Final Degree Saturation (%)	Normal Stress (ksf)	Peak Shear Stress (ksf)	Ultimate Shear Stress (ksf)
94.1	87.9	7.0	30.4	21	90	0.5	0.600	0.600
						1.5	1.248	1.200
						3	2.515	2.285





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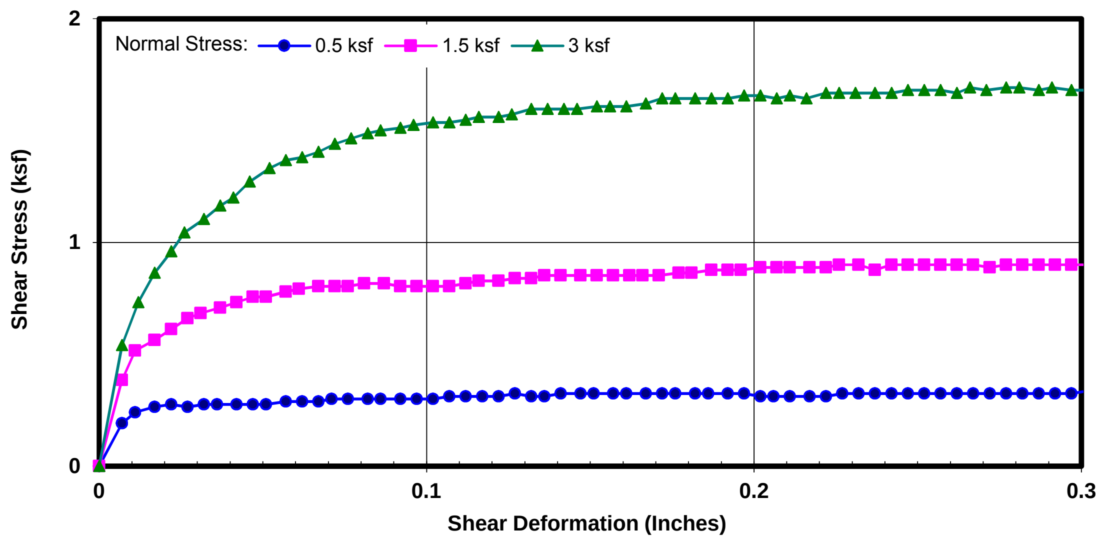
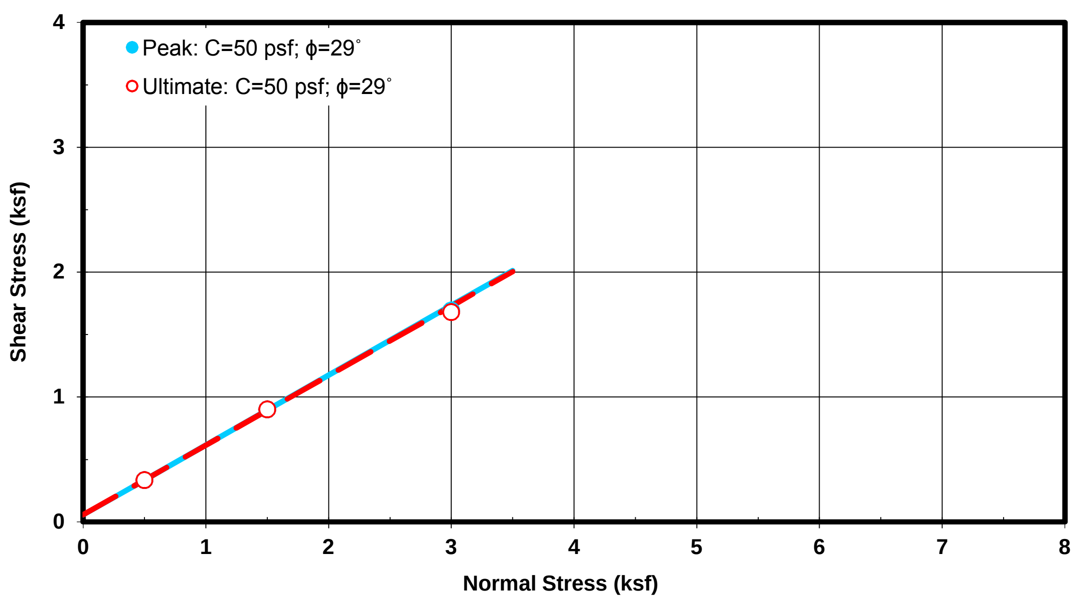
DIRECT SHEAR TEST RESULTS
ASTM D 3080

Project Name:	SCE Newberry Springs Site 2	**Tested By:** NG	**Date:** 11/22/17
Project No.:	4953170222	**Computed By:** JP	**Date:** 11/25/17
Boring No.:	BELP-3	**Checked by:** AP	**Date:** 11/27/17
Sample No.:	1 **Depth (ft):** 0-5		
Sample Type:	Remolded to 90% RC at opt. MC		
Soil Description:	Poorly-Graded Sand w/silt		
Test Condition:	Inundated **Shear Type:** Regular		

Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Initial Moisture Content (%)	Final Moisture Content (%)	Initial Degree Saturation (%)	Final Degree Saturation (%)	Normal Stress (ksf)	Peak Shear Stress (ksf)	Ultimate Shear Stress (ksf)
114.9	103.2	11.3	21.5	48	92	0.5	0.336	0.336
						1.5	0.900	0.900
						3	1.692	1.680





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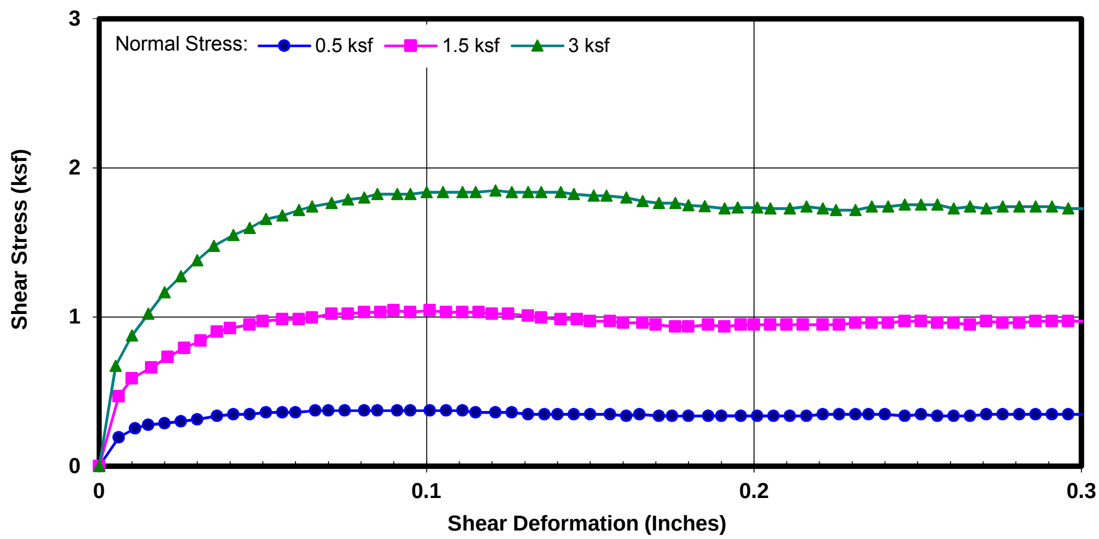
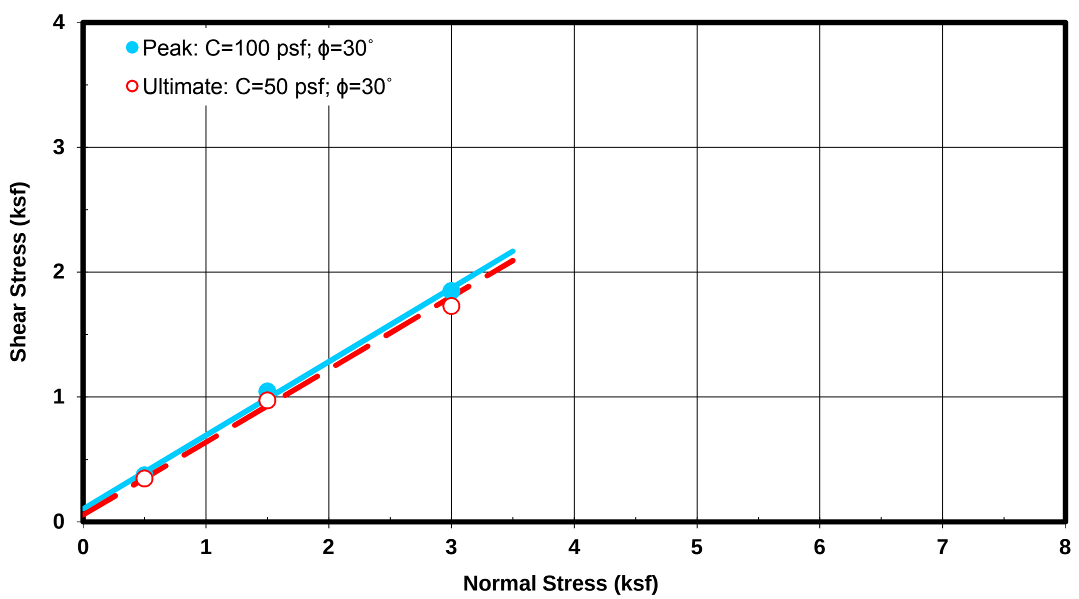
DIRECT SHEAR TEST RESULTS
ASTM D 3080

Project Name:	SCE Newberry Springs Site 2	**Tested By:**	NG	**Date:**	11/24/17
Project No.:	4953170222	**Computed By:**	JP	**Date:**	11/25/17
Boring No.:	BELP-3	**Checked by:**	AP	**Date:**	11/27/17
Sample No.:	3 **Depth (ft):** 6-6.5				
Sample Type:	Mod. Cal.				
Soil Description:	Poorly-Graded Sand w/silt				
Test Condition:	Inundated **Shear Type:** Regular				

Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Initial Moisture Content (%)	Final Moisture Content (%)	Initial Degree Saturation (%)	Final Degree Saturation (%)	Normal Stress (ksf)	Peak Shear Stress (ksf)	Ultimate Shear Stress (ksf)
105.3	104.0	1.3	20.5	5	89	0.5	0.372	0.348
						1.5	1.044	0.972
						3	1.848	1.728





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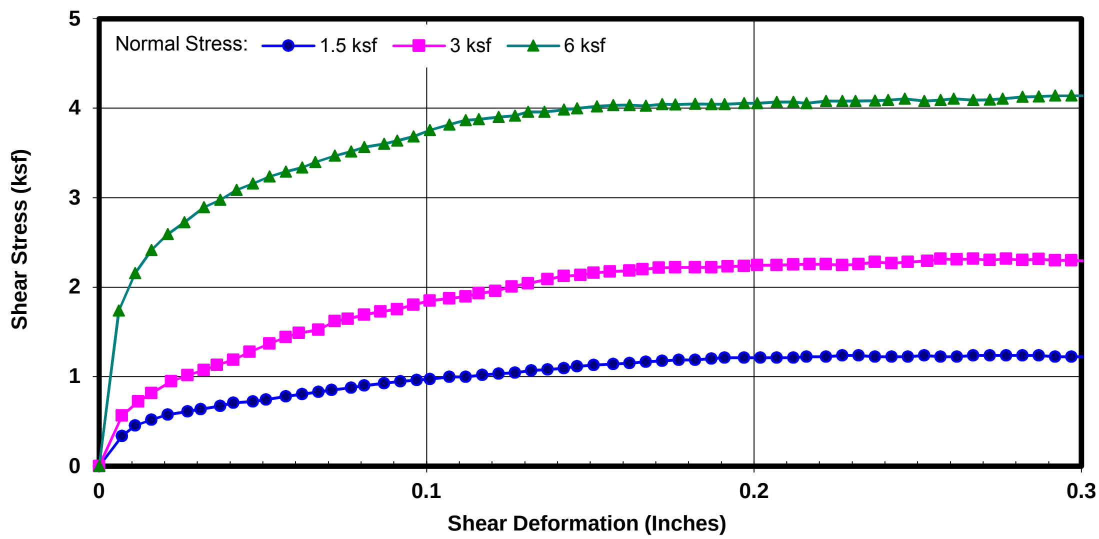
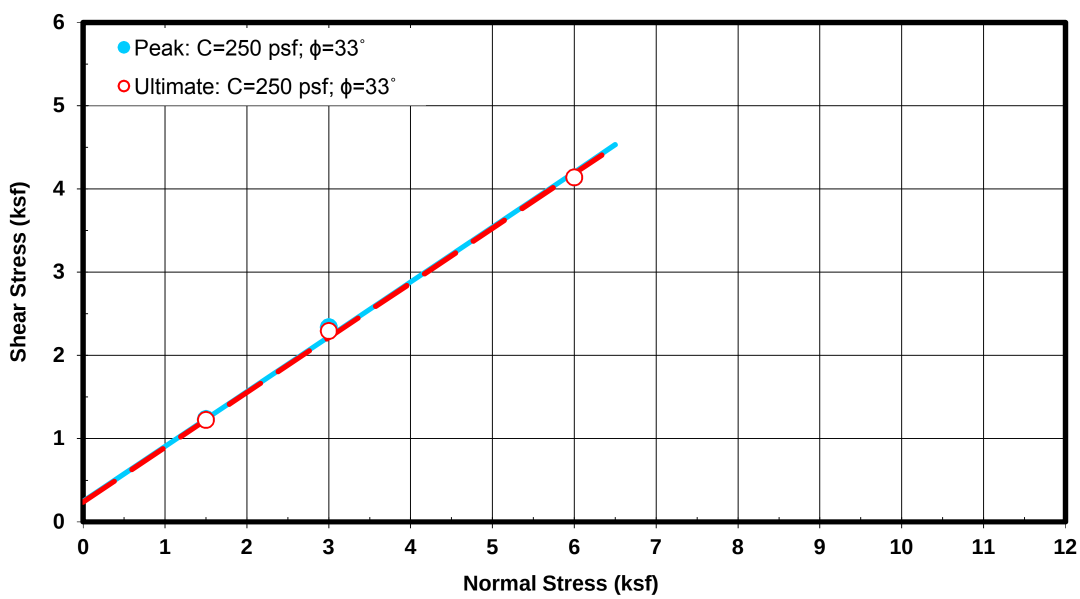
DIRECT SHEAR TEST RESULTS
ASTM D 3080

Project Name: SCE Newberry Springs Site 2
Project No.: 4953170222
Boring No.: BELP-3
Sample No.: 7 **Depth (ft):** 20-20.5
Sample Type: Mod. Cal.
Soil Description: Silty Sand w/gravel
Test Condition: Inundated **Shear Type:** Regular

Tested By: NG **Date:** 11/18/17
Computed By: JP **Date:** 11/25/17
Checked by: AP **Date:** 11/27/17

Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Initial Moisture Content (%)	Final Moisture Content (%)	Initial Degree Saturation (%)	Final Degree Saturation (%)	Normal Stress (ksf)	Peak Shear Stress (ksf)	Ultimate Shear Stress (ksf)
101.1	98.6	2.5	23.6	9	90	1.5	1.236	1.224
						3	2.340	2.292
						6	4.140	4.140





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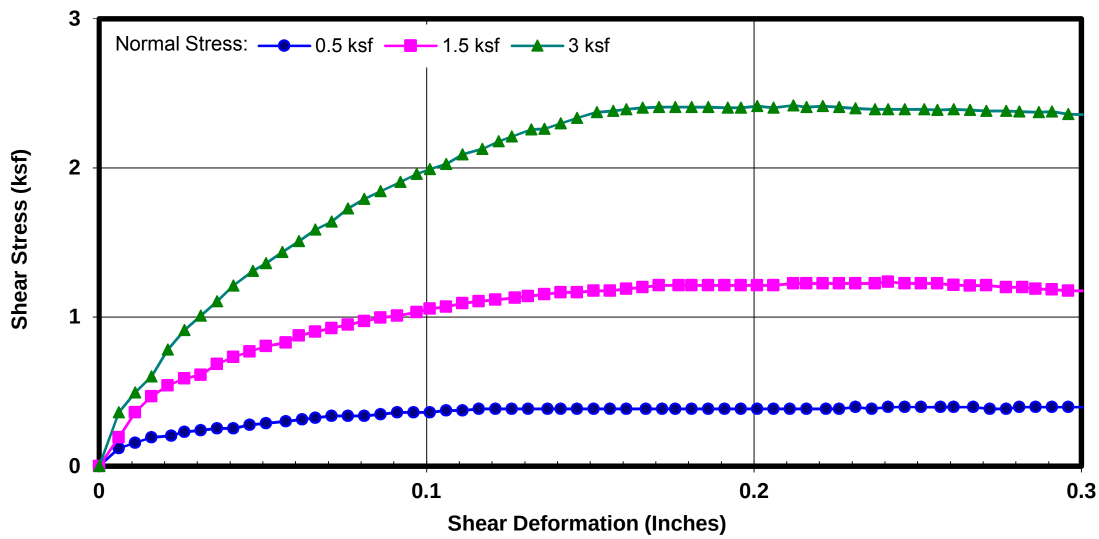
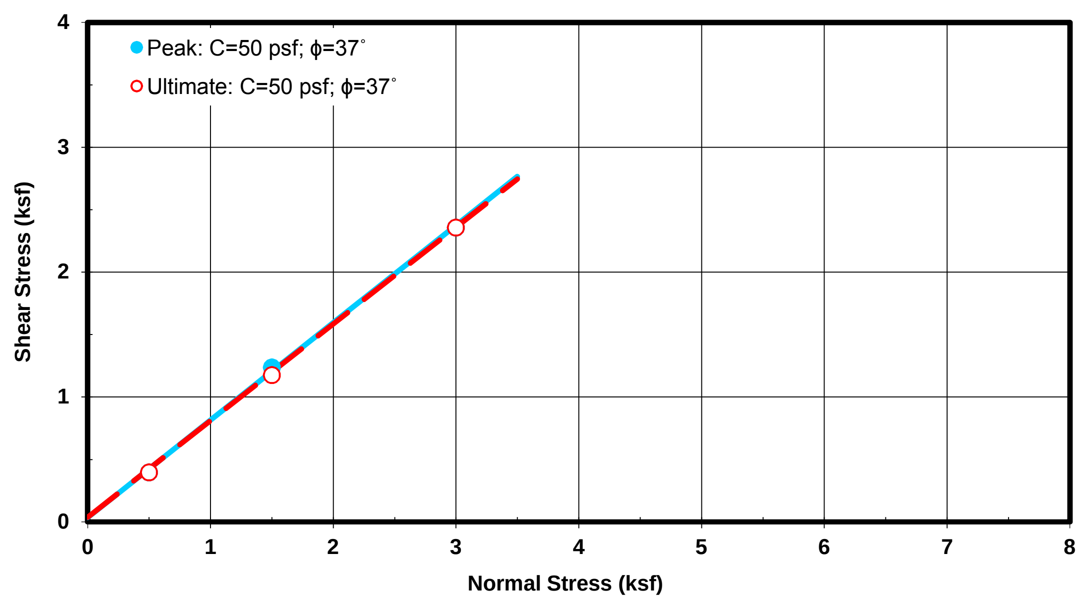
DIRECT SHEAR TEST RESULTS
ASTM D 3080

Project Name: SCE Newberry Springs Site 2
Project No.: 4953170222
Boring No.: BELP-4
Sample No.: 3 **Depth (ft):** 6-6.5
Sample Type: Mod. Cal.
Soil Description: Poorly-Graded Sand w/silt & gravel
Test Condition: Inundated **Shear Type:** Regular

Tested By: NG **Date:** 11/18/17
Computed By: JP **Date:** 11/25/17
Checked by: AP **Date:** 11/27/17

Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Initial Moisture Content (%)	Final Moisture Content (%)	Initial Degree Saturation (%)	Final Degree Saturation (%)	Normal Stress (ksf)	Peak Shear Stress (ksf)	Ultimate Shear Stress (ksf)
112.4	108.6	3.5	18.8	17	92	0.5	0.396	0.396
						1.5	1.236	1.176
						3	2.356	2.356

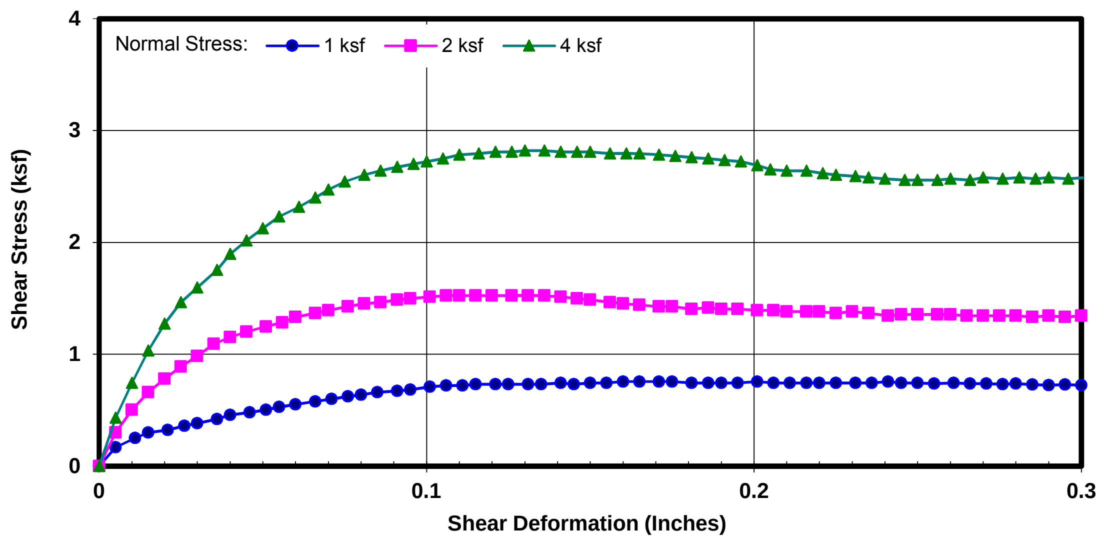


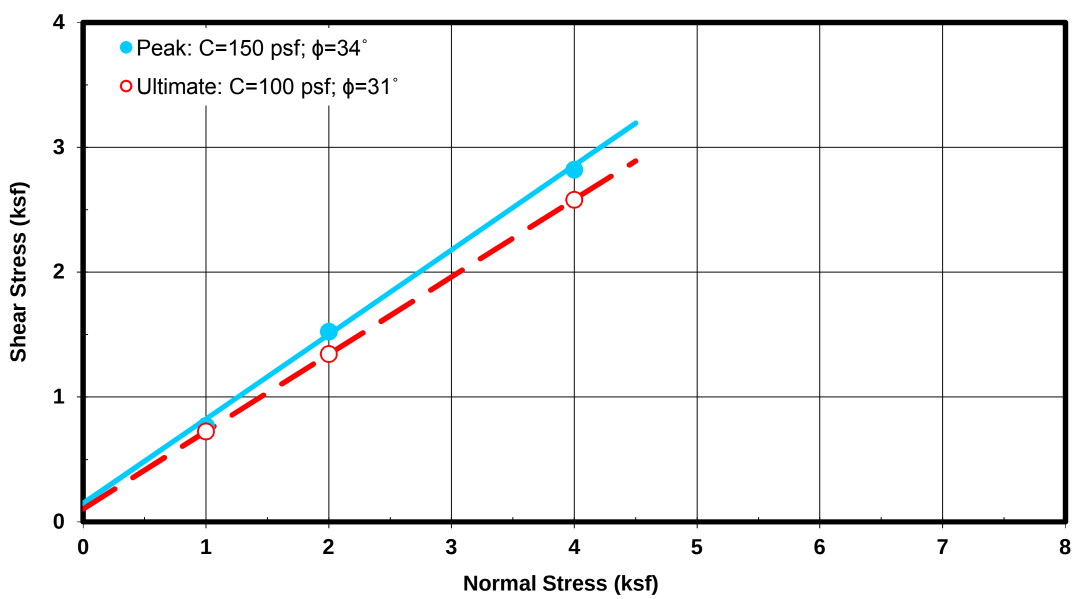


DIRECT SHEAR TEST RESULTS
ASTM D 3080

Project Name:	SCE Newberry Springs Site 2	**Tested By:**	NG	**Date:**	11/18/17
Project No.:	4953170222	**Computed By:**	JP	**Date:**	11/25/17
Boring No.:	BELP-4	**Checked by:**	AP	**Date:**	11/27/17
Sample No.:	7	**Depth (ft):**	20.5-21		
Sample Type:	Mod. Cal.				
Soil Description:	Sand w/silt & gravel				
Test Condition:	Inundated	**Shear Type:**	Regular		

Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Initial Moisture Content (%)	Final Moisture Content (%)	Initial Degree Saturation (%)	Final Degree Saturation (%)	Normal Stress (ksf)	Peak Shear Stress (ksf)	Ultimate Shear Stress (ksf)
104.0	100.4	3.6	22.9	14	91	1	0.768	0.723
						2	1.524	1.344
						4	2.820	2.580





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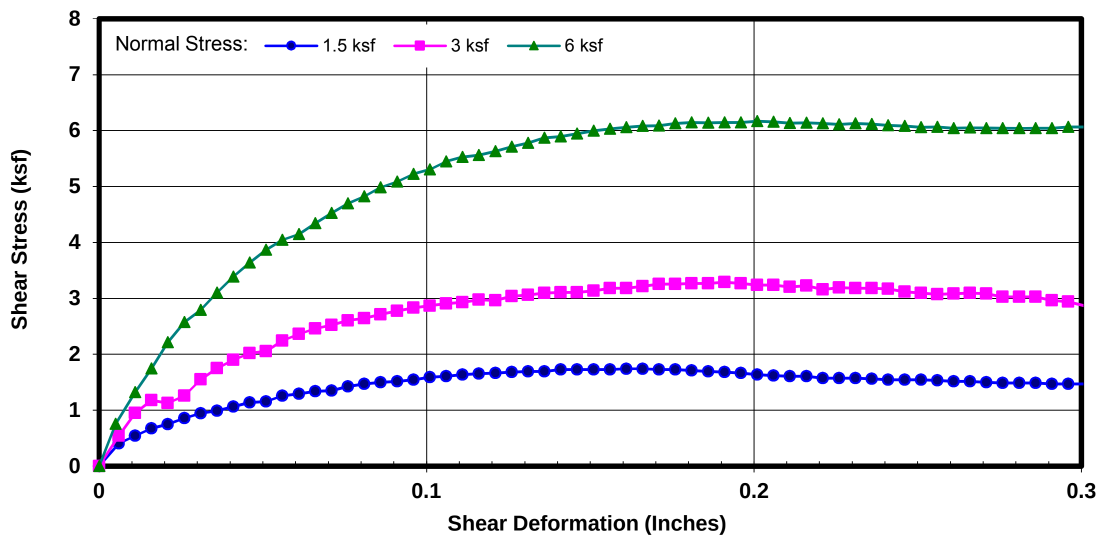
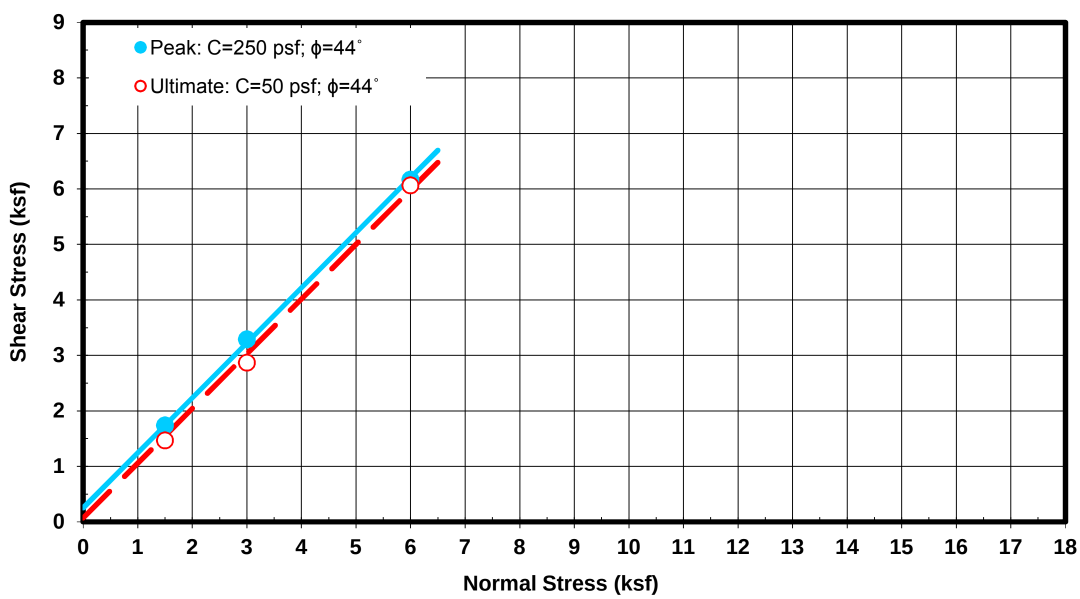
DIRECT SHEAR TEST RESULTS
ASTM D 3080

Project Name: SCE Newberry Springs Site 2
Project No.: 4953170222
Boring No.: BELP-4
Sample No.: 9 **Depth (ft):** 30.5-31
Sample Type: Mod. Cal.
Soil Description: Sand w/silt & gravel
Test Condition: Inundated **Shear Type:** Regular

Tested By: NG **Date:** 11/22/17
Computed By: JP **Date:** 11/25/17
Checked by: AP **Date:** 11/27/17

Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Initial Moisture Content (%)	Final Moisture Content (%)	Initial Degree Saturation (%)	Final Degree Saturation (%)	Normal Stress (ksf)	Peak Shear Stress (ksf)	Ultimate Shear Stress (ksf)
111.4	107.3	3.8	19.2	18	91	1.5	1.740	1.470
						3	3.288	2.868
						6	6.167	6.065





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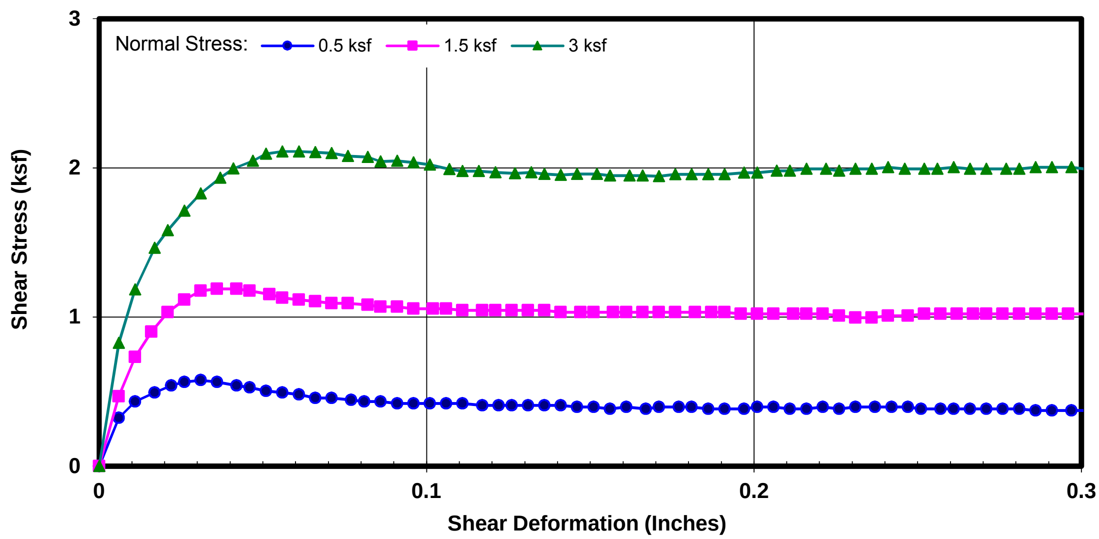
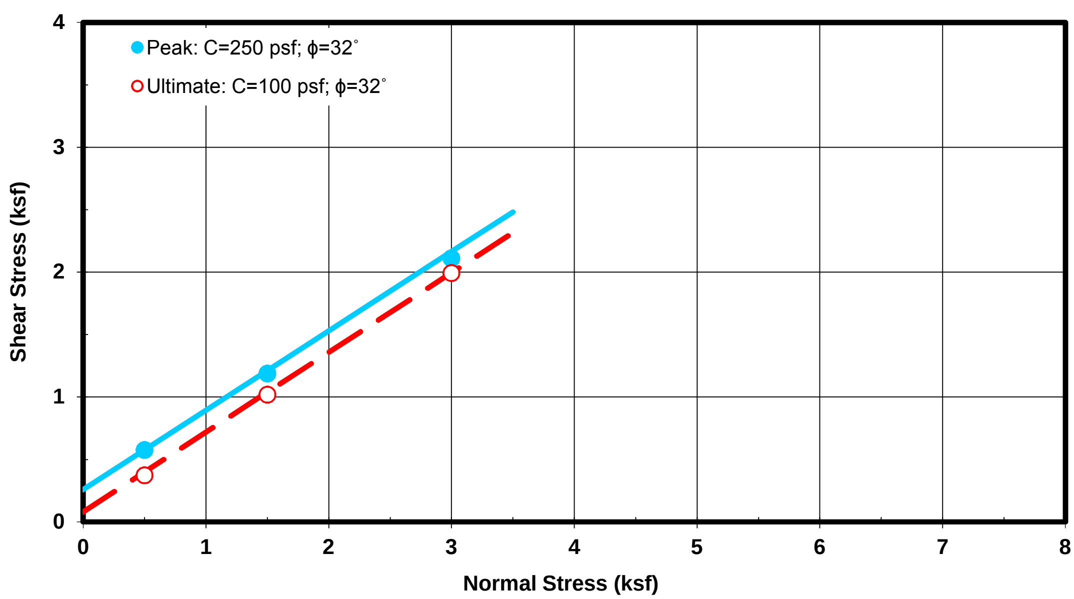
DIRECT SHEAR TEST RESULTS
ASTM D 3080

Project Name: SCE Newberry Springs Site 2
Project No.: 4953170222
Boring No.: BELP-5
Sample No.: 1 **Depth (ft):** 0-5
Sample Type: Remolded to 90% RC at opt. MC
Soil Description: Silty Sand w/gravel
Test Condition: Inundated **Shear Type:** Regular

Tested By: NG **Date:** 11/25/17
Computed By: JP **Date:** 11/27/17
Checked by: AP **Date:** 11/27/17

Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Initial Moisture Content (%)	Final Moisture Content (%)	Initial Degree Saturation (%)	Final Degree Saturation (%)	Normal Stress (ksf)	Peak Shear Stress (ksf)	Ultimate Shear Stress (ksf)
124.1	112.8	10.0	17.1	55	93	0.5	0.576	0.372
						1.5	1.188	1.020
						3	2.110	1.992





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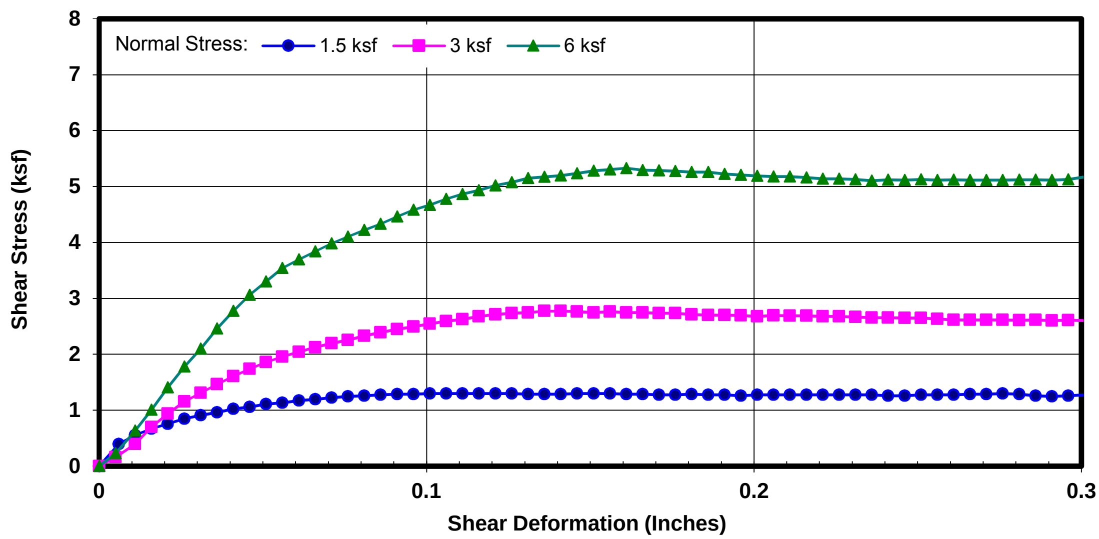
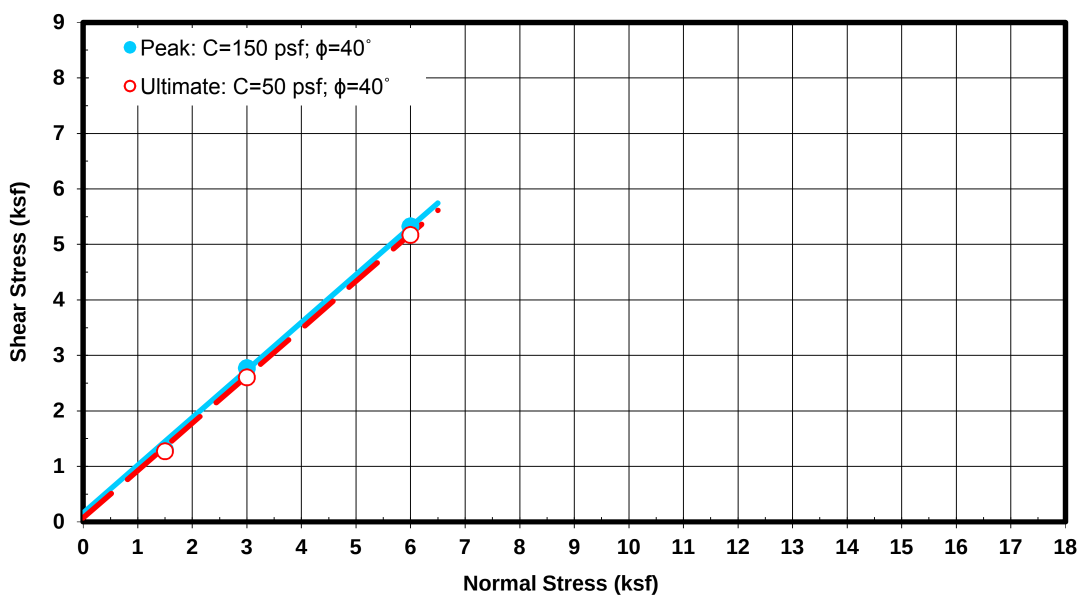
DIRECT SHEAR TEST RESULTS
ASTM D 3080

Project Name: SCE Newberry Springs Site 2
Project No.: 4953170222
Boring No.: BELP-5
Sample No.: 8 **Depth (ft):** 25.5-26
Sample Type: Mod. Cal.
Soil Description: Sand w/silt & gravel
Test Condition: Inundated **Shear Type:** Regular

Tested By: NG **Date:** 11/18/17
Computed By: JP **Date:** 11/25/17
Checked by: AP **Date:** 11/27/17

Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Initial Moisture Content (%)	Final Moisture Content (%)	Initial Degree Saturation (%)	Final Degree Saturation (%)	Normal Stress (ksf)	Peak Shear Stress (ksf)	Ultimate Shear Stress (ksf)
111.9	109.1	2.6	18.2	13	90	1.5	1.298	1.273
						3	2.772	2.604
						6	5.328	5.172





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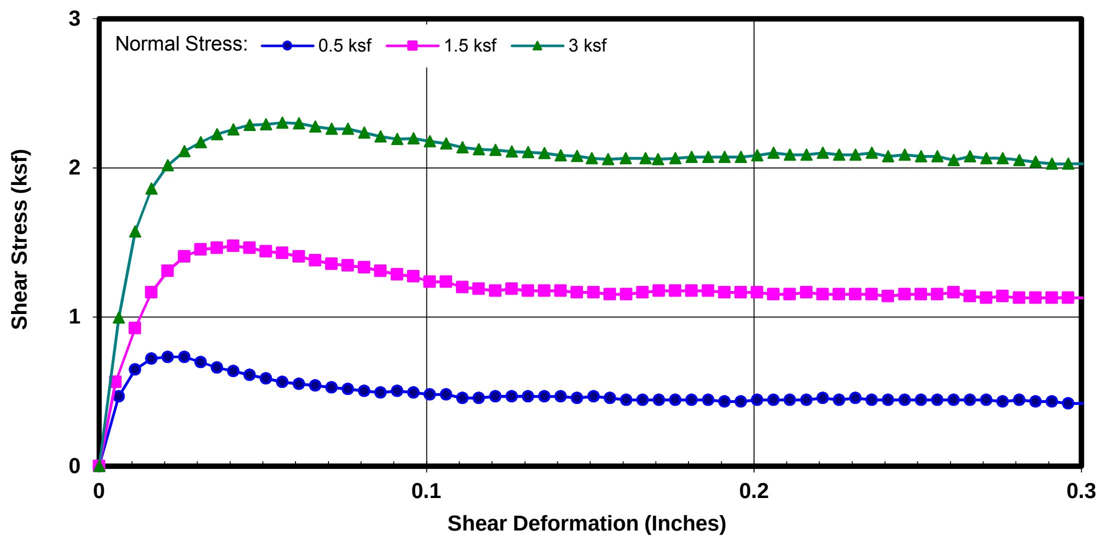
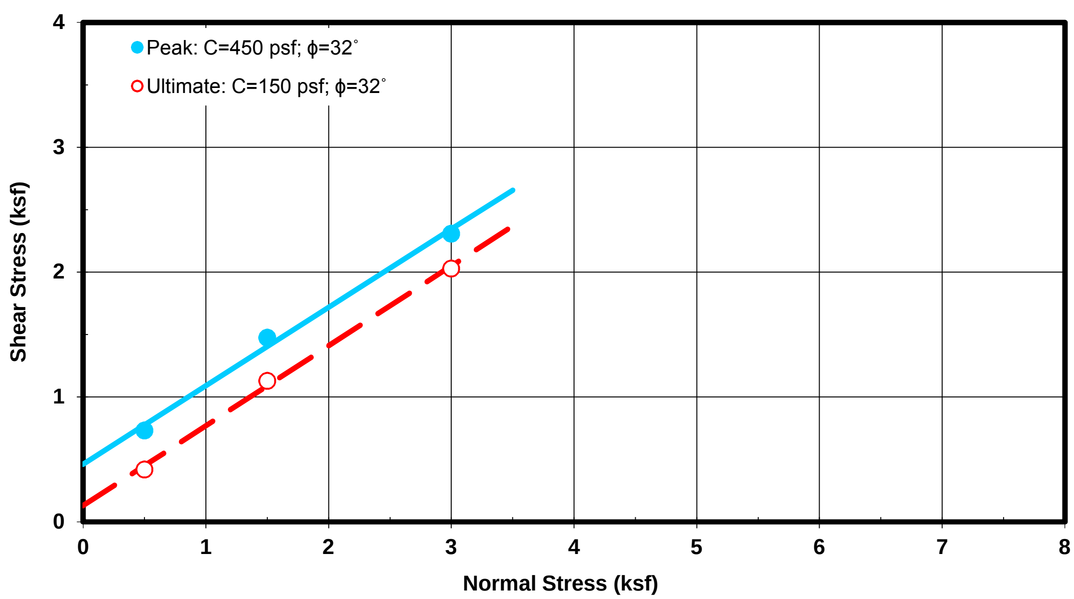
DIRECT SHEAR TEST RESULTS
ASTM D 3080

Project Name:	SCE Newberry Springs Site 2	**Tested By:** NG	**Date:** 11/25/17
Project No.:	4953170222	**Computed By:** JP	**Date:** 11/27/17
Boring No.:	BELP-6	**Checked by:** AP	**Date:** 11/27/17
Sample No.:	1 **Depth (ft):** 0-5		
Sample Type:	Remolded to 90% RC at opt. MC		
Soil Description:	Poorly-Graded Sand w/silt & gravel		
Test Condition:	Inundated **Shear Type:** Regular		

Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Initial Moisture Content (%)	Final Moisture Content (%)	Initial Degree Saturation (%)	Final Degree Saturation (%)	Normal Stress (ksf)	Peak Shear Stress (ksf)	Ultimate Shear Stress (ksf)
126.0	116.2	8.5	15.4	51	93	0.5	0.732	0.420
						1.5	1.476	1.128
						3	2.308	2.028





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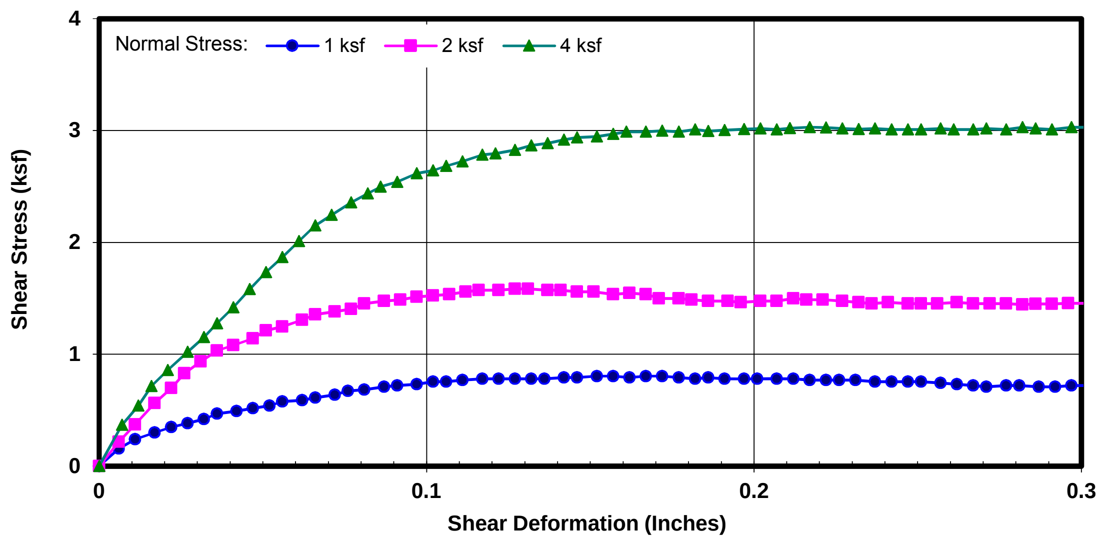
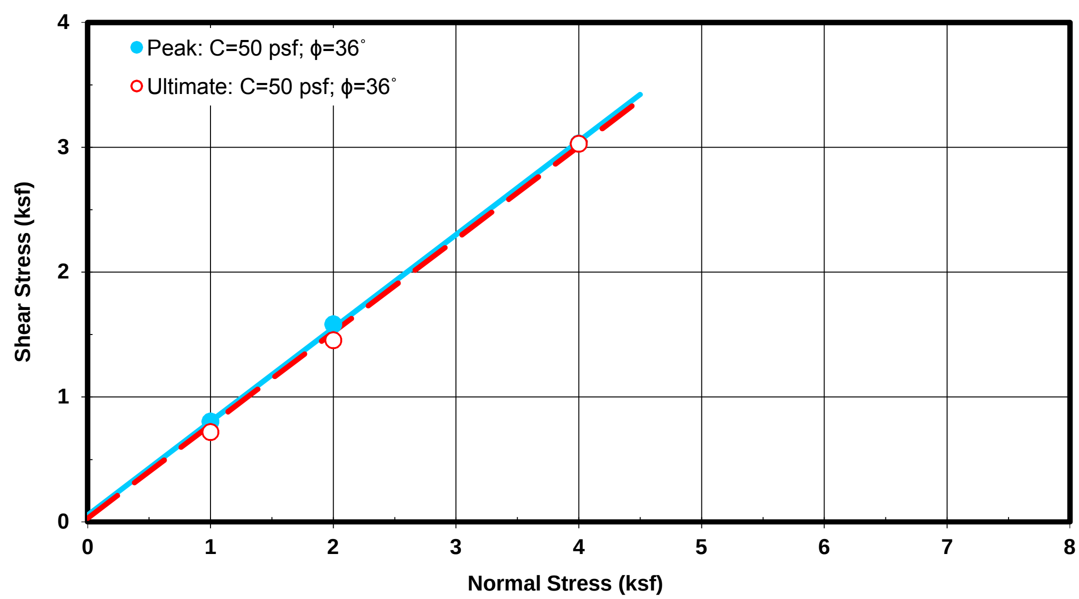
DIRECT SHEAR TEST RESULTS
ASTM D 3080

Project Name: SCE Newberry Springs Site 2
Project No.: 4953170222
Boring No.: BELP-6
Sample No.: 5 **Depth (ft):** 11-11.5
Sample Type: Mod. Cal.
Soil Description: Sand w/silt & gravel
Test Condition: Inundated **Shear Type:** Regular

Tested By: NG **Date:** 11/20/17
Computed By: JP **Date:** 11/25/17
Checked by: AP **Date:** 11/27/17

Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Initial Moisture Content (%)	Final Moisture Content (%)	Initial Degree Saturation (%)	Final Degree Saturation (%)	Normal Stress (ksf)	Peak Shear Stress (ksf)	Ultimate Shear Stress (ksf)
107.6	105.2	2.3	19.8	10	89	1	0.804	0.720
						2	1.584	1.455
						4	3.030	3.029





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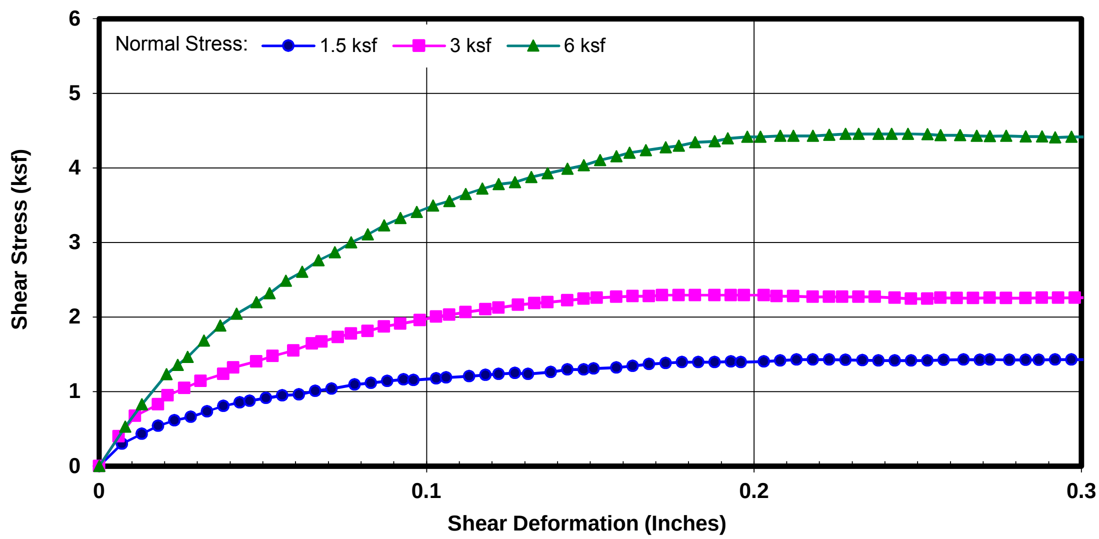
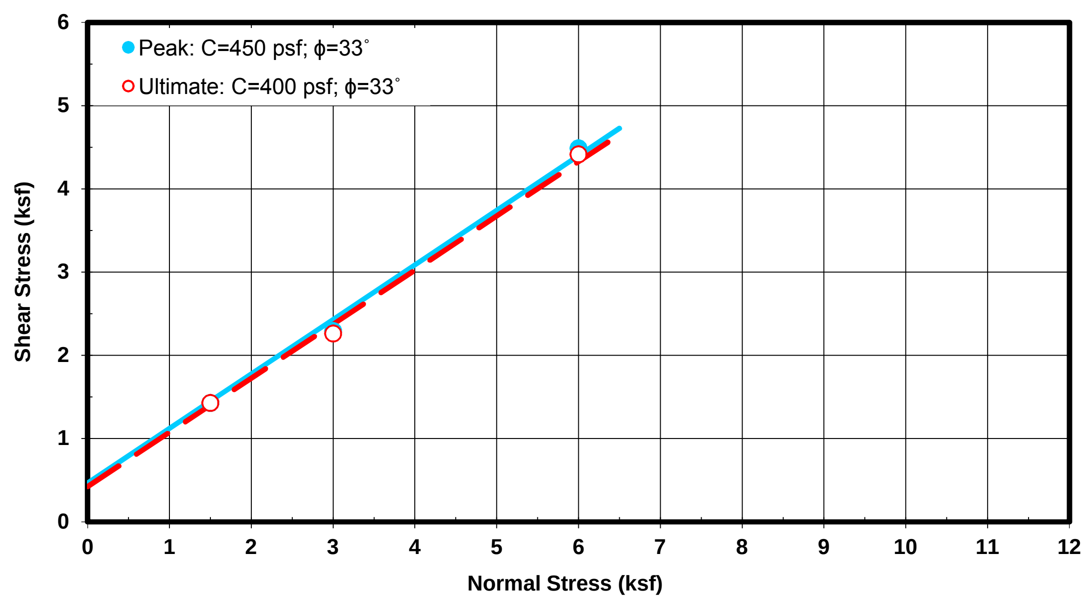
DIRECT SHEAR TEST RESULTS
ASTM D 3080

Project Name: SCE Newberry Springs Site 2
Project No.: 4953170222
Boring No.: BELP-6
Sample No.: 10 **Depth (ft):** 30-30.5
Sample Type: Mod. Cal.
Soil Description: Sand w/silt & gravel
Test Condition: Inundated **Shear Type:** Regular

Tested By: NG **Date:** 11/25/17
Computed By: JP **Date:** 11/25/17
Checked by: AP **Date:** 11/27/17

Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Initial Moisture Content (%)	Final Moisture Content (%)	Initial Degree Saturation (%)	Final Degree Saturation (%)	Normal Stress (ksf)	Peak Shear Stress (ksf)	Ultimate Shear Stress (ksf)
102.0	99.9	2.1	23.4	8	92	1.5	1.428	1.428
						3	2.292	2.262
						6	4.488	4.416





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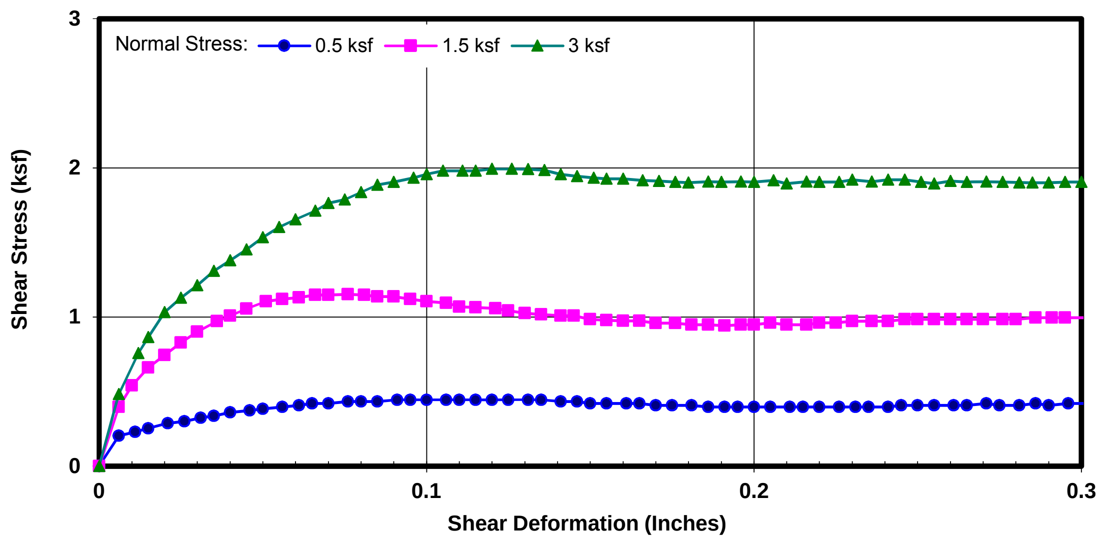
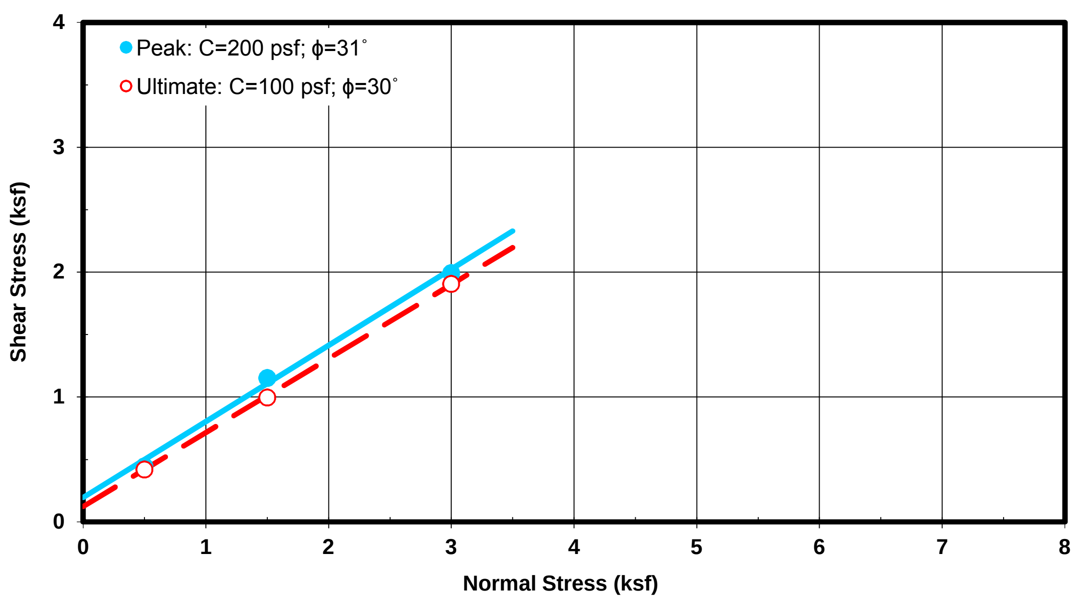
DIRECT SHEAR TEST RESULTS
ASTM D 3080

Project Name: SCE Newberry Springs Site 2
Project No.: 4953170222
Boring No.: BELP-7
Sample No.: 3 **Depth (ft):** 6-6.5
Sample Type: Mod. Cal.
Soil Description: Silty Sand
Test Condition: Inundated **Shear Type:** Regular

Tested By: ST **Date:** 11/21/17
Computed By: JP **Date:** 11/25/17
Checked by: AP **Date:** 11/27/17

Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Initial Moisture Content (%)	Final Moisture Content (%)	Initial Degree Saturation (%)	Final Degree Saturation (%)	Normal Stress (ksf)	Peak Shear Stress (ksf)	Ultimate Shear Stress (ksf)
105.6	104.3	1.3	20.7	6	91	0.5	0.444	0.420
						1.5	1.152	0.996
						3	1.992	1.906





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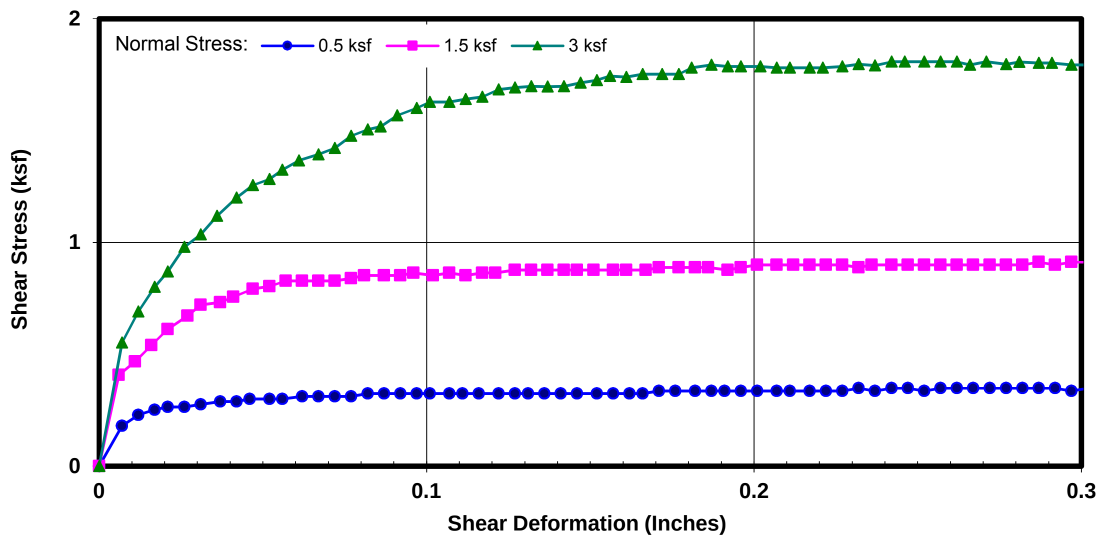
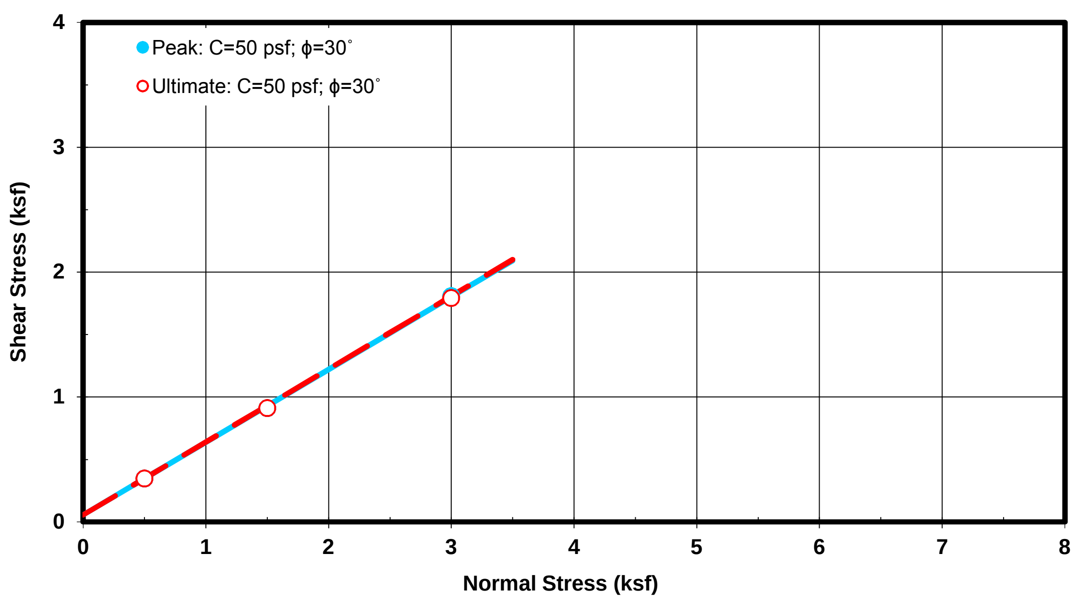
DIRECT SHEAR TEST RESULTS
ASTM D 3080

Project Name: SCE Newberry Springs Site 2
Project No.: 4953170222
Boring No.: BELP-8
Sample No.: 1 **Depth (ft):** 0-5
Sample Type: Remolded to 90% RC at opt. MC
Soil Description: Poorly-Graded Sand w/silt
Test Condition: Inundated **Shear Type:** Regular

Tested By: NG **Date:** 11/25/17
Computed By: JP **Date:** 11/27/17
Checked by: AP **Date:** 11/27/17

Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Initial Moisture Content (%)	Final Moisture Content (%)	Initial Degree Saturation (%)	Final Degree Saturation (%)	Normal Stress (ksf)	Peak Shear Stress (ksf)	Ultimate Shear Stress (ksf)
114.6	104.1	10.0	20.8	44	91	0.5	0.348	0.348
						1.5	0.912	0.912
						3	1.808	1.794





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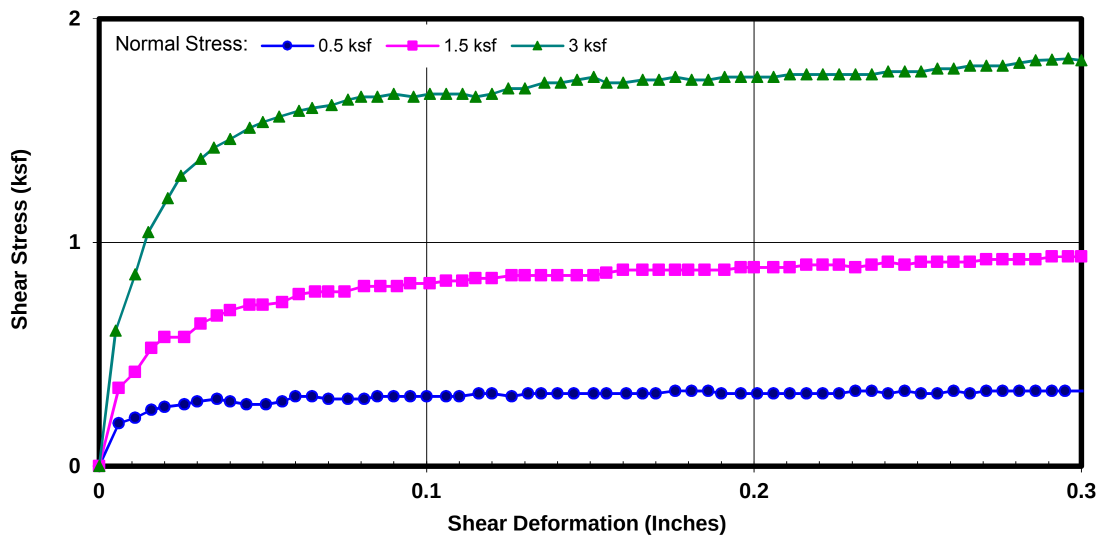
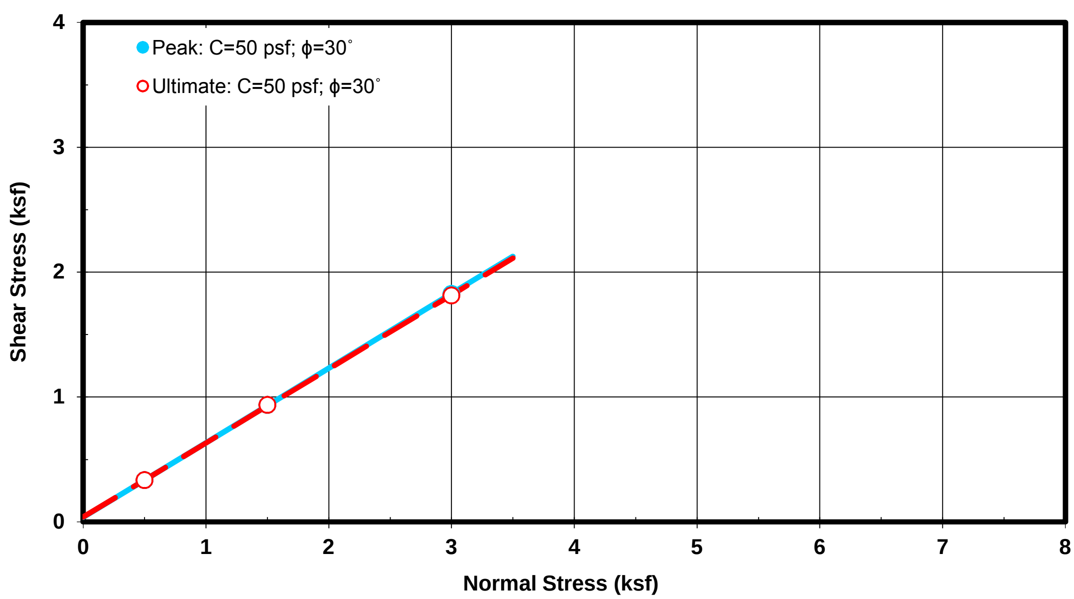
DIRECT SHEAR TEST RESULTS
ASTM D 3080

Project Name: SCE Newberry Springs Site 2 **Tested By:** NG **Date:** 11/25/17
Project No.: 4953170222 **Computed By:** JP **Date:** 11/27/17
Boring No.: BELP-9 **Checked by:** AP **Date:** 11/27/17
Sample No.: 1 **Depth (ft):** 0-5
Sample Type: Remolded to 90% RC at opt. MC
Soil Description: Poorly-Graded Sand w/silt
Test Condition: Inundated **Shear Type:** Regular

Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Initial Moisture Content (%)	Final Moisture Content (%)	Initial Degree Saturation (%)	Final Degree Saturation (%)	Normal Stress (ksf)	Peak Shear Stress (ksf)	Ultimate Shear Stress (ksf)
113.8	102.2	11.3	21.9	47	91	0.5	0.336	0.336
						1.5	0.936	0.936
						3	1.827	1.814





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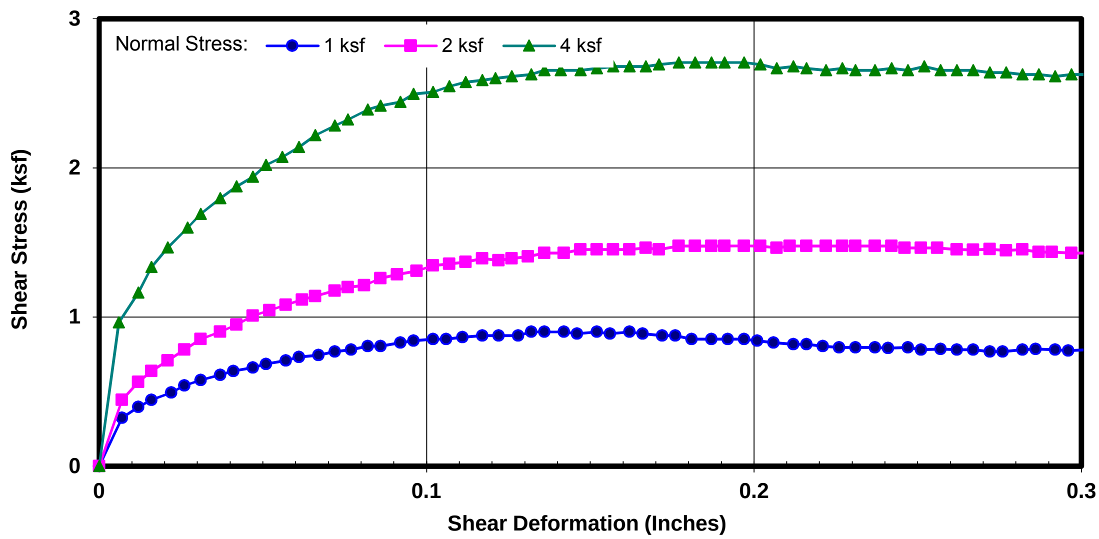
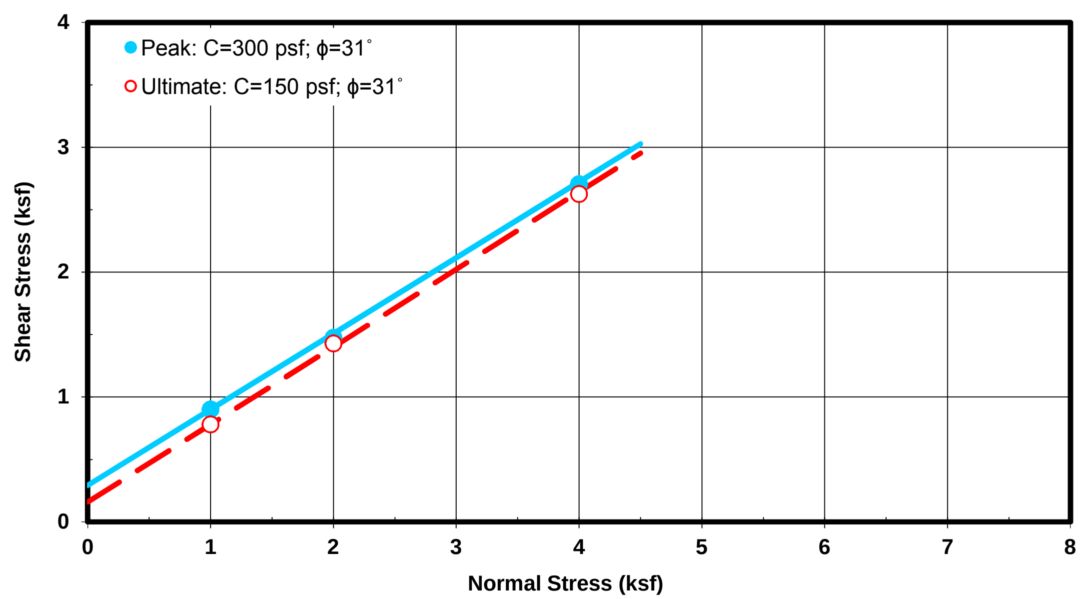
DIRECT SHEAR TEST RESULTS
ASTM D 3080

Project Name: SCE Newberry Springs Site 2
Project No.: 4953170222
Boring No.: BELP-9
Sample No.: 5 **Depth (ft):** 10.5-11
Sample Type: Mod. Cal.
Soil Description: Poorly-Graded Sand w/silt & gravel
Test Condition: Inundated **Shear Type:** Regular

Tested By: NG **Date:** 11/24/17
Computed By: JP **Date:** 11/25/17
Checked by: AP **Date:** 11/27/17

Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Initial Moisture Content (%)	Final Moisture Content (%)	Initial Degree Saturation (%)	Final Degree Saturation (%)	Normal Stress (ksf)	Peak Shear Stress (ksf)	Ultimate Shear Stress (ksf)
109.5	105.8	3.5	20.1	16	92	1	0.900	0.780
						2	1.476	1.428
						4	2.706	2.627





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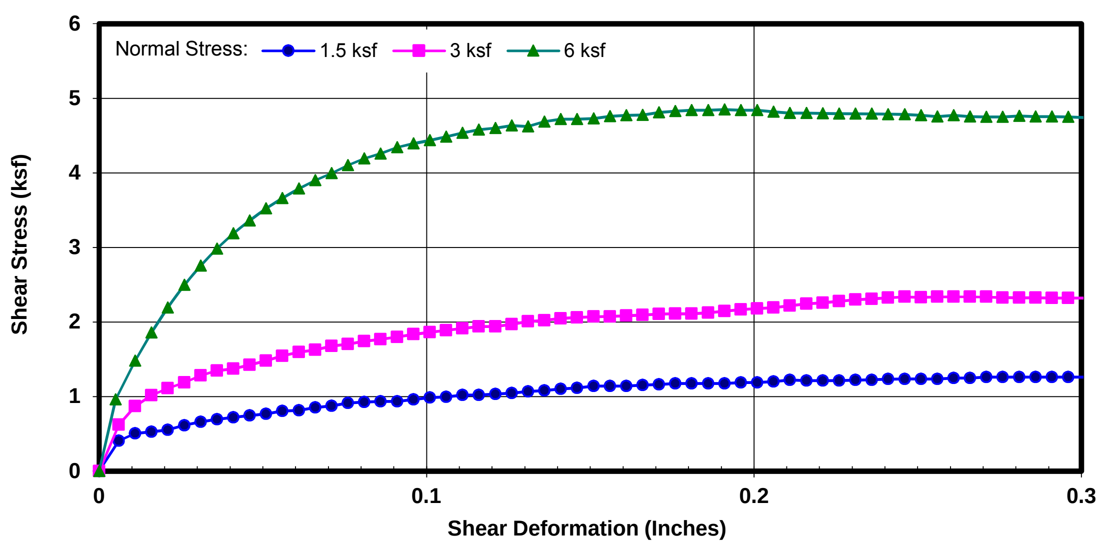
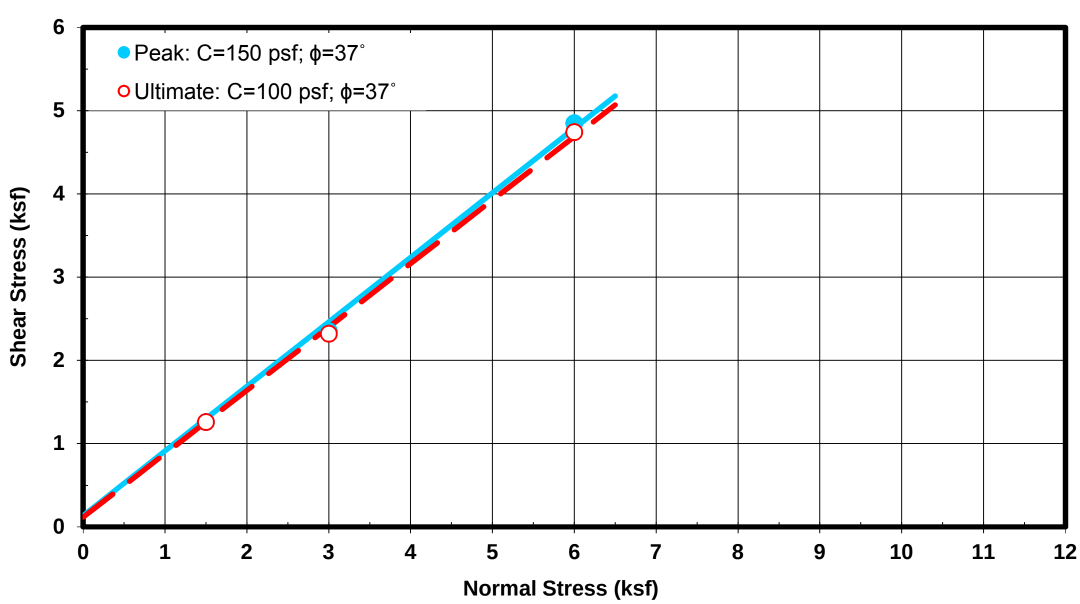
DIRECT SHEAR TEST RESULTS
ASTM D 3080

Project Name:	SCE Newberry Springs Site 2	**Tested By:** NG	**Date:** 11/24/17
Project No.:	4953170222	**Computed By:** JP	**Date:** 11/25/17
Boring No.:	BELP-9	**Checked by:** AP	**Date:** 11/27/17
Sample No.:	9 **Depth (ft):** 30-30.5		
Sample Type:	Mod. Cal.		
Soil Description:	Poorly-Graded Sand w/silt & gravel		
Test Condition:	Inundated **Shear Type:** Regular		

Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Initial Moisture Content (%)	Final Moisture Content (%)	Initial Degree Saturation (%)	Final Degree Saturation (%)	Normal Stress (ksf)	Peak Shear Stress (ksf)	Ultimate Shear Stress (ksf)
107.2	102.8	4.2	21.7	18	92	1.5	1.260	1.260
						3	2.350	2.319
						6	4.849	4.741





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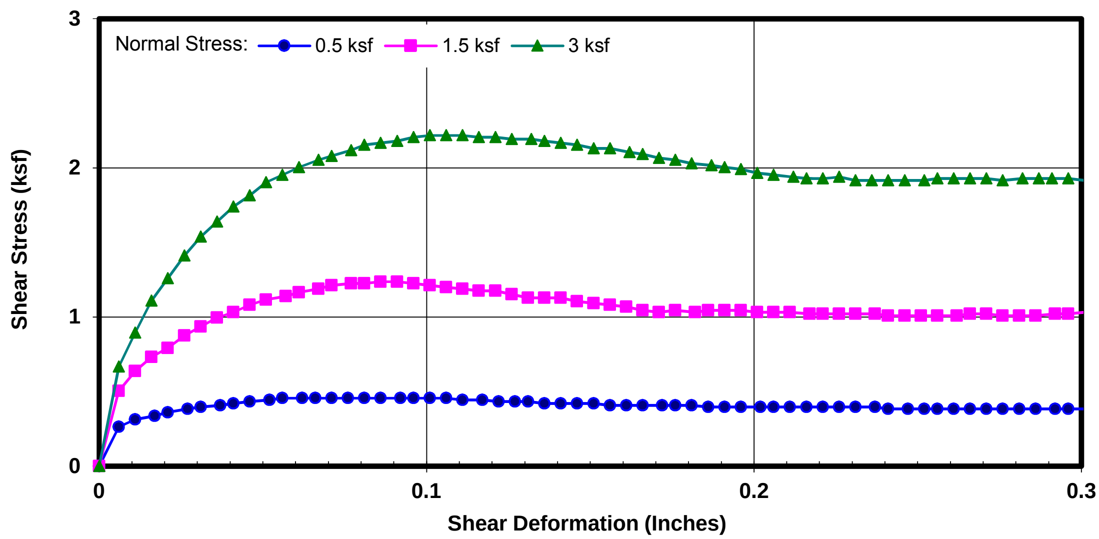
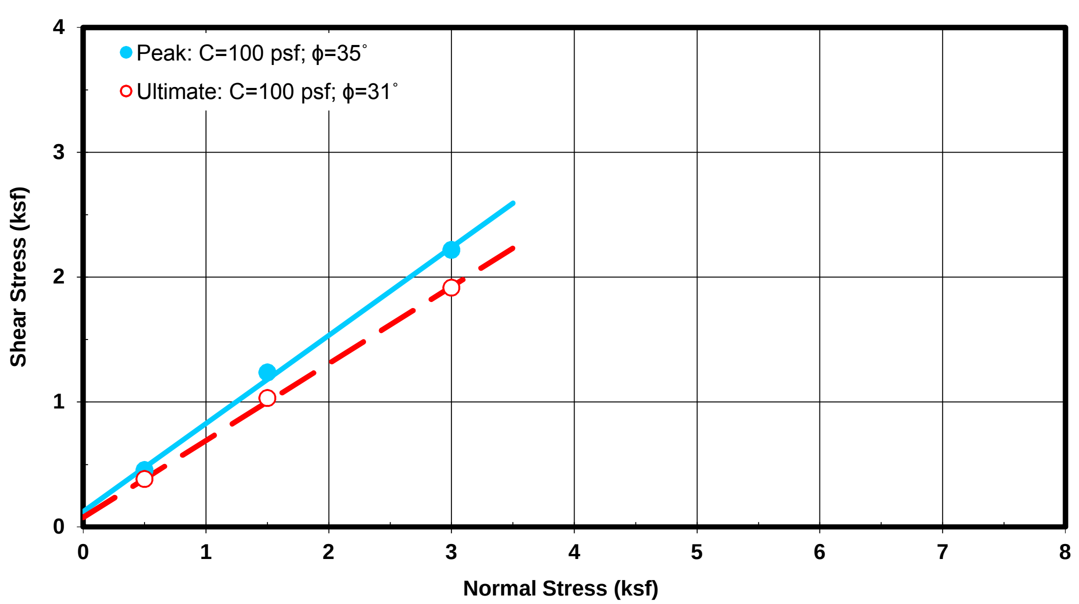
DIRECT SHEAR TEST RESULTS
ASTM D 3080

Project Name:	SCE Newberry Springs Site 2	**Tested By:** NG	**Date:** 11/24/17
Project No.:	4953170222	**Computed By:** JP	**Date:** 11/25/17
Boring No.:	BELP-10	**Checked by:** AP	**Date:** 11/27/17
Sample No.:	4 **Depth (ft):** 8-8.5		
Sample Type:	Mod. Cal.		
Soil Description:	Poorly-Graded Sand w/silt		
Test Condition:	Inundated **Shear Type:** Regular		

Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Initial Moisture Content (%)	Final Moisture Content (%)	Initial Degree Saturation (%)	Final Degree Saturation (%)	Normal Stress (ksf)	Peak Shear Stress (ksf)	Ultimate Shear Stress (ksf)
110.9	108.9	1.9	18.2	9	90	0.5	0.456	0.384
						1.5	1.236	1.032
						3	2.218	1.915





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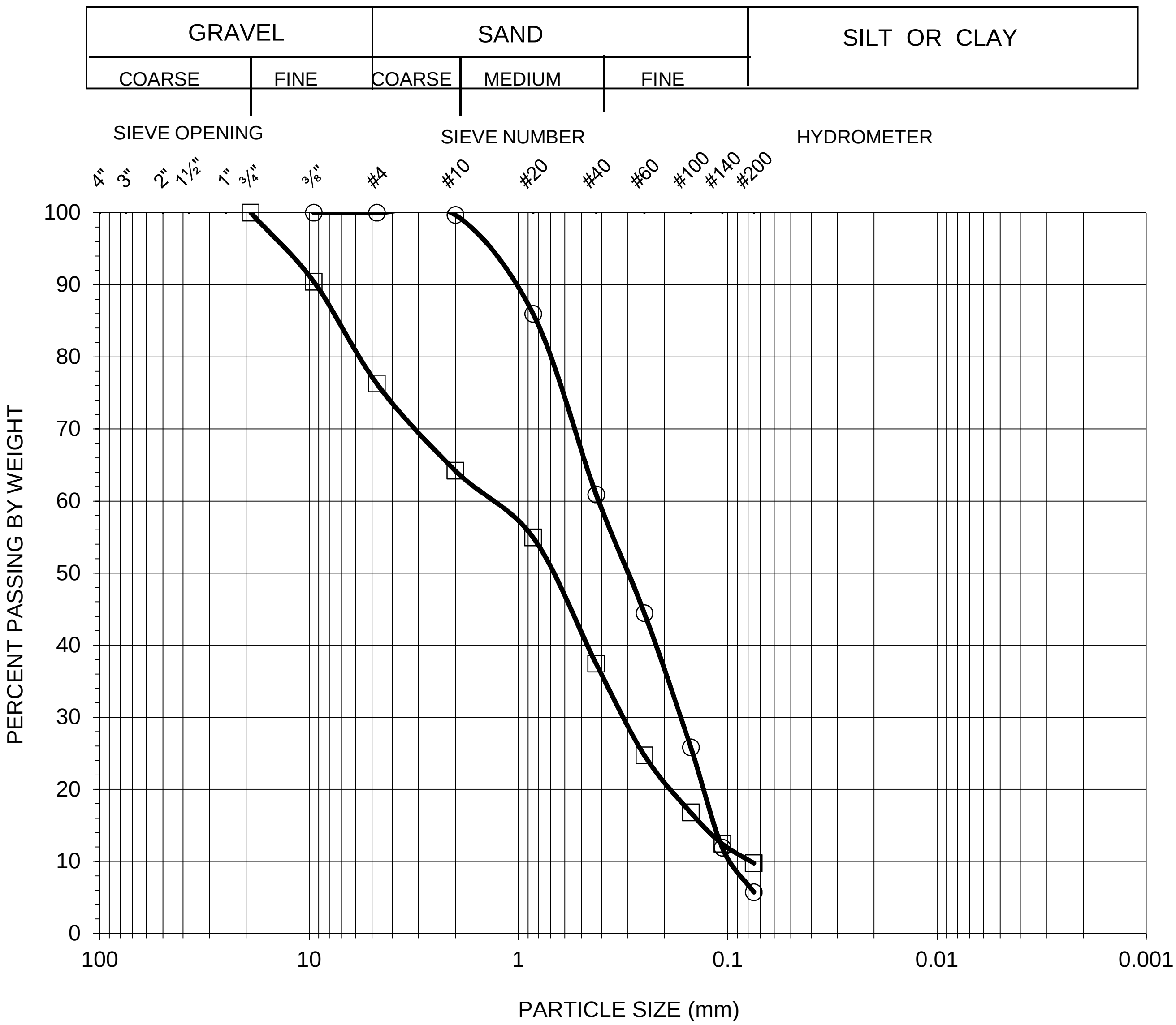
GRAIN SIZE DISTRIBUTION CURVE
ASTM D 6913

Client Name:	AMEC Foster Wheeler	Tested by:	CS	Date:	11/27/17
Project Name:	SCE Newberry Springs Site 2	Computed by:	JP	Date:	11/27/17
Project Number:	4953170222	Checked by:	AP	Date:	11/27/17



Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Type U.S.C.S
				Gravel	Sand	Silt & Clay		
○	BELP-1	1	0-5	0	94	6	N/A	SP-SM
□	BELP-1	5	11-11.5	24	66	10	N/A	SP-SM

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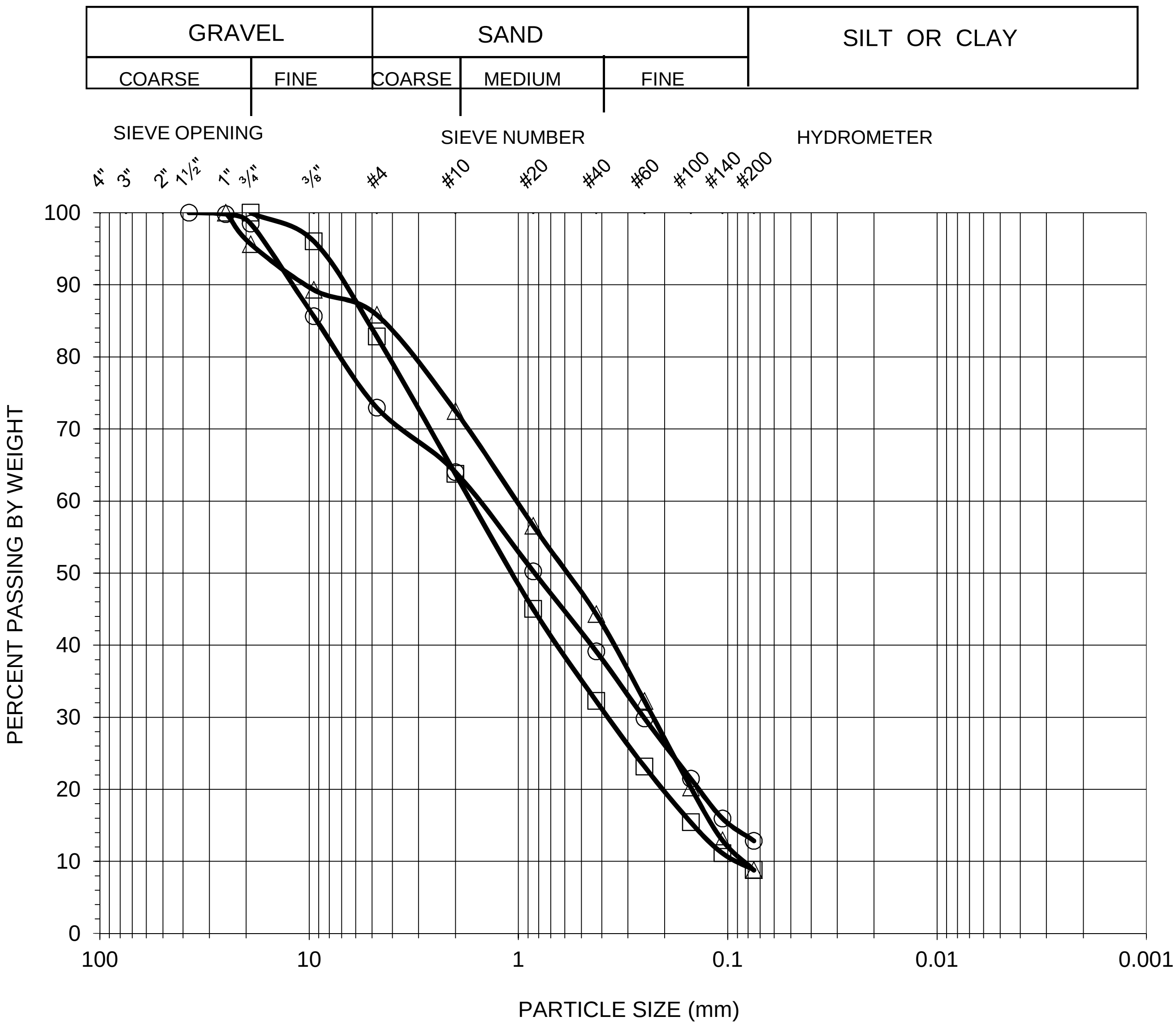
GRAIN SIZE DISTRIBUTION CURVE
ASTM D 6913

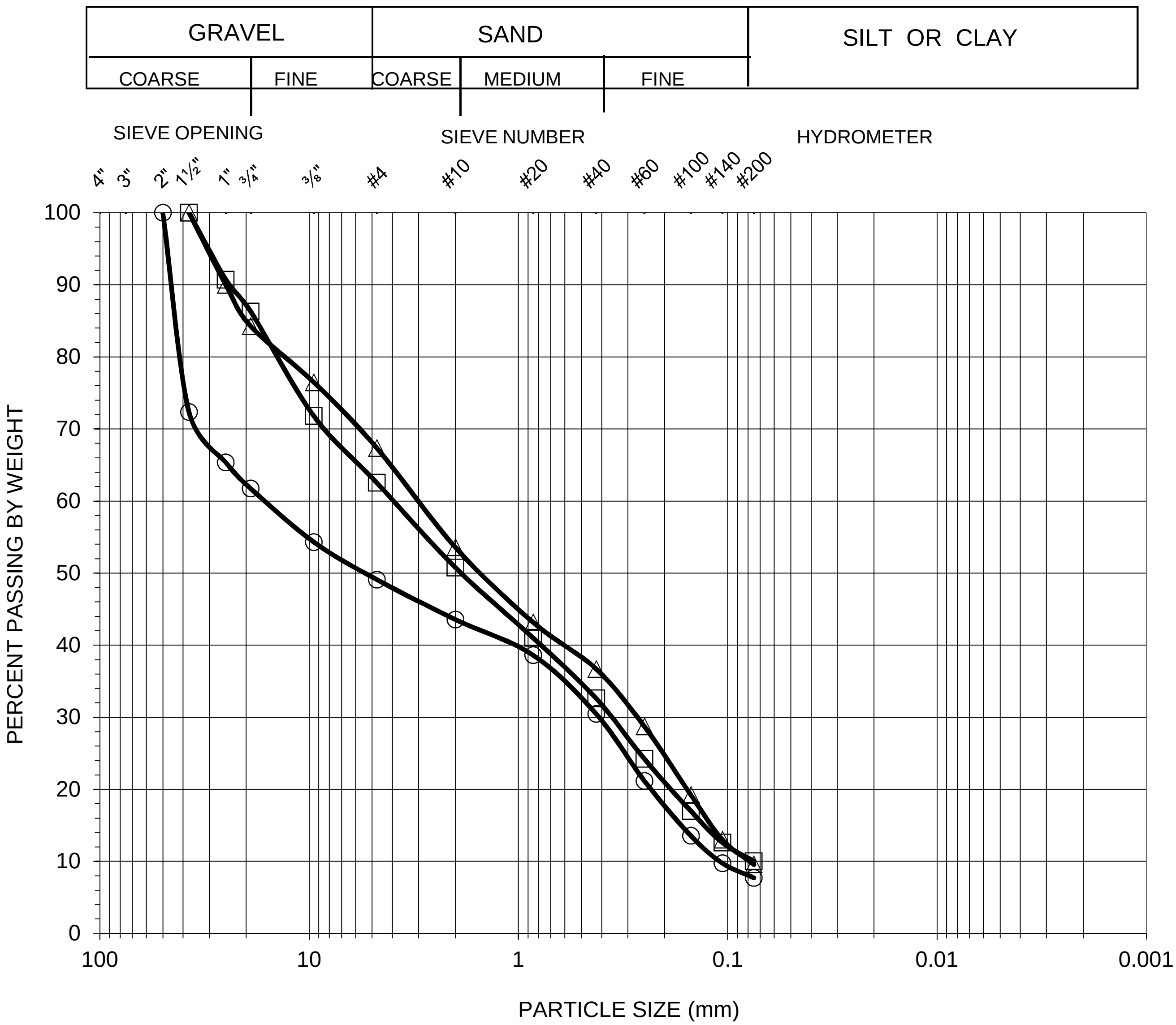
Client Name:	AMEC Foster Wheeler	Tested by:	CS	Date:	11/27/17
Project Name:	SCE Newberry Springs Site 2	Computed by:	JP	Date:	11/27/17
Project Number:	4953170222	Checked by:	AP	Date:	11/27/17



Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Type U.S.C.S
				Gravel	Sand	Silt & Clay		
○	BELP-2	1	0-5	27	60	13	N/A	SM
□	BELP-2	5	10.5-11	17	74	9	N/A	SP-SM
△	BELP-2	8	25.5-26.5	14	77	9	N/A	SP-SM

GRAIN SIZE DISTRIBUTION CURVE
ASTM D 6913

Client Name:	AMEC Foster Wheeler	Tested by:	CS	Date:	11/27/17
Project Name:	SCE Newberry Springs Site 2	Computed by:	JP	Date:	11/27/17
Project Number:	4953170222	Checked by:	AP	Date:	11/27/17



Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Type U.S.C.S
				Gravel	Sand	Silt & Clay		
○	BELP-3	4	7.5-8	51	41	8	N/A	GP-GM
□	BELP-3	8	25.5-26.5	37	53	10	N/A	SP-SM
△	BELP-3	10	35-36	33	57	10	N/A	SP-SM

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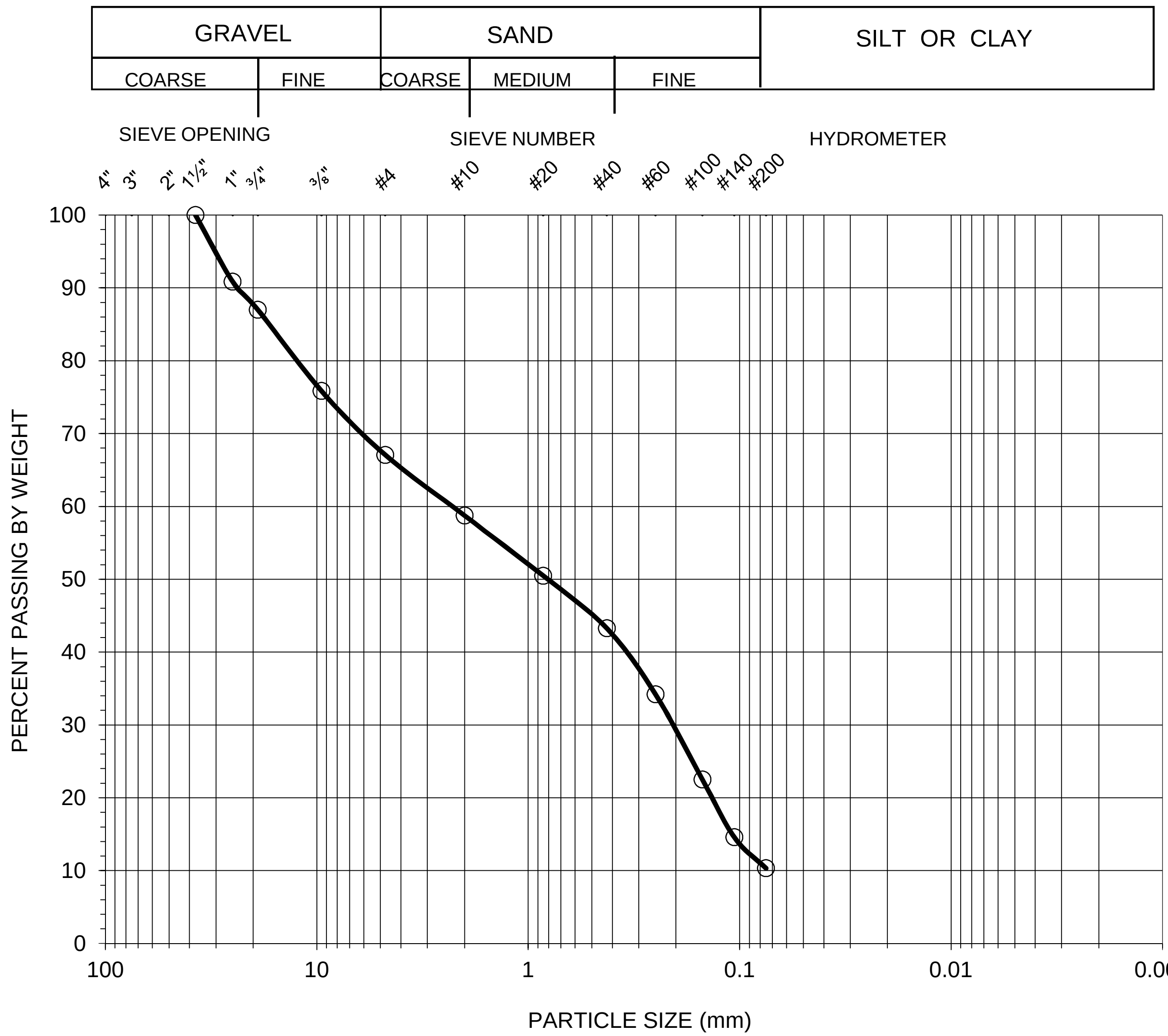
GRAIN SIZE DISTRIBUTION CURVE
ASTM D 6913

Client Name:	AMEC Foster Wheeler	Tested by:	CS	Date:	11/27/17
Project Name:	SCE Newberry Springs Site 2	Computed by:	JP	Date:	11/27/17
Project Number:	4953170222	Checked by:	AP	Date:	11/27/17



Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Type U.S.C.S
				Gravel	Sand	Silt & Clay		
○	BELP-3	12	45-45.5	33	57	10	N/A	SP-SM

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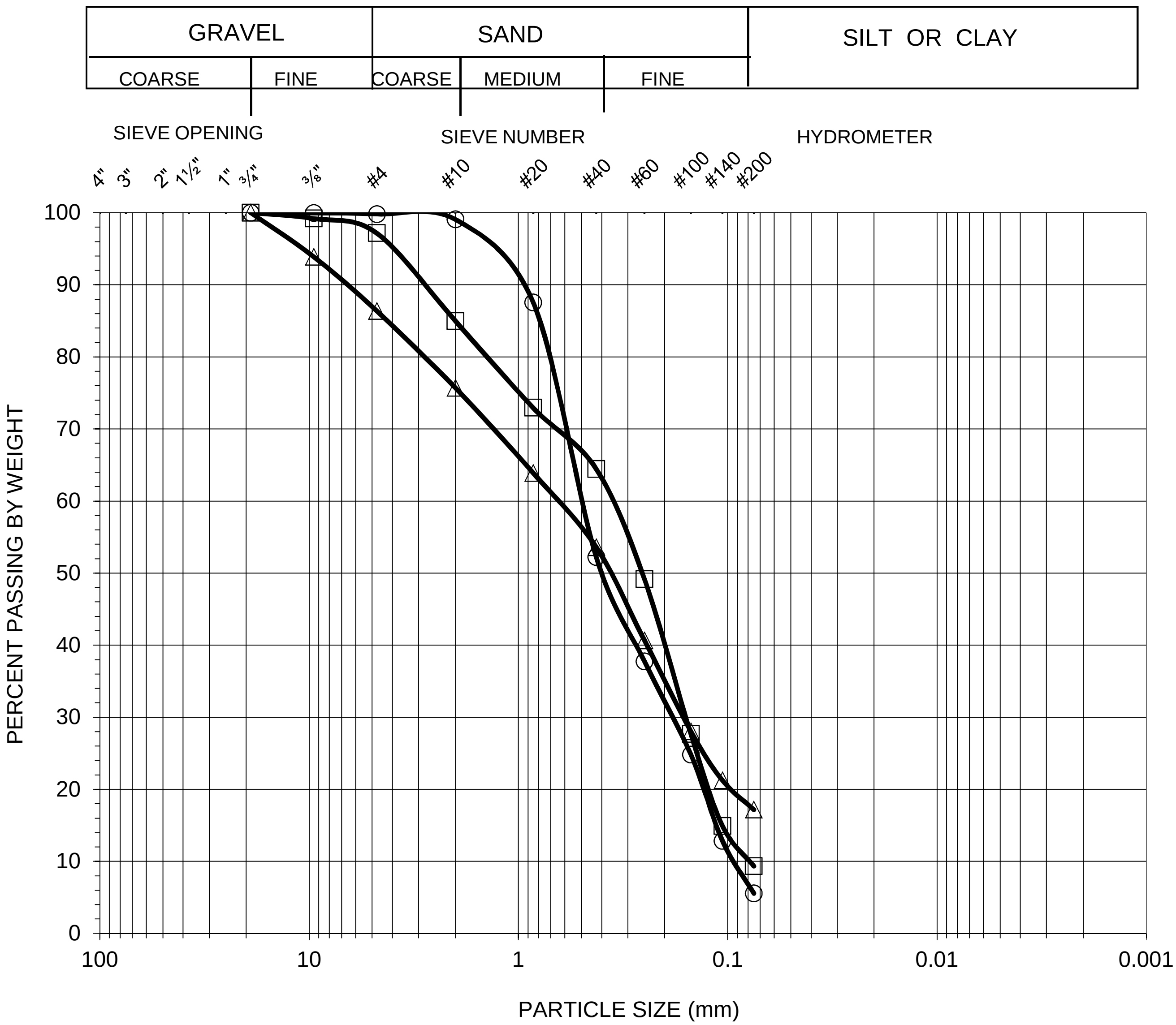
GRAIN SIZE DISTRIBUTION CURVE
ASTM D 6913

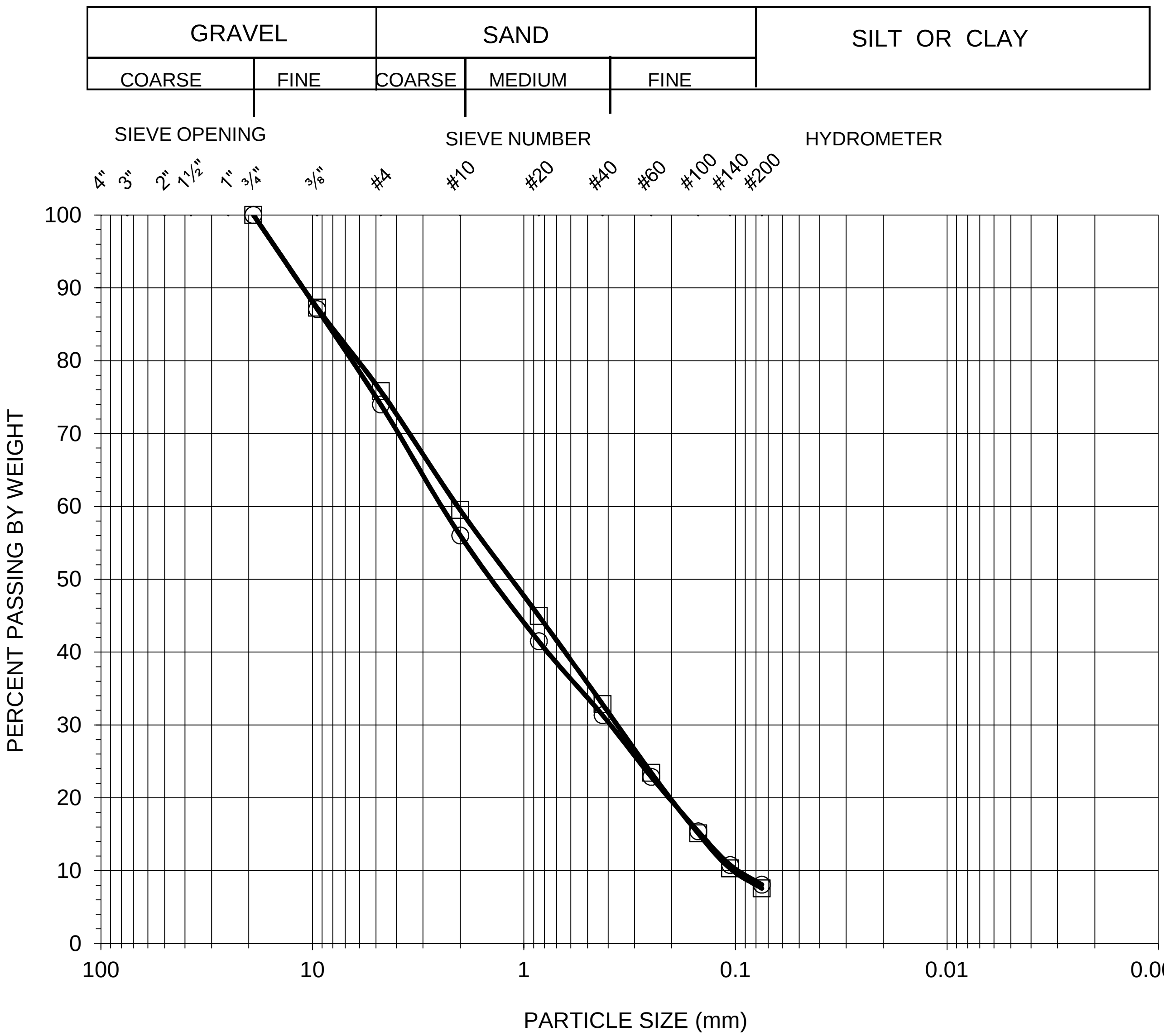
Client Name:	AMEC Foster Wheeler	Tested by:	CS	Date:	11/27/17
Project Name:	SCE Newberry Springs Site 2	Computed by:	JP	Date:	11/27/17
Project Number:	4953170222	Checked by:	AP	Date:	11/27/17



Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Type U.S.C.S
				Gravel	Sand	Silt & Clay		
○	BELP-4	1	0-5	0	94	6	N/A	SP-SM
□	BELP-4	5	11-11.5	3	88	9	N/A	SP-SM
△	BELP-4	6	15.5-16.5	14	69	17	N/A	SM

GRAIN SIZE DISTRIBUTION CURVE
ASTM D 6913

Client Name:	AMEC Foster Wheeler	Tested by:	CS	Date:	11/27/17
Project Name:	SCE Newberry Springs Site 2	Computed by:	JP	Date:	11/27/17
Project Number:	4953170222	Checked by:	AP	Date:	11/27/17



Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Type U.S.C.S
				Gravel	Sand	Silt & Clay		
○	BELP-4	8	25.5-26.5	26	66	8	N/A	SP-SM
□	BELP-4	10	35-36	24	68	8	N/A	SP-SM

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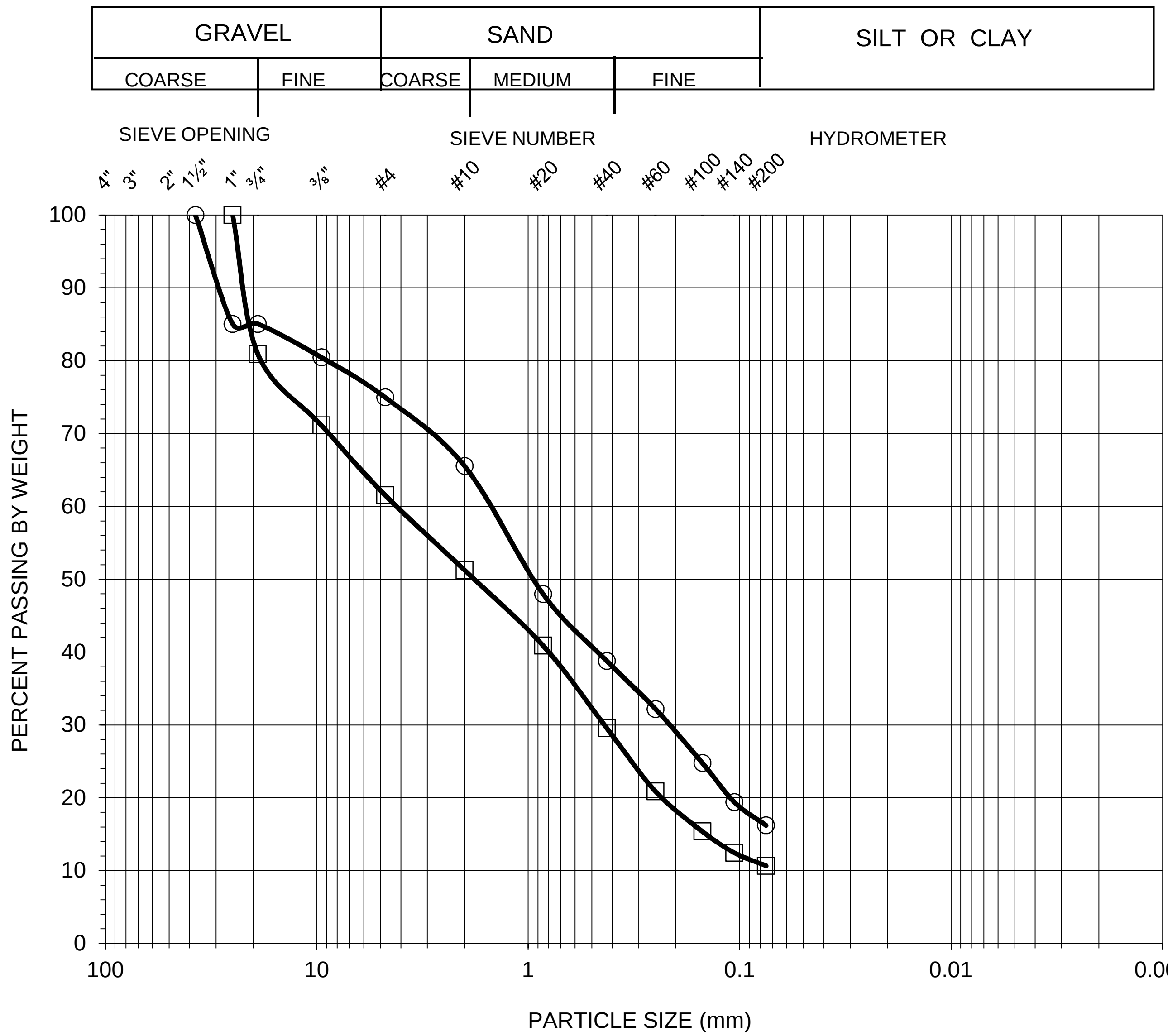
GRAIN SIZE DISTRIBUTION CURVE
ASTM D 6913

Client Name:	AMEC Foster Wheeler	Tested by:	CS	Date:	11/27/17
Project Name:	SCE Newberry Springs Site 2	Computed by:	JP	Date:	11/27/17
Project Number:	4953170222	Checked by:	AP	Date:	11/27/17



Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Type U.S.C.S
				Gravel	Sand	Silt & Clay		
○	BELP-5	2	3-3.5	25	59	16	N/A	SM
□	BELP-5	5	10.5-11.5	38	51	11	N/A	SP-SM

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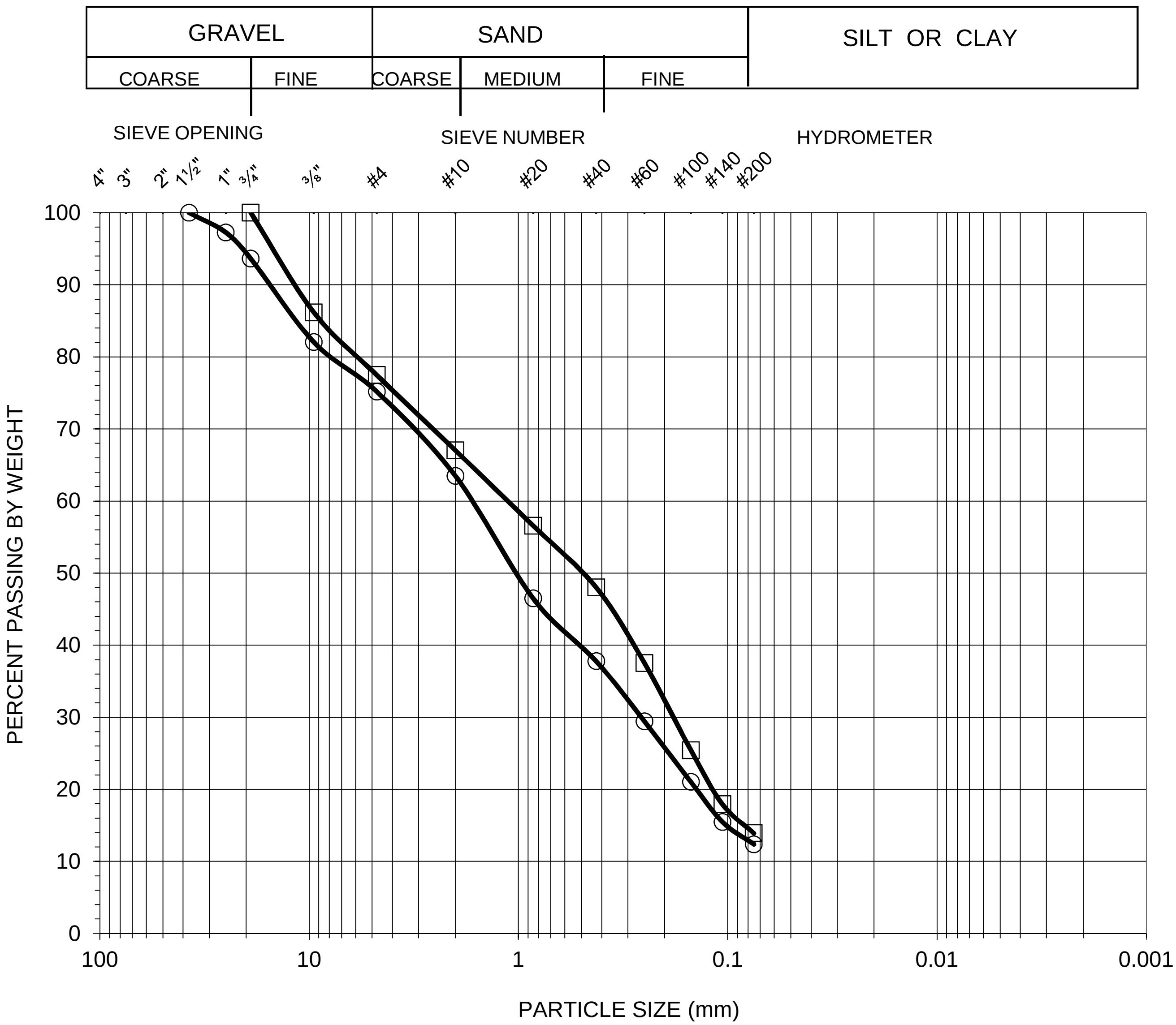
GRAIN SIZE DISTRIBUTION CURVE
ASTM D 6913

Client Name:	AMEC Foster Wheeler	Tested by:	CS	Date:	11/27/17
Project Name:	SCE Newberry Springs Site 2	Computed by:	JP	Date:	11/27/17
Project Number:	4953170222	Checked by:	AP	Date:	11/27/17



Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Type U.S.C.S
				Gravel	Sand	Silt & Clay		
○	BELP-6	1	0-5	25	63	12	N/A	SP-SM
□	BELP-6	6	15-16	23	63	14	N/A	SM

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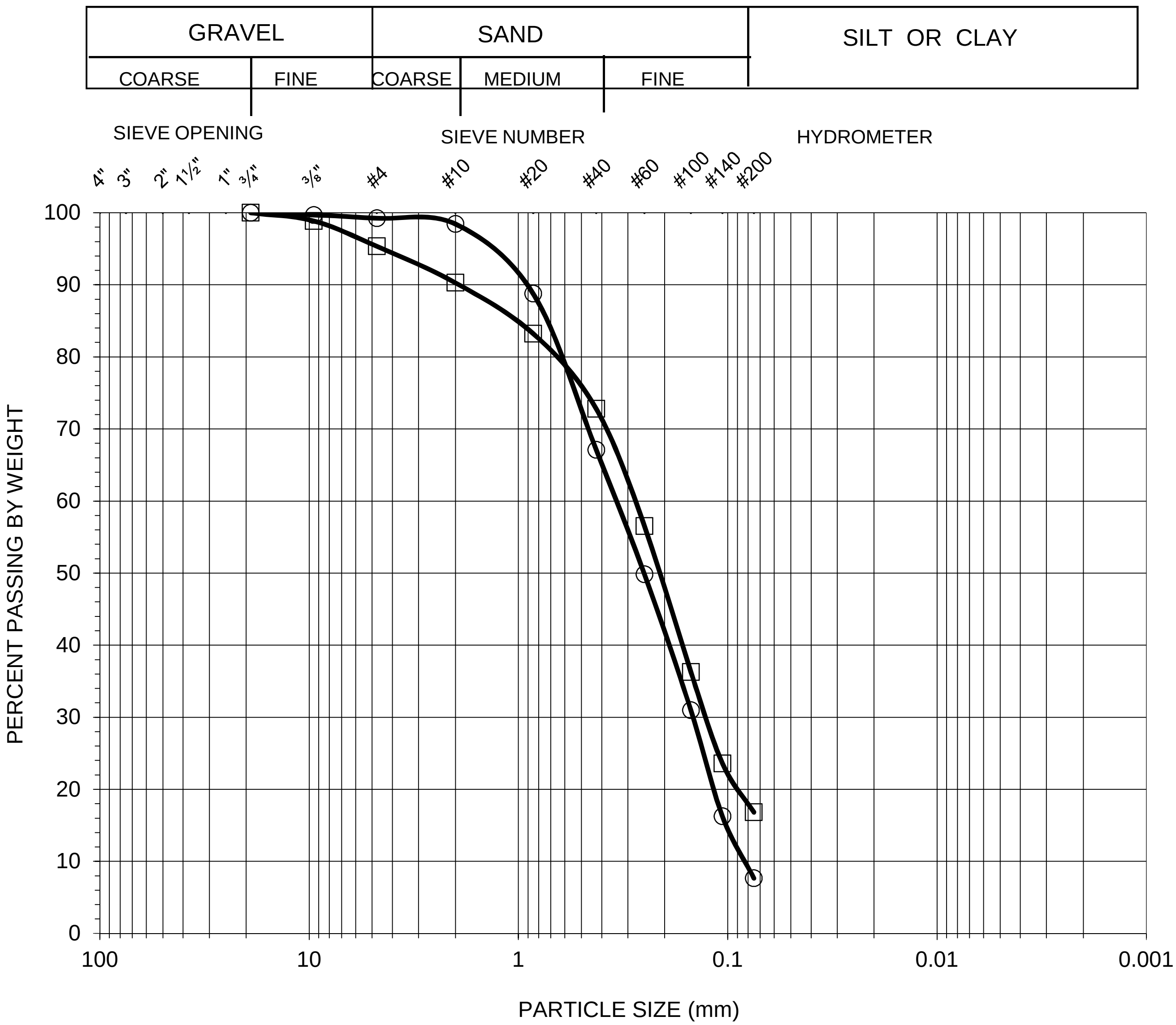
GRAIN SIZE DISTRIBUTION CURVE
ASTM D 6913

Client Name:	AMEC Foster Wheeler	Tested by:	CS	Date:	11/27/17
Project Name:	SCE Newberry Springs Site 2	Computed by:	JP	Date:	11/27/17
Project Number:	4953170222	Checked by:	AP	Date:	11/27/17



Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Type U.S.C.S
				Gravel	Sand	Silt & Clay		
○	BELP-7	1	0-5	1	91	8	N/A	SP-SM
□	BELP-7	8	25.5-26.5	5	78	17	N/A	SM

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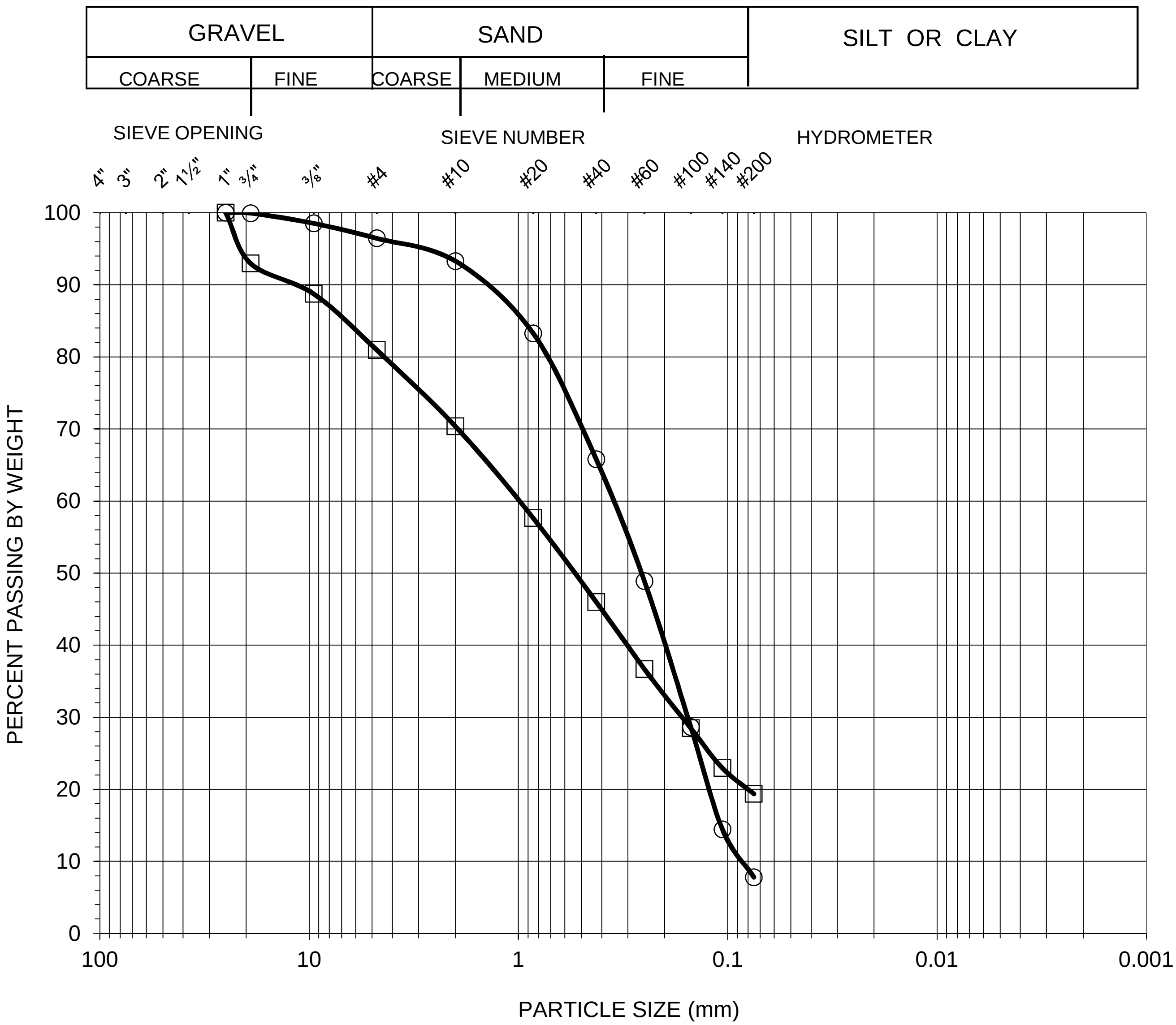
GRAIN SIZE DISTRIBUTION CURVE
ASTM D 6913

Client Name:	AMEC Foster Wheeler	Tested by:	CS	Date:	11/27/17
Project Name:	SCE Newberry Springs Site 2	Computed by:	JP	Date:	11/27/17
Project Number:	4953170222	Checked by:	AP	Date:	11/27/17



Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Type U.S.C.S
				Gravel	Sand	Silt & Clay		
○	BELP-8	1	0-5	4	88	8	N/A	SP-SM
□	BELP-8	6	15.5-16.5	19	62	19	N/A	SM

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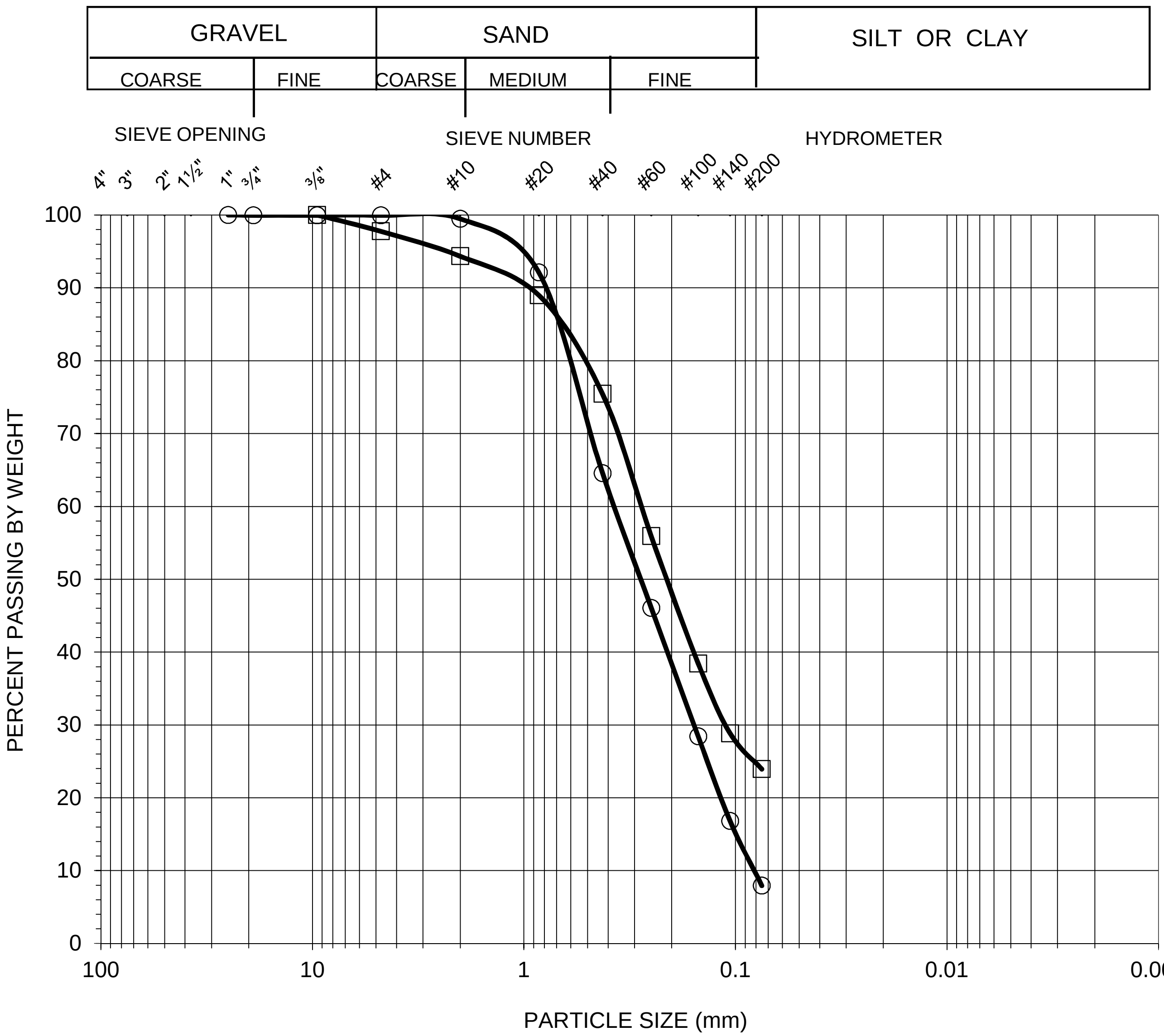
GRAIN SIZE DISTRIBUTION CURVE
ASTM D 6913

Client Name:	AMEC Foster Wheeler	Tested by:	CS	Date:	11/27/17
Project Name:	SCE Newberry Springs Site 2	Computed by:	JP	Date:	11/27/17
Project Number:	4953170222	Checked by:	AP	Date:	11/27/17



Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Type U.S.C.S
				Gravel	Sand	Silt & Clay		
○	BELP-9	1	0-5	0	92	8	N/A	SP-SM
□	BELP-9	6	16-16.5	2	74	24	N/A	SM

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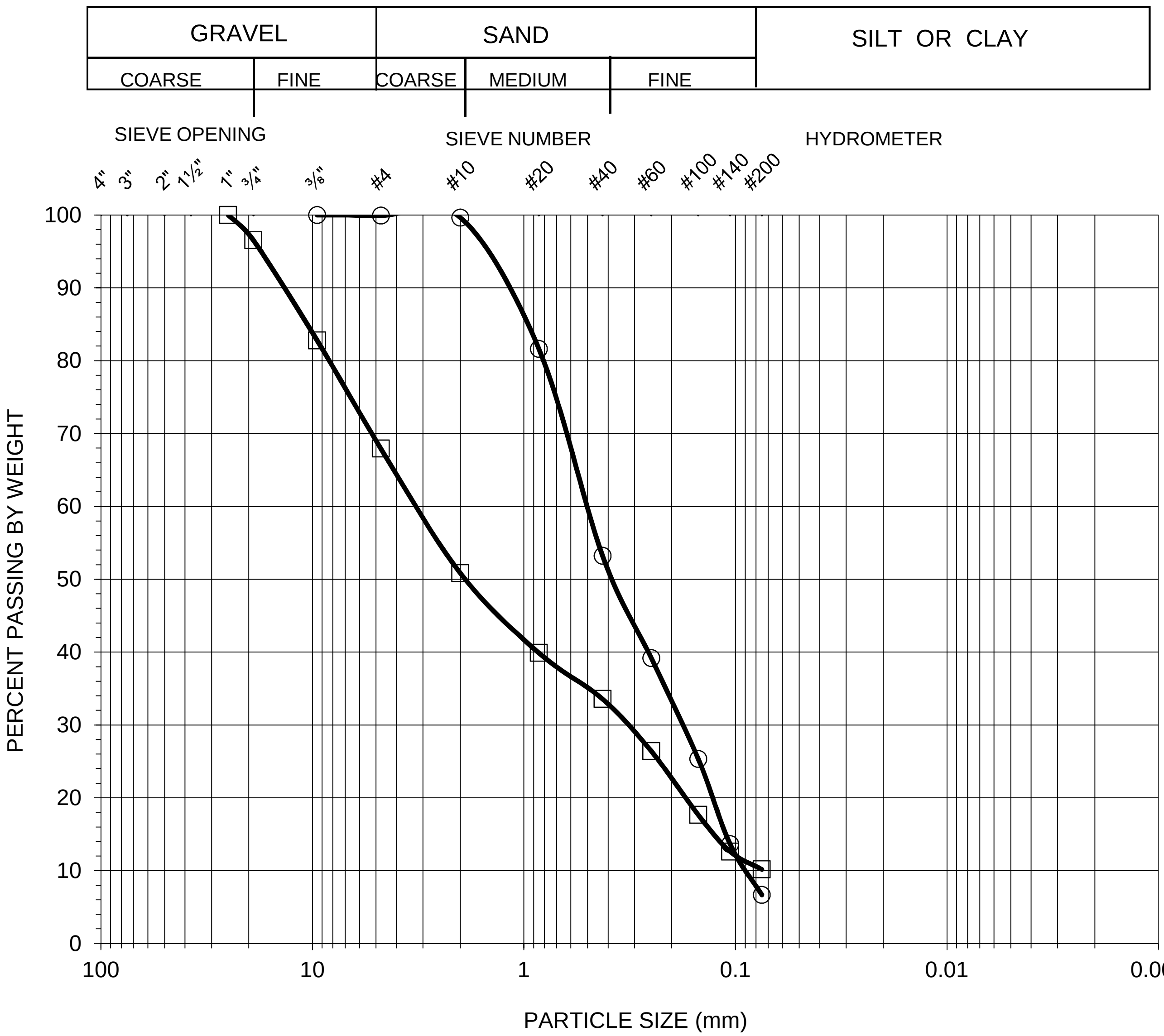
GRAIN SIZE DISTRIBUTION CURVE
ASTM D 6913

Client Name:	AMEC Foster Wheeler	Tested by:	CS	Date:	11/27/17
Project Name:	SCE Newberry Springs Site 2	Computed by:	JP	Date:	11/27/17
Project Number:	4953170222	Checked by:	AP	Date:	11/27/17



Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Type U.S.C.S
				Gravel	Sand	Silt & Clay		
○	BELP-10	1	0-5	0	93	7	N/A	SP-SM
□	BELP-10	6	15-15.5	32	58	10	N/A	SP-SM

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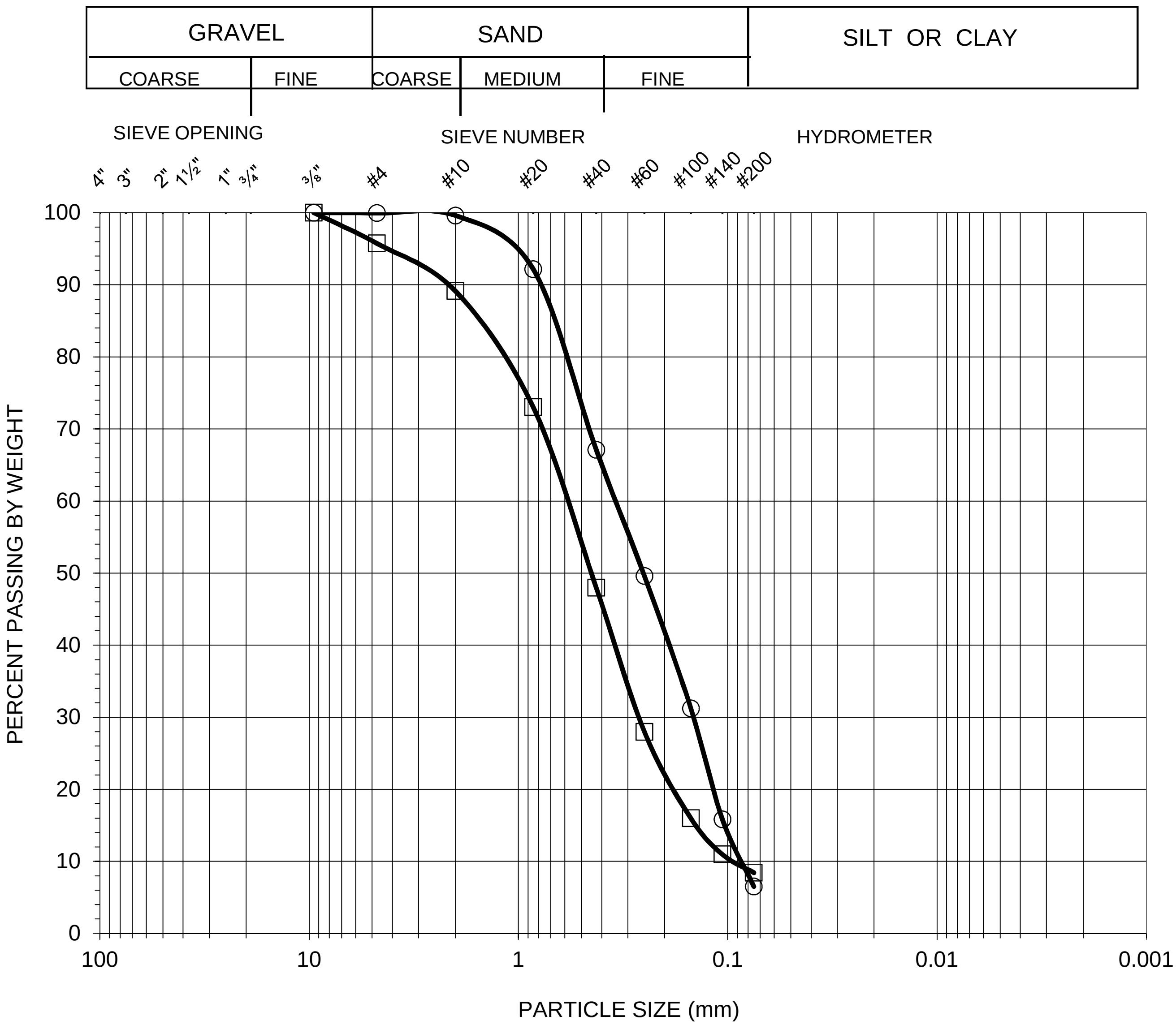
GRAIN SIZE DISTRIBUTION CURVE
ASTM D 6913

Client Name:	AMEC Foster Wheeler	Tested by:	CS	Date:	11/27/17
Project Name:	SCE Newberry Springs Site 2	Computed by:	JP	Date:	11/27/17
Project Number:	4953170222	Checked by:	AP	Date:	11/27/17



Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Type U.S.C.S
				Gravel	Sand	Silt & Clay		
○	BELP-11	1	0-5	0	93	7	N/A	SP-SM
□	BELP-11	3	6-6.5	4	88	8	N/A	SP-SM

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COMPACTION TEST

Client:	AMEC Foster Wheeler	AP Number:	17-1125
Project Name:	SCE Newberry Springs Site 2	Tested By: LS	Date: 11/16/17
Project No. :	4953170222	Calculated By: JP	Date: 11/17/17
Boring No.:	BELP-1	Checked By: AP	Date: 11/27/17
Sample No.:	1	Depth(ft.): 0-5	
Visual Sample Description:	Poorly-Graded Sand w/silt		

Compaction Method: [X] ASTM D1557 [ ] ASTM D698

Preparation Method: [ ] Moist [X] Dry

METHOD: A

MOLD VOLUME (CU.FT): 0.0333

Wt. Comp. Soil + Mold (gm.)	3680	3746	3779	3764		
Wt. of Mold (gm.)	1854	1854	1854	1854		
Net Wt. of Soil (gm.)	1826	1892	1925	1910		
Container No.						
Wt. of Container (gm.)	147.43	143.64	143.29	140.65		
Wet Wt. of Soil + Cont. (gm.)	291.03	317.36	314.66	331.31		
Dry Wt. of Soil + Cont. (gm.)	280.76	301.92	296.64	308.48		
Moisture Content (%)	7.70	9.75	11.75	13.60		
Wet Density (pcf)	120.77	125.13	127.31	126.32		
Dry Density (pcf)	112.13	114.01	113.93	111.19		

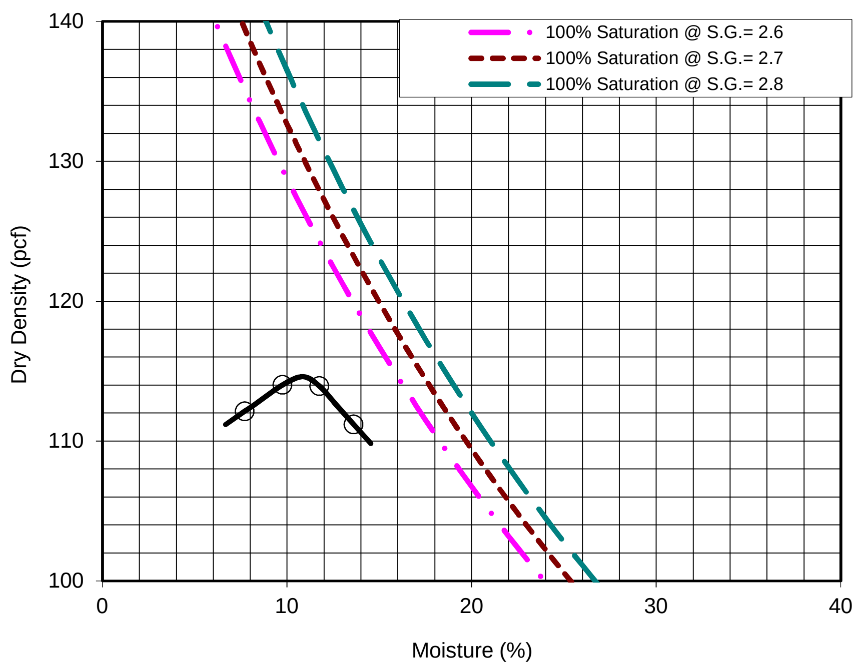
Maximum Dry Density (pcf)	**114.6**	Optimum Moisture Content (%)	**10.8**
Maximum Dry Density w/ Rock Correction (pcf)	**N/A**	Optimum Moisture Content w/ Rock Correction (%)	**N/A**

PROCEDURE USED

[X] *METHOD A: Percent of Oversize:* *0.0%*
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)

[ ] *METHOD B: Percent of Oversize:* *N/A*
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)

[ ] *METHOD C: Percent of Oversize:* *N/A*
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)



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COMPACTION TEST

Client: AMEC Foster Wheeler
AP Number: 17-1125
Project Name: SCE Newberry Springs Site 2
Tested By: AM Date: 11/22/17
Project No. : 4953170222
Calculated By: JP Date: 11/27/17
Boring No.: BELP-2
Checked By: AP Date: 11/27/17
Sample No.: 1
Depth(ft.): 0-5
Visual Sample Description: Silty Sand w/gravel

Compaction Method: [X] ASTM D1557 [ ] ASTM D698

METHOD: C
MOLD VOLUME (CU.FT): 0.0752

Preparation Method: [ ] Moist [X] Dry

Wt. Comp. Soil + Mold (gm.)	7178	7369	7382	7309		
Wt. of Mold (gm.)	2650	2650	2650	2650		
Net Wt. of Soil (gm.)	4528	4719	4732	4659		
Container No.						
Wt. of Container (gm.)	571.76	329.52	571.76	491.01		
Wet Wt. of Soil + Cont. (gm.)	777.25	574.75	797.26	736.43		
Dry Wt. of Soil + Cont. (gm.)	765.27	556.25	776.28	710.28		
Moisture Content (%)	6.19	8.16	10.26	11.93		
Wet Density (pcf)	132.73	138.33	138.72	136.58		
Dry Density (pcf)	124.99	127.89	125.82	122.03		

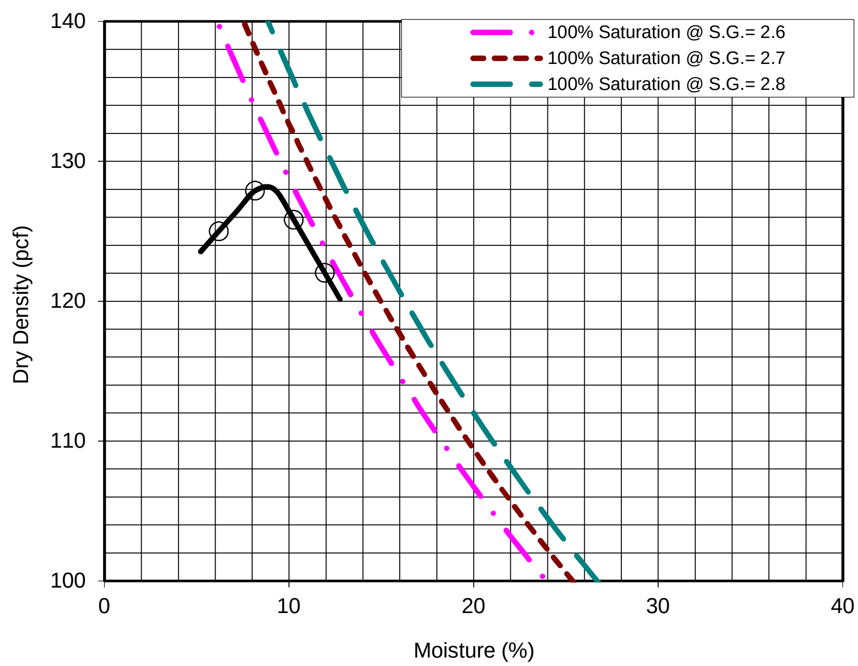
Maximum Dry Density (pcf): **128.0**
Maximum Dry Density w/ Rock Correction (pcf): **N/A**
Optimum Moisture Content (%): **8.8**
Optimum Moisture Content w/ Rock Correction (%): **N/A**

PROCEDURE USED

[ ] *METHOD A: Percent of Oversize:* *N/A*
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)

[ ] *METHOD B: Percent of Oversize:* *N/A*
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)

[X] *METHOD C: Percent of Oversize:* *1.4%*
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)



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COMPACTION TEST

Client:	AMEC Foster Wheeler			AP Number:	17-1125
Project Name:	SCE Newberry Springs Site 2	Tested By:	LS	Date:	11/16/17
Project No. :	4953170222	Calculated By:	JP	Date:	11/17/17
Boring No.:	BELP-3	Checked By:	AP	Date:	11/27/17
Sample No.:	1	Depth(ft.):	0-5		

Visual Sample Description: Poorly-Graded Sand w/silt

Compaction Method: [X] ASTM D1557 [ ] ASTM D698

METHOD: A

MOLD VOLUME (CU.FT): 0.0333

Preparation Method: [ ] Moist [X] Dry

Wt. Comp. Soil + Mold (gm.)	3688	3763	3788	3775		
Wt. of Mold (gm.)	1854	1854	1854	1854		
Net Wt. of Soil (gm.)	1834	1909	1934	1921		
Container No.						
Wt. of Container (gm.)	149.02	137.64	140.45	133.80		
Wet Wt. of Soil + Cont. (gm.)	312.12	294.37	324.12	322.20		
Dry Wt. of Soil + Cont. (gm.)	300.49	279.93	304.42	298.81		
Moisture Content (%)	7.68	10.15	12.01	14.18		
Wet Density (pcf)	121.26	126.22	127.88	127.07		
Dry Density (pcf)	112.62	114.59	114.16	111.29		

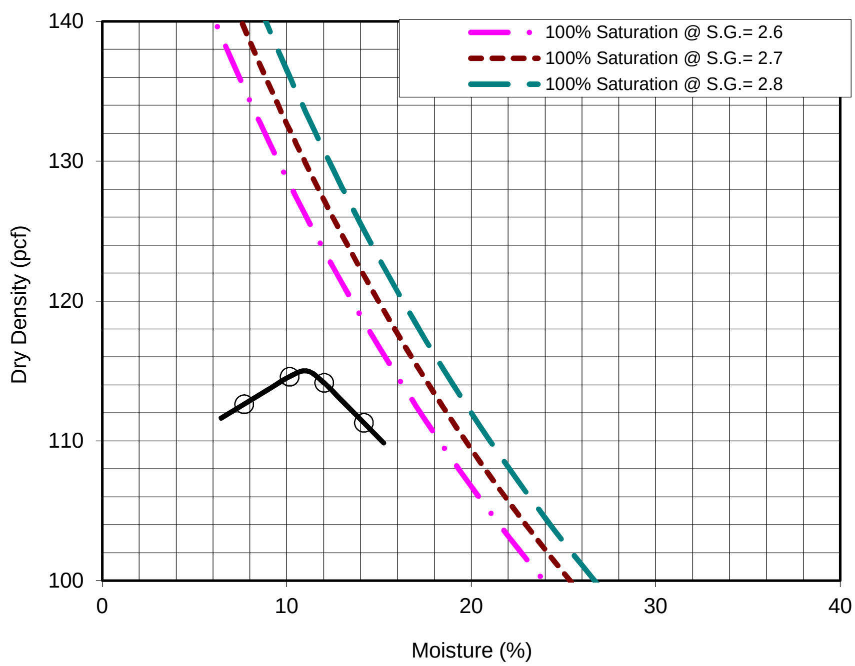
Maximum Dry Density (pcf)	**115.0**	Optimum Moisture Content (%)	**11.0**
Maximum Dry Density w/ Rock Correction (pcf)	**N/A**	Optimum Moisture Content w/ Rock Correction (%)	**N/A**

PROCEDURE USED

[X] *METHOD A: Percent of Oversize:* *0.4%*
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)

[ ] *METHOD B: Percent of Oversize:* *N/A*
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)

[ ] *METHOD C: Percent of Oversize:* *N/A*
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)



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COMPACTION TEST

Client:	AMEC Foster Wheeler			AP Number:	17-1125
Project Name:	SCE Newberry Springs Site 2	Tested By:	LS	Date:	11/20/17
Project No. :	4953170222	Calculated By:	JP	Date:	11/25/17
Boring No.:	BELP-4	Checked By:	AP	Date:	11/27/17
Sample No.:	1	Depth(ft.):	0-5		

Visual Sample Description: Poorly-Graded Sand w/silt

Compaction Method: [X] ASTM D1557 [ ] ASTM D698

Preparation Method: [ ] Moist [X] Dry

METHOD: A
MOLD VOLUME (CU.FT): 0.0333

Wt. Comp. Soil + Mold (gm.)	3753	3770	3677	3753		
Wt. of Mold (gm.)	1854	1854	1854	1854		
Net Wt. of Soil (gm.)	1899	1916	1823	1899		
Container No.						
Wt. of Container (gm.)	148.28	148.51	149.68	150.22		
Wet Wt. of Soil + Cont. (gm.)	354.77	368.57	355.73	360.65		
Dry Wt. of Soil + Cont. (gm.)	336.42	345.18	341.54	335.16		
Moisture Content (%)	9.75	11.89	7.40	13.78		
Wet Density (pcf)	125.56	126.72	120.54	125.56		
Dry Density (pcf)	114.40	113.25	112.23	110.35		

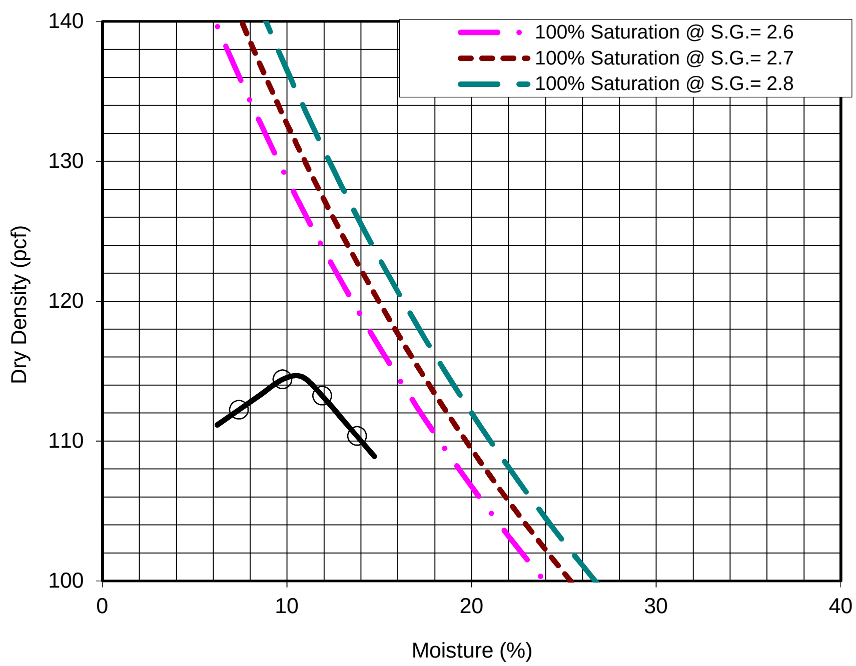
Maximum Dry Density (pcf)	**114.6**	Optimum Moisture Content (%)	**10.6**
Maximum Dry Density w/ Rock Correction (pcf)	**N/A**	Optimum Moisture Content w/ Rock Correction (%)	**N/A**

PROCEDURE USED

[X] *METHOD A: Percent of Oversize:* *0.2%*
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)

[ ] *METHOD B: Percent of Oversize:* *N/A*
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)

[ ] *METHOD C: Percent of Oversize:* *N/A*
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)



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COMPACTION TEST

Client: AMEC Foster Wheeler — AP Number: 17-1125
Project Name: SCE Newberry Springs Site 2 — Tested By: LS — Date: 11/16/17
Project No. : 4953170222 — Calculated By: JP — Date: 11/17/17
Boring No.: BELP-5 — Checked By: AP — Date: 11/27/17
Sample No.: 1 — Depth(ft.): 0-5
Visual Sample Description: Silty Sand w/gravel

Compaction Method: [X] ASTM D1557 [ ] ASTM D698
Preparation Method: [ ] Moist [X] Dry

METHOD: A
MOLD VOLUME (CU.FT): 0.0333

Wt. Comp. Soil + Mold (gm.)	3877	3950	3874	3753		
Wt. of Mold (gm.)	1854	1854	1854	1854		
Net Wt. of Soil (gm.)	2023	2096	2020	1899		
Container No.						
Wt. of Container (gm.)	149.72	150.49	135.63	131.19		
Wet Wt. of Soil + Cont. (gm.)	316.63	330.40	300.72	300.01		
Dry Wt. of Soil + Cont. (gm.)	303.77	312.51	281.16	290.53		
Moisture Content (%)	8.35	11.04	13.44	5.95		
Wet Density (pcf)	133.80	138.59	133.60	125.60		
Dry Density (pcf)	123.49	124.81	117.77	118.54		

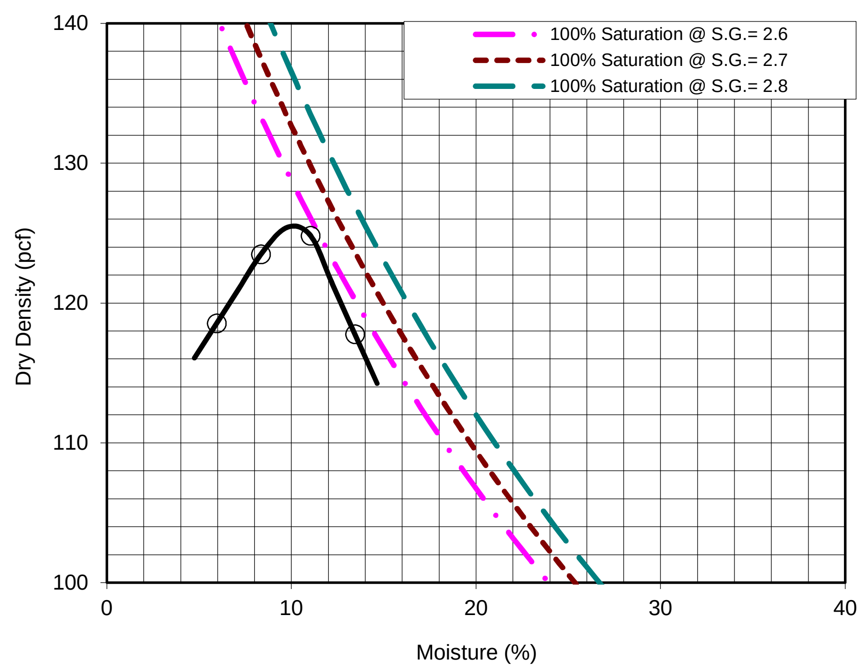
Maximum Dry Density (pcf): **125.5**
Maximum Dry Density w/ Rock Correction (pcf): **131.1**
Optimum Moisture Content (%): **10.0**
Optimum Moisture Content w/ Rock Correction (%): **8.3**

PROCEDURE USED

[X] *METHOD A: Percent of Oversize:* *16.8%*
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)

[ ] *METHOD B: Percent of Oversize:* *N/A*
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)

[ ] *METHOD C: Percent of Oversize:* *N/A*
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)



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COMPACTION TEST

Client: AMEC Foster Wheeler
AP Number: 17-1125
Project Name: SCE Newberry Springs Site 2
Tested By: LS Date: 11/16/17
Project No. : 4953170222
Calculated By: JP Date: 11/17/17
Boring No.: BELP-6
Checked By: AP Date: 11/27/17
Sample No.: 1
Depth(ft.): 0-5
Visual Sample Description: Poorly-Graded Sand w/silt & gravel

Compaction Method: [X] ASTM D1557 [ ] ASTM D698
Preparation Method: [ ] Moist [X] Dry

METHOD: B
MOLD VOLUME (CU.FT): 0.0333

Wt. Comp. Soil + Mold (gm.)	3928	3955	3805	3893		
Wt. of Mold (gm.)	1850	1850	1850	1850		
Net Wt. of Soil (gm.)	2078	2105	1955	2043		
Container No.						
Wt. of Container (gm.)	181.41	179.61	142.36	128.74		
Wet Wt. of Soil + Cont. (gm.)	406.80	394.48	342.68	317.20		
Dry Wt. of Soil + Cont. (gm.)	392.28	376.19	333.63	297.71		
Moisture Content (%)	6.89	9.30	4.73	11.53		
Wet Density (pcf)	137.40	139.19	129.30	135.12		
Dry Density (pcf)	128.55	127.34	123.46	121.15		

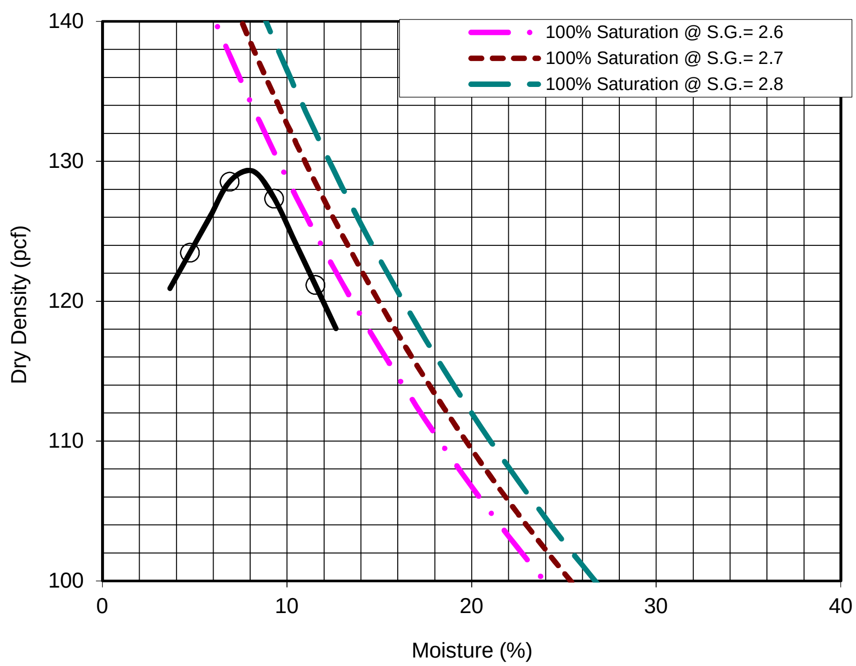
Maximum Dry Density (pcf): **129.3**
Maximum Dry Density w/ Rock Correction (pcf): **135.0**
Optimum Moisture Content (%): **8.0**
Optimum Moisture Content w/ Rock Correction (%): **6.6**

PROCEDURE USED

[ ] *METHOD A: Percent of Oversize:* *N/A*
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)

[X] *METHOD B: Percent of Oversize:* *18.0%*
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)

[ ] *METHOD C: Percent of Oversize:* *N/A*
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)



COMPACTION TEST

Client:	AMEC Foster Wheeler			AP Number:	17-1125
Project Name:	SCE Newberry Springs Site 2	Tested By:	AM	Date:	11/20/17
Project No. :	4953170222	Calculated By:	JP	Date:	11/25/17
Boring No.:	BELP-7	Checked By:	AP	Date:	11/27/17
Sample No.:	1	Depth(ft.):	0-5		

Visual Sample Description: Poorly-Graded Sand w/silt

Compaction Method: [X] ASTM D1557 [ ] ASTM D698

Preparation Method: [ ] Moist [X] Dry

METHOD: A
MOLD VOLUME (CU.FT): 0.0333

Wt. Comp. Soil + Mold (gm.)	3628	3699	3747	3760		
Wt. of Mold (gm.)	1854	1854	1854	1854		
Net Wt. of Soil (gm.)	1774	1845	1893	1906		
Container No.						
Wt. of Container (gm.)	148.88	149.59	149.21	149.60		
Wet Wt. of Soil + Cont. (gm.)	359.87	370.26	367.35	349.71		
Dry Wt. of Soil + Cont. (gm.)	348.04	352.73	345.30	326.01		
Moisture Content (%)	5.94	8.63	11.24	13.43		
Wet Density (pcf)	117.29	121.99	125.17	126.03		
Dry Density (pcf)	110.72	112.30	112.51	111.10		

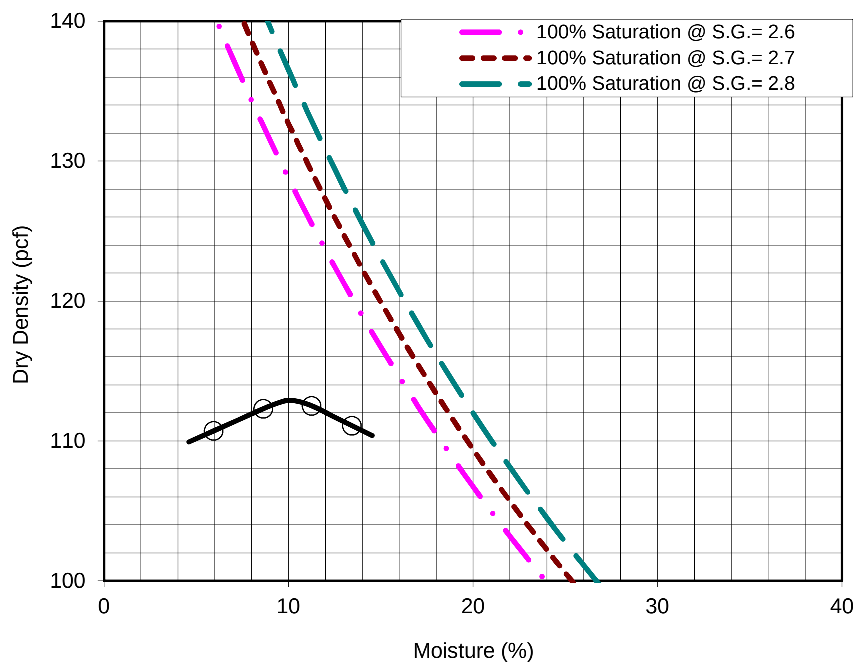
Maximum Dry Density (pcf)	**112.9**	Optimum Moisture Content (%)	**10.0**
Maximum Dry Density w/ Rock Correction (pcf)	**N/A**	Optimum Moisture Content w/ Rock Correction (%)	**N/A**

PROCEDURE USED

[X] *METHOD A: Percent of Oversize:* *0.8%*
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)

[ ] *METHOD B: Percent of Oversize:* *N/A*
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)

[ ] *METHOD C: Percent of Oversize:* *N/A*
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)



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COMPACTION TEST

Client:	AMEC Foster Wheeler			AP Number:	17-1125
Project Name:	SCE Newberry Springs Site 2	Tested By:	LS	Date:	11/15/17
Project No. :	4953170222	Calculated By:	JP	Date:	11/16/17
Boring No.:	BELP-8	Checked By:	AP	Date:	11/27/17
Sample No.:	1	Depth(ft.):	0-5		

Visual Sample Description: Poorly-Graded Sand w/silt

Compaction Method: [X] ASTM D1557 [ ] ASTM D698

METHOD: A

MOLD VOLUME (CU.FT): 0.0333

Preparation Method: [ ] Moist [X] Dry

Wt. Comp. Soil + Mold (gm.)	3690	3761	3789	3775		
Wt. of Mold (gm.)	1855	1855	1855	1855		
Net Wt. of Soil (gm.)	1835	1906	1934	1920		
Container No.						
Wt. of Container (gm.)	144.27	147.67	149.21	151.99		
Wet Wt. of Soil + Cont. (gm.)	308.66	348.39	430.95	484.96		
Dry Wt. of Soil + Cont. (gm.)	298.36	331.47	401.33	444.69		
Moisture Content (%)	6.68	9.21	11.75	13.76		
Wet Density (pcf)	121.36	126.03	127.88	127.00		
Dry Density (pcf)	113.76	115.40	114.43	111.64		

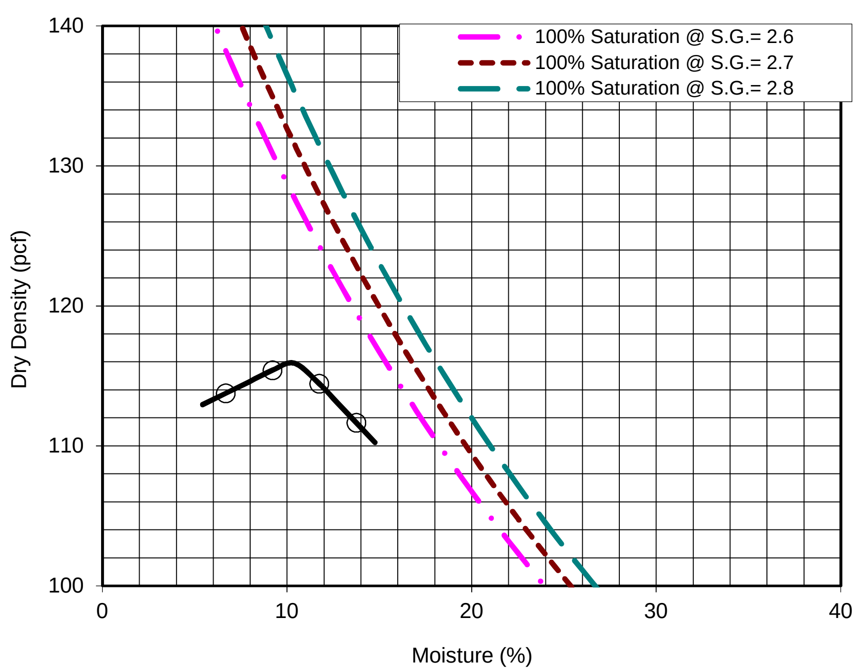
Maximum Dry Density (pcf)	**116.0**	Optimum Moisture Content (%)	**10.1**
Maximum Dry Density w/ Rock Correction (pcf)	**N/A**	Optimum Moisture Content w/ Rock Correction (%)	**N/A**

PROCEDURE USED

[X] *METHOD A: Percent of Oversize:* *3.5%*
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)

[ ] *METHOD B: Percent of Oversize:* *N/A*
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)

[ ] *METHOD C: Percent of Oversize:* *N/A*
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)



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COMPACTION TEST

Client:	AMEC Foster Wheeler			AP Number:	17-1125
Project Name:	SCE Newberry Springs Site 2	Tested By:	LS	Date:	11/16/17
Project No. :	4953170222	Calculated By:	JP	Date:	11/17/17
Boring No.:	BELP-9	Checked By:	AP	Date:	11/27/17
Sample No.:	1	Depth(ft.):	0-5		
Visual Sample Description:	Poorly-Graded Sand w/silt				

Compaction Method: [X] ASTM D1557 / [ ] ASTM D698

Preparation Method: [ ] Moist / [X] Dry

METHOD: A

MOLD VOLUME (CU.FT): 0.0333

Wt. Comp. Soil + Mold (gm.)	3675	3753	3778	3775		
Wt. of Mold (gm.)	1854	1854	1854	1854		
Net Wt. of Soil (gm.)	1821	1899	1924	1921		
Container No.						
Wt. of Container (gm.)	134.90	149.81	147.88	133.80		
Wet Wt. of Soil + Cont. (gm.)	280.10	324.64	336.40	322.20		
Dry Wt. of Soil + Cont. (gm.)	269.59	307.89	315.08	298.01		
Moisture Content (%)	7.80	10.60	12.75	14.73		
Wet Density (pcf)	120.40	125.60	127.25	127.07		
Dry Density (pcf)	111.69	113.56	112.86	110.75		

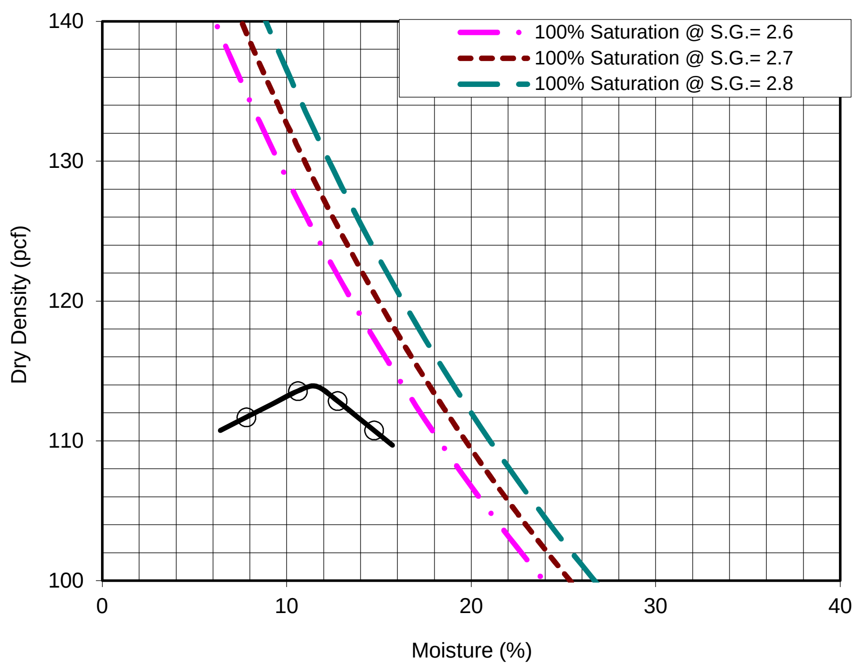
Maximum Dry Density (pcf)	**114.0**	Optimum Moisture Content (%)	**11.4**
Maximum Dry Density w/ Rock Correction (pcf)	**N/A**	Optimum Moisture Content w/ Rock Correction (%)	**N/A**

PROCEDURE USED

[X] *METHOD A: Percent of Oversize:* *0.1%*
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)

[ ] *METHOD B: Percent of Oversize:* N/A
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)

[ ] *METHOD C: Percent of Oversize:* N/A
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)



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COMPACTION TEST

Client: AMEC Foster Wheeler
AP Number: 17-1125
Project Name: SCE Newberry Springs Site 2
Tested By: CS Date: 11/21/17
Project No. : 4953170222
Calculated By: JP Date: 11/25/17
Boring No.: BELP-10
Checked By: AP Date: 11/27/17
Sample No.: 1
Depth(ft.): 0-5
Visual Sample Description: Poorly-Graded Sand w/silt

Compaction Method: [X] ASTM D1557 [ ] ASTM D698
Preparation Method: [ ] Moist [X] Dry

METHOD: A
MOLD VOLUME (CU.FT): 0.0333

Wt. Comp. Soil + Mold (gm.)	3734	3754	3668	3741		
Wt. of Mold (gm.)	1854	1854	1854	1854		
Net Wt. of Soil (gm.)	1880	1900	1814	1887		
Container No.						
Wt. of Container (gm.)	147.27	143.50	142.70	139.92		
Wet Wt. of Soil + Cont. (gm.)	342.55	391.46	400.56	436.20		
Dry Wt. of Soil + Cont. (gm.)	326.28	366.96	384.09	402.15		
Moisture Content (%)	9.09	10.96	6.82	12.98		
Wet Density (pcf)	124.34	125.63	119.94	124.80		
Dry Density (pcf)	113.98	113.22	112.28	110.46		

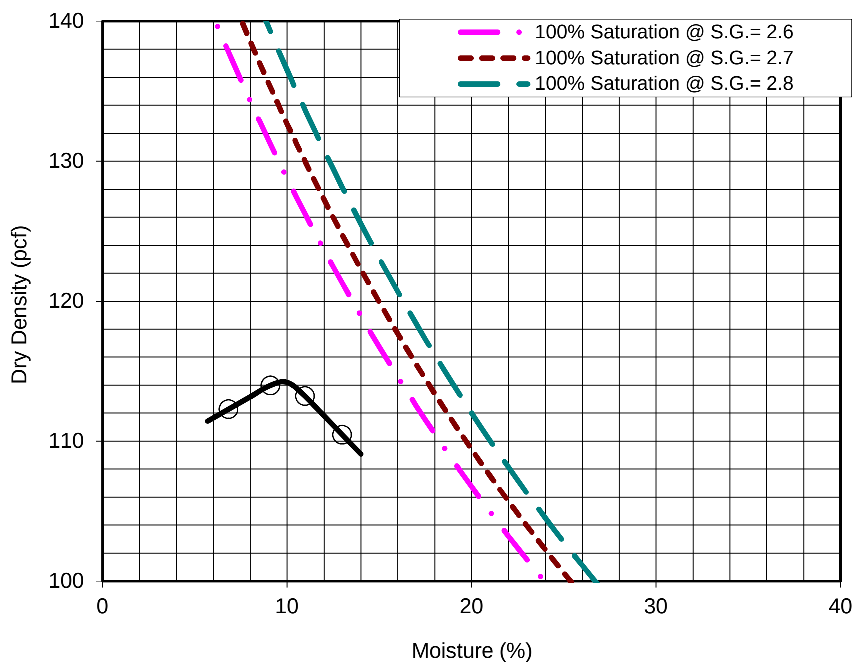
Maximum Dry Density (pcf): **114.2**
Maximum Dry Density w/ Rock Correction (pcf): **N/A**
Optimum Moisture Content (%): **9.9**
Optimum Moisture Content w/ Rock Correction (%): **N/A**

PROCEDURE USED

[X] *METHOD A: Percent of Oversize:* *0.1%*
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)

[ ] *METHOD B: Percent of Oversize:* N/A
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)

[ ] *METHOD C: Percent of Oversize:* N/A
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)



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COMPACTION TEST

Client:	AMEC Foster Wheeler			AP Number:	17-1125
Project Name:	SCE Newberry Springs Site 2	Tested By:	LS	Date:	11/20/17
Project No. :	4953170222	Calculated By:	JP	Date:	11/25/17
Boring No.:	BELP-11	Checked By:	AP	Date:	11/27/17
Sample No.:	1	Depth(ft.):	0-5		

Visual Sample Description: Poorly-Graded Sand w/silt

Compaction Method: [X] ASTM D1557 [ ] ASTM D698

Preparation Method: [ ] Moist [X] Dry

METHOD: A
MOLD VOLUME (CU.FT): 0.0333

Wt. Comp. Soil + Mold (gm.)	3753	3672	3729	3753		
Wt. of Mold (gm.)	1853	1853	1853	1853		
Net Wt. of Soil (gm.)	1900	1819	1876	1900		
Container No.						
Wt. of Container (gm.)	141.47	150.35	147.43	149.24		
Wet Wt. of Soil + Cont. (gm.)	345.37	349.30	354.83	342.21		
Dry Wt. of Soil + Cont. (gm.)	319.53	334.09	334.98	320.71		
Moisture Content (%)	14.51	8.28	10.58	12.54		
Wet Density (pcf)	125.63	120.30	124.07	125.63		
Dry Density (pcf)	109.71	111.11	112.20	111.63		

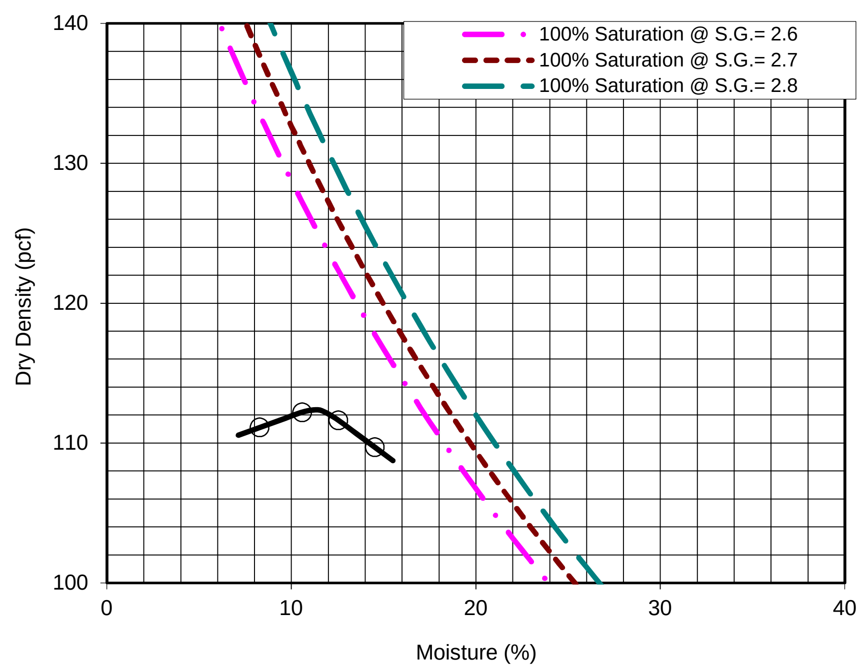
Maximum Dry Density (pcf): **112.3**
Maximum Dry Density w/ Rock Correction (pcf): **N/A**
Optimum Moisture Content (%): **11.3**
Optimum Moisture Content w/ Rock Correction (%): **N/A**

PROCEDURE USED

[X] *METHOD A: Percent of Oversize:* *0.0%*
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)

[ ] *METHOD B: Percent of Oversize:* *N/A*
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)

[ ] *METHOD C: Percent of Oversize:* *N/A*
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)



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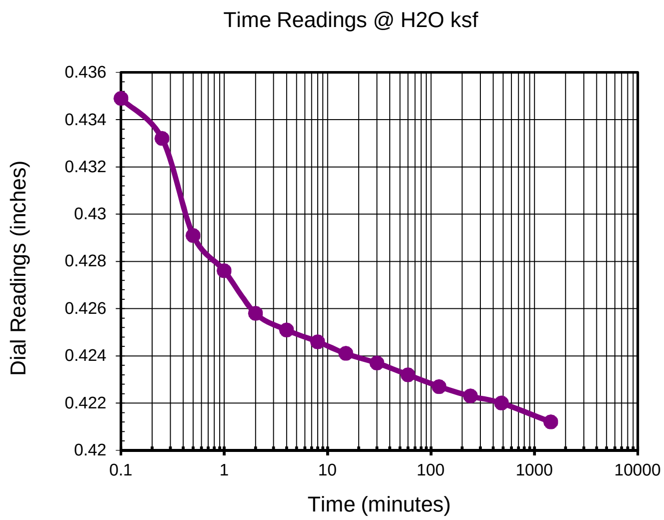
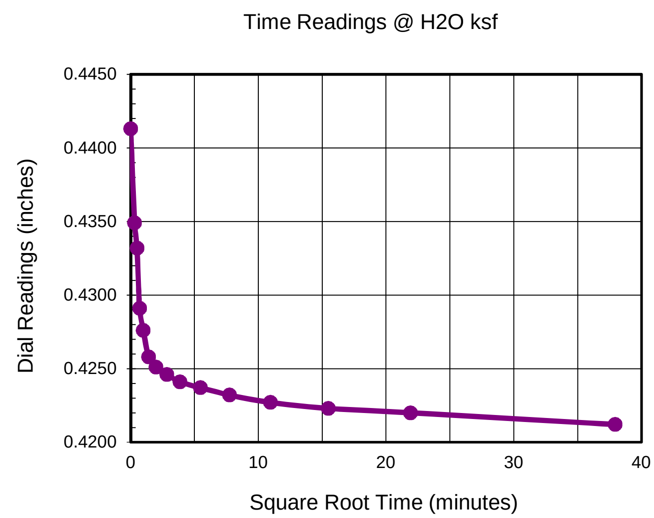
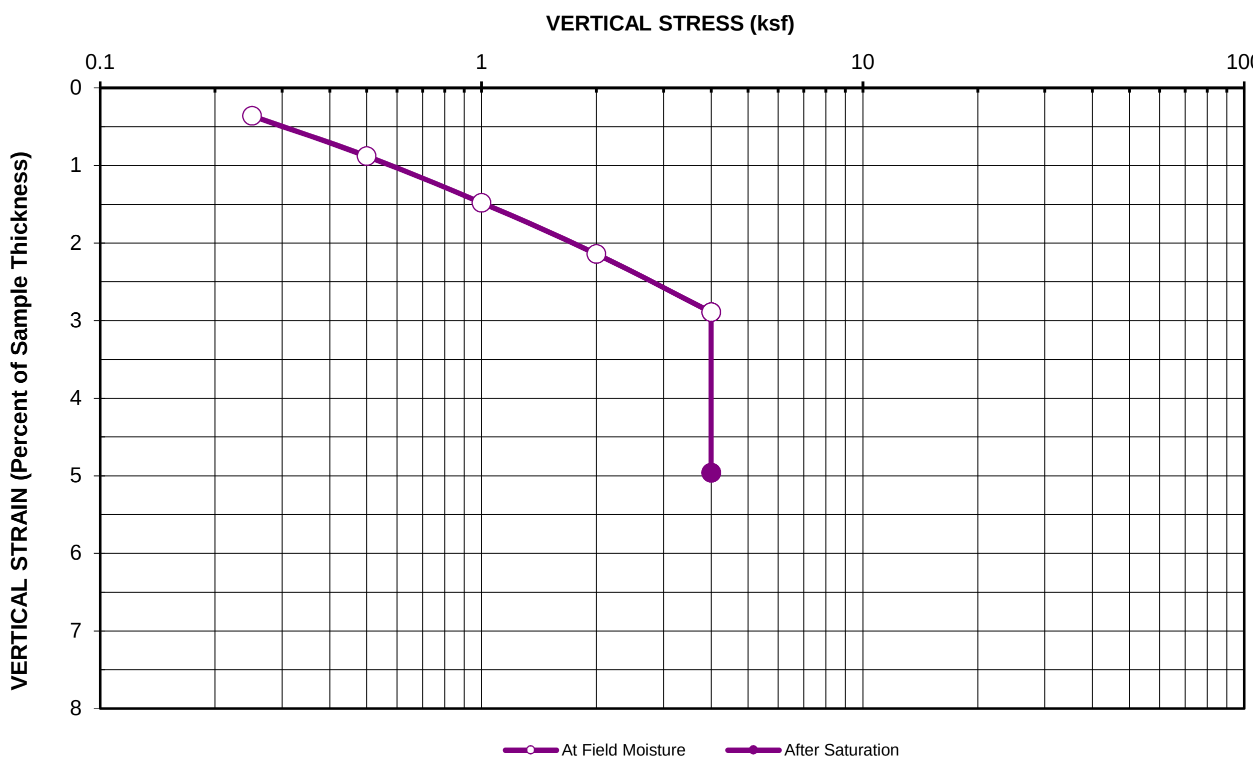


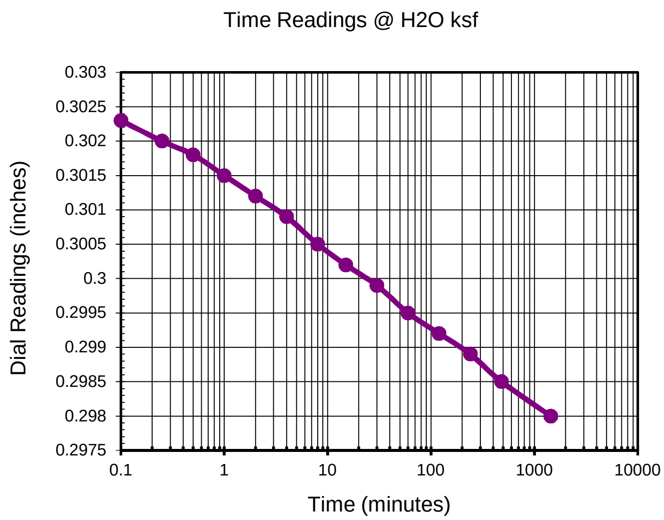


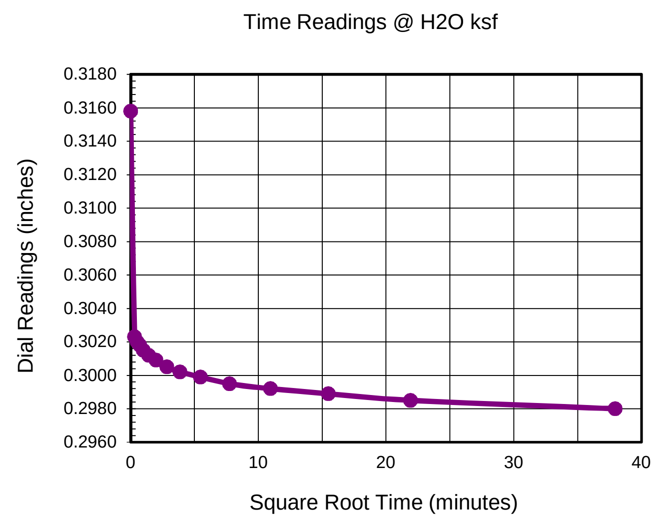


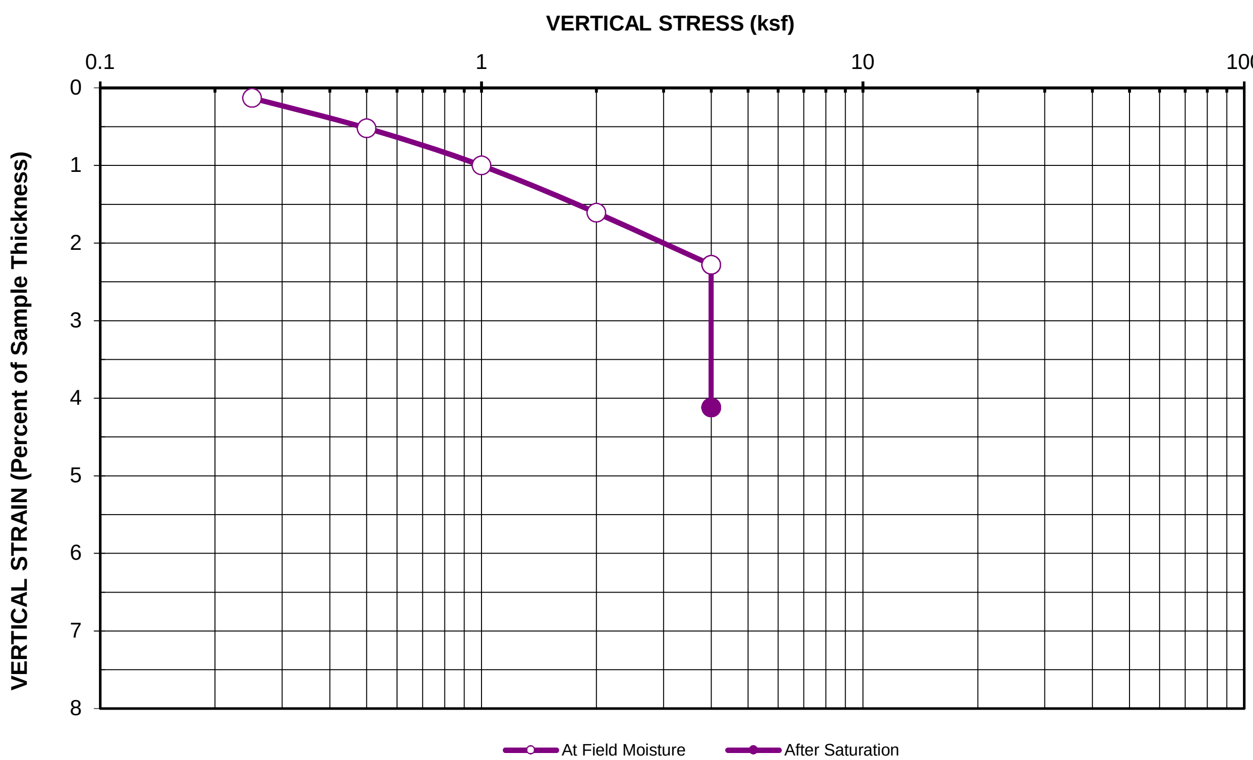
Boring No. :	BELP-2	Initial Dry Unit Weight (pcf):	106.2
Sample No.:	3	Initial Moisture Content (%):	4.6
Depth (feet):	6-6.5	Final Moisture Content (%):	18.5
Sample Type:	Mod Cal	Initial Void Ratio:	0.59
Soil Description:	Sand w/silt & gravel		
Remarks:	Collapse = 2.07% upon inundation		

Project Name: SCE Newberry Springs Site 2
Project No.: 4953170222
Project Location: N/A
AP No: 17-1125

1-D SWELL/COLLAPSE
ASTM D 4546-14, Method B







Boring No. :	BELP-4
Sample No.:	9
Depth (feet):	30.5-31
Sample Type:	Mod Cal
Soil Description:	Sand w/silt & gravel
Remarks:	Collapse = 1.84% upon inundation

Initial Dry Unit Weight (pcf):	107.9
Initial Moisture Content (%):	3.8
Final Moisture Content (%):	15.9
Initial Void Ratio:	0.56

Project Name:	SCE Newberry Springs Site 2
Project No.:	4953170222
Project Location:	N/A
AP No:	17-1125

1-D SWELL/COLLAPSE
ASTM D 4546-14, Method B

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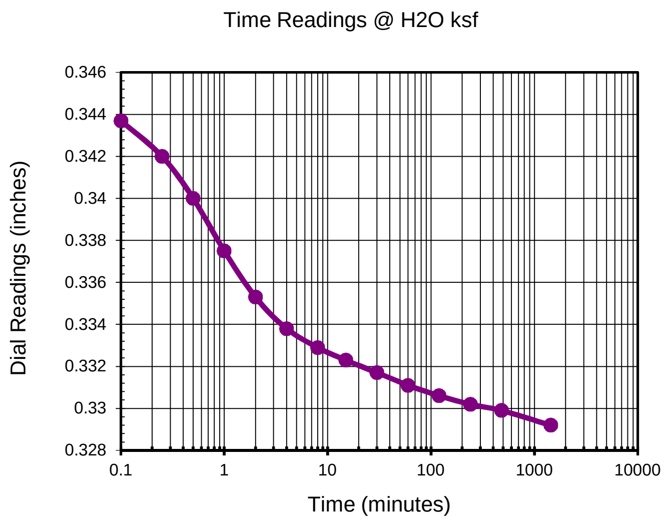

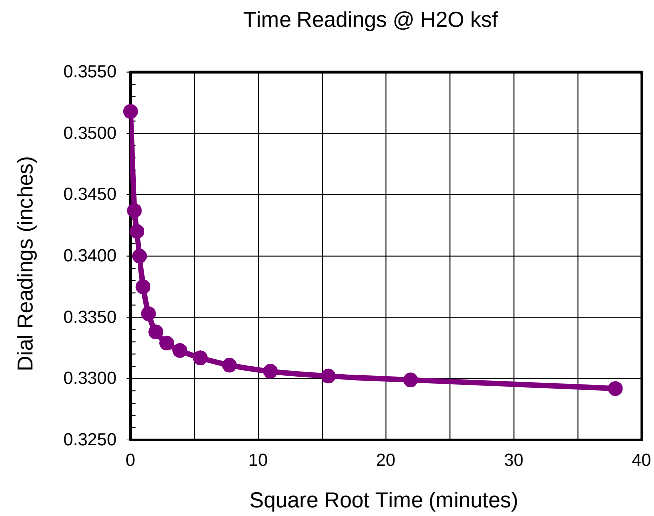

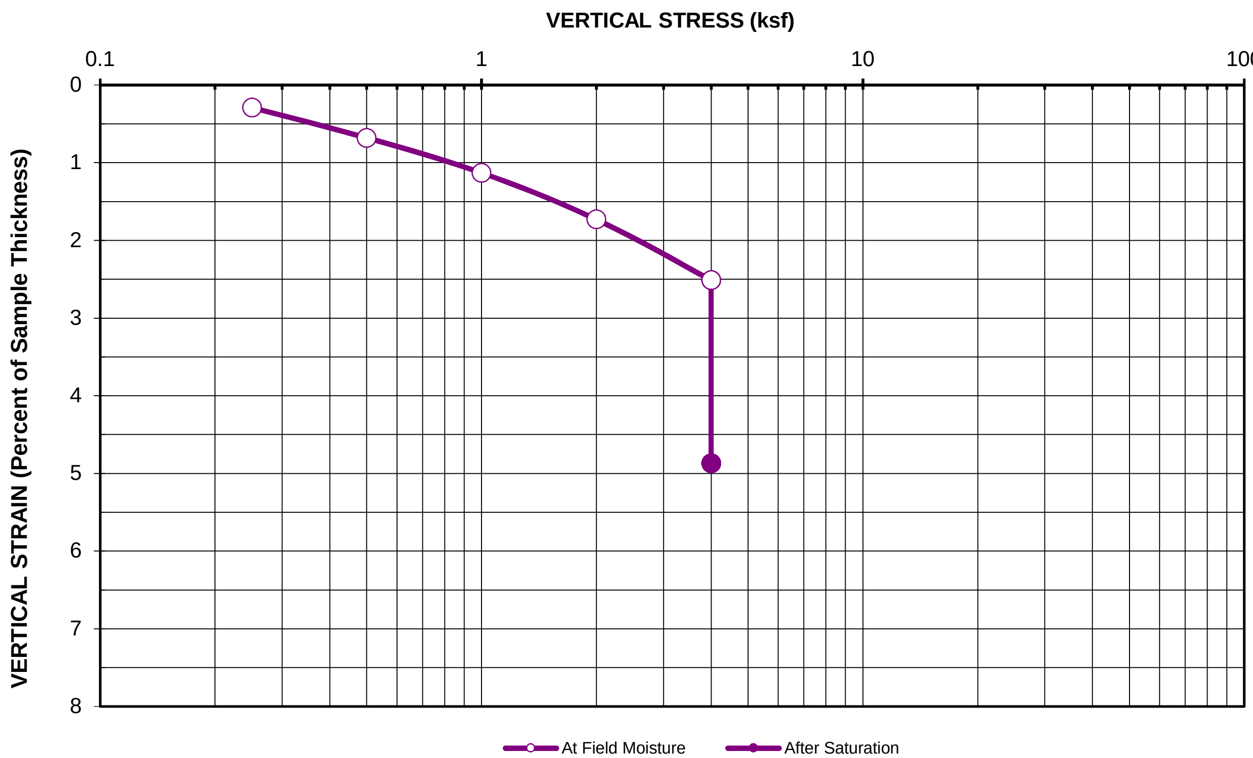

Boring No. :	BELP-6	Initial Dry Unit Weight (pcf):	108.7
Sample No.:	3	Initial Moisture Content (%):	3.9
Depth (feet):	5.5-6	Final Moisture Content (%):	17.9
Sample Type:	Mod Cal	Initial Void Ratio:	0.55
Soil Description:	Sand w/silt		
Remarks:	Collapse = 2.36% upon inundation		

Project Name:	SCE Newberry Springs Site 2
Project No.:	4953170222
Project Location:	N/A
AP No:	17-1125

1-D SWELL/COLLAPSE
ASTM D 4546-14, Method B

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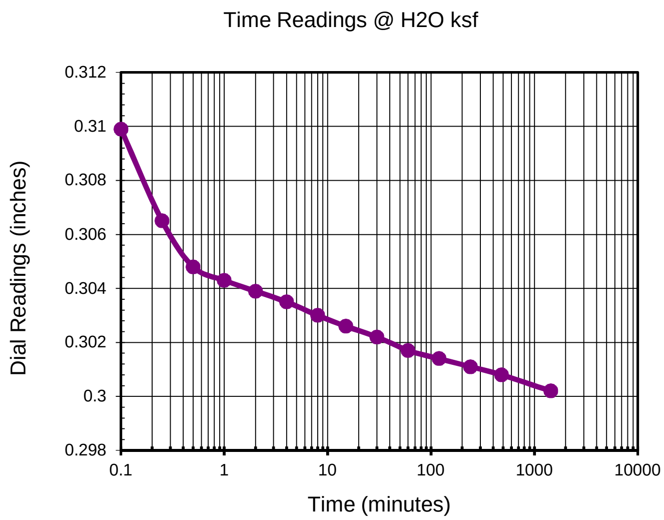

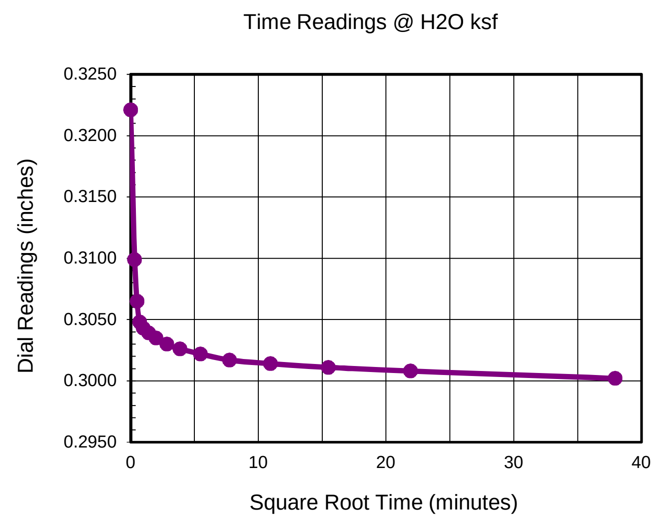

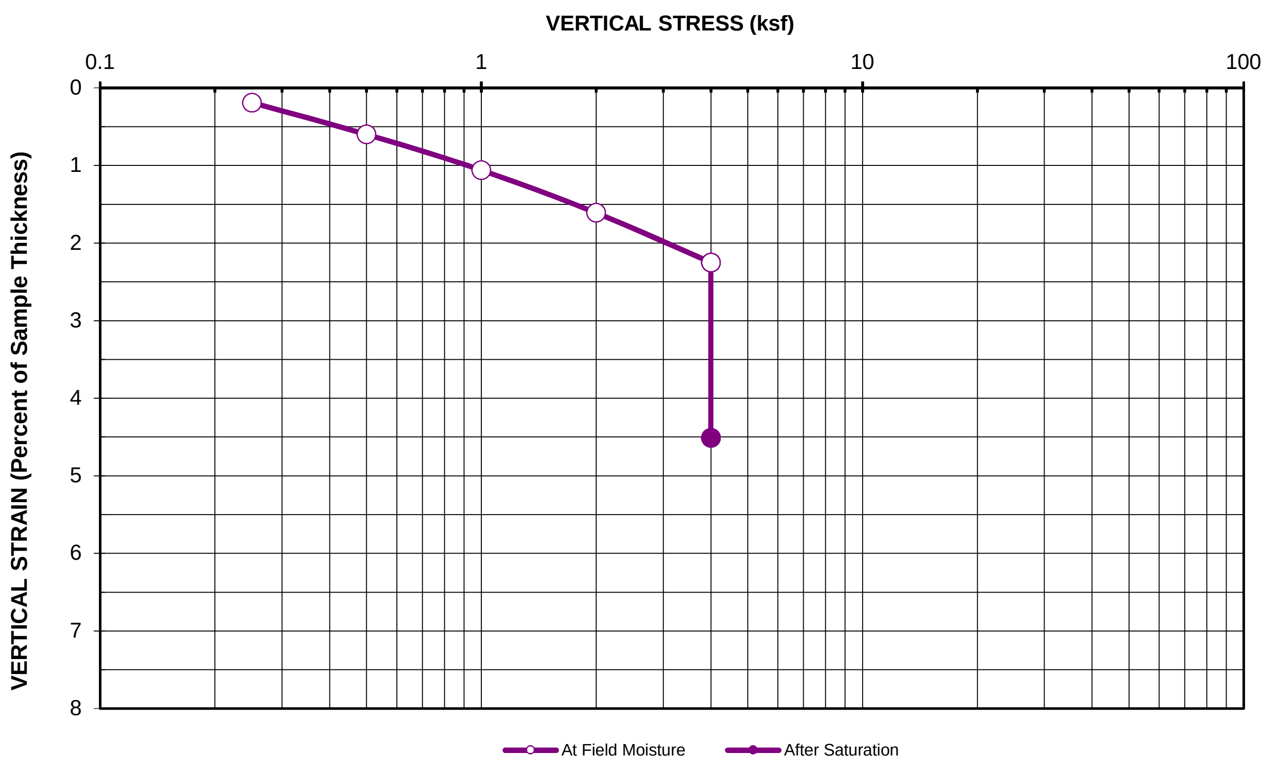

Boring No. :	BELP-7	Initial Dry Unit Weight (pcf):	115.1
Sample No.:	7	Initial Moisture Content (%):	3.4
Depth (feet):	21-21.5	Final Moisture Content (%):	14.8
Sample Type:	Mod Cal	Initial Void Ratio:	0.46
Soil Description:	Sand w/silt		
Remarks:	Collapse = 2.26% upon inundation		

Project Name: SCE Newberry Springs Site 2
Project No.: 4953170222
Project Location: N/A
AP No: 17-1125

1-D SWELL/COLLAPSE
ASTM D 4546-14, Method B

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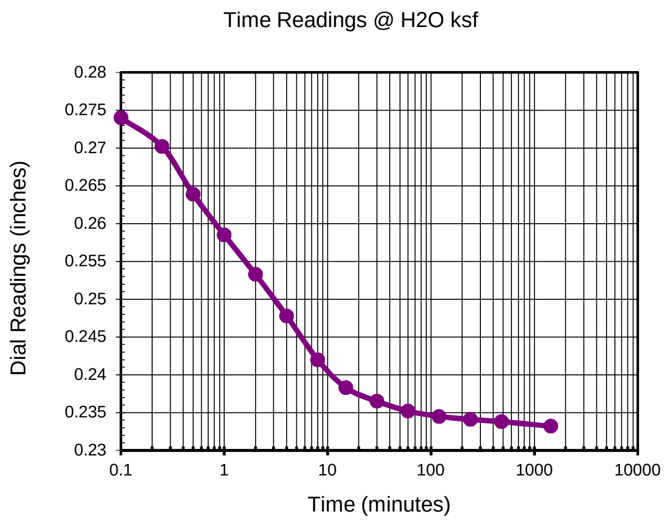

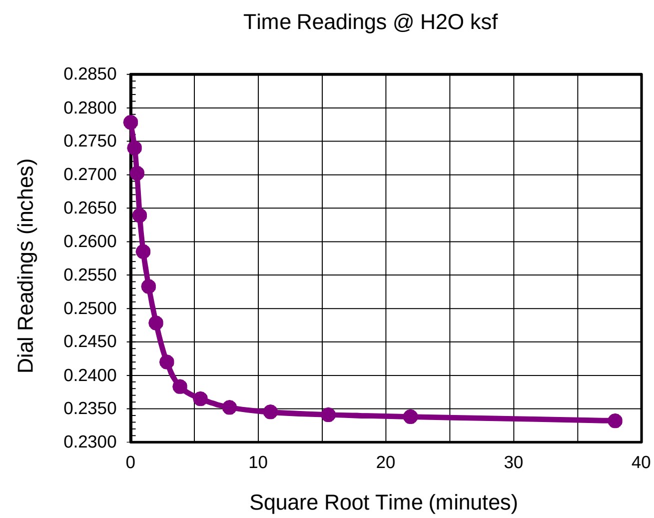

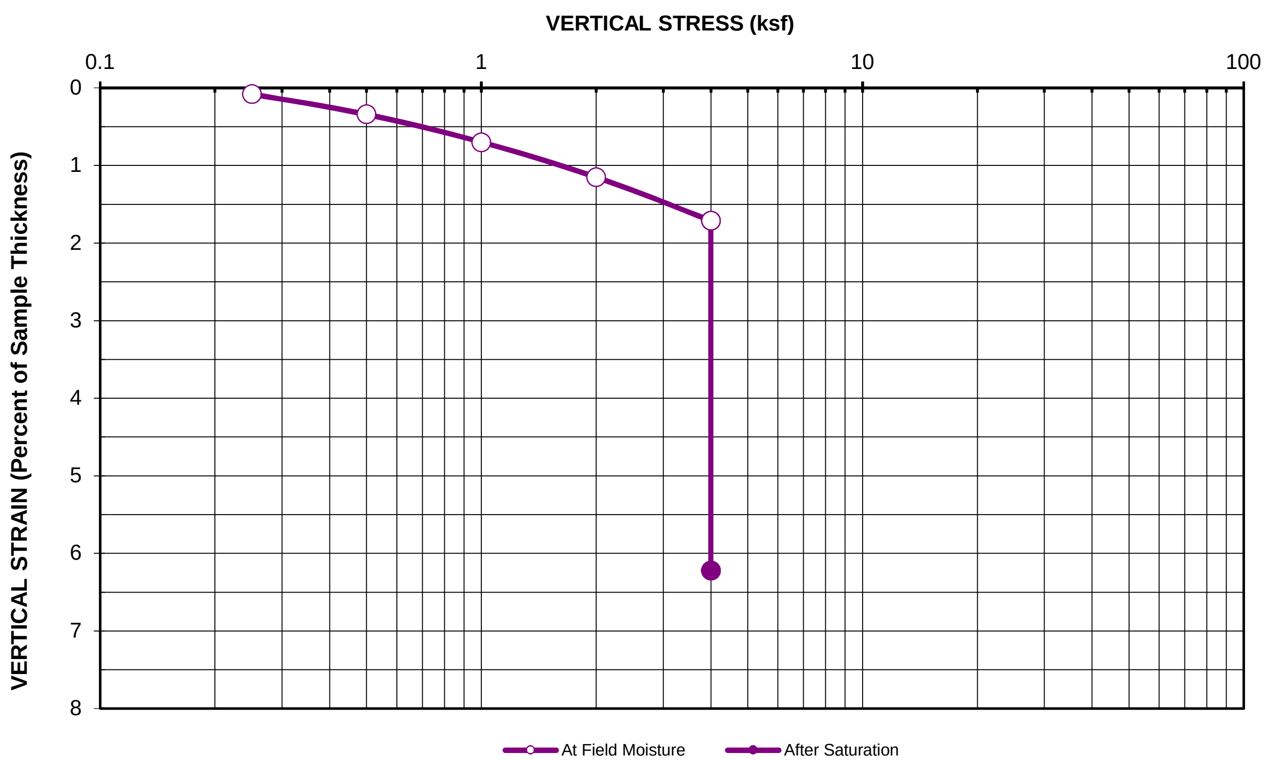

Boring No. :	BELP-9	Initial Dry Unit Weight (pcf):	109.9
Sample No.:	4	Initial Moisture Content (%):	5.4
Depth (feet):	8-8.5	Final Moisture Content (%):	14.2
Sample Type:	Mod Cal	Initial Void Ratio:	0.53
Soil Description:	Silty Sand		
Remarks:	Collapse = 4.51% upon inundation		

Project Name: SCE Newberry Springs Site 2
Project No.: 4953170222
Project Location: N/A
AP No: 17-1125

1-D SWELL/COLLAPSE
ASTM D 4546-14, Method B

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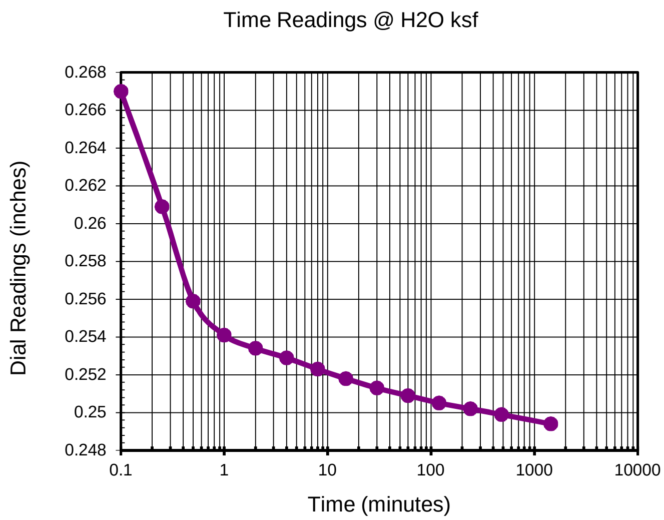
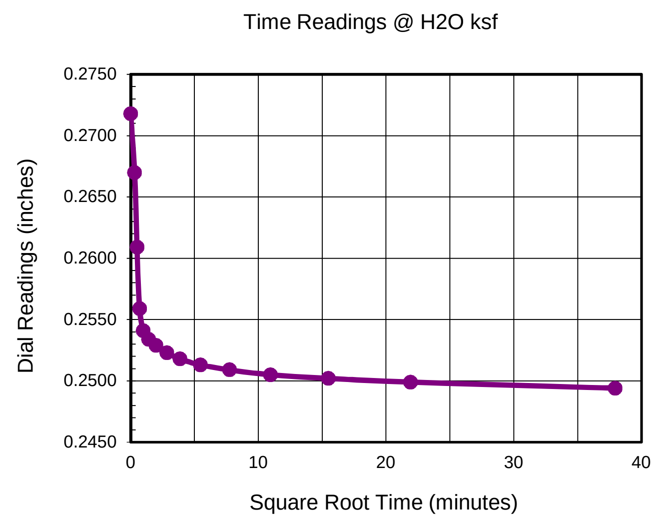
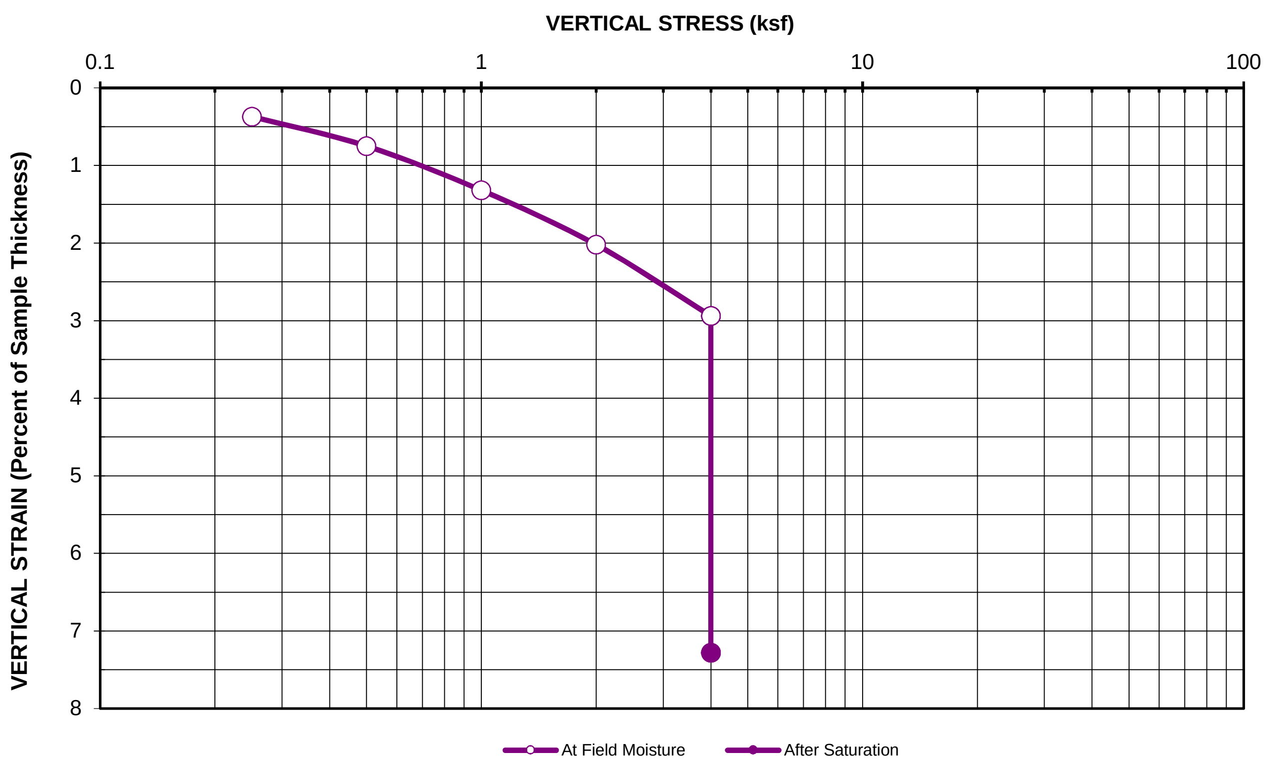






Boring No. :	BELP-10	Initial Dry Unit Weight (pcf):	105.1
Sample No.:	5	Initial Moisture Content (%):	5.3
Depth (feet):	11-11.5	Final Moisture Content (%):	17.0
Sample Type:	Mod Cal	Initial Void Ratio:	0.60
Soil Description:	Sand w/silt & gravel		
Remarks:	Collapse = 4.34% upon inundation		

Project Name: SCE Newberry Springs Site 2
Project No.: 4953170222
Project Location: N/A
AP No: 17-1125

1-D SWELL/COLLAPSE
ASTM D 4546-14, Method B

LaBelle Marvin

R - VALUE DATA SHEET

PROJECT No. 43021

DATE: 11/16/2017

BORING NO. Boring 11 @ 0'-5'

Newberry Springs Midline Capicitor, Pisgah, San Bernardino

P.N. 4953-17-0222

SAMPLE DESCRIPTION: Brown Sand

R-VALUE TESTING DATA | CA TEST 301			
	SPECIMEN ID		
	a	b	c
Mold ID Number	13	14	15
Water added, grams	90	110	120
Initial Test Water, %	9.8	11.8	12.8
Compact Gage Pressure,psi	350	350	350
Exudation Pressure, psi	682	399	172
Height Sample, Inches	2.66	2.58	2.56
Gross Weight Mold, grams	3032	2986	3007
Tare Weight Mold, grams	1968	1939	1944
Sample Wet Weight, grams	1064	1047	1063
Expansion, Inches x 10exp-4	0	0	0
Stability 2,000 lbs (160psi)	11 / 22	12 / 23	13 / 24
Turns Displacement	5.05	5.42	5.47
R-Value Uncorrected	76	73	72
R-Value Corrected	78	74	73
Dry Density, pcf	110.4	110.0	111.6

DESIGN CALCULATION DATA

Traffic Index Assumed:	4.0	4.0	4.0
G.E. by Stability	0.23	0.27	0.28
G. E. by Expansion	0.00	0.00	0.00

Equilibrium R-Value	**74** by EXUDATION	Examined & Checked: 11 /16/ 17
REMARKS:	Gf = 1.25 0.0% Retained on the 3/4" Sieve. Free Drainage.	Steven R. Marvin, RCE 30659

REGISTERED PROFESSIONAL ENGINEER STEVEN R. MARVIN C 30659 CIVIL STATE OF CALIFORNIA

The data above is based upon processing and testing samples as received from the field. Test procedures in accordance with latest revisions to Department of Transportation, State of California, Materials & Research Test Method No. 301.

R-VALUE GRAPHICAL PRESENTATION

LaBelle Marvin

PROJECT NO. 43021

DATE: 11 /16/ 16

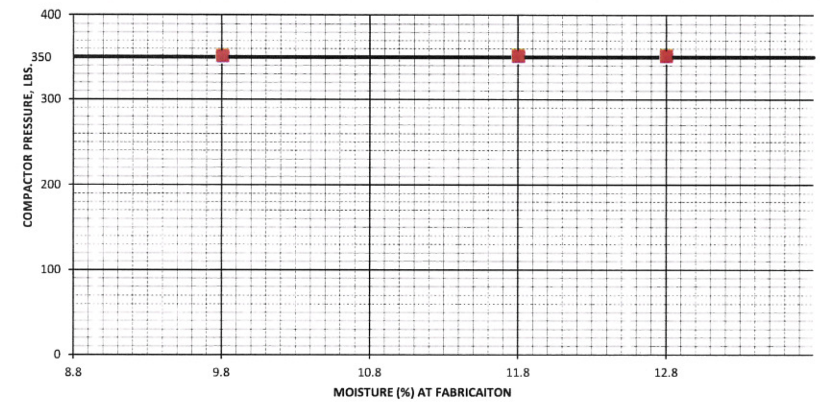
REMARKS:

BORING NO. Boring 11 @ 0'-5'

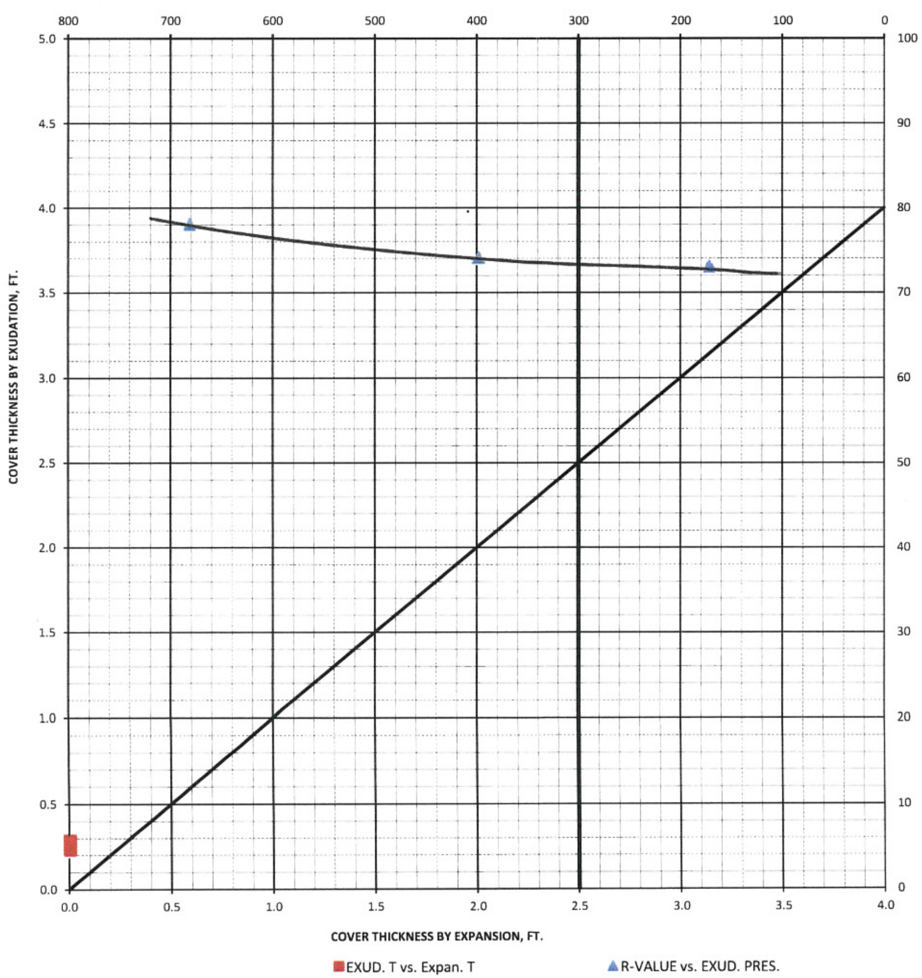
Newberry Springs Midline Capicitor, Pisgah, San Bernardino

P.N. 4953-17-0222

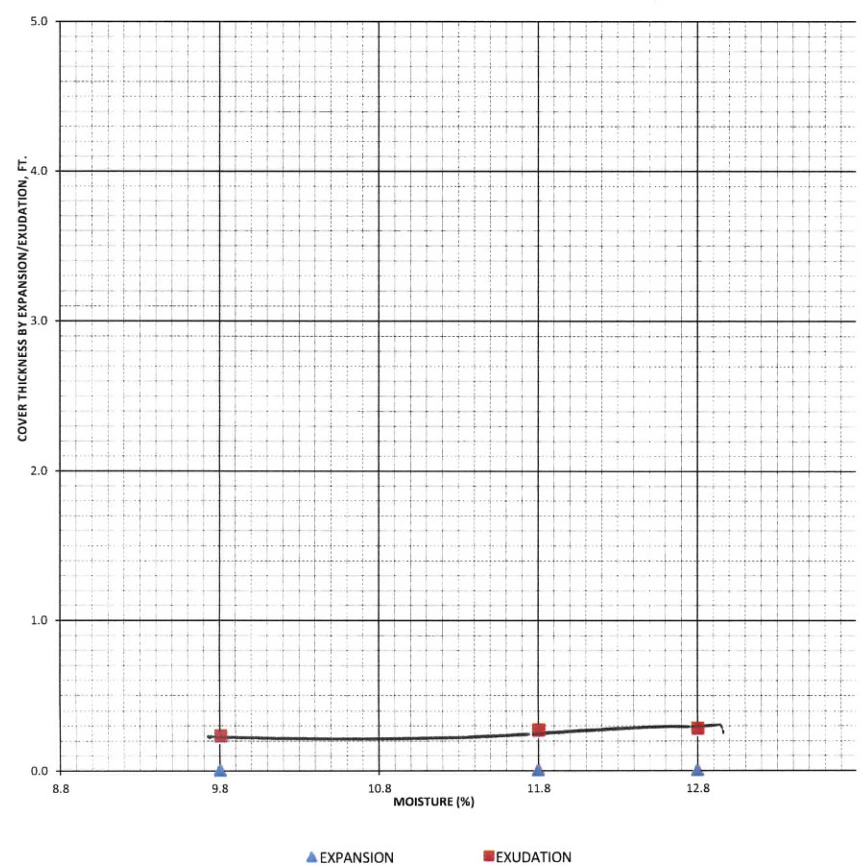
COMPACTOR PRESSURE vs MOISTURE %



COVER THICKNESS BY EXUDATION vs COVER THICKNESS BY EXPANSION



COVER THICKNESS vs MOISTURE %



HDR

Table 1 - Laboratory Tests on Soil Samples

AMEC Foster Wheeler
Newberry 500kV Midline Capacitor Construction Project
Your #4953170222, HDR Lab #17-0789LAB
20-Nov-17

Sample ID

			BELP-1 @ 0-5'	BELP-2 @ 0-5'	BELP-3 @ 0-5'	BELP-4 @ 0-5'	BELP-5 @ 0-5'
Resistivity		**Units**					
as-received		ohm-cm	1,680,000	56,000	364,000	2,160,000	84,000
saturated		ohm-cm	8,400	1,000	8,400	18,400	800
pH			7.2	7.6	7.6	7.6	7.6
Electrical Conductivity		mS/cm	0.08	0.44	0.06	0.05	0.49
Chemical Analyses							
Cations							
calcium	Ca^{2+}	mg/kg	55	27	39	50	27
magnesium	Mg^{2+}	mg/kg	6.6	5.2	5.6	5.6	5.1
sodium	Na^{1+}	mg/kg	323	488	25	12	515
potassium	K^{1+}	mg/kg	13	6.1	11	18	7.2
Anions							
carbonate	CO_3^{2-}	mg/kg	21	138	39	32	90
bicarbonate	HCO_3^{1-}	mg/kg	165	229	64	98	229
fluoride	F^{1-}	mg/kg	1.4	9.6	1.3	ND	15
chloride	Cl^{1-}	mg/kg	7.7	164	5.1	2.5	189
sulfate	SO_4^{2-}	mg/kg	35	144	23	7.0	332
phosphate	PO_4^{3-}	mg/kg	4.9	4.5	4.8	5.0	4.5
Other Tests							
ammonium	NH_4^{1+}	mg/kg	ND	ND	ND	ND	ND
nitrate	NO_3^{1-}	mg/kg	21	17	8.2	4.8	75
sulfide	S^{2-}	qual	na	na	na	na	na
Redox		mV	na	na	na	na	na

Resistivity per ASTM G187, Cations per ASTM D6919, Anions per ASTM D4327, and Alkalinity per APHA 2320-B.
Electrical conductivity in millisiemens/cm and chemical analyses were made on a 1:5 soil-to-water extract.
mg/kg = milligrams per kilogram (parts per million) of dry soil.
Redox = oxidation-reduction potential in millivolts
ND = not detected
na = not analyzed

Table 1 - Laboratory Tests on Soil Samples

AMEC Foster Wheeler
Newberry 500kV Midline Capacitor Construction Project
Your #4953170222, HDR Lab #17-0789LAB
20-Nov-17

Sample ID			BELP-7 @ 0-5'	BELP-8 @ 0-5'	BELP-10 @ 0-5'	BELP-2 @ 15-20'	BELP-3 @ 15-20'
Resistivity		**Units**					
as-received		ohm-cm	26,800	112,000	21,200	38,400	72,000
saturated		ohm-cm	10,000	5,200	8,400	720	1,120
pH			7.9	7.6	7.6	7.8	7.4
Electrical Conductivity		mS/cm	0.07	0.08	0.07	0.63	0.34
Chemical Analyses							
Cations							
calcium	Ca^{2+}	mg/kg	69	44	55	23	52
magnesium	Mg^{2+}	mg/kg	5.6	5.7	6.4	5.3	6.5
sodium	Na^{1+}	mg/kg	43	41	21	680	289
potassium	K^{1+}	mg/kg	8.7	11	18	7.6	14
Anions							
carbonate	CO_3^{2-}	mg/kg	29	26	30	110	30
bicarbonate	HCO_3^{1-}	mg/kg	256	116	101	204	85
fluoride	F^{1-}	mg/kg	2.2	2.3	ND	10	4.3
chloride	Cl^{1-}	mg/kg	3.8	11	13	216	165
sulfate	SO_4^{2-}	mg/kg	11	25	24	635	298
phosphate	PO_4^{3-}	mg/kg	4.8	5.2	5.6	4.4	ND
Other Tests							
ammonium	NH_4^{1+}	mg/kg	ND	ND	ND	ND	ND
nitrate	NO_3^{1-}	mg/kg	14	31	23	7.9	142
sulfide	S^{2-}	qual	na	na	na	na	na
Redox		mV	na	na	na	na	na

Resistivity per ASTM G187, Cations per ASTM D6919, Anions per ASTM D4327, and Alkalinity per APHA 2320-B.
Electrical conductivity in millisiemens/cm and chemical analyses were made on a 1:5 soil-to-water extract.
mg/kg = milligrams per kilogram (parts per million) of dry soil.
Redox = oxidation-reduction potential in millivolts
ND = not detected
na = not analyzed

Table 1 - Laboratory Tests on Soil Samples

AMEC Foster Wheeler
Newberry 500kV Midline Capacitor Construction Project
Your #4953170222, HDR Lab #17-0789LAB
20-Nov-17

Sample ID			BELP-6 @ 15-20'	BELP-6 @ 25'	BELP-7 @ 15'	BELP-8 @ 15'	BELP-9 @ 15-20'
Resistivity		**Units**					
as-received		ohm-cm	38,000	35,600	56,000	24,400	60,000
saturated		ohm-cm	920	1,520	1,320	680	1,120
pH			7.8	8.0	7.5	7.3	7.7
Electrical Conductivity		mS/cm	0.54	0.39	0.31	0.55	0.43
Chemical Analyses							
Cations							
calcium	Ca^{2+}	mg/kg	18	18	52	48	36
magnesium	Mg^{2+}	mg/kg	4.9	5.2	6.2	6.7	5.4
sodium	Na^{1+}	mg/kg	584	416	252	513	452
potassium	K^{1+}	mg/kg	5.4	8.5	11	8.1	11
Anions							
carbonate	CO_3^{2-}	mg/kg	144	150	29	20	78
bicarbonate	HCO_3^{1-}	mg/kg	162	116	95	143	153
fluoride	F^{1-}	mg/kg	9.4	3.2	4.8	12	13
chloride	Cl^{1-}	mg/kg	199	107	139	364	150
sulfate	SO_4^{2-}	mg/kg	309	132	281	402	410
phosphate	PO_4^{3-}	mg/kg	ND	4.6	ND	ND	4.4
Other Tests							
ammonium	NH_4^{1+}	mg/kg	ND	ND	ND	ND	ND
nitrate	NO_3^{1-}	mg/kg	78	7.6	106	204	30
sulfide	S^{2-}	qual	na	na	na	na	na
Redox		mV	na	na	na	na	na

Resistivity per ASTM G187, Cations per ASTM D6919, Anions per ASTM D4327, and Alkalinity per APHA 2320-B.
Electrical conductivity in millisiemens/cm and chemical analyses were made on a 1:5 soil-to-water extract.
mg/kg = milligrams per kilogram (parts per million) of dry soil.
Redox = oxidation-reduction potential in millivolts
ND = not detected
na = not analyzed

Table 1 - Laboratory Tests on Soil Samples

AMEC Foster Wheeler
Newberry 500kV Midline Capacitor Construction Project
Your #4953170222, HDR Lab #17-0789LAB
20-Nov-17

Sample ID			BELP-10 @ 15-20'	BELP-4 @ 15-20'
Resistivity		**Units**		
as-received		ohm-cm	64,000	56,000
saturated		ohm-cm	1,040	1,800
pH			7.5	8.0
Electrical Conductivity		mS/cm	0.42	0.29
Chemical Analyses				
Cations				
calcium	Ca^{2+}	mg/kg	66	20
magnesium	Mg^{2+}	mg/kg	6.5	5.0
sodium	Na^{1+}	mg/kg	348	315
potassium	K^{1+}	mg/kg	17	6.8
Anions				
carbonate	CO_3^{2-}	mg/kg	15	95
bicarbonate	HCO_3^{1-}	mg/kg	137	85
fluoride	F^{1-}	mg/kg	4.6	8.7
chloride	Cl^{1-}	mg/kg	218	14
sulfate	SO_4^{2-}	mg/kg	382	294
phosphate	PO_4^{3-}	mg/kg	ND	4.5
Other Tests				
ammonium	NH_4^{1+}	mg/kg	ND	ND
nitrate	NO_3^{1-}	mg/kg	198	4.3
sulfide	S^{2-}	qual	na	na
Redox		mV	na	na

Resistivity per ASTM G187, Cations per ASTM D6919, Anions per ASTM D4327, and Alkalinity per APHA 2320-B.
Electrical conductivity in millisiemens/cm and chemical analyses were made on a 1:5 soil-to-water extract.
mg/kg = milligrams per kilogram (parts per million) of dry soil.
Redox = oxidation-reduction potential in millivolts
ND = not detected
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EXPANSION INDEX TEST RESULTS

ASTM D 4829

Client Name: AMEC Foster Wheeler
Project Name: SCE Newberry Springs Site 2
Project No.: 4953170222

AP Job No.: 17-1125
Date: 11/20/17

Boring No.	Sample No.	Depth (ft)	Soil Description	Molded Dry Density (pcf)	Molded Moisture Content (%)	Init. Degree Saturation (%)	Measured Expansion Index	Corrected Expansion Index
BELP-3	1	0-5	Poorly-Graded Sand w/silt	110.2	10.3	52.9	0	0

ASTM EXPANSION CLASSIFICATION

Expansion Index	Classification
0-20	V. Low
21-50	Low
51-90	Medium
91-130	High
>130	V. High

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MOISTURE AND DENSITY TEST RESULTS

Client: AMEC Foster Wheeler
Project Name: SCE Newberry Springs Site 2
Project No.: 4953170222

AP Lab No.: 17-1125
Date: 11/21/17

Boring No.	Sample No.	Sample Depth (ft.)	Moisture Content (%)	Dry Density (pcf)
BELP-1	2	3-3.5	1.2	107.7
BELP-1	3	6-6.5	2.0	108.1
BELP-1	4	7.5-8.5	4.6	102.1
BELP-1	5	11-11.5	2.9	117.7

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MOISTURE AND DENSITY TEST RESULTS

Client: AMEC Foster Wheeler
Project Name: SCE Newberry Springs Site 2
Project No.: 4953170222

AP Lab No.: 17-1125
Date: 11/21/17

Boring No.	Sample No.	Sample Depth (ft.)	Moisture Content (%)	Dry Density (pcf)
BELP-2	3	6-6.5	4.6	110.7
BELP-2	4	7.5-8	7.0	87.1
BELP-2	5	10.5-11	4.9	105.9
BELP-2	11	40-40.5	3.0	119.9

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MOISTURE AND DENSITY TEST RESULTS

Client: AMEC Foster Wheeler
Project Name: SCE Newberry Springs Site 2
Project No.: 4953170222

AP Lab No.: 17-1125
Date: 11/21/17

Boring No.	Sample No.	Sample Depth (ft.)	Moisture Content (%)	Dry Density (pcf)
BELP-3	2	2.5-3	1.1	108.4
BELP-3	3	6-6.5	1.3	105.5
BELP-3	4	7.5-8	2.2	112.3
BELP-3	5	10.5-11	5.8	108.8
BELP-3	7	20-20.5	2.5	97.6
BELP-3	9	30.5-31	6.9	95.9

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MOISTURE AND DENSITY TEST RESULTS

Client: AMEC Foster Wheeler
Project Name: SCE Newberry Springs Site 2
Project No.: 4953170222

AP Lab No.: 17-1125
Date: 11/21/17

Boring No.	Sample No.	Sample Depth (ft.)	Moisture Content (%)	Dry Density (pcf)
BELP-4	2	3-3.5	1.9	111.9
BELP-4	3	6-6.5	3.5	110.0
BELP-4	4	8-8.5	3.9	109.0
BELP-4	5	11-11.5	4.1	106.4
BELP-4	7	20.5-21	3.6	99.6
BELP-4	9	30.5-31	3.8	107.5
BELP-4	11	40.5-41	4.3	109.9

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MOISTURE AND DENSITY TEST RESULTS

Client: AMEC Foster Wheeler
Project Name: SCE Newberry Springs Site 2
Project No.: 4953170222

AP Lab No.: 17-1125
Date: 11/21/17

Boring No.	Sample No.	Sample Depth (ft.)	Moisture Content (%)	Dry Density (pcf)
BELP-5	2	3-3.5	4.6	113.5
BELP-5	3	6-6.5	4.3	104.3
BELP-5	4	7-7.5	3.1	113.1
BELP-5	7	20-21	MISSING	
BELP-5	8	25.5-26	2.6	108.2

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MOISTURE AND DENSITY TEST RESULTS

Client: AMEC Foster Wheeler
Project Name: SCE Newberry Springs Site 2
Project No.: 4953170222

AP Lab No.: 17-1125
Date: 11/21/17

Boring No.	Sample No.	Sample Depth (ft.)	Moisture Content (%)	Dry Density (pcf)
BELP-6	2	2.5-3	3.0	105.3
BELP-6	3	5.5-6	3.9	109.2
BELP-6	4	8-8.5	5.2	112.2
BELP-6	5	11-11.5	2.3	103.8
BELP-6	10	30-30.5	2.1	98.8

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MOISTURE AND DENSITY TEST RESULTS

Client: AMEC Foster Wheeler
Project Name: SCE Newberry Springs Site 2
Project No.: 4953170222

AP Lab No.: 17-1125
Date: 11/21/17

Boring No.	Sample No.	Sample Depth (ft.)	Moisture Content (%)	Dry Density (pcf)
BELP-7	2	3-3.5	1.9	106.9
BELP-7	3	6-6.5	1.3	102.6
BELP-7	7	21-21.5	3.4	115.6
BELP-7	9	30.5-31	3.3	110.4

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MOISTURE AND DENSITY TEST RESULTS

Client: AMEC Foster Wheeler
Project Name: SCE Newberry Springs Site 2
Project No.: 4953170222

AP Lab No.: 17-1125
Date: 11/21/17

Boring No.	Sample No.	Sample Depth (ft.)	Moisture Content (%)	Dry Density (pcf)
BELP-8	2	3-3.5	1.8	106.7
BELP-8	4	7.5-8	3.5	111.8

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MOISTURE AND DENSITY TEST RESULTS

Client: AMEC Foster Wheeler
Project Name: SCE Newberry Springs Site 2
Project No.: 4953170222

AP Lab No.: 17-1125
Date: 11/21/17

Boring No.	Sample No.	Sample Depth (ft.)	Moisture Content (%)	Dry Density (pcf)
BELP-9	2	3-3.5	1.2	110.1
BELP-9	3	6-6.5	5.9	113.8
BELP-9	4	8-8.5	5.4	112.9
BELP-9	5	10.5-11	3.5	105.4
BELP-9	7	20-20.5	4.5	111.7
BELP-9	9	30-30.5	4.2	105.3

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MOISTURE AND DENSITY TEST RESULTS

Client: AMEC Foster Wheeler
Project Name: SCE Newberry Springs Site 2
Project No.: 4953170222

AP Lab No.: 17-1125
Date: 11/21/17

Boring No.	Sample No.	Sample Depth (ft.)	Moisture Content (%)	Dry Density (pcf)
BELP-10	2	3-3.5	1.2	106.7
BELP-10	3	6-6.5	1.2	106.4
BELP-10	4	8-8.5	1.9	109.9
BELP-10	5	11-11.5	5.3	106.7
BELP-10	7	20.5-21	4.0	116.0

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MOISTURE AND DENSITY TEST RESULTS

Client: AMEC Foster Wheeler
Project Name: SCE Newberry Springs Site 2
Project No.: 4953170222

AP Lab No.: 17-1125
Date: 11/21/17

Boring No.	Sample No.	Sample Depth (ft.)	Moisture Content (%)	Dry Density (pcf)
BELP-11	2	3-3.5	1.5	109.3
BELP-11	3	6-6.5	2.1	113.2
BELP-11	4	8-8.5	3.9	109.1
BELP-11	5	10.5-11	7.8	102.3

Appendix C

Field Permeability Test Results

APPENDIX C
FIELD PERMEABILITY TEST RESULTS

The field permeability tests were performed on November 2, 2017 at the two locations. Two borings were drilled to a depth of 5 feet bgs using 8-inch diameter hollow stem auger drilling equipment. Soils encountered in the two borings were poorly graded sand. After drilling was completed, a perforated pvc pipe was placed in each boring. Each hole was pre-soaked for one hour, using water from a portable water trailer to maintain a constant level at about 1 foot bgs (4 feet above the bottom of the hole). After presoaking, each hole was filled to 1 foot bgs and the time and the water level was recorded. After 25 minutes, the water level was measured again. This procedure was repeated. Both 25-minute intervals in both holes showed a fast infiltration rate, losing greater than six inches of water, therefore an interval of 10 minutes was chosen for taking subsequent measurements. Eight ten-minute intervals were measured in PT-1 and seven ten-minute intervals were measured in PT-2, refilling the water to about 1 foot bgs after every 10 minute reading. This procedure is described under the Percolation Test Procedure Section VII.3.8 in the Orange County Technical Guidance Document Appendices, which is used by San Bernardino as their Infiltration Rate Evaluation Protocol (OC TGD).

The infiltration rates were calculated according to the procedure described in Appendix VII (OC TGD). The calculations for the permeability tests are attached. The calculated infiltration rates from the two field permeability tests are 4.4 and 5.1 inch/hour. No safety factor has been applied.

SCE Newberry Site #2

Infiltration Testing - Shallow Percolation Test

The following tests were conducted on 11/2/17

Amec Foster Wheeler

Job No: 4953-17-0221
by: KSH 11/17/2017
checked: GA 11/27/2017

Boring:	Site:	Logged by	Soil type:	Diameter (in)	Width (in)	Depth (in)	Volume (ft^3)
PT-1	2	KSH	Poorly Graded Sand	8		60	12063.71579
Test results:							
Trial no.	Start time	End time	change in time (min)	initial height of water (ft)	final height of water (ft)	change in height of water (ft)	inflitration rate (in/hr)
1	9:02:00	9:27:00	25	1.03	3.21	2.18	3.4
2	9:30:00	9:55:00	25	0.64	3.18	2.54	3.7
3	9:58:00	10:08:00	10	1.00	2.25	1.25	4.2
4	10:10:00	10:20:30	10.5	1.00	2.32	1.32	4.3
5	10:22:00	10:32:00	10	1.00	2.29	1.29	4.4
6	10:35:48	10:45:48	10	1.00	2.28	1.28	4.4
7	10:47:30	10:57:30	10	1.00	2.28	1.28	4.4
8	10:59:30	11:09:30	10	1.00	2.29	1.29	4.4
9	11:11:36	11:22:00	10.4	1.00	2.34	1.34	4.4
10	11:24:06	11:35:42	11.6	1.00	2.45	1.45	4.4

Notes: Presoaked for one hour keeping a constant water level of about 1 foot bgs.

Test Pit:	Site:	Logged by	Soil type:	Diameter (in)	Width (in)	Depth (in)	Volume (ft^3)
PT-2	2	KSH	Poorly Graded Sand	8		60	12063.71579
Test results:							
Trial no.	Start time	End time	change in time (min)	initial height of water (ft)	final height of water (ft)	change in height of water (ft)	inflitration rate (in/hr)
1	9:22:00	9:47:00	25	1.00	3.33	2.33	3.7
2	9:51:00	10:16:00	25	1.00	3.29	2.29	3.6
3	10:23:30	10:33:30	10	1.00	2.49	1.49	5.2
4	10:37:54	10:48:18	10.4	1.00	2.5	1.5	5.1
5	10:53:00	11:03:00	10	1.00	2.46	1.46	5.1
6	11:06:48	11:16:48	10	1.00	2.44	1.44	5.0
7	11:20:54	11:30:54	10	1.00	2.47	1.47	5.1
8	11:34:36	11:44:36	10	1.00	2.46	1.46	5.1
9	11:50:12	12:00:36	10.4	1.00	2.51	1.51	5.1

Notes: Presoaked for one hour keeping a constant water level of about 1 foot bgs.