Geotechnical Base Line Report
Port Access Road
North Charleston, South Carolina
S&ME Project No. 1131-08-554

S&ME

Prepared for:
SCDOT
955 Park Street
Columbia, South Carolina

Prepared by:
S&ME, Inc.
620 Wando Park Boulevard
Mt Pleasant, SC 29464

July 21, 2015

July 21, 2015

SCDOT
955 Park Street
Columbia, South Carolina

Attention: Mr. Trapp Harris, P.E.

Reference: **Geotechnical Base Line Report**
Port Access Road
North Charleston, South Carolina
S&ME Project No. 1131-08-554

Dear Mr. Harris:

We have completed our geotechnical services for the Port Access Road project. Our services were performed in general accordance with our Agreement and Contract dated July 21, 2008. The purpose of our services was to explore the subsurface conditions along the proposed alignment and evaluate the subsurface conditions relative to the general support of embankments and bridges. This report presents an overview of the project information; describes the scope of our geotechnical exploration; presents a summary of the field testing, laboratory testing, and subsurface conditions; and presents a preliminary evaluation of geotechnical considerations.

We appreciate the opportunity to be of service to SCDOT for this important project. If you have any questions concerning this working draft report, please call.

Sincerely,

S&ME, Inc.

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 19871 MICHAEL S. ULMER 7/21/15

SOUTH CAROLINA S & ME, INC. No. C00473 CERTIFICATE OF AUTHORIZATION

Kyle L. Murrell, P.E.
Project Engineer

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Principal Engineer/Project Manager

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Executive Summary

This summary is presented for the convenience of the reader and is not intended as a substitute for careful study of the data contained in this report.

1. The objective of this exploration was to collect and summarize geotechnical data along the proposed Port Access Road alignment. The SCDOT will provide these data as part of the design build Request for Proposals to be issued at a later date. One boring was extended to a depth of 800 ft to obtain downhole geologic seismic data.
2. The project site is an urban, industrial area that has been developed for many decades. Underground obstructions were encountered in some borings, and some project areas explored are previously or currently contaminated hazardous materials sites.
3. Field exploration consisted of 84 borings and soundings taken to depths from 30 to 120 ft with one of the borings drilled to a depth of 800 ft. Downhole and non-intrusive geophysical testing was also performed. Intrusive exploration and testing included standard penetration test soil borings, cone penetration test soundings, seismic cone penetration test soundings, Marchetti dilatometer soundings, gamma and spontaneous potential logging, and P-S suspension logging. Non-intrusive geophysical testing included Multi-Channel Analysis of Surface Waves and Microtremor Array Measurements at five test locations.
4. Soil samples recovered from the field exploration were subject to laboratory testing including basic and index property tests. Engineering property testing included consolidation, triaxial shear, direct shear, resonant column, and torsional shear testing.
5. The project site is located within the outer Atlantic Coastal Plain Physiographic province. The upper sediments are composed of Quaternary Period deposits of Recent to Pleistocene age and underlain by Tertiary Period marl deposits.
6. Sandy soils consisting of artificial fills, clean dune sands, and clayey or silty terrace sands lie at the surface over nearly all of the alignment. The sands are quite variable in thickness and composition. Within the former naval base and along portions of I-26, these soils are mostly less than 5-ft thick. Between Spruill Avenue and Shipyard Creek, the sands form nearly the entire profile down to the marl, approaching 40 ft in thickness. The lower portions of these soils are particularly variable, consisting in many cases of thinly to thickly interbedded loose sands, soft or very soft silts and clays, and shell. Substantial portions of the alignment, particularly east of Shipyard Creek within the grounds of the former naval base, are mostly underlain by very soft alluvial or marsh silts that reach thicknesses as great as 60 ft. Similar soils are present within the general area of the I-26 interchange. Elsewhere, these soft sediments appear to thin or become absent. Depth to the upper contact of the marl varied from about 40 ft to deeper than 60 ft along the alignment, with the deeper sections seeming to correspond to areas of deep, soft silts referenced above.
7. Groundwater was encountered at a median depth of approximately 2 ft below the ground surface, which corresponds to a median elevation of 7 ft-NAVD88.
8. The majority of the soils between the water table and the Cooper marl will be susceptible to shear strength loss under seismic loading.
9. The global stability analyses of the embankments along most of the ramps indicate a factor of safety (FOS) greater than 1.3 under static conditions. Most of the ramps have a FOS less than 1.1 under psuedo-static conditions. The yield acceleration ranged from 0.12 to 0.27g. Liquefaction

stability analyses were beyond the scope of this project. Construction of Main Line 1D and the Tidewater Road Access on the former Navy Base site will pose significant challenges. A combination of staged construction, slope reinforcement, wick drains, and possibly other forms of ground improvement will be useful to reduce long-term settlement, bearing capacity failures, and global instability under embankments constructed on the former Navy Base.

10. Undercutting and subgrade reinforcement will help embankment construction along low-lying portions of the ramps, particularly where they cross existing or formerly filled marshy areas.
11. Depending on the construction settlement, a combination of wick drains and surcharging may be required for the bridge approach embankment at Ramp B near Station 58+20, Ramp C near Station 58+42, Ramp G near Station 57+89, and all of Main Line 1D east of Shipyard Creek on the former Navy Base to limit post-construction settlement to less than 5 in. Depending on the construction schedule, the bridge approach embankment on the former Navy Base may require some additional form of ground improvement to limit post-construction settlement.

1.0 Introduction

1.1 Objectives of Exploration

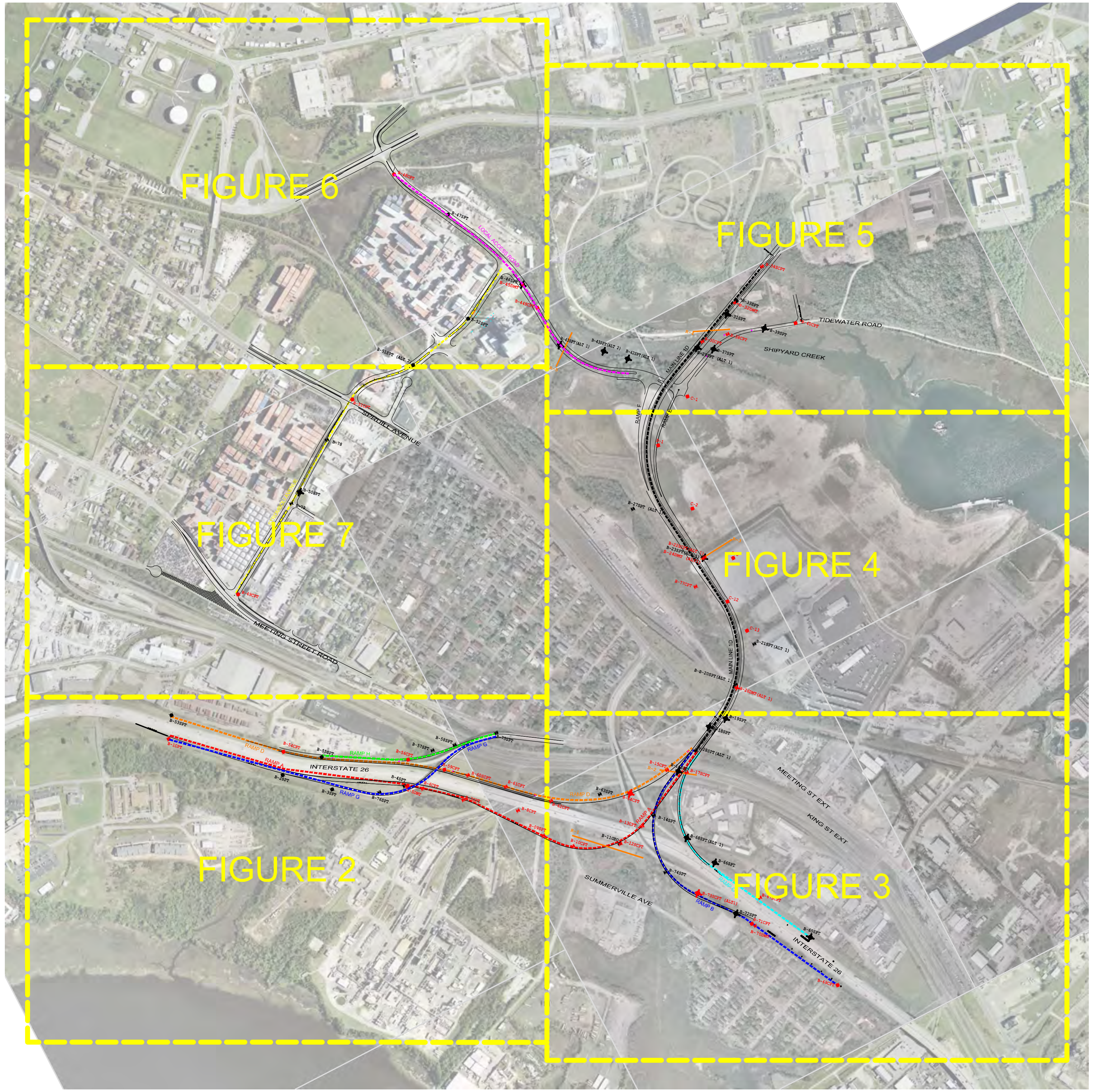
The objective of this exploration was to collect and summarize geotechnical data along the proposed Port Access Road alignment. The SCDOT will provide these data as part of the design build Request for Proposals to be issued at a later date. Included in the proposed exploration is one 800-ft deep geologic boring that will serve to improve the understanding of deeper geology in the Charleston area for geotechnical earthquake engineering.

1.2 Site Description and Proposed Development

Planning for the project is in the preliminary stages, and as of the date of this report, there are no definite distinctions between bridge and roadway sections. The proposed alignment was indicated on the map provided to us by SCDOT and shown on a reduced size plot of the Test Location Plan Details presented as Figure 1-1. The Test Location Plan is also presented full size in Appendix I. The alignment and test locations are also shown in Figure 1-2 through Figure 1-7. Plans for the proposed development are not final, though in discussions with Mr. Chris Gaskins of the SCDOT, we have developed the following general understanding of the project elements. In addition, we have reviewed the roadway feasibility study prepared by Parson Brinkerhoff and presented as part of the final project EIS in Appendix W ARFS and Supplemental Report. This information was downloaded from www.porteis.com.

The project is located in North Charleston, South Carolina. The proposed Port Access Road will provide direct access to the new container terminal under construction at the former Charleston Naval Base. The northern end of the project along I-26 is near the North Meeting Street exit and continues to approximately 1000 ft south of the Spruill Avenue exit. The proposed road will cross over North Meeting Street, King Street Extension, and Spruill Avenue. The alignment then turns north as it parallels the western boundary of the former Macalloy site and then crosses Shipyard Creek to connect to the former Naval Base. A local access road will connect Bainbridge Avenue to the main alignment and will follow a route along Shipyard Creek behind the Charleston Resource Recovery incinerator and behind a container storage area.

Much of the proposed road consists of elevated structure that crosses I-26, several urban streets, two rail lines, marsh areas, and Shipyard Creek. Although the final profile has not been established, we understand that embankments up to 20 ft high could be necessary in some areas. No major cut areas are planned at this time; therefore, off-site fill will be required to construct most embankments.



1000 500 0 1000 2000

SCALE IN FEET

TEST LOCATION PLAN DETAILS
PORT ACCESS ROAD
NORTH CHARLESTON, SOUTH CAROLINA
S&ME PROJECT NO. 1131-08-554

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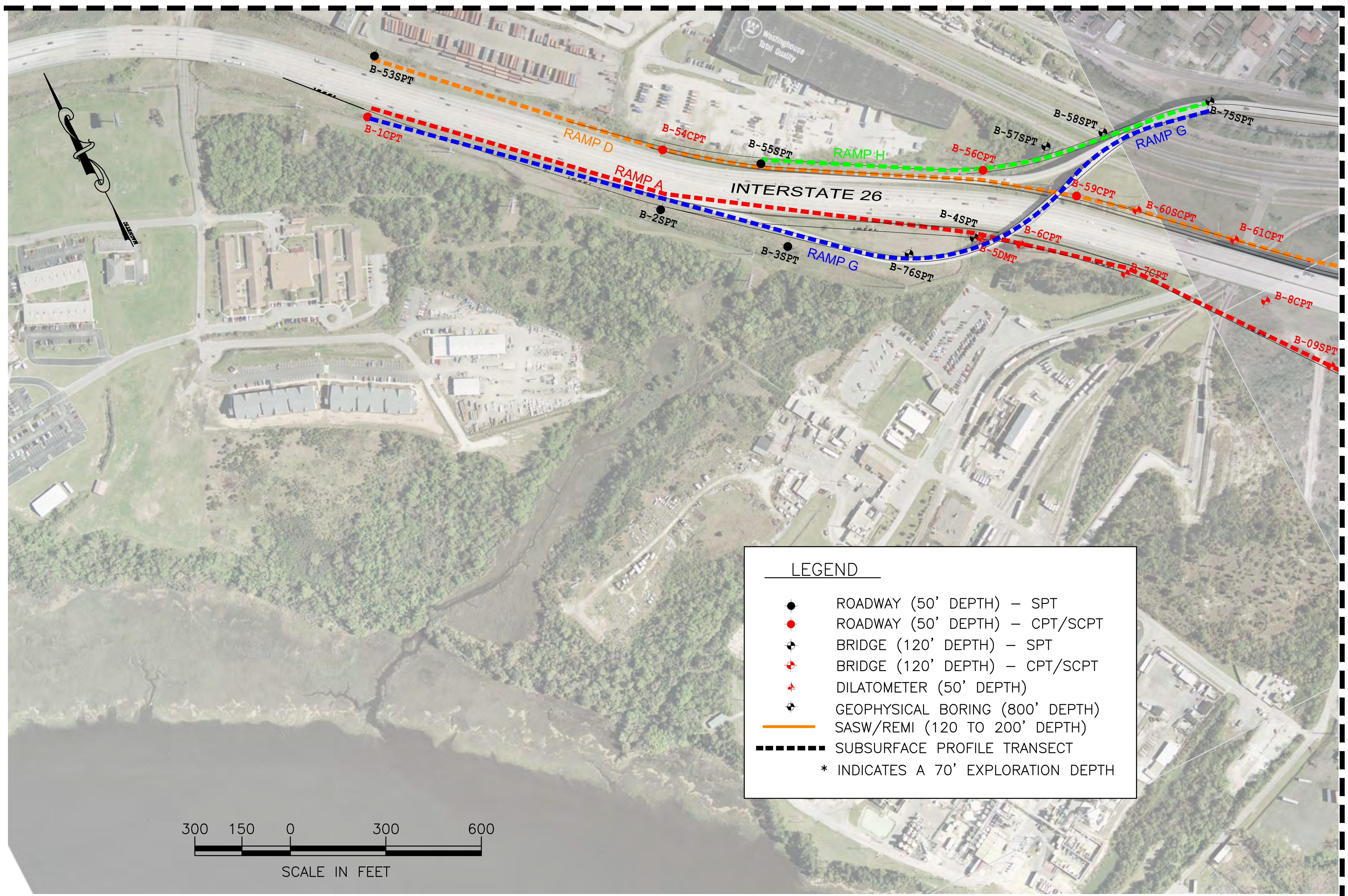
SCALE:	AS SHOWN
PROJECT NO.	1131-08-554
DRAWN BY:	LAJ
APPROVED BY:	DWH
DATE:	4-07-09
FIGURE NO.	1-1



TEST LOCATION PLAN SOUTHWEST PORT ACCESS ROAD
NORTH CHARLESTON, SOUTH CAROLINA
S&ME PROJECT NO. 1131–08–554

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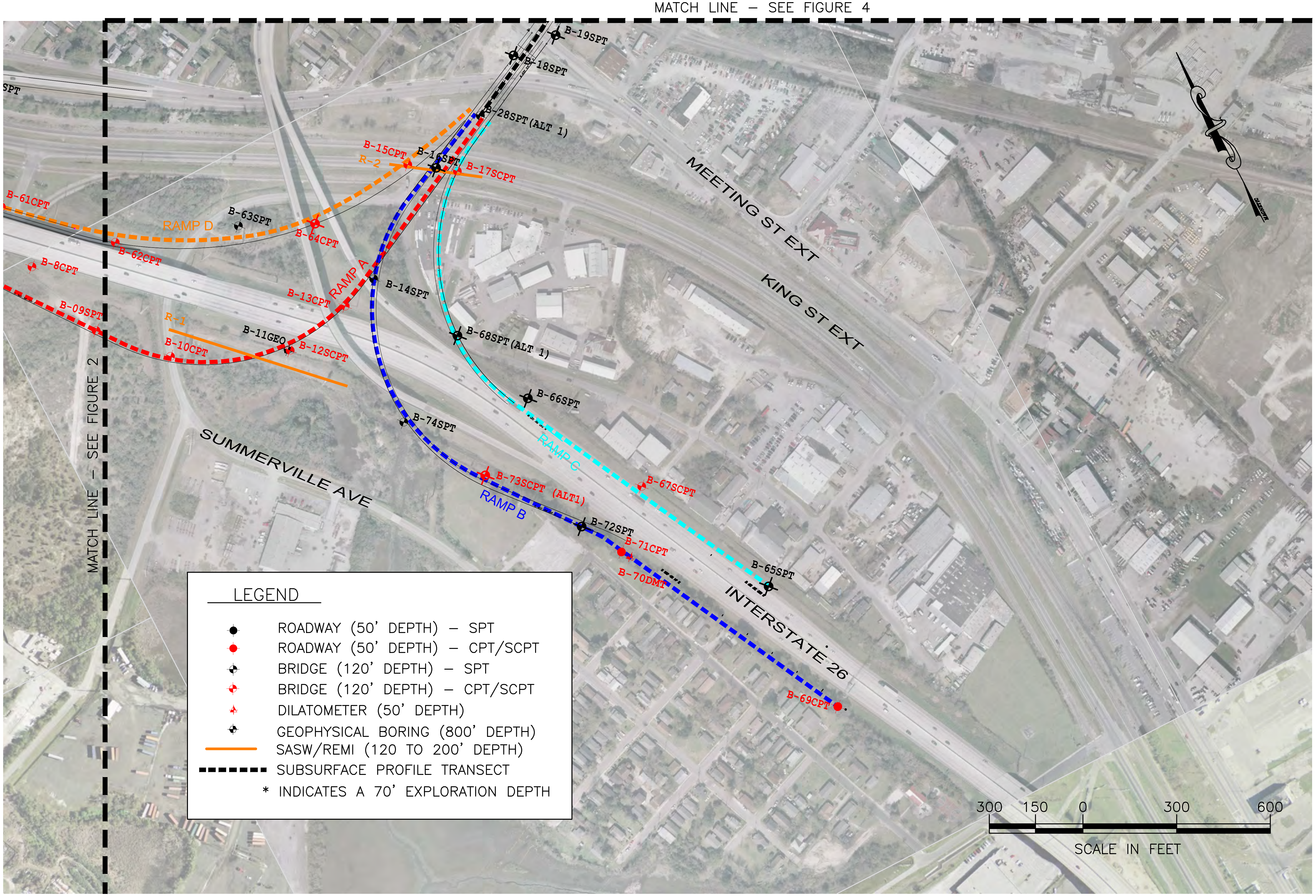
SCALE:	AS SHOWN
PROJECT NO.	1131–08–554
DRAWN BY:	LAJ
APPROVED BY:	DWH
DATE:	4–07–09
FIGURE NO.	1–2



TEST LOCATION PLAN SOUTHEAST PORT ACCESS ROAD

NORTH CHARLESTON, SOUTH CAROLINA

S&ME PROJECT NO. 1131-08-554

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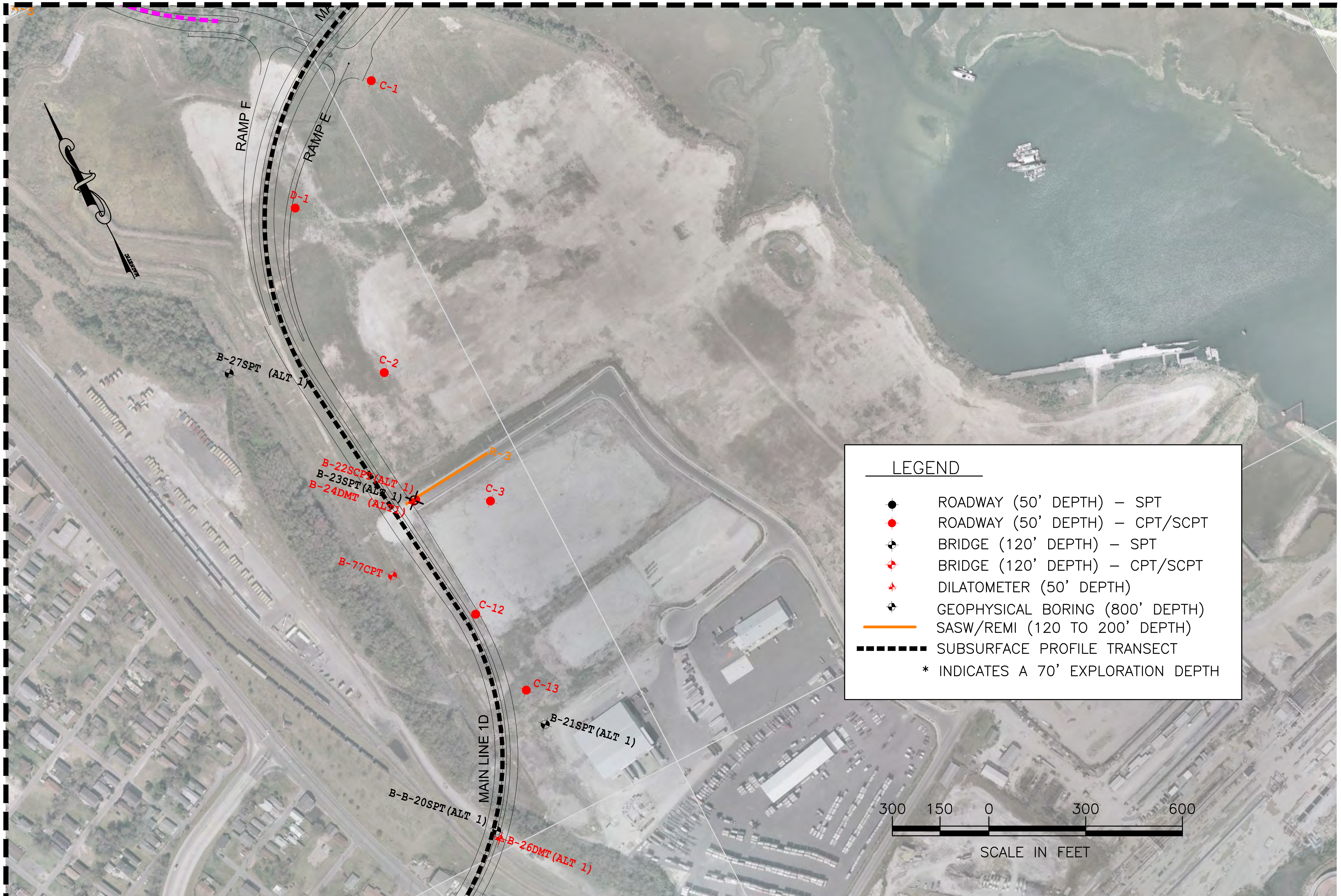
SCALE:	AS SHOWN
PROJECT NO.	1131-08-554
DRAWN BY:	LAJ
APPROVED BY:	DWH
DATE:	4-07-09
FIGURE NO.	1-3

MATCH LINE – SEE FIGURE 5



MATCH LINE – SEE FIGURE 7

MATCH LINE – SEE FIGURE 3

TEST LOCATION PLAN EAST
PORT ACCESS ROAD
NORTH CHARLESTON, SOUTH CAROLINA
S&ME PROJECT NO. 1131-08-554

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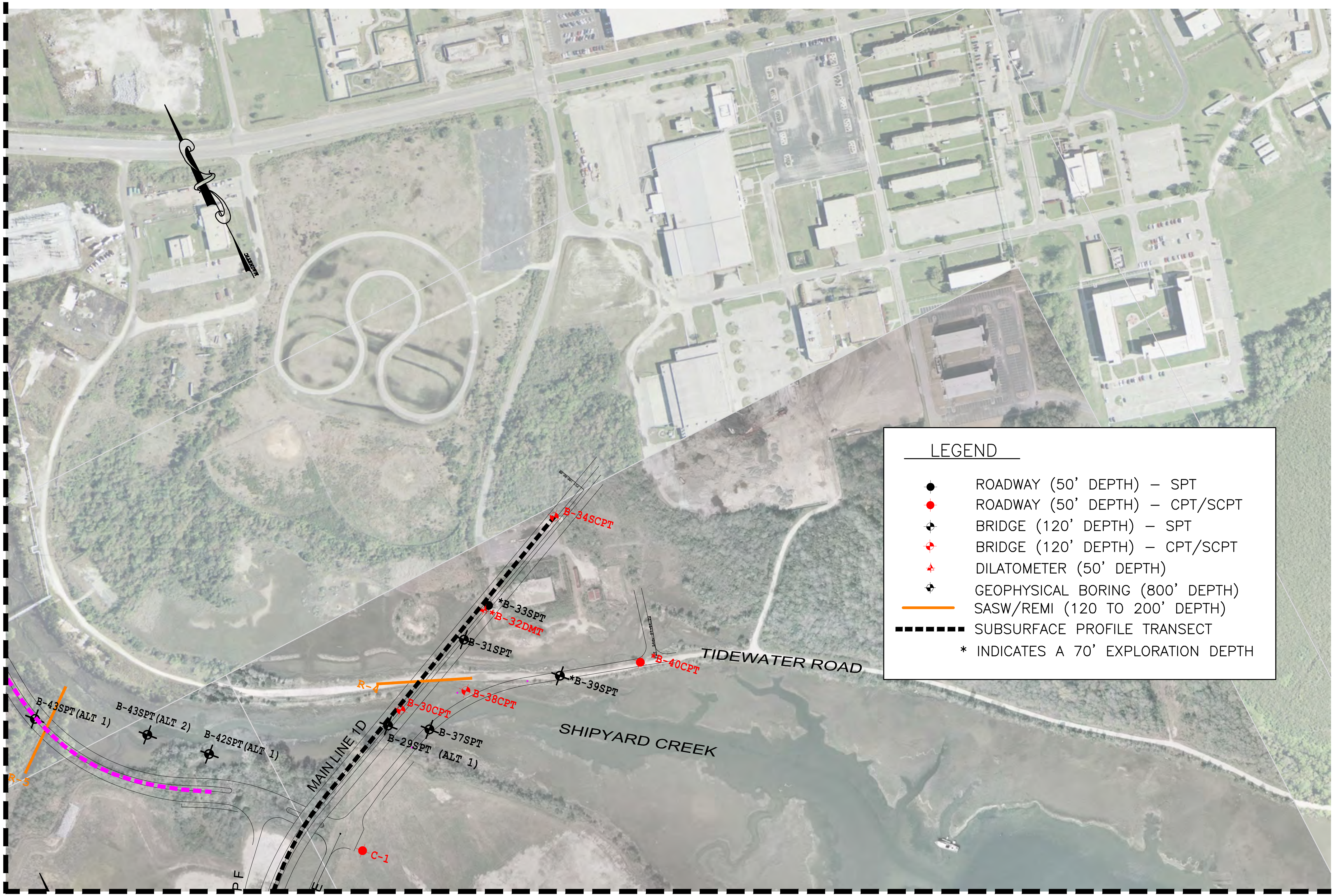
SCALE:	AS SHOWN
PROJECT NO.	1131-08-554
DRAWN BY:	LAJ
APPROVED BY:	DWH
DATE:	4-07-09
FIGURE NO.	1-4



MATCH LINE – SEE FIGURE 6

MATCH LINE – SEE FIGURE 4

TEST LOCATION PLAN NORTHEAST PORT ACCESS ROAD

NORTH CHARLESTON, SOUTH CAROLINA

S&ME PROJECT NO. 1131–08–554

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SCALE:	AS SHOWN
PROJECT NO.	1131–08–554
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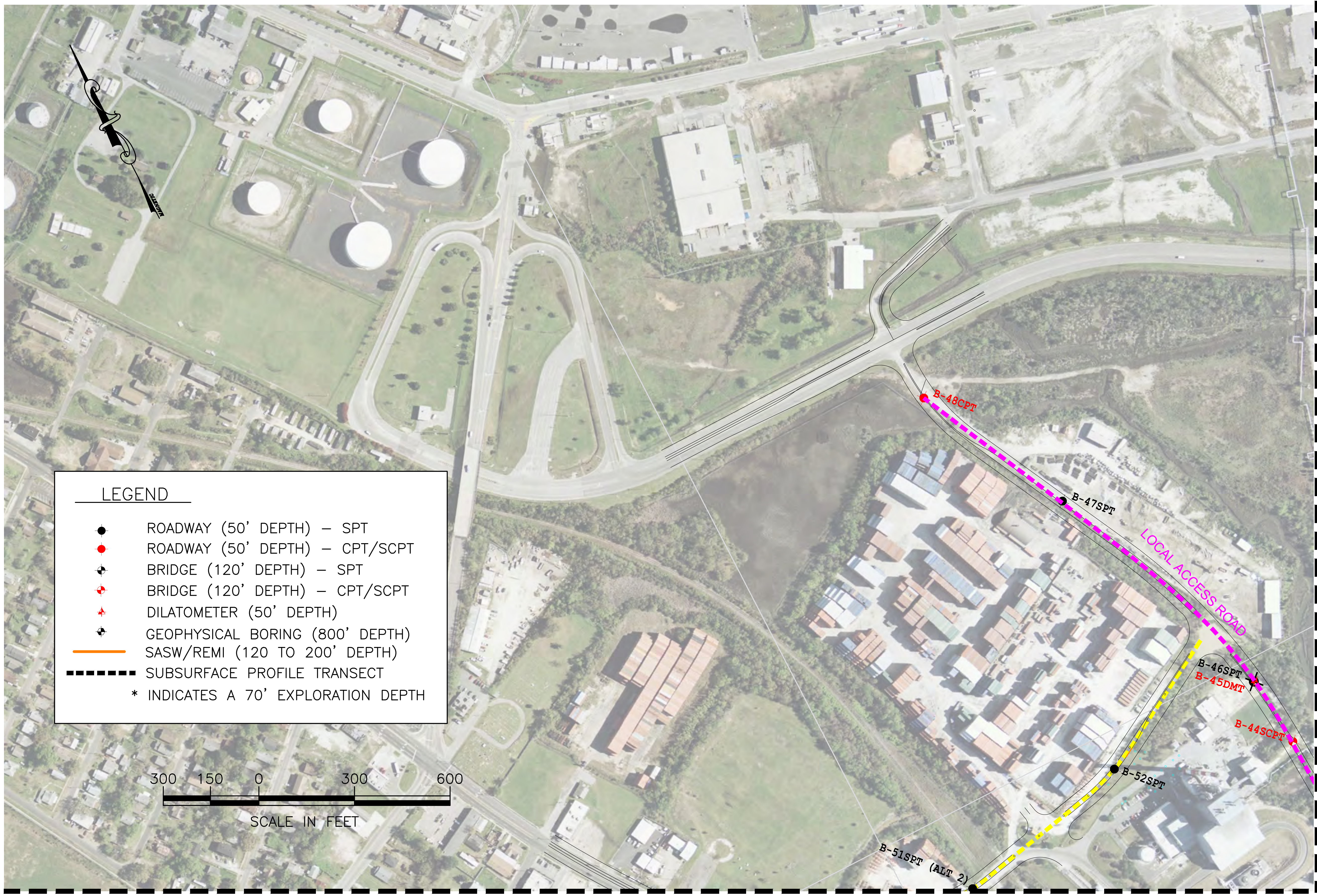
APPROVED BY:	DWH
DATE:	4–07–09
FIGURE NO.	1–5

TEST LOCATION PLAN NORTHWEST PORT ACCESS ROAD

NORTH CHARLESTON, SOUTH CAROLINA

S&ME PROJECT NO. 1131–08–554



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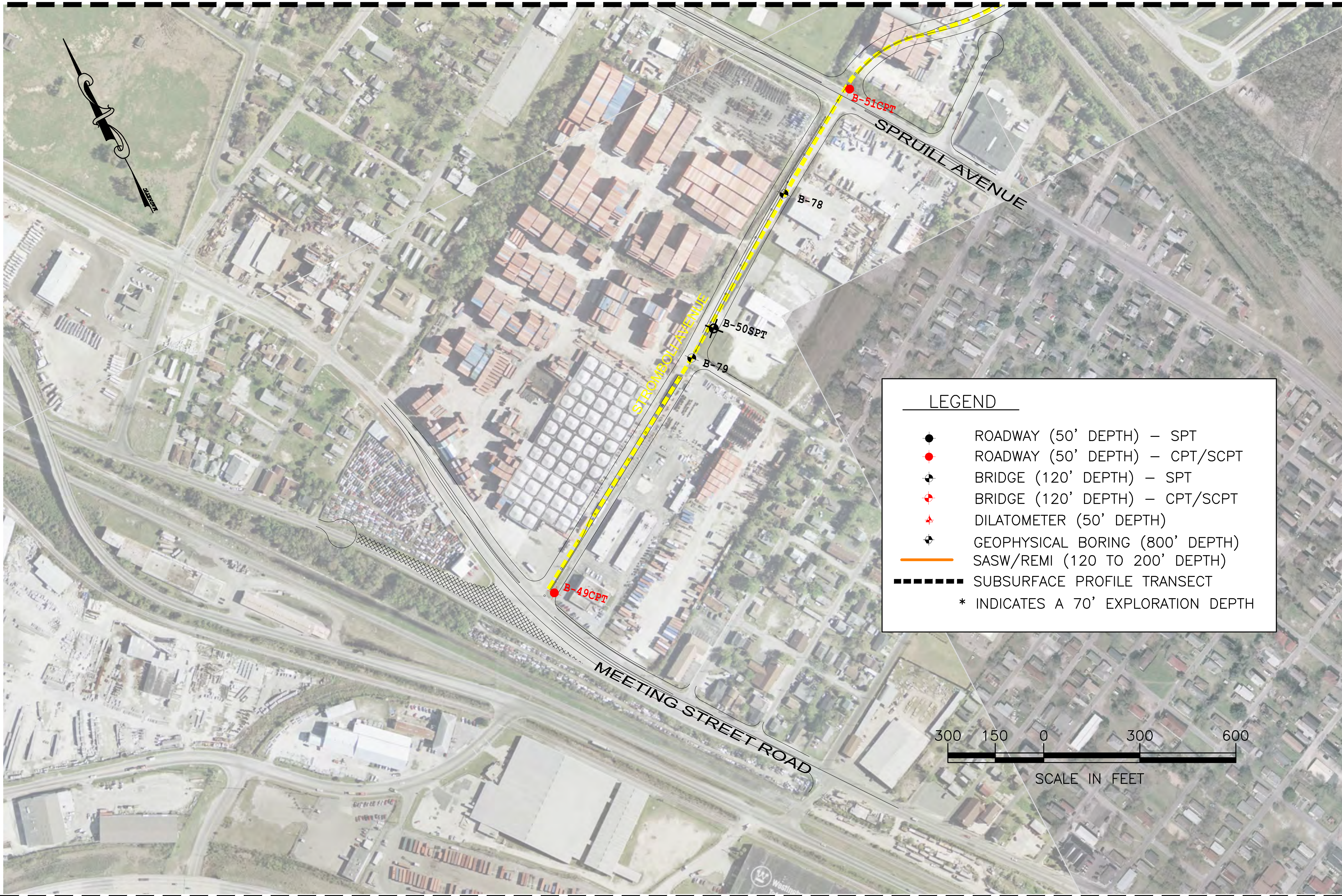
SCALE:	AS SHOWN
PROJECT NO.	1131–08–554
DRAWN BY:	LAJ
APPROVED BY:	DWH
DATE:	4–07–09
FIGURE NO.	1–6

MATCH LINE – SEE FIGURE 6



MATCH LINE – SEE FIGURE 4

MATCH LINE – SEE FIGURE 2

TEST LOCATION PLAN WEST
PORT ACCESS ROAD
NORTH CHARLESTON, SOUTH CAROLINA
S&ME PROJECT NO. 1131–08–554

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SCALE:	AS SHOWN
PROJECT NO.	1131–08–554
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DATE:	4–07–09
FIGURE NO.	1–7

The proposed alignment described above falls within an urban, industrial area that has been developed for many decades. As such, currently or previously contaminated hazardous materials sites are located within or near the proposed alignment. Specific hazardous materials sites on which the geotechnical exploration was conducted included the former Naval Base, the Macalloy site, Solvay, and a former gas station. Special measures and procedures as described in Sections 2.2 and 2.8 were implemented when geotechnical explorations were conducted at the hazardous materials sites.

2.0 Field Exploration

2.1 Summary

In addition to S&ME drill rigs, Soil Consultants, Inc. (SCI) of Charleston, South Carolina, and Mid-Atlantic Drilling, Inc. (MAD) of Carolina Beach, North Carolina, provided drillers and rigs to complete the road and bridge borings. A.E. Drilling, Inc. of Greenville, South Carolina, drilled the 800-ft deep geophysical boring. Procedures typically used by S&ME and our sub-contract drillers to conduct geotechnical explorations are outlined in the "Field Exploration Procedures" contained in Appendix II and further discussed in following sections.

Soil Test Borings (labeled with an "SPT" suffix), electronic cone penetrometer soundings (labeled with a "CPT" suffix), Marchetti dilatometer soundings (labeled with a "DMT" suffix), and bulk samples (labled Bulk 1 and 2) were performed during our exploration effort. Shear wave velocity measurements were made using Multichannel Analysis of Surface Waves (MASW), MAM (Microtremor Array Measurements) and seismic cone penetration tests (SCPT). The MASW arrays are labeled R-1 through R-5, and the SCPT soundings are designated as such.

Other specialized field tests described in our proposal were also conducted, consisting of Gamma, Spontaneous Potential, and Suspension logging. These specialized tests were only performed in boring B-11GEO and were performed to develop a better understanding of the site's deeper geologic and seismic response properties. S&ME performed the Gamma and Spontaneous Potential Logging. Geovision, Inc., performed the suspension logging.

In general, borings expected to be in embankment areas were extended to a depth of 50 ft, and borings expected to be in elevated structure areas were extended to a depth of 120 ft. The maximum depth of penetration achieved at any test location (other than B-11GEO) was 120 feet. Discussion of the subsurface conditions encountered is provided in subsequent sections of this report.

2.2 Field Engineering

The initial boring locations were chosen by SCDOT based on the proposed alignment and rig accessibility. The coordinates for the borings were determined using the Microstation drawing provided by SCDOT. The coordinates were confirmed by SCDOT, and then S&ME staked the borings in the field using a hand-held Global Positioning System (GPS) unit with sub-meter accuracy. Coordinates are presented in Table I-1 in Appendix I.

Prior to mobilizing drill rigs to the site, utility locate tickets were obtained for all of the boring locations. Staff engineers met utility locating personnel on-site as necessary. All borings were performed at least 3 ft from marked utilities. Overhead and underground utilities are present along much of the proposed alignment, including high-pressure natural gas and high-voltage overhead power lines.

Based on the initial boring locations chosen by the SCDOT, discussions with the SCDOT, and a review of readily-available information concerning the initial boring locations by the SCDOT and S&ME, it was determined that geotechnical exploration activities would be conducted at two sites (the former Naval Base and the Macalloy site) which would require the implementation of additional environmental and health and safety measures. The means of implementing the additional environmental and health and safety measures are described below.

Prior to mobilizing drill rigs to the former Navy Base, the SCDOT obtained a "Charleston Naval Complex LUC Area Construction Permit" (Construction Permit) on June 23, 2008 from the US Navy for the geotechnical exploration. A copy of this permit is included in Appendix IV of this report. In addition, S&ME prepared and submitted to the SCDOT for review the Environmental Work Plan for Geotechnical Exploration – Charleston Naval Complex dated September 10, 2008 (EWP-CNC). This work plan provided background information concerning areas of the former Naval Base on which geotechnical explorations would occur (SWMU 9 and Building 661) and certain exploration methods such as procedures for decontamination of exploration equipment and the containment, characterization, and disposal procedures for cuttings/liquids excavated or generated during the geotechnical exploration, based on our understanding of the Construction Permit. A copy of the Construction Permit was attached to the EWP-CNC.

Prior to mobilizing drill rigs to Talluah Road on the Macalloy site, the SCDOT obtained City Encroachment Permit No. 0969 (Encroachment Permit) on August 14, 2008 from the City of North Charleston for the geotechnical exploration. A copy of this permit is included in Appendix IV of this report. In addition, S&ME prepared and submitted to the SCDOT for review the Environmental Work Plan for Geotechnical Exploration – Macalloy Site (Talluah Road) dated September 24, 2008 (EWP-Macalloy), which provided background information concerning the Macalloy site and certain exploration methods such as procedures for decontamination of exploration equipment and the containment, characterization, and disposal procedures for cuttings/liquids excavated or generated during the geotechnical exploration, based on our understanding of Encroachment Permit. A copy of the Encroachment Permit was attached to the EWP-Macalloy.

Prior to mobilizing to both the former Naval Base and to Talluah Road, S&ME prepared a Health and Safety Plan (HASP) for S&ME employees to follow while conducting the geotechnical exploration at the two sites. The HASP included a description of the known existing site conditions as they may affect health and safety, activities to be conducted at the sites, monitoring requirements, and levels of personal protective equipment (PPE). A strong petroleum odor was detected in the upper 5 ft of B-18SPT, which was located at a suspected former gas station outside of the two areas described above; therefore, the HASP was amended to include the former gas station. S&ME employees followed the HASP during geotechnical exploration at the former Naval Base, Talluah Road, and the former gas station.

S&ME staff professionals logged each of the SPT borings. During Phase 1 exploration from September 2008 through November 2008, SCDOT representatives met weekly on site with the S&ME field project manager to discuss the previous week's activity and plans for the following week's work. Draft boring logs were provided to SCDOT at each weekly progress meeting. One meeting was held with SCDOT representatives prior to Phase 2 exploration in February 2009.

2.3 Boring Access and Offsets

The borings were accessed using track, truck and rubber-tire ATV carriers, depending on the site conditions. Borings B-2SPT, B-3SPT, B-66SPT, B31-SPT and B-38CPT required matting to access the locations due to soft, wet ground. Boring B-34CPT was offset approximately 75 ft southwest because the planned location was in a large inaccessible marshy area. Borings B-37SPT, B-29SPT ALT 1, B-42SPT ALT 1 and B-43SPT ALT 2 were drilled using a barge-mounted rig in Shipyard Creek. Boring B-67SCPT was abandoned after multiple attempts to access the location failed due to very soft ground and standing water. Some other borings were offset minor distances (less than 5 ft) due to utilities, overhead trees, power lines or unlevel ground.

2.4 Boring and Sampling Procedures

The following sections outline procedures used in boring and sampling of the site. Additional detailed discussion of methods used follow in Appendix II.

Borings B-15CPT through B-18SPT, B-22SCPT through B-24DMT, and B-51-SPT ALT2 were all performed in either asphalt or concrete paved areas. These locations were cored using either a drill rig or a coring machine by S&ME, SCI, or a coring subcontractor. Upon completion the borings were first grouted, backfilled with rock and sand, and then patched using asphalt coldpatch or concrete. The remaining borings were performed in unpaved areas. The borings along I-26 were performed within existing SCDOT right-of-way.

Temporary casing was installed for the borings in Shipyard Creek and borings B-11GEO and B-18SPT. All of the borings were drilled using mud rotary wash procedures. Where possible, 24-hour ground water level measurements were recorded for the SPT borings. For site access or safety reasons some of the borings were grouted immediately upon completion, and 24-hour water levels were not recorded. The water level, if recorded, is indicated on the individual boring logs. The water level indicated on the CPT and DMT logs is the level recorded immediately after completion of the sounding, and in our experience is relatively close to static ground water level at the time of exploration.

2.4.1 *Standard Penetration Test Borings*

Thirty-eight soil test borings were drilled by AE Drilling, Soil Consultants, Inc. (SCI), S&ME, and Mid-Atlantic Drilling using a mud-rotary drilling procedure. The various rigs employed and their hammer type and efficiency are presented on the individual boring logs and in Section 2.4.7. Standard Penetration Test (SPT) testing and split-spoon sampling were performed every 2½ ft in the upper 10 ft and 5-ft intervals thereafter. Continuous sampling was performed in borings B-23SPT and B-11GEO from the ground surface to an approximate Cooper Marl penetration of 10 ft to provide data for correlating CPT and DMT data to soil types. The SPT testing and split-spoon sampling was performed in general accordance with ASTM D 1586. Upon completion of the drilling, the soil samples were sealed in plastic jars and transported to laboratories for further classification and testing.

In split-spoon sampling, a standard 2-in. O.D. split steel tube is driven into undisturbed soil at a select depth using a 140-lb hammer falling a distance of 30 in. The number of blows required to advance the sampler the last 12 in. of the standard 18-in. "drive" is recorded as the Standard Penetration Resistance (N-value). The N-values are presented on the boring logs at the test depth, and provide an indication of the relative density of granular materials and the strength of cohesive materials. The results of the SPT borings are graphically presented on the boring logs in Appendix II.

In addition to the split-spoon samples, we obtained 41 undisturbed samples (Shelby-tube) (per ASTM D 1587) in selected cohesive strata. The Shelby-tube samples were collected in offset borings typically 3 ft from the original boring location. The offset borings have an "A" designation. In undisturbed sampling, a thin-walled steel tube (i.e., a Shelby tube) with a sharp leading edge is pushed into undisturbed soil at a select depth in the borehole to obtain relatively undisturbed samples of cohesive soils. Piston-type samplers were used to recover the samples. The recovered undisturbed samples were cleaned at each end, sealed with wax, capped, taped, and transported to laboratories for testing. Table II-1 in Appendix II lists the borings where we collected Shelby tubes, the depth of the sample and recovery length, the soil unit where the sample was collected, and the N-value at the sample depth.

Upon completion of each land boring, a tremie pipe was lowered to the bottom of the borehole and the hole was grouted using a bentonite slurry. The barge-based, CME 550X, and D-50 borings used a Portland cement/bentonite slurry to grout those boreholes. A Portland cement/bentonite slurry was also used to grout boring B-11GEO. Grout logs for each boring are included in Appendix II.

2.4.2 *Cone Penetration Test Soundings*

We advanced 30 CPT soundings using truck or track-mounted rigs to hydraulically advance an electronically instrumented cone penetrometer. During penetration, the tip resistance, pore-water pressure, and sleeve friction were measured and recorded in general accordance with ASTM D 5778. The method produces a nearly continuous record of information on subsurface conditions.

Cones with tip areas of 1.55 $in.^2$ (10 cm^2) and 2.33 $in.^2$ (15 cm^2) were used for testing, which correspond to cone diameters of 1.44 in. and 1.75 in., respectively. For both cone sizes, pore-water pressure transducers and porous filter elements are located directly behind the cone tip (u2 position). In addition, the cones used for this exploration were instrumented with seismic sensors for measuring shear-wave velocity. A legend with the CPT soil classification system and the logs of the cone testing are included in Appendix II.

At select elevations within soft clay strata, the advance of the cone penetrometer was halted and the rate of pore-water pressure dissipation was measured. This dissipation test data can be correlated to the time rate of consolidation for clay soils. The results of the dissipation testing, (i.e., pore-water pressures as a function of time), are presented in Appendix II.

After each CPT sounding was completed, a tremie pipe was lowered to the depth of hole cave-in, and bentonite slurry was used to grout the hole.

2.4.3 *Seismic Cone Penetration Test Sounding*

We performed shear wave velocity measurements in CPT soundings B-12SCPT, B-17SCPT, B-22SCPT, B-34SCPT, B-44SCPT, B-60SCPT, B-67 SCPT, and B-73SCPT using a cone penetrometer instrumented with geophones. The seismic cone penetrometer test (SCPT) measures the travel times of vibrations generated by an impulsive force applied to the ground surface. For each measurement (at a depth interval of approximately 3 ft), the travel time of the first arrival was determined and corrected for the horizontal offset of the source. Interval velocities were calculated by dividing the distance between adjacent depths by the difference in travel times. The SCPT data, in the form of interval velocity as a function of depth, are presented in Appendix II.

2.4.4 *Marchetti Dilatometer Test Sounding*

We performed six DMT soundings using the CPT rig to advance a specially designed, instrumented blade (the dilatometer). During the DMT sounding, data (pressure measurements) were collected at 1 ft intervals. DMT measurements consist of determining the pressure required to expand a membrane into the surrounding soil. Dilatometer test measurements were performed in general accordance with ASTM D 6635. Soil samples are not collected in a DMT sounding; however, the dilatometer data is correlated to numerous soil properties, including undrained shear strength, friction angle, and a stiffness modulus. The DMT results and a legend of formulas and soil classification are presented in Appendix II.

2.4.5 *Vane Shear Tests*

S&ME conducted nine field vane shear (FVS) tests within Unit 2 (soft clay/silt) and 2A (marsh deposits on naval base) soils in borings B-3A, B34A and B-40A. Tests were completed using a 3.625-in.-diameter Acker tapered blade in a 4-in.-diameter borehole. Force readings were measured on a Dillon force gauge. FVS tests were completed in general accordance with ASTM D2573-94. The results of the tests were corrected using the chart and factors developed by Chandler (1988). FVS test results are provided in Appendix II.

2.4.6 *Bulk Samples*

As requested by SCDOT, we collected two bulk samples (identified as Bulk-1 and Bulk-2) from the embankment near boring B-55SPT. Approximately 1.4 cubic feet of soil was recovered for each sample. Standard proctor (ASTM D698) and consolidated undrained (CU) triaxial shear tests (ASTM D4767) were performed on the samples. We also collected bulk samples from two local borrow pits for compaction and direct shear testing. Samples were collected from Frazier Pit on Countyline Road and Austin Pit on Sandhill Road.

2.4.7 *SPT Hammer Calibration*

The efficiency of the SPT hammers on the drill rigs was measured. Ten drill rigs were used to perform the Standard Penetration Tests. Hammer energy transfer measurements were obtained in general accordance with ASTM D4633 with a model PAK or PAX Pile Driving Analyzer™ (PDA) for all rigs. The PDA was used to record and interpret data from two piezoresistive or piezoelectric accelerometers which were bolted to a 2-ft long NWJ, AWJ, or BW drill rod internally instrumented with two strain transducers. The accelerometers and strain gages, which are mounted on opposing axes near the middle of the instrumented rod, monitor acceleration and strain for each hammer blow.

The analyzer converts the data to velocities and forces, computing the maximum transferred hammer energies and driving forces and stresses. All results are recorded and displayed in real time for each blow.

Nine of the ten drill rigs were manufactured by CME, and one was manufactured by Dietrich. All but two of the rigs used automatic hammers to obtain SPT N-values. The rigs without an automatic hammer were equipped with a safety hammer operated by a 7/8-in. hemp rope with two wraps over the top of the cathead. We were informed that the revolutions per minute (rpm) of the drill rig engines while operating the hydraulically powered automatic hammers was on the order of 1,800 rpm. In general, the total drill rod lengths were about 30 to 60 ft while obtaining energy measurements. However, there were several measurements obtained with drill rod lengths of about 90 to 110 ft. The N-values as observed S&ME personnel during testing ranged from about 2 to 17. Mud rotary drilling methods utilizing NWJ, AWJ, or

BW drill rods were employed to advance the boreholes to the desired sample depths. Once the sample depth was reached, the drill rods and bit were removed from the borehole and the split-spoon and drill rods were lowered to the top of the sample depth interval.

The SPT hammer energy testing is summarized in the Table 2-1 below, and more detailed results for each rig and sampling depth are included in Appendix II on the SPT Energy Measurements Data Sheets. The EFV method was used to determine the energy transferred to the drill rod, and this value was used to compute the transfer efficiency.

Table 2-1. Summary of SPT Energy Measurements

Drill Rig	Boring	Date	Hammer Type / Rod Size	Average Efficiency
CME 550 (S&ME ATV)	B-23A	9-30-08	Automatic / AWJ	80%
CME 750 (AE ATV)	B-11	10-7-08	Automatic / NWJ	76%
CME 850 (SCI Track)	B-2	9-29-08	Automatic / BW	74%
CME 55 (SCI Truck)	B-68 Alt 1	9-22-08	Automatic / BW	56%
CME 55 (SCI Truck)	*	12-17-08	Automatic / BW	80%
CME 45 (SCI Gyrotrack)	*	12-17-08	Automatic / BW	76%
CME 550 (SCI ATV)	*	12-22-08	Safety @ 2 wraps / BW	65%
Dietrich 50	B-63	2-19-09	Automatic/ AWJ	60%
CME 550 X (S&ME ATV)	**	10-30-08	Automatic/ AWJ	80%
CME 45 (MAD Barge)	B-29 Alt 1	10/17/08	Safety @ 2 wraps/ AWJ	70%

*SCI's CME 45 and 550 rigs were tested by SCI and reported to S&ME.
**S&ME CME 550X was tested on SCDOT project US 378 RBO Lynches River.

2.4.8 *Refusal to Drilling Tools*

The term "refusal" used in field notes and logs in this report means that the soils or underground obstructions resisted further penetration by the rotary drilling process. The term "refusal" was not applied to describe zero penetration by the split spoon sampler after 50 or more blows have been applied. The only SPT borings to encounter initial refusal were B-3 and B-52A. An unmarked, abandoned water line caused refusal of B-3. We suspect buried debris caused refusal of B-52A; however, we could not confirm this. Both borings were offset and completed as planned.

CPT or DMT refusal occurred when the reaction weight of the CPT rig was exceeded by the thrust required to push the tip further into the ground. At that point the rig lifted off the ground. CPT sounding B-48CPT encountered shallow refusal on buried debris and was offset approximately 10 ft. This location is near a former Solid Waste Management Unit on the former Naval Base. After offsetting, B-48CPT reached its target depth of 50 ft. Sounding B-30CPT, performed between Tidewater Road and Shipyard Creek, encountered shallow refusal multiple times and was ultimately abandoned. We understand that Tidewater Road was constructed using rubble fill and rip rap. CPT soundings B-8CPT, B-10SCPT and B-60CPT encountered refusal at depths of 113 ft, 114 ft and 111 ft, respectively. These three CPT soundings all were terminated in the Cooper Marl and likely refused on a cemented sand lens or phosphate lens within the Marl.

The proposed alignment is within an urban, industrial area that has been developed for many decades. As with all previously developed sites, underground obstructions such as buried debris, old foundations, abandoned utilities, septic tanks, and other items will be encountered.

2.4.9 *Surface Water Sampling*

On December 3, 2008, S&ME collected four surface water samples (W#1 through W#4) from Shipyard Creek. Sample W#1 was collected approximately 3,400 ft southeast of where the proposed Access Road will cross Shipyard Creek. Samples W#2, W#3, and W#4 were collected where the proposed Access Road crosses Shipyard Creek. Each surface water sample was collected directly into laboratory-supplied containers. Upon collection, Aquatox Environmental Laboratory (Aquatox) analyzed each sample in the field for pH by EPA Method 150.1. The remaining portions of each sample were transported to Aquatox's facility for analysis of the following parameters:

- Chloride and Sulfate by EPA Method 300, and;
- Resistivity by Method SW846 EPA Test Method 9050.

The results of the surface water testing are included in the Laboratory Test Data Summary in Appendix II.

2.5 Surface Wave Surveys

2.5.1 *Methodology*

Shear wave velocity measurements can be obtained using either shear wave surveys such as crosshole and downhole tests or surface wave surveys such as SASW, MASW, MAM, or ReMi™. Analysis of surface waves (R-waves) can be used to determine shear-wave velocities (Vs) as surface waves are fundamentally similar in behavior to shear waves (S-waves). In addition, the surface waves propagate to depths that are proportional to their frequencies (i.e., dispersion). The surface waves are recorded at the ground surface along a spread of low-frequency geophones. Recorded surface waves are transformed from time domain into frequency domain, from which the phase characteristics of the surface waves can be determined. A dispersion curve (a.k.a., phase velocity curve or slowness curve) is developed allowing the phase velocity (Cf) of particular frequency waves to be calculated. The dispersion curve is then transformed into the shear-wave velocity profile through a complex inversion and iterative processing.

To measure shear-wave velocities, S&ME typically performs MASW (Multi-Channel Analysis of Surface Waves) and MAM (Microtremor Array Measurements) with non-linear array geometry, combining the dispersion curves from both tests prior to the inversion process. Performing both MASW and MAM provides the greater depth of penetration associated with microtremor analyses (low frequency surface waves) without sacrificing resolution at shallower depths from MASW (higher frequency surface waves). In addition, our experience indicates using a combination of both methods to develop a shear wave velocity profile is more accurate than using Refraction Microtremor (ReMi™) exclusively, particularly when the ReMi™ array geometry is linear.

Depth of penetration using surface wave methods is mainly controlled by the shear properties of the subsurface materials and frequency range of site surface waves (generated active or ambient passive). Generally, penetration depth is greater for stiffer profiles as the signal does not attenuate as rapidly. However, because very small strain is required to determine the shear properties, sometimes velocities of very stiff materials (competent igneous or metamorphic rock) are difficult to obtain using traditional active or ambient sources.

2.5.2 *Field Testing*

Both MASW and MAM were performed at five test locations (R-1 through R-5) on the site; however, only the MASW testing yielded a dispersion curve suitable for inversion at Test Location R-4. The poor coherence of the dispersion curves from MAM testing is likely a result of lower amplitude passive energy, surface wave attenuation due to shallow soft soils, and a high velocity contrast. Accordingly, only results of the MASW tests were used for velocity measurements at R-4.

The MASW and MAM tests were performed at the approximate locations shown on the Test Location Plans. The MASW and MAM testing were conducted using the 16-channel Geometrics ES3000 seismograph and 4.5 Hz vertical geophones. For the MASW testing, the geophones were spaced in a linear geometry at intervals of 5- and 10-feet and surface waves were generated by an 8-pound sledgehammer striking a metal plate. All 16 channels were utilized in the MASW survey. In MAM testing the source of the mirotremors cannot be accurately determined; therefore 2-dimensional array geometies are preferred. Due to site space constraints, MAM testing was conducted using a linear array at Test Locations R-1, R-2, R-3, and R-5. Therefore, a larger percentage of error is expected because a 1-dimensional array geometry was utilized. MAM testing was conducted using the "L-shaped" array geometry with geophone spacing of 30 feet at R-5; only 11 channels are utilized for this array. The analysis was conducted using the OYO Corporation's SeisImager/SW software (Pickwin v. 3.14 and WaveEq).

Velocity measurements were obtained to depths of approximately 150, 145, 230, 48 and 115 feet at test locations R-1, R-2, R-3, R-4 and R-5, respectively. At Test Location R-4, only the results of the active surface wave data are included. The passive measurements produced erroneous results. Based on our experience in the general vicinity of the site, velocity (and stiffness) increases with depth. The five separate velocity profiles developed at each of the test locations are included in Appendix II.

2.6 Deep Boring with Geophysical Logging

2.6.1 *Drilling and Sampling*

Boring B-11GEO was drilled to a depth of 800 ft for purposes of obtaining deep compression and shear wave data, as well as obtaining soil samples for resonant column and torsional shear testing. Beginning on

October 6, the boring was advanced using mud-rotary methods to a depth of 400 ft. The hole was continuously sampled to a depth of 58 ft using split spoons. The hole was then sampled every 5 ft starting at a depth of 58.5 ft to a depth of 120 ft. Between a depth of 120 ft and approximately 251.5 ft, split spoon samples were taken at 159.5 ft, 179.5 ft, 189.5 ft, 199.5 ft, 219.5 ft, 229.5 ft, and 239.5 ft. Undisturbed samples (obtained either using the Pitcher barrel or direct push with a Shelby tube) were taken at depths of approximately 129.5 ft, 169.5 ft, 209.5 ft, and 249.5 ft. After this depth, Pitcher barrel sampling continued on 20-ft centers to an approximate depth of 351.5 ft. Sampling with the Pitcher barrel was then performed at a depth of approximately 374.5 ft and then again at 400 ft. The hole was then cored using a wire-line soil coring system to a depth of 500 ft, and then drilled out to a uniform 6-in. diameter with mud rotary methods. Cores samples were generally stored in core boxes, although some samples were wrapped in cheesecloth, waxed and protected in split-PVC tubes in order to preserve the samples for further testing.

After the hole was completed to a depth of 500 ft on October 16th, Suspension Logging, Borehole Gamma logging, and Borehole Spontaneous Potential logging were performed on October 17 after the borehole was conditioned and the drilling tools were removed. Following review of the preliminary geophysical test results, SCDOT decided to advance the borehole an additional 300 ft for the purpose of obtaining deeper shear and compression wave velocity profiles. On December 8, 2008, mud-rotary drilling continued to extend the hole from 500 ft to 800 ft. No samples were recovered from this interval; however, the geophysical methods described above were used to log the hole on December 10. The geophysical data available are included in Appendix II.

2.6.2 *Geophysical Testing*

Borehole geophysical logging involves the measurement of physical properties of the material immediately adjacent to the drilled borehole. Probes that measure different properties are lowered into the borehole to collect continuous or point data that is graphically displayed as a geophysical log. In order to expedite data acquisition, a suite of logs are typically collected in each borehole. Specific interpretations can be made based on numerous combinations of responses observed in several different types of logs. For this project, borehole geophysics were used to obtain information primarily on lithology and dynamic soil properties.

Gamma logs record the amount of natural gamma radiation emitted by the material surrounding the borehole. The most significant naturally occurring sources of gamma radiation are potassium-40 and daughter products of the uranium- and thorium-decay series. Clay- and shale-bearing rocks commonly emit relatively high gamma radiation because they include weathering products of potassium feldspar and mica and tend to concentrate uranium and thorium by ion absorption and exchange.

Spontaneous potential logs record potentials or voltages developed between the borehole fluid and the surrounding rock and fluids. Spontaneous-potential logs can be used in the determination of lithology and water quality. Collection of spontaneous-potential logs is limited to water- or mud-filled open holes.

S&ME performed the Gamma and Spontaneous Potential logging with Mount Sopris Instruments geophysical logging equipment. The system consisted of a 4MXA-1000 winch and an MGX II logger system configured with a polygamma probe, which includes the gamma and SP tools. The tools were referenced from the top of casing, and then corrected for true ground surface. The results of the Gamma and SP logging of B-11GEO are included in Appendix II.

Shear and compression-wave velocity measurements were performed in Boring B-11GEO using suspension logging. This method uses a 7-meter probe containing a source and two receivers. The probe is lowered into the borehole, and at incremental depths, the source generates a pressure wave in the borehole fluid. The pressure wave is converted to seismic waves (P and S) at the borehole wall. Along the wall at each receiver location, the P and S waves are converted back to pressure waves in fluid. The pressure waves are received by the geophones, which send the data to the recorder at the surface. The elapsed time between arrivals of the waves at the receivers is used to determine the average wave velocity.

The suspension logging was performed by Geovision using the OYO P-S Suspension Logger. Additional details of the system, literature about suspension logging, and the results of the logging are included in Geovision's report in Appendix II.

2.7 Site Survey Control

After the drilling was complete, the boring locations were surveyed by a licensed surveyor using a Dual-Frequency GPS tied to the South Carolina Virtual Reference Station Network. The surveyed points have an accuracy of + 0.33 ft horizontal and +0.07 ft vertical. The vertical datum is NAVD 88. The coordinates and elevation of the borings are indicated on the individual logs and tabulated in Table I-1 in Appendix I. The coordinates are presented in both latitude/longitude and South Carolina State Plane northing/easting. The test locations shown on Figure 1-1 through Figure 1-7 are the surveyed as-drilled test locations.

2.8 Implementation of Environmental Work Plans

At the former Naval Base, Talluah Road (Macalloy site), and the former gas station, downhole exploration equipment was decontaminated and drilling mud generated from standard penetration test borings was contained in general accordance with the EWP-CNC and the EWP-Macalloy. The decontamination liquids and drilling mud (investigative-derived waste, or IDW) were contained in a total of 22 steel, 55-gallon drums; the drums were labeled and secured at each site. In coordination with Environmental Projects Group, Inc. (EPG), a waste management contractor, and Republic Services, Inc. (Republic), EPG's intended disposal contractor, S&ME collected representative samples of the IDW and submitted the samples to TestAmerica Laboratories, Inc. (TA) for analysis of various parameters (based on the site from which the IDW was generated) to characterize the IDW for proper disposal. For the former Naval Base, Talluah Road (Macalloy site), and the former gas station, summaries of the characterization samples collected, the parameters analyzed, and the laboratory analytical results from TA are presented below. The TA laboratory analytical reports are provided in Appendix IV. We will coordinate with the SCDOT and EPG to properly dispose the IDW. In accordance with the US Navy Construction Permit, the US Navy will be notified of the intended disposal of the IDW generated at the former Naval Base. We performed no environmental field assessments of the sites; only characterization of IDW contained in the drums.

2.8.1 *Former Naval Base*

Twelve drums of IDW were generated during the geotechnical exploration activities at the former Naval Base. Each drum was labeled indicating the contents and initially left in the area of the borings and soundings. Because some of the boring/sounding locations were in areas that periodically flood during high tides, S&ME moved the 12 drums to a paved area near Building 661.

On December 2, 2008, S&ME collected one grab sample of material from three drums of drilling mud and one grab sample of water from one drum of decontamination water (for a total of four grab samples). The grab samples were identified as CNC-CWS, CNC-661, CNC-TWR, and CNC-DECON-GRAB.

S&ME submitted the grab samples to TA for analysis of:

- Total Volatile Organic Compounds (VOCs) by EPA Method 8260B, including:
  - 1,1-dichloroethene
  - 1,2-dichloroethane
  - 1,2-dichloroethene (total)
  - Benzene
  - chlorobenzene
  - cis-1,2-dichloroethene
  - naphthalene
  - methylene chloride (dichloromethane)
  - trichloroethene
  - vinyl chloride
  - 2-butanone
  - carbon tetrachloride
  - chloroform
  - tetrachloroethene
  -

- VOCs by EPA Method 1311/8260B (Toxicity Characteristic Leaching Procedure, or TCLP), including:
  - 1,1-dichloroethene
  - 1,2-dichloroethane
  - Benzene
  - chlorobenzene
  - trichloroethene
  - vinyl chloride
  - 2-butanone
  - carbon tetrachloride
  - chloroform
  - tetrachloroethene

On December 2, 2008, S&ME also collected one composite sample of drilling mud from the nine drums containing drilling mud and one composite sample of water from the three drums containing decontamination water (for a total of two composite samples). The composite samples were identified as CNC-MUD and CNC-DECON-COMP.

S&ME submitted the samples to TA for analysis of:

- Total Semivolatile Organic Compounds (SVOCs) by EPA Method 8270C, including:
  - 2,4-dimethylphenol
  - 2-chlorophenol
  - 2-methylnaphthalene
  - 2-methylphenol (o-cresol)
  - 4-methylphenol (p-cresol)
  - PAHs
  - 1,4-dichlorobenzene
  - 2,4-dinitrotoluene
  - hexachlorobenzene
  - hexachlorobutadiene
  - hexachloroethane
  - nitrobenzene
  - pentachlorophenol
  - pyridine
  - 2,4,5-trichlorophenol
  - 2,4,6-trichlorophenol

- SVOCs by 1311/8270C (TCLP), including:
  - Cresols
  - 1,4-dichlorobenzene
  - nitrobenzene
  - pentachlorophenol

- 2,4-dinitrotoluene
- hexachlorobenzene
- hexachlorobutadiene
- Hexachloroethane
- pyridine
- 2,4,5-trichlorophenol
- 2,4,6-trichlorophenol

♦ Total Metals by 6010B/7471A, including:
- Arsenic
- Antimony
- Barium
- Cadmium
- Chromium
- Lead
- Selenium
- Silver
- Mercury

♦ Metals by 1311/6010B/7471A (TCLP), including:
- Arsenic
- Barium
- Cadmium
- Chromium
- Lead
- Selenium
- Silver
- Mercury

The TA laboratory analytical report (Appendix IV) indicated that the concentrations of VOCs, SVOCs, and metals in samples analyzed by TCLP were below the maximum concentrations for contaminants for the toxicity characteristic listed in Table 1 of 40 CFR 261, indicating that drums did not contain waste material exhibiting characteristics of hazardous waste (by toxicity). However, because the TA laboratory analytical report indicated that the total concentrations of some parameters in the drilling mud samples exceeded risk-based screening values for soil, the SCDOT, in coordination with the US Navy and the property owner, may wish to dispose the waste material contained in the drums at a Subtitle D Landfill. Based on our coordination with EPG, Republic has approved the disposal of the drums at the Broadhurst Landfill in Georgia (Georgia EPD Permit No. 151-014D(SL). Because some of the drums contain water and drilling mud that may have a high water content, the contents of the drums may require amendment prior to disposal.

Other disposal options may be available for the contents of the drums following coordination with other parties, including, but not limited to, the US Navy, the property owner, the South Carolina Department of Health and Environmental Control (SCDHEC), the City of North Charleston, and the North Charleston Sewer District (NCSD). Following coordination with and permission from the parties listed above, other disposal options may include discharge of liquids into the NCSD's sanitary sewer system, discharge of liquids into the City of North Charleston's separate storm sewer system, or placement of the material near the locations of the borings/soundings. At the time of this report the drums remain on site.

2.8.2 *Talluah Road (Macalloy site)*

Four drums of IDW were generated during the geotechnical exploration activities at Talluah Road (on the Macalloy site). Each drum was labeled indicating the contents and left in the area of the borings and soundings (within the City of North Charleston right-of-way).

On December 2, 2008, S&ME collected a composite sample of material from the three drums containing drilling mud and a composite sample of water from the drum containing decontamination water (for a total of two composite samples). The composite samples were identified as MAC-MUD and MAC-DECON.

S&ME submitted the samples to TA for analysis of:

- Total Metals by 6010B/7196A/7471A, including:
  - Arsenic
  - Antimony
  - Barium
  - Cadmium
  - Chromium
  - Hexavalent Chromium
  - Iron
  - Lead
  - Manganese
  - Nickel
  - Selenium
  - Silver
  - Mercury

- Metals by 1311/6010B/7471A (TCLP), including:
  - Arsenic
  - Barium
  - Cadmium
  - Chromium
  - Lead
  - Selenium
  - Silver
  - Mercury

The TA laboratory analytical report (Appendix IV) indicated that the concentrations of metals in samples analyzed by TCLP were below the maximum concentrations for contaminants for the toxicity characteristic listed in Table 1 of 40 CFR 261, indicating that drums did not contain waste material exhibiting characteristics of hazardous waste (by toxicity). However, because the TA laboratory analytical report indicated that the total concentrations of some metals in the drilling mud samples exceeded risk-based screening values for soil, the SCDOT, in coordination with the City of North Charleston, may wish to dispose the waste material contained in the drums at a Subtitle D Landfill. Based on our coordination with EPG, Republic has approved the disposal of the drums at the Broadhurst Landfill in Georgia (Georgia EPD Permit No. 151-014D(SL). Because some of the drums contain water and drilling mud that may have a high water content, the contents of the drums may require amendment prior to disposal.

Other disposal options may be available for the contents of the drums following coordination with other parties, including, but not limited to, the City of North Charleston, the SCDHEC, and the NCSD. Following coordination with and permission from the parties listed above, other disposal options may include discharge of liquids into the NCSD's sanitary sewer system, discharge of liquids into the City of North Charleston's separate storm sewer system, or placement of the material near the locations of the borings/soundings. At the time of this report the drums remain on site.

2.8.3 *Former Gas Station*

Two drums of IDW were generated during the initial geotechnical exploration activities at the former gas station. Each drum was labeled indicating the contents and left in the area of the borings and soundings.

On December 2, 2008, S&ME collected one grab sample of material from one of the drums of IDW. The grab sample was identified as GAS-MUD-GRAB.

S&ME submitted the grab samples to TA for analysis of:

- VOCs by EPA Method 1311/8260B (TCLP), including:
  - 1,1-dichloroethene
  - 1,2-dichloroethane
  - Benzene
  - chlorobenzene
  - trichloroethene
  - vinyl chloride
  - 2-butanone
  - carbon tetrachloride
  - chloroform
  - tetrachloroethene

On December 2, 2008, S&ME also collected one composite sample of drilling mud from the two drums containing IDW. The composite sample was identified as GAS-MUD-COMP.

S&ME submitted the composite sample to TA for analysis of:

- SVOCs by 1311/8270C (TCLP), including:
  - Cresols
  - 1,4-dichlorobenzene
  - 2,4-dinitrotoluene
  - hexachlorobenzene
  - hexachlorobutadiene
  - Hexachloroethane
  - nitrobenzene
  - pentachlorophenol
  - pyridine
  - 2,4,5-trichlorophenol
  - 2,4,6-trichlorophenol
- Metals by 1311/6010B/7471A (TCLP), including:
  - Arsenic
  - Barium
  - Cadmium
  - Chromium
  - Lead
  - Selenium
  - Silver
  - Mercury

Additional exploration activities were conducted at the former gas station after our collection of IDW characterization samples; four additional drums of IDW were generated. Each additional drum was labeled indicating the contents and left in the area of the borings and soundings.

The TA laboratory analytical report (Appendix IV) indicated that the concentrations of VOCs, SVOCs, and metals in samples analyzed by TCLP were below the maximum concentrations for contaminants for the toxicity characteristic listed in Table 1 of 40 CFR 261, indicating that the two drums generated during the initial exploration activities did not contain waste material exhibiting characteristics of hazardous waste (by toxicity). Because the subsequent exploration was performed at the same general location of the initial exploration, it is our opinion that the characterization of the two initial drums of IDW also adequately characterizes the four drums of IDW generated during the subsequent exploration activities. Based on the laboratory analytical results and the nature of the site (mostly paved), the SCDOT, in coordination with the property owner, may wish to dispose the waste material contained in the drums at a Subtitle D Landfill. Based on our coordination with EPG, Republic has approved the disposal of the drums at the Broadhurst Landfill in Georgia (Georgia EPD Permit No. 151-014D(SL). Because some of the drums contain water and drilling mud that may have a high water content, the contents of the drums may require amendment prior to disposal.

Other disposal options may be available for the contents of the drums following additional characterization and coordination with other parties, including, but not limited to, the property owner, the City of North Charleston, the SCDHEC, and the NCSD. Following coordination with and permission from the parties listed above, other disposal options may include discharge of liquids into the NCSD's sanitary sewer system, discharge of liquids into the City of North Charleston's separate storm sewer system, or placement of the material near the locations of the borings/soundings (provided the material does not runoff the property during storm events). At the time of this report the drums remain on site.

3.0 Laboratory Testing

S&ME's AASHTO accredited laboratory in Mount Pleasant, South Carolina (S&ME-MP) performed laboratory testing on disturbed soil samples. Testing was performed to aid in the classification of soils encountered in the test borings and to provide an estimation of typical engineering parameters for encountered soils. In addition to the laboratory soil tests completed at the Mount Pleasant office, S&ME arranged for soil testing services at the following AASHTO accredited laboratories:

- S&ME – Richmond, Virginia (S&ME-RIC)
- S&ME – Spartanburg, South Carolina (S&ME-SPG)
- GeoTesting Express, Atlanta, Georgia (GTX)
- Soil Consultants, Inc., Charleston, South Carolina (SCI)

Testing was completed in general accordance with ASTM methodologies, where applicable. Table 3-1 summarizes the type and quantity of tests completed at each of the laboratories.

Table 3-1. Summary of Laboratory Test Quantity

Laboratory Test	Procedure	Testing Laboratory				Total Number of Tests
		S&ME-MP	S&ME-RIC	GTX	SCI	
Natural Moisture	ASTM D 2216	162	37	12	17	228
Atterberg Limits	ASTM D 4318	121	32	12	17	182
Grain Size Analysis	ASTM D 2217	157	39	5	11	212
Wash 200	ASTM D 1140	--- [1]	5	10	6	21
Specific Gravity	ASTM D 854	---	5	7	7	19
Unit Weight	---	---	14	12	7	33
Standard Proctor	ASTM D 698	2	---	---	---	2
Organic Content	ASTM D 2974	4	---	7	6	17
pH	ASTM D 4972	30	---	---	---	30
Resistivity	ASTM G 57	30	---	---	---	30
Electro Chemical	Various [2]	---	---	---	---	30 [3]
Consolidated Undrained (CU) Triaxial	ASTM D 4767	---	6	9	5	20

Unconsolidated Undrained (UU) Triaxial	ASTM D 2850	---	4	2	---	6
Direct Shear	ASTM D 3080	---	---	---	1	1
1-D Consolidation	ASTM D 2435	---	6	9	7	22

[1] Test not completed by corresponding laboratory.
[2] Electro Chemical testing consisted of pH (EPA Test Method 150.1), resistivity (SW846 EPA Method 9050), and sulfate and chloride content (EPA Test Method E300).
[3] Electro Chemical testing completed by AquaTox of Summerville, South Carolina and CTL Group of Columbia, Maryland.

In general, the laboratory testing can be divided into two categories: Index and Basic Property tests and Engineering Property tests. Laboratory test results are provided in Appendix III. In addition to the Index and Engineering property testing described above, Resonant Column and Torsional Shear (RCTS) testing was performed on samples obtained from Boring B-11GEO. Further details on the types of tests performed are presented in the following sections.

3.1 Index and Basic Property Testing

Index Property testing consisted of Atterberg limits, particle-size distribution, and natural moisture content tests. When Atterberg limits and particle-size distribution tests were each performed on a sample, the sample was classified in accordance with the both the Unified Soil Classification System (USCS) and AASHTO. Basic Property testing consisted of specific gravity, unit weight, Standard Proctor compaction, organic content, and electro chemical testing. Index and Basic Property test results are provided on the Laboratory Summary Table in Appendix III.

3.1.1 *Atterberg Limits*

Atterberg limits tests were performed in general accordance with ASTM D 4318. The Atterberg limits test determines the Liquid Limit (LL), Plastic Limit (PL) and Plasticity Index (PI) of fine-grained soils. The plastic limit and liquid limit represent the moisture content at which a cohesive soil changes from a semi-solid to a plastic state and from a plastic state to a liquid state, respectively. The PI is the difference between the LL and PL. The LL for each sample tested was determined using either the multi-point liquid limit method (Method A) or the one-point method (Method B) per ASTM D 4318.

3.1.2 *Particle-Size Distribution*

Particle-size distribution was performed in general accordance with ASTM D 422 and D 1140. Soil samples were sieved to determine the grain size distribution and/or the percentage of material finer than the No. 200 sieve (i.e., silt and clay particles). For select samples, the material retained on the No. 200 sieve was sieved using a full set of standard sieve sizes that included the following: 1/2 inch, 3/8 inch, No. 4, No. 10, No. 20, No. 40, No. 60, No. 80, No. 100, No. 140, and No. 200.

3.1.3 *Natural Moisture Content*

Natural moisture content tests were completed in general accordance with ASTM D 2216. The natural moisture content is defined as the ratio of the weight of water present in the soil to the dry weight of soil.

3.1.4 *Specific Gravity*

Specific gravity (G_s) tests were completed in accordance with ASTM D 854. The specific gravity of soil solids is defined as the ratio of the mass of a unit volume of soil solids to the mass of the same volume of gas-free distilled water at 20°C. S&ME-RIC and GTX performed specific gravity tests in accordance with Method A – Procedure for Moist Specimens per ASTM D 854. SCI performed specific gravity tests in general accordance with Method B – Procedure for Oven-Dry Specimens.

3.1.5 *Unit Weight Determination*

Unit weight measurements were obtained on soil samples that were extracted from Shelby tubes. In general, unit weights were determined by measuring the volume and weight of trimmed soil samples obtained for strength and consolidation testing. The natural moisture content was determined for each trimmed sample so that wet and dry unit weights could be calculated.

3.1.6 *Standard Proctor Compaction*

Standard Proctor compaction tests were performed in general accordance with ASTM D 698 Method A. The Standard Proctor compaction test is used to determine the relationship between water content and dry unit weight of compacted soils. Soils were compacted in a 4-inch mold with a 5.5-pound hammer dropped from a height of 12 inches producing a compactive effort of 12,400 ft-lbf/ft^3.

3.1.7 *Organic Content*

Organic content tests were completed in general accordance with ASTM D 2974. The organic content is defined as the ratio of the weight of organic material present in the soil to the dry weight of soil (mineral matter).

3.1.8 *Electro Chemical Classification*

Electro chemical classification tests provide quantitative information related to the aggressiveness of the soil or water conditions and the potential for deterioration of a foundation material. Electro chemical tests include pH, resistivity, sulfate ion content and chloride ion content. AquaTox of Summerville, South Carolina and CTL Group of Columbia, Maryland completed electro chemical testing on soil samples collected from our test borings and water samples collected from Shipyard Creek. Electro chemical testing was performed in general accordance with the following test methods:

- pH – EPA Test Method 150.1
- Resistivity – SW846 EPA Method 9050
- Sulfate and Chloride content – EPA Test Method E300

Additionally, S&ME-SPG completed pH and resistivity on select soil samples obtained from the test boring program in general accordance with ASTM D 4972 and G 57, respectively.

3.1.9 *Geological Classification*

Geologic classification testing was performed on 20 samples from Boring B-11 by Dr. Michael Katuna, formerly with the College of Charleston. Geologic classification was based on detailed sedimetological laboratory analysis and biostratigrahic analyses were not performed. Further details of the geologic classification methods and results are presented in the report included in Appendix II.

3.2 Engineering Property Testing

Engineering Property tests consisted of one-dimensional consolidation, Unconsolidated-Undrained triaxial, Consolidated-Undrained triaxial, and direct shear. Engineering Property test reports are provided in Appendix III. A summary of compressibility and strength tests results are provided in the following sections.

3.2.1 *Consolidation Tests*

One-dimensional consolidation tests were completed on samples trimmed from three-inch-diameter tube samples collected during the subsurface exploration. Testing was completed in general accordance with ASTM D 2435. Consolidation testing consists of loading an approximately 1-inch thick soil specimen confined in a rigid ring and measuring the resulting displacement as a function of time. Filter paper and machine deflection corrections were applied to the test data. This correction accounts for an increase in deflection at each load due to the compressibility of the filter paper and the machine. Compression Ratio (CR) was interpreted from the virgin compression portion of the strain versus log of effective stress plot. Recompression Ratio (RR) was interpreted from the final unload portion of the strain versus log of effective stress plot. The coefficient of consolidation, c_v, was interpreted using Taylor's method. The preconsolidation pressure was determined using Casagrande's method. A summary of compressibility parameters with respect to S&ME's interpreted subsurface soil units is provided in Table 3-2.

Table 3-2. Range of Compressibility Results

Soil Unit	No. of Tests	Compression Ratio, CR	Recompression Ratio, RR	Coefficient of Consolidation, c_v (ft^2/yr)	Over Consolidation Ratio, OCR
1C	1	0.29	0.065	0.9 – 48.2	1.0
1B	6	0.25 – 0.48	0.035 – 0.074	0.3 – 1195	0.6 – 1.5
2B	1	0.095	0.003	8.5 – 85.5	3.6
2C	6	0.17 – 0.59	0.017 – 0.072	0.5 – 3865	1.0 – 5.4
3	1	0.24	0.059	0.5 – 1594	5.4
4	2	0.13 – 0.14	0.027 – 0.03	8.8 – 756.9	4.3 – 5.6
5	5	0.16 – 0.28	0.008 – 0.07	5.6 – 37204	3.5 – 10

3.2.2 *Unconsolidated-Undrained Triaxial Tests*

Unconsolidated-Undrained (UU) triaxial shear tests were completed on samples trimmed from three-inch-diameter tube samples collected during the subsurface exploration. Testing was completed in general accordance with ASTM D 2850. A membrane correction was applied to the test data due to the relative softness of the clay compared to the membrane used. This correction accounts for an increase in deviator stress caused by the additional membrane confining pressure. The point of failure selected by S&ME for each specimen corresponds to the maximum principal stress difference (maximum deviator stress) attained during the performance of the test. S&ME interpreted a best-fit failure envelope using the Mohr stress circles at failure for the three specimens. A summary of total stress strength parameters with respect to S&ME's interpreted subsurface soil units is provided in Table 3-3.

Table 3-3. Range of Total Stress Strength Parameters

Soil Unit	No. of Tests	Shear Strength, S_u (psf)	Friction Angle, ϕ (degrees)
1B	4	90 – 460	0
2C	2	970 – 1130	0

3.2.3 *Consolidated-Undrained Triaxial Tests*

Isotropically Consolidated-Undrained (ICU) triaxial shear tests with pore pressure measurements were performed in general accordance with ASTM D 4767. During the ICU test, the sample is back-pressure saturated during the consolidation stage prior to loading. This allows meaningful measurement of the pore pressure response during loading and results in effective stress strength parameters. Each test series consisted of testing three specimens (from the same Shelby tube) at three different consolidation stresses. As with the UU triaxial tests, a membrane correction was applied to the ICU test results for each of the samples. Filter strips were used by GTX, as needed, to decrease the time required for testing. A filter strip correction was not applied to the ICU tests, as the error in principal stress difference due to the strength of the filter-paper strips did not exceed 5%.

Generally, the point of failure selected by S&ME for each specimen corresponds to the maximum principal stress difference (maximum deviator stress, $\sigma_{D,MAX}$) attained during the performance of the test. In three cases we used limiting strain (ε_L) criteria to select the point of failure because the maximum deviator stress was observed at 15% strain. In most cases, S&ME interpreted a best-fit failure envelope using the Mohr stress circles at failure for the three specimens. A summary of effective stress strength parameters with respect to S&ME's interpreted subsurface soil units is provided in Table 3-4.

Table 3-4. Range of Effective Stress Strength Parameters

Soil Unit	No. of Tests	Apparent Cohesion, c' (psf)	Friction Angle, ϕ' (degrees)
1A	2	0	35 - 36
1B	5	0 - 2	18 - 34
2B	1	0	33
2C	3	0 – 4	22 - 35
3	1	0	34
4	3	0 – 5	23 – 36
5	5	0 – 6	36 – 38

3.2.4 *Direct Shear*

One direct shear test was completed on a bulk soil sample collected from the Frazier borrow pit off of County Line Road in Ravenel, South Carolina. The direct shear test was performed in general accordance with ASTM D 3080. The test consists of consolidating a sample within a square shearing box with a predetermined normal stress. After the sample is consolidated, one frame of the shearing box is displaced relative to the other frame at a constant rate. The direct shear test provides a relatively rapid determination of consolidated drained strength parameters. In general, test results indicate an apparent cohesion, c', of 0 psf and an effective friction angle, ϕ', of 37 degrees.

3.3 Resonant Column and Torsional Shear Testing

Three undisturbed samples from Boring B-11GEO were subjected to RCTS testing. We arranged for Fugro Consultants, Inc. of Houston Texas to perform the testing. Tests were performed on samples form the following three depths:

- 131.8 ft, Ashley Formation of the Cooper Group
- 249.7 ft, Harleyville Formation of the Cooper Group
- 439.0 ft, Williamsburg Formation of the Black Mingo Group, Lower Bridge Member

Results of the testing are presented in the report from Fugro presented in Appendix II.

4.0 Site and Subsurface Conditions

4.1 Site Conditions

S&ME's assessment of the geotechnical conditions began with a reconnaissance of the topography and physical features of the site. The general shape and approximate plan dimensions of the site are indicated Figure 1-1 and described below. The setting of the site in terms of its location relative to the principal road or street in the site area and any secondary or cross streets is also described.

The northern end of the project along I-26 is near the North Meeting Street exit and continues to approximately 1000 ft south of the Spruill Avenue exit. The proposed road will turn east and cross over North Meeting Street, King Street Extension and Spruill Avenue. The alignment then turns north as it parallels the western boundary of the former Macalloy site and then crosses Shipyard Creek to connect to the former Naval Base. The site is located in developed urban and industrial areas. In addition to crossing several urban streets, the alignment also crosses two rail lines.

The Ashley River is located within a ½ mile of I-26 to the west, and several marshes from the Ashley River extend up to I-26. Some of these marshes were likely filled over during the construction of the interstate. Shipyard Creek, which connects to the Cooper River, lies between the former Naval Base and the former Macalloy site. The proposed alignment will cross Shipyard Creek where the channel is approximately 40 ft wide, with marshes to the east and west of the creek channel. Most of the alignment that falls within the former Naval Base is located in a marshy, soft ground area.

4.2 Regional Geology[1]

The subject site is located within the Ashley-Cooper River Sub-Basin of the lower Atlantic Coastal Plain Physiographic Province. Coastal Plain deposits generally consist of poorly- to well-consolidated sediments which include gravel, sands, silts, clays, limestones and other sedimentary rocks. Due to regional tectonics, Oligocene and older deposits of the Coastal Plain form a wedge shape block that increases in thickness from an edge along its northwestern border, the Fall Line, to a thickness on the order of 2500 ft below land surface near Charleston. Pre-Cretaceous basement metamorphic rocks are overlain, in ascending order, by the Middendorf, Black Creek and PeeDee Formations of the late Cretaceous period, and the Black Mingo, Santee Limestone and Cooper groups of the Tertiary Period.

In the shallow subsurface, there are a series of Holocene- to Quaternary-age coastal terraces that parallel the Atlantic Ocean and mark temporary high stands of the ocean during long term recession of the sea level over the last several million years. Up to nine distinct terraces have been mapped in the South Carolina coastal plain on the basis of surface elevation. The Charleston area is dominated topographically by the three youngest terrace systems, ranging from recent to late Pleistocene in age. Transgressions of the Atlantic Ocean during the post-Oligocene have extensively reworked each previously deposited unit, producing a mosaic of small remnants of Miocene through Pleistocene-age units situated more commonly side-by-side than in superposition.

[1] Stohl, Norman F. and Owens, James P. "Cretaceous Stratigraphy of the Carolina Coastal Plain" in *Geology of the Carolinas*. Horton, J. Wright Jr. and Zullo, Victor A. Editors. University of Tennessee Press, 1991.

S&ME performed an 800-ft deep geologic boring (B-11GEO) near I-26 to provide information on the geologic column at the site. Recovered samples and geophysical data from the upper 500 feet of the boring were evaluated by Dr. Michael Katuna formerly of the Dept. of Geological Sciences at the College of Charleston. The geologic sequence revealed in the upper 500 feet of Boring B-11GEO extends through most of the Tertiary column and 50 ft into the Rhems Formation, the uppermost formation of the Black Mingo Group. Further evaluation of the geophysical indicates the Rhems Formation continues to the termination depth of the boring (800 ft).

4.2.1 *Surface Sediments*

Each terrace is comprised of barrier beach, backbarrier, marine shelf, and river terrace facies. These units were formed during interglacial periods where sea levels were much greater than at present due to melting of polar icecaps. The northern and western portions of the alignment, near I-26, has been mapped as the outcrop of the beach barrier facies of the Princess Anne terrace (Colquhoun[2]) or "Q2" terrace (McCarten[3]) laid down approximately 100,000 years ago. Areas to the south and east, including the naval base, are mapped as the Silver Bluff or "Q1" terrace, laid down between 30,000 and 70,000 years ago. In addition, large areas mapped as "Q1" by McCarten also consist of freshwater stream and swamp deposits (Holocene to Pleistocene -Wisconsinan glacial age); peat and muck accumulating along imponded stream courses; and made ground filled in during development of the Charleston metropolitan area and port since 1700.

Recovered soft clays encountered at depths of in Boring B-11GEO were evaluated by Dr. Katuna as part of the Wando Formation laid down approximately 70-130,000 years ago. The Wando Formation typically underlies the Princess Anne terrace surface at altitudes below 20 feet. The unit is up to 35 feet thick. Samples contain disseminated organic material and terrestrial vertebrate fossils which indicate formation in estuarine to fluvial environments. The dynamic nature of scouring and redeposition occurring during formation of this zone is apparent from frequent variations in composition from clays to sands to silts to highly-layered combinations of all three within short horizontal distances in the borings. In places these materials are covered by modern swamp deposits up to 10 feet thick. West of I-26 are remnants of younger Pleistocene terrace sands and clays which for purpose of this report been included with the discussion of the Wando Formation. The erosional contact between these soils and the underlying Cooper Group soils is often defined by several inches of coarse grained sand, black phosphate pebbles, and worn and rounded bones and sharks' teeth.

4.2.2 *Cooper Group or Cooper Marl*

Surface sediments are unconformably underlain by the formations composing the Cooper Group or Cooper Marl. These Tertiary-age marine sediments were laid down over several periods ranging from 20 million to 30 million years ago. On the basis of the 800-ft deep boring we drilled (B-11GEO), the total thickness of the Cooper Group at the project site is approximately 240 ft. As defined by Boring B-11GEO, the Cooper Group consists of, in descending order, approximately 120 feet identified as the Ashley

[2] Colquhoun, D. J. "Terrace Sediment Complexes in Central South Carolina," Atlantic Coastal Plain Geological Association Field Conference Guidebook, Columbia, SC, 1965.
[3] McCarten, L., E. M. Lemon, Jr. and R. E. Weems, "Geology of the Area Between Charleston and Orangeburg, South Carolina," US Geological Survey Miscellaneous Investigations Series I-1472, 1984.

Formation (upper Oligocene) underlain by the Harleyville Formation (upper Eocene) also approximately 120 feet thick. An intermediate formation termed the Parkers Ferry Formation is considered to be absent at the location of Boring B-11GEO.

Local geologic mapping also describe thin erosional remnants of late-Oligocene to Miocene-age marl units termed the Chandler Bridge, Edisto, Marks Head or Goose Creek formations[4]. These sediments occur as erosional remnants of limited thickness and lateral extent on top of the Cooper Group. Similar in appearance to the Cooper Group, they are often inadvertently included as part of the Cooper Marl.

The different formations of the Cooper Group are associated with various depositional environments and were laid down at different times; however, for practical engineering purposes, all of the formations of the Cooper Group have been historically referred to as the Cooper Marl. Depth to marl within a given region often varies considerably, ranging from as shallow as 20 feet to as much as 120 feet or more below the surface, reflecting scouring of the upper surface of the marl and redeposition of new sediments in the scour channels over geologic time.

The Cooper Marl is described as a phosphatic limestone consisting of calcium carbonates (approximately 60-75%), quartz sand (app. 5-25%), clay (app. 10-30%), phosphatic sand and pebbles (app. 1-5%), and small amounts of glauconite, shell hash and mica. Its color ranges from pale green to yellowish-gray to olive brown, becoming lighter when dried. Geotechnically, the Cooper Marl typically classifies as a lightly- to moderately overconsolidated, high-plasticity, sandy silt or clay, but can also be classified as a silty sand.

4.2.3 *Santee Limestone*

Immediately underlying the Cooper Group is approximately 40 feet of fairly well consolidated, fine-grained clayey or cherty limestone termed the Cross Member of the Santee Limestone. The Cross Member extends between depths of 290 feet and 330 feet in Boring B-11GEO. The Cross Member of the Santee Limestone is a widespread unit in Dorchester, Berkeley, Charleston, and southern Orangeburg Counties. Conflicting biostratigraphic results have been reported; the Cross has been assigned both a middle Eocene age and a late Eocene age, laid down approximately 35-40 million years ago. An underlying formation termed the Moultrie Member is either absent or not identifiable.

4.2.4 *Williamsburg Limestone*

The Williamsburg Limestone consists of the Chicora Member from 330 feet to 395 feet and the Lower Bridge Member from 395 feet to 450 feet. The unit is relatively heterogeneous in composition. The Chicora Member consists of approximately 20 feet of gray, shelly limestone underlain by about 45 feet of light gray calcareous sandstone. The underlying Lower Bridge Member is a fossiliferous, sandy glauconic mudstone that is sometimes correlated to the underlying Rhems Formation. Both formations are Upper Paleocene in age laid down approximately 55 million years ago.

[4] Weems, R. E., and Earl M. Lemon, Jr., "Geology of the Cainhoy, Charleston, Ft. Moultrie, and North Charleston Quadrangles, Charleston and Berkeley Counties, South Carolina," US Geological Survey Miscellaneous Investigations Series I-1935, 1993.

4.2.5 *Rhems Formation – Black Mingo Group*

The Rhems Formation of the Black Mingo Group consists of gray silty clays, muddy sands, mudstones, and minor calcite-cemented, shelly sands of marine origin. This formation was identified between depths of 450 and 800 feet in Boring B-11GEO, but may likely extend much deeper depending on interpretation of geophysical data. The Rhems Formation is is apparently the product of rapid sediment accumulation during a short period of time in the early Paleocene approximately 60-65 million years ago.

4.3 Stratigraphy

Recovered samples and field boring logs were reviewed in the laboratory by the geotechnical engineer. Finished SPT Boring Logs, CPT and DMT Logs and other field data are assembled in Appendix II. The borings and soundings generally encountered nine soil units and general characteristics if the units are summarized in Table 4-1:

- Unit 1A – Artificial Fill
- Unit 1B – Holocene Marsh Deposits East of Shipyard Creek
- Unit 1C – Holocene Marsh Deposits West of I-26 Alignment
- Unit 2A - Recent to Pleistocene "Barrier" Sands
- Unit 2B –Fossiliferous Shell Sand and Clay
- Unit 2C – Pleistocene Clays and Silts
- Unit 3 – Pleistocene Lower Sands and Clays
- Unit 4 - Undifferentiated Miocene or Younger Marls
- Unit 5 – Oligocene Ashley Formation (Cooper Group) Marl

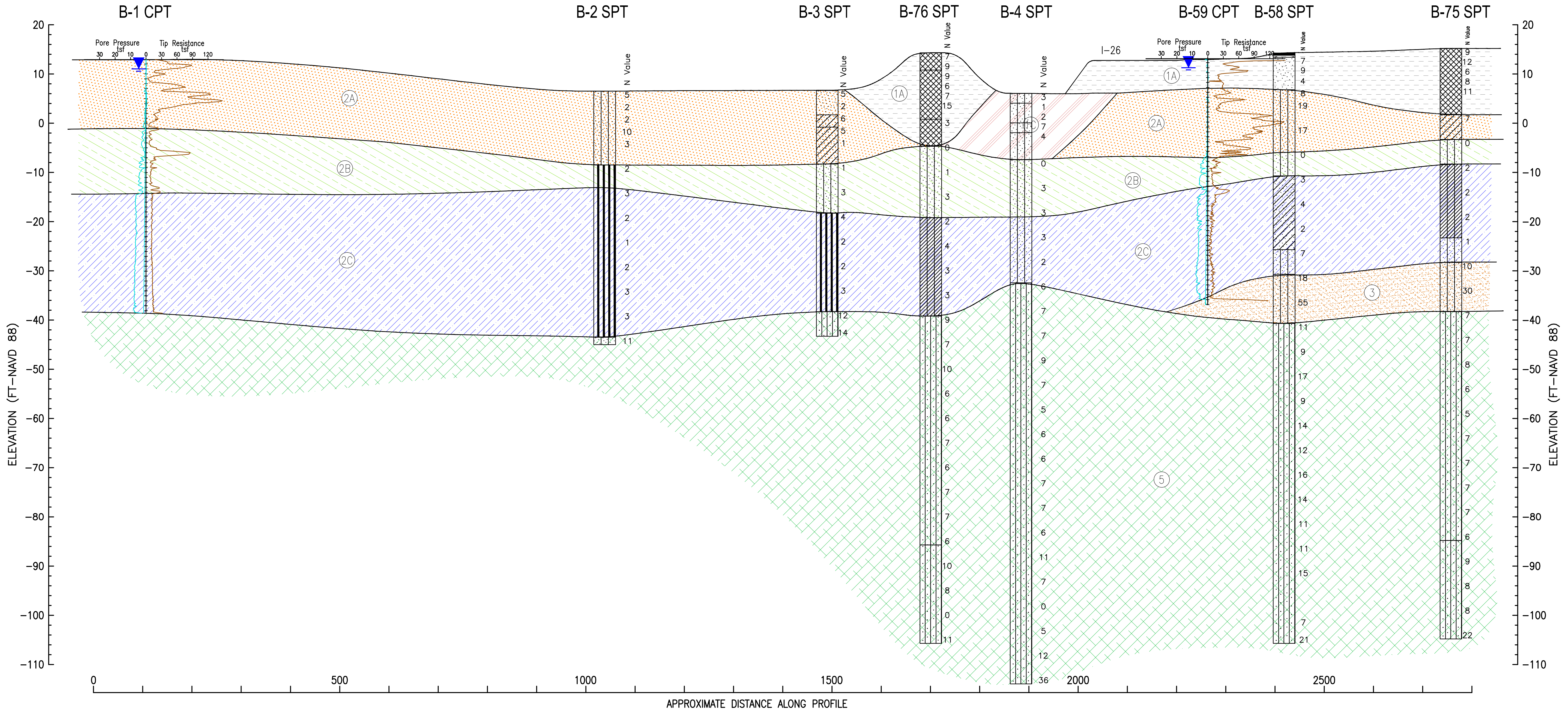
Table 4-1. Summary of Soil Units

Geologic Strata	Unit	Soil Description	Primary	Minor	SPT N OR CPT Q_T	Moisture	Dry Strength	Remolded Behavior	Remarks
Fill	1A	ARTIFICIAL FILL - Placed during previous site construction -typically no documentation of compaction or engineering control is available..	Varies	Varies	Varies	Varies	Low to Moderate	Typically non-cohesive	In areas fills are believed to contain foreign objects and materials such as stone, gravel, slab and other debris.
Holocene Deposits	1B	HOLOCENE MARSH DEPOSITS – Located east of Shipyard Creek within the naval base. Max. depths 60 feet. Very soft, normally consolidated to underconsolidated silts.	MH ML	Lenses of SM and shell	WOR to WOH	Saturated	None to Low	Mucky	Low strength, highly compressible, impervious. Surcharging necessary to consolidate materials before construction. Secondary compression must be considered.
	1C	HOLOCENE MARSH DEPOSITS – Generally west of I-26 and within gore area of interchange. Max. depths of about 10 feet.	MH ML	CL CH	WOR to WOH	Saturated; organic	None to Low	Mucky	Highly compressible, impervious. May have been partially undercut during earlier construction in some areas.
Pleistocene Coastal Plain Terraces	2A	RECENT- PLEISTOCENE “BARRIER” SANDS - Sand barrier facies of the Wando Fm. & isolated areas of Silver Bluff Terrace.	SM, SP	ML CL	N >10 bpf Qc>30 tsf	Dry to wet	None	Cohesionless to sl cohesive	Mostly clean sands with an elastic modulus of 300 to 600 ksf. Soils underwent widespread liquefaction in 1886 Charleston earthquake.
	2B	FOSSILIFEROUS SHELL SAND AND CLAY – thin, highly variable tidal or river deposited sediments	SM ML	MH SP	N ranges from 0 to 3 bpf	Typically Saturated	None to Low	Cohesionless to weakly cohesive	Relatively highly layered, rapidly draining with OCR 2.5 to 4. Some samples contain organic material and shell.

Pleistocene Coastal Plain Terraces (cont.)	2C	PLEISTOCENE CLAYS AND SILTS – soft, fine grained soils of Wando Fm or younger but in place for sufficient time to have become slightly preconsolidated.	MH ML	CH	1-3	Saturated	Low	Slightly to moderately cohesive	Preconsolidated to 2.5 to 4 times present overburden stress. Typically can support light surface loads, moderately compressible to highly compressible under embankments.
	3	PLEISTOCENE LOWER SANDS AND CLAYS – Lower clay-sand to sand facies of Wando Formation, forms scouring surface on top of underlying marls. Color is dark gray, gray to gray-green	SM SC	CL CH	N ranges from 10 to 50 bpf.	Saturated	None to Low	Slightly to moderately cohesive	Contact with underlying marls consists of a layer of coarse sand, containing shell, phosphate nodules, fossilized bones and teeth.
Marl	4	UNDIFFERENTIATED MIOCENE OR YOUNGER MARLS - gray or gray-green, fine grained sands with little to some clayey fines.	SC	MH	Qc 10-15 tsf	Saturated	Medium	Medium	Visual appearance similar to Cooper, but only preconsolidated to 8-14 ksf and are more compressible in the recompression range. Reach substantial thickness between King St. and Spruill Ave.
	5	COOPER MARL – Contain thin beds of sands and broken shell. Upper contact of bed may be shell limestone caprock with considerable phosphate, quartz pebbles and wood fragments. Typically reactive to HCl.	ML SM	SC MH	N ranges from 5 to 50 bpf	Dry to Moist	Tough, hard,	Cohesive Indurated,	Shear strength commonly exceeds 2000 psf. Soils are essentially impervious, heavily indurated, and preconsolidated to 20 ksf.

S&ME's interpreted subsurface stratification is indicated in the subsurface profiles presented as Figure 4-1 through Figure 4-12.

The depth and thickness of the subsurface strata indicated on the profiles and the SPT Boring Logs and on other field records were generalized from and interpolated between test locations. The transition between materials will be more or less gradual than indicated and may be abrupt. Information on actual subsurface conditions exists only at the specific boring locations and is relevant to the time the exploration was performed. The stratification lines were used for illustrative purposes and should not be used as the basis for design or construction cost estimates.



LEGEND

1A	ARTIFICIAL FILL
1B	HOLOCENE MARSH DEPOSITS EAST OF SHIPYARD CREEK
1C	HOLOCENE MARSH DEPOSITS WEST OF I–26 ALIGNMENT
2A	RECENT TO PLEISTOCENE "BARRIER" SANDS
2B	PLEISTOCENE FOSSILIFEROUS SHELL SAND AND SILT
2C	PLEISTOCENE CLAYS AND SILTS
3	PLEISTOCENE LOWER SANDS
4	UNDIFFERENTIATED MIOCENE OR YOUNGER MARLS
5	OLIGOCENE ASHLEY FORMATION (COOPER GROUP) MARL

Note: This generalized subsurface profile is for illustrative purposes only and is representative of subsurface conditions encountered at each individual test location. Variations in subsurface conditions will occur between test locations.

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RAMP G GENERALIZED SUBSURFACE PROFILE
BORINGS B-1 TO B-75
PORT ACCESS ROAD
NORTH CHARLESTON, SOUTH CAROLINA

SCALE: AS SHOWN	DRAWN BY: LAJ	APPROVED BY: DWH
JOB NO. 1131–08–554	DATE: 4–07–09	FIGURE NO. 4–1

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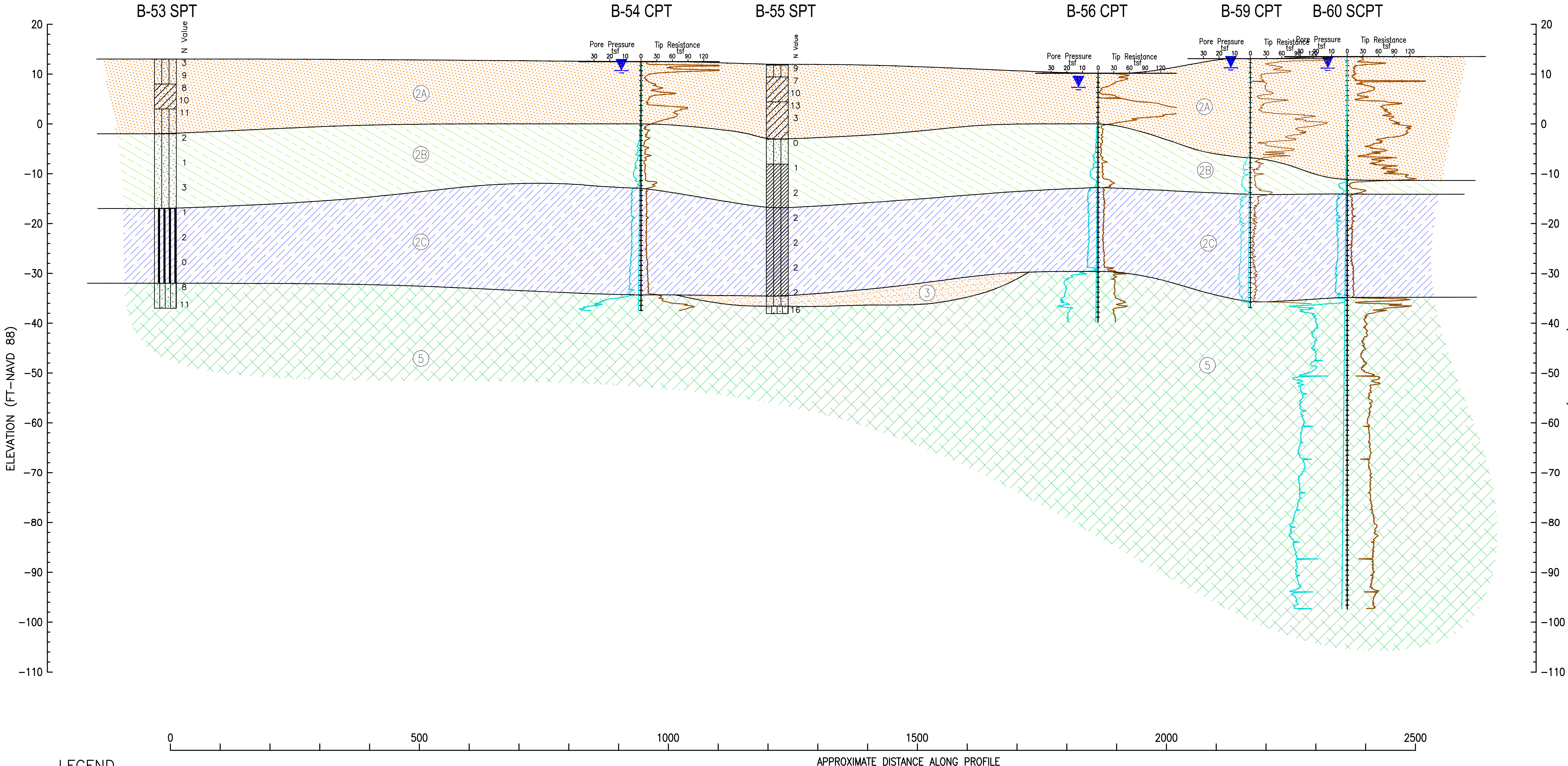

LEGEND

1A	ARTIFICIAL FILL
1B	HOLOCENE MARSH DEPOSITS EAST OF SHIPYARD CREEK
1C	HOLOCENE MARSH DEPOSITS WEST OF I–26 ALIGNMENT
2A	RECENT TO PLEISTOCENE "BARRIER" SANDS
2B	PLEISTOCENE FOSSILIFEROUS SHELL SAND AND SILT
2C	PLEISTOCENE CLAYS AND SILTS
3	PLEISTOCENE LOWER SANDS
4	UNDIFFERENTIATED MIOCENE OR YOUNGER MARLS
5	OLIGOCENE ASHLEY FORMATION (COOPER GROUP) MARL

Note: This generalized subsurface profile is for illustrative purposes only and is representative of subsurface conditions encountered at each individual test location. Variations in subsurface conditions will occur between test locations.

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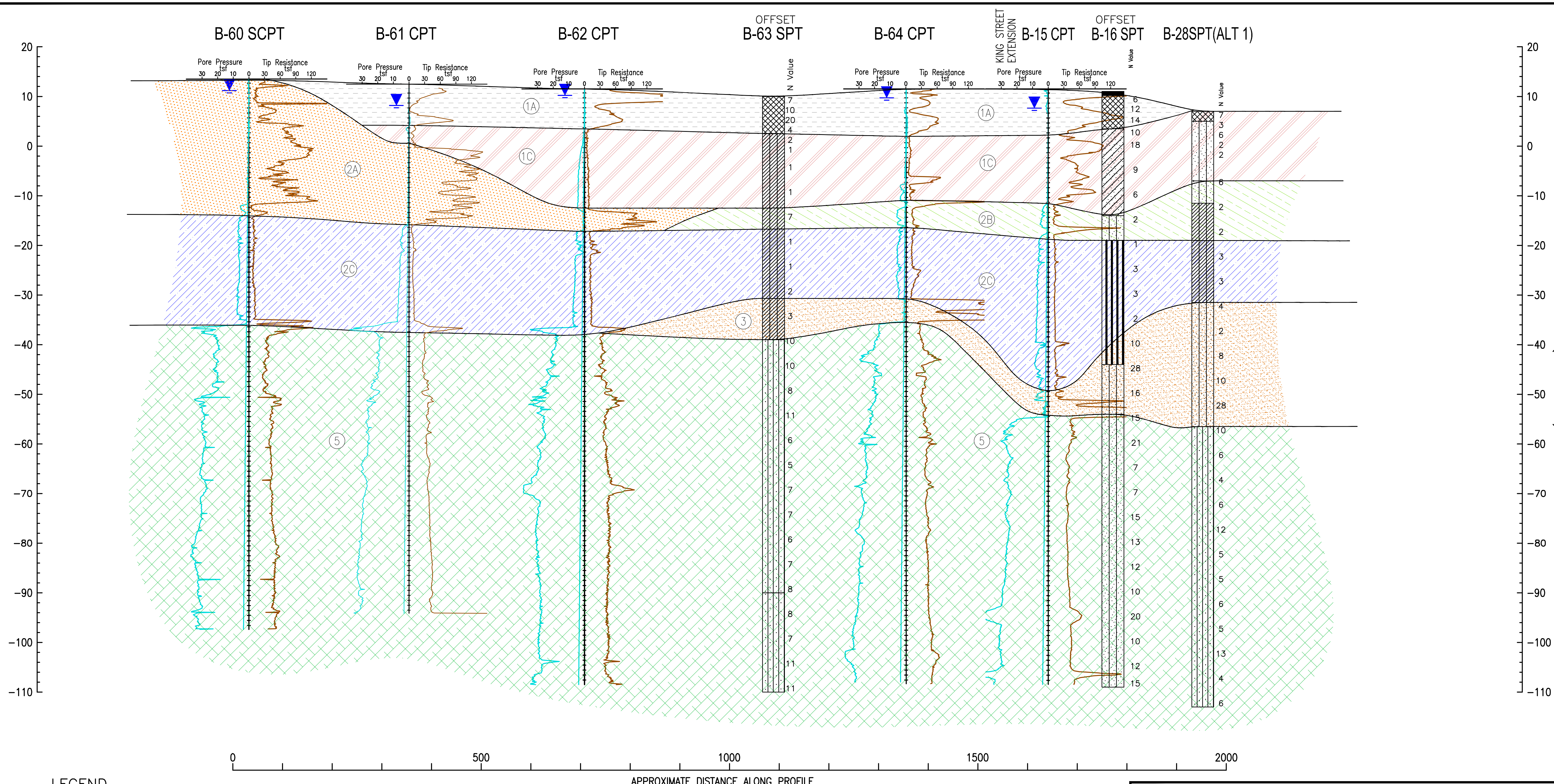
RAMP D GENERALIZED SUBSURFACE PROFILE
BORINGS B-53 TO B-60
PORT ACCESS ROAD
NORTH CHARLESTON, SOUTH CAROLINA

SCALE: AS SHOWN	DRAWN BY: LAJ	APPROVED BY: DWH
JOB NO. 1131–08–554	DATE: 4–07–09	FIGURE NO. 4–2



LEGEND

1A	ARTIFICIAL FILL	2C	PLEISTOCENE CLAYS AND SILTS
1B	HOLOCENE MARSH DEPOSITS EAST OF SHIPYARD CREEK	3	PLEISTOCENE LOWER SANDS
1C	HOLOCENE MARSH DEPOSITS WEST OF I–26 ALIGNMENT	4	UNDIFFERENTIATED MIOCENE OR YOUNGER MARLS
2A	RECENT TO PLEISTOCENE "BARRIER" SANDS	5	OLIGOCENE ASHLEY FORMATION (COOPER GROUP) MARL
2B	PLEISTOCENE FOSSILIFEROUS SHELL SAND AND SILT		

Note: This generalized subsurface profile is for illustrative purposes only and is representative of subsurface conditions encountered at each individual test location. Variations in subsurface conditions will occur between test locations.

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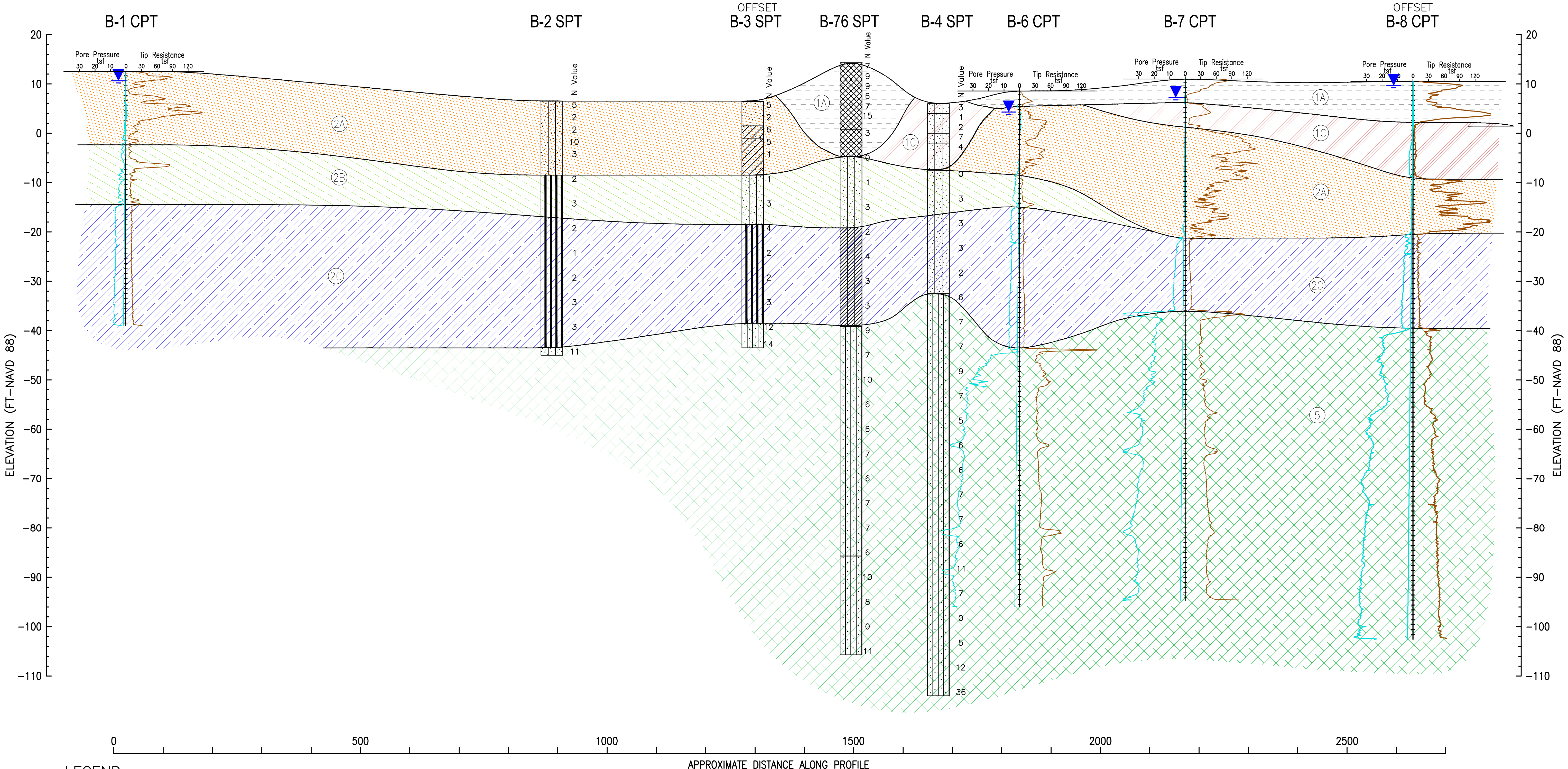
RAMP D GENERALIZED SUBSURFACE PROFILE
BORINGS B-60 TO B-28 (ALT 1)
PORT ACCESS ROAD
NORTH CHARLESTON, SOUTH CAROLINA

SCALE:	DRAWN BY:	APPROVED BY:
AS SHOWN	LAJ	DWH
JOB NO.: 1131–08–554	DATE: 4–07–09	FIGURE NO.: 4–3



LEGEND

- 1A ARTIFICIAL FILL
- 1B HOLOCENE MARSH DEPOSITS EAST OF SHIPYARD CREEK
- 1C HOLOCENE MARSH DEPOSITS WEST OF I–26 ALIGNMENT
- 2A RECENT TO PLEISTOCENE "BARRIER" SANDS
- 2B PLEISTOCENE FOSSILIFEROUS SHELL SAND AND SILT
- 2C PLEISTOCENE CLAYS AND SILTS
- 3 PLEISTOCENE LOWER SANDS
- 4 UNDIFFERENTIATED MIOCENE OR YOUNGER MARLS
- 5 OLIGOCENE ASHLEY FORMATION (COOPER GROUP) MARL

Note: This generalized subsurface profile is for illustrative purposes only and is representative of subsurface conditions encountered at each individual test location. Variations in subsurface conditions will occur between test locations.

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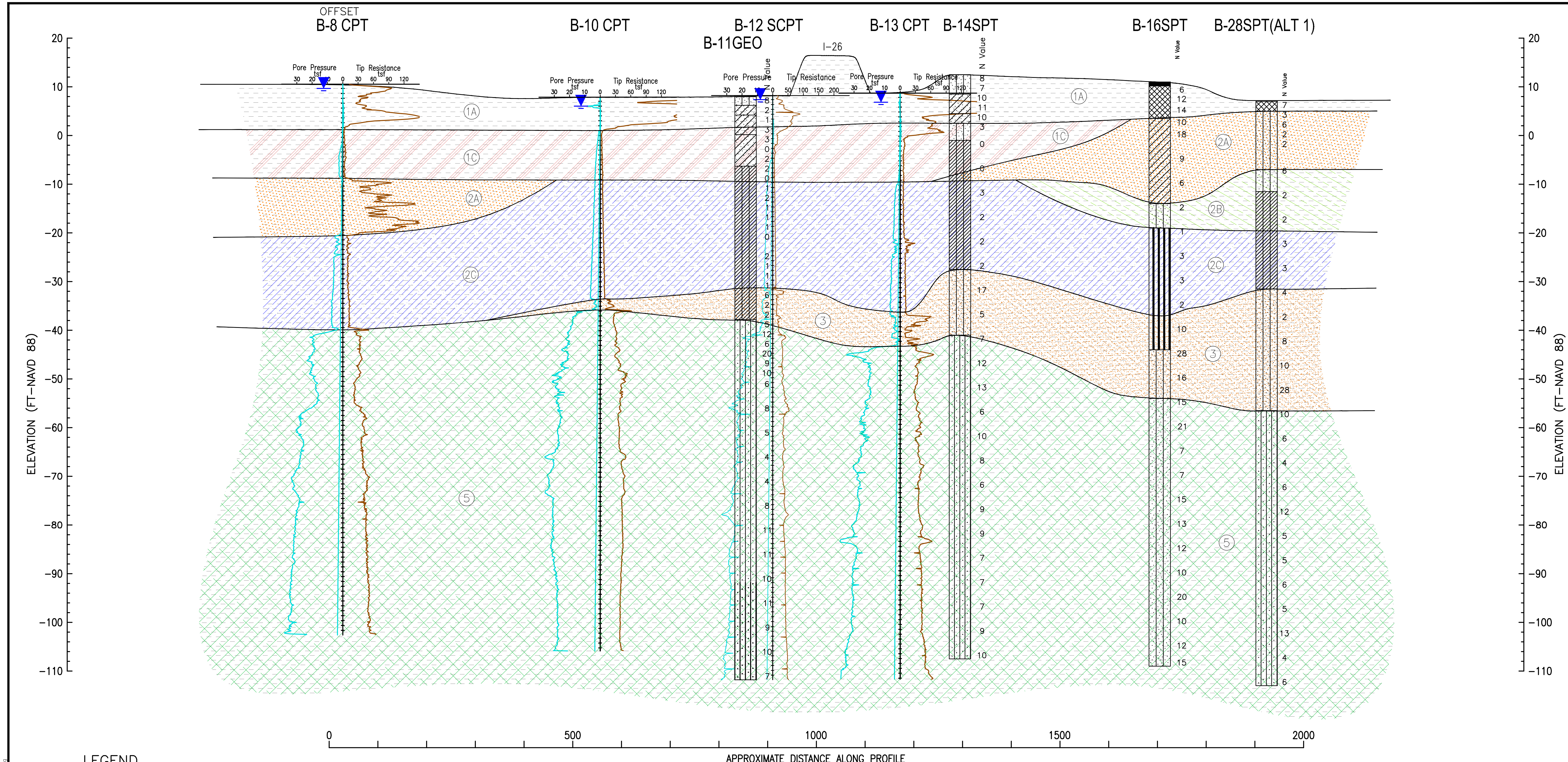
RAMP A GENERALIZED SUBSURFACE PROFILE
BORINGS B-1 TO B-8
PORT ACCESS ROAD
NORTH CHARLESTON, SOUTH CAROLINA

SCALE: AS SHOWN	DRAWN BY: LAJ	APPROVED BY: DWH
JOB NO. 1131–08–554	DATE: 4–07–09	FIGURE NO. 4–4



LEGEND

1A	ARTIFICIAL FILL
1B	HOLOCENE MARSH DEPOSITS EAST OF SHIPYARD CREEK
1C	HOLOCENE MARSH DEPOSITS WEST OF I–26 ALIGNMENT
2A	RECENT TO PLEISTOCENE "BARRIER" SANDS
2B	PLEISTOCENE FOSSILIFEROUS SHELL SAND AND SILT
2C	PLEISTOCENE CLAYS AND SILTS
3	PLEISTOCENE LOWER SANDS
4	UNDIFFERENTIATED MIOCENE OR YOUNGER MARLS
5	OLIGOCENE ASHLEY FORMATION (COOPER GROUP) MARL

Note: This generalized subsurface profile is for illustrative purposes only and is representative of subsurface conditions encountered at each individual test location. Variations in subsurface conditions will occur between test locations.

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RAMP A GENERALIZED SUBSURFACE PROFILE
BORINGS B-8 TO B-28 (ALT 1)
PORT ACCESS ROAD
NORTH CHARLESTON, SOUTH CAROLINA

SCALE: AS SHOWN	DRAWN BY: LAJ	APPROVED BY: DWH
JOB NO. 1131–08–554	DATE: 4–07–09	FIGURE NO. 4–5

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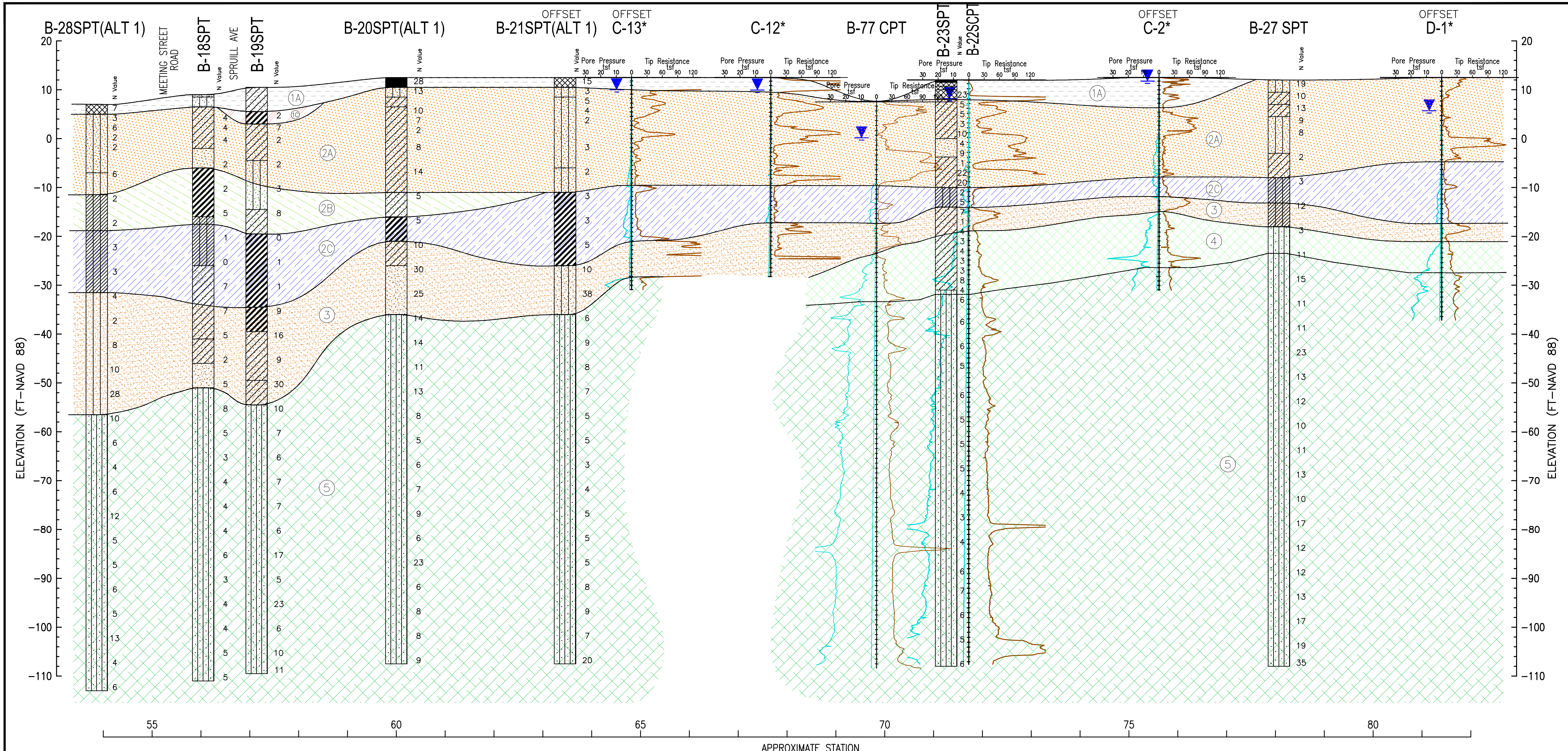

LEGEND

Symbol	Description
1A	ARTIFICIAL FILL
1B	HOLOCENE MARSH DEPOSITS EAST OF SHIPYARD CREEK
1C	HOLOCENE MARSH DEPOSITS WEST OF I-26 ALIGNMENT
2A	RECENT TO PLEISTOCENE "BARRIER" SANDS
2B	PLEISTOCENE FOSSILIFEROUS SHELL SAND AND SILT
2C	PLEISTOCENE CLAYS AND SILTS
3	PLEISTOCENE LOWER SANDS
4	UNDIFFERENTIATED MIOCENE OR YOUNGER MARLS
5	OLIGOCENE ASHLEY FORMATION (COOPER GROUP) MARL

Note: This generalized subsurface profile is for illustrative purposes only and is representative of subsurface conditions encountered at each individual test location. Variations in subsurface conditions will occur between test locations.

* ASSUMED ELEVATION 12.5 FEET

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MAIN LINE 1D GENERALIZED SUBSURFACE PROFILE
BORINGS B-28 (ALT 1) TO D-1
PORT ACCESS ROAD
NORTH CHARLESTON, SOUTH CAROLINA

SCALE: AS SHOWN	DRAWN BY: LAJ	APPROVED BY: DWH
JOB NO. 1131-08-554	DATE: 4-07-09	FIGURE NO. 4-6

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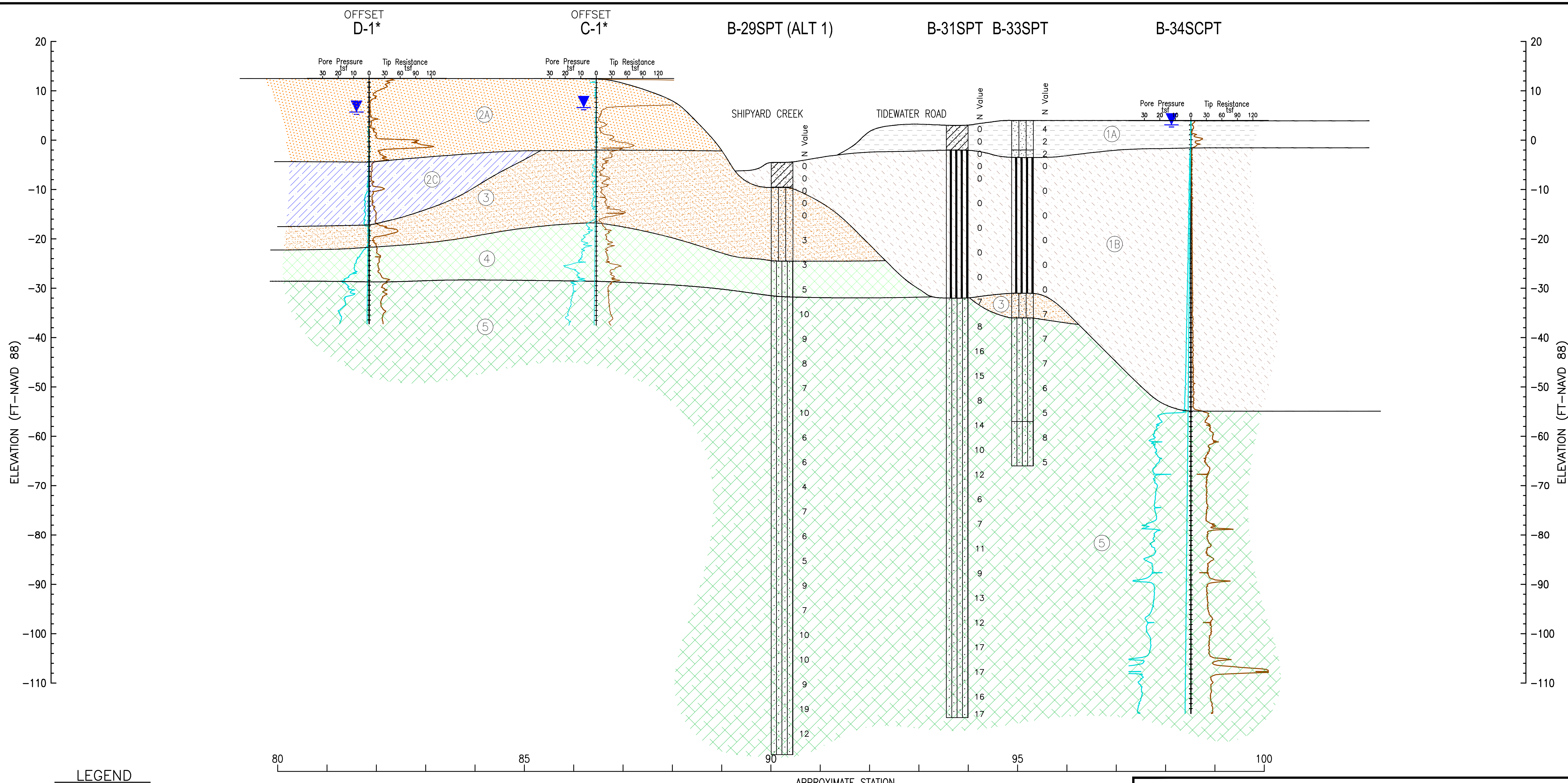

LEGEND

(1A)	ARTIFICIAL FILL
(1B)	HOLOCENE MARSH DEPOSITS EAST OF SHIPYARD CREEK
(1C)	HOLOCENE MARSH DEPOSITS WEST OF I-26 ALIGNMENT
(2A)	RECENT TO PLEISTOCENE "BARRIER" SANDS
(2B)	PLEISTOCENE FOSSILIFEROUS SHELL SAND AND SILT
(2C)	PLEISTOCENE CLAYS AND SILTS
(3)	PLEISTOCENE LOWER SANDS
(4)	UNDIFFERENTIATED MIOCENE OR YOUNGER MARLS
(5)	OLIGOCENE ASHLEY FORMATION (COOPER GROUP) MARL

* ASSUMED ELEVATION 12.5 FEET

Note: This generalized subsurface profile is for illustrative purposes only and is representative of subsurface conditions encountered at each individual test location. Variations in subsurface conditions will occur between test locations.

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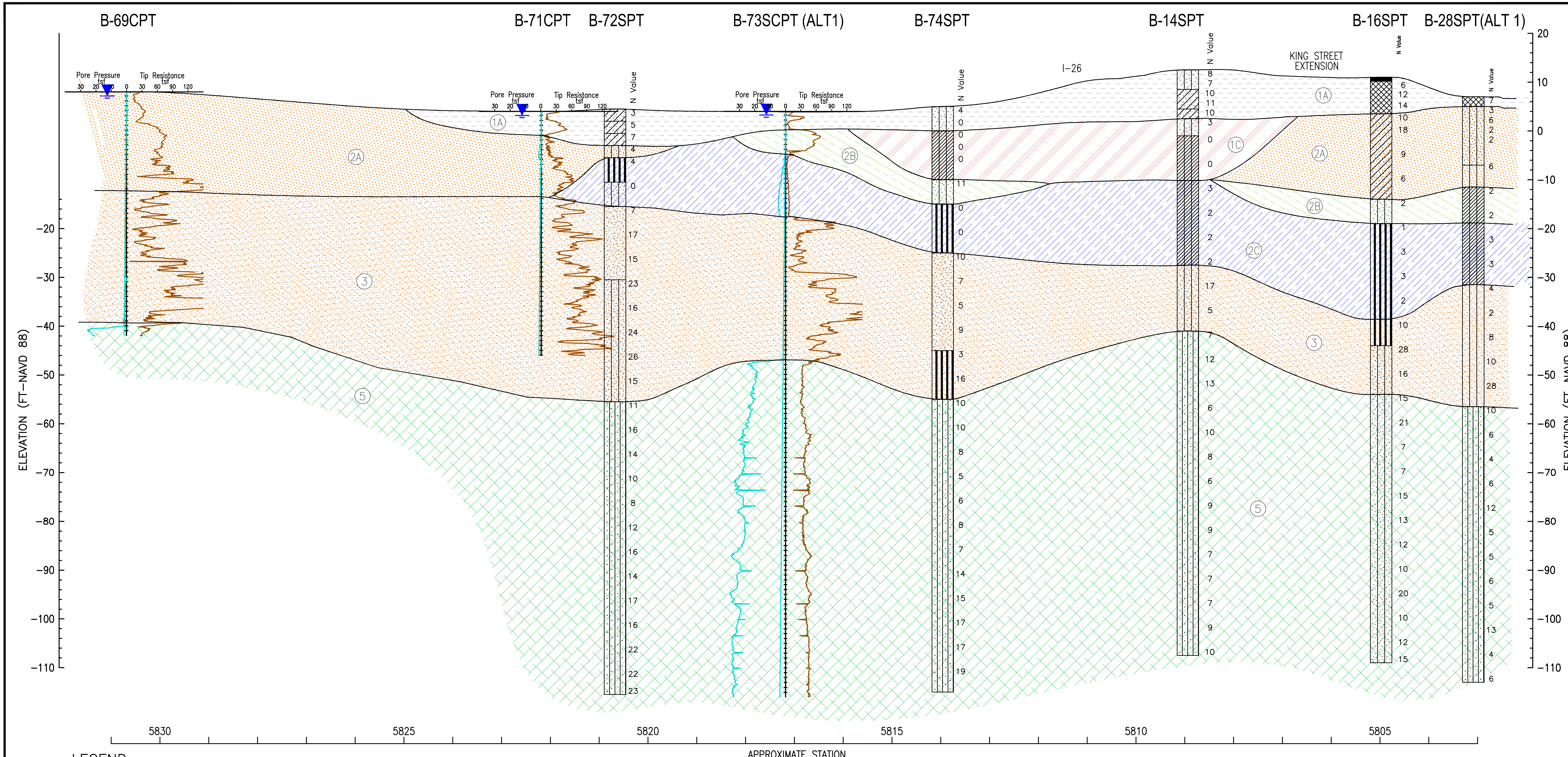
MAIN LINE 1D GENERALIZED SUBSURFACE PROFILE
BORINGS D-1 TO B-34
PORT ACCESS ROAD
NORTH CHARLESTON, SOUTH CAROLINA

SCALE: AS SHOWN	DRAWN BY: LAJ	APPROVED BY: DWH
JOB NO. 1131-08-554	DATE: 4-07-09	FIGURE NO. 4-7



LEGEND

1A	ARTIFICIAL FILL
1B	HOLOCENE MARSH DEPOSITS EAST OF SHIPYARD CREEK
1C	HOLOCENE MARSH DEPOSITS WEST OF I-26 ALIGNMENT
2A	RECENT TO PLEISTOCENE "BARRIER" SANDS
2B	PLEISTOCENE FOSSILIFEROUS SHELL SAND AND SILT
2C	PLEISTOCENE CLAYS AND SILTS
3	PLEISTOCENE LOWER SANDS
4	UNDIFFERENTIATED MIOCENE OR YOUNGER MARLS
5	OLIGOCENE ASHLEY FORMATION (COOPER GROUP) MARL

Note: This generalized subsurface profile is for illustrative purposes only and is representative of subsurface conditions encountered at each individual test location. Variations in subsurface conditions will occur between test locations.

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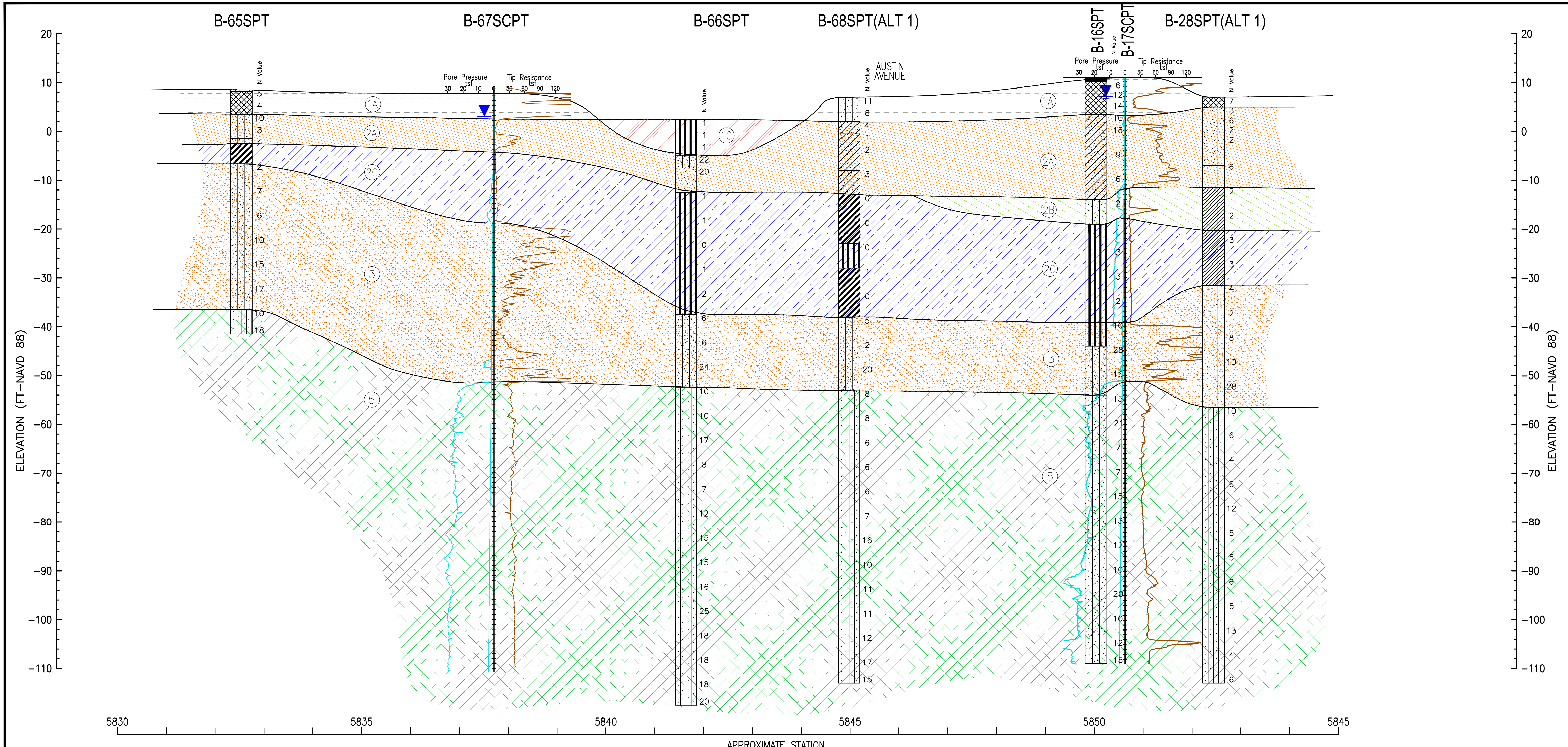
RAMP B GENERALIZED SUBSURFACE PROFILE
BORINGS B-28 (ALT 1) TO B-69
PORT ACCESS ROAD
NORTH CHARLESTON, SOUTH CAROLINA

SCALE: AS SHOWN	DRAWN BY: LAJ	APPROVED BY: DWH
JOB NO. 1131-08-554	DATE: 4-07-09	FIGURE NO. 4-8



LEGEND

- 1A ARTIFICIAL FILL
- 1B HOLOCENE MARSH DEPOSITS EAST OF SHIPYARD CREEK
- 1C HOLOCENE MARSH DEPOSITS WEST OF I–26 ALIGNMENT
- 2A RECENT TO PLEISTOCENE "BARRIER" SANDS
- 2B PLEISTOCENE FOSSILIFEROUS SHELL SAND AND SILT
- 2C PLEISTOCENE CLAYS AND SILTS
- 3 PLEISTOCENE LOWER SANDS
- 4 UNDIFFERENTIATED MIOCENE OR YOUNGER MARLS
- 5 OLIGOCENE ASHLEY FORMATION (COOPER GROUP) MARL

Note: This generalized subsurface profile is for illustrative purposes only and is representative of subsurface conditions encountered at each individual test location. Variations in subsurface conditions will occur between test locations.

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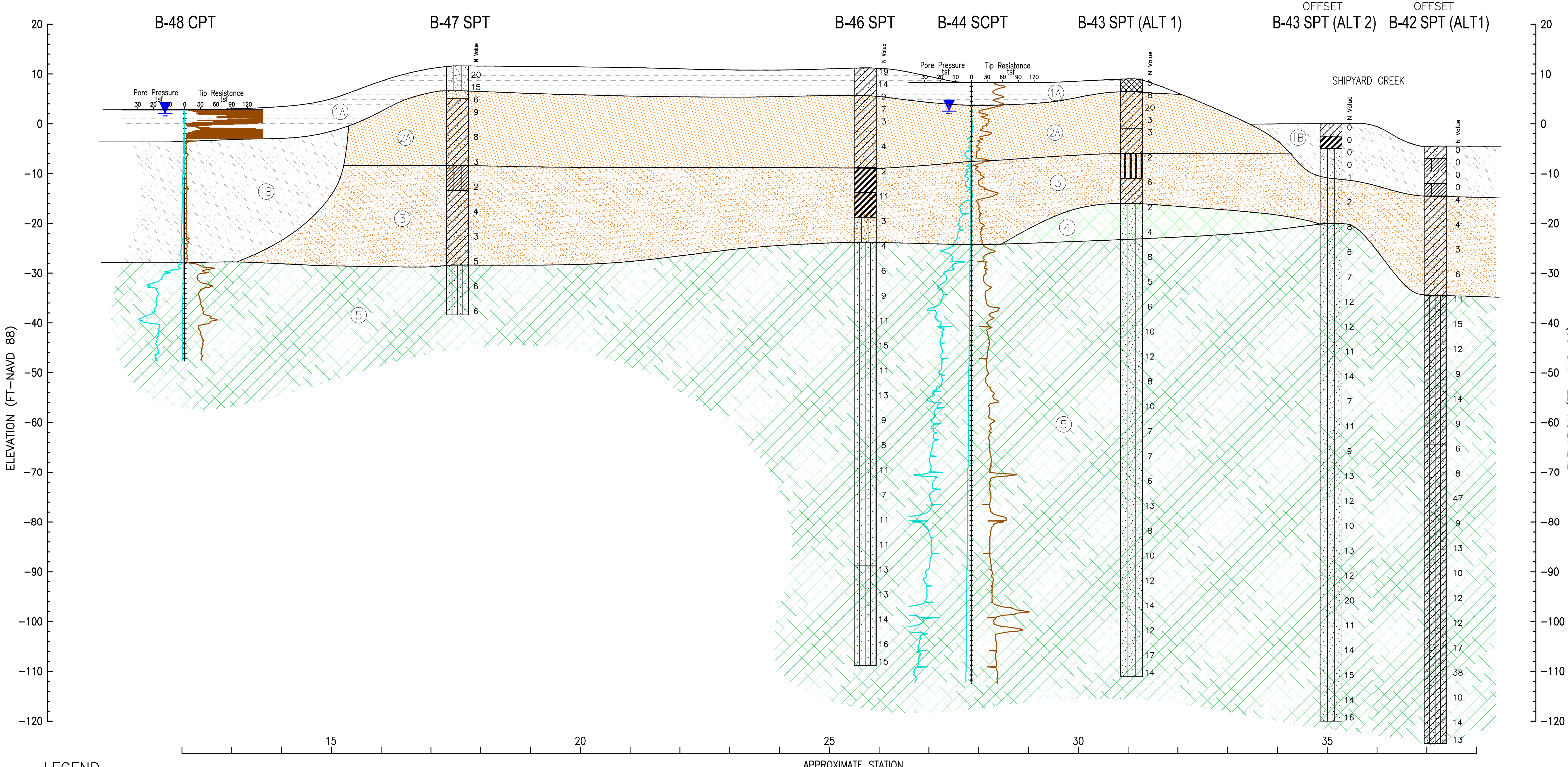
RAMP C GENERALIZED SUBSURFACE PROFILE
BORINGS B-28 (ALT 1) TO B-65
PORT ACCESS ROAD
NORTH CHARLESTON, SOUTH CAROLINA

SCALE: AS SHOWN	DRAWN BY: LAJ	APPROVED BY: DWH
JOB NO. 1131–08–554	DATE: 4–07–09	FIGURE NO. 4–9



LEGEND

1A	ARTIFICIAL FILL
1B	HOLOCENE MARSH DEPOSITS EAST OF SHIPYARD CREEK
1C	HOLOCENE MARSH DEPOSITS WEST OF I–26 ALIGNMENT
2A	RECENT TO PLEISTOCENE "BARRIER" SANDS
2B	PLEISTOCENE FOSSILIFEROUS SHELL SAND AND SILT
2C	PLEISTOCENE CLAYS AND SILTS
3	PLEISTOCENE LOWER SANDS
4	UNDIFFERENTIATED MIOCENE OR YOUNGER MARLS
5	OLIGOCENE ASHLEY FORMATION (COOPER GROUP) MARL

Note: This generalized subsurface profile is for illustrative purposes only and is representative of subsurface conditions encountered at each individual test location. Variations in subsurface conditions will occur between test locations.

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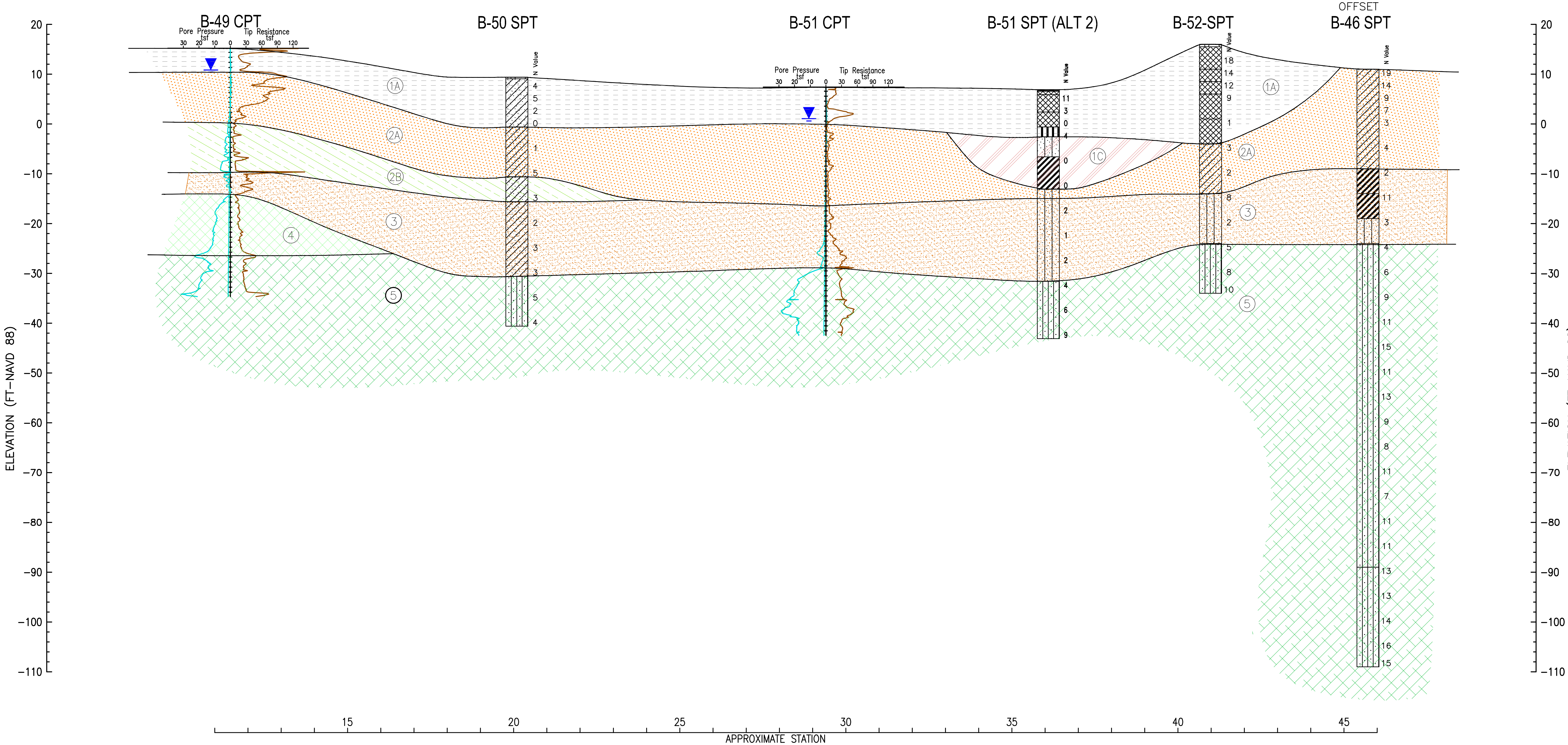
LOCAL ACCESS ROAD GENERALIZED SUBSURFACE PROFILE
BORINGS B-43 (ALT 2) TO B-48
PORT ACCESS ROAD
NORTH CHARLESTON, SOUTH CAROLINA

SCALE: AS SHOWN	DRAWN BY: LAJ	APPROVED BY: DWH
JOB NO. 1131–08–554	DATE: 4–07–09	FIGURE NO. 4–10



LEGEND

1A	ARTIFICIAL FILL
1B	HOLOCENE MARSH DEPOSITS EAST OF SHIPYARD CREEK
1C	HOLOCENE MARSH DEPOSITS WEST OF I–26 ALIGNMENT
2A	RECENT TO PLEISTOCENE "BARRIER" SANDS
2B	PLEISTOCENE FOSSILIFEROUS SHELL SAND AND SILT
2C	PLEISTOCENE CLAYS AND SILTS
3	PLEISTOCENE LOWER SANDS
4	UNDIFFERENTIATED MIOCENE OR YOUNGER MARLS
5	OLIGOCENE ASHLEY FORMATION (COOPER GROUP) MARL

Note: This generalized subsurface profile is for illustrative purposes only and is representative of subsurface conditions encountered at each individual test location. Variations in subsurface conditions will occur between test locations.

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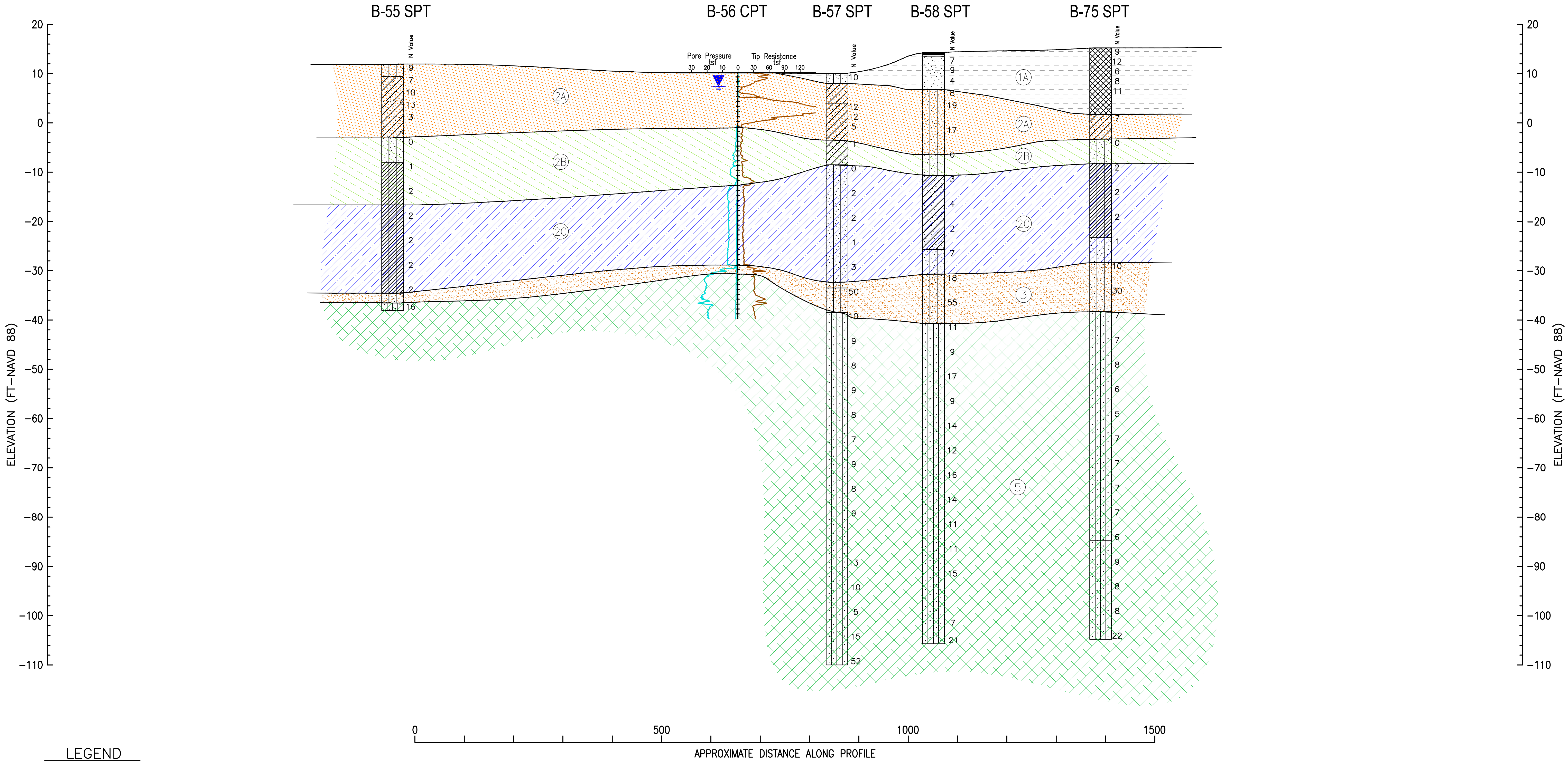
STROMBOLI AVE. GENERALIZED SUBSURFACE PROFILE
BORINGS B-51 TO B-49
PORT ACCESS ROAD
NORTH CHARLESTON, SOUTH CAROLINA

SCALE: AS SHOWN	DRAWN BY: LAJ	APPROVED BY: DWH
JOB NO. 1131–08–554	DATE: 4–07–09	FIGURE NO. 4–11



LEGEND

1A	ARTIFICIAL FILL
1B	HOLOCENE MARSH DEPOSITS EAST OF SHIPYARD CREEK
1C	HOLOCENE MARSH DEPOSITS WEST OF I–26 ALIGNMENT
2A	RECENT TO PLEISTOCENE "BARRIER" SANDS
2B	PLEISTOCENE FOSSILIFEROUS SHELL SAND AND SILT
2C	PLEISTOCENE CLAYS AND SILTS
3	PLEISTOCENE LOWER SANDS
4	UNDIFFERENTIATED MIOCENE OR YOUNGER MARLS
5	OLIGOCENE ASHLEY FORMATION (COOPER GROUP) MARL

Note: This generalized subsurface profile is for illustrative purposes only and is representative of subsurface conditions encountered at each individual test location. Variations in subsurface conditions will occur between test locations.

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RAMP H GENERALIZED SUBSURFACE PROFILE
BORINGS B-55 TO B-75
PORT ACCESS ROAD
NORTH CHARLESTON, SOUTH CAROLINA

SCALE: AS SHOWN	DRAWN BY: LAJ	APPROVED BY: DWH
JOB NO. 1131–08–554	DATE: 4–07–09	FIGURE NO. 4–12

4.3.1 *Unit 1A: Artificial Fills and Embankments*

Soils designated as "fill" include large areas of built up lands east of Shipyard Creek within the naval base. Large areas of filled land are also indicated on local geologic maps west of the I-26 alignment extending to the Ashley River. These areas were progressively filled in at various times during historical development of the Charleston metropolitan area.

Borings within the naval base and at other locations along the alignment penetrated soils evaluated as having been dumped or spoiled onto the original ground surface. The terms "dumped" or "spoiled" are used in this context to describe soils which were likely placed without apparent engineering control of either their composition or moisture content, or that appear to have been placed without compactive effort being applied or pushed out as a mass rather than placed systematically in thin lifts. Along the I-26 alignment fills were likely placed with engineering control and penetration observed in borings and soundings reflect substantially greater resistances. Boring access was limited in some areas, notably along I-26, sandy fill encountered in the borings and soundings likely do not extend very far beyond the right-of-way.

The thickness of apparent fill soils ranged from 3 ft to 5 ft east of Shipyard Creek and up to 8 ft in the vicinity of the I-26 interchange. Thickness of these materials elsewhere on the site or at locations intermediate between the borings likely varies from thicknesses noted at boring locations. In these locations the fills appeared to directly overlie soft cohesive soils of Unit 2 and natural sands do not appear to be present.

Most recovered samples evaluated as possibly fill consisted of relatively cohesionless to weakly cohesive sandy clays or clayey sands. Small discrete samples obtained in several of the borings appeared to contain some deleterious debris or organic material, but we could not make a definite judgment as to the composition of this material without exposing a larger area. The fill mass may include large organics, buried debris, or voids which could not be observed during our exploration or occur in areas not explored.

These soils will form the immediate subgrade for pavements or new embankments over much of the site. Most area fills include a relatively thin layer of sand, possibly including organics, rubble or debris pushed out over marshes or swamp. Over most of these areas fill thickness ranges from 3 to 8 feet, but fills appear to thin and become absent in the central portion of the site, between I-26 and Kings Street. Locally fill depths may be greater in thickness where material has been pushed or dumped into waterways or stream channels.

Filled areas also include built up roadway embankments or subgrades and overpasses along major highway and railroad arteries. Fills in these areas may include loose sands pushed or shoved over the original ground surface, possibly over soft surface deposits or marsh. In many areas fills exhibit relatively high apparent compaction immediately below pavements. These fills appear to consist almost entirely of sands. Maximum thickness in these areas may locally exceed 15 ft.

Recovered samples were narrowly graded fine/medium grained sands with trace to no discernable fines. Predominant classification by the Unified Soil Classification was either SM or SP based on laboratory tests and visual-manual classification procedure. Soil behavior based on CPT point resistance and friction ratio was typical of sands containing little to some silty fines. In most cases CPT penetration data imply a variable, stratified deposit consisting of moderately thick (6 in. to 12 in.) layers of alternating medium dense sands with either loose sands or soft clays or silts. Samples or cuttings recovered in the fills adjacent to Shipyard Creek contained foreign objects including shell, gravel, and stone.

Moistened samples are typically gray to brown. Samples obtained below the immediate ground surface were generally moist, with samples becoming wet or saturated within a few feet of the water table. Three soil specimens selected from widely varying locations, washed over a No. 200 sieve, indicated approximately 30-35 percent clay or silt by weight. Samples manipulated by hand exhibited essentially nonplastic, cohesionless behavior

Standard penetration test values typically ranged from 8 to 10 blows per foot. Soil consistency was evaluated as loose to medium dense. However, soil strength and compressibility is likely to be highly variable due to the incremental nature of placement and typical lack of engineering control exercised in construction of these soils. Samples were typically granular in composition and most of the fills lie above the water table; therefore they will be only partially saturated. Primary consolidation will for that reason be very rapid and impossible to tell apart from immediate settlement. Secondary compression will be very small.

4.3.2 *Unit 1B - Holocene Marsh Deposits East of Shipyard Creek*

These very soft fine grained soils consist of Holocene marsh and swamp deposits located mostly east of Shipyard Creek, falling generally within the grounds of the former naval base. Ground surface elevation throughout this area is on average several feet lower than elsewhere along the alignment. For the most part these soils are masked by a surface layer of artificial fill. The upper sands which characterize the upper 10 to 30 feet of the soil profile on the Wando Terrace west of Shipyard Creek along the alignment appear to be absent.

CPT soundings performed east of Shipyard Creek penetrated these soils to depths of about 60 feet below a thin surface layer consisting of sandy fill. These soils appear only on the Mainline ID Profile in Figure 4-7. These soils will form the principal bearing strata for soil embankments in the area east of Shipyard Creek, and the resisting strata for laterally loaded deep foundations supporting proposed bridge structure.

The soft organic silty clays are geologically recent deposits formed primarily in marshlands and waterways, which east of Shipyard Creek do not appear to have been subsequently overlain by beach or dune sands. Recovered split spoon samples were low plasticity, silty fines with very little perceptible dry strength when remolded by hand.

Predominant classification by the Unified Soil Classification was MH based on laboratory plasticity tests. However, DMT material index (I_D) values obtained were mostly less than 0.2, typical of clays. Soil behavior based on the Robertson correlation using CPT point resistance and friction ratio was typical of highly organic soils or peats, or sensitive silts or clays which exhibit very great strength loss when disturbed. CPT penetration data imply a relatively thickly stratified deposit with only moderate variation of tip stress, sleeve friction, or pore pressure readings observed within this interval.

Samples recovered in the upper 10 ft of the deposit contained trace amounts of fibrous organic matter and exhibited a distinct organic odor, but the odor diminished with depth and was not noted to occur in the lower half of the strata. Consequently, these soils have for this study been classified as MH rather than OH. Samples within 5 to 10 ft of the base of the layer exhibited trace amounts of broken shell.

Samples were wet or saturated, laboratory moisture contents commonly exceeded 100 percent and were as high as 117 percent. Assuming full saturation, these water contents imply that soil void ratio would exceed 2.5. A limited number of specimens washed over a No. 200 sieve indicated 60 to as high as 100 percent clay or silt by weight. Minus No. 40 sieve sizes exhibited liquid limit values of 55 to 80 percent and plastic limit values ranging from 35 to 55 percent. Plasticity Index values thus ranged from 20 to 35 percent. Liquidity Index values determined by comparison of plasticity indices to in-place moisture content varied from 1 to 1.5. A plasticity chart is presented as Figure 4-13, with the Holocene soils indicated.

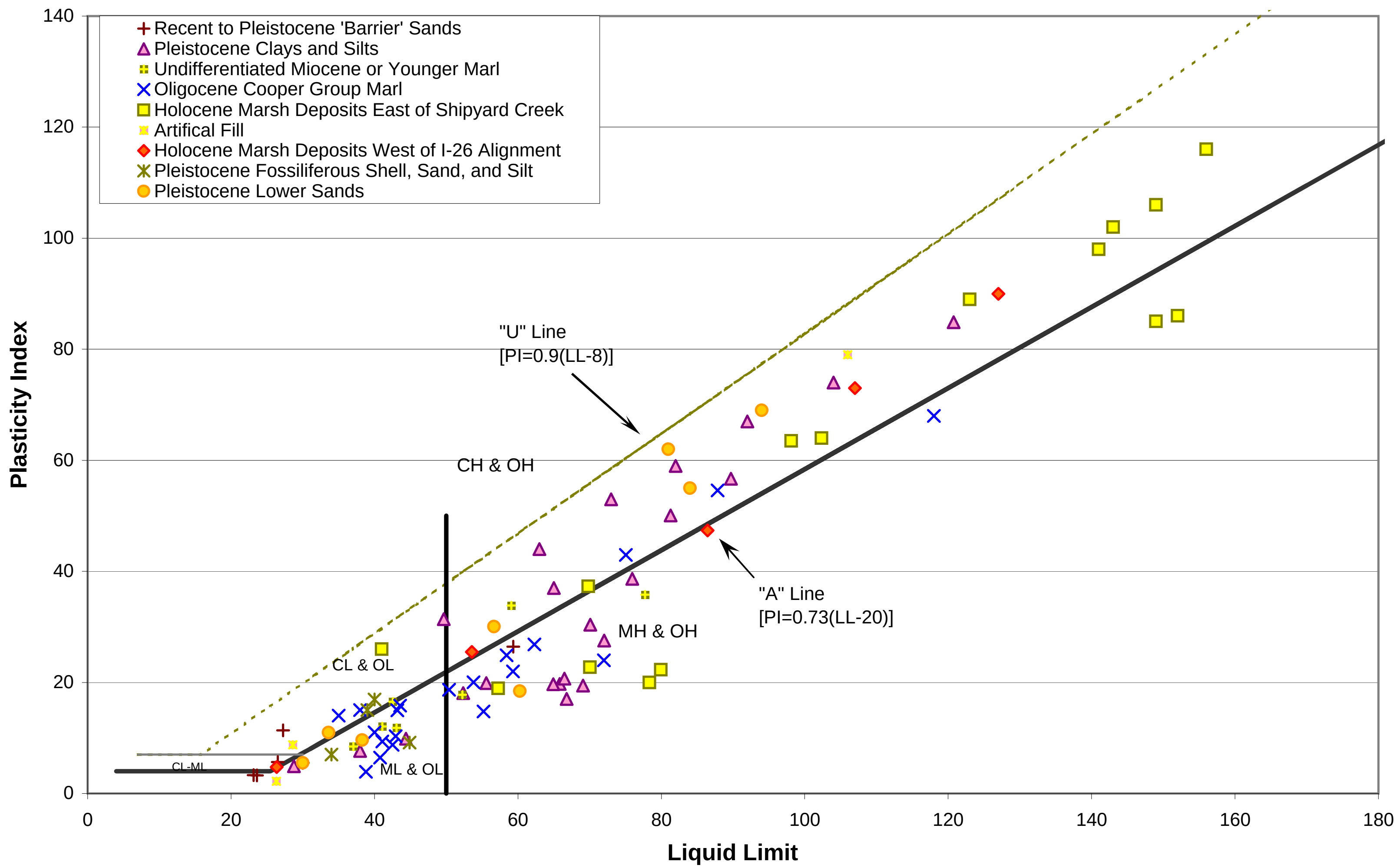
Soil consistency is typically very soft. Standard Penetration Test values recorded in soil test borings were almost uniformly "weight-of-hammer" or weight-of-rod," failing to register a recordable blow count per foot. Cone penetrometer tip resistances ranged from less than one to about 3 tons per square foot.

Undrained shear strength of the marsh deposits was estimated in sounding B-32DMT using the horizontal stress index K_D and the effective overburden stress using the relationship by Marchetti (1980). Horizontal stress index values of 3 to 4 where obtained to a depth of about 20 ft, decreasing to about 2 to 3 in the lower half of the Holocene sediments. These values imply undrained shear strength of 300 to 400 psf using the Marchetti relationship. An alternate relationship proposed by Schmertmann (1981) based on the corrected first reading and the pore pressure reading suggest undrained shear strength ranging from 200 to 300 psf. Field vane shear testing was conducted in borings B-34 and B-40 in general conformance with the procedures described by ASTM D 2573. After correction for soil plasticity, undrained shear strength values in the Holocene soils ranged from 144 to 300 psf.

Undrained shear strength values obtained in DMT soundings and vane shear tests imply a shear strength equal to about 0.4 to 0.6 times the effective overburden pressure to a depth of about 20 ft and about 0.24 to 0.30 times effective overburden stress below 20 ft. These values are consistent with very soft, slightly overconsolidated to normally consolidated cohesive soils.

Five representative undisturbed samples of the Holocene soils were sheared in triaxial compression under full saturation. Samples were obtained at depths of 15 to 40 ft below the surface. At these depths the soils would have been confined under effective stresses ranging from 800 to 2000 psf (5 to 14 psi). Two samples were sheared in compression using the UU or "Q" test method, without consolidation of the samples aned without allowing any drainage of the sample during shearing. Samples were sheared at confining stresses of 15, 25 and 35 lbs. per square inch. Sample confining stresses were selected to bracket anticipated final stresses applied at the sample depths.

Test output attached in the Appendix includes plots of deviator stress vs. applied strain for various load increments, induced pore pressure vs. applied strain, and maximum shear strength at various increments of confining stress. Peak strength values were 410 psf at a depth of 23 ft, and 460 psf at a depth of 38 ft. Both values were expressed as an undrained shear strength with zero angle of internal friction.



Proj. No. 1131-08-554 April 2009	S&ME	SOIL PLASTICITY CHART PORT ACCESS ROAD NORTH CHARLESTON, SOUTH CAROLINA	Figure: 4-13

To evaluate strength parameters that would apply to long term static conditions after consolidation of the soils under applied embankment loads, three other undisturbed samples were isotropically consolidated under applied pressures of 5 to 30 psi with full drainage. Isotropically consolidating the samples allows testing to replicate a range of long term post-construction states of stress. Following consolidation, samples were then sheared in compression using the CU or "R" test method without allowing any further drainage. Failure of the specimens during the tests was defined as the maximum stress difference (deviator stress) attained at any point during the test.

Pore pressure measurements conducted during shearing of the samples were used to evaluate cohesion and angle of internal friction for drained conditions. Drained soil parameters were derived by a best common tangent trend through the failure points plotted on the Mohr Circle envelope for both peak and residual strength values. In each case the normal stress at each point of failure was adjusted on the Mohr Circle diagram for either positive or negative pore pressures measured in the specimen at failure. In all three tests, positive pore pressures developed within the samples during shearing increased with increasing deviator stress at a rate which approached or equaled incremental deviator stress loading up to the point of failure. This is characteristic of samples that are confined at stresses that considerably exceed preconsolidation stress of the soils, or in alluvial soils where the soil structure is honeycombed or flocculated. Failure of the sample as defined by the Mohr Circle envelope under these conditions were found to closely correspond to failure as defined by maximum deviator stress on the stress strain plot. Average effective stress values of cohesion and friction angle for peak strength were about 0 psf and 18 to 29 degrees.

We used three correlations to estimate undrained shear strength from the CPT data:

$S_u = (q_t - \sigma_{vo})/N_{kT}$ - where $10 \leq N_{kT} \leq 20$ (Aas et al, 1986) (1)

$S_u = (u_2 - u_o)/N_u$ - where $7 \leq N_u \leq 9$ (Mayne & Holtz, 1988) (2)

$S_u = 0.091(\sigma_{vo}')^{0.2}(q_t - \sigma_{vo})^{0.8}$ (Duncan & Wright, 2006) (3)

Correlations 1 and 2 include empirical factors: N_{kt} and N_u. We selected "global" values of N_{kt} and N_u that produced undrained shear strengths that were in reasonable agreement with the FVT results. Since CPT is much quicker and less expensive than FVT, the correlations are a valuable means of quickly and economically estimating strengths across a project site. Such extrapolation requires the selection of single empirical parameters that yield results that are generally in agreement, hence the selection of "global" values. We ultimately used an N_{kt} value of 20 and an N_u value of 9. Plots of undrained shear strength measured with FVT and CPT and UU triaxial tests (where available) are presented in Figure 4-14 and Figure 4-15 for boring B-40 and B-34SCPT, respectively.

These soils lie mostly below the water table at this site and most of these soils will be entirely saturated upon application of load. Consolidation is likely to be relatively slow since the soils appear to be stratified horizontally to only a limited degree and drainage paths will tend to be long. Immediate compression appears to form very small percentage of the total deformation of the sample at each load increment, and is unlikely to be distinct from primary consolidation. Primary consolidation will require a marked length of time to occur after load application. Secondary compression may also be significant.

Figure 4-14. B-40 Shear Strength Comparison

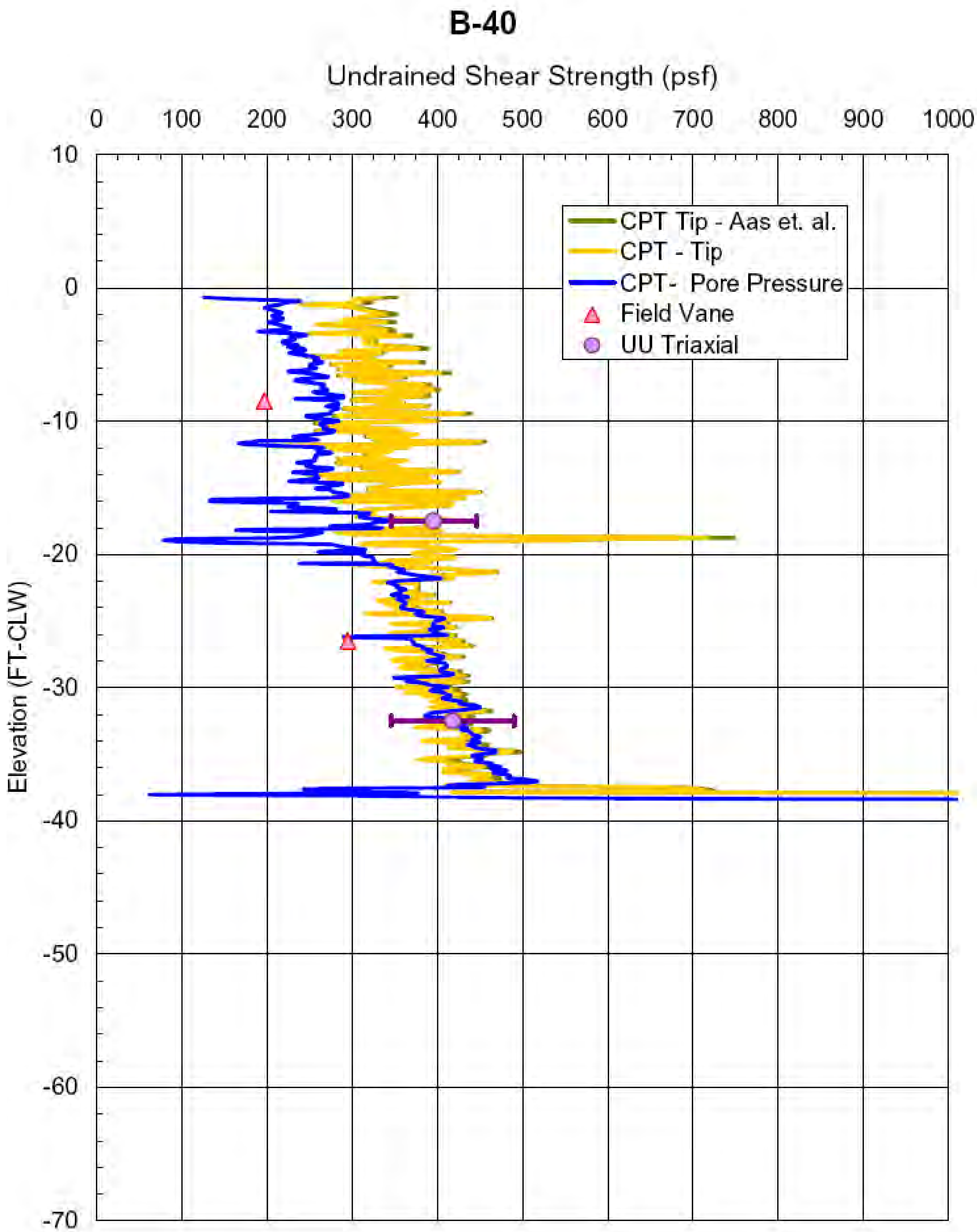
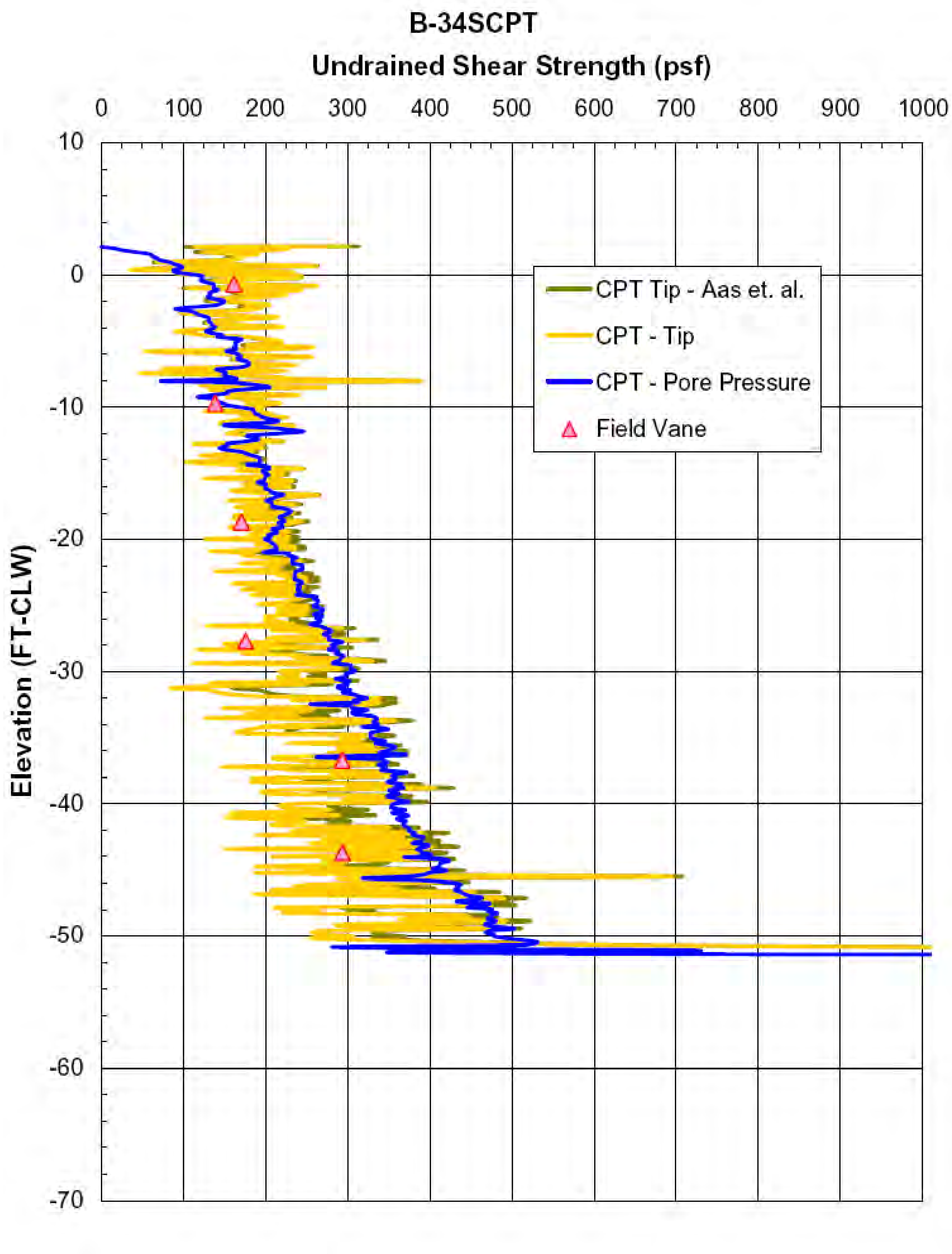


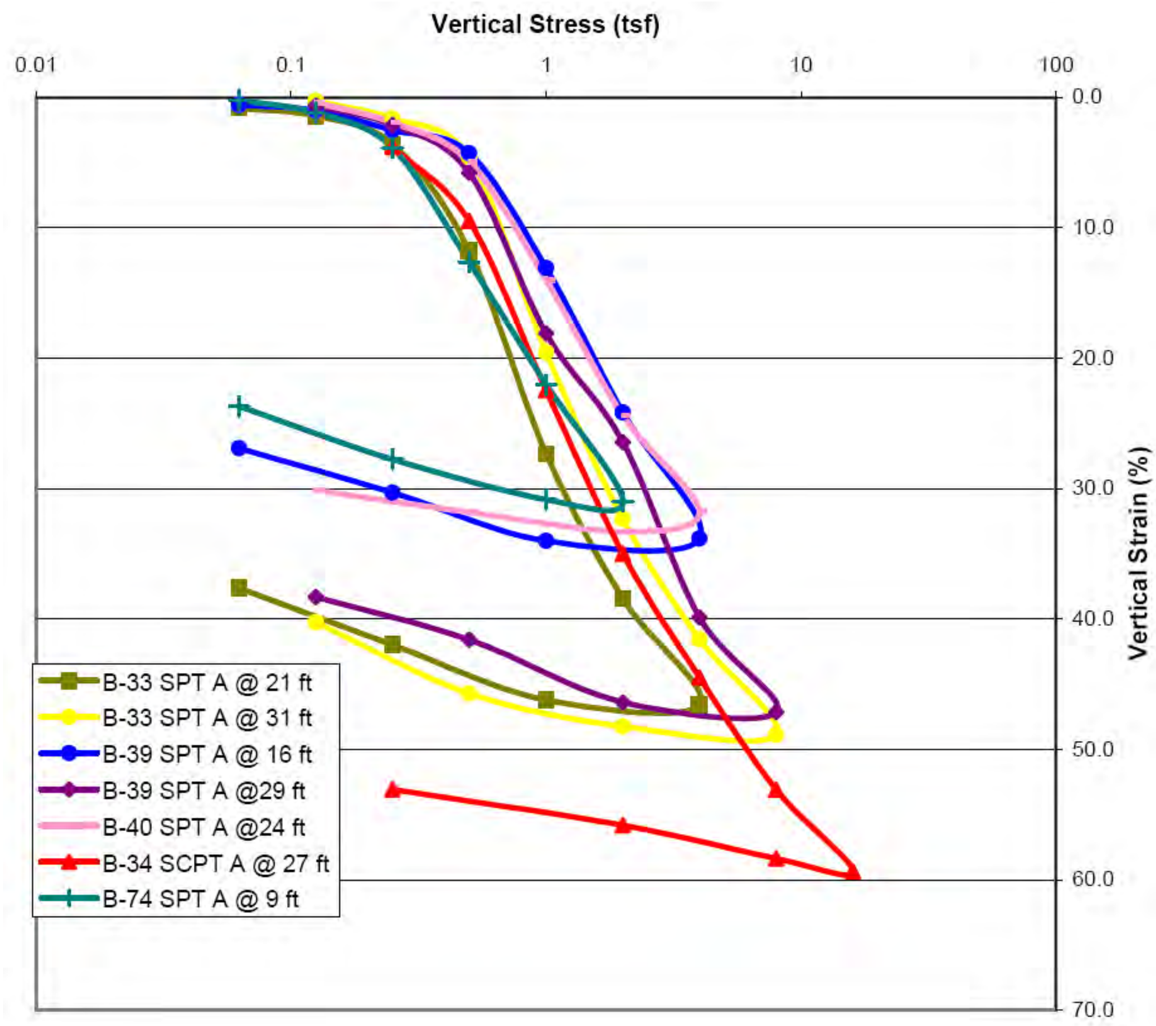
Figure 4-15. B-34SCPT Shear Strength Comparison



The compressibility of a fine-grained soil expressed as the vertical drained confined one-dimensional tangent (constrained) modulus M was determined in DMT sounding B-32DMT The constrained modulus M was estimated using the dilatometer modulus E_D, applying a proportionality constant R_M which is a function of the material index and horizontal stress index values. Estimated constrained modulus of the layer based on dilatometer readings ranged from 10 to 18 ksf.

One dimensional consolidation (oedometer) testing was conducted on five undisturbed samples of these soils recovered in borings B-33, B-34, B-39 and B-40 at depths varying from 16 to 31 ft. Samples were trimmed and seated as described by ASTM D 2435. The tests were conducted to maximum applied stresses of 16 to 32 ksf. Unload-reload cycles were not performed. From the maximum load level each sample was then unloaded to zero in five decrements. Plots of the consolodation curves for Holocene Soil are presented in Figure 4-16. Consolidation of the sample under each increment/decrement of load was computed using both log-time and Taylor's square root of time methods

Figure 4-16. Holocene Soils Consolidation Curves



Graphical presentation of sample deformation at 100 percent consolidation vs. load expressed as percent strain is attached in the appendices. Effective vertical stress of the samples in place was estimated to be 0.6 to 1.0 ksf. Applying the Casagrande construction to the consolidation curve implies a preconsolidation stress of 1.0 ksf in four of five tests, or 0.8 to 1.0 times the vertical effective stress. Average compression ratio, obtained by comparing sample strain versus applied load above the preconsolidation stress was 0.36. This would equate to a a one-dimensional constrained modulus (M) value of 18 ksf, similar to DMT M-values obtained in Boring B-32DMT. Average recompression ratio taken from the unloading portion of the consolidation test curves was 0.055.

Initial consolidation occurring immediately upon placement of each incremental load ranged from 5 percent to 10 percent of total settlement, for all load increments less than the preconsolidation stress. At the preconsolidation stress and at higher loads the percent initial consolidation decreased to about 5 percent. Time rate of consolidation as expressed by the coefficient of vertical consolidation was estimated to be 25 to 50 ft2/year below the preconsolidation stress in the consolidation tests, and 4 to 8 ft2/year during virgin compression.

4.3.3 *Unit 1C - Holocene Marsh Deposits West of I-26*

These very soft fine grained soils consist of Holocene marsh deposits located mostly west of the I-26 alignment. These soils are mapped at the surface adjacent to the Ashley River and tributary creeks leading into the project area. Ground surface elevation throughout this area is on average several feet lower than elsewhere along the alignment. In many areas these soils have been covered by artificial fills.

CPT soundings and soil test borings performed along I-26, particularly west of the current alignment, penetrated these soils to depths of about 10 ft below a thin surface layer consisting of sandy fill. These soils are present in some areas along ramps A and D and in one location (Boring B-4) along Ramp G. These soils appear to lie within a filled swale extending along the west side of the I-26 alignment and projecting eastward into the area between the connector alignment and I-26. There appears also to be a similar swale present along the I-26 alignment south of the Access Road interchange.

These soils appear to extend to far shallower depth than do similar soils encountered east of Shipyard Creek. Maximum depth of penetration was approximately elevation -10 feet.

The soft organic silty clays are geologically recent deposits formed primarily in marshlands and waterways, which outside of filled areas do not appear to have been subsequently overlain by beach or dune sands. Recovered split spoon samples were low plasticity, dark to blueish-gray silty fines with very little perceptible dry strength when remolded by hand. Some samples contained fibrous organic material consisting of marsh grasses.

Predominant classification by the Unified Soil Classification was ML or MH based on laboratory plasticity tests. DMT material index (ID) values in sounding B-5DMT obtained were 0.4 to 0.6, typical of clays to clay-silts. Soil behavior based on the Robertson correlation using CPT point resistance and friction ratio was typical of highly organic soils or peats, or sensitive silts or clays which exhibit very great strength loss when disturbed. CPT penetration data imply a relatively thickly stratified deposit with only moderate variation of tip stress, sleeve friction, or pore pressure readings observed within this interval.

Similar to soils east of Shipyard Creek, samples obtained west of I-26 were wet or saturated and contained considerable free moisture. Laboratory moisture contents commonly exceeded 100 percent and were as high as 124 percent. Assuming full saturation, these water contents imply that soil void ratio would exceed 3.0. Specimens washed over a No. 200 sieve indicated 80 to 100 percent clay or silt by weight. Minus No. 40 sieve sizes exhibited liquid limit values of 80 to 85 percent and plastic limit values ranging from 40 to 55 percent. Plasticity Index values thus ranged from 35 to 45 percent. Liquidity Index values determined by comparison of plasticity indices to in-place moisture content varied from 1 to 1.5.

Standard penetration test values typically ranged from WOH to 2 blows per foot, typically very soft consistency. Undrained shear strength was estimated using the horizontal stress index KD obtained in Sounding B-5DMT and the effective overburden stress using the relationship by Marchetti (1980). Horizontal stress index values of 4 to 5 in this zone at this location implies undrained shear strength of 180 to 200 psf.

Soil compressibility expressed as the vertical drained confined one-dimensional tangent (constrained) modulus M was estimated to range from 40 to 60 ksf. These values are roughly twice those obtained in similar materials east of Shipyard Creek, and may reflect some prior preconsolidation of the materials at the location of sounding B-5DMT by previous filling of the area. The ratio of the maximum prior applied vertical stress to the present vertical stress was estimated at Boring B-5DMT using the DMT horizontal stress index KD. The relationship proposed by Marchetti (1980) yields overconsolidation ratios of 2.7 to 4.2 considering horizontal stress index values of 3.8 to 5 in this layer. The maximum prior applied vertical stress likely ranges from 500 to about 1000 psf greater than the present vertical stress, which would equate to precompression of these soils by an additional 4 to 8 ft of material.

One dimensional consolidation (oedometer) testing was conducted on an undisturbed sample of these soils recovered in boring B-74A at a depth of 8 to 10 ft, after the sample was trimmed and seated as described by ASTM D 2435. The test was conducted to a maximum applied stress of 16 ksf using standard loading schedule A described in section 11.5 of ASTM 2435 similar to tests conducted on samples obtained east of Shipyard Creek. Effective vertical stress of the sample in place was estimated to be 400 psf. Applying the Casagrande construction to the consolidation curve implies a preconsolidation stress approximately equal to the existing vertical effective stress, implying little evident prior loading of these soils. Average compression ratio value obtained at stresses exceeding the preconsolidation stress was 0.29, slightly less than the average of the tests conducted east of Shipyard Creek. Expressed as a constrained modulus (M) value the slope of the virgin compression curve is approximately 22 ksf.

4.3.4 *Unit 2A - Recent to Pleistocene "Barrier" Sands*

Unit 2A includes a number of different layers which for convenience of discussion have been combined into a single layer for this data report. Unit 2A includes the sand barrier facies of the Wando Formation. In addition, Unit 2A also includes some isolated areas of recent to late Pleistocene terrace sands indicated on local geologic mapping as pre-Wando in origin, located generally west of I-26. These soils form the barrier facies of the Silver Bluff Terrace which have eroded and replaced the Wando barrier sands adjacent to the Ashley River.

Penetrated thickness of Unit 2A varies between 5 and about 15 ft west of Kings Street, where these soils directly overlie soft clayey soils of Unit 2. Between Kings Street and Shipyard Creek Unit 1 thickens to over 20 ft and forms most of the profile between the ground surface and the underlying Cooper Group.

Between Kings Street and Shipyard Creek these soils appear to directly overlay Pre-Pleistocene marls, with Unit 2B or 2C either absent or present only as thin inclusions or seams below Unit 2A.

Beach or dune deposited sands form the immediate ground surface in most areas where the surface elevation exceeds +10 ft. The thickness tends to increase with higher ground surface elevation, but appear to be greatest proceeding eastward from I-26 toward Shipyard Creek, and southward along I-26 from the interchange with the Port Connector. The natural soils near the surface were likely deposited as beach or dune sands during the retreat of the sea level near the end of the Pleistocene period, and the original ground surface likely took the form of the ridge and swale topography typical of dune areas. During development and urbanization of the local area the dunes would have been pushed over and the swales filled to form the currently flat surface.

In most cases these soils exhibit a rather poorly-developed weathering profile, consisting of a zone of relatively uniform fine sands containing less than about 5 percent fines, which extend to about 2 to 3 ft, underlain by a rather weak and erratic clay accumulation zone consisting of sandy clays or clayey sands about 3 ft thick. Soil consistency is typically loose to medium dense, with SPT values averaging 10 to 15 blows per foot and CPT tip resistances averaging 50 to 120 tsf.

The Wando Formation is considered to have been formed during a high stand in sea level which has not been exceeded since deposition. These soils would be considered to have never been prconsolidated by loads exceeding their own weight. The overconsolidation of sandy soils can be approximately estimated by comparing the dilatometer constrained modulus M to the CPT point stress value at a given depth, using the relationship proposed by Marchetti (2001). Adjacent CPT sounding B-70 and DMT sounding B-71 were compared and the constrained modulus appears to lie mainly within the range of about five times the CPT tip stress in this zone. For this range the sands would be considered to be normally consolidated.

A rough estimate of sand compressibility was made using uncorrected CPT tip resistance values. For the typical range of sand-sized grain sizes, elastic modulus of the soils is typically represented by a value equivalent to 2 to 4 times the tip resistance where the sands are considered as normally consolidated or uncemented. Using 3 as an average, tip resistances of 50 to 120 tons per square foot likely represent a material with an elastic modulus of 300 to 600 ksf.

4.3.5 *Unit 2B – Fossiliferous Shell Sand and Clay*

The middle portion of the Pleistocene terrace sequence along I-26 contains significant inclusions, seams or lenses of desiccated brown or orange silts and clays, soft blue-gray clays, loose gray silty or clayey sands and shell interbedded with seams of relatively clean medium dense sands. These highly variable soils are possibly tidal or river deposited sediments that were alternately covered by beach sands and compressed to some degree by migrating sand dunes, then scoured and redeposited on top of the underlying clays or marl deposits along the alignment, possibly multiple times. Typically these soils are thin, on the order of 5 ft, and they thin and become absent progressively eastward from the I-26/Port Access Road interchange and to the south along I-26 as the overlying barrier sands thicken. The contact between these soils and the underlying Unit 2C undulates across the alignment, reflecting scouring and redeposition of a pre-existing marsh.

Recovered split spoon samples from this interval were typically loose, brown or gray brown fine-grained sands with little to some clayey fines. Most borings encountered one or more seams of loose clean, gray or gray brown fine to coarse sands embedded within this material. Recovered samples from the lower several feet of Unit 2B also contained one or more seams of very soft, shelly gray clayey silts or silty clays up to 5 ft thick, sometimes containing inclusions of phosphate, wood or organics. The upper portion of Unit 2B may also exhibit up to 3 ft of marsh or peat.

Soil behavior based on CPT point resistance and friction ratio was typical of mixtures of silty clays or clayey silts, interbedded with mixtures of silty sands to sandy silts. CPT penetration data imply a variable, stratified deposit consisting of moderately thick (6 in. to 12 in.) layers of alternating sands and clays or silts.

Soil specimens washed over a No. 200 sieve indicated 20 to 40 percent clay or silt by weight. The CPT soil index parameter Ic suggests a fines content of 20 to 55 percent using the relationship by Robertson and Fear (1998). Minus No. 40 sieve sizes exhibited a relatively narrow range of moisture content values between plastic and liquid behavior, plasticity index values averaging about 10 percent. Soil moisture content ranged from 22 percent to over 40 percent, averaging about 37 percent, for about 20 tests performed in this unit.

Void ratio estimated assuming soils to be fully saturated ranged from 0.6 to 1.4, averaging about 1.0. These values are substantially lower than the Holocene soils previously discussed or the underlying clays. Soil moisture content is typically slightly below liquid limit values, suggesting some prior surface loading or desiccation of the soils subsequent to deposition.

A single one-dimensional consolidation (oedometer) testing was conducted on an undisturbed sample of these soils recovered in boring B-55A at a depth of 24 ft. This sample had a moisture content of only 30 percent and a void ratio of 0.92. The test was conducted to a maximum applied stress of 16 ksf. From this maximum level the sample was then unloaded to 0.5 ksf in three decrements. Graphical presentation of sample deformation at 100 percent consolidation vs. load expressed as percent strain is attached in the appendices. Effective vertical stress of the sample in-place was estimated to be 1000 psf. Applying the Casagrande construction to the consolidation curve implies a preconsolidation stress of 3800 psf, or 3.8 times the vertical effective stress. Average compression ratio value obtained at stresses above the preconsolidation stress taken from the virgin compression curve was 0.095. Coefficient of consolidation above the preconsolidation stress was estimated to be 80 to 100 ft^2/year.

Coefficient of Consolidation was estimated using the rate of decay of pore pressure with time after pausing penetration in soundings B-49, B-54, and B-56 at depths of 17 to 21 ft in this layer. The time required for 50 percent pore pressure dissipation was only 1 to 2 minutes in each test. The coefficient of horizontal consolidation was interpreted based on the time at 50 percent dissipation using the relationship by Robertson (1992). An approximate estimate of the coefficient of compression in the vertical direction was made using a ratio of horizontal to vertical permeability of 10, given by Jamiolkowski et. al. (1985) for clays with discontinuous lenses and layers of more permeable soils. This results in an approximate vertical coefficient of consolidation of about 300 ft^2/year.

These soils lie mostly below the water table at this site and most of these soils will be entirely saturated upon application of load. But consolidation is still likely to be relatively rapid in this zone since the soils tend to be highly stratified horizontally and drainage paths from impervious layers tend to be very short. Primary consolidation of this layer may thus be to some degree hard to tell apart from immediate compression. Secondary compression will be very small.

4.3.6 *Unit 2C – Pleistocene Clays and Silts*

These generally soft, fine grained soils are differentiated from Units 1B and 1C described above by their position below significant thicknesses of the overlying Units 2A and/or 2B soils. These soils are likely somewhat younger than the Wando Formation, particularly west of I-26, but have been in place for sufficient time to have become slightly preconsolidated. These soils reached thicknesses of up to 30 ft at some sample points, particularly along I-26 in the vicinity of the King Street flyover, and average about 25 t along I-26 north of the King Street flyover and eastward along the alignment. Unit 2C becomes thin, discontinuous or absent in the portion of the site lying east of the Meeting Street Extension to Shipyard Creek. Unit 2C also thins and becomes absent progressively southward along I-26 south of the interchange with the Port Access Road.

Recovered samples were low to moderate plasticity, silty fines with some perceptible dry strength. Some samples contained trace amounts of fine sand or shell. Predominant classification by the Unified Soil Classification was MH based on laboratory tests and visual-manual procedure. Soil behavior based on CPT point resistance and friction ratio was typical of clays or silty clays which exhibit substantially undrained behavior. In most areas CPT penetration data imply a relatively thickly stratified deposit with only moderate variation of tip stress, sleeve friction, or pore pressure readings observed within this interval.

Moistened samples are bluish-gray, in some cases grading with depth into a greenish-gray color. Samples were wet or saturated and contained considerable free moisture. Moisture contents ranged from 70 to 80 percent to as high as 102 percent. Average moisture content for about 20 tests conducted in this unit was approximately 75 percent. Soil specimens washed over a No. 200 sieve indicated 85 to 95 percent clay or silt by weight. Minus No. 40 sieve sizes exhibited liquid limit values of 60 to 102 percent and plastic limit values ranging from 21 to 69 percent. Plasticity Index values averaged about 23 percent. Liquidity Index values determined by comparison of plasticity indices to in-place moisture content varied from 1 to 1.25.

Soils in this zone were slightly more resistant to penetration by our sampling tools than the Unit 1B or 1C soils of Holocene age. Standard penetration test values typically ranged from 1 to 3 blows per foot. Cone penetrometer tip resistances ranged from 2 to 8 tons per square foot. Both are consistent with very soft to soft cohesive soils.

Undrained shear strength was estimated in sounding B-5DMT using the horizontal stress index KD and the effective overburden stress using the relationship by Marchetti (1980). Horizontal stress index values of 5 to 8 imply undrained shear strength of 600 to 1500 psf using the Marchetti relationship. The relationship by Schmertmann (1981) based on the corrected first reading and the pore pressure reading suggest undrained shear strength ranging from 450 to 1050 psf. These values imply a shear strength equal to about 0.6 to 0.8 times the effective overburden pressure. These values are consistent with soft to firm, slightly overconsolidated cohesive soils.

Four representative undisturbed samples of the 2C soils were sheared in triaxial compression under full saturation. Samples were obtained at depths of 23 to 40 ft below the surface. At these depths the soils would have been confined under effective stresses ranging from 1000 to 1600 psf (7 to 11 psi). One sample was sheared in compression using the UU or "Q" test method, without consolidation of the samples and without allowing any drainage of the sample during shearing. Specimens were sheared at confining stresses of 10, 20 and 30 lbs. per square inch.

Test output attached in the Appendix includes plots of deviator stress vs. applied strain for various load increments, induced pore pressure vs. applied strain, and maximum shear strength at various increments of confining stress. Peak undrained shear strength obtained in the UU test was 970 psf at for a samples obtained at a depth of 32 ft. Deformation continued past the evident failure point represented by the peak deviator stress and continued until deviator stress remained essentially constant with increasing deformation. The residual strength obtained was approximately 800 psf, or about 80 percent of peak undrained shear strength.

To evaluate strength parameters that would apply to long term static conditions after consolidation of the soils under applied embankment loads, three other undisturbed samples were isotropically consolidated under applied pressures of 7 to 30 psi with full drainage. Following consolidation, samples were then sheared in compression using the CU or "R" test method without allowing any further drainage. Failure of the specimens during the tests was defined as the maximum stress difference (deviator stress) attained at any point during the test. Average effective stress values of cohesion and friction angle for peak strength were about 0 psf cohesion and 22 to 35 degrees angle of internal friction.

In all three tests, positive pore pressures developed within the samples during shear. Specimens confined at stresses exceeding 20 psi (2880 psf) exhibited a positive pore pressure increase with increasing deviator stress but at a rate which approached the incremental deviator stress loading. This is characteristic of soils that are confined at pressures exceeding the overconsolidation stress. In contrast, pore pressure development within the samples confined at pressures of 10 to 15 psi (1440-2160 psf) was more characteristic of a dense saturated sand or overconsolidated soil. These samples tend to dilate when loaded to failure in undrained shear. Positive pore pressures increase with increasing deviator stress during initial stages of loading but pore pressures then decrease and became negative as the applied deviator stress approach the failure point.

The tendency for samples to dilate when confined as low confining pressures relative to sample preconsolidation creates a "hump" in the Mohr Circle envelope at low confining stresses and an unreasonably high cohesion value. A linear projection of the Mohr Circle envelope from the origin and extended tangent to the circles representing samples confined at stresses above the evident preconsolidation stress yields an effective stress angle of internal friction of 29 degrees for all three tests.

These soils are considerably less compressive than the overlying Holocene silts and clays at low stresses due to some evident preconsolidation of the strata. Where penetrated by dilatometer sounding B-5DMT, the compressibility expressed as the vertical drained confined one-dimensional tangent (constrained) modulus M averages about 250 ksf between depths of 13 and 38 ft at current in-situ stresses. SPT N-values obtained in this interval in the adjacent boring B-3 range from 2 to 3 blows per foot, fairly typical for this unit.

The ratio of the maximum prior applied vertical stress to the present vertical stress was estimated using the DMT horizontal stress index KD using the relationship proposed by Marchetti (1980). For horizontal stress index values of 5 to 8 in this layer, the maximum prior applied vertical stress likely ranges from 4 to 6 times the present vertical stress. The procedure by Mayne (1995) based on corrected first reading and pore pressure reading values would suggest a maximum prior applied vertical stress of about 2.5 to 4 times the current vertical stress. Interpolation of these data would indicate a maximum prior applied vertical stress on the order of 2.2 to 4.4 ksf. Since current in-situ stresses are lower, DMT modulus values may be expected to underestimate deformation of the soils under loads which exceed the preconsolidation stress.

One dimensional consolidation (oedometer) testing was conducted on six undisturbed samples of these soils recovered in borings B-2A, B-3A, B-53A, and B-55B at depths varying from 24 to 40 ft. The tests were conducted to maximum applied stresses of 16 to 32 ksf. From the maximum load level each sample was then unloaded to 0.5 ksf in three decrements. Graphical presentation of sample deformation at 100 percent consolidation vs. load expressed as percent strain is attached in the appendices.

Effective vertical stress of the samples in place was estimated to be 1.0 to 1.6 ksf. The Casagrande construction implies a preconsolidation stress of 2.8 to 3.8 ksf in five of six tests, or 1.9 to 3.5 times the vertical effective stress. At applied stresses below the preconsolidation stress, taken as the average of the increments immediately above and below the current overburden stress, average constrained modulus obtained was 125 ksf. Discarding two outliers, the upper range of M values obtained in the preconsolidation range vary from 170 to 344 ksf, which are similar to DMT M-values obtained in Boring B-32DMT. Average compression ratio obtained above the preconsolidation stress was 0.42. This would equate to a one-dimensional constrained modulus (M) value of only 28 to 40 ksf. Average recompression ratio taken from the unloading portion of the consolidation test curves was 0.06.

Initial consolidation occurring immediately upon placement of each incremental load ranged from 5 percent to 10 percent of total settlement, for all load increments less than the preconsolidation stress. At the preconsolidation stress and at higher loads the percent initial consolidation decreased to about 5 percent. Time rate of consolidation as expressed by the coefficient of vertical consolidation was estimated to be 200 to 300 ft^2/year below the preconsolidation stress in the consolidation tests, and about 6 ft^2/year during virgin compression.

4.3.7 *Unit 3 – Pleistocene Lower Sands and Clays*

These sands and sandy clays occur between the overlying units 2A, 2B or 2C, and the underlying marls of the Oligocene Cooper Group or the younger marls. These soils typically comprise the lower portion of the Wando Formation and contain interlayered clayey sands, clays and dense clean sands. All of these soils are grouped together for the purpose of this discussion. Unit 3 appears to be present over wide areas, but the soils are largely confined to about 5 to 10 ft of thickness in the vicinity of King Street Extension, Spruill Avenue and Meeting Street Extension. In these areas Unit 3 appears to have been deposited in troughs or channels eroded into the top of the marl. Unit 3 becomes thicker and approaches 20 feet or more in thickness east of the railroad alignment and along I-26 south of the Port Access Road interchange.

The sand facies appears more common in the project area. Sand consistency ranges from very loose to dense. Predominant gradation appears to be within the fine to medium sand grain range. Soil classification based on the unified system was SC, SP-SM, SP, or SM depending on location. The contact between these soils and the underlying marls commonly consists of a layer of coarse sand, containing shell, phosphate nodules, fossilized bones and teeth. Moistened color ranges from dark gray, gray to gray-green. SPT penetration resistances range from less than 10 to over 50 blows per foot.

A single one dimensional consolidation test was conducted on an undisturbed sample of clays occurring within this unit at a depth of 24 ft in boring B-47A. The test was conducted to a maximum applied stresses of 16 ksf. Effective vertical stress of the sample in place was estimated to be 1.2 ksf. The Casagrande construction implies a preconsolidation stress of 6.6 ksf, or 5.4 times the vertical effective stress. At applied stresses below the preconsolidation stress, taken as the average of the increments immediately above and below the current overburden stress, average constrained modulus obtained was 125 to 250 ksf. Average compression ratio obtained above the preconsolidation stress was 0.24. This would equate to a one-dimensional constrained modulus (M) value of only 96 ksf. Average recompression ratio taken from the unloading portion of the consolidation test curves was 0.06.

Time rate of consolidation as expressed by the coefficient of vertical consolidation was estimated to be 150 to 450 ft^2/year below the preconsolidation stress in the consolidation tests, and about 10 ft^2/year during virgin compression.

An undisturbed sample was isotropically consolidated under applied pressures of 9 to 30 psi with full drainage. Following consolidation, each specimen was then sheared in compression using the CU or "R" test method without allowing any further drainage. Failure of the specimens during the tests was defined as the maximum stress difference (deviator stress) attained at any point during the test. Average effective stress values of cohesion and friction angle for peak strength were zero cohesion and 35 degrees angle of internal friction.

4.3.8 *Unit 4 - Undifferentiated Miocene or Younger Marls*

Unit 4 is differentiated from the underlying Cooper Group or Cooper Marl (Unit 5) based generally lower penetration resistance, and relatively lower dynamic pore pressures during CPT penetration exhibited in this zone. Occurrence of these materials appears limited to the eastern portion of the alignment extending to Shipyard Creek, where the unit reaches thicknesses as great as 15 ft. There are some very limited occurrences of this material also near I-26. Elsewhere these materials appear to have been eroded and replaced by the fine grained deposits of units 1 or 2 or the sands of Unit 3.

Recovered samples consisted of gray or gray-green, fine grained sands with little to some clayey fines. Unified soil classification based on visual manual procedure was SC or MH. Soil behavior based on CPT point resistance and friction ratio was typical of mixtures of silty sands to sandy silts. Fines content determined in the laboratory was approximately 25 percent. The CPT soil index parameter Ic suggests a fines content of 35 to 40 percent.

Soils penetrated by the CPT were assigned to Unit 4 where CPT dynamic pore pressures did not exceed 15 tsf. Cone penetrometer tip resistances ranged from 10 to 15 tsf. SPT penetration resistances obtained within this zone ranged from weight-of-hammer to about 5 to 6 blows per foot.

Four representative undisturbed samples of the marl encountered just below the apparent contact between the Wando Formation and the underlying Cooper Group soils were obtained at locations where apparent marl consistency, based on SPT values, was lower than in other locations sampled in an attempt to determine whether this lower-consistency marl exhibited significantly lower long-term strength. Samples were sheared in triaxial compression under full saturation.

Samples were obtained at depths of 34 to as great as 75 ft below the surface, ranging from 2 to 15 ft below the upper marl contact. At these depths the soils would have been confined under effective stresses ranging from 1600 to 3400 psf (12 to 24 psi). Test output attached in the Appendix includes plots of deviator stress vs. applied strain for various load increments, induced pore pressure vs. applied strain, and maximum shear strength at various increments of confining stress. Average effective stress values of cohesion and friction angle for peak strength obtained from the test data, were zero cohesion and 35 to 38 degrees angle of internal friction. These effective stress strength values are not materially different from the underlying Unit 5 materials.

One dimensional consolidation (oedometer) testing was conducted on four undisturbed samples of these soils recovered in borings B-18A, B-27Alt 1, B-33A and B-77B. The tests were conducted to maximum applied stresses of 64 ksf. From the maximum load level each sample was then unloaded to 0.5 ksf in three to four decrements. Graphical presentation of sample deformation at 100 percent consolidation vs. load expressed as percent strain is attached in the appendices. Effective vertical stress of the samples in place was estimated to be 2.0 ksf. The Casagrande construction implies a preconsolidation stress as low as 8 ksf in one sample (B-27 Alt 1A at 33 feet) and 11.8 ksf in another (B-77B at 37 ft). The remaining two samples exhibited preconsolidation stresses of about 14 ksf.

The lower-consistency marl appears relatively compressible compared to underlying stiffer marl. At applied stresses below the preconsolidation stress, taken as the average of the increments immediately above and below the current overburden stress, average constrained modulus obtained was 120 to 220 ksf. Average compression ratio obtained above the preconsolidation stress was 0.24 to 0.28. This would equate to a one-dimensional constrained modulus (M) value of only about 30 ksf. Average recompression ratio taken from the unloading portion of the consolidation test curves was 0.07.

Preconsolidation of the upper lower-consistency marl appears marginally lower that preconsolidation stress values obtained in undisturbed samples obtained at greater depths of penetration into the marl at other locations. This observation is also mirrored by evident lower penetration resistances as well as lower excess pore pressure development in the CPT soundings.

4.3.9 *Unit 5 – Oligocene Ashley Formation (Cooper Group) Marl*

Nearly all borings and soundings terminated in the “basement” stratum of the Ashley Formation of the Cooper Group. These soils will likely form the principal bearing strata for deep foundations supporting the proposed structures. Depth to Unit 5 below the ground surface varied somewhat along the alignment, reflecting scouring or erosion of the upper surface of the unit subsequent to deposition. Overall the upper contact of this unit is to some degree undulating and depths to the upper contact likely vary substantially in areas not explored.

At the east end of the alignment within the naval base, Unit 5 appears to have been eroded and was encountered approximately 60 ft below the surface, lying immediately below deep very soft clay deposits of Unit 1B. Substantially deeper scouring of the Cooper marl has occurred elsewhere within the naval base (80 ft or deeper), though borings along the alignment did not encounter scour holes that deep. Unit 5 also occurs at a depth of about 65 ft near Spruill Avenue to Meeting Street, where the eroded marl appears to have been replaced by Unit 3 sands. At other locations explored Unit 5 appears to occur between 40 and 45 ft below the surface.

Where penetrated by the borings, these materials consist of firm to stiff, sandy, olive green silts or silty clays. “Marl” or calcarenite, underlying the Pleistocene deposits of Units 2 and 3, is commonly identified on the basis of a distinct olive-greenish color, brittle soil fabric or stiff to very stiff consistency. As distinct from the overlying Unit 4 materials, most samples from Unit 5 behaved as cohesive lumps when remolded by hand.

Predominant classification of these soils based on visual examination was ML with a considerable number of samples classified as SM. Fines content determined in the laboratory averaged from just below to just over 50 percent, with some scattered samples as high as 80 percent. Fines content appeared to increase with depth. Recovered samples were generally moist. Moisture contents ranged from 45 percent to as high as 75 percent oven-dried. Void ratio was typically 1.0 to 1.2.

In CPT soundings the Cooper Marl is evidenced by occurrence of very high excess pore pressures, reflecting a highly impervious character due to relatively great age, the presence of calcium carbonate cementation and high degree of consolidation relative to the overlying soils. Soil behavior based on CPT point resistance and friction ratio was typical of mixtures of sandy silts or silty sands. These deposits are evident in the CPT soundings by an increase in excess pore pressure measurements to values exceeding 15 tsf ranging as high as 30 tsf. Standard penetration resistances generally varying between 8 and 12 blows per foot, and CPT tip resistances of 25 to 35 tsf are typical of very stiff consistency for cohesive soils. Cooper Marl soils react to hydrochloric acid due to the presence of calcium carbonate.

A total of seven representative undisturbed samples of the Cooper Group soils were sheared in triaxial compression under full saturation. Several samples were obtained at locations where apparent marl consistency, based on SPT values, was lower than in other locations sampled in an attempt to determine whether lower-consistency marl exhibited significantly lower long-term strength.

Samples were obtained at depths of 32 to 102 ft below the surface. At these depths the soils would have been confined under effective stresses ranging from 1600 to over 5000 psf (12 to 35 psi). Test output attached in the Appendix includes plots of deviator stress vs. applied strain for various load increments, induced pore pressure vs. applied strain, and maximum shear strength at various increments of confining stress.

All samples were isotropically consolidated under applied pressures of 15 to 55 psi with full drainage. Following consolidation, samples were then sheared in compression using the CU or "R" test method without allowing any further drainage. Failure of the specimens during the tests was defined as the maximum stress difference (deviator stress) attained at any point during the test. Average effective stress values of cohesion and friction angle for peak strength obtained from the test data, were zero cohesion and 34 to 38 degrees angle of internal friction.

One dimensional consolidation (oedometer) testing was conducted on four undisturbed samples of these soils recovered in borings B-23 Alt 1, and B-76A at depths varying from 50 to 75 ft. The tests were conducted to maximum applied stresses of 32 to 64 ksf. From the maximum load level each sample was then unloaded to 0.5 ksf in three to four decrements. Graphical presentation of sample deformation at 100 percent consolidation vs. load expressed as percent strain is attached in the appendices.

Effective vertical stress of the samples in place was estimated to be 2.0 to 3.2 ksf. The Casagrande construction implies a preconsolidation stress of 20 ksf to as high as 22.5 ksf. Compared to present overburden stresses, overconsolidation ratio values ranged from as great as 10 to as low as 6.3. At applied stresses below the preconsolidation stress, taken as the average of the increments immediately above and below the current overburden stress, average constrained modulus obtained was 450 to 750 ksf. Average compression ratio obtained above the preconsolidation stress was 0.16 to 0.17. This would equate to a one-dimensional constrained modulus (M) value of only 220 ksf at very high stresses. Average recompression ratio taken from the unloading portion of the consolidation test curves was 0.017.

Since this layer is moderately to heavily overconsolidated, compression due to deformation of soil grains will occur almost immediately after load application. Time-dependent compression due to primary consolidation and secondary compression will be very small.

4.4 Groundwater

As discussed in Section 2.4, 24-hour ground water levels were not recorded in some of the soil borings. Groundwater level was measured immediately following the completion of the CPT and DMT soundings. The groundwater levels are presented on the boring and sounding logs, where available, and the subsurface profiles. Groundwater was encountered at a median depth of 2 ft below the ground surface, corresponding to a median groundwater elevation of 7 ft NAVD 88. Groundwater levels are expected to fluctuate with climatic, seasonal and tidal changes, as well as with construction activity at the site. Groundwater measurements made at different times than our exploration may indicate groundwater levels substantially different than indicated on the boring logs in the Appendix.

5.0 Geotechnical Design Considerations

The analyses and results presented herein were completed prior to adoption of the current Geotechnical Design Manual (GDM); therefore, the methods and results may not be in full compliance with the GDM and are provided only for information. Furthermore, the environment issues associated with some of the construction methods presented are not discussed in this report, and the inclusion of any methods in this report is not an endorsement of feasibility. The analyses presented herein are based, in part, upon data obtained from our subsurface exploration. Since portions of the project site were previously developed, obstructions which were not evident at the time of our exploration (i.e., buried debris, old fill, etc.) will be encountered during construction. In addition, variations in the subsurface conditions will not become evident until construction.

5.1 General Discussion

Due to the variations in the subsurface conditions, design and construction considerations for each ramp and the main line will be addressed separately. The considerations and discussion below are based on preliminary analyses of the collected data and provided profiles. Final design recommendations should be based on additional detailed analyses and the final embankment and bridge requirements.

5.1.1 *Static Settlement*

From a geotechnical engineering perspective, the marsh deposits and clays and silts overlying the Cooper Marl, particularly the Holocene age deposits will likely pose the greatest challenge. Based on the laboratory data, the Unit 2C clays and silts appear to be overconsolidated enough that they will not experience virgin compression under low to moderate (i.e., 5 to 12 ft) fill height loads. At bridge abutments, where fill heights tend to be high and settlement tolerances low, compression of this layer may require preloading, wick drains and surcharging, or some combination of approaches to mitigate long-term settlement.

The main interchange is located in an area where the softer shallow marsh deposits were encountered as well. Ramps B and C have embankment bridge abutments in this area and may require some form of treatment to meet normal SCDOT settlement criteria. More substantial ground improvement methods such as pile or column supported embankments may be required if project schedules preclude long surcharging periods.

The portion of the alignment on the former Navy Base contains the poorest soils encountered over the entire alignment. The very soft clays and silts (Unit 1B) overlying the Cooper Marl are very weak and compressible. The ground improvement methods mentioned above will almost certainly be necessary for any grade-supported embankments on the former Navy Base, and staged filling cycles may have to be implemented to prevent overstressing the soils and causing bearing capacity failures of the embankment during construction. Tidewater Road, which runs parallel to Shipyard Creek, was constructed from rubble fill. Deep foundation excavations along and adjacent to Tidewater Road would likely encounter rubble overlying the very weak soils.

5.1.2 *Shear Strength Loss Screening*

The soils encountered in the borings and soundings were evaluated for Shear Strength Loss (SSL) based on laboratory soil shear strength testing, SPT and CPT testing, laboratory index testing, and the depth to the water table. The evaluation indicates Sand-Like soils, Normally Sensitive (NS) Clay-Like soils, and Highly Sensitive (HS) Clay-Like soils between the water table and the Cooper Marl are susceptible to SSL. Liquefaction triggering evaluations should be performed on these soils during design. The Cooper Marl and soils below the Cooper Marl are not susceptible to SSL.

5.1.3 *Buried Debris*

Buried debris was encountered along the proposed Local Access Road alignment near Bainbridge Avenue. Although no other large deposits of buried debris were encountered, based on our knowledge of the site history, debris and uncontrolled fill would likely be encountered during a more complete site exploration where access to all portions of the alignment was available. Due to property owners' site access restrictions, we were not able to explore areas along the alignment of the Local Access Road and Stromboli Avenue. Closed, former landfills are known to exist in this area within and very close to the proposed alignment. Most of the area of North Charleston where the alignment is located has been developed commercially or by heavy industry for many decades. The legacy of this type of development frequently includes buried debris, uncontrolled fill, and environmental contamination. Undercutting and/or special considerations (e.g., predrilling) may be necessary for grading, ground improvement, and foundation installation operations.

5.2 Ramp A

Based on our understanding of the alignment profile drawings in the provided Environmental Impact Statement, Ramp A begins along I-26 eastbound approximately 1200 ft west of the North Meeting Street exit and crosses over I-26 approximately 500 ft east of the Rhodia (a.k.a. Solvay) plant. The ramp then crosses Summerville Avenue and King Street Extension before joining Ramps B, C and D at the beginning of Main Line 1D immediately west of Meeting Street Extension.

Based on the site conditions and review of aerial photographs, it appears areas of Ramp A near the North Meeting Street exit and near Summerville Avenue lie within or near tidal marsh areas of the Ashley River.

The borings along Ramp A generally encountered very loose to dense sands overlying very soft to firm clays. The sand stratum averaged about 8 to 10 ft thick, but thickened to about 30 ft in the vicinity of the North Meeting Street exit ramp. An approximately 10 ft thick layer of medium dense sand was encountered in the middle of the clay stratum in a boring near the Rhodia plant. The clay stratum extended from below the sand to the top of the Cooper marl, except near the southern end of the ramp where the interchange with I-26 is located. A lower sand stratum directly overlying the marl was encountered in the borings in this area. The top-of-marl elevation was generally around elevation -40 ft-NAVD 88 over most of the ramp; however, the top-of-marl elevation dropped abruptly in the vicinity of King Street Extension to an elevation of about -53 ft. Figure 4-4 and Figure 4-5 illustrate our interpretation of the subsurface profile based on the borings, and depict the soil units encountered.

5.2.1 *Static Settlement*

Based on the ramp profile, it appears that approximately 4 to 6 ft of fill will be placed along most of Ramp A. The fill height at the bridge abutment near Station 5792+25 will approach 11 ft. Settlements from the weight of the new fill are primarily expected due to compression of the upper sandy soils, with some minor compression of the soft to firm clays overlying the Cooper Group. Based on the laboratory and CPT data, the clays have an OCR of at least 2. With a maximum fill height of 11 ft, settlements should be on the order of 1 to 2 in.

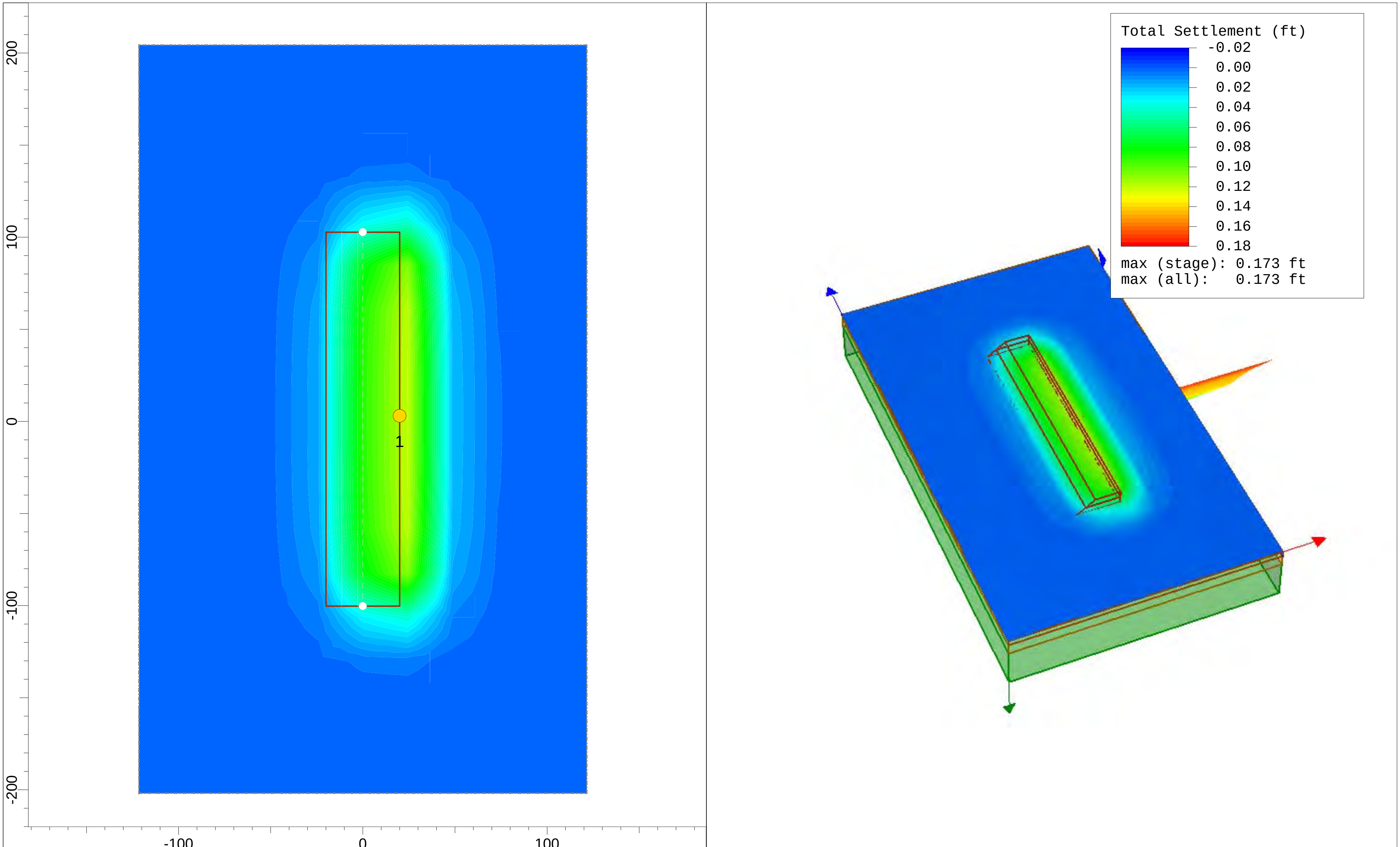
We estimate that approximately 50% of the predicted settlement will occur within 90 days following fill placement, and that long term settlement will be less than SCDOT typical maximum allowable limits of 5 in. for roadways and 2 in. for bridge abutments. Settlements were estimated using the program Settle 3D© with primary consolidation theory. Figure 5-1 and Figure 5-2 show cross sections of the proposed embankments at Station 5792 and Stations 5770 to 5780. The total settlement shown in the upper right-hand corner is the settlement calculated at the point labeled "1" on the left-hand plan view, and is the point where the maximum settlement was calculated.

5.2.2 *Embankment Global Stability*

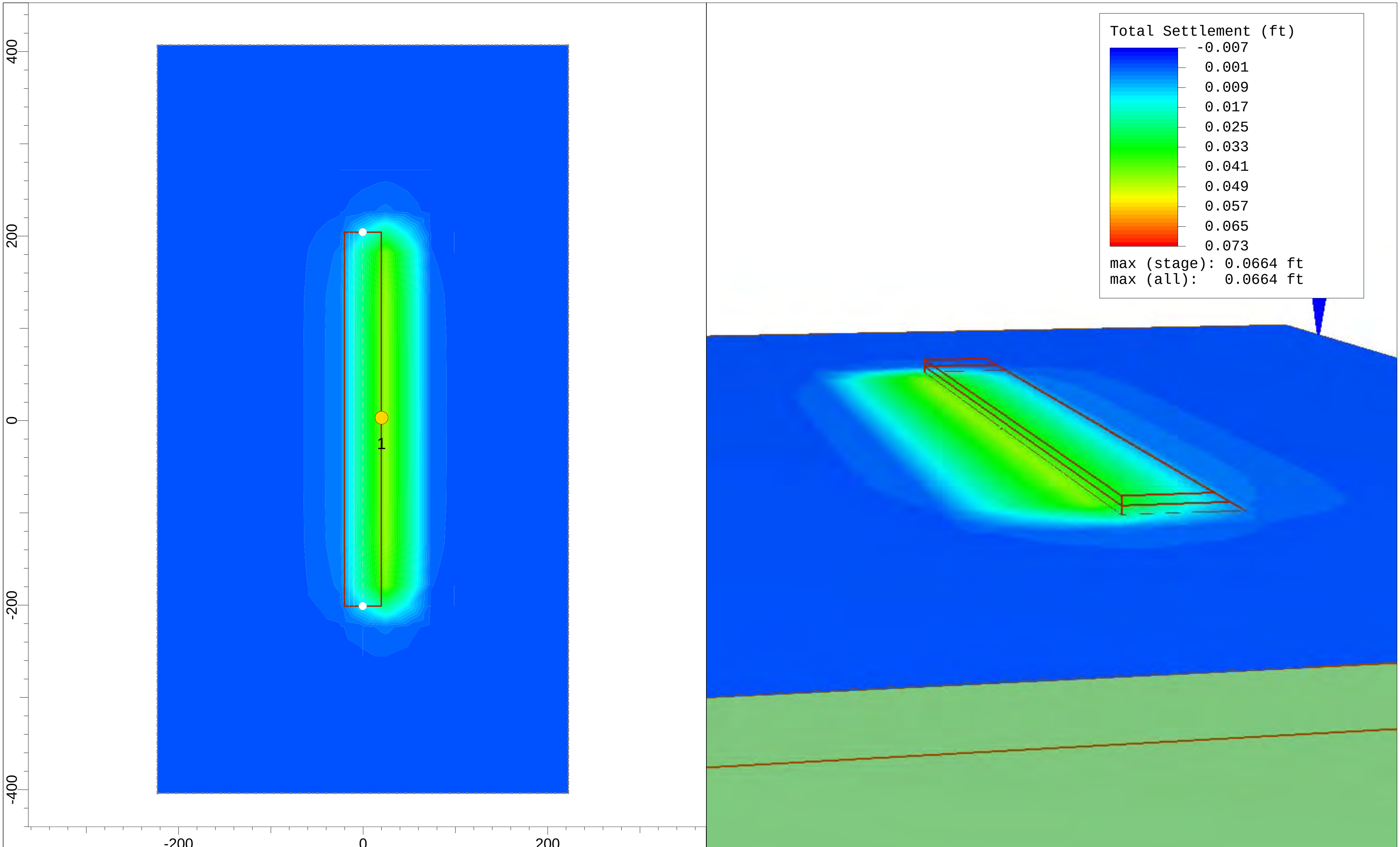
We performed static slope (global external) stability analysis for the embankment along Ramp A using limit equilibrium methods. Representative sections were modeled at Stations 5772+00 and 5792+25 because these areas are where the highest fill heights occur. SLIDE Version 5.024 was used for these analyses. The results of our analyses indicate that the embankment configuration shown in our analyses will be stable during and following construction with a factor of safety (FOS) greater than 1.4 under static conditions.

To evaluate the seismic response of the proposed embankments, we performed pseudo-static analyses based on the provided slope configuration according to the unified methodology described by the FHWA[5]. In summary, the unified methodology includes an equivalent horizontal (static) force in the slope stability calculations to represent the seismically-induced inertial force (as a percentage of gravity). A pseudo-static seismic coefficient of 0.27g (which is ½ the SEE peak ground acceleration) was used in our evaluation. Although a Site Specific Seismic Study was beyond the scope of this project, we estimated the seismic coefficient based on our local experience for the purpose of this preliminary evaluation. The FOS for the representative embankment sections are less than 1.1 for pseudo static seismic conditions using an acceleration of 0.27g. Yield accelerations ranged from 0.16g to 0.18g. Liquefaction global stability and detailed deformation analyses were beyond the scope of this project; however, based on the yield accelerations, deformations should be relatively small (less than 3 in.). Figure 5-3 through Figure 5-6 show a representative cross section at Stations 5772+00 and 5792+25, respectively, under static and pseudo-static conditions.

[5] FHWA Geotechnical Earthquake Engineering Manual, Vol. FHWAH1-99-012, Chapter 7.4. December, 1998.



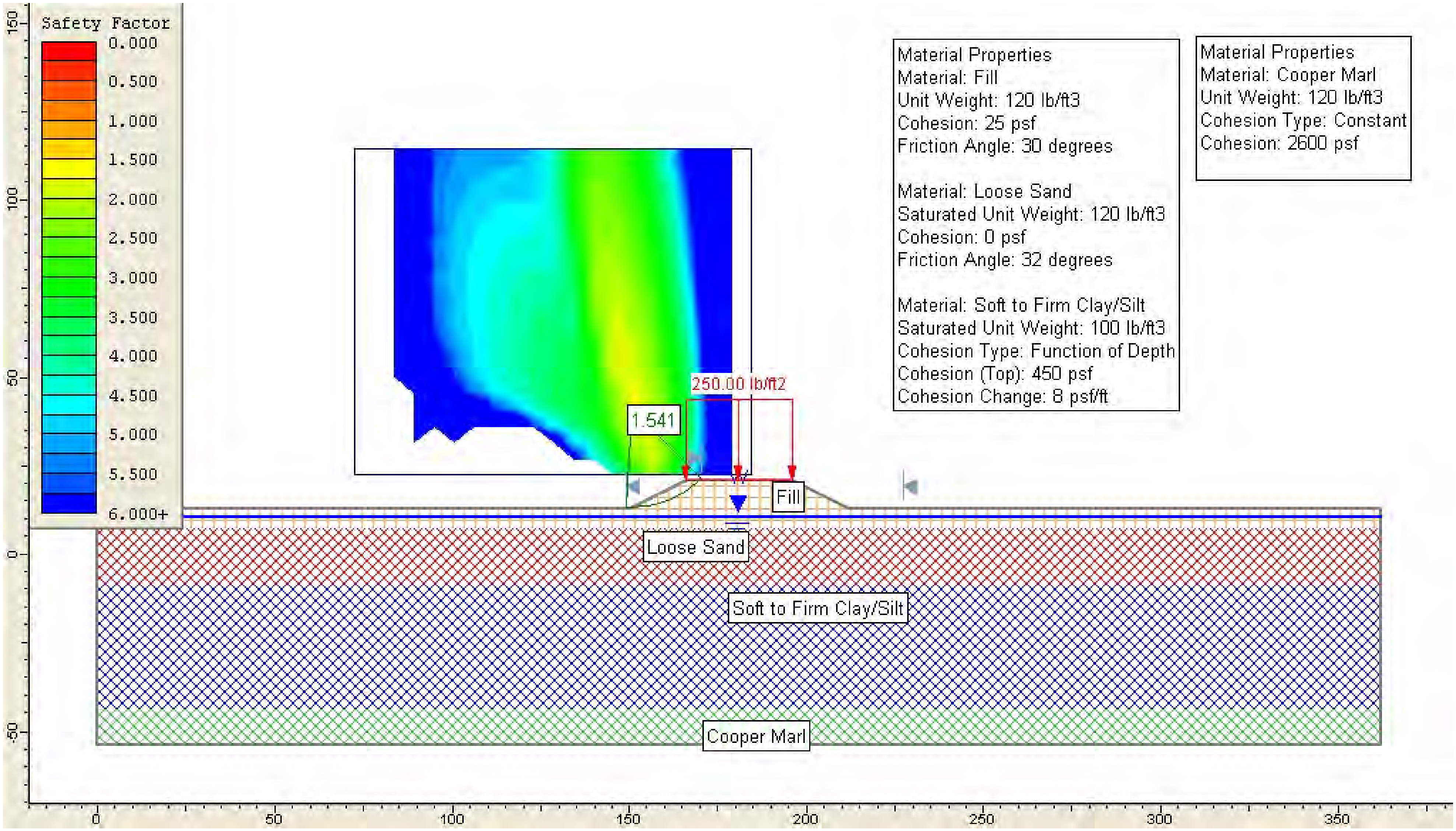
S&ME	Project	Port Access Road	
	Analysis Description	Embankment Settlement at Ramp A: Station 5792	
		12 ft of fill at end bent; B-6 soil model	
	Drawn By	DWH	Company: S&ME, Inc.
SETTLE3D 1.007	Date	3/20/09	Figure 5-1



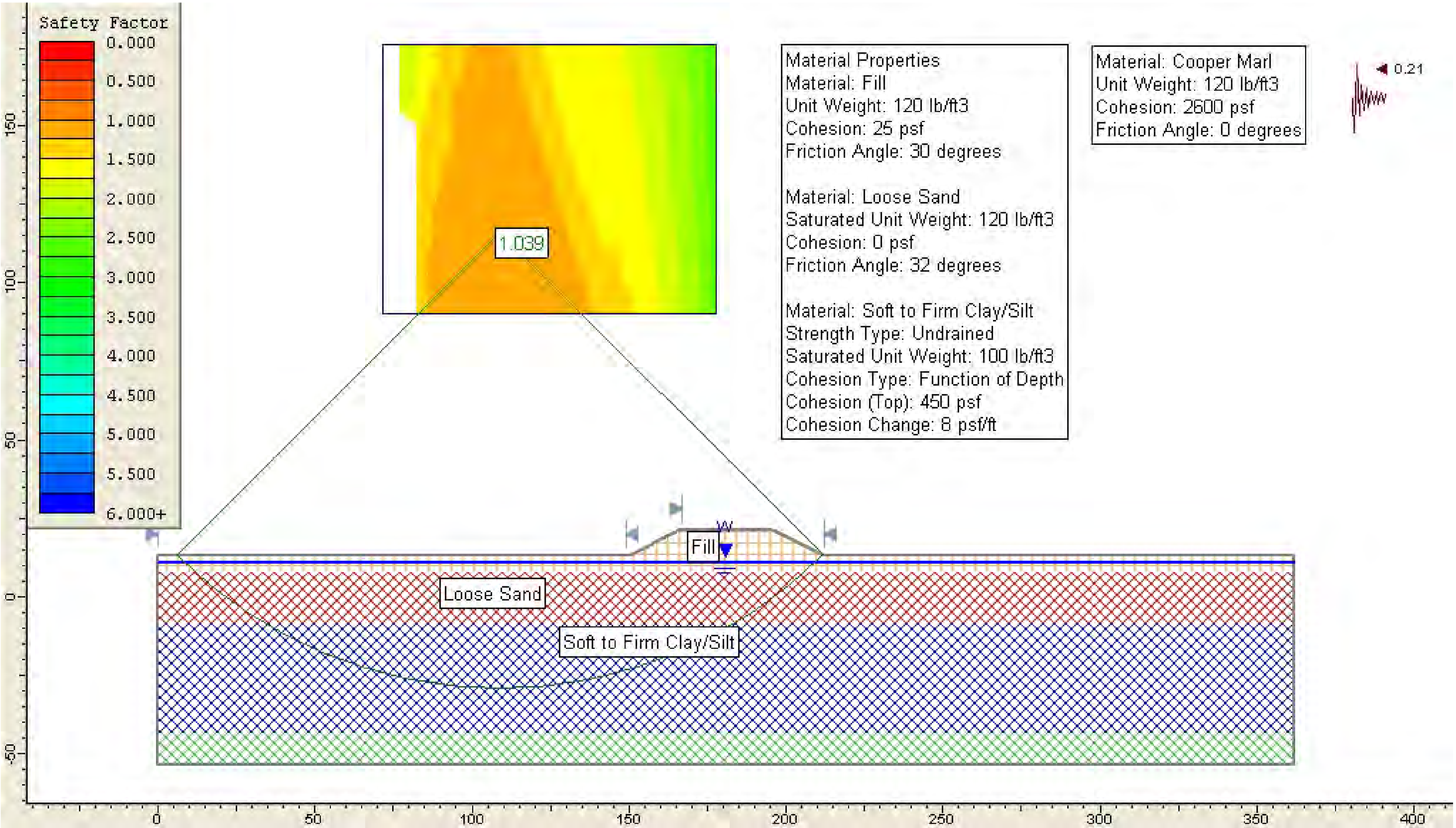
S&ME

SETTLE3D 1.007

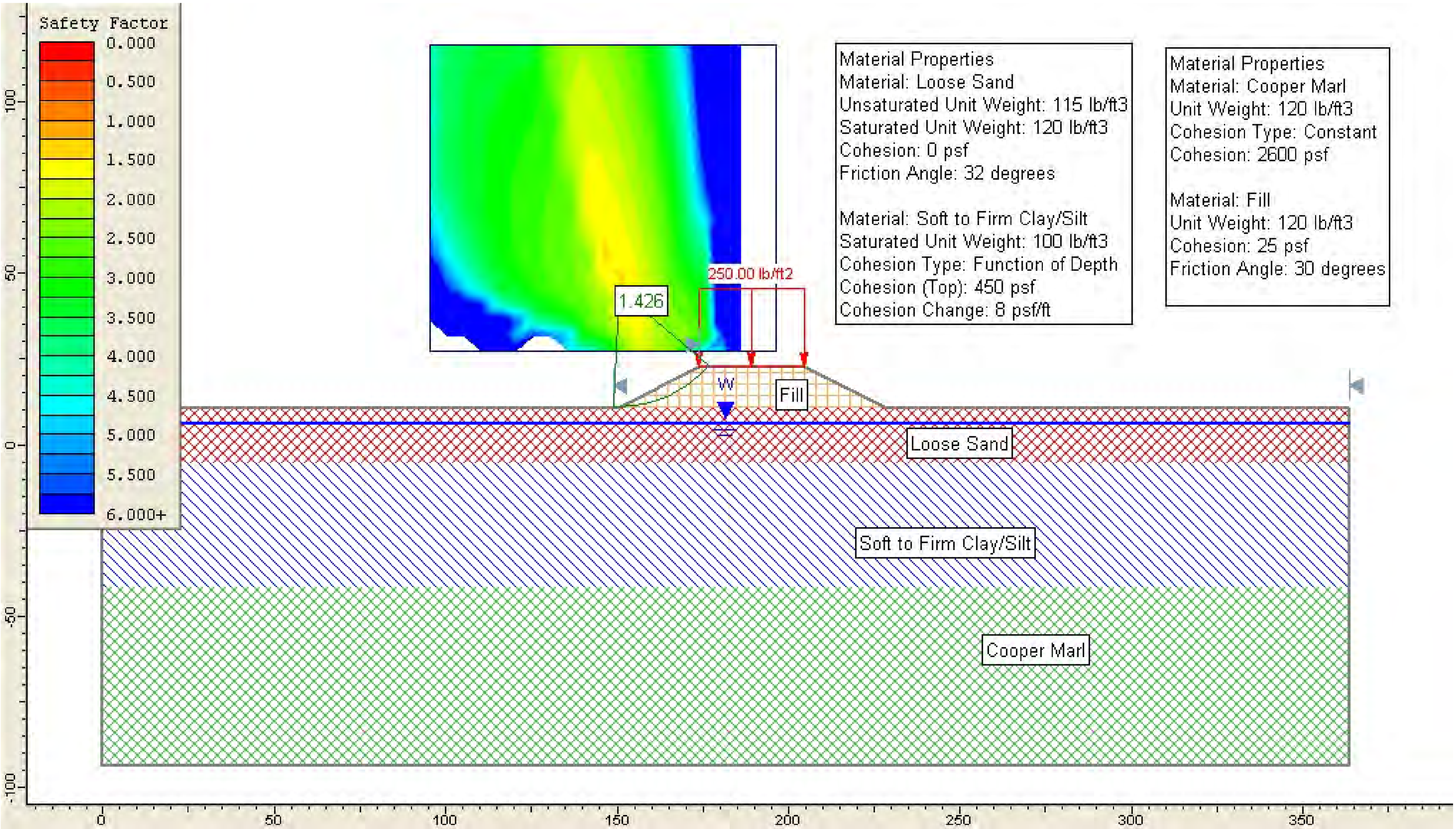
Project	Port Access Road
Analysis Description	Embankment Settlement along Ramp A: Stations 5770 to 5780
	6 ft of fill; B-2 & B-6 soil model
Drawn By DWH	*Company* S&ME, Inc.
Date 3/20/09	Figure 5-2



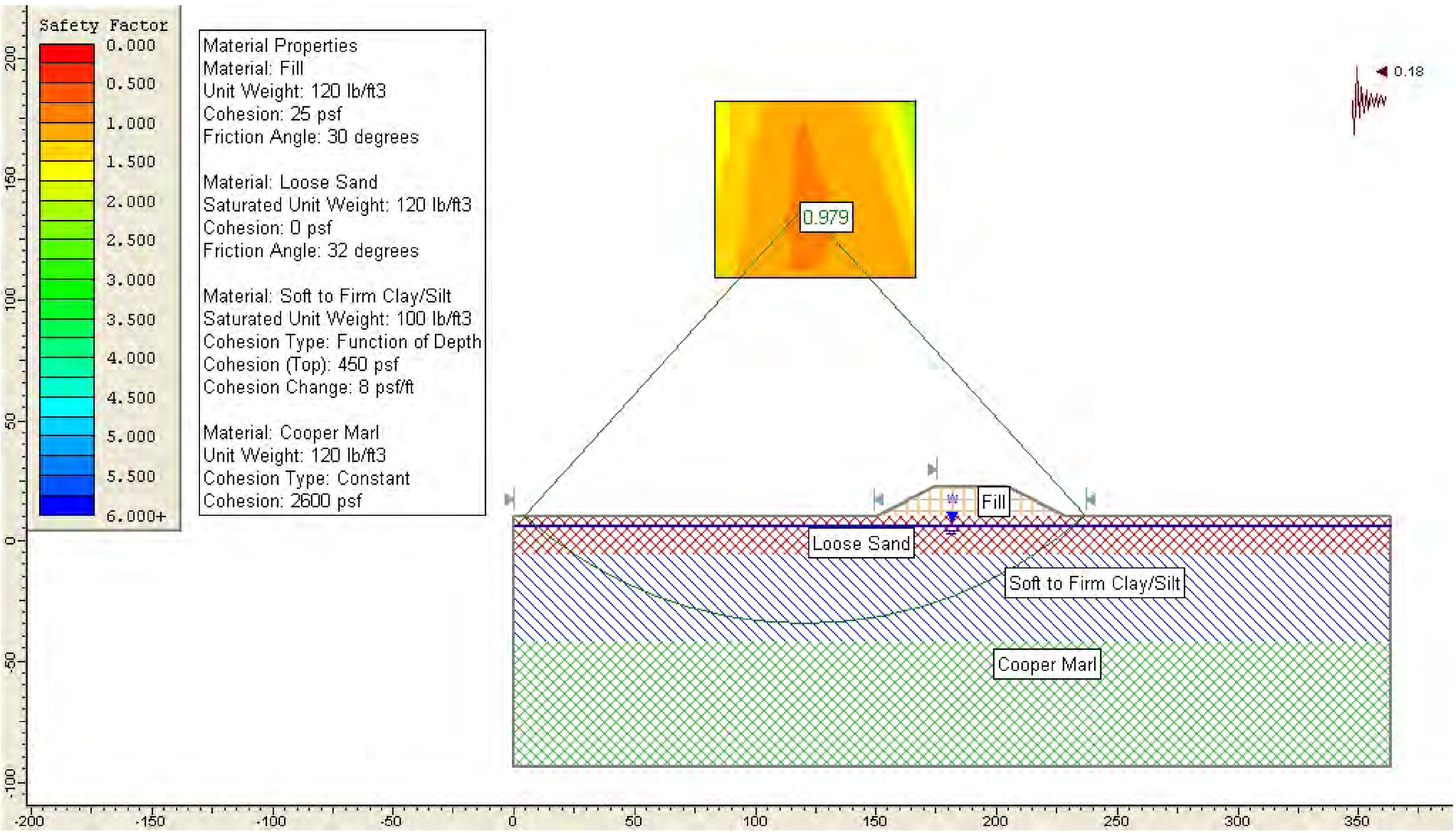
PROJECT NO. 1131-08-554	S&ME	**PORT ACCESS ROAD** **EMBANKMENT STABILITY ANALYSIS – RAMP A** STATION 5772+00 - STATIC CONDITION 8 FT OF FILL; B-2 SOIL MODEL	**Figure 5-3**
APRIL 2009			
AS SHOWN			



PROJECT NO. 1131-08-554	S&ME	**PORT ACCESS ROAD** **EMBANKMENT STABILITY ANALYSIS – RAMP A** STATION 5772+00 – PSEUDO-STATIC CONDITION 8 FT OF FILL; B-2 SOIL MODEL
APRIL 2009		
AS SHOWN		**Figure 5-4**



PROJECT NO. 1131-08-554	S&ME	**PORT ACCESS ROAD**	**Figure 5-5**
APRIL 2009		**EMBANKMENT STABILITY ANALYSIS – RAMP A**	
AS SHOWN		STATION 5792+25 – STATIC CONDITION 12 FT OF FILL; B-6 SOIL MODEL	



PROJECT NO. 1131-08-554	S&ME	**PORT ACCESS ROAD** **EMBANKMENT STABILITY ANALYSIS – RAMP A** STATION 5792+25 – PSEUDO-STATIC CONDITION 12 FT OF FILL; B-6 SOIL MODEL	**Figure 5-6**
APRIL 2009			
AS SHOWN			

5.2.3 *Deep Foundations*

We assume most of the bridges will be supported on drilled shafts or driven pre-stressed concrete (PSC) piles bearing in the Cooper marl. For our preliminary deep foundation analyses, we have neglected the contribution or potential downdrag of the overburden soils. A unit side friction value of 3.0 ksf and unit end bearing value of 30 ksf was used for drilled shafts bearing in the Cooper marl. Unit values of 2.6 ksf and 26 ksf were used for driven piles. The unit values are based upon laboratory testing and our local experience with load test results on drilled shafts and driven piles. Figure 5-7 and Figure 5-8 below present the estimated axial capacity for 3-ft, 4-ft, 6-ft and 8-ft diameter drilled shafts bearing in the Cooper marl, as well as 20-in. square and 24-in. square PSC piles bearing in the marl. A top-of-marl elevation for Ramp A of -45 ft-NAVD 88 was used. Based on the subsurface profile, this is an appropriate top-of-marl elevation for most of Ramp A; however, it should be noted that the marl dips to an elevation of about -52 ft in the borings along King Street Extension where Ramps A through D converge. Shafts would have to be longer at King Street Extension and possibly further from King Street Extension for a corresponding axial capacity, depending on the actual top-of-marl elevation at each bent location.

Figure 5-7. Ramp A Ultimate Drilled Shaft Capacity vs. Tip Elevation

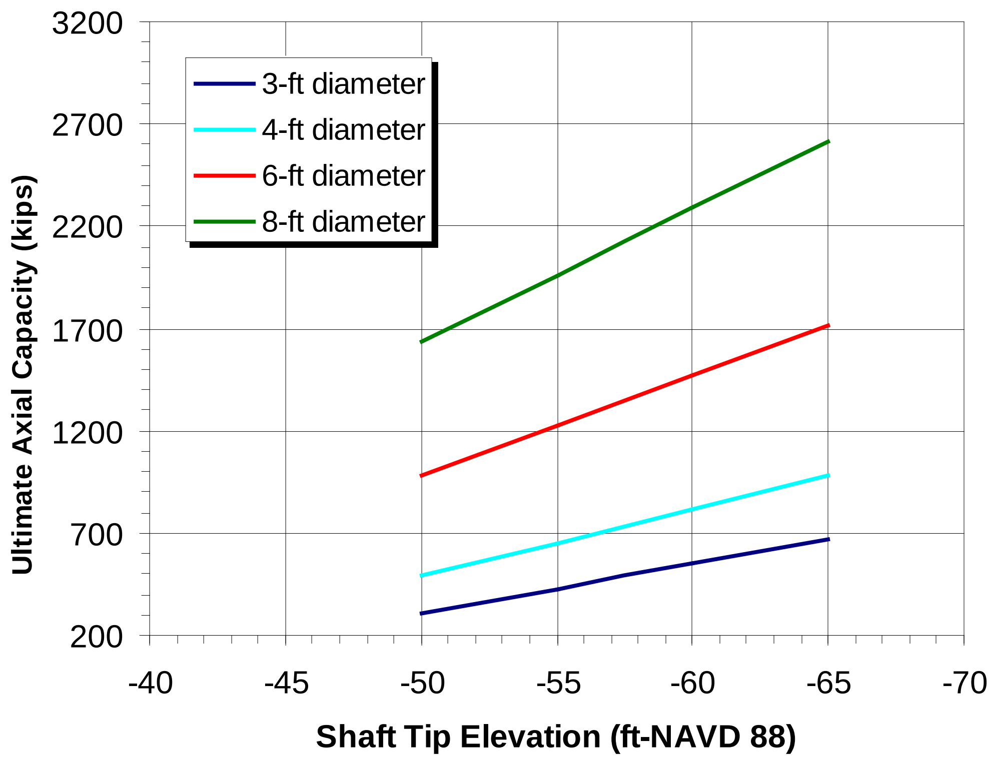
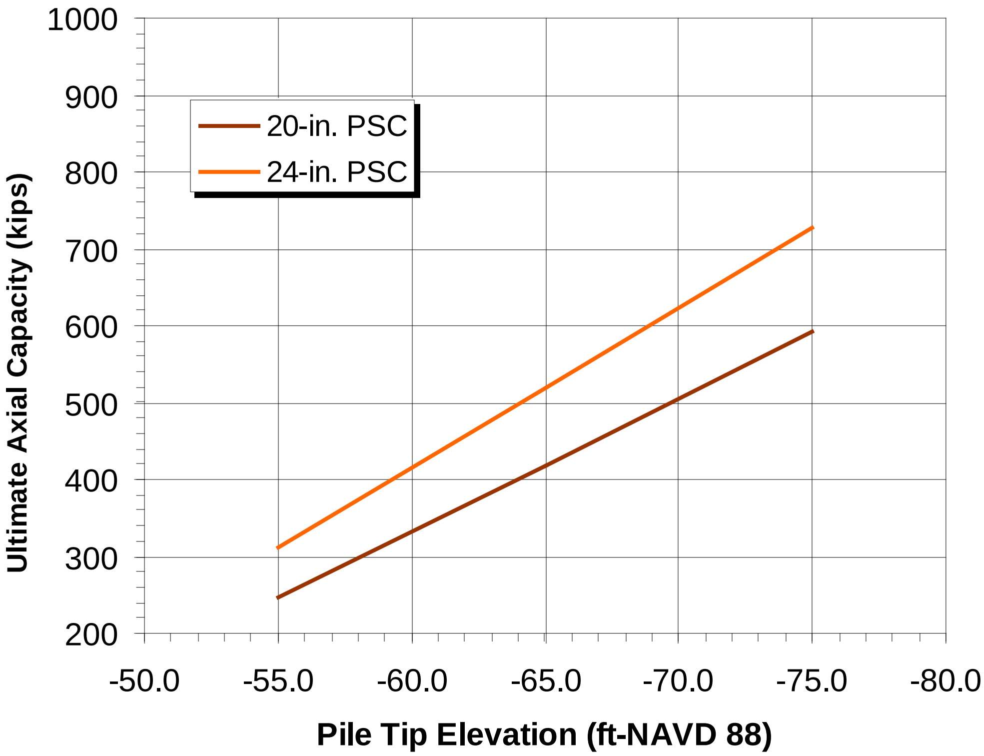


Figure 5-8. Ramp A Ultimate Driven PSC Pile Capacity vs. Tip Elevation



5.3 Ramp B

Ramp B begins at Spruill Avenue and heads west, crossing King Street Extension, the CSX Railroad, Summerville Avenue, the Spruill Avenue exit ramp from I-26 westbound, and the on-ramp to I-26 eastbound from Meeting Street Extension. It diverges from Ramps A, C and D near King Street Extension. Portions of Ramp B also appear to lie within tidal marsh areas of the Ashley River, particularly near where Ramp B crosses I-26.

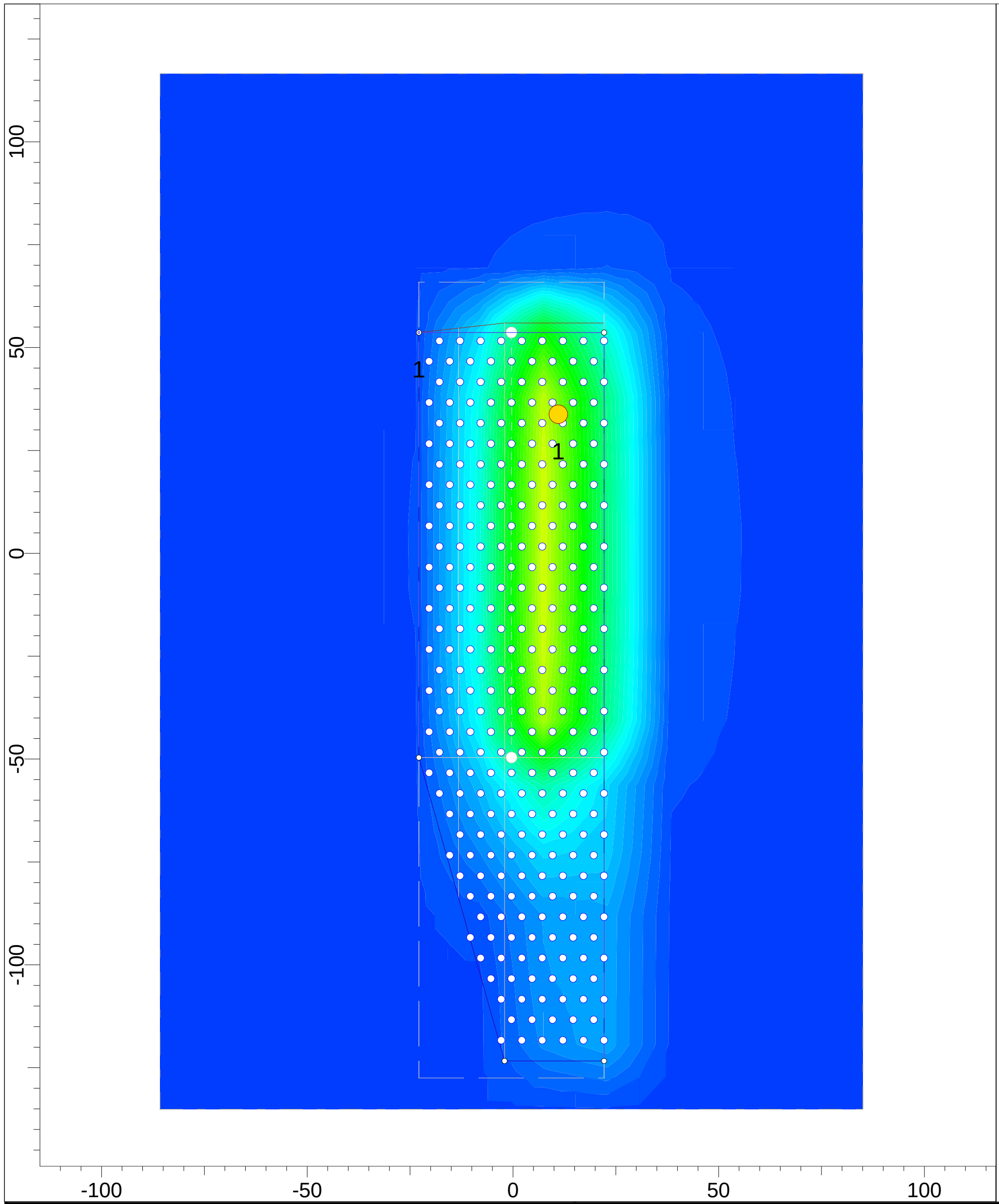
The subsurface conditions change significantly from south to north. At the southern end of the ramp along I-26, the borings encountered loose to dense sands from the ground surface to the top of the Cooper. As the ramp approaches the marshy tidal area near the existing I-26 on-ramp from Meeting Street Extension, a layer of soft clay and silt was encountered that becomes thicker as the ramp approaches the Main Line. A consolidation test performed on an undisturbed sample of the weight-of-hammer silt near the bridge abutment indicated a Compression Ratio (Cr) of 0.29, an Overconsolidation Ratio (OCR) of 1 and a Coefficient of Consolidation (Cv) of 0.01 ft2/day. Figure 4-8 shows the subsurface profile along Ramp B.

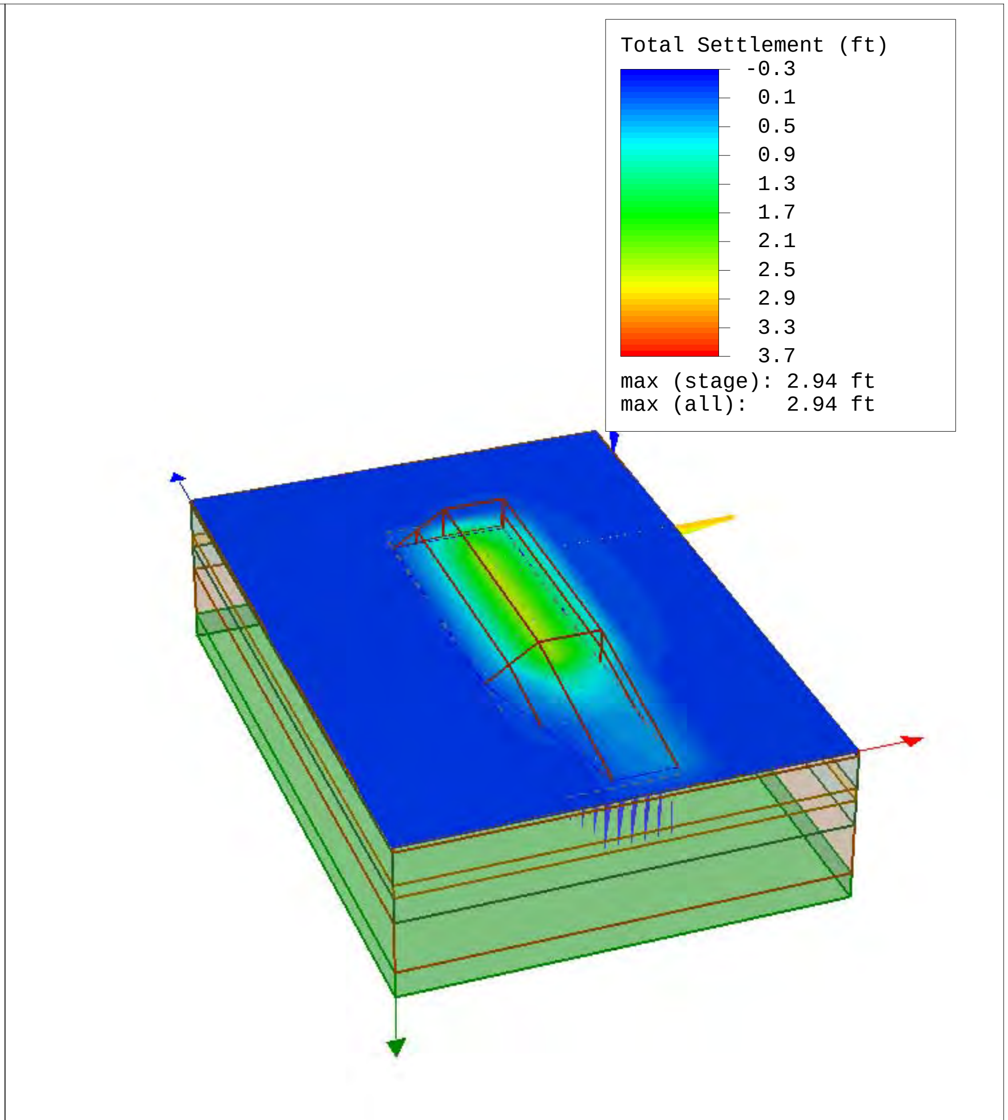
5.3.1 *Static Settlement*

Based on the ramp profile, we estimate up to 13 ft of fill will be placed near Station 5820+50 on Ramp B. This is the area where the very soft clay is relatively thick (about 25 ft). Settlements from the weight of the new fill are primarily expected due to compression of this soft layer. With a maximum fill height of 13 ft, settlements could be on the order of 3 ft and would occur slowly. Due to the magnitude and settlement rate, some form of ground improvement will likely be required at this bridge abutment. Based on our analyses, a combination of wick drains on a 5-ft triangular spacing and a 6 to 8 ft surcharge can reduce settlements to typically acceptable SCDOT limits in a reasonable amount of time. We estimate that at least a 1 yr surcharge period would be required. Other forms of ground improvement may be necessary if schedule limitations preclude long surcharge periods. Figure 5-9 shows a representative cross section of the embankment with the calculated settlement at the point shown on the plan view. The wick drains used in the analysis are shown as a group of thin blue lines extending from the ground surface through the soft strata into underlying sands.

5.3.2 *Embankment Global Stability*

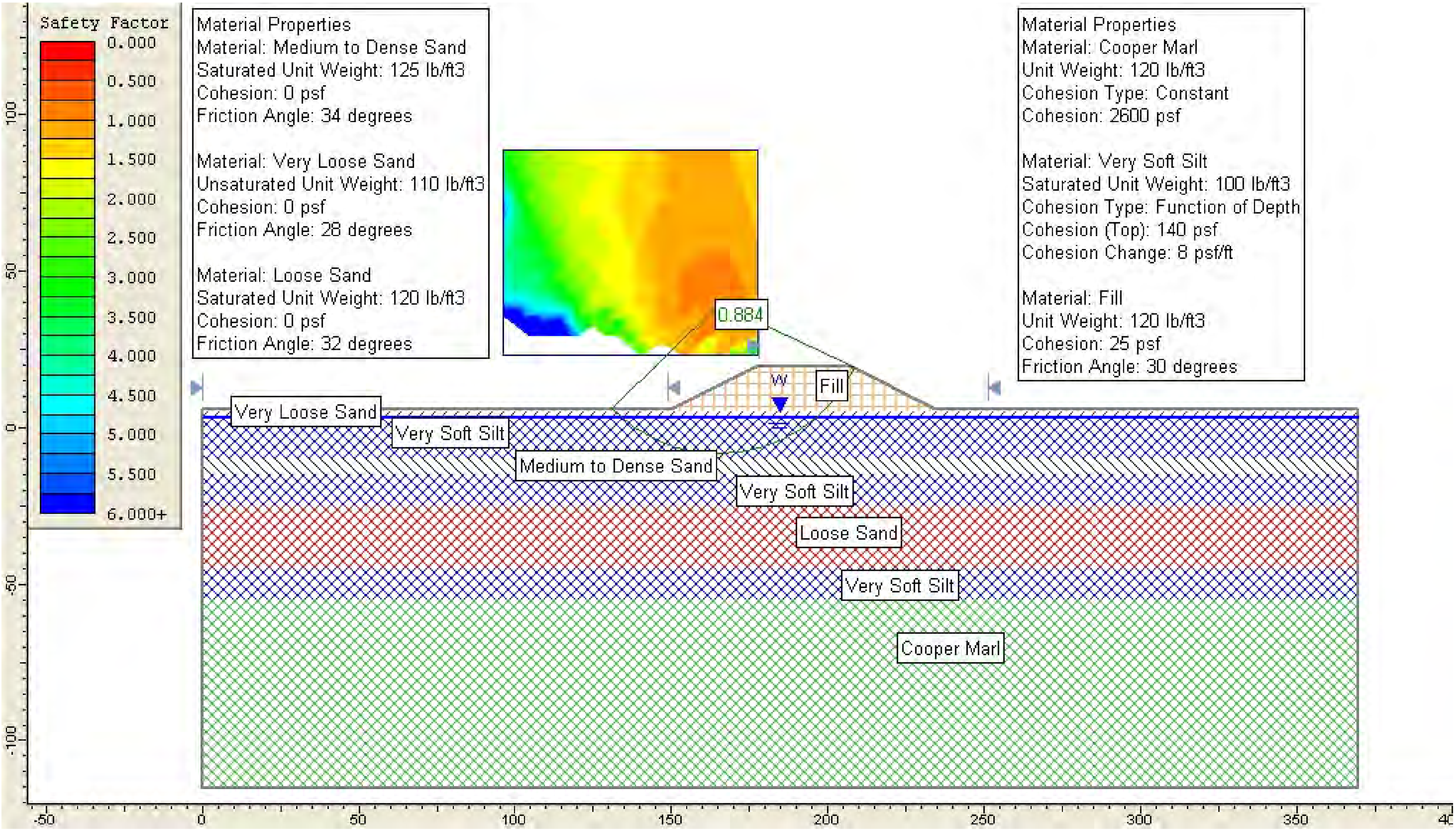
The results of our global stability analyses indicate that the embankment configuration shown will be stable during and following construction with a FOS greater than 1.4 under static conditions. The FOS for the representative embankment section is less than 1.1 for pseudo-static seismic conditions, under an acceleration of 0.27g. The yield acceleration is 0.18g. Figure 5-10 through Figure 5-12 show a representative cross section at Station 5820+46 under static and pseudo-static conditions.



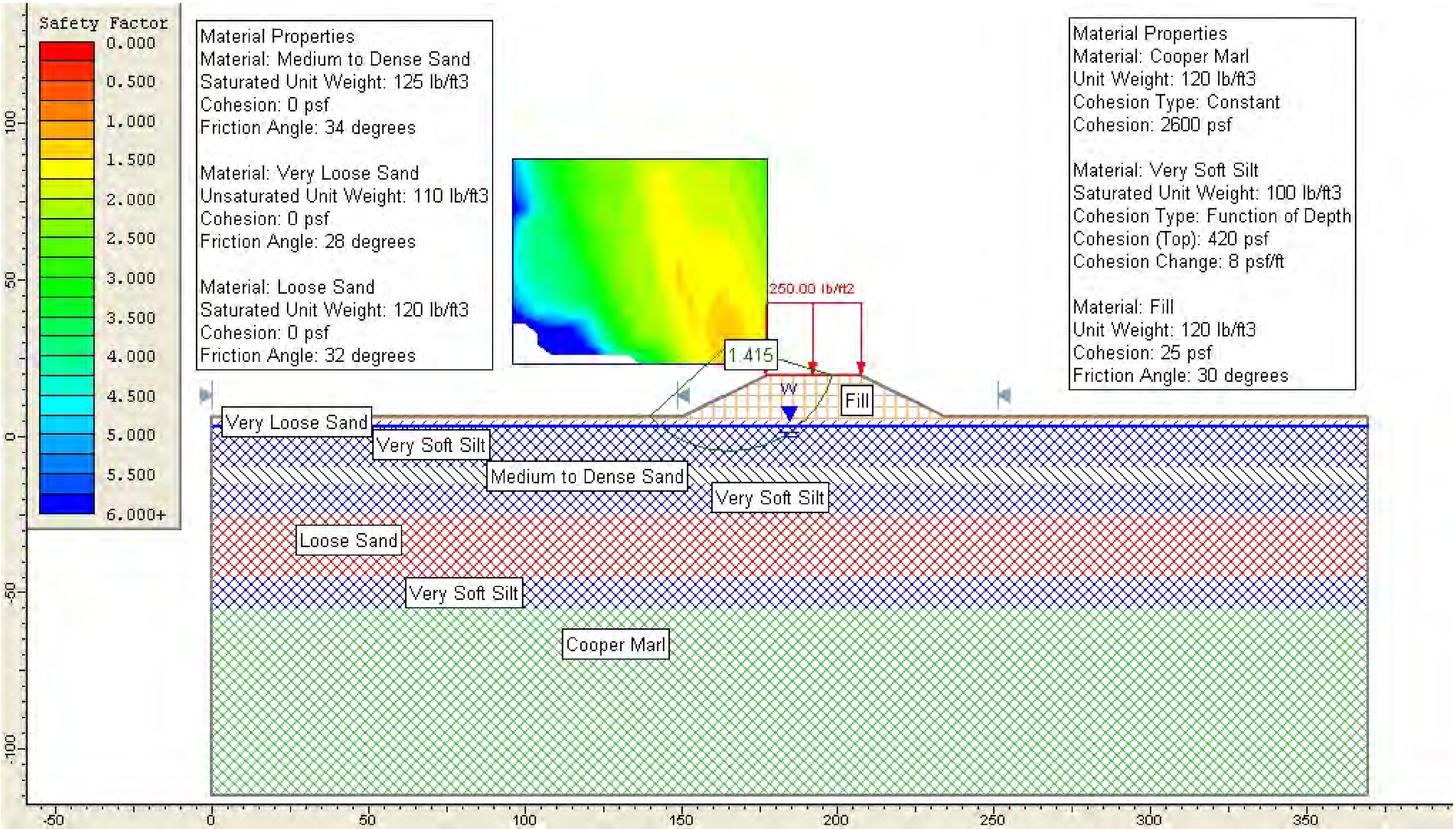


Project	Port Access Road		
Analysis Description	Embankment Settlement at Ramp B Station 5820+25		
	13 ft of fill with 6 ft surcharge; B-74 soil model		
Drawn By	DWH	*Company*	S&ME, Inc.
Date	3/20/09		Figure 5-9

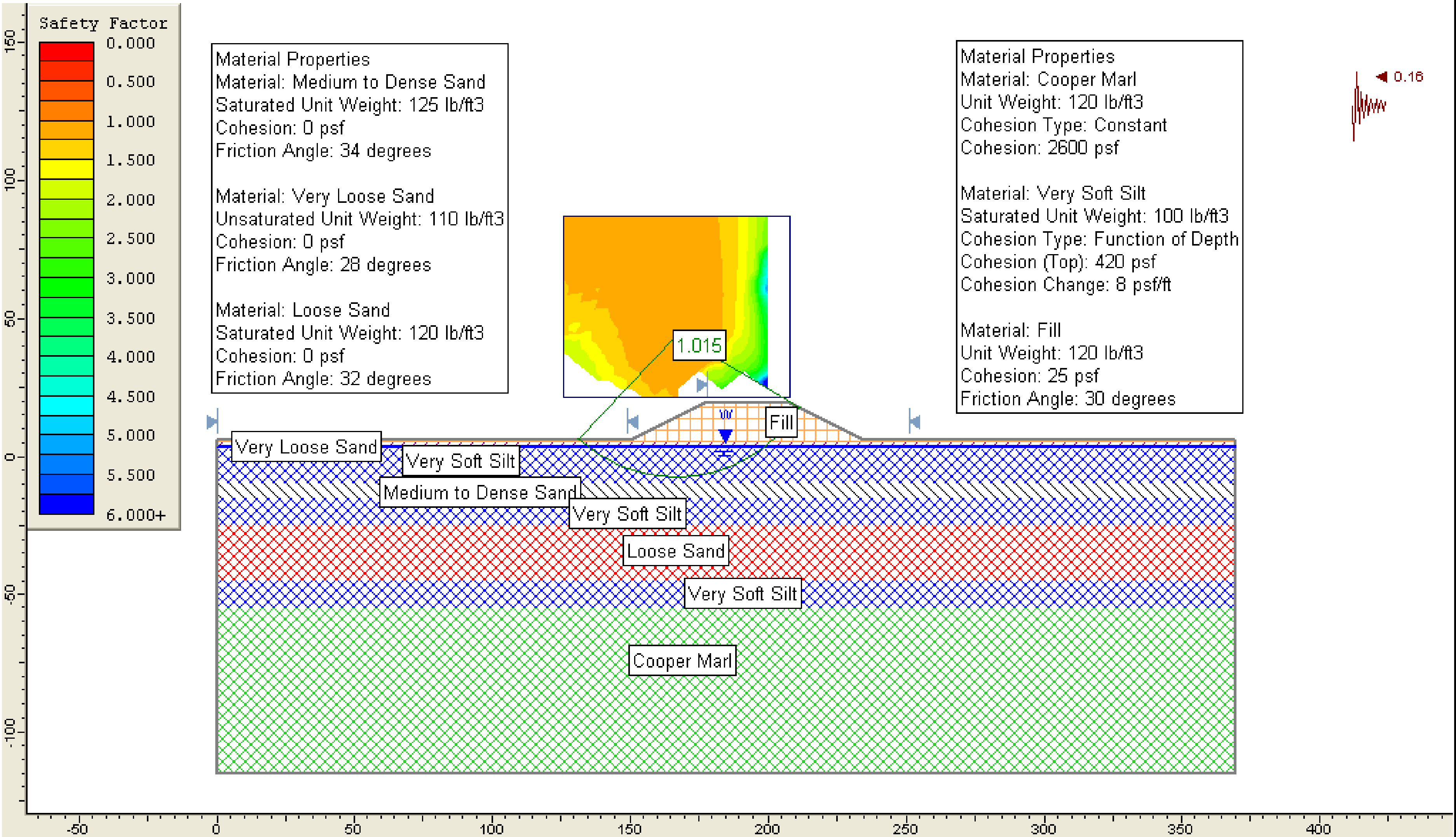
SETTLE3D 1.007



PROJECT NO. 1131-08-554	S&ME	**PORT ACCESS ROAD** **EMBANKMENT STABILITY ANALYSIS – RAMP B** STATION 5820+46 – STATIC CONDITION (AFTER CONSTRUCTION) 13.5 FT OF FILL; B-74 SOIL MODEL	**Figure 5-10**
APRIL 2009			
AS SHOWN			



PROJECT NO. 1131-08-554	S&ME	**PORT ACCESS ROAD** **EMBANKMENT STABILITY ANALYSIS – RAMP B** STATION 5820+46 – STATIC CONDITION (LONG TERM) 13.5 FT OF FILL; B-74 SOIL MODEL	**Figure 5-11**
APRIL 2009			
AS SHOWN			



PROJECT NO. 1131-08-554 APRIL 2009 AS SHOWN	S&ME	**PORT ACCESS ROAD** **EMBANKMENT STABILITY ANALYSIS – RAMP B** STATION 5820+46 – PSEUDO-STATIC CONDITION 13.5 FT OF FILL; B-74 SOIL MODEL	**Figure 5-12**

5.3.3 *Deep Foundations*

Figure 5-13 and Figure 5-14 present the estimated axial capacity for drilled shafts and driven, square PSC piles bearing in the Cooper marl. A top-of-marl elevation for Ramp B of -45 ft-NAVD 88 was used. Based on the subsurface profile, this is an appropriate top-of-marl elevation for most of Ramp B. Ramp B converges with Ramps A, C and D at King Street Extension where the marl dips to an elevation of about -52 ft; therefore shaft lengths might be longer in the vicinity of King Street Extension.

Figure 5-13. Ramp B Ultimate Drilled Shaft Capacity vs. Tip Elevation

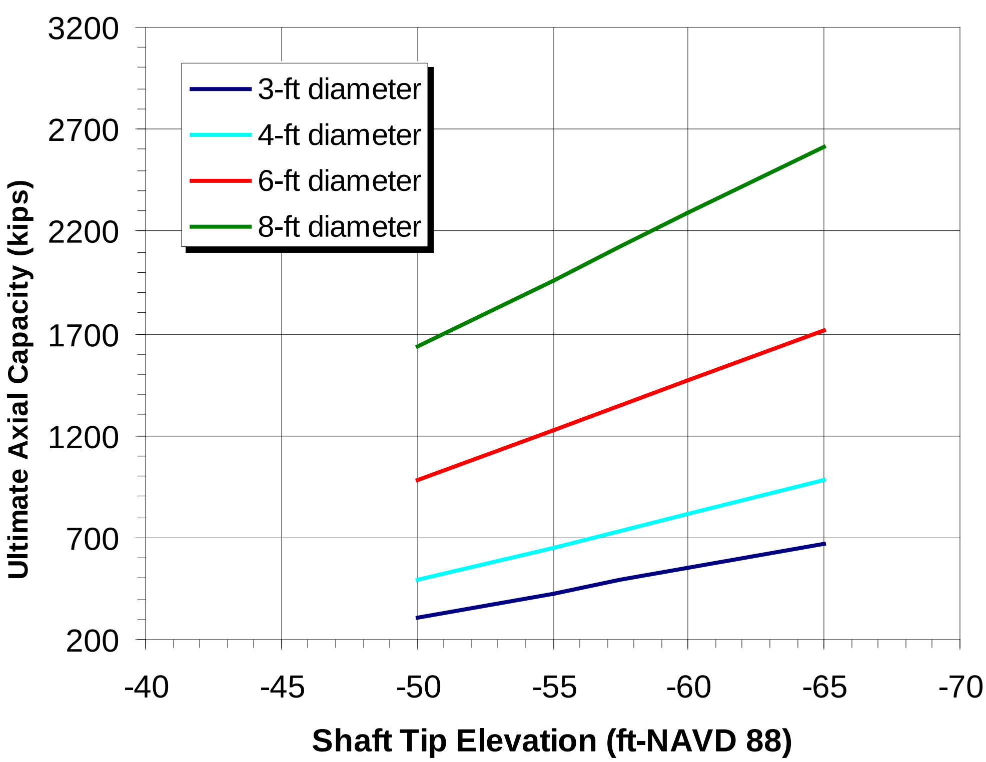
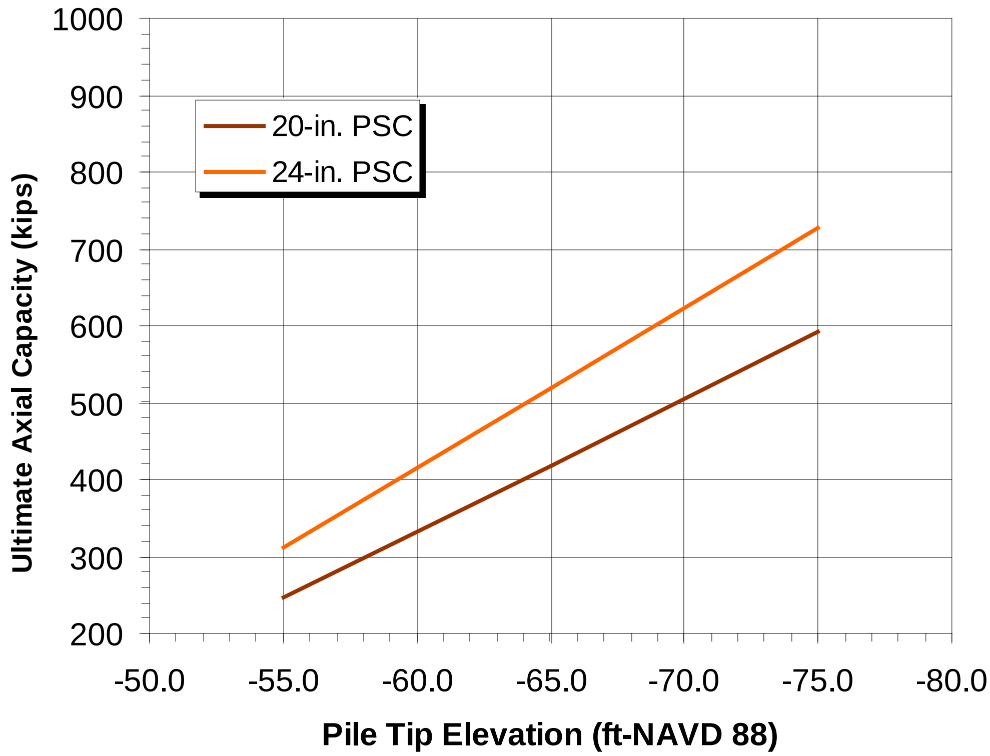


Figure 5-14. Ramp B Ultimate Driven PSC Pile Capacity vs. Tip Elevation



5.4 Ramp C

Ramp C begins along I-26 westbound approximately 1400 ft east of the Spruill Avenue exit, veers east and crosses the Southern Lumber plant parking lot. It then crosses King Street Extension and joins Ramps A, B and D at the beginning of Main Line 1D. The area where Ramp C veers away from I-26 is low-lying, marshy, and appears to be tidally influenced. We encountered very soft, wet soils at the ground surface when drilling in this area.

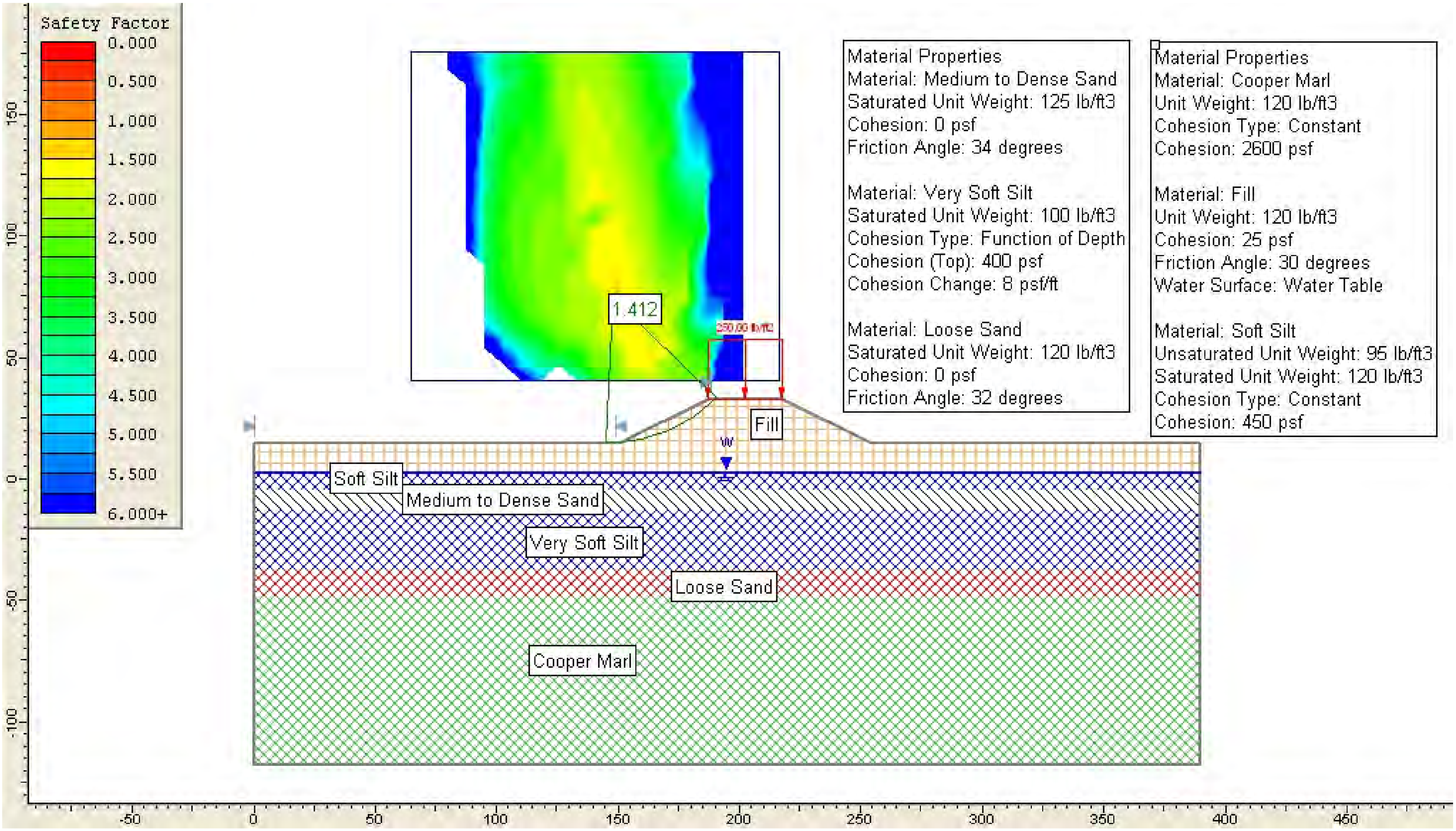
The subsurface conditions along Ramp C are similar to those encountered along Ramp B; however, the soft clay and silt strata was encountered further south along Ramp C. The top-of-marl elevation dips slightly from south to north as well. Figure 4-9 shows the subsurface profile along Ramp C.

5.4.1 *Static Settlement*

Based on the ramp profile, we estimate up to 15 ft of fill will be placed near Station 5842+50 on Ramp C. This is the area where the very soft clay is relatively thick (about 25 ft). Settlements from the weight of the new fill are primarily expected due to compression of this soft layer. Similar to Ramp B, settlements could be on the order of 3 ft and would occur slowly. A combination of surcharging and wick drains will likely be required, as a minimum. As with Ramp B, other forms of ground improvement may be necessary if schedule limitations preclude long surcharge periods.

5.4.2 *Embankment Global Stability*

The results of our global stability analyses indicate that the embankment configuration shown will be stable during and following construction with a FOS greater than 1.4 under static conditions. The FOS for the representative embankment section is less than 1.1 for pseudo-static seismic conditions, under an acceleration of 0.27g. The yield acceleration is 0.10g. Figure 5-15 and Figure 5-16 show representative cross sections at Station 5842+55, under static and pseudo-static conditions.



PROJECT NO. 1131-08-554

APRIL 2009

AS SHOWN

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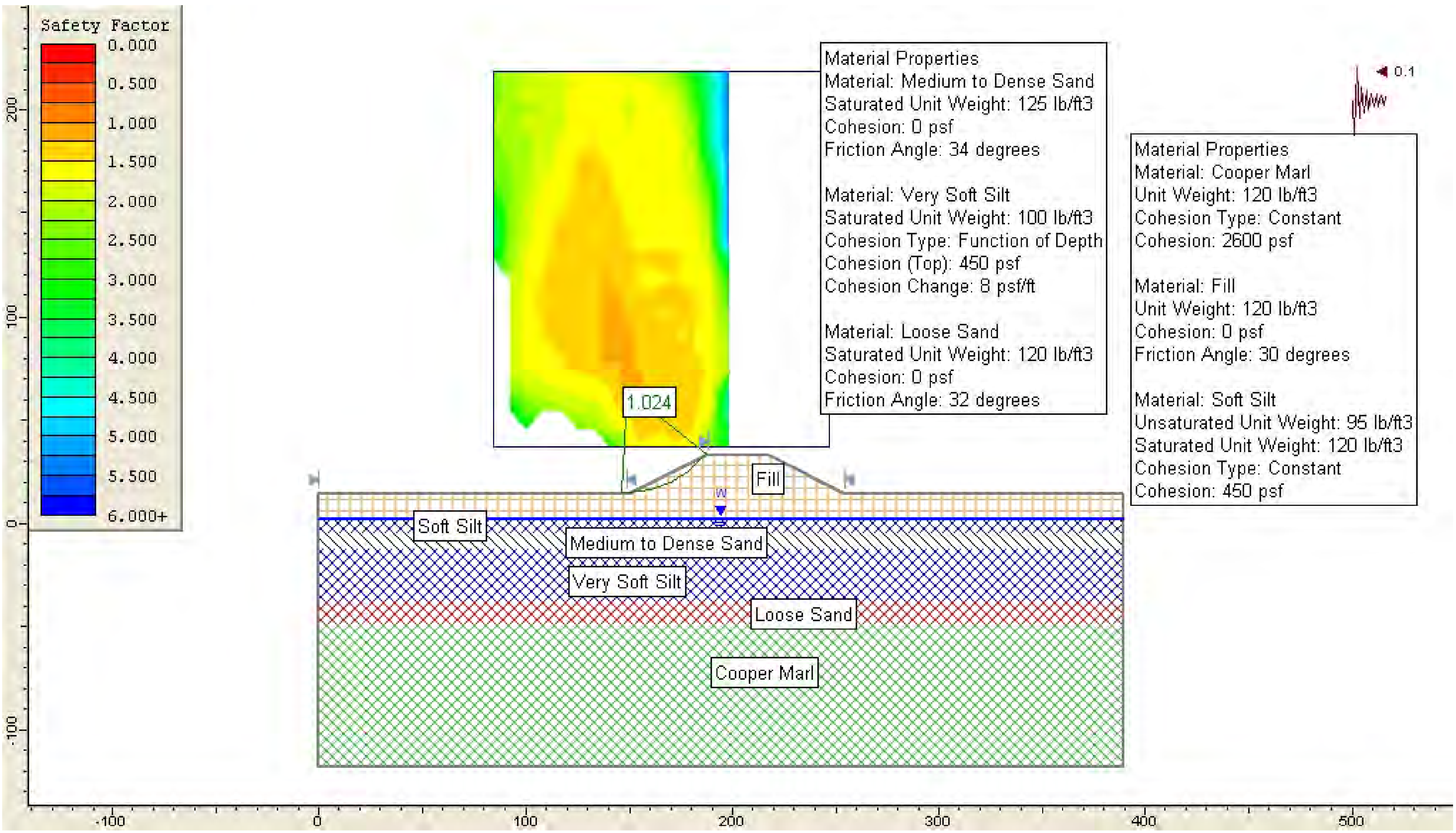
PORT ACCESS ROAD

EMBANKMENT STABILITY ANALYSIS – RAMP C

STATION 5842+55 – STATIC CONDITION

18.5 FT OF FILL; B-66 SOIL MODEL

Figure 5-15



PROJECT NO. 1131-08-554	S&ME	**PORT ACCESS ROAD** **EMBANKMENT STABILITY ANALYSIS – RAMP C** STATION 5842+55 – PSEUDO-STATIC CONDITION 18.5 FT OF FILL; B-66 SOIL MODEL	**Figure 5-16**
APRIL 2009			
AS SHOWN			

5.4.3 *Deep Foundations*

Figure 5-17 and Figure 5-18 present the estimated axial capacity for drilled shafts and driven, square PSC piles, respectively, bearing in the Cooper marl. A top-of-marl elevation for Ramp C of -53 ft-NAVD 88 was used. Based on the subsurface profile, this is an appropriate top-of-Cooper elevation for most of Ramp C. Similar to Ramps A, B and D, shafts for Ramp C in the vicinity of King Street Extension would need to be longer for a comparable capacity.

Figure 5-17. Ramp C Ultimate Drilled Shaft Capacity vs. Tip Elevation

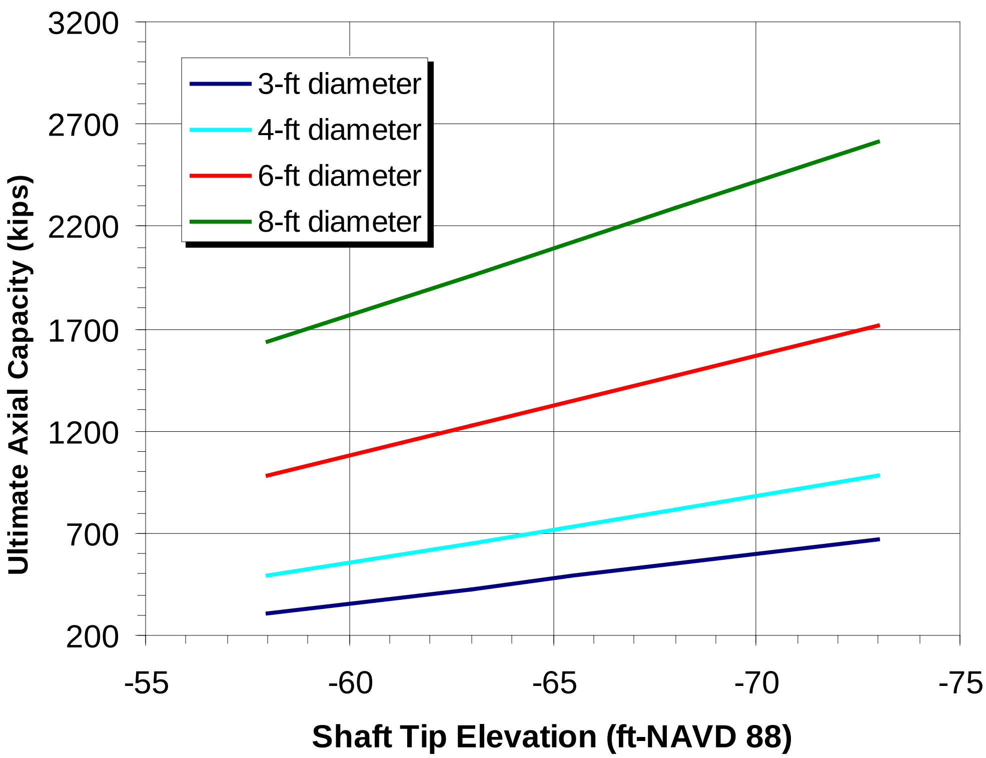
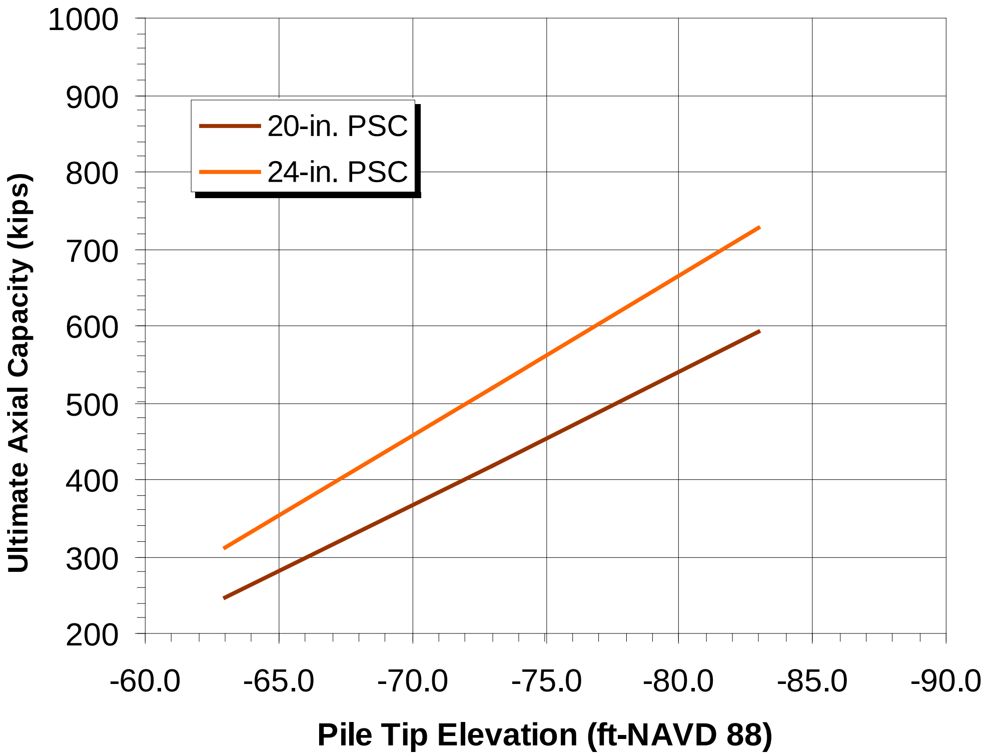


Figure 5-18. Ramp C Ultimate Driven PSC Pile Capacity vs. Tip Elevation



5.5 Ramp D

Ramp D begins along I-26 westbound north of the North Meeting Street flyover. It crosses under the flyover and follows I-26 westbound to Summerville Avenue. It then crosses Summerville Avenue, the I-26 eastbound entrance ramp, the Spruill Avenue exit ramp and King Street Extension before terminating along with Ramps A, B and C at the beginning of Main Line 1D.

The subsurface conditions generally consist of approximately 10 to 30 ft of loose to dense sands overlying soft to firm clays and silts. The clay/silt stratum varies in thickness and depth along the ramp. It reaches a thickness of nearly 40 ft in the vicinity of Summerville Avenue, where it is also closest to the surface. Along the portion of Ramp D where embankments are currently proposed, the clay/silt stratum was encountered from about elevation -4 ft to -32 ft. The CPT data and laboratory data from Ramp G nearby indicates the Unit 2C clay is slightly overconsolidated. Figure 4-2 and Figure 4-3 show the subsurface profile along Ramp D.

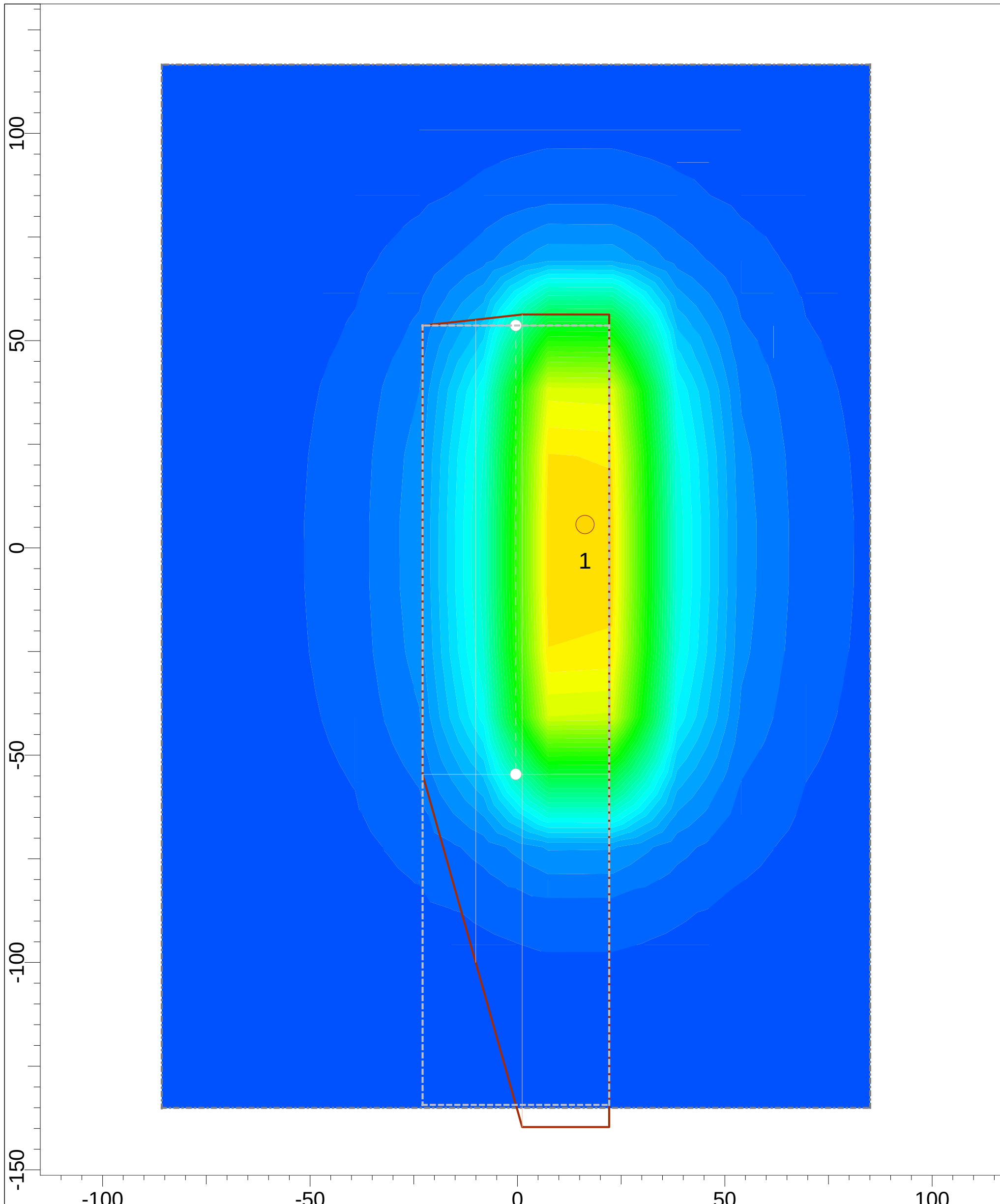
5.5.1 *Static Settlement*

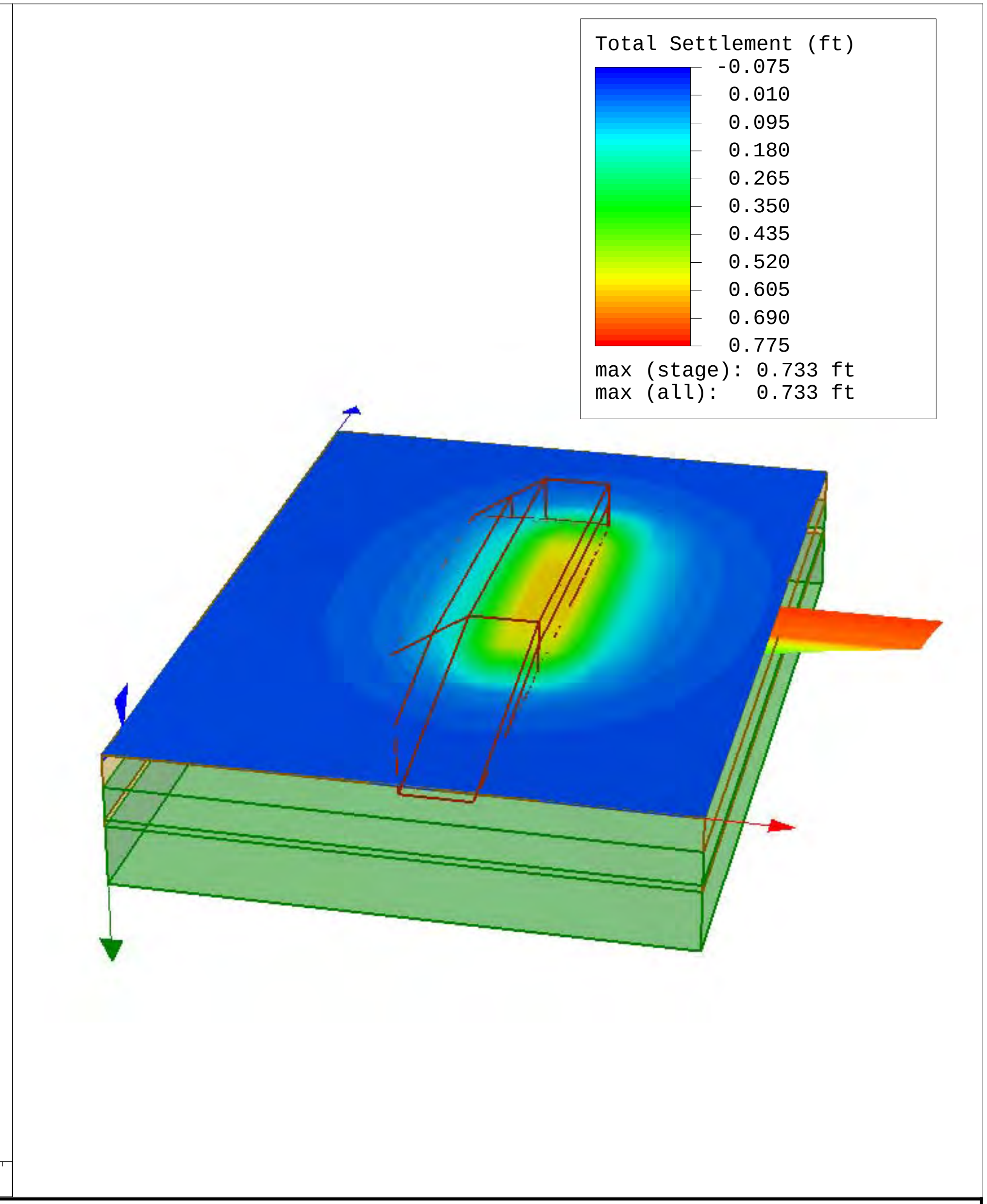
Based on the ramp profile, we estimate up to 15 ft of fill will be placed near Station 5772+50 on Ramp D. Settlements from the weight of the new fill are expected due to compression of the upper sands and to a lesser degree the underlying clay stratum. With a maximum fill height of 15 ft, we expect settlement could be on the order of 6 to 8 in. Most of the settlement would occur relatively quickly during construction. Wick drains should not be required for Ramp D.

Figure 5-19 shows a representative cross section of the embankment with the calculated settlement at the point shown on the plan view.

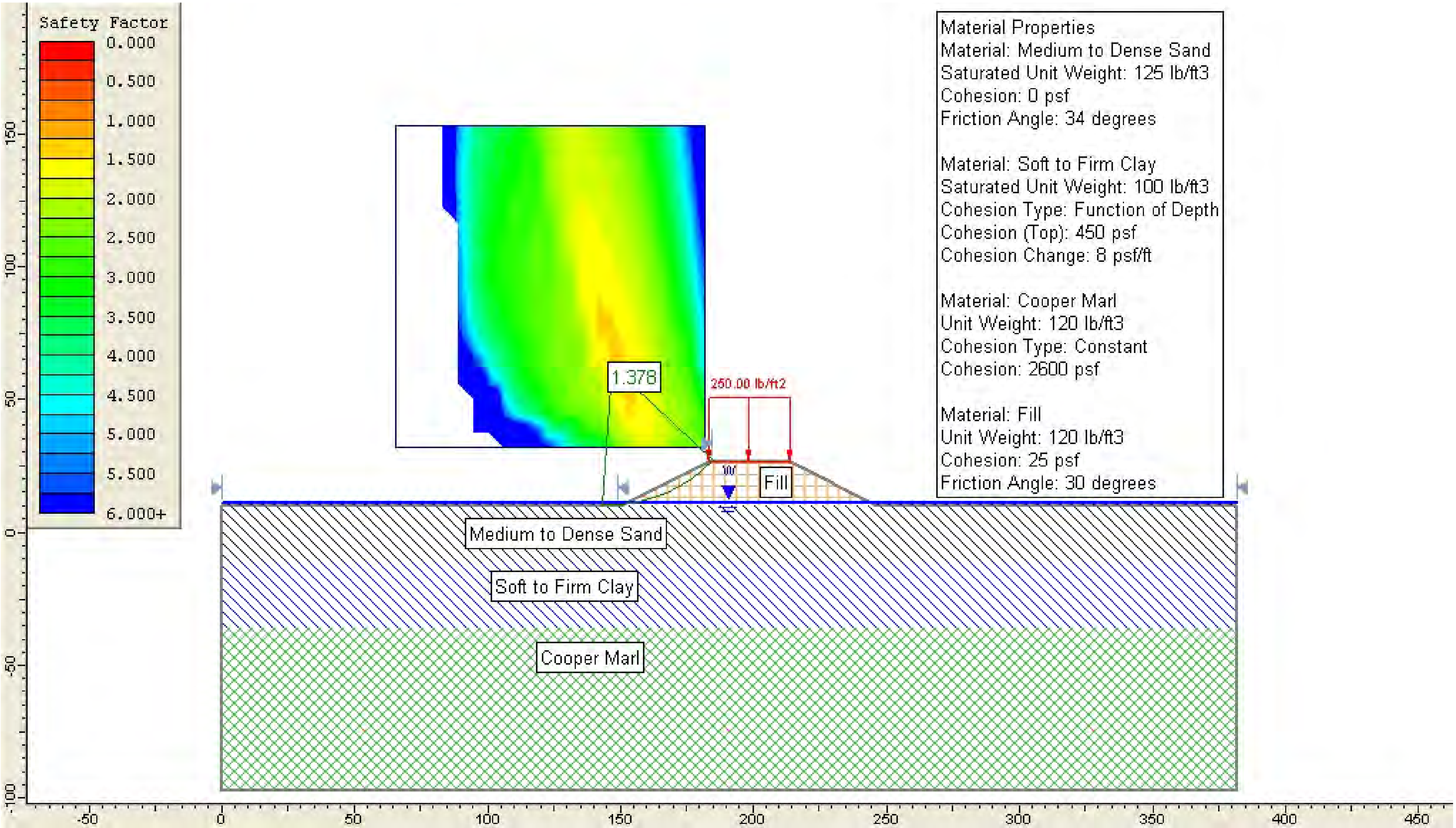
5.5.2 *Embankment Global Stability*

The results of our global stability analyses indicate that the embankment configuration shown will be stable during and following construction with a FOS greater than 1.3 under static conditions. The FOS for the representative embankment section is less than 1.1 for pseudo-static seismic conditions, under an acceleration of 0.27g. The yield acceleration ranged from 0.16g to 0.20g. Figure 5-20 and Figure 5-21 show a representative cross section at Station 5772+50.

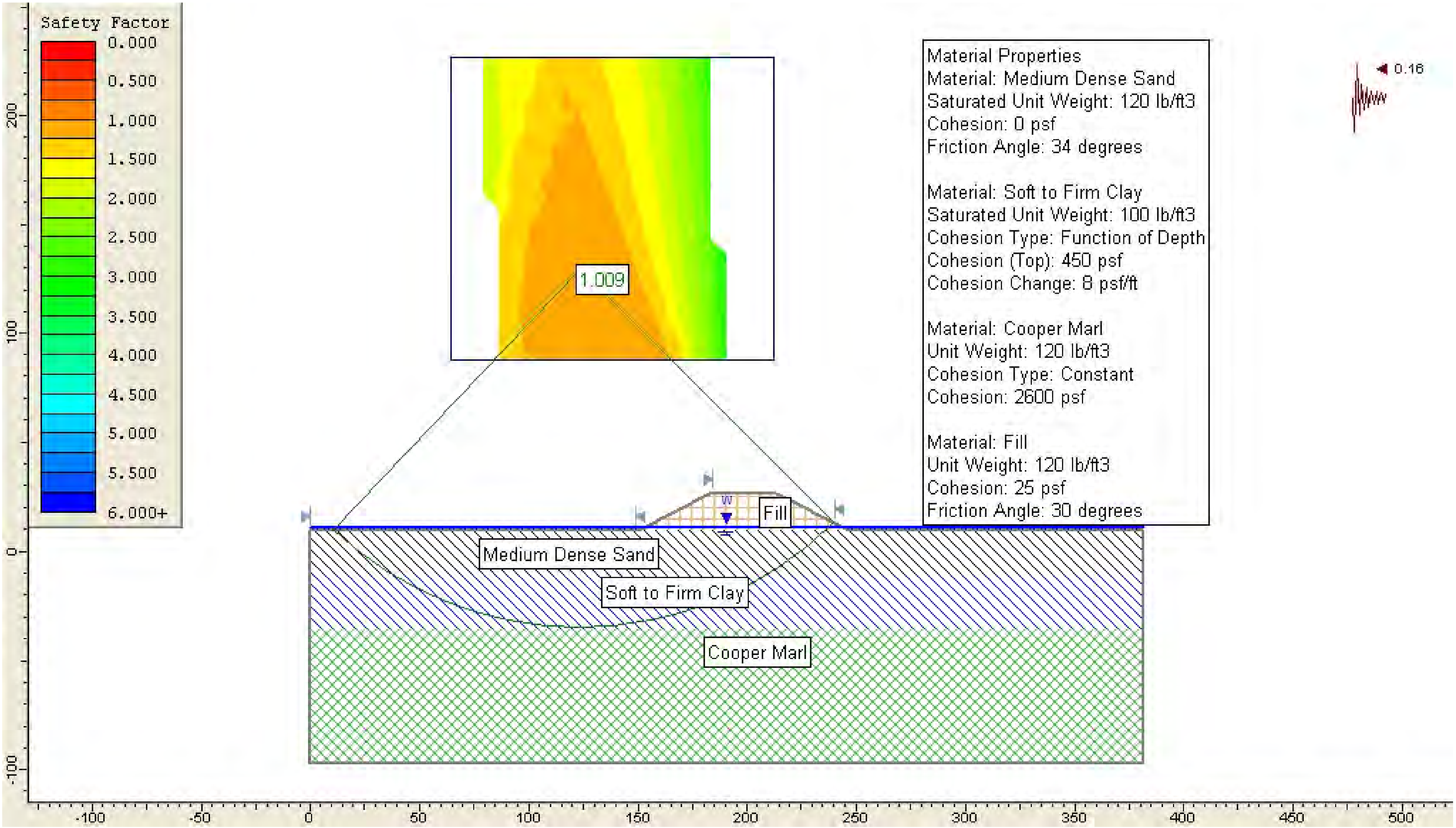




S&ME	Project: Port Access Road		
	Analysis Description: Embankment Settlement at Ramp D Station 5772+50		
	13 ft of fill with 4 ft surcharge; B-56 and B-3 soil model		
	Drawn By: DWH	Company: S&ME, Inc.	
SETTLE3D 1.007	Date: 3/20/09	Figure 5-19	



PROJECT NO. 1131-08-554	S&ME	**PORT ACCESS ROAD** **EMBANKMENT STABILITY ANALYSIS – RAMP D** STATION 5772+50 – STATIC CONDITION 16.5 FT OF FILL; B-60 SOIL MODEL	**Figure 5-20**
APRIL 2009			
AS SHOWN			



PROJECT NO. 1131-08-554	S&ME	**PORT ACCESS ROAD** **EMBANKMENT STABILITY ANALYSIS – RAMP D** STATION 5772+34 – PSEUDO-STATIC CONDITION 16.5 FT OF FILL; B-60 SOIL MODEL	**Figure 5-21**
APRIL 2009			
AS SHOWN			

5.5.3 *Deep Foundations*

Figure 5-22 below present the estimated axial capacity for drilled shafts and driven, square PSC piles bearing in the Cooper marl. A top-of-Cooper elevation for Ramp D of -40 ft-NAVD 88 was used. Based on the subsurface profile, this is an appropriate top-of-marl elevation for most of Ramp D. Ramp D converges with Ramps A through C at King Street Extension where the marl dips to an elevation of about -52 ft; therefore shaft lengths might be longer as the ramp approaches King Street Extension.

Figure 5-22. Ramp D Ultimate Drilled Shaft Capacity vs. Tip Elevation

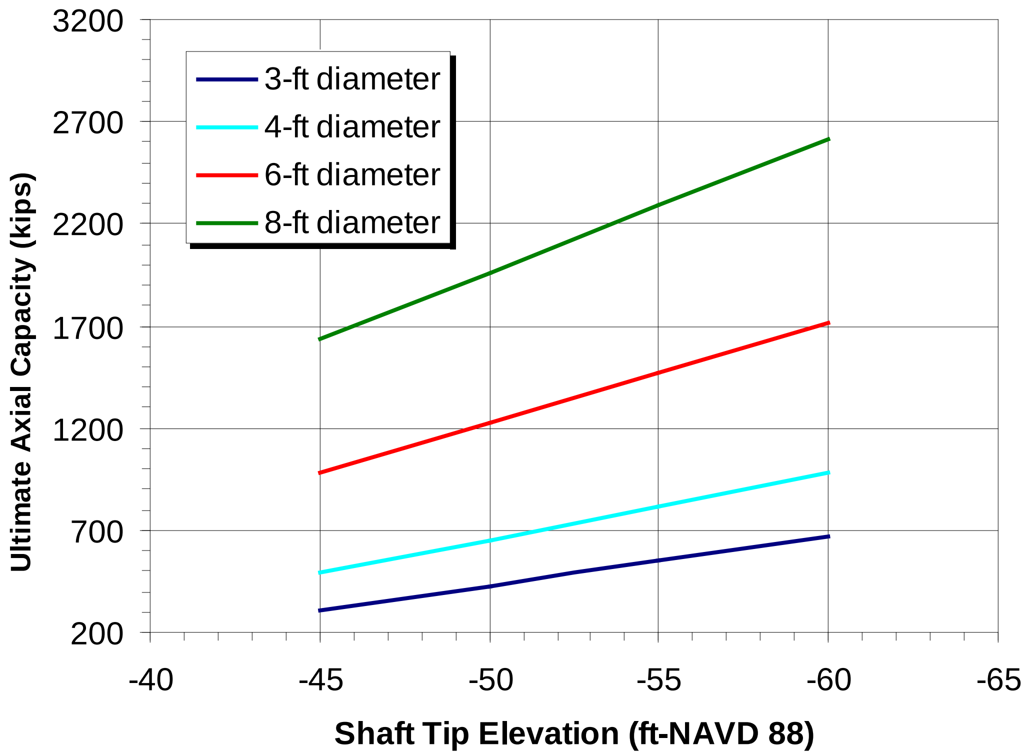
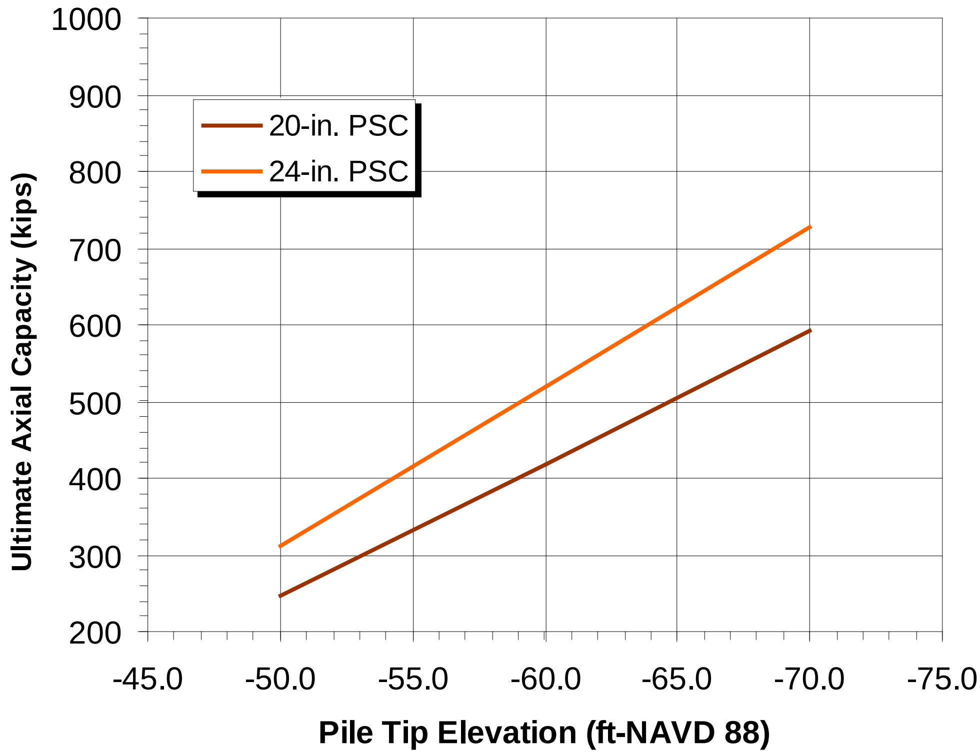


Figure 5-23. Ramp D Ultimate Driven PSC Pile Capacity vs. Tip Elevation



5.6 Main Line 1D

The Main Line 1D begins between Spruill Avenue and Meeting Street Extension. It crosses Meeting Street Extension and two sets of railroad tracks before turning north near the Sonoco Facility on the former Macalloy site. It follows the western edge of the Macalloy site for approximately 1500 ft before turning east and heading toward the former Naval Base. It crosses Shipyard Creek and Tidewater Road near the northeast corner of the Macalloy site.

On the former Naval Base side of Shipyard Creek, the alignment crosses very soft subgrade and deeper soils, and crosses over an abandoned building before terminating at the new port site. The ground surface is subject to tidal flooding. The area immediately surrounding the abandoned building has been filled. Visual evidence of significant settlement is apparent on the building and its sidewalks and parking lot.

Along the portion of the alignment from Spruill Avenue and through the Macalloy site, the borings generally encountered interbedded layers of very loose to medium dense sands and very soft to firm clays and silts. The soft clay layers encountered were thicker near the western end of Main Line 1D, and became thinner and generally more sandy to the east. A fairly abrupt change in the top-of-marl elevation occurred between Meeting Street Extension and the railroad tracks, which is a distance of less than 250 ft. The top-of-marl elevation rose from about -54 ft at Spruill Avenue and Meeting Street Extension to about -36 ft at the railroad tracks. The Macalloy site was the only area where the Miocene "young" marl was encountered with any significant thickness. The young marl was encountered in the borings near the mid-point of the Main Line 1D alignment and pinched out just east of Shipyard Creek.

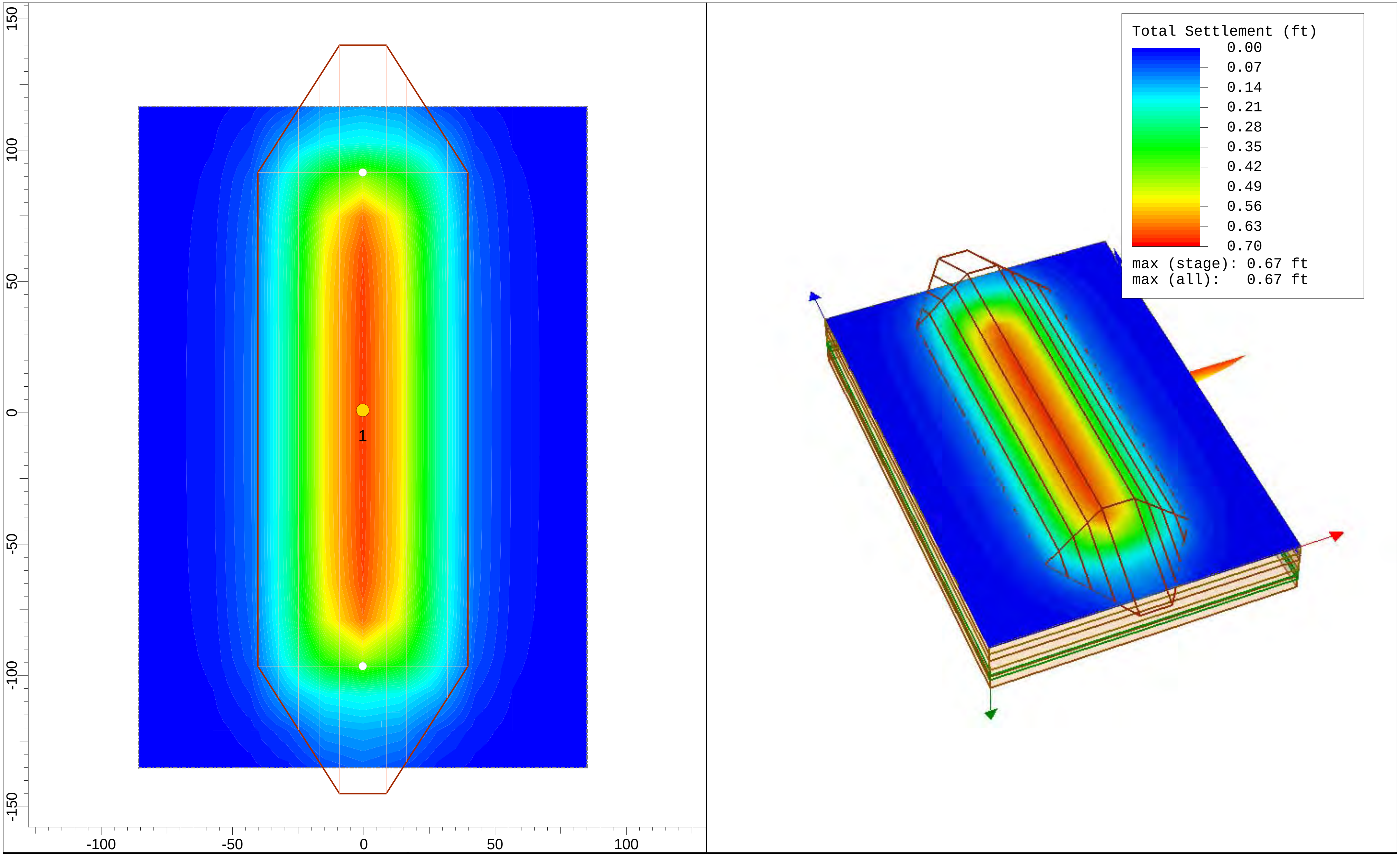
A portion of the Macalloy site was remediated, and we understand that in some areas the remediation involved the removal of up to 20 ft of soil. Based on our knowledge of the site, most of the alignment does not fall within the remediated area; however, the portion of the alignment near Shipyard Creek and the Local Access Road could fall within this area. The fill in this area should be considered uncontrolled. Also, slag waste material is present over much of the site, including areas not remediated. Based on our knowledge of the site, the slag fill is within most of the alignment on the site and was encountered in the boring we performed near the center of the site (B-23SPT ALT1). Additional exploration will be required to determine the actual extent of the slag and uncontrolled fill.

The subsurface conditions east of Shipyard Creek on the former Naval Base are substantially different from those encountered over the rest of the project site. The borings there encountered from 30 to 50 ft of very soft, very weak, under to normally consolidated and highly compressible Unit 1B clays and silts overlying the Cooper marl. A thin, discontinuous “crust” of sand exists at the ground surface in some areas. N-values in the clay strata were generally weight-of-hammer and CPT tip resistances were less than 5 tsf. Vane shear, Cu and Uu testing, and CPT correlations indicated strengths on the order of 140 psf at the top of the strata to 400 psf at the bottom of the strata. Compression Ratio (Cr) indices ranged from 0.25 to 0.48 and Recompression Ratio (Rr) indices ranged from 0.049 to 0.077. Overconsolidation Ratio (OCR) values ranged from 0.6 to 1.5. The vertical Coefficient of Consolidation (Cv) is generally on the order of 0.015 ft^2/day. Figures 4.5A and 4.5B show the subsurface profile along the Main Line 1D.

5.6.1 *Static Settlement*

We understand that a portion of the Main Line may be constructed as embankments rather than elevated structure; therefore, we estimated settlements assuming an embankment height that approximated the proposed bridge height. For the portion of the Main Line along the western edge of the Macalloy site, we assumed a maximum fill height of 30 ft. Settlement will occur primarily due to compression of the sands and will occur relatively quickly. We estimate that about 6 to 8 in. of settlement will occur, with most of the settlement occurring within 90 days of construction. Figure 5-24 shows the representative embankment cross section modeled and the estimated settlement. Areas of uncontrolled fill could have more compressible materials in them, and the compressibility of the slag over much of the site is unknown at this time.

Constructing any embankment on the former Naval Base soils will be much more difficult and complex. Based on the ramp profile, we estimate up to 15 ft of fill will be placed near the bridge abutment at Station 94+00 on the Main Line about 250 ft east of Shipyard Creek and will decrease to a fill height of about 5 ft from 600 ft east of the creek to the tie-in with the new port. The very soft clay/silt stratum ranges in thickness from about 35 ft at the bridge abutment to about 50 ft at the tie in to the new port.



S&ME	Project	Port Access Road	
	Analysis Description	Embankment Settlement along Main Line 1D McAlloy Site	
		30 ft of fill ; B-77 used for soil model	
	Drawn By	DWH	Company: S&ME, Inc.
SETTLE3D 1.007	Date	3/30/09	Figure 5-24

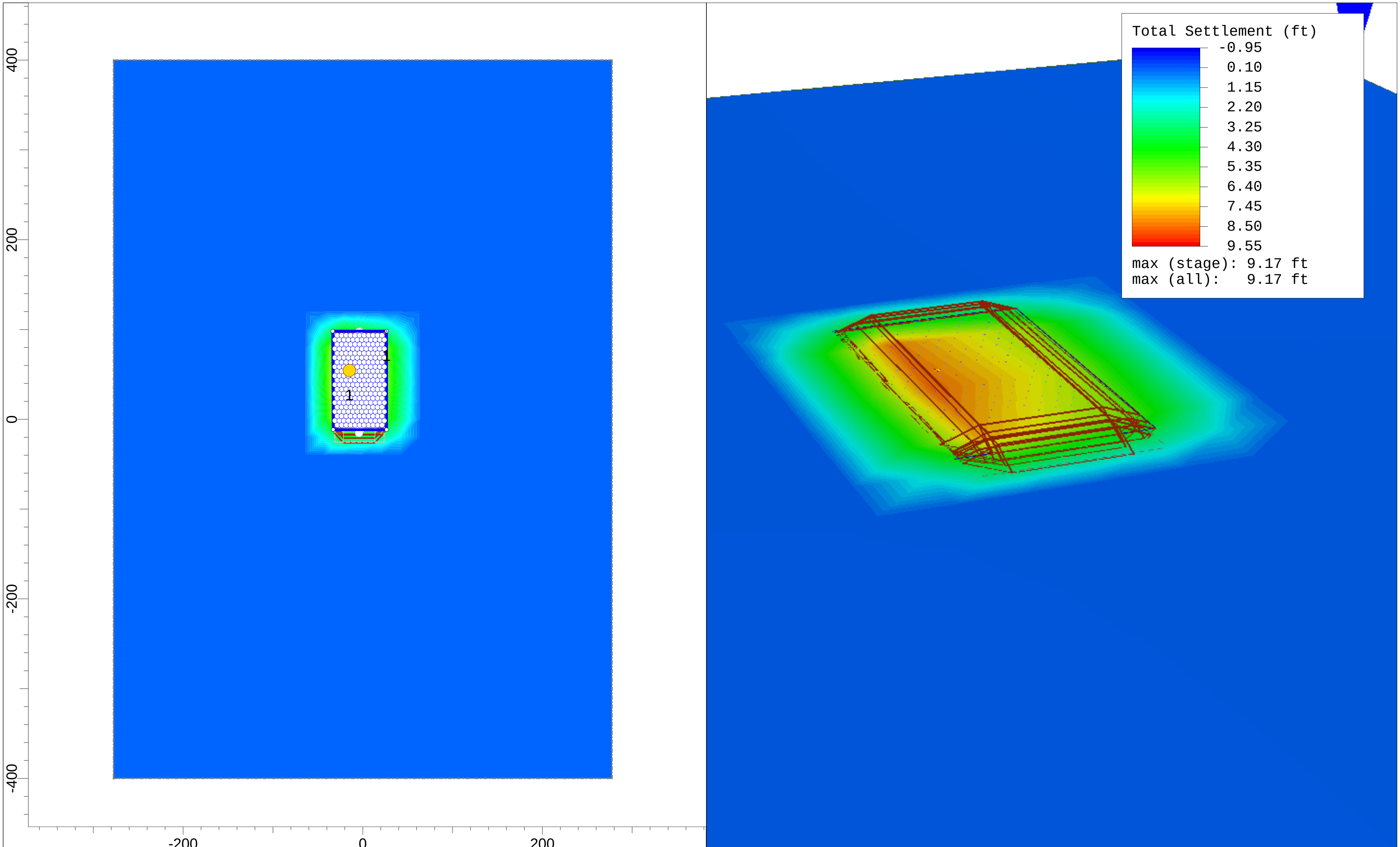
Settlements from the weight of the new fill will occur due to compression of the clay/silt stratum. With a permanent maximum fill height of 15 ft, settlements could be on the order of 9 ft and would occur very slowly. With a 5-ft surcharge, this would result in the placement of about 29 ft of fill. In addition to very large settlement magnitudes, staged construction would probably have to be utilized. We estimate that a maximum initial embankment height of 4 to 5 ft could be constructed before causing a bearing capacity (i.e., lateral squeeze) type failure.

Due to the magnitude and settlement rate, some form of ground improvement will be required at this bridge abutment. Further, based on our analyses, we do not expect that wick drains and surcharging will allow for sufficient settlement to occur in any normal project schedule that would meet typical bridge abutment settlement criteria. A column or pile supported embankment will probably be required for the bridge abutment fill.

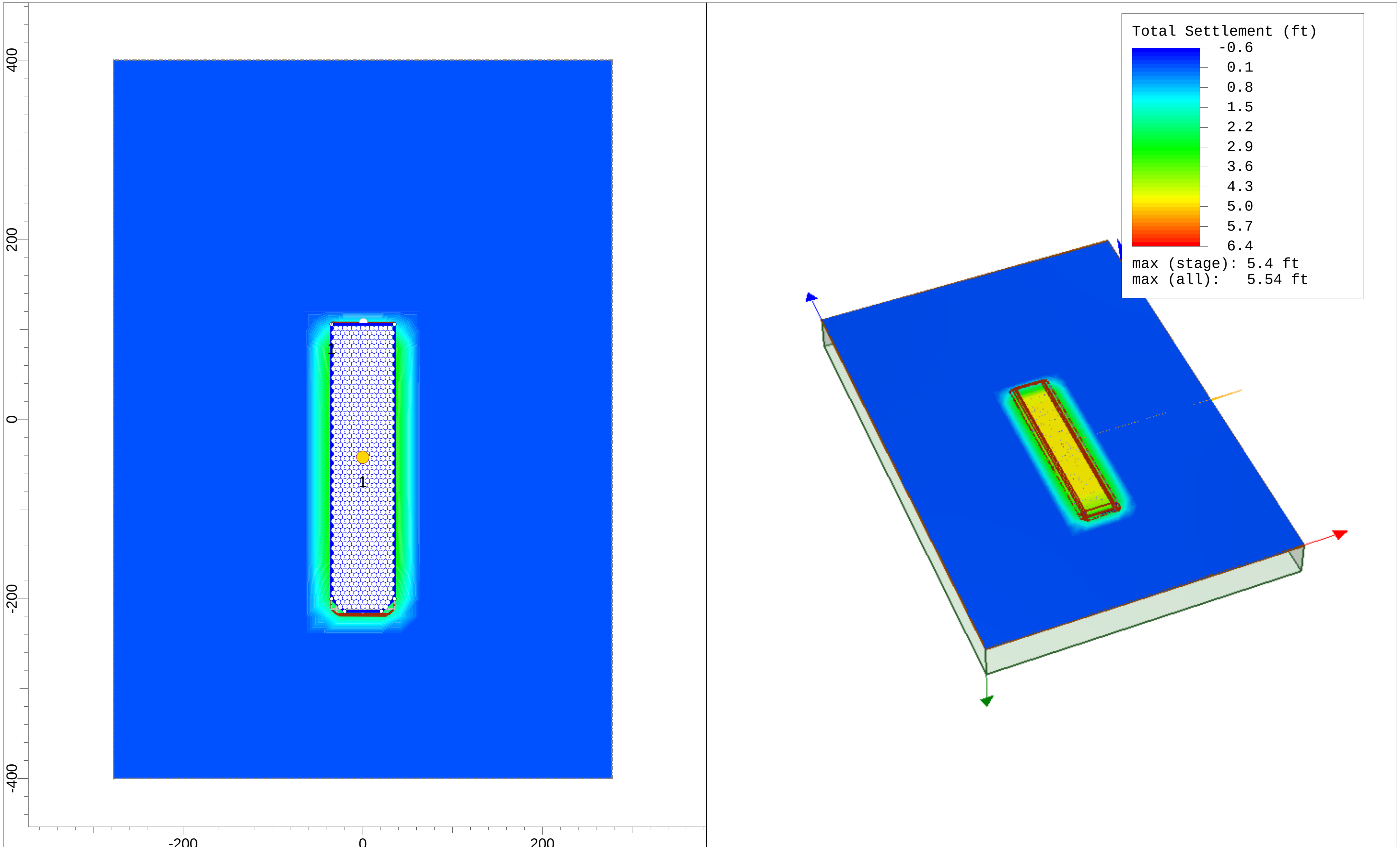
For the portion of the Main Line on the former Naval Base where fill heights will be about 5 ft, we expect that a combination of wick drains and surcharging could be used to reduce settlement to an acceptable amount. Staged construction would still likely be necessary to prevent overstressing the very weak soils. We estimate that total settlements on the order of 5 ft would occur from raising the site grade by 5 ft. Depending on the sensitivity of the soils, many stages of filling could be required to achieve the final grade. Based on our analyses, a combination of wick drains on a 5-ft triangular spacing and a 3 ft surcharge will likely be required to reduce settlements to typically acceptable limits in a reasonable amount of time. We estimate that approximately 2 years would be required from the time the first fill was placed until the surcharge could be removed. This significant time period should be considered when planning the construction sequence. Figures 5-25 and 5-26 show representative embankment cross sections with corresponding settlement magnitudes for the bridge abutment fill and the lower roadway fill.

5.6.2 *Embankment Global Stability*

The results of our global stability analyses indicate that the embankment configurations shown for Stations 100+00 and 93+75 for the former Naval Base will be stable during and following construction with a FOS greater than 1.3 under static conditions. For the portion of the Main Line along the western edge of the Macalloy site at Station 70+00, we assumed a maximum fill height of 30 ft. The embankment shown will be unstable without reinforcement or reduction in the fill height with a FOS of 0.96 under static conditions. The FOS for the representative embankment sections are less than 1.1 for pseudo-static seismic conditions, under an acceleration of 0.27g. The yield acceleration ranged from 0.12g to 0.13g. Figures 5-27 through 5-42 show representative cross sections at Stations 100+00, 93+75 and 70+00, respectively, under static and pseudo-static conditions including reinforcement or reduced fill heights. Although no detailed deformation analysis was performed, greater seismic deformations could also be expected on the Navy Base embankments than on the other embankments along the alignment.



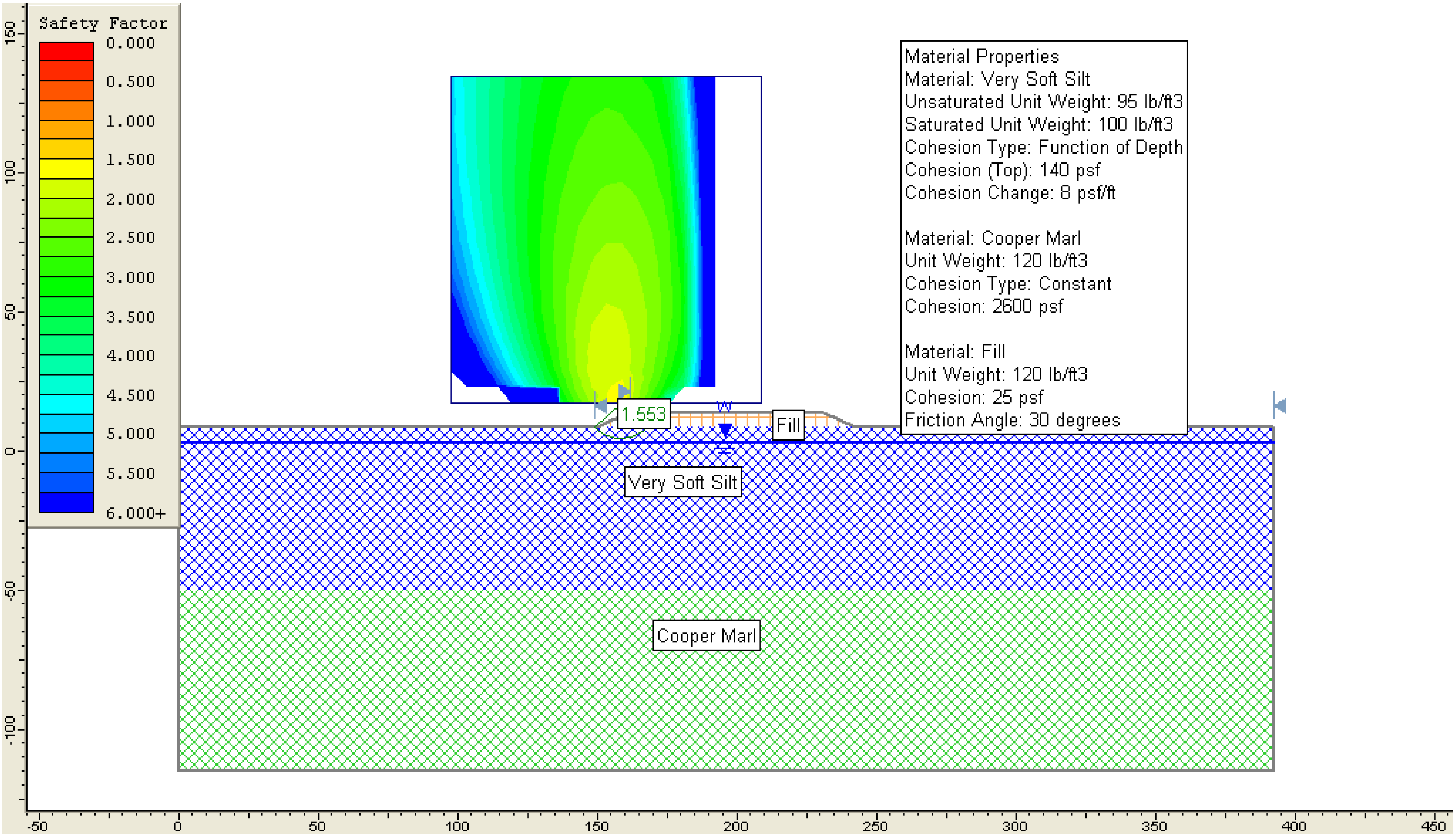
S&ME	*Project*	Port Access Road	
	Analysis Description	Navy Base Embankment Settlement at Station 94+00	
		15 ft permanent fill (5 ft surcharge) (29 ft of total material) B-33 soil model	
	Drawn By DWH	*Company* S&ME, Inc.	
SETTLE3D 1.007	*Date* 3/26/09	Figure 5-25	



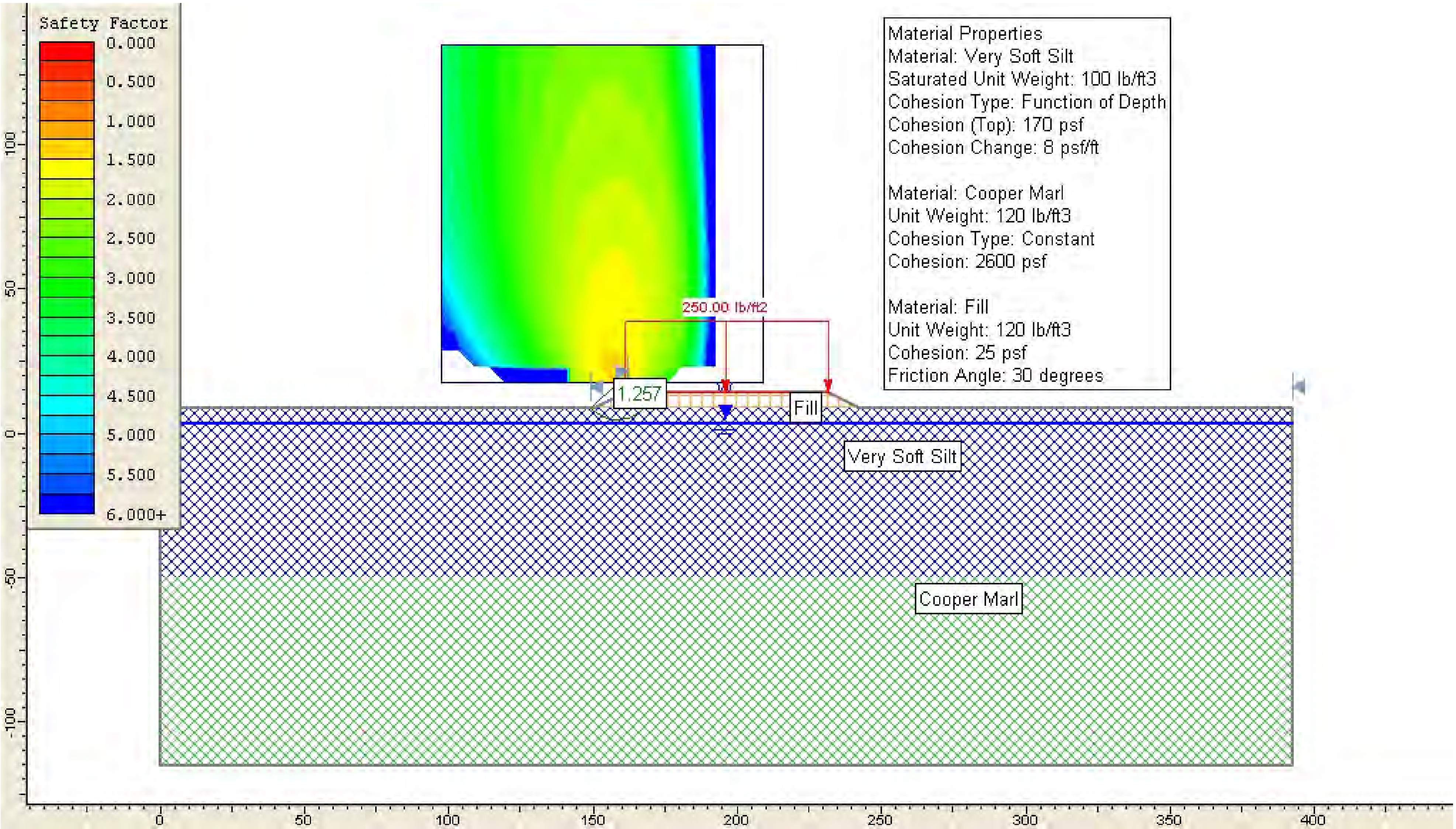
S&ME

SETTLE3D 1.007

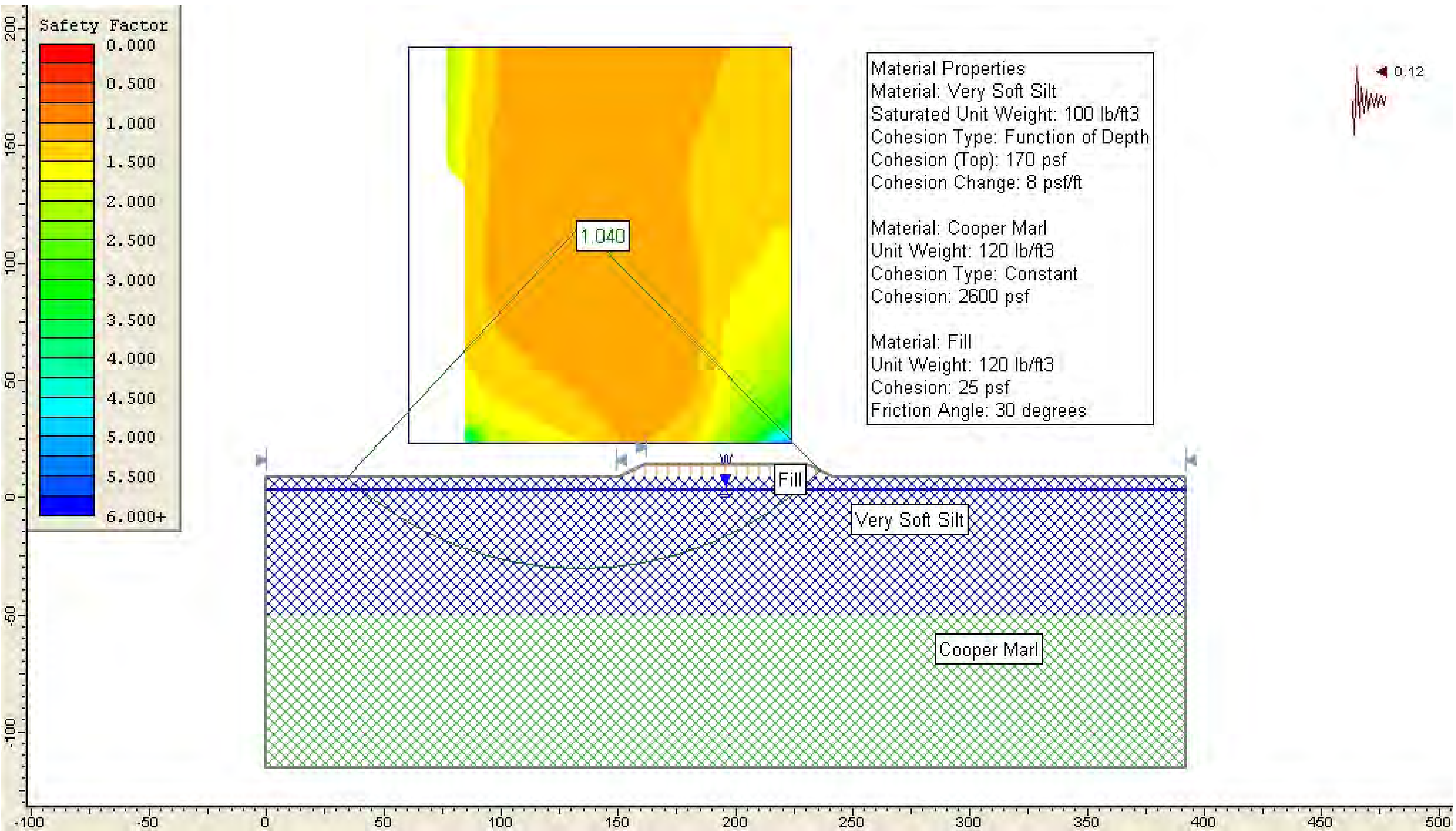
Project	Port Access Road
Analysis Description	Navy Base Embankment from Station 97+00 to 100+00
	5 ft of permanent fill (3 ft surcharge) 14 ft total material; B-34 soil model
Drawn By DWH	*Company* S&ME, Inc.
Date 3/26/09	Figure 5-26



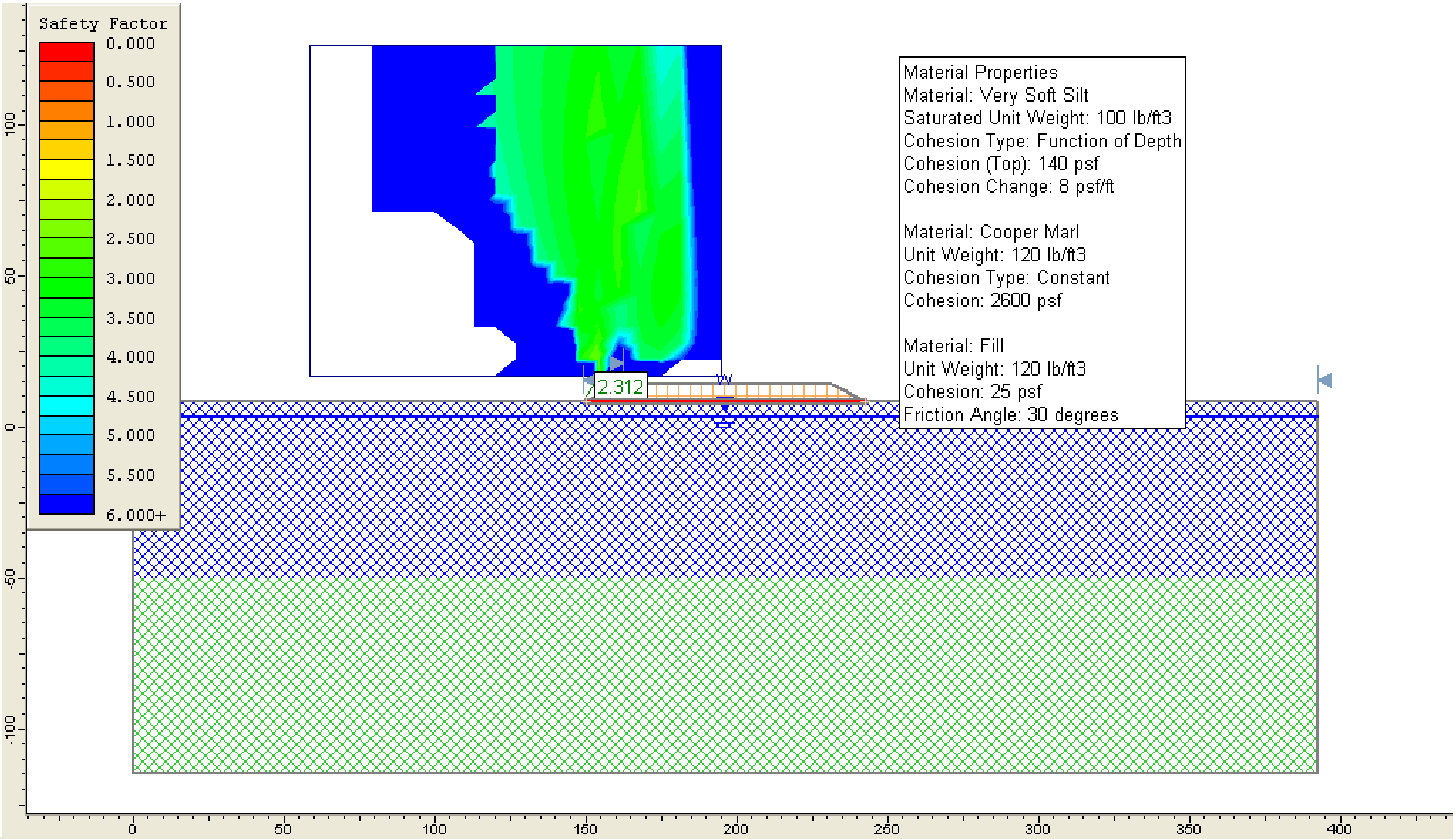
PROJECT NO. 1131-08-554 APRIL 2009 AS SHOWN	S&ME	**PORT ACCESS ROAD** **EMBANKMENT STABILITY ANALYSIS – RAMP 1D** STATION 100+00 –STATIC CONDITION (AFTER CONSTRUCTION) 5.5 FT OF FILL; B-34 SOIL MODEL	**Figure 5-27**



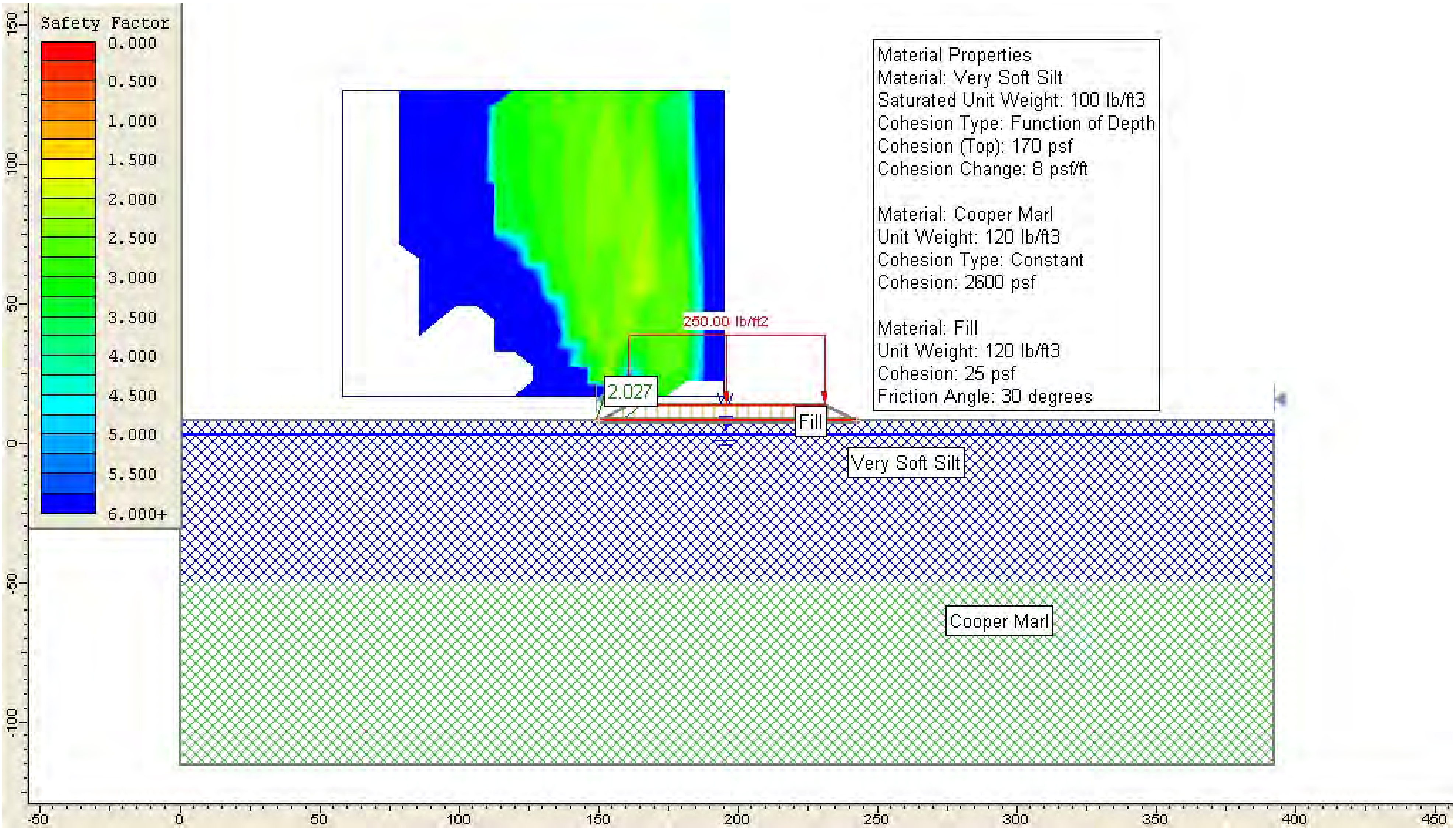
PROJECT NO. 1131-08-554	S&ME	**PORT ACCESS ROAD** **EMBANKMENT STABILITY ANALYSIS – RAMP 1D** STATION 100+00 - STATIC CONDITION 5.5 FT OF FILL; B-34 SOIL MODEL	**Figure 5-28**
APRIL 2009			
AS SHOWN			



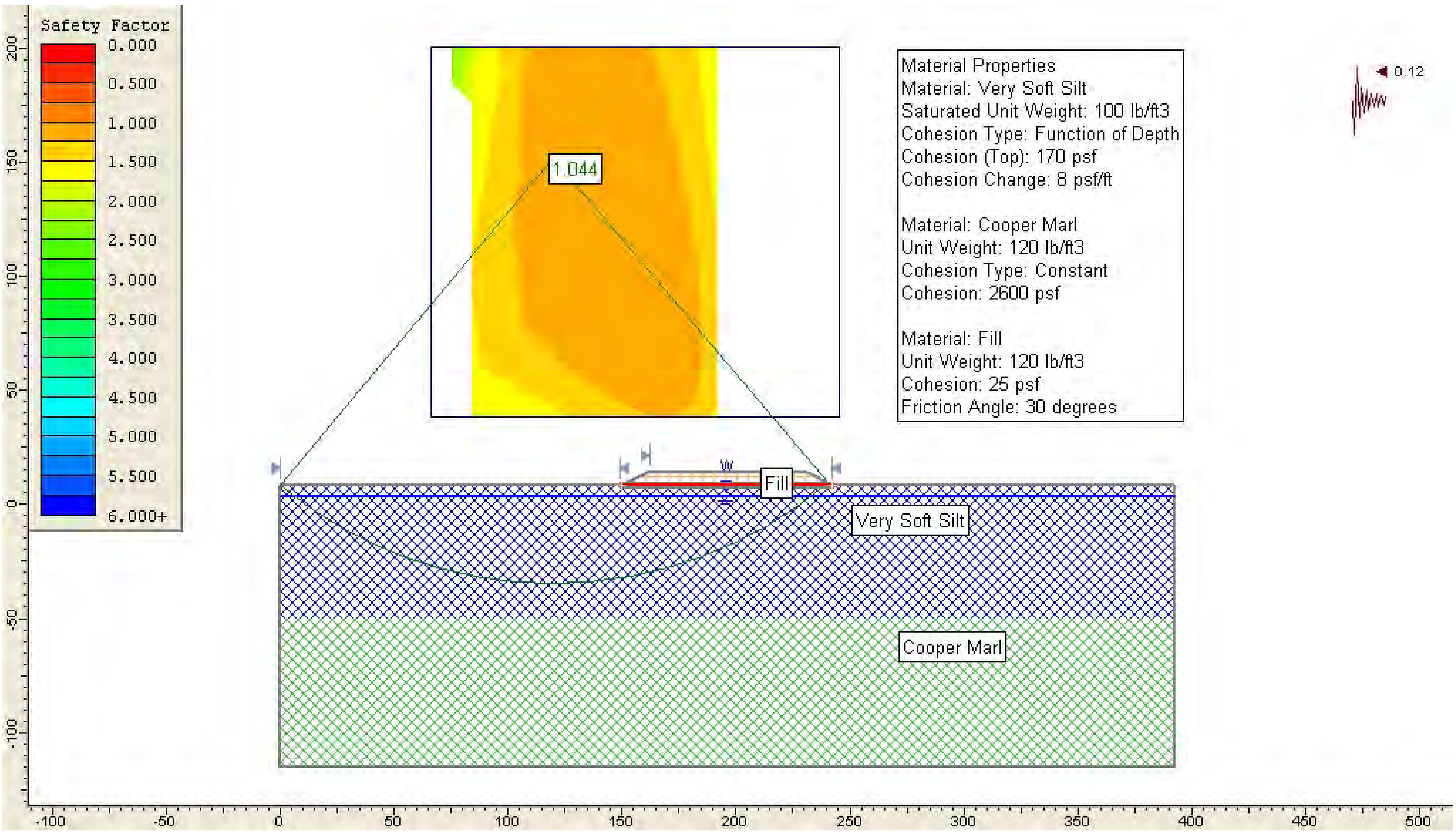
PROJECT NO. 1131-08-554	S&ME	**PORT ACCESS ROAD** **EMBANKMENT STABILITY ANALYSIS – RAMP 1D** STATION 100+00 – PSEUDO-STATIC CONDITION 5.5 FT OF FILL; B-34 SOIL MODEL	**Figure 5-29**
APRIL 2009			
AS SHOWN			



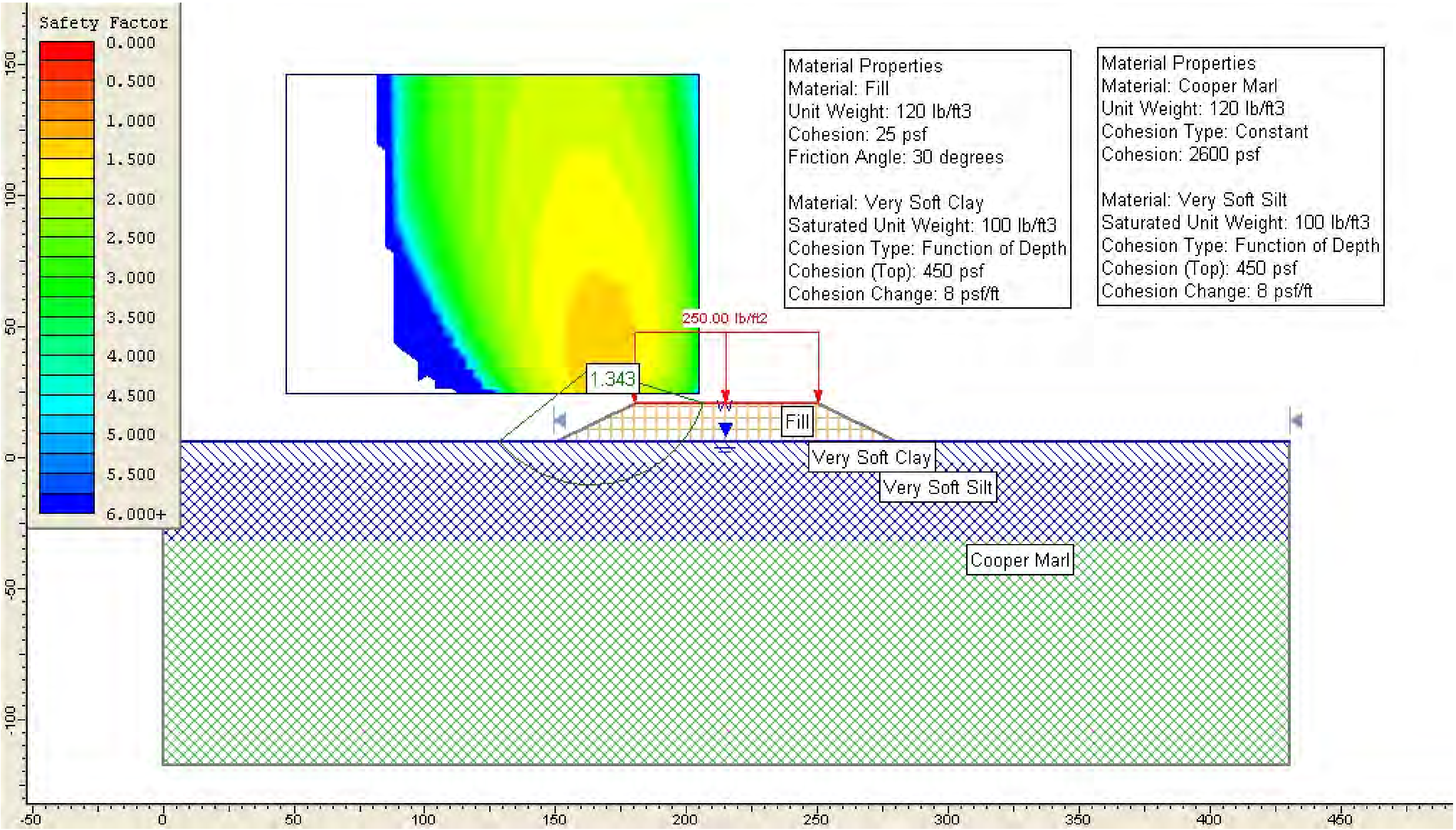
PROJECT NO. 1131-08-554 APRIL 2009 AS SHOWN	S&ME	**PORT ACCESS ROAD** **EMBANKMENT STABILITY ANALYSIS – RAMP 1D** STATION 100+00 – STATIC CONDITION AFTER CONSTRUCTION WITH REINFORCEMENT 5.5 FT OF FILL; B-34 SOIL MODEL	**Figure 5-30**



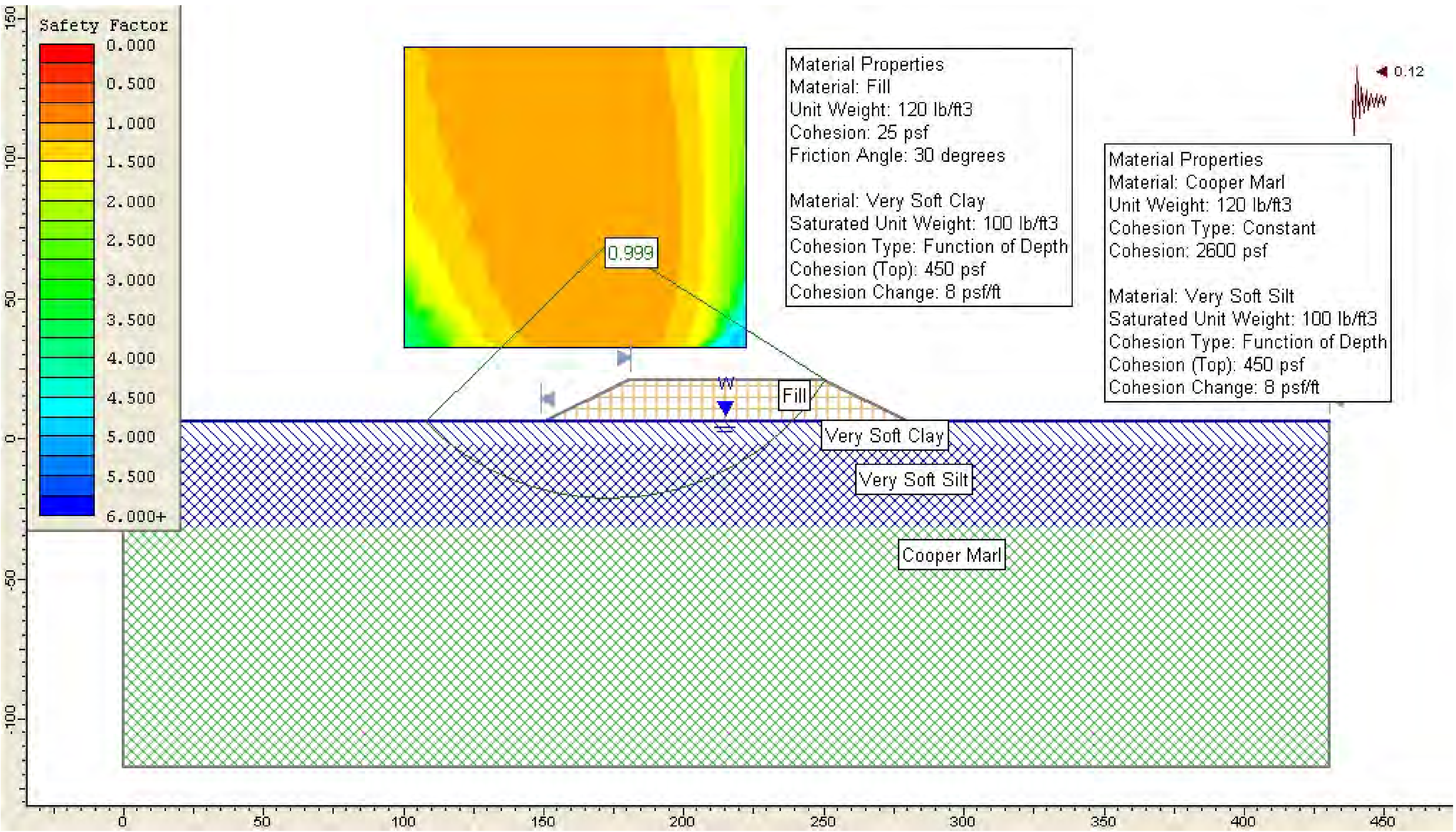
PROJECT NO. 1131-08-554	S&ME	**PORT ACCESS ROAD** **EMBANKMENT STABILITY ANALYSIS – RAMP 1D** STATION 100+00 – LONG TERM STATIC CONDITION WITH REINFORCEMENT 5.5 FT OF FILL; B-34 SOIL MODEL
APRIL 2009		**Figure 5-31**
AS SHOWN		



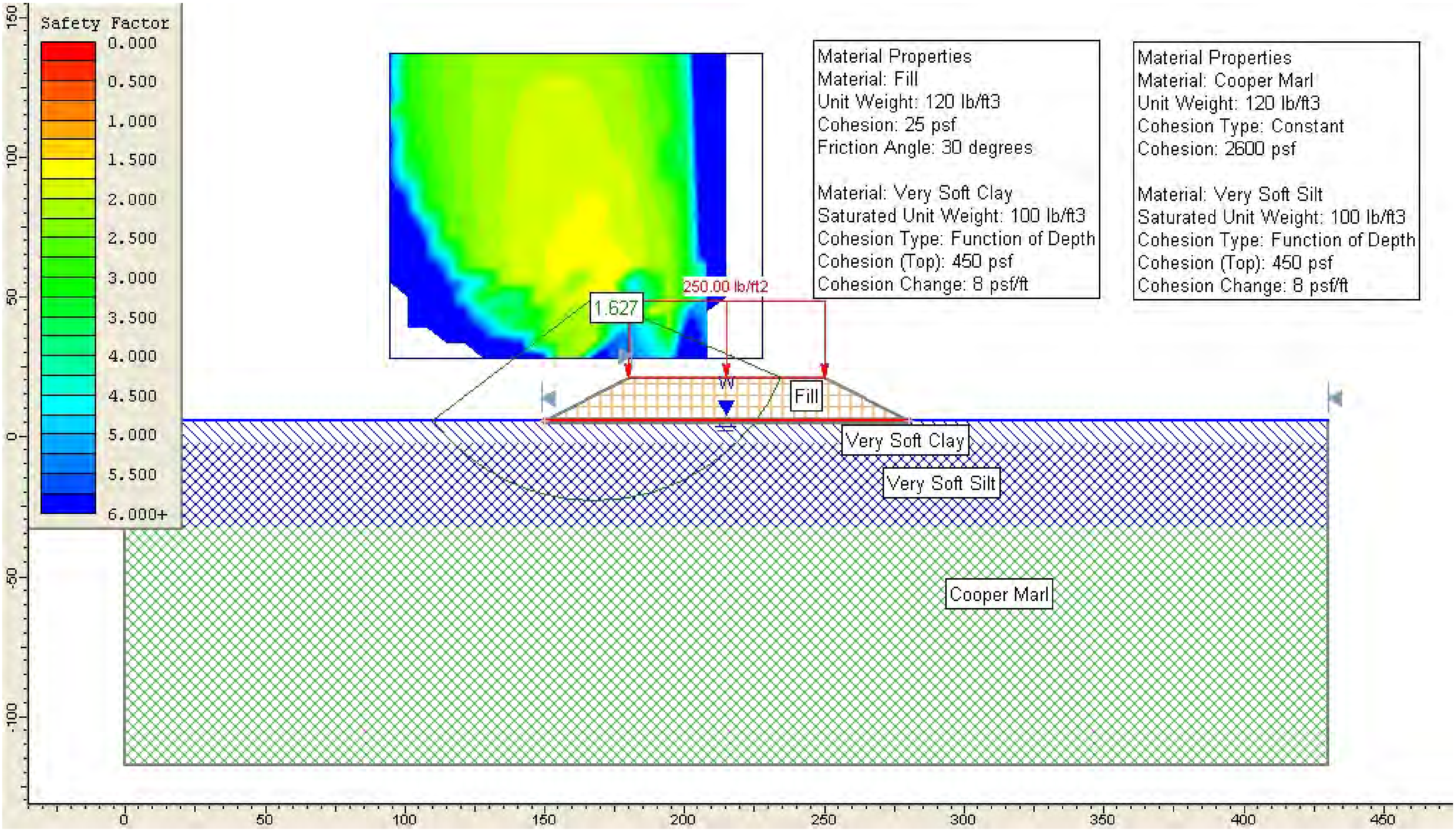
PROJECT NO. 1131-08-554	**PORT ACCESS ROAD** **EMBANKMENT STABILITY ANALYSIS – RAMP 1D** STATION 100+00 – PSEUDO-STATIC CONDITION WITH REINFORCEMENT 5.5 FT OF FILL; B-34 SOIL MODEL	**Figure 5-32**
APRIL 2009		
AS SHOWN		



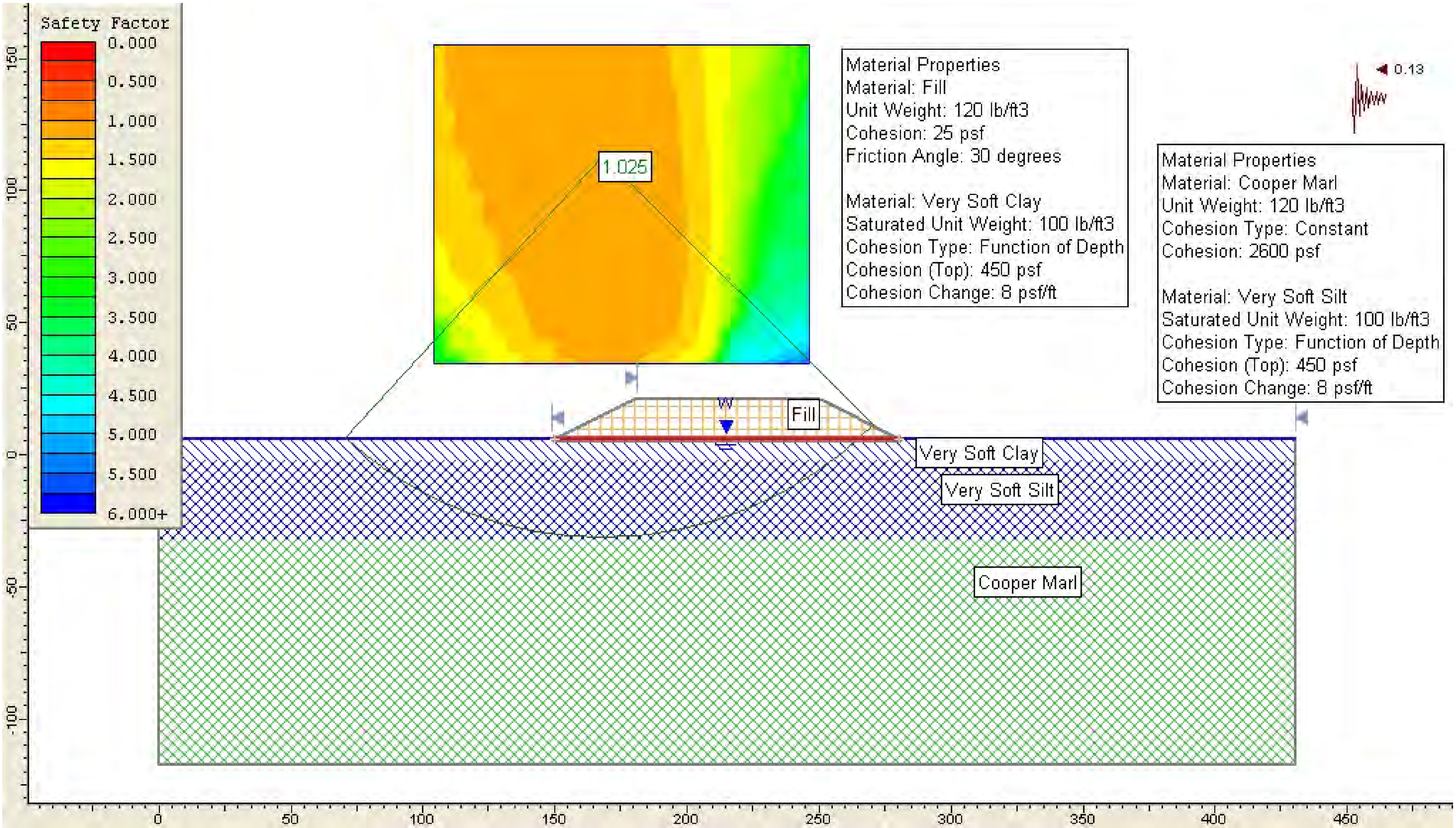
PROJECT NO. 1131-08-554	S&ME	**PORT ACCESS ROAD** **EMBANKMENT STABILITY ANALYSIS – RAMP 1D** STATION 93+75 –STATIC CONDITION (LONG TERM) 15 FT OF FILL; B-34 SOIL MODEL	**Figure 5-33**
APRIL 2009			
AS SHOWN			



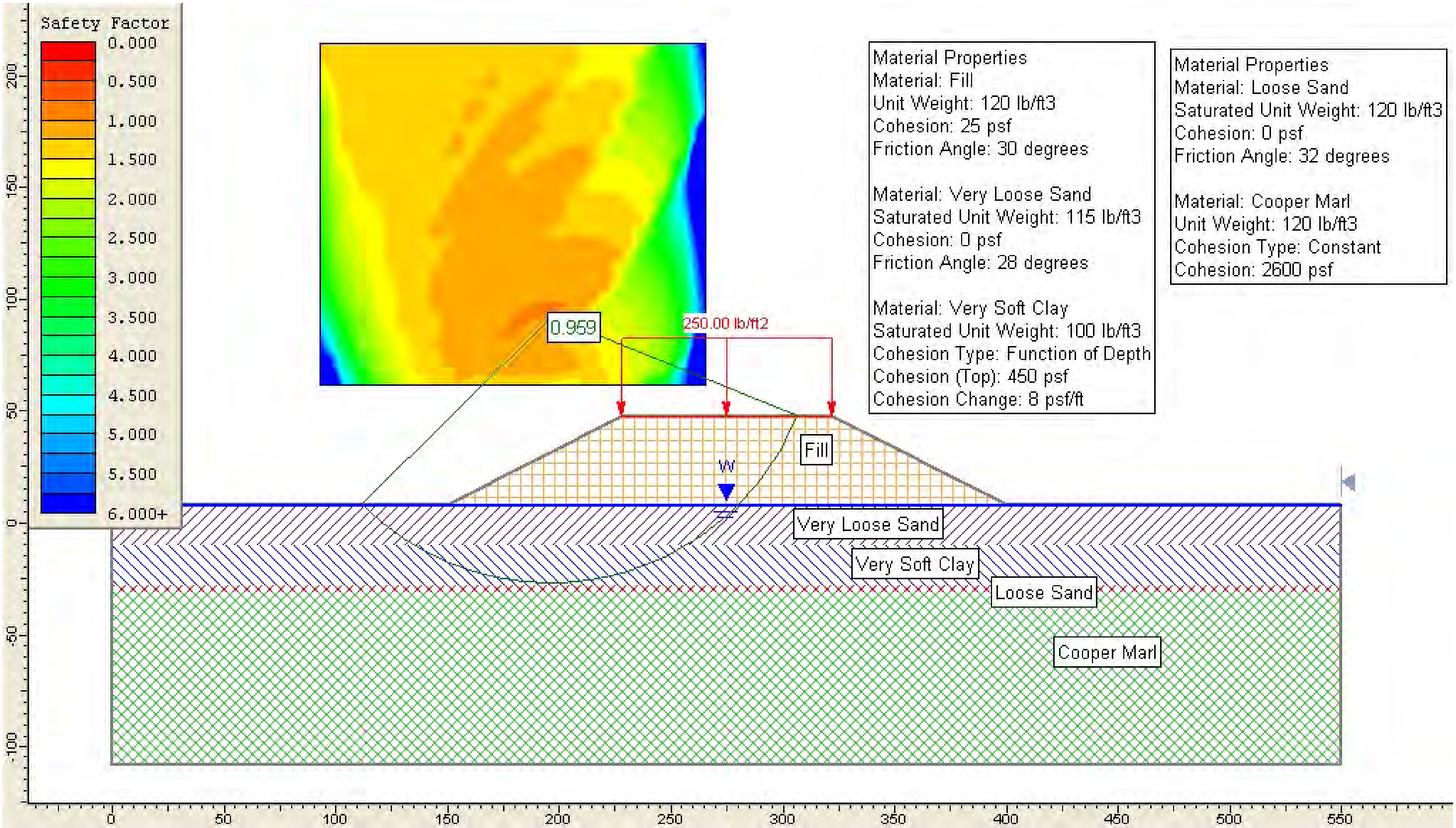
PROJECT NO. 1131-08-554	S&ME	**PORT ACCESS ROAD** **EMBANKMENT STABILITY ANALYSIS – RAMP 1D** STATION 93+75 – PSEUDO-STATIC CONDITION 15 FT OF FILL; B-34 SOIL MODEL	**Figure 5-34**
APRIL 2009			
AS SHOWN			



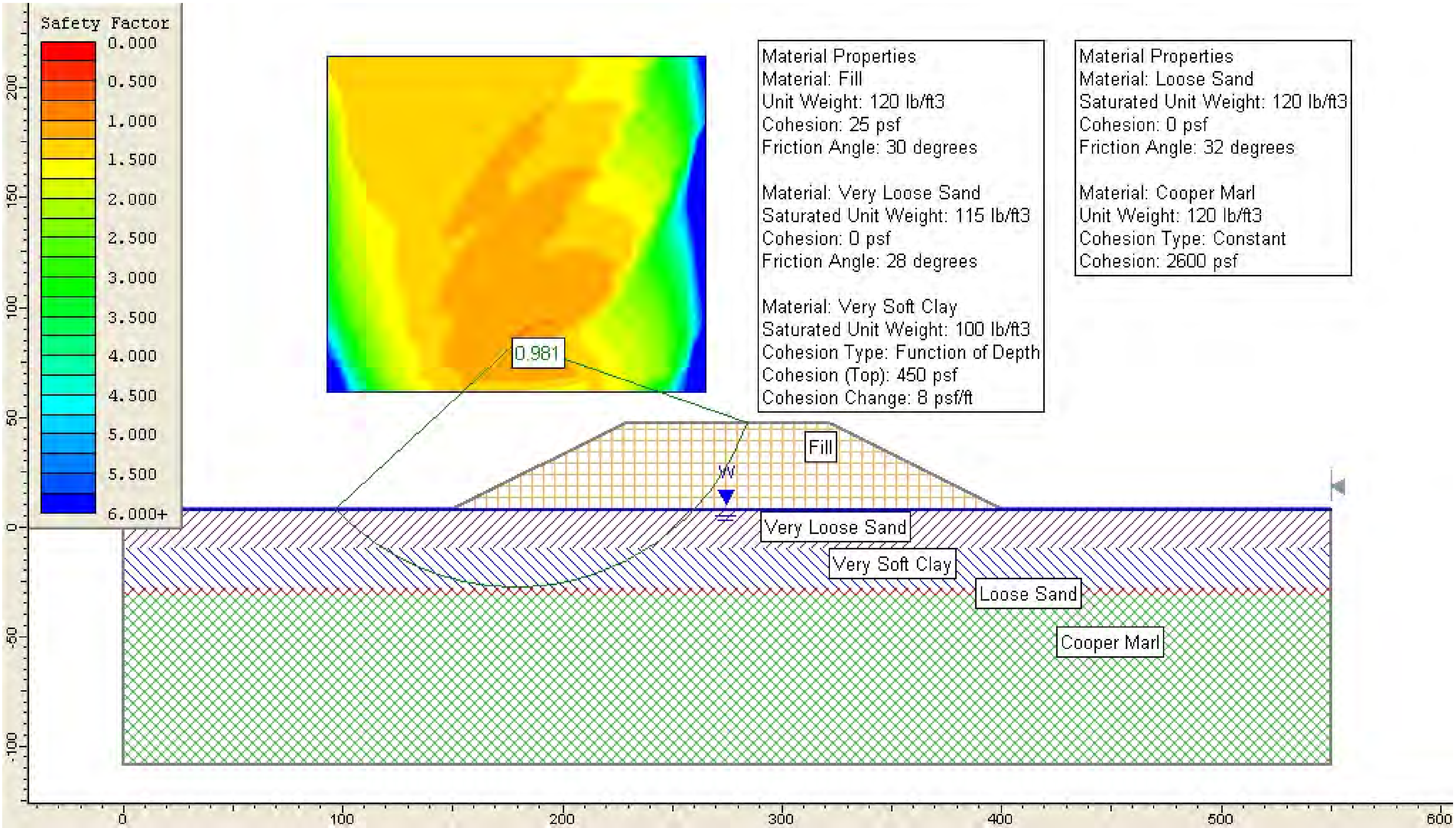
PROJECT NO. 1131-08-554	S&ME	**PORT ACCESS ROAD** **EMBANKMENT STABILITY ANALYSIS – RAMP 1D** STATION 93+75 – LONG TERM STATIC CONDITION WITH REINFORCEMENT 15 FT OF FILL; B-34 SOIL MODEL	**Figure 5-35**
APRIL 2009			
AS SHOWN			



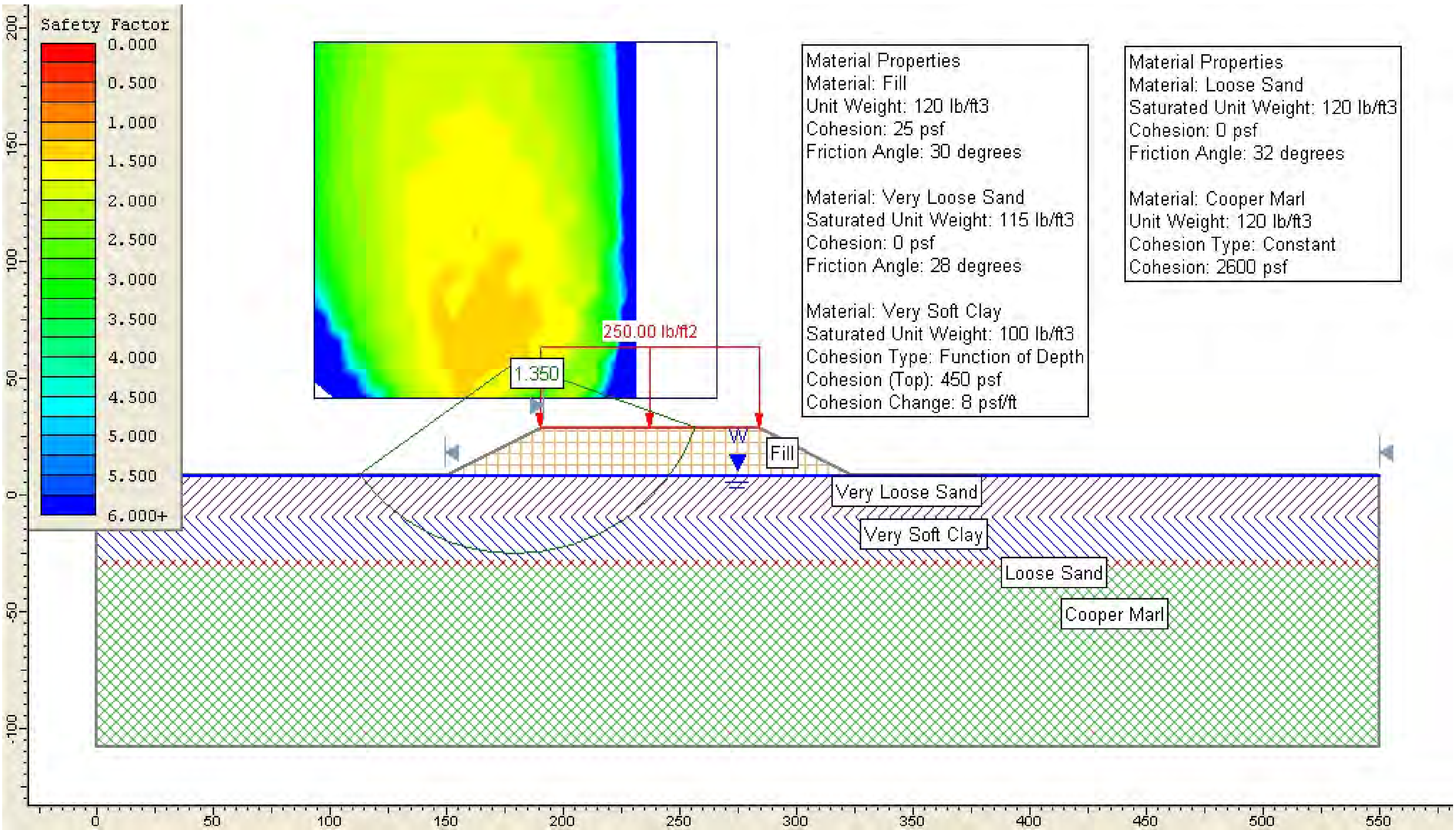
PROJECT NO. 1131-08-554	S&ME	**PORT ACCESS ROAD** **EMBANKMENT STABILITY ANALYSIS – RAMP 1D** STATION 93+75 – PSEUDO-STATIC CONDITION WITH REINFORCEMENT 15 FT OF FILL; B-34 SOIL MODEL	**Figure 5-36**
APRIL 2009			
AS SHOWN			



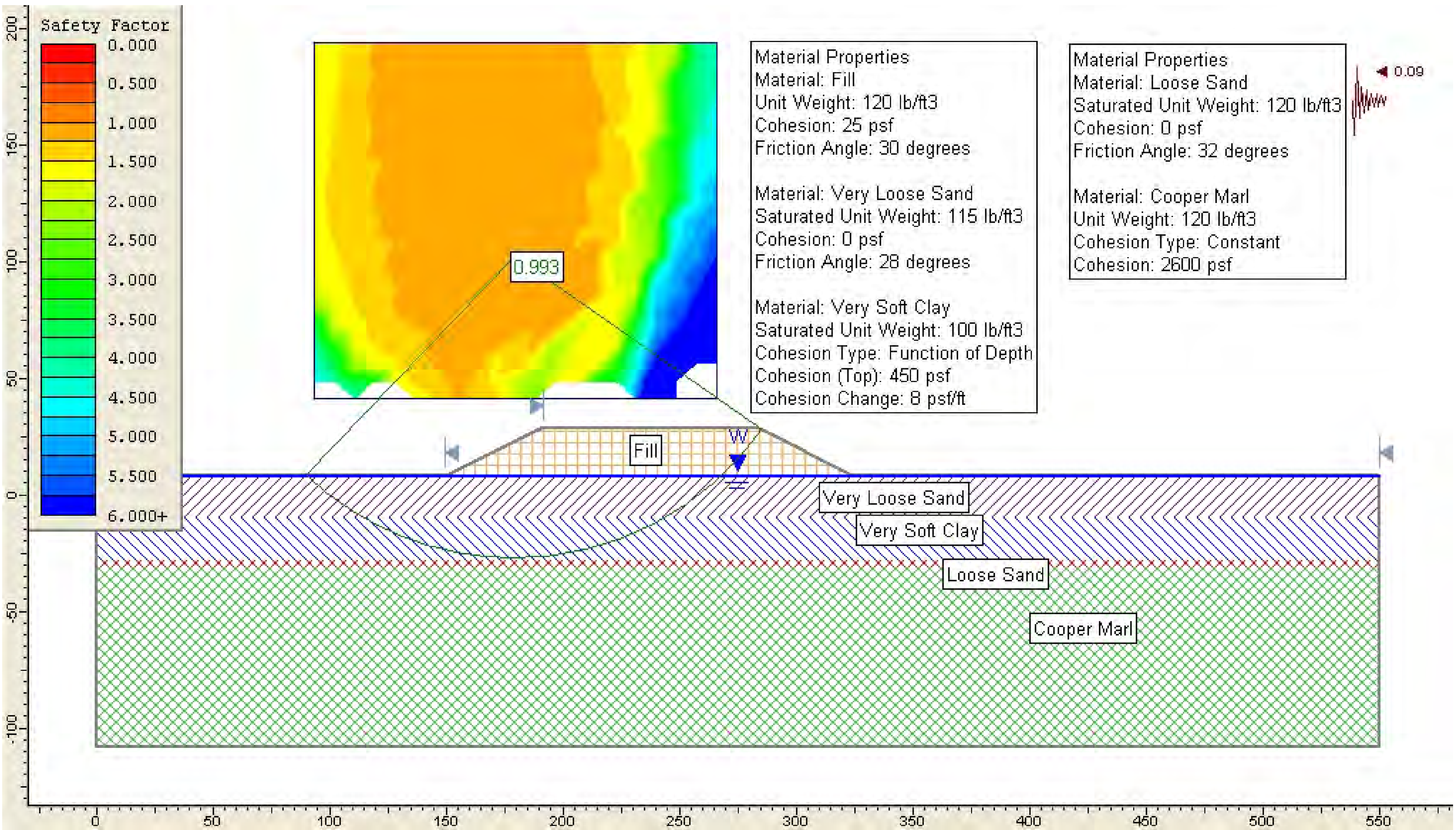
PROJECT NO. 1131-08-554	S&ME	**PORT ACCESS ROAD** **EMBANKMENT STABILITY ANALYSIS – RAMP 1D** STATION 70+00 – STATIC CONDITION 39 FT OF FILL; B-22 AND B-23 SOIL MODEL	**Figure 5-37**
APRIL 2009			
AS SHOWN			



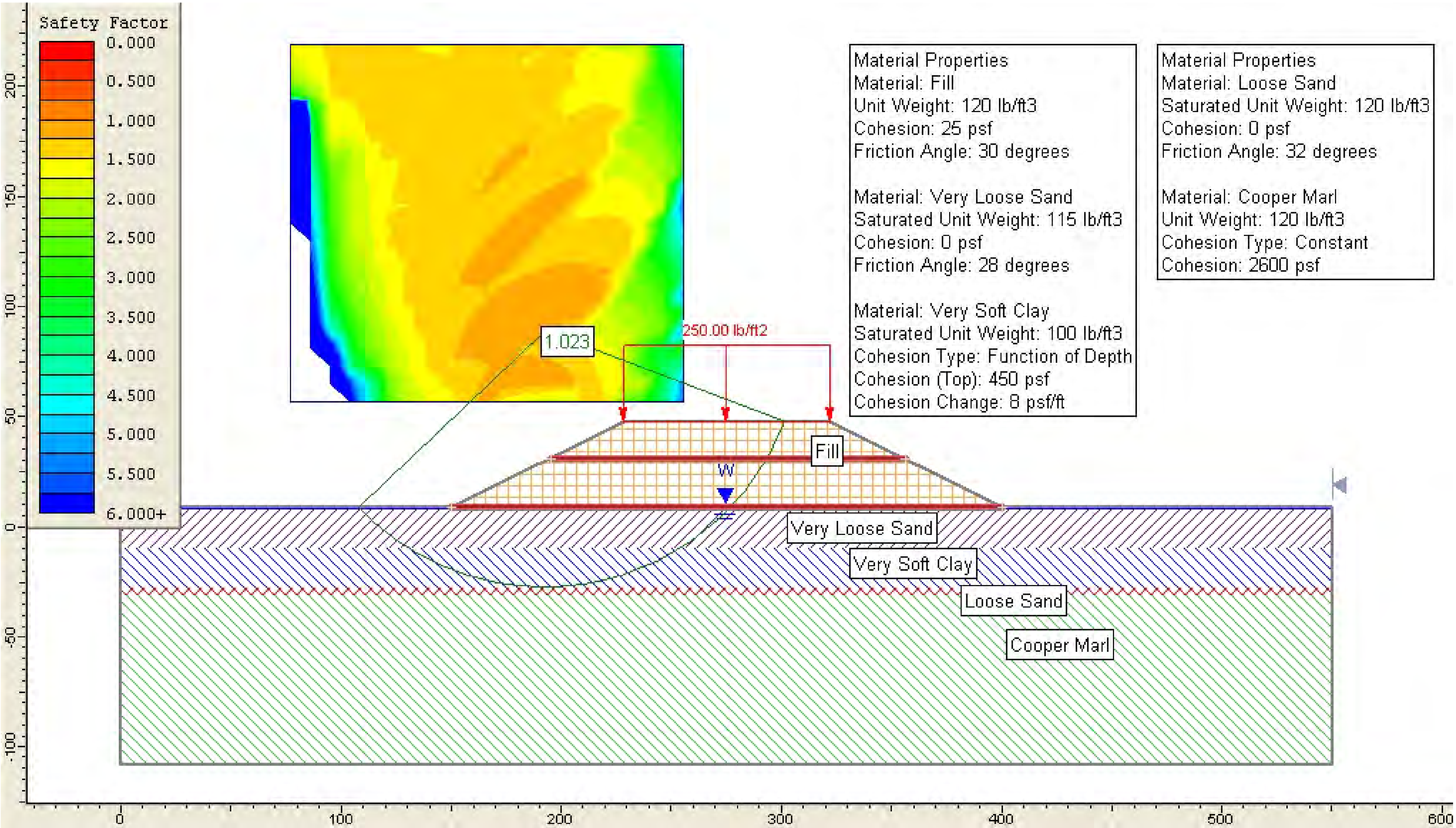
PROJECT NO. 1131-08-554	S&ME	**PORT ACCESS ROAD** **EMBANKMENT STABILITY ANALYSIS – RAMP 1D** STATION 70+00 – PSEUDO-STATIC CONDITION 39 FT OF FILL; B-22 AND B-23 SOIL MODEL
APRIL 2009		**Figure 5-38**
AS SHOWN		



PROJECT NO. 1131-08-554 APRIL 2009 AS SHOWN	S&ME	**PORT ACCESS ROAD** **EMBANKMENT STABILITY ANALYSIS – RAMP 1D** STATION 70+00 – STATIC CONDITION 20 FT OF FILL; B-22 AND B-23 SOIL MODEL	**Figure 5-39**



PROJECT NO. 1131-08-554	S&ME	**PORT ACCESS ROAD** **EMBANKMENT STABILITY ANALYSIS – RAMP 1D** STATION 70+00 – PSEUDO-STATIC CONDITION 20 FT OF FILL; B-22 AND B-23 SOIL MODEL	**Figure 5-40**
APRIL 2009			
AS SHOWN			

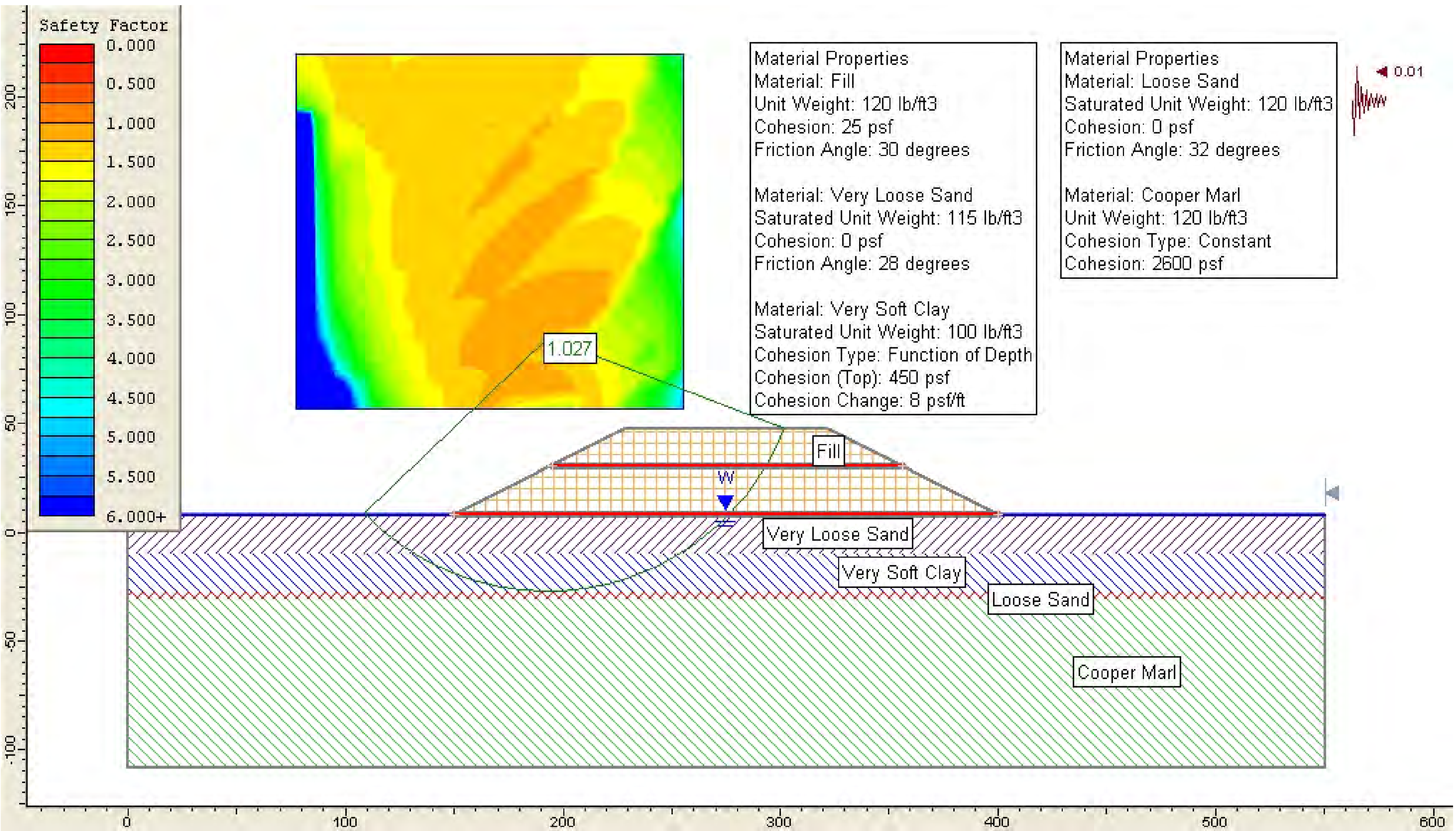


PROJECT NO. 1131-08-554	
APRIL 2009	
AS SHOWN	

S&ME

PORT ACCESS ROAD
EMBANKMENT STABILITY ANALYSIS – RAMP 1D
STATION 70+00 – STATIC CONDITION WITH REINFORCEMENT
39 FT OF FILL; B-22 AND B-23 SOIL MODEL

Figure 5-41



PROJECT NO. 1131-08-554	S&ME	**PORT ACCESS ROAD** **EMBANKMENT STABILITY ANALYSIS – RAMP 1D** STATION 70+00 – PSEUDO-STATIC CONDITION WITH REINFORCEMENT 39 FT OF FILL; B-22 AND B-23 SOIL MODEL	**Figure 5-42**
APRIL 2009			
AS SHOWN			

5.6.3 *Deep Foundations*

Figures 5-43and 5-44 presents the estimated axial capacity for drilled shafts and driven, square PSC piles bearing in the Cooper marl. A top-of-marl elevation of -40 ft-NAVD 88 for the Main Line was used. Based on the subsurface profile, this is an appropriate top-of-marl elevation for most of the Main Line. Additionally, the "younger" marl deposit was encountered over portions of the Main Line but not along the entire alignment. The top-of-marl elevation also increases rather dramatically between Spruill Avenue and the Macalloy Site. A more detailed analysis of shaft and pile capacities, particularly for a bridge over Shipyard Creek and the bridge over Spruill and Meeting Street, would need to be performed once final bent locations are established and a decision is made about using embankments or elevated structure.

A lower side friction value of 1.5 ksf was used for the younger marl deposit encountered along a portion of the Main Line. The shaft and pile capacities presented below assume the unit side friction indicated above and a young marl thickness of 10 ft.

Figure 5-43. Main Line 1D Ultimate Drilled Shaft Capacity vs. Tip Elevation

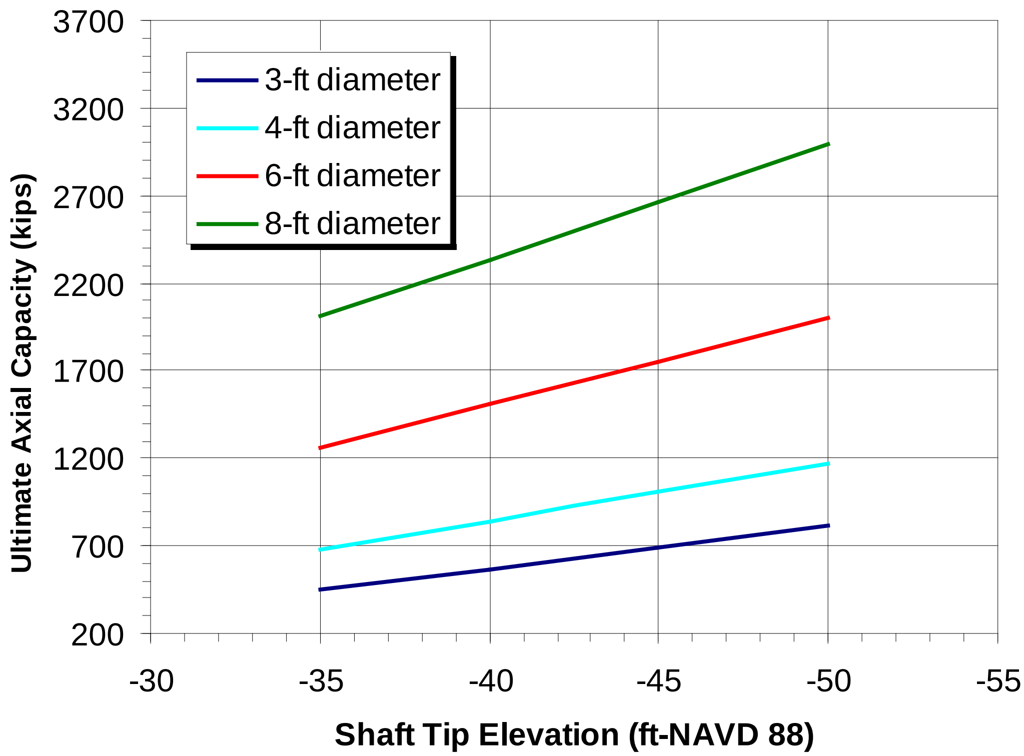
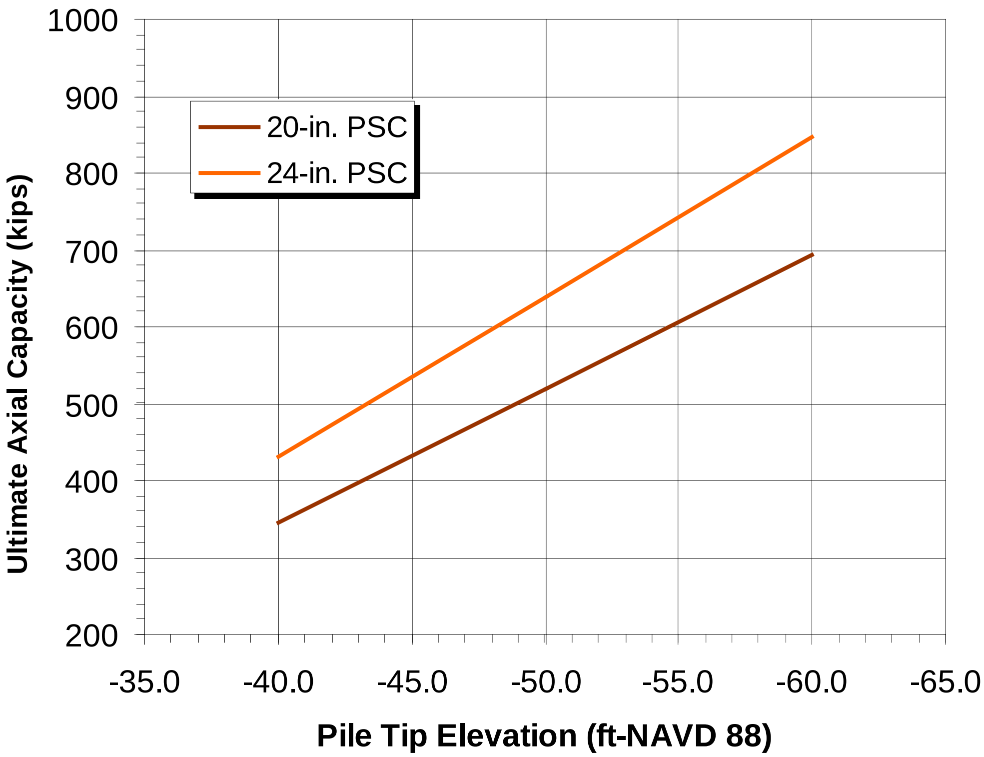


Figure 5-44. Main Line 1D Ultimate Driven PSC Pile Capacity vs. Tip Elevation



5.7 Ramps E and F

Ramps E and F exit from the Main Line 1D on the Macalloy site. Ramp E continues across Shipyard Creek to provide Tidewater Road access. Ramp F will serve a local access road between Bainbridge Avenue and the Main Line. Although we were not able to explore these Ramps as completely as the others, the available subsurface data generally indicates loose to medium dense clayey sands interbedded with layers of medium dense to dense cleaner sands and some thin soft clay layers. The sands extend to an elevation of approximately -18 ft, where the younger marl deposit was encountered. This younger marl transitioned into the Cooper marl at an approximate elevation of -30 ft. While the portion of Ramp E that lies within the Macalloy site west of Shipyard Creek consists of basically sandy soils overlying the Cooper Group, the portion of the ramp that lies within the former Naval Base east of Shipyard Creek consists of the very soft clays and silts described above for the Main Line. For a subsurface profile of Ramps E and F, please refer to the Main Line 1D subsurface profile drawings.

5.7.1 *Static Settlement*

Based on the ramps' profiles, we estimate up to 11 ft of fill will be placed at the bridge abutments. Settlements from the weight of the new fill are expected due to compression of the upper sands and to a lesser degree the underlying clay layers. We expect settlements on the order of 2 to 4 in. Most of the settlement would occur relatively quickly during construction. Wick drains should not be required for

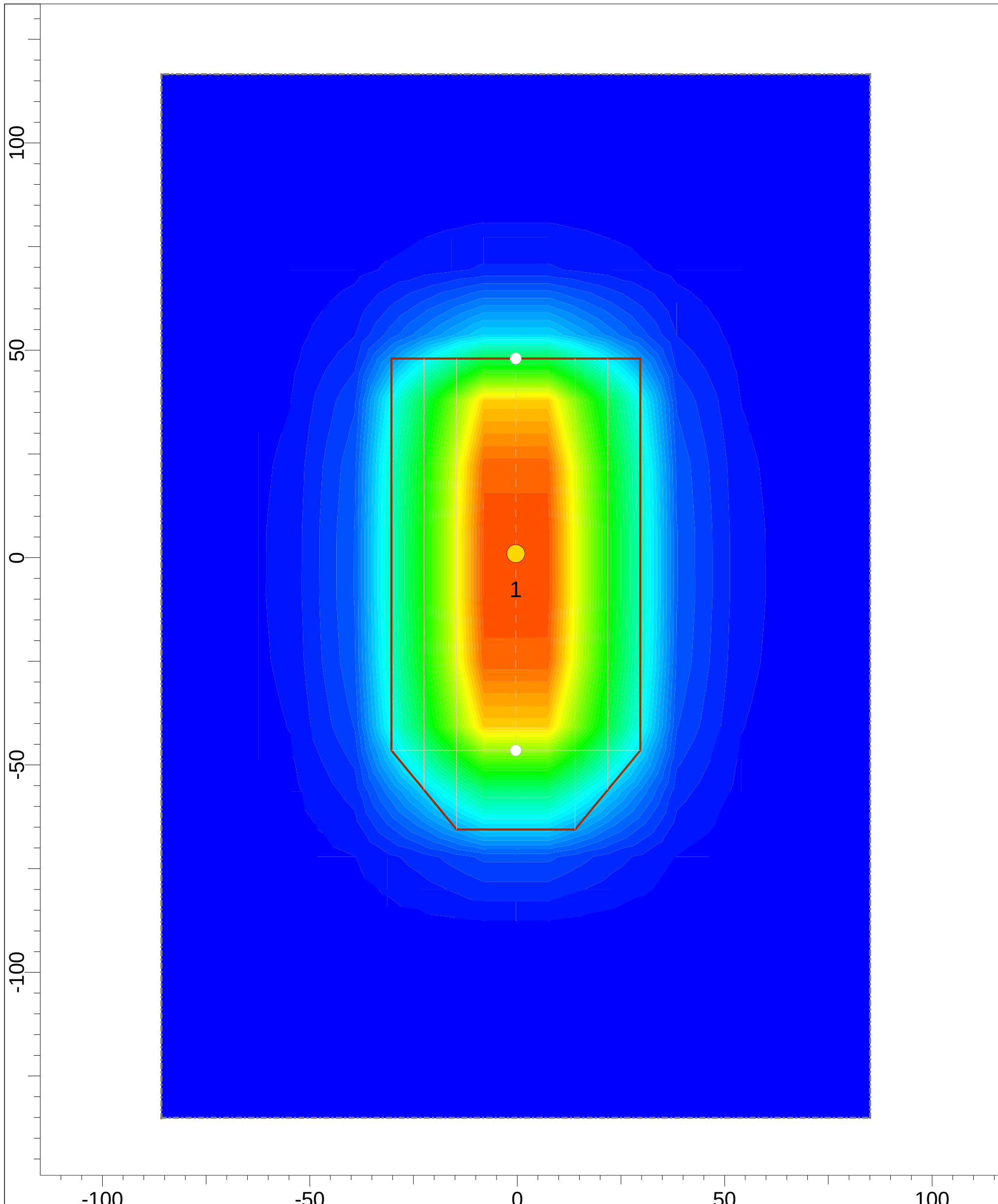
Ramps E or F. Figure 5-45 shows a representative cross section of the Ramp E and Ramp F embankments with the calculated settlement at the point shown on the plan view.

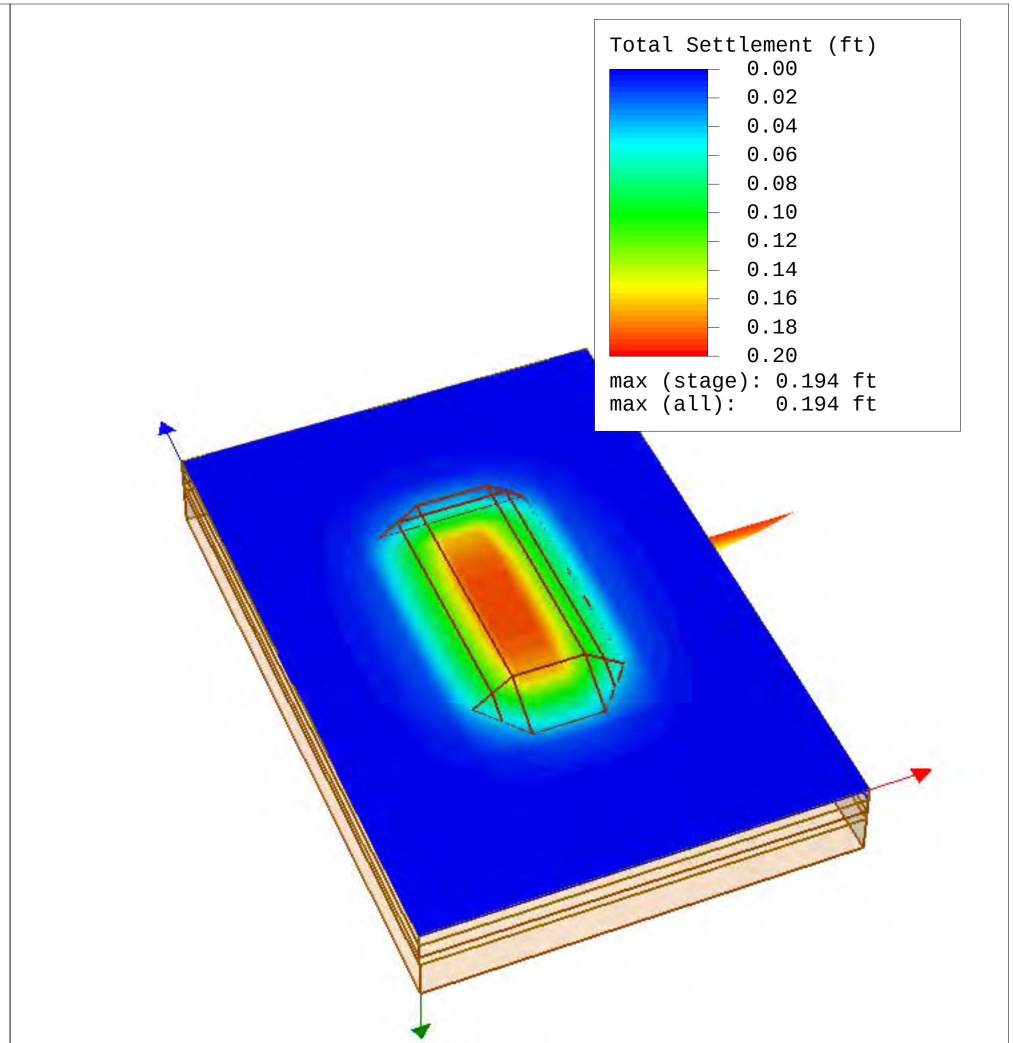
5.7.2 *Embankment Global Stability*

The results of our global stability analyses indicate that the embankment configuration shown will be stable during and following construction with a FOS greater than 1.4 under static conditions. The FOS for the representative embankment section is less than 1.1 for pseudo-static seismic conditions, under an acceleration of 0.27g. The yield accelerations are 0.20g. Figures 5-46 through 5-49 show representative cross sections at Stations 81+30 and 68+30, respectively, under static and pseudo-static conditions.

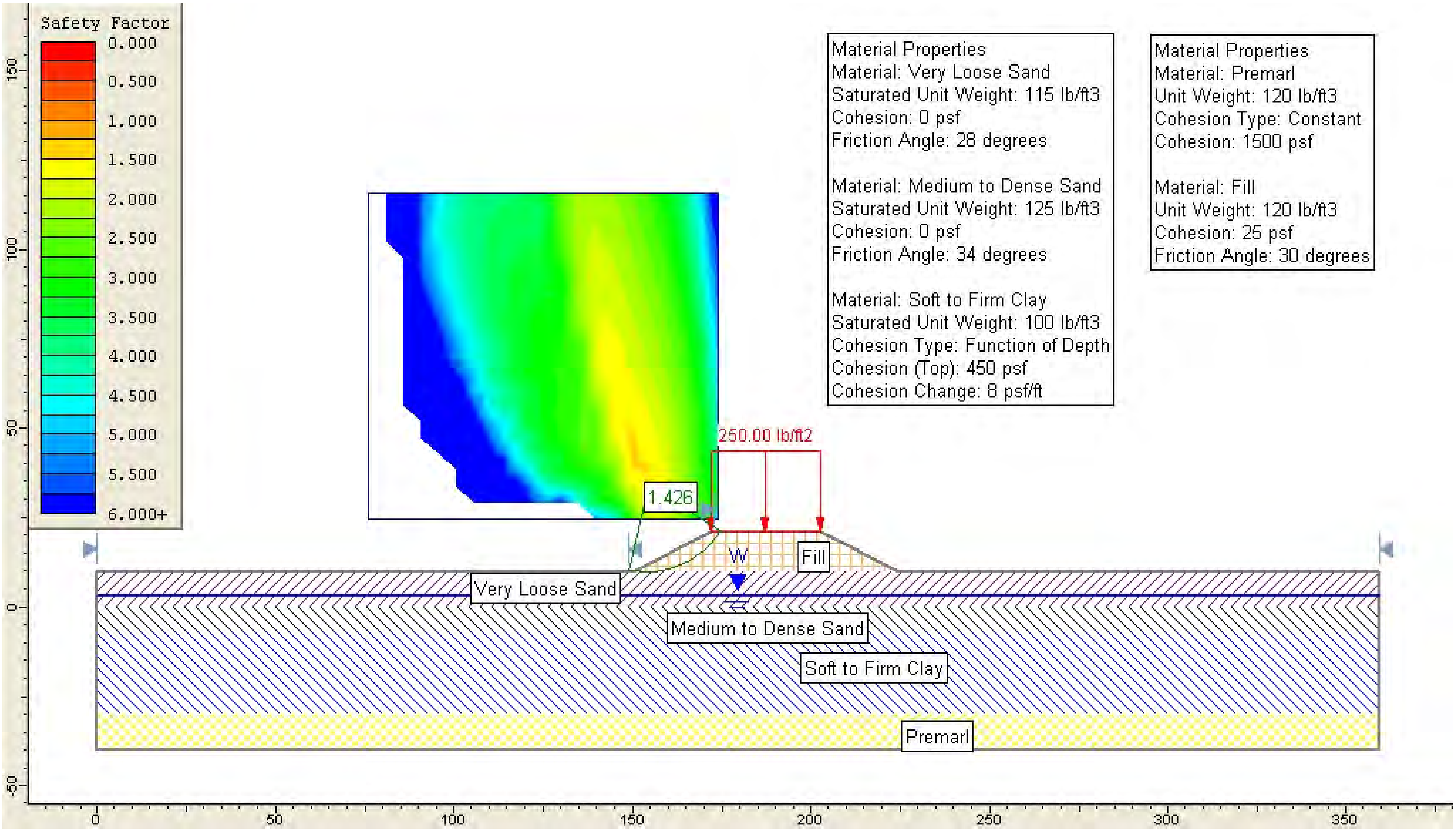
5.7.3 *Deep Foundations*

Based on the available data, a top-of-marl elevation of -40 ft-NAVD 88 was used for Ramps E and F. Additionally, the "younger" marl deposit was encountered in the borings near the Ramps. Therefore, the axial capacity analyses presented for the Main Line should be applicable for Ramps E and F. Additional exploration would be necessary to confirm this.

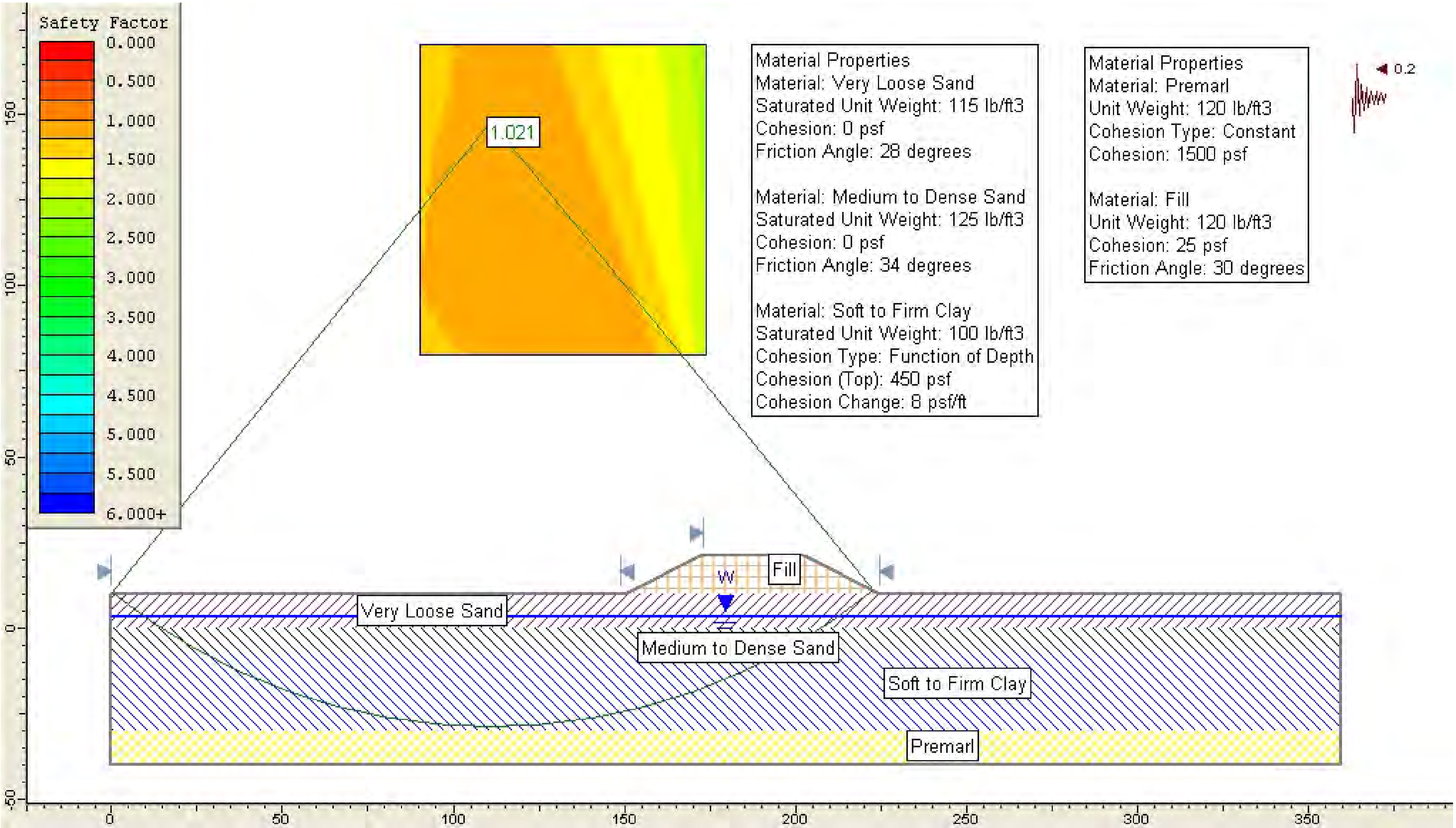




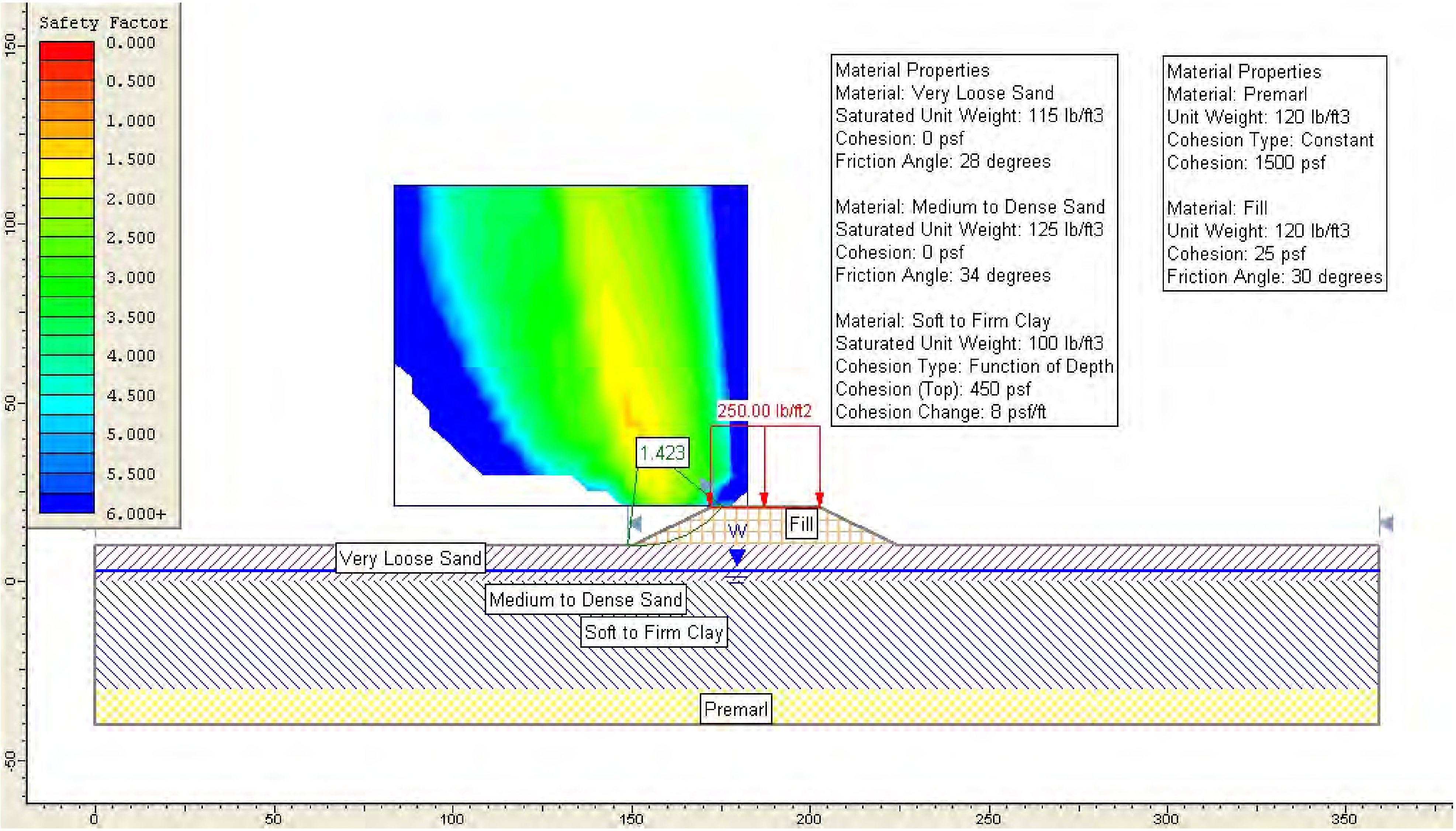
S&ME	Project	Port Access Road	
	Analysis Description	Embankment Settlement at Ramp E, Station 82+50	
		11 ft of fill; C-1 soil model	
	Drawn By	DWH	Company S&ME, Inc.
SETTLE3D 1.007	Date	3/20/09	Figure 5-45



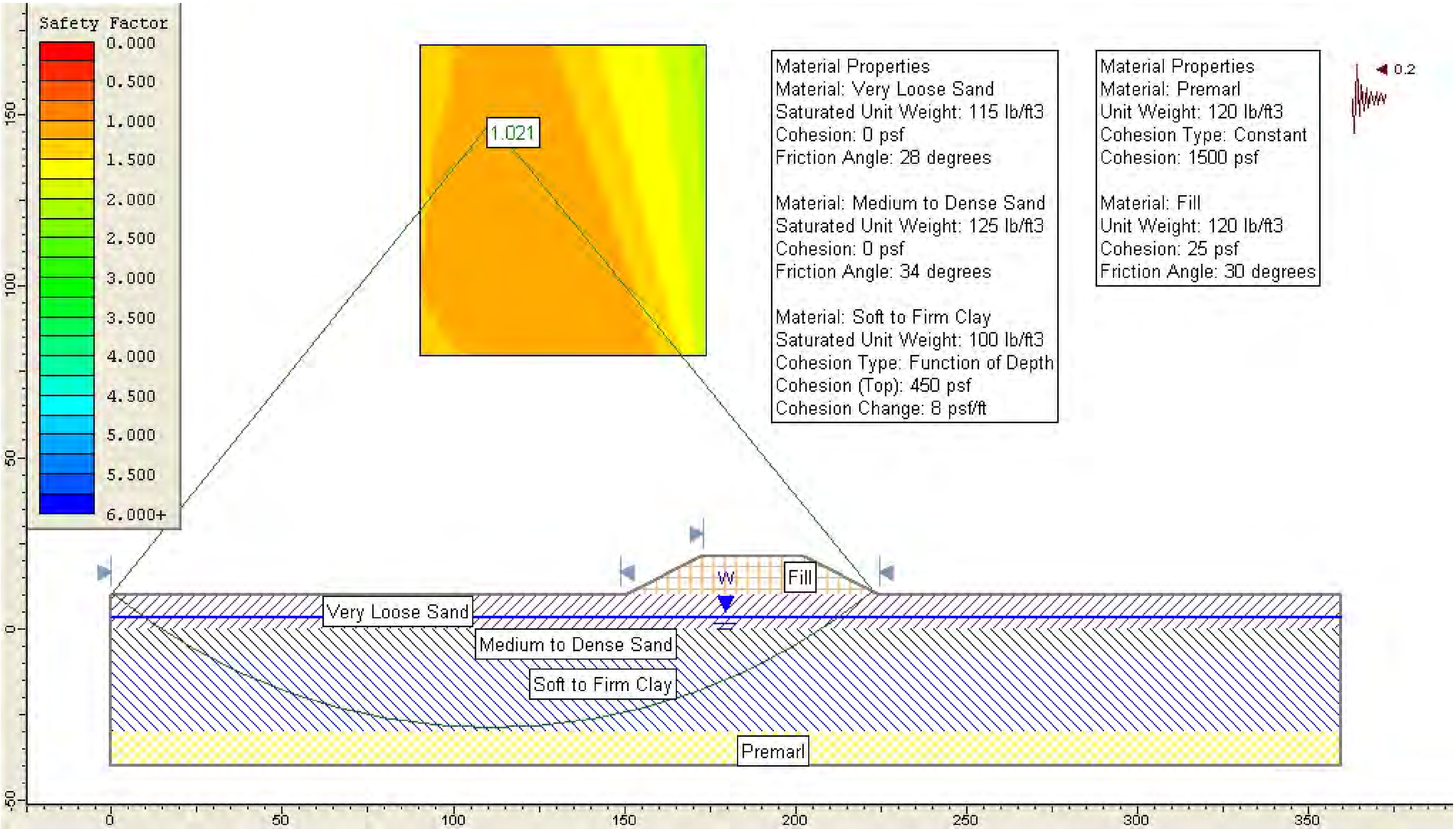
PROJECT NO. 1131-08-554	S&ME	**PORT ACCESS ROAD** **EMBANKMENT STABILITY ANALYSIS – RAMP E** STATION 81+30 – STATIC CONDITION 11 FT OF FILL; D-1 SOIL MODEL	**Figure 5-46**
APRIL 2009			
AS SHOWN			



PROJECT NO. 1131-08-554	S&ME	**PORT ACCESS ROAD** **EMBANKMENT STABILITY ANALYSIS – RAMP E** STATION 81+30 – PSEUDO-STATIC CONDITION 11 FT OF FILL; D-1 SOIL MODEL	**Figure 5-47**
APRIL 2009			
AS SHOWN			



PROJECT NO. 1131-08-554	S&ME	**PORT ACCESS ROAD** **EMBANKMENT STABILITY ANALYSIS – RAMP F** STATION 68+30 – STATIC CONDITION 11 FT OF FILL; D-1 SOIL MODEL	**Figure 5-48**
APRIL 2009			
AS SHOWN			



PROJECT NO. 1131-08-554	S&ME	**PORT ACCESS ROAD** **EMBANKMENT STABILITY ANALYSIS – RAMP F** STATION 68+30 – PSEUDO-STATIC CONDITION 11 FT OF FILL; D-1 SOIL MODEL 0
APRIL 2009		**Figure 5-49**
AS SHOWN		

5.8 Ramp G

Ramp G begins along I-26 eastbound north of the North Meeting Street exit and follows the existing exit ramp over I-26, King Street Extended and railroad tracks before returning to grade at Meeting Street Extension.

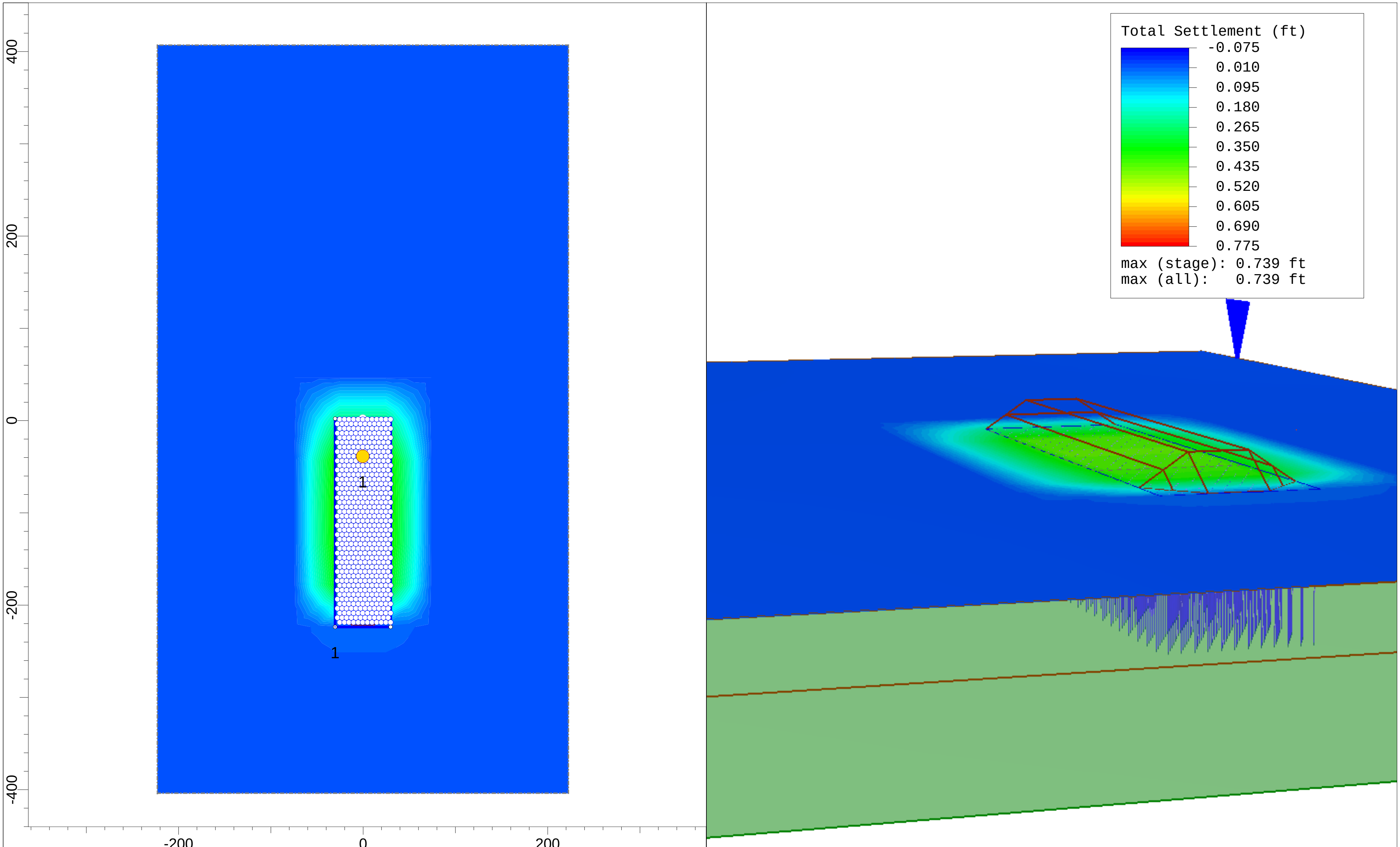
The subsurface conditions along Ramp G generally consist of approximately 20 ft of very loose to medium dense sands overlying approximately 20 to 25 ft of soft to firm clays and silts. The CPT data and laboratory data from Ramp G nearby indicates the clay is slightly overconsolidated. Figure 4-1 shows the subsurface profile along Ramp G.

5.8.1 *Static Settlement*

Based on the ramp profile, we estimate up to 12 ft of fill will be placed near Station 5789+00 at the bridge abutment for Ramp G. Settlements from the weight of the new fill are expected due to compression of the upper sands and to a lesser degree the underlying clay stratum. The addition of 12 ft of fill will result in settlements that exceed typical SCDOT bridge abutment limits. With a maximum fill height of 12 ft, we expect settlement could be on the order of 6 to 8 in. Wick drains and surcharging will likely be required to reduce long term settlement. We estimate wick drains on a 5-ft triangular spacing with a 3 ft surcharge left in place for 90 days will reduce post-construction settlement to under 2 inches. Figure 5-50 shows a representative cross section of the embankment with the calculated settlement at the point shown on the plan view.

5.8.2 *Embankment Global Stability*

The results of our global stability analyses indicate that the embankment configuration shown will be stable during and following construction with a FOS greater than 1.4 under static conditions. The FOS for the representative embankment section generally is less than 1.1 for pseudo-static seismic conditions, under an acceleration of 0.27g. The yield acceleration ranged from 0.21g to 0.27g. Figures 5-51 through 5-56 show representative cross sections at Stations 5772+00, 5789+35, and 5801+65, respectively, under static and pseudo-static conditions.

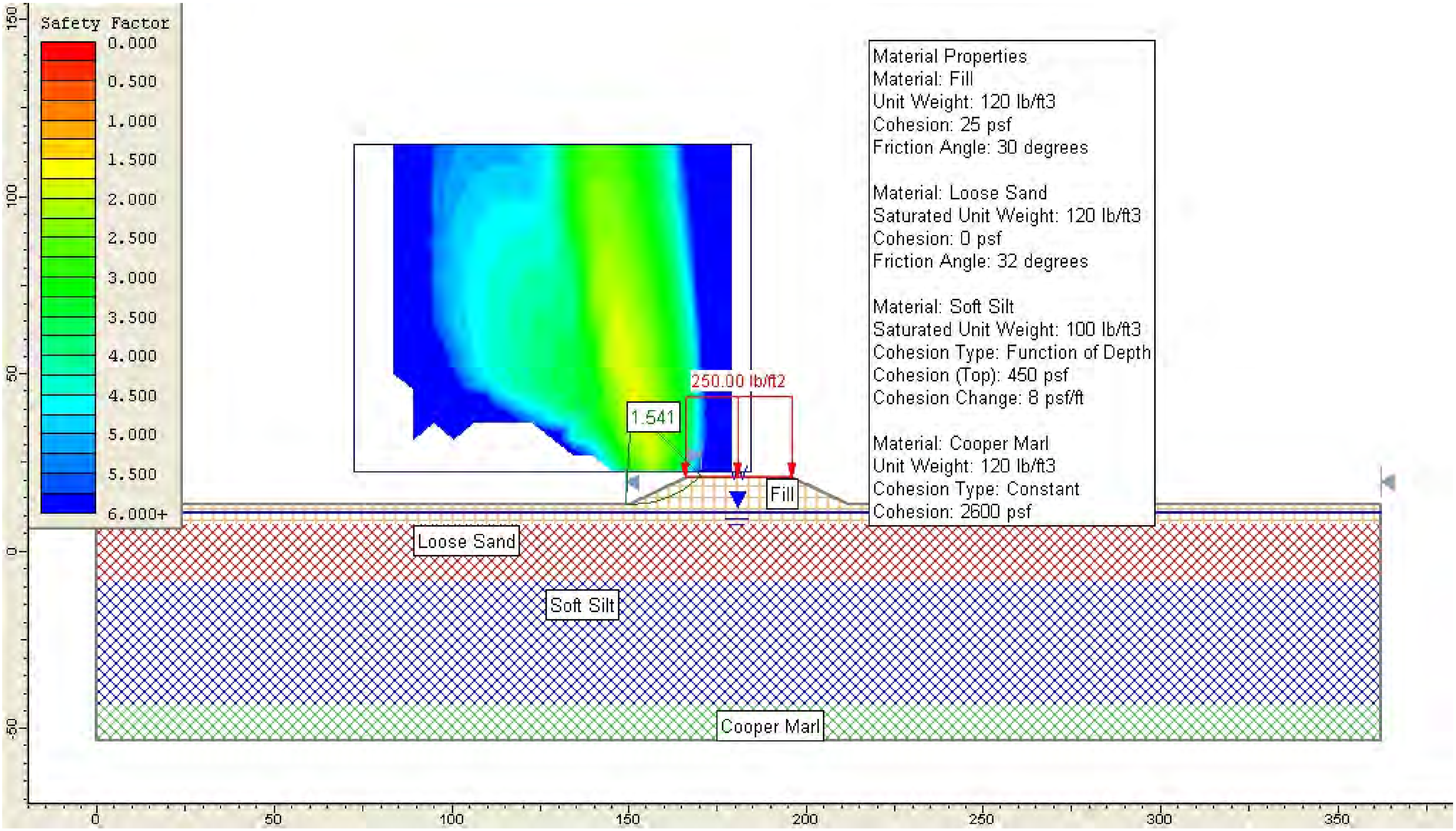


S&ME

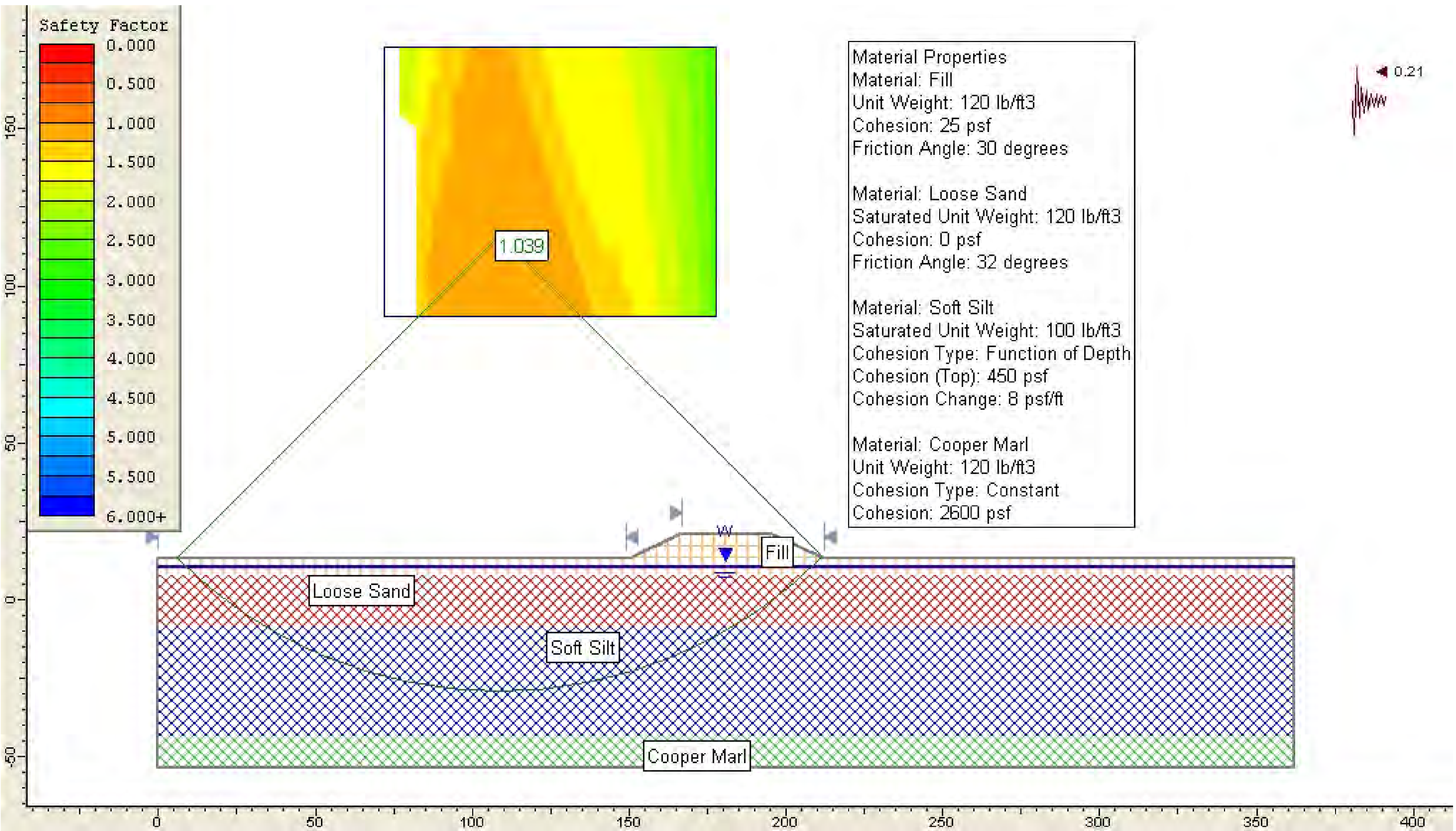
SETTLE3D 1.007

Project	Port Access Road
Analysis Description	Embankment Settlement along Ramp G: Station 5789+00
	13 ft of fill with 3 ft surcharge; B-76 and B-3 soil model

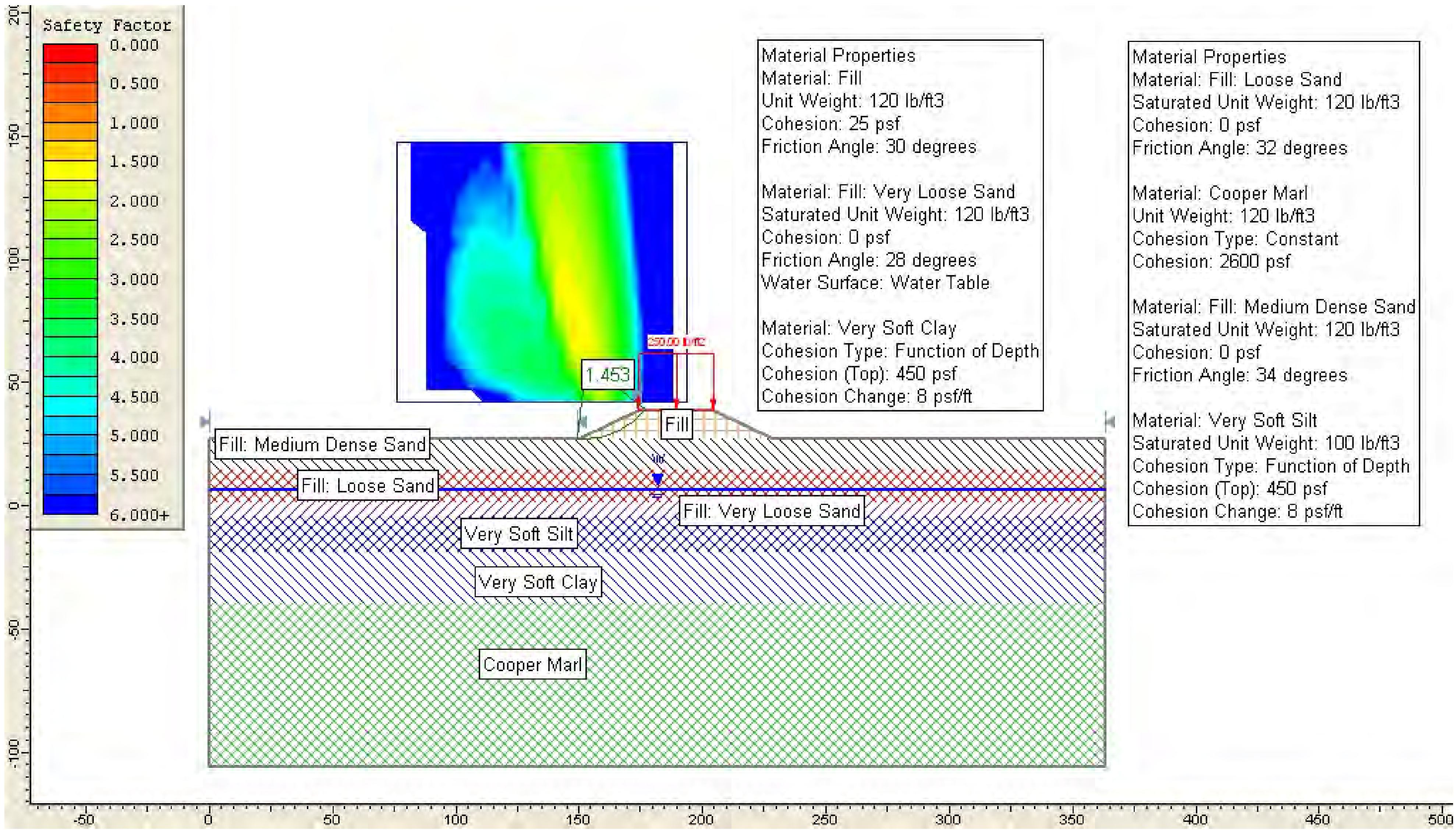
Drawn By	DWH	*Company*	S&ME, Inc.
Date	3/30/09		Figure 5-50



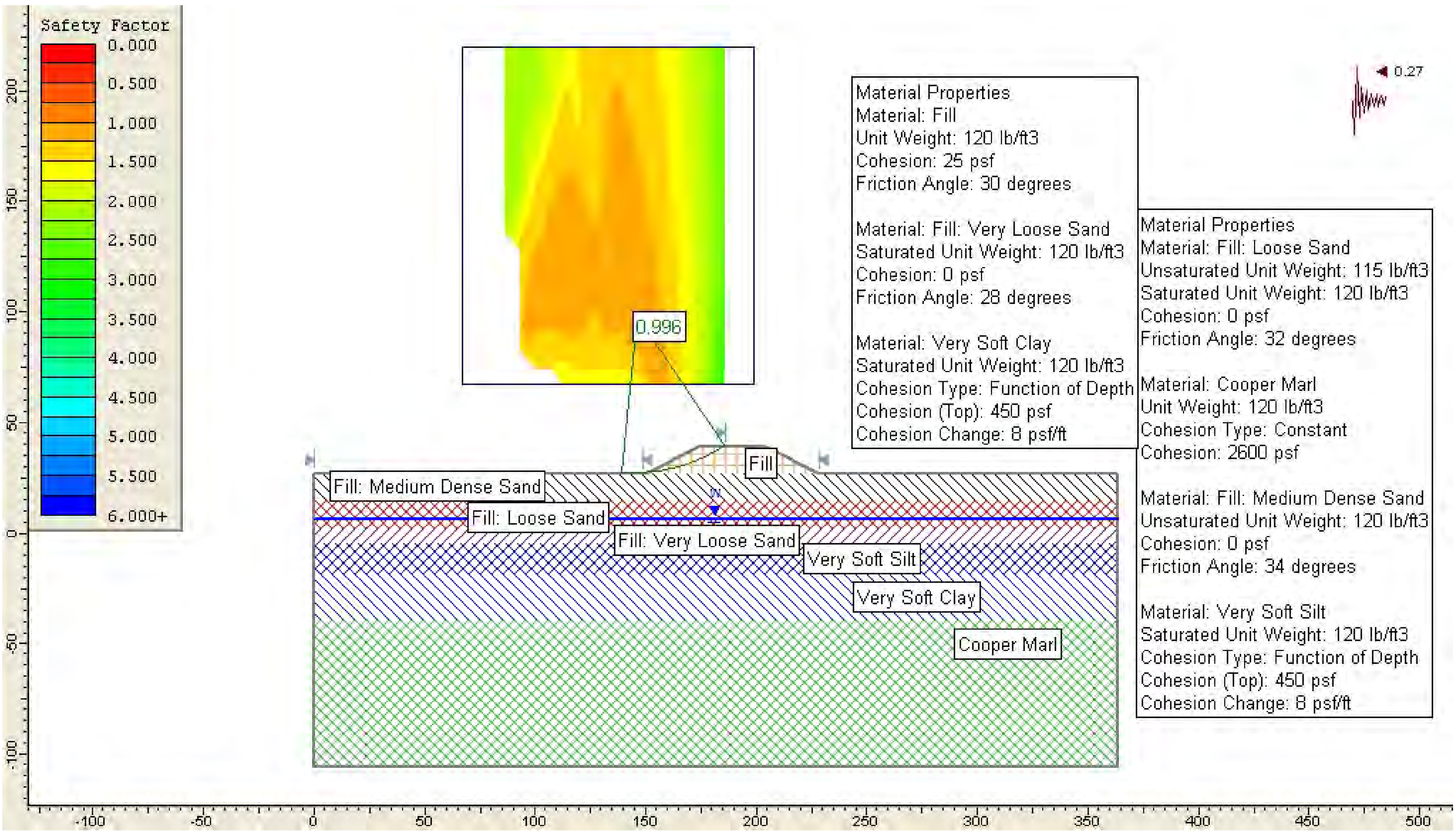
PROJECT NO. 1131-08-554	S&ME	**PORT ACCESS ROAD** **EMBANKMENT STABILITY ANALYSIS – RAMP G** STATION 5772+00 – STATIC CONDITION 8 FT OF FILL; B-2 SOIL MODEL
APRIL 2009		**Figure 5-51**
AS SHOWN		



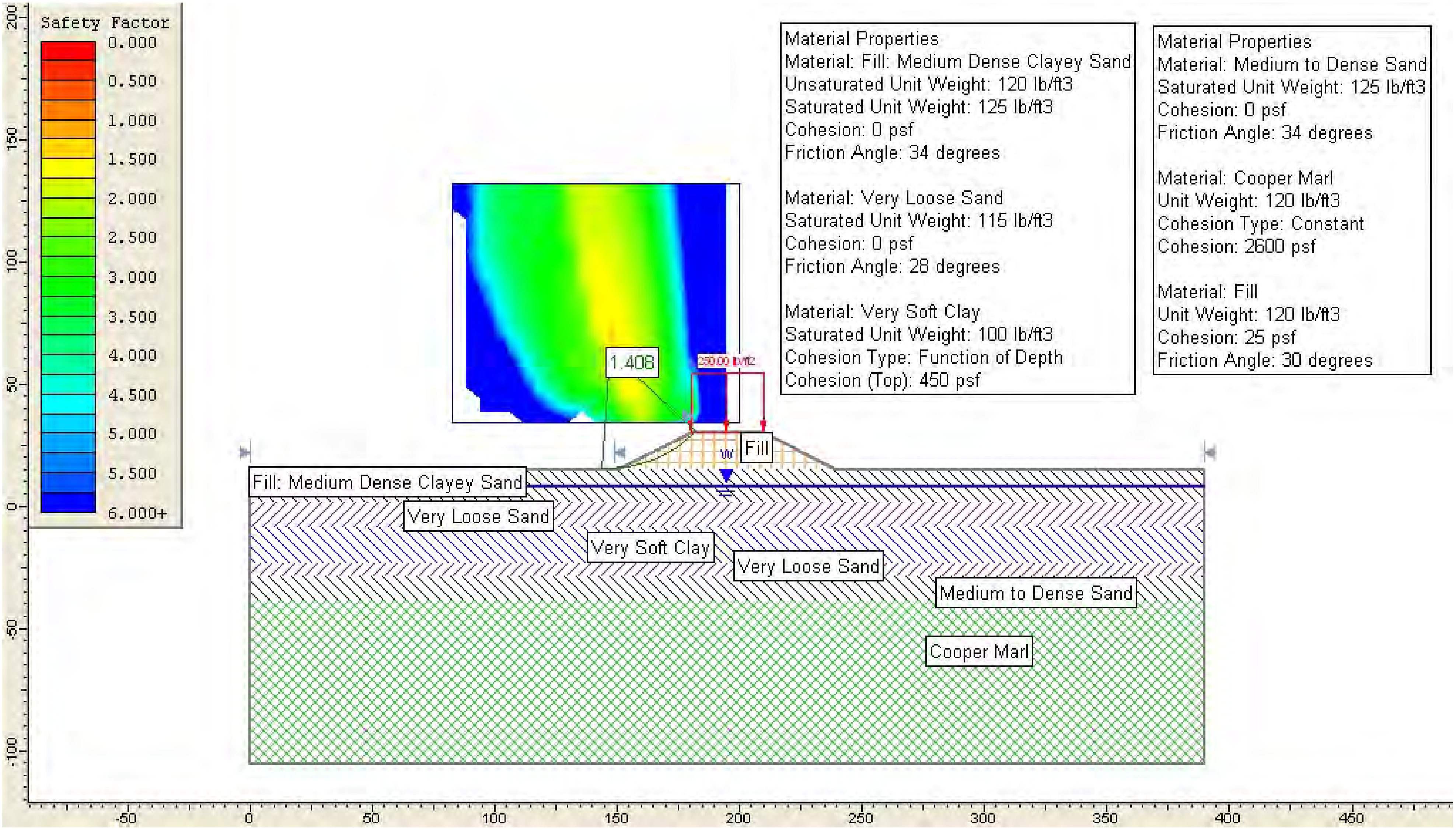
PROJECT NO. 1131-08-554	S&ME	**PORT ACCESS ROAD** **EMBANKMENT STABILITY ANALYSIS – RAMP G** STATION 5772+00 – PSEUDO-STATIC CONDITION 8 FT OF FILL; B-2 SOIL MODEL	**Figure 5-52**
APRIL 2009			
AS SHOWN			



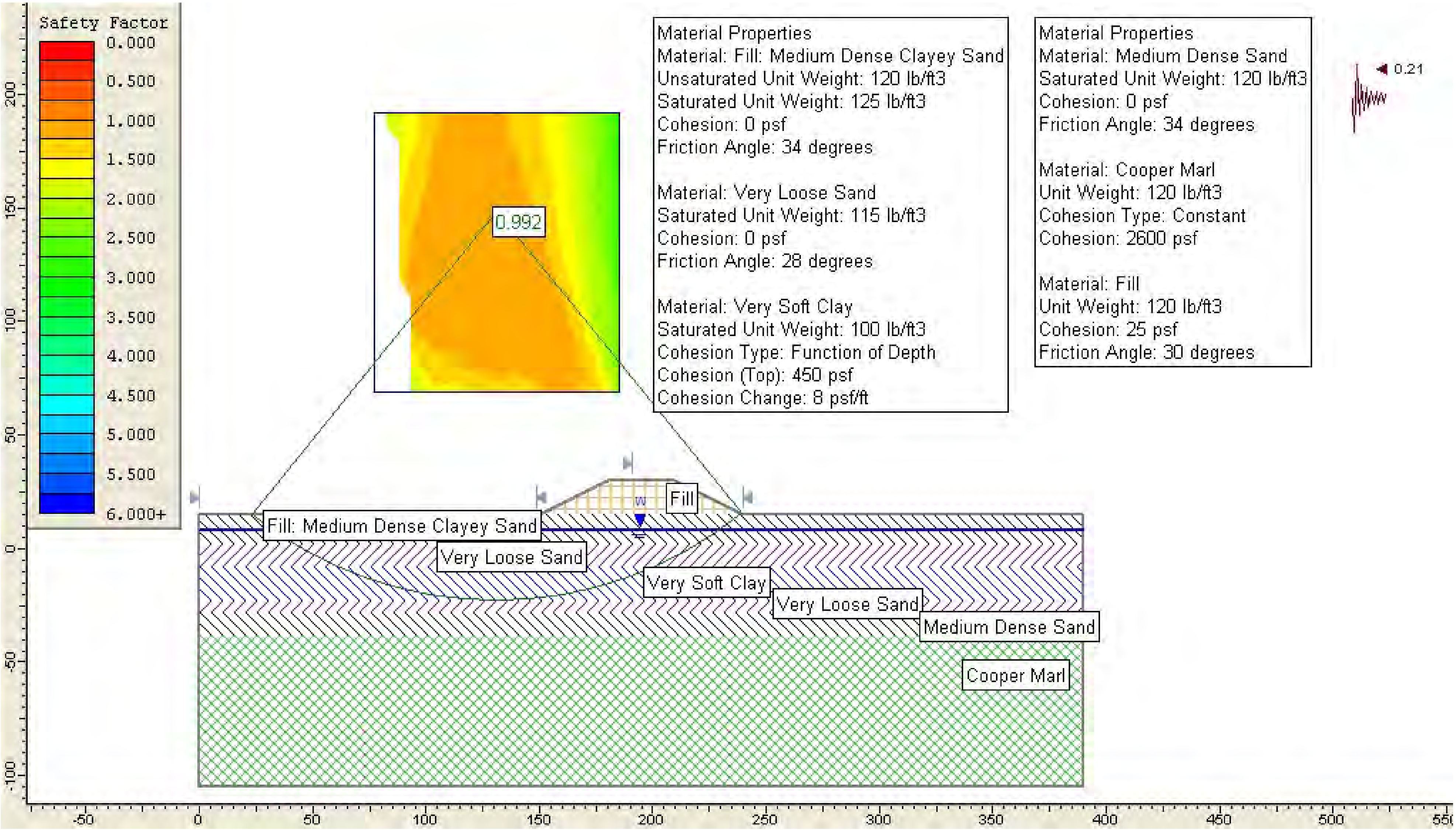
PROJECT NO. 1131-08-554	S&ME	**PORT ACCESS ROAD**	**Figure 5-53**
APRIL 2009		**EMBANKMENT STABILITY ANALYSIS – RAMP G** STATION 5789+00 – STATIC CONDITION 12 FT OF FILL; B-76 SOIL MODEL	
AS SHOWN			



PROJECT NO. 1131-08-554	S&ME	**PORT ACCESS ROAD**	**Figure 5-54**
APRIL 2009		**EMBANKMENT STABILITY ANALYSIS – RAMP G**	
AS SHOWN		STATION 5789+00 – PSEUDO-STATIC CONDITION 12 FT OF FILL; B-76 SOIL MODEL	



PROJECT NO. 1131-08-554	S&ME	**PORT ACCESS ROAD** **EMBANKMENT STABILITY ANALYSIS – RAMP G** STATION 5801+50 – STATIC CONDITION 15 FT OF FILL; B-75 SOIL MODEL	**Figure 5-55**
APRIL 2009			
AS SHOWN			



PROJECT NO. 1131-08-554	S&ME	**PORT ACCESS ROAD** **EMBANKMENT STABILITY ANALYSIS – RAMP G** STATION 5801+50 – PSEUDO-STATIC CONDITION 15 FT OF FILL; B-75 SOIL MODEL	**Figure 5-56**
APRIL 2009			
AS SHOWN			

5.8.3 *Deep Foundations*

Figures 5-57 and 5-58 present the estimated axial capacity for drilled shafts and driven, square PSC piles bearing in the Cooper marl. A top-of-marl elevation for Ramp G of -40 ft-NAVD 88 was used.

Figure 5-57. Ramp G Ultimate Drilled Shaft Capacity vs. Tip Elevation

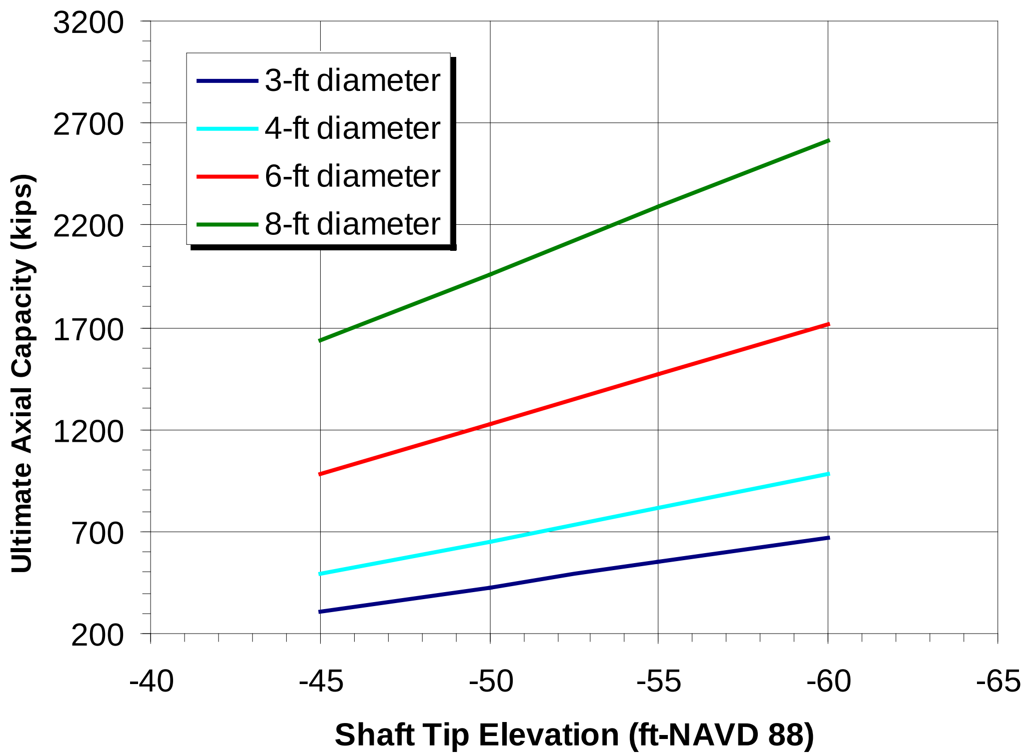
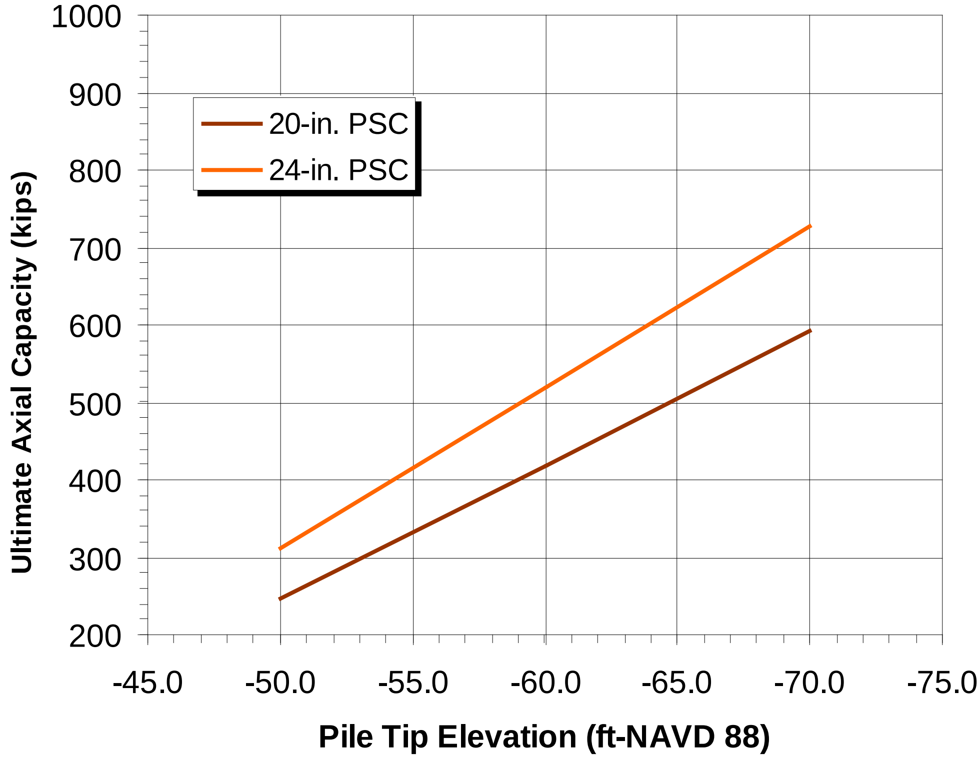


Figure 5-58. Ramp G Ultimate Driven PSC Pile Capacity vs. Tip Elevation



5.9 Ramp H

Ramp H begins along I-26 eastbound just south of Baker Hospital Road. It parallels the existing on-ramp to I-26 from Meeting Street Extension, and crosses CSX railroad tracks and King Street Extension before returning to grade at Meeting Street.

The subsurface conditions along Ramp H are similar to Ramp G and generally consist of approximately 20 ft of very loose to medium dense sands overlying approximately 20 to 25 ft of soft to firm clays and silts. The CPT data and laboratory data from Ramp G nearby indicates the clay is slightly overconsolidated. Figure 4-12 shows the subsurface profile along Ramp H.

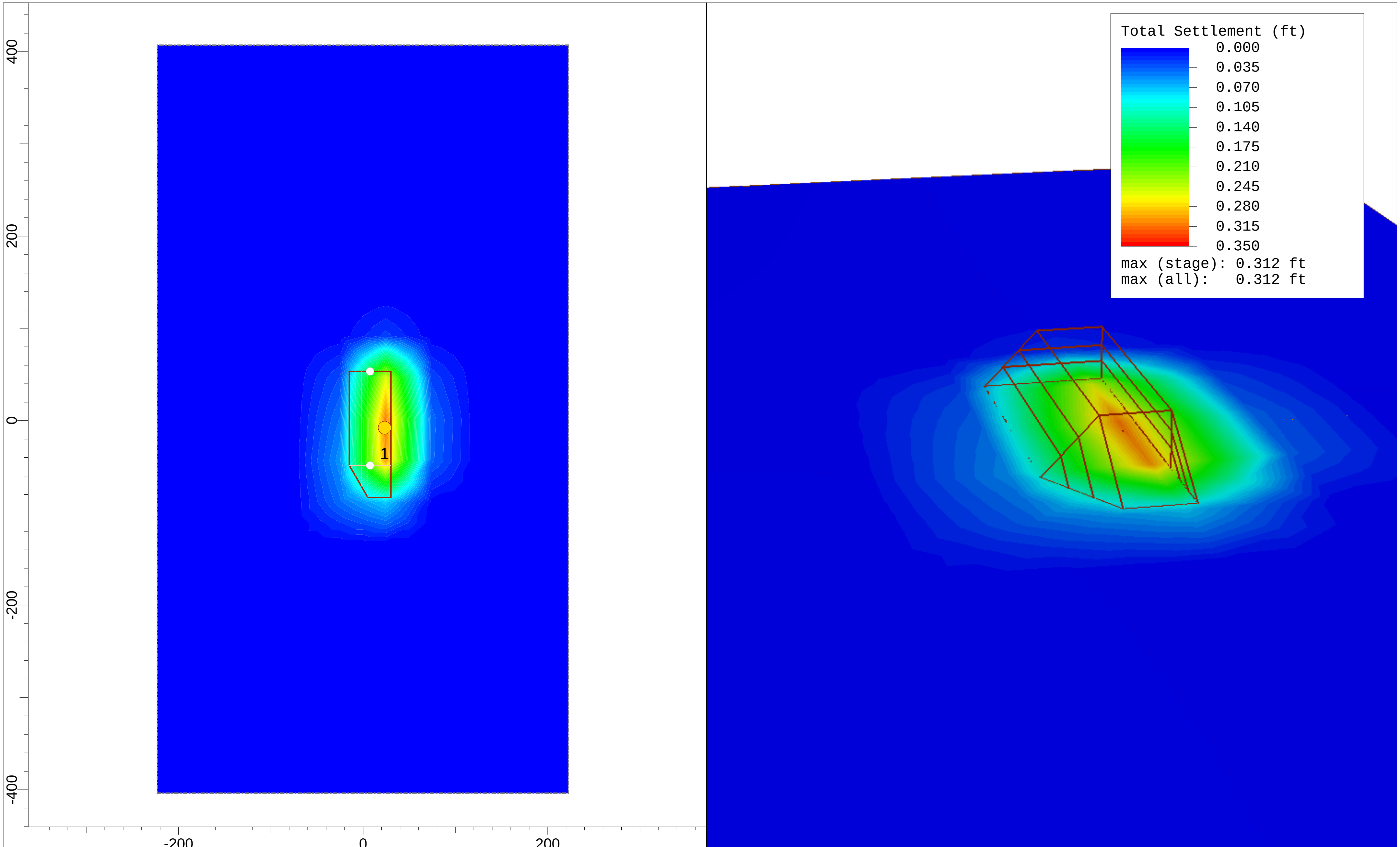
5.9.1 *Static Settlement*

Based on the ramp profile, we estimate up to 20 ft of fill will be placed near Stations 5636+50 and 5745+00 at the bridge abutments for Ramp H. Settlements from the weight of the new fill are expected due to compression of the upper sands and the underlying clay stratum. Although the underlying clays are slightly overconsolidated, the addition of 20 ft of fill will result in settlements that exceed typical SCDOT bridge abutment limits. With a maximum fill height of 20 ft, we expect settlement could be on the order of 3 to 4 in. Approximately half the settlement should occur within 90 days of fill placement. Wick drains should not be required for Ramp H.

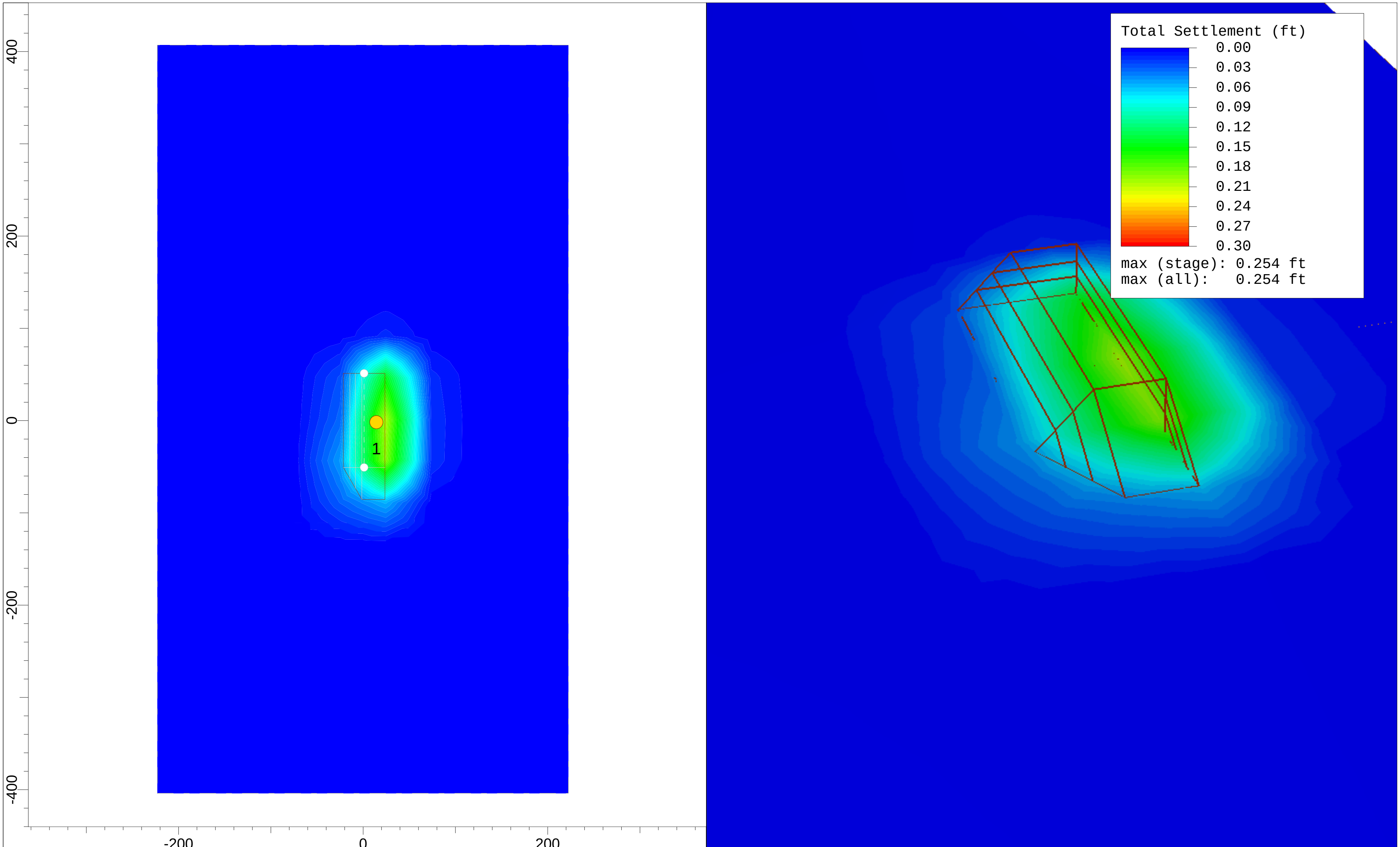
Figures 5-60 and 5-61 show a representative cross sections of the embankment at Stations 5736+50 and 5745+00 with the calculated settlement at the point shown on the plan view.

5.9.2 *Embankment Global Stability*

The results of our global stability analyses indicate that the embankment configuration shown will be stable during and following construction with a FOS greater than 1.3 under static conditions. The FOS for the representative embankment section in general is less than 1.1 for pseudo-static seismic conditions, under an acceleration of 0.27g. The yield accelerations ranged from 0.12g to 0.27g. Figures 5-62 and 5-67 show representative cross sections at Stations 5744+45, 5736+84 and 5765+00, respectively, under static and pseudo-static conditions.

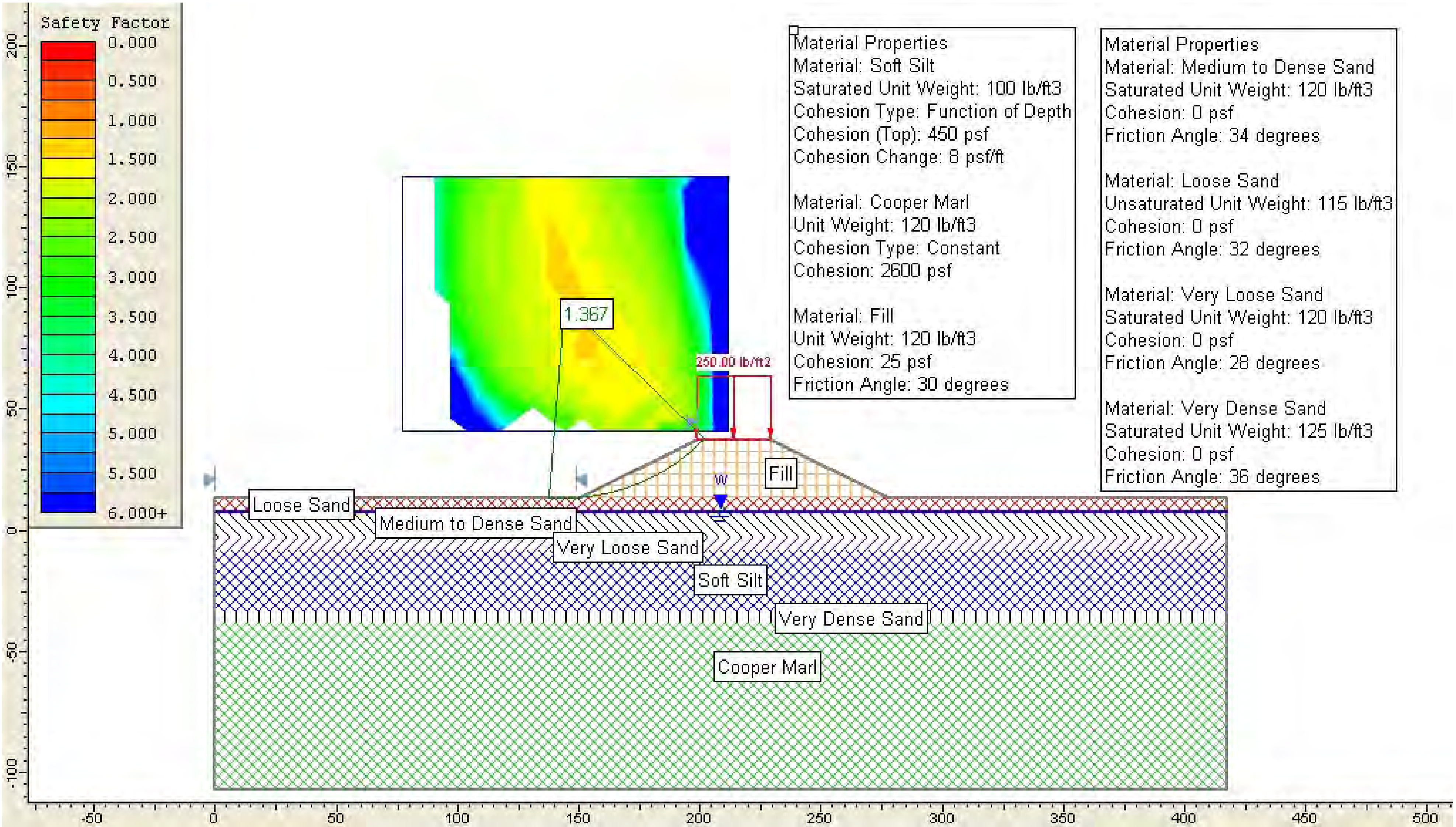


S&ME	*Project*	Port Access Road	
	Analysis Description	Embankment Settlement at Ramp H: Station 5736+50	
		20 ft of fill; B-75 soil model	
	Drawn By DWH	*Company* S&ME, Inc.	
SETTLE3D 1.007	*Date* 3/20/09	Figure 5-59	

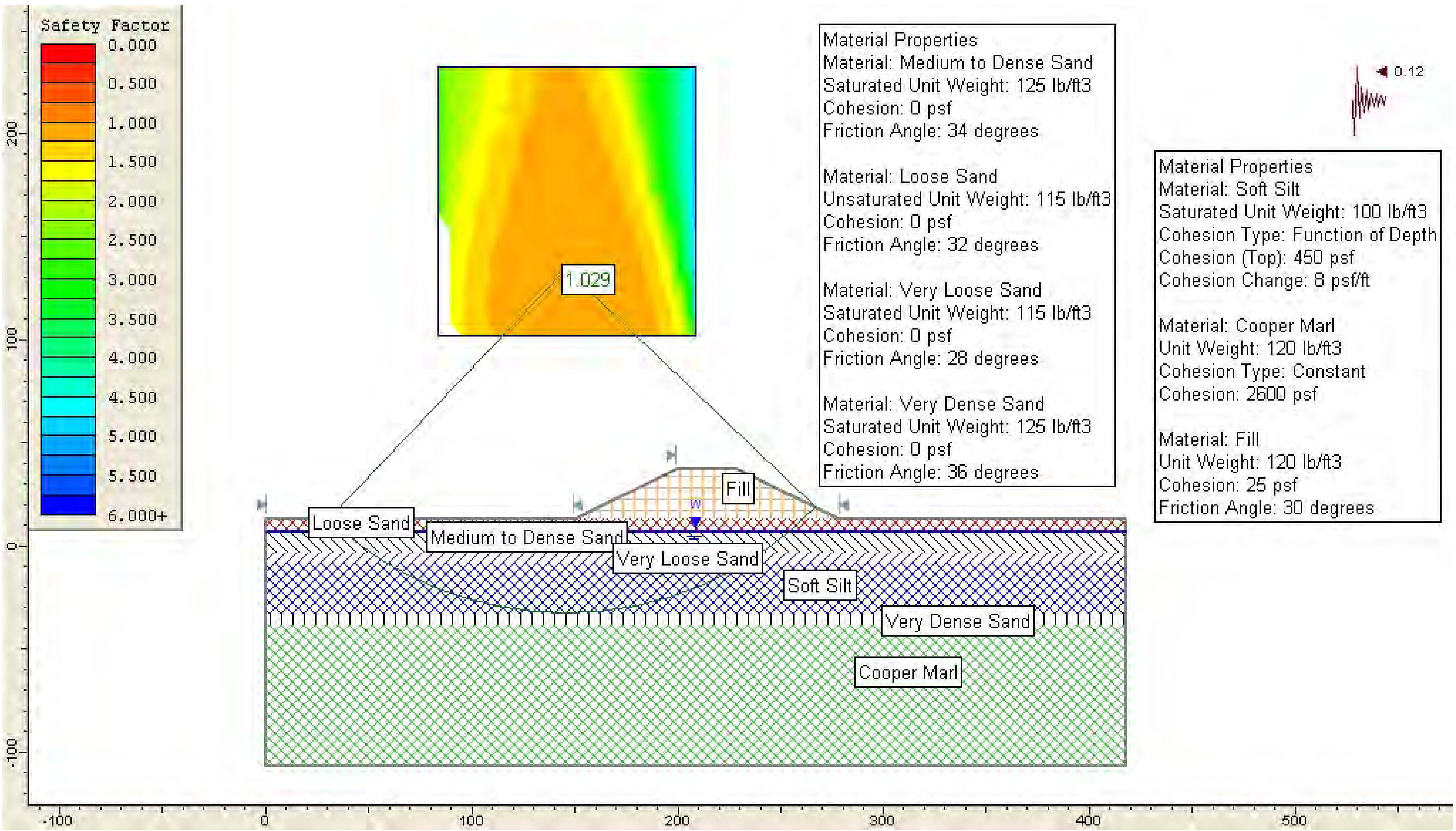


SETTLE3D 1.007

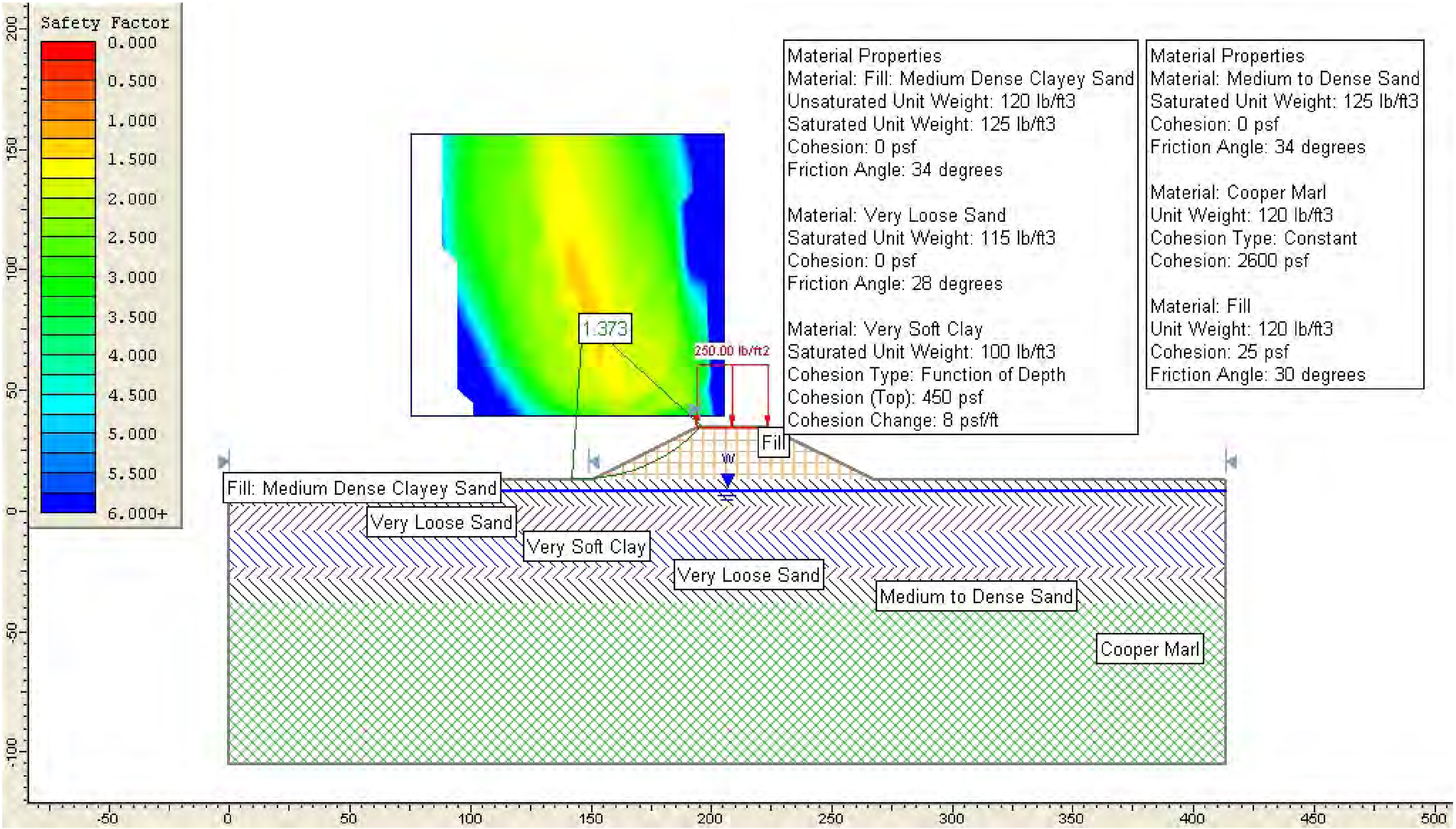
Project	Port Access Road		
Analysis Description	Embankment Settlement at Ramp H: Station 5745		
	20 ft of fill; B-57 soil model		
Drawn By	DWH	*Company*	S&ME, Inc.
Date	3/20/09		Figure No. 5-60



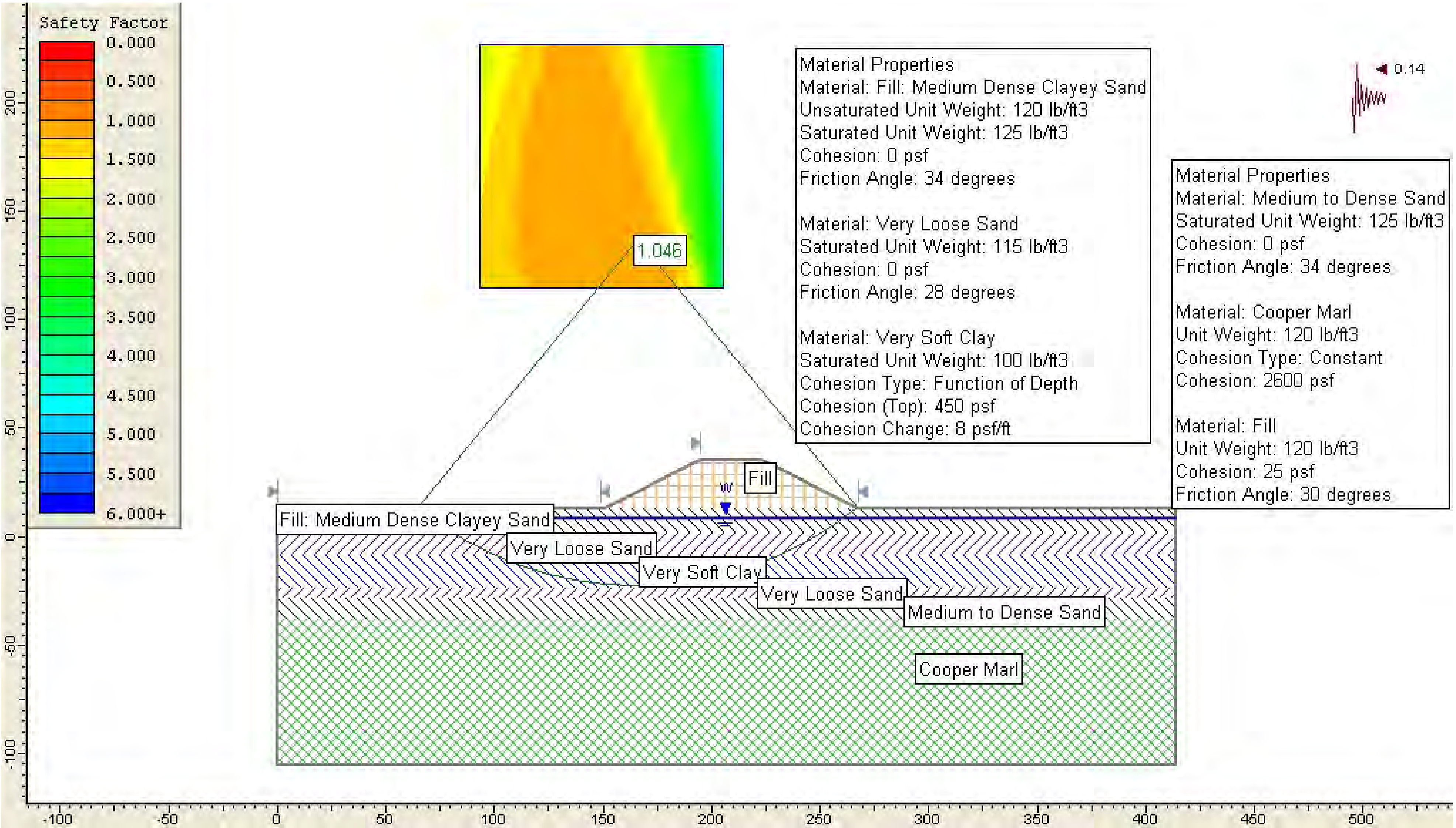
PROJECT NO. 1131-08-554	S&ME	**PORT ACCESS ROAD** **EMBANKMENT STABILITY ANALYSIS – RAMP H** STATION 5744+50 – STATIC CONDITION 24.5 FT OF FILL; B-57 SOIL MODEL	**Figure 5-61**
APRIL 2009			
AS SHOWN			



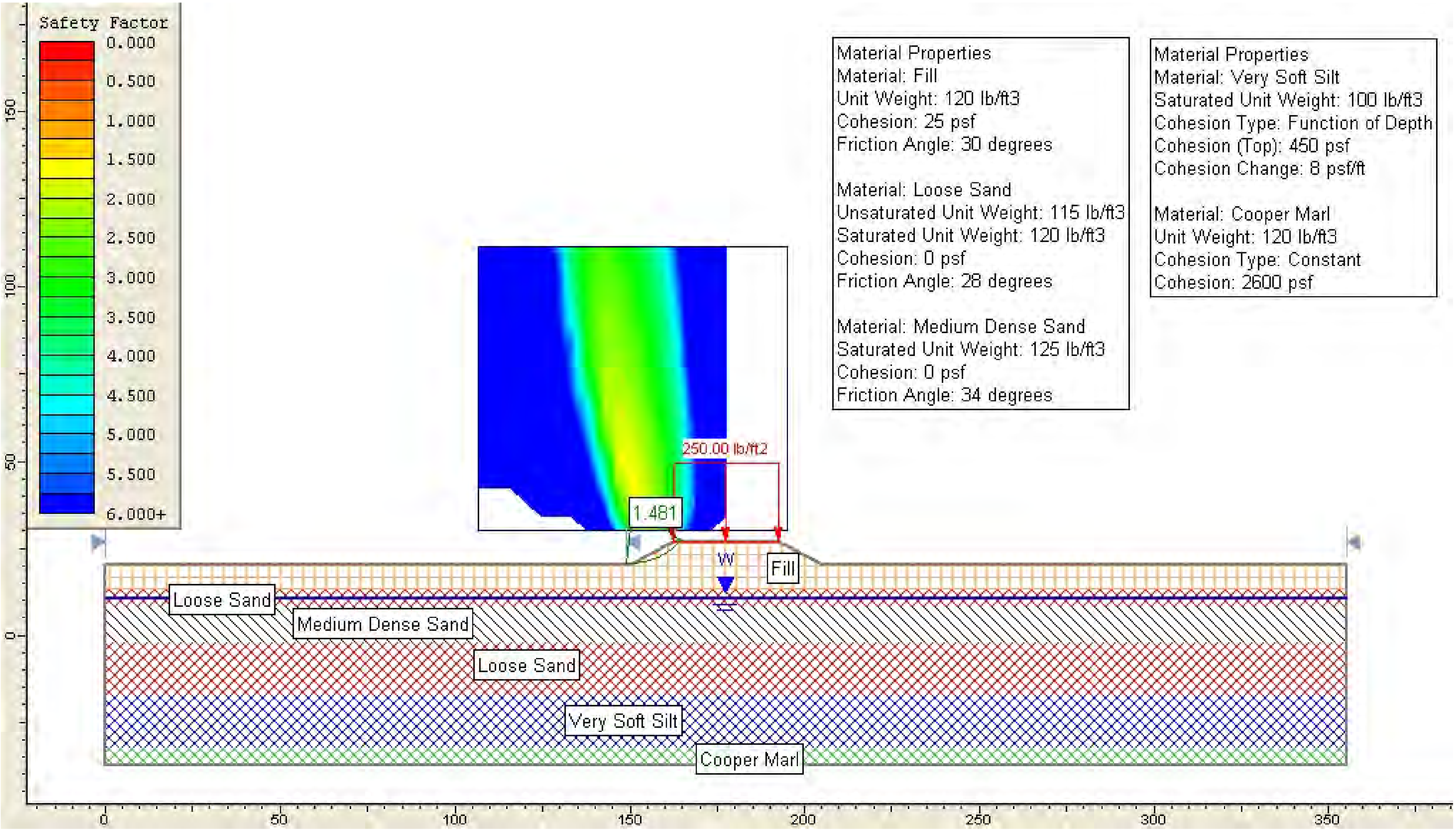
PROJECT NO. 1131-08-554	S&ME	**PORT ACCESS ROAD** **EMBANKMENT STABILITY ANALYSIS – RAMP H** STATION 5744+45 – PSEUDO-STATIC CONDITION 24.5 FT OF FILL; B-57 SOIL MODEL	**Figure 5-62**
APRIL 2009			
AS SHOWN			



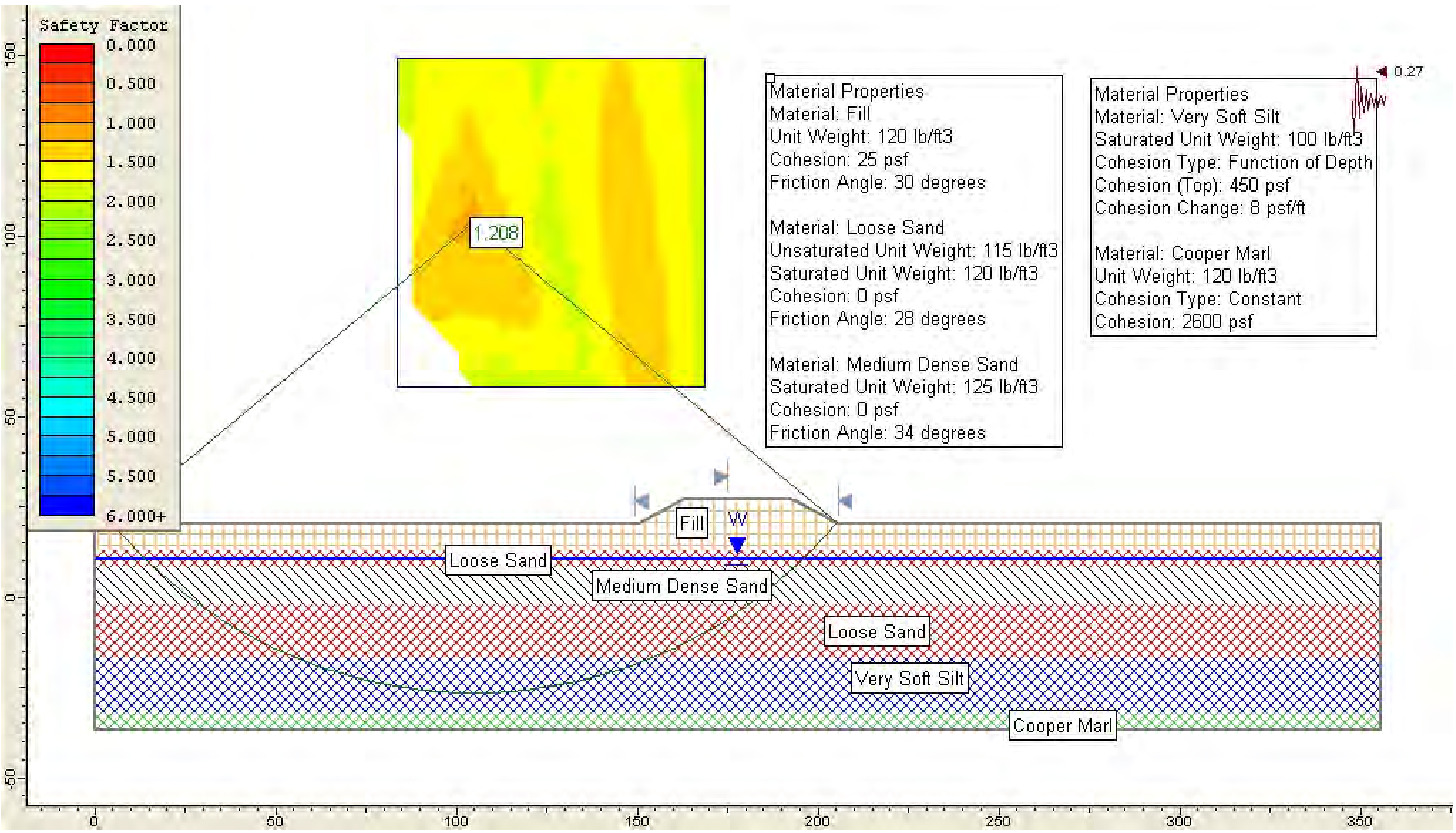
PROJECT NO. 1131-08-554	S&ME	**PORT ACCESS ROAD** **EMBANKMENT STABILITY ANALYSIS – RAMP H** STATION 5736+50 – STATIC CONDITION 22 FT OF FILL; B-75 SOIL MODEL	**Figure 5-63**
APRIL 2009			
AS SHOWN			



PROJECT NO. 1131-08-554	**PORT ACCESS ROAD**	**Figure 5-64**
APRIL 2009	**EMBANKMENT STABILITY ANALYSIS – RAMP H**	
AS SHOWN	STATION 5736+50 – PSEUDO-STATIC CONDITION 22 FT OF FILL; B-75 SOIL MODEL	



PROJECT NO. 1131-08-554	S&ME	**PORT ACCESS ROAD** **EMBANKMENT STABILITY ANALYSIS – RAMP H** STATION 5765+00 – STATIC CONDITION 6.5 FT OF FILL; B-53 AND B-54 SOIL MODEL
APRIL 2009		
AS SHOWN		**Figure 5-65**



PROJECT NO. 1131-08-554	S&ME	**PORT ACCESS ROAD** **EMBANKMENT STABILITY ANALYSIS – RAMP H** STATION 5765+00 – PSEUDO-STATIC CONDITION 6.5 FT OF FILL; B-53 AND B-54 SOIL MODEL
APRIL 2009		**Figure 5-66**
AS SHOWN		

5.9.3 *Deep Foundations*

Based on the subsurface data, the top-of-Cooper elevation for Ramp H is approximately -40 ft-NAVD 88. Therefore, the axial capacity analyses presented for Ramp G should be applicable for Ramp H.

5.10 Local Access Road

Based on the available drawings, an access road will connect the Main Line to Bainbridge Avenue via Ramps E and F on the former Macalloy site. Although a profile of the access road was not available at the time of this report, we understand that a portion of the road will be elevated along Shipyard Creek. The road will transition to existing grade between the incinerator facility and Bainbridge Avenue.

The subsurface conditions along the access road generally consisted of very loose to medium dense silty to clayey sands interbedded with layers of very soft to stiff sandy clays. The young marl was encountered above the Cooper along the portion of the access road near the Main Line. The young marl eventually pinched out about mid-way along the road to Bainbridge Avenue. The end of the road near Bainbridge Avenue crosses a tidal marsh. We encountered buried debris in this area. The container storage area immediately west of the road and adjacent to the incinerator facility is a former landfill as well. It is very likely that buried debris exists along the proposed local access road in this area. Figure 4-10 shows the subsurface profile along the Local Access Road.

5.10.1 *Settlement and Stability*

Although an alignment profile was not available from which to base settlement and stability analyses, we do not expect that any special ground improvement would be required based on the borings performed in the area where the road would like be an embankment. The soils were primarily sandy clays and clayey sands, which would consolidate rather quickly. This assessment assumes no buried debris under the embankment. Quantifying the magnitude of settlement expected over a landfill or buried debris in general would require additional exploration and detailed analyses beyond the scope this preliminary analysis.

5.10.2 *Deep Foundations*

Figures 5-68 and 5-69 below present the estimated axial capacity for drilled shafts and driven, square PSC piles bearing in the Cooper marl. A top-of-marl elevation of -24 ft-NAVD 88 was used. Based on the subsurface profile, the "younger" marl deposit was encountered over the portion of the access road where deep foundations would be utilized. The young marl was encountered at an elevation of approximately -18 ft-NAVD 88.

Figure 5-67. Local Access Road Ultimate Drilled Shaft Capacity vs. Tip Elevation

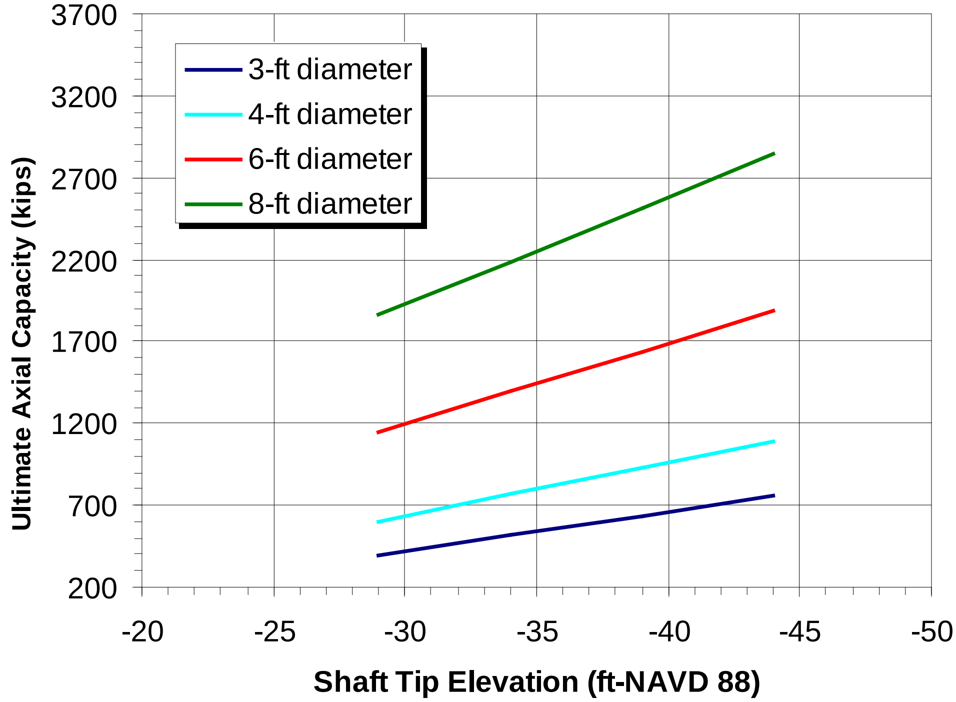
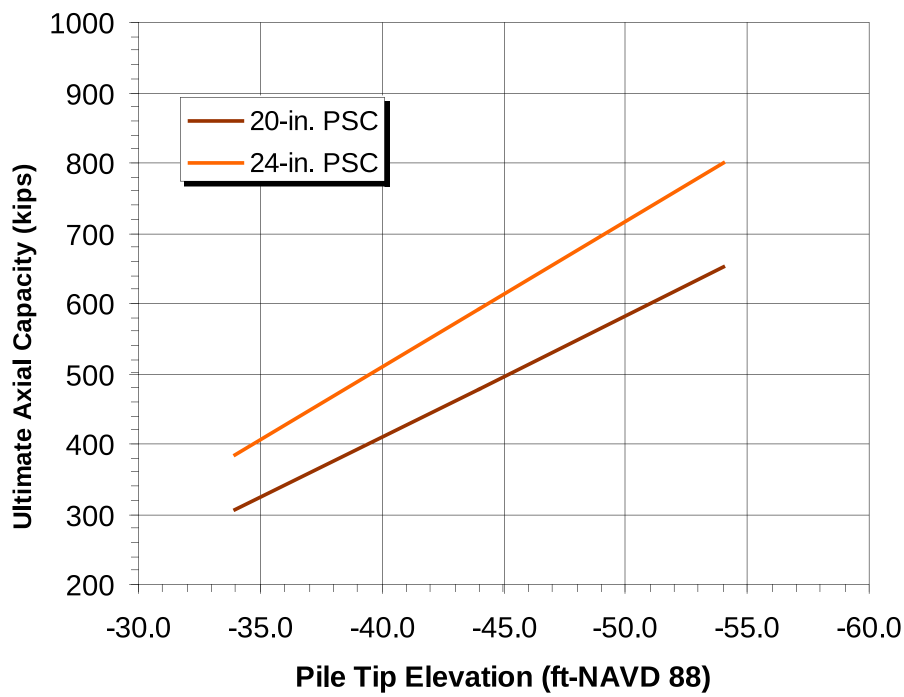


Figure 5-68. Local Access Road Ultimate Driven PSC Pile Capacity vs. Tip Elevation



5.11 Stromboli Avenue

A secondary road will turn off of the Local Access Road between the incinerator facility and the adjacent container storage yard. It will cross a set of abandoned railroad tracks, another container storage yard, and Meeting Street Extension before connecting with the existing Stromboli Avenue. The road will lead west along Stromboli Avenue and terminate at Spruill Avenue. Figure 4-11 shows the subsurface profile along the Stromboli Avenue alignment between Meeting Street Extension and the incinerator facility. A third container storage yard is located north of Stromboli Avenue. All three of these container yards are either known or suspected former landfills. We were not able to drill on the actual storage yards, but drilled just beyond their limits. Uncontrolled fill, debris and isolated organics were encountered in the borings drilled adjacent to the two easternmost container yards. Additional exploration would be necessary to confirm the presence or absence of buried debris in the portions of the alignment that cross theses container yards, and the presence of such buried debris would present a challenge to construction. We note that Figure 4-11 does not show buried debris or garbage because we were not able to drill in the suspected landfill areas.

5.11.1 *Settlement and Stability*

An alignment profile was not available from which to base settlement and stability analyses; however, the alignment as presently shown will cross at least two suspected former landfills. As discussed previously, quantifying the magnitude of settlement of a landfill with unknown contents and depth is extremely difficult. These areas will present a unique challenge to the final project designers and constructors.

5.12 Construction Considerations

5.12.1 *Subgrade Preparation*

Due to the presence of clayey surface soils in some areas, establishing positive site drainage before construction will be critical to site development. Prior to beginning mass clearing and grubbing, surface water in the proposed fill areas should be removed by establishing drainage prior to beginning site work. To the extent possible, heavy clearing equipment should not be allowed in saturated areas; such traffic will significantly increase the instability of these soils.

Preparation for fill placement should begin by clearing and grubbing. After clearing and stripping is complete, all areas at grade or to receive fill should be evaluated. Depending on conditions at the time of construction, the evaluation may include proofrolling with a heavily-loaded dump truck or similar heavy equipment to detect unstable/unsuitable areas. Unstable/unsuitable areas should either be repaired in-place or undercut.

5.12.2 *Undercutting of Unsuitable Subgrade*

As previously mentioned, some of the surface soils along the alignment are moisture sensitive. Moisture sensitive soils are very unstable once they become wet or if they are overexposed to construction traffic. It is difficult to predict the amount of undercutting that will be required since the soils at the subgrade level will be disturbed during site grubbing and will be disturbed to some degree by the roadway construction.

We note that the extent of undercutting will depend heavily on climatic conditions during construction and, more importantly, the contractor's ability to properly maintain good site drainage and limit the disturbance of temporarily wet subgrades. During periods of heavy rainfall, the undercutting can be limited by maintaining adequate site drainage and prohibiting heavy, rubber-tired equipment from traveling on exposed, wet subgrade soils. The presence of contaminated soils may restrict undercutting or require special handling and disposal.

5.12.3 *Subgrade Stabilization*

In lieu of undercutting, it may also be appropriate to stabilize soft subgrade areas with used of crushed rock and/or geotextile. Also, depending on the degree of instability at the time of construction and the fill height necessary to achieve the design grade, it may be possible to "bridge" some areas of moderately weak subgrade soils with controlled fill. Bridging typically involves placement of a relatively thick layer (12 in. to 18 in.) of granular fill with a low ground-pressure bulldozer. The bulldozer stays on the top of the bridge lift, pushing the fill ahead of it, to avoid overstressing the underlying weak subgrade. Subsequent lifts of fill may then be placed and compacted in accordance with the controlled fill requirements.

Placing a geotextile between the subgrade and initial fill or bridge lift may also stabilize areas of weaker soils and may reduce the need for undercutting. Areas of significant instability may require some undercutting prior to placement of the stabilization geotextile and subsequent placement of controlled fill. Determination of whether to undercut, bridge, or use a geotextile is best determined by a qualified Geotechnical Engineer in the field at the time of construction. The former Navy Base is an area where geotextiles and bridge lifts will likely be necessary to create a stable working platform. Undercutting and proofrolling are not practical on such thick deposits of very soft soils.

Areas where unstable subgrades are likely to be encountered include, but are not limited to:

- Ramps A and G near the North Meeting Street exit
- Ramp B near the on-ramp from Spruill Avenue to I-26 eastbound
- Ramp C in the area of the bridge abutment embankment
- The Main Line near Shipyard Creek, if it is grade supported at that point
- The Main Line and the Tidewater Access Road east of Shipyard Creek
- The Local Access Road near Bainbridge Avenue

The areas noted above are where we encountered soft, wet subgrade soils during our exploration and are where embankments are presently planned. There are other areas along the alignment where unstable subgrade soils are present, but elevated structures are planned. If the distribution of elevated structure to embankment changes, then additional areas would come under consideration for subgrade stabilization.

6.0 Limitations

This report has been prepared in accordance with generally accepted geotechnical engineering practice for specific application to this project. The conclusions contained in this report were based on the applicable standards of our profession at the time this report was prepared. No other warranty (express or implied) is conferred.

The analyses and conclusions submitted in this report are based, in part, upon the data obtained from the subsurface exploration. The nature and extent of variations between the borings may not become evident until construction and are not warranted. Due to the distance between each boring, subsurface conditions can be expected to vary from the conditions described herein and shown on the attached logs and cross-sectional profiles.

Boring and sounding penetration data and soil descriptions are included on the attached Boring and Sounding logs and Subsurface Profiles. The enclosed finished logs and profiles represent our interpretation of the contents of the field records based on the results of engineering examination and tests of field samples. Finished logs depict conditions at the specific boring locations at the particular time when drilled. For the purpose of illustration, conditions were interpolated between the borings on the subsurface profiles using reasonable engineering judgment.

The above presented engineering properties are S&ME's interpretation of the laboratory testing results. The geotechnical engineer of record for the project must review the laboratory testing results to develop his or her own interpretation of the testing result and application to the design stress levels and loadings. The above presented strength parameters are for the individual soil samples tested at the stress levels indicated on the laboratory test sheets.

Appendices

Appendix I – Boring Coordinates and Elevations

Table I-1. Boring Coordinates and Elevations

Table I-1: I-26 Port Road Access Borings in Lat/Long and State Plane					
S&ME BORING ID	LAT (North)	LONG (West)	NORTH	EAST	ELEVATION (ft-NAVD 88)
B-01CPT	32.840334	79.967662	367978.9	2317051.2	12.6
B-02SPT	32.838441	79.965459	367297.0	2317734.6	6.5
B-03SPT	32.837647	79.964486	367011.0	2318036.4	6.7
B-04SPT	32.836928	79.962741	366754.9	2318574.8	6.0
B-05DMT	32.836891	79.962714	366741.6	2318583.2	5.0
B-06CPT	32.836681	79.962377	366666.2	2318687.4	8.6
B-07CPT	32.836077	79.961577	366449.0	2318935.3	10.9
B-08CPT	32.835301	79.960428	366170.2	2319291.1	10.3
B-10CPT	32.834032	79.959589	365711.1	2319553.5	7.8
B-11GEO	32.833599	79.958476	365556.9	2319896.9	8.5
B-12SCPT	32.833586	79.958457	365552.5	2319902.9	8.2
B-13CPT	32.833796	79.957743	365631.1	2320121.2	8.8
B-14SPT	32.833867	79.957274	365658.2	2320265.0	12.6
B-15CPT	32.834548	79.956464	365908.4	2320511.2	11.3
B-16SPT	32.834406	79.956220	365857.6	2320586.9	10.9
B-17SCPT	32.834292	79.956040	365816.9	2320642.7	10.8
B-18SPT	32.834962	79.954958	366063.8	2320972.4	8.9
B-19SPT	32.834947	79.954469	366059.8	2321122.7	10.5
B-20SPT ALT1	32.835504	79.953796	366264.5	2321327.2	12.7
B-21SPT ALT1	32.836079	79.952891	366476.8	2321603.2	12.5
B-22SCPT	32.838328	79.952978	367294.4	2321568.0	11.9
B-23SPT ALT1	32.838330	79.952996	367295.2	2321562.6	11.9
B-24DMT	32.838324	79.953015	367292.8	2321556.7	11.9
B-26DMT ALT1	32.835417	79.953739	366233.2	2321345.2	13.0
B-27SPT	32.839965	79.954075	367886.6	2321225.3	11.6
B-28SPT ALT1	32.834594	79.955548	365928.0	2320792.4	7.1
B-29SPT ALT 1	32.842517	79.950563	368826.0	2322294.3	-4.5
B-31SPT	32.842866	79.949465	368956.5	2322630.2	2.8
B-32DMT	32.842993	79.949117	369003.5	2322736.5	3.7
B-33SPT	32.842972	79.949128	368996.1	2322733.4	3.8
B-34SCPT	32.843438	79.948060	369169.0	2323059.7	4.3
B-37SPT	32.842321	79.950207	368755.7	2322404.3	-4.5
B-38CPT	32.842467	79.949692	368810.5	2322561.9	1.6
B-39SPT	32.842202	79.948771	368717.0	2322845.8	2.5
B-40CPT	32.841980	79.947978	368638.7	2323090.1	2.3
B-42SPT ALT 1	32.843023	79.952317	369004.5	2321753.7	-4.5
B-43SPT ALT 1	32.843996	79.953725	369354.3	2321317.9	9.1
B-43SPT ALT 2	32.843420	79.952783	369147.4	2321609.2	-4.5
B-44SCPT	32.844947	79.953772	369699.9	2321299.8	8.3
B-45DMT	32.845567	79.953840	369925.4	2321276.7	11.2
B-46SPT	32.845572	79.953855	369927.1	2321272.2	11.2
B-47SPT	32.847721	79.954719	370706.1	2320998.9	11.6
B-48CPT	32.849066	79.955477	371193.3	2320761.2	2.8
B-49CPT	32.842451	79.964270	368759.5	2318085.2	15.2
B-50SPT	32.843816	79.961579	369264.3	2318906.4	9.4
B-51CPT	32.845086	79.959216	369733.6	2319627.5	7.4
B-51SPT ALT2	32.845129	79.957383	369754.9	2320190.4	6.9
B-52SPT	32.845455	79.955530	369879.2	2320758.0	16.2

Table I-1 Continued: I-26 Port Road Access Borings in Lat/Long and State Plane					
S&ME BORING ID	**LAT (North)**	**LONG (West)**	**NORTH**	**EAST**	**ELEVATION (ft-NAVD 88)**
B-53SPT	32.840771	79.967309	368139.2	2317158.0	13.1
B-54CPT	32.838890	79.965152	367461.5	2317827.2	12.4
B-55SPT	32.838388	79.964332	367281.2	2318080.8	11.9
B-56CPT	32.837441	79.962355	366942.7	2318691.4	9.8
B-57SPT	32.837229	79.961718	366867.7	2318887.8	10.1
B-57SPU	32.837248	79.961723	366874.5	2318886.4	9.7
B-58SPT	32.837245	79.961091	366875.4	2319080.4	14.3
B-59CPT	32.836866	79.961633	366735.9	2318915.3	13.1
B-60SCPT	32.836514	79.961155	366609.3	2319063.5	13.6
B-61CPT	32.835896	79.960432	366386.8	2319287.8	12.5
B-62CPT	32.835147	79.959541	366117.0	2319564.0	11.6
B-63SPT	32.834698	79.958336	365957.5	2319936.0	10.0
B-64CPT	32.834470	79.957609	365876.8	2320160.0	11.4
B-65SPT	32.829776	79.955199	364176.4	2320917.5	8.4
B-66SPT	32.832233	79.956501	365066.1	2320508.7	2.3
B-67SCPT	32.831033	79.955904	364631.5	2320696.3	7.7
B-68SPT ALT1	32.833011	79.956843	365348.4	2320400.7	6.8
B-69CPT	32.828555	79.955149	363732.4	2320937.5	7.9
B-70DMT	32.830574	79.956331	364463.3	2320566.9	4.5
B-71CPT	32.830651	79.956387	364491.0	2320549.4	4.0
B-72SPT	32.831000	79.956606	364617.4	2320480.7	4.3
B-73CPT ALT1	32.831791	79.957274	364903.1	2320272.7	4.0
B-74SPT	32.832559	79.957759	365180.8	2320120.8	4.9
B-75SPT	32.837054	79.959982	366809.5	2319421.8	15.2
B-76SPT	32.837176	79.963382	366843.1	2318377.0	14.3
B-77CPT	32.837882	79.953696	367130.0	2321349.3	10.9
B-78	32.844567	79.960373	369541.2	2319274.0	8.1
B-79	32.843106	79.962994	369001.9	2318474.6	11.7
C\L CREEK*	32.842365	79.949605	368773.6	2322589.0	-4.6
C\L CREEK1*	32.842721	79.950889	368899.1	2322193.4	-4.4

*C\L CREEK and C\L CREEK1 are centerline of Shipyard Creek channel.
Horizontal Datum is NAD 83.

Appendix II – Boring and Sounding Records

SPT Boring Logs
SPT Boring Procedures
SPT Energy Measurements Data Sheets
SPT Boring Grout Logs
Table II-1: Bulk and Undisturbed Sample Locations and Depths

Cone Penetrometer Test (CPT) Sounding Logs
CPT Sounding Procedures
CPT Correlations and Robertson Classification Legend

Marchetti Dilatometer Test (DMT) Sounding Logs
DMT Correlations

CPT Pore Pressure Dissipation Test Data

Vane Shear Test Data

SCPT Shear Wave Velocity Test Data
MASW and MAM Data

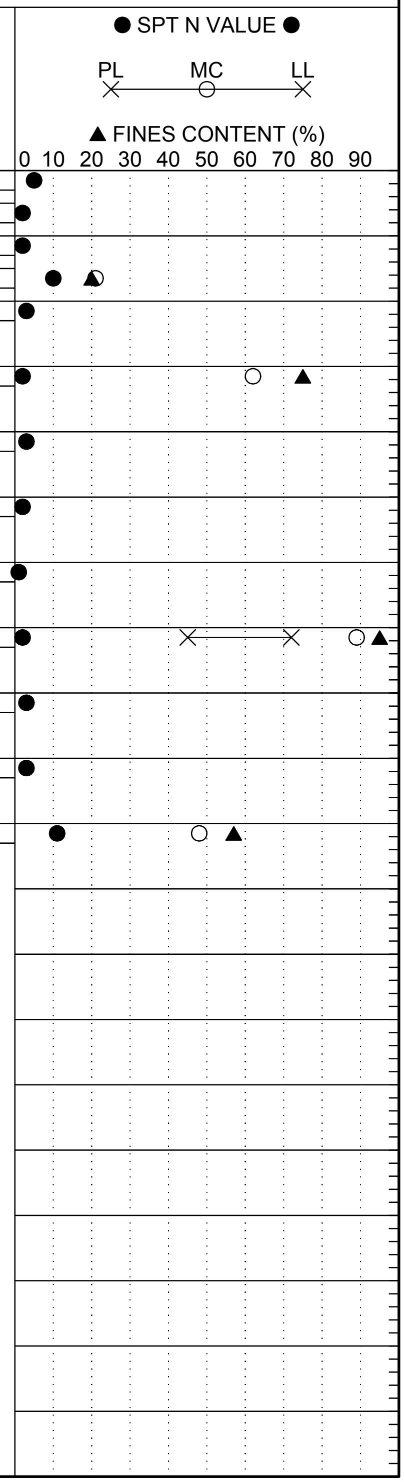
Geophysical Test Data from 800 ft deep Boring B-11GEO
Suspension Logging Procedures and Literature
Stratigraphic Interpretation of Geological Formations Observed in Borehole (B-11)
Resonant Column/Torsional Shear (RCTS) Test Results

SPT Boring Logs

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	R. BOLLER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-02 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	6.5 ft	**Latitude:**	32.838441	**Longitude:**	79.965459	**Date Started:**	9/29/08
Total Depth:	51.5 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	9/29/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-850	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	73%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** 2 ft	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	▽ **SILTY SAND (SM)**	0.0	SS	1	2	3	5
1.5		loose, black and brown, fine; with clay and fine roots	2.5	SS	WOH	1	1	2
			5.0	SS	WOH	1	1	2
-3.5		- - - very loose; no clay or roots	7.5	SS	7	5	5	10
		- - - with decaying roots	10.0	SS	3	2	1	3
-8.5	15.0	- - - medium dense, gray, fine						
		- - - very loose, bluish gray, fine	15.0	SS	WOH	1	1	2
-13.5		**SILT (MH)** soft, gray; with shells	20.0	SS	1	1	2	3
-18.5		- - - soft, bluish gray; with clay and trace sand	25.0	SS	WOH	WOH	2	2
-23.5		- - - very soft; with clay and shells	30.0	SS	WOH	WOH	1	1
-28.5		- - - soft	35.0	SS	WOH	WOH	2	2
-33.5			40.0	SS	WOH	1	2	3
-38.5		- - - with clay and trace sand	45.0	SS	WOH	1	2	3
-43.5	50.0	**MARL: SANDY SILT (ML)**	50.0	SS	3	5	6	11
	51.5	stiff, light greenish brown						
-48.5		**BORING TERMINATED AT 51.5 FEET.**						
-53.5								
-58.5								
-63.5								
-68.5								
-73.5								
-78.5								
-83.5								
-88.5								



LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	R. BOLLER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-02 SPT A	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	6.5 ft	**Latitude:**	32.838441	**Longitude:**	79.965451	**Date Started:**	9/30/08
Total Depth:	37 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	9/30/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-850	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	73%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** 2 ft	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● / PL MC LL / ▲ FINES CONTENT (%)
	0.0	WASH ROTARY TO 23 FEET								
-16.5	23.0 – 25.0	3" X 30" FIXED PISTON SAMPLE PUSHED 24" WITH 22" RECOVERY		23.0	ST					
		WASH ROTARY TO 35 FEET								
-28.5	35.0 – 37.0	3" X 30" FIXED PISTON SAMPLE PUSHED 24" WITH 24" RECOVERY		35.0	ST					
		BORING TERMINATED AT 37 FEET.								

Elevation scale: 1.5, -3.5, -8.5, -13.5, -18.5, -23.5, -28.5, -33.5, -38.5, -43.5, -48.5, -53.5, -58.5, -63.5, -68.5, -73.5, -78.5, -83.5, -88.5

Chart scale: 0 10 20 30 40 50 60 70 80 90

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

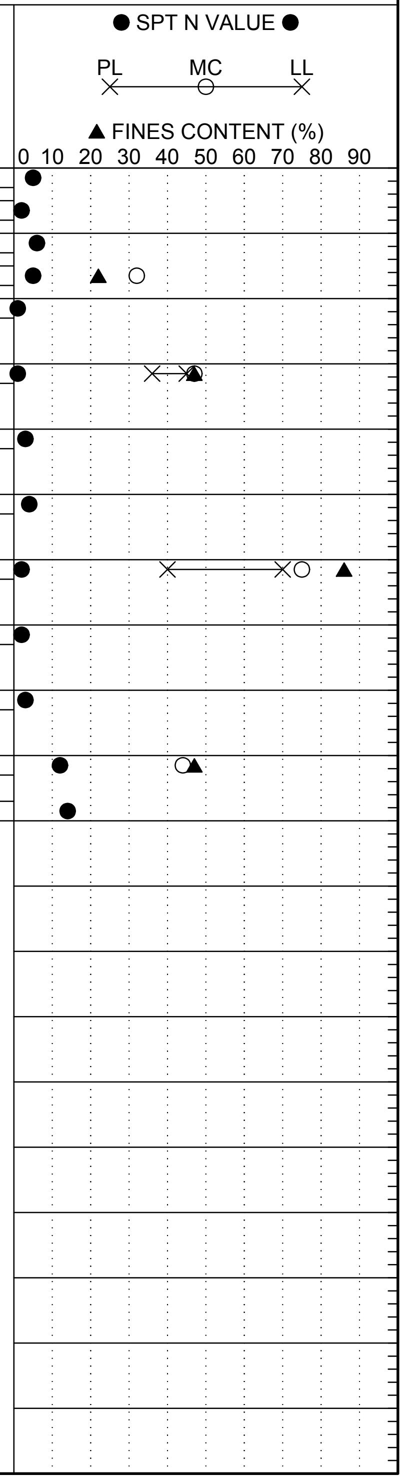
SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	R. BOLLER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-03 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	6.5 ft	**Latitude:**	32.837647	**Longitude:**	79.964486	**Date Started:**	9/30/08
Total Depth:	50 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	9/30/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-850	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	73%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** 2 ft	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION
	0.0	
	0.1	**ORGANIC LADEN TOPSOIL= 1 INCH**
1.5	5.0	**SAND (SP)** loose, light brown to grayish brown, fine; with roots
	7.5	- - - very loose; no roots
-8.5	15.0	**CLAYEY SAND (SC)** loose, light bluish gray, fine; with silt and shells
-18.5	25.0	**SLIGHTLY CLAYEY SAND (SP-SC)** loose, light brown, fine - - - very loose
		SILTY SAND (SM) very loose, light bluish gray, fine; with shells
		SILT (MH) soft, light bluish gray - - - very soft; with clay
-38.5	45.0	- - - soft
-43.5	50.0	**COOPER MARL: SILTY SAND (SM)** medium dense, olive green, fine
		BORING TERMINATED AT 50 FEET.

Elevation scale (ft): 1.5, -3.5, -8.5, -13.5, -18.5, -23.5, -28.5, -33.5, -38.5, -43.5, -48.5, -53.5, -58.5, -63.5, -68.5, -73.5, -78.5, -83.5, -88.5

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
0.0	SS	1	2	3	5
2.5	SS	1	WOH	2	2
5.0	SS	WOH	2	4	6
7.5	SS	3	3	2	5
10.0	SS	WOH	1	WOH	1
15.0	SS	WOH	WOH	1	1
20.0	SS	1	1	2	3
25.0	SS	WOH	1	3	4
30.0	SS	WOH	WOH	2	2
35.0	SS	WOH	WOH	2	2
40.0	SS	1	1	2	3
45.0	SS	1	6	6	12
48.5	SS	4	6	8	14



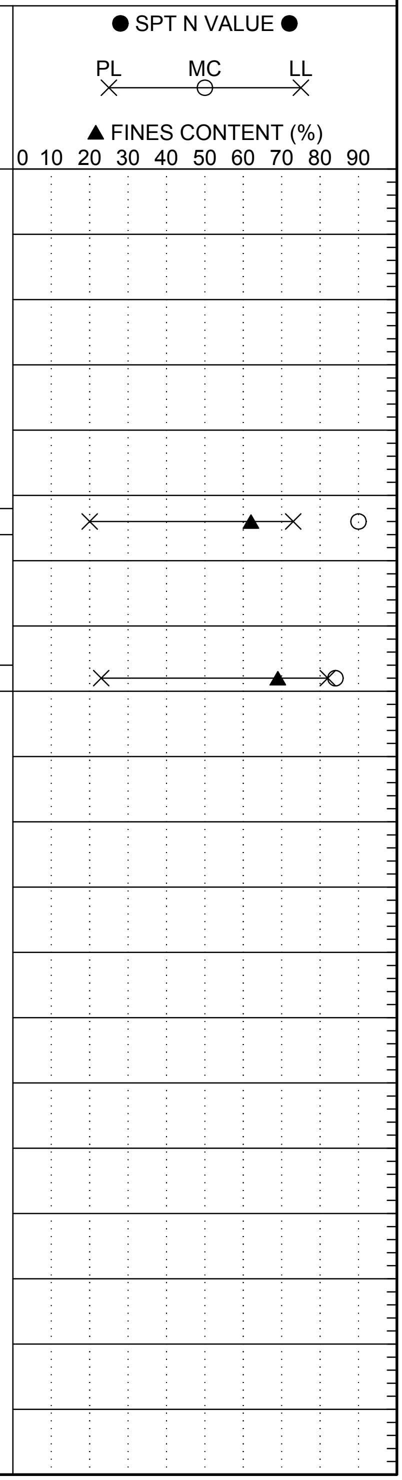
LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	R. BOLLER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-03 SPT A	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	6.5 ft	**Latitude:**	32.837647	**Longitude:**	79.964486	**Date Started:**	10/1/08
Total Depth:	40 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	10/1/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-850	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	73%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** 2 ft	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	WASH ROTARY TO 26 FEET							
1.5									
-3.5									
-8.5									
-13.5									
-18.5	26.0			26.0	ST				
	28.0	3" X 30" FIXED PISTON SAMPLE PUSHED 24" WITH 10" RECOVERY							
-23.5		WASH ROTARY TO 38 FEET							
-28.5									
	38.0			38.0	ST				
-33.5	40.0	3" X 30" FIXED PISTON SAMPLE PUSHED 24" WITH 23" RECOVERY							
		BORING TERMINATED AT 40 FEET.							
-38.5									
-43.5									
-48.5									
-53.5									
-58.5									
-63.5									
-68.5									
-73.5									
-78.5									
-83.5									
-88.5									



LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	R. BOLLER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-03 SPT B	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	6.5 ft	**Latitude:**	32.837647	**Longitude:**	79.964486	**Date Started:**	10/1/08
Total Depth:	34 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	10/1/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-850	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	73%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** 2 ft	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● PL MC LL ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
	0.0	**WASH ROTARY TO 28.5 FEET**								
-23.5	28.5 / 30.0	**VANE INSERTED TO A DEPTH OF 30 FEET**								
	32.5	**WASH ROTARY TO 32.5 FEET**								
	34.0	**VANE INSERTED TO A DEPTH OF 34 FEET**								

Elevation scale: 1.5, -3.5, -8.5, -13.5, -18.5, -23.5, -28.5, -33.5, -38.5, -43.5, -48.5, -53.5, -58.5, -63.5, -68.5, -73.5, -78.5, -83.5, -88.5

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

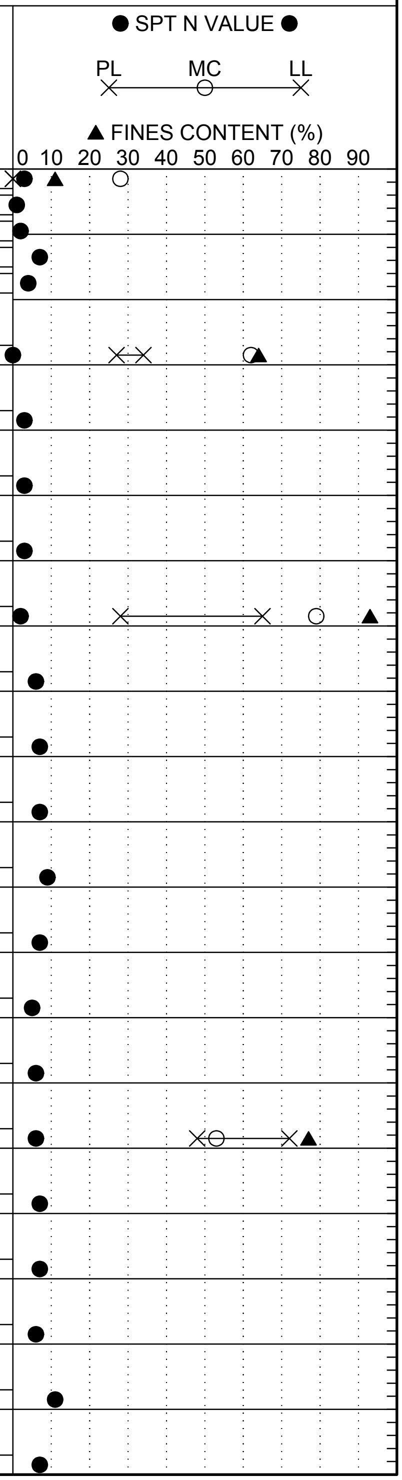
SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	M. EICHELBERGER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-04 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	6.0 ft	**Latitude:**	32.836928	**Longitude:**	79.962741	**Date Started:**	2/23/2009
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	2/23/2009
Bore Hole Diameter (in):	3	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-550X	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	80%
Core Size:		**Driller:**	S&ME	**Groundwater:**	**TOB** N/A	**24HR**	4.5 ft

Depth (ft)	MATERIAL DESCRIPTION
0.0	**SLIGHTLY SILTY SAND (SM)** medium dense, dark grayish brown, fine; trace organics
2.0	**SANDY SILT (ML)** very soft, dark brown to black, fine, saturated; with organics
6.0	**SLIGHTLY SILTY SAND (SP-SM)** loose, gray, fine
8.0	**SILTY SAND (SM)** very loose, bluish gray, fine; with marsh grass
13.5	**SANDY SILT (ML)** very soft, bluish gray, fine; with shell - - - no sand
38.5	**MARL: SANDY SILT (ML)** firm, olive green, fine, calcareous - - - stiff - - - firm - - - stiff

Elevation (ft): 1.0, -4.0, -9.0, -14.0, -19.0, -24.0, -29.0, -34.0, -39.0, -44.0, -49.0, -54.0, -59.0, -64.0, -69.0, -74.0, -79.0, -84.0, -89.0

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
0.0	SS	0	2	7	3
2.0	SS	WOH	WOH	1	1
4.0	SS	WOH	1	1	2
6.0	SS	3	4	3	7
8.0	SS	2	2	2	4
13.5	SS	WOH	WOH	WOH	0
18.5	SS	1	2	1	3
23.5	SS	WOH	1	2	3
28.5	SS	WOH	1	2	3
33.5	SS	WOH	1	1	2
38.5	SS	2	3	3	6
43.5	SS	2	3	4	7
48.5	SS	2	3	4	7
53.5	SS	8	4	5	9
58.5	SS	3	3	4	7
63.5	SS	2	2	3	5
68.5	SS	2	3	3	6
73.5	SS	2	3	3	6
78.5	SS	3	3	4	7
83.5	SS	3	4	3	7
88.5	SS	2	3	3	6
93.5	SS	5	6	5	11
98.5	SS	2	3	4	7



LEGEND

Continued Next Page

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	Project No. (PIN):	1131-08-554	County:	CHARLESTON	Eng./Geo.:	M. EICHELBERGER
Site Description:	PORT ACCESS ROAD					Route:	
Boring No.:	B-04 SPT	Boring Location:		Offset:		Alignment:	
Elev.:	6.0 ft	Latitude:	32.836928	Longitude:	79.962741	Date Started:	2/23/2009
Total Depth:	120 ft	Soil Depth:	ft	Core Depth:	ft	Date Completed:	2/23/2009
Bore Hole Diameter (in):	3	Sampler Configuration		Liner Required:	Y (N)	Liner Used:	Y (N)
Drill Machine:	CME-550X	Drill Method:	MUD ROTARY	Hammer Type:	Automatic	Energy Ratio:	80%
Core Size:		Driller:	S&ME	Groundwater:	TOB N/A	24HR	4.5 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
-99.0		--- very hard	103.5	SS	8	54/3		0
-104.0		--- firm	108.5	SS	1	2	3	5
-109.0		--- stiff	113.5	SS	WOH	3	9	12
-114.0	120.0	--- hard	118.5	SS	31	17	19	36
-119.0		**BORING TERMINATED AT 120 FEET.**						
-124.0								
-129.0								
-134.0								
-139.0								
-144.0								
-149.0								
-154.0								
-159.0								
-164.0								
-169.0								
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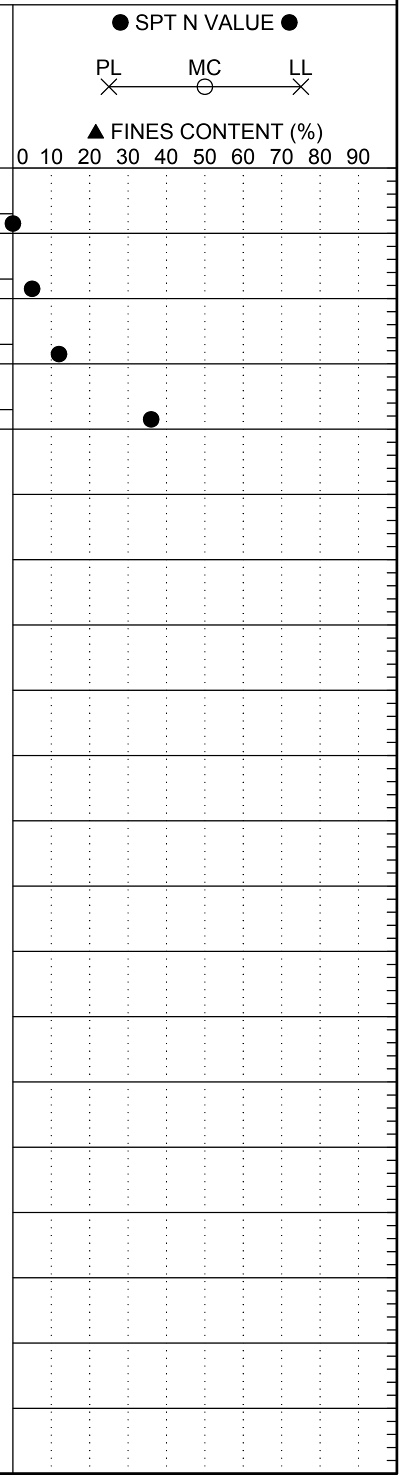
-184.0								
-189.0								



LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	R. BOLLER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-09 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	ft	**Latitude:**	32.83453	**Longitude:**	79.960182	**Date Started:**	7/28/09
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	7/28/2009
Bore Hole Diameter (in):		**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	D-50	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	60%
Core Size:		**Driller:**	S&ME	**Groundwater:**	TOB	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0							
	0.2	**ORGANIC LADEN TOPSOIL= 2 INCHES**	0.0	SS	6	5	3	8
		FILL: GYPSUM/SILTY SAND (SM) loose, white to brownish gray, fine	2.5	SS	4	2	2	4
	5.0	- - - very loose, light brownish gray	5.0	SS	2	3	4	7
		FILL: SANDY SILT (ML) firm, light brownish gray	7.5	SS	3	2	2	4
	10.0	- - - soft, brownish gray	10.0	SS	4	4	4	8
	13.5	**FILL: GYPSUM/SILTY SAND (SM)** loose, brownish gray, fine; trace of clay	13.5	SS	3	5	3	8
	18.5	**SILTY SAND (SM)** loose, blackish brown, fine; trace of cemented pieces	18.5	SS	3	2	2	4
	23.5	**SLIGHTLY SILTY SAND (SP-SM)** very loose, gray, fine	23.5	SS		WOH		0
		CLAY (CL) very soft, greenish blue; trace of sand	28.5	SS		WOH		0
	33.5	**CLAYEY SILT (MH)** very soft, dark greenish blue; trace of sand	33.5	SS		WOH		0
			38.5	SS		WOH		0
			43.5	SS		WOH		0
			48.5	SS		WOH		0
			53.5	SS		WOH		0
	58.5	**SITLY SAND (SM)** loose, light greenish brown, fine	58.5	SS	2	4	5	9
		- - - greenish brown	63.5	SS	2	3	3	6

● SPT N VALUE ●

PL MC LL

▲ FINES CONTENT (%)

0 10 20 30 40 50 60 70 80 90

LEGEND

Continued Next Page

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	P. BAUMSTARK
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-11 GEO	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	8.5 ft	**Latitude:**	32.8336	**Longitude:**	79.958476	**Date Started:**	10/6/08
Total Depth:	800 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	12/9/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-750	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	76%
Core Size:		**Driller:**	MAD	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft): 3.5, -1.5, -6.5, -11.5, -16.5, -21.5, -26.5, -31.5, -36.5, -41.5, -46.5, -51.5, -56.5, -61.5, -66.5, -71.5, -76.5, -81.5, -86.5

Depth (ft): 0.0, 0.3, 2.0, 4.0, 6.5, 8.0, 14.5, 46.0

MATERIAL DESCRIPTION

ORGANIC LADEN TOPSOIL= 3 INCHES

SLIGHTLY SILTY SAND (SP-SM)
loose, gray and brown, fine; with trace organics

SLIGHTLY CLAYEY SAND (SP-SC)
very loose, gray and brown, fine; with trace organics and silt

CLAYEY SAND (SC)
very loose, gray and brown, fine; with debris

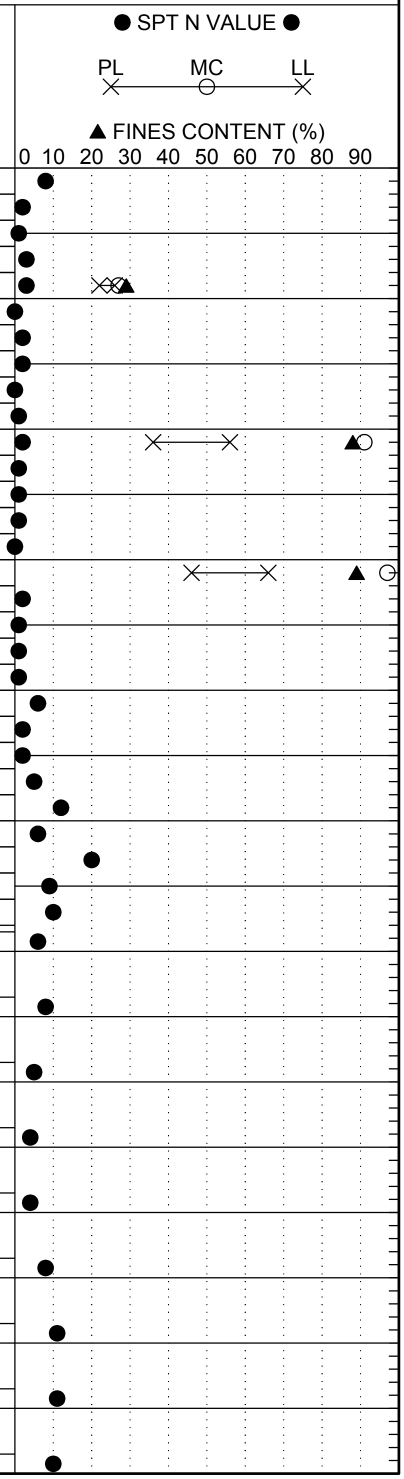
SLIGHTLY CLAYEY SAND (SP-SC)
vey loose, gray, fine

SILTY SAND (SM)
very loose, gray and brown, fine
- - - gray

SILTY CLAY (CL)
very soft, gray; with trace fine sand
- - - no sand
- - - with trace organics
- - - with trace fine sand, no organics
- - - with trace organics
- - - no organics
- - - soft; with sand and shell

COOPER MARL: SANDY SILT(ML)
soft, olive green
- - - stiff
- - - firm
- - - stiff
- - - firm
- - - soft
- - - firm
- - - stiff

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
0.0	SS	2	3	5	8
2.0	SS	1	1	1	2
4.0	SS	WOH	1	1	1
6.0	SS	1	1	2	3
8.0	SS	1	2	1	3
10.0	SS		WOH		0
12.0	SS	1	1	1	2
14.0	SS	WOH	1	1	2
16.0	SS		WOH		0
18.0	SS	WOH	WOH	1	1
20.0	SS	WOH	1	1	2
22.0	SS	WOH	WOH	1	1
24.0	SS	WOH	WOH	1	1
26.0	SS	WOH	WOH	1	1
28.0	SS		WOH		0
30.0	SS	WOH	WOH	1	
32.0	SS	WOH	1	1	2
34.0	SS	WOH	WOH	1	1
36.0	SS	WOH	WOH	1	1
38.0	SS	WOH	WOH	1	1
40.0	SS	WOH	3	3	6
42.0	SS	WOH	1	1	2
44.0	SS	WOH	WOH	2	2
46.0	SS	WOH	2	3	5
48.0	SS	2	5	7	12
50.0	SS	4	6	0	6
52.0	SS	7	10	10	20
54.0	SS	7	9	0	9
56.0	SS	4	4	6	10
58.5	SS	2	3	3	6
63.5	SS	3	4	4	8
68.5	SS	3	2	3	5
73.5	SS	2	2	2	4
78.5	SS	3	1	3	4
83.5	SS	2	3	5	8
88.5	SS	5	5	6	11
93.5	SS	3	5	6	11
98.5	SS	2	4	6	10



LEGEND

Continued Next Page

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 08554.GPJ SC_DOT.GDT 4/3/09

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	P. BAUMSTARK
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-11 GEO	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	8.5 ft	**Latitude:**	32.8336	**Longitude:**	79.958476	**Date Started:**	10/6/08
Total Depth:	800 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	12/9/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-750	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	76%
Core Size:		**Driller:**	MAD	**Groundwater:**	**TOB** N/A	**24HR**	N/A

● SPT N VALUE ● — PL, MC, LL — ▲ FINES CONTENT (%) — 0 10 20 30 40 50 60 70 80 90

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
-96.5			103.5	SS	3	4	7	11
-101.5			108.5	SS	3	3	6	9
-106.5			113.5	SS	3	4	6	10
-111.5		- - - firm	118.5	SS	3	2	5	7
-116.5								
-121.5	131.7	**3" X 30" FIXED PISTON SAMPLE PUSHED 24" WITH 30" RECOVERY**	129.3	ST				
-126.5								
-131.5								
-136.5								
-141.5								
-146.5								
-151.5			159.5	SS	4	5	7	12
-156.5								
-161.5	171.6	**3" X 36" PITCHER BARREL SAMPLE PUSHED 36" WITH 12" RECOVERY**	169.2	PB				
-166.5								
-171.5			179.5	SS	10	3	6	9
-176.5								
-181.5			189.5	SS	2	5	7	12
-186.5								
			199.5					

LEGEND

Continued Next Page

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	P. BAUMSTARK
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-11 GEO	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	8.5 ft	**Latitude:**	32.8336	**Longitude:**	79.958476	**Date Started:**	10/6/08
Total Depth:	800 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	12/9/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-750	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	76%
Core Size:		**Driller:**	MAD	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
		- - - very hard cemented sand layer		PB	22	50/2		100
-196.5								
-201.5	211.5	**3" X 36" PITCHER BARREL SAMPLE PUSHED 36" WITH 24" RECOVERY**	209.5	PB				
-206.5								
-211.5			219.5	SS	2	6	24	30
-216.5		- - - cemented sand layer						
-221.5			229.5	SS	5	50/5		100
-226.5								
-231.5			239.5	SS	1	19	50/2	100
-236.5								
-241.5	251.5	**3" X 36" PITCHER BARREL SAMPLE PUSHED 36" WITH 24" RECOVERY**	249.5	PB				
-246.5								
-251.5								
-256.5								
-261.5	271.0	**3" X 36" PITCHER BARREL SAMPLE PUSHED 36" WITH 18" RECOVERY**	269.5	PB				
-266.5								
-271.5								
-276.5								
-281.5	290.0 / 291.0	**3" X 36" PITCHER BARREL SAMPLE PUSHED 36" WITH 14" RECOVERY**	288.5	PB				
-286.5		**CROSS MEMBER: SANTEE LIMESTONE**						

● SPT N VALUE ●

PL — MC — LL

▲ FINES CONTENT (%)

0 10 20 30 40 50 60 70 80 90

Continued Next Page

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	P. BAUMSTARK
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-11 GEO	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	8.5 ft	**Latitude:**	32.8336	**Longitude:**	79.958476	**Date Started:**	10/6/08
Total Depth:	800 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	12/9/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-750	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	76%
Core Size:		**Driller:**	MAD	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● / PL MC LL / ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
-296.5										
-301.5	311.5	**3" X 36" PITCHER BARREL SAMPLE PUSHED 36" WITH 21" RECOVERY**		308.5	PB					
-306.5										
-311.5										
-316.5										
-321.5	330.0	**3" X 36" PITCHER BARREL SAMPLE PUSHED 36" WITH 25" RECOVERY**		328.5	PB					
	331.5	**<u>WILLIAMSBURG FORMATION- CHICORA MEMBER: BLACK MINGO GROUP</u>**								
-326.5										
-331.5										
-336.5										
-341.5	351.5	**3" X 36" PITCHER BARREL SAMPLE PUSHED 36" WITH 19" RECOVERY**		348.5	PB					
-346.5										
-351.5										
-356.5										
-361.5										
-366.5	377.0	**3" X 36" PITCHER BARREL SAMPLE PUSHED 36" WITH 20" RECOVERY**		374.5	PB					
-371.5										
-376.5										
-381.5										
-386.5	395.0	**<u>WILLIAMSBURG FORMATION- LOWER BRIDGE MEMBER: BLACK MINGO</u>**		399.5						

Continued Next Page

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	P. BAUMSTARK
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-11 GEO	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	8.5 ft	**Latitude:**	32.8336	**Longitude:**	79.958476	**Date Started:**	10/6/08
Total Depth:	800 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	12/9/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-750	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	76%
Core Size:		**Driller:**	MAD	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● / PL MC LL / ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
	402.5	**GROUP**		400.0	PB					
-396.5		**3" X 36" PITCHER BARREL SAMPLE PUSHED TO REFUSAL**								
-401.5										
-406.5										
-411.5										
-416.5										
-421.5										
-426.5										
-431.5										
-436.5										
-441.5	450.0	**RHEMS FORMATION: BLACK MINGO GROUP**								
-446.5										
-451.5										
-456.5										
-461.5										
-466.5										
-471.5										
-476.5										
-481.5										
-486.5										

LEGEND

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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	P. BAUMSTARK
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-11 GEO	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	8.5 ft	**Latitude:**	32.8336	**Longitude:**	79.958476	**Date Started:**	10/6/08
Total Depth:	800 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	12/9/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-750	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	76%
Core Size:		**Driller:**	MAD	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● PL MC LL ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
-496.5										
-501.5										
-506.5										
-511.5										
-516.5										
-521.5										
-526.5										
-531.5										
-536.5										
-541.5										
-546.5										
-551.5										
-556.5										
-561.5										
-566.5										
-571.5										
-576.5										
-581.5										
-586.5										

LEGEND

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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	P. BAUMSTARK
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-11 GEO	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	8.5 ft	**Latitude:**	32.8336	**Longitude:**	79.958476	**Date Started:**	10/6/08
Total Depth:	800 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	12/9/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-750	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	76%
Core Size:		**Driller:**	MAD	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● PL MC LL ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
					CT					
-596.5										
-601.5										
-606.5										
-611.5										
-616.5										
-621.5										
-626.5										
-631.5										
-636.5										
-641.5										
-646.5										
-651.5										
-656.5										
-661.5										
-666.5										
-671.5										
-676.5										
-681.5										
-686.5										

LEGEND

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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	P. BAUMSTARK
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-11 GEO	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	8.5 ft	**Latitude:**	32.8336	**Longitude:**	79.958476	**Date Started:**	10/6/08
Total Depth:	800 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	12/9/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-750	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	76%
Core Size:		**Driller:**	MAD	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● / PL MC LL / ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
-696.5										
-701.5										
-706.5										
-711.5										
-716.5										
-721.5										
-726.5										
-731.5										
-736.5										
-741.5										
-746.5										
-751.5										
-756.5										
-761.5										
-766.5										
-771.5										
-776.5										
-781.5										
-786.5										
	800.0									

LEGEND

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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	P. BAUMSTARK
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-11 GEO	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	8.5 ft	**Latitude:**	32.8336	**Longitude:**	79.958476	**Date Started:**	10/6/08
Total Depth:	800 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	12/9/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-750	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	76%
Core Size:		**Driller:**	MAD	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● PL MC LL ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
-796.5		**BORING TERMINATED AT800 FEET.**								
-801.5										
-806.5										
-811.5										
-816.5										
-821.5										
-826.5										
-831.5										
-836.5										
-841.5										
-846.5										
-851.5										
-856.5										
-861.5										
-866.5										
-871.5										
-876.5										
-881.5										
-886.5										

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	M. EICHELBERGER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-14 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	12.5 ft	**Latitude:**	32.833867	**Longitude:**	79.957274	**Date Started:**	2/24/2009
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	2/24/2009
Bore Hole Diameter (in):	3	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	D-50	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	60%
Core Size:		**Driller:**	S&ME	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft): 7.5, 2.5, -2.5, -7.5, -12.5, -17.5, -22.5, -27.5, -32.5, -37.5, -42.5, -47.5, -52.5, -57.5, -62.5, -67.5, -72.5, -77.5, -82.5

Depth (ft): 0.0, 4.0, 8.0, 10.0, 13.5, 40.0, 53.5

MATERIAL DESCRIPTION

SILTY SAND (SM)
loose, brown, fine; with trace organics
- - - reddish brown

CLAYEY SAND (SC)
medium dense, reddish brown, fine; trace organics

SLIGHTLY CLAYEY SAND (SP-SC)
mediun dense, gray and red, fine, saturated

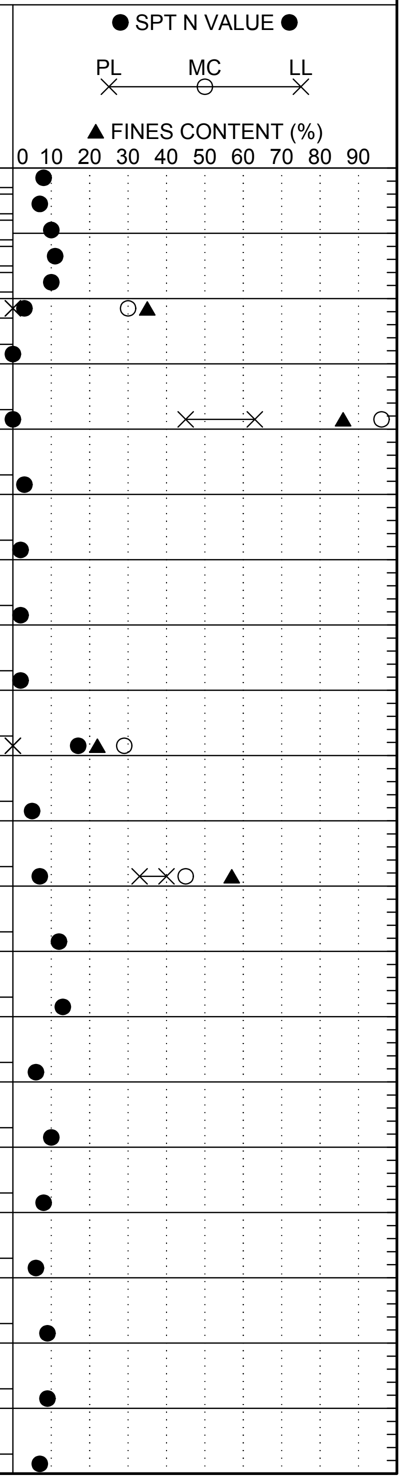
SILTY SAND (SM)
loose, bluish gray, fine, saturated

CLAYEY SILT (MH)
very soft, bluish gray
- - - soft; with shell
- - - very soft; with sand and trace shell
- - - no sand or shell

SILTY SAND (SM)
medium dense, gray, fine, saturated; with wood
- - - loose

COOPER MARL: SANDY SILT (ML)
firm, olive green, fine, calcareous; with phosphate
- - - still
- - - stiff
- - - firm
- - - stiff

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
0.0	SS	3	3	5	8
2.0	SS	3	4	3	7
4.0	SS	2	5	5	10
6.0	SS	4	5	6	11
8.0	SS	4	5	5	10
10.0	SS	3	2	1	3
13.5	SS				0
18.5	SS				0
23.5	SS	1	1	2	3
28.5	SS	2	1	1	2
33.5	SS	1	1	1	2
38.5	SS	1	1	1	2
43.5	SS	5	7	10	17
48.5	SS	2	2	3	5
53.5	SS	2	3	4	7
58.5	SS	6	7	5	12
63.5	SS	3	6	7	13
68.5	SS	1	2	4	6
73.5	SS	4	4	6	10
78.5	SS	2	4	4	8
83.5	SS	2	3	3	6
88.5	SS	3	3	6	9
93.5	SS	2	3	6	9
98.5	SS	3	3	4	7



LEGEND

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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	M. EICHELBERGE
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-14 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	12.5 ft	**Latitude:**	32.833867	**Longitude:**	79.957274	**Date Started:**	2/24/2009
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	2/24/2009
Bore Hole Diameter (in):	3	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	D-50	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	60%
Core Size:		**Driller:**	S&ME	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● / PL MC LL / ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
		- - - firm								
-92.5				103.5	SS	3	3	4	7	●
-97.5				108.5	SS	3	3	4	7	●
-102.5		- - - stiff		113.5	SS	3	4	5	9	●
-107.5	120.0			118.5	SS	3	4	6	10	●
-112.5		**BORING TERMINATED AT 120 FEET.**								
-117.5										
-122.5										
-127.5										
-132.5										
-137.5										
-142.5										
-147.5										
-152.5										
-157.5										
-162.5										
-167.5										
-172.5										
-177.5										
-182.5										

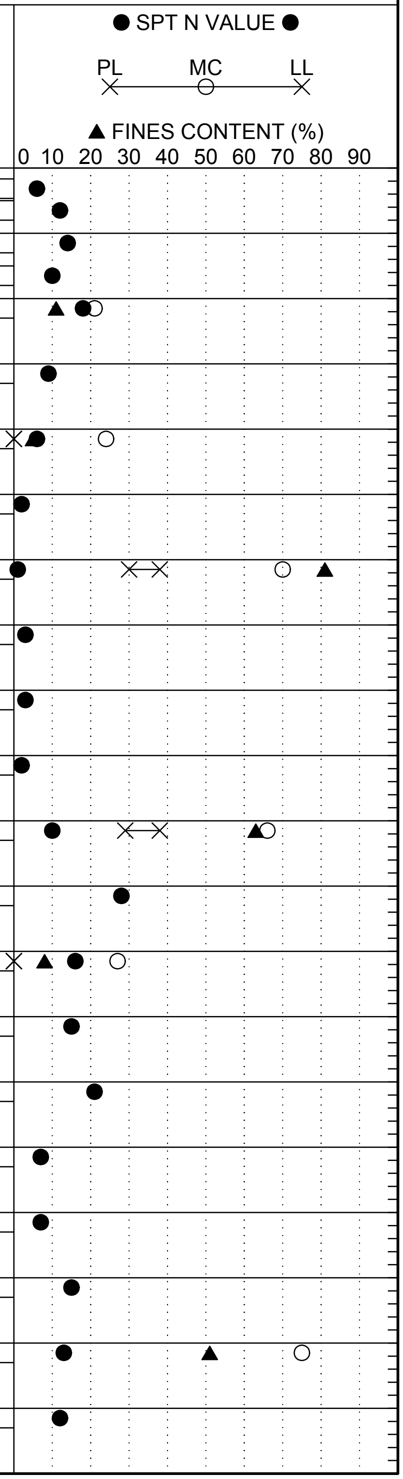
LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	R. BOLLER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-16 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.: 11.0 ft	**Latitude:** 32.834406	**Longitude:**	79.956219	**Date Started:**	10/19/08		
Total Depth: 120 ft	**Soil Depth:** ft	**Core Depth:**	ft	**Date Completed:**	10/19/2008		
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-55	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	56%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0							
	0.8	**ASPHALT= 10 INCHES**	0.8	SS	6	3	3	6
6.0		**FILL: SAND (SP)** loose, dark brown, fine; with crushed stone	2.5	SS	3	5	7	12
	7.5		5.0	SS	8	9	5	14
1.0		--- medium dense	7.5	SS	5	5	5	10
		SLIGHTLY CLAYEY SAND (SP-SC)	10.0	SS	11	10	8	18
-4.0		loose, light reddish brown, fine	15.0	SS	1	4	5	9
-9.0		--- medium dense, light yellowish brown, fine	20.0	SS	5	4	2	6
-14.0	25.0	--- loose, light yellowish brown, fine to medium; --- light reddish brown	25.0	SS	WOH	WOH	2	2
-19.0	30.0	**SILTY SAND (SM)** very loose, bluish green, fine; trace shell	30.0	SS	WOH	WOH	1	1
-24.0		**SILT (ML)**	35.0	SS	1	1	2	3
-29.0		very soft, bluish green; with clay and trace fine sand	40.0	SS	1	1	2	3
-34.0		--- soft; --- no sand	45.0	SS	1	1	1	2
-39.0		--- very soft; --- stiff, dark gray; with fine sand	50.0	SS	WOH	WOH	10	10
-44.0	55.0	**SLIGHTLY SILTY SAND (SP-SM)**	55.0	SS	7	11	17	28
-49.0		medium dense, dark gray, fine; --- grayish green	60.0	SS	6	7	9	16
-54.0	65.0	**COOPER MARL: SANDY SILT (ML)**	65.0	SS	15	9	6	15
-59.0		very stiff, olive green	70.0	SS	7	10	11	21
-64.0		--- firm	75.0	SS	1	2	5	7
-69.0			80.0	SS	2	2	5	7
-74.0		--- very stiff	85.0	SS	2	6	9	15
-79.0		--- stiff	90.0	SS	1	5	8	13
-84.0			95.0	SS	2	5	7	12
			100.0					



LEGEND *Continued Next Page*

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 08554.GPJ SC_DOT.GDT 4/3/09

Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	R. BOLLER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-16 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	11.0 ft	**Latitude:**	32.834406	**Longitude:**	79.956219	**Date Started:**	10/19/08
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	10/19/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-55	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	56%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
				SS	3	4	6	10
-94.0		--- very stiff	105.0	SS	6	8	17	20
-99.0		--- stiff	110.0	SS	1	3	7	10
-104.0			115.0	SS	1	3	9	12
-109.0	120.0		118.5	SS	1	5	10	15
-114.0		**BORING TERMINATED AT 120 FEET.**						
-119.0								
-124.0								
-129.0								
-134.0								
-139.0								
-144.0								
-149.0								
-154.0								
-159.0								
-164.0								
-169.0								
-174.0								
-179.0								
-184.0								

● SPT N VALUE ●

PL MC LL

▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90

LEGEND

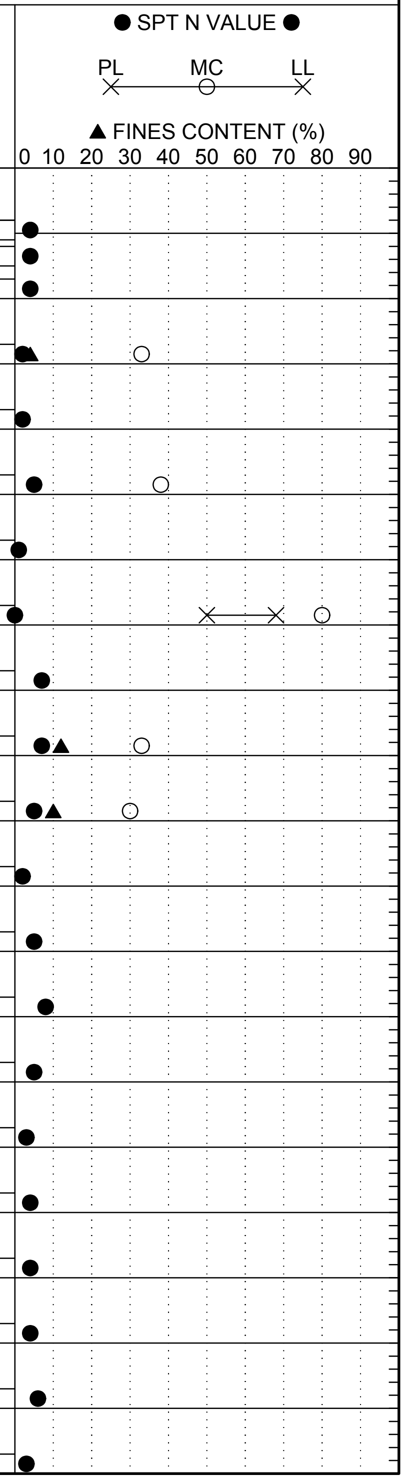
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	P.BAUMSTARK
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-18 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	9.0 ft	**Latitude:**	32.834962	**Longitude:**	79.954958	**Date Started:**	9/18/2008
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	9/23/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-550	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	80%
Core Size:		**Driller:**	S&ME	**Groundwater:**	**TOB** 2 ft	**24HR**	3.5 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION
	0.0	
	0.5	**CONCRETE = 6 INCHES**
4.0	2.5	**SLIGHTLY SILTY SAND (SP-SM)** brown to dark brown, fine; petroleum odor
-1.0	11.0	**SLIGHTLY CLAYEY SAND (SP-SC)** very loose, gray brown, fine
-6.0	15.0	**SAND (SP)** very loose, gray brown, fine
-11.0		**SANDY CLAY (CL)** very soft, gray; with shell
-16.0	25.0	- - - firm with sand seams
-21.0		**CLAYEY SILT (MH)** very soft, gray
-26.0	35.0	- - - with trace organics
-31.0		**SLIGHTLY CLAYEY SAND (SP-SC)** loose, gray, fine
-36.0		
-41.0	50.0	**CLAYEY SAND (SC)** very loose, gray, fine
-46.0	55.0	**SAND (SP)** loose, gray-brown, fine; with clay nodules
-51.0	60.0	**COOPER MARL: SILTY CLAY (CL)** firm, olive green; with some sand
-56.0		
-61.0		- - - soft
-66.0		
-71.0		
-76.0		
-81.0		
-86.0		

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
0.0	HAND AUGER				
4.0	SS	3	2	2	4
6.0	SS	4	2	2	4
8.5	SS	11	3	1	4
13.5	SS	2	1	1	2
18.5	SS	WOH	1	1	2
23.5	SS	4	3	2	5
28.5	SS	WOH	WOH	1	1
33.5	SS		WOH		0
38.5	SS	5	3	4	7
43.5	SS	4	4	3	7
48.5	SS	2	2	3	5
53.5	SS	1	1	1	2
58.5	SS	3	2	3	5
63.5	SS	4	4	4	8
68.5	SS	3	2	3	5
73.5	SS	2	1	2	3
78.5	SS	2	2	2	4
83.5	SS	2	2	2	4
88.5	SS	2	2	2	4
93.5	SS	2	3	3	6
98.5	SS	2	2	1	3



LEGEND

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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	P.BAUMSTARK
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-18 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	9.0 ft	**Latitude:**	32.834962	**Longitude:**	79.954958	**Date Started:**	9/18/2008
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	9/23/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-550	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	80%
Core Size:		**Driller:**	S&ME	**Groundwater:**	**TOB** 2 ft	**24HR**	3.5 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	SPT N VALUE / PL MC LL / FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
-96.0				103.5	SS	2	2	2	4	●
-101.0				108.5	SS	2	2	2	4	●
-106.0				113.5	SS	2	2	3	5	●
-111.0	120.0			118.5	SS	3	2	3	5	●
		BORING TERMINATED AT 120 FEET.								
-116.0										
-121.0										
-126.0										
-131.0										
-136.0										
-141.0										
-146.0										
-151.0										
-156.0										
-161.0										
-166.0										
-171.0										
-176.0										
-181.0										
-186.0										

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	M. EICHELBERGER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-18 SPT ALT A	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	9.0 ft	**Latitude:**	32.834962	**Longitude:**	79.954958	**Date Started:**	3/11/2009
Total Depth:	102 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	3/11/2009
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-850	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	74%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● / PL MC LL / ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
	0.0	**WASH ROTARY TO 75 FEET**								
4.0										
-1.0										
-6.0										
-11.0										
-16.0										
-21.0										
-26.0										
-31.0										
-36.0										
-41.0										
-46.0										
-51.0										
-56.0										
-61.0										
-66.0	75.0	**3" X 30" FIXED PISTON SAMPLE PUSHED WITH 24" RECOVERY**		75.0	ST					PL ~20, LL ~35, MC ~50, Fines ~64
	77.0	**WASH ROTARY TO 100 FEET**								
-71.0										
-76.0										
-81.0										
-86.0	100.0			100.0						

LEGEND

Continued Next Page

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	M. EICHELBERGER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-18 SPT ALT A	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	9.0 ft	**Latitude:**	32.834962	**Longitude:**	79.954958	**Date Started:**	3/11/2009
Total Depth:	102 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	3/11/2009
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-850	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	74%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● PL MC LL ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
	102.0	**3" X 30" FIXED PISTON SAMPLE PUSHED WITH 24" RECOVERY**			ST					
-96.0										
-101.0										
-106.0										
-111.0										
-116.0										
-121.0										
-126.0										
-131.0										
-136.0										
-141.0										
-146.0										
-151.0										
-156.0										
-161.0										
-166.0										
-171.0										
-176.0										
-181.0										
-186.0										

LEGEND

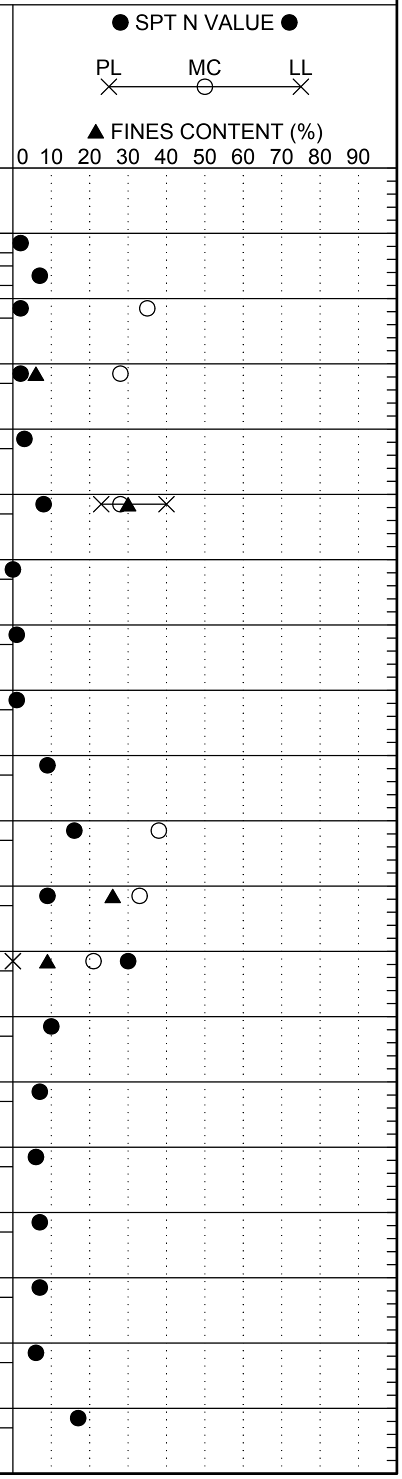
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	R. BOLLER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-19 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	10.5 ft	**Latitude:**	32.834947	**Longitude:**	79.954469	**Date Started:**	9/24/08
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	9/24/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-850	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	73%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION
10.5	0.0	**SLIGHTLY CLAYEY SAND (SP-SC)** dark brownish gray, fine to medium
5.5	5.0	
3.0	7.5	**SANDY CLAY (CL)** soft, gray
-4.5	15.0	**CLAYEY SAND (SC)** loose, light gray, fine; - - - very loose
		SILTY SAND (SM) very loose, light to dark brown, fine to medium grained
-14.5	25.0	
-19.5	30.0	- - - brown to black; with trace debris
		CLAYEY SAND (SC) loose, gray, fine
		CLAY (CL) very soft, gray; with trace fine sand
-34.5	45.0	- - - stiff, gray, fine; with trace wood
-39.5	50.0	**CLAYEY SAND (SC)** medium dense, gray, fine; - - - loose
-49.5	60.0	**SLIGHTLY CLAYEY SAND (SP-SC)** medium dense, dark gray and brown, fine to medium
-54.5	65.0	**COOPER MARL: SANDY SILT (ML)** stiff, olive green; - - - firm; - - - very stiff

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
0.0	HAND AUGER				
5.0	SS	1	1	1	2
7.5	SS	4	4	3	7
10.0	SS	1	1	1	2
15.0	SS	1	1	1	2
20.0	SS	1	2	1	3
25.0	SS	1	3	5	8
30.0	SS	WOH			0
35.0	SS	WOH	WOH	1	1
40.0	SS	WOH	WOH	1	1
45.0	SS	4	4	5	9
50.0	SS	2	6	10	16
55.0	SS	2	3	6	9
60.0	SS	5	6	24	30
65.0	SS	3	4	6	10
70.0	SS	2	2	5	7
75.0	SS	1	2	4	6
80.0	SS	1	2	5	7
85.0	SS	2	2	5	7
90.0	SS	2	2	4	6
95.0	SS	1	2	15	17
100.0					



LEGEND

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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	R. BOLLER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-19 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	10.5 ft	**Latitude:**	32.834947	**Longitude:**	79.954469	**Date Started:**	9/24/08
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	9/24/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-850	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	73%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
		- - - soft		SS	WOH	WOH	5	5
-94.5		- - - very stiff	105.0	SS	16	12	11	23
-99.5			110.0	SS	WOH	WOH	6	6
-104.5		- - - firm	115.0	SS	2	3	7	10
-109.5	120.0	- - - stiff	118.5	SS	3	4	7	11
-114.5		**BORING TERMINATED AT 120 FEET.**						
-119.5								
-124.5								
-129.5								
-134.5								
-139.5								
-144.5								
-149.5								
-154.5								
-159.5								
-164.5								
-169.5								
-174.5								
-179.5								
-184.5								

● SPT N VALUE ●

PL MC LL

▲ FINES CONTENT (%)

0 10 20 30 40 50 60 70 80 90

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

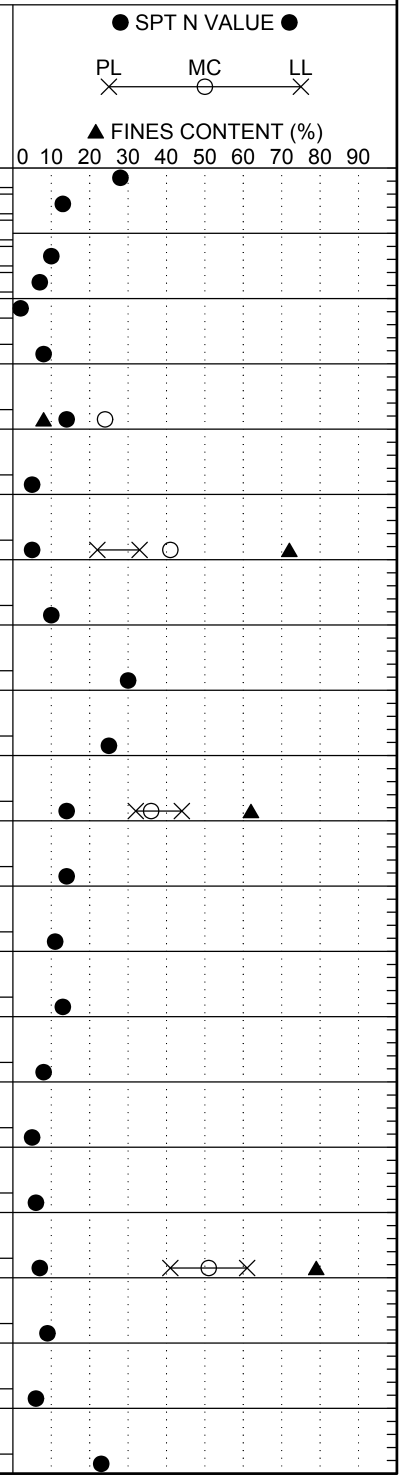
SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	P. BAUMSTARK
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-20 SPT Alt 1	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	12.5 ft	**Latitude:**	32.835504	**Longitude:**	79.953796	**Date Started:**	2/23/2009
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	2/23/2009
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-55	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	80%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** N/A	**24HR**	4 ft

Elevation (ft): 7.5, 2.5, -2.5, -7.5, -12.5, -17.5, -22.5, -27.5, -32.5, -37.5, -42.5, -47.5, -52.5, -57.5, -62.5, -67.5, -72.5, -77.5, -82.5

Depth (ft)	MATERIAL DESCRIPTION
0.0 – 2.0	**GRAVEL**
2.0 – 6.0	**SLIGHTLY SILTY SAND (SP-SM)** medium dense, dark gray to black; organic stained with some clay
4.0	▼ (groundwater)
6.0	**HAND AUGER: CLAYEY SAND (SC)** gray brown, fine
	SLIGHTLY CLAYEY SAND (SP-SC) medium dense, gray brown, fine
23.5	- - - loose, brown - - - very loose, with trace clay
28.5	- - -loose, black, coarse - - -medium dense, brown, coarse
33.5	**CLAYEY SAND (SC)** loose, dark gray; with trace shell
38.5	**SANDY CLAY (CL)** firm, dark gray; with trace wood, silt, and organics
48.5	**CLAYEY SAND (SC)** medium dense, dark gray, fine
	SAND (SP) medium dense, gray, fine - - - with trace clay
	COOPER MARL: SANDY SILT(ML) stiff, olive green, fine; with trace shell - - - firm - - - stiff - - - firm

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
0.0	SS	11	16	12	28
2.0	SS	8	8	5	13
4.0	SS				
6.0	SS	3	5	5	10
8.0	SS	2	3	4	7
10.0	SS	1	1	1	2
13.5	SS	4	3	5	8
18.5	SS	6	6	8	14
23.5	SS	1	2	3	5
28.5	SS	1	3	2	5
33.5	SS	6	6	4	10
38.5	SS	12	10	20	30
43.5	SS	10	11	14	25
48.5	SS	7	7	7	14
53.5	SS	4	6	8	14
58.5	SS	3	4	7	11
63.5	SS	4	5	8	13
68.5	SS	3	3	5	8
73.5	SS	1	2	3	5
78.5	SS	2	2	4	6
83.5	SS	2	3	4	7
88.5	SS	2	4	5	9
93.5	SS	1	2	4	6
98.5	SS	1	7	16	23



LEGEND

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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	P. BAUMSTARK
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-20 SPT Alt 1	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	12.5 ft	**Latitude:**	32.835504	**Longitude:**	79.953796	**Date Started:**	2/23/2009
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	2/23/2009
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-55	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	80%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** N/A	**24HR**	4 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
		- - - hard							
-92.5		- - - firm		103.5	SS	1	1	5	6
-97.5				108.5	SS	2	3	5	8
-102.5				113.5	SS	2	2	6	8
-107.5	120.0			118.5	SS	4	3	6	9
-112.5		**BORING TERMINATED AT 120 FEET.**							
-117.5									
-122.5									
-127.5									
-132.5									
-137.5									
-142.5									
-147.5									
-152.5									
-157.5									
-162.5									
-167.5									
-172.5									
-177.5									
-182.5									

● SPT N VALUE ●

PL MC LL

▲ FINES CONTENT (%)

0 10 20 30 40 50 60 70 80 90

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	M. EICHELBERGER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-21 SPT ALT 1	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	12.5 ft	**Latitude:**	32.83608	**Longitude:**	79.952891	**Date Started:**	2/23/2009
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	2/23/2009
Bore Hole Diameter (in):	3	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-550X	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	80%
Core Size:		**Driller:**	S&ME	**Groundwater:**	**TOB** N/A	**24HR**	8 ft

MATERIAL DESCRIPTION

Depth (ft)	Material Description
0.0	**FILL: CLAYEY SAND (SC)** medium dense, brown, fine, moist; with crushed stone and trace organics
2.0	
4.0	**SILTY SAND (SM)** very loose, dark brown, fine; with organics
	SLIGHTLY SILTY SAND (SP-SM) loose, bluish gray and brown, fine, saturated
18.5	--- very loose, light brown, medium coarse
23.5	--- with shell
	SILTY SAND (SM) very loose, dark gray, fine; with shell
	SANDY CLAY (CL) soft, dark gray, fine; with silt
38.5	--- no sand --- firm; trace shell
	SLIGHTLY SILTY SAND (SP-SM) medium dense, brown, medium grained; with shell
48.5	--- dense, gray, fine, saturated
	MARL: SANDY SILT (ML) firm, olive green, fine, calcareous --- stiff --- firm --- soft --- firm

Elevation scale (ft): 7.5, 2.5, -2.5, -7.5, -12.5, -17.5, -22.5, -27.5, -32.5, -37.5, -42.5, -47.5, -52.5, -57.5, -62.5, -67.5, -72.5, -77.5, -82.5

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
0.0	SS	6	6	9	15
2.0	SS	2	2	1	3
4.0	SS	3	3	2	5
6.0	SS	3	2	2	4
8.0	SS	1	1	1	2
13.5	SS	1	1	2	3
18.5	SS	2	1	1	2
23.5	SS	1	1	2	3
28.5	SS	WOH	2	1	3
33.5	SS	1	2	3	5
38.5	SS	4	5	5	10
43.5	SS	13	26	12	38
48.5	SS	2	3	3	6
53.5	SS	3	4	5	9
58.5	SS	3	4	4	8
63.5	SS	2	3	4	7
68.5	SS	WOH	2	3	5
73.5	SS	1	2	3	5
78.5	SS	1	1	2	3
83.5	SS	1	2	2	4
88.5	SS	2	2	3	5
93.5	SS	2	2	3	5
98.5	SS	2	2	3	5

● SPT N VALUE ●

PL — MC — LL

▲ FINES CONTENT (%)

0 10 20 30 40 50 60 70 80 90

LEGEND

Continued Next Page

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	M. EICHELBERGER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-21 SPT ALT 1	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	12.5 ft	**Latitude:**	32.83608	**Longitude:**	79.952891	**Date Started:**	2/23/2009
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	2/23/2009
Bore Hole Diameter (in):	3	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-550X	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	80%
Core Size:		**Driller:**	S&ME	**Groundwater:**	**TOB** N/A	**24HR**	8 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
-92.5			103.5	SS	2	3	5	8
-97.5		--- stiff	108.5	SS	2	4	5	9
-102.5			113.5	SS	2	3	4	7
-107.5	120.0	--- very stiff	118.5	SS	6	8	12	20
-112.5		**BORING TERMINATED AT 120 FEET.**						
-117.5								
-122.5								
-127.5								
-132.5								
-137.5								
-142.5								
-147.5								
-152.5								
-157.5								
-162.5								
-167.5								
-172.5								
-177.5								
-182.5								

● SPT N VALUE ●

PL MC LL

▲ FINES CONTENT (%)

0 10 20 30 40 50 60 70 80 90

LEGEND

SAMPLER TYPE
- SS - Split Spoon
- ST - Shelby Tube
- AWG - Rock Core, 1-1/8"
- NQ - Rock Core, 1-7/8"
- CU - Cuttings
- CT - Continuous Tube

DRILLING METHOD
- HSA - Hollow Stem Auger
- CFA - Continuous Flight Augers
- DC - Driving Casing
- RW - Rotary Wash
- RC - Rock Core

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	M. EICHELBERGER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-21 SPT ALT 1A	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	12.5 ft	**Latitude:**	32.83608	**Longitude:**	79.952891	**Date Started:**	3/4/2009
Total Depth:	32 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	3/4/2009
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-850	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	74%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** N/A	**24HR**	8 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● PL MC LL ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
	0.0	**SHELBY TUBE TO 25 FEET**								
7.5										
2.5										
-2.5										
-7.5										
-12.5	25.0			25.0						
	27.0	**3" X 30" SHELBY TUBE PUSHED WITH 22" RECOVERY**			ST					
-17.5	30.0	**WASH ROTARY TO 30 FEET**		30.0						
	32.0	**3" X 30" SHELBY TUBE PUSHED WITH 22" RECOVERY**			ST					
-22.5										
-27.5										
-32.5										
-37.5										
-42.5										
-47.5										
-52.5										
-57.5										
-62.5										
-67.5										
-72.5										
-77.5										
-82.5										

LEGEND

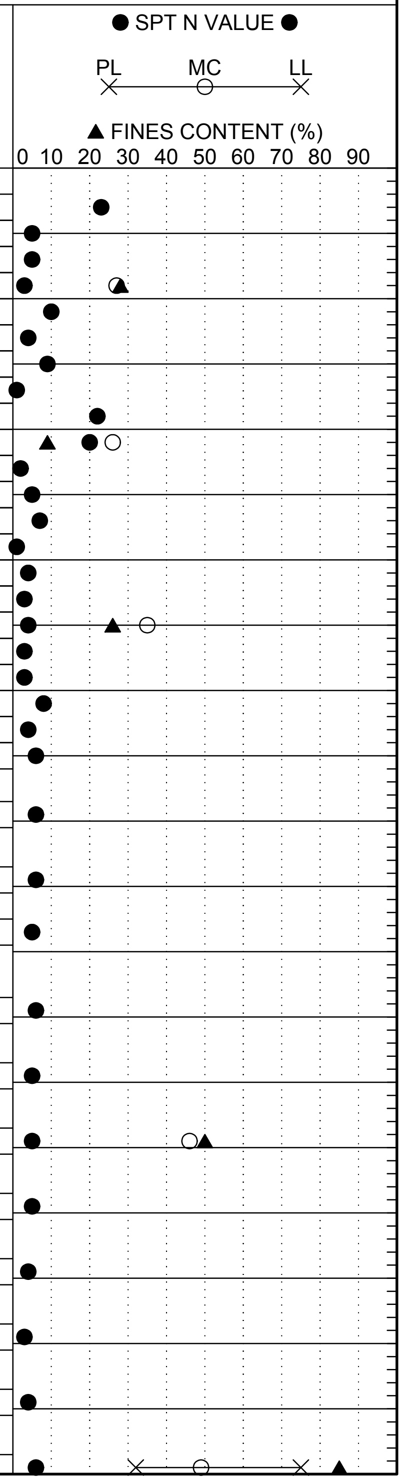
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	P. BAUMSTARK
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-23 SPT AB	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	12.0 ft	**Latitude:**	32.83833	**Longitude:**	79.952996	**Date Started:**	9/30/08
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	9/30/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-550	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	80%
Core Size:		**Driller:**	S&ME	**Groundwater:**	**TOB** 7 ft	**24HR**	6 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION
	0.0	
	0.5	**ASPHALT= 6 INCHES**
	1.3	**CRUSHED STONE**
7.0	2.0	**CRUSHED STONE AND DEBRIS**
	4.0	**FILL: SLIGHTLY SILTY SAND (SP-SM)** medium dense, dark brown to black, fine
2.0	12.0	**CLAYEY SAND (SC)** gray, loose, fine
-3.0	15.8	--- brown
-8.0	22.0	--- gray brown
-13.0	26.0	--- very loose
-18.0		--- loose, fine to coarse
-23.0		**SAND (SP)** very loose, gray, coarse; with trace phosphate
-28.0	43.0	**SLIGHTLY CLAYEY SAND (SP-SC)** very loose, gray, fine; with trace shell
-33.0		--- medium dense, gray, fine to coarse
-38.0		**SILTY CLAY (CL)** very soft, gray; with trace sand and shell
-43.0		--- soft
-48.0		**CLAYEY SAND (SC)** loose, gray; with trace shell
-53.0		--- very loose
		--- very loose, dark olive green; with trace silt and shell
-58.0		--- loose
-63.0		**COOPER MARL: SANDY SILT (ML)** soft, olive green; with sand seams
-68.0		--- loose, olive green
		--- firm
-73.0		--- soft
-78.0		
-83.0		

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
2.0					
4.0	SS	10	12	11	23
6.0	SS	5	2	3	5
8.0	SS	4	3	2	5
10.0	SS	1	1	2	3
12.0	SS	2	4	6	10
14.0	SS	3	2	2	4
16.0	SS	3	3	6	9
18.0	SS	1	WOH	1	1
20.0	SS	3	8	14	22
22.0	SS	7	10	10	20
24.0	SS	1	1	1	2
26.0	SS	WOH	2	3	5
28.0	SS	3	3	4	7
30.0	SS	WOH	1	WOH	1
32.0	SS	WOH	2	2	4
34.0	SS	1	2	1	3
36.0	SS	1	2	2	4
38.0	SS	2	1	2	3
40.0	SS	WOH	1	2	3
42.0	SS	3	4	4	8
44.0	SS	2	2	2	4
	SS	2	3	3	6
48.5	SS	2	2	4	6
53.5	SS	2	3	3	6
57.5	SS	3	3	2	5
63.5	SS	2	3	3	6
68.5	SS	2	3	2	5
73.5	SS	3	3	2	5
78.5	SS	2	3	2	5
83.5	SS	2	2	2	4
88.5	SS	2	1	2	3
93.5	SS	2	2	2	4
98.5					



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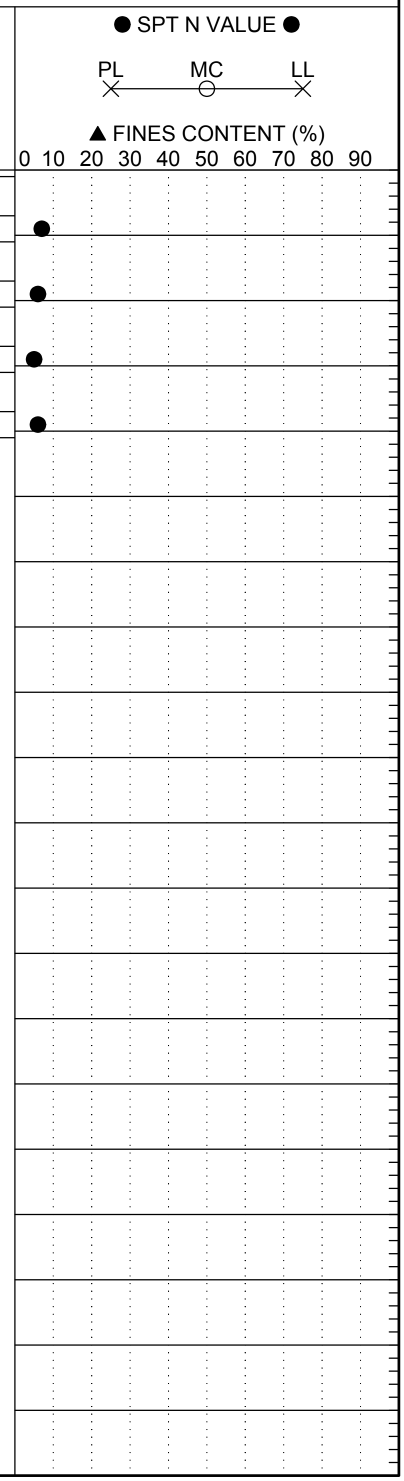
LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	P. BAUMSTARK
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-23 SPT ALT 1	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	12.0 ft	**Latitude:**	32.83833	**Longitude:**	79.952996	**Date Started:**	9/30/08
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	9/30/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-550	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	80%
Core Size:		**Driller:**	S&ME	**Groundwater:**	**TOB** 7 ft	**24HR**	6 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
		- - - firm		SS	2	3	3	6
-93.0			103.5	SS	3	3	4	7
-98.0			108.5	SS	2	3	3	6
-103.0			113.5	SS	3	3	2	5
-108.0	120.0		118.5	SS	6	3	3	6
-113.0		**BORING TERMINATED AT 120 FEET.**						
-118.0								
-123.0								
-128.0								
-133.0								
-138.0								
-143.0								
-148.0								
-153.0								
-158.0								
-163.0								
-168.0								
-173.0								
-178.0								
-183.0								



LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	P. BAUMSTARK
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-23 SPT ALT 1A	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	12.0 ft	**Latitude:**	32.83833	**Longitude:**	79.952996	**Date Started:**	9/30/08
Total Depth:	52 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	9/30/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-550	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	80%
Core Size:		**Driller:**	S&ME	**Groundwater:**	**TOB** 7 ft	**24HR**	6 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● / PL MC LL / ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
	0.0	**WASH ROTARY TO 50 FEET**								
7.0										
2.0										
-3.0										
-8.0										
-13.0										
-18.0										
-23.0										
-28.0										
-33.0										
-38.0	50.0	**3" X 30" FIXED PISTON SAMPLE PUSHED 24" WITH 24" RECOVERY**		50.0	ST					
	52.0									
-43.0										
-48.0										
-53.0										
-58.0										
-63.0										
-68.0										
-73.0										
-78.0										
-83.0										

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

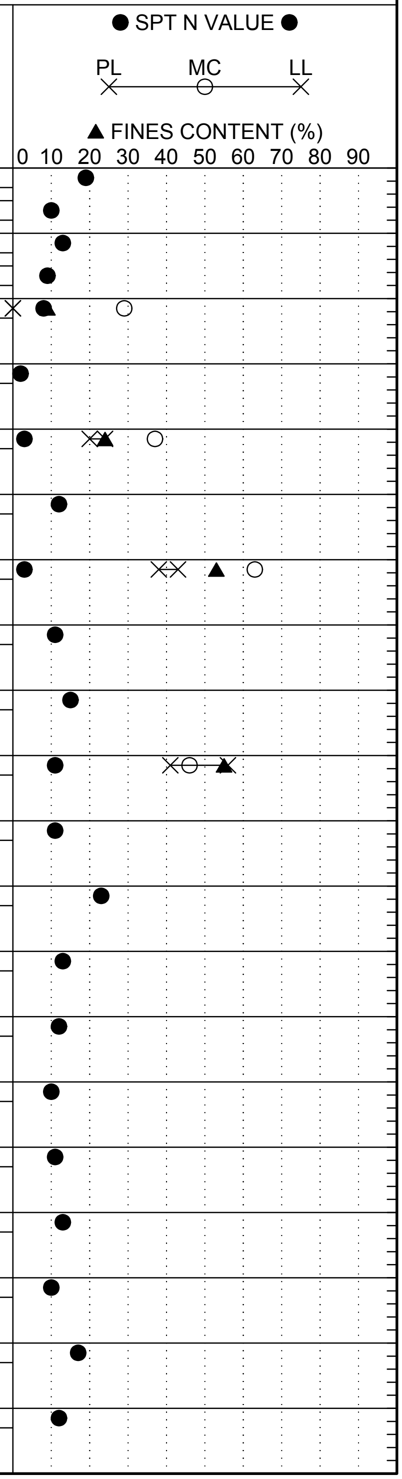
SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	R. BOLLER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-27 SPT A	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	12.0 ft	**Latitude:**	32.839965	**Longitude:**	79.954075	**Date Started:**	3/2/2009
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	3/2/2009
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-850	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	74%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION
	0.0	**SLIGHTLY SILTY SAND (SP-SM)** medium dense, light brown, fine; possible fill
7.0	5.0	
	7.5	**CLAYEY SAND (SC)** loose, light brown to brown, fine
2.0		
-3.0	15.0	**SLIGHTLY CLAYEY SAND (SP-SC)** medium dense, yellowish brown, fine; with crushed stone
-8.0	20.0	**SLIGHTLY SILTY SAND (SP-SM)** loose, grayish brown to yellowish brown, fine
-13.0		
-18.0	30.0	**CLAYEY SAND (SC)** very loose, bluish tan; with silt and shells
-23.0		**CLAYEY SILT (MH)** soft, bluish tan; with sand and shells
-28.0		- - - stiff
-33.0		**COOPER MARL: SANDY SILT (ML)** soft, greenish brown, fine; with shells
-38.0		- - - stiff
-43.0		- - - very stiff
-48.0		- - - stiff
-53.0		
-58.0		
-63.0		
-68.0		
-73.0		
-78.0		- - - very stiff
-83.0		- - - stiff

Depth scale: 2.5, 5.0, 7.5, 15.0, 20.0, 30.0

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
0.0	SS	4	8	11	19
2.5	SS	2	4	6	10
5.0	SS	7	7	6	13
7.5	SS	4	5	4	9
10.0	SS	3	4	4	8
15.0	SS	1	1	1	2
20.0	SS	1	1	2	3
25.0	SS	1	3	9	12
30.0	SS	1	1	2	3
35.0	SS	1	4	7	11
40.0	SS	4	7	8	15
45.0	SS	2	4	7	11
50.0	SS	3	5	6	11
55.0	SS	4	11	12	23
60.0	SS	4	5	8	13
65.0	SS	4	4	8	12
70.0	SS	3	3	7	10
75.0	SS	2	5	6	11
80.0	SS	2	4	9	13
85.0	SS	1	2	8	10
90.0	SS	1	2	15	17
95.0	SS	2	4	8	12
100.0					



LEGEND

Continued Next Page

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	R. BOLLER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-27 SPT ALT 1	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	12.0 ft	**Latitude:**	32.839965	**Longitude:**	79.954075	**Date Started:**	3/2/2009
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	3/2/2009
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-850	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	74%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
				SS	2	4	8	12
-93.0			105.0	SS	3	4	9	13
-98.0		- - - very stiff	110.0	SS	4	7	10	17
-103.0			115.0	SS	4	5	14	19
			118.5	SS	11	11	24	35
-108.0	120.0							
-113.0		**BORING TERMINATED AT 120 FEET.**						
-118.0								
-123.0								
-128.0								
-133.0								
-138.0								
-143.0								
-148.0								
-153.0								
-158.0								
-163.0								
-168.0								
-173.0								
-178.0								
-183.0								

● SPT N VALUE ●

PL MC LL

▲ FINES CONTENT (%)

0 10 20 30 40 50 60 70 80 90

LEGEND

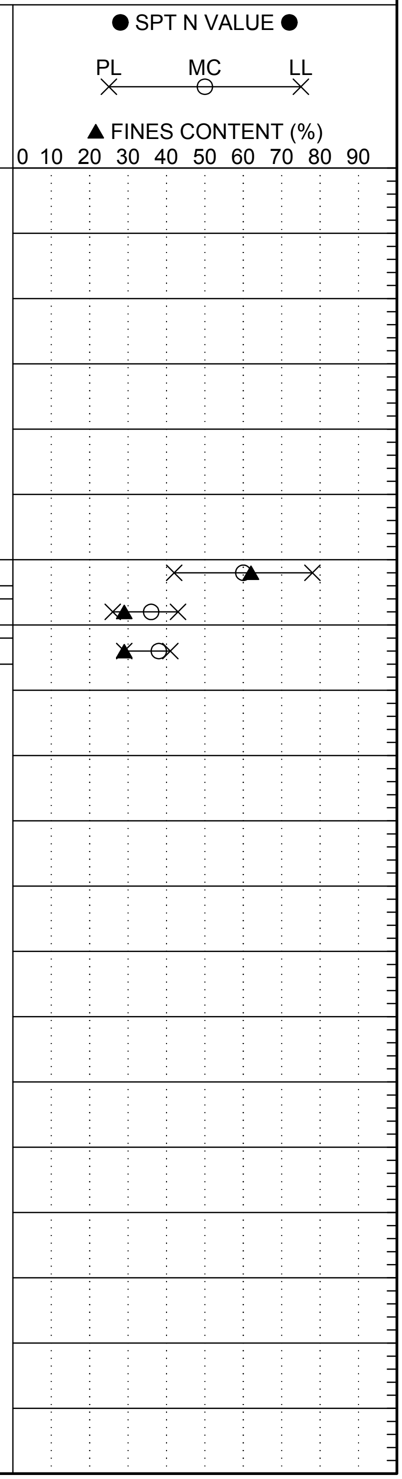
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	M. EICHELBERGER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-27 SPT ALT 1A	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	12.0 ft	**Latitude:**	32.839965	**Longitude:**	79.954075	**Date Started:**	3/3/2009
Total Depth:	38 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	3/3/2009
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-850	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	74%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
12.0	0.0	**WASH ROTARY TO 30 FEET**							
-18.0	30.0	**3" X 30" FIXED PISTON SAMPLE PUSHED WITH 18" RECOVERY**		30.0	ST				
	32.0	**WASH ROTARY TO 33 FEET**							
	33.0	**3" X 30" FIXED PISTON SAMPLE PUSHED WITH 24" RECOVERY**		33.0	ST				
	35.0	**WASH ROTARY TO 36 FEET**							
	36.0	**3" X 30" FIXED PISTON SAMPLE PUSHED WITH 24" RECOVERY**		36.0	ST				
	38.0								

Elevation scale (ft): 7.0, 2.0, -3.0, -8.0, -13.0, -18.0, -23.0, -28.0, -33.0, -38.0, -43.0, -48.0, -53.0, -58.0, -63.0, -68.0, -73.0, -78.0, -83.0



LEGEND

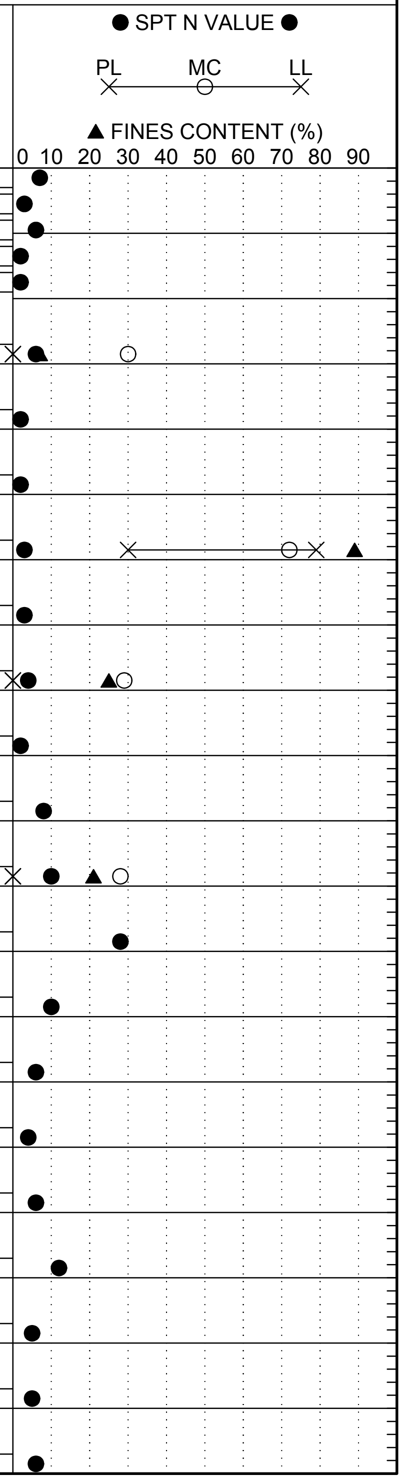
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	M. EICHELBERGER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-28 SPT Alt. 1	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	7.0 ft	**Latitude:**	32.834594	**Longitude:**	79.955548	**Date Started:**	2/17/09
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	2/17/2009
Bore Hole Diameter (in):	3in/4in	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-550	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	74%
Core Size:		**Driller:**	S&ME	**Groundwater:**	**TOB** 7 ft	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION
	0.0	**CLAYEY SAND (SC)** loose, gray, fine, dry; with stone
2.0	2.0	**SILTY SAND (SM)** loose, gray, fine, moist; with organics
-3.0		--- loose
-8.0	14.0	--- very loose, dark brown, saturated; with organics
-13.0	18.5	--- gray; less organics
		SLIGHTLY SILTY SAND (SP) loose, light brown, fine; with shell hash
-18.0 / -23.0		**CLAY (CH)** very soft, gray, fine, saturated; with shell
-28.0		--- trace shell & organics
		--- no shell
-33.0	38.5	**SILTY SAND (SM)** very loose, greenish gray, fine, saturated
-38.0		--- with trace shell
-43.0		--- loose
-48.0		--- medium dense
-53.0		--- course grained; with phosphate and shell
-58.0	63.5	**COOPER MARL: SANDY SILTY (ML)** firm, olive green, fine
-63.0 / -68.0		--- soft
-73.0		--- firm
-78.0		--- stiff
-83.0		--- firm
-88.0		

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
0.0	SS	4	3	4	7
2.0	SS	3	2	1	3
4.0	SS	3	3	3	6
6.0	SS	1	1	1	2
8.0	SS	2	1	1	2
13.5	SS	3	2	4	6
18.5	SS	1	1	1	2
23.5	SS	WOH	1	1	2
28.5	SS	1	1	2	3
33.5	SS	1	1	2	3
38.5	SS	2	2	2	4
43.5	SS	1	1	1	2
48.5	SS	7	6	2	8
53.5	SS	3	5	5	10
58.5	SS	10	14	14	28
63.5	SS	3	5	5	10
68.5	SS	2	2	4	6
73.5	SS	2	2	2	4
78.5	SS	1	3	3	6
83.5	SS	2	5	7	12
88.5	SS	2	2	3	5
93.5	SS	2	2	3	5
98.5	SS	1	2	4	6



LEGEND

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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	M. EICHELBERGER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-28 SPT ALT 1	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	7.0 ft	**Latitude:**	32.834594	**Longitude:**	79.955548	**Date Started:**	2/17/09
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	2/17/2009
Bore Hole Diameter (in):	3in/4in	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-550	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	74%
Core Size:		**Driller:**	S&ME	**Groundwater:**	**TOB** 7 ft	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
-98.0			103.5	SS	3	2	3	5
-103.0		--- stiff	108.5	SS	5	8	5	13
-108.0		--- soft	113.5	SS	2	2	2	4
-113.0	120.0	--- firm	118.5	SS	2	3	3	6
-118.0		**BORING TERMINATED AT 120 FEET.**						
-123.0								
-128.0								
-133.0								
-138.0								
-143.0								
-148.0								
-153.0								
-158.0								
-163.0								
-168.0								
-173.0								
-178.0								
-183.0								
-188.0								

● SPT N VALUE ●

PL MC LL

▲ FINES CONTENT (%)

0 10 20 30 40 50 60 70 80 90

LEGEND

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
AWG - Rock Core, 1-1/8"
NQ - Rock Core, 1-7/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	P. OREE
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-29 SPT A **Boring Location:**			**Offset:**		**Alignment:**	
Elev.: -4.5 ft	**Latitude:** 32.84252	**Longitude:**	79.95056	**Date Started:**	10/17/08		
Total Depth: 120 ft	**Soil Depth:** ft	**Core Depth:**	ft	**Date Completed:**	10/17/2008		
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-45	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	70%
Core Size:		**Driller:**	MAD	**Groundwater:**	**TOB** Tidal	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION
	0.0	**CLAYEY SAND (SC)** very loose, greenish gray brown, fine
-9.5	5.0	**CLAYEY SILT (MH)** very soft, olive green, with trace sand
-14.5		
-19.5		- - - soft
-24.5	20.0	**COOPER MARL: SANDY SILT (ML)** soft, olive green
-29.5		
-34.5		- - - stiff
-39.5		
-44.5		
-49.5		- - - firm
-54.5		- - - stiff
-59.5		- - - firm
-64.5		- - - with trace shell
-69.5		- - - soft
-74.5		- - - firm; no shell
-79.5		- - - with trace shell
-84.5		
		- - - soft
-89.5		- - - stiff
-94.5		- - - firm
-99.5		- - - stiff

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
0.0	SS	WOR			0
2.5	SS	WOR			0
5.0	SS	WOR			0
7.5	SS	WOR			0
10.0	SS	WOH			0
15.0	SS	3	1	2	3
20.0	SS	2	1	2	3
25.0	SS	2	2	3	5
30.0	SS	3	5	5	10
35.0	SS	4	4	5	9
40.0	SS	3	3	5	8
45.0	SS	3	3	4	7
50.0	SS	3	4	6	10
55.0	SS	3	3	3	6
60.0	SS	2	3	3	6
65.0	SS	3	2	2	4
70.0	SS	4	3	4	7
75.0	SS	3	3	3	6
80.0	SS	3	2	3	5
85.0	SS	3	4	5	9
90.0	SS	2	3	4	7
95.0	SS	4	4	6	10
100.0					

● SPT N VALUE ● — PL, MC, LL — ▲ FINES CONTENT (%) — 0 10 20 30 40 50 60 70 80 90

123

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LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	P. OREE
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-29 SPT ALT 1	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	-4.5 ft	**Latitude:**	32.84252	**Longitude:**	79.95056	**Date Started:**	10/17/08
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	10/17/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-45	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	70%
Core Size:		**Driller:**	MAD	**Groundwater:**	**TOB** Tidal	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● / PL MC LL / ▲ FINES CONTENT (%)
		--- no shell			SS	4	4	6	10	●
-109.5				105.0	SS	5	4	5	9	● ×–○–× ▲
-114.5		--- very stiff		110.0	SS	6	9	10	19	●
-119.5		--- stiff		115.0	SS	4	5	7	12	●
-124.5	120.0									
-129.5		**BORING TERMINATED AT 120 FEET.**								
-134.5										
-139.5										
-144.5										
-149.5										
-154.5										
-159.5										
-164.5										
-169.5										
-174.5										
-179.5										
-184.5										
-189.5										
-194.5										
-199.5										

Chart scale: 0 10 20 30 40 50 60 70 80 90

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	M. EICHELBERGER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-31 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	3.0 ft	**Latitude:**	32.842866	**Longitude:**	79.949465	**Date Started:**	10/8/08
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	10/8/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-850	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	73%
Core Size:		**Driller:**	MAD	**Groundwater:**	**TOB** Tidal	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● / PL MC LL / ▲ FINES CONTENT (%)
	0.0	**SANDY CLAY (CL)** very soft, dark brown, fine; with roots	0.0	SS	WOR			0	
			2.5	SS	WOR			0	
-2.0	5.0	**SILT (MH)** very soft, dark gray; with trace roots and organic odor	5.0	SS	WOR			0	78
			7.5	SS	WOR			0	
-7.0			10.0	SS	WOR			0	147
-12.0			15.0	SS	WOR			0	
-17.0		--- no odor	20.0	SS	WOR			0	
-22.0			25.0	SS	WOR			0	
-27.0		--- with trace shell	30.0	SS	WOR			0	
-32.0	35.0	**COOPER MARL: SANDY SILT (MH)** firm, olive green; with clay	35.0	SS	3	3	4	7	
-37.0		--- stiff	40.0	SS	2	3	5	8	
-42.0		--- very stiff	45.0	SS	6	7	9	16	
-47.0			50.0	SS	5	6	9	15	
-52.0		--- firm	55.0	SS	2	3	5	8	
-57.0		--- stiff	60.0	SS	3	5	9	14	
-62.0		--- trace shell	65.0	SS	3	3	7	10	
-67.0			70.0	SS	2	5	7	12	
-72.0		--- firm	75.0	SS	2	2	4	6	
-77.0			80.0	SS	1	3	4	7	
-82.0		--- stiff	85.0	SS	2	4	7	11	
-87.0			90.0	SS	1	3	6	9	
-92.0			95.0	SS	3	5	8	13	
			100.0						

Scale: 0 10 20 30 40 50 60 70 80 90

Continued Next Page

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	M. EICHELBERGER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-31 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	3.0 ft	**Latitude:**	32.842866	**Longitude:**	79.949465	**Date Started:**	10/8/08
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	10/8/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-850	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	73%
Core Size:		**Driller:**	MAD	**Groundwater:**	**TOB** Tidal	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
				SS	2	4	8	12
-102.0		- - - very stiff	105.0	SS	WOH	3	14	17
-107.0			110.0	SS	3	6	11	17
-112.0			115.0	SS	3	6	10	16
-117.0	120.0		118.5	SS	7	6	11	17
-122.0		**BORING TERMINATED AT 120 FEET.**						
-127.0								
-132.0								
-137.0								
-142.0								
-147.0								
-152.0								
-157.0								
-162.0								
-167.0								
-172.0								
-177.0								
-182.0								
-187.0								
-192.0								

● SPT N VALUE ●

PL MC LL

▲ FINES CONTENT (%)

0 10 20 30 40 50 60 70 80 90

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	R. BOLLER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-33 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.: 4.0 ft	**Latitude:** 32.842972	**Longitude:**	79.949128	**Date Started:**	9/24/08		
Total Depth: 70 ft	**Soil Depth:** ft	**Core Depth:**	ft	**Date Completed:**	9/24/2008		
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-550	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	80%
Core Size:		**Driller:**	S&ME	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft) 0.0	MATERIAL DESCRIPTION
		SILTY SAND (SM) very loose, light brown to greenish brown, fine; with shells
-1.0	6.0	
	7.5	- - - greenish brown
-6.0		**SANDY SILT (ML)** soft, gray
-11.0		**SILT (MH)** very soft, dark gray; with clay and trace fine sand - - - no sand - - - dark grayish green; with sand and shells
-31.0	35.0	**SILTY SAND (SM)** loose, light greenish brown, fine; with shells
-36.0	40.0	**COOPER MARL: SANDY SILT (ML)** firm, olive green
-56.0	61.0	**COOPER MARL: SILTY SAND (SM)** loose, olive green; with clay
-66.0	70.0	**BORING TERMINATED AT 70 FEET.**

Elevation scale: -1.0, -6.0, -11.0, -16.0, -21.0, -26.0, -31.0, -36.0, -41.0, -46.0, -51.0, -56.0, -61.0, -66.0, -71.0, -76.0, -81.0, -86.0, -91.0

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
1.0	SS	3	2	2	4
3.5	SS	2	1	1	2
6.0	SS	1	1	1	2
8.5	SS	WOH			0
13.5	SS	WOH			0
18.5	SS	WOH			0
23.5	SS	WOH			0
28.5	SS	WOH			0
33.5	SS	WOH			0
38.5	SS	3	2	5	7
43.5	SS	2	4	3	7
48.5	SS	1	3	4	7
53.5	SS	2	3	3	6
58.5	SS	2	2	3	5
63.5	SS	3	4	4	8
68.5	SS	2	3	2	5

● SPT N VALUE ●
PL MC LL
▲ FINES CONTENT (%)
0 10 20 30 40 50 60 70 80 90
163

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	P. BAUMSTARK
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-33 SPT A	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	4.0 ft	**Latitude:**	32.842972	**Longitude:**	79.949128	**Date Started:**	9/24/08
Total Depth:	52 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	9/24/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-550	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	80%
Core Size:		**Driller:**	S&ME	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● / PL – MC – LL / ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
	0.0	**WASH ROTARY TO 20 FEET**								
-1.0										
-6.0										
-11.0										
-16.0	20.0			20.0						
	22.0	**3" X 30" FIXED PISTON SAMPLE PUSHED 24" WITH 24" RECOVERY**			ST					162
-21.0		**WASH ROTARY TO 30 FEET**								
-26.0	30.0			30.0						
	32.0	**3" X 30" FIXED PISTON SAMPLE PUSHED 24" WITH 24" RECOVERY**			ST					149
-31.0		**WASH ROTARY TO 50 FEET**								
-36.0										
-41.0										
-46.0	50.0			50.0						
	52.0	**3" X 30" FIXED PISTON SAMPLE PUSHED 24" WITH 19" RECOVERY**			ST					118
-51.0		**BORING TERMINATED AT 52 FEET.**								
-56.0										
-61.0										
-66.0										
-71.0										
-76.0										
-81.0										
-86.0										
-91.0										

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	M. EICHELBERGER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-34 SCPT A	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	4.5 ft	**Latitude:**	32.84343	**Longitude:**	79.94806	**Date Started:**	3/5/2009
Total Depth:	44 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	3/5/2009
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-850	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	74%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** 0 ft	**24HR**	0 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● / PL MC LL / ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
	0.0	**WASH ROTARY TO 8 FEET**								
-0.5										
	8.0			8.0						
-5.5	10.0	**3" X 30" FIXED PISTON SAMPLE PUSHED WITH 13" RECOVERY**			ST					
-10.5		**WASH ROTARY TO 26 FEET**								
-15.5										
-20.5	26.0			26.0						
	28.0	**3" X 30" FIXED PISTON SAMPLE PUSHED WITH 17" RECOVERY**			ST					
-25.5		**WASH ROTARY TO 42 FEET**								
-30.5										
-35.5	42.0			42.0						
	44.0	**3" X 30" FIXED PISTON SAMPLE PUSHED WITH 17" RECOVERY**			ST					
-40.5		**BORING TERMINATED AT 44 FEET.**								
-45.5										
-50.5										
-55.5										
-60.5										
-65.5										
-70.5										
-75.5										
-80.5										
-85.5										
-90.5										

LEGEND

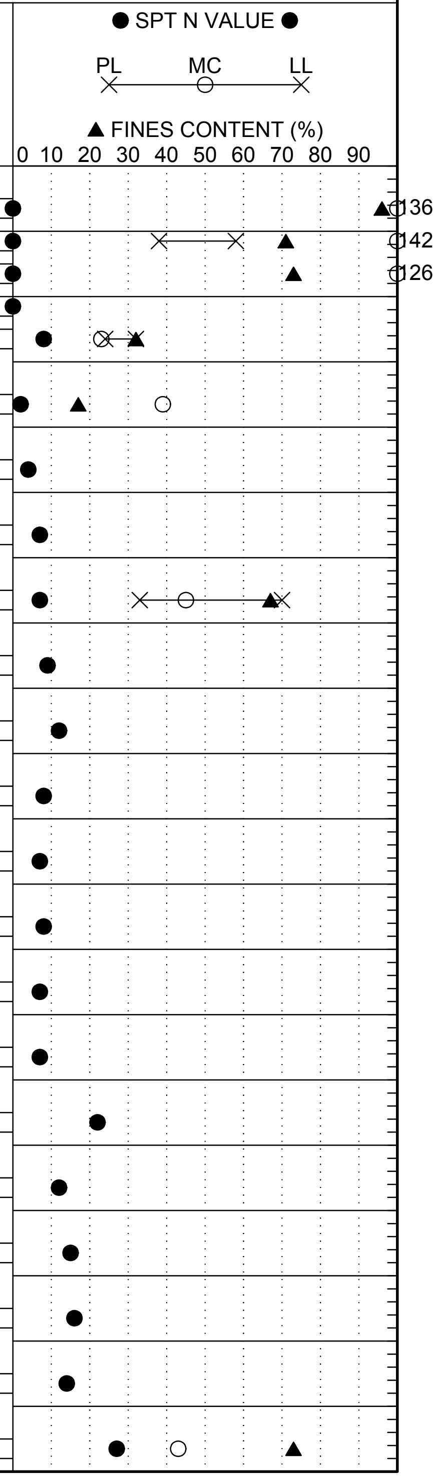
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT **Soil Test Boring Log**

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	P. OREE
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-37 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	-4.5 ft	**Latitude:**	32.84232	**Longitude:**	79.95021	**Date Started:**	10/13/08
Total Depth:	121.5 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	10/14/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-45	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	70%
Core Size:		**Driller:**	MAD	**Groundwater:**	**TOB** Tidal	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION
-4.5	0.0	**SANDY SILT (MH)** very soft, gray and black
-12.0	7.5	**SILTY SAND (SM)** very loose, gray and olive green, fine
		- - - loose
		- - -very loose, brown and gray
		- - - olive green
		- - - loose; with shells
-34.5	30.0	**COOPER MARL: SANDY SILT (ML)** firm, olive green; with fine sand
		- - - stiff
		- - - firm
		- - - stiff
		- - - firm
		- - - very stiff
		- - - stiff
		- - - very stiff
		- - - stiff

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
2.5	SS		WOR		0
5.0	SS		WOR		0
7.5	SS		WOR		0
10.0	SS		WOR		0
12.5	SS	2	3	5	8
17.5	SS	1	1	1	2
22.5	SS	1	2	2	4
27.5	SS	3	3	4	7
32.5	SS	3	3	4	7
37.5	SS	3	3	6	9
42.5	SS	4	5	7	12
47.5	SS	5	3	5	8
52.5	SS	3	3	4	7
57.5	SS	4	4	4	8
62.5	SS	3	3	4	7
67.5	SS	3	3	4	7
72.5	SS	12	15	7	22
77.5	SS	4	6	6	12
82.5	SS	6	7	8	15
87.5	SS		8	8	16
92.5	SS	5	6	8	14
97.5	SS	18	12	15	27



LEGEND

Continued Next Page

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	P. OREE
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-37 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	-4.5 ft	**Latitude:**	32.84232	**Longitude:**	79.95021	**Date Started:**	10/13/08
Total Depth:	121.5 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	10/14/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-45	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	70%
Core Size:		**Driller:**	MAD	**Groundwater:**	**TOB** Tidal	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
		- - - very stiff		102.5	SS	9	9	16	25
-109.5				107.5	SS	7	10	13	23
-114.5				112.5	SS	7	8	9	17
-119.5		- - - hard		117.5	SS	12	12	21	33
-124.5	121.5	- - - stiff		120.0	SS	6	6	7	13
-129.5		**BORING TERMINATED AT 121.5 FEET.**							
-134.5									
-139.5									
-144.5									
-149.5									
-154.5									
-159.5									
-164.5									
-169.5									
-174.5									
-179.5									
-184.5									
-189.5									
-194.5									
-199.5									

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

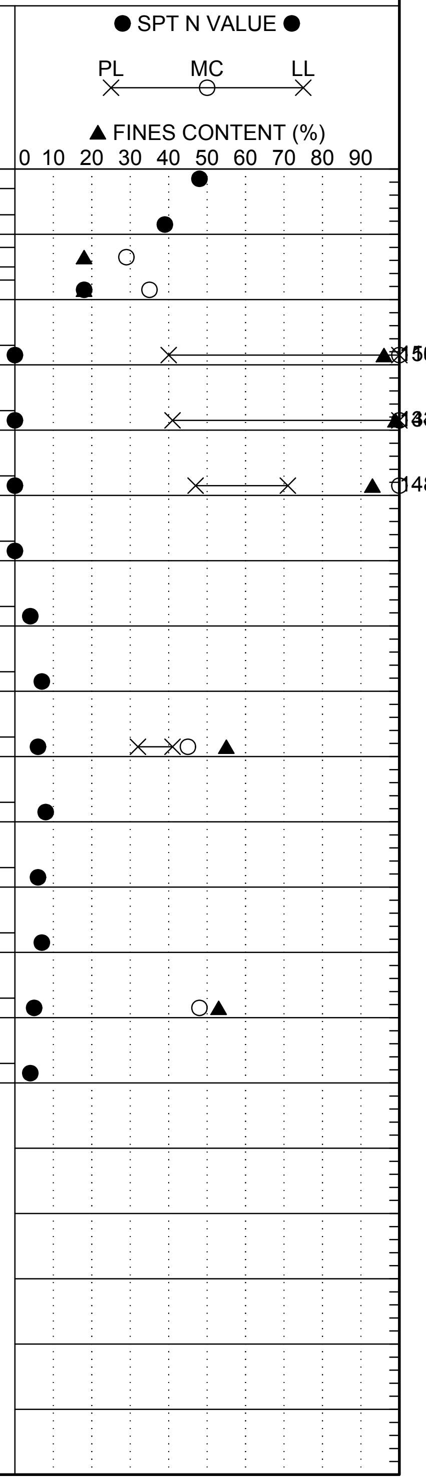
SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	P. BAUMSTARK
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-39 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	2.5 ft	**Latitude:**	32.842202	**Longitude:**	79.948771	**Date Started:**	9/25/08
Total Depth:	70 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	9/25/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-550	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	80%
Core Size:		**Driller:**	S&ME	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Depth (ft)	MATERIAL DESCRIPTION
0.0	**FILL: SLIGHTLY SILTY SAND (SP-SM)** very dense, gray to dark gray, fine; with some shell & rock
7.5	- - - dense, dark gray to black; with some shell, crushed stone, and debris - - - very dense; with some clay, shell, and crushed stone
10.0	**CLAYEY SAND (SC) (FILL)** medium dense, grayish brown; with some silt, crushed stone, and wood **SILTY CLAY (CH)** very soft, dark gray; with some wood - - - dark gray to brown; with trace wood and shell
34.5	- - - with trace wood and organics - - - with trace shell **COOPER MARL: SANDY SILT (ML)** firm, olive green - - - stiff - - - firm
70.0	- - - soft

BORING TERMINATED AT 70 FEET.

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
0.0	SS	15	22	26	48
3.5	SS	29	7	32	39
6.0	SS	50/4			
8.5	SS	23	10	8	18
13.5	SS		WOH		0
18.5	SS		WOH		0
23.5	SS		WOH		0
28.5	SS		WOH		0
33.5	SS	1	2	2	4
38.5	SS	3	3	4	7
43.5	SS	3	3	3	6
48.5	SS	3	3	5	8
53.5	SS	3	3	3	6
58.5	SS	2	3	4	7
63.5	SS	2	3	2	5
68.5	SS	2	2	2	4



LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 08554.GPJ SC_DOT.GDT 4/3/09

Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	P. BAUMSTARK
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-39 SPT A	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	2.5 ft	**Latitude:**	32.842202	**Longitude:**	79.948771	**Date Started:**	9/25/08
Total Depth:	30 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	9/25/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-550	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	80%
Core Size:		**Driller:**	S&ME	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● / PL MC LL / ▲ FINES CONTENT (%)
	0.0	**WASH ROTARY TO 15 FEET**								
-12.5	15.0			15.0						
	17.0	**3" X 30" FIXED PISTON SAMPLE PUSHED 24" WITH 24" RECOVERY**			ST					149
		WASH ROTARY TO 28 FEET								
	28.0			28.0						
-27.5	30.0	**3" X 30" FIXED PISTON SAMPLE PUSHED 24" WITH 24" RECOVERY**			ST					149
		BORING TERMINATED AT 30 FEET.								

Elevation scale: -2.5, -7.5, -12.5, -17.5, -22.5, -27.5, -32.5, -37.5, -42.5, -47.5, -52.5, -57.5, -62.5, -67.5, -72.5, -77.5, -82.5, -87.5, -92.5

Fines content scale: 0 10 20 30 40 50 60 70 80 90

LEGEND

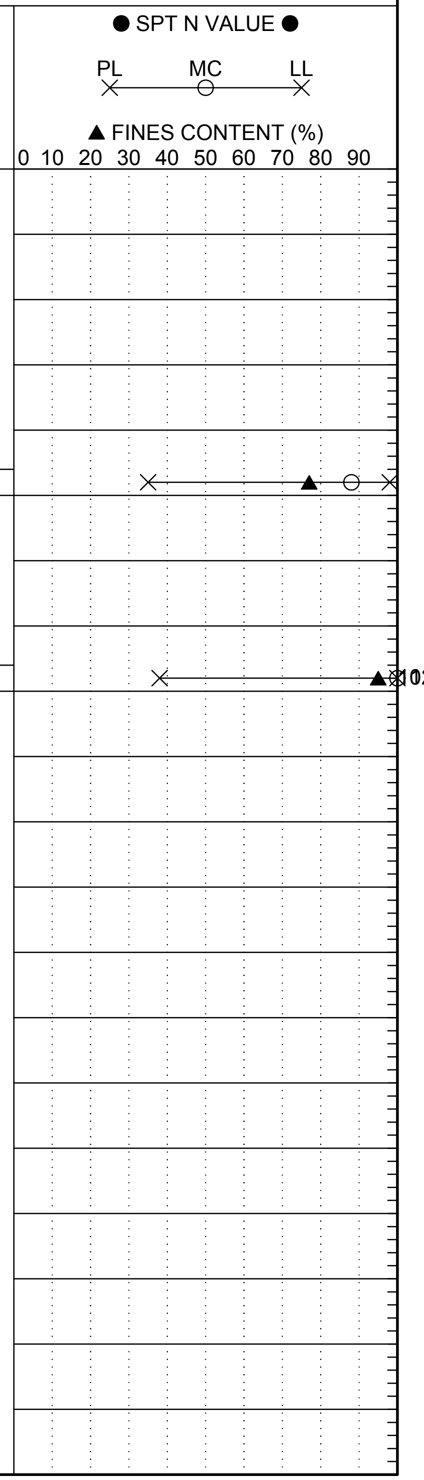
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	M. Eichelberger
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-40 SPT A	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	2.5 ft	**Latitude:**	32.84198	**Longitude:**	79.947978	**Date Started:**	10/2/08
Total Depth:	40 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	10/2/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-550	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	80%
Core Size:		**Driller:**	S&ME	**Groundwater:**	**TOB** 2 ft	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	**WASH ROTARY TO 13.5 FEET**							
-12.5	13.5 – 15.0	**VANE INSERTED TO A DEPTH OF 15 FEET**							
-17.5		**WASH ROTARY TO 23 FEET**							
-22.5	23.0 – 25.0	**3" X 30" FIXED PISTON SAMPLE PUSHED 24" WITH 24" RECOVERY**		23.0	ST				
-27.5		**WASH ROTARY TO 31.5 FEET**							
-32.5	31.5 – 33.0	**VANE INSERTED TO A DEPTH OF 33 FEET**							
		WASH ROTARY TO 38 FEET							
-37.5	38.0 – 40.0	**3" X 30" FIXED PISTON SAMPLE PUSHED 24" WITH 24" RECOVERY**		38.0	ST				
		BORING TERMINATED AT 40 FEET.							

Elevation scale: -2.5, -7.5, -12.5, -17.5, -22.5, -27.5, -32.5, -37.5, -42.5, -47.5, -52.5, -57.5, -62.5, -67.5, -72.5, -77.5, -82.5, -87.5, -92.5



LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 08554.GPJ SC_DOT.GDT 4/3/09

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	P. OREE
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-42 SPT A	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	-4.5 ft	**Latitude:**	32.843023	**Longitude:**	79.952317	**Date Started:**	10/15/08
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	10/16/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-45	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	70%
Core Size:		**Driller:**	MAD	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Depth (ft)	MATERIAL DESCRIPTION
0.0	**CLAYEY SAND (SC)** very loose, dark grayish brown, fine; with trace roots
5.0	**SILTY CLAY (CH)** very soft, olive green; with trace roots and sand
10.0	**CLAYEY SAND (SC)** very loose, dark grayish brown, fine
	SILTY CLAY (CH) very soft, olive green; with trace sand
	CLAYEY SAND (SC) very loose, light gray, fine; with trace crushed stone - - - no crushed stone, olive green - - - loose
30.0	**COOPER MARL: SILTY SAND (SM)** medium dense, dark olive green, fine
60.0	**COOPER MARL: SANDY SILT (ML)** soft, dark olive green, fine

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
0.0	SS	WOH			0
2.5	SS	WOR			0
5.0	SS	WOH			0
7.5	SS	WOH			0
10.0	SS	2	2	2	4
15.0	SS	5	3	1	4
20.0	SS	2	1	2	3
25.0	SS	2	3	3	6
30.0	SS	2	5	6	11
35.0	SS	4	7	8	15
40.0	SS	3	5	7	12
45.0	SS	3	4	5	9
50.0	SS	3	5	9	14
55.0	SS	4	4	5	9
60.0	SS	3	2	4	6

Elevation (ft): -9.5, -14.5, -19.5, -24.5, -29.5, -34.5, -39.5, -44.5, -49.5, -54.5, -59.5, -64.5

● SPT N VALUE ● — PL, MC, LL — ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90

LEGEND

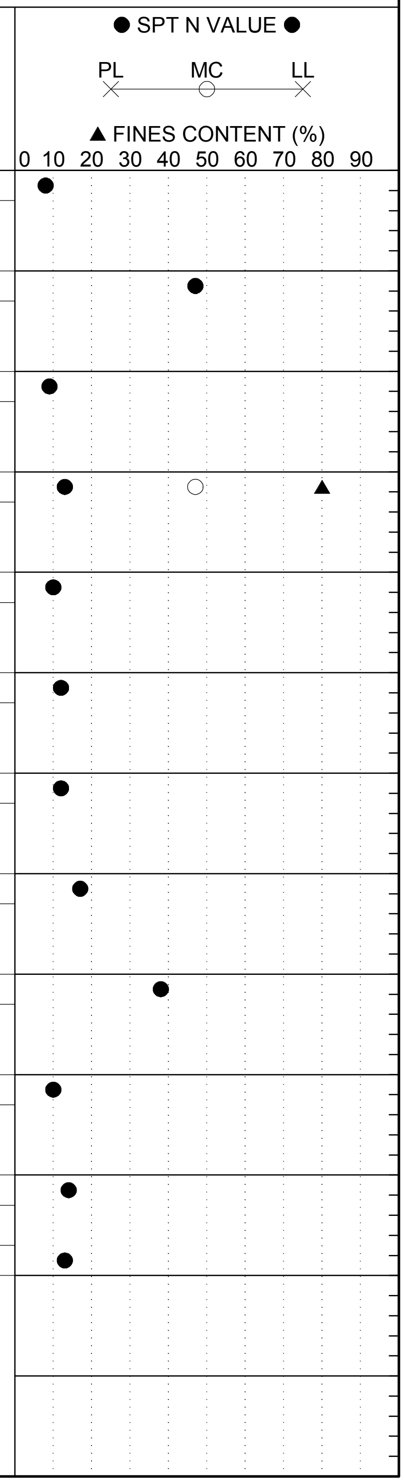
Continued Next Page

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	P. OREE
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-42 SPT A	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	-4.5 ft	**Latitude:**	32.843023	**Longitude:**	79.952317	**Date Started:**	10/15/08
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	10/16/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-45	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	70%
Core Size:		**Driller:**	MAD	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
					SS	3	4	4	8
-74.5		- - - hard; no shell		70.0	SS	12	20	27	47
-79.5		- - - stiff		75.0	SS	4	4	5	9
-84.5				80.0	SS	4	6	7	13
-89.5				85.0	SS	4	4	6	10
-94.5				90.0	SS	4	5	7	12
-99.5				95.0	SS	4	5	7	12
-104.5		- - - very stiff		100.0	SS	3	7	10	17
-109.5		- - - hard		105.0	SS	8	16	22	38
-114.5		- - - stiff		110.0	SS	3	4	6	10
-119.5				115.0	SS	4	5	9	14
				118.5	SS	4	5	8	13
-124.5	120.0								
-129.5		**BORING TERMINATED AT 120 FEET.**							



LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

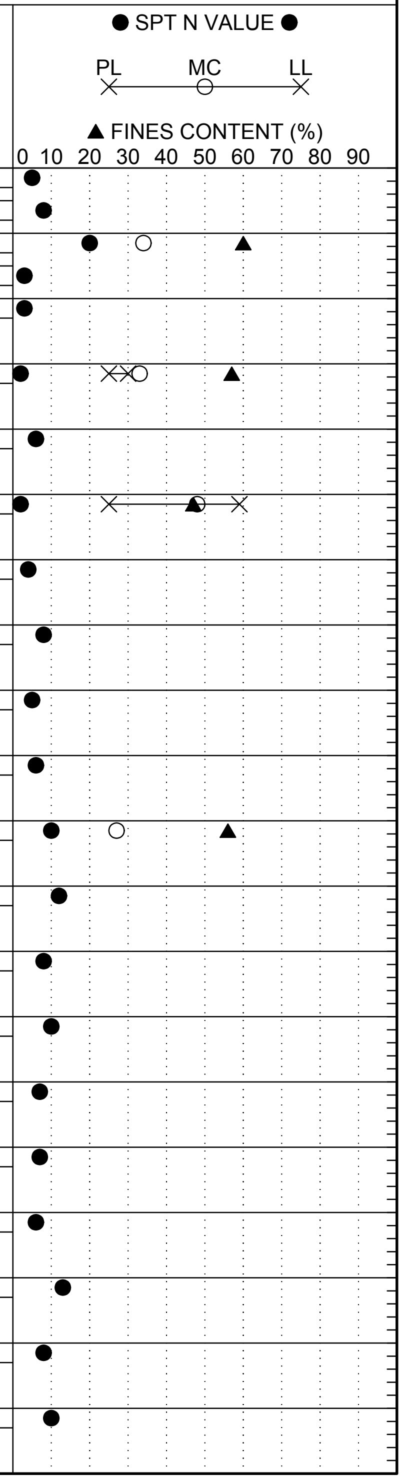
SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	R. BOLLER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-43 SPT AB1	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	9.0 ft	**Latitude:**	32.843996	**Longitude:**	79.953725	**Date Started:**	10/3/08
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	10/3/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-850	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	73%
Core Size:		**Driller:**	S&ME	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Depth (ft)	MATERIAL DESCRIPTION
0.0	**FILL: SAND (SP)** loose, light brown and black; with fine roots
2.5	**SANDY CLAY (CL)** stiff, light reddish brown to gray mottled; - - - very stiff, light reddish brown; - - - soft
15.0	**SLIGHTLY CLAYEY SAND (SP-SC)** very loose, light brown, fine
20.0	**SANDY SILT (ML)** soft, light gray; with trace clay
25.0	**CLAYEY SAND (SC)** loose, gray, fine
	COOPER MARL: SANDY SILT (ML) soft, dark olive green; - - - stiff; - - - firm; - - - stiff; - - -firm; - - - stiff

Elevation (ft) scale: 4.0, -1.0, -6.0, -11.0, -16.0, -21.0, -26.0, -31.0, -36.0, -41.0, -46.0, -51.0, -56.0, -61.0, -66.0, -71.0, -76.0, -81.0, -86.0

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
0.0	SS	3	2	3	5
2.5	SS	3	3	5	8
5.0	SS	5	10	10	20
7.5	SS	3	2	1	3
10.0	SS	WOH	1	2	3
15.0	SS	1	1	1	2
20.0	SS	1	3	3	6
25.0	SS	WOH	WOH	2	2
30.0	SS	1	2	2	4
35.0	SS	2	3	5	8
40.0	SS	1	2	3	5
45.0	SS	1	2	4	6
50.0	SS	4	4	6	10
55.0	SS	4	4	8	12
60.0	SS	2	3	5	8
65.0	SS	6	6	4	10
70.0	SS	3	2	5	7
75.0	SS	2	2	5	7
80.0	SS	1	2	4	6
85.0	SS	7	6	7	13
90.0	SS	1	1	7	8
95.0	SS	1	3	7	10
100.0					



LEGEND

Continued Next Page

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	R. BOLLER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-43 SPT ALT 1	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	9.0 ft	**Latitude:**	32.843996	**Longitude:**	79.953725	**Date Started:**	10/3/08
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	10/3/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-850	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	73%
Core Size:		**Driller:**	S&ME	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
				SS	2	3	9	12
-96.0			105.0	SS	3	6	8	14
-101.0			110.0	SS	1	2	9	12
-106.0			115.0	SS	4	6	11	17
			118.5	SS	2	4	10	14
-111.0	120.0							
-116.0		**BORING TERMINATED AT 120 FEET.**						
-121.0								
-126.0								
-131.0								
-136.0								
-141.0								
-146.0								
-151.0								
-156.0								
-161.0								
-166.0								
-171.0								
-176.0								
-181.0								
-186.0								

● SPT N VALUE ●
PL MC LL
▲ FINES CONTENT (%)
0 10 20 30 40 50 60 70 80 90

LEGEND

SAMPLER TYPE
SS - Split Spoon
ST - Shelby Tube
AWG - Rock Core, 1-1/8"
NQ - Rock Core, 1-7/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD
HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	M. EICHELBERGER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-43 SPT ALT 1A	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	9.0 ft	**Latitude:**	32.843996	**Longitude:**	79.953725	**Date Started:**	3/12/2009
Total Depth:	42 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	3/12/2009
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-850	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	74%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● PL MC LL ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
	0.0	**WASH ROTARY TO 26 FEET**								
4.0										
-1.0										
-6.0										
-11.0										
-16.0	26.0			26.0	ST					
	28.0	**3" X 30" FIXED PISTON SAMPLE PUSHED WITH 24" RECOVERY**								
-21.0		**WASH ROTARY TO 40 FEET**								
-26.0										
-31.0	40.0			40.0	ST					
	42.0	**3" X 30" FIXED PISTON SAMPLE PUSHED WITH 24" RECOVERY**								
-36.0										
-41.0										
-46.0										
-51.0										
-56.0										
-61.0										
-66.0										
-71.0										
-76.0										
-81.0										
-86.0										

LEGEND

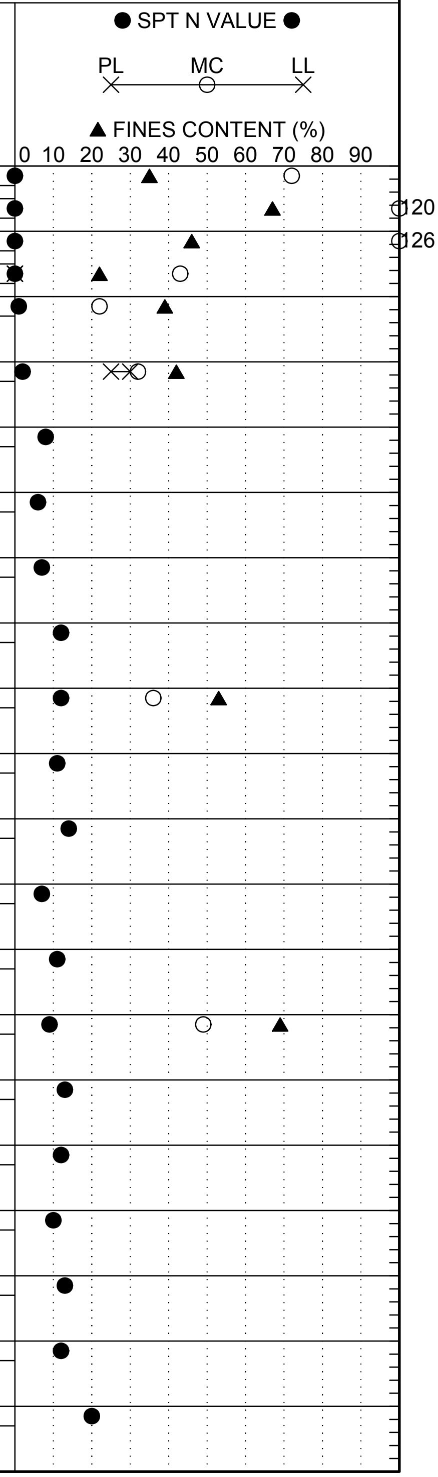
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	P. OREE
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-43 SPT A	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	-4.5 ft	**Latitude:**	32.84342	**Longitude:**	79.95278	**Date Started:**	10/16/08
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	10/16/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-45	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	70%
Core Size:		**Driller:**	MAD	**Groundwater:**	**TOB** Tidal	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION
	0.0	
	2.5	**CLAYEY SAND (SC)**
-9.5	5.0	very loose, black and dark gray, fine
		CLAY (CL)
-14.5		very soft, gray
		SILTY SAND (SM)
-19.5		very loose, dark gray and brown, fine
-24.5	20.0	- - - gray
		- - - brown and light gray
-29.5		**COOPER MARL: SANDY SILT (ML)**
		stiff, olive green
-34.5		- - - firm
-39.5		- - - stiff
-44.5		
-49.5		
-54.5		
-59.5		- - - firm
-64.5		- - - stiff
-69.5		
-74.5		
-79.5		
-84.5		
-89.5		
-94.5		
-99.5		- - - very stiff

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
0.0	SS	WOH			0
2.5	SS	WOH			0
5.0	SS	WOH			0
7.5	SS	WOH			0
10.0	SS	WOH	WOH	1	1
15.0	SS	1	1	1	2
20.0	SS	2	4	4	8
25.0	SS	3	2	4	6
30.0	SS	2	3	4	7
35.0	SS	4	5	7	12
40.0	SS	4	5	7	12
45.0	SS	3	4	7	11
50.0	SS	4	7	7	14
55.0	SS	4	3	4	7
60.0	SS	3	5	6	11
65.0	SS	3	3	6	9
70.0	SS	4	6	7	13
75.0	SS	3	5	7	12
80.0	SS	4	4	6	10
85.0	SS	4	5	8	13
90.0	SS	5	5	7	12
95.0	SS	4	5	15	20
100.0					



LEGEND

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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	P. OREE
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-43 SPT ALT 2	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	-4.5 ft	**Latitude:**	32.84342	**Longitude:**	79.95278	**Date Started:**	10/16/08
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	10/16/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-45	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	70%
Core Size:		**Driller:**	MAD	**Groundwater:**	**TOB** Tidal	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
		- - - stiff			SS	5	5	6	11
-109.5				105.0	SS	5	6	8	14
-114.5				110.0	SS	5	7	8	15
-119.5				115.0	SS	5	7	7	14
-124.5	120.0	- - - very stiff		118.5	SS	5	6	10	16
-129.5		**BORING TERMINATED AT 120 FEET.**							
-134.5									
-139.5									
-144.5									
-149.5									
-154.5									
-159.5									
-164.5									
-169.5									
-174.5									
-179.5									
-184.5									
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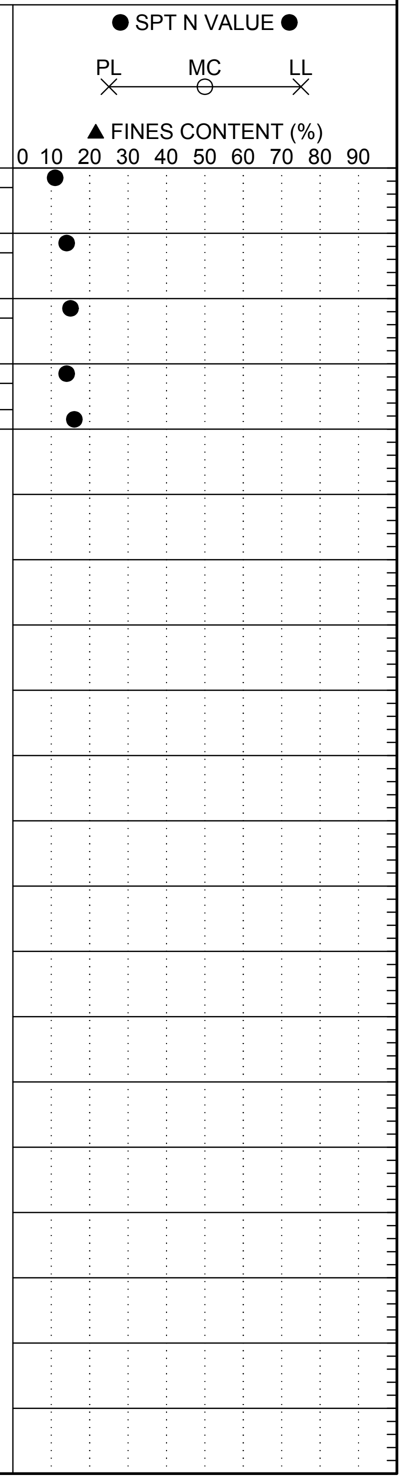
-194.5									
-199.5									



LEGEND

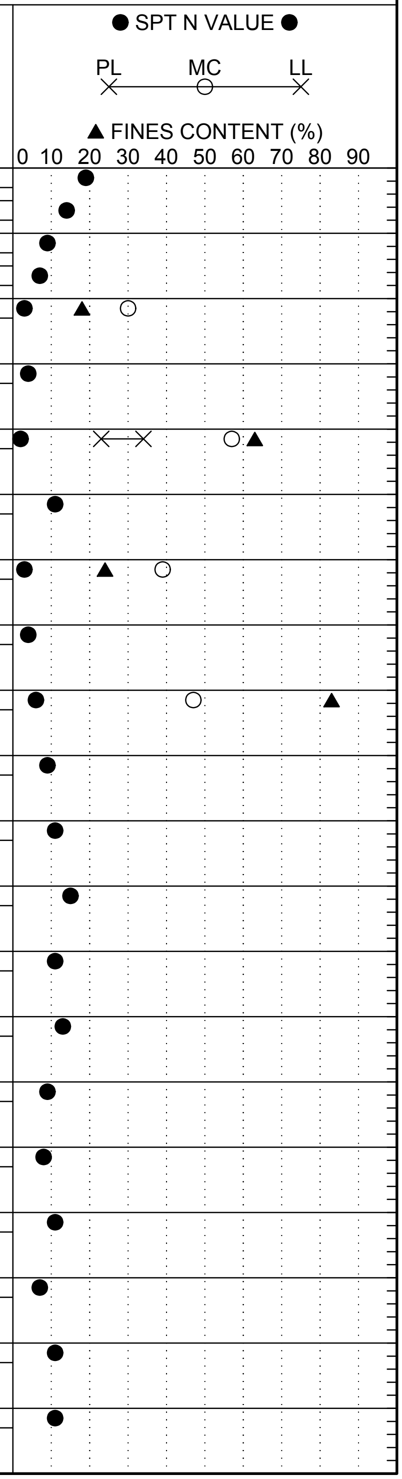
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	P. OREE
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-46 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	11.0 ft	**Latitude:**	32.845572	**Longitude:**	79.953855	**Date Started:**	10/6/08
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	10/6/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-850	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	73%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** N/A	**24HR**	7 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION
6.0	0.0	**CLAYEY SAND (SC)** medium dense, brown and gray, fine to medium sand; with trace roots
1.0	5.0	--- brown; no roots
-4.0		**CLAYEY SAND (SC)** loose, brown and gray, fine to medium sand; with trace roots
-9.0	20.0	--- very loose, tan and gray, fine --- trace shell
-14.0	25.0	**CLAY (CL)** very soft, gray; with fine sand and trace shell
-19.0	30.0	**SANDY CLAY (CL)** stiff, gray and olive green; with trace cemented fine sand
-24.0	35.0	**SILTY SAND (SM)** very loose, olive green, fine; with trace clay
-29.0		**COOPER MARL: CLAYEY SILT (ML)** soft, olive green; with some fine sand
-34.0		--- firm; with trace shell
-39.0		--- stiff
-44.0		
-49.0		
-54.0		
-59.0		
-64.0		
-69.0		
-74.0		--- firm
-79.0		
-84.0		

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
0.0	SS	4	7	12	19
2.5	SS	4	6	8	14
5.0	SS	3	3	6	9
7.5	SS	3	4	3	7
10.0	SS	3	2	1	3
15.0	SS	1	2	2	4
20.0	SS	1	1	1	2
25.0	SS	3	5	6	11
30.0	SS	1	1	2	3
35.0	SS	1	1	3	4
40.0	SS	2	2	4	6
45.0	SS	3	3	6	9
50.0	SS	3	3	8	11
55.0	SS	5	6	9	15
60.0	SS	4	4	7	11
65.0	SS	5	6	7	13
70.0	SS	4	5	4	9
75.0	SS	1	3	5	8
80.0	SS	2	4	7	11
85.0	SS	1	3	4	7
90.0	SS	WOH	4	7	11
95.0	SS	WOH	3	8	11
100.0					



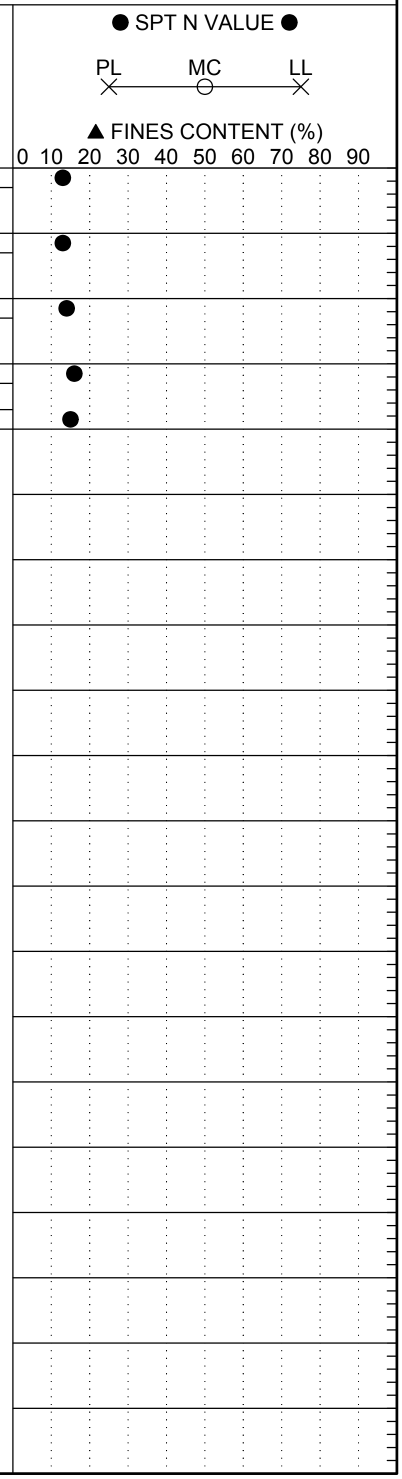
LEGEND *Continued Next Page*

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.: 10.224B	**Project No. (PIN):** 1131-08-554	**County:** CHARLESTON			**Eng./Geo.:** P. OREE		
Site Description: PORT ACCESS ROAD					**Route:**		
Boring No.: B-46 SPT	**Boring Location:**	**Offset:**			**Alignment:**		
Elev.: 11.0 ft	**Latitude:** 32.845572	**Longitude:** 79.953855			**Date Started:** 10/6/08		
Total Depth: 120 ft	**Soil Depth:** ft	**Core Depth:** ft			**Date Completed:** 10/6/2008		
Bore Hole Diameter (in): 4	**Sampler Configuration**	**Liner Required:** Y (N)			**Liner Used:** Y (N)		
Drill Machine: CME-850	**Drill Method:** MUD ROTARY	**Hammer Type:** Automatic			**Energy Ratio:** 73%		
Core Size:	**Driller:** SCI	**Groundwater:**	**TOB** N/A		**24HR** 7 ft		

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
				SS	2	4	9	13
-94.0			105.0	SS	4	5	8	13
-99.0			110.0	SS	2	5	9	14
-104.0		- - - very stiff	115.0	SS	4	6	10	16
-109.0	120.0	- - - stiff	118.5	SS	5	6	9	15
-114.0		**BORING TERMINATED AT 120 FEET.**						
-119.0								
-124.0								
-129.0								
-134.0								
-139.0								
-144.0								
-149.0								
-154.0								
-159.0								
-164.0								
-169.0								
-174.0								
-179.0								
-184.0								



LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	M. EICHELBERGER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-46 SPT A	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	11.0 ft	**Latitude:**	32.845572	**Longitude:**	79.953855	**Date Started:**	3/5/2008
Total Depth:	26 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	3/5/2009
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-850	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	74%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** N/A	**24HR**	7 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	SPT N VALUE / PL MC LL / FINES CONTENT (%)
	0.0	**WASH ROTARY TO 20 FEET**								
6.0										
1.0										
-4.0										
-9.0	20.0			20.0						
	22.0	**3" X 30" FIXED PISTON SAMPLE PUSHED WITH 23" RECOVERY**			ST					101
	24.0	**WASH ROTARY TO 24 FEET**		24.0						
-14.0	26.0	**3" X 30" FIXED PISTON SAMPLE PUSHED WITH 24" RECOVERY**			ST					
		BORING TERMINATED AT 26 FEET.								
-19.0										
-24.0										
-29.0										
-34.0										
-39.0										
-44.0										
-49.0										
-54.0										
-59.0										
-64.0										
-69.0										
-74.0										
-79.0										
-84.0										

Fines content scale: 0 10 20 30 40 50 60 70 80 90

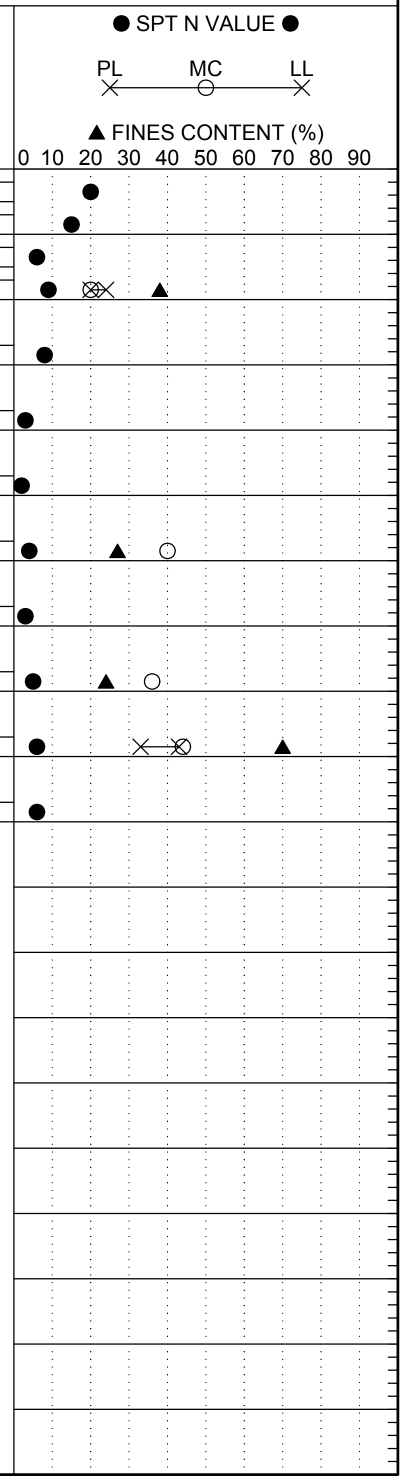
LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	P. BAUMSTARK
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-47 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	11.5 ft	**Latitude:**	32.847721	**Longitude:**	79.954719	**Date Started:**	9/29/08
Total Depth:	50 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	9/29/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-550	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	80%
Core Size:		**Driller:**	S&ME	**Groundwater:**	**TOB** N/A	**24HR**	4.5 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	**FILL: SLIGHTLY SILTY SAND (SP-SM)** medium dense, gray brown, fine; with shell and crushed stone	1.0	SS	12	8	12	20
6.5	5.0		3.5	SS	10	6	9	15
	6.5	**SAND (SP)** loose, gray brown, fine	6.0	SS	2	2	4	6
1.5			8.5	SS	4	4	5	9
-3.5		**CLAYEY SAND (SC)** loose, gray brown, fine; with gray clean sand lenses	13.5	SS	3	3	5	8
-8.5	20.0		18.5	SS	2	1	2	3
-13.5	25.0	- - - very loose; brown clean sand lense	23.5	SS	2	1	1	2
-18.5		**SILTY CLAY (CL)** very soft, greenish gray	28.5	SS	WOH	2	2	4
-23.5		**CLAYEY SAND (SC)** very loose, greenish gray, fine; with trace silt and shell	33.5	SS	2	1	2	3
-28.5	40.0		38.5	SS	2	2	3	5
-33.5		**COOPER MARL: SANDY SILT (ML)** olive green, firm	43.5	SS	2	2	4	6
-38.5	50.0		48.5	SS	3	3	3	6
-43.5		**BORING TERMINATED AT 50 FEET.**						
-48.5								
-53.5								
-58.5								
-63.5								
-68.5								
-73.5								
-78.5								
-83.5								



LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT 08554.GPJ SC_DOT.GDT 4/8/09

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	P. BAUMSTARK
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-47 SPT A	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	11.5 ft	**Latitude:**	32.847721	**Longitude:**	79.954719	**Date Started:**	10/2/08
Total Depth:	25.5 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	10/2/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-550	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	80%
Core Size:		**Driller:**	S&ME	**Groundwater:**	**TOB** N/A	**24HR**	4.5 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	SPT N VALUE / PL MC LL / FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
	0.0	**WASH ROTARY TO 23.5 FEET**								
6.5										
1.5										
-3.5										
-8.5										
	23.5			23.5						
-13.5	25.5	**3" X 30" FIXED PISTON SAMPLE PUSHED 24" WITH 21" RECOVERY**			ST					
		BORING TERMINATED AT 25.5 FEET.								
-18.5										
-23.5										
-28.5										
-33.5										
-38.5										
-43.5										
-48.5										
-53.5										
-58.5										
-63.5										
-68.5										
-73.5										
-78.5										
-83.5										

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	P. BAUMSTARK
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-50 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	9.5 ft	**Latitude:**	32.843816	**Longitude:**	79.96158	**Date Started:**	10/1/08
Total Depth:	50 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	10/1/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-550	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	80%
Core Size:		**Driller:**	S&ME	**Groundwater:**	**TOB** N/A	**24HR**	3 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION
9.5	0.0	
	0.3	**ORGANIC LADEN TOPSOIL= 4 INCHES**
		SLIGHTLY CLAYEY SAND (SP-SC) very loose, brown, fine
		- - - loose, gray brown
-0.5	10.0	- - - very loose; trace silt and shell
		- - - gray; with trace silt and shell
		CLAYEY SAND (SC) very loose, gray, fine; with trace silt and some shell
-10.5	20.0	
-15.5	25.0	**SLIGHTLY CLAYEY SAND (SP-SC)** very loose, gray, fine; with trace shell
		CLAYEY SAND (SC) very loose, greenish brown, fine
		- - - trace shell and phosphate
-30.5	40.0	**COOPER MARL: CLAYEY SILT (ML)** soft, olive green; with trace sand
-40.5	50.0	**BORING TERMINATED AT 50 FEET.**

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
1.0	SS	2	2	2	4
3.5	SS	5	3	2	5
6.0	SS	2	1	1	2
8.5	SS	WOH			0
13.5	SS	WOH	WOH	1	1
18.5	SS	2	2	3	5
23.5	SS	2	2	1	3
28.5	SS	1	1	1	2
33.5	SS	1	2	1	3
38.5	SS	2	1	2	3
43.5	SS	2	2	3	5
48.5	SS	2	2	2	4

● SPT N VALUE ●
PL MC LL
▲ FINES CONTENT (%)
0 10 20 30 40 50 60 70 80 90

Elevation scale: 4.5, -0.5, -5.5, -10.5, -15.5, -20.5, -25.5, -30.5, -35.5, -40.5, -45.5, -50.5, -55.5, -60.5, -65.5, -70.5, -75.5, -80.5, -85.5

Depth scale: 0.0, 0.3, 10.0, 20.0, 25.0, 40.0, 50.0

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	M. EICHELBERGER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-51 SPT ALT 2	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	7.0 ft	**Latitude:**	32.845129	**Longitude:**	79.957383	**Date Started:**	10/9/08
Total Depth:	50 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	10/9/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-550	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	80%
Core Size:		**Driller:**	S&ME	**Groundwater:**	**TOB** N/A	**24HR**	4.5 ft

MATERIAL DESCRIPTION

Depth (ft) of strata boundaries: 0.0, 0.3, 1.0, 4.5, 7.5, 9.5, 13.5, 20.0, 38.5, 50.0

Elevation (ft) scale: 2.0, -3.0, -8.0, -13.0, -18.0, -23.0, -28.0, -33.0, -38.0, -43.0, -48.0, -53.0, -58.0, -63.0, -68.0, -73.0, -78.0, -83.0, -88.0

ASPHALT= 4 INCHES

FILL: SILTY SAND (SM)
dark gray, fine; cement stabilized silty sand

FILL: SLIGHTLY SILTY SAND (SP-SM)
medium dense, light brown, fine; with trace shell

FILL: SILTY SAND (SM)
very loose, gray; with shell hash

SILT (MH)
very soft, black; organic stained

SILTY SAND (SM)
very loose, dark gray, medium

ORGANIC CLAY (CH)
very soft, dark gray; with wood

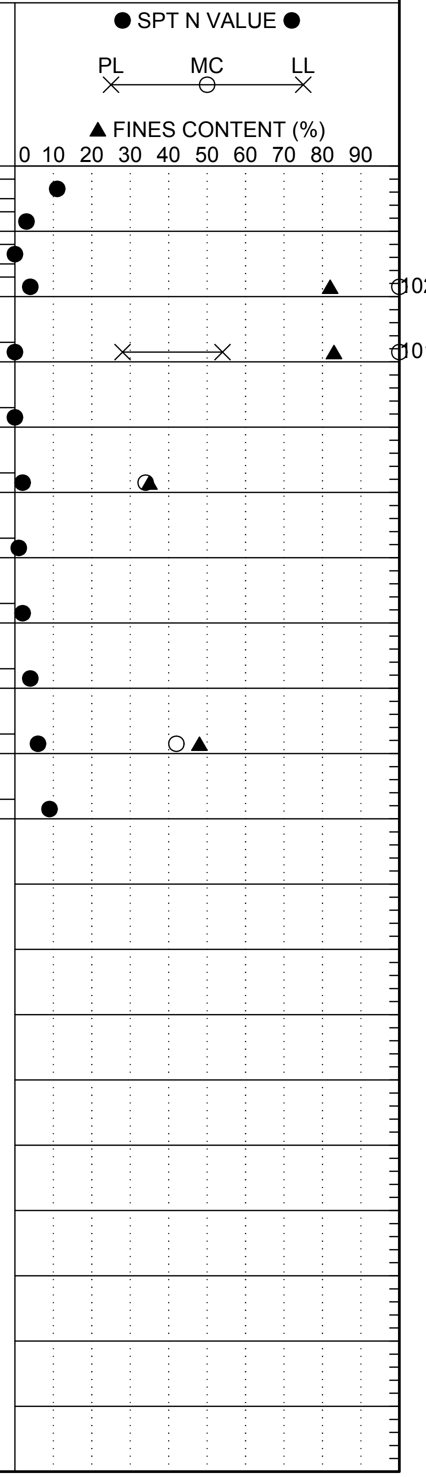
SILTY SAND (SM)
very loose, bluish gray, fine; with trace shell

- - - light brownish gray; with trace shell and phosphate

COOPER MARL: SILTY SAND (SM)
loose, olive green

BORING TERMINATED AT 50 FEET.

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
1.0	SS	9	4	7	11
3.5	SS	3	2	1	3
6.0	SS	WOH			0
8.5	SS	WOH	WOH	4	4
13.5	SS	WOH			0
18.5	SS	WOH			0
23.5	SS	WOH	WOH	2	2
28.5	SS	WOH	WOH	1	1
33.5	SS	1	1	1	2
38.5	SS	2	2	2	4
43.5	SS	2	3	3	6
48.5	SS	3	4	5	9



LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	M. EICHELBERGER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-51 SPT ALT 2A	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	7.0 ft	**Latitude:**	32.845119	**Longitude:**	79.957373	**Date Started:**	10/10/08
Total Depth:	22 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	10/10/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-550	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	80%
Core Size:		**Driller:**	S&ME	**Groundwater:**	**TOB** N/A	**24HR**	4.5 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● PL MC LL ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
	0.0	**WASH ROTARY TO 24 FEET**								
2.0										
-3.0										
-8.0										
-13.0										
-18.0	24.0			24.0						
	26.0	**3" X 30" FIXED PISTON SAMPLE PUSHED WITH 24" RECOVERY**			ST					
-23.0										
-28.0										
-33.0										
-38.0										
-43.0										
-48.0										
-53.0										
-58.0										
-63.0										
-68.0										
-73.0										
-78.0										
-83.0										
-88.0										

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

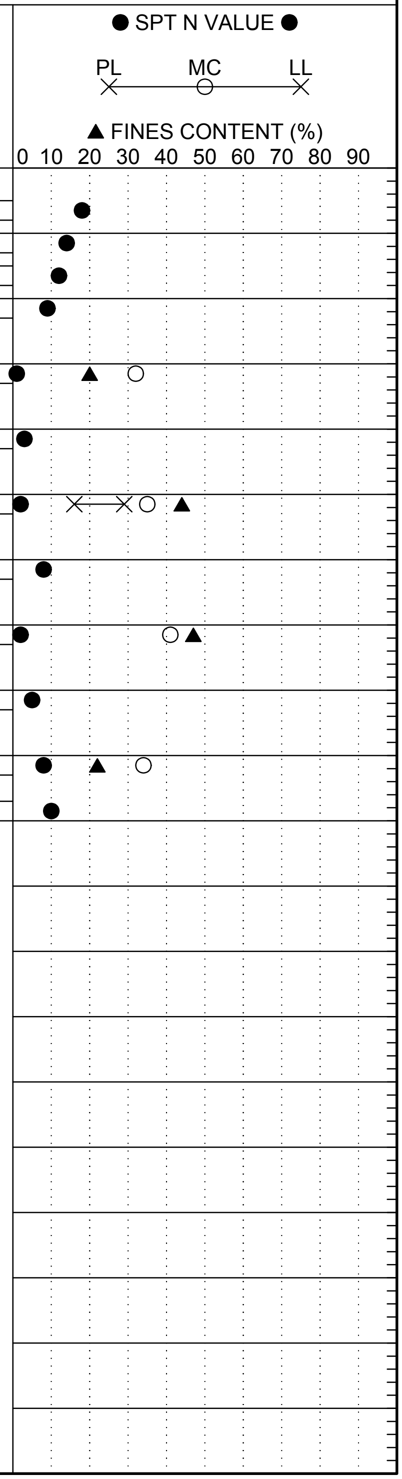
File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	M. EICHELBERGER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-52 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	16.0 ft	**Latitude:**	32.845455	**Longitude:**	79.95553	**Date Started:**	10/7/08
Total Depth:	50 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	10/7/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-45	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	70%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Depth (ft)	Elevation (ft)	MATERIAL DESCRIPTION
0.0–0.5	16.0	**ORGANIC LADEN TOPSOIL= 6 INCHES**
0.5–13.0		**FILL: SAND (SP)** medium dense, brown and black, fine to medium; with trace roots; - - - gray
13.0–21.0		**FILL: SLIGHTLY CLAYEY SAND (SP-SC)** medium dense, dark brown and gray, fine; with broken brick and asphalt
21.0–27.0		**FILL: CLAYEY SAND (SC)** medium dense, gray, fine; with debris
27.0–35.0		**POSSIBLE FILL: ORGANIC SANDY CLAY (CL)** stiff, light brown
35.0–41.0		**POSSIBLE FILL: SILTY SAND (SM)** very loose, gray and brown, fine
41.0–51.5		**CLAYEY SAND (SC)** very loose, light brownish gray, fine; with shells; - - - with trace roots and some shells
51.5–60.0		**SILTY SAND (SM)** loose, gray to greenish gray, fine; - - - very loose, olive green
60.0–66.0		**COOPER MARL: SILTY SAND (SM)** loose, olive green, fine

BORING TERMINATED AT 50 FEET.

Depth scale markings: 0.0, 0.5, 5.0, 7.5, 10.0, 15.0, 20.0, 30.0, 40.0, 50.0
Elevation scale markings: 11.0, 6.0, 1.0, -4.0, -9.0, -14.0, -19.0, -24.0, -29.0, -34.0, -39.0, -44.0, -49.0, -54.0, -59.0, -64.0, -69.0, -74.0, -79.0

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
2.5	SS	6	9	9	18
5.0	SS	5	5	9	14
7.5	SS	3	6	6	12
10.0	SS	3	3	6	9
15.0	SS	1	WOH	1	1
20.0	SS	2	1	2	3
25.0	SS	WOH	WOH	2	2
30.0	SS	1	3	5	8
35.0	SS	1	1	1	2
40.0	SS	1	2	3	5
45.0	SS	3	4	4	8
48.5	SS	4	4	6	10



LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	M. EICHELBERGER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-52 SPT A	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	16.0 ft	**Latitude:**	32.845456	**Longitude:**	79.955517	**Date Started:**	10/7/08
Total Depth:	2.5 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	10/7/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-850	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	73%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ●
	0.0									
	0.5	**ORGANIC LADEN TOPSOIL= 6 INCHES**		0.0	SS	2	5	6	11	●
	2.5	**FILL: SAND (SP)** medium dense, brown and black, fine to medium grained; with trace roots								
		BORING REFUSAL AT 2.5 FEET.								
11.0										
6.0										
1.0										
-4.0										
-9.0										
-14.0										
-19.0										
-24.0										
-29.0										
-34.0										
-39.0										
-44.0										
-49.0										
-54.0										
-59.0										
-64.0										
-69.0										
-74.0										
-79.0										

PL — MC — LL

▲ FINES CONTENT (%)

0 10 20 30 40 50 60 70 80 90

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	M. EICHELBERGER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-52 SPT B	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	16.0 ft	**Latitude:**	32.845456	**Longitude:**	79.955517	**Date Started:**	10/7/08
Total Depth:	26 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	10/7/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-850	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	73%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● PL MC LL ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
	0.0	**WASH ROTARY TO 24 FEET**								
11.0										
6.0										
1.0										
-4.0										
	24.0			24.0						
-9.0	26.0	**3" X 30" FIXED PISTON SAMPLE PUSHED WITH 23" RECOVERY**			ST					
-14.0										
-19.0										
-24.0										
-29.0										
-34.0										
-39.0										
-44.0										
-49.0										
-54.0										
-59.0										
-64.0										
-69.0										
-74.0										
-79.0										

LEGEND

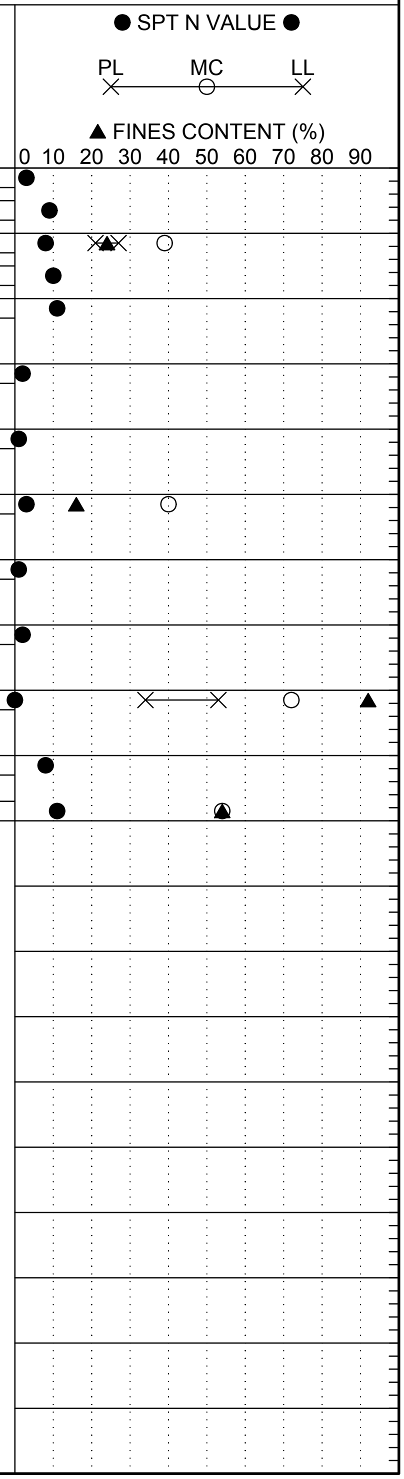
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	R. BOLLER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-53 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	13.0 ft	**Latitude:**	32.840771	**Longitude:**	79.967309	**Date Started:**	9/18/2008
Total Depth:	50 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	9/18/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-850	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	73%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** N/A	**24HR**	2.5 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION
	0.0	**SILTY SAND (SM)** very loose, black and dark brown, fine; with fine roots
8.0	5.0	
		- - - loose, grayish brown to reddish brown mottled
3.0	10.0	**CLAYEY SAND (SC)**
-2.0	15.0	medium dense, brown to reddish brown mottled, fine
-7.0		- - - light grayish brown to reddish brown mottled
-12.0		**SLIGHTLY SILTY SAND (SP-SM)** medium dense, light grayish brown, fine
-17.0	30.0	**SILTY SAND (SM)**
-22.0		very loose, light greenish blue, fine; with shells
-27.0		**SILT (MH)**
-32.0	45.0	very soft, greenish blue; with clay and trace shell
		- - - with clay
-37.0	50.0	- - - dark gray
-42.0		**COOPER MARL: SANDY SILT(ML)** stiff, olive green
-47.0		**BORING TERMINATED AT 50 FEET.**
-52.0		
-57.0		
-62.0		
-67.0		
-72.0		
-77.0		
-82.0		

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
0.0	SS	1	1	2	3
2.5	SS	3	4	5	9
5.0	SS	2	3	5	8
7.5	SS	3	4	6	10
10.0	SS	3	4	7	11
15.0	SS	WOH	1	1	2
20.0	SS	WOH	WOH	1	1
25.0	SS	2	1	2	3
30.0	SS	WOH	WOH	1	1
35.0	SS	WOH	WOH	2	2
40.0	SS		WOH		0
45.0	SS	3	3	5	8
48.5	SS	3	5	6	11



LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	R. BOLLER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-53 SPT A	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	13.0 ft	**Latitude:**	32.840771	**Longitude:**	79.967309	**Date Started:**	9/19/2008
Total Depth:	34 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	9/19/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-850	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	73%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● PL MC LL ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
	0.0	**WASH ROTARY TO 32 FEET**								
8.0										
3.0										
-2.0										
-7.0										
-12.0										
-17.0	32.0			32.0						
	34.0	**3" X 30" FIXED PISTON SAMPLE PUSHED WITH 24" RECOVERY**			ST					
-22.0		**BORING TERMINATED AT 34 FEET.**								
-27.0										
-32.0										
-37.0										
-42.0										
-47.0										
-52.0										
-57.0										
-62.0										
-67.0										
-72.0										
-77.0										
-82.0										

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	R.BOLLER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-55 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	12.0 ft	**Latitude:**	32.838384	**Longitude:**	79.96432278	**Date Started:**	9/18/2008
Total Depth:	50 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	9/18/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-850	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	70%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** N/A	**24HR**	N/A

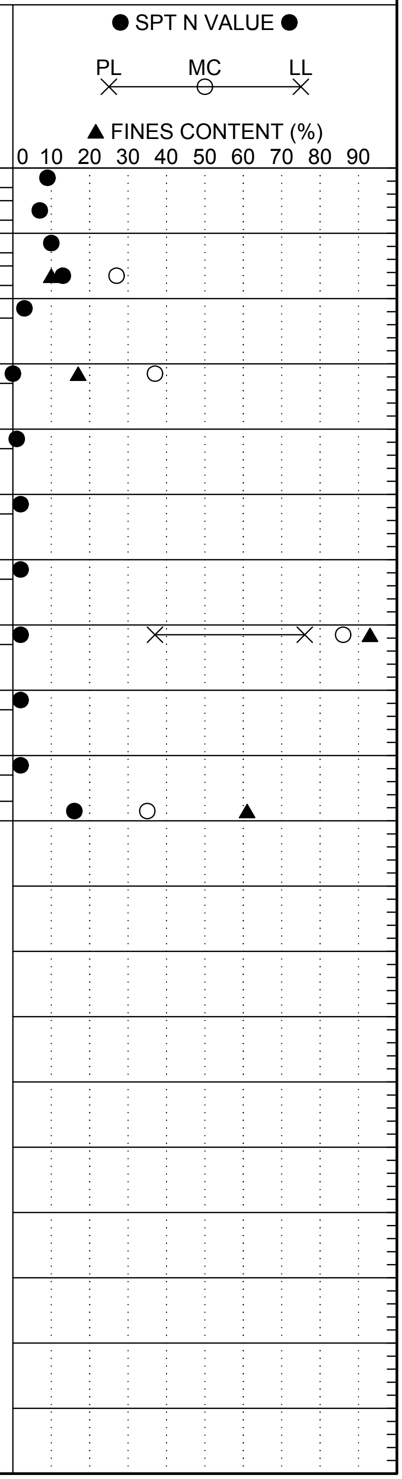
Depth (ft)	MATERIAL DESCRIPTION
0.0–0.2	**TOPSOIL= 2 INCHES**
0.2–2.5	**SILTY SAND (SM)** loose, dark brown and black, fine; with fine roots
2.5–7.5	
7.5–15.0	**CLAYEY SAND (SC)** loose, grayish brown, fine
15.0–20.0	**SLIGHTLY CLAYEY SAND (SP-SC)** medium dense, light grayish brown, fine; - - - very loose
20.0–	**SILTY SAND (SM)** very loose, bluish green, fine; with shells
–46.5	**CLAYEY SILT (MH)** very soft, bluish green; - - - with shells; - - - trace sand; - - - trace shells
46.5–48.5	**SILTY SAND (SM)** medium dense, light greenish brown, fine
48.5–50.0	**COOPER MARL: SANDY SILT (ML)** very stiff, olive green

BORING TERMINATED AT 50 FEET.

Elevation (ft): 7.0, 2.0, -3.0, -8.0, -13.0, -18.0, -23.0, -28.0, -33.0, -38.0, -43.0, -48.0, -53.0, -58.0, -63.0, -68.0, -73.0, -78.0, -83.0

Depth (ft): 0.0, 0.2, 2.5, 7.5, 15.0, 20.0, 46.5, 48.5, 50.0

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
0.0	SS	3	5	4	9
2.5	SS	WOH	3	4	7
5.0	SS	3	4	6	10
7.5	SS	2	7	6	13
10.0	SS	1	1	2	3
15.0	SS		WOH		0
20.0	SS	WOH	WOH	1	1
25.0	SS	1	1	1	2
30.0	SS	1	1	1	2
35.0	SS	WOH	1	1	2
40.0	SS	WOH	1	1	2
45.0	SS	WOH	1	1	2
48.5	SS	6	8	8	16



LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	R.BOLLER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-55 SPT A	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	12.0 ft	**Latitude:**	32.838384	**Longitude:**	79.96432278	**Date Started:**	9/22/2008
Total Depth:	26 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	9/22/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-850	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	70%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	**WASH ROTARY TO 24 FEET**							
7.0									
2.0									
-3.0									
-8.0									
	24.0			24.0					
-13.0	26.0	**3" X 30" FIXED PISTON SAMPLE PUSHED WITH 13" RECOVERY**			ST				
		BORING TERMINATED AT 26 FEET.							
-18.0									
-23.0									
-28.0									
-33.0									
-38.0									
-43.0									
-48.0									
-53.0									
-58.0									
-63.0									
-68.0									
-73.0									
-78.0									
-83.0									

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	R.BOLLER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-55 SPT B	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	12.0 ft	**Latitude:**	32.838384	**Longitude:**	79.96432278	**Date Started:**	9/22/2008
Total Depth:	37 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	9/22/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-850	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	70%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● / PL MC LL / ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
12.0	0.0	**WASH ROTARY TO 35 FEET**								
-23.0	35.0	**3" X 30" FIXED PISTON SAMPLE PUSHED WITH 13" RECOVERY**		35.0	ST					PL ≈ 30, MC ≈ 84, ▲104
	37.0									

Elevation scale: 7.0, 2.0, -3.0, -8.0, -13.0, -18.0, -23.0, -28.0, -33.0, -38.0, -43.0, -48.0, -53.0, -58.0, -63.0, -68.0, -73.0, -78.0, -83.0

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	M. EICHELBERGER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-57 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	10.0 ft	**Latitude:**	32.837229	**Longitude:**	79.961718	**Date Started:**	2/26/2009
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	2/26/2009
Bore Hole Diameter (in):	3	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	D-50	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	60%
Core Size:		**Driller:**	S&ME	**Groundwater:**	**TOB** N/A	**24HR**	3 ft

Elevation (ft): 5.0, 0.0, -5.0, -10.0, -15.0, -20.0, -25.0, -30.0, -35.0, -40.0, -45.0, -50.0, -55.0, -60.0, -65.0, -70.0, -75.0, -80.0, -85.0

Depth (ft)	MATERIAL DESCRIPTION
0.0	**SLIGHTLY SILTY SAND (SP-SM)**
2.0	loose, brown to dark brown, moist; with trace roots and organic stained
6.0	**CLAYEY SAND (SC)** black, fine, moist
	- - - gray to brown mottled
13.5	**SLIGHTLY CLAYEY SAND (SP-SC)** medium dense, gray brown, medium coarse, saturated
	- - - coarse
18.5	**SLIGHTLY CLAYEY SAND (SP-SC)** very loose, gray, saturated
	SANDY SILT (ML) very soft, gray, saturated; with trace shell
	- - - gray; with some shell
	- - - with trace shell
43.5	- - - with sand seams
48.5	**SLIGHTLY SILTY SAND (SP-SM)** very dense, gray, coarse, saturated; with phosphate
	COOPER MARL: SANDY SILT (ML) stiff, olive green; with trace shell
	- - - firm
	- - - stiff
	- - - firm
	- - - stiff
	- - - firm
	- - - stiff

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
0.0	SS	3	4	6	10
2.0	SS				
4.0	SS				
6.0	SS	3	5	7	12
8.0	SS	4	6	6	12
10.0	SS	3	2	3	5
13.5	SS	1	0	1	1
18.5	SS	WOH	WOH	WOH	0
23.5	SS	1	1	1	2
28.5	SS	1	1	1	2
33.5	SS	1	1	0	1
38.5	SS	1	2	1	3
43.5	SS	16	26	24	50
48.5	SS	3	4	6	10
53.5	SS	2	4	5	9
58.5	SS	3	4	4	8
63.5	SS	3	4	5	9
68.5	SS	3	3	5	8
73.5	SS	3	3	4	7
78.5	SS	3	4	5	9
83.5	SS	3	4	4	8
88.5	SS	3	4	5	9
93.5	SS				
98.5	SS	3	5	9	13

● SPT N VALUE ●
PL MC LL
▲ FINES CONTENT (%)
0 10 20 30 40 50 60 70 80 90

Continued Next Page

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	M. EICHELBERGE
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-57 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	10.0 ft	**Latitude:**	32.837229	**Longitude:**	79.961718	**Date Started:**	2/26/2009
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	2/26/2009
Bore Hole Diameter (in):	3	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	D-50	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	60%
Core Size:		**Driller:**	S&ME	**Groundwater:**	**TOB** N/A	**24HR**	3 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
				103.5	SS	3	4	6	10
-95.0									
				108.5	SS	1	2	3	5
-100.0									
				113.5	SS	4	6	9	15
-105.0									
				118.5	SS	3	28	24	52
-110.0	120.0	- - - very hard							
-115.0		**BORING TERMINATED AT 120 FEET.**							
-120.0									
-125.0									
-130.0									
-135.0									
-140.0									
-145.0									
-150.0									
-155.0									
-160.0									
-165.0									
-170.0									
-175.0									
-180.0									
-185.0									

● SPT N VALUE ●

PL MC LL

▲ FINES CONTENT (%)

0 10 20 30 40 50 60 70 80 90

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	M. EICHELBERGER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-57 SPT A	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	10.0 ft	**Latitude:**	32.837229	**Longitude:**	79.961718	**Date Started:**	3/11/2009
Total Depth:	32 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	3/11/2009
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-850	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	74%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** N/A	**24HR**	3 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● / PL MC LL / ▲ FINES CONTENT (%)
	0.0	**WASH ROTARY TO 20 FEET**								
-10.0	20.0 – 22.0	**3" X 30" FIXED PISTON SAMPLE PUSHED WITH 24" RECOVERY**		20.0	ST					
		WASH ROTARY TO 30 FEET								
-20.0	30.0 – 32.0	**3" X 30" FIXED PISTON SAMPLE PUSHED WITH 24" RECOVERY**		30.0	ST					
		BORING TERMINATED AT 32 FEET.								

Elevation scale: 5.0, 0.0, -5.0, -10.0, -15.0, -20.0, -25.0, -30.0, -35.0, -40.0, -45.0, -50.0, -55.0, -60.0, -65.0, -70.0, -75.0, -80.0, -85.0

Chart scale: 0 10 20 30 40 50 60 70 80 90

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

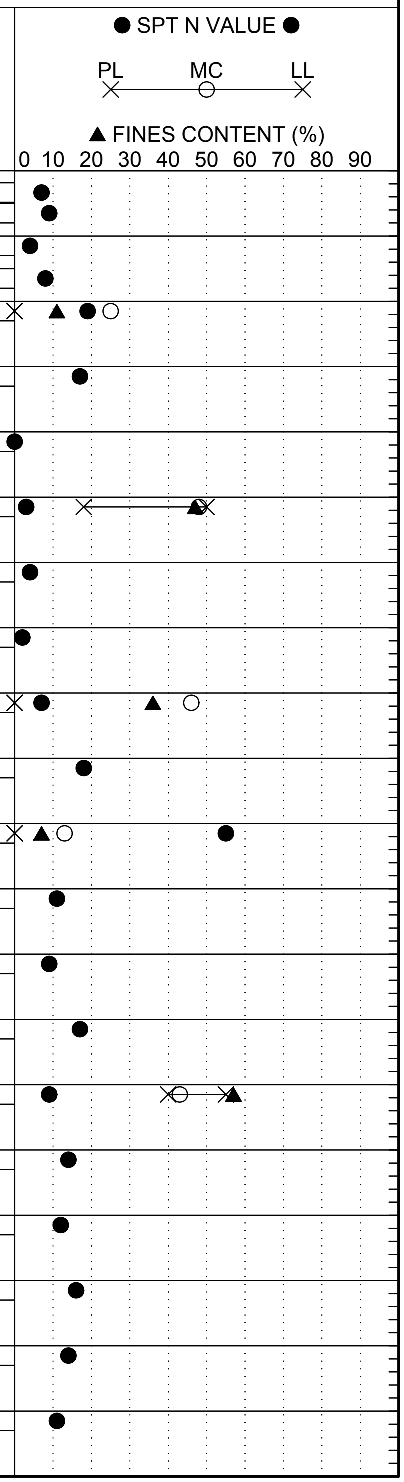
SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	J. BURNS
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-58 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	14.5 ft	**Latitude:**	32.837245	**Longitude:**	79.961091	**Date Started:**	10/19/08
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	10/19/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-55	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	56%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION
14.5	0.0	**ASPHALT= 5 INCHES**
	0.5	**CONCRETE= 5 INCHES**
	0.9	**FILL: SAND (SP)** loose, yellowish brown, fine, moist
	7.5	**SLIGHTLY SILTY SAND (SP-SM)** loose, yellowish brown, fine, moist - - - medium dense - - - reddish brown, saturated - - - very loose, gray; with trace shell
	25.0	**CLAYEY SAND (SC)** very loose, fine, saturated, bluish gray
	40.0	**SILTY SAND (SC)** loose, gray and brown, fine, saturated
	45.0	**SLIGHTLY SILTY SAND (SP-SM)** medium dense, gray, fine, saturated - - - very dense; with trace phosphate
	55.0	**COOPER MARL: SANDY SILT (ML)** stiff, olive green - - - very stiff - - - stiff - - - very stiff

Elevation scale (ft): 9.5, 4.5, -0.5, -5.5, -10.5, -15.5, -20.5, -25.5, -30.5, -35.5, -40.5, -45.5, -50.5, -55.5, -60.5, -65.5, -70.5, -75.5, -80.5

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
0.9	SS	4	4	3	7
2.5	SS	3	4	5	9
5.0	SS	3	2	2	4
7.5	SS	2	3	5	8
10.0	SS	7	7	12	19
15.0	SS	8	9	8	17
20.0	SS	WOH			0
25.0	SS	WOH	WOH	3	3
30.0	SS	WOH	2	2	4
35.0	SS	WOH	1	1	2
40.0	SS	WOH	2	5	7
45.0	SS	4	1	16	18
50.0	SS	15	26	29	55
55.0	SS	4	5	6	11
60.0	SS	3	4	5	9
65.0	SS	7	9	8	17
70.0	SS	4	4	5	9
75.0	SS	WOH	4	10	14
80.0	SS	4	4	8	12
85.0	SS	5	6	10	16
90.0	SS	5	5	9	14
95.0	SS	5	5	6	11
100.0					



LEGEND

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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	J. BURNS
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-58 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	14.5 ft	**Latitude:**	32.837245	**Longitude:**	79.961091	**Date Started:**	10/19/08
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	10/19/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y N	**Liner Used:**	Y N
Drill Machine:	CME-55	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	56%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
				SS	2	3	8	11
-90.5			105.0	SS	4	5	10	15
-95.5			110.0	SS	3	30	50/2	
-100.5		- - -hard, thin cemented layer	115.0					
		- - - firm		SS	WOH	1	6	7
-105.5	120.0	- - - very stiff	118.5	SS	5	5	16	21
-110.5		**BORING TERMINATED AT 120 FEET.**						
-115.5								
-120.5								
-125.5								
-130.5								
-135.5								
-140.5								
-145.5								
-150.5								
-155.5								
-160.5								
-165.5								
-170.5								
-175.5								
-180.5								

● SPT N VALUE ●

PL MC LL

▲ FINES CONTENT (%)

0 10 20 30 40 50 60 70 80 90

LEGEND

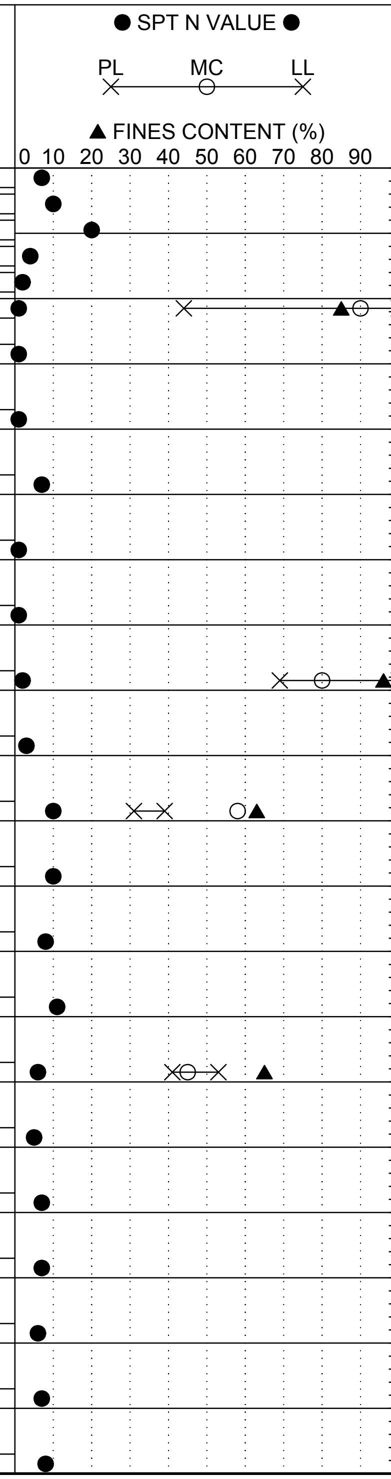
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	P. BAUMSTARK
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-63 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	10.0 ft	**Latitude:**	32.8347	**Longitude:**	79.9583356	**Date Started:**	2/18/2009
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	2/18/2009
Bore Hole Diameter (in):	3	**Sampler Configuration**		**Liner Required:**	Y Ⓝ	**Liner Used:**	Y Ⓝ
Drill Machine:	D-50	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	60%
Core Size:		**Driller:**	S&ME	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION
10.0	0.0	**FILL: SAND (SP)** medium dense, brown the gray brown, fine, moist
2.5	7.5	**CLAYEY SILT(MH)** very soft, dark gray, saturated; with trace sand
		- - - with trace shell and sand
		- - - no shell
		- - - soft, dark brown; with organics and wood
-39.0	49.0	- - - dark gry; with phosphate pieces
		COOPER MARL: SANDY SILT (ML) stiff, olive green, fine, saturated
		- - - trace shell fragments
		- - - firm

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
0.0	SS	3	3	4	7
2.0	SS	3	3	7	10
4.0	SS	6	10	10	20
6.0	SS	3	3	1	4
8.0	SS	1	1	1	2
10.0	ss	1	0	1	1
13.5	SS	1	0	1	1
18.5	SS	1	0	1	1
23.5	SS	4	5	2	7
28.5	SS	1	0	1	1
33.5	SS	1	0	1	1
38.5	SS	1	1	1	2
43.5	SS	1	1	2	3
48.5	SS	2	4	6	10
53.5	SS	3	4	6	10
58.5	SS	3	3	5	8
63.5	SS	4	4	7	11
68.5	SS	3	3	3	6
73.5	SS	3	2	3	5
78.5	SS	2	3	4	7
83.5	SS	2	3	4	7
88.5	SS	2	3	3	6
93.5	SS	3	3	4	7
98.5	SS	3	4	4	8



LEGEND

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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	P. BAUMSTARK
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-63 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	10.0 ft	**Latitude:**	32.8347	**Longitude:**	79.9583356	**Date Started:**	2/18/2009
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	2/18/2009
Bore Hole Diameter (in):	3	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	D-50	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	60%
Core Size:		**Driller:**	S&ME	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● PL MC LL ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
-95.0				103.5	SS	3	4	4	8	●
-100.0				108.5	SS	4	3	4	7	●
-105.0		- - - stiff		113.5	SS	3	6	5	11	●
-110.0	120.0			118.5	SS	4	4	7	11	●
-115.0		**BORING TERMINATED AT 120 FEET.**								
-120.0										
-125.0										
-130.0										
-135.0										
-140.0										
-145.0										
-150.0										
-155.0										
-160.0										
-165.0										
-170.0										
-175.0										
-180.0										
-185.0										

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

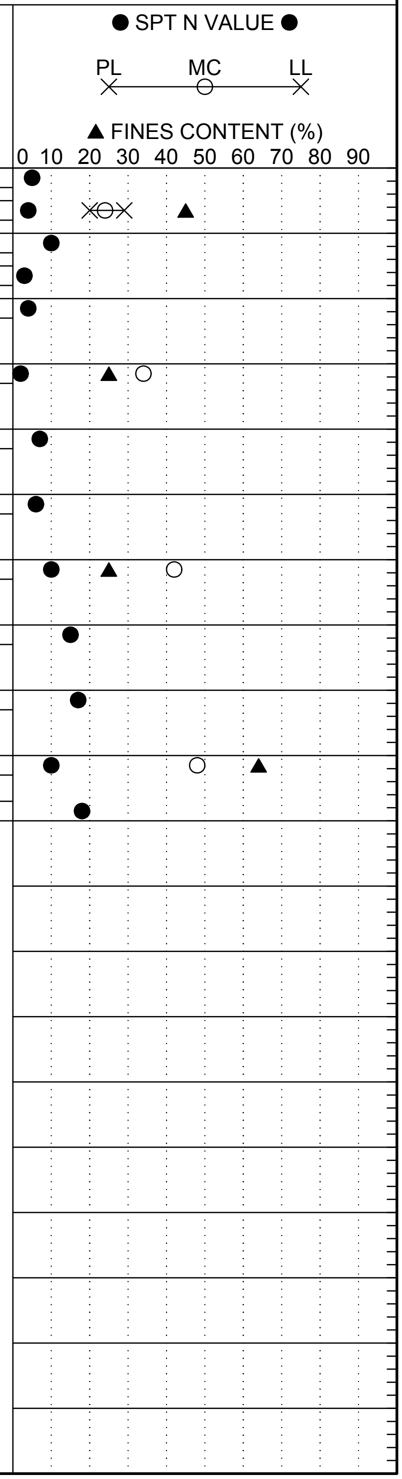
SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	T. HENDERSON
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-65 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	8.5 ft	**Latitude:**	32.829776	**Longitude:**	79.955199	**Date Started:**	9/18/2008
Total Depth:	50 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	9/18/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-45	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	70%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION
	0.0 – 0.3	**ORGANIC LADEN TOPSOIL= 4 INCHES**
	0.3 – 5.0	**FILL: CLAYEY SAND (SC)** loose, brown, fine; with roots
3.5	5.0 – 10.0	**POSSIBLE FILL: SLIGHTY SANDY CLAY (CL)** soft, red, gray and brown mottled
-1.5	10.0 – 11.0	
-6.5	15.0	**SLIGHTLY SILTY SAND (SP-SM)** loose, brown, fine; - - - very loose, light brown; with red cemented nodules
-21.5		**SILTY SAND (SM)** very loose, red and brown, fine
-26.5		**SANDY CLAY (CL)** soft, gray
-31.5		**SILTY SAND (SM)** very loose, gray, fine; - - - loose, gray, fine; - - - medium dense; 2 inch thick cemented layer
-36.5	45.0	
-41.5	50.0	**COOPER MARL: SANDY SILT (ML)** stiff, olive green; - - - very stiff
		BORING TERMINATED AT 50 FEET.

Elevation scale: 3.5, -1.5, -6.5, -11.5, -16.5, -21.5, -26.5, -31.5, -36.5, -41.5, -46.5, -51.5, -56.5, -61.5, -66.5, -71.5, -76.5, -81.5, -86.5

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
0.0	SS	1	2	3	5
2.5	SS	2	2	2	4
5.0	SS	3	5	5	10
7.5	SS	2	2	1	3
10.0	SS	1	3	1	4
15.0	SS	1	1	1	2
20.0	SS	2	3	4	7
25.0	SS	2	4	2	6
30.0	SS	2	3	7	10
35.0	SS	5	7	8	15
40.0	SS	3	8	9	17
45.0	SS	2	4	6	10
48.5	SS	6	9	9	18



LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	R. BOLLER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-66 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	2.5 ft	**Latitude:**	32.832233	**Longitude:**	79.9565	**Date Started:**	11/10/08
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	11/11/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-850	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	73%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** Ground Surface	**24HR**	N/A

Depth (ft)	Elevation (ft)	MATERIAL DESCRIPTION
0.0		**SILT (ML)** very soft, black; with organics
7.5		**SLIGHTLY SILTY SAND (SP-SM)** medium dense, gray, fine
10.0		**SAND (SP)** medium dense, gray, fine
15.0		**SILT (MH)** very soft, light bluish green; with clay - - - with trace fine sand
40.0		**SILTY SAND (SM)** loose, light bluish green, fine; with shells
45.0		**SLIGHTLY SILTY SAND (SP-SM)** loose, light bluish green, fine - - - medium dense, gray
55.0		**COOPER MARL: SANDY SILT (ML)** stiff, olive green, fine - - - very stiff - - - stiff - - - firm - - - stiff - - - very stiff

Elevation scale (ft): -2.5, -7.5, -12.5, -17.5, -22.5, -27.5, -32.5, -37.5, -42.5, -47.5, -52.5, -57.5, -62.5, -67.5, -72.5, -77.5, -82.5, -87.5, -92.5

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
0.0	SS	WOH	WOH	1	1
2.5	SS	WOH	WOH	1	1
5.0	SS	WOH	WOH	1	1
7.5	SS	1	6	16	22
10.0	SS	9	14	6	20
15.0	SS	WOH	WOH	1	1
20.0	SS	WOH	WOH	WOH	1
25.0	SS		WOH		0
30.0	SS	WOH	WOH	1	1
35.0	SS	WOH	1	1	2
40.0	SS	3	4	2	6
45.0	SS	WOH	2	4	6
50.0	SS	WOH	10	14	24
55.0	SS	2	4	6	10
60.0	SS	2	4	6	10
65.0	SS	7	7	10	17
70.0	SS	3	2	6	8
75.0	SS	2	2	5	7
80.0	SS	3	3	9	12
85.0	SS	5	5	10	15
90.0	SS	5	5	10	15
95.0	SS	4	4	11	16
100.0					

● SPT N VALUE ●

PL MC LL

▲ FINES CONTENT (%)

0 10 20 30 40 50 60 70 80 90

Continued Next Page

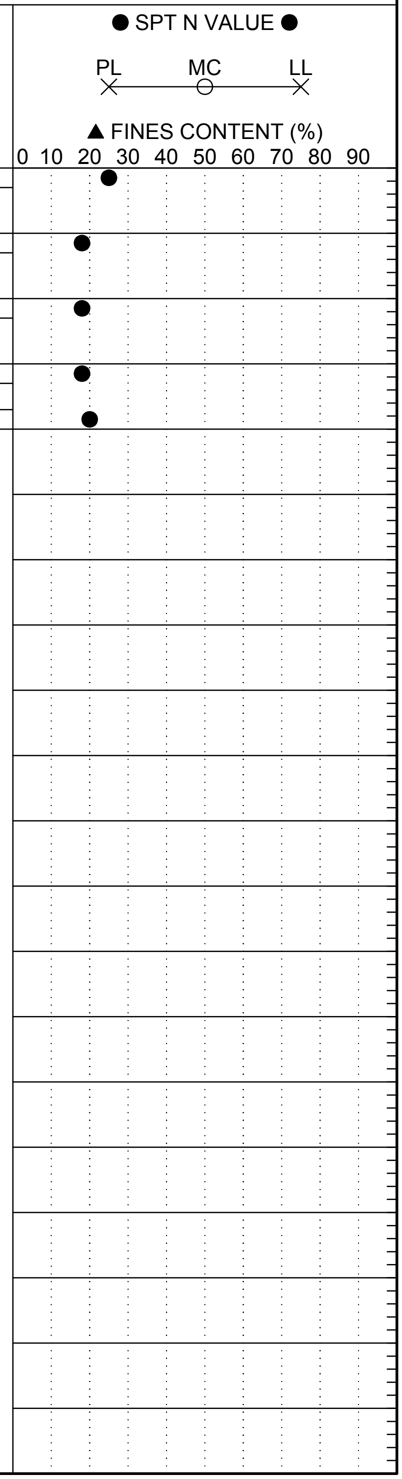
LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	R. BOLLER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-66 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	2.5 ft	**Latitude:**	32.832233	**Longitude:**	79.9565	**Date Started:**	11/10/08
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	11/11/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-850	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	73%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** Ground Surface	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
					SS	5	9	16	25
-102.5				105.0	SS	4	7	11	18
-107.5				110.0	SS	5	7	11	18
-112.5				115.0	SS	5	7	11	18
-117.5	120.0			118.5	SS	5	8	12	20
-122.5		**BORING TERMINATED AT 120 FEET.**							
-127.5									
-132.5									
-137.5									
-142.5									
-147.5									
-152.5									
-157.5									
-162.5									
-167.5									
-172.5									
-177.5									
-182.5									
-187.5									
-192.5									



LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	R. BOLLER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-66 SPT A	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	2.5 ft	**Latitude:**	32.832233	**Longitude:**	79.9565	**Date Started:**	11/11/08
Total Depth:	22 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	11/11/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-850	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	73%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** Ground Surface	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● PL MC LL ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
	0.0	**WASH ROTARY TO 20 FEET**								
-17.5	20.0	**3" X 30" FIXED PISTON SAMPLE PUSHED 24" WITH 24" RECOVERY**		20.0	ST					
	22.0	**BORING TERMINATED AT 22 FEET.**								

Elevation scale: -2.5, -7.5, -12.5, -17.5, -22.5, -27.5, -32.5, -37.5, -42.5, -47.5, -52.5, -57.5, -62.5, -67.5, -72.5, -77.5, -82.5, -87.5, -92.5

SC_DOT 08554.GPJ SC_DOT.GDT 4/3/09

LEGEND

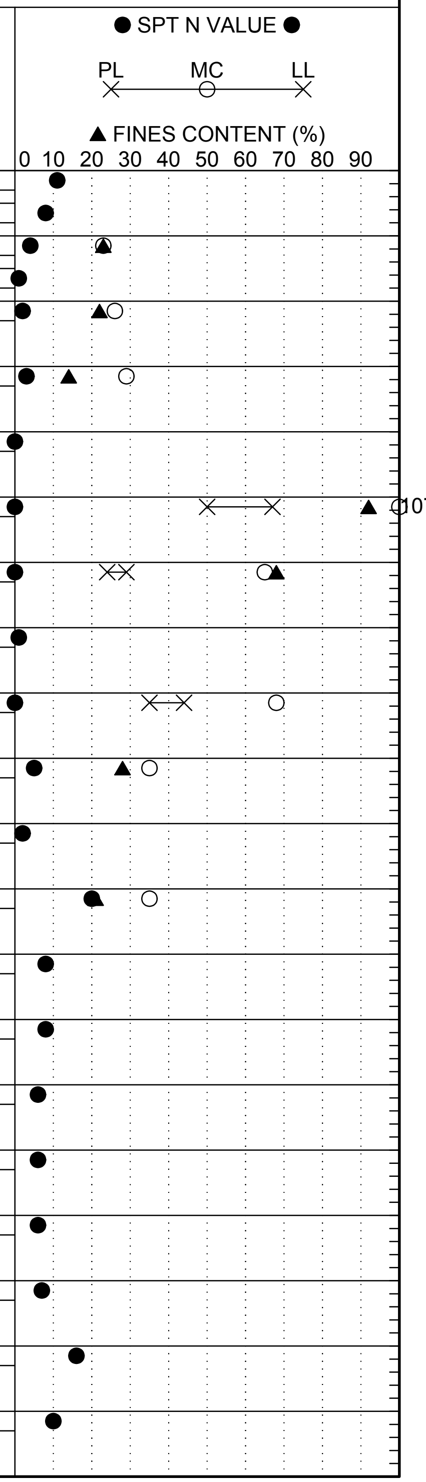
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	P. OREE
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-68 SPT A	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	7.0 ft	**Latitude:**	32.833011	**Longitude:**	79.956843	**Date Started:**	9/22/2008
Total Depth:	50 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	9/22/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-55	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	56%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION
	0.0	**SLIGHTLY SILTY SAND (SP-SM)** medium dense, brown, fine; some roots
2.0	5.0	- - - loose, no roots
	7.5	**SLIGHTLY CLAYEY SAND (SP-SC)** very loose, brown and gray, fine
-3.0		
-8.0	15.0	**CLAYEY SAND (SC)** very loose, gray to dark gray, fine
-13.0	20.0	- - - with trace silt
-18.0		**SLIGHTLY CLAYEY SAND (SP-SC)** very loose, dark gray, fine; organic stained
-23.0	30.0	**CLAY (CL)** very soft, gray; with trace roots
-28.0	35.0	**SILT (ML)** very soft, gray; with some fine sand
-33.0		**CLAY (CH)** very soft, gray
-38.0	45.0	- - - with sand lenses
-43.0		**SILTY SAND (SM)** loose, gray, fine; with wood fragments
-48.0		- - - very loose; with trace roots
-53.0	60.0	- - - medium dense; no roots
		COOPER MARL: SANDY SILT (ML) stiff, olive green
-58.0		
-63.0		- - - firm
-68.0		
-73.0		
-78.0		
-83.0		- - - very stiff
-88.0		- - - stiff

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
0.0	SS	2	5	6	11
2.5	SS	3	4	4	8
5.0	SS	1	2	2	4
7.5	SS		1/18"		1
10.0	SS	1	1	1	2
15.0	SS	1	1	2	3
20.0	SS		WOH		0
25.0	SS		WOH		0
30.0	SS		WOH		0
35.0	SS	WOH	WOH	1	1
40.0	SS		WOH		0
45.0	SS	1	2	3	5
50.0	SS	WOH	1	1	2
55.0	SS	4	8	12	20
60.0	SS	3	3	5	8
65.0	SS	2	3	5	8
70.0	SS	1	1	5	6
75.0	SS	1	2	4	6
80.0	SS	1	2	4	6
85.0	SS	1	1	6	7
90.0	SS	1	4	12	16
95.0	SS	2	4	6	10
100.0					



LEGEND *Continued Next Page*

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	P. OREE
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-68 SPT ALT 1	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	7.0 ft	**Latitude:**	32.833011	**Longitude:**	79.956843	**Date Started:**	9/22/2008
Total Depth:	50 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	9/22/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-55	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	56%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
				SS	3	3	8	11
-98.0			105.0	SS	3	4	7	11
-103.0			110.0	SS	2	4	8	12
-108.0		--- very stiff	115.0	SS	4	6	11	17
			118.5	SS	5	7	8	15
-113.0	120.0	--- stiff						
		BORING TERMINATED AT 120 FEET.						
-118.0								
-123.0								
-128.0								
-133.0								
-138.0								
-143.0								
-148.0								
-153.0								
-158.0								
-163.0								
-168.0								
-173.0								
-178.0								
-183.0								
-188.0								

● SPT N VALUE ●

PL MC LL

▲ FINES CONTENT (%)

0 10 20 30 40 50 60 70 80 90

LEGEND

SAMPLER TYPE
- SS - Split Spoon
- ST - Shelby Tube
- AWG - Rock Core, 1-1/8"
- NQ - Rock Core, 1-7/8"
- CU - Cuttings
- CT - Continuous Tube

DRILLING METHOD
- HSA - Hollow Stem Auger
- CFA - Continuous Flight Augers
- DC - Driving Casing
- RW - Rotary Wash
- RC - Rock Core

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	R. BOLLER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-72 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	4.5 ft	**Latitude:**	32.831	**Longitude:**	79.956606	**Date Started:**	9/15/2008
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	9/16/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-550	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	63%
Core Size:		**Driller:**	SCI	**Groundwater:**	TOB N/A	**24HR**	1 ft

Elevation (ft): -0.5, -5.5, -10.5, -15.5, -20.5, -25.5, -30.5, -35.5, -40.5, -45.5, -50.5, -55.5, -60.5, -65.5, -70.5, -75.5, -80.5, -85.5, -90.5

Depth (ft): 0.0, 2.5, 5.0, 7.5, 10.0, 15.0, 20.0, 35.0, 60.0

MATERIAL DESCRIPTION

CLAYEY SAND (SC)
very loose, dark brown and brown, fine

SLIGHTLY CLAYEY SAND (SP-SC)
loose, dark brown to grayish brown mottled, fine

SLIGHTLY CLAYEY SAND (SP-SC)
loose, gray, fine

SILTY SAND (SM)
very loose, gray to reddish brown mottled, fine

SILT (MH)
soft, gray to reddish brown mottled; with sand

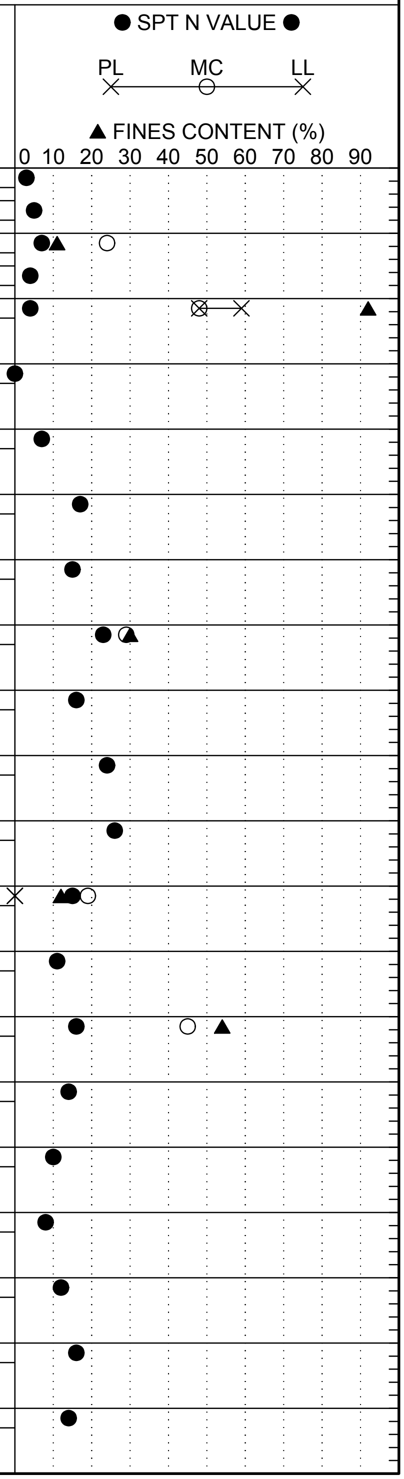
SLIGHTLY SILTY SAND (SP-SM)
very loose, gray, fine

SAND (SP)
loose, gray, fine
- - - medium dense, light brown
- - - light reddish brown

SLIGHTLY SILTY SAND (SM)
medium dense, light grayish brown
- - - light brown
- - - gray
- - - dark gray

COOPER MARL: SANDY SILT (ML)
stiff, olive green
- - - very stiff
- - - stiff
- - - very stiff

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
0.0	SS	1	2	1	3
2.5	SS	2	2	3	5
5.0	SS	2	3	4	7
7.5	SS	2	1	3	4
10.0	SS	2	1	3	4
15.0	SS		WOH		0
20.0	SS	2	3	4	7
25.0	SS	3	5	12	17
30.0	SS	4	7	8	15
35.0	SS	8	10	13	23
40.0	SS	5	7	9	16
45.0	SS	6	11	13	24
50.0	SS	9	14	12	26
55.0	SS	7	8	7	15
60.0	SS	3	4	7	11
65.0	SS	6	8	8	16
70.0	SS	3	5	9	14
75.0	SS	3	3	7	10
80.0	SS	2	2	6	8
85.0	SS	3	4	8	12
90.0	SS	4	5	11	16
95.0	SS	4	5	9	14
100.0					



LEGEND

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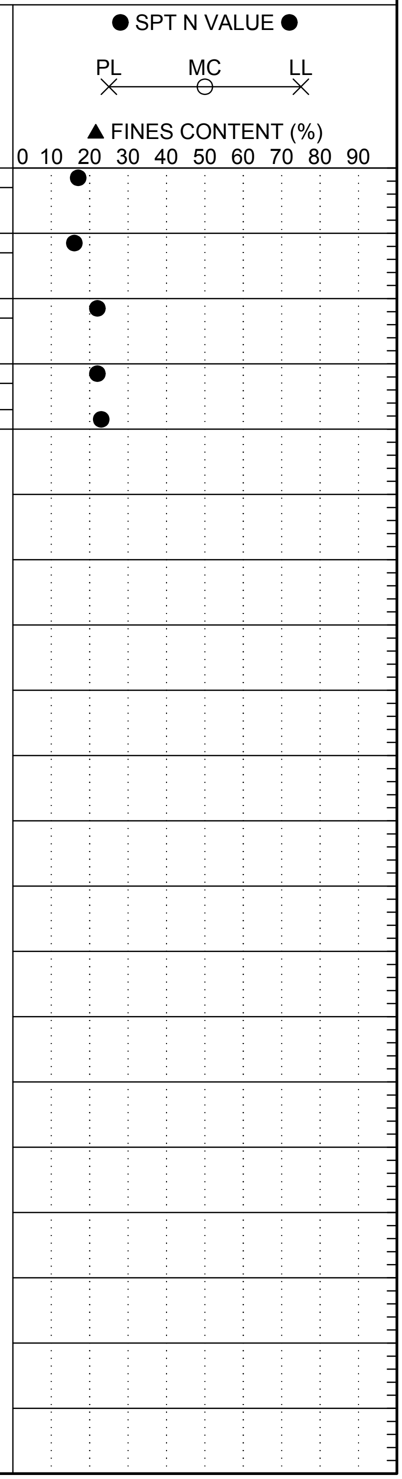
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	R. BOLLER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-72 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	4.5 ft	**Latitude:**	32.831	**Longitude:**	79.956606	**Date Started:**	9/15/2008
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	9/16/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-550	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	63%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** N/A	**24HR**	1 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
					SS	4	5	12	17
-100.5				105.0	SS	5	8	8	16
-105.5				110.0	SS	4	9	13	22
-110.5				115.0	SS	6	8	14	22
-115.5	120.0			118.5	SS	7	10	13	23
-120.5		**BORING TERMINATED AT 120 FEET.**							
-125.5									
-130.5									
-135.5									
-140.5									
-145.5									
-150.5									
-155.5									
-160.5									
-165.5									
-170.5									
-175.5									
-180.5									
-185.5									
-190.5									



LEGEND

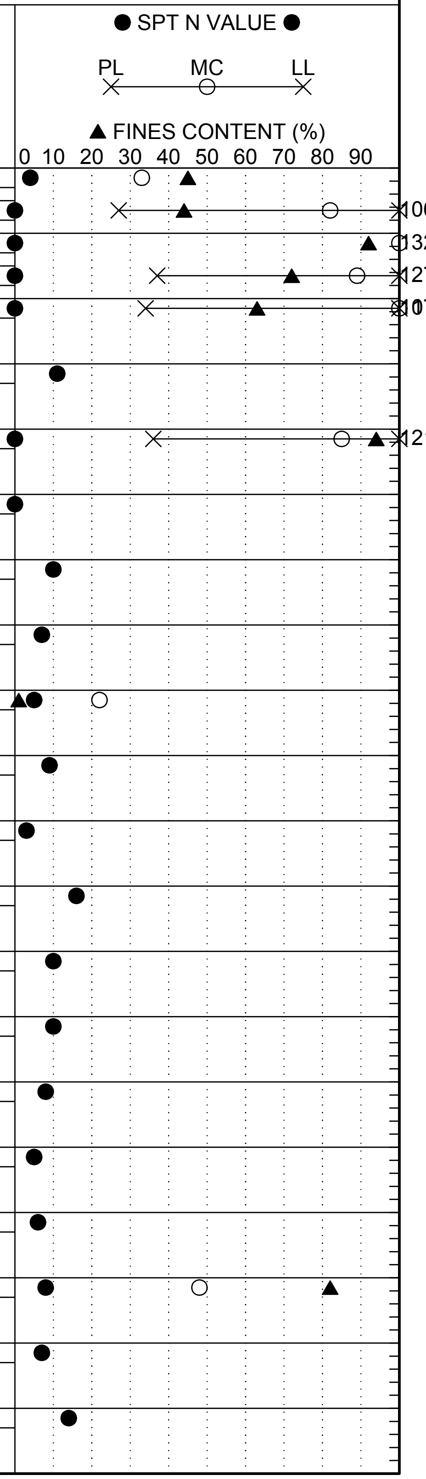
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	R. BOLLER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-74 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	5.0 ft	**Latitude:**	32.832559	**Longitude:**	79.95776	**Date Started:**	9/16/2008
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	9/16/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-45	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	76%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** N/A	**24HR**	1.5 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION
	0.0	**SILTY SAND (SM)** very loose, dark brown and black, fine; with roots
0.0	5.0	**SILTY CLAY (CH)** very soft, black and dark gray; with roots and fine sand
-10.0	15.0	--- blackish gray; with clay
-15.0	20.0	**SILTY SAND (SM)** medium dense, dark gray, fine
		CLAYEY SILT (MH) very soft, greenish gray
-25.0	30.0	**SAND (SP)** loose, gray, fine; with shells
-45.0	50.0	**SILT (ML)** soft, bluish gray; with clay and trace sand
		--- very stiff, brownish green; with clay and sand
-55.0	60.0	**COOPER MARL: SANDY SILT (ML)** stiff, olive green
		--- soft
		--- firm
		--- stiff
		--- firm
		--- stiff

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
0.0	SS	1	2	2	4
2.5	SS	WOH			0
5.0	SS	WOH			0
7.5	SS	WOH			0
10.0	SS	WOH			0
15.0	SS	5	7	4	11
20.0	SS	WOH			0
25.0	SS	WOH			0
30.0	SS	4	5	5	10
35.0	SS	3	3	4	7
40.0	SS	3	3	2	5
45.0	SS	4	5	4	9
50.0	SS	1	1	2	3
55.0	SS	4	7	9	16
60.0	SS	3	4	6	10
65.0	SS	3	5	5	10
70.0	SS	3	3	5	8
75.0	SS	3	2	3	5
80.0	SS	2	1	5	6
85.0	SS	2	3	5	8
90.0	SS	1	2	5	7
95.0	SS	4	5	9	14
100.0					



LEGEND

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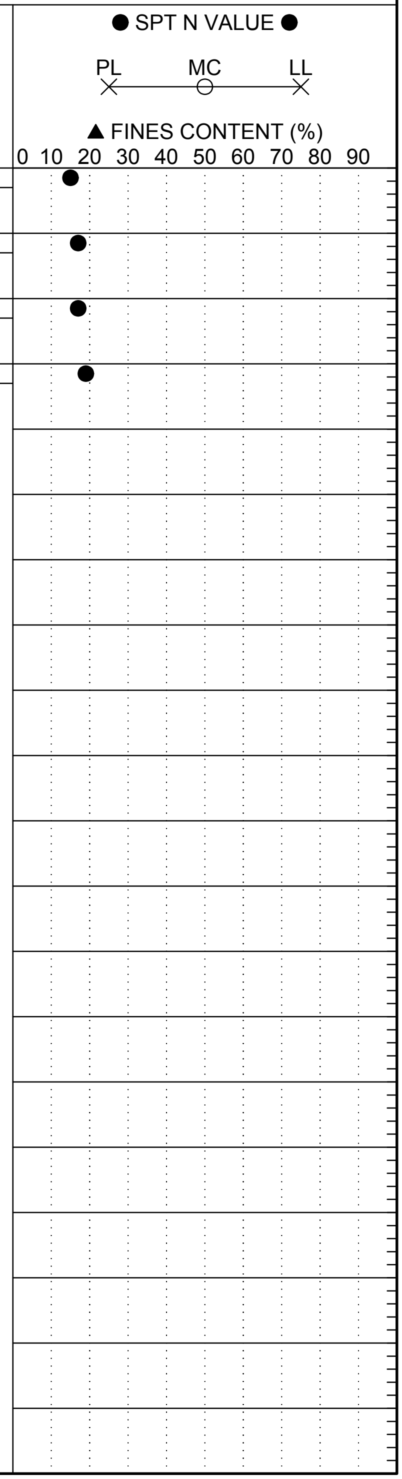
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	R. BOLLER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-74 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	5.0 ft	**Latitude:**	32.832559	**Longitude:**	79.95776	**Date Started:**	9/16/2008
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	9/16/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-45	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	76%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** N/A	**24HR**	1.5 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
					SS	3	5	10	15
-100.0		- - - very stiff		105.0	SS	4	5	12	17
-105.0				110.0	SS	3	6	11	17
-110.0				115.0	SS	5	6	13	19
-115.0	120.0	**BORING TERMINATED AT 120 FEET.**							
-120.0									
-125.0									
-130.0									
-135.0									
-140.0									
-145.0									
-150.0									
-155.0									
-160.0									
-165.0									
-170.0									
-175.0									
-180.0									
-185.0									
-190.0									



LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	R. BOLLER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-74 SPT A	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	4.5 ft	**Latitude:**	32.832565	**Longitude:**	79.957768	**Date Started:**	9/18/2008
Total Depth:	65 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	9/18/2008
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-45	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	76%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	SPT N VALUE / PL MC LL / FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
	0.0	**WASH ROTARY TO 8 FEET**								
-0.5										
	8.0			8.0						
-5.5	10.0	**3" X 30" FIXED PISTON SAMPLE PUSHED WITH 23" RECOVERY**			ST					125
		WASH ROTARY TO 65 FEET								
-10.5										
-15.5										
-20.5										
-25.5										
-30.5										
-35.5										
-40.5										
-45.5										
-50.5										
-55.5										
	65.0			65.0						
-60.5	66.2	**3" X 30" FIXED PISTON SAMPLE PUSHED WITH 14" RECOVERY**			ST					
		BORING TERMINATED AT 66.2 FEET.								
-65.5										
-70.5										
-75.5										
-80.5										
-85.5										
-90.5										

LEGEND

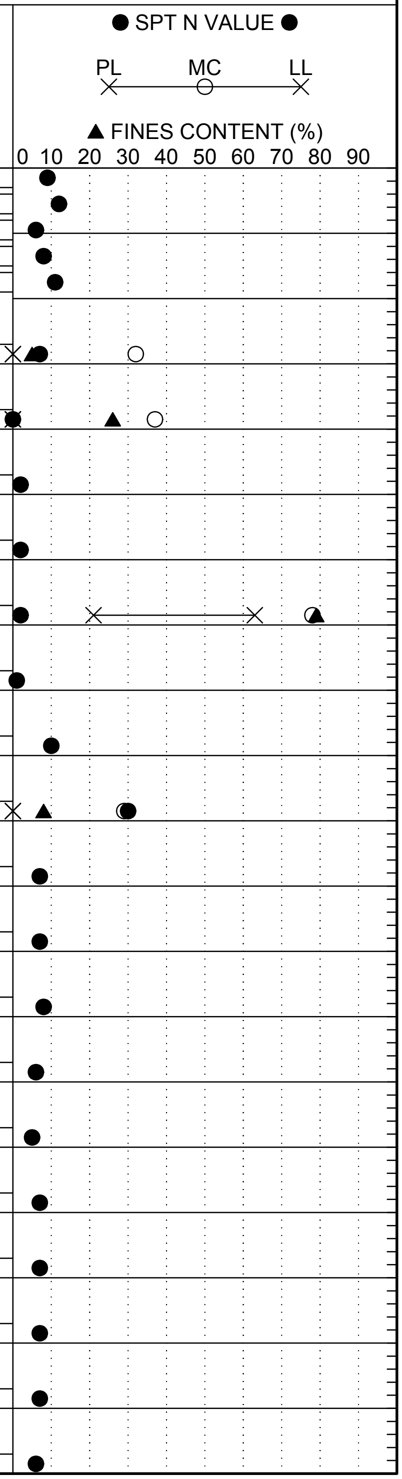
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	M. EICHELBERGER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-75 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	15.0 ft	**Latitude:**	32.837054	**Longitude:**	79.959982	**Date Started:**	2/19/2009
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	2/19/2009
Bore Hole Diameter (in):	3	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-550X	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	80%
Core Size:		**Driller:**	S&ME	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION
15.0	0.0	**FILL: CLAYEY SAND (SC)** loose, brown-red mottled, fine, moist - - - medium dense, dark brown, saturated; with trace organics and shell - - - gray and red mottled
1.5	13.5	**SLIGHTLY CLAYEY SAND (SP-SC)** loose, light gray, fine, saturated
-3.5	18.5	**SILTY SAND (SM)** very loose, gray, fine, saturated
-8.5	23.5	**SILTY CLAY (CH)** very soft, bluish gray, saturated; with trace sand and shell
-23.5	38.5	**SILTY SAND (SM)** very loose, dark grayish brown, fine, saturated
-28.5	43.5	**SLIGHTLY SILTY SAND (SP-SM)** medium dense, gray, fine, saturated
-38.5	53.5	**MARL: SANDY SILT (ML)** firm, olive green, fine, calcareous; trace phosphate

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
0.0	SS	2	4	5	9
2.0	SS	4	8	4	12
4.0	SS	2	3	3	6
6.0	SS	2	4	4	8
8.0	SS	4	5	6	11
13.5	SS	3	4	3	7
18.5	SS	WOH	WOH	WOH	0
23.5	SS	WOH	1	1	2
28.5	SS	1	1	1	2
33.5	SS	WOH	1	1	2
38.5	SS	WOH	WOH	1	1
43.5	SS	6	6	4	10
48.5	SS	6	13	17	30
53.5	SS	2	3	4	7
58.5	SS	2	3	4	7
63.5	SS	3	4	4	8
68.5	SS	2	3	3	6
73.5	SS	1	2	3	5
78.5	SS	2	3	4	7
83.5	SS	2	2	5	7
88.5	SS	2	3	4	7
93.5	SS	3	3	4	7
98.5	SS	2	2	4	6



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LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	M. EICHELBERGER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-75 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	15.0 ft	**Latitude:**	32.837054	**Longitude:**	79.959982	**Date Started:**	2/19/2009
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	2/19/2009
Bore Hole Diameter (in):	3	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-550X	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	80%
Core Size:		**Driller:**	S&ME	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ●
-90.0		- - - stiff		103.5	SS	3	4	5	9	●
-95.0		- - - firm		108.5	SS	3	4	4	8	●
-100.0				113.5	SS	2	3	5	8	●
-105.0	120.0	- - - very stiff		118.5	SS	4	7	15	22	●
-110.0		**BORING TERMINATED AT 120 FEET.**								
-115.0										
-120.0										
-125.0										
-130.0										
-135.0										
-140.0										
-145.0										
-150.0										
-155.0										
-160.0										
-165.0										
-170.0										
-175.0										
-180.0										

PL — MC — LL; ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

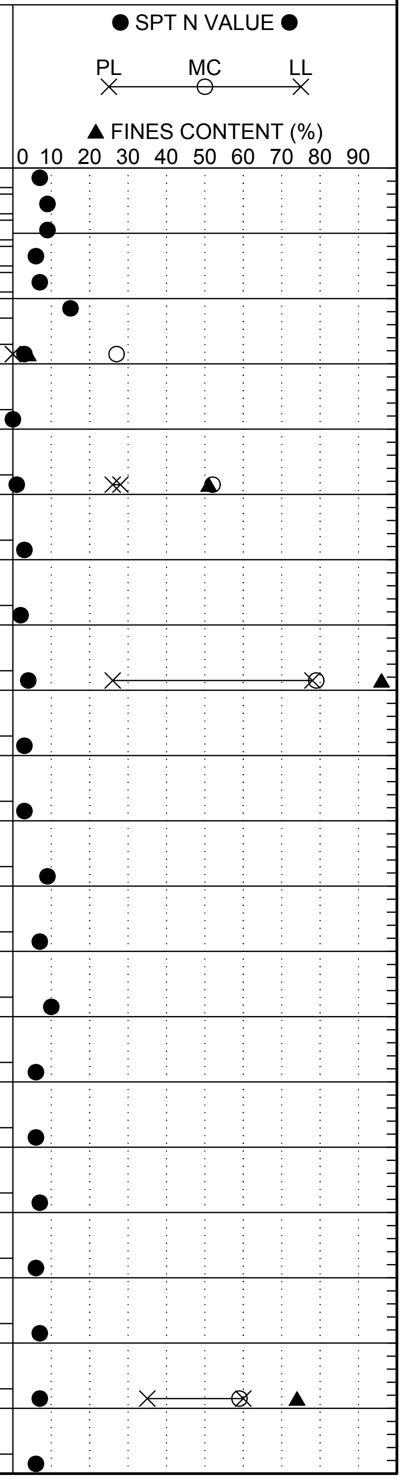
SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	M. EICHELBERGER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-76 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	14.5 ft	**Latitude:**	32.837175	**Longitude:**	79.963382	**Date Started:**	2/10/2009
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	2/10/2009
Bore Hole Diameter (in):	3	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-550X	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	80%
Core Size:		**Driller:**	S&ME	**Groundwater:**	**TOB** 13 ft	**24HR**	8 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION
14.5	0.0	**FILL: SILTY SAND (SM)** loose, brown,moist, fine; with trace roots
11.0	3.5	- - - dark brown, organic stained; with organics and trace roots
		FILL: CLAYEY SAND (SC)
1.0	13.5	very loose, reddish brown, moist, fine
		- - - gray, red, and brown mottled
-4.5	19.0	- - - medium dense
		POSSIBLE FILL: SAND (SP) very loose, reddish yellow, saturated, fine
		SANDY SILT (ML) soft, dark gray, fine, saturated; with trace shell
		- - - very soft
		- - - soft
-19.0	33.5	**SILTY CLAY (CH)** very soft, dark gray, saturated; with trace shell
		- - - soft
		- - - gray; with trace sand and no shell
-39.0	53.5	**MARL: SANDY SILT (ML)** stiff, olive green, fine
		- - - firm
		- - - stiff
		- - - firm

Elevation scale (ft): 9.5, 4.5, -0.5, -5.5, -10.5, -15.5, -20.5, -25.5, -30.5, -35.5, -40.5, -45.5, -50.5, -55.5, -60.5, -65.5, -70.5, -75.5, -80.5

Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
0.0	SS	2	3	4	7
2.0	SS	4	4	5	9
4.0	SS	1	4	5	9
6.0	SS	2	3	3	6
8.0	SS	2	3	4	7
10.0	SS	1	7	8	15
13.5	SS	WOH	1	2	3
18.5	SS	WOH	WOH	WOH	0
23.5	SS	WOH	WOH	1	1
28.5	SS	1	1	2	3
33.5	SS	WOH	WOH	2	2
38.5	SS	WOH	2	2	4
43.5	SS	WOH	1	2	3
48.5	SS	1	1	2	3
53.5	SS	3	4	5	9
58.5	SS	3	3	4	7
63.5	SS	4	4	6	10
68.5	SS	2	3	3	6
73.5	SS	2	3	3	6
78.5	SS	3	3	4	7
83.5	SS	4	3	3	6
88.5	SS	3	2	5	7
93.5	SS	3	3	4	7
98.5	SS	2	3	3	6



LEGEND

Continued Next Page

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	M. EICHELBERGER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-76 SPT	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	14.5 ft	**Latitude:**	32.837175	**Longitude:**	79.963382	**Date Started:**	2/10/2009
Total Depth:	120 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	2/10/2009
Bore Hole Diameter (in):	3	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-550X	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	80%
Core Size:		**Driller:**	S&ME	**Groundwater:**	**TOB** 13 ft	**24HR**	8 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
-90.5		--- stiff	103.5	SS	3	3	7	10
-95.5		--- firm	108.5	SS	3	3	5	8
		--- hard cemented layer 10"						
-100.5		--- hard cemented layer 3"	113.5	SS	2	50/3		0
-105.5	120.0	--- stiff	118.5	SS	2	3	8	11
-110.5		**BORING TERMINATED AT 120 FEET.**						
-115.5								
-120.5								
-125.5								
-130.5								
-135.5								
-140.5								
-145.5								
-150.5								
-155.5								
-160.5								
-165.5								
-170.5								
-175.5								
-180.5								

● SPT N VALUE ●

PL MC LL

▲ FINES CONTENT (%)

0 10 20 30 40 50 60 70 80 90

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	M. EICHELBERGER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-76 SPT A	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	14.5 ft	**Latitude:**	32.837175	**Longitude:**	79.963382	**Date Started:**	2/16/2009
Total Depth:	66 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	2/16/2009
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-550X	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	80%
Core Size:		**Driller:**	S&ME	**Groundwater:**	**TOB** 10.5 ft	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	**WASH ROTARY TO 60 FEET**							
	60.0			60.0					
	62.0	**3" X 30" FIXED PISTON SAMPLE PUSHED 24" WITH 24" RECOVERY**		62.0	ST				
	64.0	**3" X 30" FIXED PISTON SAMPLE PUSHED 24" WITH 24" RECOVERY**		64.0	ST				
	66.0	**3" X 30" FIXED PISTON SAMPLE PUSHED 24" WITH 16" RECOVERY**			ST				
		BORING TERMINATED AT 66 FEET.							

Elevation scale: 9.5, 4.5, -0.5, -5.5, -10.5, -15.5, -20.5, -25.5, -30.5, -35.5, -40.5, -45.5, -50.5, -55.5, -60.5, -65.5, -70.5, -75.5, -80.5

● SPT N VALUE ●

PL MC LL

▲ FINES CONTENT (%)

0 10 20 30 40 50 60 70 80 90

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	M. EICHELBERGER
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-77 CPT A5 1 B	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	11.0 ft	**Latitude:**	32.837882	**Longitude:**	79.953696	**Date Started:**	3/4/2009
Total Depth:	39 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	3/4/2009
Bore Hole Diameter (in):	4	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-850	**Drill Method:**	MUD ROTARY	**Hammer Type:**	Automatic	**Energy Ratio:**	74%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** 7.5 ft	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	**WASH ROTARY TO 34 FEET**							
-23.0	34.0	**3" X 30" FIXED PISTON SAMPLE PUSHED WITH 22" RECOVERY**		34.0	ST				
-25.0	36.0	**WASH ROTARY TO 37 FEET**							
-26.0	37.0	**3" X 30" FIXED PISTON SAMPLE PUSHED WITH 20" RECOVERY**		37.0	ST				
-28.0	39.0								

Elevation scale: 6.0, 1.0, -4.0, -9.0, -14.0, -19.0, -24.0, -29.0, -34.0, -39.0, -44.0, -49.0, -54.0, -59.0, -64.0, -69.0, -74.0, -79.0, -84.0

● SPT N VALUE ●

PL MC LL

▲ FINES CONTENT (%)

0 10 20 30 40 50 60 70 80 90

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	Project No. (PIN):	1131-08-554	County:	CHARLESTON	Eng./Geo.:	M. EICHELBERG
Site Description:	PORT ACCESS ROAD					Route:	
Boring No.:	B-78	Boring Location:		Offset:		Alignment:	
Elev.:	8.0 ft	Latitude:	32.844567	Longitude:	79.960373	Date Started:	3/25/2009
Total Depth:	15 ft	Soil Depth:	ft	Core Depth:	ft	Date Completed:	3/25/2009
Bore Hole Diameter (in):	6	Sampler Configuration		Liner Required:	Y (N)	Liner Used:	Y (N)
Drill Machine:	D-50	Drill Method:	AUGER	Hammer Type:	Automatic	Energy Ratio:	60%
Core Size:		Driller:	S&ME	Groundwater:	TOB 5 ft	24HR	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● PL MC LL ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
	0.0	**FILL: SLIGHTLY SILTY SAND (SP-SM)** yellowish-brown, fine, moist								
3.0	5.0	**POSSIBLE FILL: CLAYEY SAND (SC)** reddish brown, fine, saturated								
-2.0										
-7.0	15.0	**AUGER TERMINATED AT 15 FEET. Boring was performed to check for the presence of debris. No sampling was performed.**								
-12.0										
-17.0										
-22.0										
-27.0										
-32.0										
-37.0										
-42.0										
-47.0										
-52.0										

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	10.224B	**Project No. (PIN):**	1131-08-554	**County:**	CHARLESTON	**Eng./Geo.:**	M. EICHELBERG
Site Description:	PORT ACCESS ROAD					**Route:**	
Boring No.:	B-79	**Boring Location:**		**Offset:**		**Alignment:**	
Elev.:	10.0 ft	**Latitude:**	32.844	**Longitude:**	79.9615	**Date Started:**	3/25/2009
Total Depth:	15 ft	**Soil Depth:**	ft	**Core Depth:**	ft	**Date Completed:**	3/25/2009
Bore Hole Diameter (in):	6	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	D-50	**Drill Method:**	AUGER	**Hammer Type:**	Automatic	**Energy Ratio:**	60%
Core Size:		**Driller:**	S&ME	**Groundwater:**	**TOB** 6 ft	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● PL MC LL ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
	0.0	**FILL: SILTY SAND (SM)** dark gray, fine, moist								
5.0	4.0	**POSSIBLE FILL: SLIGHTLY SILTY SAND (SP-SM)** light gray, fine, saturated - - - reddish yellow - - - shell								
0.0										
-5.0	15.0	**AUGER TERMINATED AT 15 FEET. Boring was performed to check for the presence of debris. No sampling was performed.**								
-10.0										
-15.0										
-20.0										
-25.0										
-30.0										
-35.0										
-40.0										
-45.0										
-50.0										

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SPT Boring Procedures

FIELD TESTING PROCEDURES

Soil Classifications

Soil classifications provide a general guide to the engineering properties of various soil types and enable the engineer to apply his past experience to current problems. In our exploration, samples obtained during drilling operations are examined and visually classified according to color, texture, and relative density or consistency (based on standard penetration resistance). The consistency and relative density designations are as follows:

SANDS		SILTS AND CLAYS	
N (SPT)	**Relative Density**	**N (SPT)**	**Consistency**
0 - 4	Very Loose	0 - 2	Very Soft
5 - 10	Loose	3 - 4	Soft
11 - 30	Medium Dense	5 - 8	Firm
		9 - 15	Stiff
31 - 50	Dense	16 - 30	Very Stiff
50+	Very Dense	31 - 50	Hard
		50+	Very Hard

Soil Test Borings

All boring and sampling operations were conducted in accordance with ASTM Designation D 1586. Initially, the borings were advanced by either mechanically augering or wash boring through the soils. Where necessary, a heavy drilling fluid is used below the water table to stabilize the side and bottom of the drill hole. At regular intervals soil samples were obtained with a standard 1.4-inch I.D., 2-inch O.D., split-barrel sampler. The sampler was first seated 6 inches to penetrate any loose cuttings and then driven an additional foot with blows of a 140 pound hammer falling 30 inches. The number of hammer blows required to drive the sampler the final foot is designated the "Standard Penetration Resistance". The penetration resistance, when properly evaluated, is an index to the soil strength.

SPT Energy Measurements Data Sheets

SPT Energy Measurements Data Sheet

S&ME

Drill Rig: Raleigh CME 550 ATV
Hammer: Auto
Operator: R. Norwood
Location: Charleston, SC

Date: 9/30/2008
Project No.: 1131-08-554
Boring ID: B-23A
Drilling Method: Mud Rotary

Rod Type/ID: 71AW-1

AR: 1.21 in^2

Depth: 24 ft
LE: 30 ft
Blow Count: 1, 1, 1, 2

Blow No.	EFV Energy
1	0.28
2	0.27
3	0.27
4	0.28
5	0.27
6	0.28
7	0.28
8	0.28

Avg. Energy: 0.27 ft-kips
Max. Rated Energy: 0.35 ft-kips
Efficiency: 78%
Std. Deviation: 0.01 ft-kips

Depth: 26 ft
LE: 32 ft
Blow Count: 3, 3, 4, 3

Blow No.	EFV Energy
1	0.27
2	0.27
3	0.28
4	0.28
5	0.28
6	0.28
7	0.28
8	0.29
9	0.30
10	0.28
11	0.28
12	0.28
13	0.28

Avg. Energy: 0.28 ft-kips
Max. Rated Energy: 0.35 ft-kips
Efficiency: 80%
Std. Deviation: 0.01 ft-kips

Depth: 30 ft
LE: 36 ft
Blow Count: WOH, 2, 2, 2

Blow No.	EFV Energy
1	0.28
2	0.27
3	0.29
4	0.29
5	0.29
6	0.29

Avg. Energy: 0.28 ft-kips
Max. Rated Energy: 0.35 ft-kips
Efficiency: 81%
Std. Deviation: 0.01 ft-kips

Depth: 34
LE: 40
Blow Count: 1, 2, 2, 2

Blow No.	EFV Energy
1	0.27
2	0.28
3	0.29
4	0.29
5	0.29
6	0.29
7	~~0.04~~

Avg. Energy: 0.29 ft-kips
Max. Rated Energy: 0.35 ft-kips
Efficiency: 81%
Std. Deviation: 0.01 ft-kips

Average efficiency from all tests 80%

Comments: The maximum rated energy of 0.35 ft-kips is calculated based on an assumed hammer weight of 140 lbs (0.14 kips) and an assumed drop height of 30 in. (2.5 ft). N-value is addtion of the last two increment. LE = length from gages to end of sampler. EFV method used for energy.

SPT Energy Measurements Data Sheet

S&ME

Drill Rig:	AE CME 750 ATV	**Date:**	10/7/2008
Hammer:	Auto	**Project No.:**	1131-08-554
Operator:		**Boring ID:**	B-11
Location:	Charleston, SC	**Drilling Method:**	Mud Rotary

Rod Type/ID: NWJ2 **AR:** 1.43 in^2

Depth: 48 ft
LE: 54.75 ft
Blow Count:

Blow No.	EFV Energy
1	0.25
2	0.25
3	0.25
4	0.25
5	0.28
6	0.26
7	0.27
8	0.27
9	0.26
10	0.26
11	0.26
12	0.26
13	0.28
14	0.29
15	0.29

Avg. Energy: 0.27 ft-kips
Max. Rated Energy: 0.35 ft-kips
Efficiency: 76%
Std. Deviation: 0.01 ft-kips

Depth: 50 ft
LE: 56.75 ft
Blow Count:

Blow No.	EFV Energy
1	0.25
2	0.25
3	0.26
4	0.25
5	0.27
6	0.27
7	0.27
8	0.26
9	0.28
10	0.27
11	0.27
12	0.26
13	0.31

Avg. Energy: 0.27 ft-kips
Max. Rated Energy: 0.35 ft-kips
Efficiency: 76%
Std. Deviation: 0.02 ft-kips

Depth: 52 ft
LE: 59.75 ft
Blow Count:

Blow No.	EFV Energy
1	0.25
2	0.31
3	0.26
4	0.28
5	0.25
6	0.25
7	0.26

Avg. Energy: 0.27 ft-kips
Max. Rated Energy: 0.35 ft-kips
Efficiency: 76%
Std. Deviation: 0.02 ft-kips

Depth: 54
LE: 59.75
Blow Count:

Blow No.	EFV Energy
1	0.25
2	0.27
3	0.27
4	0.28
5	0.28
6	0.27
7	0.27
8	0.24
9	0.28
10	0.35
11	0.22
12	0.29
13	0.24
14	0.25
15	0.32
16	0.29
17	0.27
18	~~0.16~~
19	~~0.43~~

Avg. Energy: 0.27 ft-kips
Max. Rated Energy: 0.35 ft-kips
Efficiency: 78%
Std. Deviation: 0.03 ft-kips

Average efficiency from all tests 76%

Comments: The maximum rated energy of 0.35 ft-kips is calculated based on an assumed hammer weight of 140 lbs (0.14 kips) and an assumed drop height of 30 in. (2.5 ft). N-value is addtion of the last two increment. LE = length from gages to end of sampler. EFV method used for energy.

SPT Energy Measurements Data Sheet

S&ME

Drill Rig: SCI CME 850 Track
Hammer: Auto
Operator:
Location: Charleston, SC

Date: 9/29/2008
Project No.: 1131-08-554
Boring ID: B-2
Drilling Method: Mud Rotary

Rod Type/ID: 102BW-1

AR: 1.77 in^2

Depth: 7.5 ft
LE: 32 ft
Blow Count: 7, 5, 5

Blow No.	EFV Energy
1	0.25
2	~~0.00~~
3	0.25
4	0.24
5	0.26
6	0.25
7	0.27
8	0.26
9	0.25
10	0.26
11	0.26
12	0.26
13	0.25
14	0.25
15	0.26
16	0.27
17	0.27

Depth: 10 ft
LE: 36 ft
Blow Count: 3, 2, 1

Blow No.	EFV Energy
1	0.14
2	0.24
3	0.24
4	0.23
5	0.23
6	0.23

Depth: 25
LE: 40
Blow Count: WOH, WOH, 2

Blow No.	EFV Energy
1	0.27
2	0.27

Depth: 40
LE: 40
Blow Count: WOR, 1, 2

Blow No.	EFV Energy
1	0.26
2	0.27
3	0.27
4	0.28

Depth: 50
LE: 40
Blow Count: 3, 5, 6

Blow No.	EFV Energy
1	0.29
2	0.27
3	0.28
4	0.27
5	0.28
6	0.28
7	0.28
8	0.28
9	0.27
10	0.27
11	0.27
12	0.27
13	0.27
14	0.27

	Depth 7.5	Depth 10	Depth 25	Depth 40	Depth 50
Avg. Energy:	0.26 ft-kips	0.22 ft-kips	0.27 ft-kips	0.27 ft-kips	0.27 ft-kips
Max. Rated Energy:	0.35 ft-kips	0.35 ft-kips	0.35 ft-kips	0.35 ft-kips	0.35 ft-kips
Efficiency:	74%	62%	76%	77%	78%
Std. Deviation:	0.01 ft-kips	0.04 ft-kips	0.00 ft-kips	0.01 ft-kips	0.01 ft-kips

Average efficiency from all tests 73%

Comments: The maximum rated energy of 0.35 ft-kips is calculated based on an assumed hammer weight of 140 lbs (0.14 kips) and an assumed drop height of 30 in. (2.5 ft). N-value is addtion of the last two increment. LE = length from gages to end of sampler. EFV method used for energy.

SPT Energy Measurements Data Sheet

S&ME

Drill Rig: SCI CME 55 Truck
Hammer: Auto
Operator:
Location: Charleston, SC

Date: 9/22/2008
Project No.: 1131-08-554
Boring ID: B-68 ALT 1
Drilling Method: Mud Rotary

Rod Type/ID: 102BW-1
AR: 1.77 in²

Depth: 85 ft
LE: 88.75 ft
Blow Count: 1, 1, 6

Blow No.	EFV Energy
1	0.19
2	0.18
3	0.19
4	0.19
5	0.20
6	0.19
7	0.20

Avg. Energy: 0.19 ft-kips
Max. Rated Energy: 0.35 ft-kips
Efficiency: 55%
Std. Deviation: 0.00 ft-kips

Depth: 90 ft
LE: 93.75 ft
Blow Count: 1, 4, 12

Blow No.	EFV Energy
1	0.20
2	0.18
3	0.19
4	0.21
5	0.21
6	0.20
7	0.20
8	0.20
9	0.21
10	0.20
11	0.21
12	0.20
13	0.20
14	0.20
15	0.21
16	0.21
17	0.21

Avg. Energy: 0.20 ft-kips
Max. Rated Energy: 0.35 ft-kips
Efficiency: 58%
Std. Deviation: 0.01 ft-kips

Depth: 100 ft
LE: 103.75 ft
Blow Count: 3, 3, 8

Blow No.	EFV Energy
1	0.10
2	0.10
3	0.10
4	0.19
5	0.19
6	0.20
7	0.20
8	0.20
9	0.20
10	0.20
11	0.20
12	0.20
13	0.21
14	0.20
15	0.26

Avg. Energy: 0.18 ft-kips
Max. Rated Energy: 0.35 ft-kips
Efficiency: 52%
Std. Deviation: 0.04 ft-kips

Depth: 105
LE: 108.75
Blow Count: 3, 4, 7

Blow No.	EFV Energy
1	0.21
2	0.21
3	0.22
4	0.22
5	0.22
6	0.21
7	0.21
8	0.20
9	0.21
10	0.20
11	0.21
12	0.21
13	0.21
14	0.21

Avg. Energy: 0.21 ft-kips
Max. Rated Energy: 0.35 ft-kips
Efficiency: 60%
Std. Deviation: 0.01 ft-kips

Average efficiency from all tests 56%

Comments: The maximum rated energy of 0.35 ft-kips is calculated based on an assumed hammer weight of 140 lbs (0.14 kips) and an assumed drop height of 30 in. (2.5 ft). N-value is addtion of the last two increment. LE = length from gages to end of sampler. EFV method used for energy.

SPT Energy Measurements Data Sheet

S&ME

Drill Rig: MAD CME 45C Barge
Hammer: Safety
Operator:
Location: Charleston, SC

Date: 10/17/2008
Project No.: 1131-08-554
Boring ID: B-29 Alt 1
Drilling Method: Mud Rotary

Rod Type/ID: 71AW-1

AR: 1.21 in^2

Depth*: 45 ft
LE: 54 ft
Blow Count: 3, 3, 7

Blow No.	EFV Energy
1	0.24
2	0.24
3	0.23
4	0.23
5	0.22
6	0.23
7	0.19
8	0.20
9	0.20
10	0.21
11	0.21
12	0.20
13	0.21

Depth*: 46.5 ft
LE: 54 ft
Blow Count: 3, 6, 9

Blow No.	EFV Energy
1 to 6	-
7	0.23
8	0.24
9	0.25
10	0.24
11	0.25
12	0.26
13	0.25
14	0.26
15	0.24
16	0.24
17	0.25
18	0.24

Depth*: 48 ft
LE: 56 ft
Blow Count:

Blow No.	EFV Energy
1	0.27
2	0.25
3	0.25
4	0.26
5	0.26
6	0.24
7	0.25
8	0.24
9	0.24
10	0.26
11	0.25
12	0.26
13	0.26
14	0.26
15	0.25
16	0.24
17	0.25
18	0.24
19	0.25
20	0.24
21	0.26
22	0.26

Depth*: 100
LE: 109
Blow Count:

Blow No.	EFV Energy
1	0.26
2	0.26
3	0.27
4	0.26
5	0.27
6	0.26
7	0.26
8	0.27
9	0.27
10	0.27
11	0.27
12	0.25
13	0.25
14	0.26
15	0.27

*Depth is referenced to mudline

	Depth 45	Depth 46.5	Depth 48	Depth 100
Avg. Energy:	0.22 ft-kips	0.25 ft-kips	0.25 ft-kips	0.26 ft-kips
Max. Rated Energy:	0.35 ft-kips	0.35 ft-kips	0.35 ft-kips	0.35 ft-kips
Efficiency:	62%	70%	72%	75%
Std. Deviation:	0.02 ft-kips	0.01 ft-kips	0.01 ft-kips	0.01 ft-kips

Average efficiency from all tests 70%

Comments: The maximum rated energy of 0.35 ft-kips is calculated based on an assumed hammer weight of 140 lbs (0.14 kips) and an assumed drop height of 30 in. (2.5 ft). N-value is addtion of the last two increment. LE = length from gages to end of sampler. EFV method used for energy.

SPT Energy Measurements Data Sheet

Drill Rig:	S&ME Diedrich D-50 Track Rig	**Date:**	2/19/2009
Hammer:	Automatic	**Project No.:**	1131-08-554
Oper./Engr.:	H. Forbes	**Boring ID:**	B-63
Location:	Charleston, SC	**Drilling Method:**	Mud Rotary

Rod Type/ID: 71AW-2 **AR:** 1.21 in^2

	Test 1	Test 2	Test 3	Test 4
Depth:	53.5 ft	58.5 ft	63.5 ft	68.5
LE:	59.4 ft	64.4 ft	69.4 ft	74.4
Blow Count:	3, 4, 6	3, 3, 5	4, 4, 7	3, 3, 3

Blow No.	EFV Energy
1	0.32
2	0.30
3	0.26
4	0.24
5	0.22
6	0.24
7	0.24
8	0.22
9	0.22
10	0.23
11	0.21
12	0.20
13	0.20

Blow No.	EFV Energy
1	0.15
2	0.26
3	0.21
4	0.25
5	0.20
6	0.20
7	0.25
8	0.21
9	0.20
10	0.26
11	0.25

Blow No.	EFV Energy
1	0.23
2	0.20
3	0.15
4	0.21
5	0.22
6	0.20
7	0.20
8	0.20
9	0.21
10	0.19
11	0.22
12	0.18
13	0.23
14	0.19
15	0.19
16	0.17

Blow No.	EFV Energy
1	0.22
2	0.21
3	0.21
4	0.21
5	0.15
6	0.17
7	0.17
8	0.15
9	0.17

	Test 1	Test 2	Test 3	Test 4
Avg. Energy:	0.24 ft-kips	0.22 ft-kips	0.20 ft-kips	0.18 ft-kips
Max. Rated Energy:	0.35 ft-kips	0.35 ft-kips	0.35 ft-kips	0.35 ft-kips
Efficiency:	68%	63%	57%	53%
Std. Deviation:	0.04 ft-kips	0.03 ft-kips	0.02 ft-kips	0.03 ft-kips

Average efficiency from all tests 60%

Comments: LE = length from gages to end of sampler. EFV method used for energy.
The maximum rated energy of 0.35 ft-kips is calculated based on an assumed hammer weight of
140 lbs (0.14 kips) and an assumed drop height of 30 in. (2.5 ft).

SPT Hammer Efficiency Sheet

Drill Rig:	SCI CME 550	Test Date:	12/22/08	Boring ID:	TB-6
Hammer:	Safety Hammer	Project No. :	05226	Rod Type:	BW
Rig Operator:	Williams/Benbow	Location:	Meeting Street	Analyzer ID:	216BW
Engineer:	Henderson	Drilling Method:	Mud Rotary	Analyzer Rod Area:	1.81 in^2

Depth: 35 ft
LE: 38 ft
Blow Count: 1,2,4

Blow No.	Energy	Blow No.	Energy
1	0.220	26	
2	0.234	27	
3	0.233	28	
4	0.240	29	
5	0.231	30	
6	0.226	31	
7	0.227	32	
8		33	
9		34	
10		35	
11		36	
12		37	
13		38	
14		39	
15		40	
16		41	
17		42	
18		43	
19		44	
20		45	
21		46	
22		47	
23		48	
24		49	
25		50	

Average Energy: 0.230 kip-ft
Max. Rated Energy: 0.350 kip-ft
Efficiency: 66%
Std. Deviation: 0.006 kip-ft

Depth: 45 ft
LE: 48 ft
Blow Count: 14,14,12

Blow No.	Energy	Blow No.	Energy	Blow No.	Energy
1	0.216	26	0.251	51	
2	0.210	27	0.252	52	
3	0.248	28	0.255	53	
4	0.236	29	0.252	54	
5	0.196	30	0.252	55	
6	0.241	31	0.252	56	
7	0.232	32	0.252	57	
8	0.250	33	0.255	58	
9	0.249	34	0.242	59	
10	0.257	35	0.249	60	
11	0.228	36	0.250	61	
12	0.231	37	0.246	62	
13	0.261	38	0.229	63	
14	0.227	39	0.254	64	
15	0.242	40	0.252	65	
16	0.255	41		66	
17	0.248	42		67	
18	0.236	43		68	
19	0.225	44		69	
20	0.253	45		70	
21	0.256	46		71	
22	0.258	47		72	
23	0.247	48		73	
24	0.264	49		74	
25	0.247	50		75	

Average Energy: 0.244 kip-ft
Max. Rated Energy: 0.350 kip-ft
Efficiency: 70%
Std. Deviation: 0.014 kip-ft

Average efficiency from all tests: 68%

Comments: Safety hammer operated by Williams
LE = length of rod from below gages to bottom of sampler.
Maximum rated energy based on an assumed hammer weight of 0.14 kips and an assumed drop height of 2.5 feet.

SPT Hammer Efficiency Sheet

Drill Rig:	SCI CME 550	Test Date:	12/22/08	Boring ID:	TB-4
Hammer:	Safety Hammer	Project No. :	05226	Rod Type:	BW
Rig Operator:	Nelson/Grimball	Location:	Meeting Street	Analyzer ID:	216BW
Engineer:	Henderson	Drilling Method:	Mud Rotary	Analyzer Rod Area:	1.81 in^2

Depth: 40 ft
LE: 43 ft
Blow Count: 2,2,4

Blow No.	Energy	Blow No.	Energy
1	0.199	26	
2	0.207	27	
3	0.212	28	
4	0.215	29	
5	0.221	30	
6	0.224	31	
7	0.218	32	
8	0.225	33	
9		34	
10		35	
11		36	
12		37	
13		38	
14		39	
15		40	
16		41	
17		42	
18		43	
19		44	
20		45	
21		46	
22		47	
23		48	
24		49	
25		50	

Average Energy: 0.215 kip-ft
Max. Rated Energy: 0.350 kip-ft
Efficiency: 61%
Std. Deviation: 0.009 kip-ft

Depth: 57 ft
LE: 50 ft
Blow Count: 14,30,31

Blow No.	Energy	Blow No.	Energy	Blow No.	Energy
1	0.211	26	0.218	51	0.204
2	0.230	27	0.220	52	0.205
3	0.238	28	0.223	53	0.216
4	0.236	29	0.209	54	0.218
5	0.236	30	0.218	55	0.201
6	0.234	31	0.214	56	0.204
7	0.233	32	0.225	57	0.197
8	0.233	33	0.205	58	0.190
9	0.239	34	0.216	59	0.217
10	0.247	35	0.211	60	0.199
11	0.230	36	0.213	61	0.187
12	0.234	37	0.208	62	0.225
13	0.237	38	0.196	63	0.209
14	0.219	39	0.211	64	0.199
15	0.220	40	0.196	65	0.197
16	0.234	41	0.201	66	0.205
17	0.218	42	0.214	67	0.200
18	0.219	43	0.191	68	0.196
19	0.216	44	0.197	69	0.188
20	0.226	45	0.215	70	0.206
21	0.218	46	0.206	71	0.204
22	0.218	47	0.205	72	0.193
23	0.222	48	0.211	73	0.211
24	0.224	49	0.190	74	0.200
25	0.212	50	0.204	75	0.199

Average Energy: 0.213 kip-ft
Max. Rated Energy: 0.350 kip-ft
Efficiency: 61%
Std. Deviation: 0.014 kip-ft

Average efficiency from all tests: 61%

Comments: Safety hammer operated by Nelson
LE = length of rod from below gages to bottom of sampler.
Maximum rated energy based on an assumed hammer weight of 0.14 kips and an assumed drop height of 2.5 feet.

SPT Hammer Efficiency Sheet

Drill Rig:	SCI CME 550	Test Date:	12/22/08	Boring ID:	TB-4
Hammer:	Safety Hammer	Project No. :	05226	Rod Type:	BW
Rig Operator:	Grimball/Nelson	Location:	Meeting Street	Analyzer ID:	216BW
Engineer:	Henderson	Drilling Method:	Mud Rotary	Analyzer Rod Area:	1.81 in^2

Depth: 35 ft
LE: 38 ft
Blow Count: 2,3,3

Blow No.	Energy	Blow No.	Energy
1	0.215	26	
2	0.215	27	
3	0.208	28	
4	0.210	29	
5	0.204	30	
6	0.210	31	
7	0.214	32	
8	0.213	33	
9		34	
10		35	
11		36	
12		37	
13		38	
14		39	
15		40	
16		41	
17		42	
18		43	
19		44	
20		45	
21		46	
22		47	
23		48	
24		49	
25		50	

Average Energy: 0.211 kip-ft
Max. Rated Energy: 0.350 kip-ft
Efficiency: 60%
Std. Deviation: 0.004 kip-ft

Depth: 45 ft
LE: 48 ft
Blow Count: 4,15,46

Blow No.	Energy	Blow No.	Energy	Blow No.	Energy
1	0.191	26	0.220	51	0.219
2	0.218	27	0.232	52	0.217
3	0.220	28	0.206	53	0.190
4	0.219	29	0.243	54	0.224
5	0.217	30	0.246	55	0.223
6	0.219	31	0.235	56	0.209
7	0.233	32	0.224	57	0.212
8	0.219	33	0.237	58	0.226
9	0.218	34	0.224	59	0.262
10	0.220	35	0.223	60	0.2
11	0.241	36	0.213	61	0.229
12	0.218	37	0.245	62	0.199
13	0.228	38	0.214	63	0.222
14	0.239	39	0.205	64	0.214
15	0.228	40	0.222	65	0.217
16	0.223	41	0.223	66	
17	0.230	42	0.206	67	
18	0.249	43	0.210	68	
19	0.241	44	0.224	69	
20	0.251	45	0.216	70	
21	0.226	46	0.220	71	
22	0.248	47	0.231	72	
23	0.207	48	0.212	73	
24	0.235	49	0.224	74	
25	0.228	50	0.221	75	

Average Energy: 0.223 kip-ft
Max. Rated Energy: 0.350 kip-ft
Efficiency: 64%
Std. Deviation: 0.014 kip-ft

Average efficiency from all tests: 62%

Comments: Safety hammer operated by Grimball
LE = length of rod from below gages to bottom of sampler.
Maximum rated energy based on an assumed hammer weight of 0.14 kips and an assumed drop height of 2.5 feet.

SPT Hammer Efficiency Sheet

Drill Rig: SCI CME 550	Test Date: 12/22/08	Boring ID: TB-6
Hammer: Safety Hammer	Project No. : 05226	Rod Type: BW
Rig Operator: Benbow/Williams	Location: Meeting Street	Analyzer ID: 216BW
Engineer: Henderson	Drilling Method: Mud Rotary	Analyzer Rod Area: 1.81 in^2

Depth: 40 ft
LE: 43 ft
Blow Count: 2,4,4

Blow No.	Energy	Blow No.	Energy
1	0.230	26	
2	0.223	27	
3	0.227	28	
4	0.217	29	
5	0.241	30	
6	0.247	31	
7	0.240	32	
8	0.248	33	
9	0.251	34	
10	0.265	35	
11		36	
12		37	
13		38	
14		39	
15		40	
16		41	
17		42	
18		43	
19		44	
20		45	
21		46	
22		47	
23		48	
24		49	
25		50	

Average Energy: 0.239 kip-ft
Max. Rated Energy: 0.350 kip-ft
Efficiency: 68%
Std. Deviation: 0.015 kip-ft

Depth: 47 ft
LE: 50 ft
Blow Count: 16,25,20

Blow No.	Energy	Blow No.	Energy	Blow No.	Energy
1	0.253	26	0.256	51	0.240
2	0.235	27	0.249	52	0.254
3	0.240	28	0.254	53	0.261
4	0.249	29	0.250	54	0.245
5	0.253	30	0.269	55	0.258
6	0.249	31	0.255	56	0.255
7	0.256	32	0.259	57	0.249
8	0.221	33	0.249	58	0.253
9	0.228	34	0.242	59	0.229
10	0.225	35	0.248	60	0.234
11	0.239	36	0.253	61	0.245
12	0.241	37	0.257	62	
13	0.249	38	0.251	63	
14	0.243	39	0.246	64	
15	0.253	40	0.254	65	
16	0.251	41	0.259	66	
17	0.268	42	0.257	67	
18	0.260	43	0.254	68	
19	0.245	44	0.267	69	
20	0.257	45	0.252	70	
21	0.265	46	0.241	71	
22	0.255	47	0.260	72	
23	0.279	48	0.250	73	
24	0.280	49	0.262	74	
25	0.276	50	0.252	75	

Average Energy: 0.251 kip-ft
Max. Rated Energy: 0.350 kip-ft
Efficiency: 72%
Std. Deviation: 0.012 kip-ft

Average efficiency from all tests: 70%

Comments: Safety hammer operated by Benbow
LE = length of rod from below gages to bottom of sampler.
Maximum rated energy based on an assumed hammer weight of 0.14 kips and an assumed drop height of 2.5 feet.

SPT Hammer Efficiency Sheet

Drill Rig:	SCI CME 55	Test Date:	12/17/08	Boring ID:	TB-1
Hammer:	Automatic	Project No. :	05226	Rod Type:	BW
Rig Operator:	Benbow/Heath	Location:	Meeting Street	Analyzer ID:	216BW
Engineer:	Henderson	Drilling Method:	Mud Rotary	Rod Area:	1.81 in^2

Depth: 35 ft
LE: 38 ft
Blow Count: 2,2,3

Blow No.	Energy	Blow No.	Energy
1	0.270	26	
2	0.277	27	
3	0.291	28	
4	0.274	29	
5	0.291	30	
6	0.290	31	
7	0.273	32	
8		33	
9		34	
10		35	
11		36	
12		37	
13		38	
14		39	
15		40	
16		41	
17		42	
18		43	
19		44	
20		45	
21		46	
22		47	
23		48	
24		49	
25		50	

Average Energy: 0.281 kip-ft
Max. Rated Energy: 0.350 kip-ft
Efficiency: 80%
Std. Deviation: 0.009 kip-ft

Depth: 40 ft
LE: 43 ft
Blow Count: 1,1,4

Blow No.	Energy	Blow No.	Energy
1	0.275	26	
2	0.274	27	
3	0.275	28	
4	0.283	29	
5	0.281	30	
6	0.288	31	
7		32	
8		33	
9		34	
10		35	
11		36	
12		37	
13		38	
14		39	
15		40	
16		41	
17		42	
18		43	
19		44	
20		45	
21		46	
22		47	
23		48	
24		49	
25		50	

Average Energy: 0.279 kip-ft
Max. Rated Energy: 0.350 kip-ft
Efficiency: 80%
Std. Deviation: 0.006 kip-ft

Depth: 45 ft
LE: 48 ft
Blow Count: 15,20,17

Blow No.	Energy	Blow No.	Energy	Blow No.	Energy
1	0.230	26	0.285	51	0.268
2	0.280	27	0.289	52	0.258
3	0.284	28	0.291	53	
4	0.279	29	0.292	54	
5	0.274	30	0.285	55	
6	0.271	31	0.277	56	
7	0.266	32	0.280	57	
8	0.281	33	0.288	58	
9	0.279	34	0.279	59	
10	0.279	35	0.281	60	
11	0.284	36	0.289	61	
12	0.274	37	0.284	62	
13	0.281	38	0.287	63	
14	0.274	39	0.288	64	
15	0.283	40	0.272	65	
16	0.281	41	0.280	66	
17	0.271	42	0.280	67	
18	0.275	43	0.292	68	
19	0.290	44	0.271	69	
20	0.288	45	0.298	70	
21	0.282	46	0.288	71	
22	0.285	47	0.285	72	
23	0.290	48	0.287	73	
24	0.285	49	0.287	74	
25	0.279	50	0.283	75	

Average Energy: 0.281 kip-ft
Max. Rated Energy: 0.350 kip-ft
Efficiency: 80%
Std. Deviation: 0.010 kip-ft

Average efficiency from all tests: 80%

Comments: LE = length of rod from below gages to bottom of sampler.
Maximum rated energy based on an assumed hammer weight of 0.14 kips and an assumed drop height of 2.5 feet.

SPT Hammer Efficiency Sheet

Drill Rig:	SCI Gyrotrack	Test Date:	12/17/08	Boring ID:	TB-3
Hammer:	Automatic	Project No. :	05226	Rod Type:	BW
Rig Operator:	Williams/Benbow	Location:	Meeting Street	Analyzer ID:	216BW
Engineer:	Henderson	Drilling Method:	Mud Rotary	Rod Area:	1.81 in^2

Depth: 35 ft
LE: 38 ft
Blow Count: 1,1,3

Blow No.	Energy	Blow No.	Energy
1	0.259	26	
2	0.265	27	
3	0.273	28	
4	0.265	29	
5	0.266	30	
6		31	
7		32	
8		33	
9		34	
10		35	
11		36	
12		37	
13		38	
14		39	
15		40	
16		41	
17		42	
18		43	
19		44	
20		45	
21		46	
22		47	
23		48	
24		49	
25		50	

Average Energy: 0.266 kip-ft
Max. Rated Energy: 0.350 kip-ft
Efficiency: 76%
Std. Deviation: 0.005 kip-ft

Depth: 40 ft
LE: 43 ft
Blow Count: 1,2,3

Blow No.	Energy	Blow No.	Energy
1	0.263	26	
2	0.267	27	
3	0.266	28	
4	0.268	29	
5	0.265	30	
6	0.267	31	
7		32	
8		33	
9		34	
10		35	
11		36	
12		37	
13		38	
14		39	
15		40	
16		41	
17		42	
18		43	
19		44	
20		45	
21		46	
22		47	
23		48	
24		49	
25		50	

Average Energy: 0.266 kip-ft
Max. Rated Energy: 0.350 kip-ft
Efficiency: 76%
Std. Deviation: 0.002 kip-ft

Depth: 45 ft
LE: 48 ft
Blow Count: 13,23,23

Blow No.	Energy	Blow No.	Energy	Blow No.	Energy
1	0.273	26	0.265	51	0.269
2	0.266	27	0.266	52	0.270
3	0.263	28	0.267	53	0.268
4	0.267	29	0.269	54	0.266
5	0.263	30	0.270	55	0.271
6	0.268	31	0.268	56	0.270
7	0.266	32	0.269	57	0.271
8	0.262	33	0.269	58	0.271
9	0.263	34	0.269	59	0.264
10	0.265	35	0.268	60	
11	0.264	36	0.266	61	
12	0.265	37	0.265	62	
13	0.266	38	0.268	63	
14	0.266	39	0.270	64	
15	0.265	40	0.270	65	
16	0.267	41	0.266	66	
17	0.267	42	0.269	67	
18	0.265	43	0.269	68	
19	0.265	44	0.266	69	
20	0.265	45	0.267	70	
21	0.266	46	0.270	71	
22	0.268	47	0.269	72	
23	0.269	48	0.271	73	
24	0.268	49	0.270	74	
25	0.267	50	0.270	75	

Average Energy: 0.267 kip-ft
Max. Rated Energy: 0.350 kip-ft
Efficiency: 76%
Std. Deviation: 0.002 kip-ft

Average efficiency from all tests: 76%

Comments: LE = length of rod from below gages to bottom of sampler.
Maximum rated energy based on an assumed hammer weight of 0.14 kips and an assumed drop height of 2.5 feet.

SPT Boring Grout Logs

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-3 SPT B
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-3 SPT B	CLIENT:	SCDOT	Consultant REP.:	
DRILLER:	Soil Consultants	RIG TYPE:	CME 850	DATE:	10/1/2008

Grout Mix: BenSeal- 37.5 lbs
Water- 30 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ $*34 = 2.96\ ft^3$

Where 0.333 indicates the diameter of the borehole in feet and 34 indicates the length of grout.

DATE DRILLED:	10/1/2008	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	6.5 ft	PUMP TYPE:		in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	Not Measured	VOLUME (HOLE) gal	22.1	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	Not Recorded	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	34	TREMIE DEPTH ft	34	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	34	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-2 SPT
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-2 SPT	CLIENT:	SCDOT	Consultant REP.:	Ron Boller
DRILLER:	Soil Consultants	RIG TYPE:	CME 850	DATE:	9/29/2008

Grout Mix: BenSeal- 37.5 lbs
Water- 30 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *50 = 4.36 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 50 indicates the length of grout.

DATE DRILLED:	9/29/2008	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	6.5 ft	PUMP TYPE:		in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	Ground Surface	VOLUME (HOLE) gal	32.6	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	Not Recorded	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	50	TREMIE DEPTH ft	50	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	50	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-2A SPT
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-2A SPT	CLIENT:	SCDOT	Consultant REP.:	Ron Boller
DRILLER:	Soil Consultants	RIG TYPE:	CME 850	DATE:	9/30/2008

Grout Mix: BenSeal- 37.5 lbs
Water- 30 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *37= 3.2 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 25.5 indicates the length of grout.

DATE DRILLED:	9/30/2008	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	6.5 ft	PUMP TYPE:		in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	4.5ft	VOLUME (HOLE) gal	24.1	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	Not Recorded	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	37 ft	TREMIE DEPTH ft	37	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	37	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-3 SPT
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-3 SPT	CLIENT:	SCDOT	Consultant REP.:	Ron Boller
DRILLER:	Soil Consultants	RIG TYPE:	CME 850	DATE:	9/30/2008

Grout Mix: BenSeal- 37.5 lbs
Water- 30 gal

Example Calculation Hole Volume= $\frac{\prod * (0.333)^2}{4}$ *50 = 4.36 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 50 indicates the length of grout.

DATE DRILLED:	9/30/2008	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	6.5 ft	PUMP TYPE:		in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	Not Measured	VOLUME (HOLE) gal	32.6	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	Not Recorded	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	50	TREMIE DEPTH ft	50	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	50	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-3 SPT A
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-3 SPT A	CLIENT:	SCDOT	Consultant REP.:	RB/ME
DRILLER:	Soil Consultants	RIG TYPE:	CME 850	DATE:	10/1/2008

Grout Mix: BenSEal- 37.5 lbs
Water- 30 gal

Example Calculation Hole Volume= $\frac{\prod * (0.333)^2}{4}$ *40= 3.5 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 25.5 indicates the length of grout.

DATE DRILLED:	10/1/2008	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	6.5 ft	PUMP TYPE:		in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	Not Measured	VOLUME (HOLE) gal	26.1	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	Not Recorded	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	40 ft	TREMIE DEPTH ft	40	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	40	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-18 SPT A
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-18 SPT A	CLIENT:	SCDOT	Consultant REP.:	M. Eichelberger
DRILLER:	SCI	RIG TYPE:	CME 55	DATE:	3/11/2009

Grout Mix: Bentonite- 50 lb
Water- 55 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{} *100 = 8.72\ ft^3$

Where 0.333 indicates the diameter of the borehole in feet and 100 indicates the length of grout.

DATE DRILLED:	3/11/2009	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	9 FT	PUMP TYPE:	Honda 4.0	in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	3.5 FT	VOLUME (HOLE) gal	65.3	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	60	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	100 ft	TREMIE DEPTH ft	100	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	100	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-20 SPT Alt 1
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-20 SPT Alt 1	CLIENT:	SCDOT	Consultant REP.:	P. Baumstark
DRILLER:	SCI	RIG TYPE:	CME 850	DATE:	2/24/2009

Grout Mix: Bentonite- 50 lbs
Water- 55 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4} *120= 10.45\ ft^3$

Where 0.333 indicates the diameter of the borehole in feet and 120 indicates the length of grout.

DATE DRILLED:	2/24/2009	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	12.5 FT	PUMP TYPE:	Mono Pump	in the field. Two batches of grout were used to grout the hole to the top.
G.W. LEVEL:	4 FT	VOLUME (HOLE) gal	78.2	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	91	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	120 ft	TREMIE DEPTH ft	120	top of the hole.
DRILL MUD:	Bentonite	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	120	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-4 SPT
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-4 SPT	CLIENT:	SCDOT	Consultant REP.:	M. Eichelberger
DRILLER:	S&ME, Inc.	RIG TYPE:	CME 550X	DATE:	2/24/2009

Grout Mix: Bentonite- 8 lb
Portland Cement- 192 lb
Water- 30 gal

Example Calculation Hole Volume= $\frac{\prod*(0.25)^2}{4}$ *120 = 5.89 ft^3

Where 0.25 indicates the diameter of the borehole in feet and 120 indicates the length of grout.

DATE DRILLED:	2/24/2009	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	6.5 ft	PUMP TYPE:	Honda 4.0	in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	3 ft	VOLUME (HOLE) gal	44	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	3-in	VOLUME (GROUT) gal	45	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	120 ft	TREMIE DEPTH ft	120	top of the hole.
DRILL MUD:	Bentonite	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	120	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-14 SPT
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-14 SPT	CLIENT:	SCDOT	Consultant REP.:	M. Eichelberger
DRILLER:	S&ME	RIG TYPE:	D 50	DATE:	2/24/09-2/25/09

Grout Mix: Bentonite- 10 lbs
Portland Cement- 240 lb
Water- 35 gal

Example Calculation Hole Volume= $\frac{\prod*(0.25)^2}{4}$ *120= 5.89 ft^3

Where 0.25 indicates the diameter of the borehole in feet and 120 indicates the length of grout.

DATE DRILLED:	2/24/09-2/25/09	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:		PUMP TYPE:		in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:		VOLUME (HOLE) gal	44	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	3-in	VOLUME (GROUT) gal	50	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	120 ft	TREMIE DEPTH ft	120	top of the hole.
DRILL MUD:	Bentonite	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	120	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-16 SPT
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-16 SPT	CLIENT:	SCDOT	Consultant REP.:	R. Boller
DRILLER:	Soil Consultants, Inc.	RIG TYPE:	CME 55	DATE:	10/19/2008

Grout Mix: BenSeal- 75 lbs
Water- 60 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *120 = 10.5 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 120 indicates the length of grout.

DATE DRILLED:	10/19/2008	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	11 ft	PUMP TYPE:		in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	Not Recorded	VOLUME (HOLE) gal	78.3	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	Not Recorded	as the hole was grouted. Grout was topped with 12.5 gal of gravel
DEPTH:	120 ft	TREMIE DEPTH ft	120	and 6 in. of asphalt cold patch.
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	120	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-18 SPT
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-18 SPT	CLIENT:	SCDOT	Consultant REP.:	P. Baumstark
DRILLER:	S&ME, Inc.	RIG TYPE:	CME 550	DATE:	9/18/2008

Grout Mix: Grout Well- 100 lbs
Water- 48 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *120 = 10.5 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 120 indicates the length of grout.

DATE DRILLED:	10/19/2008	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	9 ft	PUMP TYPE:		in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	3.5 FT	VOLUME (HOLE) gal	78.3	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	Not Recorded	as the hole was grouted. Grout was topped with 12.5 gal of gravel
DEPTH:	120 ft	TREMIE DEPTH ft	120	and 6 in. non-shrink concrete patch.
DRILL MUD:	Kaolin	CASING DEPTH ft	70 ft	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	120	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-19 SPT
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-19 SPT	CLIENT:	SCDOT	Consultant REP.:	P. Oree
DRILLER:	Soil Consultants	RIG TYPE:	CME 55	DATE:	9/24/2008

Grout Mix: BenSeal- 75 lbs
Water- 60 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *120 = 10.5 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 120 indicates the length of grout.

DATE DRILLED:	9/24/2008	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	10.5 ft	PUMP TYPE:		in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	4 ft	VOLUME (HOLE) gal	78.3	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	Not Recorded	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	120	TREMIE DEPTH ft	120	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	120	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-23 SPT Alt 1
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-23 SPT Alt 1	CLIENT:	SCDOT	Consultant REP.:	P. Baumstark
DRILLER:	S&ME, Inc.	RIG TYPE:	CME 550	DATE:	9/30/2008

Grout Mix: Grout Well- 100 lbs
Water- 48 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *120= 10.5 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 120 indicates the length of grout.

DATE DRILLED:	9/30/2008	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	12 ft	PUMP TYPE:		in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	6 FT	VOLUME (HOLE) gal	78.3	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	Not Recorded	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	120 ft	TREMIE DEPTH ft	120	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	70 ft	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	120	

GEOTECHNICAL GROUTING FIELD LOG

Boring No.: B-21 SPT Alt 1

JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-21 SPT Alt 1	CLIENT:	SCDOT	Consultant REP.:	M. Eichelberger
DRILLER:	S&ME	RIG TYPE:	CME 550X	DATE:	2/23/2009

Grout Mix: Bentonite- 8 lb
Portland Cement- 192 lb
Water- 35 gal

Example Calculation Hole Volume= $\frac{\prod*(0.25)^2}{4}$ *120 = 5.89 ft^3

Where 0.25 indicates the diameter of the borehole in feet and 120 indicates the length of grout.

DATE DRILLED:	2/22/09-	GROUT HOSE DIAMETER:	1 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	12.5 FT	PUMP TYPE:	Trash Pump	in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	8 ft	VOLUME (HOLE) gal	44	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	3-in.	VOLUME (GROUT) gal	45	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	120 ft	TREMIE DEPTH ft	120	top of the hole.
DRILL MUD:	Bentonite	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	120	

GEOTECHNICAL GROUTING FIELD LOG

Boring No.: B-21 SPT Alt 1 A

JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-21 SPT Alt 1 A	CLIENT:	SCDOT	Consultant REP.:	M. Eichelberger
DRILLER:	SCI	RIG TYPE:	CME 850	DATE:	3/4/2009

Grout Mix: Bentonite- 75 lbs
Water- 40 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *32= 2.79 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 32 indicates the length of grout.

DATE DRILLED:	3/4/2009	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	12.5 FT	PUMP TYPE:	Mono Pump	in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	8 FT	VOLUME (HOLE) gal	21	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	30	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	32 ft	TREMIE DEPTH ft	32	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	32	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-27 SPT Alt 1
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-27 SPT Alt 1	CLIENT:	SCDOT	Consultant REP.:	M. Eichelberger
DRILLER:	SCI	RIG TYPE:	CME 850	DATE:	3/3/2009

Grout Mix: Bentonite- 50 lb
Water- 50 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *120= 10.5 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 120 indicates the length of grout.

DATE DRILLED:	3/3/2009	GROUT HOSE DIAMETER:	1 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	12 FT	PUMP TYPE:	mono pump	in the field. Two batches of grout were used to grout the hole to the top.
G.W. LEVEL:	Not Recorded	VOLUME (HOLE) gal	78.3	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4 in.	VOLUME (GROUT) gal	85	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	120 ft	TREMIE DEPTH ft	120	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	120	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-27 SPT Alt 1 A
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-27 SPT Alt 1 A	CLIENT:	SCDOT	Consultant REP.:	M. Eichelberger
DRILLER:	SCI	RIG TYPE:	CME 850	DATE:	3/3/2009

Grout Mix: Bentonite- 50 lbs
Water- 50 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *38= 3.3 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 38 indicates the length of grout.

DATE DRILLED:	3/3/2009	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	12 ft	PUMP TYPE:	Honda 4.0	in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	Not Recorded	VOLUME (HOLE) gal	24.8	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4 in.	VOLUME (GROUT) gal	30	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	38 ft	TREMIE DEPTH ft	38	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1 in.	GROUT DEPTH ft	38	

GEOTECHNICAL GROUTING FIELD LOG

Boring No.: B-31 SPT

JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-31 SPT	CLIENT:	SCDOT	Consultant REP.:	P. Oree
DRILLER:	Soil Consultants	RIG TYPE:	CME 850	DATE:	10/8/2008

Grout Mix: BenSeal- 75 lbs
Water- 60 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *120 = 10.5 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 120 indicates the length of grout.

DATE DRILLED:	10/8/2008	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	3 ft	PUMP TYPE:		in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	Ground Surface	VOLUME (HOLE) gal	78.3	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	Not Recorded	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	120 ft	TREMIE DEPTH ft	120	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	120	

GEOTECHNICAL GROUTING FIELD LOG

Boring No.: B-33 SPT

JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-33 SPT	CLIENT:	SCDOT	Consultant REP.:	R. Boller
DRILLER:	S&ME, Inc.	RIG TYPE:	CME 550	DATE:	9/25/2008

Grout Mix: Grout Well- 50 lbs
Water- 24 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *70= 6.1 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 70 indicates the length of grout.

DATE DRILLED:	9/25/2008	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	4 ft	PUMP TYPE:		in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	Tidal	VOLUME (HOLE) gal	45.6	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	45	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	70 ft	TREMIE DEPTH ft	70	top of the hole.
DRILL MUD:	Bentonite	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	70	

GEOTECHNICAL GROUTING FIELD LOG

Boring No.: B-28 SPT Alt 1

JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-28 SPT Alt 1	CLIENT:	SCDOT	Consultant REP.:	M. Eichelberger
DRILLER:	S&ME	RIG TYPE:	CME 550X	DATE:	2/18/2009

Grout Mix: Bentonite- 8 lb
Portland Cement- 192 lb
Water- 30 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *67 + $\frac{\prod*(0.25)^2}{4}$ *53 = 8.44 ft^3

Where 0.25 and 0.333 indicates the diameter of the borehole in feet and 67 and 53 indicates the length of grout.

DATE DRILLED:	2/18/2009	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	7 ft	PUMP TYPE:	Honda 4.0	in the field. Two batches of grout were used to grout the hole to the top.
G.W. LEVEL:	7 ft	VOLUME (HOLE) gal	63.2	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in/3- in	VOLUME (GROUT) gal	70	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	120 ft	TREMIE DEPTH ft	120	top of the hole.
DRILL MUD:	Bentonite	CASING DEPTH ft	67	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	120	

GEOTECHNICAL GROUTING FIELD LOG

Boring No.: B-43 SPT Alt 1 A

JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-43 SPT Alt 1 A	CLIENT:	SCDOT	Consultant REP.:	P. Baumstark
DRILLER:	SCI	RIG TYPE:	CME 850	DATE:	3/12/2009

Grout Mix: Bentonite- 50 lbs
Water- 55 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *42= 3.66 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 120 indicates the length of

DATE DRILLED:	3/12/2009	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	9 ft	PUMP TYPE:	Mono Pump	in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	Not Recorded	VOLUME (HOLE) gal	27.4	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	30	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	42 ft	TREMIE DEPTH ft	42	top of the hole.
DRILL MUD:	Bentonite	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	42	

GEOTECHNICAL GROUTING FIELD LOG

Boring No.: B-33 SPT A

JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-33 SPT A	CLIENT:	SCDOT	Consultant REP.:	P. Baumstark
DRILLER:	S&ME, Inc.	RIG TYPE:	CME 550	DATE:	9/24/2008

Grout Mix: Grout Well- 50 lbs
Water- 24 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *52 = 4.5 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 52 indicates the length of grout.

DATE DRILLED:	9/24/2008	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	4 ft	PUMP TYPE:		in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	Not Recorded	VOLUME (HOLE) gal	33.9	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	38	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	52 ft	TREMIE DEPTH ft	52	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	52	

GEOTECHNICAL GROUTING FIELD LOG

Boring No.: B-37 SPT

JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-37 SPT	CLIENT:	SCDOT	Consultant REP.:	P. Oree
DRILLER:	Mid Atlantic Drilling	RIG TYPE:	CME 45	DATE:	10/13/2008

Grout Mix: Portland Cement- 50 lbs
Water- 30 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *120=10.5 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 120 indicates the length of grout.

DATE DRILLED:	10/13/2008	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:		PUMP TYPE:		in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	Tidal	VOLUME (HOLE) gal	78.3	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	55	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	120 ft	TREMIE DEPTH ft	120	top of the hole.
DRILL MUD:	Bentonite	CASING DEPTH ft	40 ft	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	120	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-34 SPT A
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-34 SPT A	CLIENT:	SCDOT	Consultant REP.:	M. Eichelberger
DRILLER:	SCI	RIG TYPE:	CME 850	DATE:	3/5/2009

Grout Mix: Bentonite- 50 lb
Water- 50 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *44 = 3.84 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 26 indicates the length of grout.

DATE DRILLED:	3/5/2009	GROUT HOSE DIAMETER:	1 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:		PUMP TYPE:	mono pump	in the field. One half of a batch of grout was used to grout the hole to the top.
G.W. LEVEL:		VOLUME (HOLE) gal	29	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4 in.	VOLUME (GROUT) gal	40	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	44 ft	TREMIE DEPTH ft	44	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	44	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-46 SPT A
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-46 SPT A	CLIENT:	SCDOT	Consultant REP.:	M. Eichelberger
DRILLER:	SCI	RIG TYPE:	CME 850	DATE:	3/5/2009

Grout Mix: Bentonite- 50 lbs
Water- 50 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *26=2.27 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 26 indicates the length of grout.

DATE DRILLED:	3/5/2009	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:		PUMP TYPE:	Honda 4.0	in the field. One half of a batch of grout was used to grout the hole to the top.
G.W. LEVEL:		VOLUME (HOLE) gal	17	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4 in.	VOLUME (GROUT) gal	35	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	26 ft	TREMIE DEPTH ft	26	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1 in.	GROUT DEPTH ft	26	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-39 SPT
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-39 SPT	CLIENT:	SCDOT	Consultant REP.:	P. Baumstark
DRILLER:	S&ME, Inc.	RIG TYPE:	CME 550	DATE:	9/25/2008

Grout Mix: Grout Well- 50 lbs
Water- 24 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *70 = 6.1 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 70 indicates the length of grout.

DATE DRILLED:	9/25/2008	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	2.5 ft	PUMP TYPE:		in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	Ground Surface	VOLUME (HOLE) gal	45.6	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	Not Recorded	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	70 ft	TREMIE DEPTH ft	70	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	70	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-39 SPT A
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-39 SPT A	CLIENT:	SCDOT	Consultant REP.:	P. Baumstark
DRILLER:	S&ME, Inc.	RIG TYPE:	CME 550	DATE:	9/25/2008

Grout Mix: Grout Well- 50 lbs
Water- 24 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *30=2.6 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 30 indicates the length of grout.

DATE DRILLED:	9/25/2008	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	2.5 ft	PUMP TYPE:		in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	Ground Surface	VOLUME (HOLE) gal	19.5	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	Not Recorded	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	30 ft	TREMIE DEPTH ft	30	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	30	

GEOTECHNICAL GROUTING FIELD LOG

Boring No.: B-42 SPT Alt 1

JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-42 SPT Alt 1	CLIENT:	SCDOT	Consultant REP.:	P. Oree
DRILLER:	Mid Atlantic Drilling	RIG TYPE:	CME 45	DATE:	10/15/2008

Grout Mix: Portland Cement- 200 lbs
Water- 60 gal

Example Calculation Hole Volume= $\frac{\prod *(0.333)^2}{4}$ *120 = 10.5 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 120 indicates the length of grout.

DATE DRILLED:	10/15/2008	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:		PUMP TYPE:		in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	Tidal	VOLUME (HOLE) gal	78..3	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	56	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	120 ft	TREMIE DEPTH ft	120	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	20 ft	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	120	

GEOTECHNICAL GROUTING FIELD LOG

Boring No.: B-43 SPT A lt 1

JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-43 SPT A lt 1	CLIENT:	SCDOT	Consultant REP.:	R. Boller
DRILLER:	S&ME, Inc.	RIG TYPE:	CME 850	DATE:	10/2/2008

Grout Mix: BenSeal- 75 lbs
Water- 60 gal

Example Calculation Hole Volume= $\frac{\prod *(0.333)^2}{4}$ *120=10.5 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 120 indicates the length of grout.

DATE DRILLED:	10/2/2008	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	9.1 ft	PUMP TYPE:		in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	Not Recorded	VOLUME (HOLE) gal	78.3	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	Not Recorded	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	120 ft	TREMIE DEPTH ft	120	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	120	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-43 SPT Alt 2
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-43 SPT Alt 2	CLIENT:	SCDOT	Consultant REP.:	P. Oree
DRILLER:	Mid Atlantic Drilling	RIG TYPE:	Jack-up Barge	DATE:	10/16/2008

Grout Mix: Portland Cement- 200 lbs

Water- 60 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *120 = 10.5 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 120 indicates the length of grout.

DATE DRILLED:	10/16/2008	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:		PUMP TYPE:		in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	Tidal	VOLUME (HOLE) gal	78..3	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	65	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	120 ft	TREMIE DEPTH ft	120	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	20 ft	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	120	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-46 SPT
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-46 SPT	CLIENT:	SCDOT	Consultant REP.:	P. Oree
DRILLER:	Soil Consultants, Inc.	RIG TYPE:	Gyrotrac	DATE:	10/6/2008

Grout Mix: BenSeal- 75 lbs

Water- 60 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *120=10.5 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 120 indicates the length of grout.

DATE DRILLED:	10/2/2008	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	11.2 ft	PUMP TYPE:		in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	7 ft	VOLUME (HOLE) gal	78.3	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	125	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	120 ft	TREMIE DEPTH ft	120	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	120	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-47 SPT
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-47 SPT	CLIENT:	SCDOT	Consultant REP.:	P. Baumstark
DRILLER:	S&ME, Inc.	RIG TYPE:	CME 550	DATE:	9/29/2008

Grout Mix: Grout Well- 50 lbs
Water- 24 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *50 = 4.36 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 50 indicates the length of grout.

DATE DRILLED:	9/29/2008	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	11.5 FT	PUMP TYPE:		in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	4.5ft	VOLUME (HOLE) gal	32.6	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	25	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	50	TREMIE DEPTH ft	50	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	50	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-47 SPT A
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-47 SPT A	CLIENT:	SCDOT	Consultant REP.:	P. Baumstark
DRILLER:	S&ME, Inc.	RIG TYPE:	CME 550	DATE:	9/29/2008

Grout Mix: Grout Well- 50 lbs
Water- 24 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *25.5= 2.2 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 25.5 indicates the length of grout.

DATE DRILLED:	9/29/2008	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	11.5 FT	PUMP TYPE:		in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	4.5ft	VOLUME (HOLE) gal	17	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	25	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	25.5 ft	TREMIE DEPTH ft	25.5	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	25.5	

GEOTECHNICAL GROUTING FIELD LOG

Boring No.: B-50 SPT

JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-50 SPT	CLIENT:	SCDOT	Consultant REP.:	P. Baumstark
DRILLER:	S&ME, Inc.	RIG TYPE:	CME 550	DATE:	9/29/2008

Grout Mix: Grout Well- 50 lbs
Water- 24 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *50 = 4.4 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 50 indicates the length of grout.

DATE DRILLED:	9/29/2008	GROUT HOSE DIAMETER:	3 in.
SURF. ELEVATION:	9.5 ft	PUMP TYPE:	
G.W. LEVEL:	4.5ft	VOLUME (HOLE) gal	32.6
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	Not Recorded
DEPTH:	50	TREMIE DEPTH ft	50
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	50

Notes: Grout mix is an approximate mix that was replicated in the field. One batch of grout was used to grout the hole to the top. Tremie pipe was lowered to the bottom of the hole and raised as the hole was grouted. Grout was observed flowing out of the top of the hole.

GEOTECHNICAL GROUTING FIELD LOG

Boring No.: B-51 SPT Alt 2

JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-51 SPT Alt 2	CLIENT:	SCDOT	Consultant REP.:	M. Eichelberger
DRILLER:	S&ME, Inc.	RIG TYPE:	CME 550	DATE:	9/29/2008

Grout Mix: Grout Well- 50 lbs
Water- 24 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *50= 4.4 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 50 indicates the length of grout.

DATE DRILLED:	9/29/2008	GROUT HOSE DIAMETER:	3 in.
SURF. ELEVATION:	7 ft	PUMP TYPE:	
G.W. LEVEL:	4.5ft	VOLUME (HOLE) gal	32.6
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	Not Recorded
DEPTH:	50 ft	TREMIE DEPTH ft	50
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	50

Notes: Grout mix is an approximate mix that was replicated in the field. One batch of grout was used to grout the hole to the top. Tremie pipe was lowered to the bottom of the hole and raised as the hole was grouted. Grout was observed flowing out of the top of the hole.

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-51 SPT Alt 2 A
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-51 SPT Alt 2 A	CLIENT:	SCDOT	Consultant REP.:	M. Eichelberger
DRILLER:	S&ME, Inc.	RIG TYPE:	CME 550	DATE:	10/10/2008

Grout Mix: Grout Well- 50 lbs
Water- 24 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}*26 = 2.3\ ft^3$

Where 0.333 indicates the diameter of the borehole in feet and 26 indicates the length of grout.

DATE DRILLED:	10/9/2008	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated in the field. One batch of grout was used to grout the hole to the top. Tremie pipe was lowered to the bottom of the hole and raised as the hole was grouted. Grout was observed flowing out of the top of the hole.
SURF. ELEVATION:	6.9 ft	PUMP TYPE:		
G.W. LEVEL:	4.5ft	VOLUME (HOLE) gal	17	
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	Not Recorded	
DEPTH:	26 ft	TREMIE DEPTH ft	26	
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	26	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-52 SPT
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-52 SPT	CLIENT:	SCDOT	Consultant REP.:	P. Oree
DRILLER:	Soil Consultants, Inc.	RIG TYPE:	CME 850	DATE:	10/7/2008

Grout Mix: BenSeal- 37.5 lbs
Water- 30 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}*50= 4.4\ ft^3$

Where 0.333 indicates the diameter of the borehole in feet and 50 indicates the length of grout.

DATE DRILLED:	10/7/2008	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated in the field. One batch of grout was used to grout the hole to the top. Tremie pipe was lowered to the bottom of the hole and raised as the hole was grouted. Grout was observed flowing out of the top of the hole.
SURF. ELEVATION:	16.0 ft	PUMP TYPE:		
G.W. LEVEL:	Not Recorded	VOLUME (HOLE) gal	32.6	
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	Not Recorded	
DEPTH:	50 ft	TREMIE DEPTH ft	50	
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	50	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-52 SPT B
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-52 SPT B	CLIENT:	SCDOT	Consultant REP.:	P. Oree
DRILLER:	Soil Consultants, Inc.	RIG TYPE:	CME 850	DATE:	10/7/2008

Grout Mix: BenSeal- 37.5 lbs
Water- 30 gal

Example Calculation Hole Volume= $\frac{\prod * (0.333)^2}{4} *27 = 2.4\ ft^3$

Where 0.333 indicates the diameter of the borehole in feet and 27 indicates the length of grout.

DATE DRILLED:	10/7/2008	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	16.0 ft	PUMP TYPE:		in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	Not Recorded	VOLUME (HOLE) gal	17.6	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	Not Recordedd	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	27 ft	TREMIE DEPTH ft	27	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	27	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-53 SPT
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-53 SPT	CLIENT:	SCDOT	Consultant REP.:	R. Boller
DRILLER:	Soil Consultants, Inc.	RIG TYPE:	CME 850	DATE:	9/17/2008

Grout Mix: BenSeal- 37.5 lbs
Water- 30 gal

Example Calculation Hole Volume= $\frac{\prod * (0.333)^2}{4} *50= 4.4\ ft^3$

Where 0.333 indicates the diameter of the borehole in feet and 50 indicates the length of grout.

DATE DRILLED:	9/17/2008	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	13.1 ft	PUMP TYPE:		in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	Not Recorded	VOLUME (HOLE) gal	32.6	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	Not Recorded	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	50 ft	TREMIE DEPTH ft	50	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	50	

GEOTECHNICAL GROUTING FIELD LOG

Boring No.: B-53 SPT A

JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-53 SPT A	CLIENT:	SCDOT	Consultant REP.:	R. Boller
DRILLER:	Soil Consultants, Inc.	RIG TYPE:	CME 850	DATE:	9/19/2008

Grout Mix: BenSeal- 37.5 lbs
Water- 30 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *34 = 3.0 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 34 indicates the length of grout.

DATE DRILLED:	9/19/2008	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	13.0 ft	PUMP TYPE:		in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	Not Recorded	VOLUME (HOLE) gal	22.1	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	22.1*	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	34 ft	TREMIE DEPTH ft	34	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	*Volume of grout not recorded in the field.
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	34	

GEOTECHNICAL GROUTING FIELD LOG

Boring No.: B-55 SPT

JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-55 SPT	CLIENT:	SCDOT	Consultant REP.:	R. Boller
DRILLER:	Soil Consultants, Inc.	RIG TYPE:	CME 850	DATE:	9/18/2008

Grout Mix: BenSeal- 37.5 lbs
Water- 30 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *50= 4.4 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 50 indicates the length of grout.

DATE DRILLED:	9/18/2008	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	12 ft	PUMP TYPE:		in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	Not Recorded	VOLUME (HOLE) gal	32.6	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	Not Recorded	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	50 ft	TREMIE DEPTH ft	50	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	50	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-55 SPT B
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-55 SPT B	CLIENT:	SCDOT	Consultant REP.:	R. Boller
DRILLER:	Soil Consultants, Inc.	RIG TYPE:	CME 850	DATE:	9/22/2008

Grout Mix: BenSeal- 37.5 lbs
Water- 30 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *37 = 3.2 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 37 indicates the length of grout.

DATE DRILLED:	9/22/2008	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	12 ft	PUMP TYPE:		in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	Not Recorded	VOLUME (HOLE) gal	24.1	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	24.1*	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	37 ft	TREMIE DEPTH ft	37	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	*Volume of grout not recorded in the field.
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	37	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-58 SPT
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-58 SPT	CLIENT:	SCDOT	Consultant REP.:	J. Burns
DRILLER:	Soil Consultants, Inc.	RIG TYPE:	CME 850	DATE:	10/19/2008

Grout Mix: BenSeal- 75 lbs
Water- 60 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *120= 10.5 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 120 indicates the length of grout.

DATE DRILLED:	10/19/2008	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	14.5 ft	PUMP TYPE:		in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	Not Recorded	VOLUME (HOLE) gal	78.3	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	Not Recorded	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	120 ft	TREMIE DEPTH ft	120	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	120	

GEOTECHNICAL GROUTING FIELD LOG

Boring No.: B-57 SPT

JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-57 SPT	CLIENT:	SCDOT	Consultant REP.:	M. Eichelberger
DRILLER:	S&ME	RIG TYPE:	D 50	DATE:	2/27/2009

Grout Mix: Bentonite- 50 lb
Portland Cement- 98 lb
Water- 45 gal

Example Calculation Hole Volume= $\frac{\prod*(0.25)^2}{4}$ *120 = 5.89 ft^3

Where 0.25 indicates the diameter of the borehole in feet and 120 indicates the length of grout.

DATE DRILLED:	2/26/09-2/27/09	GROUT HOSE DIAMETER:	1 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	10 ft	PUMP TYPE:	Trash Pump	in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	3 ft	VOLUME (HOLE) gal	44	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	3-in.	VOLUME (GROUT) gal	48	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	120 ft	TREMIE DEPTH ft	120	top of the hole.
DRILL MUD:	Bentonite	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	120	

GEOTECHNICAL GROUTING FIELD LOG

Boring No.: B-57 SPT A

JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-57 SPT A	CLIENT:	SCDOT	Consultant REP.:	M. Eichelberger
DRILLER:	SCI	RIG TYPE:	CME 850	DATE:	3/11/2009

Grout Mix: Bentonite- 50 lbs
Water- 55 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *30= 2.62 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 120 indicates the length of grout.

DATE DRILLED:	3/11/2009	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	10 ft	PUMP TYPE:	Mono Pump	in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	3 ft	VOLUME (HOLE) gal	20	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	30	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	30 ft	TREMIE DEPTH ft	30	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	30	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-63 SPT
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-63 SPT	CLIENT:	SCDOT	Consultant REP.:	P. Baumstark
DRILLER:	S&ME	RIG TYPE:	D 50	DATE:	2/20/2009

Grout Mix: Bentonite- 50 lb
Portland Cement- 192 lb
Water- 70 gal

Example Calculation Hole Volume= $\frac{\prod * (0.333)^2}{4}$ $*120 = 10.5\ ft^3$

Where 0.333 indicates the diameter of the borehole in feet and 120 indicates the length of grout.

DATE DRILLED:	2/19/09-2/20/09	GROUT HOSE DIAMETER:	1 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	10 ft	PUMP TYPE:	Trash Pump	in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	5 ft	VOLUME (HOLE) gal	78.3	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4 in.	VOLUME (GROUT) gal	80	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	120 ft	TREMIE DEPTH ft	120	top of the hole.
DRILL MUD:	Bentonite	CASING DEPTH ft	4 ft	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	120	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-75 SPT
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-75 SPT	CLIENT:	SCDOT	Consultant REP.:	M. Eichelberger
DRILLER:	SCI	RIG TYPE:	CME 550 X	DATE:	2/19/2009

Grout Mix: Bentonite- 50 lbs
Water- 55 gal

Example Calculation Hole Volume= $\frac{\prod * (0.25)^2}{4}$ $*120= 5.89\ ft^3$

Where 0.25 indicates the diameter of the borehole in feet and 120 indicates the length of grout.

DATE DRILLED:	2/19/2009	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	15 ft	PUMP TYPE:	Honda 4.0	in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	Not Recorded	VOLUME (HOLE) gal	44	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	3 in.	VOLUME (GROUT) gal	38	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	120 ft	TREMIE DEPTH ft	120	top of the hole.
DRILL MUD:	Bentonite	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	120	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-65 SPT
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-65 SPT	CLIENT:	SCDOT	Consultant REP.:	T. Henderson
DRILLER:	Soil Consultants, Inc.	RIG TYPE:	CME 850	DATE:	9/18/2008

Grout Mix: BenSeal- 37.5 lbs
Water- 30 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *50 = 4.4 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 50 indicates the length of grout.

DATE DRILLED:	9/18/2008	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	8.5 ft	PUMP TYPE:		in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	Not Recorded	VOLUME (HOLE) gal	32.6	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	Not Recorded	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	50 ft	TREMIE DEPTH ft	50	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	50	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-66 SPT
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-66 SPT	CLIENT:	SCDOT	Consultant REP.:	R. Boller
DRILLER:	Soil Consultants, Inc.	RIG TYPE:	CME 850	DATE:	11/10/2008

Grout Mix: BenSeal- 75 lbs
Water- 60 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *120= 10.5 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 120 indicates the length of grout.

DATE DRILLED:	11/10/2008	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	2.5 ft	PUMP TYPE:		in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	Ground Surface	VOLUME (HOLE) gal	78.3	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	69	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	120 ft	TREMIE DEPTH ft	120	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	120	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-66 SPT A
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-66 SPT A	CLIENT:	SCDOT	Consultant REP.:	R. Boller
DRILLER:	Soil Consultants, Inc.	RIG TYPE:	CME 850	DATE:	11/11/2008

Grout Mix: BenSeal- 37.5 lbs
Water- 30 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *22 = 1.9 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 22 indicates the length of grout.

DATE DRILLED:	11/11/2008	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	2.5 ft	PUMP TYPE:		in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	Ground Surface	VOLUME (HOLE) gal	14.3	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	41	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	22 ft	TREMIE DEPTH ft	22	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	22	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-68 SPT Alt 1
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-68 SPT Alt 1	CLIENT:	SCDOT	Consultant REP.:	P. Oree
DRILLER:	Soil Consultants, Inc.	RIG TYPE:	CME 850	DATE:	9/23/2008

Grout Mix: BenSeal- 75 lbs
Water- 60 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *120= 10.5 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 120 indicates the length of grout.

DATE DRILLED:	9/23/2008	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	7 ft	PUMP TYPE:		in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	Ground Surface	VOLUME (HOLE) gal	78.3	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	Not Recorded	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	120 ft	TREMIE DEPTH ft	120	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	*Volume of grout was not recorded during time of drilling.
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	120	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-72 SPT
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-72 SPT	CLIENT:	SCDOT	Consultant REP.:	R. Boller
DRILLER:	Soil Consultants, Inc.	RIG TYPE:	CME 550	DATE:	9/16/2008

Grout Mix: BenSeal- 75 lbs
Water- 60 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *120 = 10.5ft^3

Where 0.333 indicates the diameter of the borehole in feet and 120 indicates the length of grout.

DATE DRILLED:	9/16/2008	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	4.3 ft	PUMP TYPE:		in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	1 ft	VOLUME (HOLE) gal	78.3	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	Not Recorded	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	120 ft	TREMIE DEPTH ft	120	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	120	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-74 SPT
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-74 SPT	CLIENT:	SCDOT	Consultant REP.:	P. Oree
DRILLER:	Soil Consultants, Inc.	RIG TYPE:	CME 850	DATE:	9/16/2008

Grout Mix: BenSeal- 75 lbs
Water- 60 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *120= 10.5 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 120 indicates the length of grout.

DATE DRILLED:	9/16/2008	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	4.9 ft	PUMP TYPE:		in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	20 in.	VOLUME (HOLE) gal	78.3	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	Not Recorded	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	120 ft	TREMIE DEPTH ft	120	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	120	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-74 SPT A
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-74 SPT A	CLIENT:	SCDOT	Consultant REP.:	R. Boller
DRILLER:	Soil Consultants, Inc.	RIG TYPE:	CME 550	DATE:	9/16/2008

Grout Mix: BenSeal- 37.5 lbs
Water- 30 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *64 = 5.6 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 120 indicates the length of grout.

DATE DRILLED:	9/16/2008	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	5 ft	PUMP TYPE:		in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	20 in.	VOLUME (HOLE) gal	41.7	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	Not Recorded	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	64 ft	TREMIE DEPTH ft	64	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	64	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-29 SPT Alt 1
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-29 SPT Alt 1	CLIENT:	SCDOT	Consultant REP.:	P. Oree
DRILLER:	Mid Atlantic Drilling	RIG TYPE:	CME 45	DATE:	10/17/2008

Grout Mix: Portland Cement- 50 lbs
Water- 24 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *120 = 10.5

Where 0.333 indicates the diameter of the borehole in feet and 120 indicates the length of grout.

DATE DRILLED:	10/17/2008	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:		PUMP TYPE:		in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	Tidal	VOLUME (HOLE) gal	78..3	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4-in	VOLUME (GROUT) gal	65	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	120 ft	TREMIE DEPTH ft	120	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	20 ft	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	120	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-76 SPT
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-76 SPT	CLIENT:	SCDOT	Consultant REP.:	M. Eichelberger
DRILLER:	S&ME	RIG TYPE:	CME 550 X	DATE:	2/10/2009

Grout Mix: Bentonite- 50 lb
Portland Cement- 192 lb
Water- 28 gal

Example Calculation Hole Volume= $\frac{\prod*(0.25)^2}{4}$ *120 = 5.89 ft^3

Where 0.25 indicates the diameter of the borehole in feet and 120 indicates the length of grout.

DATE DRILLED:	2/9/09-2/10/09	GROUT HOSE DIAMETER:	1 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	14.5 FT	PUMP TYPE:	Trash Pump	in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	10 ft	VOLUME (HOLE) gal	44	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	3 in.	VOLUME (GROUT) gal	40	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	120 ft	TREMIE DEPTH ft	120	top of the hole.
DRILL MUD:	Bentonite	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	120	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-76 SPT A
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-76 SPT A	CLIENT:	SCDOT	Consultant REP.:	M. Eichelberger
DRILLER:	SCI	RIG TYPE:	CME 550 X	DATE:	2/16/2009

Grout Mix: Bentonite- 8 lbs
Portland Cement- 192 lb
Water- 28 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *66= 5.76 ft^3

Where 0.25 indicates the diameter of the borehole in feet and 120 indicates the length of grout.

DATE DRILLED:	2/16/2009	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	14.5 FT	PUMP TYPE:	Honda 4.0	in the field. Two batches of grout were used to grout the hole to the top.
G.W. LEVEL:	10 ft	VOLUME (HOLE) gal	43.1	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4 in.	VOLUME (GROUT) gal	56	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	66 ft	TREMIE DEPTH ft	66	top of the hole.
DRILL MUD:	Bentonite	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	66	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-77 CPT A
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-77 SPT A	CLIENT:	SCDOT	Consultant REP.:	M. Eichelberger
DRILLER:	SCI	RIG TYPE:	CME 850	DATE:	3/4/2009

Grout Mix: Bentonite- 50 lb
Water- 50 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *34 = 2.96 ft^3

Where 0.333 indicates the diameter of the borehole in feet and 34 indicates the length of grout.

DATE DRILLED:	3/3/2009	GROUT HOSE DIAMETER:	1 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	11 FT	PUMP TYPE:	mono pump	in the field. One half of a batch of grout was used to grout the hole to the top.
G.W. LEVEL:	7.5 FT	VOLUME (HOLE) gal	22	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4 in.	VOLUME (GROUT) gal	30	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	34 ft	TREMIE DEPTH ft	34	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	34	

GEOTECHNICAL GROUTING FIELD LOG

				Boring No.:	B-77 CPT B
JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-77 SPT B	CLIENT:	SCDOT	Consultant REP.:	M. Eichelberger
DRILLER:	SCI	RIG TYPE:	CME 850	DATE:	3/4/2009

Grout Mix: Bentonite- 50 lbs
Water- 50 gal

Example Calculation Hole Volume= $\frac{\prod*(0.333)^2}{4}$ *39= 3.4 ft^3

Where 0.25 indicates the diameter of the borehole in feet and 39 indicates the length of grout.

DATE DRILLED:	3/4/2009	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	11 FT	PUMP TYPE:	Honda 4.0	in the field. One half of a batch of grout was used to grout the hole to the top.
G.W. LEVEL:	7.5 FT	VOLUME (HOLE) gal	25.5	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	4 in.	VOLUME (GROUT) gal	35	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	39 ft	TREMIE DEPTH ft	39	top of the hole.
DRILL MUD:	Kaolin	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1 in.	GROUT DEPTH ft	39	

GEOTECHNICAL GROUTING FIELD LOG

Boring No.:	B-78

JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-78	CLIENT:	SCDOT	Consultant REP.:	M. Eichelberger
DRILLER:	S&ME, Inc.	RIG TYPE:	D 50	DATE:	3/25/2009

Grout Mix:	Bentonite- 10 lb
	Portland Cement- 92 lbs
	Water- 25 gal

Example Calculation Hole Volume= $\frac{\prod *(0.5)^2}{4}$ *15 = 2.9 ft^3

Where 0.5 indicates the diameter of the borehole in feet and 15 indicates the length of grout.

DATE DRILLED:	3/25/2009	GROUT HOSE DIAMETER:	1 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	8 ft	PUMP TYPE:	Trash Pump	in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	5 ft	VOLUME (HOLE) gal	22	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	6 in.	VOLUME (GROUT) gal	30	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	15 ft	TREMIE DEPTH ft	15	top of the hole.
DRILL MUD:	NONE	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1in.	GROUT DEPTH ft	15	

GEOTECHNICAL GROUTING FIELD LOG

Boring No.:	B-79

JOB NAME:	Port Access Road	JOB NO.:	1131-08-554	PAGE NO.:	_1_/_1_
LOCATION:	B-79	CLIENT:	SCDOT	Consultant REP.:	M. Eichelberger
DRILLER:	S&ME, Inc.	RIG TYPE:	D 50	DATE:	3/25/2009

Grout Mix:	Bentonite- 10 lb
	Portland Cement- 80 lbs
	Water- 25 gal

Example Calculation Hole Volume= $\frac{\prod *(0.5)^2}{4}$ *15=2.9 ft^3

Where 0.5 indicates the diameter of the borehole in feet and 15 indicates the length of grout.

DATE DRILLED:	3/25/2009	GROUT HOSE DIAMETER:	3 in.	Notes: Grout mix is an approximate mix that was replicated
SURF. ELEVATION:	10 ft	PUMP TYPE:	Trash Pump	in the field. One batch of grout was used to grout the hole to the top.
G.W. LEVEL:	6 ft	VOLUME (HOLE) gal	22	Tremie pipe was lowered to the bottom of the hole and raised
HOLE DIAMETER:	6 in.	VOLUME (GROUT) gal	30	as the hole was grouted. Grout was observed flowing out of the
DEPTH:	15 ft	TREMIE DEPTH ft	15	top of the hole.
DRILL MUD:	NONE	CASING DEPTH ft	NONE	
TREMIE DIAMETER:	1 in.	GROUT DEPTH ft	15	

Table II-1: Bulk and Undisturbed Sample Locations and Depths

Table II-1: Bulk and Undisturbed Sample Locations and Depths					
S&ME BORING ID	**SAMPLE DEPTH** (ft)	**RECOVERY** (inches)	**SOIL TYPE**	**SUBSURFACE PROFILE UNIT NO.**	**CONSISTENCY** (N)
B-02A	24	22	Clay/Silt	2C	2
B-02A	36	24	Clay/Silt	2C	2
B-03A	27	10	Clay/Silt	2C	4
B-03A	39	23	Clay/Silt	2C	2
B-18 A	75-77	24	Marl	5	3
B-18 A	100-102	24	Marl	5	3
B-21 ALT-1 A	25-27	22	Clay/Silt	2C	3
B-21 ALT-1 A	30-32	22	Clay/Silt	2C	3
B-23 ALT 1A	51	24	Marl	5	6
B-27 ALT-1 A	30-32	18	Pre-Marl	4	3
B-27 ALT-1 A	33-35	24	Pre-Marl	4	3
B-27 ALT-1 A	36-38	24	Pre-Marl	4	11
B-33A	21	24	Clay/Silt	1B	0
B-33A	31	24	Clay/Silt	1B	0
B-33A	51	19	Marl	5	7
B-34 A	8ft-10ft	13	Clay/Silt	1B	N/A
B-34 A	26-28	17	Clay/Silt	1B	N/A
B-34 A	42-44	17	Clay/Silt	1B	N/A
B-39A	16	24	Clay/Silt	1B	0
B-39A	29	24	Clay/Silt	1B	0
B-40A	24	24	Clay/Silt	1B	2
B-40A	39	24	Clay/Silt	1B	2
B-43 ALT-1 A	26-28	24	Pre-Marl	4	2
B-43 ALT-1 A	40-42	24	Marl	5	5
B-46 A	20-22	23	Clay/Silt	3	2
B-46 A	24-26	24	Clay/Silt	3	11
B-47A	25	21	Clay/Silt	3	2
B-51 ALT 2A	25	24	Silty Sand	3	2
B-52B	25	23	Clayey Sand	2A	2
B-53A	33	24	Clay/Silt	2C	1
B-55A	25	21	Clay/Silt	2B	2
B-55B	36	13	Clay/Silt	2C	2
B-57 A	20-22	24	Clay/Silt	2C	0
B-57 A	30-32	24	Clay/Silt	2C	2
B-66A	21	24	Clay/Silt	2C	1
B-74A	9	23	Clay/Silt	1C	0
B-74A	66	14	Marl	5	10
B-76 A	60-62	24	Marl	5	7
B-76 A	62-64	24	Marl	5	10
B-77 B	34-36	22	Pre-Marl	4	N/A
B-77 B	37-39	20	Pre-Marl	4	N/A

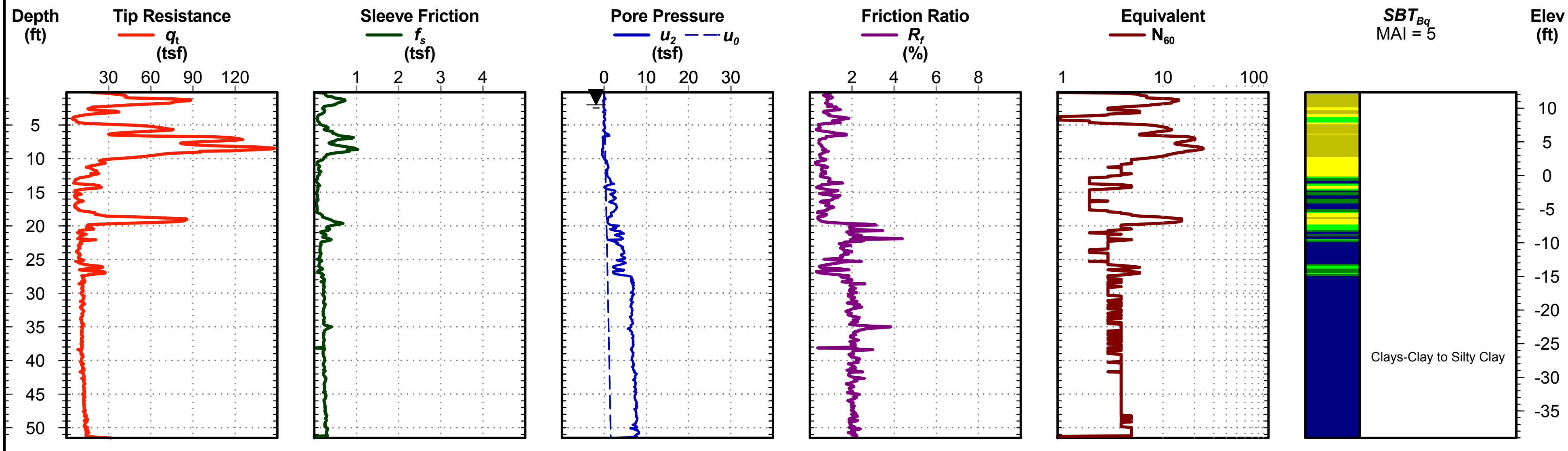
Cone Penetrometer Test (CPT) Sounding Logs

S&ME

Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Cone Penetration Test *B-01 CPT*

Date:	Sep. 30, 2008	**Latitude:**	32.840334	**Total Depth:**	51.5 ft
Estimated Water Depth:	2 ft	**Longitude:**	79.967662	**Termination Criteria:**	Target Depth
Rig/Operator:	Gyrotrac/A. Feix	**Elevation:**	12.5 NAVD 88	**Cone Size:**	1.44



Electronic Filename:

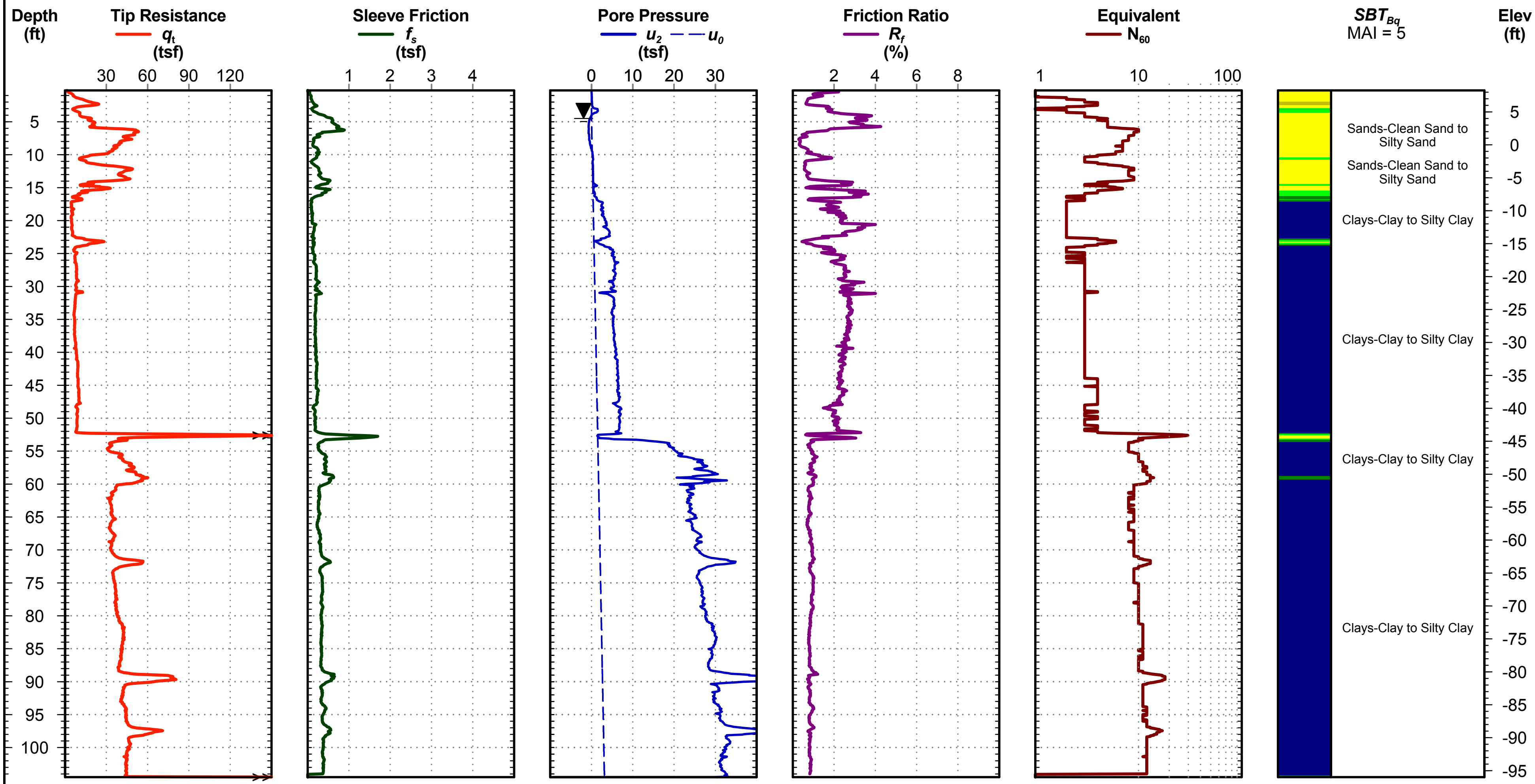
B-01 CPT

S&ME

Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Cone Penetration Test B-06 CPT

Date:	Feb. 19, 2009	**Latitude:**	32.836681	**Total Depth:**	104.5 ft
Estimated Water Depth:	4.5 ft	**Longitude:**	79.962377	**Termination Criteria:**	Maximum Reaction Force
Rig/Operator:	ATV/M. Cox	**Elevation:**	8.5 NAVD 88	**Cone Size:**	1.75



B-06 CPT

Electronic Filename: e19f0901c.dat

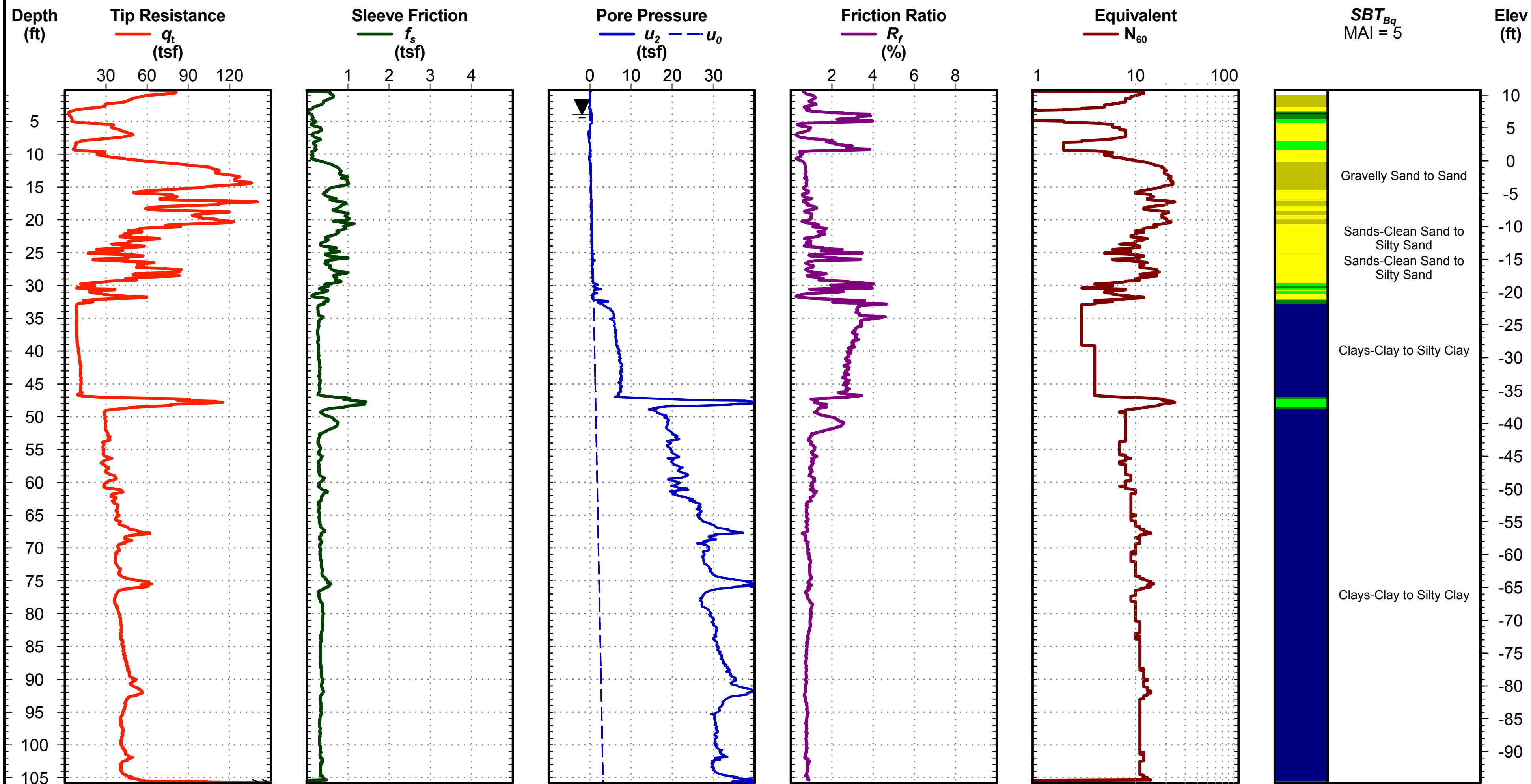
S&ME

Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Cone Penetration Test

B-07 CPT

Date:	Feb. 18, 2009	**Latitude:**	32.836077	**Total Depth:**	105.8 ft
Estimated Water Depth:	4 ft	**Longitude:**	79.961577	**Termination Criteria:**	Maximum Reaction Force
Rig/Operator:	ATV/ M. Cox	**Elevation:**	11 NAVD 88	**Cone Size:**	1.75



B-07 CPT

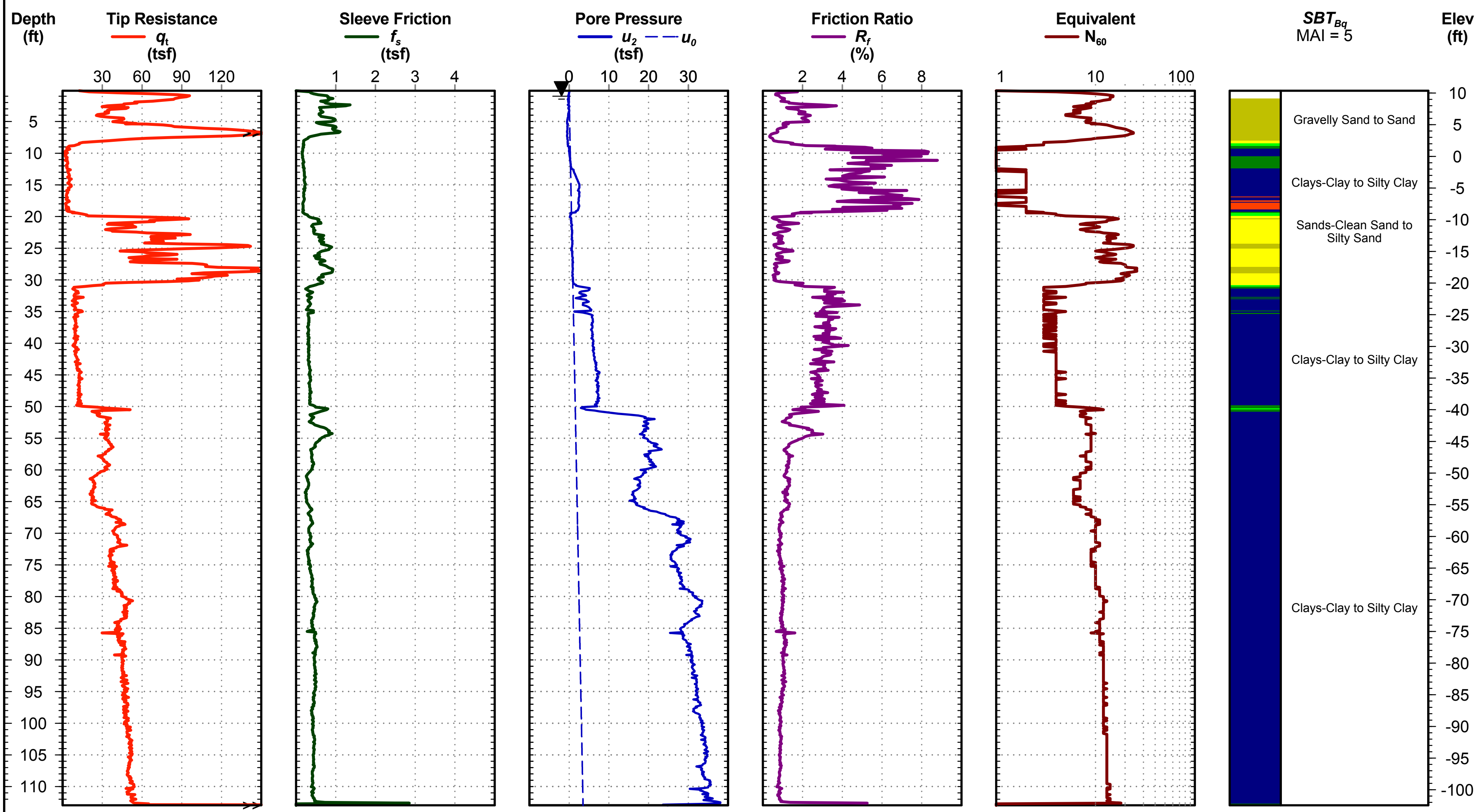
Electronic Filename: e18f0902c.dat

S&ME

Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Cone Penetration Test B-08 CPT

Date:	Sep. 18, 2008	**Latitude:**	32.835301	**Total Depth:**	113.0 ft
Estimated Water Depth:	1 ft	**Longitude:**	79.960428	**Termination Criteria:**	Maximum Reaction Force
Rig/Operator:	Gyrotrac/A. Feix	**Elevation:**	10.5 NAVD 88	**Cone Size:**	1.44



B-08 CPT

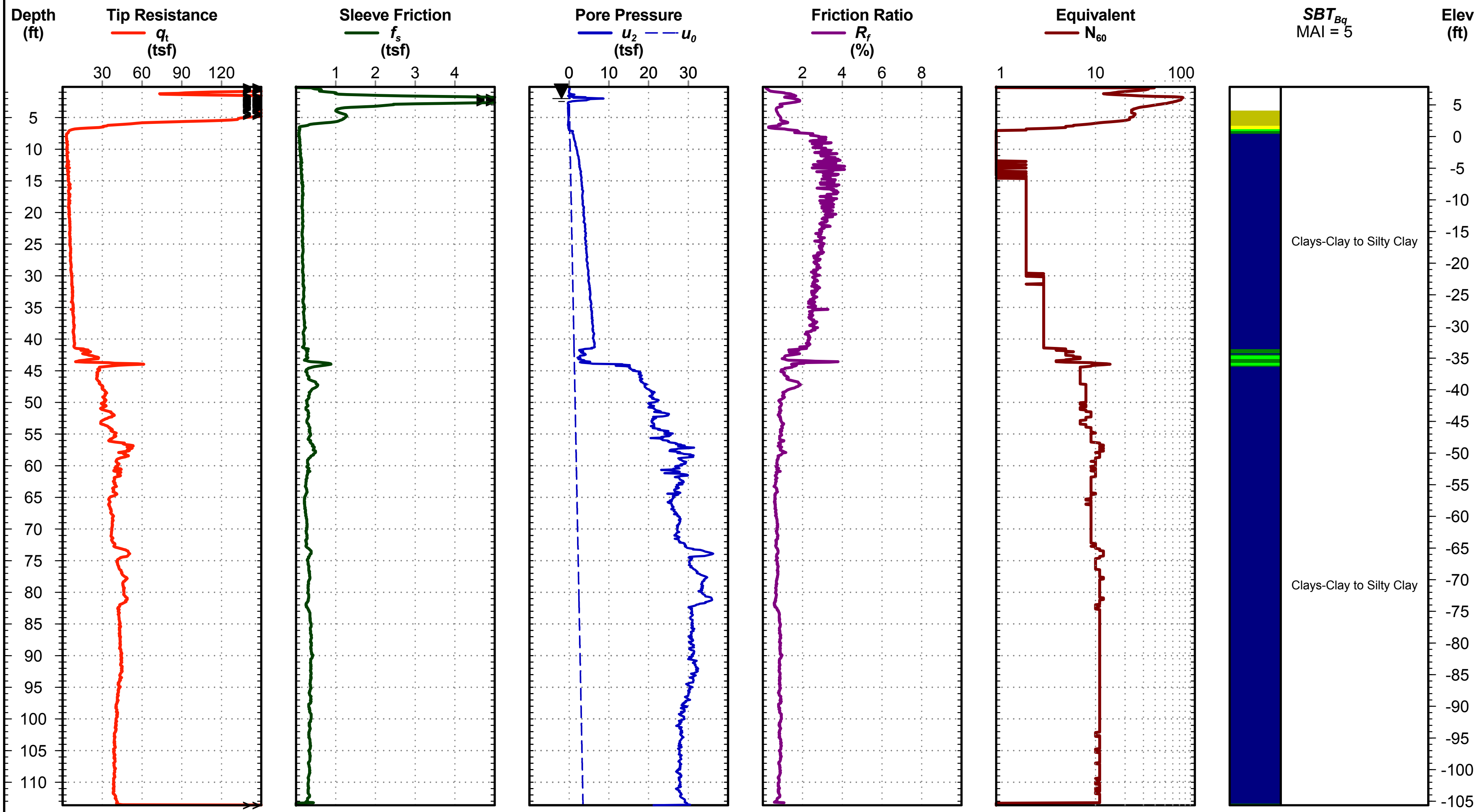
Electronic Filename: f18s0804c.ecp

S&ME

Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Cone Penetration Test B-10 CPT

Date:	Oct. 6, 2008	Latitude:	32.834032	Total Depth:	113.6 ft
Estimated Water Depth:	2 ft	Longitude:	79.959589	Termination Criteria:	Target Depth
Rig/Operator:	Truck/M. Cox	Elevation:	8 NAVD 88	Cone Size:	1.75



B-10 CPT

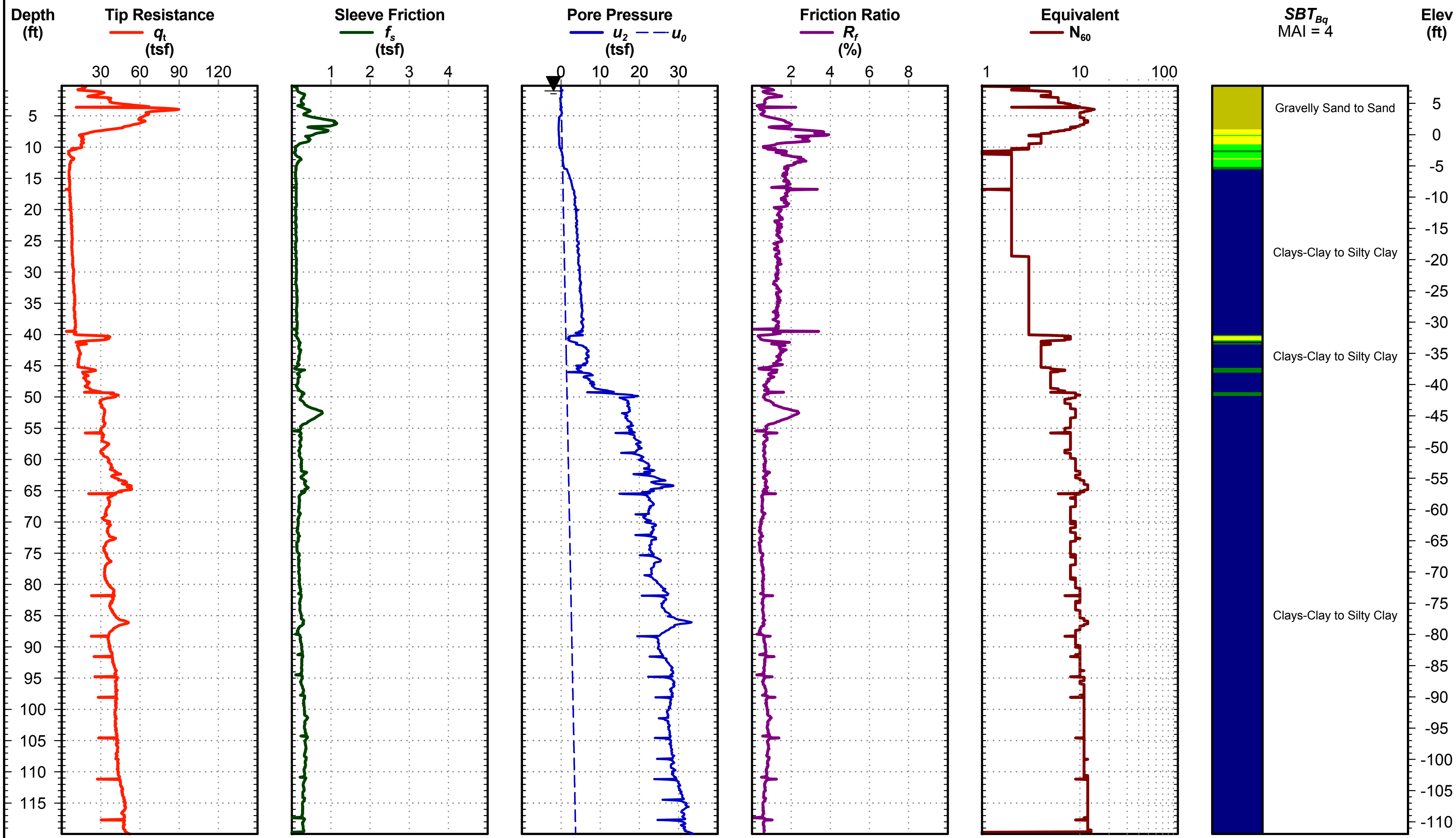
Electronic Filename: e06o0802c.ecp

Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Cone Penetration Test

B-12 SCPT

Date:	Oct. 27, 2008	**Latitude:**	32.833586	**Total Depth:**	120.0 ft
Estimated Water Depth:	1 ft	**Longitude:**	79.958457	**Termination Criteria:**	Target Depth
Rig/Operator:	ATV/M. Cox	**Elevation:**	8 NAVD 88	**Cone Size:**	1.75



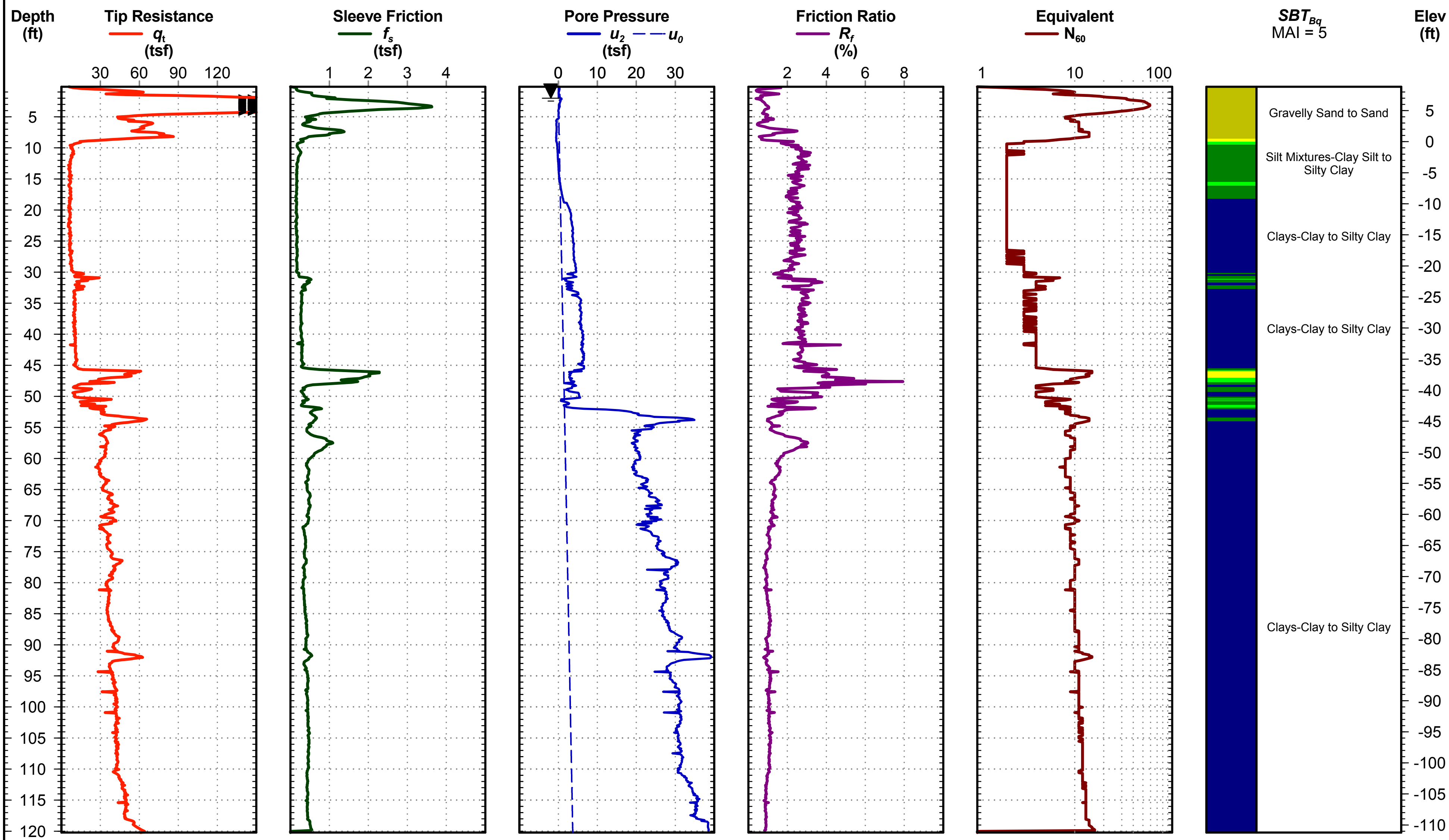
B-12 SCPT

Electronic Filename: e27o0801c.ecp

Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Cone Penetration Test B-13 CPT

Date:	Sep. 17, 2008	**Latitude:**	32.833796	**Total Depth:**	120.2 ft
Estimated Water Depth:	2 ft	**Longitude:**	79.957743	**Termination Criteria:**	Target Depth
Rig/Operator:	Gyrotrac/A. Feix	**Elevation:**	9 NAVD 88	**Cone Size:**	1.44



B-13 CPT

Electronic Filename: f17s0803c.ecp

S&ME

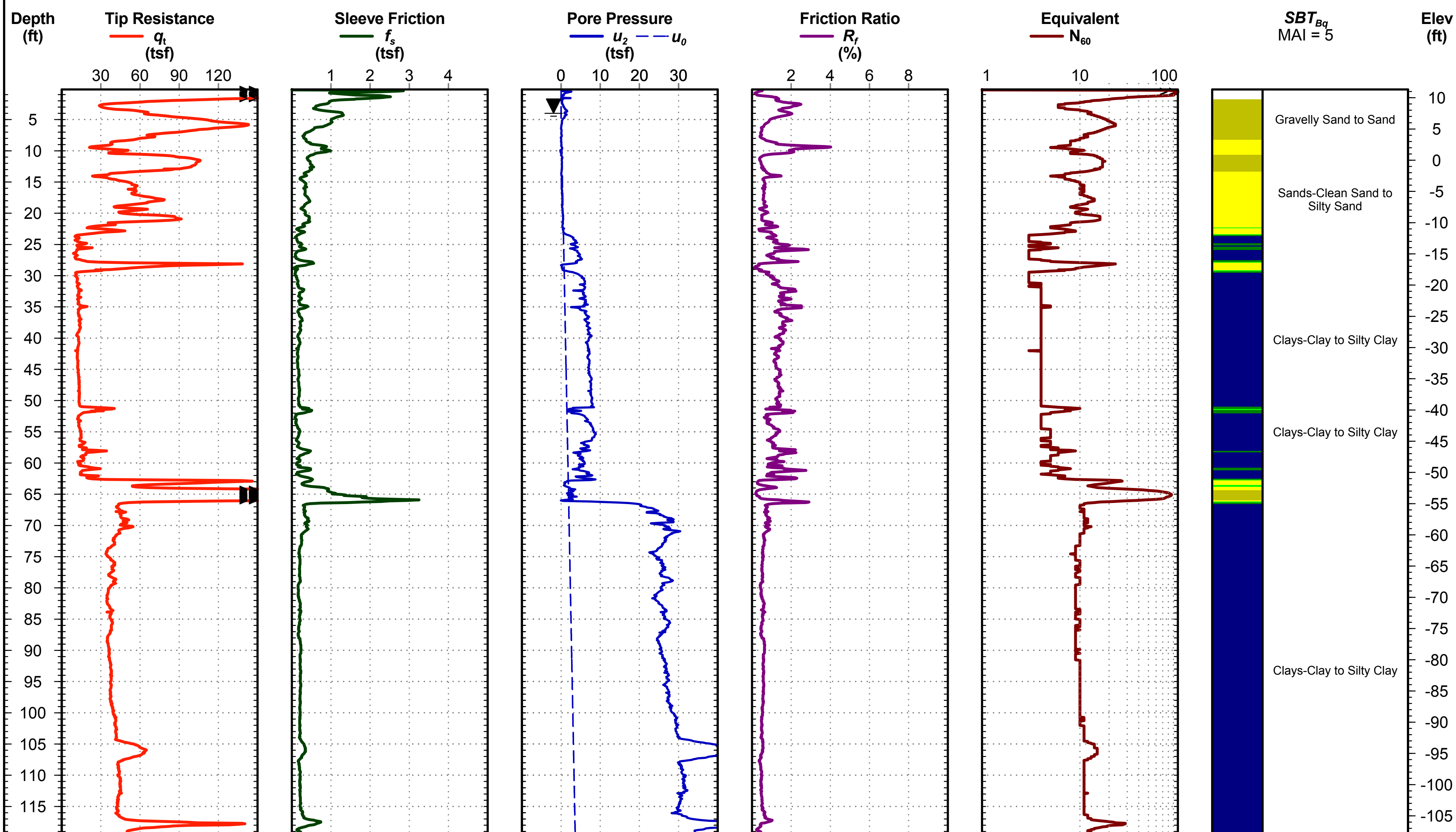
Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Cone Penetration Test B-15 CPT

Date: Oct. 9, 2008
Estimated Water Depth: 4 ft
Rig/Operator: Gyrotrac/A. Feix

Latitude: 32.834548
Longitude: 79.956464
Elevation: 11.5 NAVD 88

Total Depth: 119.8 ft
Termination Criteria: Target Depth
Cone Size: 1.75



B-15 CPT

Electronic Filename: f09o0801c.ecp

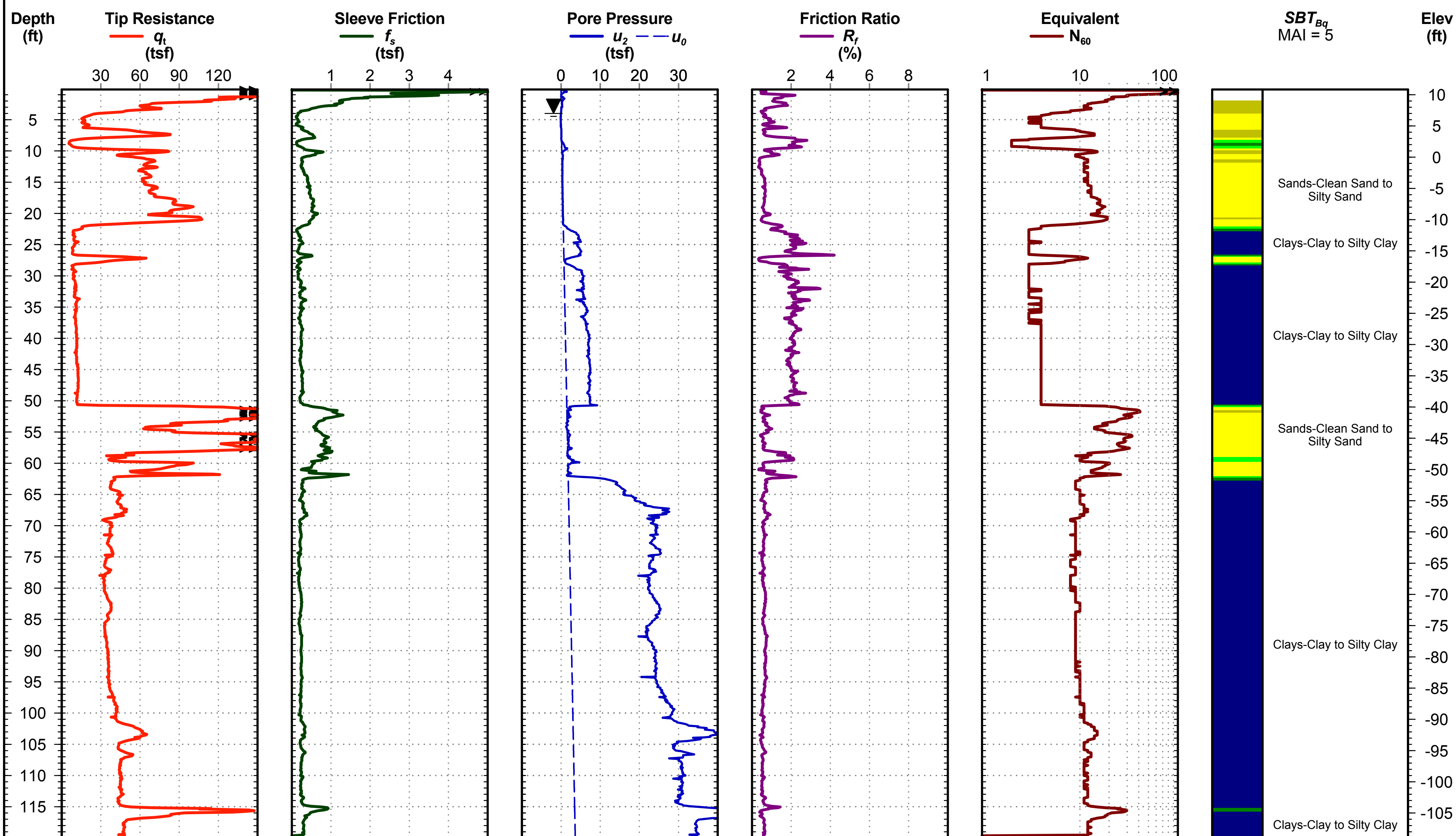
Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Cone Penetration Test B-17 CPT

Date: Oct. 9, 2008
Estimated Water Depth: 4 ft
Rig/Operator: Gyrotrac/A. Feix

Latitude: 32.834292
Longitude: 79.95604
Elevation: 11 NAVD 88

Total Depth: 119.9 ft
Termination Criteria: Target Depth
Cone Size: 1.75



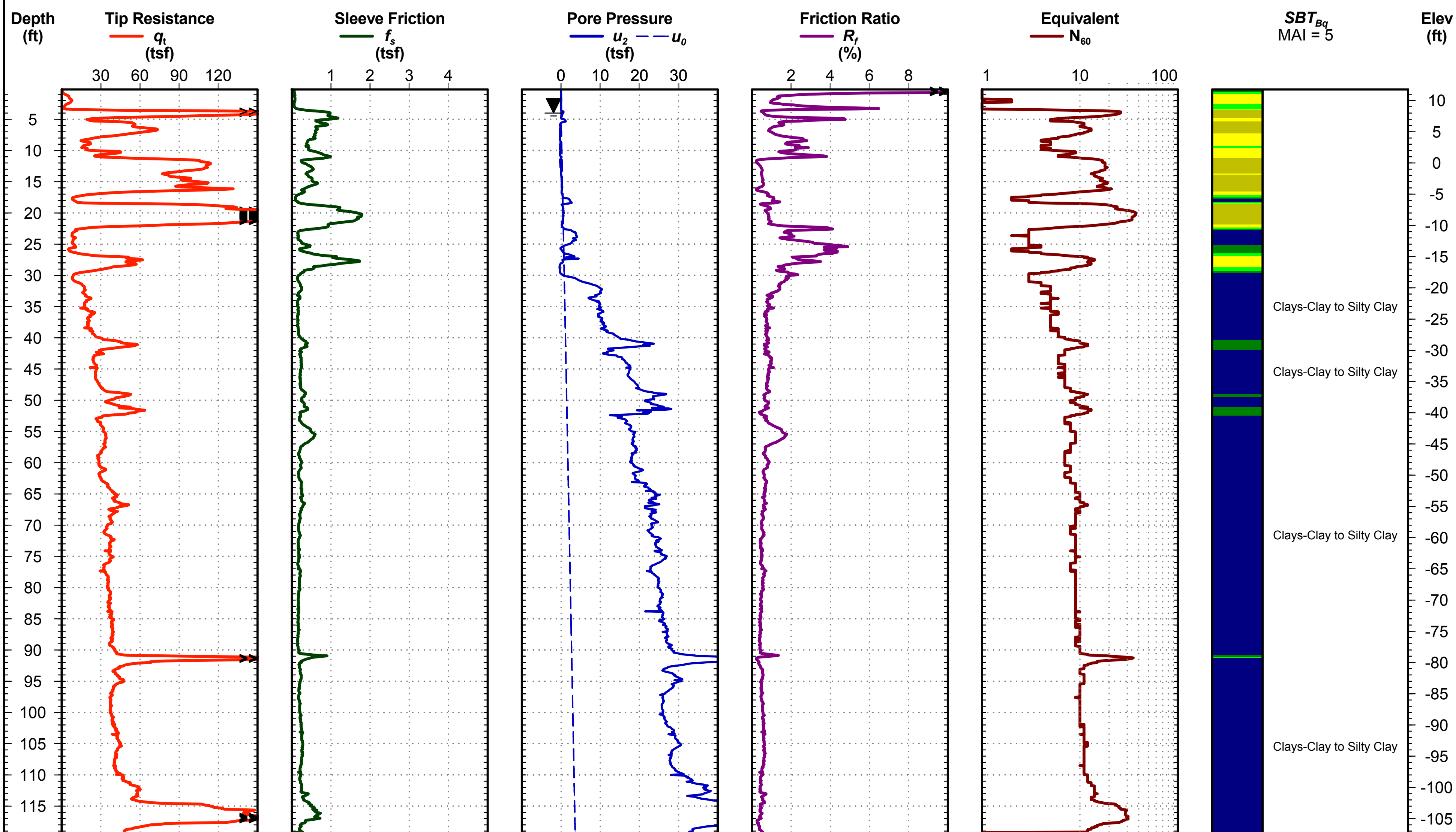
B-17 CPT

Electronic Filename: f09o0807c.ecp

Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Cone Penetration Test *B-22 SCPT*

Date:	Oct. 1, 2008	**Latitude:**	32.838328	**Total Depth:**	119.5 ft
Estimated Water Depth:	4 ft	**Longitude:**	79.952978	**Termination Criteria:**	Target Depth
Rig/Operator:	Gyrotrac/A. Feix	**Elevation:**	12 NAVD 88	**Cone Size:**	1.75



B-22 SCPT

Electronic Filename: f01o0803c.ecp

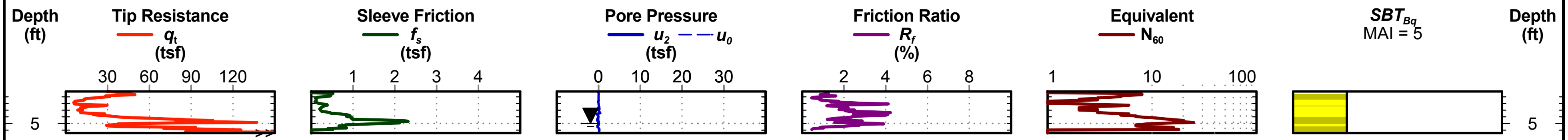
Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Cone Penetration Test B-30-CPT

Date: Oct. 8, 2008
Estimated Water Depth: 5 ft
Rig/Operator: Gyrotrac/M. Cox

Latitude:
Longitude:
Elevation:

Total Depth: 6.4 ft
Termination Criteria: Maximum Reaction Force
Cone Size: 1.75



B-30-CPT

Electronic Filename: e08o0806c.dat

S&ME

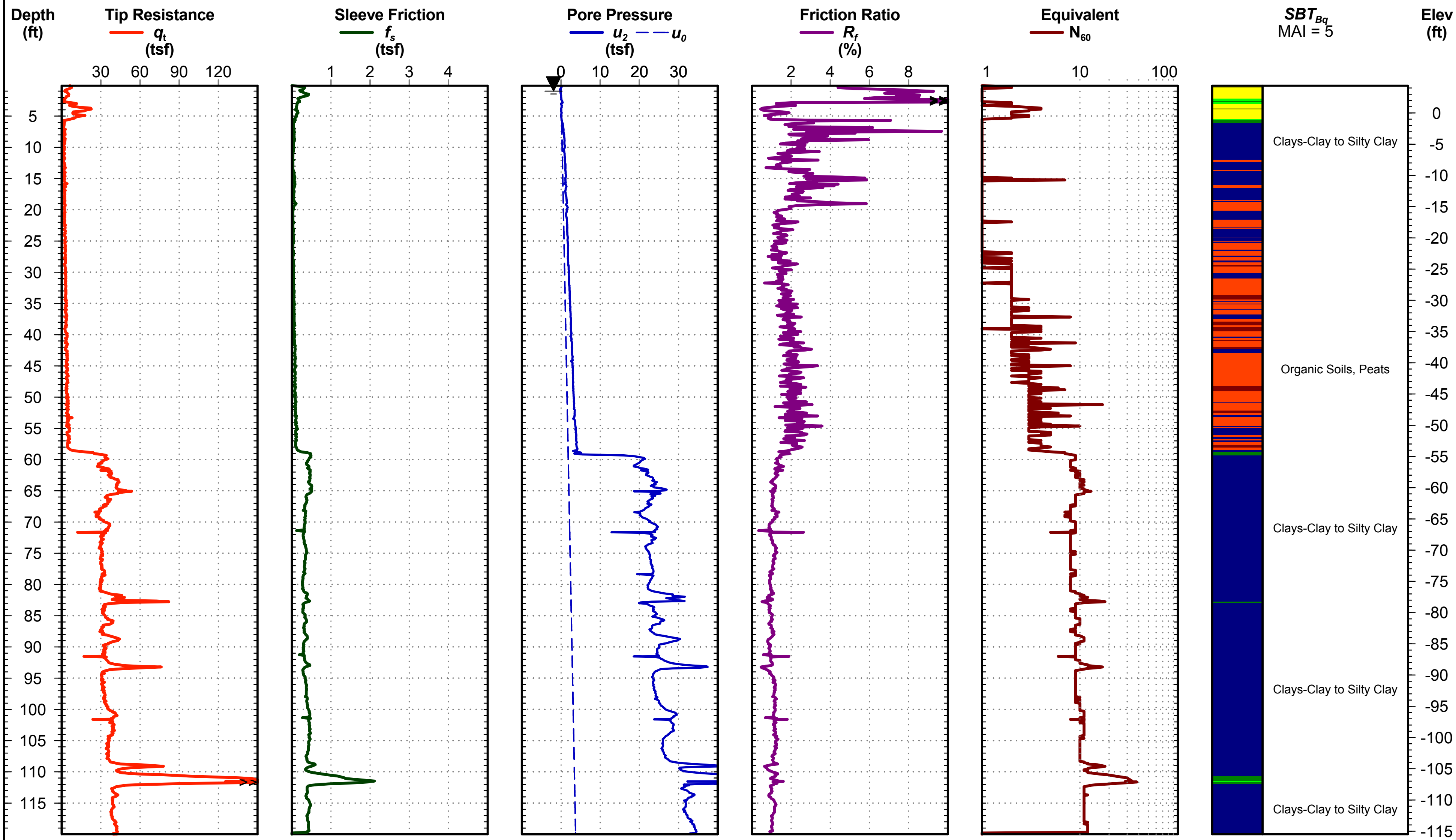
Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Cone Penetration Test B-34 SCPT

Date: Sep. 23, 2008
Estimated Water Depth: 1 ft
Rig/Operator: Gyrotrac/A. Feix

Latitude: 32.843438
Longitude: 79.94806
Elevation: 4.5 NAVD 88

Total Depth: 120.0 ft
Termination Criteria: Target Depth
Cone Size: 1.44



B-34 SCPT

Electronic Filename: f23s0802c.ecp

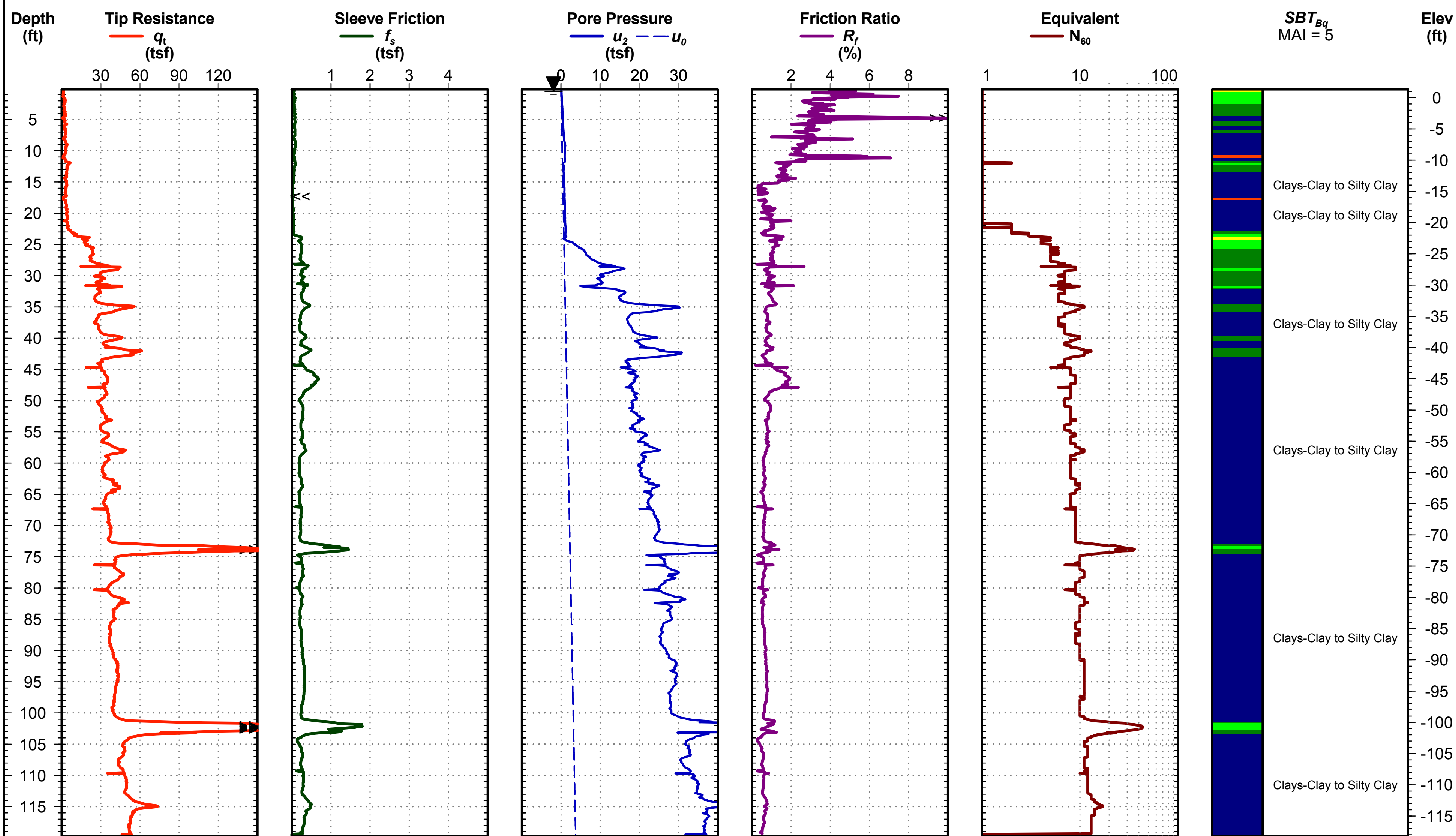
S&ME

Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Cone Penetration Test

B-38 CPT

Date:	Oct. 8, 2008	**Latitude:**	32.842467	**Total Depth:**	119.7 ft
Estimated Water Depth:	0.5 ft	**Longitude:**	79.949692	**Termination Criteria:**	Target Depth
Rig/Operator:	Truck/M. Cox	**Elevation:**	1.5 NAVD 88	**Cone Size:**	1.75



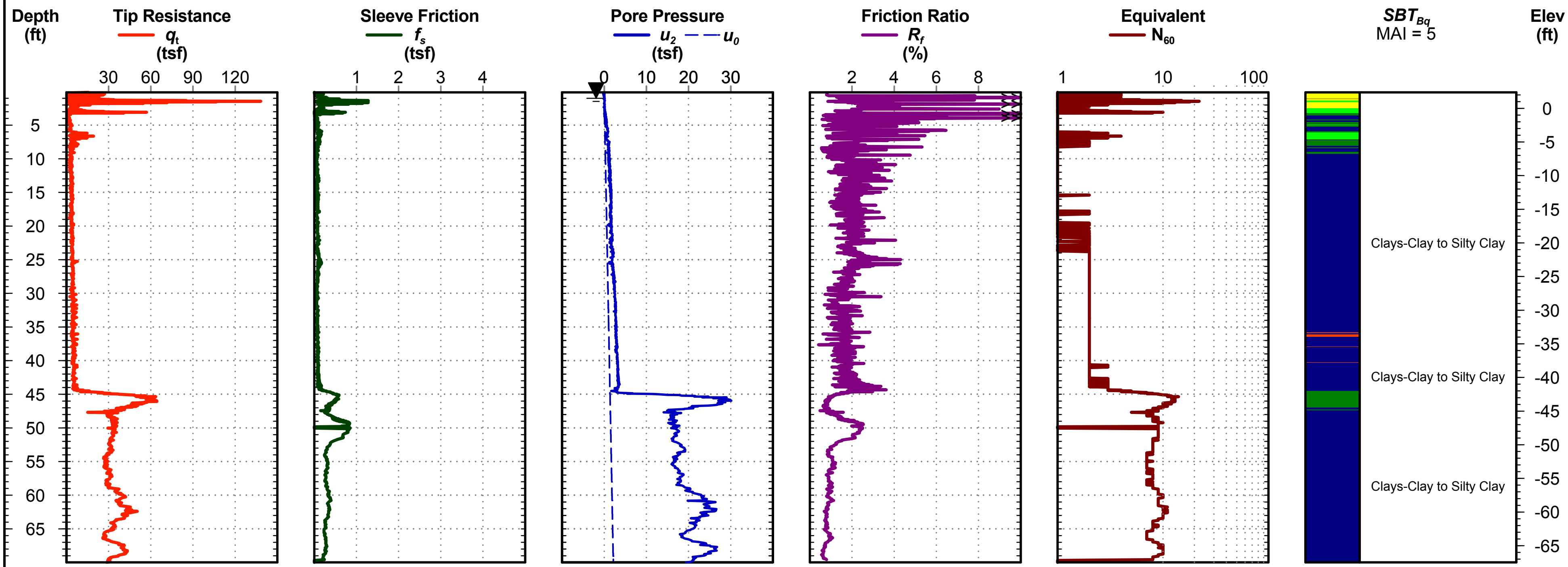
B-38 CPT

Electronic Filename: e08o0809c.ecp

Cone Penetration Test B-40 CPT

Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Date:	Sep. 23, 2008	**Latitude:**	32.84198	**Total Depth:**	70.0 ft
Estimated Water Depth:	1 ft	**Longitude:**	79.947978	**Termination Criteria:**	Target Depth
Rig/Operator:	Gyrotrac/A. Feix	**Elevation:**	2.5 NAVD 88	**Cone Size:**	1.44



B-40 CPT

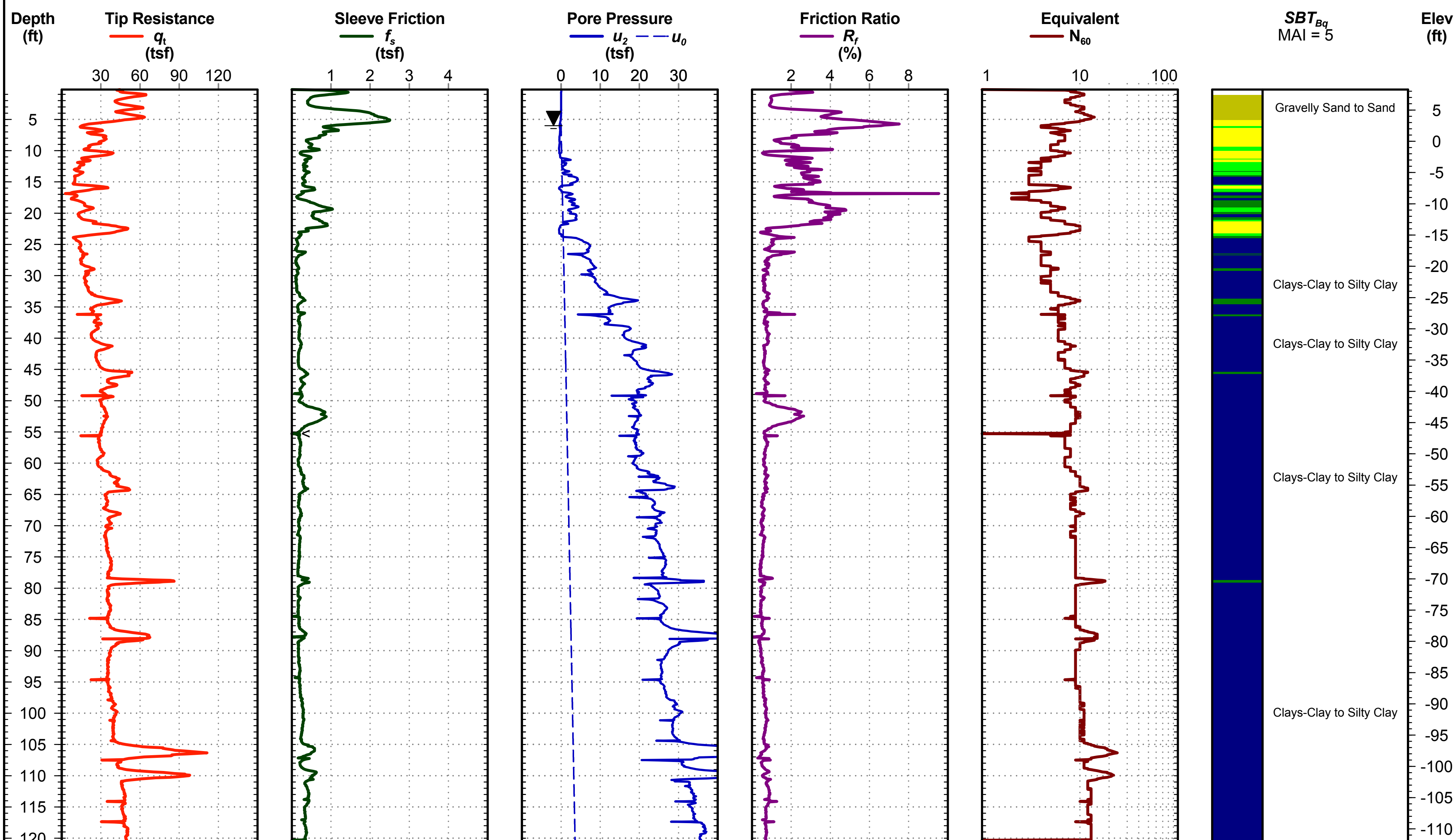
Electronic Filename: f23s0801c.ecp

S&ME

Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Cone Penetration Test B-44 SCPT

Date:	Oct. 1, 2008	**Latitude:**	32.844947	**Total Depth:**	120.7 ft
Estimated Water Depth:	6 ft	**Longitude:**	79.953772	**Termination Criteria:**	Target Depth
Rig/Operator:	Truck/M. Cox	**Elevation:**	8.5 NAVD 88	**Cone Size:**	1.75



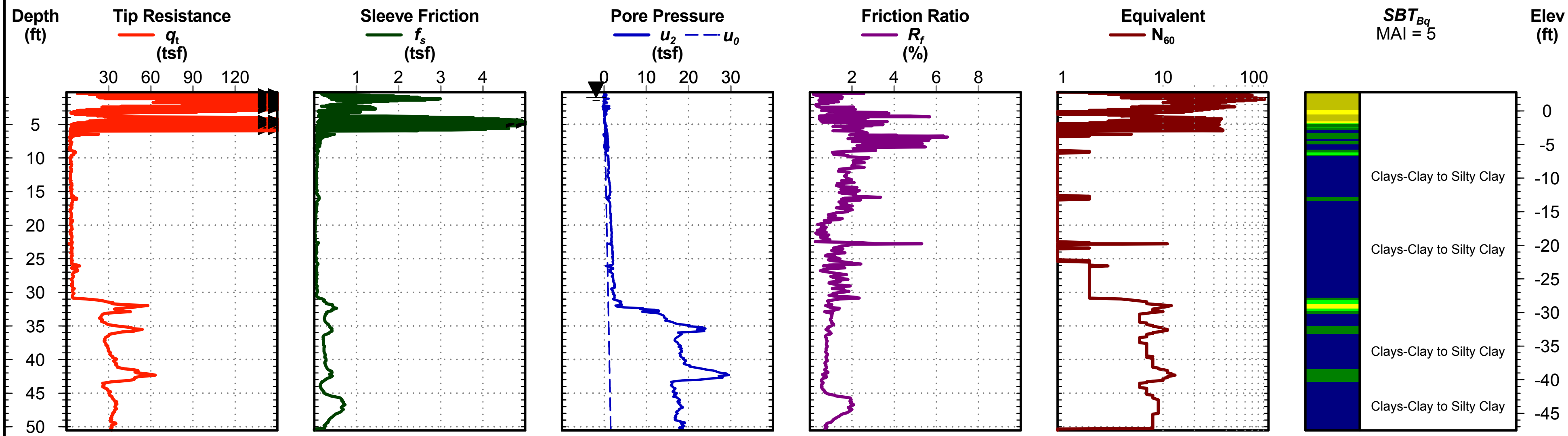
B-44 SCPT

Electronic Filename: e01o0801c.ecp

Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Cone Penetration Test B-48 CPT

Date:	Sep. 22, 2008	**Latitude:**	32.849066	**Total Depth:**	50.5 ft
Estimated Water Depth:	1 ft	**Longitude:**	79.955477	**Termination Criteria:**	Target Depth
Rig/Operator:	Gyrotrac/A. Feix	**Elevation:**	3 NAVD 88	**Cone Size:**	1.44



B-48 CPT

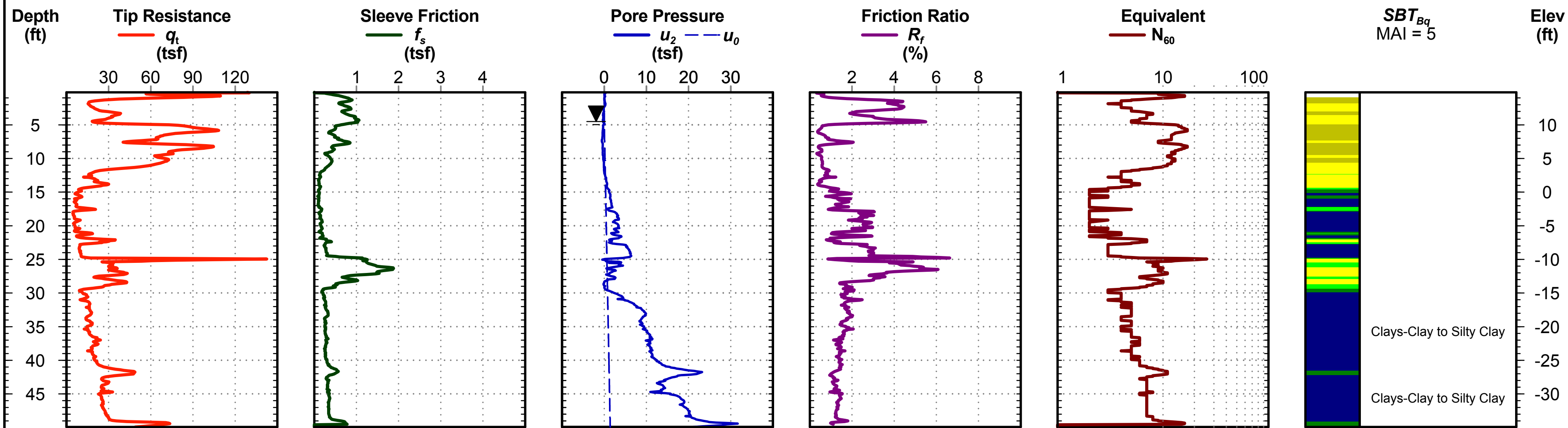
Electronic Filename: f22s0802c.ecp

S&ME

Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Cone Penetration Test B-49 CPT

Date:	Sep. 18, 2008	**Latitude:**	32.842451	**Total Depth:**	49.9 ft
Estimated Water Depth:	4.5 ft	**Longitude:**	79.96427	**Termination Criteria:**	Target Depth
Rig/Operator:	Gyrotrac/A. Feix	**Elevation:**	15 NAVD 88	**Cone Size:**	1.75



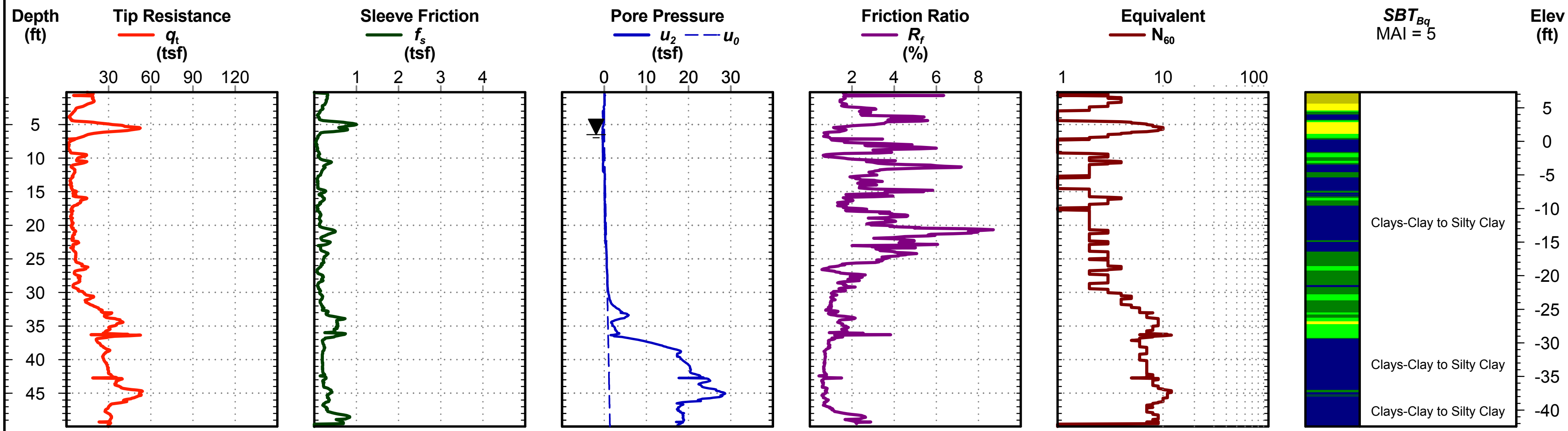
B-49 CPT

Electronic Filename: e18s0801c.ecp

Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Cone Penetration Test B-51 CPT

Date:	Oct. 1, 2008	**Latitude:**	32.845086	**Total Depth:**	49.9 ft
Estimated Water Depth:	6.5 ft	**Longitude:**	79.959216	**Termination Criteria:**	Target Depth
Rig/Operator:	Truck/A. Feix	**Elevation:**	7.5 NAVD 88	**Cone Size:**	1.75



B-51 CPT

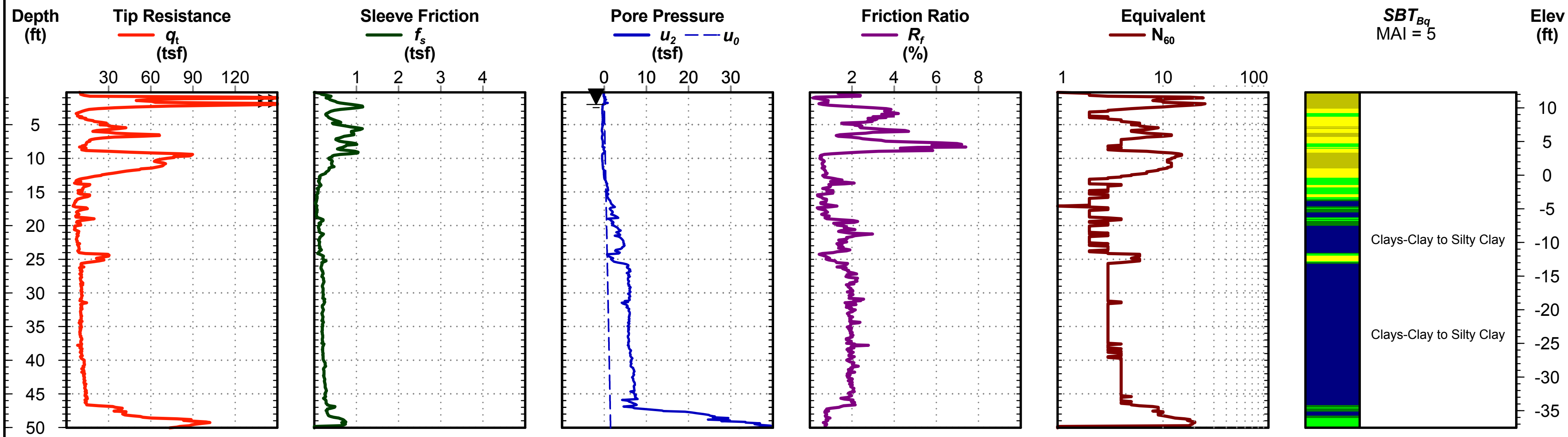
Electronic Filename: e01o0803c.ecp

S&ME

Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Cone Penetration Test B-54 CPT

Date:	Sep. 18, 2008	**Latitude:**	32.83889	**Total Depth:**	50.0 ft
Estimated Water Depth:	2 ft	**Longitude:**	79.965152	**Termination Criteria:**	Target Depth
Rig/Operator:	Gyrotrac/A. Feix	**Elevation:**	12.5 NAVD 88	**Cone Size:**	1.44



B-54 CPT

Electronic Filename: f18s0801c.ecp

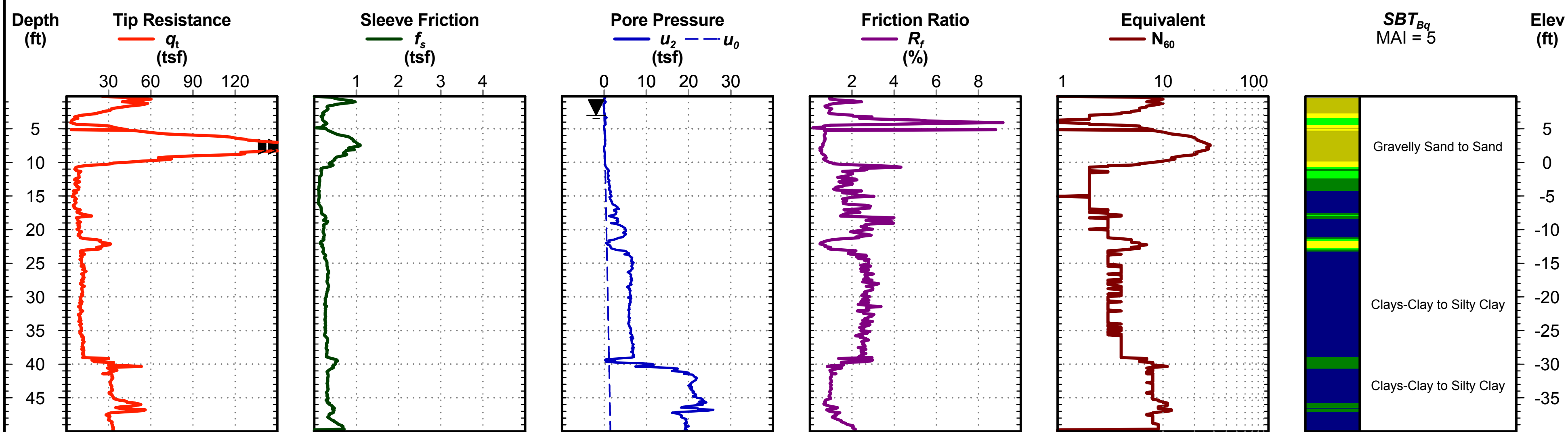
Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Cone Penetration Test B-56 CPT

Date: Sep. 18, 2008
Estimated Water Depth: 3 ft
Rig/Operator: Gyrotrac/A. Feix

Latitude: 32.837441
Longitude: 79.962355
Elevation: 10 NAVD 88

Total Depth: 50.0 ft
Termination Criteria: Target Depth
Cone Size: 1.44



B-56 CPT

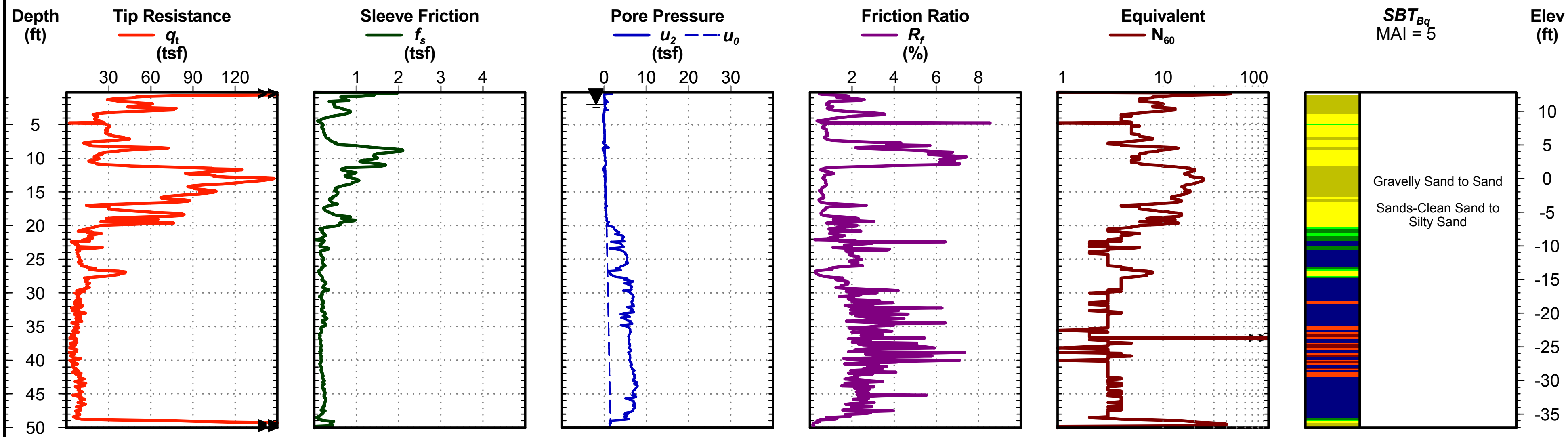
Electronic Filename: f18s0802c.ecp

S&ME

Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Cone Penetration Test B-59 CPT

Date:	Sep. 30, 2008	**Latitude:**	32.836866	**Total Depth:**	50.0 ft
Estimated Water Depth:	2 ft	**Longitude:**	79.961633	**Termination Criteria:**	Target Depth
Rig/Operator:	Gyrotrac/A. Feix	**Elevation:**	13 NAVD 88	**Cone Size:**	1.44



Electronic Filename:

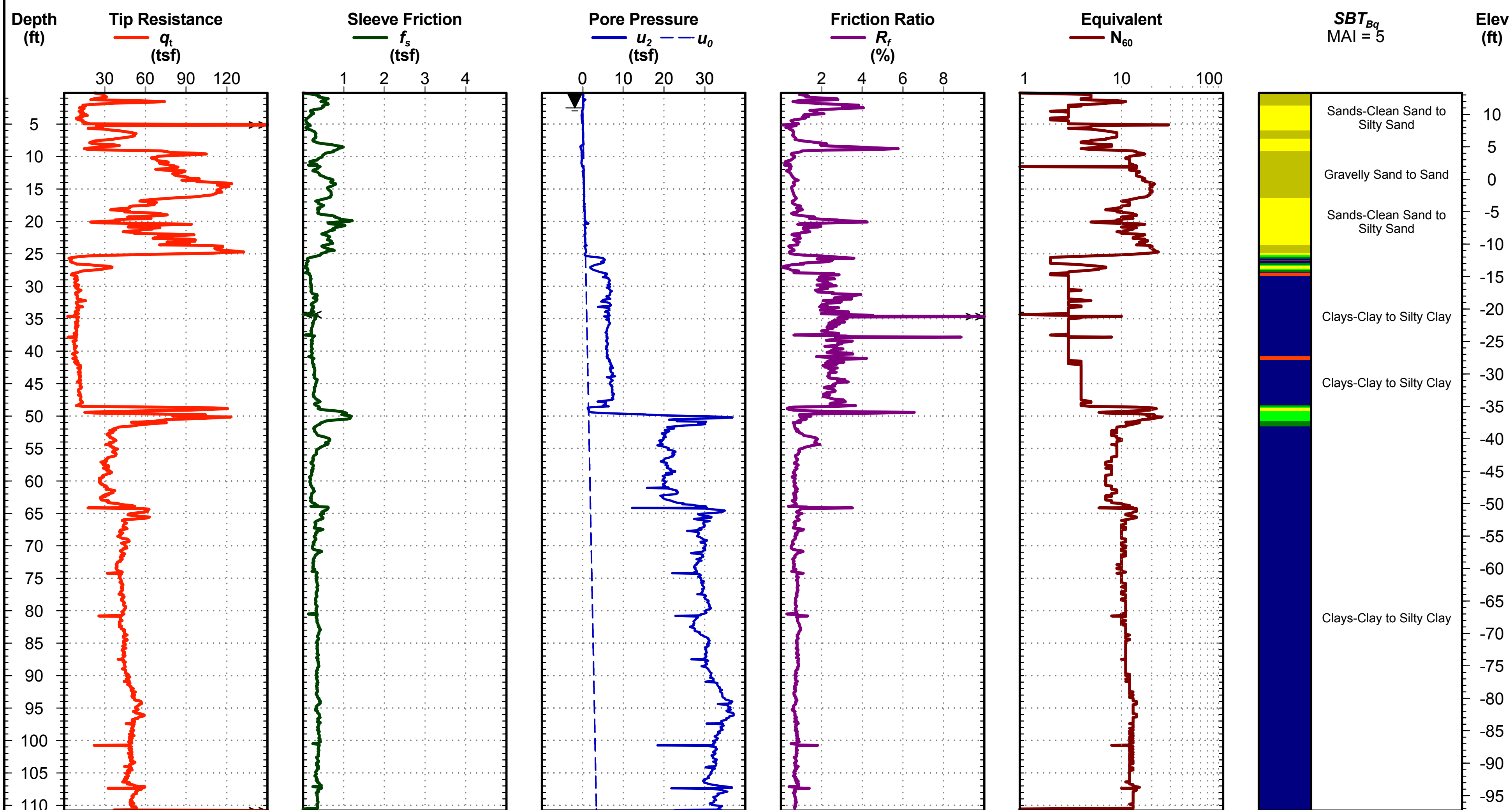
B-59 CPT

S&ME

Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Cone Penetration Test B-60 SCPT

Date:	Sep. 30, 2008	**Latitude:**	32.836514	**Total Depth:**	110.8 ft
Estimated Water Depth:	2.5 ft	**Longitude:**	79.961155	**Termination Criteria:**	Maximum Reaction Force
Rig/Operator:	Gyrotrac/A. Feix	**Elevation:**	13.5 NAVD 88	**Cone Size:**	1.44



B-60 SCPT

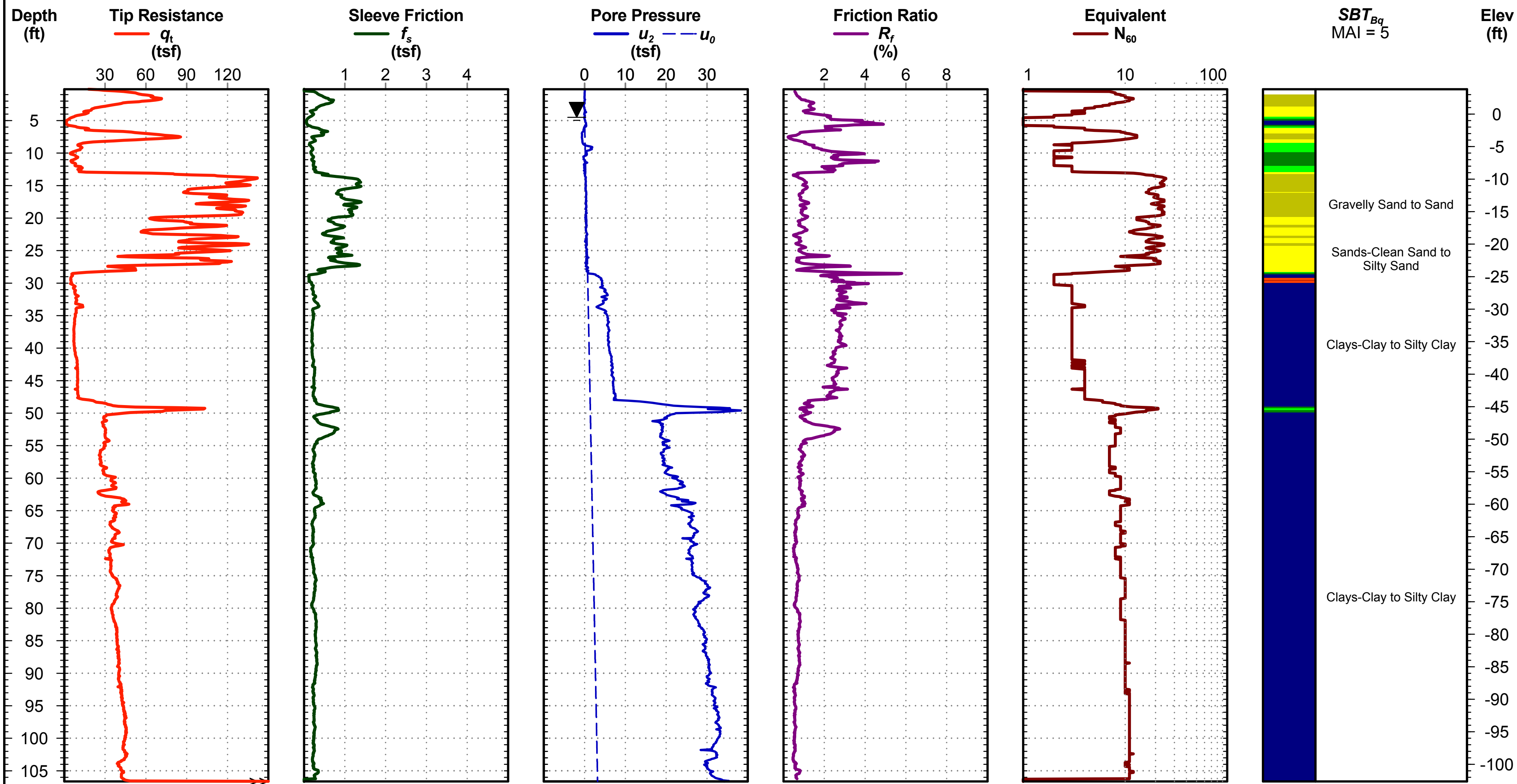
Electronic Filename: f30s0804c.ecp

S&ME

Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Cone Penetration Test B-61 CPT

Date:	Feb. 18, 2009	**Latitude:**	32.835896	**Total Depth:**	106.6 ft
Estimated Water Depth:	4.5 ft	**Longitude:**	79.960432	**Termination Criteria:**	Target Depth
Rig/Operator:	ATV/ M. Cox	**Elevation:**	4 NAVD 88	**Cone Size:**	1.75



B-61 CPT

Electronic Filename: e18f0901c.dat

S&ME

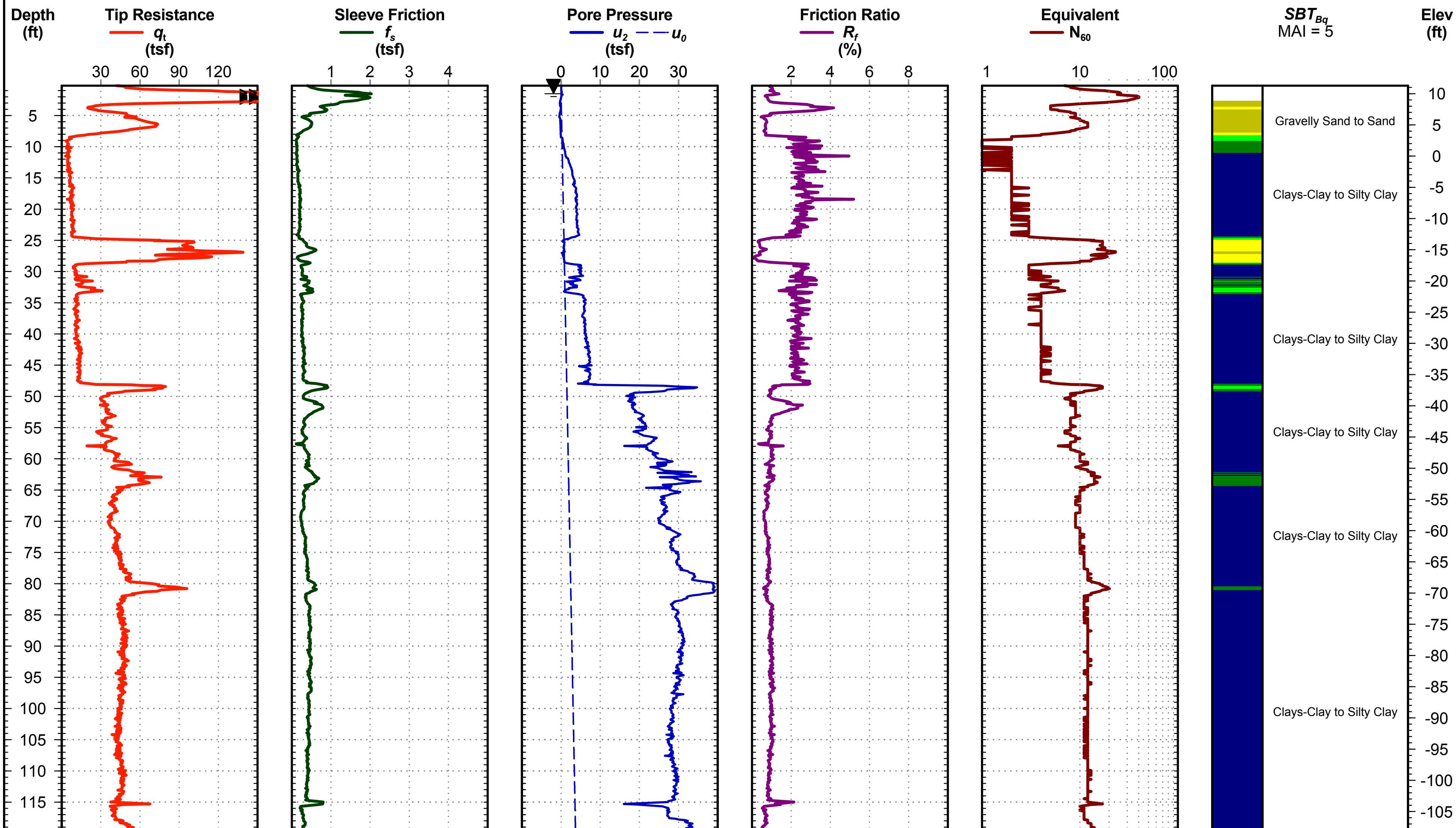
Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Cone Penetration Test B-62 CPT

Date: Sep. 18, 2008
Estimated Water Depth: 1.5 ft
Rig/Operator: Gyrotrac/A. Feix

Latitude: 32.835147
Longitude: 79.959541
Elevation: 11.5 NAVD 88

Total Depth: 119.9 ft
Termination Criteria: Target Depth
Cone Size: 1.44



B-62 CPT

Electronic Filename: f18s0803c.ecp

S&ME

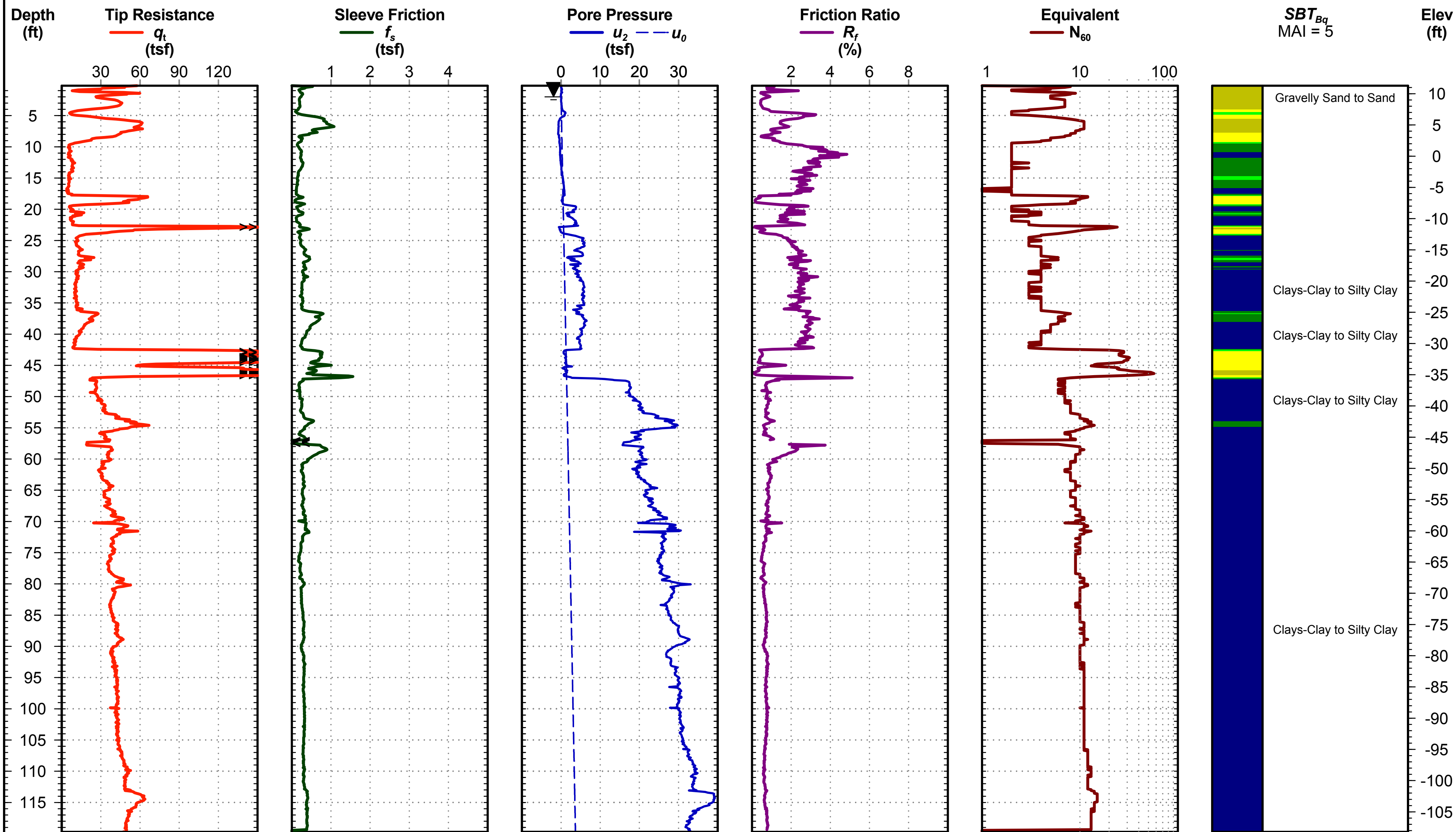
Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Cone Penetration Test B-64 CPT

Date: Sep. 17, 2008
Estimated Water Depth: 2 ft
Rig/Operator: Gyrotrac/A. Feix

Latitude: 32.83447
Longitude: 79.957609
Elevation: 11.5 NAVD 88

Total Depth: 119.7 ft
Termination Criteria: Target Depth
Cone Size: 1.44



B-64 CPT

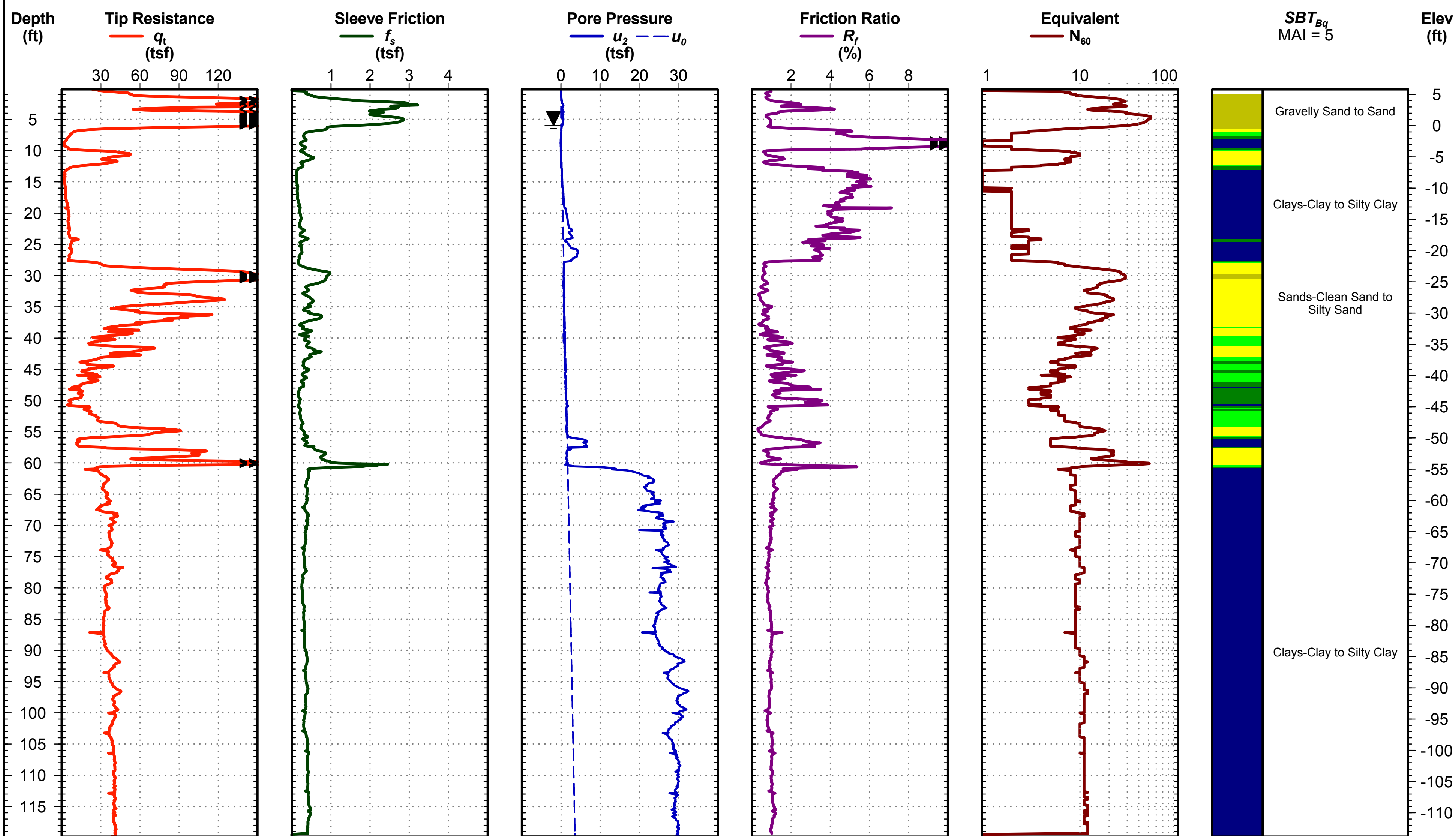
Electronic Filename: f17s0802c.ecp

S&ME

Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Cone Penetration Test B-67 SCPT

Date:	Feb. 10, 2009	**Latitude:**	32.831033	**Total Depth:**	119.8 ft
Estimated Water Depth:	6 ft	**Longitude:**	79.955904	**Termination Criteria:**	Target Depth
Rig/Operator:	Truck/ A. Feix	**Elevation:**	6 NAVD 88	**Cone Size:**	1.75



B-67 SCPT

Electronic Filename: f10f0902c.dat

S&ME

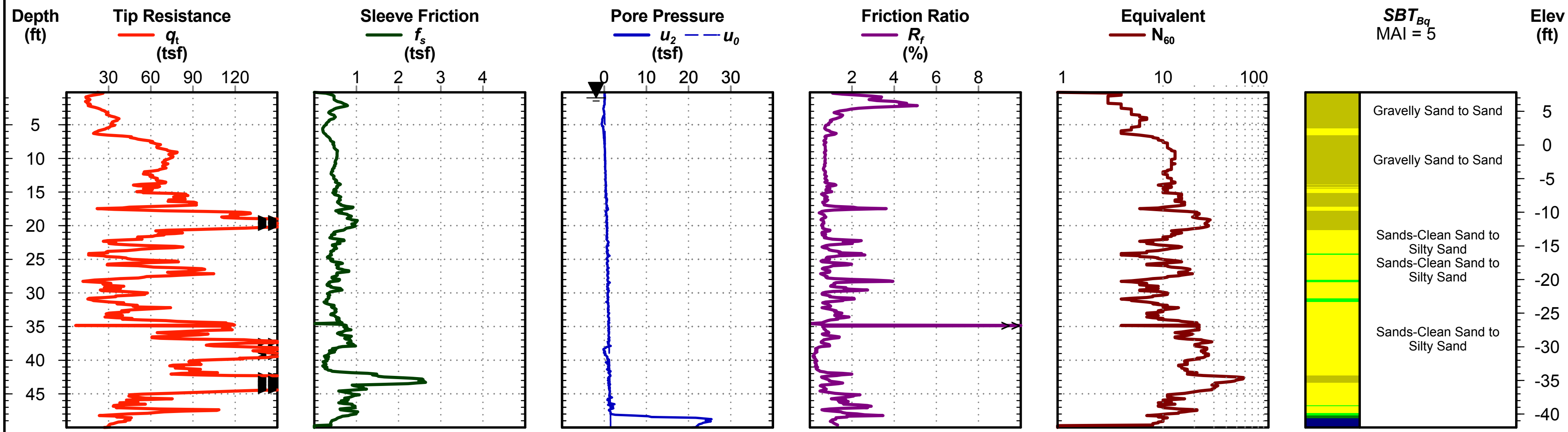
Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Cone Penetration Test B-69 CPT

Date: Sep. 15, 2008
Estimated Water Depth: 1 ft
Rig/Operator: Gyrotrac/A. Feix

Latitude: 32.828555
Longitude: 79.955149
Elevation: 8 NAVD 88

Total Depth: 50.0 ft
Termination Criteria: Target Depth
Cone Size: 1.44



B-69 CPT

Electronic Filename: f15s0802c.ecp

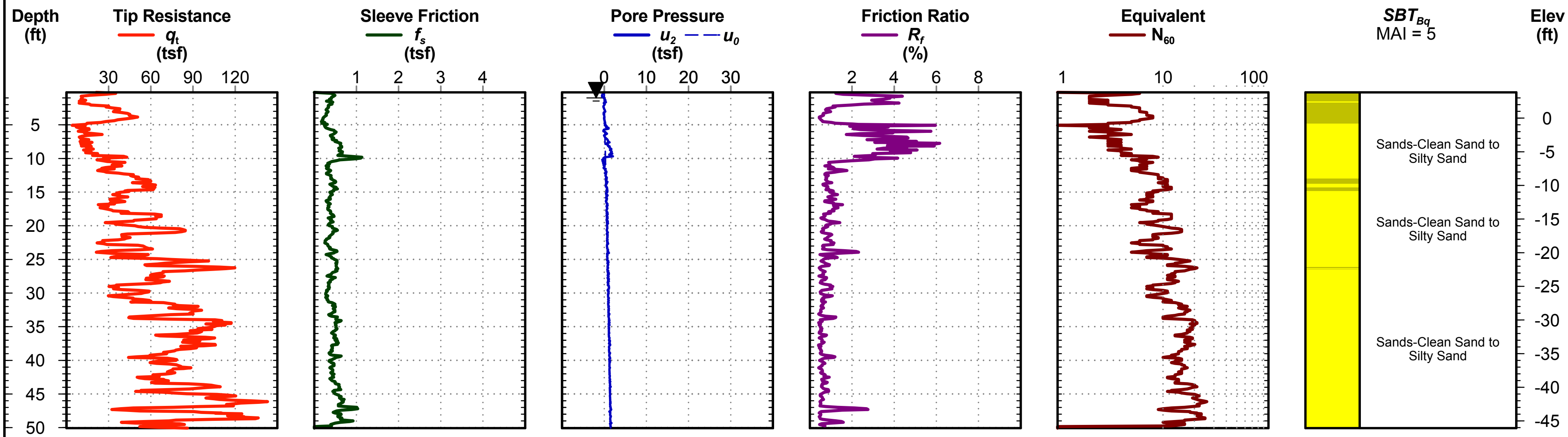
Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Cone Penetration Test B-71 CPT

Date: Sep. 15, 2008
Estimated Water Depth: 1 ft
Rig/Operator: Gyrotrac/A. Feix

Latitude: 32.830651
Longitude: 79.956387
Elevation: 4 NAVD 88

Total Depth: 50.1 ft
Termination Criteria: Target Depth
Cone Size: 1.44



B-71 CPT

Electronic Filename: f15s0801c.ecp

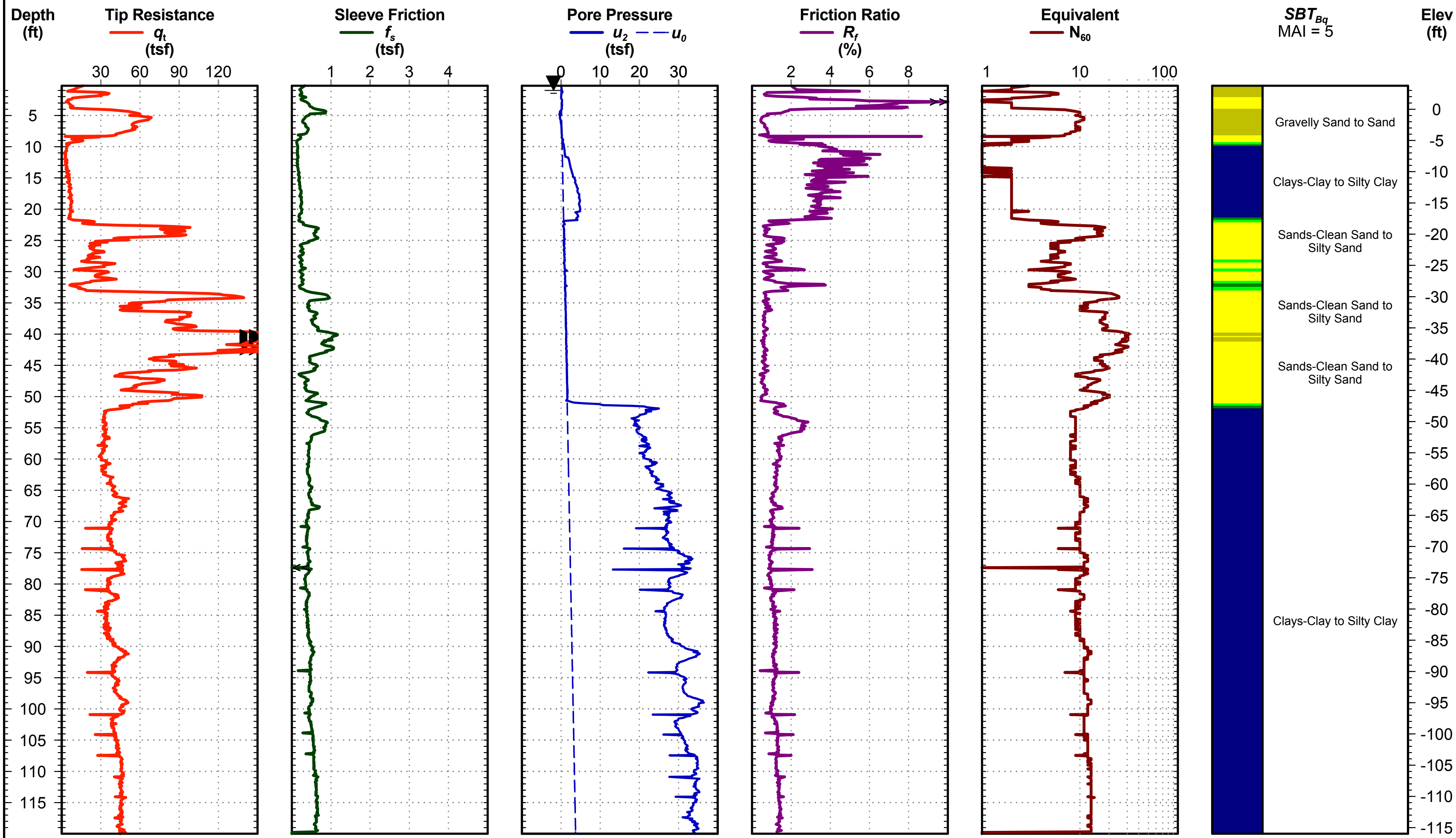
Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Cone Penetration Test B-73 SCPT ALT 1

Date: Sep. 15, 2008
Estimated Water Depth: 1 ft
Rig/Operator: Gyrotrac/A. Feix

Latitude: 32.831791
Longitude: 79.957274
Elevation: 4 NAVD 88

Total Depth: 120.0 ft
Termination Criteria: Target Depth
Cone Size: 1.44



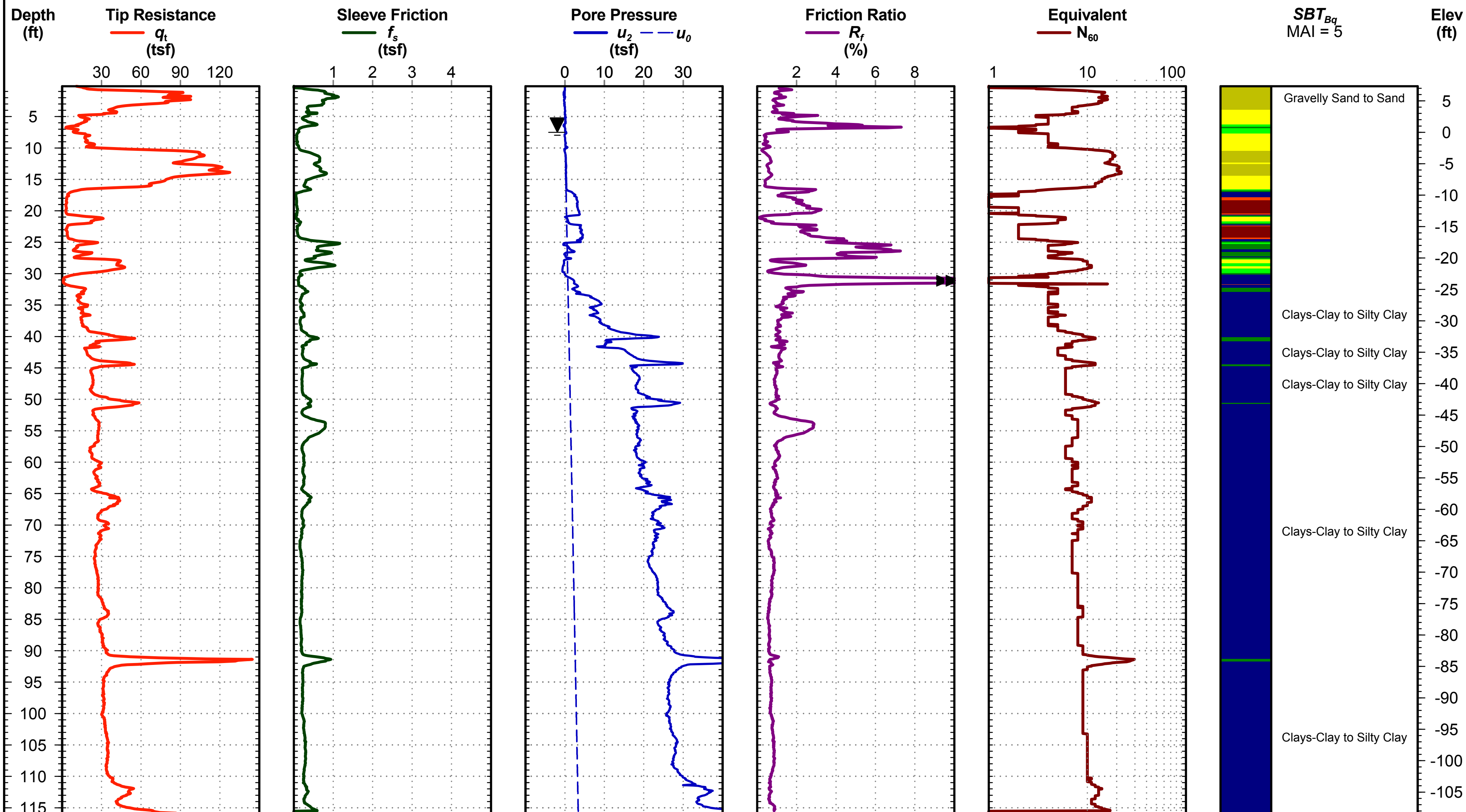
B-73 SCPT ALT 1

Electronic Filename: f15s0803c.ecp

Cone Penetration Test B-77 CPT

Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Date:	Feb. 23, 2009	**Latitude:**	32.837882	**Total Depth:**	115.9 ft
Estimated Water Depth:	7.5 ft	**Longitude:**	79.953696	**Termination Criteria:**	Target Depth
Rig/Operator:	Gyrotrac/ A. Feix	**Elevation:**	7.5 NAVD 88	**Cone Size:**	1.75



B-77 CPT

Electronic Filename: e23f0901c.dat

CPT Sounding Procedures

FIELD TESTING PROCEDURES

Cone Penetrometer Test (CPT) Sounding

The cone penetrometer test soundings (ASTM D 5778) were performed by hydraulically pushing an electronically instrumented cone penetrometer through the soil at a constant rate. As the cone penetrometer tip was advanced through the soil, nearly continuous readings of point stress, sleeve friction and pore water pressure were recorded and stored in the on-site computers. Using theoretical and empirical relationships, CPT data can be used to determine soil stratigraphy and estimate soil properties and parameters such as effective stress, friction angle, Young's Modulus and undrained shear strength.

The consistency and relative density designations, which are based on the cone tip resistance, q_t for sands and cohesive soils (silts and clays) are as follows:

SANDS		**SILTS AND CLAYS**	
Cone Tip Resistance, q_t (tsf)	**Relative Density**	**Cone Tip Resistance, q_t (tsf)**	**Consistency**
<20	Very Loose	<5	Very Soft
20 – 40	Loose	5 – 10	Soft
40 – 120	Medium Dense	10 – 15	Firm
		15 – 30	Stiff
120 – 200	Dense	30 –60	Very Stiff
>200	Very Dense	>60	Hard

CPT Correlations

References are in parenthesis next to the appropriate equation.

General

p_a = atmospheric pressure (for unit normalization)
q_t = corrected cone tip resistance (tsf)
f_s = friction sleeve resistance (tsf)
$R_f = 100\% * (f_s/q_t)$
u_2 = pore pressure behind cone tip (tsf)
u_0 = hydrostatic pressure
$B_q = (u_2-u_0)/(q_t-\sigma_{v0})$
$Q_t = (q_t-\sigma_{v0})/ \sigma'_{v0}$
$F_r = 100\% * f_s/(q_t- \sigma_{v0})$
$I_c = ((3.47-\log Q_t)^2+(\log F_r+1.22)^2)^{0.5}$

N-Value
$N_{60} = (q_t/pa)/[8.5(1-I_c/4.6)]$ (6)

(6) Jefferies, M.G. and Davies, M.P., (1993), "Use of CPTu to estimate equivalent SPT N60", ASTM Geotechnical Testing Journal, Vol. 16, No. 4

CPT Correlations and Robertson Classification Legend

CPT Soil Classification Legend

Zone	Q_t/N	Description
1	2	Sensitive, Fine Grained
2	1	Organic Soils-Peats
3	1.5	Clays-Clay to Silty Clay
4	2	Silt Mixtures-Clayey Silt to Silty Clay
5	3	Sand Mixtures-Silty Sand to Sandy Silt
6	4.5	Sands-Clean Sand to Silty Sand
7	6	Gravelly Sand to Sand
8	1	Very Stiff Clay to Clayey Sand*
9	2	Very Stiff, Fine Grained*

(*) Heavily Overconsolidated or Cemented

Robertson's Soil Behavior Type (SBT), 1990			
Group #	**Description**	**Ic**	
		Min	**Max**
1	Sensitive, fine grained	N/A	
2	Organic soils - peats	3.60	N/A
3	Clays - silty clay to clay	2.95	3.60
4	Silt mixtures - clayey silt to silty clay	2.60	2.95
5	Sand mixtures - silty sand to sandy silt	2.05	2.60
6	Sands - clean sand to silty sand	1.31	2.05
7	Gravelly sand to dense sand	N/A	1.31
8	Very stiff sand to clayey sand (High OCR or cemented)	N/A	
9	Very stiff, fine grained (High OCR or cemented)	N/A	

Soil behavior type is based on empirical data and may not be representative of soil classification based on plasticity and grain size distribution.

Relative Density and Consistency Table			
SANDS		SILTS and CLAYS	
Cone Tip Stress, qt (tsf)	Relative Density	Cone Tip Stress, qt (tsf)	Consistency
Less than 20	Very Loose	Less than 5	Very Soft
20 - 40	Loose	5 - 15	Soft to Firm
40 - 120	Medium Dense	15 - 30	Stiff
120 - 200	Dense	30 - 60	Very Stiff
Greater than 200	Very Dense	Greater than 60	Hard

Marchetti Dilatometer Test (DMT) Sounding Logs

S&ME

Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

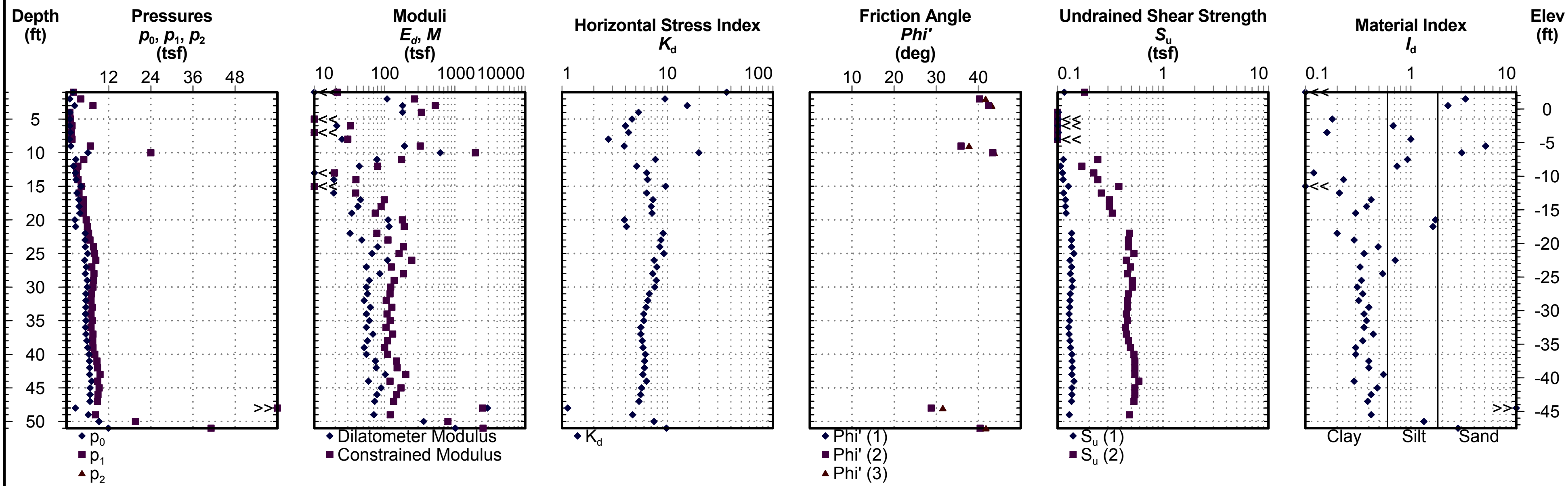
Dilatometer Test

B-05 DMT

Date: Feb. 19, 2009
Estimated Water Depth: 3.5 ft
Rig/Operator: ATV/ M. Cox

Latitude: 32.836891
Longitude: 79.962714
Elevation: 3.5 NAVD 88

Total Depth: 51.0 ft
Termination Criteria: Maximum Reaction Force
Membrane Type: Soft



B-05 DMT

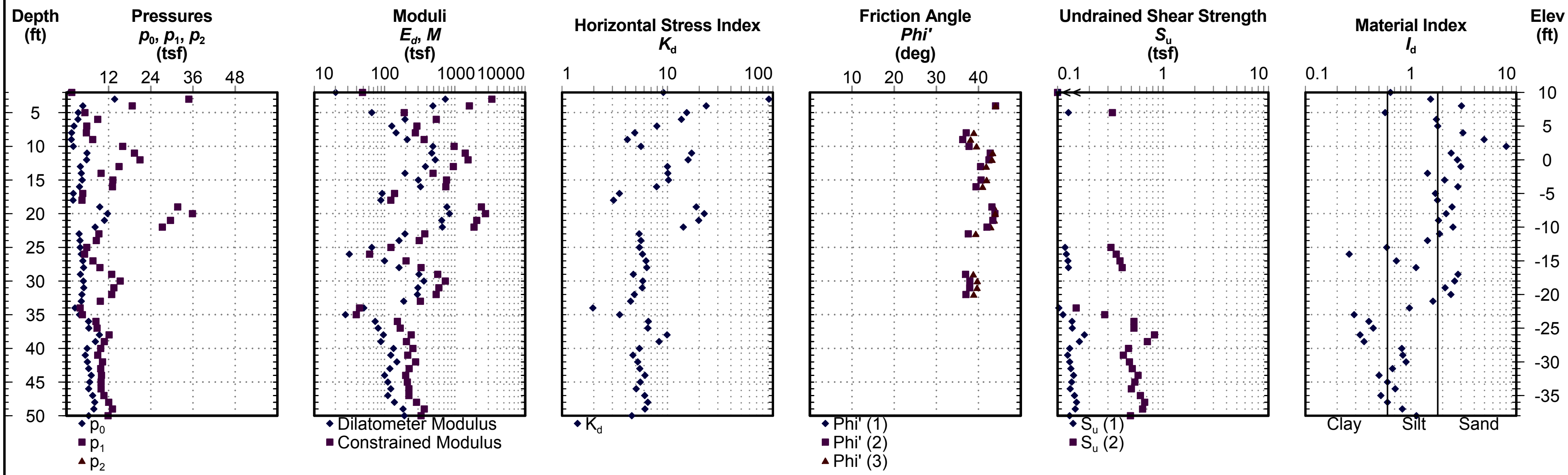
S&ME

Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Dilatometer Test

B-24 DMT

Date:	Oct. 1, 2008	**Latitude:**	32.838324	**Total Depth:**	50.0 ft
Estimated Water Depth:	4 ft	**Longitude:**	79.953015	**Termination Criteria:**	Target Depth
Rig/Operator:	Gyrotrac/A. Feix	**Elevation:**	12 NAVD 88	**Membrane Type:**	Soft



B-24 DMT

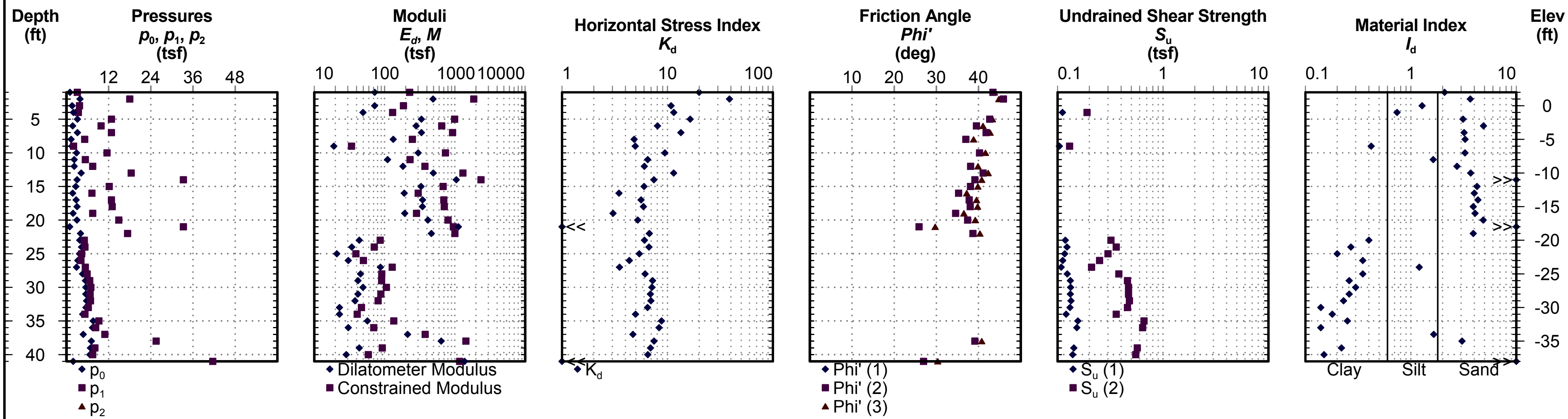
Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Dilatometer Test B-26 DMT Alt 1

Date: Feb. 20, 2009
Estimated Water Depth: 3 ft
Rig/Operator: ATV/ M. Cox

Latitude: 32.835417
Longitude: 79.953739
Elevation: 3 NAVD 88

Total Depth: 41.0 ft
Termination Criteria: Maximum Reaction Force
Membrane Type: Soft



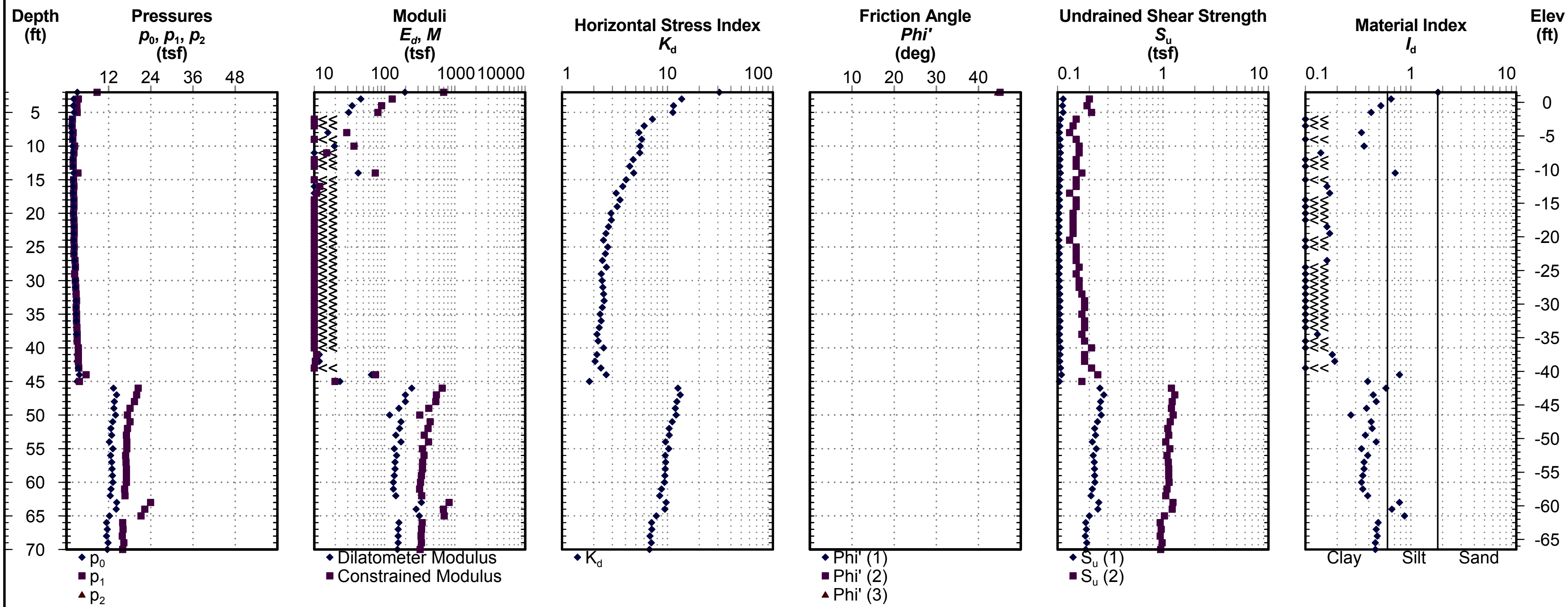
B-26 DMT Alt 1

Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Dilatometer Test

B-32 DMT

Date:	Sep. 23, 2008	**Latitude:**	32.842993	**Total Depth:**	70.0 ft
Estimated Water Depth:	3 ft	**Longitude:**	79.949117	**Termination Criteria:**	Target Depth
Rig/Operator:	Gyrotrac/A. Feix	**Elevation:**	3.5 NAVD 88	**Membrane Type:**	Soft



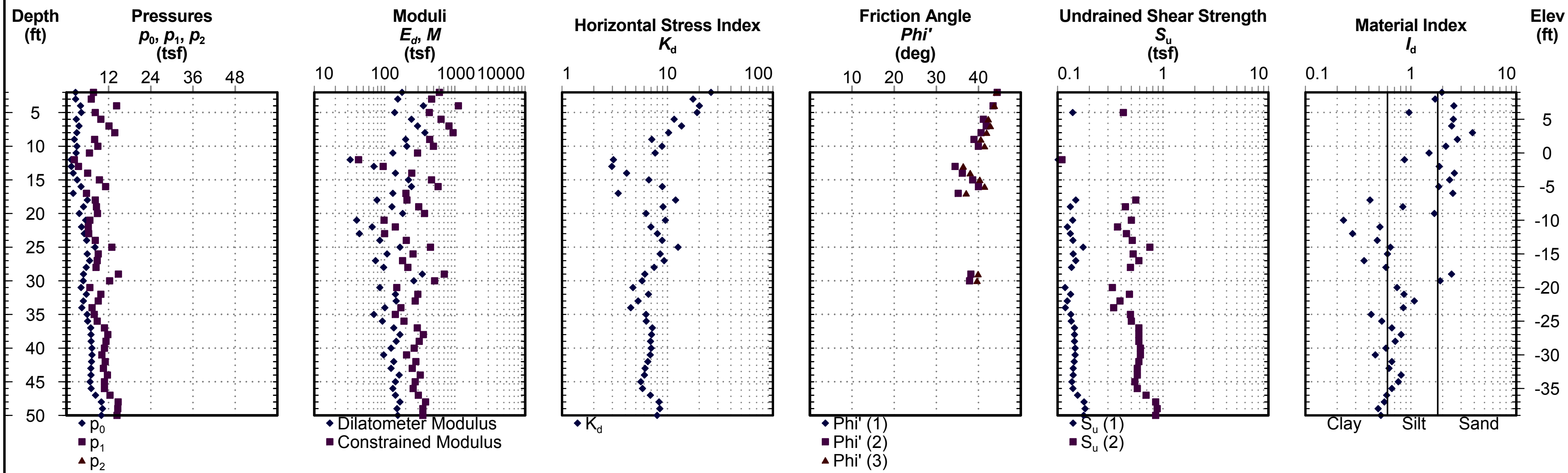
B-32 DMT

S&ME

Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Dilatometer Test B-45 DMT

Date:	Sep. 15, 2008	**Latitude:**	32.845567	**Total Depth:**	50.0 ft
Estimated Water Depth:	4 ft	**Longitude:**	79.95384	**Termination Criteria:**	Target Depth
Rig/Operator:	Gyrotrac/A. Feix	**Elevation:**	11 NAVD 88	**Membrane Type:**	Soft

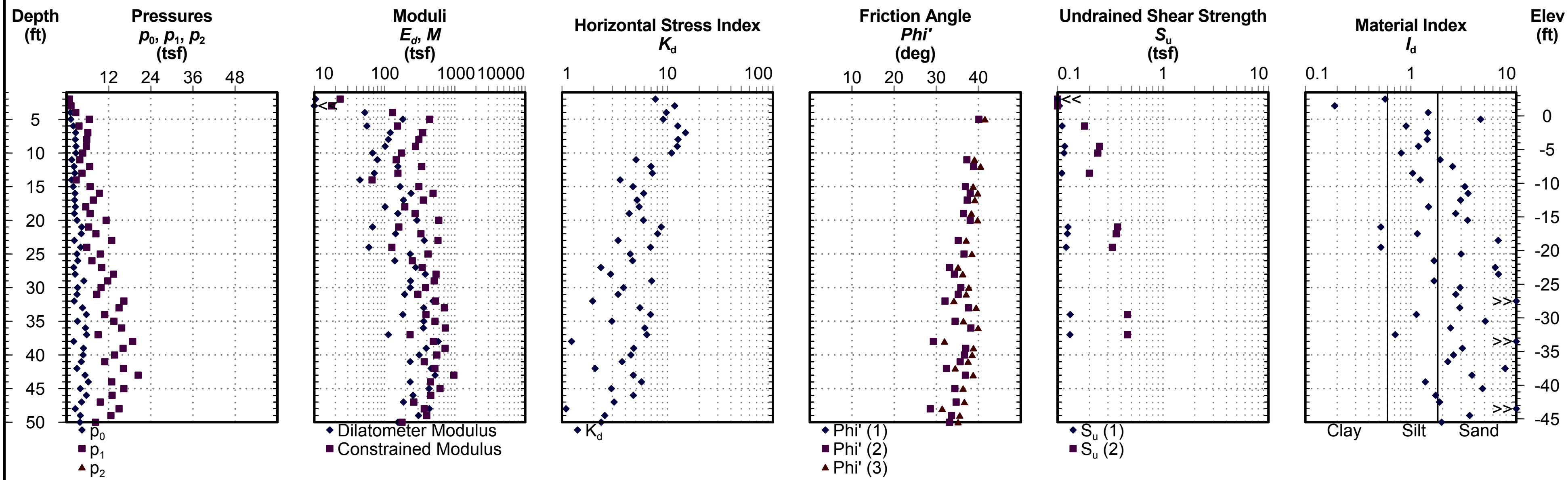


B-45 DMT

Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Dilatometer Test *B-70 DMT*

Date:	Sep. 15, 2008	**Latitude:**	32.830574	**Total Depth:**	50.0 ft
Estimated Water Depth:	1 ft	**Longitude:**	79.956331	**Termination Criteria:**	Target Depth
Rig/Operator:	Gyrotrac/A. Feix	**Elevation:**	4.5 NAVD 88	**Membrane Type:**	Soft



B-70 DMT

DMT Correlations

DMT CORRELATIONS

DMT

$p_o = 1.05(A\text{-}Z_M+\Delta A)\text{-}0.05(B\text{-} Z_M\text{-}\Delta B)$

$p_1 = B\text{-} Z_M\text{-}\Delta B$

$I_D = (p_1\text{-} p_o)/(p_o\text{-} u_0)$

$K_D = (p_o\text{-} u_0)/ \sigma'_{vo}$

$E_D = 34.7(p_1\text{-} p_o)$

R_M = function(K_D, I_D) – see table

$K_o = (K_D/1.5)^{0.47}\text{-}0.6$ (DMT) 5

$OCR = (0.5K_D)^{1.56}$ 5

$\sigma_p' = 0.51(p_o – u_o)$ 8

Undrained Shear Strength

$S_u\ (1) = 0.22\ \sigma_{vo}'\ (0.5K_D)^{1.25}$ 5

$S_u\ (2) = (p_o – u_o)/10$ 12

Drained Friction Angle

$\varphi'\ (1) = 37.3[(K_D\text{-}0.8)/(K_o+0.8)]^{0.082}$ 15

where:

$K_o = (K_D/1.5)^{0.47} – 0.6$

$\varphi'\ (2) = 28 + 14.6\text{Log}(K_D) – 2.1\text{Log}^2(K_D)$ 16

$$\varphi'\ (3) = 31 + \frac{1}{\frac{0.236}{K_D - 1} + 0.066}$$ 16

Unit Weight

$\rho = 1.12(E_D/ p_a)^{0.1} I_D^{-0.05}$ 17

Relative Density and Void Ratio

$D_R = 100[(K_D\text{-}1)/7]^{1/2}$ 19

Compressibility

$M = R_m\ E_D$ where R_m= function(I_D, K_D)

References

5 Marchetti, S. (1980), "In-situ tests by flat dilatometer.", *Journal of Geotechnical Engineering*, Vol. 107, GT3

8 Mayne, P. W., (1995), "Profiling yield stresses in clays by in situ tests.", *Transportation Research Record No. 1479: Engineering Properties and Practice in Overconsolidated Clays*. National Academy Press, Washington, D.C.

12 Schmertmann, J. H., (1988) *Guidelines for Using the CPT, CPTu, and Marchetti DMT for Geotechnical Design: Volume III – DMT Test Methods and Data Reduction*. FHWA-PA-87-024+84-24

16 Marchetti, S. (1997), "The flat Dilatometer design applications", Third Geotechnical Engineering Conference, Cairo University

17 Mayne (2006) Enhanced Site Characterization Course Notes

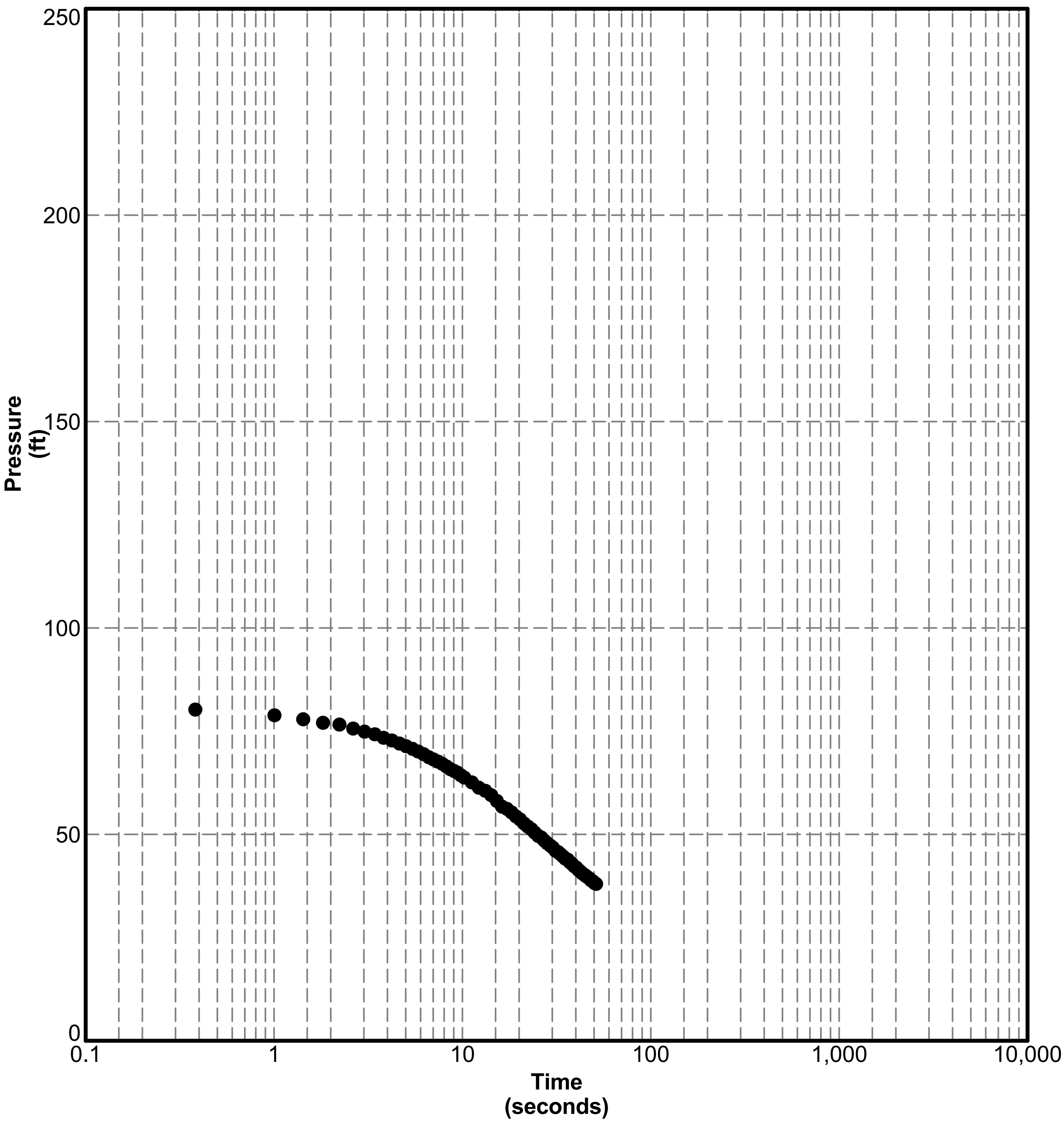
19 Reyna & Chameau (1991)

CPT Pore Pressure Dissipation Test Data

Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Pore Pressure Dissipation

Date:	Sep. 30, 2008	**Latitude:**	32.840334	**Depth:**	22.0 ft
Estimated Water Depth:	2 ft	**Longitude:**	79.967662	**Termination Criteria:**	Target Depth
Rig/Operator:	Gyrotrac/A. Feix	**Elevation:**	12.5 NAVD 88	**Cone Size:**	1.44



CPT - PORE PRESSURE DISSIPATION 08554CPT.GPJ S&ME.GDT 3/31/09

B-01 CPT

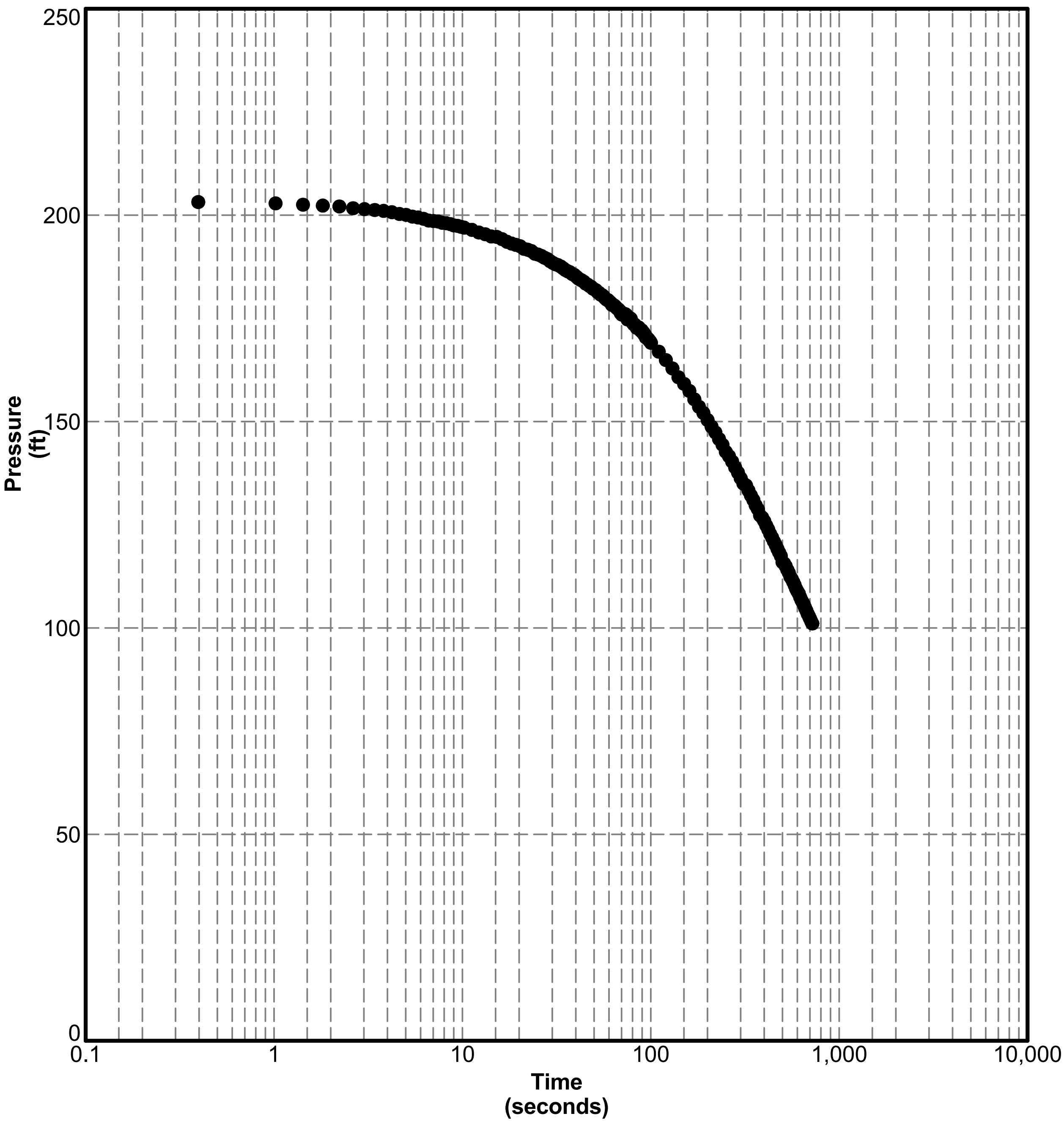
Electronic Filename: f30s0801d.22.txt

S&ME

Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Pore Pressure Dissipation

Date:	Sep. 30, 2008	**Latitude:**	32.840334	**Depth:**	35.1 ft
Estimated Water Depth:	2 ft	**Longitude:**	79.967662	**Termination Criteria:**	Target Depth
Rig/Operator:	Gyrotrac/A. Feix	**Elevation:**	12.5 NAVD 88	**Cone Size:**	1.44



CPT - PORE PRESSURE DISSIPATION 08554CPT.GPJ S&ME.GDT 3/31/09

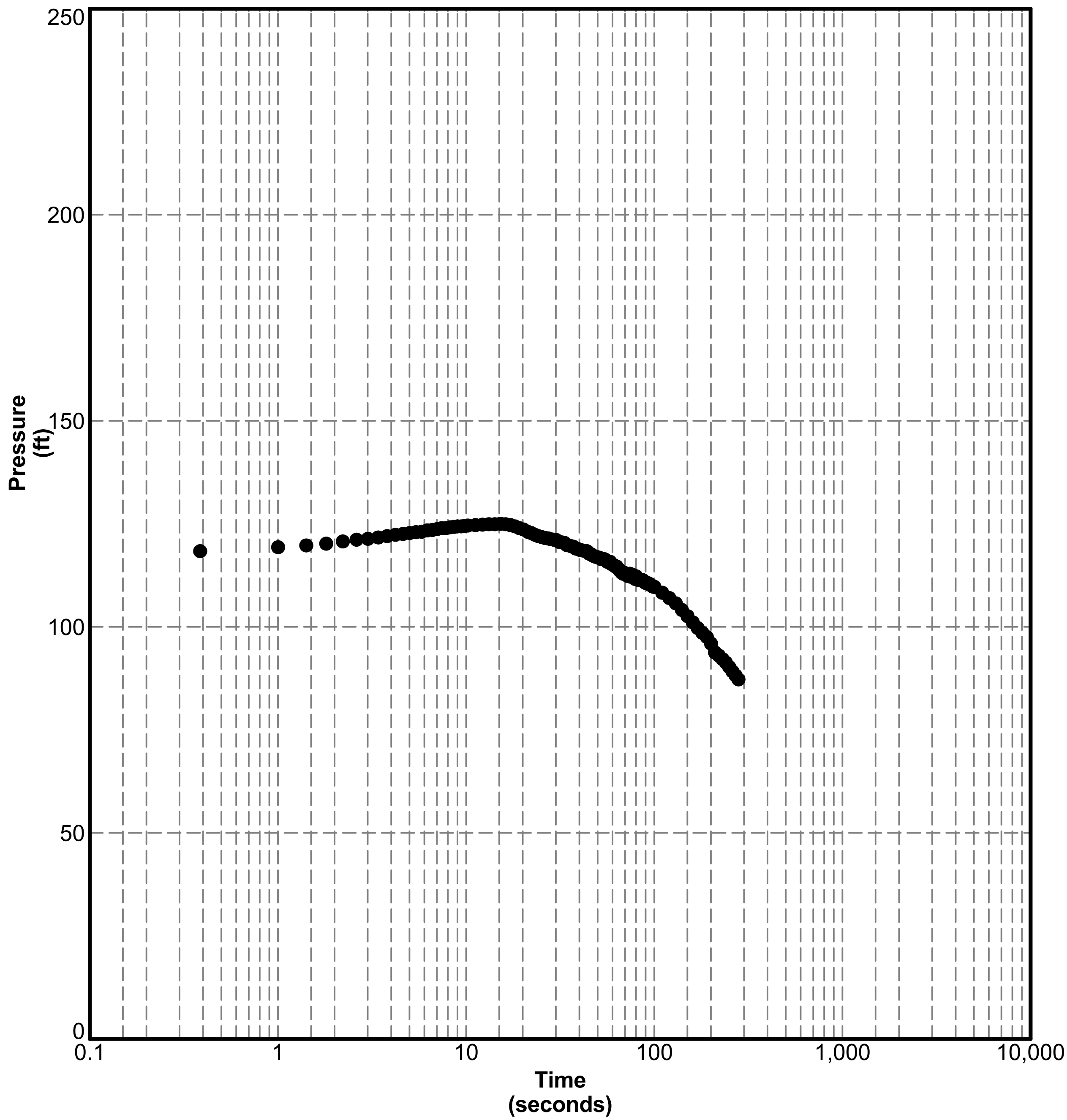
B-01 CPT

Electronic Filename: f30s0801d.35.txt

Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Pore Pressure Dissipation

Date:	Sep. 17, 2008	**Latitude:**	32.833796	**Depth:**	22.3 ft
Estimated Water Depth:	2 ft	**Longitude:**	79.957743	**Termination Criteria:**	Target Depth
Rig/Operator:	Gyrotrac/A. Feix	**Elevation:**	9 NAVD 88	**Cone Size:**	1.44



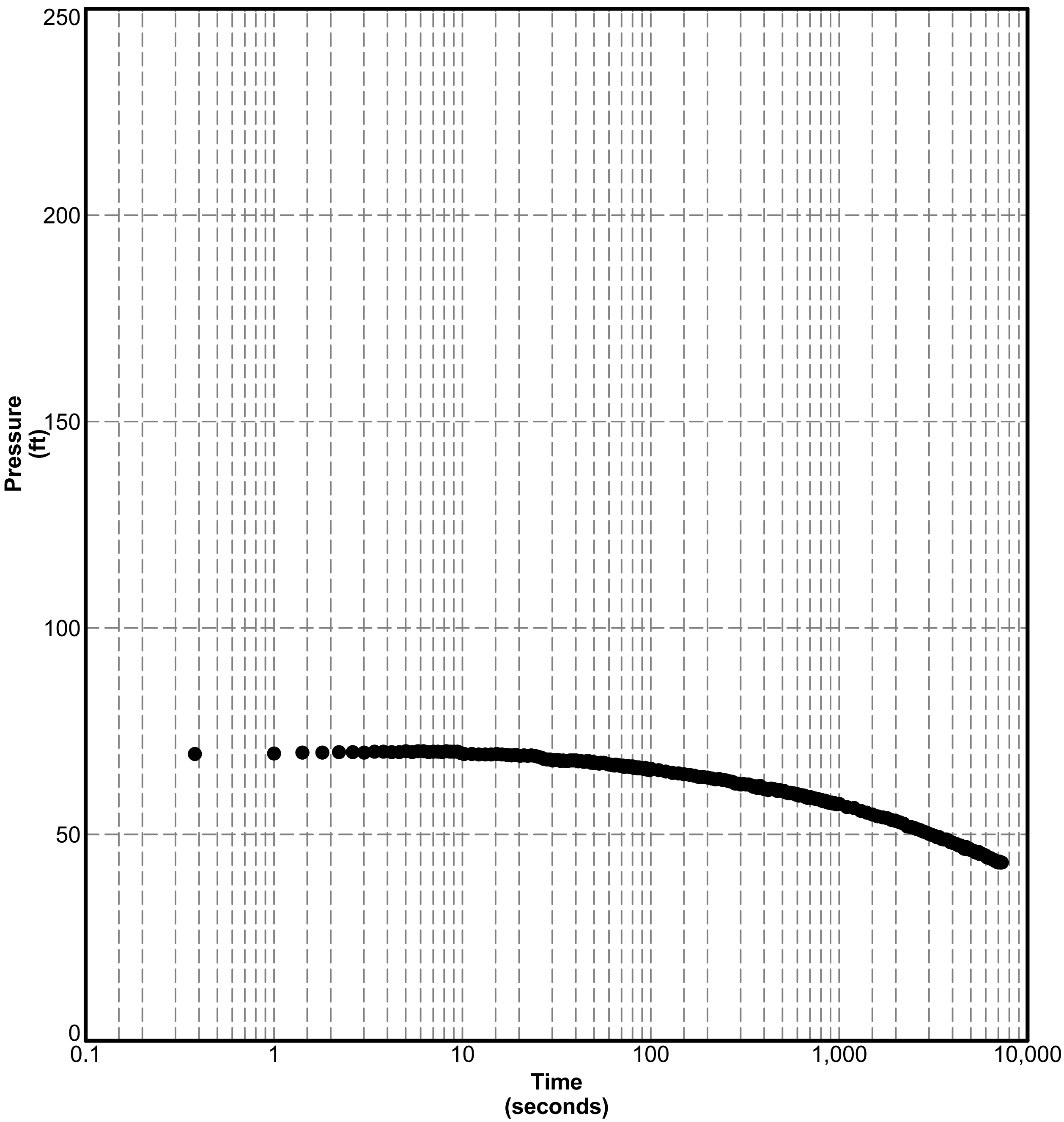
B-13 CPT

Electronic Filename: f17s0802d.22.txt

Pore Pressure Dissipation

Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Date:	Sep. 24, 2008	**Latitude:**	32.84198	**Depth:**	28.6 ft
Estimated Water Depth:	1 ft	**Longitude:**	79.947978	**Termination Criteria:**	Target Depth
Rig/Operator:	Gyrotrac/A. Feix	**Elevation:**	2.5 NAVD 88	**Cone Size:**	1.44



CPT - PORE PRESSURE DISSIPATION 08554CPT.GPJ S&ME.GDT 3/31/09

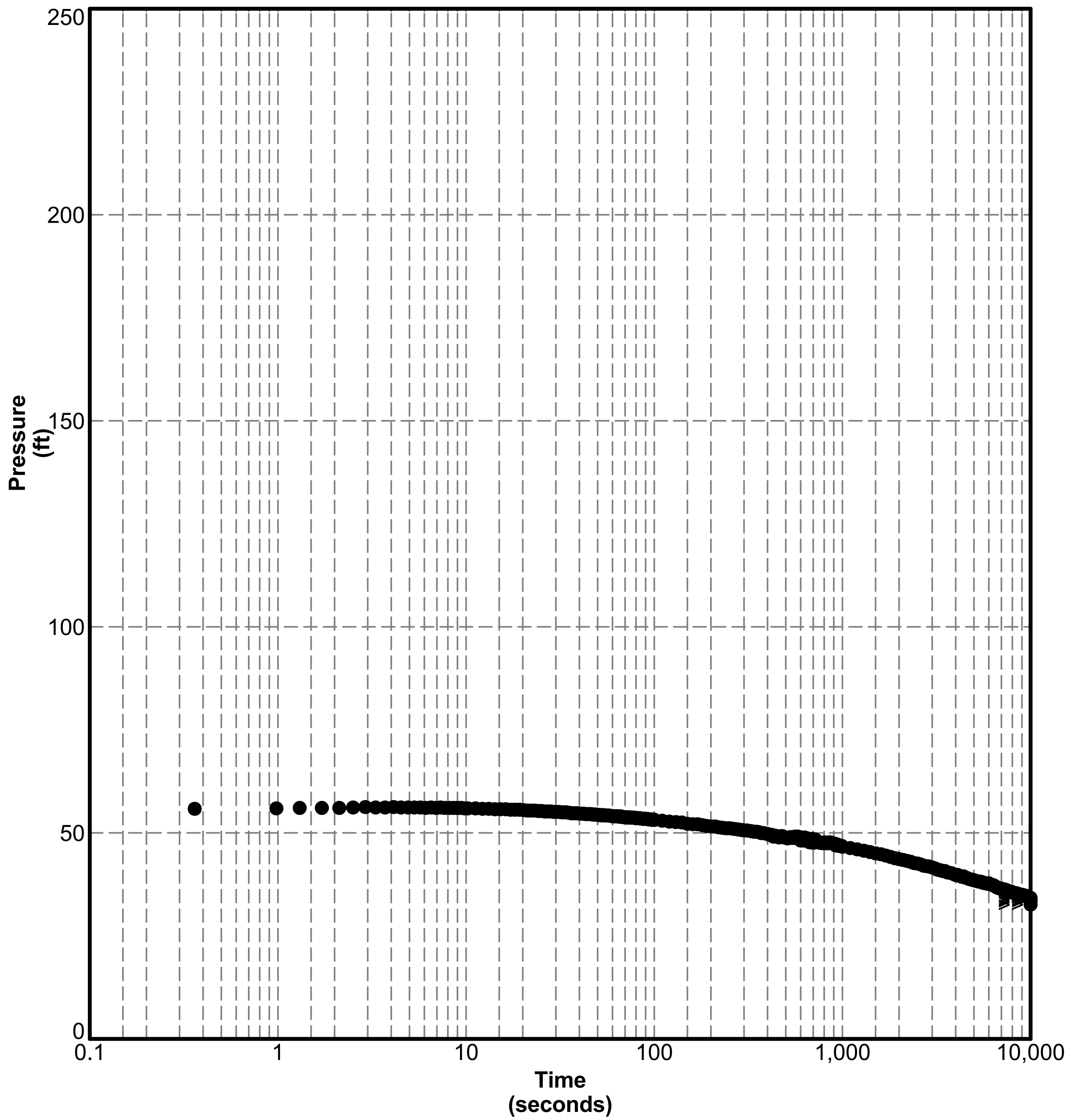
B-40 CPT

Electronic Filename: f24s0801d.29.txt

Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Pore Pressure Dissipation

Date:	Sep. 22, 2008	**Latitude:**	32.849066	**Depth:**	22.8 ft
Estimated Water Depth:	1 ft	**Longitude:**	79.955477	**Termination Criteria:**	Target Depth
Rig/Operator:	Gyrotrac/A. Feix	**Elevation:**	3 NAVD 88	**Cone Size:**	1.44



CPT - PORE PRESSURE DISSIPATION 08554CPT.GPJ S&ME.GDT 3/31/09

B-48 CPT

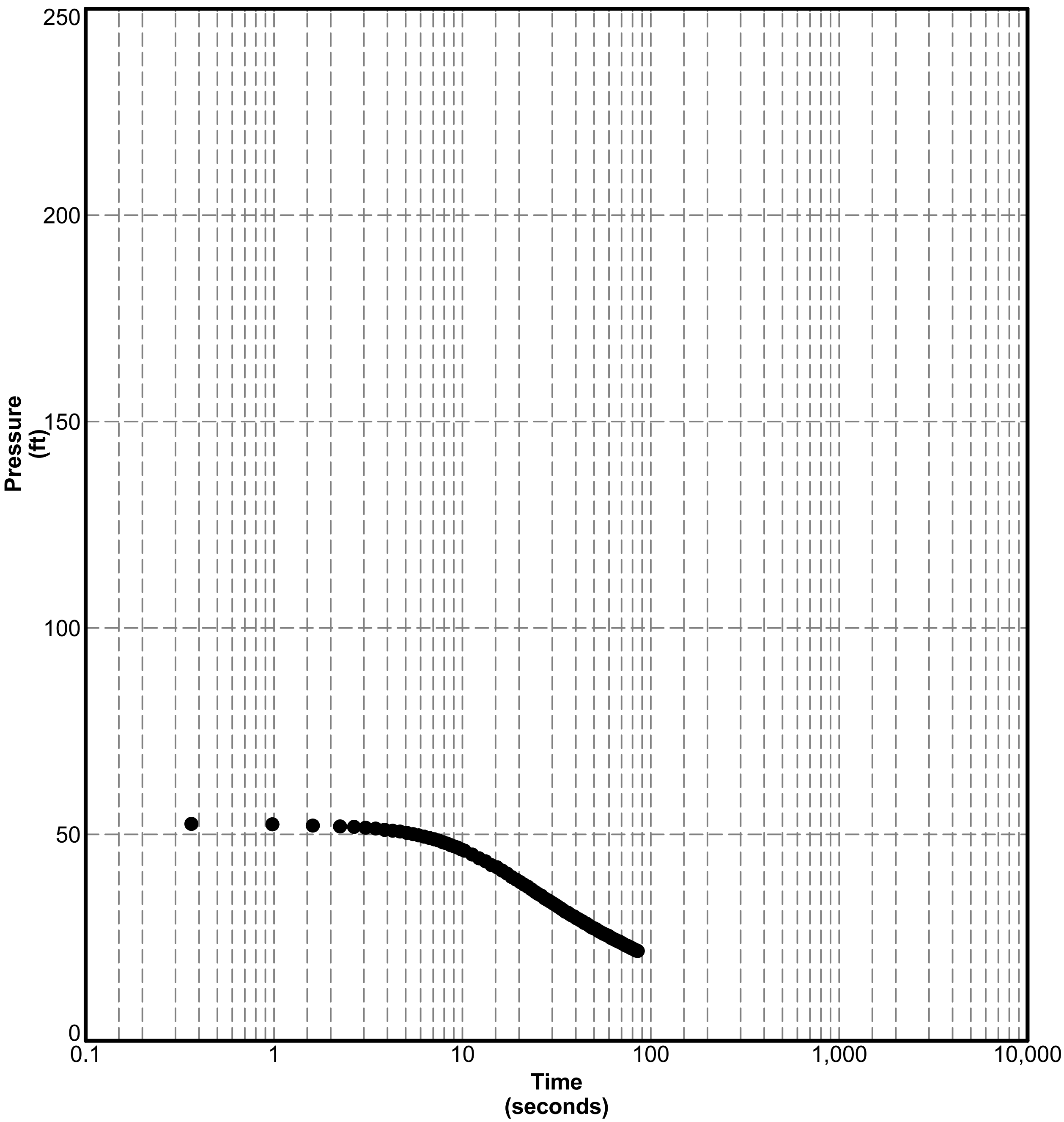
Electronic Filename: f22s0802d.23.txt

S&ME

Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Pore Pressure Dissipation

Date:	Sep. 18, 2008	**Latitude:**	32.842451	**Depth:**	17.3 ft
Estimated Water Depth:	4.5 ft	**Longitude:**	79.96427	**Termination Criteria:**	Target Depth
Rig/Operator:	Gyrotrac/A. Feix	**Elevation:**	15 NAVD 88	**Cone Size:**	1.75



B-49 CPT

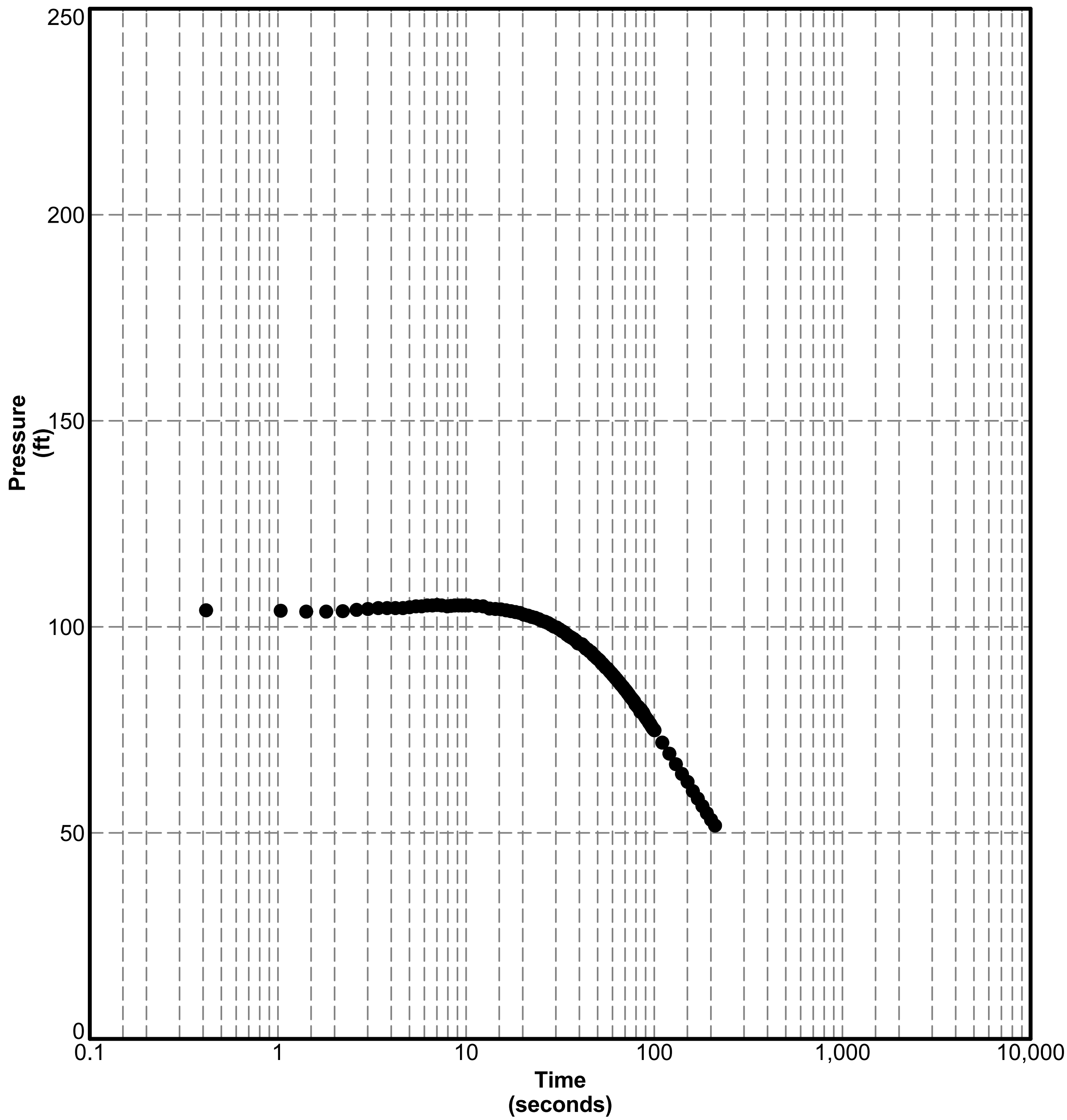
Electronic Filename: e18s0801d.17.txt

S&ME

Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Pore Pressure Dissipation

Date:	Sep. 18, 2008	**Latitude:**	32.83889	**Depth:**	21.4 ft
Estimated Water Depth:	2 ft	**Longitude:**	79.965152	**Termination Criteria:**	Target Depth
Rig/Operator:	Gyrotrac/A. Feix	**Elevation:**	12.5 NAVD 88	**Cone Size:**	1.44



CPT - PORE PRESSURE DISSIPATION 08554CPT.GPJ S&ME.GDT 3/31/09

B-54 CPT

Electronic Filename: f18s0801d.21.txt

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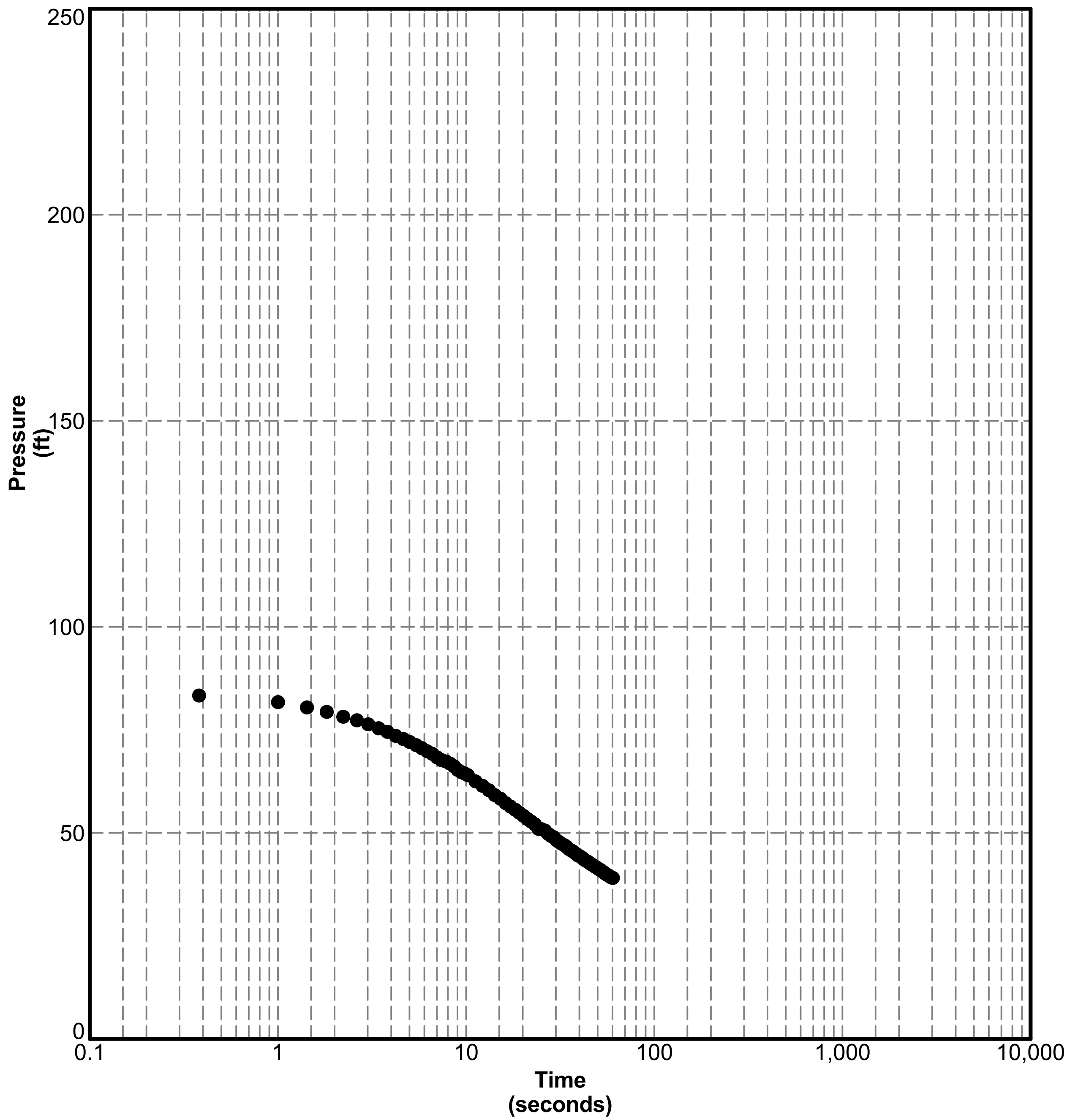
Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Pore Pressure Dissipation

Date:	Sep. 18, 2008	**Latitude:**	32.837441	**Depth:**	19.0 ft
Estimated Water Depth:	3 ft	**Longitude:**	79.962355	**Termination Criteria:**	Target Depth
Rig/Operator:	Gyrotrac/A. Feix	**Elevation:**	10 NAVD 88	**Cone Size:**	1.44

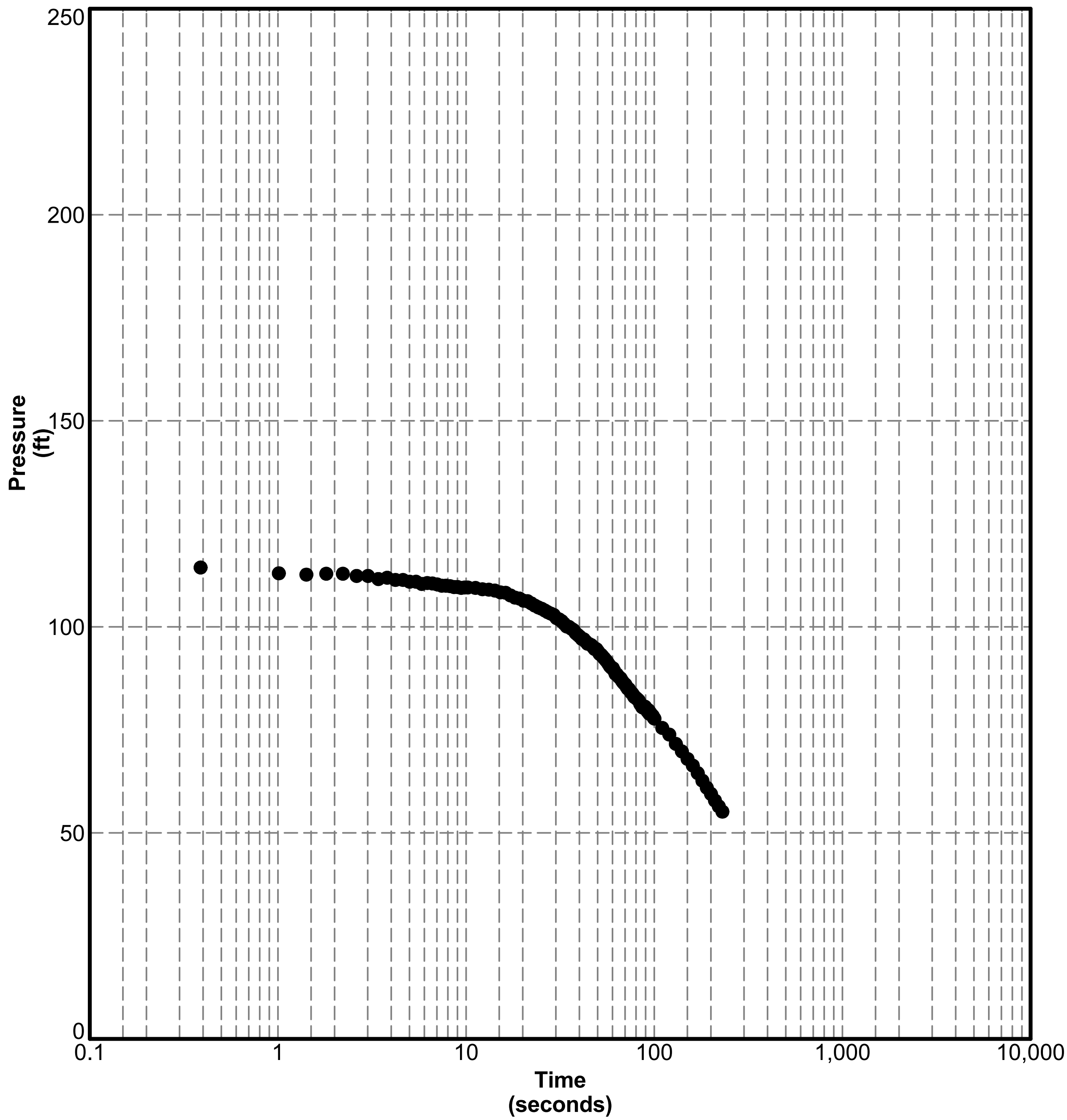


S&ME

Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Pore Pressure Dissipation

Date:	Sep. 30, 2008	**Latitude:**	32.836866	**Depth:**	22.4 ft
Estimated Water Depth:	2 ft	**Longitude:**	79.961633	**Termination Criteria:**	Target Depth
Rig/Operator:	Gyrotrac/A. Feix	**Elevation:**	13 NAVD 88	**Cone Size:**	1.44



CPT - PORE PRESSURE DISSIPATION 08554CPT.GPJ S&ME.GDT 3/31/09

B-59 CPT

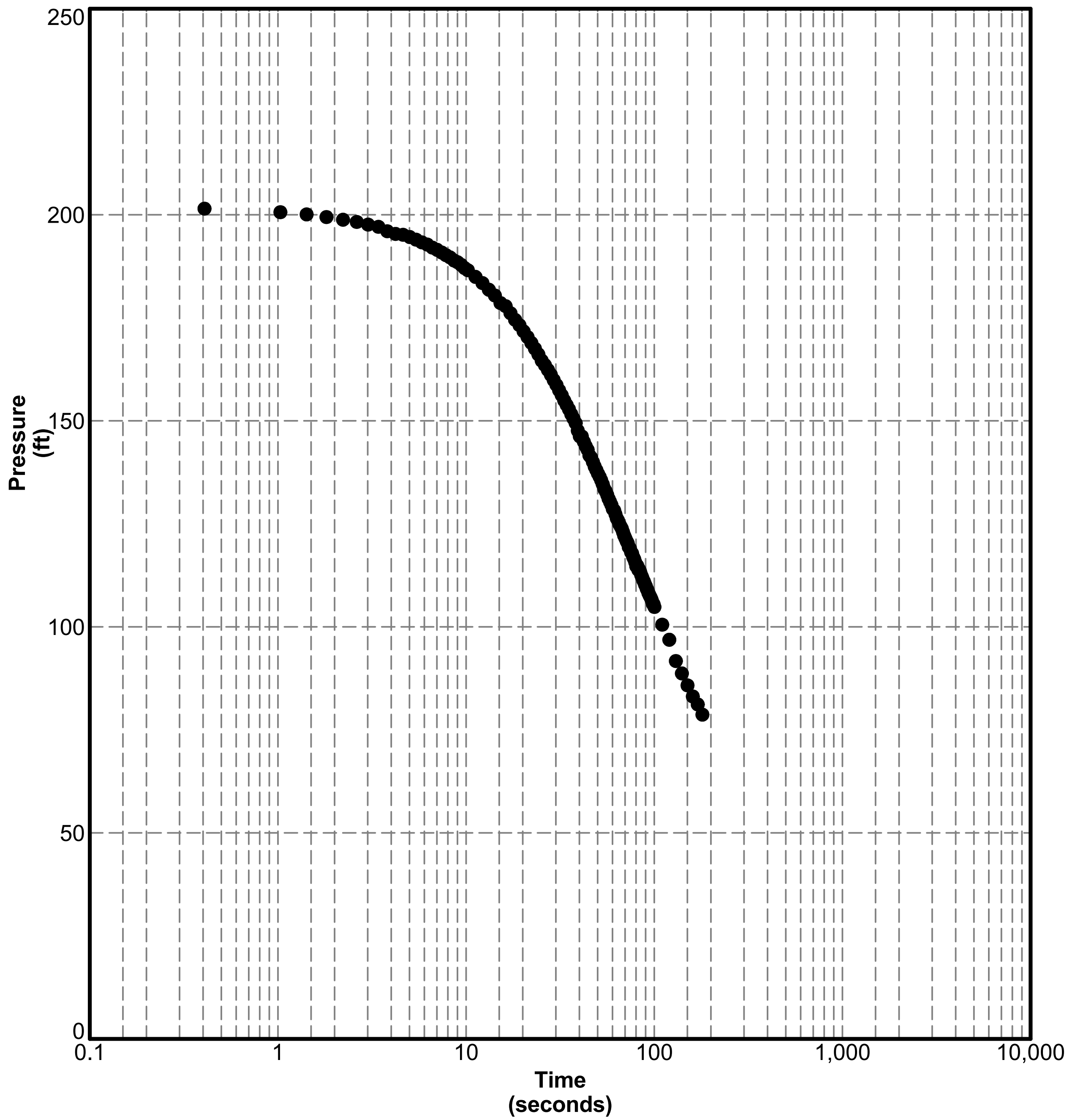
Electronic Filename: f30s0802d.22.txt

S&ME

Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Pore Pressure Dissipation

Date:	Sep. 30, 2008	**Latitude:**	32.836866	**Depth:**	29.6 ft
Estimated Water Depth:	2 ft	**Longitude:**	79.961633	**Termination Criteria:**	Target Depth
Rig/Operator:	Gyrotrac/A. Feix	**Elevation:**	13 NAVD 88	**Cone Size:**	1.44



CPT - PORE PRESSURE DISSIPATION 08554CPT.GPJ S&ME.GDT 3/31/09

B-59 CPT

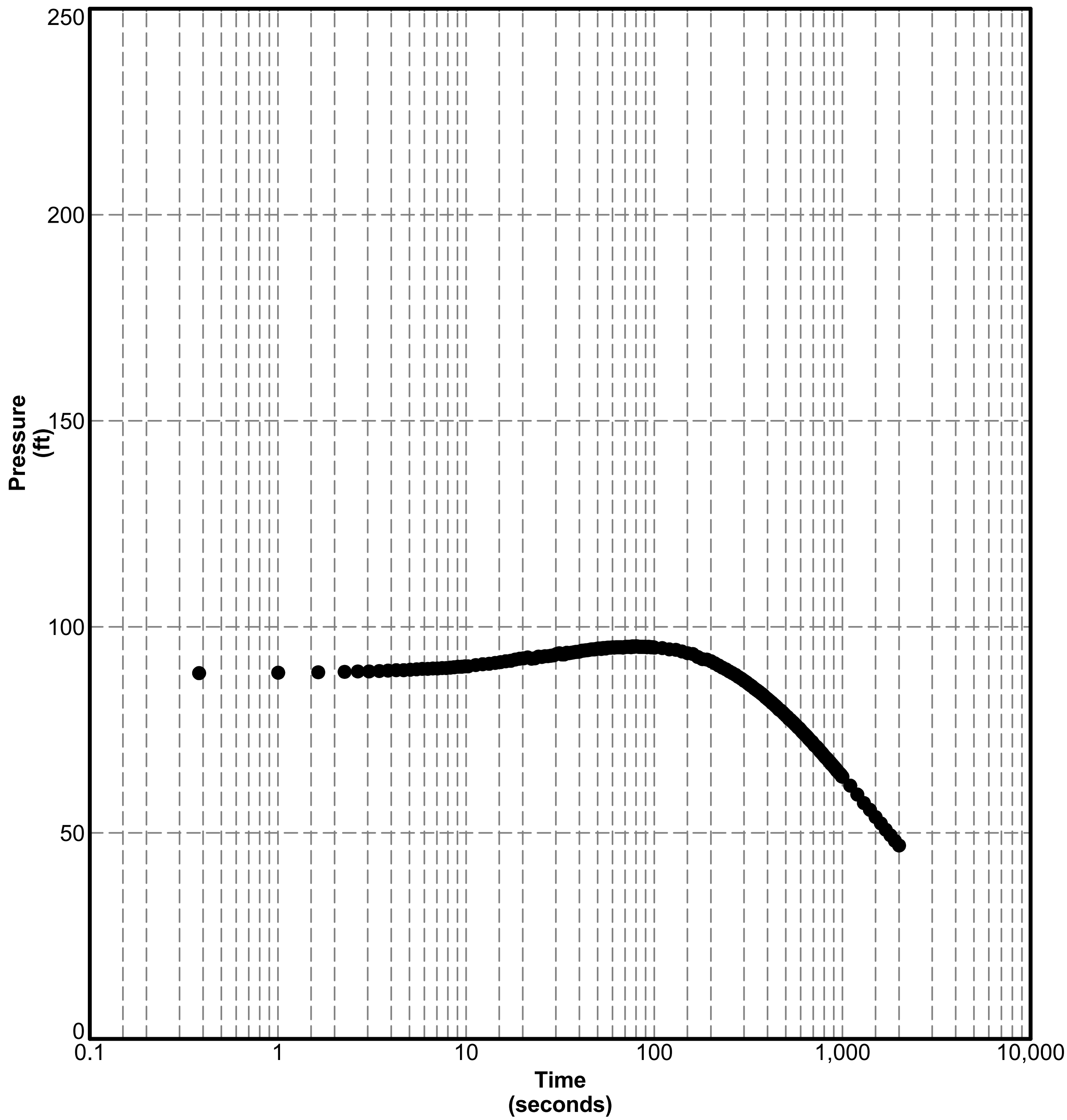
Electronic Filename: f30s0802d.30.txt

S&ME

Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Pore Pressure Dissipation

Date: Feb. 10, 2009
Estimated Water Depth:
Rig/Operator:
Latitude:
Longitude:
Elevation:
Depth: 22.9 ft
Termination Criteria:
Cone Size:



CPT - PORE PRESSURE DISSIPATION 08554CPT.GPJ S&ME.GDT 3/31/09

B-67SCPT

Electronic Filename: f10f0902d.txt

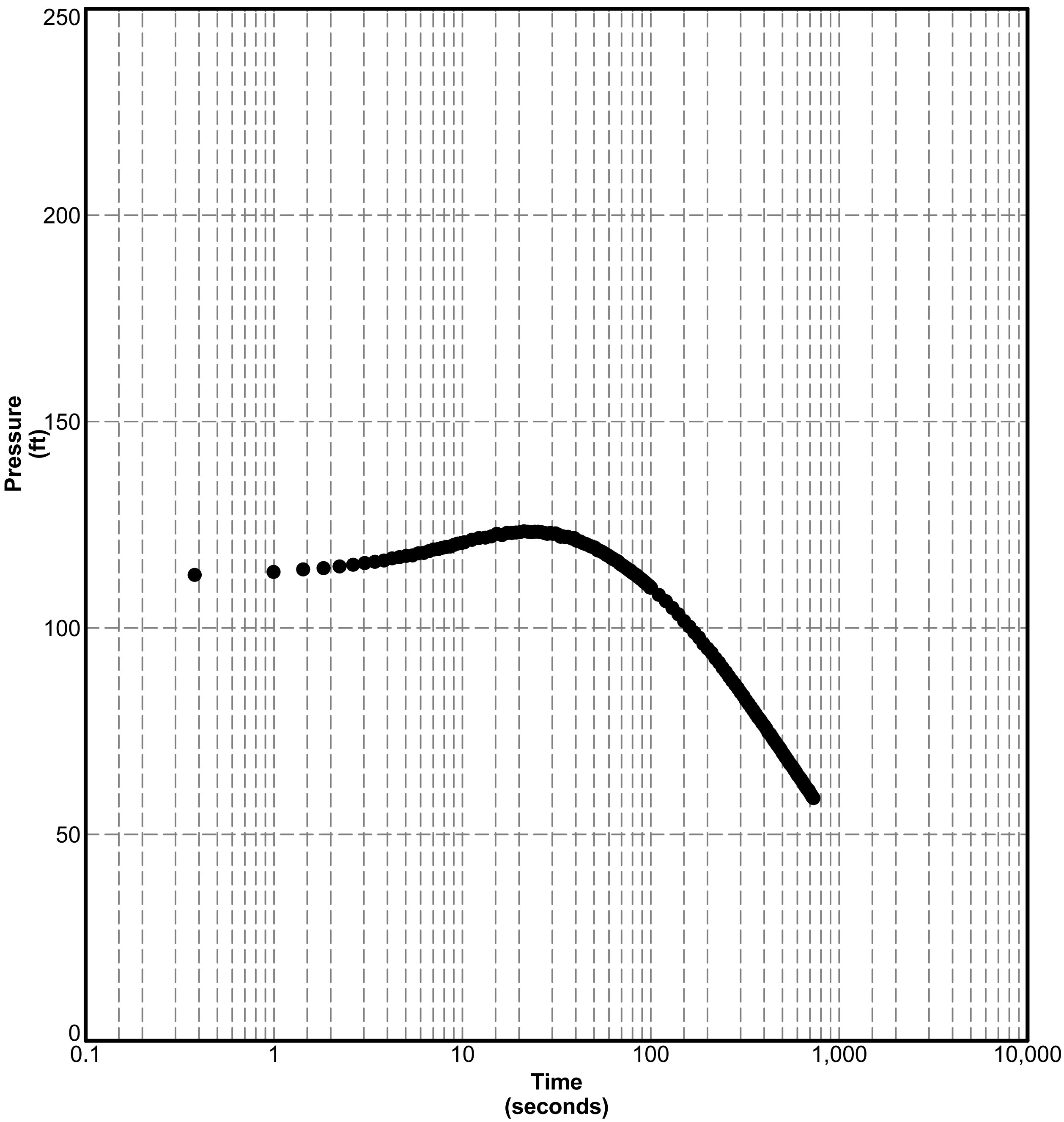
Port Access Road
North Charleston, SC
S&ME Project No: 1131-08-554

Pore Pressure Dissipation

Date: Feb. 19, 2009
Estimated Water Depth:
Rig/Operator:

Latitude:
Longitude:
Elevation:

Depth: 20.8 ft
Termination Criteria:
Cone Size:



CPT - PORE PRESSURE DISSIPATION 08554CPT.GPJ S&ME.GDT 3/31/09

B-6CPT

Electronic Filename: e19f0901d.txt

Vane Shear Test Data

Test Location Information:

Exploration:	B-3B	Date:	10/1/2008
Surface El.:	6.95 feet	Engineer:	MLE
Test Depth:	34 feet		
Test El.:	-27.1 feet		

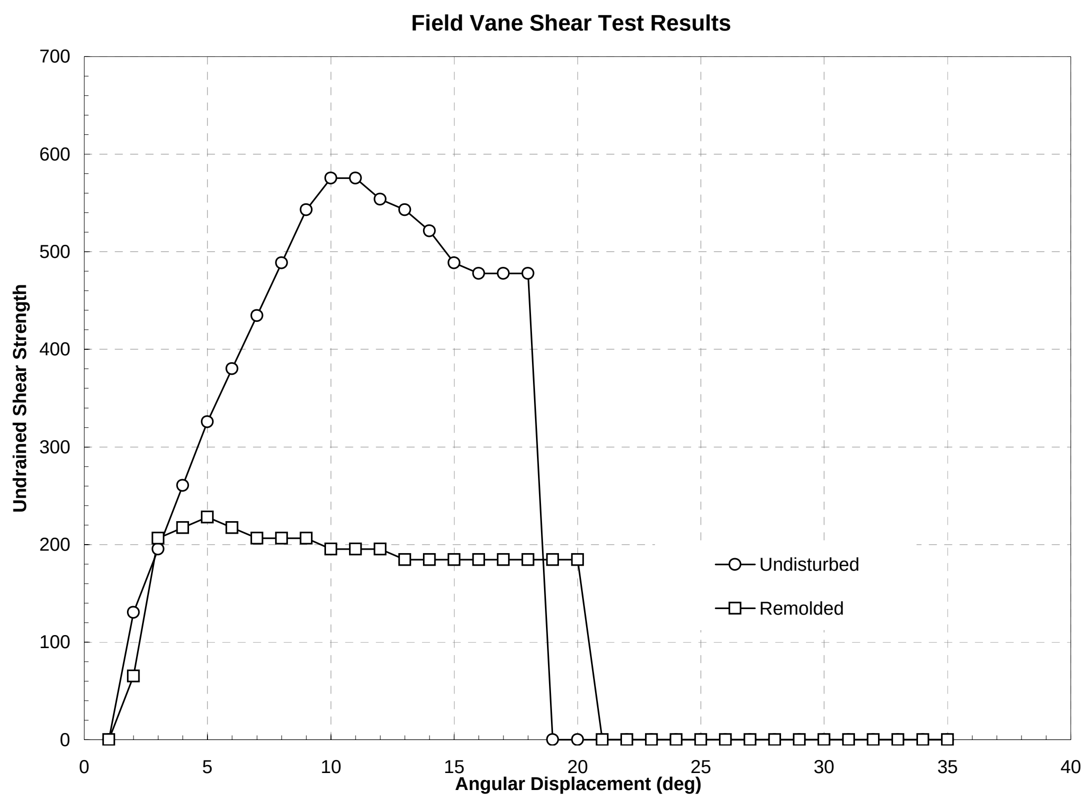
Soil Data*:

Liquid Limit:	70
Plastic Limit:	40
Plasticity Index:	30
%-Passing 200:	86
Classification:	MH
Moisture Content:	75

Summary of Test Results:

	Uncorrected	Corrected	Chandler Correction Factor
Undisturbed S_u (psf):	580	464	0.8
Remolded S_u (psf):	230	184	Sensitivity
Effective Vertical Stress (psf):	1,108	1,108	2.5
S_u / p'_o	0.52	0.42	

***Note: Soil data was gathered from B-3 SPT at a depth of 30 ft.**



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FIELD VANE SHEAR TEST REPORT | 1 of 3

Project No.:	1131-08-554
Project Name:	Port Access Road
Location:	Charleston, SC
Client:	SCDOT

Test Location Information:

Exploration: B-3B
Date: 10/1/2008
Surface El.: 6.95 feet
Engineer: MLE
Test Depth: 34 feet
Test El.: -27.1 feet

Vane and Test Data:

Vane Diameter: 3 5/8 inches
Vane Type: Standard Vane
Vane Constant, k: 0.905
Depth of Vane Tip: 34 ft
Torque Arm Length: 12 inches
Depth of Vane Tip Below Bottom of Hole: 1.5 ft
Torque Rate - Undisturbe 0.1 deg/sec
Torque Rate - Remolded: 0.1 deg/sec

Undisturbed Condition				Undisturbed Condition			
Degrees of Rotation	Dial Reading (lbs)	Friction (lbs)	S_u (psf)	Degrees of Rotation	Dial Reading (lbs)	Friction (lbs)	Su (psf)
0.5	0	0	0	16	44	0	478
1	12	0	130	17		0	0
1.5	18	0	195	18		0	0
2	24	0	261	19		0	0
3	30	0	326	20		0	0
4	35	0	380	21		0	0
5	40	0	434	22		0	0
6	45	0	489	23		0	0
7	50	0	543	24		0	0
8	53	0	576	25		0	0
9	53	0	576	26		0	0
10	51	0	554	27		0	0
11	50	0	543	28		0	0
12	48	0	521	29		0	0
13	45	0	489	30		0	0
14	44	0	478	31		0	0
15	44	0	478	32		0	0
		0	0	33		0	0

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FIELD VANE SHEAR TEST REPORT | 2 of 3

Project No.: 1131-08-554
Project Name: Port Access Road
Location: Charleston, SC
Client: SCDOT

Test Location Information:

Exploration:	B-3B	Date:	10/1/2008
Surface El.:	6.95 feet	Engineer:	MLE
Test Depth:	34 feet		
Test El.:	-27.1 feet		

Vane and Test Data:

Vane Diameter:	3 5/8	inches	Vane Type:	Standard Vane
Vane Constant, k:	0.905		Depth of Vane Tip:	34
Torque Arm Length:	12	inches	Depth of Vane Tip Below Bottom of Hole:	34
Torque Rate - Undisturbe	0.1	deg/sec		
Torque Rate - Remolded:	0.1	deg/sec		

Remolded Condition				Remolded Condition			
Degrees of Rotation	Dial Reading (lbs)	Friction (lbs)	S_u (psf)	Degrees of Rotation	Dial Reading (lbs)	Friction (lbs)	Su (psf)
1	0	0	0	18	17	0	185
2	6	0	65	19	17	0	185
3	19	0	206	20	17	0	185
4	20	0	217	21		0	0
5	21	0	228	22		0	0
6	20	0	217	23		0	0
7	19	0	206	24		0	0
8	19	0	206	25		0	0
9	19	0	206	26		0	0
10	18	0	195	27		0	0
11	18	0	195	28		0	0
12	18	0	195	29		0	0
13	17	0	185	30		0	0
14	17	0	185	31		0	0
15	17	0	185	32		0	0
16	17	0	185	33		0	0
17	17	0	185	34		0	0
				35		0	0

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FIELD VANE SHEAR TEST REPORT | 3 of 3

Project No.:	1131-08-554
Project Name:	Port Access Road
Location:	Charleston, SC
Client:	SCDOT

Test Location Information:

Exploration:	B-34SCPT		Date:	10/21/2008
Surface El.:	7.8	feet	Engineer:	MLE
Test Depth:	8.5	feet		
Test El.:	-0.7	feet		

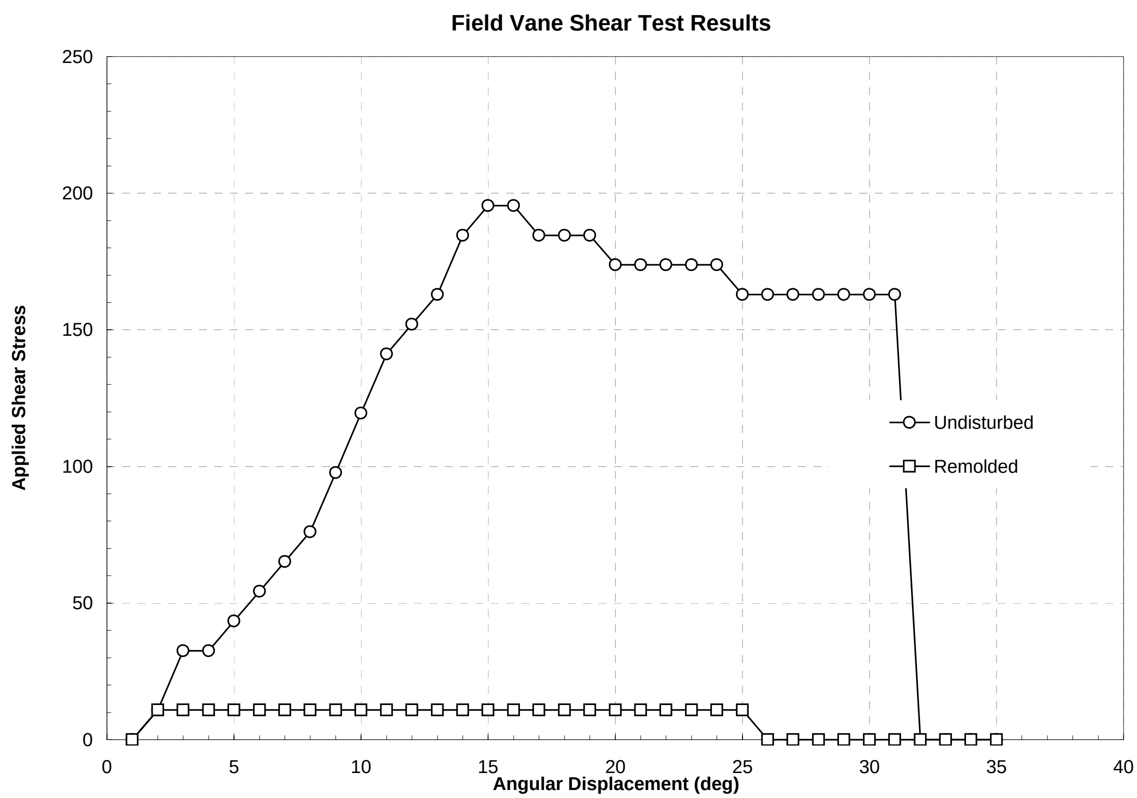
Soil Data:

Liquid Limit:	71
Plastic Limit:	47
Plasticity Index:	24
%-Passing 200:	93
Classification:	MH
Moisture Content:	148

Summary of Test Results:

	Uncorrected	Corrected	Chandler Correction Factor
Undisturbed S_u (psf):	195	162	0.83
Remolded S_u (psf):	11	9	Sensitivity
Effective Vertical Stress (psf):	277	277	17.7
S_u / p'_o	0.70	0.58	

***Note: Soil data was gathered from B-39 SPT at a depth of 23.5 ft.**



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FIELD VANE SHEAR TEST REPORT | 1 of 3

Project No.:	1131-08-554
Project Name:	Port Access Road
Location:	Charleston, SC
Client:	SCDOT

Test Location Information:

Exploration:	B-34SCPT	Date:	10/21/2008
Surface El.:	7.8 feet	Engineer:	MLE
Test Depth:	8.5 feet		
Test El.:	-0.7 feet		

Vane and Test Data:

Vane Diameter:	3 5/8	inches	Vane Type:	Standard Vane
Vane Constant, k:	0.905		Depth of Vane Tip:	8.5
Torque Arm Length:	12	inches	Depth of Vane Tip Below Bottom of Hole:	18 in.
Torque Rate - Undisturbe	0.1	deg/sec		
Torque Rate - Remolded:	0.1	deg/sec		

Undisturbed Condition				Undisturbed Condition			
Degrees of Rotation	Dial Reading (lbs)	Friction (lbs)	S_u (psf)	Degrees of Rotation	Dial Reading (lbs)	Friction (lbs)	Su (psf)
0.5	0	0	0	16	17	0	185
1	1	0	11	17	17	0	185
1.5	3	0	33	18	16	0	174
2	3	0	33	19	16	0	174
3	4	0	43	20	16	0	174
4	5	0	54	21	16	0	174
5	6	0	65	22	16	0	174
6	7	0	76	23	15	0	163
7	9	0	98	24	15	0	163
8	11	0	119	25	15	0	163
9	13	0	141	26	15	0	163
10	14	0	152	27	15	0	163
11	15	0	163	28	15	0	163
12	17	0	185	29	15	0	163
13	18	0	195	30		0	0
14	18	0	195	31		0	0
15	17	0	185	32		0	0
		0	0	33		0	0

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FIELD VANE SHEAR TEST REPORT | 2 of 3

Project No.:	1131-08-554
Project Name:	Port Access Road
Location:	Charleston, SC
Client:	SCDOT

Test Location Information:

Exploration:	B-34SCPT	Date:	10/21/2008
Surface El.:	7.8 feet	Engineer:	MLE
Test Depth:	8.5 feet		
Test El.:	-0.7 feet		

Vane and Test Data:

Vane Diameter:	3 5/8	inches	Vane Type:	Standard Vane
Vane Constant, k:	0.905		Depth of Vane Tip:	8.5
Torque Arm Length:	12	inches	Depth of Vane Tip Below Bottom of Hole:	18 in.
Torque Rate - Undisturbe	0.1	deg/sec		
Torque Rate - Remolded:	0.1	deg/sec		

Remolded Condition				Remolded Condition			
Degrees of Rotation	Dial Reading (lbs)	Friction (lbs)	S_u (psf)	Degrees of Rotation	Dial Reading (lbs)	Friction (lbs)	Su (psf)
1	0	0	0	18	1	0	11
2	1	0	11	19	1	0	11
3	1	0	11	20	1	0	11
4	1	0	11	21	1	0	11
5	1	0	11	22	1	0	11
6	1	0	11	23	1	0	11
7	1	0	11	24	1	0	11
8	1	0	11	25	1	0	11
9	1	0	11	26		0	0
10	1	0	11	27		0	0
11	1	0	11	28		0	0
12	1	0	11	29		0	0
13	1	0	11	30		0	0
14	1	0	11	31		0	0
15	1	0	11	32		0	0
16	1	0	11	33		0	0
17	1	0	11	34		0	0
				35		0	0

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FIELD VANE SHEAR TEST REPORT | 3 of 3

Project No.:	1131-08-554
Project Name:	Port Access Road
Location:	Charleston, SC
Client:	SCDOT

Test Location Information:

Exploration:	B-34SCPT		Date:	10/21/2008
Surface El.:	7.8	feet	Engineer:	RCB
Test Depth:	17.5	feet		
Test El.:	-9.7	feet		

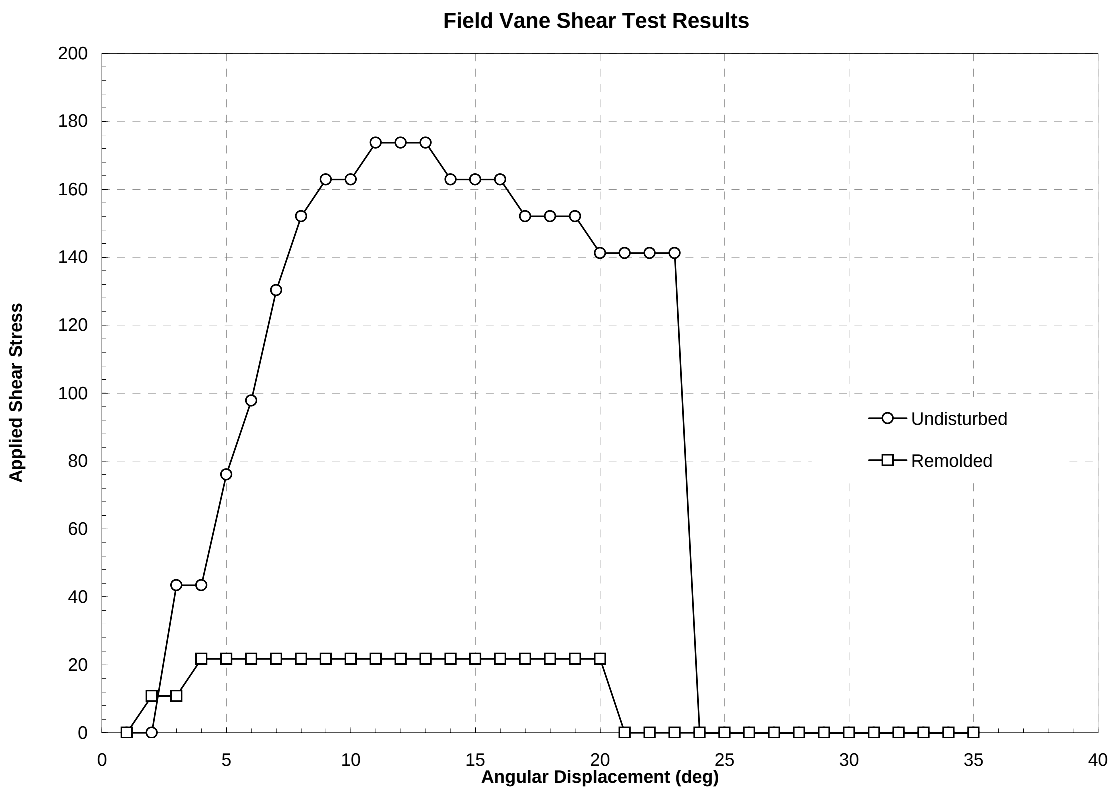
Soil Data:

Liquid Limit:	71
Plastic Limit:	47
Plasticity Index:	24
%-Passing 200:	93
Classification:	MH
Moisture Content:	148

Summary of Test Results:

	Uncorrected	Corrected	Chandler Correction Factor
Undisturbed S_u (psf):	174	144	0.83
Remolded S_u (psf):	22	18	Sensitivity
Effective Vertical Stress (psf):	571	571	7.9
S_u / p'_o	0.30	0.25	

***Note: Soil data was gathered from B-39 SPT at a depth of 23.5 ft.**



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FIELD VANE SHEAR TEST REPORT | 1 of 3

Project No.:	1131-08-554
Project Name:	Port Access Road
Location:	Charleston, SC
Client:	SCDOT

Test Location Information:

Exploration:	B-34SCPT	Date:	10/21/2008
Surface El.:	7.8 feet	Engineer:	RCB
Test Depth:	17.5 feet		
Test El.:	-9.7 feet		

Vane and Test Data:

Vane Diameter:	3 5/8	inches	Vane Type:	Standard Vane
Vane Constant, k:	0.905		Depth of Vane Tip:	17.5
Torque Arm Length:	12	inches	Depth of Vane Tip Below Bottom of Hole:	18 in.
Torque Rate - Undisturbe	0.1	deg/sec		
Torque Rate - Remolded:	0.1	deg/sec		

Undisturbed Condition				Undisturbed Condition			
Degrees of Rotation	Dial Reading (lbs)	Friction (lbs)	S_u (psf)	Degrees of Rotation	Dial Reading (lbs)	Friction (lbs)	Su (psf)
0.5	0	0	0	16	14	0	152
1	0	0	0	17	14	0	152
1.5	4	0	43	18	13	0	141
2	4	0	43	19	13	0	141
3	7	0	76	20	13	0	141
4	9	0	98	21	13	0	141
5	12	0	130	22		0	0
6	14	0	152	23		0	0
7	15	0	163	24		0	0
8	15	0	163	25		0	0
9	16	0	174	26		0	0
10	16	0	174	27		0	0
11	16	0	174	28		0	0
12	15	0	163	29		0	0
13	15	0	163	30		0	0
14	15	0	163	31		0	0
15	14	0	152	32		0	0
		0	0	33		0	0

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FIELD VANE SHEAR TEST REPORT | 2 of 3

Project No.:	1131-08-554
Project Name:	Port Access Road
Location:	Charleston, SC
Client:	SCDOT

Test Location Information:

Exploration:	B-34SCPT	Date:	10/21/2008
Surface El.:	7.8 feet	Engineer:	RCB
Test Depth:	17.5 feet		
Test El.:	-9.7 feet		

Vane and Test Data:

Vane Diameter:	3 5/8	inches	Vane Type:	Standard Vane
Vane Constant, k:	0.905		Depth of Vane Tip:	17.5
Torque Arm Length:	12	inches	Depth of Vane Tip Below Bottom of Hole:	18 in.
Torque Rate - Undisturbe	0.1	deg/sec		
Torque Rate - Remolded:	0.1	deg/sec		

Remolded Condition				Remolded Condition			
Degrees of Rotation	Dial Reading (lbs)	Friction (lbs)	S_u (psf)	Degrees of Rotation	Dial Reading (lbs)	Friction (lbs)	Su (psf)
1	0	0	0	18	2	0	22
2	1	0	11	19	2	0	22
3	1	0	11	20	2	0	22
4	2	0	22	21		0	0
5	2	0	22	22		0	0
6	2	0	22	23		0	0
7	2	0	22	24		0	0
8	2	0	22	25		0	0
9	2	0	22	26		0	0
10	2	0	22	27		0	0
11	2	0	22	28		0	0
12	2	0	22	29		0	0
13	2	0	22	30		0	0
14	2	0	22	31		0	0
15	2	0	22	32		0	0
16	2	0	22	33		0	0
17	2	0	22	34		0	0
				35		0	0

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FIELD VANE SHEAR TEST REPORT | 3 of 3

Project No.:	1131-08-554
Project Name:	Port Access Road
Location:	Charleston, SC
Client:	SCDOT

Test Location Information:

Exploration:	B-34SCPT	Date:	10/22/2008
Surface El.:	7.8 feet	Engineer:	RCB
Test Depth:	26.5 feet		
Test El.:	-18.7 feet		

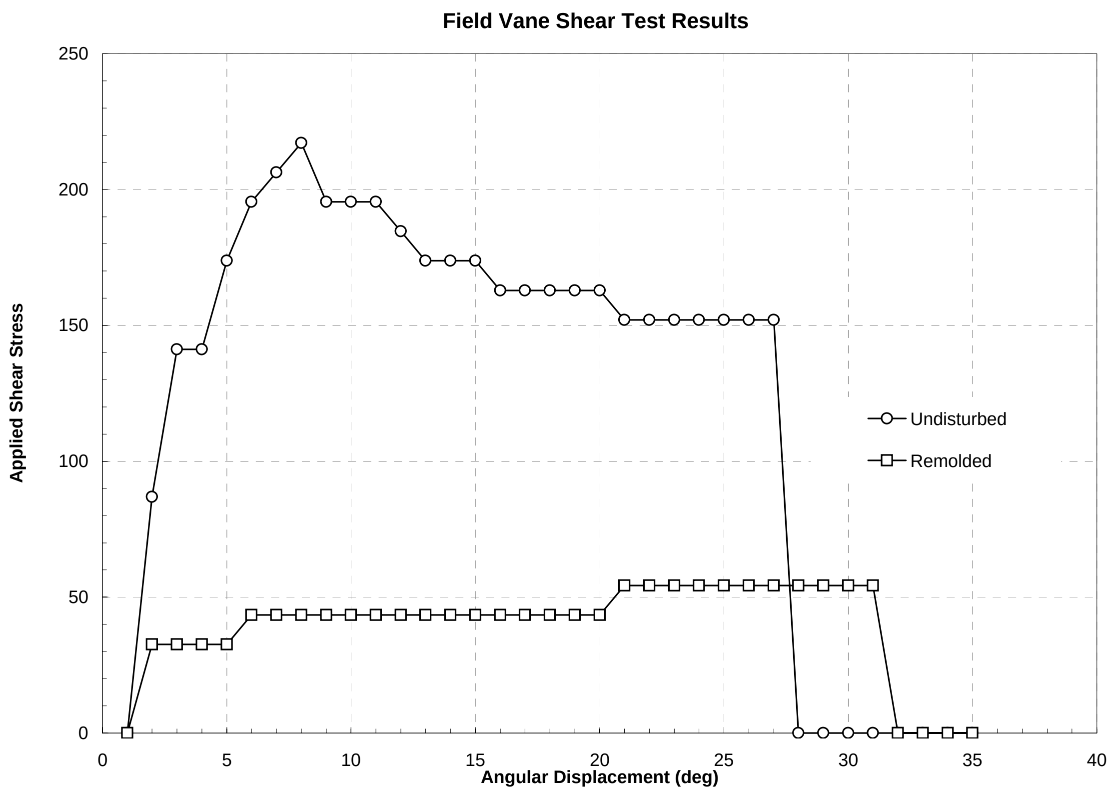
Soil Data:

Liquid Limit:	71
Plastic Limit:	47
Plasticity Index:	24
%-Passing 200:	93
Classification:	MH
Moisture Content:	148

Summary of Test Results:

	Uncorrected	Corrected	Chandler Correction Factor
Undisturbed S_u (psf):	217	180	0.83
Remolded S_u (psf):	54	45	Sensitivity
Effective Vertical Stress (psf):	864	864	4.0
S_u / p'_o	0.25	0.21	

***Note: Soil data was gathered from B-39 SPT at a depth of 23.5 ft.**



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FIELD VANE SHEAR TEST REPORT | 1 of 3

Project No.:	1131-08-554
Project Name:	Port Access Road
Location:	Charleston, SC
Client:	SCDOT

Test Location Information:

Exploration:	B-34SCPT	Date:	10/22/2008
Surface El.:	7.8 feet	Engineer:	RCB
Test Depth:	26.5 feet		
Test El.:	-18.7 feet		

Vane and Test Data:

Vane Diameter:	3 5/8	inches	Vane Type:	Standard Vane
Vane Constant, k:	0.905		Depth of Vane Tip:	26.5
Torque Arm Length:	12	inches	Depth of Vane Tip Below Bottom of Hole:	18 in.
Torque Rate - Undisturbe	0.1	deg/sec		
Torque Rate - Remolded:	0.1	deg/sec		

Undisturbed Condition				Undisturbed Condition			
Degrees of Rotation	Dial Reading (lbs)	Friction (lbs)	S_u (psf)	Degrees of Rotation	Dial Reading (lbs)	Friction (lbs)	Su (psf)
0.5	0	0	0	16	15	0	163
1	8	0	87	17	15	0	163
1.5	13	0	141	18	15	0	163
2	13	0	141	19	14	0	152
3	16	0	174	20	14	0	152
4	18	0	195	21	14	0	152
5	19	0	206	22	14	0	152
6	20	0	217	23	14	0	152
7	18	0	195	24	14	0	152
8	18	0	195	25	14	0	152
9	18	0	195	26		0	0
10	17	0	185	27		0	0
11	16	0	174	28		0	0
12	16	0	174	29		0	0
13	16	0	174	30		0	0
14	15	0	163	31		0	0
15	15	0	163	32		0	0
		0	0	33		0	0

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FIELD VANE SHEAR TEST REPORT | 2 of 3

Project No.:	1131-08-554
Project Name:	Port Access Road
Location:	Charleston, SC
Client:	SCDOT

Test Location Information:

Exploration:	B-34SCPT	Date:	10/22/2008
Surface El.:	7.8 feet	Engineer:	RCB
Test Depth:	26.5 feet		
Test El.:	-18.7 feet		

Vane and Test Data:

Vane Diameter:	3 5/8	inches	Vane Type:	Standard Vane
Vane Constant, k:	0.905		Depth of Vane Tip:	26.5
Torque Arm Length:	12	inches	Depth of Vane Tip Below Bottom of Hole:	18 in.
Torque Rate - Undisturbe	0.1	deg/sec		
Torque Rate - Remolded:	0.1	deg/sec		

Remolded Condition				Remolded Condition			
Degrees of Rotation	Dial Reading (lbs)	Friction (lbs)	S_u (psf)	Degrees of Rotation	Dial Reading (lbs)	Friction (lbs)	Su (psf)
1	0	0	0	18	4	0	43
2	3	0	33	19	4	0	43
3	3	0	33	20	4	0	43
4	3	0	33	21	5	0	54
5	3	0	33	22	5	0	54
6	4	0	43	23	5	0	54
7	4	0	43	24	5	0	54
8	4	0	43	25	5	0	54
9	4	0	43	26	5	0	54
10	4	0	43	27	5	0	54
11	4	0	43	28	5	0	54
12	4	0	43	29	5	0	54
13	4	0	43	30	5	0	54
14	4	0	43	31	5	0	54
15	4	0	43	32		0	0
16	4	0	43	33		0	0
17	4	0	43	34		0	0
				35		0	0

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FIELD VANE SHEAR TEST REPORT | 3 of 3

Project No.:	1131-08-554
Project Name:	Port Access Road
Location:	Charleston, SC
Client:	SCDOT

Test Location Information:

Exploration:	B-34SCPT	Date:	10/22/2008
Surface El.:	7.8 feet	Engineer:	RCB
Test Depth:	35.5 feet		
Test El.:	-27.7 feet		

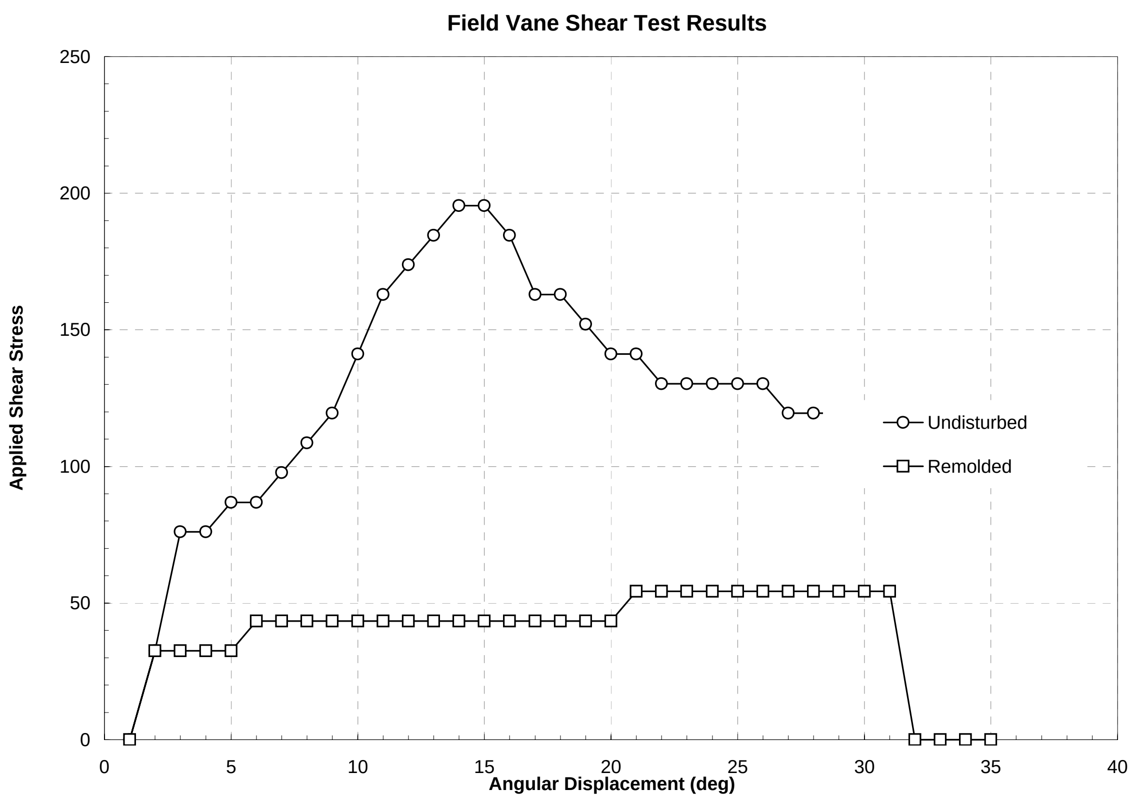
Soil Data:

Liquid Limit:	71
Plastic Limit:	47
Plasticity Index:	24
%-Passing 200:	93
Classification:	MH
Moisture Content:	148

Summary of Test Results:

	Uncorrected	Corrected	Chandler Correction Factor
Undisturbed S_u (psf):	217	180	0.83
Remolded S_u (psf):	54	45	Sensitivity
Effective Vertical Stress (psf):	1,157	1,157	4.0
S_u / p'_o	0.19	0.16	

***Note: Soil data was gathered from B-39 SPT at a depth of 23.5 ft.**



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FIELD VANE SHEAR TEST REPORT | 1 of 3

Project No.:	1131-08-554
Project Name:	Port Access Road
Location:	Charleston, SC
Client:	SCDOT

Test Location Information:

Exploration:	B-34SCPT	Date:	10/22/2008
Surface El.:	7.8 feet	Engineer:	RCB
Test Depth:	35.5 feet		
Test El.:	-27.7 feet		

Vane and Test Data:

Vane Diameter:	3 5/8	inches	Vane Type:	Standard Vane
Vane Constant, k:	0.905		Depth of Vane Tip:	35.5
Torque Arm Length:	12	inches	Depth of Vane Tip Below Bottom of Hole:	18 in.
Torque Rate - Undisturbe	0.1	deg/sec		
Torque Rate - Remolded:	0.1	deg/sec		

Undisturbed Condition				Undisturbed Condition			
Degrees of Rotation	Dial Reading (lbs)	Friction (lbs)	S_u (psf)	Degrees of Rotation	Dial Reading (lbs)	Friction (lbs)	Su (psf)
0.5	0	0	0	16	15	0	163
1	3	0	33	17	14	0	152
1.5	7	0	76	18	13	0	141
2	7	0	76	19	13	0	141
3	8	0	87	20	12	0	130
4	8	0	87	21	12	0	130
5	9	0	98	22	12	0	130
6	10	0	109	23	12	0	130
7	11	0	119	24	12	0	130
8	13	0	141	25	11	0	119
9	15	0	163	26	11	0	119
10	16	0	174	27	11	0	119
11	17	0	185	28	11	0	119
12	18	0	195	29	11	0	119
13	18	0	195	30	11	0	119
14	17	0	185	31	11	0	119
15	15	0	163	32	10	0	109
		0	0	33	10	0	109

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FIELD VANE SHEAR TEST REPORT | 2 of 3

Project No.:	1131-08-554
Project Name:	Port Access Road
Location:	Charleston, SC
Client:	SCDOT

Test Location Information:

Exploration:	B-34SCPT	Date:	10/22/2008
Surface El.:	7.8 feet	Engineer:	RCB
Test Depth:	35.5 feet		
Test El.:	-27.7 feet		

Vane and Test Data:

Vane Diameter:	3 5/8	inches	Vane Type:	Standard Vane
Vane Constant, k:	0.905		Depth of Vane Tip:	35.5
Torque Arm Length:	12	inches	Depth of Vane Tip Below Bottom of Hole:	18 in.
Torque Rate - Undisturbe	0.1	deg/sec		
Torque Rate - Remolded:	0.1	deg/sec		

Remolded Condition				Remolded Condition			
Degrees of Rotation	Dial Reading (lbs)	Friction (lbs)	S_u (psf)	Degrees of Rotation	Dial Reading (lbs)	Friction (lbs)	Su (psf)
1	0	0	0	18	4	0	43
2	3	0	33	19	4	0	43
3	3	0	33	20	4	0	43
4	3	0	33	21	5	0	54
5	3	0	33	22	5	0	54
6	4	0	43	23	5	0	54
7	4	0	43	24	5	0	54
8	4	0	43	25	5	0	54
9	4	0	43	26	5	0	54
10	4	0	43	27	5	0	54
11	4	0	43	28	5	0	54
12	4	0	43	29	5	0	54
13	4	0	43	30	5	0	54
14	4	0	43	31	5	0	54
15	4	0	43	32		0	0
16	4	0	43	33		0	0
17	4	0	43	34		0	0
				35		0	0

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FIELD VANE SHEAR TEST REPORT | 3 of 3

Project No.:	1131-08-554
Project Name:	Port Access Road
Location:	Charleston, SC
Client:	SCDOT

Test Location Information:

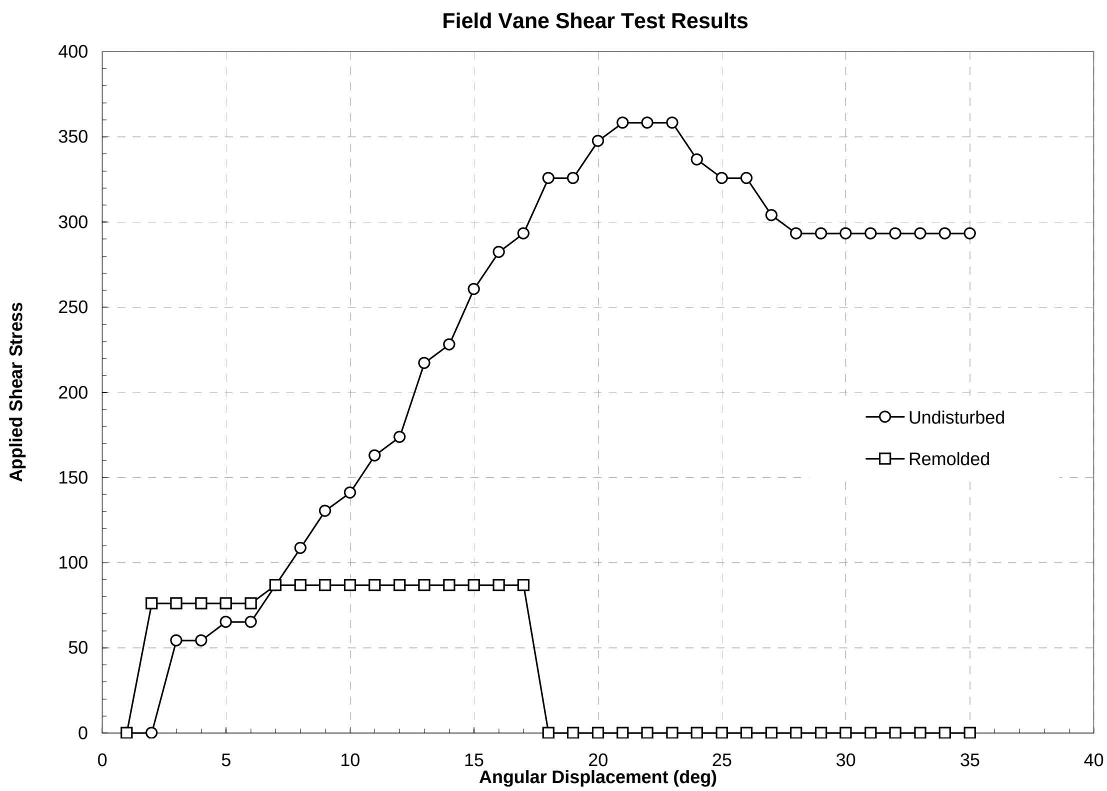
Exploration:	B-34SCPT	Date:	10/22/2008
Surface El.:	7.8 feet	Engineer:	RCB
Test Depth:	44.5 feet		
Test El.:	-36.7 feet		

Soil Data:

Liquid Limit:	71		Uncorrected	Corrected	Chandler Correction Factor
Plastic Limit:	47	Undisturbed S_u (psf):	358	297	0.83
Plasticity Index:	24	Remolded S_u (psf):	87	72	Sensitivity
%-Passing 200:	93	Effective Vertical Stress (psf):	1,451	1,451	4.1
Classification:	MH	S_u / p'_o	0.25	0.20	
Moisture Content:	148				

Summary of Test Results:

***Note: Soil data was gathered from B-39 SPT at a depth of 23.5 ft.**



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FIELD VANE SHEAR TEST REPORT | 1 of 3

Project No.:	1131-08-554
Project Name:	Port Access Road
Location:	Charleston, SC
Client:	SCDOT

Test Location Information:

Exploration:	B-34SCPT	Date:	10/22/2008
Surface El.:	7.8 feet	Engineer:	RCB
Test Depth:	44.5 feet		
Test El.:	-36.7 feet		

Vane and Test Data:

Vane Diameter:	3 5/8	inches	Vane Type:	Standard Vane
Vane Constant, k:	0.905		Depth of Vane Tip:	44.5
Torque Arm Length:	12	inches	Depth of Vane Tip Below Bottom of Hole:	18 in.
Torque Rate - Undisturbe	0.1	deg/sec		
Torque Rate - Remolded:	0.1	deg/sec		

Undisturbed Condition				Undisturbed Condition			
Degrees of Rotation	Dial Reading (lbs)	Friction (lbs)	S_u (psf)	Degrees of Rotation	Dial Reading (lbs)	Friction (lbs)	Su (psf)
0.5	0	0	0	16	30	0	326
1	0	0	0	17	30	0	326
1.5	5	0	54	18	32	0	348
2	5	0	54	19	33	0	358
3	6	0	65	20	33	0	358
4	6	0	65	21	33	0	358
5	8	0	87	22	31	0	337
6	10	0	109	23	30	0	326
7	12	0	130	24	30	0	326
8	13	0	141	25	28	0	304
9	15	0	163	26	27	0	293
10	16	0	174	27	27	0	293
11	20	0	217	28	27	0	293
12	21	0	228	29	27	0	293
13	24	0	261	30	27	0	293
14	26	0	282	31	27	0	293
15	27	0	293	32	27	0	293
		0	0	33	27	0	293

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FIELD VANE SHEAR TEST REPORT | 2 of 3

Project No.:	1131-08-554
Project Name:	Port Access Road
Location:	Charleston, SC
Client:	SCDOT

Test Location Information:

Exploration:	B-34SCPT	Date:	10/22/2008
Surface El.:	7.8 feet	Engineer:	RCB
Test Depth:	44.5 feet		
Test El.:	-36.7 feet		

Vane and Test Data:

Vane Diameter:	3 5/8	inches	Vane Type:	Standard Vane
Vane Constant, k:	0.905		Depth of Vane Tip:	44.5
Torque Arm Length:	12	inches	Depth of Vane Tip Below Bottom of Hole:	18 in.
Torque Rate - Undisturbe	0.1	deg/sec		
Torque Rate - Remolded:	0.1	deg/sec		

Remolded Condition				Remolded Condition			
Degrees of Rotation	Dial Reading (lbs)	Friction (lbs)	S_u (psf)	Degrees of Rotation	Dial Reading (lbs)	Friction (lbs)	Su (psf)
1	0	0	0	18		0	0
2	7	0	76	19		0	0
3	7	0	76	20		0	0
4	7	0	76	21		0	0
5	7	0	76	22		0	0
6	7	0	76	23		0	0
7	8	0	87	24		0	0
8	8	0	87	25		0	0
9	8	0	87	26		0	0
10	8	0	87	27		0	0
11	8	0	87	28		0	0
12	8	0	87	29		0	0
13	8	0	87	30		0	0
14	8	0	87	31		0	0
15	8	0	87	32		0	0
16	8	0	87	33		0	0
17	8	0	87	34		0	0
				35		0	0

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FIELD VANE SHEAR TEST REPORT | 3 of 3

Project No.:	1131-08-554
Project Name:	Port Access Road
Location:	Charleston, SC
Client:	SCDOT

Test Location Information:

Exploration:	B-34SCPT	Date:	10/22/2008
Surface El.:	7.8 feet	Engineer:	RCB
Test Depth:	51.5 feet		
Test El.:	-43.7 feet		

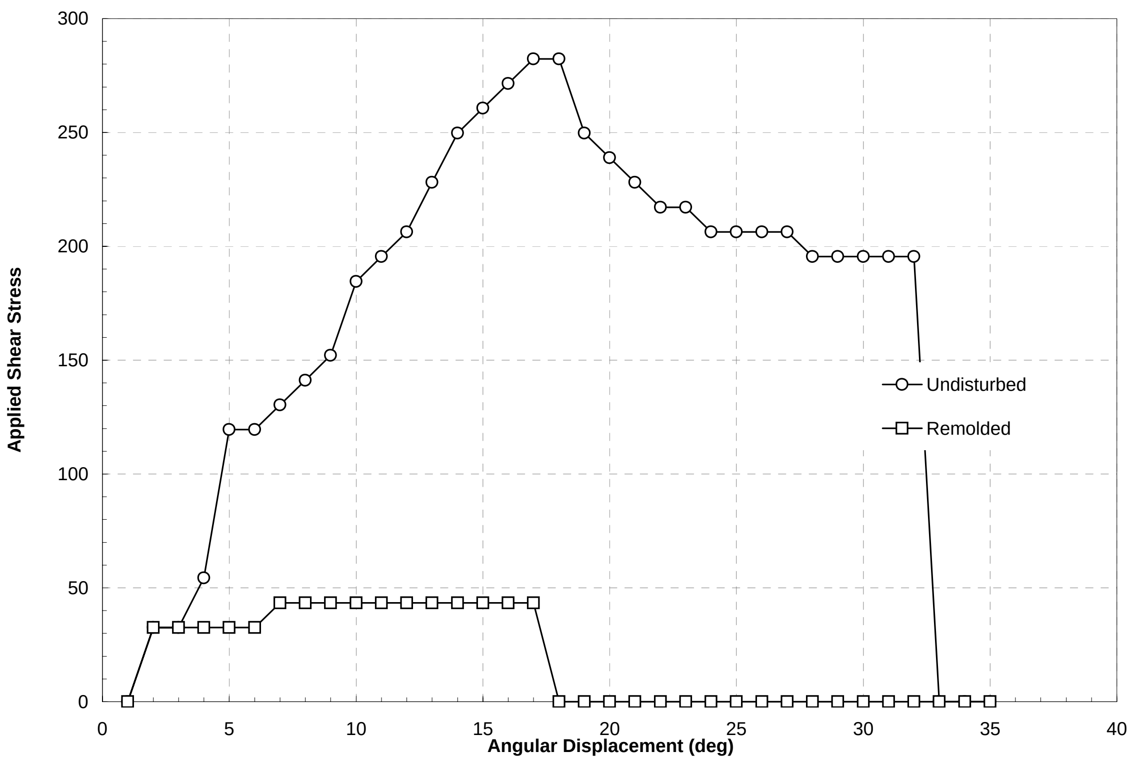
Soil Data:

Liquid Limit:	71		Uncorrected	Corrected	Chandler Correction Factor
Plastic Limit:	47	Undisturbed S_u (psf):	358	297	0.83
Plasticity Index:	24	Remolded S_u (psf):	43	36	Sensitivity
%-Passing 200:	93	Effective Vertical Stress (psf):	1,679	1,679	8.3
Classification:	MH	S_u / p'_o	0.21	0.18	
Moisture Content:	148				

Summary of Test Results:

***Note: Soil data was gathered from B-39 SPT at a depth of 23.5 ft.**

Field Vane Shear Test Results



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FIELD VANE SHEAR TEST REPORT | 1 of 3

Project No.:	1131-08-554
Project Name:	Port Access Road
Location:	Charleston, SC
Client:	SCDOT

Test Location Information:

Exploration:	B-34SCPT	Date:	10/22/2008
Surface El.:	7.8 feet	Engineer:	RCB
Test Depth:	51.5 feet		
Test El.:	-43.7 feet		

Vane and Test Data:

Vane Diameter:	3 5/8	inches	Vane Type:	Standard Vane
Vane Constant, k:	0.905		Depth of Vane Tip:	51.5
Torque Arm Length:	12	inches	Depth of Vane Tip Below Bottom of Hole:	18 in.
Torque Rate - Undisturbe	0.1	deg/sec		
Torque Rate - Remolded:	0.1	deg/sec		

Undisturbed Condition				Undisturbed Condition			
Degrees of Rotation	Dial Reading (lbs)	Friction (lbs)	S_u (psf)	Degrees of Rotation	Dial Reading (lbs)	Friction (lbs)	Su (psf)
0.5	0	0	0	16	26	0	282
1	3	0	33	17	23	0	250
1.5	3	0	33	18	22	0	239
2	5	0	54	19	21	0	228
3	11	0	119	20	20	0	217
4	11	0	119	21	20	0	217
5	12	0	130	22	19	0	206
6	13	0	141	23	19	0	206
7	14	0	152	24	19	0	206
8	17	0	185	25	19	0	206
9	18	0	195	26	18	0	195
10	19	0	206	27	18	0	195
11	21	0	228	28	18	0	195
12	23	0	250	29	18	0	195
13	24	0	261	30	18	0	195
14	25	0	272	31		0	0
15	26	0	282	32		0	0
		0	0	33		0	0

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FIELD VANE SHEAR TEST REPORT | 2 of 3

Project No.:	1131-08-554
Project Name:	Port Access Road
Location:	Charleston, SC
Client:	SCDOT

Test Location Information:

Exploration:	B-34SCPT	Date:	10/22/2008
Surface El.:	7.8 feet	Engineer:	RCB
Test Depth:	51.5 feet		
Test El.:	-43.7 feet		

Vane and Test Data:

Vane Diameter:	3 5/8	inches	Vane Type:	Standard Vane
Vane Constant, k:	0.905		Depth of Vane Tip:	51.5
Torque Arm Length:	12	inches	Depth of Vane Tip Below Bottom of Hole:	18 in.
Torque Rate - Undisturbe	0.1	deg/sec		
Torque Rate - Remolded:	0.1	deg/sec		

Remolded Condition				Remolded Condition			
Degrees of Rotation	Dial Reading (lbs)	Friction (lbs)	S_u (psf)	Degrees of Rotation	Dial Reading (lbs)	Friction (lbs)	Su (psf)
1	0	0	0	18		0	0
2	3	0	33	19		0	0
3	3	0	33	20		0	0
4	3	0	33	21		0	0
5	3	0	33	22		0	0
6	3	0	33	23		0	0
7	4	0	43	24		0	0
8	4	0	43	25		0	0
9	4	0	43	26		0	0
10	4	0	43	27		0	0
11	4	0	43	28		0	0
12	4	0	43	29		0	0
13	4	0	43	30		0	0
14	4	0	43	31		0	0
15	4	0	43	32		0	0
16	4	0	43	33		0	0
17	4	0	43	34		0	0
				35		0	0

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FIELD VANE SHEAR TEST REPORT | 3 of 3

Project No.:	1131-08-554
Project Name:	Port Access Road
Location:	Charleston, SC
Client:	SCDOT

Test Location Information:

Exploration:	B-40	Date:	10/2/2008
Surface El.:	2.3 feet	Engineer:	MLE
Test Depth:	15 feet		
Test El.:	-12.7 feet		

Soil Data:

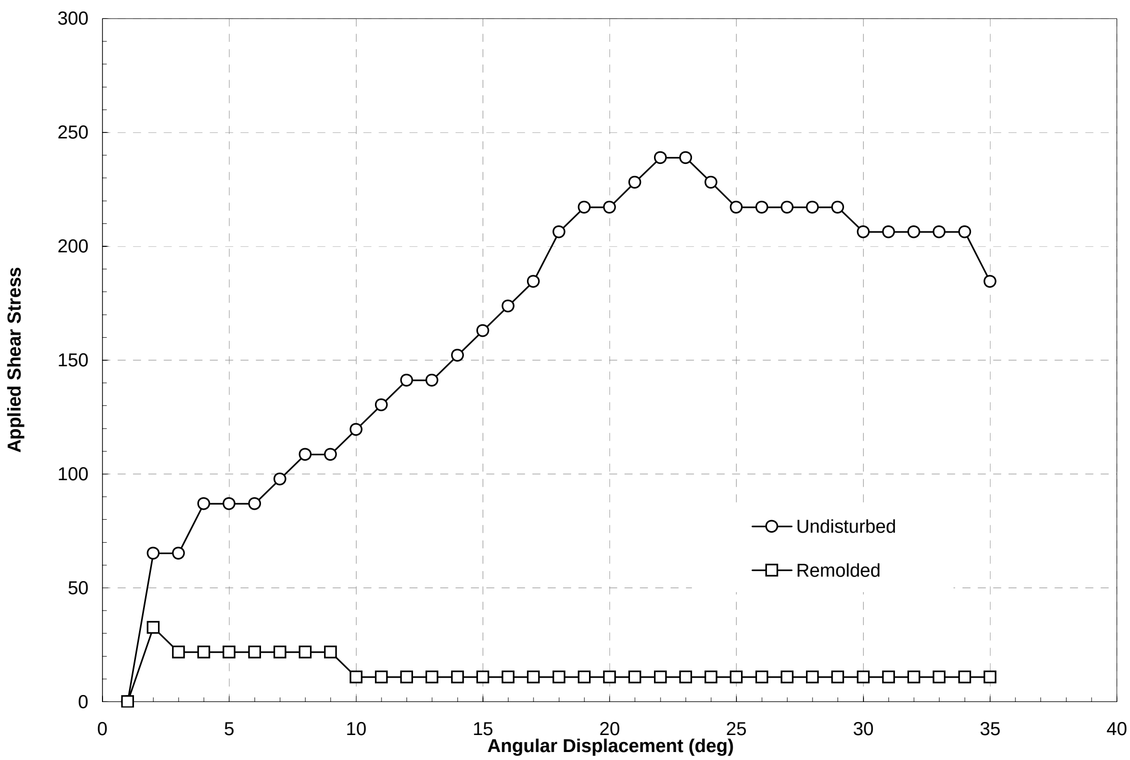
Liquid Limit:	71
Plastic Limit:	47
Plasticity Index:	24
%-Passing 200:	93
Classification:	MH
Moisture Content:	148

Summary of Test Results:

	Uncorrected	Corrected	Chandler Correction Factor
Undisturbed S_u (psf):	240	199	0.83
Remolded S_u (psf):	30	25	Sensitivity
Effective Vertical Stress (psf):	489	489	8.0
S_u / p'_o	0.49	0.41	

***Note: Soil data was gathered from B-39 SPT at a depth of 23.5 ft.**

Field Vane Shear Test Results



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FIELD VANE SHEAR TEST REPORT | 1 of 3

Project No.:	1131-08-554
Project Name:	Port Access Road
Location:	Charleston, SC
Client:	SCDOT

Test Location Information:

Exploration:	B-40		Date:	10/2/2008
Surface El.:	2.3	feet	Engineer:	MLE
Test Depth:	15	feet		
Test El.:	-12.7	feet		

Vane and Test Data:

Vane Diameter:	3 5/8	inches	Vane Type:	Standard Vane
Vane Constant, k:	0.905		Depth of Vane Tip:	15 ft
Torque Arm Length:	12	inches	Depth of Vane Tip Below Bottom of Hole:	1.5 ft
Torque Rate - Undisturbe	0.1	deg/sec		
Torque Rate - Remolded:	0.1	deg/sec		

Undisturbed Condition				Undisturbed Condition			
Degrees of Rotation	**Dial Reading (lbs)**	**Friction (lbs)**	**S_u (psf)**	**Degrees of Rotation**	**Dial Reading (lbs)**	**Friction (lbs)**	**Su (psf)**
0.5	0	0	0	16	19	0	206
1	6	0	65	17	20	0	217
1.5	6	0	65	18	20	0	217
2	8	0	87	19	21	0	228
3	8	0	87	20	22	0	239
4	8	0	87	21	22	0	239
5	9	0	98	22	21	0	228
6	10	0	109	23	20	0	217
7	10	0	109	24	20	0	217
8	11	0	119	25	20	0	217
9	12	0	130	26	20	0	217
10	13	0	141	27	20	0	217
11	13	0	141	28	19	0	206
12	14	0	152	29	19	0	206
13	15	0	163	30	19	0	206
14	16	0	174	31	19	0	206
15	17	0	185	32	19	0	206
	18	0	195	33	17	0	185

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FIELD VANE SHEAR TEST REPORT | 2 of 3

Project No.:	1131-08-431
Project Name:	Spring/Fishburne Outfall Project
Location:	Charleston, SC
Client:	Black and Veatch

Test Location Information:

Exploration:	B-40		Date:	10/2/2008
Surface El.:	2.3	feet	Engineer:	MLE
Test Depth:	15	feet		
Test El.:	-12.7	feet		

Vane and Test Data:

Vane Diameter:	3 5/8	inches	Vane Type:	Standard Vane
Vane Constant, k:	0.905		Depth of Vane Tip:	15
Torque Arm Length:	12	inches	Depth of Vane Tip Below Bottom of Hole:	1.5
Torque Rate - Undisturbe	0.1	deg/sec		
Torque Rate - Remolded:	0.1	deg/sec		

Remolded Condition				Remolded Condition			
Degrees of Rotation	Dial Reading (lbs)	Friction (lbs)	S_u (psf)	Degrees of Rotation	Dial Reading (lbs)	Friction (lbs)	Su (psf)
1	0	0	0	18	1	0	11
2	3	0	33	19	1	0	11
3	2	0	22	20	1	0	11
4	2	0	22	21	1	0	11
5	2	0	22	22	1	0	11
6	2	0	22	23	1	0	11
7	2	0	22	24	1	0	11
8	2	0	22	25	1	0	11
9	2	0	22	26	1	0	11
10	1	0	11	27	1	0	11
11	1	0	11	28	1	0	11
12	1	0	11	29	1	0	11
13	1	0	11	30	1	0	11
14	1	0	11	31	1	0	11
15	1	0	11	32	1	0	11
16	1	0	11	33	1	0	11
17	1	0	11	34	1	0	11
				35	1	0	11

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FIELD VANE SHEAR TEST REPORT | 3 of 3

Project No.:	1131-08-431
Project Name:	Spring/Fishburne Outfall Project
Location:	Charleston, SC
Client:	Black and Veatch

Test Location Information:

Exploration:	B-40	Date:	10/2/2008
Surface El.:	2.3 feet	Engineer:	MLE
Test Depth:	33 feet		
Test El.:	-30.7 feet		

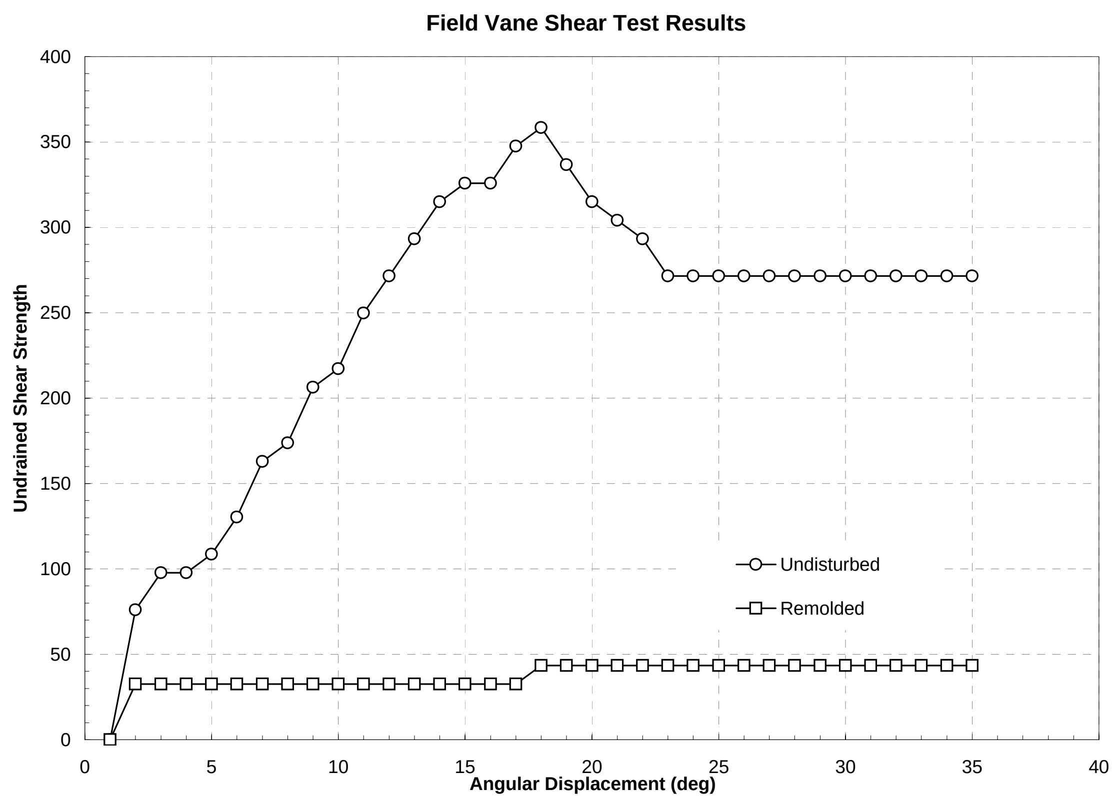
Soil Data:

Liquid Limit:	71
Plastic Limit:	47
Plasticity Index:	24
%-Passing 200:	93
Classification:	MH
Moisture Content:	148

Summary of Test Results:

	Uncorrected	Corrected	Chandler Correction Factor
Undisturbed S_u (psf):	360	299	0.83
Remolded S_u (psf):	50	42	Sensitivity
Effective Vertical Stress (psf):	1,076	1,076	7.2
S_u / p'_o	0.33	0.28	

***Note: Soil data was gathered from B-39 SPT at a depth of 23.5 ft.**



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FIELD VANE SHEAR TEST REPORT | 1 of 3

Project No.:	1131-08-554
Project Name:	Port Access Road
Location:	Charleston, SC
Client:	SCDOT

Test Location Information:

Exploration:	B-40		Date:	10/2/2008
Surface El.:	2.3	feet	Engineer:	MLE
Test Depth:	33	feet		
Test El.:	-30.7	feet		

Vane and Test Data:

Vane Diameter:	3 5/8	inches	Vane Type:	Standard Vane
Vane Constant, k:	0.905		Depth of Vane Tip:	33 ft
Torque Arm Length:	12	inches	Depth of Vane Tip Below Bottom of Hole:	1.5 ft
Torque Rate - Undisturbe	0.1	deg/sec		
Torque Rate - Remolded:	0.1	deg/sec		

Undisturbed Condition				Undisturbed Condition			
Degrees of Rotation	Dial Reading (lbs)	Friction (lbs)	S_u (psf)	Degrees of Rotation	Dial Reading (lbs)	Friction (lbs)	Su (psf)
0.5	0	0	0	16	33	0	358
1	7	0	76	17	31	0	337
1.5	9	0	98	18	29	0	315
2	9	0	98	19	28	0	304
3	10	0	109	20	27	0	293
4	12	0	130	21	25	0	272
5	15	0	163	22	25	0	272
6	16	0	174	23	25	0	272
7	19	0	206	24	25	0	272
8	20	0	217	25	25	0	272
9	23	0	250	26	25	0	272
10	25	0	272	27	25	0	272
11	27	0	293	28	25	0	272
12	29	0	315	29	25	0	272
13	30	0	326	30	25	0	272
14	30	0	326	31	25	0	272
15	32	0	348	32	25	0	272
		0	0	33	25	0	272

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FIELD VANE SHEAR TEST REPORT | 2 of 3

Project No.:	1131-08-431
Project Name:	Spring/Fishburne Outfall Project
Location:	Charleston, SC
Client:	Black and Veatch

Test Location Information:

Exploration:	B-40	Date:	10/2/2008
Surface El.:	2.3 feet	Engineer:	MLE
Test Depth:	33 feet		
Test El.:	-30.7 feet		

Vane and Test Data:

Vane Diameter:	3 5/8	inches	Vane Type:	Standard Vane
Vane Constant, k:	0.905		Depth of Vane Tip:	33 ft
Torque Arm Length:	12	inches	Depth of Vane Tip Below Bottom of Hole:	1.5 ft
Torque Rate - Undisturbe	0.1	deg/sec		
Torque Rate - Remolded:	0.1	deg/sec		

Remolded Condition				Remolded Condition			
Degrees of Rotation	Dial Reading (lbs)	Friction (lbs)	S_u (psf)	Degrees of Rotation	Dial Reading (lbs)	Friction (lbs)	Su (psf)
1	0	0	0	18	4	0	43
2	3	0	33	19	4	0	43
3	3	0	33	20	4	0	43
4	3	0	33	21	4	0	43
5	3	0	33	22	4	0	43
6	3	0	33	23	4	0	43
7	3	0	33	24	4	0	43
8	3	0	33	25	4	0	43
9	3	0	33	26	4	0	43
10	3	0	33	27	4	0	43
11	3	0	33	28	4	0	43
12	3	0	33	29	4	0	43
13	3	0	33	30	4	0	43
14	3	0	33	31	4	0	43
15	3	0	33	32	4	0	43
16	3	0	33	33	4	0	43
17	3	0	33	34	4	0	43
				35	4	0	43

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FIELD VANE SHEAR TEST REPORT | 3 of 3

Project No.:	1131-08-431
Project Name:	Spring/Fishburne Outfall Project
Location:	Charleston, SC
Client:	Black and Veatch

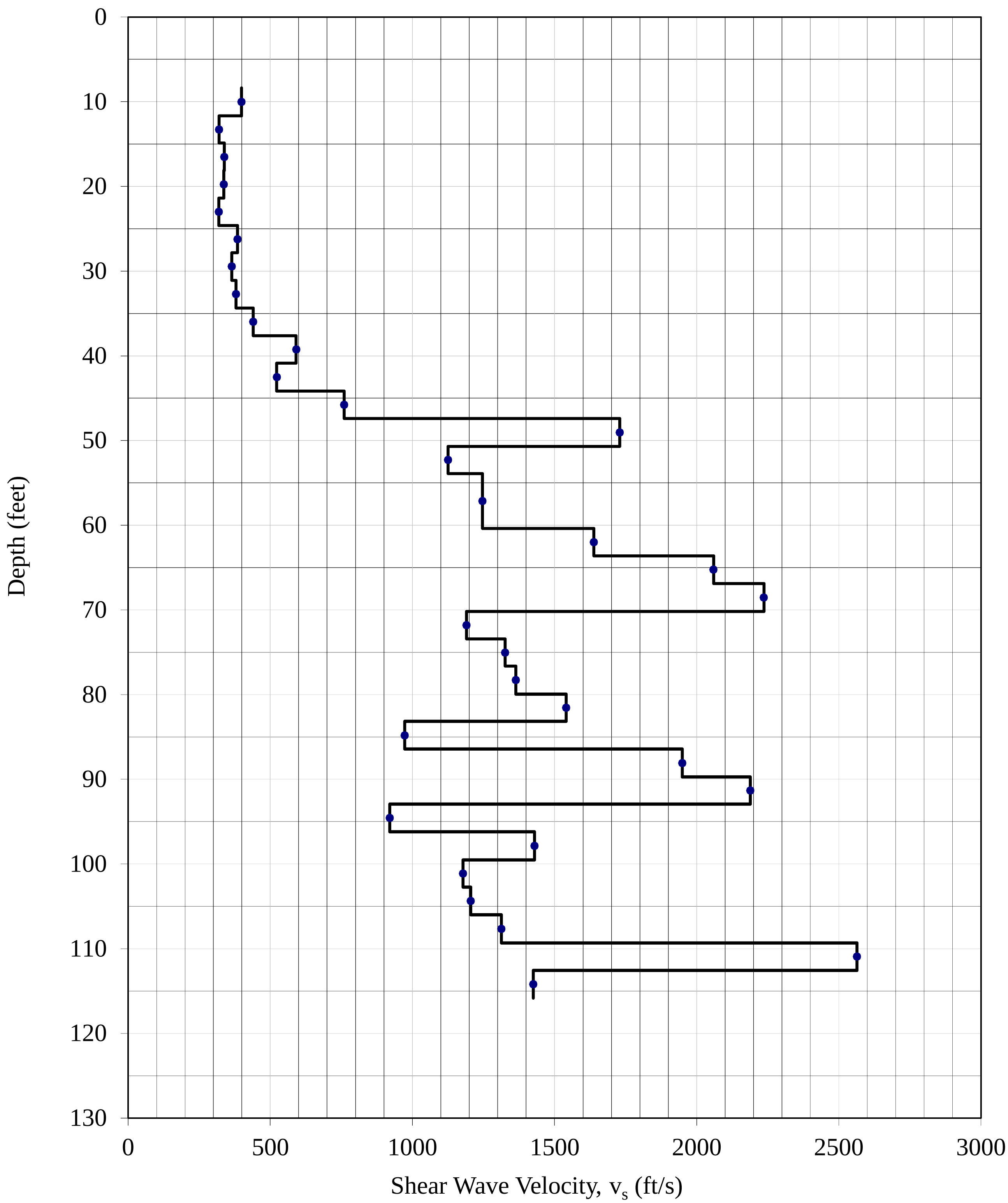
SCPT Shear Wave Velocity Test Data

Shear Wave Velocity Calculations

S&ME

Port Access Road
Charleston, SC

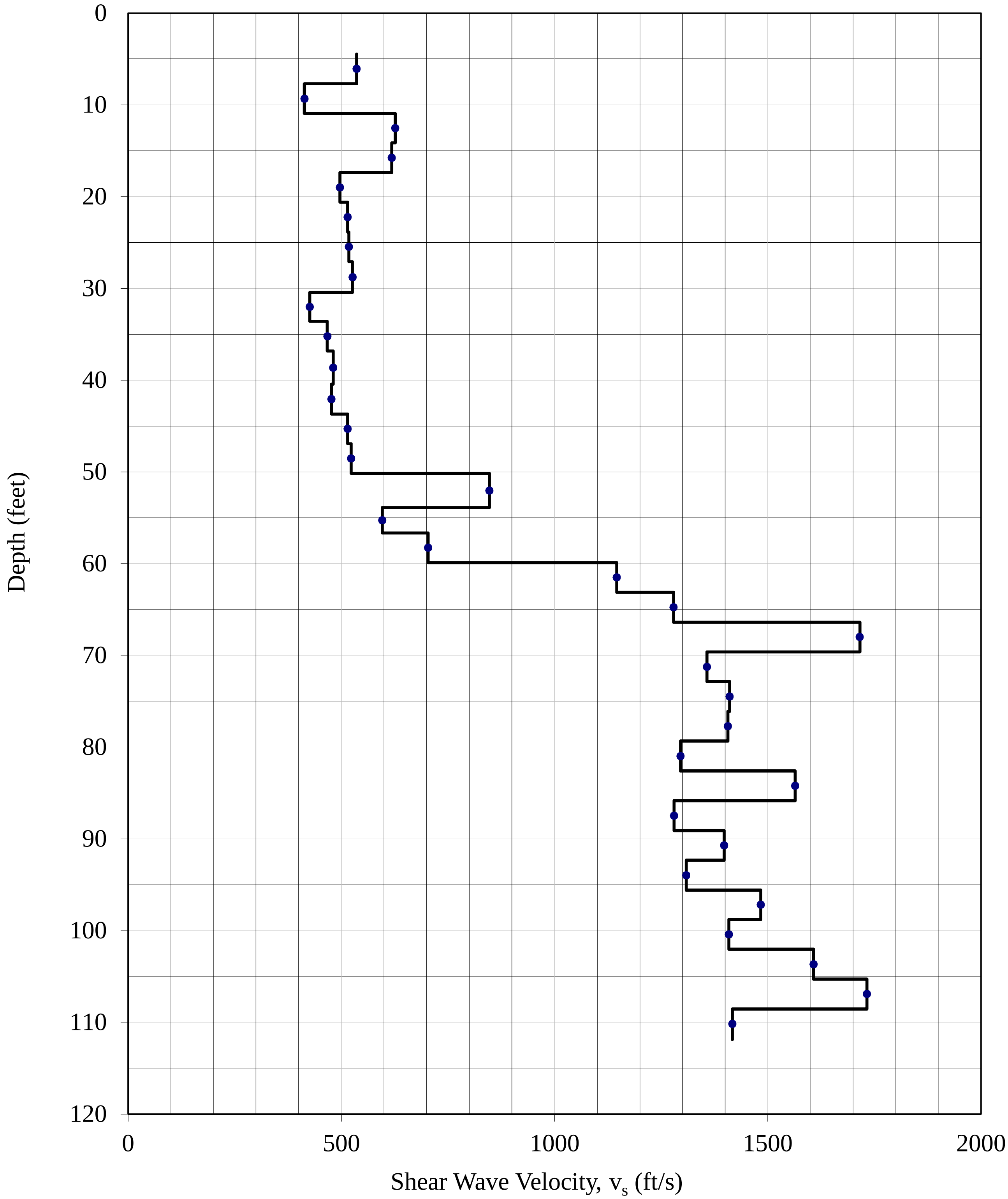
Sounding ID: **B-12 SCPT** Project Number: **1131-08-554**
Date: 10/27/08



Shear Wave Velocity Calculations

Port Access Road
North Charleston, SC

Sounding ID: **B-17SCPT** Project Number: **1131-08-554**
Date: 10/09/08



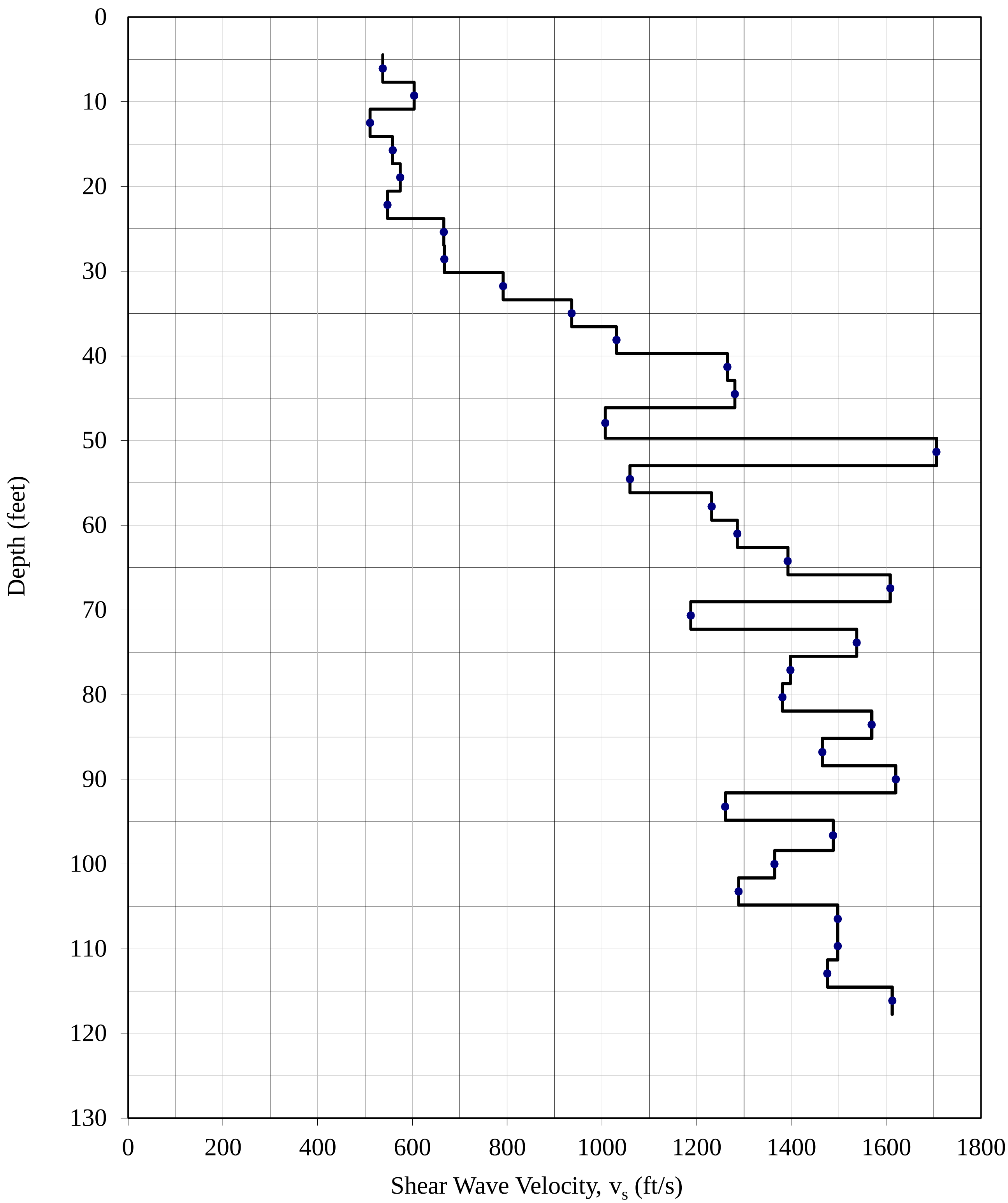
* Site Class based on 2003 International Building Code - *Table 1615.1 - SITE CLASS DEFINITIONS*

Shear Wave Velocity Calculations

Port Access Road
North Charleston, SC

Sounding ID: **B-22SCPT**
Date: 10/01/08

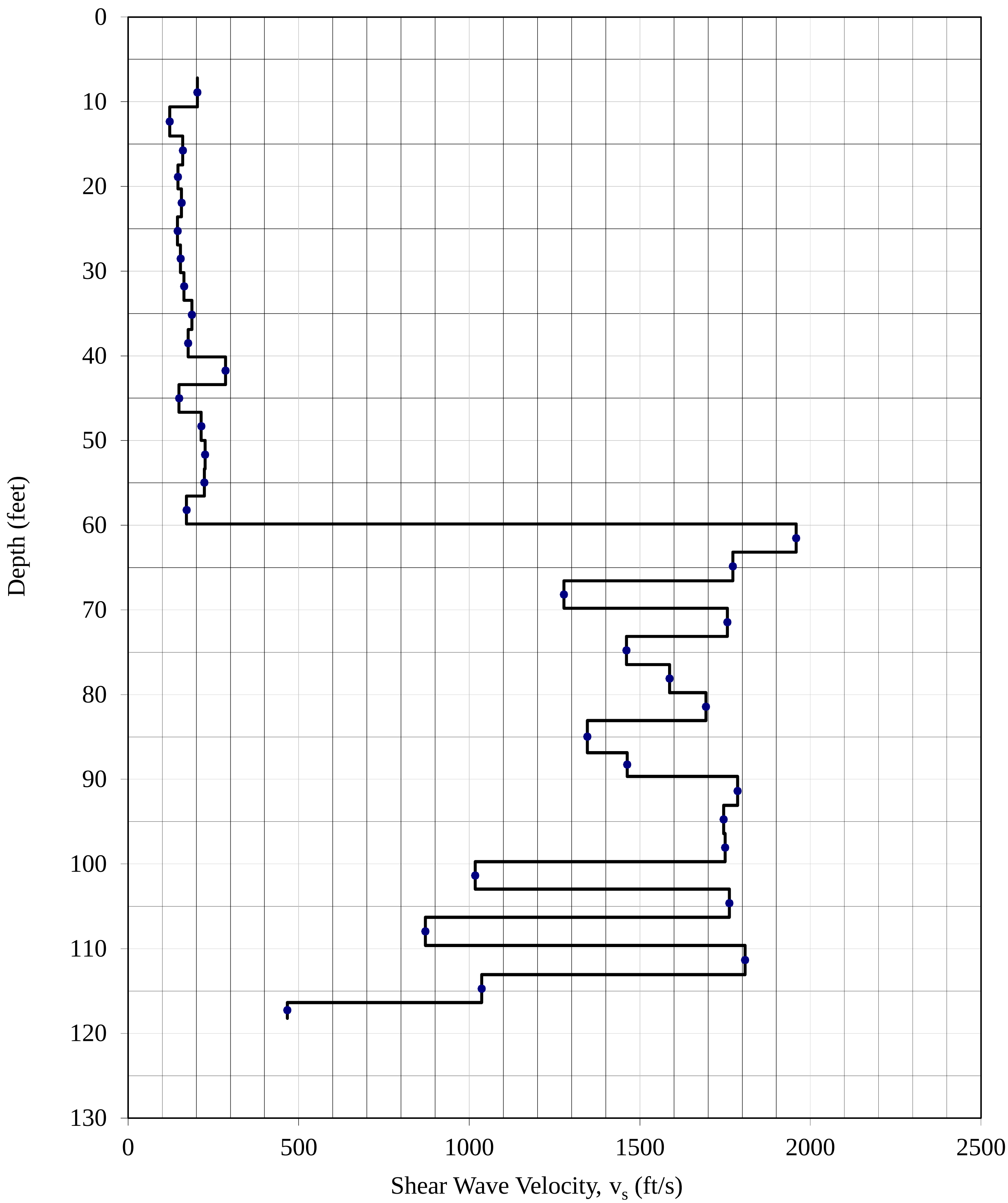
Project Number: **1131-08-554**



Shear Wave Velocity Calculations

Port Access Road
North Charleston, SC

Sounding ID: **B-34SCPT** Project Number: **1131-08-554**
Date: 09/23/08

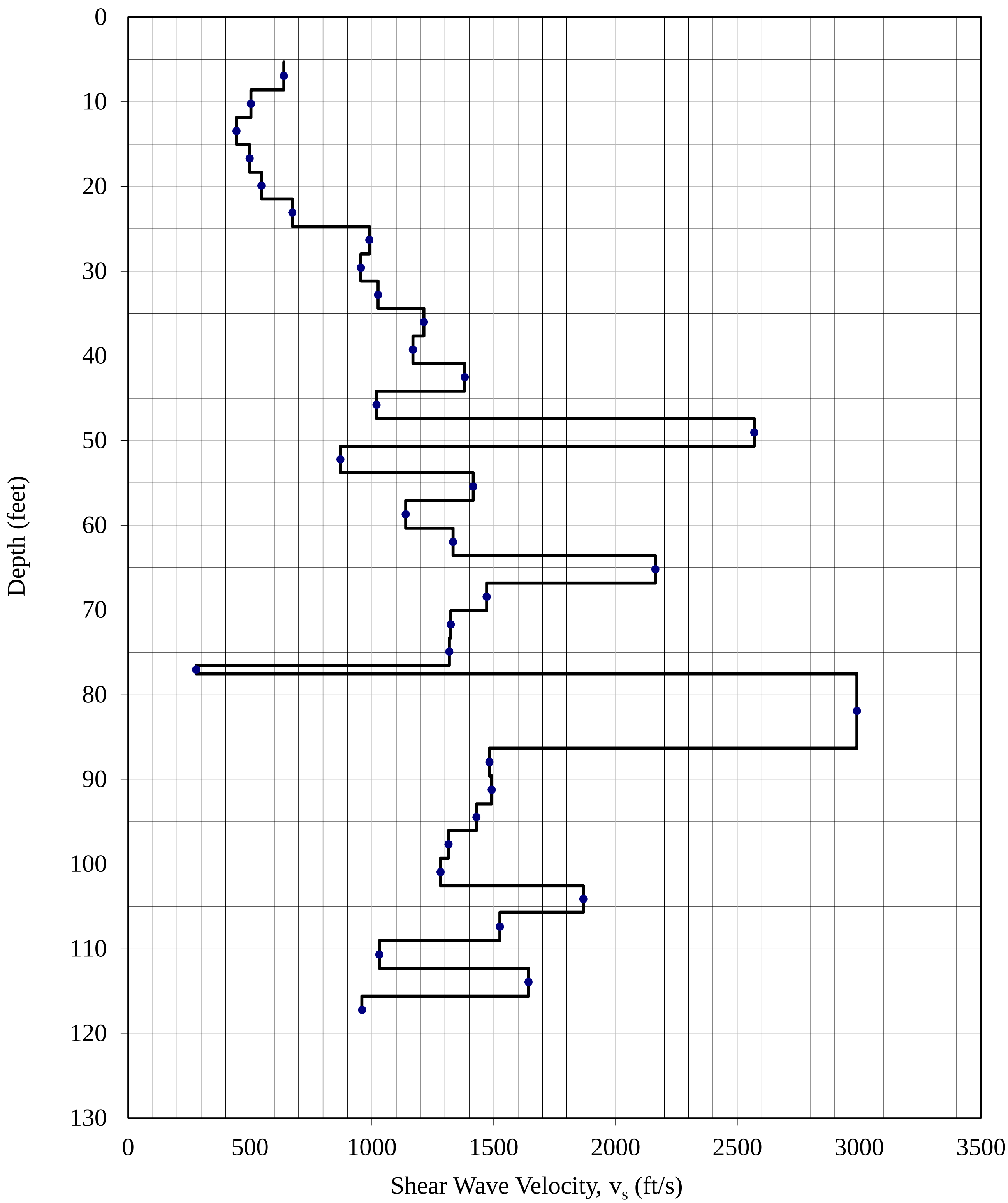


Shear Wave Velocity Calculations

Port Access Road
N. Charleston, SC

Sounding ID: **B-44SCPT**
Date: 10/01/08

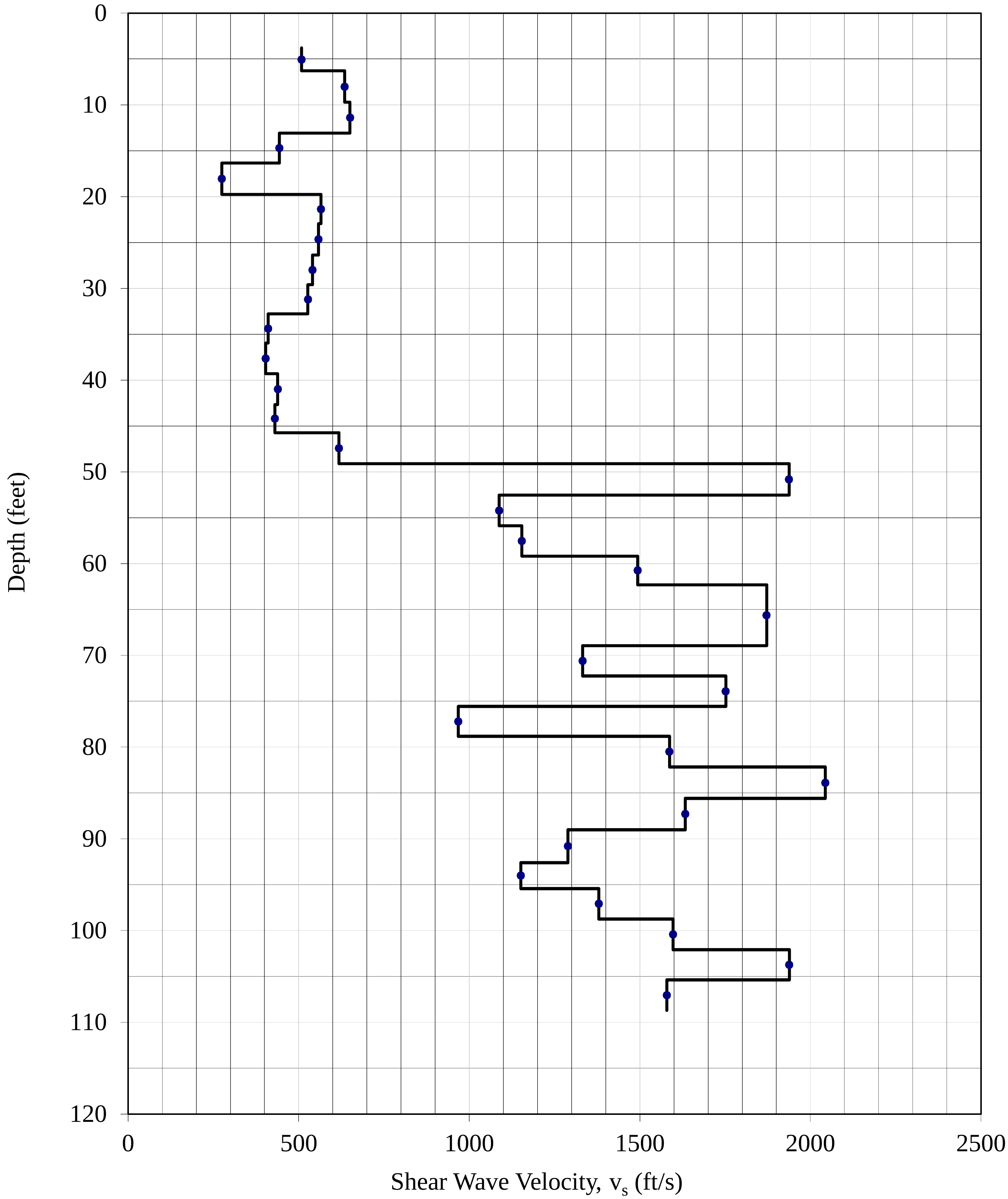
Project Number: **1131-08-554**



Shear Wave Velocity Calculations

Port Access Road
North Charleston, SC

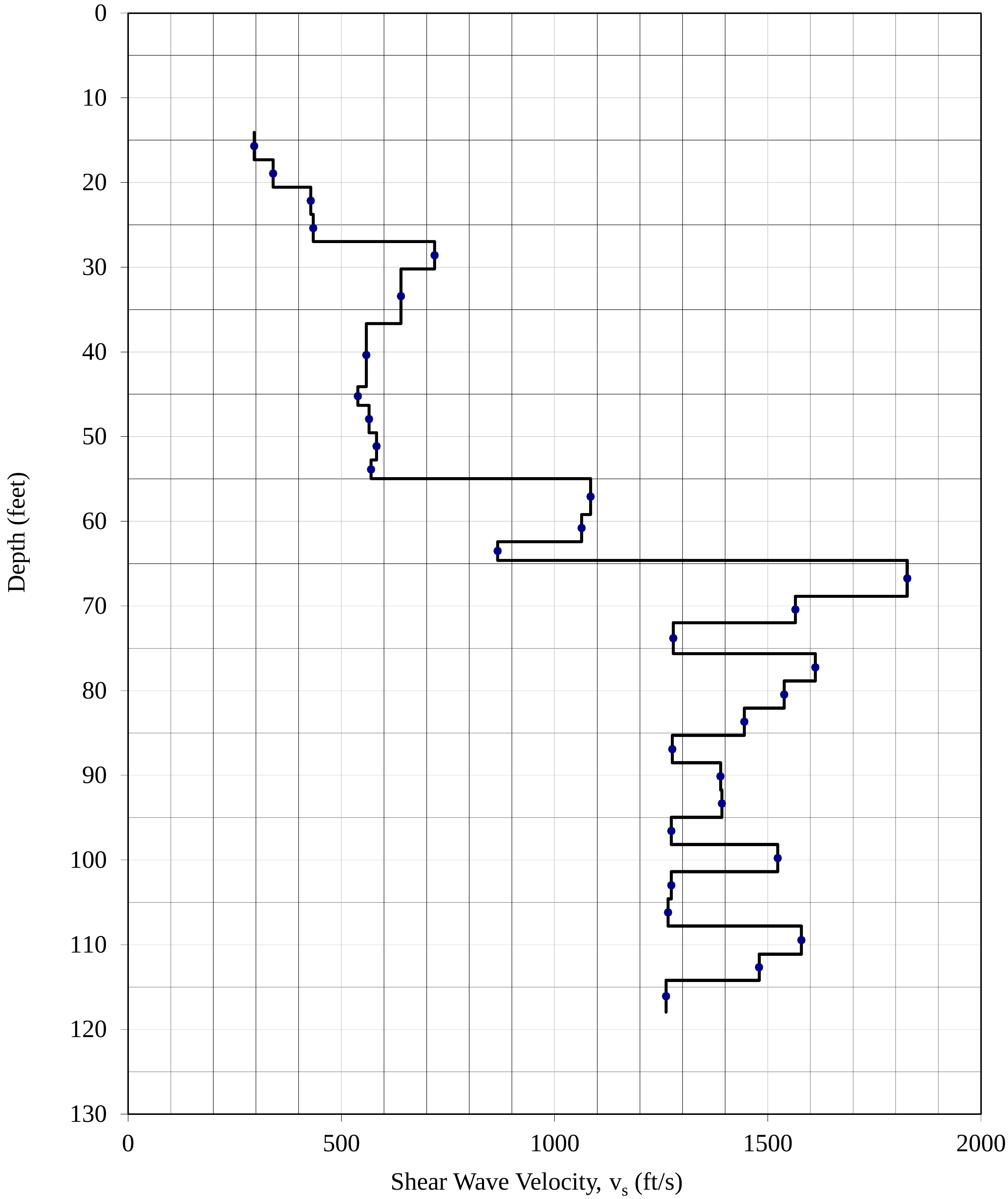
Sounding ID: **B-60SCPT** Project Number: **1131-08-554**
Date: 09/30/08



Shear Wave Velocity Calculations

Port Access Road
North Charleston, SC

Sounding ID: **B-67SCPT** Project Number: **1131-08-554**
Date: 02/10/09

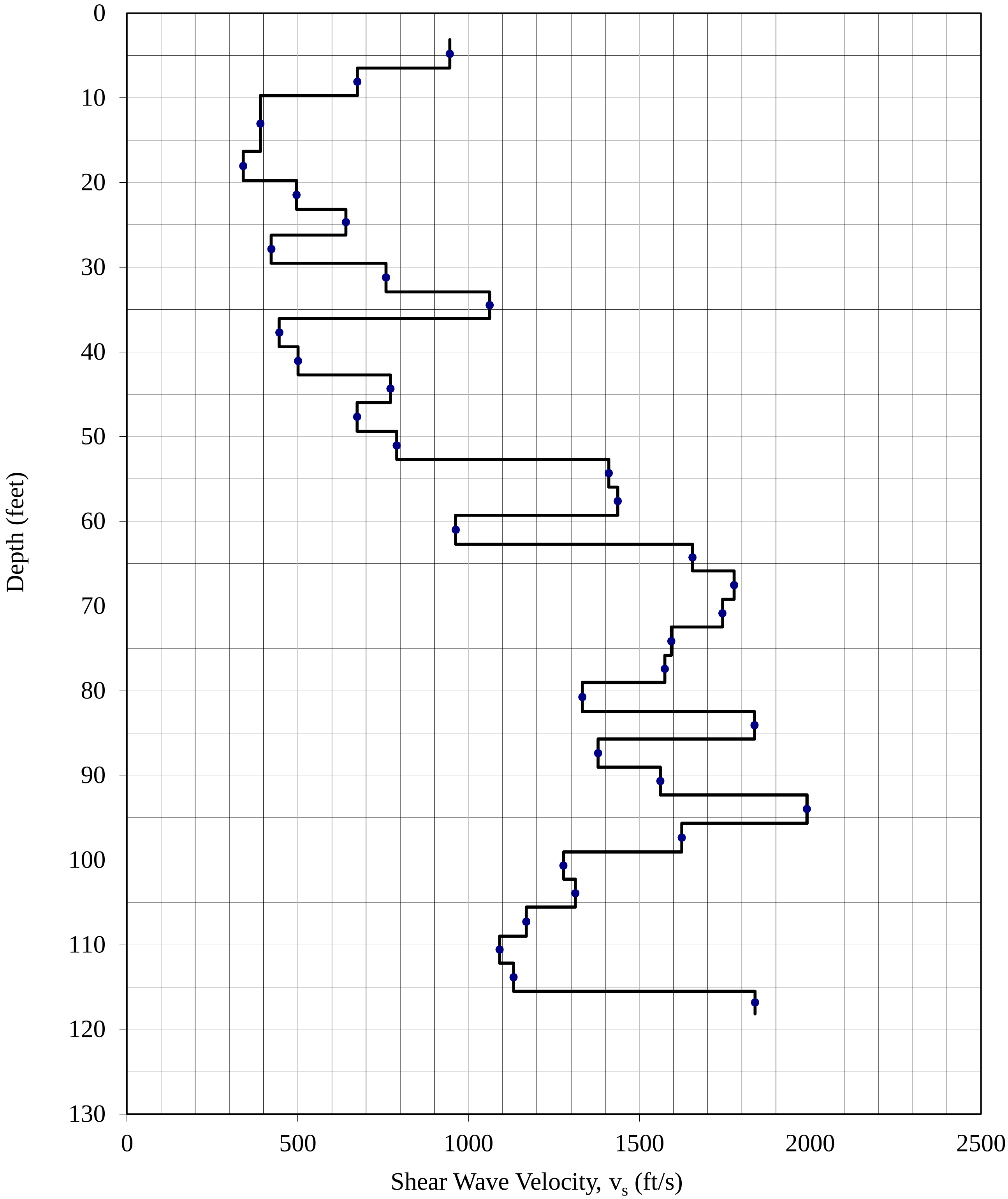


* Site Class based on 2003 International Building Code - *Table 1615.1 - SITE CLASS DEFINITIONS*

Shear Wave Velocity Calculations

Port Access Road
North Charleston, SC

Sounding ID: **B-73SCPT** Project Number: **1131-08-554**
Date: 09/15/08

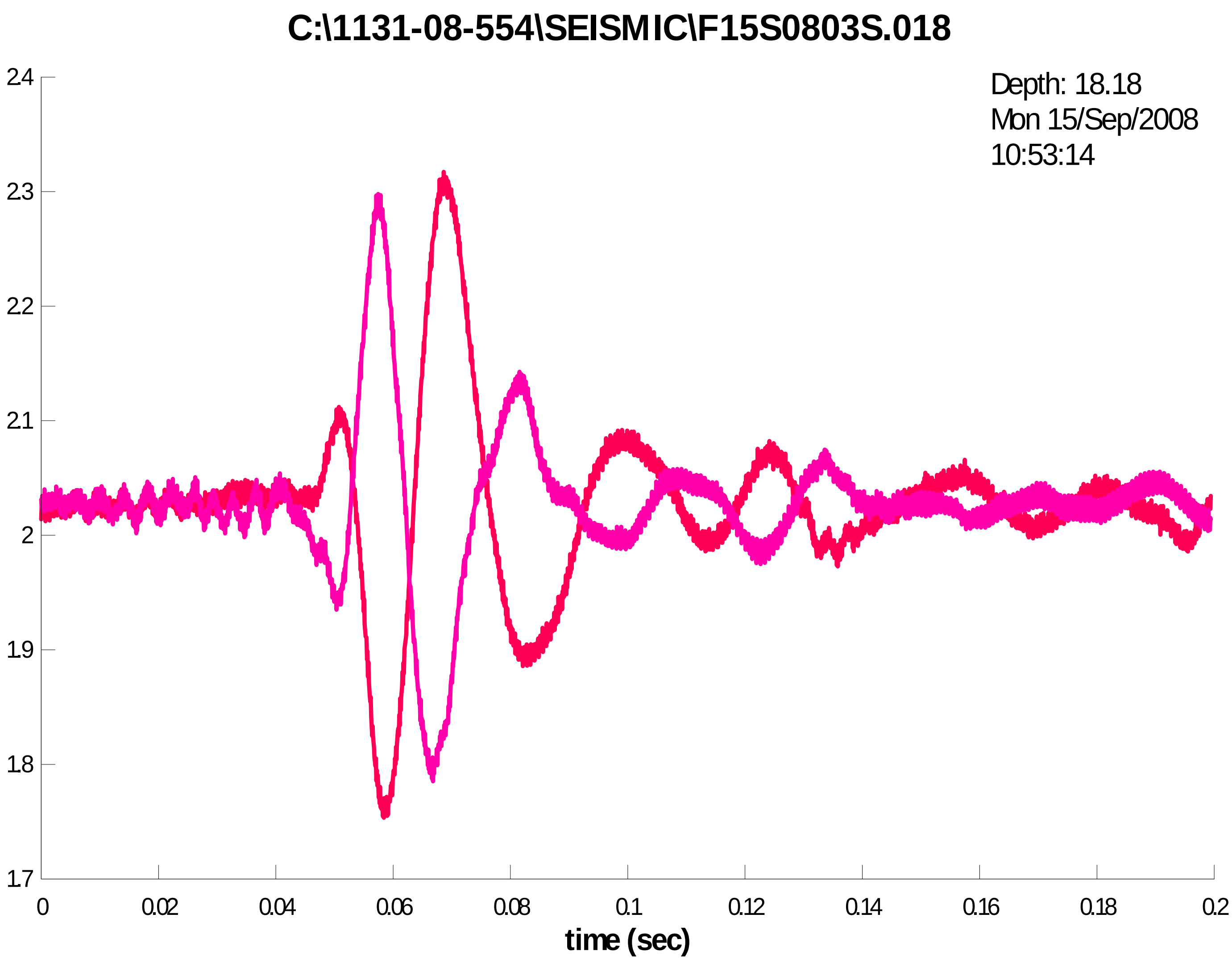


TYPICAL CPT – SHEAR WAVE RESULTS

Test ID: B-73SCPT, 18.18 ft
Site: Port Access Road
Location: North Charleston, SC
Project: 1131-08-554
Client: SCDOT

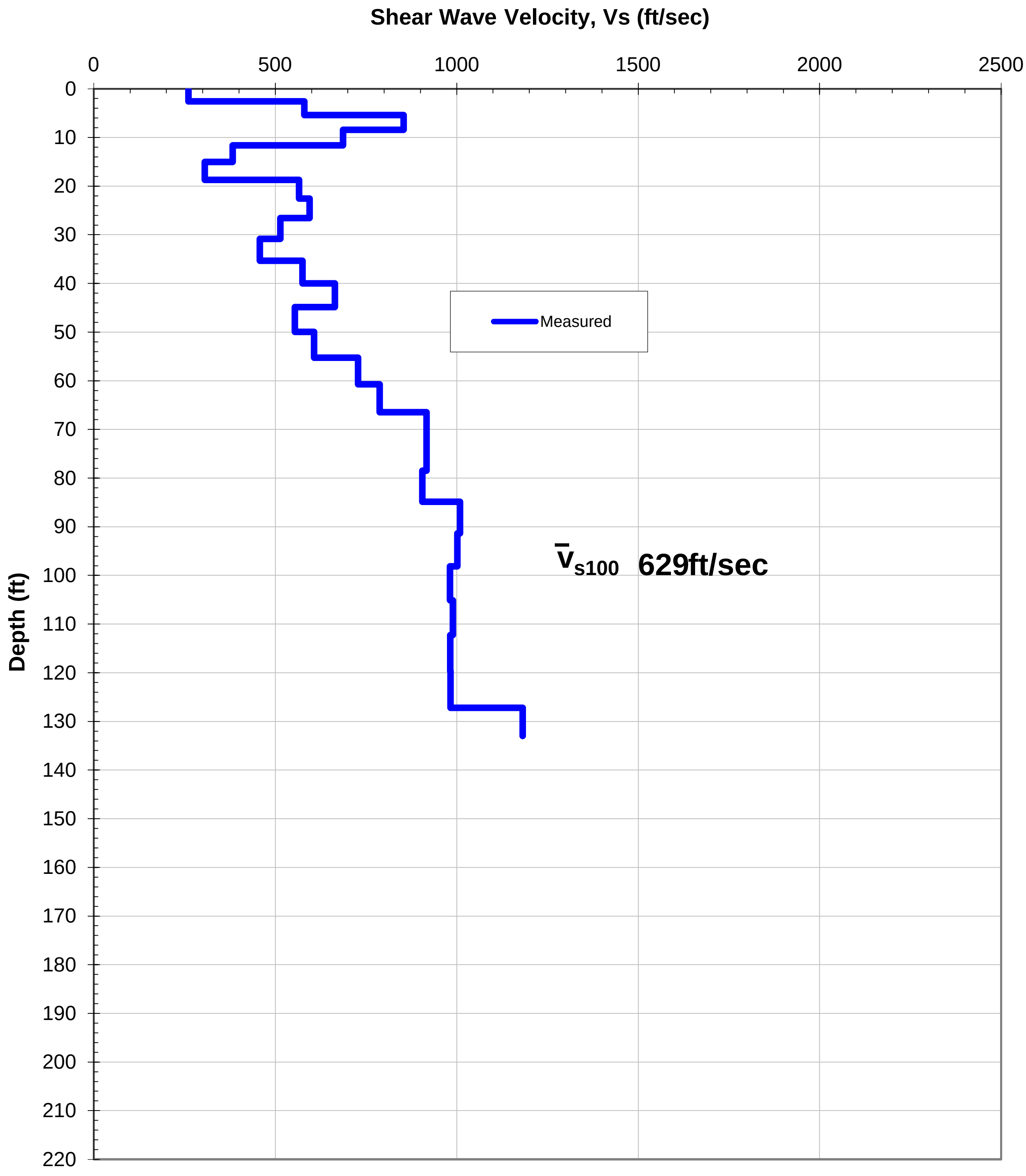
Date: 15/Sep/2008

Interpretation: Peak Interval Travel Time
S-Wave 1 (sec): 0. 06874
S-Wave 2 (sec): 0. 06875

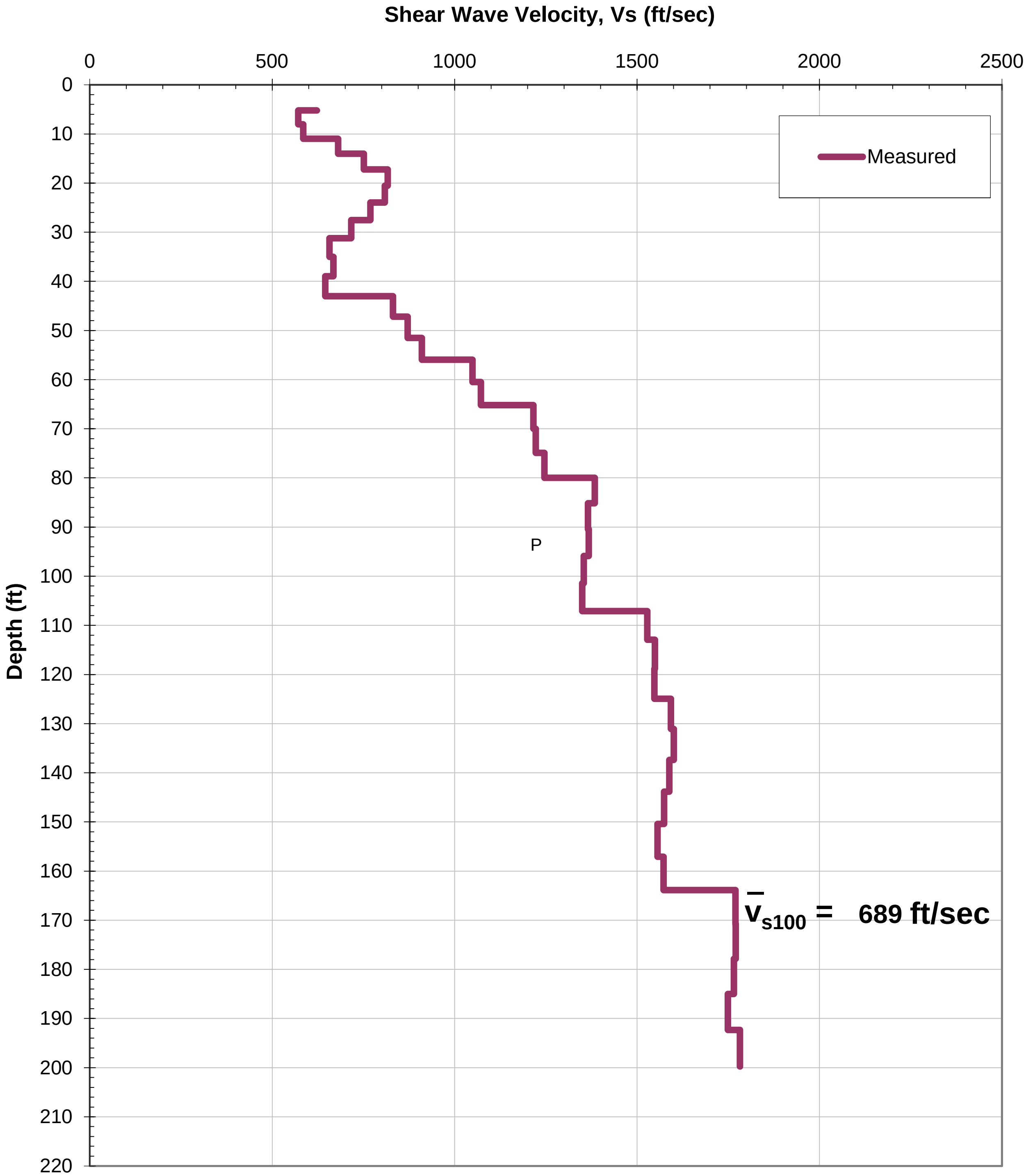


MASW and MAM Data

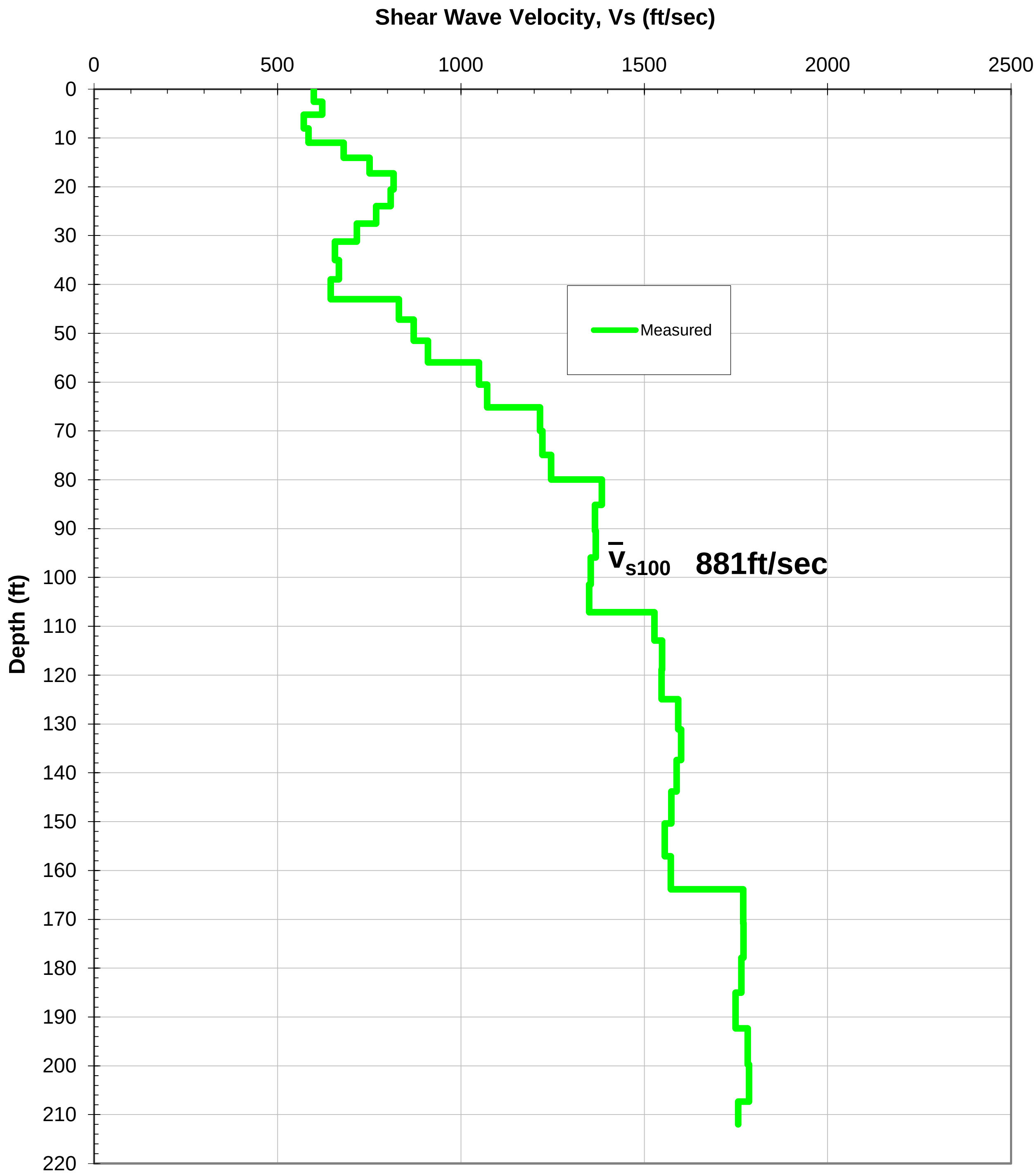
Shear Wave Velocity Profile R-1
Port Access Road
Charleston, South Carolina
1131-08-554



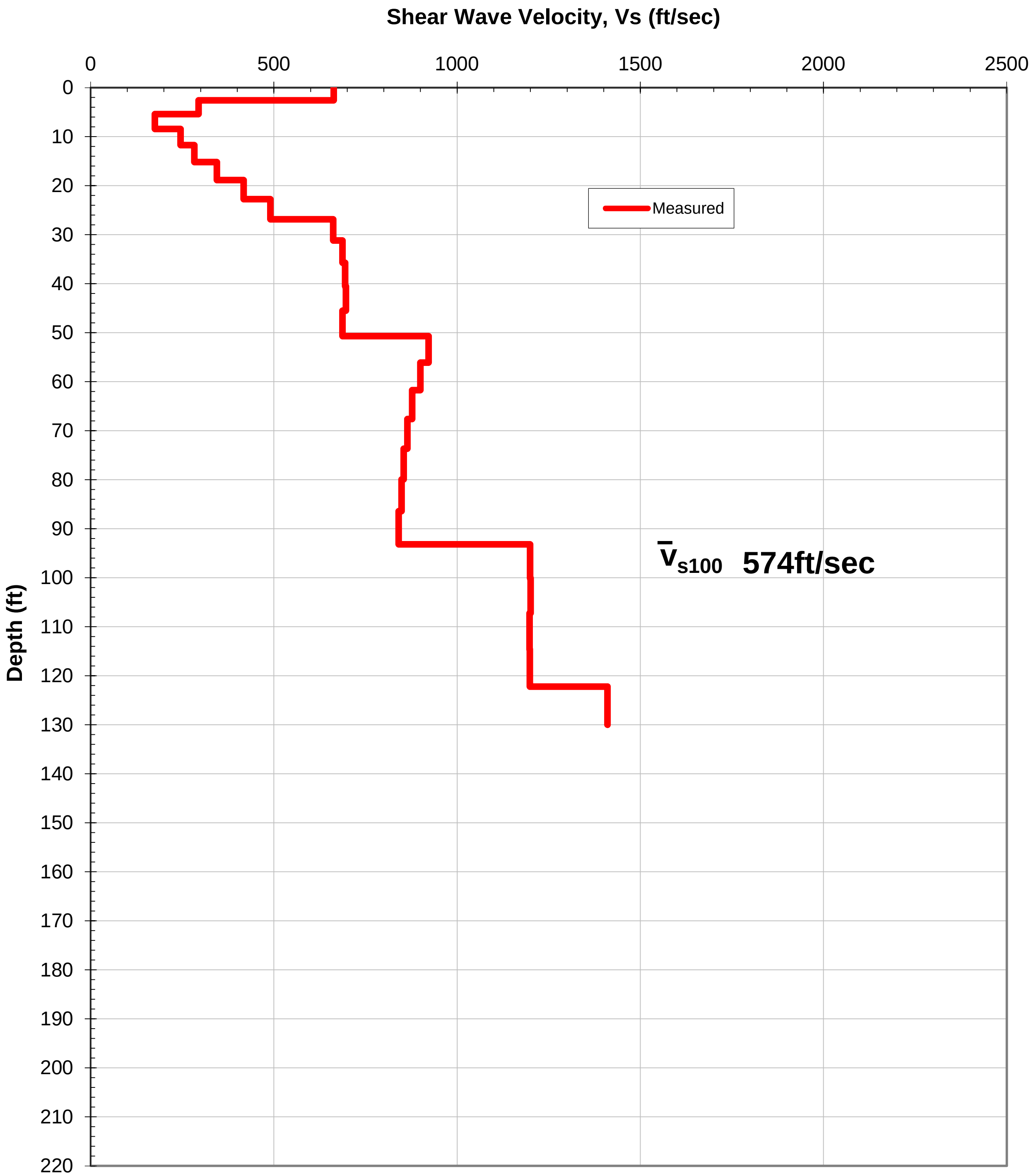
Shear Wave Velocity Profile R-2
Port Access Road
Charleston, South Carolina
1131-08-554



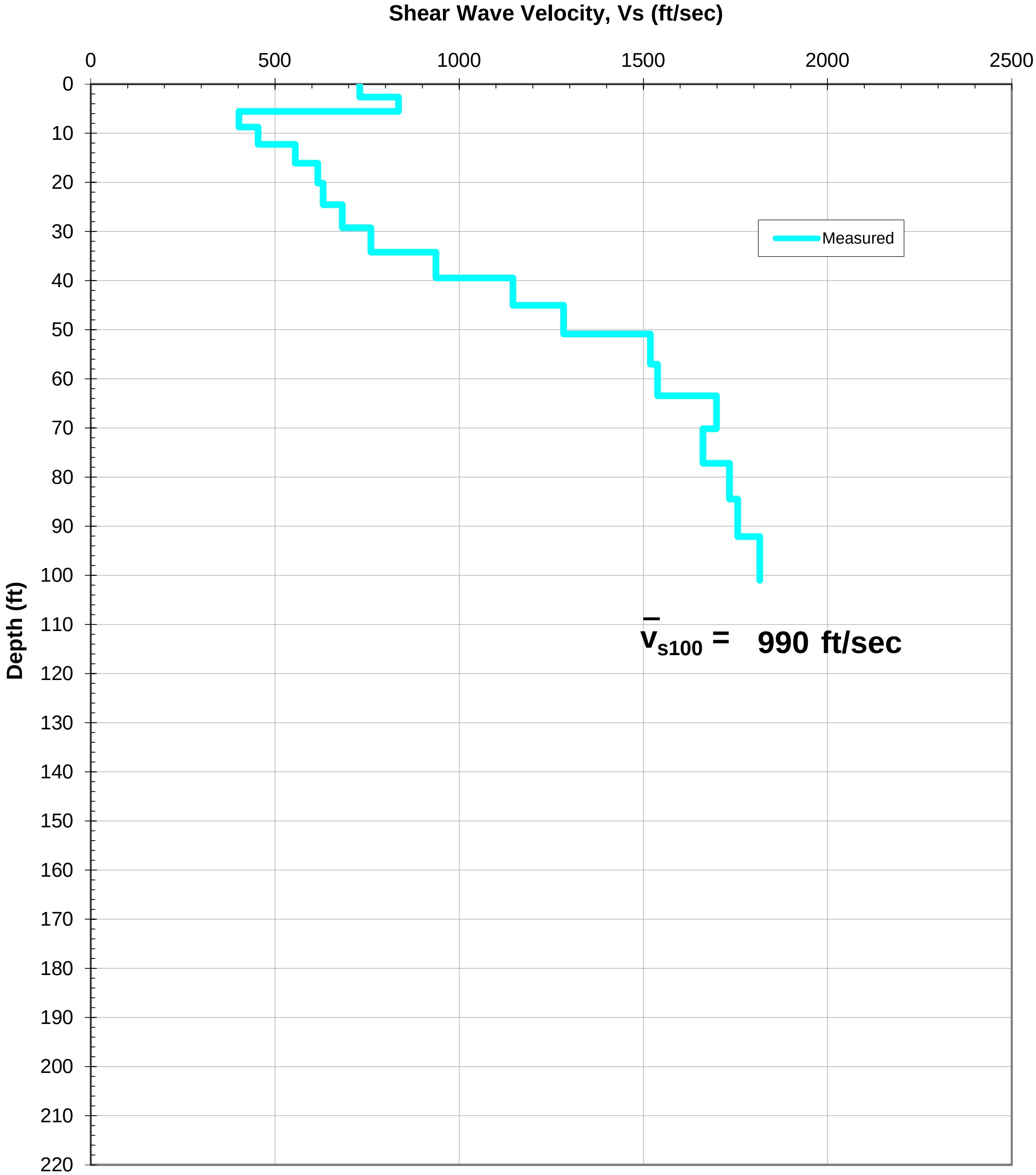
Shear Wave Velocity Profile R-3
Port Access Road
Charleston, South Carolina
1131-08-554



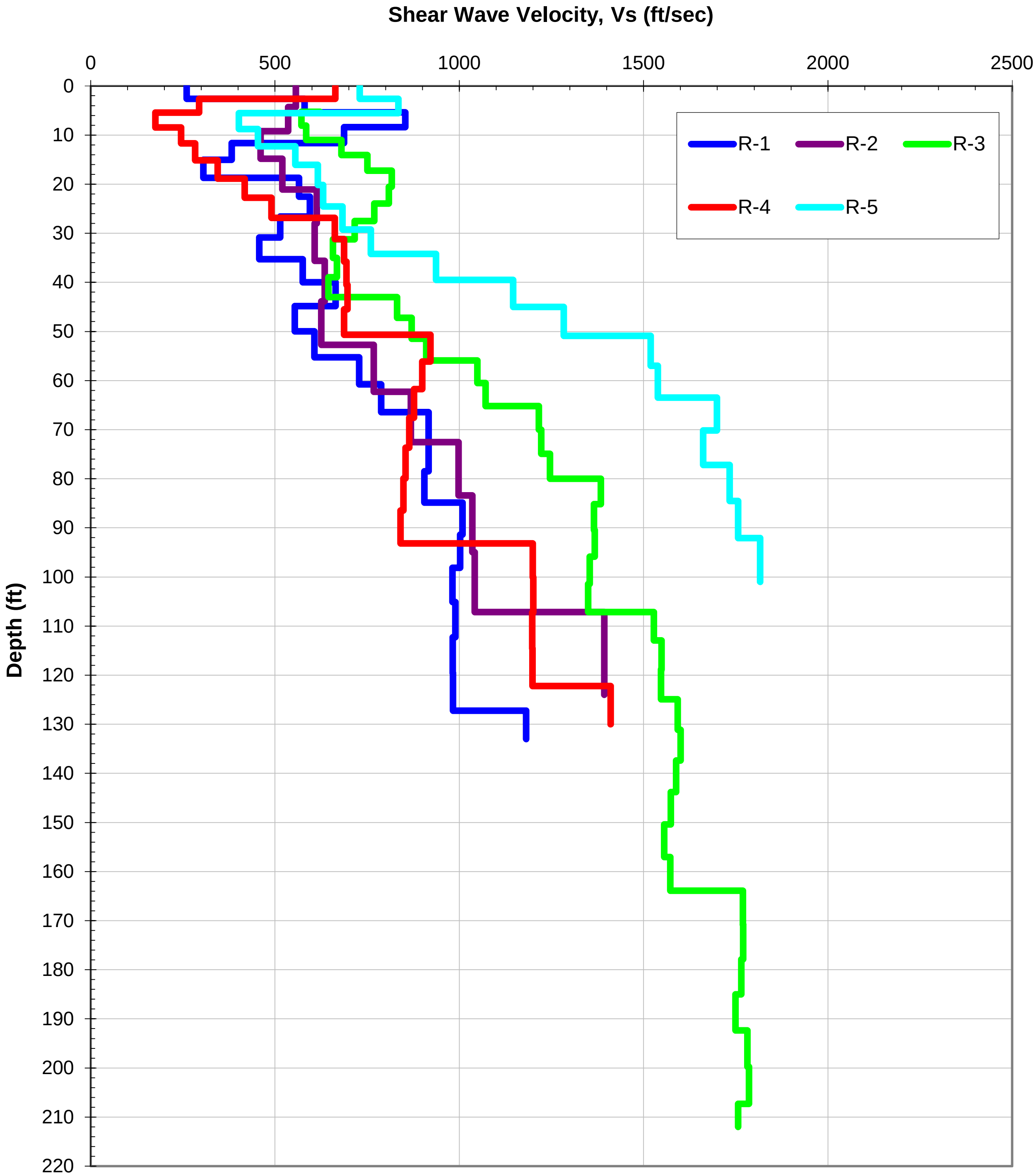
Shear Wave Velocity Profile R-4
Port Access Road
Charleston, South Carolina
1131-08-554



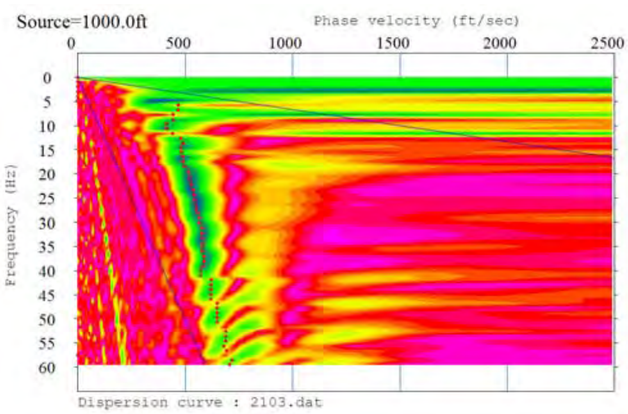
Shear Wave Velocity Profile R-5
Port Access Road
Charleston, South Carolina
1131-08-554



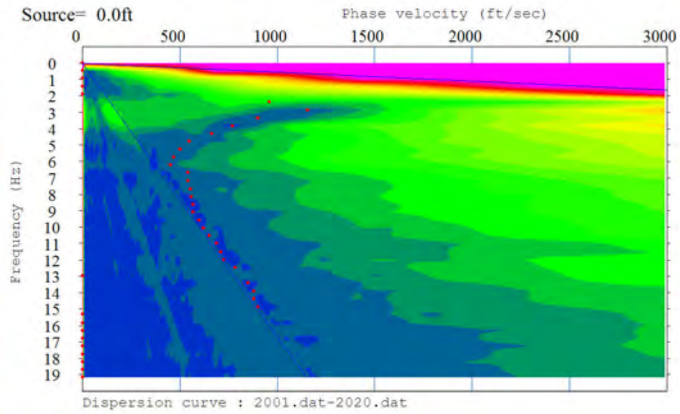
Shear Wave Velocity Profiles
Port Access Road
Charleston, South Carolina
1131-08-554



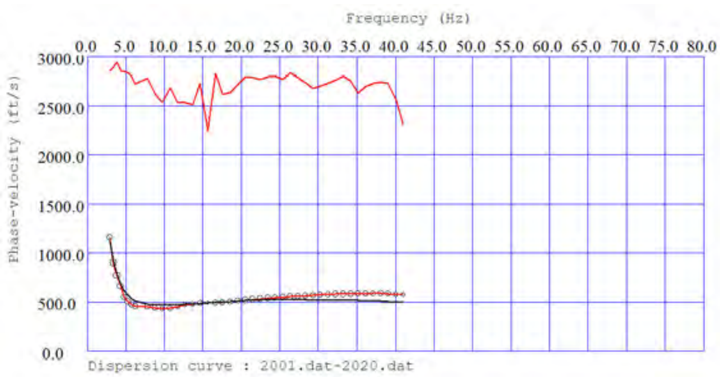
Location R-1



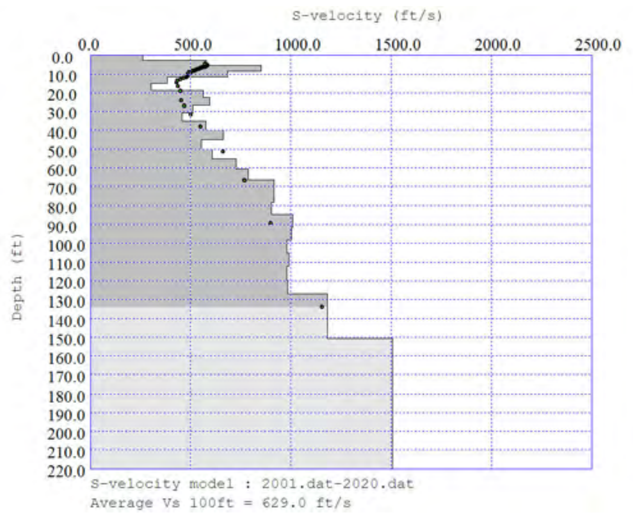
Active Surface Wave data, 7’ geophone spacing



Passive Surface Wave Data: Linear array, 30’ geophone spacing

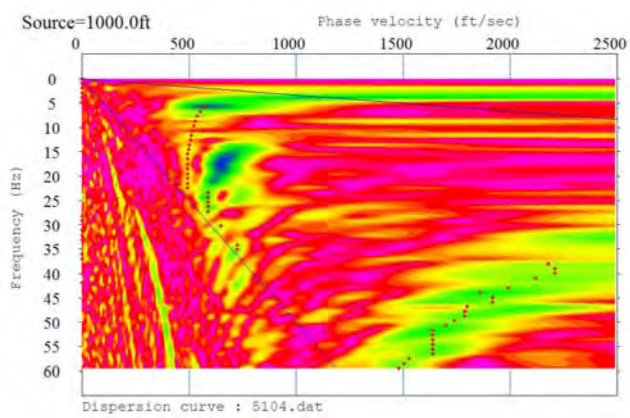


Combined Dispersion Curve

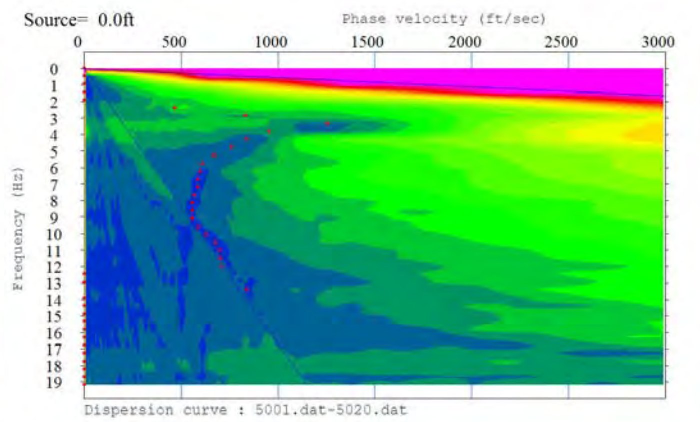


Inverted Depth Model

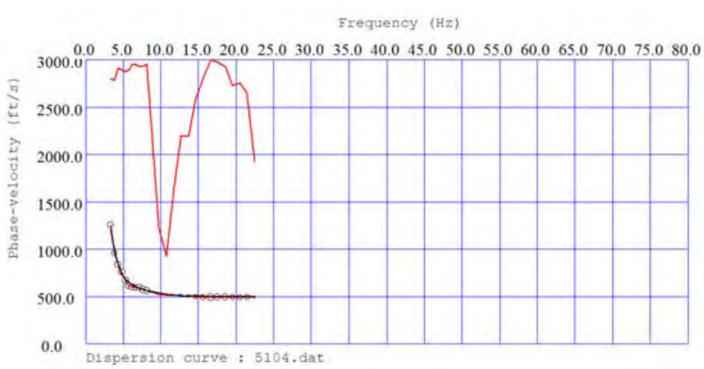
Location R-2



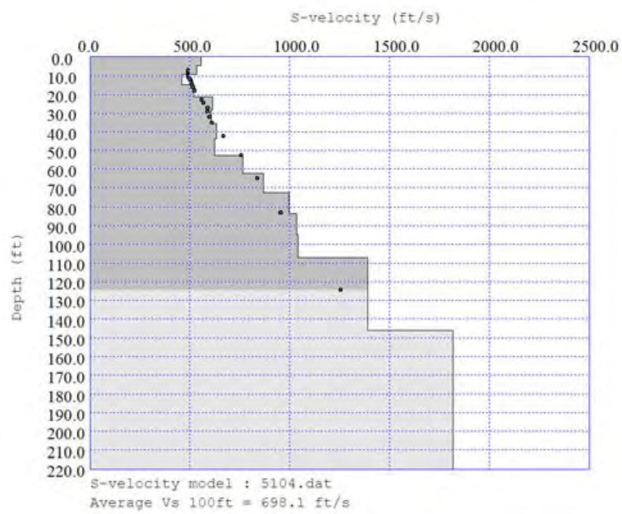
Active Surface Wave data, 7’ geophone spacing



Passive Surface Wave Data: Linear array, 30’ geophone spacing

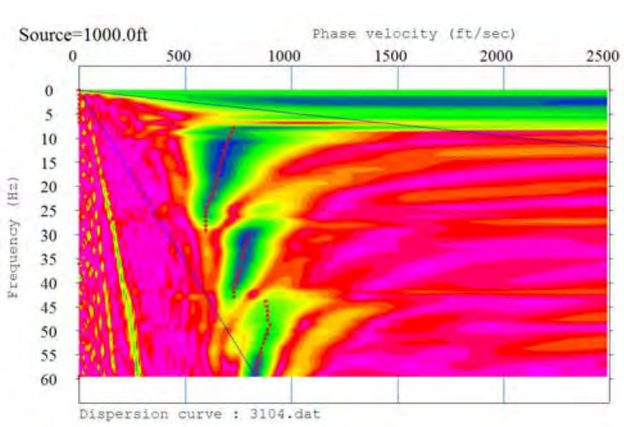


Combined Dispersion Curve

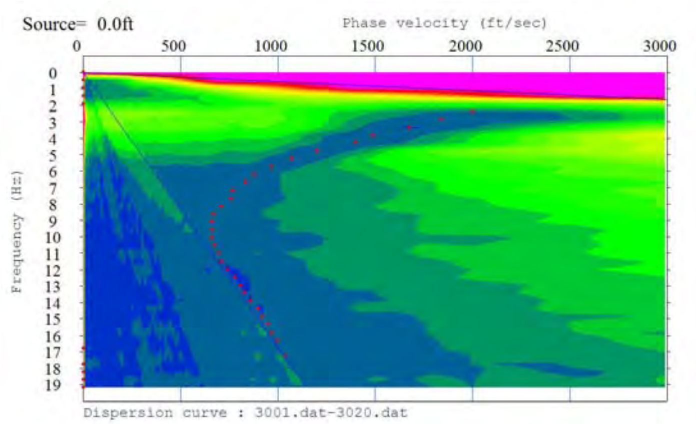


Inverted Depth Model

Location R-3

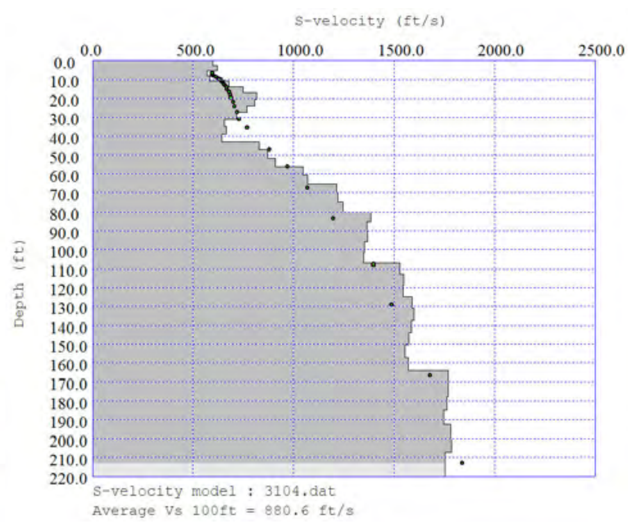


Active Surface Wave data, 7’ geophone spacing



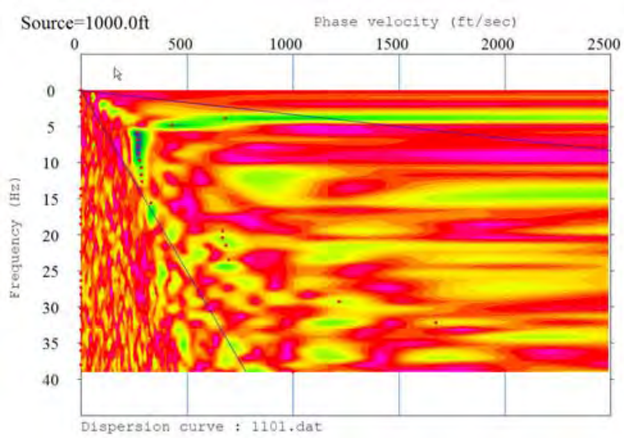
Passive Surface Wave Data: Linear array, 30’ geophone spacing

Combined Dispersion Curve

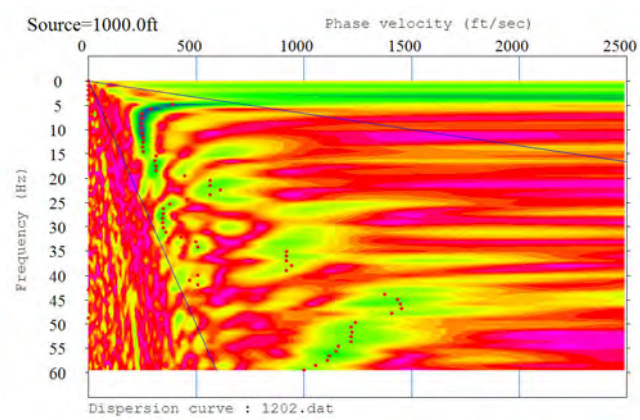


Inverted Depth Model

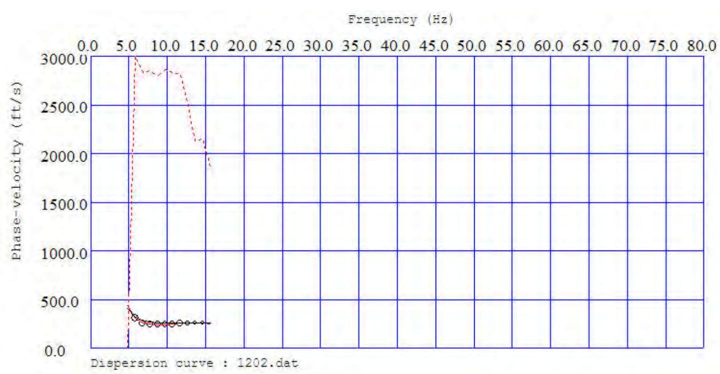
Location R-4



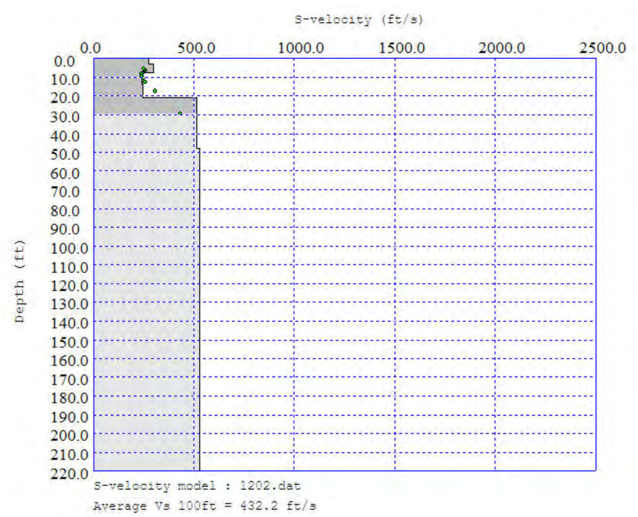
Active Surface Wave data, 10’ geophone spacing



Active Surface Wave data, 5’ geophone spacing

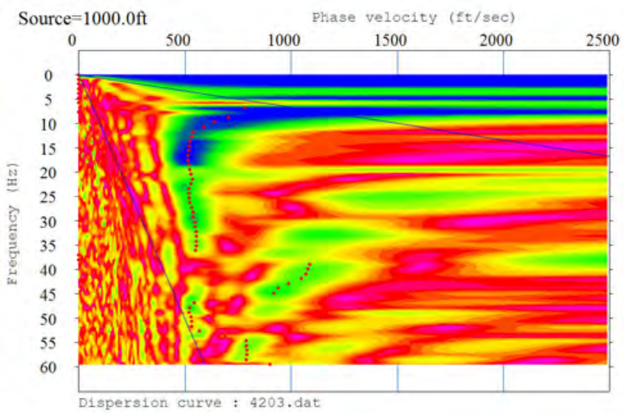


Combined Dispersion Curve

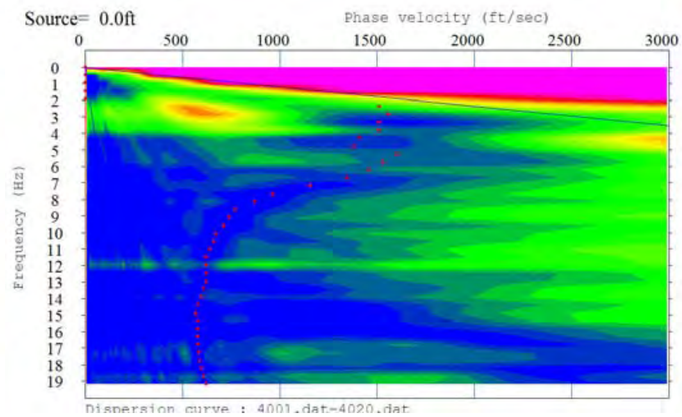


Inverted Depth Model

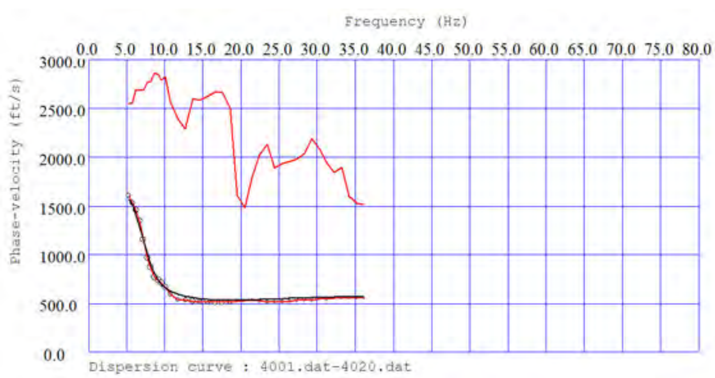
Location R-5



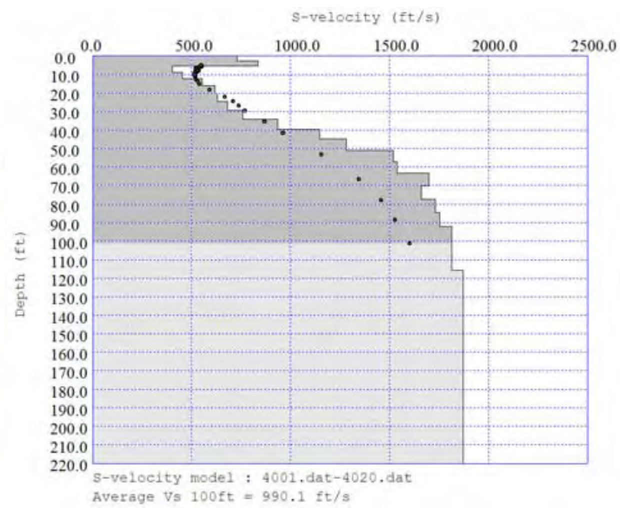
Active Surface Wave data, 7’ geophone spacing



Passive Surface Wave Data: Linear array, 30’ geophone spacing



Combined Dispersion Curve



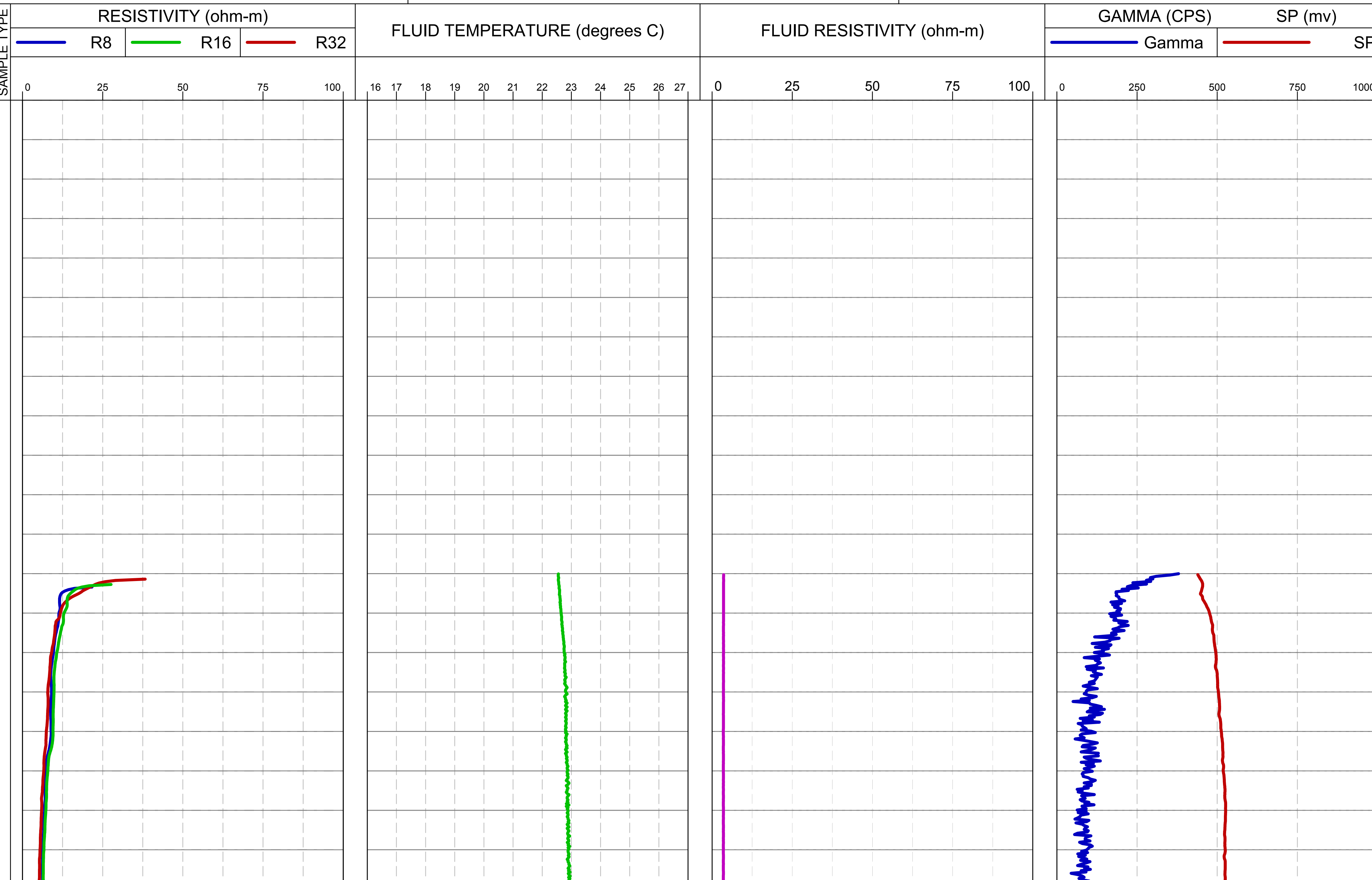
Inverted Depth Model

Geophysical Test Data from 800 ft deep Boring B-11GEO

PROJECT: **Port Access Road** **Charleston, South Carolina** **S&ME Project Number 1131-08-554**	NOTES:	BORING LOG: B-11 GEO

DATE DRILLED: 10/6/2008	DRILLING METHOD: Mud Rotary	LOGGED BY: MLE	DRILLER:
ELEVATION: 8.5 FEET	BORING DEPTH: 800 FEET	WATER LEVEL @ TOB: NOT OBTAINED	WATER LEVEL @ 24 hrs: NOT OBTAINED

DEPTH (feet)	MATERIAL DESCRIPTION	ELEVATION (feet)
	ORGANIC LADEN TOPSOIL= 3 INCHES	
5	**SLIGHTLY SILTY SAND (SP-SM)** loose, gray and brown, fine; with trace organics	4
10		-2
15	**SLIGHTLY CLAYEY SAND (SP-SC)** very loose, gray and brown, fine; with trace organics and silt	-7
20	**CLAYEY SAND (SC)** very loose, gray and brown, fine; with debris	-12
25		-17
30	**SLIGHTLY CLAYEY SAND (SP-SC)** vey loose, gray, fine	-22
35	**SILTY SAND (SM)** very loose, gray and brown, fine	-27
40	- - - gray	-32
45	**SILTY CLAY (CL)** very soft, gray; with trace fine sand and organics	-37
50	- - - with trace fine sand, no organics	-42
55	- - - with trace organics	-47
60	- - - no organics	-52
	- - - soft; with sand and shell	
65		-57
70		-62
75	**COOPER MARL: SANDY SILT(ML)** soft, olive green	-67
80		-72
85	- - - firm	-77
90	- - - stiff	-82
95		-87



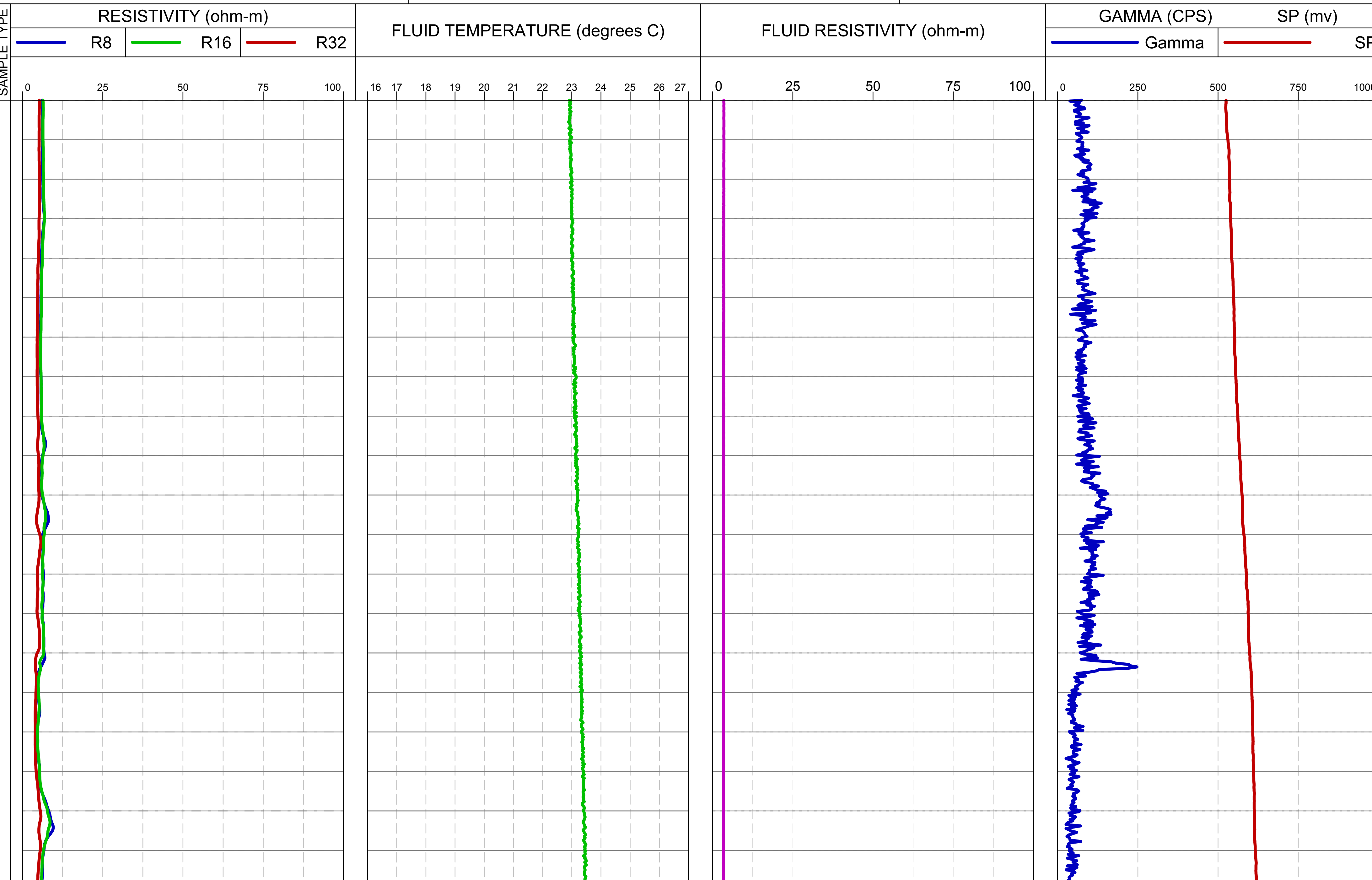
NOTES:

1. *THIS LOG IS ONLY A PORTION OF A REPORT PREPARED FOR THE NAMED PROJECT AND MUST ONLY BE USED TOGETHER WITH THAT REPORT.*
2. *GEOTECHNICAL BORING AND SAMPLING OPERATIONS WERE CONDUCTED IN GENERAL ACCORDANCE WITH ASTM D 5783 AND ASTM D 2113.*
3. *THE GEOPHYSICAL LOGGING DATA WAS OBTAINED USING MOUNT SOPRIS INSTRUMENTS GEOPHYSICAL LOGGING EQUIPMENT.*
4. *STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.*
5. *WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.*

S&ME

PROJECT: Port Access Road Charleston, South Carolina S&ME Project Number 1131-08-554	NOTES:		BORING LOG: B-11 GEO
DATE DRILLED: 10/6/2008	DRILLING METHOD: Mud Rotary	LOGGED BY: MLE	DRILLER:
ELEVATION: 8.5 FEET	BORING DEPTH: 800 FEET	WATER LEVEL @ TOB: NOT OBTAINED	WATER LEVEL @ 24 hrs: NOT OBTAINED

DEPTH (feet)	GRAPHIC LOG	LITHOLOGIC UNIT	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO.	SAMPLE TYPE
105					-97		
110					-102		
115					-107		
120			- - - firm		-112		
125					-117		
130			**3" X 30" FIXED PISTON SAMPLE PUSHED 24" WITH 30" RECOVERY**		-122		
135					-127		
140					-132		
145					-137		
150			**COOPER MARL: SANDY SILT(ML)** soft, olive green *(continued)*		-142		
155					-147		
160					-152		
165					-157		
170			**3" X 36" PITCHER BARREL SAMPLE PUSHED 36" WITH 12" RECOVERY**		-162		
175					-167		
180					-172		
185					-177		
190					-182		
195					-187		



NOTES:

1. THIS LOG IS ONLY A PORTION OF A REPORT PREPARED FOR THE NAMED PROJECT AND MUST ONLY BE USED TOGETHER WITH THAT REPORT.
2. GEOTECHNICAL BORING AND SAMPLING OPERATIONS WERE CONDUCTED IN GENERAL ACCORDANCE WITH ASTM D 5783 AND ASTM D 2113.
3. THE GEOPHYSICAL LOGGING DATA WAS OBTAINED USING MOUNT SOPRIS INSTRUMENTS GEOPHYSICAL LOGGING EQUIPMENT.
4. STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.
5. WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.

PROJECT: Port Access Road Charleston, South Carolina S&ME Project Number 1131-08-554	NOTES:		BORING LOG: B-11 GEO
DATE DRILLED: 10/6/2008	DRILLING METHOD: Mud Rotary	LOGGED BY: MLE	DRILLER:
ELEVATION: 8.5 FEET	BORING DEPTH: 800 FEET	WATER LEVEL @ TOB: NOT OBTAINED	WATER LEVEL @ 24 hrs: NOT OBTAINED

DEPTH (feet)	GRAPHIC LOG	LITHOLOGIC UNIT	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO.	SAMPLE TYPE
			- - - very hard cemented sand layer				
205					-197		
210			**3" X 36" PITCHER BARREL SAMPLE PUSHED 36" WITH 24" RECOVERY**		-202		
215					-207		
220					-212		
225			- - - cemented sand layer		-217		
230					-222		
235					-227		
240					-232		
245			**COOPER MARL: SANDY SILT(ML)** soft, olive green *(continued)*		-237		
250			**3" X 36" PITCHER BARREL SAMPLE PUSHED 36" WITH 24" RECOVERY**		-242		
255					-247		
260					-252		
265					-257		
270			**3" X 36" PITCHER BARREL SAMPLE PUSHED 36" WITH 18" RECOVERY**		-262		
275					-267		
280					-272		
285					-277		
290			**3" X 36" PITCHER BARREL SAMPLE PUSHED 36" WITH 14" RECOVERY**		-282		
295			**CROSS MEMBER: SANTEE LIMESTONE**		-287		

RESISTIVITY (ohm-m) — R8, R16, R32 — 0, 25, 50, 75, 100

FLUID TEMPERATURE (degrees C) — 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27

FLUID RESISTIVITY (ohm-m) — 0, 25, 50, 75, 100

GAMMA (CPS) — Gamma; SP (mv) — SP — 0, 250, 500, 750, 1000

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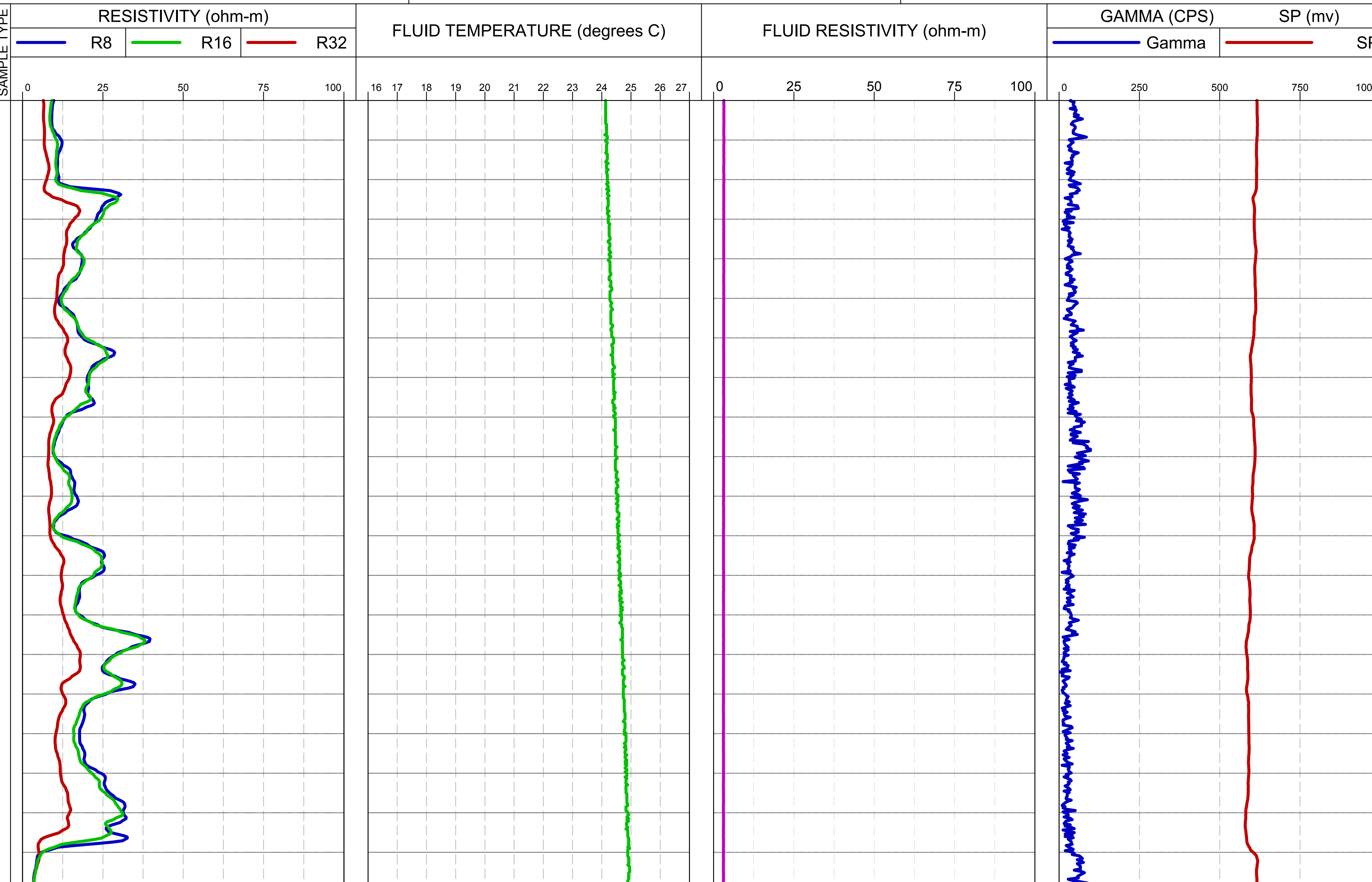
DEPTH (feet)	GRAPHIC LOG	LITHOLOGIC UNIT	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO.	SAMPLE TYPE
305					-297		
310			3" X 36" PITCHER BARREL SAMPLE PUSHED 36" WITH 21" RECOVERY		-302		
315			**CROSS MEMBER: SANTEE LIMESTONE** *(continued)*		-307		
320					-312		
325					-317		
330			3" X 36" PITCHER BARREL SAMPLE PUSHED 36" WITH 25" RECOVERY		-322		
335					-327		
340					-332		
345					-337		
350			3" X 36" PITCHER BARREL SAMPLE PUSHED 36" WITH 19" RECOVERY		-342		
355					-347		
360					-352		
365			**WILLIAMSBURG FORMATION- CHICORA MEMBER: BLACK MINGO GROUP**		-357		
370					-362		
375			3" X 36" PITCHER BARREL SAMPLE PUSHED 36" WITH 20" RECOVERY		-367		
380					-372		
385					-377		
390					-382		
395					-387		



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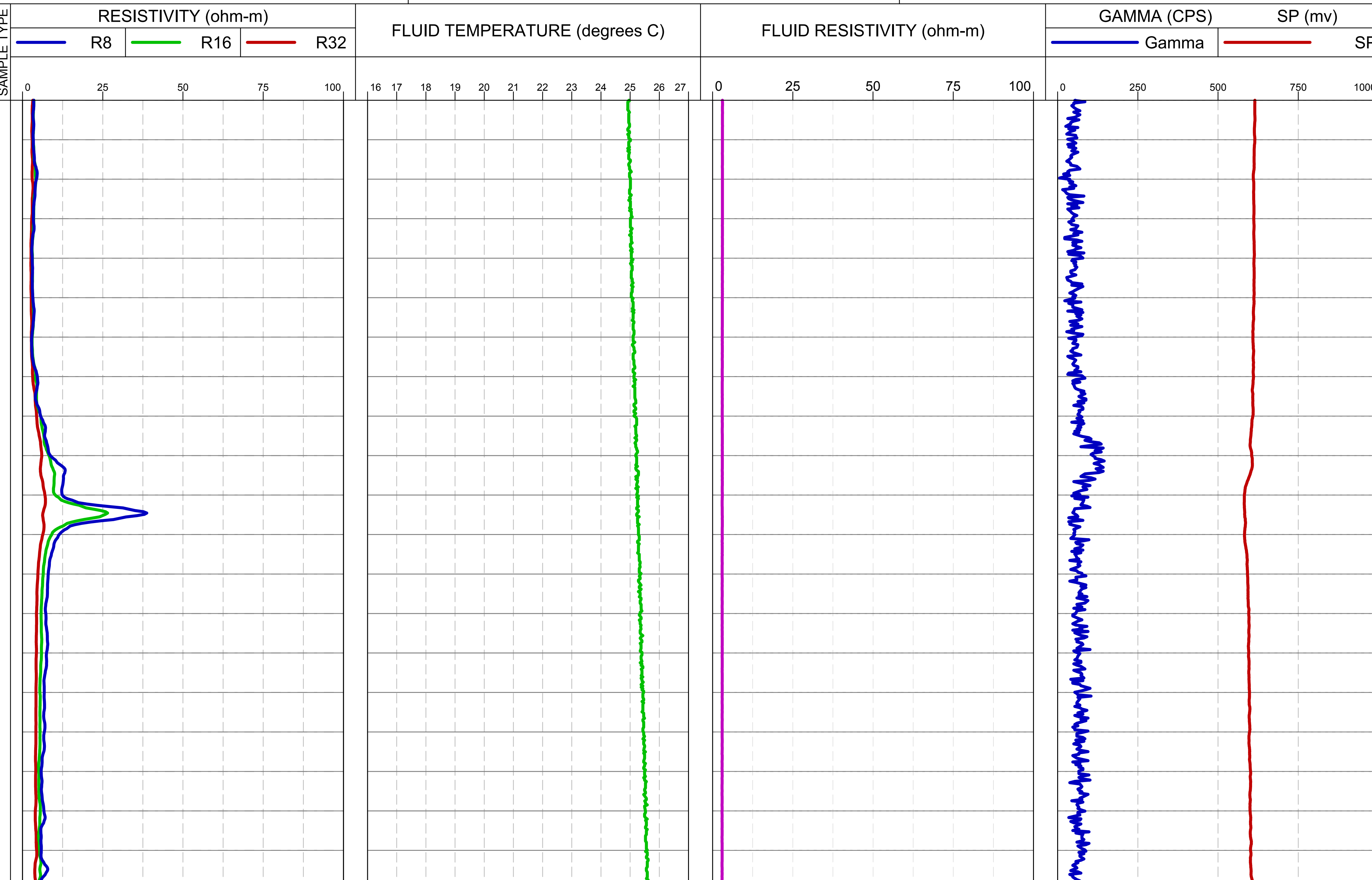
S&ME

PROJECT:	Port Access Road Charleston, South Carolina **S&ME Project Number 1131-08-554**	NOTES:	BORING LOG: B-11 GEO

DATE DRILLED: 10/6/2008	DRILLING METHOD: Mud Rotary	LOGGED BY: MLE	DRILLER:
ELEVATION: 8.5 FEET	BORING DEPTH: 800 FEET	WATER LEVEL @ TOB: NOT OBTAINED	WATER LEVEL @ 24 hrs: NOT OBTAINED

DEPTH (feet)	GRAPHIC LOG	LITHOLOGIC UNIT	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO.	SAMPLE TYPE
405			**WILLIAMSBURG FORMATION- LOWER BRIDGE MEMBER: BLACK MINGO GROUP** *(continued)* **3" X 36" PITCHER BARREL SAMPLE PUSHED TO REFUSAL** *(continued)*		-397		
410					-402		
415					-407		
420					-412		
425					-417		
430					-422		
435					-427		
440					-432		
445					-437		
450			**RHEMS FORMATION: BLACK MINGO GROUP**		-442		
455					-447		
460					-452		
465					-457		
470					-462		
475					-467		
480					-472		
485					-477		
490					-482		
495					-487		



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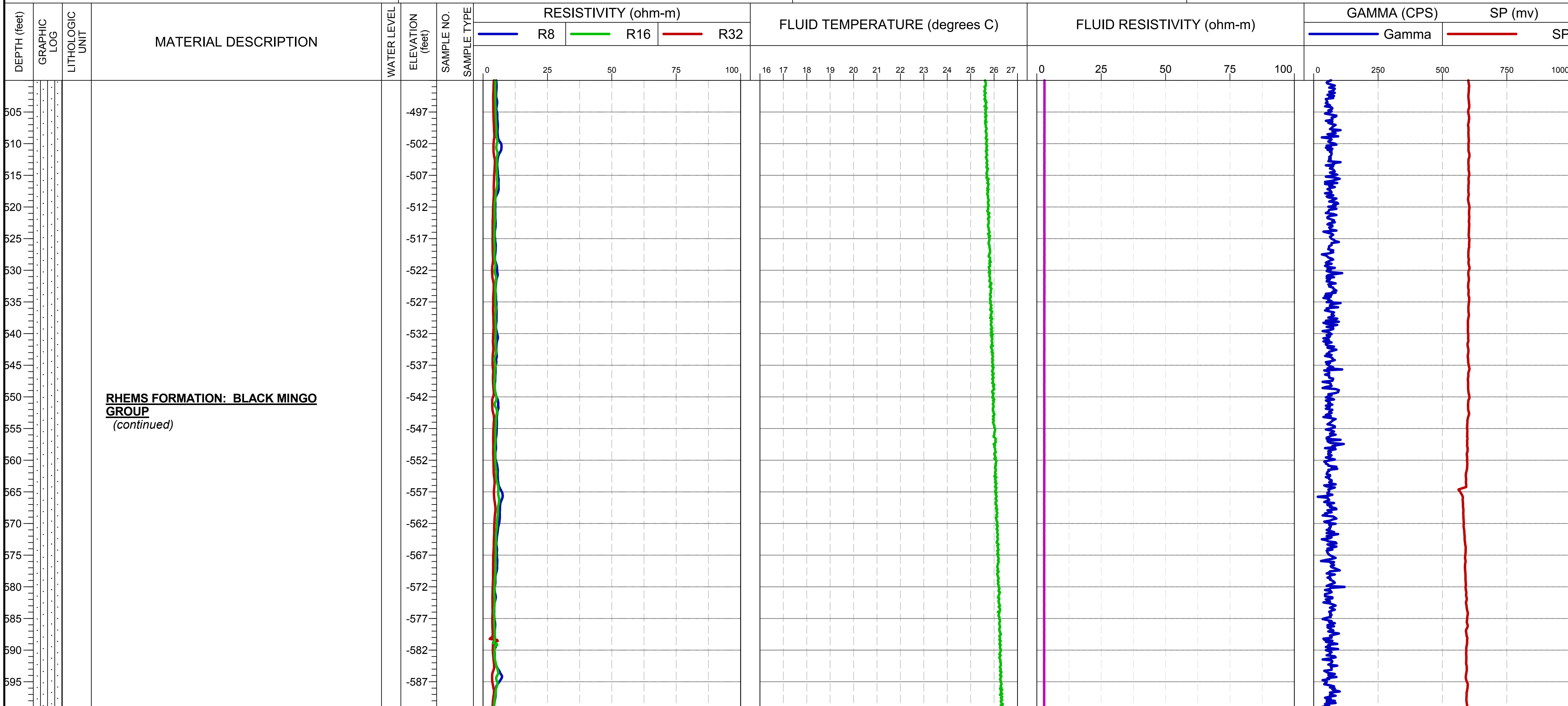

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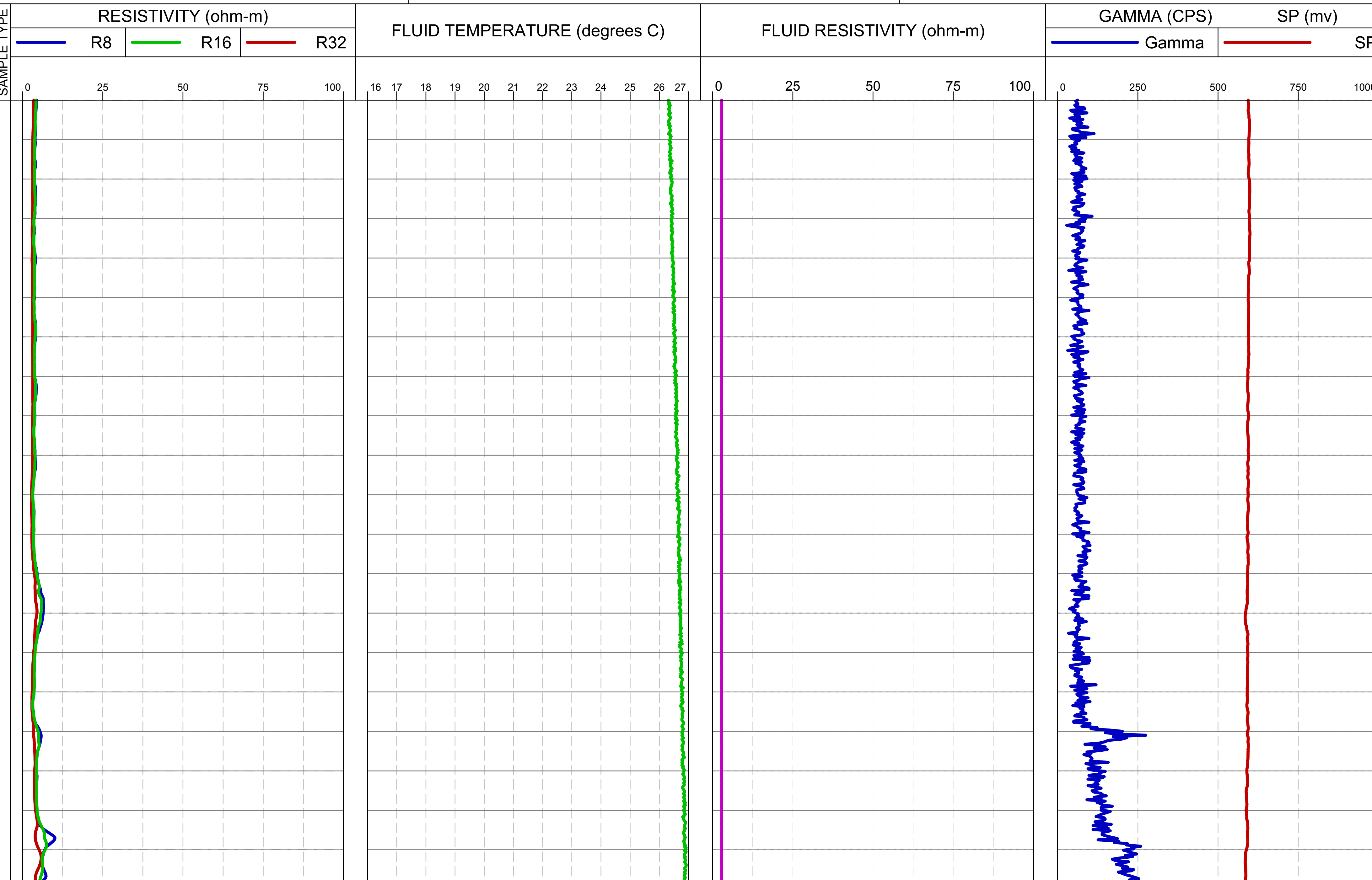
DEPTH (feet)	GRAPHIC LOG	LITHOLOGIC UNIT	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO.	SAMPLE TYPE
605					-597		
610					-602		
615					-607		
620					-612		
625					-617		
630					-622		
635					-627		
640					-632		
645					-637		
650			**RHEMS FORMATION: BLACK MINGO GROUP** *(continued)*		-642		
655					-647		
660					-652		
665					-657		
670					-662		
675					-667		
680					-672		
685					-677		
690					-682		
695					-687		



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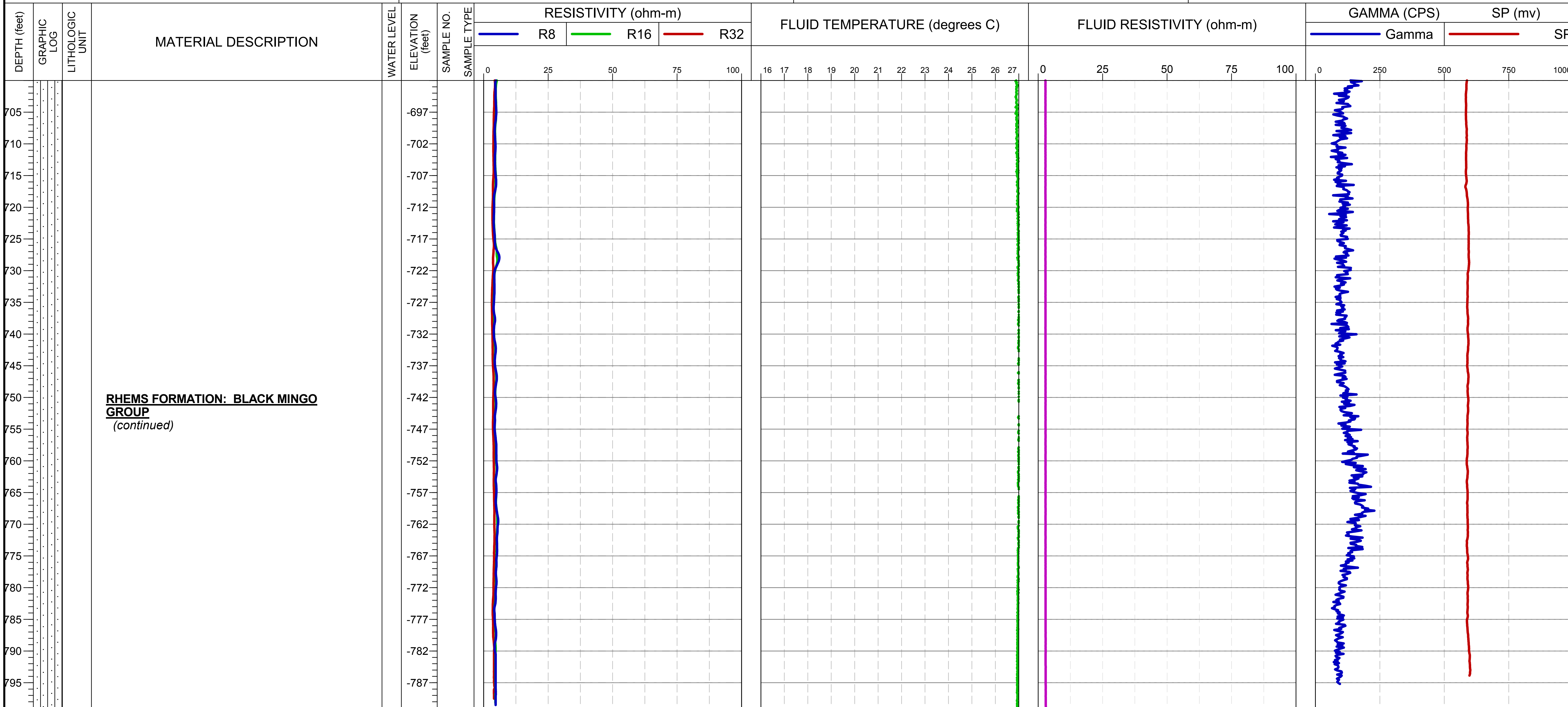

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DEPTH (feet)	GRAPHIC LOG	LITHOLOGIC UNIT	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO.	SAMPLE TYPE	RESISTIVITY (ohm-m) R8 R16 R32 0 25 50 75 100	FLUID TEMPERATURE (degrees C) 16 17 18 19 20 21 22 23 24 25 26 27	FLUID RESISTIVITY (ohm-m) 0 25 50 75 100	GAMMA (CPS) Gamma / SP (mv) SP 0 250 500 750 1000
			BORING TERMINATED AT800 FEET.								

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Suspension Logging Procedures and Literature

GEOVision
geophysical services

REPORT

P-S SUSPENSION LOGGING
BOREHOLE B-11GEO

PORT ACCESS ROAD
NORTH CHARLESTON, SOUTH CAROLINA

Report 8456-01 Rev 1

December 22, 2008

REPORT

P-S SUSPENSION LOGGING
BOREHOLE B-11GEO

PORT ACCESS ROAD
NORTH CHARLESTON, SOUTH CAROLINA

Report 8456-01 Rev 1
Prepared for:

S&ME, Inc.
620 Wando Park Boulevard
Mt. Pleasant SC 29464

Prepared by

GEOVision Geophysical Services
1124 Olympic Drive
Corona, California 92881
(951) 549-1234

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INTRODUCTION

OYO suspension velocity measurements were performed in a single borehole adjacent to I-26 off Austin Road, in North Charleston, South Carolina, as a component of the geotechnical investigation of the Port Access Road. Suspension logging data acquisition was performed on October 17 and December 11, 2008 by John Diehl of GEOVision. The analysis and report were prepared by John Diehl and all work was reviewed by Antony Martin, also of GEOVision. The work was performed under subcontract with S&ME of Charleston, with Aaron Goldberg as the point of contact for S&ME.

This report presents the results of suspension velocity measurements collected in the uncased boring designated B-11GEO, as detailed below. The purpose of this study was to acquire shear wave velocities and compressional wave velocities as a function of depth.

BORING DESIGNATION	DATES LOGGED	GENERAL LOCATION	GROUND SURFACE ELEVATION + (FT)	COORDINATES*	
				LAT (North)	LONG (West)
B-11GEO 60-500ft	10-17-08	Charleston, SC	8.5	32.833599	79.958476
B-11GEO 500-800ft	12-11-08	Charleston, SC	8.5	32.833599	79.958476

*coordinates are in NAD 83 latitudes and longitudes

+ vertical datum NAVD88, feet

Table 1 Boring locations and logging dates

The OYO Model 170 Suspension Logging Recorder and Suspension Logging Probe were used to obtain in-situ horizontal shear and compressional wave velocity measurements at 1.64 ft intervals. The acquired data was analyzed and a profile of velocity versus depth was produced for both compressional and horizontally polarized shear waves.

INSTRUMENTATION AND PROCEDURES

The **GEO***Vision* Procedure for Oyo P-S Suspension Seismic Velocity Logging (Appendix A) was followed during this investigation. This procedure was supplied and approved in advance of the field work. Following is a summary.

OYO P-S Suspension Instrumentation

Suspension soil velocity measurements were performed using the Model 170 P- and S_H-wave suspension logging system, manufactured by OYO Corporation. A 7-conductor version of this OYO system was used during the first logging run, and a 4-conductor version for the second run. Otherwise the probe for both tests was identical.

Calibration records for both recorders are presented in Appendix B. The suspension logging system directly determines the average velocity of a segment of the soil column surrounding the borehole of interest by measuring the elapsed time between arrivals of a wave propagating upward through the soil column. The receivers that detect the wave, and the source that generates the wave, are moved as a unit in the borehole producing relatively constant amplitude signals at all depths.

The suspension system probe consists of a combined reversible polarity solenoid horizontal shear-wave source (S_H) and compressional-wave source (P), joined to two biaxial receivers by a flexible isolation cylinder, as shown in Figure 1. The separation of the two receivers is approximately 1 meter allowing average wave velocity in the region between the receivers to be determined by inversion of the wave travel time between the two receivers. The total length of the probe as used in this survey is 5.8m with the center point of the receiver pair 3.7m above the bottom end of the probe. The probe receives control signals from, and sends the amplified receiver signals to, instrumentation on the surface via an armored 4 or 7 conductor cable. The cable is wound onto the drum of a winch and is used to support the probe. Cable travel is measured via encoder to provide probe depth data.

The entire probe is suspended by the cable and approximately centered in the borehole. Therefore, source motion is not coupled directly to the borehole walls; rather, the source motion creates a horizontally propagating impulsive pressure wave in the fluid filling the borehole and surrounding the source. This pressure wave is converted to P and S_H-waves in the surrounding soil and rock as it impinges upon the borehole wall. These waves propagate through the soil and rock surrounding the borehole, in turn causing a pressure wave to be generated in the fluid surrounding the receivers as the soil waves pass their location. Separation of the P- and S_H-waves at the receivers is achieved as follows:

1. Orientation of the horizontal receivers is maintained parallel to the axis of the source, thereby maximizing the amplitude of the recorded SH-wave signals.
2. At each depth, S_H-wave signals are recorded with the source actuated in opposite directions, producing S_H-wave signals of opposite polarity, providing a characteristic S_H-wave signature distinct from the P-wave signal.
3. The 2.1m separation of source and first receiver permits the P-wave signal to pass and damp significantly before the slower S_H-wave signal arrives at the receiver. In faster soils or rock, the isolation tube is extended to allow greater separation of the P- and S_H-wave signals.
4. In saturated soils, the received P-wave signal is typically of much higher frequency than the received S_H-wave signal, permitting additional separation of the two signals by low pass filtering.
5. Direct arrival of the original pressure pulse in the fluid is not detected at the receivers because the wavelength of the pressure pulse in fluid is significantly greater than the dimension of the fluid annulus surrounding the probe (meter versus centimeter scale), preventing significant energy transmission through the fluid medium.

In operation, a distinct, repeatable pattern of impulses is generated at each depth as follows:

1. The source is fired in one direction producing dominantly horizontal shear with some vertical compression, and the signals from the horizontal receivers situated parallel to the axis of motion of the source are recorded.
2. The source is fired again in the opposite direction and the horizontal receiver signals are recorded.
3. The source is fired again and the vertical receiver signals are recorded. The repeated source pattern facilitates the picking of the P and S_H-wave arrivals. Reversal of the source changes the polarity of the S_H-wave pattern but not the P-wave pattern.

The data gathered from each receiver during the source activation is recorded as a different channel on the recording system. The Model 170 digital recorder has six channels (two simultaneous recording channels), each with a 12 bit, 1024 sample record. The recorded data is displayed on a CRT display and transferred via GPIB interface to hard disk for further processing. Up to 8 sampling sequences can be summed to improve the signal to noise ratio of the signals.

Review of the displayed data on the CRT allows the operator to set the gains, filters, delay time, pulse length (energy), sample rate, and summing number to optimize the quality of the data before recording. Verification of the calibration of the Model 170 digital recorder is performed every twelve months using a NIST traceable frequency source and counter.

Field Measurement Procedures

10-17-08

The borehole probe was first positioned with the center of the receivers at ground surface. The electronic depth counters were set to 0m. The probe was then lowered below the surface to below the surface casing for the first measurement, at about 61ft. Subsequent measurements were made at 0.5m intervals as the probe was lowered down the borehole. At each measurement depth a measurement sequence of two opposite horizontal records and one vertical record was performed while the probe was stationary. Gains and record lengths were adjusted as required. The data record from each depth was checked, accepted or repeated, recorded on diskette, and printed before moving to the next depth. This continued until the last measurement at the bottom of the borehole.

12-11-08

The procedure for the second logging run was nearly identical, except that measurements began at approximately 480ft below the surface, providing a small overlap of data.

DATA ANALYSIS

The OYO Model 170 P-S Suspension Logger system can be used to measure ground velocity in two ways using the same data. The standard method is to measure the velocity from the travel time between the two receivers, as described under "Instrumentation" in the previous section. A second method is to use the travel time from the source to the first receiver. The difference between these methods is summarized as follows:

1. The receiver-to-receiver (R1-R2) method is normally more accurate, because the picks are made from the peak of the arrival waveform. The analyst picks the arrival waveform and software is used to find the peaks. Travel time is then from peak-to-peak.
2. R1-R2 data has higher resolution, because the travel time is averaged over the nominal 1m between receivers. The greater scatter in velocities is attributed to the changes in material from one measurement location to another. These measurements are very repeatable.
3. Averaging the "normal" and "reverse" travel times eliminates errors due to hysteresis of the source (difference in actuation pulses).
4. Source-to-receiver (S-R1) measurements are subject to a source delay, nominally 4 milliseconds for the 7-conductor system, and 3 milliseconds for the 4-conductor system. This source delay is independently verifiable, but subject at times to change due to degradation of source springs during the measurement program.
5. The S-R1 results are subject to larger errors as the analyst must select the first S_H-wave arrival (first motion) often in the presence of P-wave contamination rather that the first peak of the waveform. These errors are less significant, however, since the total travel path is twice as long.
6. The S-R1 results exhibit less scatter, since the velocity is averaged over the greater distance from the source to the first receiver, 2.1m compared to 1m.
7. The S-R1 results are less subject to possible effects of attenuation and dispersion, if present, because first arrivals are picked. However, if the horizontal waveforms exhibit significantly different frequency content at the near and far receivers then the R1-R2 data is interpreted using first arrival picks rather than peak to peak travel time.

8. The S-R1 data set extends about 1.5m deeper than the R1-R2 data set. The reason is that the depth reference location between the source and the first receiver is about 2.1m below the depth reference between R1 and R2.

For the above considerations, R1-R2 results are typically considered “primary” results, and S-R1 results are used only to check the validity of the R1-R2 results for quality assurance purposes.

P-Wave Analysis

The recorded digital records were analyzed to locate the first minima or first arrival on the vertical axis records, indicating the arrival of P-wave energy. The difference in travel time between receiver 1 and receiver 2 (R1-R2) arrivals was used to calculate the P-wave velocity for that 1m segment of the soil column. When observable, P-wave arrivals on the horizontal axis records were used to verify the velocities determined from the vertical axis data. P-wave arrival data was generally of excellent quality in the borehole.

The P-wave velocity calculated from the travel time over the 2.1m interval from source to receiver 1 (S-R1) was calculated and plotted for quality assurance of the velocity derived from the travel time between receivers. In this analysis, the depth values as recorded were increased by 1.5m to correspond to the mid-point of the 2.1m S-R1 interval, as illustrated in Figure 1. Travel times were obtained by picking the first break of the P-wave signal at receiver 1 and subtracting the source delay; approximately 3 or 4 milliseconds (see above), the calculated and experimentally verified delay from source trigger pulse (beginning of record) to source impact. This delay corresponds to the duration of acceleration of the solenoid before impact.

S_H-Wave Analysis

The recorded digital records were studied to establish the presence of clear S_H-wave pulses, as indicated by the presence of opposite polarity pulses on each pair of horizontal records. Ideally, the S_H-wave signals from the 'normal' and 'reverse' source pulses are very nearly inverted images of each other. Digital FFT - IFFT low-pass filtering was used to remove the higher frequency P-wave signal from the S_H-wave signal. Different filter cutoffs were used to separate P- and S_H-waves at different depths.

Generally, the first maxima were picked for the 'normal' signals and the first minima for the 'reverse' signals, although other points on the waveform were used if the first pulse was distorted. The absolute arrival time of the 'normal' and 'reverse' signals may vary by +/- 0.2 milliseconds, due to differences in the actuation time of the solenoid source. This is caused by constant mechanical bias in the source or by borehole inclination. This variation does not affect the R1-R2 velocity determinations, as the differential time is measured between arrivals of waves created by the same source actuation. The final velocity value is the average of the values obtained from the 'normal' and 'reverse' source actuations.

The S_H-wave velocity calculated from the travel time over the 2.1m interval from source to receiver 1 (S-R1) was calculated and plotted for verification of the velocity derived from the travel time between receivers. In this analysis, the depth values were increased by 1.5m to correspond to the mid-point of the 2.1m S-R1 interval, as illustrated in Figure 1. Travel times were obtained by picking the first break of the S_H-wave signal at the near receiver and subtracting approximately 4 or 3 milliseconds (see above), the source delay.

RESULTS

Discussion of OYO P-S Suspension Velocity Log Results

Suspension R1-R2 P- and S_H-wave velocities for borehole B-11GEO is plotted in Figure 2. The suspension velocity data presented in Figure 2 are presented in Table 2.

P and S_H-wave velocity data from quality assurance analysis for borehole B-11GEO using S-R1 data is plotted together with R1-R2 analysis in Figure 3 to aid in visual comparison. It must be noted that R1-R2 data is an average velocity over a 1m segment of the soil column whereas S-R1 data is an average over 2.1m. S-R1 data are, therefore somewhat smoother. S-R1 data are presented in tabular format in Table 3.

The overall data quality in this borehole was excellent. Good correspondence between the shapes of the P- and S_H-wave velocity curves are observed for all data sets and velocities derived from S-R1 and R1-R2 data are generally in good agreement for the borehole, providing verification of the higher resolution R1-R2 data. The agreement is quite good, and the velocities are reasonable for these materials.

OYO P-S Suspension Data Reliability

P- and S_H-wave velocity measurement using the suspension method averages velocity over a 1m depth interval. This high resolution results in the scatter of velocity values shown in the plots. Individual measurements are very reliable with estimated precision of +/- 5%.

Standardized field procedures (Appendix A) and quality assurance checks add to the reliability of these data. P and S_H-wave data quality is generally excellent.

Quality Assurance

These velocity measurements were performed using industry-standard or better methods for both measurements and analyses. All work was performed under **GEO***Vision* quality assurance procedures, which include:

- Use of before and after NIST-traceable calibrations, where applicable, for field and laboratory instrumentation.
- Use of standard field data logs
- Use of independent verification of data by comparison of receiver-to-receiver and source-to-receiver velocities.
- Independent review of calculations and results by a registered professional engineer, geologist, or geophysicist.

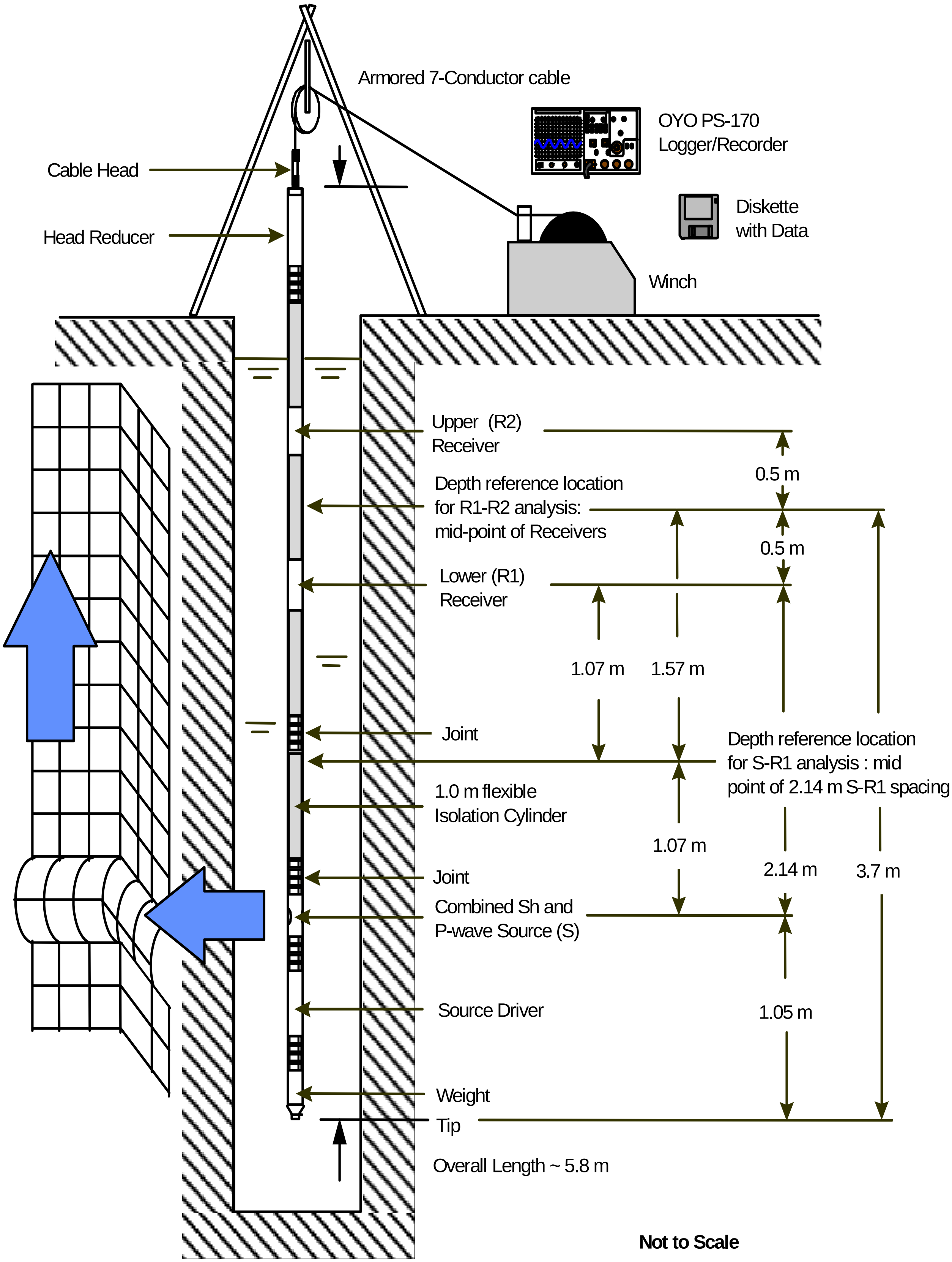


Figure 1: **Concept Illustration of P-S Logging System**

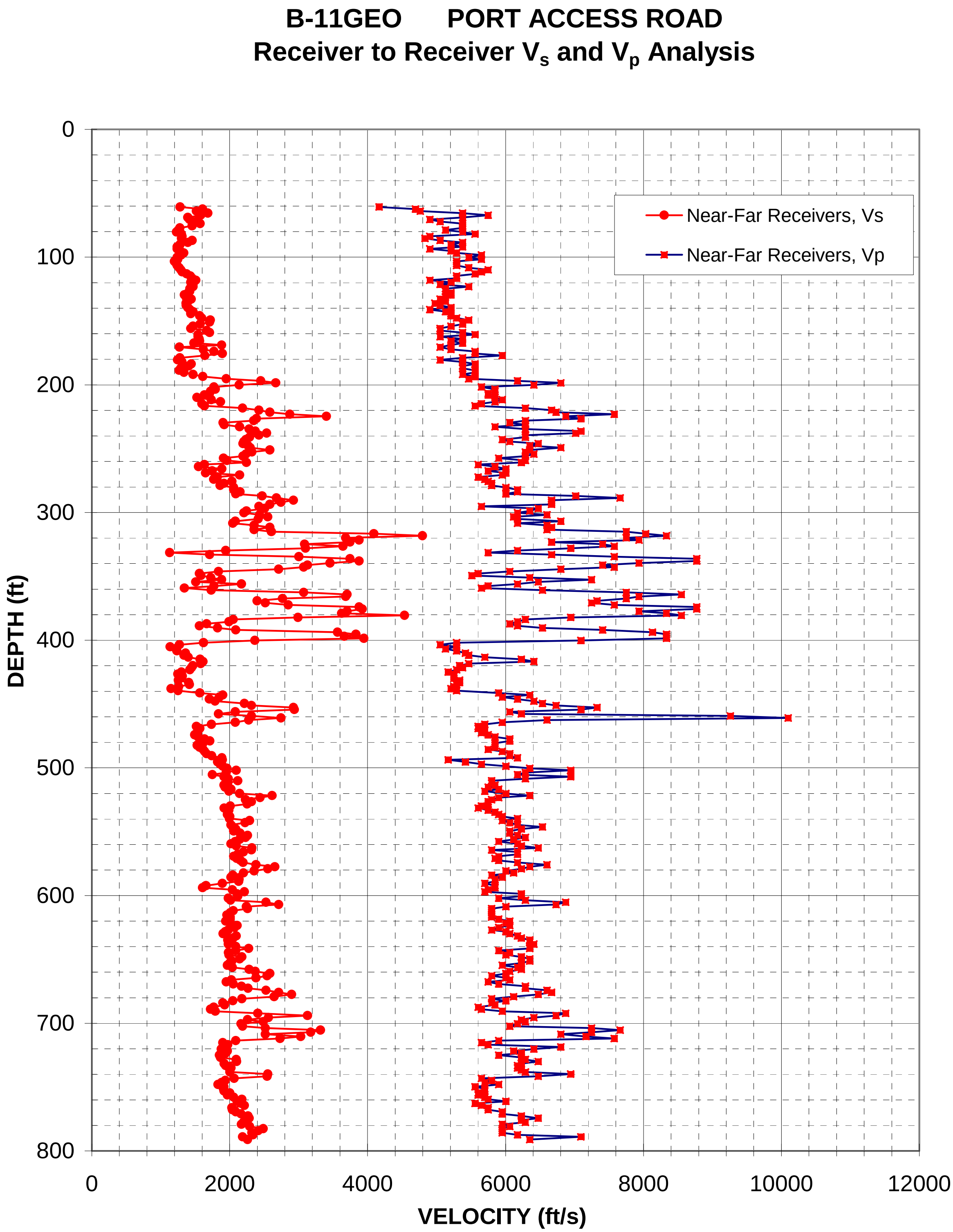


Figure 2: Borehole B-11GEO, Suspension Receiver to Receiver P- and S_H-wave Velocities

Table 2: Summary of Shear and Compressional Wave Velocity Based on Receiver-to-Receiver Travel Time Data - Borehole B-11GEO, Port Access Road, North Charleston

Summary of Compressional Wave Velocity, Shear Wave Velocity, and Poisson's Ratio Based on Receiver-to-Receiver Travel Time Data - Borehole B-11GEO

American Units				Metric Units			
Depth at Midpoint Between Receivers	Velocity		Poisson's Ratio	Depth at Midpoint Between Receivers	Velocity		Poisson's Ratio
	V_s	V_p			V_s	V_p	
(ft)	(ft/s)	(ft/s)		(m)	(m/s)	(m/s)	
60.7	1280	4170	0.45	18.5	390	1270	0.45
62.3	1610	4690	0.43	19.0	490	1430	0.43
64.0	1520	4760	0.44	19.5	460	1450	0.44
65.6	1680	5380	0.45	20.0	510	1640	0.45
67.3	1580	5750	0.46	20.5	480	1750	0.46
68.9	1390	5380	0.46	21.0	430	1640	0.46
70.5	1420	4900	0.45	21.5	430	1490	0.45
72.2	1520	5050	0.45	22.0	460	1540	0.45
73.8	1570	5380	0.45	22.5	480	1640	0.45
75.5	1460	5380	0.46	23.0	440	1640	0.46
77.1	1280	5380	0.47	23.5	390	1640	0.47
78.7	1260	5130	0.47	24.0	380	1560	0.47
80.4	1230	5380	0.47	24.5	370	1640	0.47
82.0	1300	5560	0.47	25.0	400	1690	0.47
83.7	1310	4900	0.46	25.5	400	1490	0.46
85.3	1300	4830	0.46	26.0	400	1470	0.46
86.9	1460	5050	0.45	26.5	440	1540	0.45
88.6	1390	5380	0.46	27.0	430	1640	0.46
90.2	1280	5210	0.47	27.5	390	1590	0.47
91.9	1240	5380	0.47	28.0	380	1640	0.47
93.5	1240	4900	0.47	28.5	380	1490	0.47
95.1	1280	5210	0.47	29.0	390	1590	0.47
96.8	1330	5290	0.47	29.5	410	1610	0.47
98.4	1300	5650	0.47	30.0	400	1720	0.47
100.1	1240	5460	0.47	30.5	380	1670	0.47
101.7	1250	5650	0.47	31.0	380	1720	0.47
103.4	1200	5290	0.47	31.5	370	1610	0.47
105.0	1230	5290	0.47	32.0	370	1610	0.47
106.6	1240	5290	0.47	32.5	380	1610	0.47
108.3	1270	5460	0.47	33.0	390	1670	0.47
109.9	1290	5750	0.47	33.5	390	1750	0.47
111.6	1310	5650	0.47	34.0	400	1720	0.47
113.2	1380	5560	0.47	34.5	420	1690	0.47
114.8	1430	5290	0.46	35.0	440	1610	0.46
116.5	1460	5290	0.46	35.5	440	1610	0.46
118.1	1510	4900	0.45	36.0	460	1490	0.45
119.8	1440	5210	0.46	36.5	440	1590	0.46
121.4	1470	5050	0.45	37.0	450	1540	0.45
123.0	1470	5460	0.46	37.5	450	1670	0.46
124.7	1420	5130	0.46	38.0	430	1560	0.46
126.6	1420	5130	0.46	38.6	430	1560	0.46

Summary of Compressional Wave Velocity, Shear Wave Velocity, and Poisson's Ratio Based on Receiver-to-Receiver Travel Time Data - Borehole B-11GEO

American Units				Metric Units			
Depth at Midpoint Between Receivers	Velocity		Poisson's Ratio	Depth at Midpoint Between Receivers	Velocity		Poisson's Ratio
	V_s	V_p			V_s	V_p	
(ft)	(ft/s)	(ft/s)		(m)	(m/s)	(m/s)	
128.0	1400	5210	0.46	39.0	430	1590	0.46
129.6	1340	5210	0.46	39.5	410	1590	0.46
131.2	1370	5130	0.46	40.0	420	1560	0.46
132.9	1440	5050	0.46	40.5	440	1540	0.46
134.5	1400	5130	0.46	41.0	430	1560	0.46
136.2	1370	4980	0.46	41.5	420	1520	0.46
137.8	1370	5050	0.46	42.0	420	1540	0.46
139.4	1390	5210	0.46	42.5	430	1590	0.46
141.1	1420	4900	0.45	43.0	430	1490	0.45
142.7	1470	5130	0.46	43.5	450	1560	0.46
144.4	1440	5210	0.46	44.0	440	1590	0.46
146.0	1560	5210	0.45	44.5	480	1590	0.45
147.6	1590	5290	0.45	45.0	490	1610	0.45
149.3	1720	5460	0.45	45.5	520	1670	0.45
150.9	1710	5380	0.44	46.0	520	1640	0.44
152.6	1570	5380	0.45	46.5	480	1640	0.45
154.2	1470	5210	0.46	47.0	450	1590	0.46
155.8	1440	5050	0.46	47.5	440	1540	0.46
157.5	1670	5050	0.44	48.0	510	1540	0.44
159.1	1710	5380	0.44	48.5	520	1640	0.44
160.8	1540	5560	0.46	49.0	470	1690	0.46
162.4	1540	5050	0.45	49.5	470	1540	0.45
164.0	1560	5380	0.45	50.0	470	1640	0.45
165.7	1560	5210	0.45	50.5	480	1590	0.45
167.3	1480	5380	0.46	51.0	450	1640	0.46
169.0	1880	5210	0.42	51.5	570	1590	0.42
170.6	1270	5050	0.47	52.0	390	1540	0.47
172.2	1620	5210	0.45	52.5	490	1590	0.45
173.9	1770	5560	0.44	53.0	540	1690	0.44
175.5	1890	5560	0.43	53.5	580	1690	0.43
177.2	1640	5950	0.46	54.0	500	1810	0.46
178.8	1280	5380	0.47	54.5	390	1640	0.47
180.5	1240	5050	0.47	55.0	380	1540	0.47
182.1	1310	5380	0.47	55.5	400	1640	0.47
183.7	1440	5560	0.46	56.0	440	1690	0.46
185.4	1410	5380	0.46	56.5	430	1640	0.46
187.0	1290	5380	0.47	57.0	390	1640	0.47
188.7	1270	5560	0.47	57.5	390	1690	0.47
190.3	1340	5560	0.47	58.0	410	1690	0.47
191.9	1470	5380	0.46	58.5	450	1640	0.46
193.6	1610	5560	0.45	59.0	490	1690	0.45
195.2	1950	5460	0.43	59.5	590	1670	0.43
196.9	2450	6170	0.41	60.0	750	1880	0.41

Summary of Compressional Wave Velocity, Shear Wave Velocity, and Poisson's Ratio Based on Receiver-to-Receiver Travel Time Data - Borehole B-11GEO

American Units				Metric Units			
Depth at Midpoint Between Receivers	Velocity		Poisson's Ratio	Depth at Midpoint Between Receivers	Velocity		Poisson's Ratio
	V_s	V_p			V_s	V_p	
(ft)	(ft/s)	(ft/s)		(m)	(m/s)	(m/s)	
198.5	2670	6800	0.41	60.5	810	2070	0.41
200.1	2140	6410	0.44	61.0	650	1950	0.44
201.8	1770	5650	0.45	61.5	540	1720	0.45
203.4	1790	5850	0.45	62.0	550	1780	0.45
205.1	1720	5850	0.45	62.5	530	1780	0.45
206.7	1710	5750	0.45	63.0	520	1750	0.45
208.0	1630	5750	0.46	63.4	500	1750	0.46
210.0	1530	5850	0.46	64.0	460	1780	0.46
211.6	1730	5950	0.45	64.5	530	1810	0.45
213.3	1870	5850	0.44	65.0	570	1780	0.44
214.9	1600	5650	0.46	65.5	490	1720	0.46
216.5	1630	5560	0.45	66.0	500	1690	0.45
218.2	2190	6290	0.43	66.5	670	1920	0.43
219.8	2420	6670	0.42	67.0	740	2030	0.42
221.5	2580	6730	0.41	67.5	790	2050	0.41
223.1	2870	7580	0.42	68.0	880	2310	0.42
224.7	3400	6870	0.34	68.5	1040	2090	0.34
226.4	2390	7090	0.44	69.0	730	2160	0.44
228.0	2350	6290	0.42	69.5	720	1920	0.42
229.7	1900	6060	0.45	70.0	580	1850	0.45
231.3	1920	6290	0.45	70.5	590	1920	0.45
232.9	2140	5850	0.42	71.0	650	1780	0.42
234.6	2280	6290	0.42	71.5	700	1920	0.42
236.2	2370	7090	0.44	72.0	720	2160	0.44
237.9	2530	7020	0.42	72.5	770	2140	0.42
239.5	2420	6290	0.41	73.0	740	1920	0.41
241.1	2290	6290	0.42	73.5	700	1920	0.42
242.8	2240	5950	0.42	74.0	680	1810	0.42
244.4	2210	6060	0.42	74.5	670	1850	0.42
246.1	2190	6470	0.44	75.0	670	1970	0.44
247.7	2270	6350	0.43	75.5	690	1940	0.43
249.3	2300	6800	0.44	76.0	700	2070	0.44
251.0	2580	6350	0.40	76.5	790	1940	0.40
252.6	2320	6290	0.42	77.0	710	1920	0.42
254.3	2240	6410	0.43	77.5	680	1950	0.43
255.9	2190	6290	0.43	78.0	670	1920	0.43
257.6	1910	5900	0.44	78.5	580	1800	0.44
259.2	1960	6290	0.45	79.0	600	1920	0.45
260.8	2240	6230	0.43	79.5	680	1900	0.43
262.5	1630	5600	0.45	80.0	500	1710	0.45
264.1	1550	5850	0.46	80.5	470	1780	0.46
265.8	1890	6010	0.45	81.0	580	1830	0.45
267.4	1750	5750	0.45	81.5	530	1750	0.45

Summary of Compressional Wave Velocity, Shear Wave Velocity, and Poisson's Ratio Based on Receiver-to-Receiver Travel Time Data - Borehole B-11GEO

American Units				Metric Units			
Depth at Midpoint Between Receivers	Velocity		Poisson's Ratio	Depth at Midpoint Between Receivers	Velocity		Poisson's Ratio
	V_s	V_p			V_s	V_p	
(ft)	(ft/s)	(ft/s)		(m)	(m/s)	(m/s)	
269.0	1650	6010	0.46	82.0	500	1830	0.46
270.7	2140	5950	0.43	82.5	650	1810	0.43
272.3	1820	5600	0.44	83.0	560	1710	0.44
274.0	1770	5700	0.45	83.5	540	1740	0.45
275.6	2030	5750	0.43	84.0	620	1750	0.43
277.2	1920	5800	0.44	84.5	580	1770	0.44
278.9	1860	5800	0.44	85.0	570	1770	0.44
280.5	2060	6010	0.43	85.5	630	1830	0.43
282.2	2060	6170	0.44	86.0	630	1880	0.44
283.8	2150	6170	0.43	86.5	660	1880	0.43
285.4	2090	6010	0.43	87.0	640	1830	0.43
287.1	2470	7020	0.43	87.5	750	2140	0.43
288.7	2680	7660	0.43	88.0	820	2340	0.43
290.4	2920	6670	0.38	88.5	890	2030	0.38
292.0	2740	6670	0.40	89.0	840	2030	0.40
293.6	2580	6670	0.41	89.5	790	2030	0.41
295.3	2420	5650	0.39	90.0	740	1720	0.39
296.9	2510	6470	0.41	90.5	760	1970	0.41
298.9	2240	6350	0.43	91.1	680	1940	0.43
300.2	2210	6170	0.43	91.5	670	1880	0.43
301.8	2430	6600	0.42	92.0	740	2010	0.42
303.5	2550	6120	0.39	92.5	780	1860	0.39
305.1	2420	6170	0.41	93.0	740	1880	0.41
306.8	2080	6800	0.45	93.5	640	2070	0.45
308.4	2040	6170	0.44	94.0	620	1880	0.44
310.0	2360	6600	0.43	94.5	720	2010	0.43
311.7	2580	6670	0.41	95.0	790	2030	0.41
313.3	2360	6600	0.43	95.5	720	2010	0.43
315.0	2600	7750	0.44	96.0	790	2360	0.44
316.6	4090	8030	0.32	96.5	1250	2450	0.32
318.2	4800	8330	0.25	97.0	1460	2540	0.25
319.9	3680	7750	0.35	97.5	1120	2360	0.35
321.5	3880	7940	0.34	98.0	1180	2420	0.34
323.2	3750	6670	0.27	98.5	1140	2030	0.27
324.8	3090	7410	0.39	99.0	940	2260	0.39
326.4	3640	7580	0.35	99.5	1110	2310	0.35
328.1	3100	6940	0.38	100.0	950	2120	0.38
329.7	1940	6170	0.44	100.5	590	1880	0.44
331.4	1130	5750	0.48	101.0	340	1750	0.48
333.0	1710	6670	0.46	101.5	520	2030	0.46
334.7	3000	7580	0.41	102.0	920	2310	0.41
336.3	3750	8770	0.39	102.5	1140	2670	0.39
337.9	3880	8770	0.38	103.0	1180	2670	0.38

Summary of Compressional Wave Velocity, Shear Wave Velocity, and Poisson's Ratio Based on Receiver-to-Receiver Travel Time Data - Borehole B-11GEO

American Units				Metric Units			
Depth at Midpoint Between Receivers	Velocity		Poisson's Ratio	Depth at Midpoint Between Receivers	Velocity		Poisson's Ratio
	V_s	V_p			V_s	V_p	
(ft)	(ft/s)	(ft/s)		(m)	(m/s)	(m/s)	
339.6	3450	7940	0.38	103.5	1050	2420	0.38
341.2	3130	7410	0.39	104.0	950	2260	0.39
342.9	3070	7580	0.40	104.5	940	2310	0.40
344.5	2710	6800	0.41	105.0	830	2070	0.41
346.1	1840	6060	0.45	105.5	560	1850	0.45
347.8	1560	5600	0.46	106.0	480	1710	0.46
349.4	1580	5510	0.45	106.5	480	1680	0.45
351.1	1730	6350	0.46	107.0	530	1940	0.46
352.7	1880	7250	0.46	107.5	570	2210	0.46
354.3	1510	6470	0.47	108.0	460	1970	0.47
356.0	2170	6170	0.43	108.5	660	1880	0.43
357.6	1770	5750	0.45	109.0	540	1750	0.45
359.3	1340	5650	0.47	109.5	410	1720	0.47
360.9	1730	6540	0.46	110.0	530	1990	0.46
362.5	3070	7750	0.41	110.5	940	2360	0.41
364.2	3700	8550	0.38	111.0	1130	2610	0.38
365.8	3680	7940	0.36	111.5	1120	2420	0.36
367.5	2770	7750	0.43	112.0	840	2360	0.43
369.1	2400	7330	0.44	112.5	730	2230	0.44
370.7	2520	7250	0.43	113.0	770	2210	0.43
372.4	2850	7580	0.42	113.5	870	2310	0.42
374.0	3880	8770	0.38	114.0	1180	2670	0.38
375.7	3920	8770	0.38	114.5	1200	2670	0.38
377.3	3700	7940	0.36	115.0	1130	2420	0.36
378.9	3620	8330	0.38	115.5	1100	2540	0.38
380.6	4540	8550	0.30	116.0	1380	2610	0.30
382.2	2990	6940	0.39	116.5	910	2120	0.39
383.9	2050	6290	0.44	117.0	630	1920	0.44
385.5	1990	6170	0.44	117.5	610	1880	0.44
387.1	1670	6060	0.46	118.0	510	1850	0.46
388.8	1560	6170	0.47	118.5	480	1880	0.47
390.4	1830	6540	0.46	119.0	560	1990	0.46
392.1	2090	7410	0.46	119.5	640	2260	0.46
393.7	3570	8130	0.38	120.0	1090	2480	0.38
395.3	3830	8330	0.37	120.5	1170	2540	0.37
397.0	3660	8330	0.38	121.0	1120	2540	0.38
398.6	3940	8330	0.36	121.5	1200	2540	0.36
400.3	2360	7090	0.44	122.0	720	2160	0.44
401.9	1620	5290	0.45	122.5	490	1610	0.45
403.5	1270	5050	0.47	123.0	390	1540	0.47
405.2	1140	5290	0.48	123.5	350	1610	0.48
406.8	1220	5130	0.47	124.0	370	1560	0.47
408.5	1230	5290	0.47	124.5	380	1610	0.47

Summary of Compressional Wave Velocity, Shear Wave Velocity, and Poisson's Ratio
Based on Receiver-to-Receiver Travel Time Data - Borehole B-11GEO

American Units				Metric Units			
Depth at Midpoint Between Receivers	Velocity		Poisson's Ratio	Depth at Midpoint Between Receivers	Velocity		Poisson's Ratio
	V_s	V_p			V_s	V_p	
(ft)	(ft/s)	(ft/s)		(m)	(m/s)	(m/s)	
410.1	1360	5420	0.47	125.0	410	1650	0.47
411.8	1340	5460	0.47	125.5	410	1670	0.47
413.4	1400	5700	0.47	126.0	430	1740	0.47
415.0	1570	6230	0.47	126.5	480	1900	0.47
416.7	1610	6410	0.47	127.0	490	1950	0.47
418.3	1580	5460	0.45	127.5	480	1670	0.45
420.0	1470	5330	0.46	128.0	450	1630	0.46
421.6	1450	5380	0.46	128.5	440	1640	0.46
423.2	1420	5290	0.46	129.0	430	1610	0.46
424.9	1300	5170	0.47	129.5	400	1580	0.47
426.5	1250	5250	0.47	130.0	380	1600	0.47
428.2	1310	5250	0.47	130.5	400	1600	0.47
429.8	1290	5250	0.47	131.0	390	1600	0.47
431.4	1260	5330	0.47	131.5	380	1630	0.47
433.1	1410	5330	0.46	132.0	430	1630	0.46
434.7	1420	5290	0.46	132.5	430	1610	0.46
436.4	1260	5250	0.47	133.0	380	1600	0.47
438.0	1150	5210	0.47	133.5	350	1590	0.47
439.6	1250	5290	0.47	134.0	380	1610	0.47
441.3	1570	5900	0.46	134.5	480	1800	0.46
442.9	1900	6350	0.45	135.0	580	1940	0.45
444.6	1850	5950	0.45	135.5	560	1810	0.45
446.2	1710	6170	0.46	136.0	520	1880	0.46
447.8	1790	6410	0.46	136.5	540	1950	0.46
449.5	2210	6540	0.44	137.0	680	1990	0.44
451.1	2310	6730	0.43	137.5	710	2050	0.43
452.8	2920	7330	0.41	138.0	890	2230	0.41
454.4	2940	7090	0.40	138.5	900	2160	0.40
456.0	2080	6060	0.43	139.0	640	1850	0.43
457.7	1840	6230	0.45	139.5	560	1900	0.45
459.3	2310	9260	0.47	140.0	710	2820	0.47
461.0	2740	10100	0.46	140.5	840	3080	0.46
462.6	2280	6600	0.43	141.0	690	2010	0.43
464.2	2080	5950	0.43	141.5	640	1810	0.43
465.9	1740	5700	0.45	142.0	530	1740	0.45
467.5	1520	5600	0.46	142.5	460	1710	0.46
469.2	1570	5600	0.46	143.0	480	1710	0.46
470.8	1540	5700	0.46	143.5	470	1740	0.46
472.4	1540	5650	0.46	144.0	470	1720	0.46
474.1	1490	5750	0.46	144.5	450	1750	0.46
475.7	1540	5850	0.46	145.0	470	1780	0.46
477.4	1630	6060	0.46	145.5	500	1850	0.46
479.0	1710	6060	0.46	146.0	520	1850	0.46

Summary of Compressional Wave Velocity, Shear Wave Velocity, and Poisson's Ratio Based on Receiver-to-Receiver Travel Time Data - Borehole B-11GEO

American Units				Metric Units			
Depth at Midpoint Between Receivers	Velocity V_s	Velocity V_p	Poisson's Ratio	Depth at Midpoint Between Receivers	Velocity V_s	Velocity V_p	Poisson's Ratio
(ft)	(ft/s)	(ft/s)		(m)	(m/s)	(m/s)	
480.6	1610	5850	0.46	146.5	490	1780	0.46
482.3	1530	5850	0.46	147.0	470	1780	0.46
483.9	1560	5850	0.46	147.5	480	1780	0.46
485.6	1610	5750	0.46	148.0	490	1750	0.46
487.2	1640	5950	0.46	148.5	500	1810	0.46
488.9	1660	6060	0.46	149.0	510	1850	0.46
490.5	1740	6060	0.46	149.5	530	1850	0.46
492.1	1890	6170	0.45	150.0	580	1880	0.45
493.8	1890	5170	0.42	150.5	580	1580	0.42
495.4	1830	5420	0.44	151.0	560	1650	0.44
497.1	1860	5650	0.44	151.5	570	1720	0.44
498.7	1900	6010	0.44	152.0	580	1830	0.44
500.3	1960	6350	0.45	152.5	600	1940	0.45
502.0	2100	6940	0.45	153.0	640	2120	0.45
503.6	1950	6290	0.45	153.5	590	1920	0.45
505.3	1750	6170	0.46	154.0	530	1880	0.46
506.9	1920	6940	0.46	154.5	580	2120	0.46
508.5	1980	6290	0.45	155.0	600	1920	0.45
510.2	2120	5800	0.42	155.5	650	1770	0.42
511.8	1970	5800	0.43	156.0	600	1770	0.43
513.5	1920	5850	0.44	156.5	580	1780	0.44
515.1	1930	5750	0.44	157.0	590	1750	0.44
516.7	2020	5900	0.43	157.5	620	1800	0.43
518.4	1990	5700	0.43	158.0	610	1740	0.43
520.0	2140	6010	0.43	158.5	650	1830	0.43
521.7	2610	6350	0.40	159.0	800	1940	0.40
523.3	2440	5900	0.40	159.5	740	1800	0.40
524.9	2230	5800	0.41	160.0	680	1770	0.41
526.6	2310	5750	0.40	160.5	710	1750	0.40
528.2	2250	5750	0.41	161.0	690	1750	0.41
529.9	2010	5650	0.43	161.5	610	1720	0.43
531.5	1920	5600	0.43	162.0	590	1710	0.43
533.1	1990	5750	0.43	162.5	610	1750	0.43
534.8	1970	5850	0.44	163.0	600	1780	0.44
536.4	1970	5900	0.44	163.5	600	1800	0.44
538.1	2000	5950	0.44	164.0	610	1810	0.44
539.7	2000	6170	0.44	164.5	610	1880	0.44
541.3	2290	5950	0.41	165.0	700	1810	0.41
543.0	2220	6060	0.42	165.5	680	1850	0.42
544.6	2020	6170	0.44	166.0	620	1880	0.44
546.3	2040	6540	0.45	166.5	620	1990	0.45
547.9	2090	6230	0.44	167.0	640	1900	0.44
549.5	2060	6060	0.43	167.5	630	1850	0.43

Summary of Compressional Wave Velocity, Shear Wave Velocity, and Poisson's Ratio Based on Receiver-to-Receiver Travel Time Data - Borehole B-11GEO

American Units				Metric Units			
Depth at Midpoint Between Receivers	Velocity		Poisson's Ratio	Depth at Midpoint Between Receivers	Velocity		Poisson's Ratio
	V_s	V_p			V_s	V_p	
(ft)	(ft/s)	(ft/s)		(m)	(m/s)	(m/s)	
551.2	2150	6060	0.43	168.0	660	1850	0.43
552.8	2260	6170	0.42	168.5	690	1880	0.42
554.5	2230	6290	0.43	169.0	680	1920	0.43
556.1	2140	6120	0.43	169.5	650	1860	0.43
557.7	2080	5900	0.43	170.0	640	1800	0.43
559.4	2020	6170	0.44	170.5	620	1880	0.44
561.0	2100	6230	0.44	171.0	640	1900	0.44
562.7	2320	6470	0.43	171.5	710	1970	0.43
564.3	2310	5800	0.41	172.0	710	1770	0.41
565.9	2200	6170	0.43	172.5	670	1880	0.43
567.6	2120	6170	0.43	173.0	650	1880	0.43
569.2	2060	5900	0.43	173.5	630	1800	0.43
570.9	2100	5850	0.43	174.0	640	1780	0.43
572.5	2160	5900	0.42	174.5	660	1800	0.42
574.2	2190	6170	0.43	175.0	670	1880	0.43
575.8	2380	6600	0.43	175.5	730	2010	0.43
577.4	2660	6350	0.39	176.0	810	1940	0.39
579.1	2550	6230	0.40	176.5	780	1900	0.40
580.7	2360	6010	0.41	177.0	720	1830	0.41
582.4	2200	6120	0.43	177.5	670	1860	0.43
584.0	2040	5800	0.43	178.0	620	1770	0.43
585.6	2020	5950	0.43	178.5	620	1810	0.43
587.3	2140	5850	0.42	179.0	650	1780	0.42
588.9	2130	5850	0.42	179.5	650	1780	0.42
590.6	1890	5700	0.44	180.0	580	1740	0.44
592.2	1660	5850	0.46	180.5	510	1780	0.46
593.8	1610	5850	0.46	181.0	490	1780	0.46
595.5	2040	5750	0.43	181.5	620	1750	0.43
597.1	2210	5700	0.41	182.0	680	1740	0.41
598.8	2110	6230	0.44	182.5	640	1900	0.44
600.4	2120	6230	0.43	183.0	650	1900	0.43
602.0	1980	5900	0.44	183.5	600	1800	0.44
603.7	2010	6290	0.44	184.0	610	1920	0.44
605.3	2530	6870	0.42	184.5	770	2090	0.42
607.0	2710	6730	0.40	185.0	830	2050	0.40
608.6	2240	6010	0.42	185.5	680	1830	0.42
610.2	2260	5800	0.41	186.0	690	1770	0.41
611.9	2050	5800	0.43	186.5	630	1770	0.43
613.5	2010	5800	0.43	187.0	610	1770	0.43
615.2	1960	5800	0.44	187.5	600	1770	0.44
616.8	2010	5800	0.43	188.0	610	1770	0.43
618.4	2010	5900	0.43	188.5	610	1800	0.43
620.1	1940	6060	0.44	189.0	590	1850	0.44

Summary of Compressional Wave Velocity, Shear Wave Velocity, and Poisson's Ratio Based on Receiver-to-Receiver Travel Time Data - Borehole B-11GEO

American Units				Metric Units			
Depth at Midpoint Between Receivers	Velocity		Poisson's Ratio	Depth at Midpoint Between Receivers	Velocity		Poisson's Ratio
	V_s	V_p			V_s	V_p	
(ft)	(ft/s)	(ft/s)		(m)	(m/s)	(m/s)	
621.7	2010	6010	0.44	189.5	610	1830	0.44
623.4	2110	6060	0.43	190.0	640	1850	0.43
625.0	2070	5900	0.43	190.5	630	1800	0.43
627.0	1980	5800	0.43	191.1	600	1770	0.43
628.3	1940	6010	0.44	191.5	590	1830	0.44
629.9	1900	6060	0.45	192.0	580	1850	0.45
631.6	2100	6170	0.43	192.5	640	1880	0.43
633.2	2050	6230	0.44	193.0	630	1900	0.44
634.8	1970	6350	0.45	193.5	600	1940	0.45
636.5	1990	6350	0.45	194.0	610	1940	0.45
638.1	1980	6410	0.45	194.5	600	1950	0.45
639.8	2090	6350	0.44	195.0	640	1940	0.44
641.4	2280	6350	0.43	195.5	690	1940	0.43
643.0	2090	5900	0.43	196.0	640	1800	0.43
644.7	1980	6060	0.44	196.5	600	1850	0.44
646.3	1990	6010	0.44	197.0	610	1830	0.44
648.0	2180	6230	0.43	197.5	660	1900	0.43
649.6	2140	6350	0.44	198.0	650	1940	0.44
651.3	2030	6350	0.44	198.5	620	1940	0.44
652.9	2000	6230	0.44	199.0	610	1900	0.44
654.5	1970	5950	0.44	199.5	600	1810	0.44
656.2	2040	6170	0.44	200.0	620	1880	0.44
657.8	2280	6230	0.42	200.5	700	1900	0.42
659.5	2370	6060	0.41	201.0	720	1850	0.41
661.1	2580	6010	0.39	201.5	790	1830	0.39
662.7	2540	5800	0.38	202.0	780	1770	0.38
664.4	2380	6010	0.41	202.5	730	1830	0.41
666.0	2030	6060	0.44	203.0	620	1850	0.44
667.7	1950	5750	0.44	203.5	590	1750	0.44
669.3	2050	5900	0.43	204.0	630	1800	0.43
670.9	2170	6290	0.43	204.5	660	1920	0.43
672.6	2270	6290	0.43	205.0	690	1920	0.43
674.2	2530	6600	0.41	205.5	770	2010	0.41
675.9	2710	6670	0.40	206.0	830	2030	0.40
677.5	2900	6470	0.37	206.5	880	1970	0.37
679.1	2650	6120	0.38	207.0	810	1860	0.38
680.8	2180	5800	0.42	207.5	660	1770	0.42
682.4	2040	6010	0.43	208.0	620	1830	0.43
684.1	1900	5800	0.44	208.5	580	1770	0.44
685.7	1930	5850	0.44	209.0	590	1780	0.44
687.3	1770	5600	0.44	209.5	540	1710	0.44
689.0	1720	5650	0.45	210.0	530	1720	0.45
690.6	1790	5950	0.45	210.5	550	1810	0.45

Summary of Compressional Wave Velocity, Shear Wave Velocity, and Poisson's Ratio Based on Receiver-to-Receiver Travel Time Data - Borehole B-11GEO

American Units				Metric Units			
Depth at Midpoint Between Receivers	Velocity		Poisson's Ratio	Depth at Midpoint Between Receivers	Velocity		Poisson's Ratio
	V_s	V_p			V_s	V_p	
(ft)	(ft/s)	(ft/s)		(m)	(m/s)	(m/s)	
692.3	2410	6870	0.43	211.0	730	2090	0.43
693.9	3130	6730	0.36	211.5	950	2050	0.36
695.5	2560	6410	0.40	212.0	780	1950	0.40
697.2	2260	6230	0.42	212.5	690	1900	0.42
698.8	2490	6290	0.41	213.0	760	1920	0.41
700.5	2160	6170	0.43	213.5	660	1880	0.43
702.4	2190	6060	0.43	214.1	670	1850	0.43
703.7	2520	7250	0.43	214.5	770	2210	0.43
705.4	3320	7660	0.38	215.0	1010	2340	0.38
707.0	3170	7250	0.38	215.5	970	2210	0.38
708.7	2520	6800	0.42	216.0	770	2070	0.42
710.3	3030	7170	0.39	216.5	920	2180	0.39
711.9	2730	7580	0.43	217.0	830	2310	0.43
713.6	2090	5900	0.43	217.5	640	1800	0.43
715.2	1900	5650	0.44	218.0	580	1720	0.44
716.9	1970	5750	0.43	218.5	600	1750	0.43
718.5	1940	6800	0.46	219.0	590	2070	0.46
720.1	1880	6410	0.45	219.5	570	1950	0.45
721.8	1970	6120	0.44	220.0	600	1860	0.44
723.4	1940	6230	0.45	220.5	590	1900	0.45
725.1	1850	5900	0.45	221.0	560	1800	0.45
726.7	1870	6230	0.45	221.5	570	1900	0.45
728.4	2100	6290	0.44	222.0	640	1920	0.44
730.0	2100	6470	0.44	222.5	640	1970	0.44
731.6	1920	6230	0.45	223.0	590	1900	0.45
733.3	1940	6170	0.44	223.5	590	1880	0.44
734.9	2020	6170	0.44	224.0	620	1880	0.44
736.6	2000	6230	0.44	224.5	610	1900	0.44
738.2	2000	6290	0.44	225.0	610	1920	0.44
739.8	2550	6940	0.42	225.5	780	2120	0.42
741.5	2540	6470	0.41	226.0	780	1970	0.41
743.1	2060	5650	0.42	226.5	630	1720	0.42
744.8	1940	5800	0.44	227.0	590	1770	0.44
746.4	1880	5700	0.44	227.5	570	1740	0.44
748.0	1830	5900	0.45	228.0	560	1800	0.45
749.7	1920	5560	0.43	228.5	580	1690	0.43
751.3	1910	5700	0.44	229.0	580	1740	0.44
753.0	1920	5700	0.44	229.5	580	1740	0.44
754.6	2000	5600	0.43	230.0	610	1710	0.43
756.2	1970	5600	0.43	230.5	600	1710	0.43
757.9	2060	5700	0.43	231.0	630	1740	0.43
759.5	2180	5750	0.42	231.5	660	1750	0.42
761.2	2110	6010	0.43	232.0	640	1830	0.43

Summary of Compressional Wave Velocity, Shear Wave Velocity, and Poisson's Ratio Based on Receiver-to-Receiver Travel Time Data - Borehole B-11GEO

American Units				Metric Units			
Depth at Midpoint Between Receivers	Velocity		Poisson's Ratio	Depth at Midpoint Between Receivers	Velocity		Poisson's Ratio
	V_s	V_p			V_s	V_p	
(ft)	(ft/s)	(ft/s)		(m)	(m/s)	(m/s)	
762.8	2160	5560	0.41	232.5	660	1690	0.41
764.4	2210	5650	0.41	233.0	680	1720	0.41
766.1	2030	5750	0.43	233.5	620	1750	0.43
767.7	2040	5750	0.43	234.0	620	1750	0.43
769.4	2090	5950	0.43	234.5	640	1810	0.43
771.0	2160	5950	0.42	235.0	660	1810	0.42
772.6	2270	6230	0.42	235.5	690	1900	0.42
774.3	2280	6470	0.43	236.0	700	1970	0.43
775.9	2240	6230	0.43	236.5	680	1900	0.43
777.6	2200	6290	0.43	237.0	670	1920	0.43
779.2	2170	5950	0.42	237.5	660	1810	0.42
780.8	2290	6060	0.42	238.0	700	1850	0.42
782.5	2490	5950	0.39	238.5	760	1810	0.39
784.1	2420	5950	0.40	239.0	740	1810	0.40
785.8	2320	5950	0.41	239.5	710	1810	0.41
787.4	2340	6170	0.42	240.0	710	1880	0.42
789.0	2190	7090	0.45	240.5	670	2160	0.45
791.0	2260	6350	0.43	241.1	690	1940	0.43

Notes: "-" means no data available at that particular interval of depth.

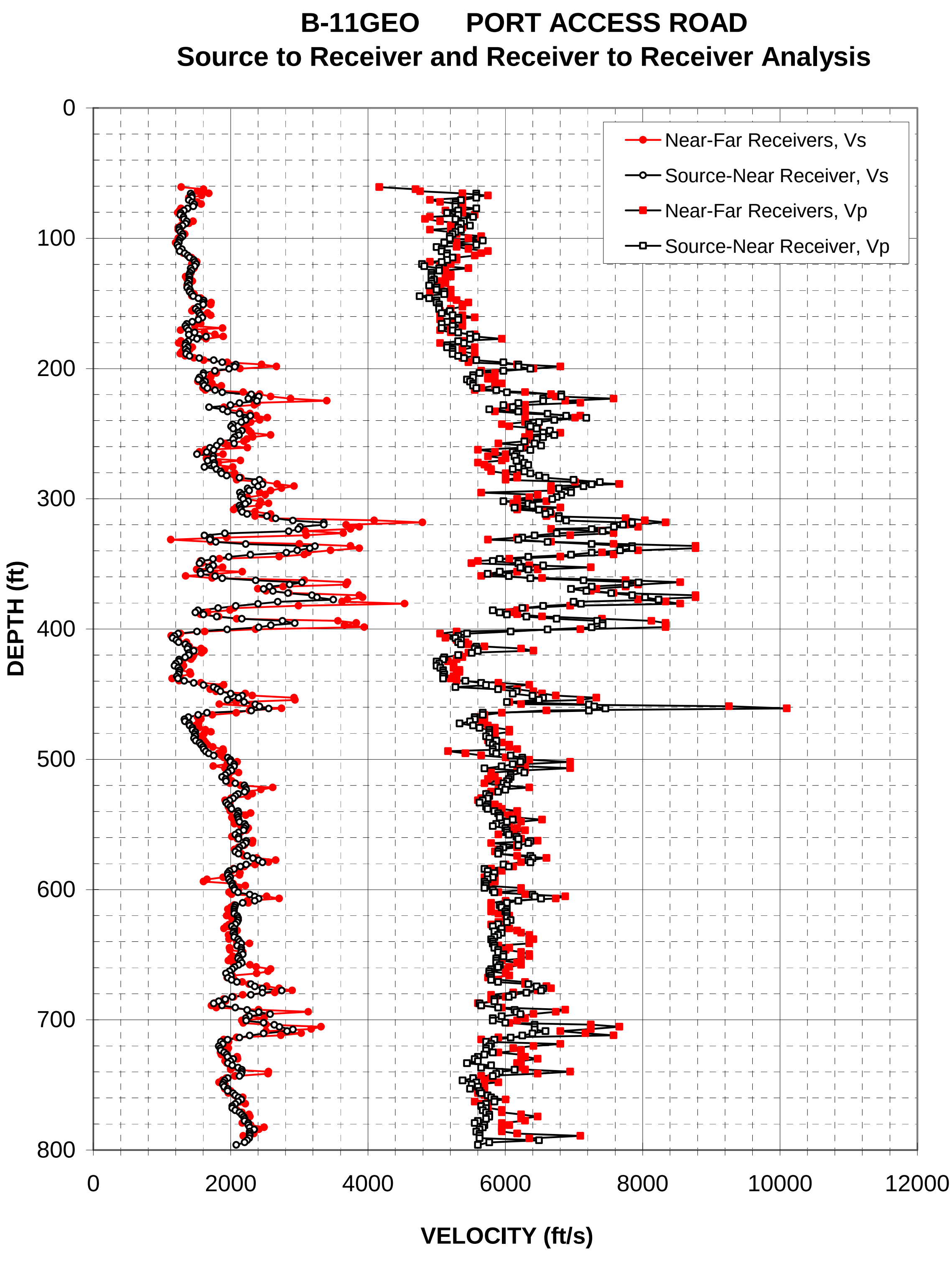


Figure 3: Borehole B-11GEO, Suspension Source to Receiver P- and S_H-wave Velocities

Table 3: Summary of Shear and Compressional Wave Velocity Based on Source-to-Receiver Travel Time Data - Borehole B-11GEO, Port Access Road, North Charleston

Summary of Compressional Wave Velocity, Shear Wave Velocity, and Poisson's Ratio Based on Source-to-Receiver Travel Time Data - Borehole B-11GEO

American Units				Metric Units			
Depth at Midpoint Between Source and Near Receiver	Velocity		Poisson's Ratio	Depth at Midpoint Between Source and Near Receiver	Velocity		Poisson's Ratio
	V_s	V_p			V_s	V_p	
(ft)	(ft/s)	(ft/s)		(m)	(m/s)	(m/s)	
65.7	1420	5580	0.47	20.0	430	1700	0.47
67.4	1440	5580	0.46	20.5	440	1700	0.46
69.0	1440	5580	0.46	21.0	440	1700	0.46
70.7	1390	5360	0.46	21.5	420	1630	0.46
72.3	1440	5270	0.46	22.0	440	1610	0.46
73.9	1470	5270	0.46	22.5	450	1610	0.46
75.6	1460	5270	0.46	23.0	440	1610	0.46
77.2	1370	5580	0.47	23.5	420	1700	0.47
78.9	1320	5310	0.47	24.0	400	1620	0.47
80.5	1280	5150	0.47	24.5	390	1570	0.47
82.1	1270	5310	0.47	25.0	390	1620	0.47
83.8	1320	5530	0.47	25.5	400	1690	0.47
85.4	1320	5270	0.47	26.0	400	1610	0.47
87.1	1360	5400	0.47	26.5	420	1650	0.47
88.7	1350	5360	0.47	27.0	410	1630	0.47
90.3	1300	5490	0.47	27.5	400	1670	0.47
92.0	1250	5310	0.47	28.0	380	1620	0.47
93.6	1250	5360	0.47	28.5	380	1630	0.47
95.3	1270	5270	0.47	29.0	390	1610	0.47
96.9	1300	5230	0.47	29.5	400	1590	0.47
98.5	1300	5190	0.47	30.0	400	1580	0.47
100.2	1270	5190	0.47	30.5	390	1580	0.47
101.8	1250	5670	0.47	31.0	380	1730	0.47
103.5	1250	5110	0.47	31.5	380	1560	0.47
105.1	1230	5580	0.47	32.0	370	1700	0.47
106.8	1240	5000	0.47	32.5	380	1520	0.47
108.4	1290	5080	0.47	33.0	390	1550	0.47
110.0	1260	5080	0.47	33.5	380	1550	0.47
111.7	1330	5150	0.46	34.0	410	1570	0.46
113.3	1370	5150	0.46	34.5	420	1570	0.46
115.0	1400	5230	0.46	35.0	430	1590	0.46
116.6	1460	5150	0.46	35.5	450	1570	0.46
118.2	1480	5080	0.45	36.0	450	1550	0.45
119.9	1500	4790	0.45	36.5	460	1460	0.45
121.5	1480	4820	0.45	37.0	450	1470	0.45
123.2	1420	5040	0.46	37.5	430	1540	0.46
124.8	1430	5040	0.46	38.0	440	1540	0.46
126.4	1410	4930	0.46	38.5	430	1500	0.46
128.1	1400	4930	0.46	39.0	430	1500	0.46
129.7	1400	4930	0.46	39.5	430	1500	0.46

Summary of Compressional Wave Velocity, Shear Wave Velocity, and Poisson's Ratio Based on Source-to-Receiver Travel Time Data - Borehole B-11GEO

American Units			
Depth at Midpoint Between Source and Near Receiver	Velocity		Poisson's Ratio
	V_s	V_p	
(ft)	(ft/s)	(ft/s)	
131.7	1400	4960	0.46
133.0	1400	4930	0.46
134.6	1370	4930	0.46
136.3	1400	4890	0.46
137.9	1370	5000	0.46
139.6	1410	5000	0.46
141.2	1400	5110	0.46
142.8	1430	5110	0.46
144.5	1460	4750	0.45
146.1	1530	4890	0.45
147.8	1610	5000	0.44
149.4	1600	5000	0.44
151.0	1600	5040	0.44
152.7	1520	5040	0.45
154.3	1490	5040	0.45
156.0	1520	5190	0.45
157.6	1540	5080	0.45
159.2	1570	5230	0.45
160.9	1590	5310	0.45
162.5	1530	5310	0.45
164.2	1450	5150	0.46
165.8	1360	5080	0.46
167.4	1340	5230	0.46
169.1	1360	5080	0.46
170.7	1390	5230	0.46
172.4	1480	5310	0.46
174.0	1390	5490	0.47
175.6	1640	5580	0.45
177.3	1510	5490	0.46
178.9	1390	5310	0.46
180.6	1350	5400	0.47
182.2	1340	5150	0.46
183.9	1370	5150	0.46
185.5	1350	5230	0.46
187.1	1370	5230	0.46
188.8	1350	5230	0.46
190.4	1400	5310	0.46
192.1	1540	5400	0.46
193.7	1750	5580	0.45
195.3	1880	5970	0.45
197.0	2080	6190	0.44
198.6	2060	6190	0.44

Metric Units			
Depth at Midpoint Between Source and Near Receiver	Velocity		Poisson's Ratio
	V_s	V_p	
(m)	(m/s)	(m/s)	
40.1	430	1510	0.46
40.5	430	1500	0.46
41.0	420	1500	0.46
41.5	430	1490	0.46
42.0	420	1520	0.46
42.5	430	1520	0.46
43.0	430	1560	0.46
43.5	440	1560	0.46
44.0	440	1450	0.45
44.5	470	1490	0.45
45.0	490	1520	0.44
45.5	490	1520	0.44
46.0	490	1540	0.44
46.5	460	1540	0.45
47.0	450	1540	0.45
47.5	460	1580	0.45
48.0	470	1550	0.45
48.5	480	1590	0.45
49.0	480	1620	0.45
49.5	470	1620	0.45
50.0	440	1570	0.46
50.5	420	1550	0.46
51.0	410	1590	0.46
51.5	410	1550	0.46
52.0	420	1590	0.46
52.5	450	1620	0.46
53.0	420	1670	0.47
53.5	500	1700	0.45
54.0	460	1670	0.46
54.5	420	1620	0.46
55.0	410	1650	0.47
55.5	410	1570	0.46
56.0	420	1570	0.46
56.5	410	1590	0.46
57.0	420	1590	0.46
57.5	410	1590	0.46
58.0	430	1620	0.46
58.5	470	1650	0.46
59.0	530	1700	0.45
59.5	570	1820	0.45
60.0	630	1890	0.44
60.5	630	1890	0.44

Summary of Compressional Wave Velocity, Shear Wave Velocity, and Poisson's Ratio Based on Source-to-Receiver Travel Time Data - Borehole B-11GEO

American Units				Metric Units			
Depth at Midpoint Between Source and Near Receiver	Velocity		Poisson's Ratio	Depth at Midpoint Between Source and Near Receiver	Velocity		Poisson's Ratio
	V_s	V_p			V_s	V_p	
(ft)	(ft/s)	(ft/s)		(m)	(m/s)	(m/s)	
200.3	1980	6370	0.45	61.0	600	1940	0.45
201.9	1770	5970	0.45	61.5	540	1820	0.45
203.5	1610	5630	0.46	62.0	490	1710	0.46
205.2	1600	5530	0.45	62.5	490	1690	0.45
206.8	1550	5530	0.46	63.0	470	1690	0.46
208.5	1530	5440	0.46	63.5	470	1660	0.46
210.1	1630	5490	0.45	64.0	500	1670	0.45
211.7	1600	5530	0.45	64.5	490	1690	0.45
213.1	1610	5530	0.45	64.9	490	1690	0.45
215.0	1660	5580	0.45	65.5	510	1700	0.45
216.7	1780	5870	0.45	66.0	540	1790	0.45
218.3	1880	6030	0.45	66.5	570	1840	0.45
219.9	2300	6820	0.44	67.0	700	2080	0.44
221.6	2410	6820	0.43	67.5	730	2080	0.43
223.2	2260	6550	0.43	68.0	690	2000	0.43
224.9	2390	6550	0.42	68.5	730	2000	0.42
226.5	2130	6190	0.43	69.0	650	1890	0.43
228.1	2000	5970	0.44	69.5	610	1820	0.44
229.8	1690	6110	0.46	70.0	510	1860	0.46
231.4	1890	5770	0.44	70.5	570	1760	0.44
233.1	1960	6190	0.44	71.0	600	1890	0.44
234.7	2130	6620	0.44	71.5	650	2020	0.44
236.3	2290	6890	0.44	72.0	700	2100	0.44
238.0	2210	7180	0.45	72.5	670	2190	0.45
239.6	2220	6720	0.44	73.0	680	2050	0.44
241.3	2160	6490	0.44	73.5	660	1980	0.44
242.9	2030	6340	0.44	74.0	620	1930	0.44
244.5	2010	6370	0.44	74.5	610	1940	0.44
246.2	2040	6460	0.44	75.0	620	1970	0.44
247.8	2160	6650	0.44	75.5	660	2030	0.44
249.5	2120	6550	0.44	76.0	640	2000	0.44
251.1	2120	6720	0.44	76.5	650	2050	0.44
252.7	2060	6550	0.45	77.0	630	2000	0.45
254.4	2040	6460	0.44	77.5	620	1970	0.44
256.0	1850	6280	0.45	78.0	570	1910	0.45
257.7	2050	6430	0.44	78.5	630	1960	0.44
259.3	1800	6520	0.46	79.0	550	1990	0.46
261.0	1700	6220	0.46	79.5	520	1900	0.46
262.6	1750	6370	0.46	80.0	530	1940	0.46
264.2	1650	6110	0.46	80.5	500	1860	0.46
265.9	1510	6160	0.47	81.0	460	1880	0.47
267.5	1750	6140	0.46	81.5	530	1870	0.46

Summary of Compressional Wave Velocity, Shear Wave Velocity, and Poisson's Ratio Based on Source-to-Receiver Travel Time Data - Borehole B-11GEO

American Units				Metric Units			
Depth at Midpoint Between Source and Near Receiver	Velocity		Poisson's Ratio	Depth at Midpoint Between Source and Near Receiver	Velocity		Poisson's Ratio
	V_s	V_p			V_s	V_p	
(ft)	(ft/s)	(ft/s)		(m)	(m/s)	(m/s)	
269.2	1740	6220	0.46	82.0	530	1900	0.46
270.8	1670	6160	0.46	82.5	510	1880	0.46
272.4	1760	6280	0.46	83.0	540	1910	0.46
274.1	1760	6340	0.46	83.5	540	1930	0.46
275.7	1620	6190	0.46	84.0	490	1890	0.46
277.4	1800	6110	0.45	84.5	550	1860	0.45
279.0	1850	6280	0.45	85.0	570	1910	0.45
280.6	1870	6370	0.45	85.5	570	1940	0.45
282.3	1950	6490	0.45	86.0	590	1980	0.45
283.9	2130	6590	0.44	86.5	650	2010	0.44
285.6	2420	6990	0.43	87.0	740	2130	0.43
287.2	2350	7380	0.44	87.5	720	2250	0.44
288.8	2460	7260	0.43	88.0	750	2210	0.43
290.5	2400	7140	0.44	88.5	730	2180	0.44
292.1	2250	6780	0.44	89.0	690	2070	0.44
293.8	2270	6960	0.44	89.5	690	2120	0.44
295.4	2140	6960	0.45	90.0	650	2120	0.45
297.0	2160	6820	0.44	90.5	660	2080	0.44
298.7	2150	6750	0.44	91.0	660	2060	0.44
300.3	2180	6680	0.44	91.5	670	2040	0.44
302.0	2260	5970	0.42	92.0	690	1820	0.42
303.9	2210	6340	0.43	92.6	670	1930	0.43
305.2	2130	6400	0.44	93.0	650	1950	0.44
306.9	2150	6140	0.43	93.5	660	1870	0.43
308.5	2150	6490	0.44	94.0	660	1980	0.44
310.2	2170	6650	0.44	94.5	660	2030	0.44
311.8	2240	6590	0.43	95.0	680	2010	0.43
313.4	2530	6780	0.42	95.5	770	2070	0.42
315.1	2660	6780	0.41	96.0	810	2070	0.41
316.7	2910	6890	0.39	96.5	890	2100	0.39
318.4	3360	7850	0.39	97.0	1020	2390	0.39
320.0	3360	7710	0.38	97.5	1020	2350	0.38
321.6	3010	7580	0.41	98.0	920	2310	0.41
323.3	2990	7260	0.40	98.5	910	2210	0.40
324.9	2850	7420	0.41	99.0	870	2260	0.41
326.6	1920	6750	0.46	99.5	580	2060	0.46
328.2	1620	6430	0.47	100.0	490	1960	0.47
329.8	1700	6250	0.46	100.5	520	1910	0.46
331.5	1700	6190	0.46	101.0	520	1890	0.46
333.1	1790	6620	0.46	101.5	540	2020	0.46
334.8	2220	7260	0.45	102.0	680	2210	0.45
336.4	3230	7850	0.40	102.5	980	2390	0.40

Summary of Compressional Wave Velocity, Shear Wave Velocity, and Poisson's Ratio Based on Source-to-Receiver Travel Time Data - Borehole B-11GEO

American Units				Metric Units			
Depth at Midpoint Between Source and Near Receiver	Velocity		Poisson's Ratio	Depth at Midpoint Between Source and Near Receiver	Velocity		Poisson's Ratio
	V_s	V_p			V_s	V_p	
(ft)	(ft/s)	(ft/s)		(m)	(m/s)	(m/s)	
338.1	3150	7850	0.40	103.0	960	2390	0.40
339.7	2970	7670	0.41	103.5	910	2340	0.41
341.3	2810	7260	0.41	104.0	860	2210	0.41
343.0	2290	6960	0.44	104.5	700	2120	0.44
344.6	1970	6340	0.45	105.0	600	1930	0.45
346.3	1740	5920	0.45	105.5	530	1800	0.45
347.9	1580	5820	0.46	106.0	480	1770	0.46
349.5	1550	6190	0.47	106.5	470	1890	0.47
351.2	1750	6550	0.46	107.0	530	2000	0.46
352.8	1680	6220	0.46	107.5	510	1900	0.46
354.5	1700	6340	0.46	108.0	520	1930	0.46
356.1	1560	5920	0.46	108.5	480	1800	0.46
357.7	1570	5740	0.46	109.0	480	1750	0.46
359.4	1780	6050	0.45	109.5	540	1850	0.45
361.0	1880	6370	0.45	110.0	570	1940	0.45
362.7	2370	7140	0.44	110.5	720	2180	0.44
364.3	3040	7940	0.41	111.0	930	2420	0.41
365.9	2860	7760	0.42	111.5	870	2360	0.42
367.6	2570	7260	0.43	112.0	780	2210	0.43
369.2	2480	6960	0.43	112.5	760	2120	0.43
370.9	2620	7180	0.42	113.0	800	2190	0.42
372.5	2840	7540	0.42	113.5	860	2300	0.42
374.1	3180	7850	0.40	114.0	970	2390	0.40
375.8	3260	8040	0.40	114.5	990	2450	0.40
377.4	3500	8230	0.39	115.0	1070	2510	0.39
379.1	2690	6990	0.41	115.5	820	2130	0.41
380.7	2400	7110	0.44	116.0	730	2170	0.44
382.3	2080	6550	0.44	116.5	630	2000	0.44
384.0	1820	6250	0.45	117.0	550	1910	0.45
385.6	1520	5820	0.46	117.5	460	1770	0.46
387.3	1490	5920	0.47	118.0	450	1800	0.47
388.9	1610	6030	0.46	118.5	490	1840	0.46
390.5	1800	6310	0.46	119.0	550	1920	0.46
392.2	2160	6750	0.44	119.5	660	2060	0.44
393.8	2760	7340	0.42	120.0	840	2240	0.42
395.5	2930	7420	0.41	120.5	890	2260	0.41
397.1	2590	7420	0.43	121.0	790	2260	0.43
398.7	2410	7260	0.44	121.5	730	2210	0.44
400.4	1950	6620	0.45	122.0	590	2020	0.45
402.0	1510	6080	0.47	122.5	460	1850	0.47
403.7	1240	5440	0.47	123.0	380	1660	0.47
405.3	1180	5310	0.47	123.5	360	1620	0.47

Summary of Compressional Wave Velocity, Shear Wave Velocity, and Poisson's Ratio Based on Source-to-Receiver Travel Time Data - Borehole B-11GEO

American Units			
Depth at Midpoint Between Source and Near Receiver	Velocity		Poisson's Ratio
	V_s	V_p	
(ft)	(ft/s)	(ft/s)	
406.9	1160	5270	0.47
408.6	1210	5360	0.47
410.2	1240	5310	0.47
411.9	1340	5360	0.47
413.5	1380	5580	0.47
415.1	1370	5560	0.47
416.8	1460	5600	0.46
418.4	1390	5510	0.47
420.1	1390	5310	0.46
421.7	1340	5110	0.46
423.4	1250	5090	0.47
425.0	1250	5000	0.47
426.6	1200	5040	0.47
428.3	1180	5000	0.47
429.9	1240	5060	0.47
431.6	1260	5090	0.47
433.2	1250	5090	0.47
434.8	1240	5110	0.47
436.5	1220	5090	0.47
438.1	1230	5090	0.47
439.8	1330	5420	0.47
441.4	1460	5650	0.46
443.0	1610	5720	0.46
444.7	1750	5270	0.44
446.3	1810	5900	0.45
448.0	1850	6160	0.45
449.6	2000	6110	0.44
451.2	2170	6400	0.43
452.9	2120	6550	0.44
454.5	1960	6490	0.45
456.2	2200	6030	0.42
457.8	2360	7220	0.44
459.4	2420	7300	0.44
461.1	2560	7460	0.43
462.7	2300	7220	0.44
464.4	1660	5670	0.45
466.0	1530	5670	0.46
467.6	1390	5560	0.47
469.3	1330	5560	0.47
470.9	1340	5490	0.47
472.6	1400	5340	0.46
474.2	1400	5530	0.47

Metric Units			
Depth at Midpoint Between Source and Near Receiver	Velocity		Poisson's Ratio
	V_s	V_p	
(m)	(m/s)	(m/s)	
124.0	350	1610	0.47
124.5	370	1630	0.47
125.0	380	1620	0.47
125.5	410	1630	0.47
126.0	420	1700	0.47
126.5	420	1690	0.47
127.0	450	1710	0.46
127.5	430	1680	0.47
128.0	430	1620	0.46
128.5	410	1560	0.46
129.0	380	1550	0.47
129.5	380	1520	0.47
130.0	370	1540	0.47
130.5	360	1520	0.47
131.0	380	1540	0.47
131.5	380	1550	0.47
132.0	380	1550	0.47
132.5	380	1560	0.47
133.0	370	1550	0.47
133.5	380	1550	0.47
134.0	400	1650	0.47
134.5	450	1720	0.46
135.0	490	1740	0.46
135.5	530	1610	0.44
136.0	550	1800	0.45
136.5	570	1880	0.45
137.0	610	1860	0.44
137.5	660	1950	0.43
138.0	640	2000	0.44
138.5	600	1980	0.45
139.0	670	1840	0.42
139.5	720	2200	0.44
140.0	740	2220	0.44
140.5	780	2270	0.43
141.0	700	2200	0.44
141.5	510	1730	0.45
142.0	470	1730	0.46
142.5	420	1690	0.47
143.0	410	1690	0.47
143.5	410	1670	0.47
144.0	430	1630	0.46
144.5	430	1690	0.47

Summary of Compressional Wave Velocity, Shear Wave Velocity, and Poisson's Ratio Based on Source-to-Receiver Travel Time Data - Borehole B-11GEO

American Units				Metric Units			
Depth at Midpoint Between Source and Near Receiver	Velocity		Poisson's Ratio	Depth at Midpoint Between Source and Near Receiver	Velocity		Poisson's Ratio
	V_s	V_p			V_s	V_p	
(ft)	(ft/s)	(ft/s)		(m)	(m/s)	(m/s)	
475.8	1440	5630	0.46	145.0	440	1710	0.46
477.5	1450	5770	0.47	145.5	440	1760	0.47
479.1	1490	5770	0.46	146.0	450	1760	0.46
480.8	1480	5770	0.46	146.5	450	1760	0.46
482.4	1490	5720	0.46	147.0	450	1740	0.46
484.0	1470	5770	0.47	147.5	450	1760	0.47
485.7	1490	5870	0.47	148.0	460	1790	0.47
487.3	1550	5770	0.46	148.5	470	1760	0.46
489.0	1570	5820	0.46	149.0	480	1770	0.46
490.6	1600	5870	0.46	149.5	490	1790	0.46
492.2	1610	5820	0.46	150.0	490	1770	0.46
493.9	1640	5820	0.46	150.5	500	1770	0.46
495.5	1680	5870	0.46	151.0	510	1790	0.46
497.2	1750	6080	0.45	151.5	530	1850	0.45
498.8	1960	6250	0.45	152.0	600	1910	0.45
500.5	2000	6250	0.44	152.5	610	1910	0.44
502.1	2000	6220	0.44	153.0	610	1900	0.44
503.7	2050	6110	0.44	153.5	630	1860	0.44
505.4	2050	5950	0.43	154.0	630	1810	0.43
507.0	2000	5700	0.43	154.5	610	1740	0.43
508.7	2010	6220	0.44	155.0	610	1900	0.44
510.3	1960	6280	0.45	155.5	600	1910	0.45
511.9	1920	6080	0.44	156.0	590	1850	0.44
513.6	1880	6080	0.45	156.5	570	1850	0.45
515.2	1930	6050	0.44	157.0	590	1850	0.44
516.9	1930	6030	0.44	157.5	590	1840	0.44
518.5	2070	5970	0.43	158.0	630	1820	0.43
520.1	2200	6030	0.42	158.5	670	1840	0.42
521.8	2220	5950	0.42	159.0	680	1810	0.42
523.4	2230	6000	0.42	159.5	680	1830	0.42
525.1	2210	5900	0.42	160.0	670	1800	0.42
526.7	2110	5720	0.42	160.5	640	1740	0.42
528.3	2070	5770	0.43	161.0	630	1760	0.43
530.0	2040	5740	0.43	161.5	620	1750	0.43
531.6	1990	5670	0.43	162.0	610	1730	0.43
533.3	1930	5630	0.43	162.5	590	1710	0.43
534.9	1960	5740	0.43	163.0	600	1750	0.43
536.5	2000	5720	0.43	163.5	610	1740	0.43
538.2	2010	5740	0.43	164.0	610	1750	0.43
539.8	2110	5840	0.43	164.5	640	1780	0.43
541.5	2120	5900	0.43	165.0	640	1800	0.43
543.1	2100	5920	0.43	165.5	640	1800	0.43

Summary of Compressional Wave Velocity, Shear Wave Velocity, and Poisson's Ratio Based on Source-to-Receiver Travel Time Data - Borehole B-11GEO

American Units				Metric Units			
Depth at Midpoint Between Source and Near Receiver	Velocity		Poisson's Ratio	Depth at Midpoint Between Source and Near Receiver	Velocity		Poisson's Ratio
	V_s	V_p			V_s	V_p	
(ft)	(ft/s)	(ft/s)		(m)	(m/s)	(m/s)	
544.7	2110	5920	0.43	166.0	640	1800	0.43
546.4	2120	6110	0.43	166.5	640	1860	0.43
548.0	2130	6030	0.43	167.0	650	1840	0.43
549.7	2210	5870	0.42	167.5	670	1790	0.42
551.3	2220	5820	0.41	168.0	680	1770	0.41
552.9	2200	6000	0.42	168.5	670	1830	0.42
554.6	2190	6030	0.42	169.0	670	1840	0.42
556.2	2120	6030	0.43	169.5	640	1840	0.43
557.9	2070	6050	0.43	170.0	630	1850	0.43
559.5	2120	6160	0.43	170.5	640	1880	0.43
561.1	2120	6190	0.43	171.0	640	1890	0.43
562.8	2230	6370	0.43	171.5	680	1940	0.43
564.4	2220	6340	0.43	172.0	680	1930	0.43
566.1	2180	6190	0.43	172.5	660	1890	0.43
567.7	2130	5970	0.43	173.0	650	1820	0.43
569.3	2110	5920	0.43	173.5	640	1800	0.43
571.0	2070	5900	0.43	174.0	630	1800	0.43
572.6	2120	5900	0.43	174.5	640	1800	0.43
574.3	2240	6370	0.43	175.0	680	1940	0.43
575.9	2330	6400	0.42	175.5	710	1950	0.42
577.6	2410	6340	0.42	176.0	730	1930	0.42
579.2	2460	6370	0.41	176.5	750	1940	0.41
580.8	2230	5970	0.42	177.0	680	1820	0.42
582.5	2140	6050	0.43	177.5	650	1850	0.43
584.1	2050	5700	0.43	178.0	630	1740	0.43
585.8	1990	5740	0.43	178.5	610	1750	0.43
587.4	1960	5840	0.44	179.0	600	1780	0.44
589.0	1960	5740	0.43	179.5	600	1750	0.43
590.7	1990	5820	0.43	180.0	610	1770	0.43
592.3	1970	5740	0.43	180.5	600	1750	0.43
594.0	2000	5700	0.43	181.0	610	1740	0.43
595.6	2030	5720	0.43	181.5	620	1740	0.43
597.2	2030	5720	0.43	182.0	620	1740	0.43
598.9	2050	5700	0.43	182.5	630	1740	0.43
600.5	2060	5820	0.43	183.0	630	1770	0.43
602.2	2110	5840	0.43	183.5	640	1780	0.43
603.8	2280	6400	0.43	184.0	700	1950	0.43
605.4	2350	6430	0.42	184.5	720	1960	0.42
607.1	2410	6520	0.42	185.0	730	1990	0.42
608.7	2350	6190	0.42	185.5	720	1890	0.42
610.4	2180	6030	0.42	186.0	660	1840	0.42
612.0	2070	5920	0.43	186.5	630	1800	0.43

Summary of Compressional Wave Velocity, Shear Wave Velocity, and Poisson's Ratio Based on Source-to-Receiver Travel Time Data - Borehole B-11GEO

American Units				Metric Units			
Depth at Midpoint Between Source and Near Receiver	Velocity		Poisson's Ratio	Depth at Midpoint Between Source and Near Receiver	Velocity		Poisson's Ratio
	V_s	V_p			V_s	V_p	
(ft)	(ft/s)	(ft/s)		(m)	(m/s)	(m/s)	
613.6	2060	5950	0.43	187.0	630	1810	0.43
615.3	2050	6030	0.43	187.5	630	1840	0.43
616.9	2050	6000	0.43	188.0	630	1830	0.43
618.6	2050	6030	0.43	188.5	630	1840	0.43
620.2	2100	6030	0.43	189.0	640	1840	0.43
621.8	2110	6030	0.43	189.5	640	1840	0.43
623.5	2110	6080	0.43	190.0	640	1850	0.43
625.1	2100	6030	0.43	190.5	640	1840	0.43
626.8	2070	5900	0.43	191.0	630	1800	0.43
628.4	2020	5820	0.43	191.5	620	1770	0.43
630.0	2050	5950	0.43	192.0	630	1810	0.43
632.0	2050	5840	0.43	192.6	630	1780	0.43
633.3	2040	5950	0.43	193.0	620	1810	0.43
635.0	2060	5900	0.43	193.5	630	1800	0.43
636.6	2050	5840	0.43	194.0	630	1780	0.43
638.2	2110	5790	0.42	194.5	640	1770	0.42
639.9	2130	5820	0.42	195.0	650	1770	0.42
641.5	2160	5820	0.42	195.5	660	1770	0.42
643.2	2100	5840	0.43	196.0	640	1780	0.43
644.8	2160	5840	0.42	196.5	660	1780	0.42
646.4	2160	5900	0.42	197.0	660	1800	0.42
648.1	2160	5900	0.42	197.5	660	1800	0.42
649.7	2180	5970	0.42	198.0	660	1820	0.42
651.4	2120	5970	0.43	198.5	640	1820	0.43
653.0	2110	5870	0.43	199.0	640	1790	0.43
654.7	2140	5870	0.42	199.5	650	1790	0.42
656.3	2160	5870	0.42	200.0	660	1790	0.42
657.9	2120	5920	0.43	200.5	640	1800	0.43
659.6	2060	5900	0.43	201.0	630	1800	0.43
661.2	2030	5790	0.43	201.5	620	1770	0.43
662.9	1990	5770	0.43	202.0	610	1760	0.43
664.5	1930	5770	0.44	202.5	590	1760	0.44
666.1	2010	5790	0.43	203.0	610	1770	0.43
667.8	1960	5790	0.44	203.5	600	1770	0.44
669.4	2010	5790	0.43	204.0	610	1770	0.43
671.1	2090	5900	0.43	204.5	640	1800	0.43
672.7	2300	6340	0.42	205.0	700	1930	0.42
674.3	2350	6460	0.42	205.5	720	1970	0.42
676.0	2460	6550	0.42	206.0	750	2000	0.42
677.6	2740	6520	0.39	206.5	840	1990	0.39
679.3	2460	6310	0.41	207.0	750	1920	0.41
680.9	2300	6110	0.42	207.5	700	1860	0.42

Summary of Compressional Wave Velocity, Shear Wave Velocity, and Poisson's Ratio Based on Source-to-Receiver Travel Time Data - Borehole B-11GEO

American Units				Metric Units			
Depth at Midpoint Between Source and Near Receiver	Velocity		Poisson's Ratio	Depth at Midpoint Between Source and Near Receiver	Velocity		Poisson's Ratio
	V_s	V_p			V_s	V_p	
(ft)	(ft/s)	(ft/s)		(m)	(m/s)	(m/s)	
682.5	2030	6050	0.44	208.0	620	1850	0.44
684.2	1920	5840	0.44	208.5	590	1780	0.44
685.8	1830	5840	0.45	209.0	560	1780	0.45
687.5	1750	5630	0.45	209.5	530	1710	0.45
689.1	1880	5650	0.44	210.0	570	1720	0.44
690.7	2070	5900	0.43	210.5	630	1800	0.43
692.4	2240	6140	0.42	211.0	680	1870	0.42
694.0	2410	6160	0.41	211.5	730	1880	0.41
695.7	2580	6220	0.40	212.0	790	1900	0.40
697.3	2270	5950	0.41	212.5	690	1810	0.41
698.9	2220	5820	0.41	213.0	680	1770	0.41
700.6	2230	5820	0.41	213.5	680	1770	0.41
702.2	2480	6000	0.40	214.0	760	1830	0.40
703.9	2640	6430	0.40	214.5	800	1960	0.40
705.5	2710	6430	0.39	215.0	830	1960	0.39
707.5	2910	6430	0.37	215.6	890	1960	0.37
708.8	2820	6590	0.39	216.0	860	2010	0.39
710.4	2480	6400	0.41	216.5	760	1950	0.41
712.1	2280	6250	0.42	217.0	700	1910	0.42
713.7	2130	6080	0.43	217.5	650	1850	0.43
715.3	1960	5840	0.44	218.0	600	1780	0.44
717.0	1860	5720	0.44	218.5	570	1740	0.44
718.6	1890	5790	0.44	219.0	570	1770	0.44
720.3	1830	5770	0.44	219.5	560	1760	0.44
721.9	1850	5720	0.44	220.0	560	1740	0.44
723.5	1860	5720	0.44	220.5	570	1740	0.44
725.2	1910	5820	0.44	221.0	580	1770	0.44
726.8	1950	5700	0.43	221.5	590	1740	0.43
728.5	1960	5600	0.43	222.0	600	1710	0.43
730.1	2040	5560	0.42	222.5	620	1690	0.42
731.8	2000	5600	0.43	223.0	610	1710	0.43
733.4	1960	5440	0.43	223.5	600	1660	0.43
735.0	2030	5790	0.43	224.0	620	1770	0.43
736.7	2110	5650	0.42	224.5	640	1720	0.42
738.3	2160	6140	0.43	225.0	660	1870	0.43
740.0	2160	5920	0.42	225.5	660	1800	0.42
741.6	2160	5870	0.42	226.0	660	1790	0.42
743.2	2130	5820	0.42	226.5	650	1770	0.42
744.9	1960	5530	0.43	227.0	600	1690	0.43
746.5	1910	5380	0.43	227.5	580	1640	0.43
748.2	1900	5580	0.43	228.0	580	1700	0.43
749.8	1890	5510	0.43	228.5	570	1680	0.43

Summary of Compressional Wave Velocity, Shear Wave Velocity, and Poisson's Ratio Based on Source-to-Receiver Travel Time Data - Borehole B-11GEO

American Units				Metric Units			
Depth at Midpoint Between Source and Near Receiver	Velocity		Poisson's Ratio	Depth at Midpoint Between Source and Near Receiver	Velocity		Poisson's Ratio
	V_s	V_p			V_s	V_p	
(ft)	(ft/s)	(ft/s)		(m)	(m/s)	(m/s)	
751.4	1910	5600	0.43	229.0	580	1710	0.43
753.1	1960	5490	0.43	229.5	600	1670	0.43
754.7	1960	5630	0.43	230.0	600	1710	0.43
756.4	2040	5650	0.43	230.5	620	1720	0.43
758.0	2070	5740	0.43	231.0	630	1750	0.43
759.6	2120	5790	0.42	231.5	640	1770	0.42
761.3	2160	5840	0.42	232.0	660	1780	0.42
762.9	2110	5840	0.43	232.5	640	1780	0.43
764.6	2070	5720	0.42	233.0	630	1740	0.42
766.2	2030	5650	0.43	233.5	620	1720	0.43
767.8	2030	5720	0.43	234.0	620	1740	0.43
769.5	2070	5670	0.42	234.5	630	1730	0.42
771.1	2130	5720	0.42	235.0	650	1740	0.42
772.8	2160	5770	0.42	235.5	660	1760	0.42
774.4	2190	5770	0.42	236.0	670	1760	0.42
776.0	2210	5720	0.41	236.5	670	1740	0.41
777.7	2210	5600	0.41	237.0	670	1710	0.41
779.3	2260	5560	0.40	237.5	690	1690	0.40
781.0	2260	5700	0.41	238.0	690	1740	0.41
782.6	2280	5670	0.40	238.5	700	1730	0.40
784.2	2340	5630	0.39	239.0	710	1710	0.39
785.9	2280	5580	0.40	239.5	700	1700	0.40
787.5	2280	5630	0.40	240.0	700	1710	0.40
789.2	2280	5630	0.40	240.5	700	1710	0.40
790.8	2270	5630	0.40	241.0	690	1710	0.40
792.4	2240	6490	0.43	241.5	680	1980	0.43
794.1	2210	5770	0.41	242.0	670	1760	0.41
796.1	2080	5600	0.42	242.6	640	1710	0.42

Notes: "-" means no data available at that particular interval of depth.

APPENDIX A

PROCEDURE FOR
OYO P-S SUSPENSION SEISMIC
VELOCITY LOGGING

PROCEDURE FOR

OYO P-S SUSPENSION SEISMIC VELOCITY LOGGING

Background

This procedure describes a method for measuring shear and compressional wave velocities in soil and rock. The OYO P-S Suspension Method is applied by generating shear and compressional waves in a borehole using the OYO P-S Suspension Logger borehole tool and measuring the travel time between two receiver geophones or hydrophones located in the same tool.

Objective

The outcome of this procedure is a plot and table of P and S_H wave velocity versus depth for each borehole. Standard analysis is performed on receiver to receiver data. Data is presented in report format, with digital data files transmitted in Excel, Word or ASCII format.

Instrumentation

1. OYO Model 170 Digital Logging Recorder or equivalent
2. OYO P-S Suspension Logger probe or equivalent, including two sets horizontal and vertical geophones, seismic source, and power supply for the source and receivers
3. Winch and winch controller, with logging cable
4. Batteries to operate P-S Logger and winch

The Suspension P-S Logger system, manufactured by OYO Corporation, or the Robertson Digital P-S Suspension Probe with the Robertson Micrologger2 are currently the only commercially available suspension logging systems. As shown in Figure 1, these systems consists of a borehole probe suspended by a cable and a recording/control electronics package on the surface.

The suspension system probe consists of a combined reversible polarity solenoid horizontal shear-wave generator (S_H) and compressional-wave generator (P), joined to two biaxial geophones by a flexible isolation cylinder. The separation of the two geophones is one meter, allowing average wave velocity in the region between the geophones to be determined by inversion of the wave travel time between the two geophones. The total length of the probe is approximately 7 meters; the center point of the geophones is approximately 4 meters above the bottom end of the probe.

The probe receives control signals from, and sends the amplified geophone signals to, the instrumentation package on the surface via an armored 4 or 7 conductor cable. The cable is wound onto the drum of a winch and is used to support the probe. Cable travel is measured by a rotary encoder to provide probe depth data.

The entire probe is suspended by the cable and may be centered in the borehole by nylon "whiskers." Therefore, source motion is not coupled directly to the borehole walls; rather, the source motion creates a horizontally propagating pressure wave in the fluid filling the borehole and surrounding the source. This pressure wave produces a horizontal displacement of the soil forming the wall of the borehole. This displacement propagates up and down the borehole wall, in turn causing a pressure wave to be generated in the fluid surrounding the geophones as the soil displacement wave passes their location.

Environmental Conditions

The OYO P-S Suspension Logging Method can be used in either cased or uncased boreholes. For best results, the uncased borehole must be between 10 and 20 cm in diameter, or 4 to 8 inches. A cased borehole may be as small as 3 inches, if properly grouted (see below) and the grout annulus does not exceed 1 inch.

Uncased boreholes are preferred because the effects of the casing and grouting are removed. It is recommended that the borehole be drilled using the rotary mud method. This method does little damage to the borehole wall, and the drilling fluid coats and seals the borehole wall reducing fluid loss and wall collapse. The borehole fluid is required for the logging, and must be well circulated prior to logging.

If the borehole must be cased, the casing must be PVC and properly installed and grouted. Any voids in the grout will cause problems with the data. Likewise, large grout bulbs used to fill cavities will also cause problems. The grout must be set before testing. This means the grouting must take place at least 48 hours before testing.

For borehole casing, applicable preparation procedures are presented in ASTM Standard D4428/D4428M-91 Section 4.1 (see ASTM website for copy).

Calibration

Calibration of the digital recorder is required. Calibration is limited to the timing accuracy of the recorder. GEOVision's Seismograph Calibration Procedure or equivalent should be used. Calibration must be performed on an annual basis.

Measurement Procedure

The entire probe is lowered into the borehole to a specific measurement depth by the winch. A measurement sequence is then initiated by the operator from the instrumentation package control panel. No further operator intervention is then needed to complete the measurement sequence described below.

The system electronics activates the SH-wave source in one direction and records the output of the two horizontally oriented geophone axes which are situated parallel to the axis of motion of the source. The source is then activated in the opposite direction, and the horizontal output signals are again recorded, producing a SH-wave record of polarity opposite to the previous record. The source is finally actuated in the first direction again, and the responses of the vertical geophone axes to the resultant P-wave are recorded during this sampling.

The data from each geophone during each source activation is recorded as a different channel on the recording system. The seismograph has at least six channels (two simultaneous recording channels), each with at least a 12 bit 1024 sample record. Newer seismographs may have longer record lengths. The recorded data is displayed on a CRT or LCD display and possibly on paper tape output as six channels with a common time scale. Data is stored on digital media for further processing. Up to 8 sampling sequences can be stacked (averaged) to improve the signal to noise ratio of the signals.

Review of the data on the display or paper tape allows the operator to set the gains, filters, delay time, pulse length (energy), sample rate, and stacking number in order to optimize the quality of the data before recording. In the case of the Model 170, printed data is verified by the operator prior to moving the probe. In the case of the Robertson Micrologger2, storage on the hard disk should be verified from time-to-time, certainly before exiting the borehole.

Typical depth spacing for measurements is 1.0 meters, or 3.3 feet. Alternative spacing is 0.5 meter, or 1.6 feet.

Required Field Records

1) Field log for each borehole showing

    a) Borehole identification

    b) Date of test

    c) Tester or data recorder

d) Description of measurement

e) Any deviations from test plan and action taken as a result

f) QA Review

2) Paper output records are no longer required, since the Micrologger2 cannot generate them. However, data must be stored in at least 2 places prior to leaving the site

3) List of record ID numbers (for data on digital media) and corresponding depth

4) Diskettes, CDRom, or USB flash drives with backup copies of data on hard disk, labeled with borehole designation, record ID numbers, date, and tester name.

An example Field Log is attached to this procedure.

Analysis

Following completion of field work, the recorded digital records are processed by computer using the OYO Corporation software program PSLOG and interactively analyzed by an experienced geophysicist to produce plots and tables of P and S_H wave velocity versus depth.

The digital time series records from each depth are transferred to a personal computer for analysis. Figure 2 shows a sample of the data from a single depth. These digital records are analyzed to locate the first minima on the vertical axis records, indicating the arrival of P-wave energy. The difference in travel time between these arrivals is used to calculate the P-wave velocity for that 1-meter interval. When observable, P-wave arrivals on the horizontal axis records are used to verify the velocities determined from the vertical axis data. In addition, the soil velocity calculated from the travel time from source to first receiver is compared to the velocity derived from the travel time between receivers.

The digital records are studied to establish the presence of clear SH-wave pulses, as indicated by the presence of opposite polarity pulses on each pair of horizontal records. Ideally, the SH-wave signals from the ‘normal’ and ‘reverse’ source pulses are very nearly inverted images of each other. Digital FFT – IFFT lowpass filtering are used to remove the higher frequency P-wave signal from the SH-wave signal.

The first maxima are picked for the ‘normal’ signals and the first minima are picked for the 'reverse' signals. The absolute arrival time of the ‘normal’ and ‘reverse’ signals may vary by +/- 0.2 milliseconds, due to differences in actuation time of the solenoid source caused by constant mechanical bias in the source or by borehole inclination. This variation does not affect the velocity determinations, as the differential time is measured between arrivals of waves created by the same source actuation. The final velocity value is the average of the values obtained from the 'normal' and 'reverse' source actuations.

In Figure 2, the time difference over the 1-meter interval of 1.70 millisecond is equivalent to a SH-wave velocity of 588 m/sec. Whenever possible, time differences are determined from several phase points on the S_H -wave pulse trains to verify the data obtained from the first arrival of the S_H -wave pulse. In addition, the soil velocity calculated from the travel time from source to first receiver is compared to the velocity derived from the travel time between receivers.

Figure 3 is a sample composite plot of the far normal horizontal geophone records for a range of depths. This plot shows the waveforms at each depth, clearly showing the S-wave arrivals. This display format is used during analysis to observe trends in velocity with changing depth.

Once the proper picks are entered in PSLOG, the picks are transferred to an Excel spreadsheet where Vs and Vp are calculated. The spreadsheet allows output for presentation in charts and tables.

Standard analysis is performed on receiver 1 to receiver 2 data, with separate analysis performed on source to receiver data as a quality assurance procedure.

Registered Geophysicist Antony J Martin Date 9/11/06

QA Review ________ Date 9/11/06

References:

1. "In Situ P and S Wave Velocity Measurement", Ohya, S. 1986. Proceedings of In-Situ '86, *Use of In-Situ Tests In Geotechnical Engineering*, an ASCE Specialty Conference sponsored by the Geotechnical Engineering Division of ASCE and co-sponsored by the Civil Engineering Dept of Virginia Tech.

2. Guidelines for Determining Design Basis Ground Motions, Report TR-102293, Electric Power Research Institute, Palo Alto, California, November 1993, Sections 7 and 8.

3. "Standard test Methods for Crosshole Seismic Testing", ASTM Standard D4428/D4428M-91, July 1991, Philadelphia, PA

OYO SUSPENSION P-S VELOCITY LOGGING SETUP

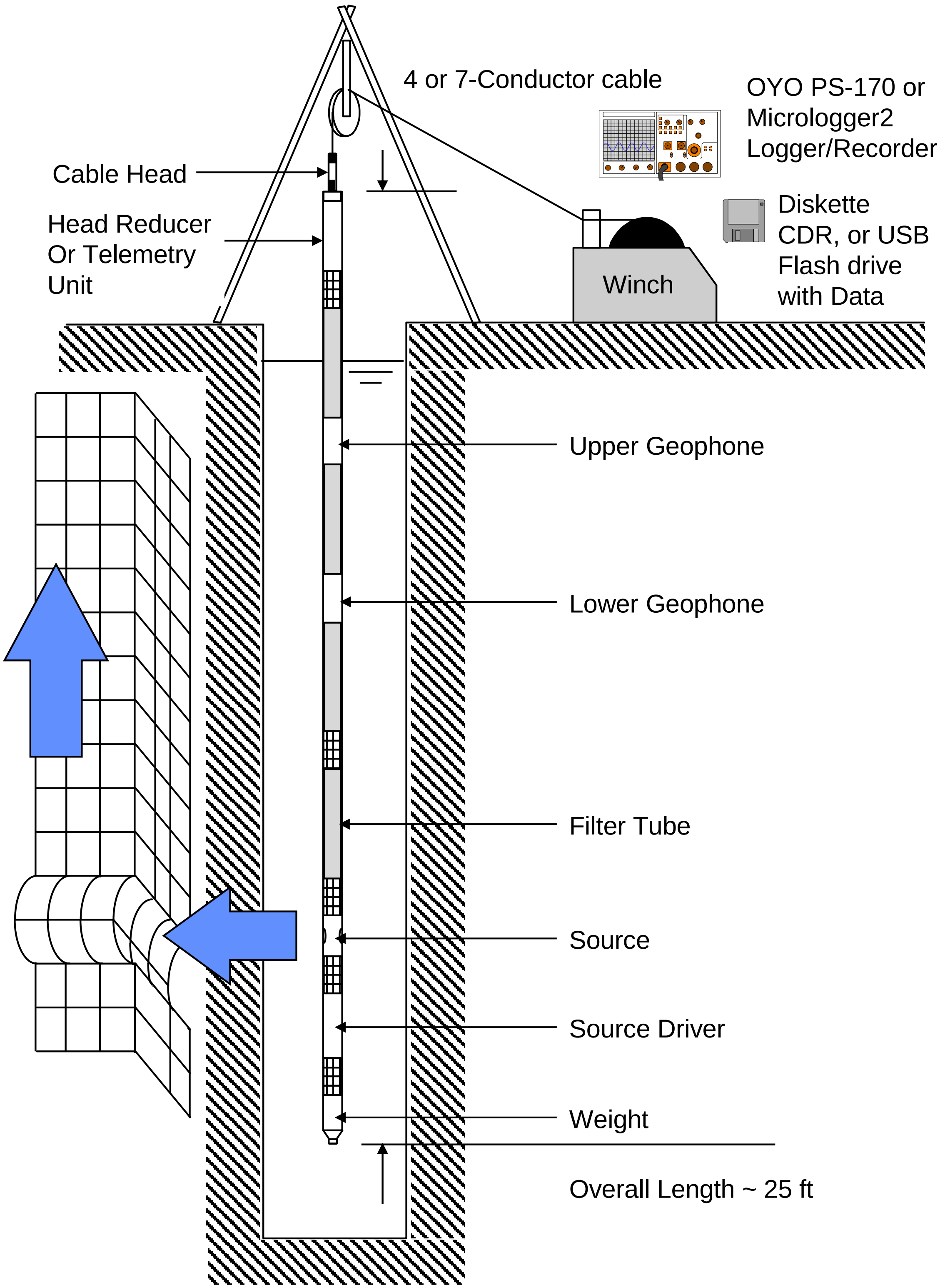


Figure 1. Suspension PS logging method setup

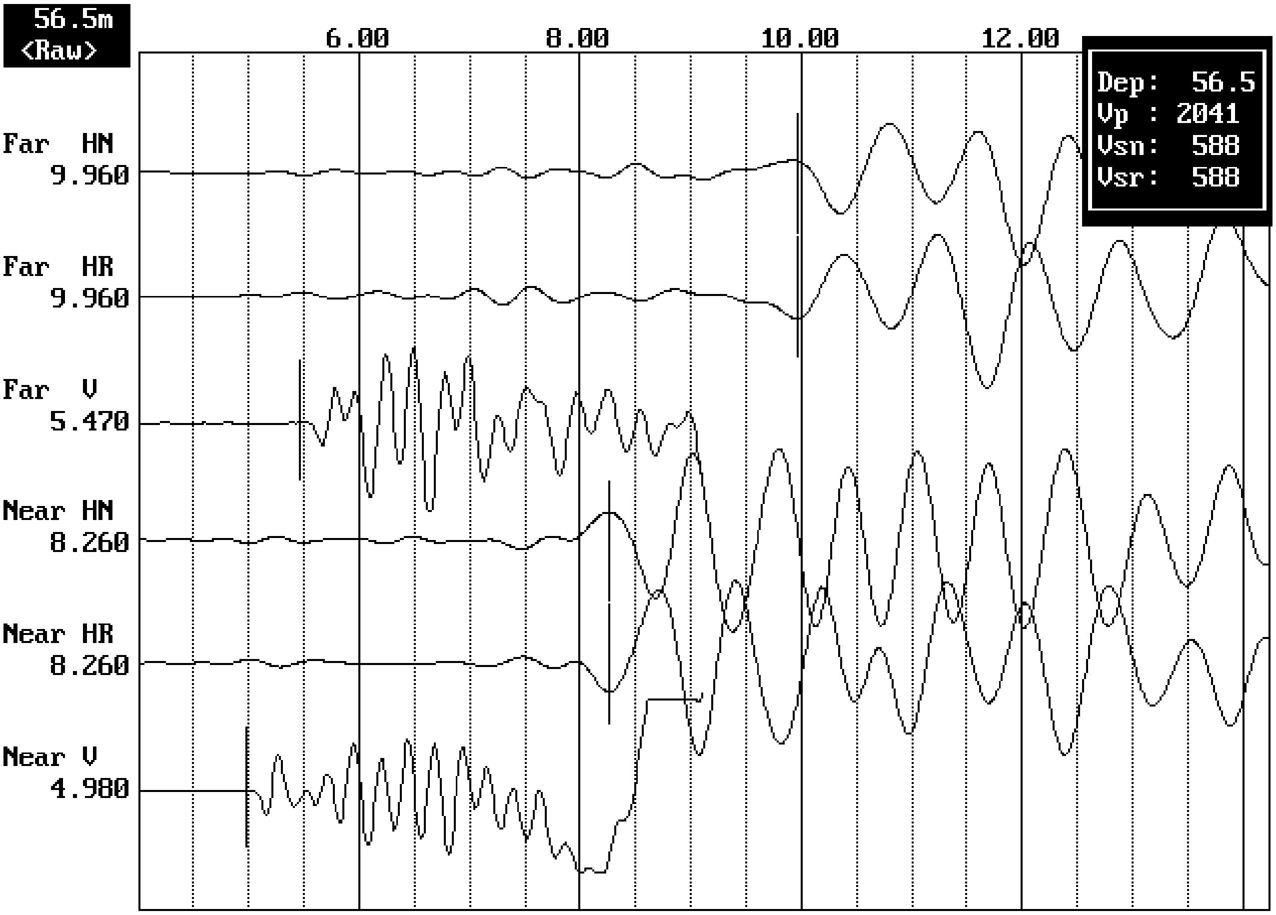


Figure 2. Sample suspension method waveform data showing horizontal normal and reversed (HR and HN), and vertical (V) waveforms received at the near (bottom 3 channels) and far (top 3 channels) geophones. The arrivals in milliseconds for each pick are shown on the left. The box in the upper right corner shows the depth in the borehole and the velocities calculated based on the picks.

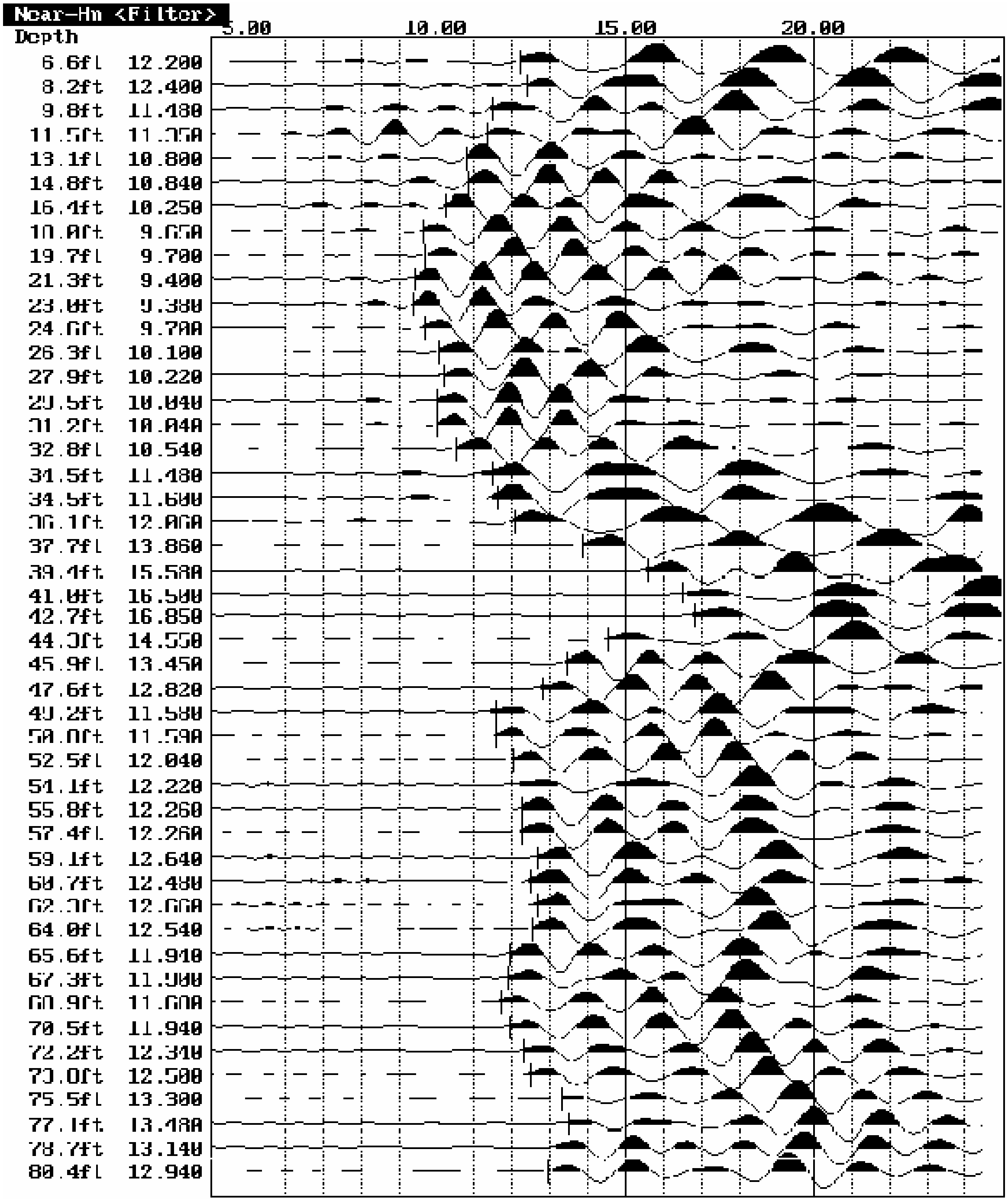


Figure 3. Sample composite waveform plot for normal shear waves received at the near geophone in a single borehole

APPENDIX B

OYO 170 VELOCITY LOGGING SYSTEM

NIST TRACEABLE CALIBRATION PROCEDURE AND CALIBRATION RECORDS

EDISON ESI℠
A SO TH N CALIFORNIA EDISON® Company

Metrology
7300 Fenwick Lane
Westminster, CA 92683
Phone: 866-723-2257

Calibration Report

NVLAP Accredited
Calibration
GEOVision Geophysical Services
1124 Olympic Drive
Corona, CA 92881-3390

TEST NUMBER
558547

NVLAP
Lab Code:105014-0

Manufacturer:	Oyo	**Condition As Found:**	In Tolerance
Model Number:	03331-0000	**Condition As Left:**	In Tolerance
Description:	Seismograph,	**Calibration Date:**	07/31/2008
Asset Number:	15014	**Calibration Due Date:**	07/31/2009
Serial Number:	15014	**Calibration Interval:**	12 Months
PO Number:	8200-080122-01		

Remarks:

This unit was calibrated with the customer's old procedure and specifications which have been reviewed by Metrology Engineering and documented in SCE Document M013684. The data can be found on page 2 of this report with the original observation data on pages 3,4,5. The unit was then calibrated with the customer's new procedure and specification's which have been reviewed by Metrology Engineering and documented in SCE Document M013987. The data can be found on pages 6 and 7 of this report with the original observation data on page 8 of this report.

Standards Utilized

I.D. No.	Mfg.	Model No.	Description	Cal. Date	Due Date
S1-01252	Hewlett Packard	5335A OPT 010,203040	Counter, Universal,	07/17/2008	01/17/2009
S1-01347	Hewlett Packard	3325A	Generator, Function, Synthesizer	04/24/2008	10/24/2008
S1-03686	Fluke	910	Standard, Frequency, Controlled, Gps	01/22/2008	01/22/2009

Procedure: Customer
Temperature: 23° C
Humidity: 52% RH
Test No.: 558547

Calibration Performed By:			Quality Reviewer:	
Branson, Craig A	Metrologist	714-895-0714		8-2-08
Name	Title	Phone	Name	Date

Custom Specification Report

Oyo 03331-0000 Seismograph

STEP NUM	FUNCTION TESTED	NOMINAL VALUE	AS FOUND	AS LEFT	Out of Tol	CALIBRATION TOLERANCE
	CH HN Frequency Square Wave	100.0 Hz	100.0	Same		99.0 to 101.0 Hz [EMU 0.000500]
	|	100.0 Hz	100.0	Same		99.0 to 101.0 Hz [EMU 0.000500]
	Sine Wave	100.0 Hz	100.1	Same		99.0 to 101.0 Hz [EMU 0.000500]
	|	100.0 Hz	100.0	Same		99.0 to 101.0 Hz [EMU 0.000500]
	CH HR Frequency Square Wave	100.0 Hz	100.0	Same		99.0 to 101.0 Hz [EMU 0.000500]
	|	100.0 Hz	100.0	Same		99.0 to 101.0 Hz [EMU 0.000500]
	Sine Wave	100.0 Hz	100.0	Same		99.0 to 101.0 Hz [EMU 0.000500]
	|	100.0 Hz	99.8	Same		99.0 to 101.0 Hz [EMU 0.000500]
	CH V Frequency Square Wave	100.0 Hz	100.0	Same		99.0 to 101.0 Hz [EMU 0.000500]
	|	100.0 Hz	100.0	Same		99.0 to 101.0 Hz [EMU 0.000500]
	Sine Wave	100.0 Hz	100.0	Same		99.0 to 101.0 Hz [EMU 0.000500]
	|	100.0 Hz	100.0	Same		99.0 to 101.0 Hz [EMU 0.000500]

Remarks:

3.f8

GEOVision geophysical services

SEISMOGRAPH CALIBRATION DATA SHEET REV 4/6/06

INSTRUMENT DATA

SYSTEM MFR:	OYO	MODEL NO.:	03331-0000
SERIAL NO.:	15014	CALIBRATION DATE:	7/31/2008
BY:	CRAIG BRANSON	DUE DATE:	7/31/2009
COUNTER MFR:	HEWLETT PACKARD	MODEL NO.:	5335A
SERIAL NO.:	2626A09881	CALIBRATION DATE:	7/17/2008
BY:	SCE #S1-01252	DUE DATE:	1/17/2009
FCTN GEN MFR:	HEWLETT PACKARD	MODEL NO.:	3325A
SERIAL NO.:	2652A25647	CALIBRATION DATE:	4/24/2008
BY:	SCE #S1-01347	DUE DATE:	10/24/2008

SYSTEM SETTINGS:

GAIN:	10
FILTER:	20 KHZ
RANGE:	100 MILLISEC
DELAY:	0
STACK: 1 (STD)	1
PULSE:	1.6
DISPLAY:	NA
SYSTEM: DATE = CORRECT DATE & TIME	7/31/2008 1729

PROCEDURE:

SET FREQUENCY TO 100.0HZ SQUAREWAVE WITH AMPLITUDE APPROXIMATELY 0.25 VOLT PEAK. RECORD BOTH ON DISK AND PAPER TAPE, IF AVAILABLE. ANALYZE AND PRINT WAVEFORMS FROM ANALYSIS UTILITY. ATTACH PAPER COPIES OF PRINTOUT AND PAPER TAPES, IF AVAILABLE, TO THIS FORM. AVERAGE FREQUENCY MUST BE BETWEEN 99.0 AND 101.0 HZ.

AS FOUND 99.9 Hz AS LEFT 99.9 Hz

WAVEFORM	FILE NO	FREQUENCY	TIME FOR 9 CYCLES Hn	TIME FOR 9 CYCLES Hr	TIME FOR 9 CYCLES V	AVERAGE FREQ.
SQUARE	201	100.0	90.00ms	90.00ms	90.00 ms	100.0 Hz
SQUARE	202	100.0	90.00 ms	90.00ms	90.00 ms	100.0 Hz
SINE	203	100.0	89.90 ms	90.00ms	90.00 ms	100.0 Hz
SINE	204	100.0	90.00ms	90.20ms	90.00 ms	99.9 Hz

CALIBRATED BY: CRAIG BRANSON 7/31/2008 Craig Branson

NAME DATE SIGNATURE

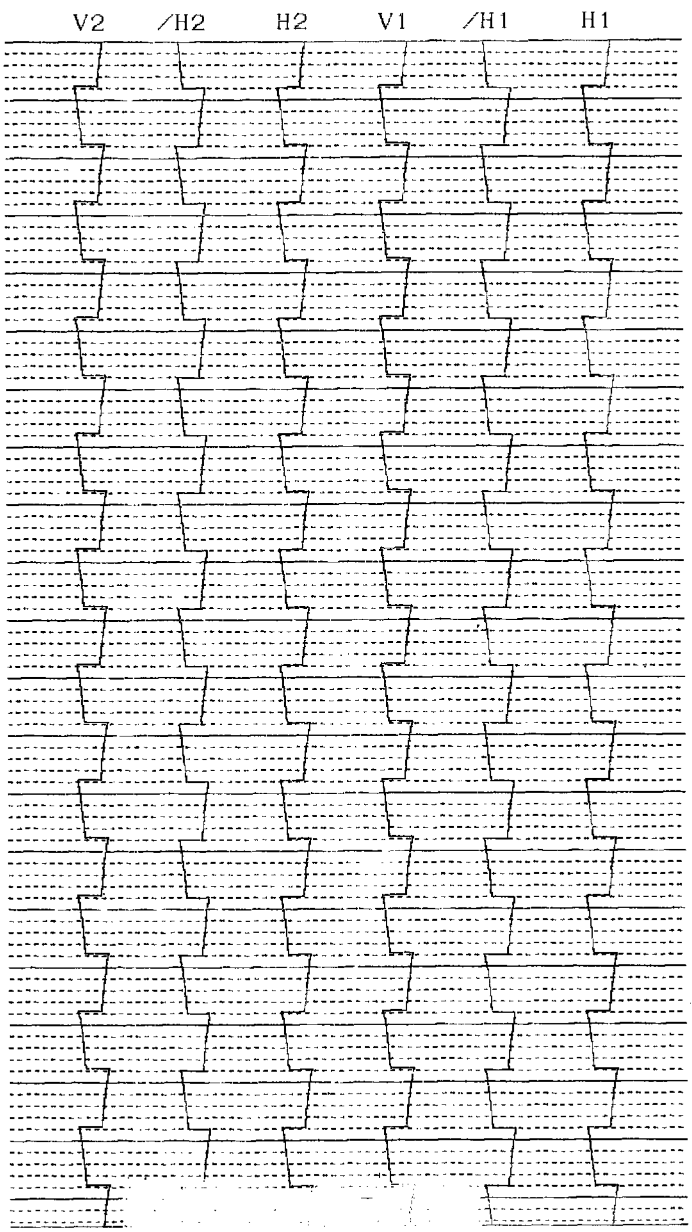
S/N 15014

Suspension 170 1.42

ID_NO. : 201
HOLE NO. : 0
DEPTH : 0.0 [m]
DATE : 31/07/08 05:28:48 PM
H-SAMPLE RATE: 100 [μSEC]
V-SAMPLE RATE: 100 [μSEC]
PULSE WIDTH : 1.6 [mSEC]
DELAY TIME : 0 [mSEC]

	H1	/H1	V1	H2	/H2	V2
GAIN	:X 10	X 10	X 10	X 10	X 10	X 10
LCF[Hz]	: 5	5	5	5	5	5
HCF[Hz]	: 20K	20K	20K	20K	20K	20K
STACK	: 1	1	1	1	1	1

TRACE SIZE : 1
H-TIME SCALE: 1.00 [mSEC/LINE]
V-TIME SCALE: 1.00 [mSEC/LINE]



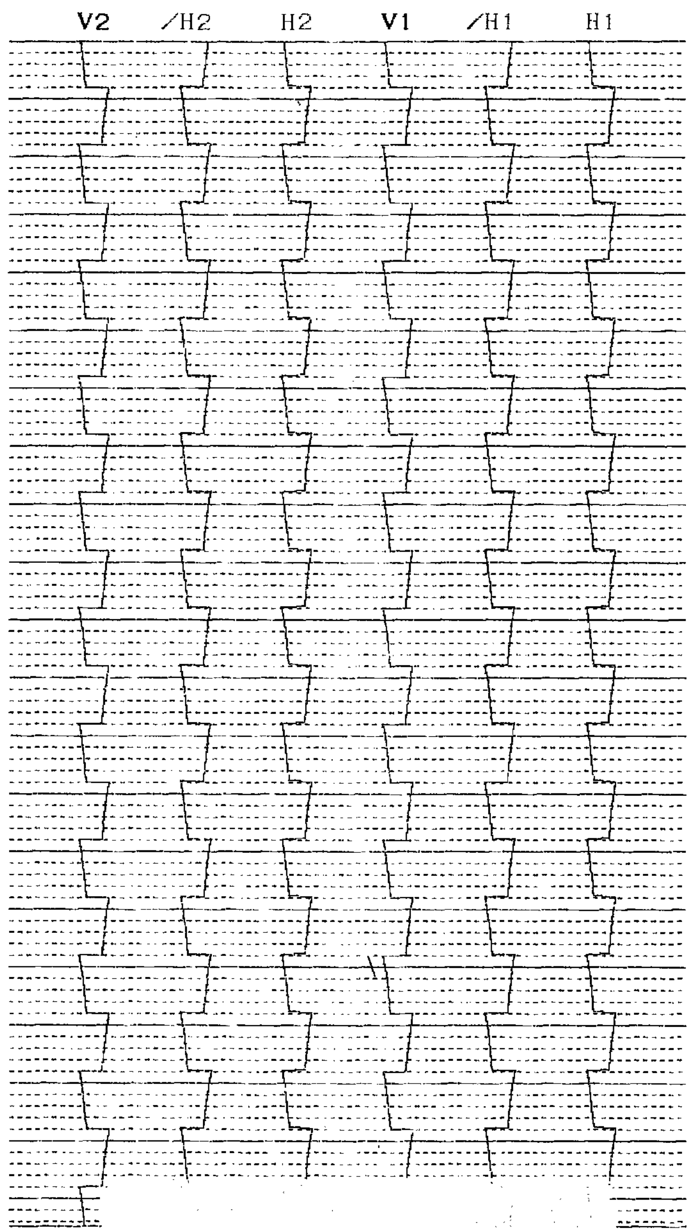
S/N 15014

Suspension 170 1.42

ID_NO. : 202
HOLE NO. : 0
DEPTH : 0.0 [m]
DATE : 31/07/08 05:30:17 PM
H-SAMPLE RATE: 100 [μSEC]
V-SAMPLE RATE: 100 [μSEC]
PULSE WIDTH : 1.6 [mSEC]
DELAY TIME : 0 [mSEC]

	H1	/H1	V1	H2	/H2	V2
GAIN	:X 10	X 10	X 10	X 10	X 10	X 10
LCF[Hz]	: 5	5	5	5	5	5
HCF[Hz]	: 20K	20K	20K	20K	20K	20K
STACK	: 1	1	1	1	1	1

TRACE SIZE : 1
H-TIME SCALE: 1.00 [mSEC/LINE]
V-TIME SCALE: 1.00 [mSEC/LINE]



5 of 8

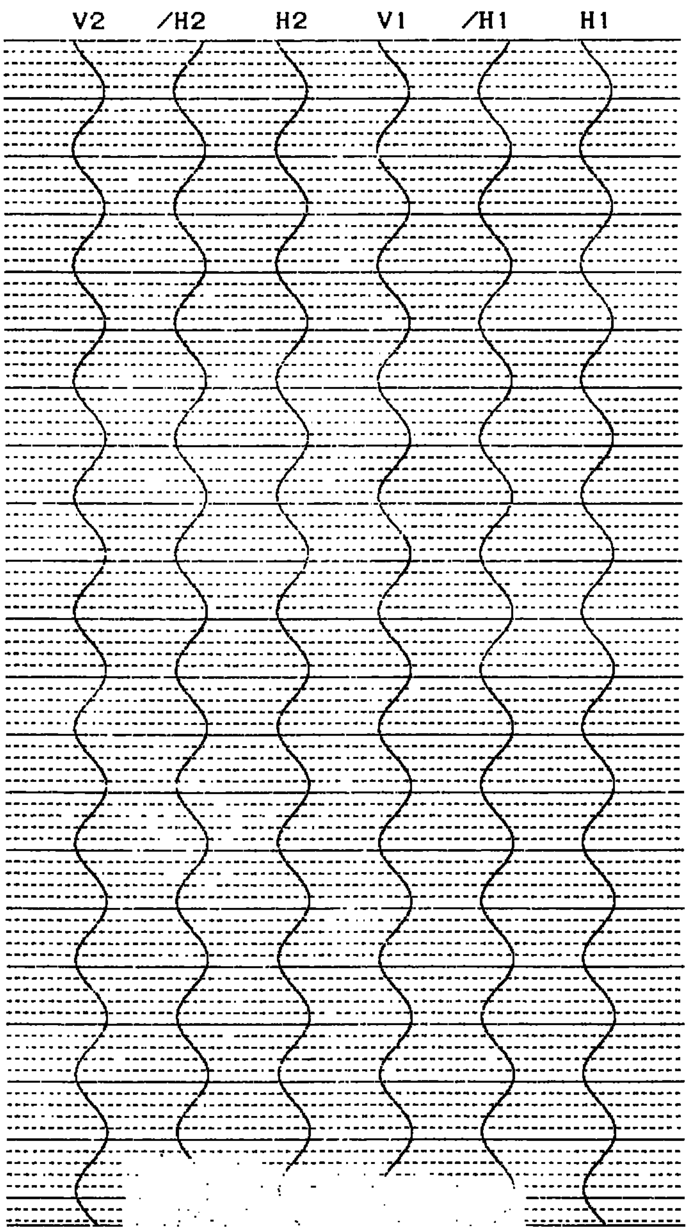
OYO S/N 15014

Suspension 170 1.42

ID_NO. : 203
HOLE NO. : 0
DEPTH : 0.0 [m]
DATE : 31/07/08 05:31:28 PM
H-SAMPLE RATE : 100 [μSEC]
V-SAMPLE RATE : 100 [μSEC]
PULSE WIDTH : 1.6 [mSEC]
DELAY TIME : 0 [mSEC]

	H1	/H1	V1	H2	/H2	V2
GAIN	:X 10	X 10	X 10	X 10	X 10	X 10
LCF [Hz]	5	5	5	5	5	5
HCF [Hz]	20K	20K	20K	20K	20K	20K
STACK	1	1	1	1	1	1

TRACE SIZE : 1
H-TIME SCALE : 1.00 [mSEC/LINE]
V-TIME SCALE : 1.00 [mSEC/LINE]



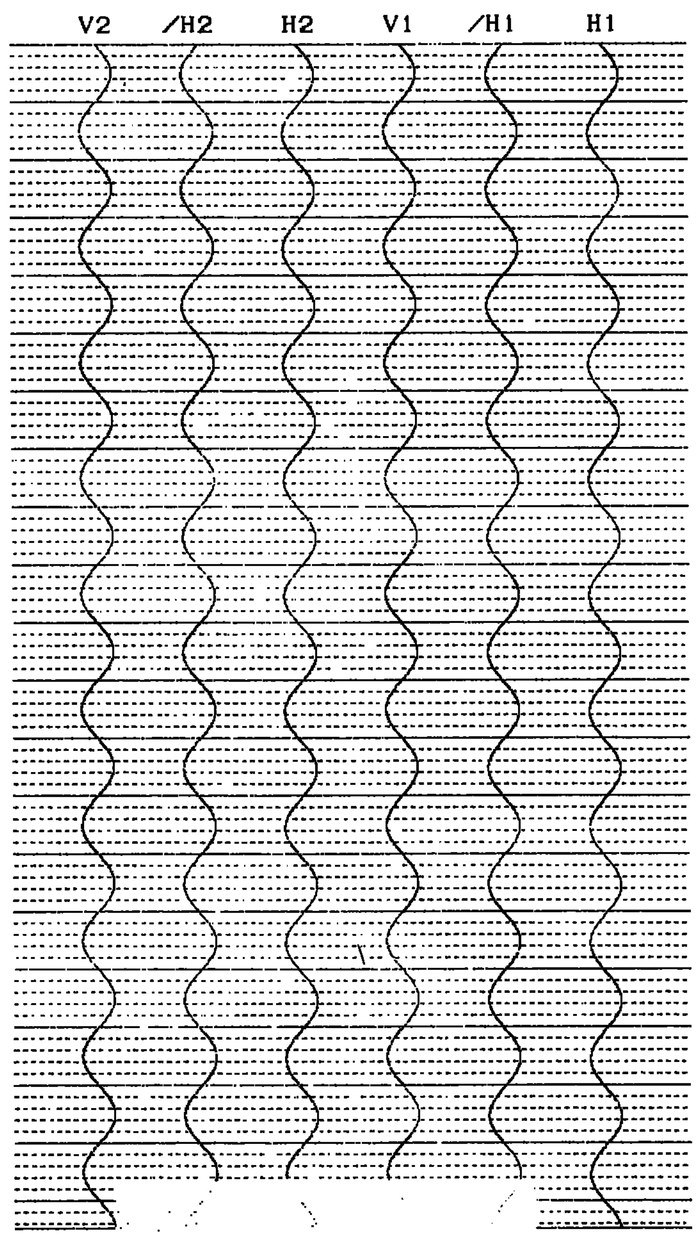
OYO S/N 15014

Suspension 170 1.42

ID_NO. : 204
HOLE NO. : 0
DEPTH : 0.0 [m]
DATE : 31/07/08 05:32:32 PM
H-SAMPLE RATE : 100 [μSEC]
V-SAMPLE RATE : 100 [μSEC]
PULSE WIDTH : 1.6 [mSEC]
DELAY TIME : 0 [mSEC]

	H1	/H1	V1	H2	/H2	V2
GAIN	:X 10	X 10	X 10	X 10	X 10	X 10
LCF [Hz]	5	5	5	5	5	5
HCF [Hz]	20K	20K	20K	20K	20K	20K
STACK	1	1	1	1	1	1

TRACE SIZE : 1
H-TIME SCALE : 1.00 [mSEC/LINE]
V-TIME SCALE : 1.00 [mSEC/LINE]



Custom Specification Report

Oyo 03331-0000 Logger/Recorder, Seismic, PS Suspension

STEP NUM	FUNCTION TESTED	NOMINAL VALUE	AS FOUND	AS LEFT	Out of Tol	CALIBRATION TOLERANCE
	CH HN Frequency Sine Wave	50.00 Hz	50.00	Same		49.50 to 50.50 Hz [EMU 0.000250]
	|	100.0 Hz	100.0	Same		99.0 to 101.0 Hz [EMU 0.000500]
	|	200.0 Hz	199.8	Same		198.0 to 202.0 Hz [EMU 0.001000]
	|	500.0 Hz	499.4	Same		495.0 to 505.0 Hz [EMU 0.002500]
	|	1000 Hz	1000	Same		990 to 1010 Hz [EMU 0.005000]
	|	2000 Hz	2002	Same		1980 to 2020 Hz [EMU 0.010000]
	CH HR Frequency Sine Wave	50.00 Hz	50.00	Same		49.50 to 50.50 Hz [EMU 0.000250]
	|	100.0 Hz	100.1	Same		99.0 to 101.0 Hz [EMU 0.000500]
	|	200.0 Hz	199.8	Same		198.0 to 202.0 Hz [EMU 0.001000]
	|	500.0 Hz	499.4	Same		495.0 to 505.0 Hz [EMU 0.002500]
	|	1000 Hz	1001	Same		990 to 1010 Hz [EMU 0.005000]
	|	2000 Hz	2000	Same		1980 to 2020 Hz [EMU 0.010000]
	CH V Frequency Sine Wave	50.00 Hz	50.06	Same		49.50 to 50.50 Hz [EMU 0.000250]
	|	100.0 Hz	99.9	Same		99.0 to 101.0 Hz [EMU 0.000500]
	|	200.0 Hz	200.0	Same		198.0 to 202.0 Hz [EMU 0.001000]
	|	500.0 Hz	500.6	Same		495.0 to 505.0 Hz [EMU 0.002500]

Remarks:

Custom Specification Report

Oyo 03331-0000 Logger/Recorder, Seismic, PS Suspension

STEP NUM	FUNCTION TESTED	NOMINAL VALUE	AS FOUND	AS LEFT	Out of Tol	CALIBRATION TOLERANCE
	CH V Frequency Sine Wave	1000 Hz	1001	Same		990 to 1010 Hz [EMU 0.005000]
	|	2000 Hz	1998	Same		1980 to 2020 Hz [EMU 0.010000]

Remarks:

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SUSPENSION PS SEISMIC LOGGER/RECORDER CALIBRATION DATA FORM

INSTRUMENT DATA

System mfg.:	Oyo	Model no.:	03331-0000
Serial no.:	15014	Calibration date:	7/31/2008
By:	Craig Branson	Due date:	7/31/2009
Counter mfg.:	Hewlett-Packard	Model no.:	5335A
Serial no.:	2626A09881	Calibration date:	7/17/2008
By:	SCE #S1-01252	Due date:	1/17/2009
Signal generator mfg.:	Hewlett-Packard	Model no.:	3325A
Serial no.:	2652A25647	Calibration date:	4/24/2008
By:	SCE #S1-01347	Due date:	10/24/2008

SYSTEM SETTINGS:

Gain:	10
Filter	20KHz
Range:	See sample period in table below
Delay:	0
Stack (1 std)	1
System date = correct date and time	7/31/2008 1734

PROCEDURE:

Set sine wave frequency to target frequency with amplitude of approximately 0.25 volt peak
Note actual frequency on data form.
Set sample period and record data file to disk. Note file name on data form.
Pick duration of 9 cycles using PSLOG.EXE program, note duration on data form, and save as .sps file. Calculate average frequency for each channel pair and note on data form.

Average frequency must be within +/- 1% of actual frequency at all data points.

Maximum error ((AVG-ACT)/ACT*100)% As found 0.12% As left 0.12%

Target Frequency (Hz)	Actual Frequency (Hz)	Sample Period (microS)	File Name	Time for 9 cycles Hn (msec)	Average Frequency Hn (Hz)	Time for 9 cycles Hr (msec)	Average Frequency Hr (Hz)	Time for 9 cycles V (msec)	Average Frequency V (Hz)
50.00	50.00	200	205	180.0	50.00	180.0	50.00	179.8	50.06
100.0	100.0	100	206	90.00	100.0	89.90	100.1	90.10	99.9
200.0	200.0	50	207	45.05	199.8	45.05	199.8	45.00	200.0
500.0	500.0	20	208	18.02	499.4	18.02	499.4	17.98	500.6
1000	1000	10	209	9.000	1000	8.990	1001	8.990	1001
2000	2000	5	210	4.495	2002	4.500	2000	4.505	1998

Calibrated by:	Craig Branson	7/31/2008	Craig Branson
	Name	Date	Signature
Witnessed by:	Robert Steller	7/31/2008	Robert Steller
	Name	Date	Signature

EDISON ESI℠

A SOUTHERN CALIFORNIA EDISON® Company

Metrology
7300 Fenwick Lane
Westminster, CA 92683
Phone: 866-723-2257

Calibration Report

NVLAP Accredited
Calibration

GEOVision Geophysical Services
1124 Olympic Drive
Corona, CA 92881-3390

TEST NUMBER
558548

NVLAP®
Lab Code:105014-0

Manufacturer:	Oyo Corporation	**Condition As Found:**	In Tolerance
Model Number:	3331-A	**Condition As Left:**	In Tolerance
Description:	Logger, Suspension,	**Calibration Date:**	07/31/2008
Asset Number:	19029	**Calibration Due Date:**	07/31/2009
Serial Number:	19029	**Calibration Interval:**	12 Months
PO Number:	8200-080122-01		

Remarks:

This unit was calibrated with the customer's old procedure and specifications which have been reviewed by Metrology Engineering and documented in SCE Document M013684. The data can be found on page 2 of this report with the original observation data on pages 3,4,5. The unit was then calibrated with the customer's new procedure and specification's which have been reviewed by Metrology Engineering and documented in SCE Document M013987. The data can be found on pages 6 and 7 of this report with the original observation data on page 8 of this report.

Standards Utilized

I.D. No.	Mfg.	Model No.	Description	Cal. Date	Due Date
S1-01252	Hewlett Packard	5335A OPT 010,203040	Counter, Universal,	07/17/2008	01/17/2009
S1-01347	Hewlett Packard	3325A	Generator, Function, Synthesizer	04/24/2008	10/24/2008
S1-03686	Fluke	910	Standard, Frequency, Controlled, Gps	01/22/2008	01/22/2009

Procedure: Customer
Temperature: 23° C
Humidity: 52% RH
Test No.: 558548

Calibration Performed By:			Quality Reviewer:	
Branson, Craig A	Metrologist	714-895-0714		8-2-08
Name	Title	Phone	Name	Date

Custom Specification Report

Oyo 3331-A Seismograph

STEP NUM	FUNCTION TESTED	NOMINAL VALUE	AS FOUND	AS LEFT	Out of Tol	CALIBRATION TOLERANCE
	CH HN Frequency Square Wave	100.0 Hz	100.0	Same		99.0 to 101.0 Hz [EMU 0.000500]
	|	100.0 Hz	100.0	Same		99.0 to 101.0 Hz [EMU 0.000500]
	Sine Wave	100.0 Hz	99.9	Same		99.0 to 101.0 Hz [EMU 0.000500]
	|	100.0 Hz	99.8	Same		99.0 to 101.0 Hz [EMU 0.000500]
	CH HR Frequency Square Wave	100.0 Hz	100.0	Same		99.0 to 101.0 Hz [EMU 0.000500]
	|	100.0 Hz	100.0	Same		99.0 to 101.0 Hz [EMU 0.000500]
	Sine Wave	100.0 Hz	99.9	Same		99.0 to 101.0 Hz [EMU 0.000500]
	|	100.0 Hz	99.8	Same		99.0 to 101.0 Hz [EMU 0.000500]
	CH V Frequency Square Wave	100.0 Hz	100.0	Same		99.0 to 101.0 Hz [EMU 0.000500]
	|	100.0 Hz	100.0	Same		99.0 to 101.0 Hz [EMU 0.000500]
	Sine Wave	100.0 Hz	99.8	Same		99.0 to 101.0 Hz [EMU 0.000500]
	|	100.0 Hz	100.0	Same		99.0 to 101.0 Hz [EMU 0.000500]

Remarks:

3.48

GEOVision geophysical services

SEISMOGRAPH CALIBRATION DATA SHEET REV 4/6/06

INSTRUMENT DATA

SYSTEM MFR:	OYO	MODEL NO.:	3331-A
SERIAL NO.:	19029	CALIBRATION DATE:	7/31/2008
BY:	CRAIG BRANSON	DUE DATE:	7/31/2009
COUNTER MFR:	HEWLETT PACKARD	MODEL NO.:	5335A
SERIAL NO.:	2626A09881	CALIBRATION DATE:	7/17/2008
BY:	SCE #S1-01252	DUE DATE:	1/17/2009
FCTN GEN MFR:	HEWLETT PACKARD	MODEL NO.:	3325A
SERIAL NO.:	2652A25647	CALIBRATION DATE:	4/24/2008
BY:	SCE #S1-01347	DUE DATE:	10/24/2008

SYSTEM SETTINGS:

GAIN:	10
FILTER:	20 KHZ
RANGE:	100 MILLISEC
DELAY:	0
STACK: 1 (STD)	1
PULSE:	1.6
DISPLAY:	NA
SYSTEM: DATE = CORRECT DATE & TIME	7/31/2008 1810

PROCEDURE:
SET FREQUENCY TO 100.0HZ SQUAREWAVE WITH AMPLITUDE APPROXIMATELY 0.25 VOLT PEAK. RECORD BOTH ON DISK AND PAPER TAPE, IF AVAILABLE. ANALYZE AND PRINT WAVEFORMS FROM ANALYSIS UTILITY. ATTACH PAPER COPIES OF PRINTOUT AND PAPER TAPES, IF AVAILABLE, TO THIS FORM. AVERAGE FREQUENCY MUST BE BETWEEN 99.0 AND 101.0 HZ.

AS FOUND 99.8 HZ AS LEFT 99.8 HZ

WAVEFORM	FILE NO	FREQUENCY	TIME FOR 9 CYCLES Hn	TIME FOR 9 CYCLES Hr	TIME FOR 9 CYCLES V	AVERAGE FREQ.
SQUARE	301	100.0	90.00 ms	90.00 ms	90.00 ms	100.0 HZ
SQUARE	302	100.0	90.00 ms	90.00 ms	90.00 ms	100.0 HZ
SINE	303	100.0	90.10 ms	90.10 ms	90.20 ms	99.85 HZ
SINE	304	100.0	90.20 ms	90.20 ms	90.00 ms	99.85 HZ

CALIBRATED BY: CRAIG BRANSON (NAME) 7/31/2008 (DATE) Craig Branson (SIGNATURE)

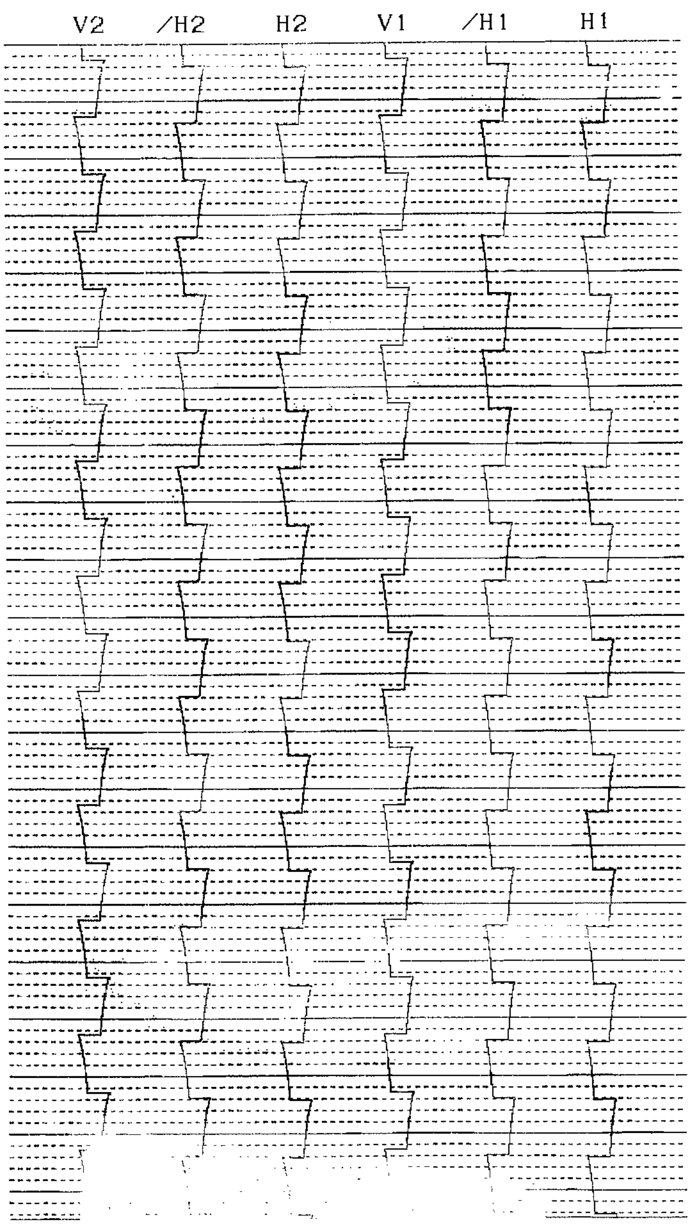
OYO S/N 19029

Suspension 170 4.25

ID_NO. : 301
HOLE NO. : 2
DEPTH : 0.0 [m]
DATE : 31/07/08 06:08:54 PM
H-SAMPLE RATE: 100 [μSEC]
V-SAMPLE RATE: 100 [μSEC]
PULSE WIDTH : 1.6 [mSEC]
DELAY TIME : 0 [mSEC]

	H1	/H1	V1	H2	/H2	V2
GAIN	:X 10	X 10	X 10	X 10	X 10	X 10
LCF[Hz]	: 5	5	5	5	5	5
HCF[Hz]	: 20K	20K	20K	20K	20K	20K
STACK	: 1	1	1	1	1	1

TRACE SIZE : 1
H-TIME SCALE: 1.00 [mSEC/LINE]
V-TIME SCALE: 1.00 [mSEC/LINE]



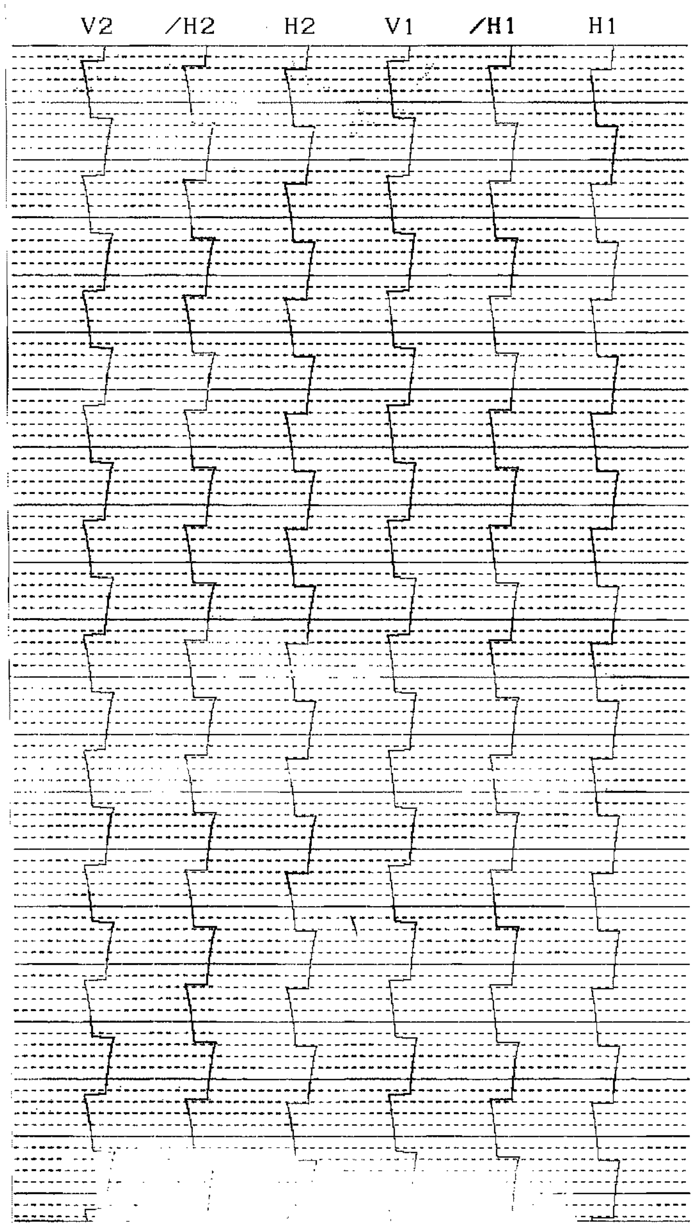
OYO S/N 19029

Suspension 170 4.25

ID_NO. : 302
HOLE NO. : 2
DEPTH : 0.0 [m]
DATE : 31/07/08 06:11:54 PM
H-SAMPLE RATE: 100 [μSEC]
V-SAMPLE RATE: 100 [μSEC]
PULSE WIDTH : 1.6 [mSEC]
DELAY TIME : 0 [mSEC]

	H1	/H1	V1	H2	/H2	V2
GAIN	:X 10	X 10	X 10	X 10	X 10	X 10
LCF[Hz]	: 5	5	5	5	5	5
HCF[Hz]	: 20K	20K	20K	20K	20K	20K
STACK	: 1	1	1	1	1	1

TRACE SIZE : 1
H-TIME SCALE: 1.00 [mSEC/LINE]
V-TIME SCALE: 1.00 [mSEC/LINE]



5.58.

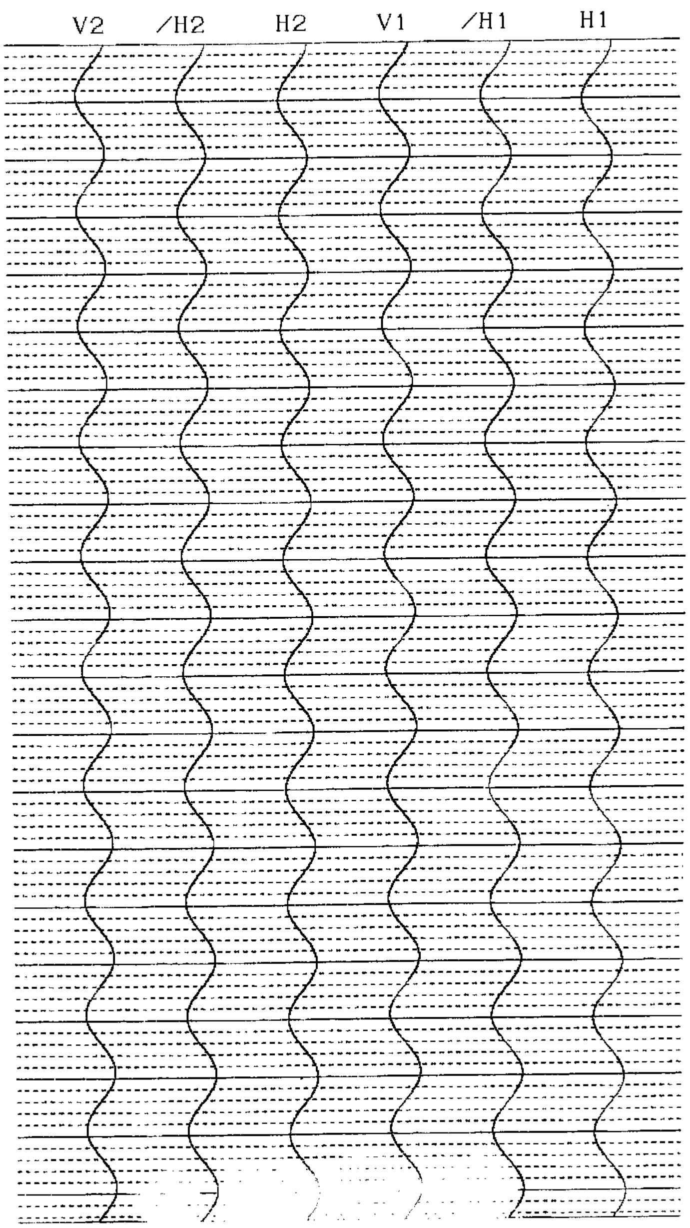
OYO S/N 19029

Suspension 170 4.25

ID_NO. : 303
HOLE NO. : 2
DEPTH : 0.0 [m]
DATE : 31/07/08 06:13:02 PM
H-SAMPLE RATE: 100 [μSEC]
V-SAMPLE RATE: 100 [μSEC]
PULSE WIDTH : 1.6 [mSEC]
DELAY TIME : 0 [mSEC]

	H1	/H1	V1	H2	/H2	V2
GAIN	:X 10	X 10	X 10	X 10	X 10	X 10
LCF[Hz]	: 5	5	5	5	5	5
HCF[Hz]	: 20K	20K	20K	20K	20K	20K
STACK	: 1	1	1	1	1	1

TRACE SIZE : 1
H-TIME SCALE: 1.00 [mSEC/LINE]
V-TIME SCALE: 1.00 [mSEC/LINE]



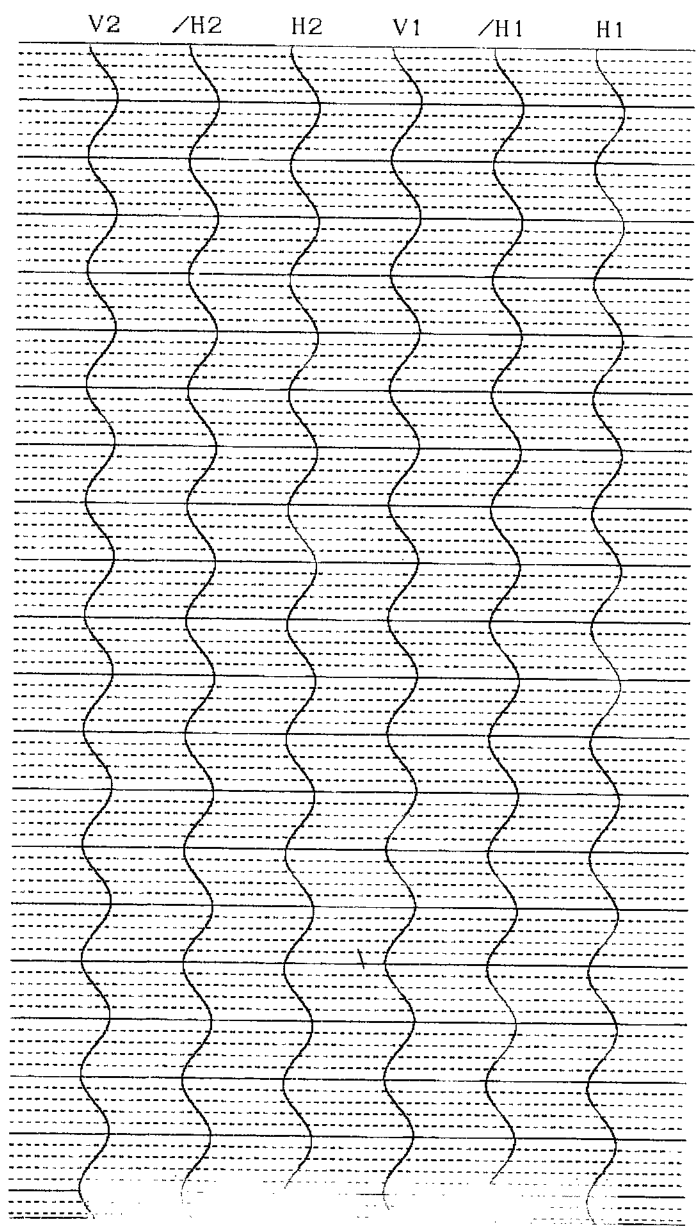
OYO S/N 19029

Suspension 170 4.25

ID_NO. : 304
HOLE NO. : 2
DEPTH : 0.0 [m]
DATE : 31/07/08 06:13:50 PM
H-SAMPLE RATE: 100 [μSEC]
V-SAMPLE RATE: 100 [μSEC]
PULSE WIDTH : 1.6 [mSEC]
DELAY TIME : 0 [mSEC]

	H1	/H1	V1	H2	/H2	V2
GAIN	:X 10	X 10	X 10	X 10	X 10	X 10
LCF[Hz]	: 5	5	5	5	5	5
HCF[Hz]	: 20K	20K	20K	20K	20K	20K
STACK	: 1	1	1	1	1	1

TRACE SIZE : 1
H-TIME SCALE: 1.00 [mSEC/LINE]
V-TIME SCALE: 1.00 [mSEC/LINE]



Custom Specification Report

Oyo Corporation 3331-A Logger, Suspension,

STEP NUM	FUNCTION TESTED	NOMINAL VALUE	AS FOUND	AS LEFT	Out of Tol	CALIBRATION TOLERANCE
	CH HN Frequency Sine Wave	50.00 Hz	49.95	Same		49.50 to 50.50 Hz [EMU 0.000250]
	|	100.0 Hz	100.1	Same		99.0 to 101.0 Hz [EMU 0.000500]
	|	200.0 Hz	199.8	Same		198.0 to 202.0 Hz [EMU 0.001000]
	|	500.0 Hz	500.0	Same		495.0 to 505.0 Hz [EMU 0.002500]
	|	1000 Hz	1001	Same		990 to 1010 Hz [EMU 0.005000]
	|	2000 Hz	1998	Same		1980 to 2020 Hz [EMU 0.010000]
	CH HR Frequency Sine Wave	50.00 Hz	49.89	Same		49.50 to 50.50 Hz [EMU 0.000500]
	|	100.0 Hz	99.9	Same		99.0 to 101.0 Hz [EMU 0.000500]
	|	200.0 Hz	200.0	Same		198.0 to 202.0 Hz [EMU 0.001000]
	|	500.0 Hz	499.4	Same		495.0 to 505.0 Hz [EMU 0.002500]
	|	1000 Hz	997.8	Same		990 to 1010 Hz [EMU 0.005000]
	|	2000 Hz	2000	Same		1980 to 2020 Hz [EMU 0.010000]
	CH V Frequency Sine Wave	50.00 Hz	49.95	Same		49.50 to 50.50 Hz [EMU 0.000500]
	|	100.0 Hz	99.78	Same		99.0 to 101.0 Hz [EMU 0.000500]
	|	200.0 Hz	199.8	Same		198.0 to 202.0 Hz [EMU 0.001000]
	|	500.0 Hz	499.4	Same		495.0 to 505.0 Hz [EMU 0.002500]

Remarks:

Custom Specification Report

Oyo Corporation 3331-A Logger, Suspension,

STEP NUM	FUNCTION TESTED	NOMINAL VALUE	AS FOUND	AS LEFT	Out of Tol	CALIBRATION TOLERANCE
	CH V Frequency Sine Wave	1000 Hz	997.8	Same		990 to 1010 Hz [EMU 0.005000]
	|	2000 Hz	1998	Same		1980 to 2020 Hz [EMU 0.010000]

Remarks:

GEOVision geophysical services

SUSPENSION PS SEISMIC LOGGER/RECORDER CALIBRATION DATA FORM

INSTRUMENT DATA

System mfg.:	Oyo	Model no.:	3331-A
Serial no.:	19029	Calibration date:	7/31/2008
By:	Craig Branson	Due date:	7/31/2009
Counter mfg.:	Hewlett-Packard	Model no.:	5335A
Serial no.:	2626A09881	Calibration date:	7/17/2008
By:	SCE #S1-01252	Due date:	1/17/2009
Signal generator mfg.:	Hewlett-Packard	Model no.:	3325A
Serial no.:	2652A25647	Calibration date:	4/24/2008
By:	SCE #S1-01347	Due date:	10/24/2008

SYSTEM SETTINGS:

Gain:	10
Filter	20KHz
Range:	See sample period in table below
Delay:	0
Stack (1 std)	1
System date = correct date and time	7/31/2008 1816

PROCEDURE:

Set sine wave frequency to target frequency with amplitude of approximately 0.25 volt peak
Note actual frequency on data form.
Set sample period and record data file to disk. Note file name on data form.
Pick duration of 9 cycles using PSLOG.EXE program, note duration on data form, and save as .sps file. Calculate average frequency for each channel pair and note on data form.

Average frequency must be within +/- 1% of actual frequency at all data points.

Maximum error ((AVG-ACT)/ACT*100)% As found -0.22 As left -0.22

Target Frequency (Hz)	Actual Frequency (Hz)	Sample Period (microS)	File Name	Time for 9 cycles Hn (msec)	Average Frequency Hn (Hz)	Time for 9 cycles Hr (msec)	Average Frequency Hr (Hz)	Time for 9 cycles V (msec)	Average Frequency V (Hz)
50.00	50.00	200	305	180.2	49.95	180.4	49.89	180.2	49.95
100.0	100.0	100	306	89.9	100.1	90.1	99.9	90.2	99.78
200.0	200.0	50	307	45.05	199.8	45.00	200.0	45.05	199.8
500.0	500.0	20	308	18.00	500.0	18.02	499.4	18.02	499.4
1000	1000	10	309	8.990	1001	9.020	997.8	9.020	997.8
2000	2000	5	310	4.505	1998	4.500	2000	4.505	1998

	Name	Date	Signature
Calibrated by:	Craig Branson	7/31/2008	Craig Branson
Witnessed by:	Robert Steller	7/31/2008	

Stratigraphic Interpretation of Geological Formations Observed in Borehole (B-11)

Stratigraphic Interpretation of Geological Formations Observed in SCDOT Borehole (B-11) North Charleston, S.C.

Prepared by: Dr. Michael Katuna

for S&ME Inc.

March, 2009

Introduction

A 500-foot deep borehole was drilled in North Charleston near the intersection of I-26 and the Spruill Avenue eastbound ramp. Sampling was accomplished using split spoon, Shelby tube and continuous coring techniques. Sample splits were collected (where possible) from these cored intervals at observable lithologic discontinuities and near stratal boundaries as determined from geophysical logs. The depth and thickness of formational units recorded from geophysical logs may vary from those obtained by sediment sampling due to errors resulting from unrecovered intervals and sediment compression. In most cases, the log depths for formational contacts were used and appear to be more accurate. Log depths were mainly obtained from gamma ray logs that usually indicate unconformable formational contacts due to the presence and concentration of minerals such as glauconite and phosphate that normally contain some radioactive elements.

This report contains the lithologic and stratigraphic determination of geologic formations that were encountered in the borehole. These determinations were based upon detailed sedimentological laboratory analyses of the sample splits. The analyses included; lithologic descriptions including sediment color, visual estimates of grain size and associated textural characteristics, relative abundances of constituents such as the percentage of sand vs. silt/clay fractions, and other relevant information. The utilization of biostratigraphic analyses (not included in this study) would help to confirm the stratigraphic interpretation. Stratigraphic correlation was also made with the Cannon Park core (CHN 800) that was previously studied by the U.S. Geological Survey (Bybell, L.M. et al., 1998).

Laboratory Procedure and Sample Analyses

A total of twenty sediment samples were collected from the 500-foot deep soil boring located in North Charleston near the intersection of Spruill Avenue and I-26. These samples were collected at specific intervals based upon the preliminary identification of stratigraphic units identified from geophysical logs obtained at the site. Sample splits were acquired from near the upper and lower boundaries of apparent stratigraphic units as identified from the gamma ray log. Samples were also taken in the central section of each representative unit to better define their lithologic character. The samples were then taken to the sedimentology laboratory at the College of Charleston where they were allowed to air dry prior to processing.

Once dry, the samples were disaggregated by hand using a mortar and pestle. The color of the dry sample was determined and recorded using a standard Munsell Soil Color Chart. The entire ground sample was then passed through a sample splitter to provide a working sample of approximately 15 – 30 grams. Each sample split was weighed on a top loading balance and placed into a 400 ml beaker. Since all of the samples contained a significant amount of silt and clay, it was necessary to disaggregate each sample to remove the finer grained fraction. Removal of the silt and clay allowed for visual analysis of the sand fraction that is a better indicator of the lithologic differences between stratigraphic units. In order to accomplish this, a 220 ml solution of 0.5N sodium hexametaphosphate was then added to the sample to initiate flocculation. The samples were then mechanically agitated for approximately 10 to 20 minutes (depending on clay content) using an ultrasonic cell dismembrator. This procedure caused defloculation of the finer grained material creating a suspended sediment slurry. The slurry was then passed through a 270-mesh stainless steel sieve to separate the sand from the silt/clay fraction. The samples were transferred to filter paper and placed into a drying oven.

Once the sand portion had dried sufficiently, it was then weighed on a top loading balance to determine the sand percentage for each of the samples. The sand fraction was then analyzed under a stereozoom binocular microscope to identify the textural and compositional characteristics for each of the samples. The sedimentological characteristics of the sand were used to identify differences in lithology for each of the formational/stratigraphic units encountered in the borehole.

Lithologic Descriptions of Sediment Samples and Stratigraphic Relationships

Wando Formation (Pleistocene)

Sample 24-26 ft.: CLAY - Greenish-gray (10Y6/1) clay containing 3.54% sand: well sorted, very fine sub-angular to sub-rounded quartz sand containing disseminated organic matter and trace amounts of muscovite and other heavy minerals.

Sample 44-46 ft.: SANDY CLAY – Greenish-gray (10Y5/1) containing 17.5% sand; moderately sorted, sub-angular to sub-rounded fine to medium quartz sand with shell fragments; trace amounts of mica, heavy minerals and well rounded phosphate grains, and organic matter.

Sample 46-48 ft.: SAND (71.6%) with silt and clay, Grayish-brown (10YR5/2). Very fine, well-sorted, sub-rounded quartz sand with disseminated organic matter and minor amounts of heavy minerals.

Ashley Formation (Top of the Tertiary - Cooper Group)

Sample 48-50 ft.: CLAYEY SAND (45.5%) – Light Olive Gray (5Y6/2) Fine to medium grained calcareous clayey sand with abundant micro-fossils (forams) and macrofossil fragments, quartz sand with well rounded phosphate grains and trace amounts of heavy minerals.

Sample 58-60 ft.: SANDY CLAY (32.7% sand) – Light Olive Gray (5Y6/2)

Sandy calcareous clay with well-sorted, very fine to fine quartz sand containing abundant whole and fragmented microfossils as well as fragmented macrofossils some replaced by silica, glauconite and phosphate grains common with trace amounts of heavy minerals.

Sample 78.5-80 ft.: SANDY CLAY (23.9% sand) – Olive (5Y5/3)

Very-fine to fine, well-sorted sandy clay, calcareous sand composed of micro and macro shell fragments, quartz common with trace amounts of phosphate, muscovite and other heavy minerals.

Sample 131.8 ft.: SANDY CLAY (28.2% sand) – Light yellowish-brown (2.5Y 6/3) Very fine to fine clayey calcareous foraminiferal sand with quartz, fossil fragments (spicules, spines, etc.) as well as trace amounts of phosphate and glauconite.

Harleyville Formation - (Cooper Group) – Upper Eocene

Sample 179.5-181 ft.: CLAY (6.25% sand) (Pale Olive (5Y6/3) Mostly silt and clay with limited amounts of quartz sand, calcareous microfossiliferous shell fragments, and trace amounts of phosphate and glauconite, sand-size fraction is very fine-grained, sub-rounded and well sorted.

Sample 239.5-241 ft.: SANDY CLAY (20.4% sand) Light Gray (5Y7/2) Very fine to fine, well sorted calcareous sand composed of foraminiferal and macrofossil shell fragments, glauconite common with trace amounts of quartz.

Sample 250 ft.: SANDY CLAY (27.9% sand) Light Gray (2.5Y7/2) Very fine grained sandy calcareous clay containing abundant whole and fragmented foram shells, spines, etc. with trace amounts of quartz, glauconite and phosphate.

Sample 270 ft.: CLAY (14.2% sand) Light Gray (5Y7/2) Very fine to fine, well-sorted calcareous sand composed primarily of glauconite and phosphate with trace amounts of quartz, fragmented micro and macrofossil shell fragments.

Sample 290 ft.: CLAY (19.2% sand) Light Gray (2.5Y7/2) Diastem at the base of the Harleyville Formation, fine to medium grained granular sand, abundant phosphate and glauconite grains, shell fragments common, abundant foraminiferal sand, echinoderm spines and limestone fragments (basal lag) with some pyrite grains as well as coatings on shell fragments.

Cross Member – Santee Limestone

Sample 310 ft.: LIMESTONE (27.6% sand) Pale yellow (2.5Y 7/3) Fine - grained clayey (micritic) limestone containing abundant foraminiferal shells and siliceous spicules (radiolarian spines) with trace amounts of quartz, glauconite and heavy minerals.

Williamsburg Formation — Black Mingo Group

Sample 330 ft.: (Chicora Member) LIMESTONE (67.7% sand) Gray (2.5Y6/1) carbonate cemented quartz sand grains, grains are subangular to subrounded with occasional polished black phosphate, shell fragments are common and often have calcite spar coatings on surfaces and exhibits moldic porosity.

Sample 350 ft.: (Chicora Member) SANDSTONE (58.7% sand) Gray (2.5Y6/1) Calcareous cemented, well-sorted, subangular to subrounded, micaceous quartz sandstone, rare microfossils, shell fragments, with trace amounts of glauconite and phosphate.

Sample 375.5 ft.: (Chicora Member) SANDSTONE (61.6% sand) Light gray (2.5Y7/1) calcite cemented medium to coarse quartz sandstone, with abundant shell fragments (mainly oysters) and occasional glauconite and phosphate

Sample 426 ft.: (Lower Bridge Member) MUDSTONE (5.0% sand) Gray (2.5Y6/1) Mostly silt and clay, with some very fine to fine angular to sub-angular quartz sand with trace amounts of fossil material and finely disseminated glauconite and other heavy minerals.

Sample 439 ft.: (Lower Bridge Member) MUDSTONE (1.1% sand) Gray (2.5Y 5/1) Clay containing minor amounts of very fine grained quartz sand, glauconite, collophane, and heavy minerals.

Sample 446 ft.: (Lower Bridge Member) MUDSTONE (12.1% sand) Gray (5Y6/1) Mostly silt and clay with very fine to fine sub-angular quartz sand with trace amounts of glauconite, phosphate, pyrite and some silica spicules.

Rhems Formation – Black Mingo Group

Sample 470 ft.: SANDSTONE (69.1% sand) Gray (5Y5/1) Well-sorted, sub-angular to sub-rounded quartz sand with trace amounts of glauconite, mica and phosphate, no apparent microfossils.

Delineation of Stratigraphic/Formational Units

The following is a list of the formational units that have been identified in the borehole based upon lithostratigraphic analysis and geophysical logs:

0 – 48 ft. - Wando Formation (Pleistocene)

48 – 170 ft. – Ashley Formation – Cooper Group (Upper Oligocene)

170 – 290 ft. – Harleyville Formation – Cooper Group (Upper Eocene)

290 – 330 ft. – Cross Member – Santee Limestone (Middle Eocene)

330 – 395 ft. – Williamsburg Formation – Chicora Member – Black Mingo Group (Upper Paleocene)

395 – 450 ft. – Williamburg Formation – Lower Bridge Member – Black Mingo Group (Upper Paleocene)

450 - >500ft. – Rhems Formation – Black Mingo Group (Upper to Lower Paleocene)

Formational Descriptions

The Wando Formation consists of a series of Pleistocene sediments composed of shelly, quartz sands and silty clay deposits that were formed in barrier/beach and lagoonal environments. The Wando Formation was initially mapped by Weems and Lemon (1993) in the Charleston area and represents a relict Pleistocene barrier island shoreline that parallels the modern coastline.

The Cooper Group consists of a series of formational units composed of fossiliferous, clay-rich impermeable limestones that were originally designated as the Cooper "marl". At this locality, the Ashley and Harleyville Formations represent the Cooper Group. The Ashley Formation is widespread throughout the Charleston area, and consists of an olive green to brown, phosphatic and quartz-rich clayey limestone containing abundant microfossils (forams). The older Harleyville Formation is a finer-grained, glauconitic, clay-rich limestone also containing an abundance of microfossils.

The Cross Member/Formation of the Santee Limestone is represented by a fairly well consolidated, fossiliferous white to pale yellow limestone, partially silicified, containing abundant radiolarian (silica) spines forming dense "cherty" layers in sections. This unit is approximately forty feet thick in this region.

Stratigraphic units within the Black Mingo Group exhibit the greatest lithologic variability and hence are somewhat difficult to differentiate from one another based solely upon composition. The Williamsburg Formation consists of the Chicora Member and the underlying Lower Bridge Member. The Chicora Member is the most heterogeneous unit and consists of quartz sandstones, moldic limestones and mudstones that are fossiliferous and normally highly burrowed. The Lower Bridge Member (distinguished from geophysical logs) is more homogeneous and consists of fossiliferous, interbedded sandy and silty-clay layers. The oldest, and lowermost formation within the Black Mingo Group is the Rhems Formation. It is generally the thickest formational unit and should extend well below the terminus of the borehole. It normally consists of a rather monotonous section of mainly mudstones within some thin sandy layers.

References Cited

Bybell, L.M., Conlon, K.J., Edwards, L.E., Frederiksen, N.O., Gohn, G.S., and Self-Trail, J.M., 1998, Biostratigraphy and Physical Stratigraphy of the U.S.G.S.-Cannon Park Core (CHN 800), Charleston County, South Carolina, U.S. Geological Survey Open File Report 98-246, 65p.

Weems R.E. and Lemon, E.M. Jr., 1993, Geology of the Cainhoy, Charleston, Fort Moultrie, and North Charleston quadrangles, Charleston and Berkeley Countries, South Carolina, U.S. Geological Survey Miscellaneous Investigations Series Map I – 1935, 1:24,000.

Resonant Column/Torsional Shear (RCTS) Test Results

FUGRO CONSULTANTS, INC.

SCDOT PORT ACCESS ROAD

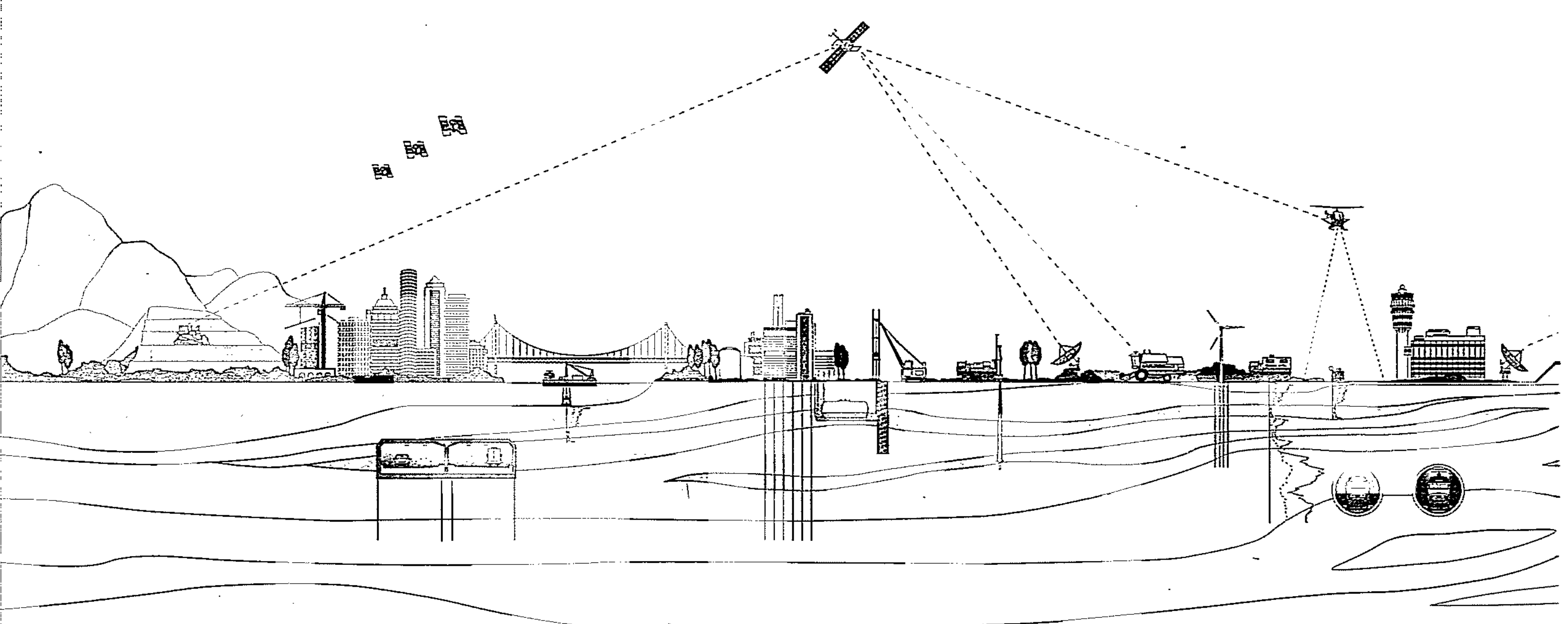
RESONANT COLUMN / TORSIONAL SHEAR (RCTS) TEST RESULTS

PREPARED FOR: S&ME, INC.

PREPARED BY: FUGRO CONSULTANTS INC.

DATE: February 4, 2009

FUGRO#0411-08-1721



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February 4, 2009

William M. Camp, III, P.E.
Technical Principal/Vice President
S&ME, Inc.
620 Wando Park Boulevard
Mt. Pleasant SC 29464

RE: Three (3) Resonant Column and Torsional Shear Test Results for the SCDOT Port Access Road

Dear Mr. Camp:

Per your request, Fugro has completed the above referenced assignment. The reports are attached to this letter. Please let us know if you have questions. Thanks.

Very truly yours,

Fugro Consultants, Inc.

Jiewu Meng, PhD, P.E.
Project Engineer

Bill DeGroff

Bill DeGroff, P.E.
Laboratory Department Manager

Enclosures

Applicability of Report

The laboratory testing results, as well as the conclusions and recommendations, if any, contained in this report, were completed based on our scope of services and on our established technical practice. We have prepared this report exclusively for S&ME to assist in their SCDOT Port Access Road project. We conducted our services using the standard level of care and diligence normally practiced by recognized engineering laboratories now performing similar services under similar circumstances. We intend for this report, including all illustrations, to be used in its entirety. Data as presented in this report should be used along with other available information and questions should be asked when inconsistency, if any, is observed.

APPENDIX A

Borehole B11
Depth = 249.65 ft
Total Unit Weight = 115.8 lb/ft^3
Water Content = 31.06 %
LL=41, PL=24, PI=17

FUGRO JOB #: 0411-08-1721
Testing Station: RC7

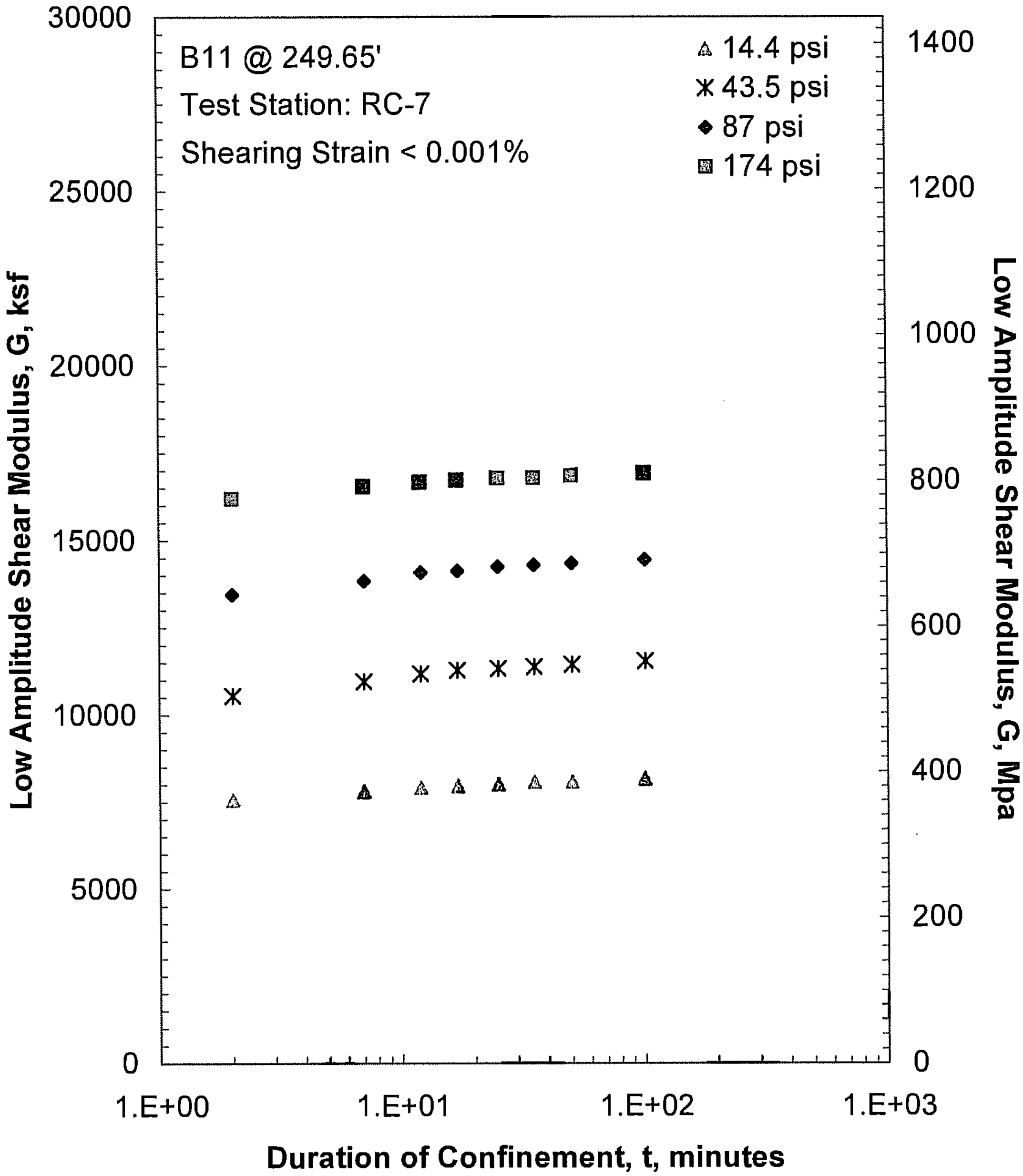


Figure A.1 Variation in Low-Amplitude Shear Modulus with Magnitude and Duration of Isotropic Confining Pressure from Resonant Column Tests

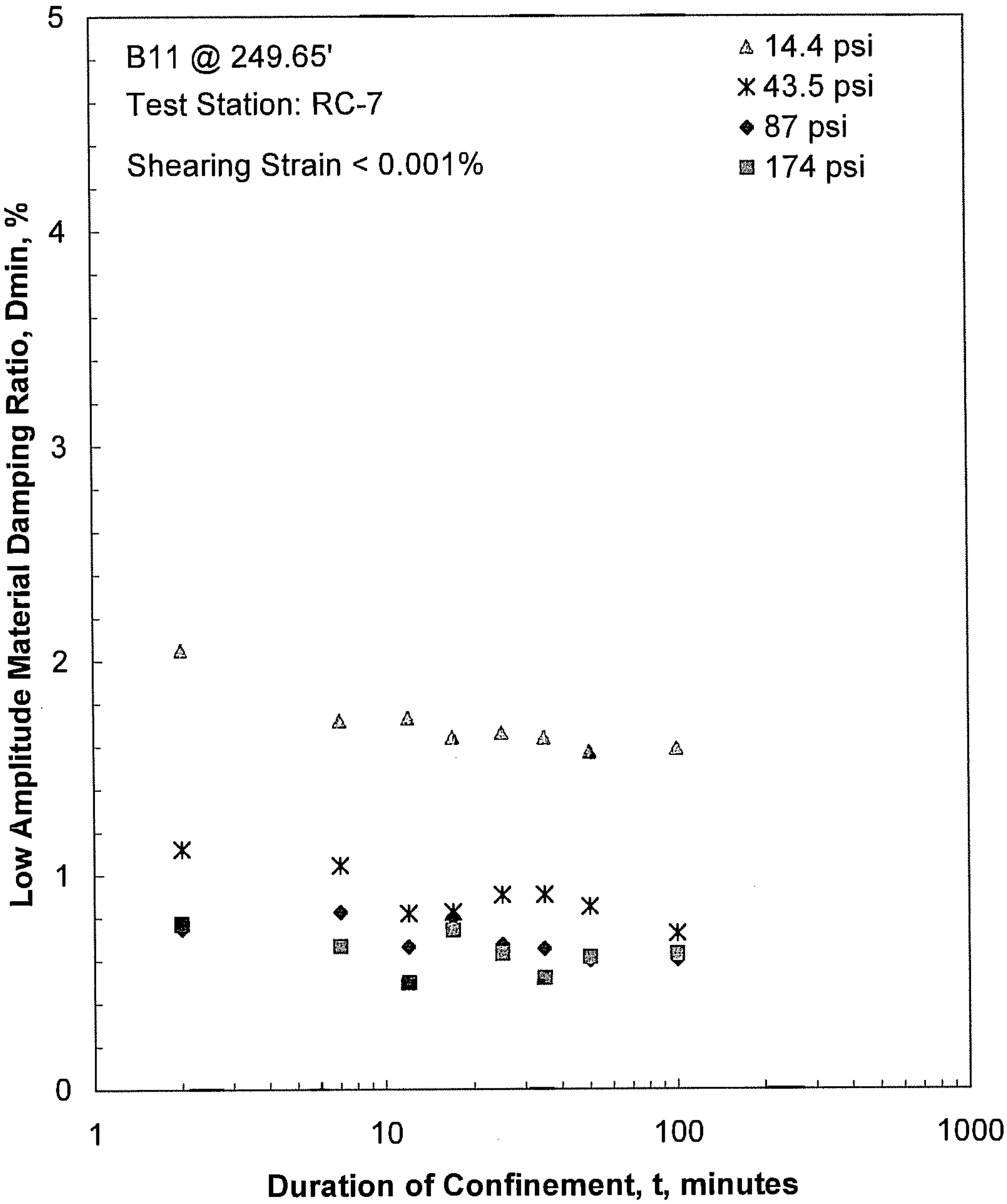


Figure A.2 Variation in Damping Ratio and Duration of Isotropic Confining Pressure from Resonant Column Tests

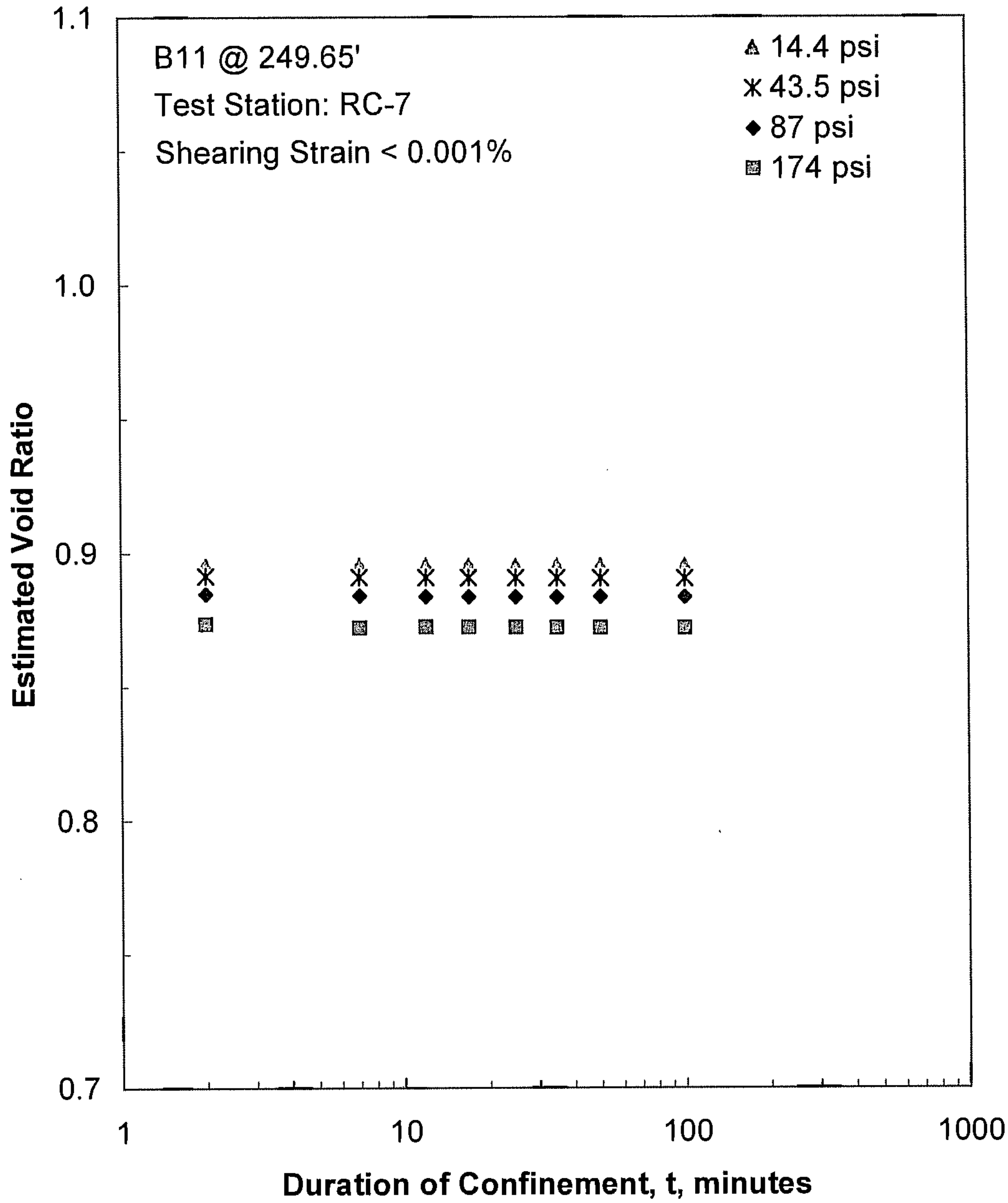


Figure A.3 Variation in Estimated Void Ratio and Duration of Isotropic Confining Pressure from Resonant Column Tests

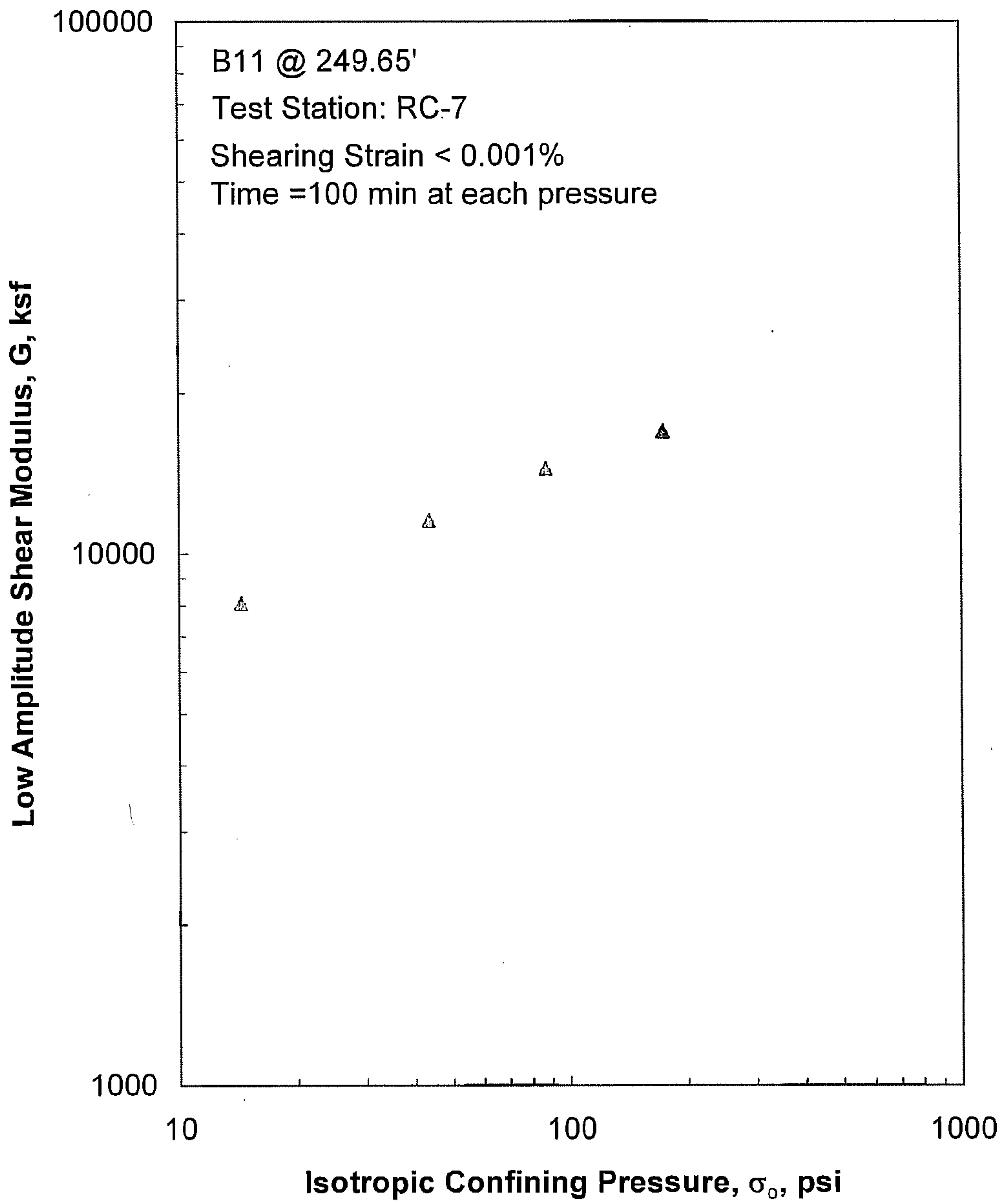


Figure A.4 Variation in Shear Modulus with Magnitude and Duration of Isotropic Confining Pressure from Resonant Column Tests

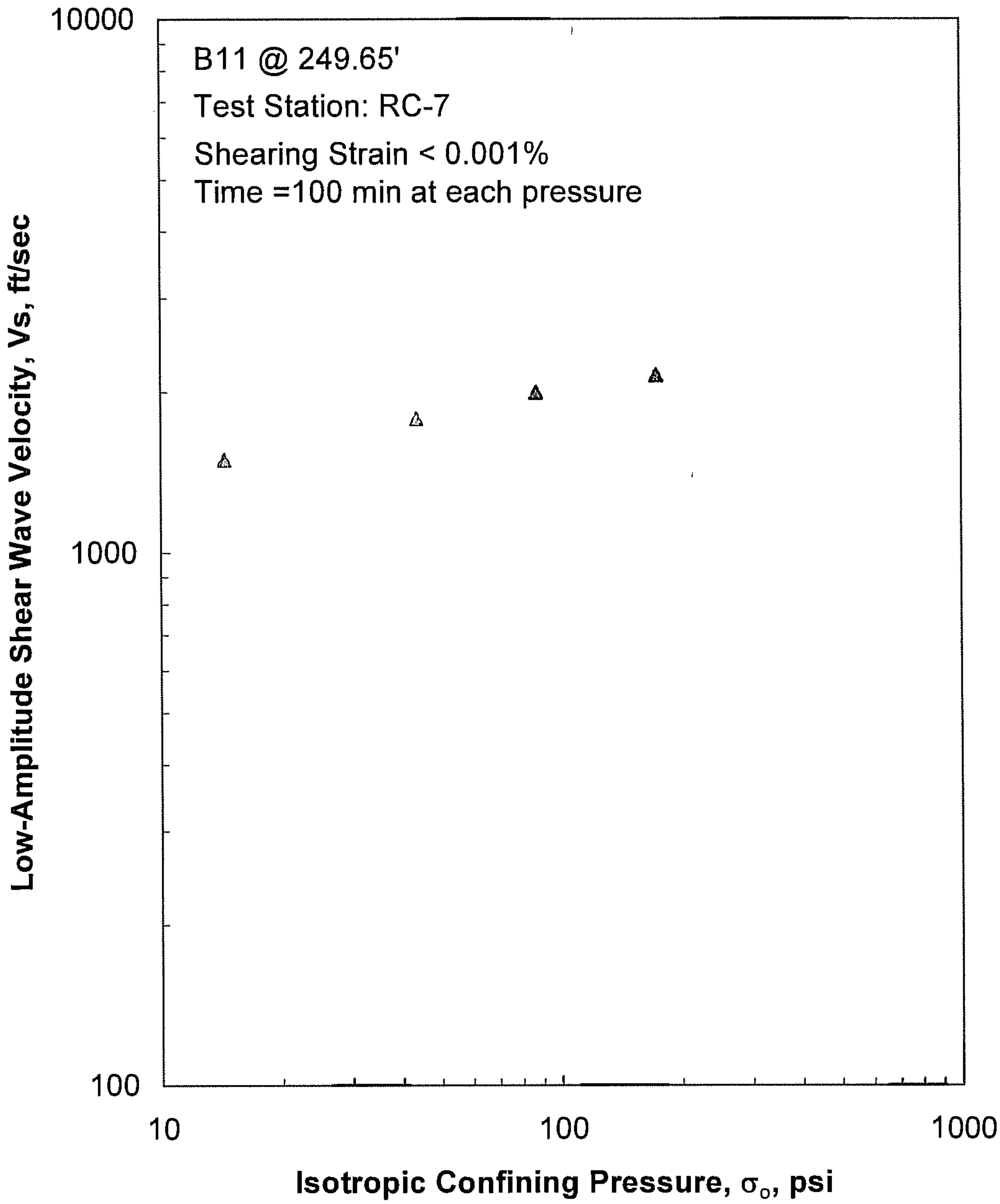


Figure A.5 Variation in Shear Wave Velocity with Magnitude and Duration of Isotropic Confining Pressure from Resonant Column Tests

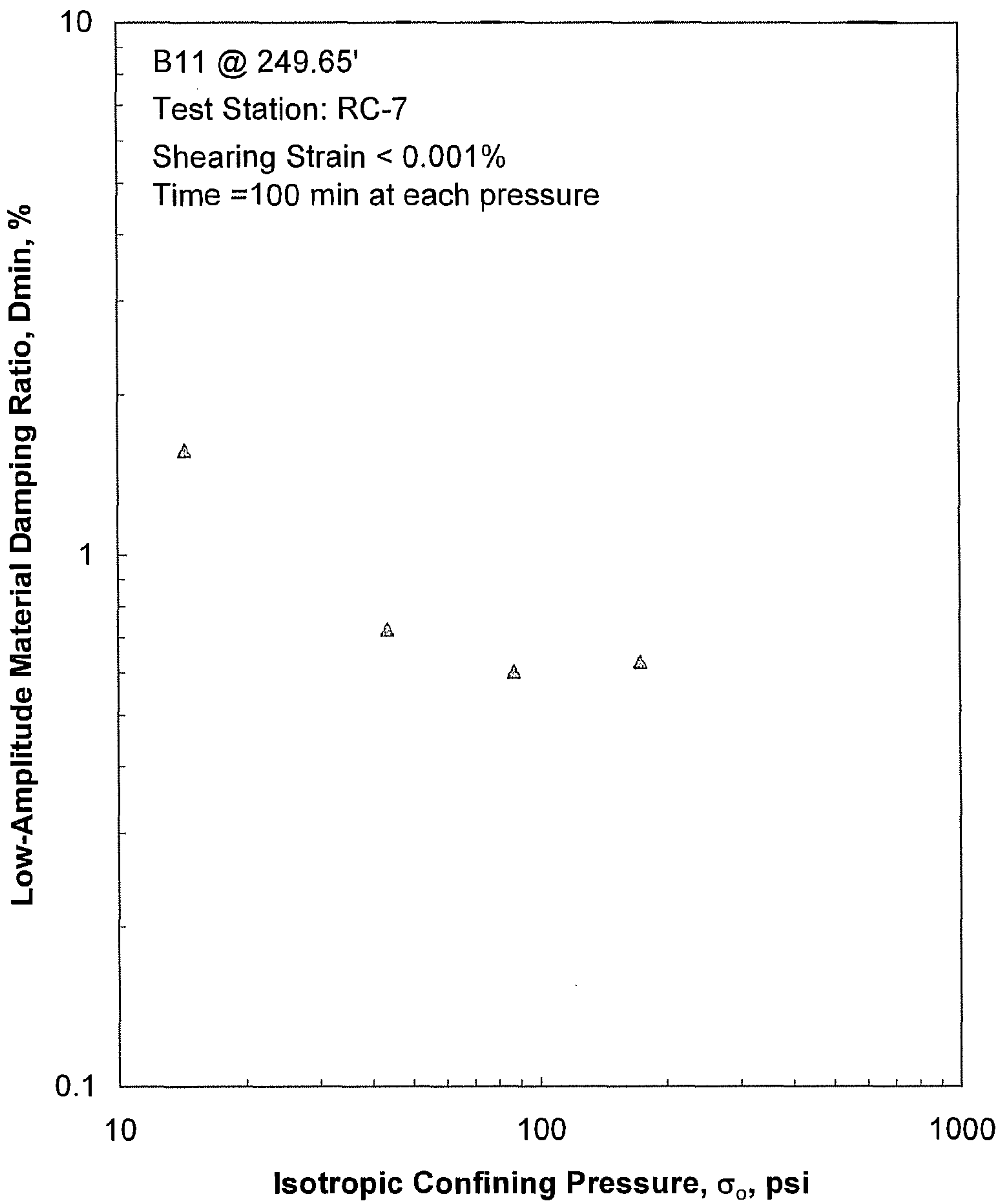


Figure A.6 Variation in Material Damping Ratio and Duration of Isotropic Confining Pressure from Resonant Column Tests

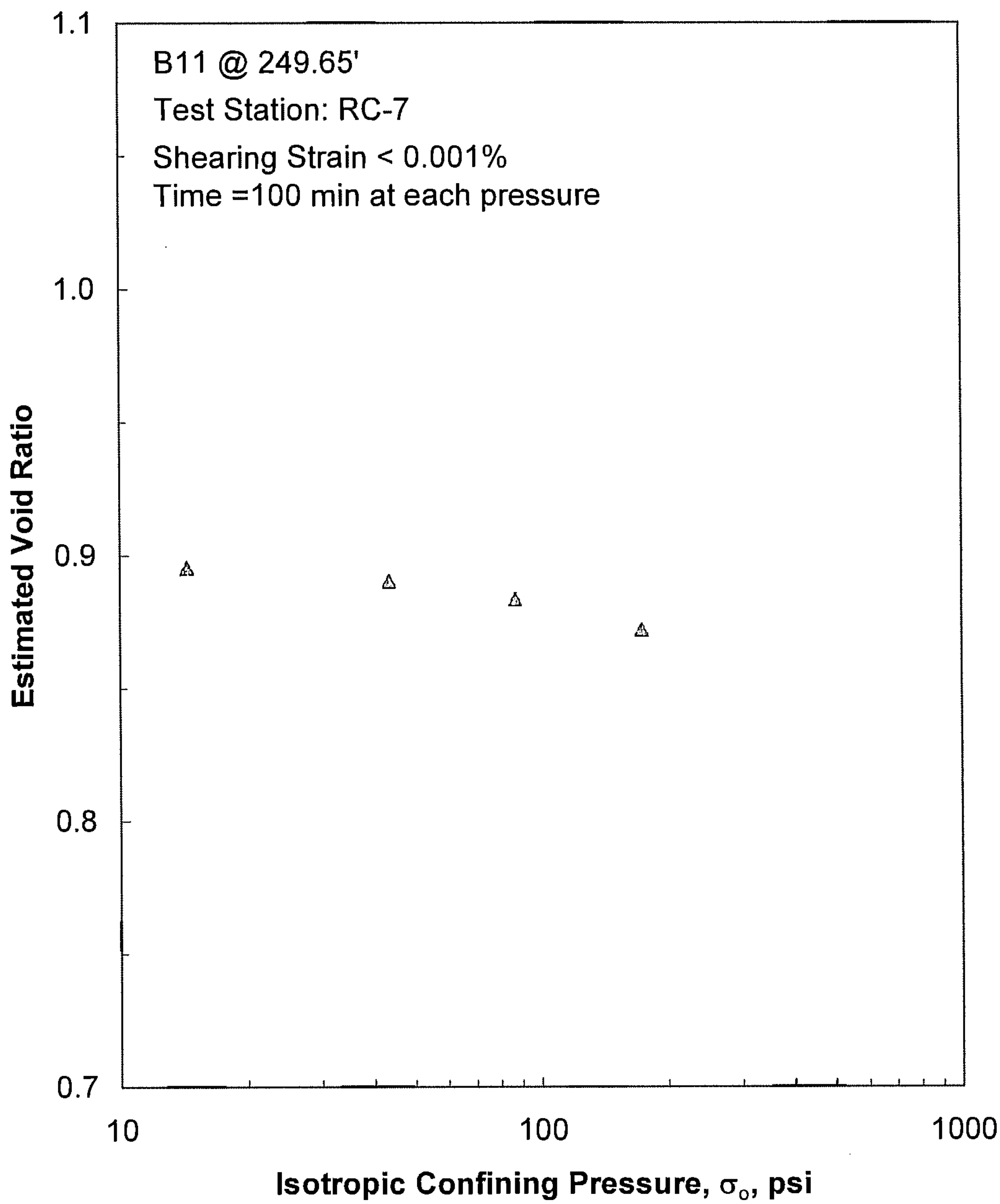


Figure A.7 Variation in Estimated Void Ratio with Magnitude and Duration of Isotropic Confining Pressure from Resonant Column Tests

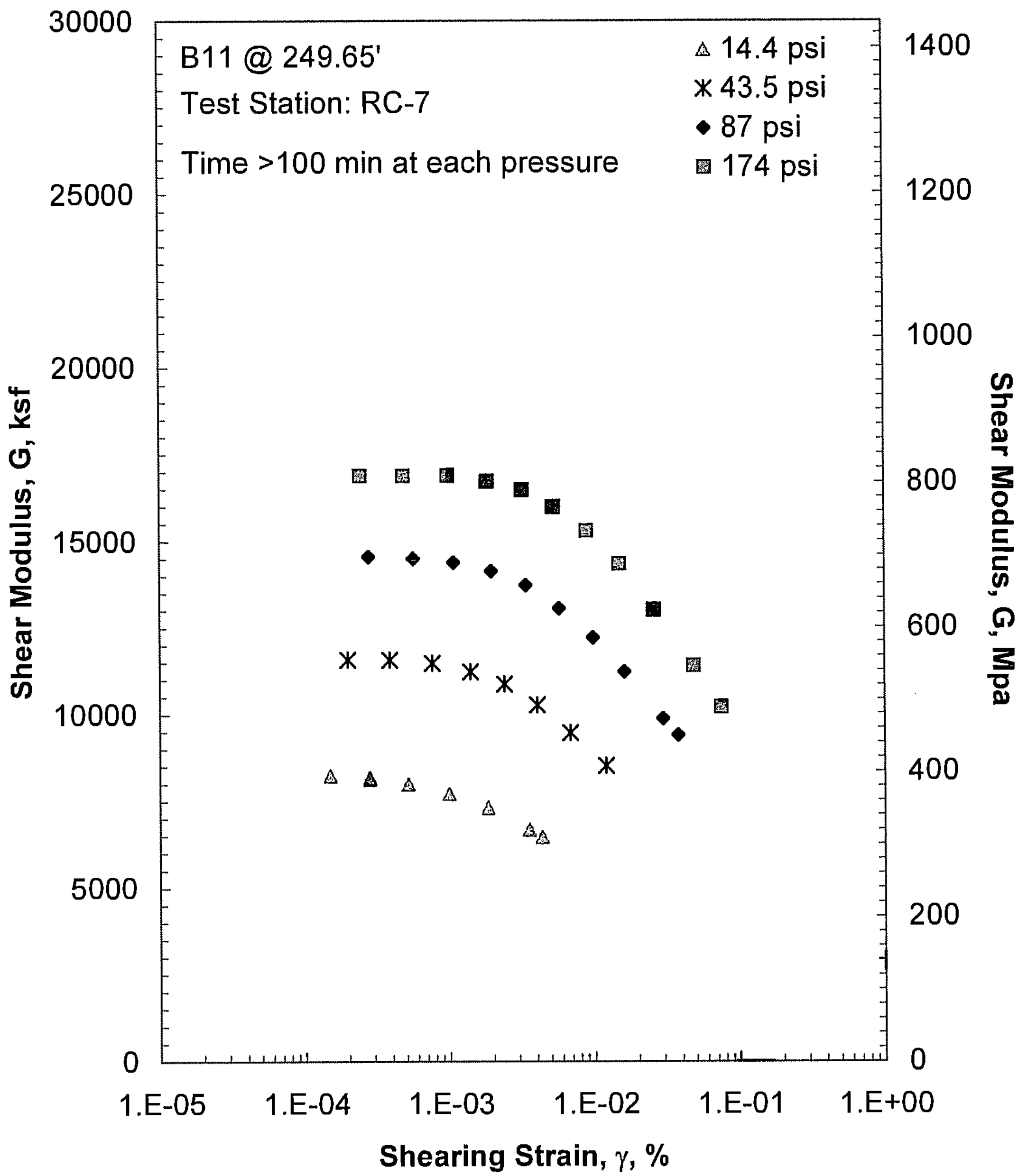


Figure A.8 Comparison of the Variation in Shear Modulus with Shearing Strain and Isotropic Confining Pressure from the Resonant Column Tests

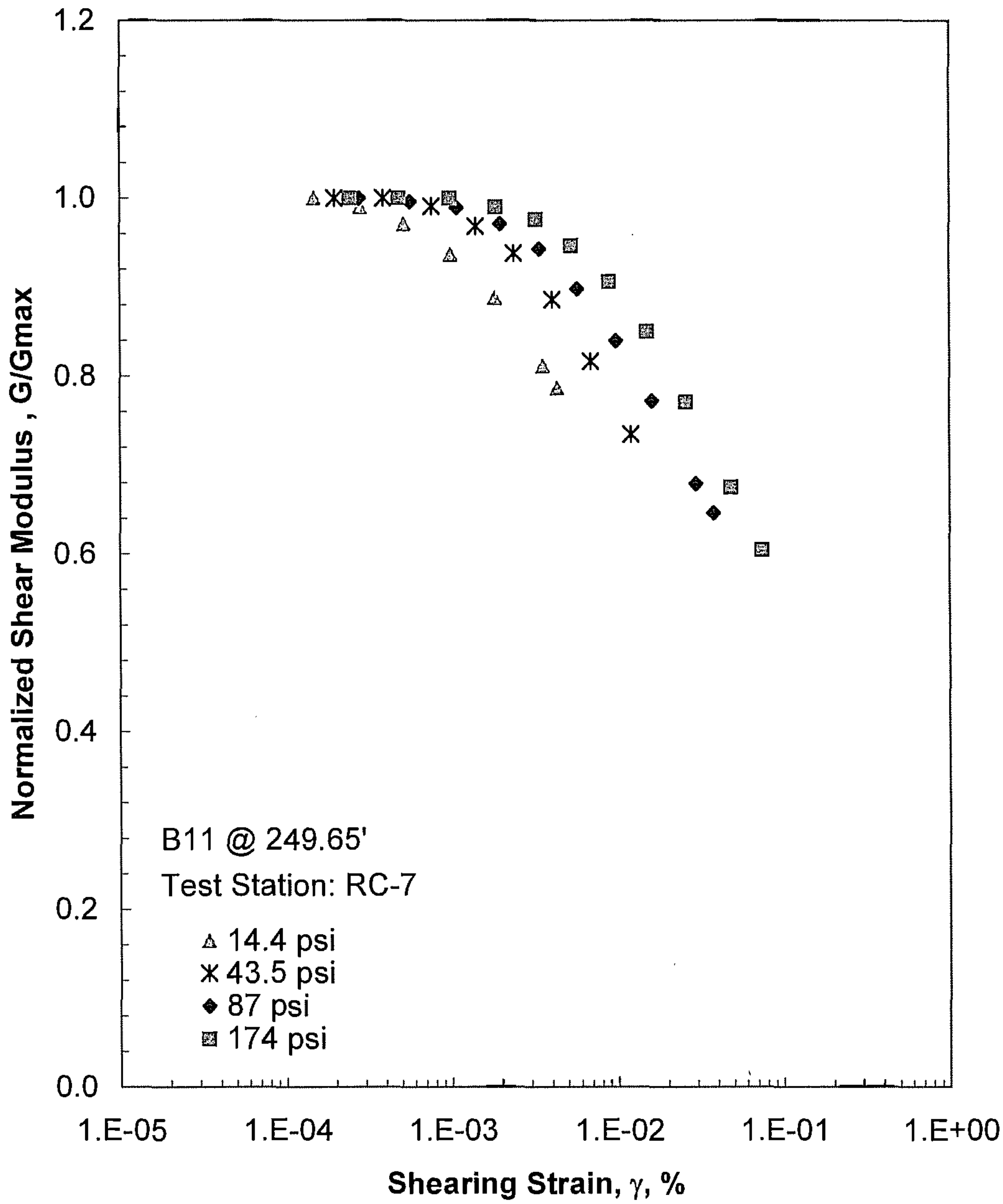


Figure A.9 Comparison of the Variation in Normalized Shear Modulus with Shearing Strain and Isotropic Confining Pressure from the Resonant Column Tests

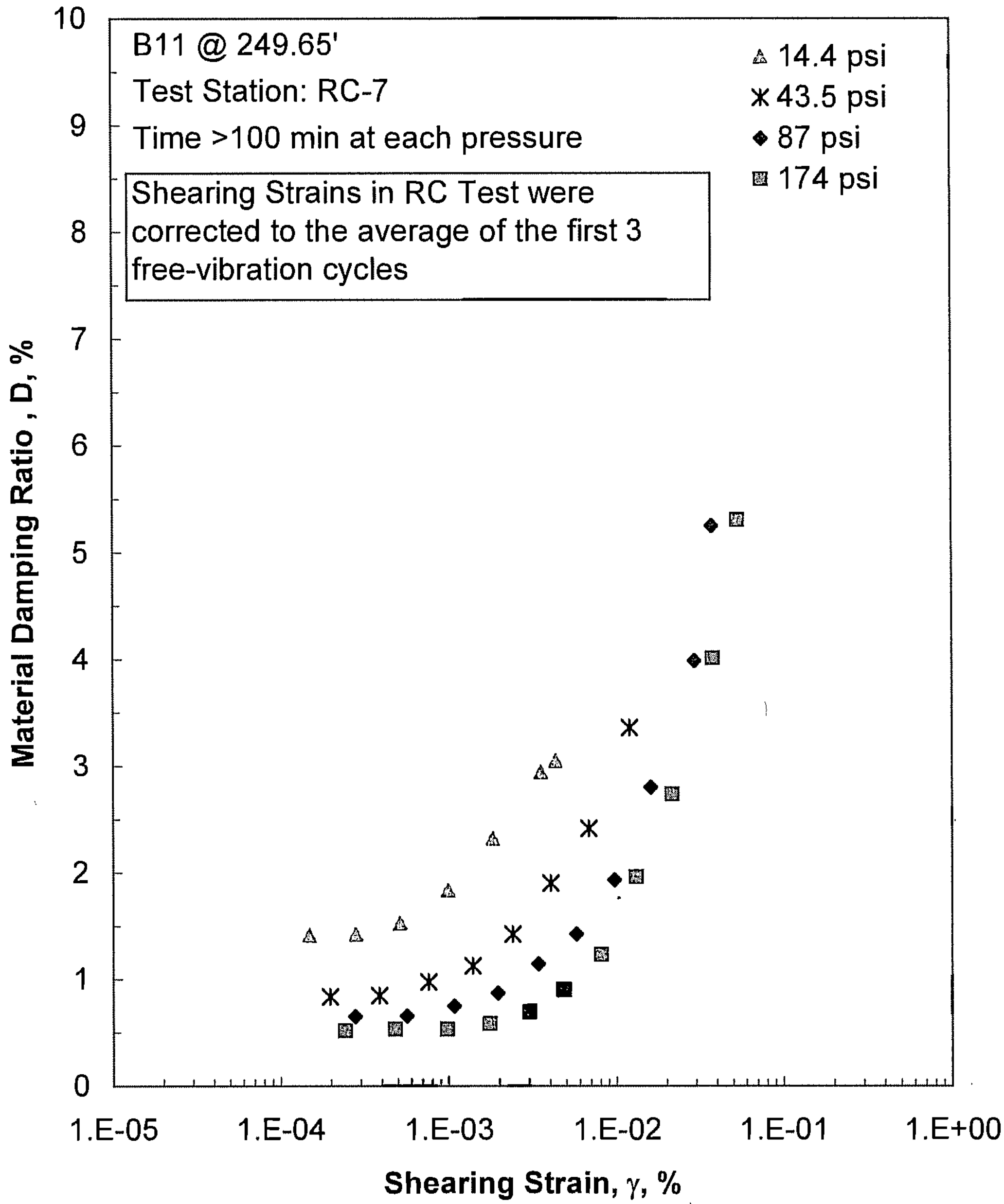


Figure A.10 Comparison of the Variation in Material Damping Ratio with Shearing Strain and Isotropic Confining Pressure from the Resonant Column Tests

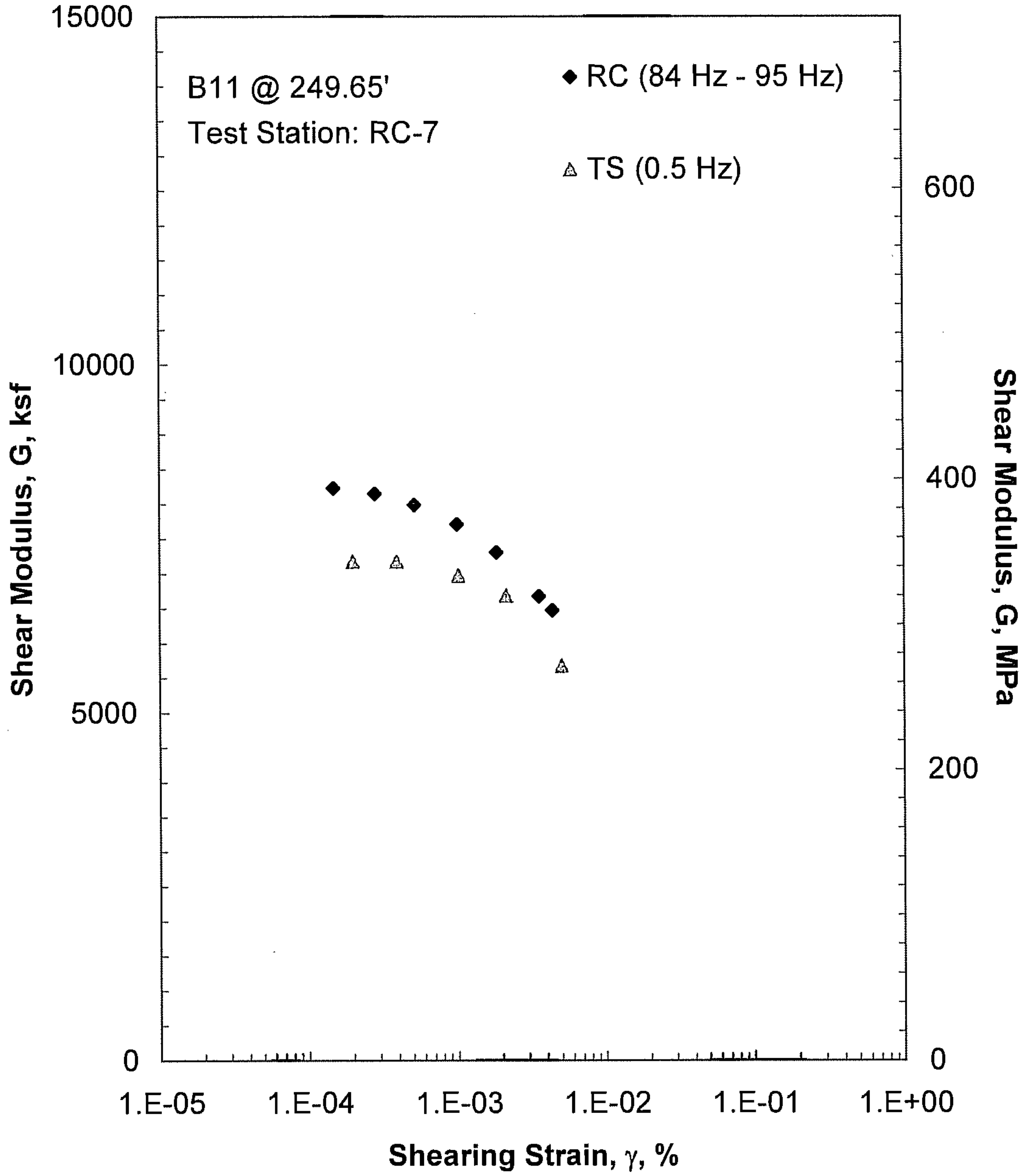


Figure A.11 Comparison of the Variation in Shear Modulus with Shearing Strain at an Isotropic Confining Pressure of 14.4 psi from the Combined RCTS Tests

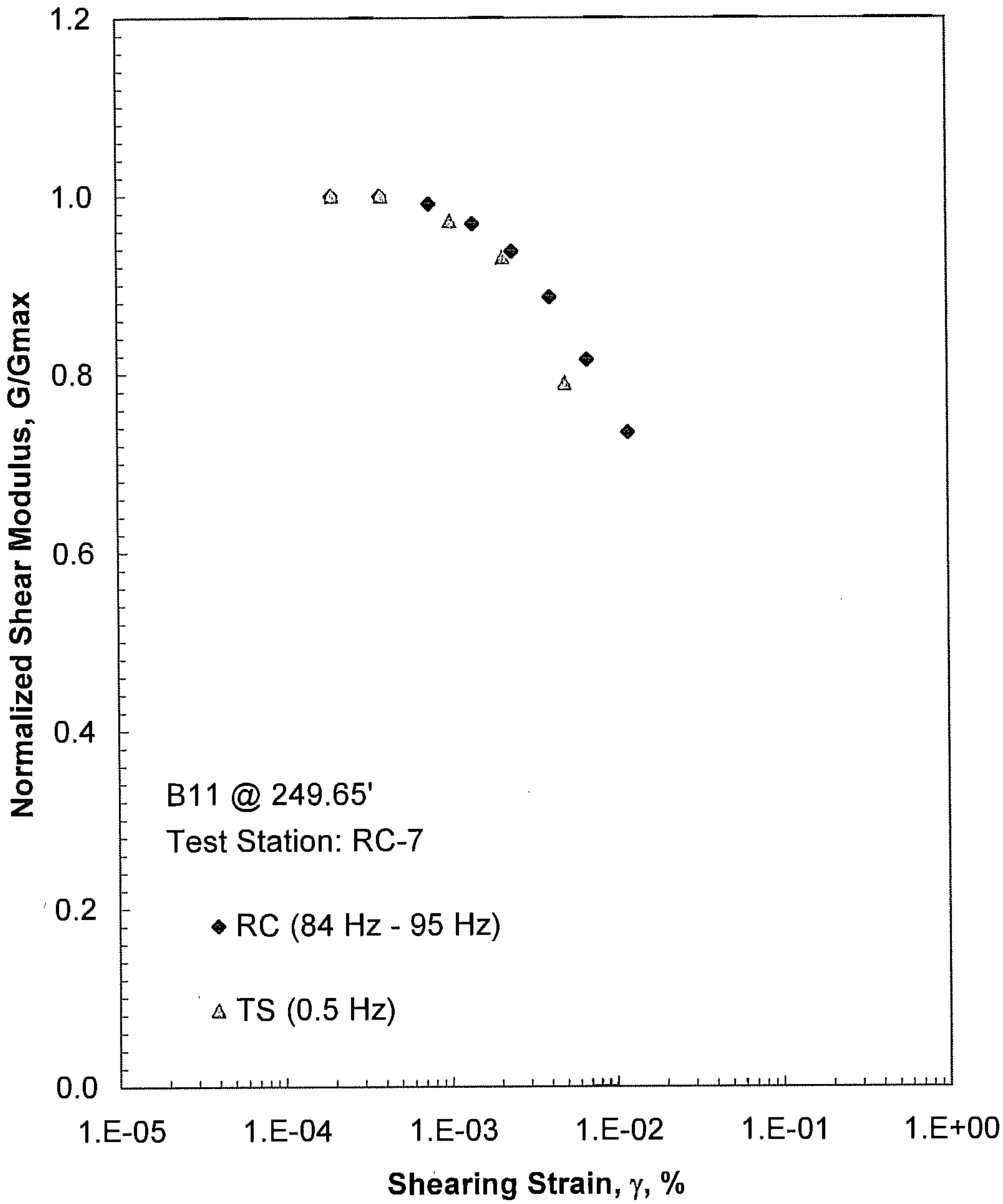


Figure A.12 Comparison of the Variation in Normalized Shear Modulus with Shearing Strain at an Isotropic Confining Pressure of 14.4 psi from the Combined RCTS Tests

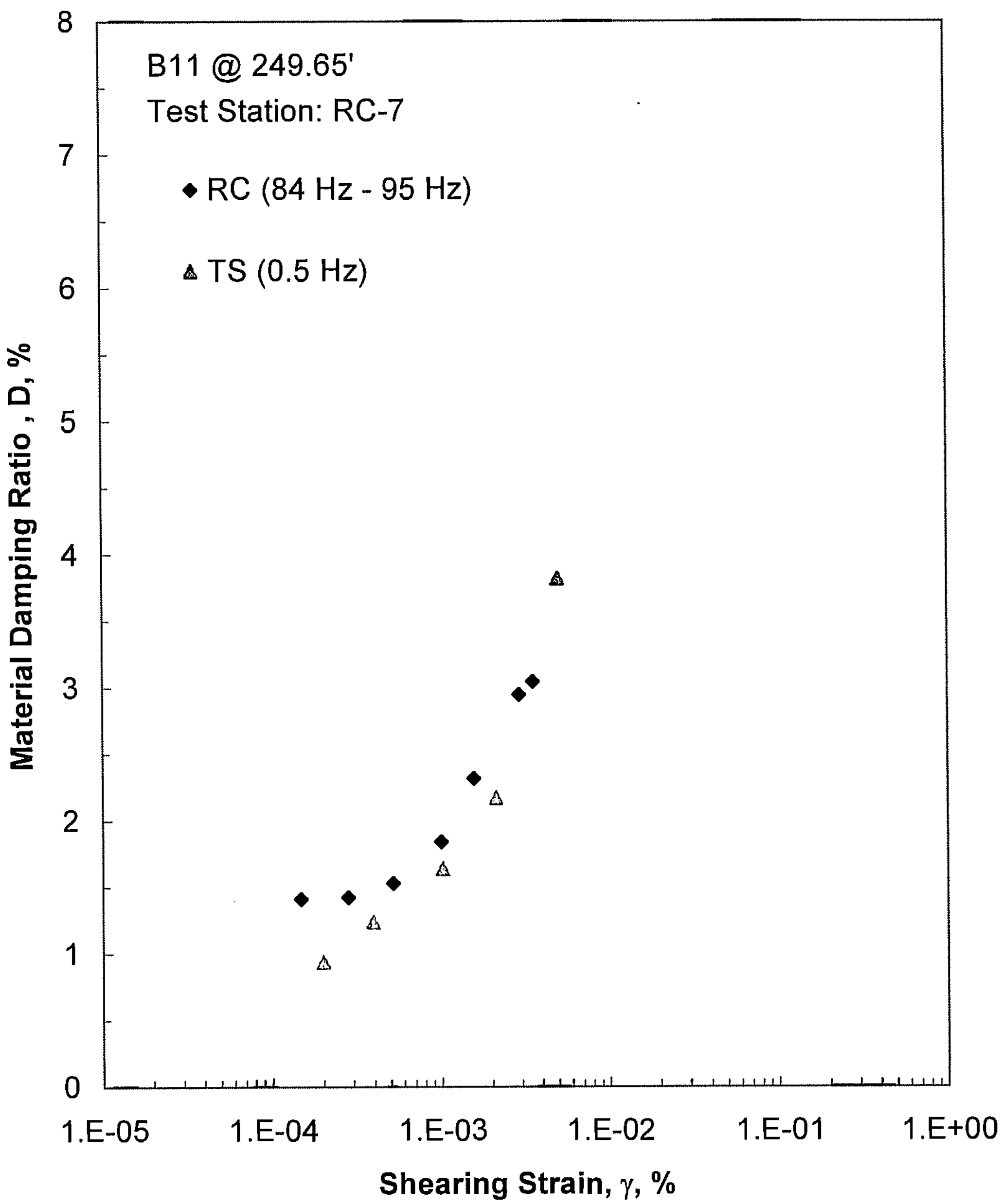


Figure A.13 Comparison of the Variation in Material Damping Ratio with Shearing Strain at an Isotropic Confining Pressure of 14.4 psi from the Combined RCTS Tests

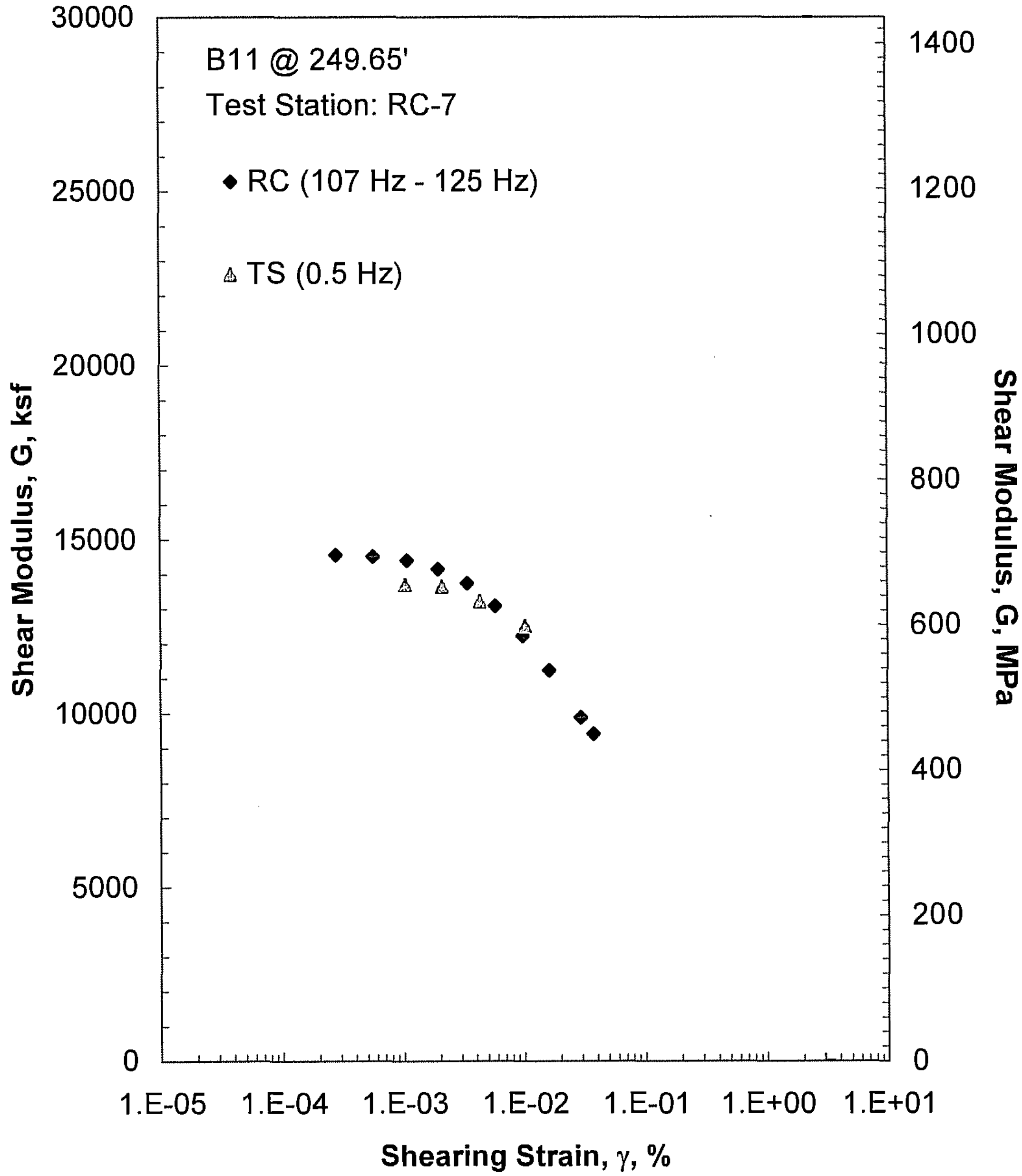


Figure A.14 Comparison of the Variation in Shear Modulus with Shearing Strain at an Isotropic Confining Pressure of 87 psi from the Combined RCTS Tests

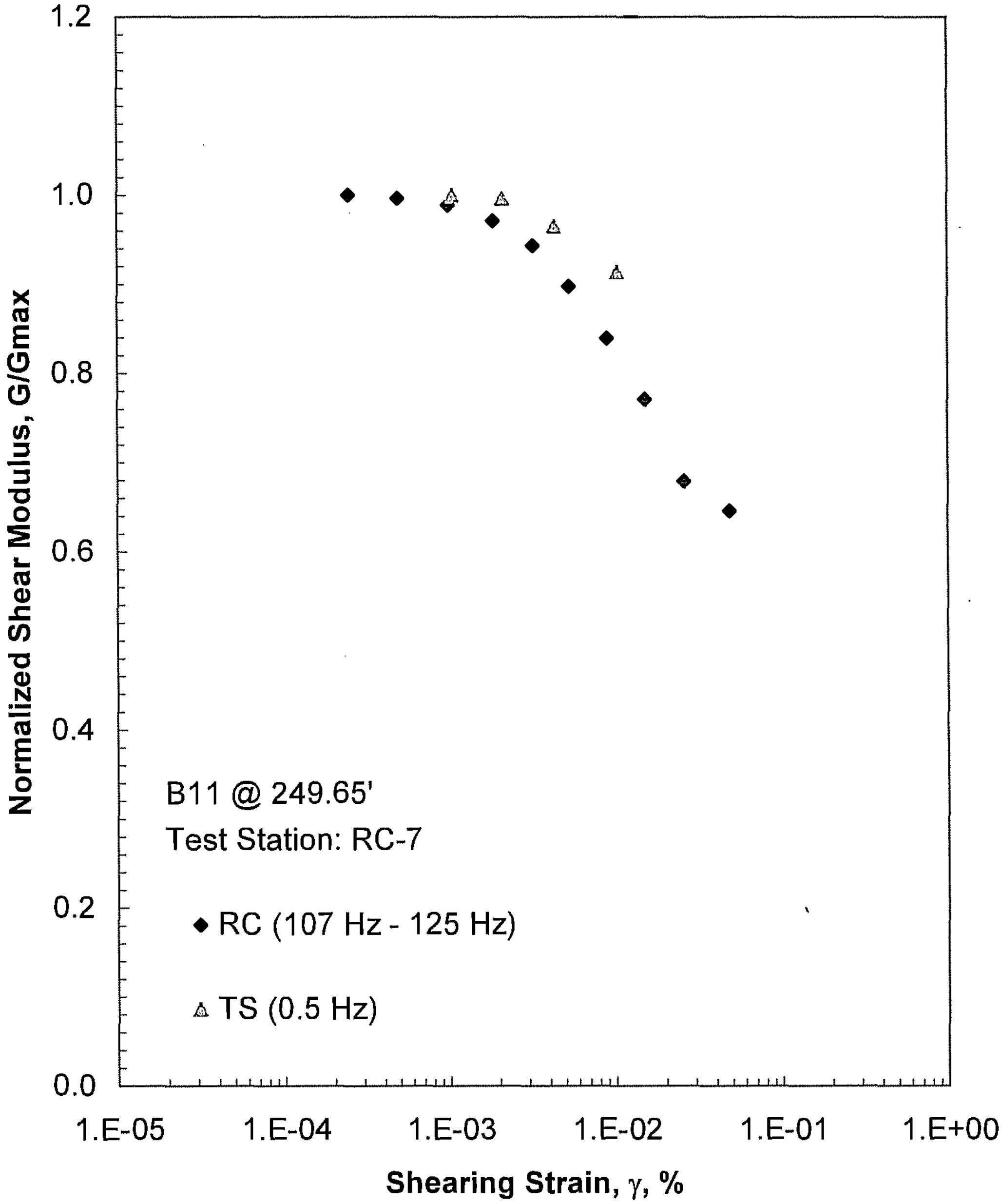


Figure A.15 Comparison of the Variation in Normalized Shear Modulus with Shearing Strain at an Isotropic Confining Pressure of 87 psi from the Combined RCTS Tests

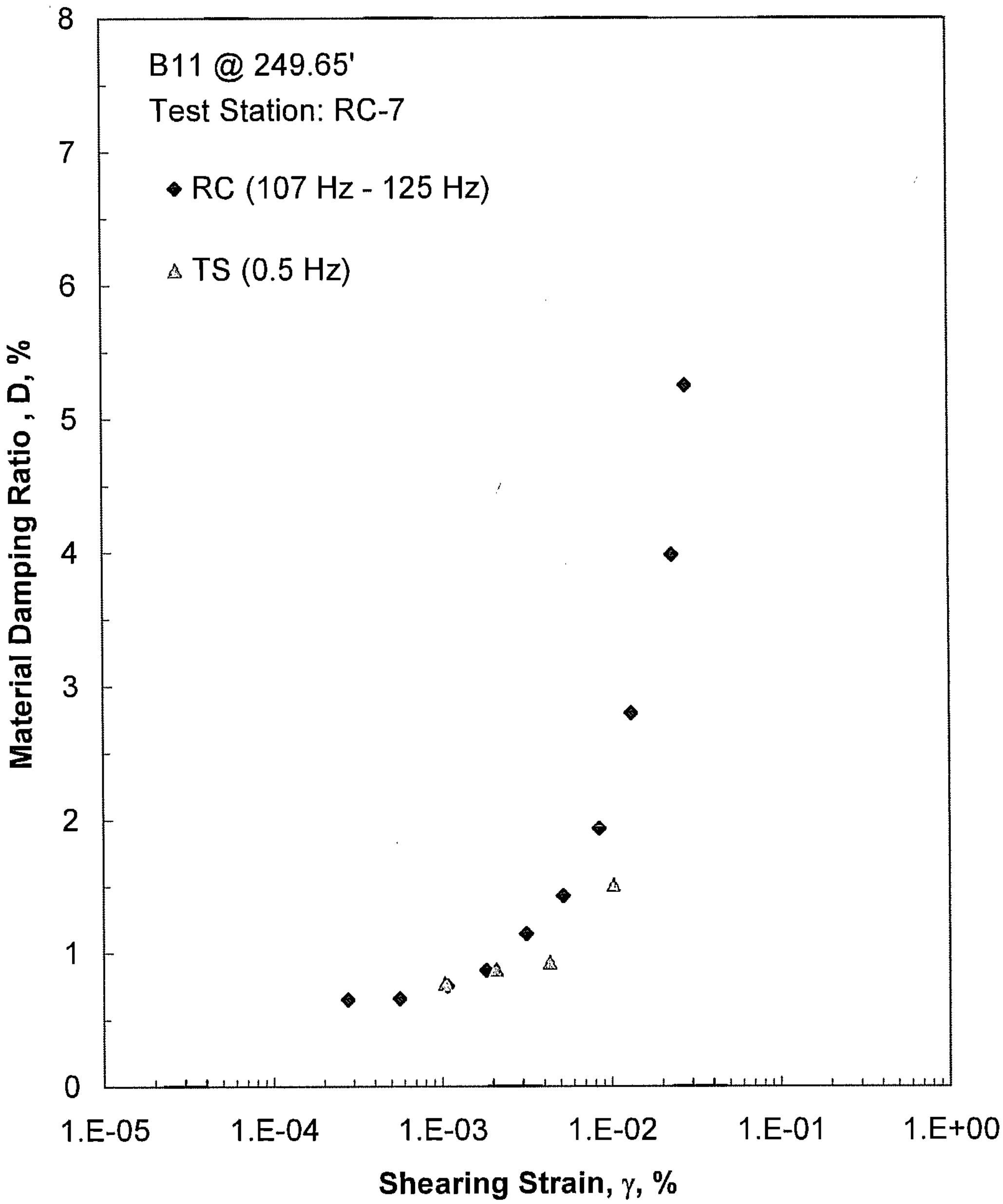


Figure A.16 Comparison of the Variation in Material Damping Ratio with Shearing Strain at an Isotropic Confining Pressure of 87 psi from the Combined RCTS Tests

Table A.1 Variation in Low-Amplitude Shear Wave Velocity, Low-Amplitude Shear Modulus, Low-Amplitude Material Damping Ratio and Estimated Void Ratio with Isotropic Confining Pressure from RC Tests of Specimen B11@249.65'

Isotropic Confining Pressure, σ_o			Low-Amplitude Shear Modulus, G_{max}		Low-Amplitude Shear Wave Velocity, Vs	Low-Amplitude Material Damping Ratio, Dmin	Estimated Void Ratio, e
(psi)	(psf)	(kPa)	(ksf)	(MPa)	(fps)	(%)	
14.4	2074	99	8066	387	1492	1.57	0.90
43.5	6264	300	11536	554	1782	0.72	0.89
87	12528	599	14444	693	1990	0.60	0.88
174	25056	1199	16912	812	2147	0.63	0.87

Table A.2 Variation in Shear Modulus and Material Damping Ratio with Shearing Strain from RC Tests of Specimen B11 @ 249.65'; Isoptropic Confining Pressure, σ_o= 14.4 psi

Peak Shearing Strain, %	Shear Modulus, G, ksf	Normalized Shear Modulus, G/G_{max}	Average$^+$ Shearing Strain, %	Material Damping Ratio^x, D, %
1.48E-04	8229	1.00	1.48E-04	1.41
2.80E-04	8148	0.99	2.80E-04	1.42
5.16E-04	7987	0.97	5.16E-04	1.53
9.90E-04	7708	0.94	9.90E-04	1.84
1.83E-03	7304	0.89	1.56E-03	2.32
3.54E-03	6676	0.81	2.90E-03	2.94
4.34E-03	6469	0.79	3.52E-03	3.05

$^+$ Average Shearing Strain from the First Three Cycles of the Free Vibration Decay Curve

^{x} Average Damping Ratio from the First Three Cycles of the Free Vibration Decay Curve

Table A.3 Variation in Shear Modulus and Material Damping Ratio with Shearing Strain from RC Tests of Specimen B11 @ 249.65'; Isoptropic Confining Pressure, σ_o= 43.5 psi

Peak Shearing Strain, %	Shear Modulus, G, ksf	Normalized Shear Modulus, G/G_{max}	Average$^+$ Shearing Strain, %	Material Damping Ratio^x, D, %
1.97E-04	11588	1.00	1.97E-04	0.83
3.86E-04	11588	1.00	3.86E-04	0.84
7.62E-04	11484	0.99	7.62E-04	0.97
1.39E-03	11227	0.97	1.25E-03	1.13
2.39E-03	10871	0.94	2.15E-03	1.42
4.04E-03	10265	0.89	3.56E-03	1.90
6.84E-03	9458	0.82	5.75E-03	2.41
1.20E-02	8512	0.73	9.71E-02	3.36

$^+$ Average Shearing Strain from the First Three Cycles of the Free Vibration Decay Curve

^{x} Average Damping Ratio from the First Three Cycles of the Free Vibration Decay Curve

Table A.4 Variation in Shear Modulus and Material Damping Ratio with Shearing Strain from RC Tests of Specimen B11 @ 249.65'; Isoptropic Confining Pressure, σ_o= 87 psi

Peak Shearing Strain, %	Shear Modulus, G, ksf	Normalized Shear Modulus, G/G_{max}	Average^{+} Shearing Strain, %	Material Damping Ratio^{x}, D, %
2.77E-04	14556	1.00	2.77E-04	0.65
5.63E-04	14504	1.00	5.63E-04	0.65
1.07E-03	14399	0.99	1.07E-03	0.75
1.96E-03	14138	0.97	1.82E-03	0.87
3.40E-03	13726	0.94	3.13E-03	1.14
5.74E-03	13069	0.90	5.16E-03	1.42
9.72E-03	12219	0.84	8.45E-03	1.93
1.61E-02	11226	0.77	1.32E-02	2.80
2.95E-02	9878	0.68	2.30E-02	3.98
3.76E-02	9398	0.65	2.78E-02	5.25

$^{+}$ Average Shearing Strain from the First Three Cycles of the Free Vibration Decay Curve

^{x} Average Damping Ratio from the First Three Cycles of the Free Vibration Decay Curve

Table A.5 Variation in Shear Modulus and Material Damping Ratio with Shearing Strain from RC Tests of Specimen B11 @ 249.65'; Isoptropic Confining Pressure, σ_o= 174 psi

Peak Shearing Strain, %	Shear Modulus, G, ksf	Normalized Shear Modulus, G/G_{max}	Average+ Shearing Strain, %	Material Damping Ratiox, D, %
2.43E-04	16891	1.00	2.43E-04	0.52
4.82E-04	16891	1.00	4.82E-04	0.53
9.78E-04	16891	1.00	9.78E-04	0.53
1.84E-03	16723	0.99	1.75E-03	0.59
3.21E-03	16473	0.98	3.01E-03	0.69
5.27E-03	15987	0.95	4.85E-03	0.90
8.88E-03	15298	0.91	8.08E-03	1.23
1.50E-02	14348	0.85	1.32E-02	1.96
2.58E-02	13014	0.77	2.16E-02	2.73
4.81E-02	11400	0.67	3.80E-02	4.01
7.44E-02	10208	0.60	5.35E-02	5.31

+ Average Shearing Strain from the First Three Cycles of the Free Vibration Decay Curve

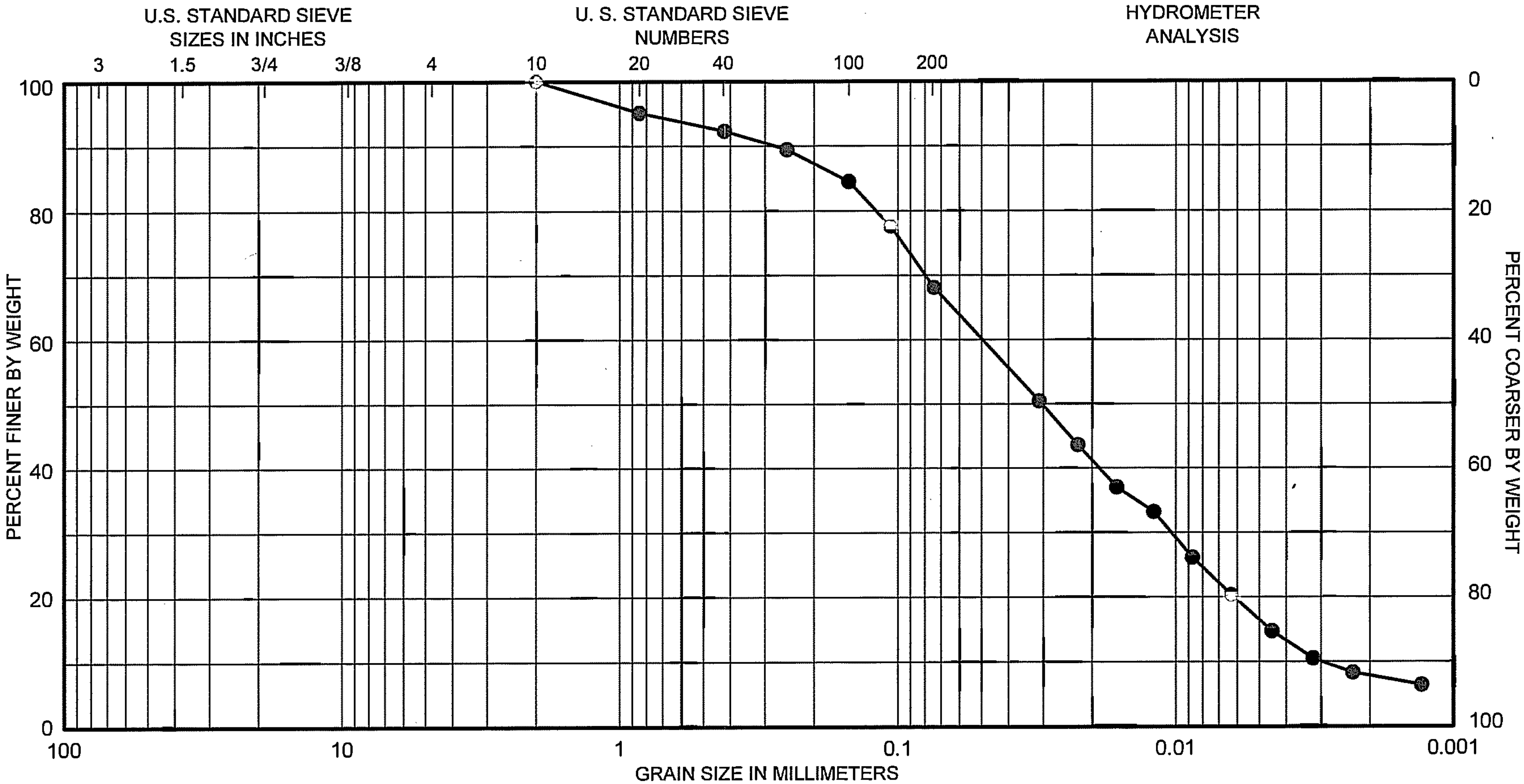
x Average Damping Ratio from the First Three Cycles of the Free Vibration Decay Curve

Table A.6 Variation in Shear Modulus, Normalized Shear Modulus and Material Damping Ratio with Shearing Strain from TS Tests of Specimen B11 @ 249.65'; Isotropic Confining Pressure, σ_o= 14.4 psi

Peak Shearing Strain, %	Shear Modulus, G, ksf	Normalized Shear Modulus, G/G_{max}	Material Damping Ratio, D, %
1.99E-04	7174	1.00	0.94
3.92E-04	7174	1.00	1.24
1.02E-03	6973	0.97	1.64
2.12E-03	6679	0.93	2.17
5.00E-03	5666	0.79	3.82

Table A.7 Variation in Shear Modulus, Normalized Shear Modulus and Material Damping Ratio with Shearing Strain from TS Tests of Specimen B11 @ 249.65'; Isotropic Confining Pressure, σ_o= 87 psi

Peak Shearing Strain, %	Shear Modulus, G, ksf	Normalized Shear Modulus, G/G_{max}	Material Damping Ratio, D, %
1.04E-03	13693	1.00	0.77
2.09E-03	13645	1.00	0.87
4.32E-03	13216	0.97	0.93
1.03E-02	12502	0.91	1.51



GRAVEL		SAND			SILT or CLAY
Coarse	Fine	Coarse	Medium	Fine	

SYMBOL	BORING	DEPTH, FT	C_c	C_u	D_{50}	D_{90}	CLASSIFICATION
●	B-11	249.65	0.73	16.75	0.03	0.28	

GRAIN SIZE CURVE

Report No. 0411-08-1721

PLATE

Table B.6 Variation in Shear Modulus, Normalized Shear Modulus and Material Damping Ratio with Shearing Strain from TS Tests of Specimen B11 @ 131.8; Isotropic Confining Pressure, σ_o= 14.4 psi

Peak Shearing Strain, %	Shear Modulus, G, ksf	Normalized Shear Modulus, G/G_{max}	Material Damping Ratio, D, %
3.11E-04	1366	1.00	1.58
6.23E-04	1366	1.00	1.50
1.00E-03	1366	1.00	1.62
2.02E-03	1350	0.99	1.44
4.17E-03	1312	0.96	1.57
5.03E-03	1269	0.93	1.70

APPENDIX B

Borehole B11
Depth = 131.8 ft
Total Unit Weight = 100.4 lb/ft^3
Water Content = 57.76 %
LL=106, PL=33, PI=73

FUGRO JOB #: 0411-08-1721
Testing Station: RC7

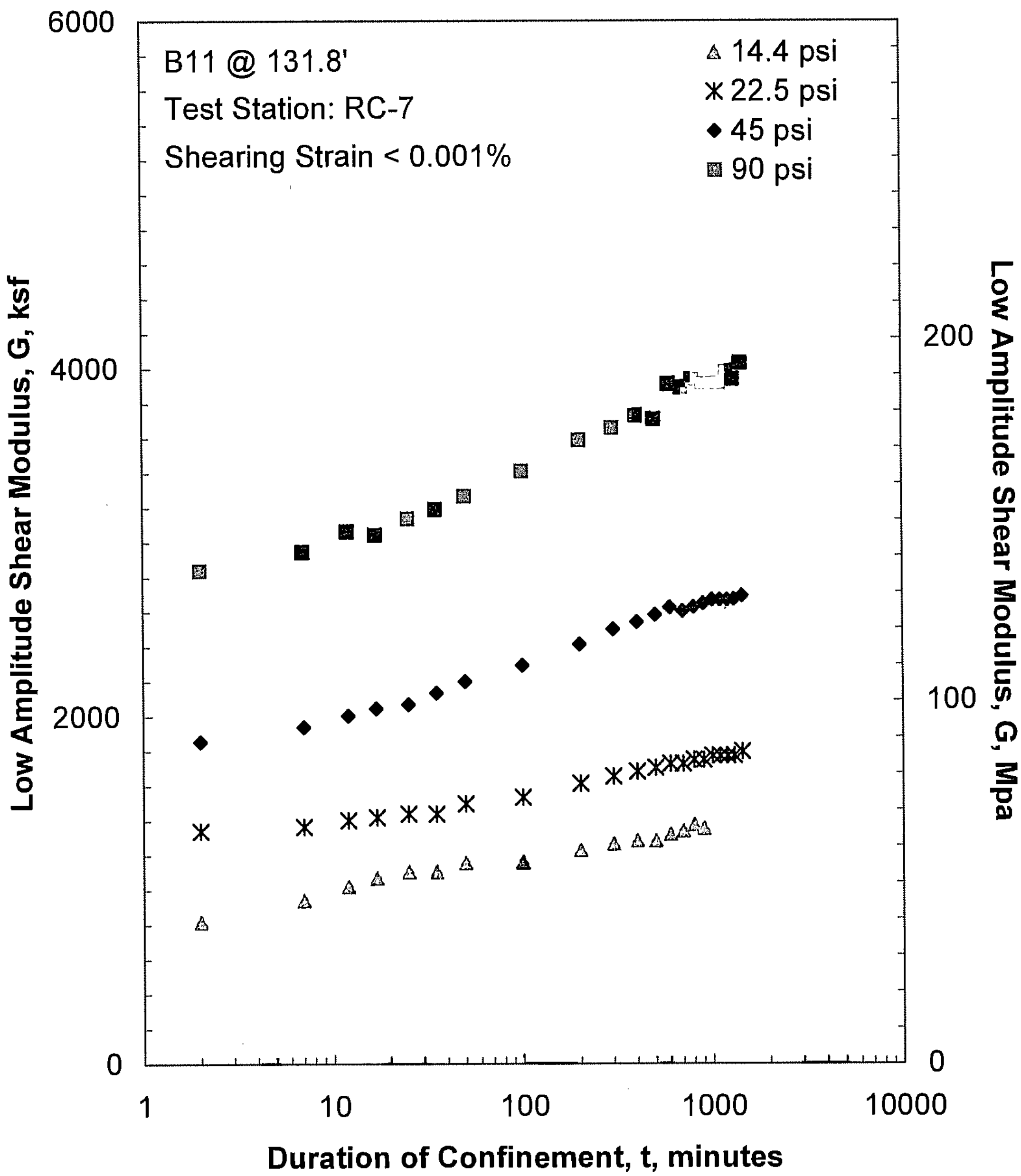


Figure B.1 Variation in Low-Amplitude Shear Modulus with Magnitude and Duration of Isotropic Confining Pressure from Resonant Column Tests

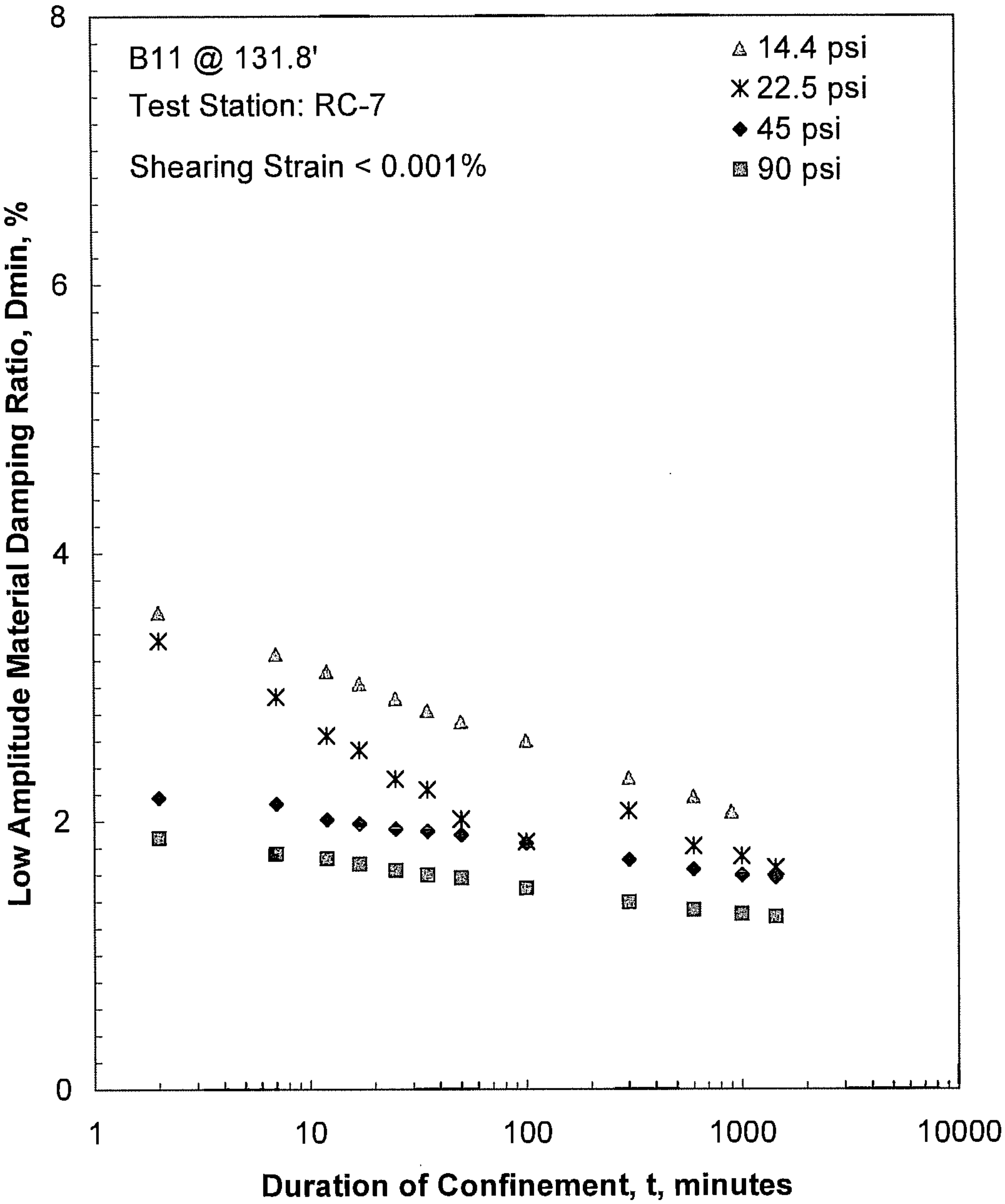


Figure B.2 Variation in Damping Ratio and Duration of Isotropic Confining Pressure from Resonant Column Tests

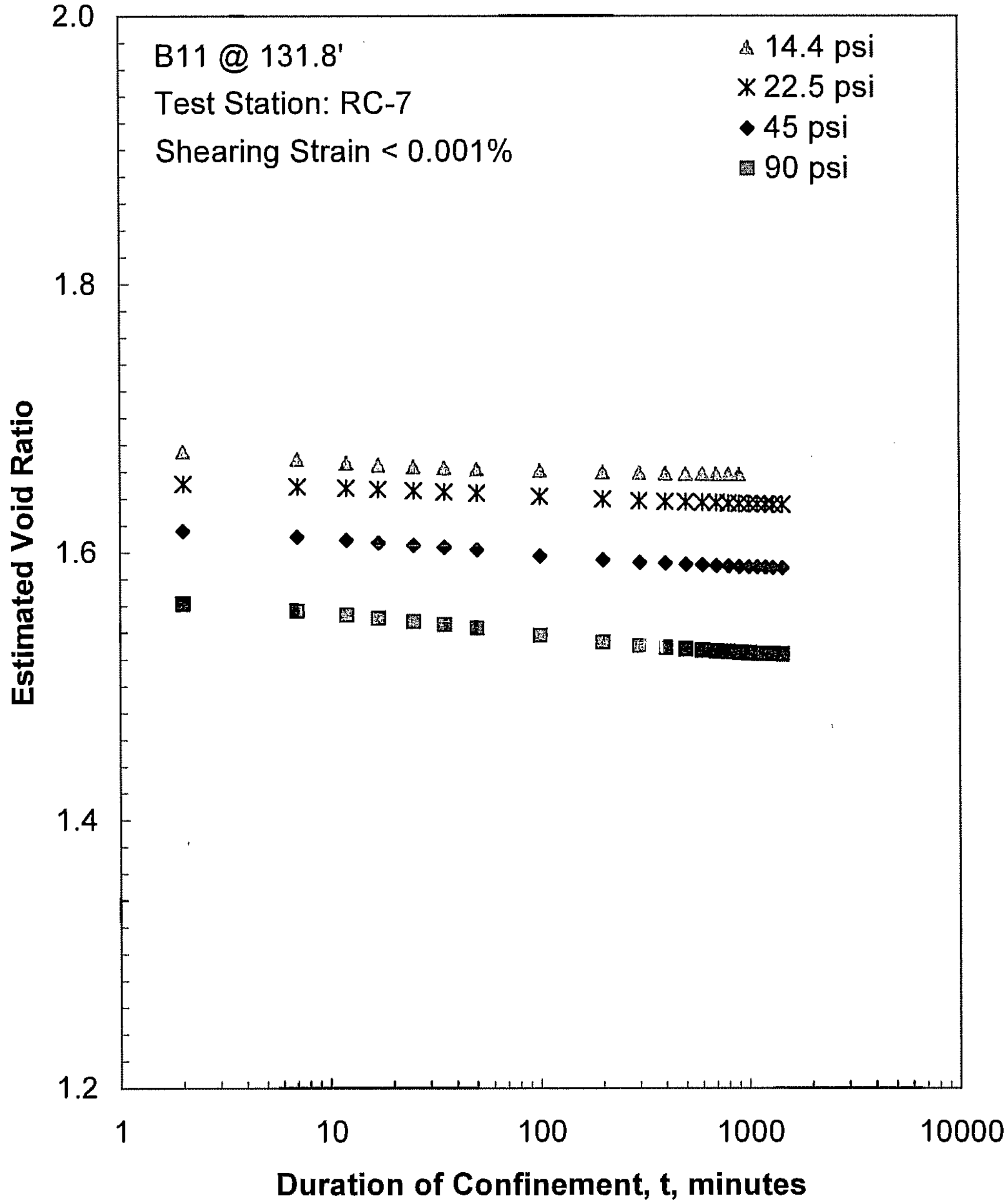


Figure B.3 Variation in Estimated Void Ratio and Duration of Isotropic Confining Pressure from Resonant Column Tests

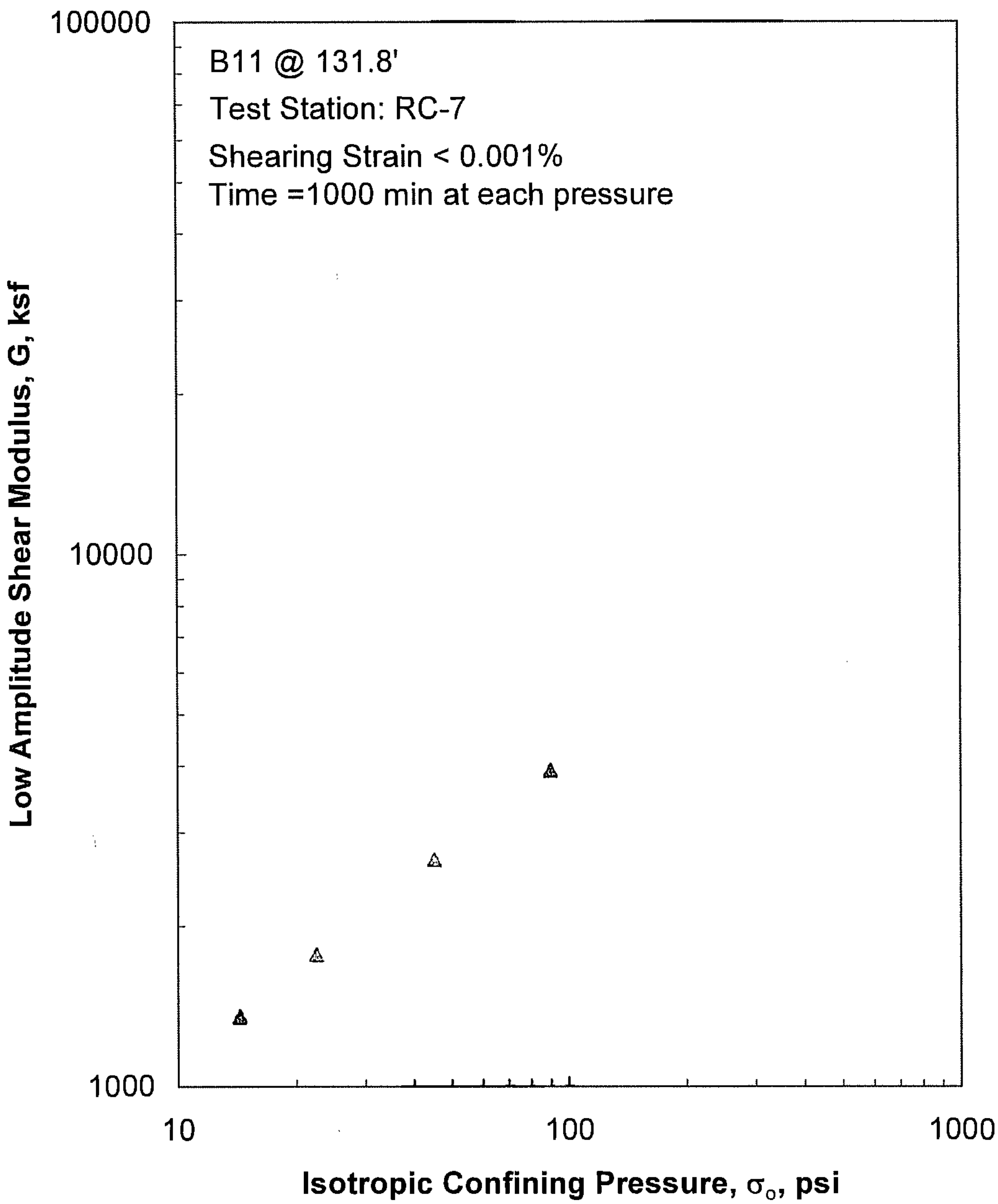


Figure B.4 Variation in Shear Modulus with Magnitude and Duration of Isotropic Confining Pressure from Resonant Column Tests

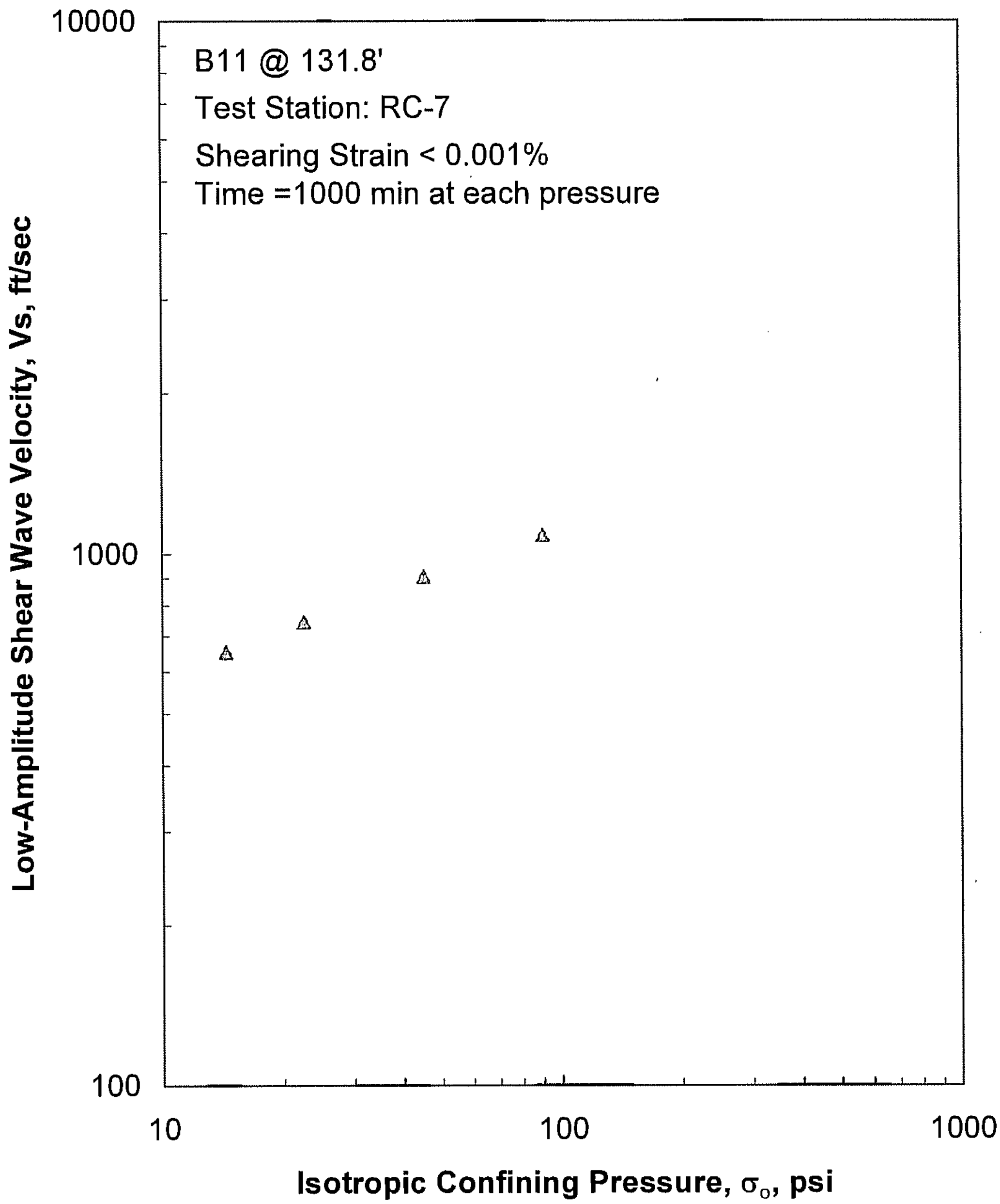


Figure B.5 Variation in Shear Wave Velocity with Magnitude and Duration of Isotropic Confining Pressure from Resonant Column Tests

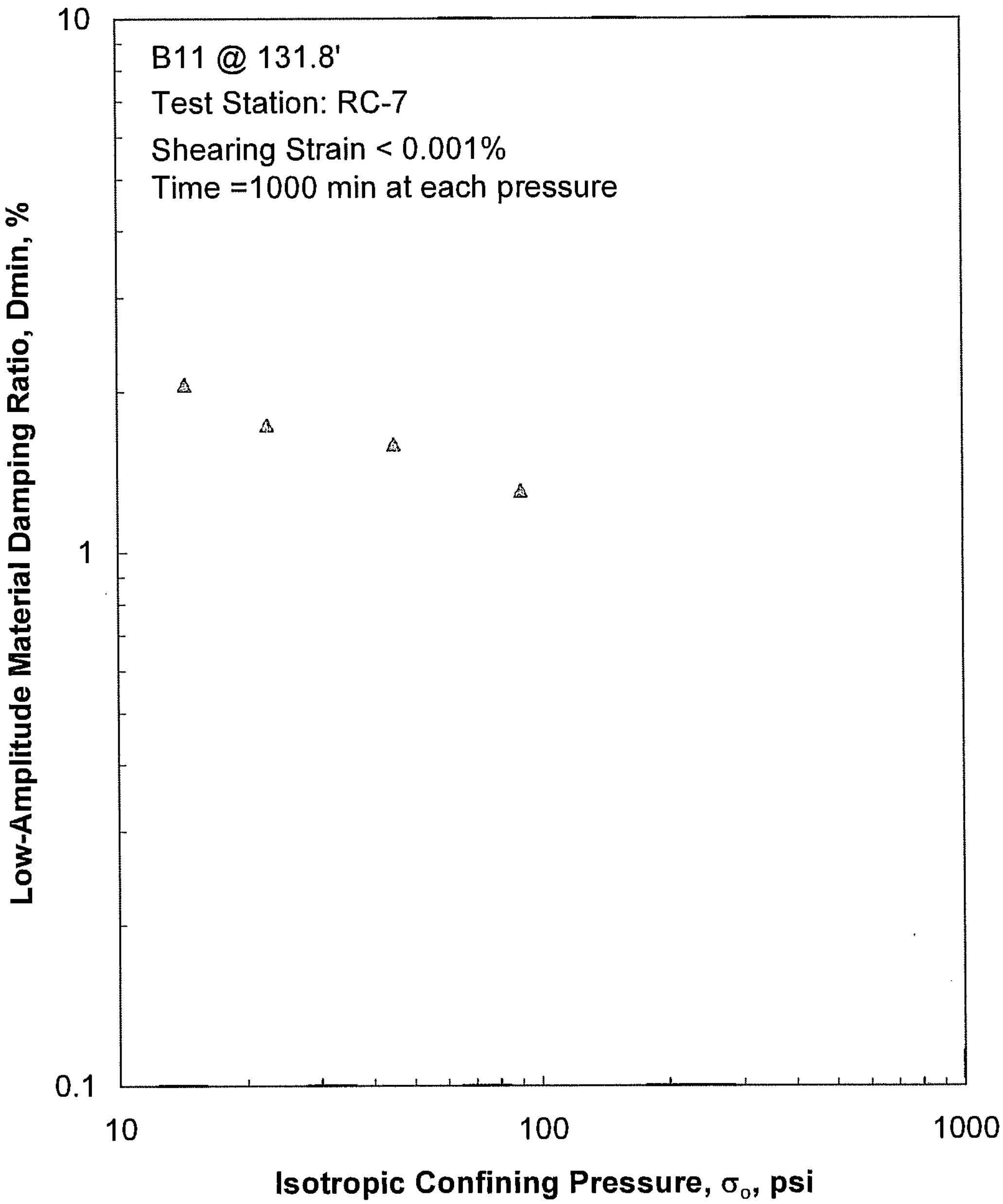


Figure B.6 Variation in Material Damping Ratio and Duration of Isotropic Confining Pressure from Resonant Column Tests

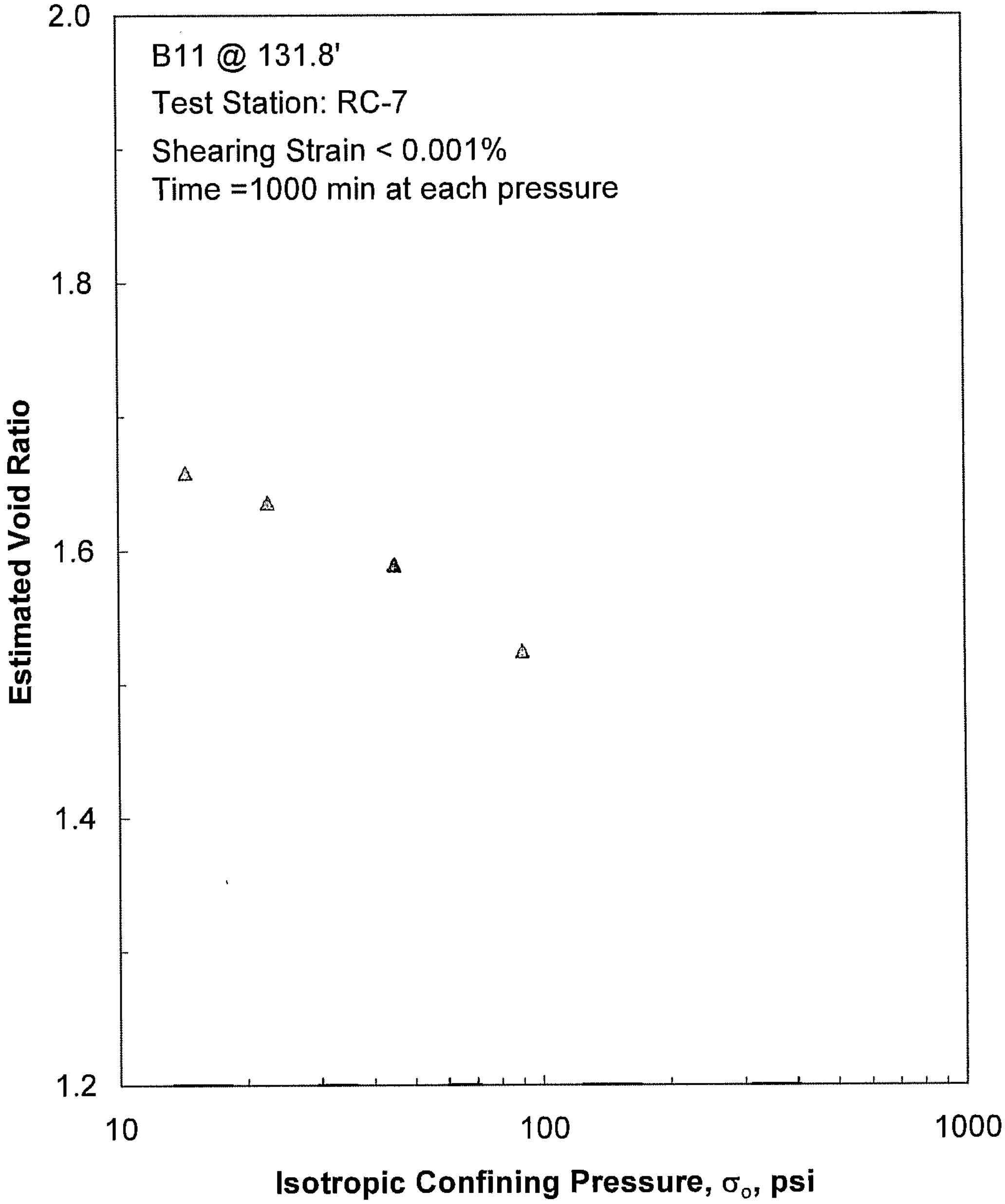


Figure B.7 Variation in Estimated Void Ratio with Magnitude and Duration of Isotropic Confining Pressure from Resonant Column Tests

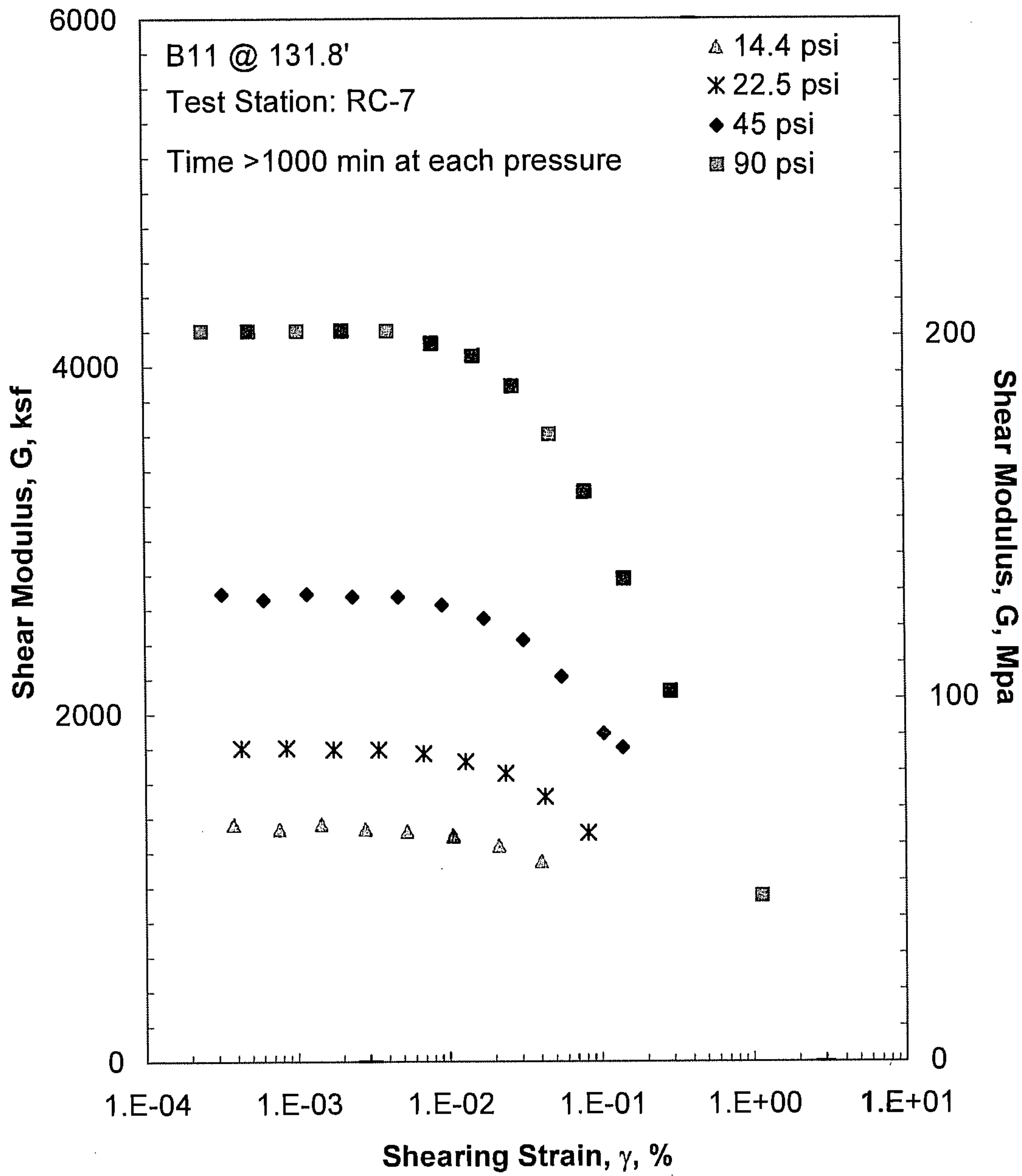


Figure B.8 Comparison of the Variation in Shear Modulus with Shearing Strain and Isotropic Confining Pressure from the Resonant Column Tests

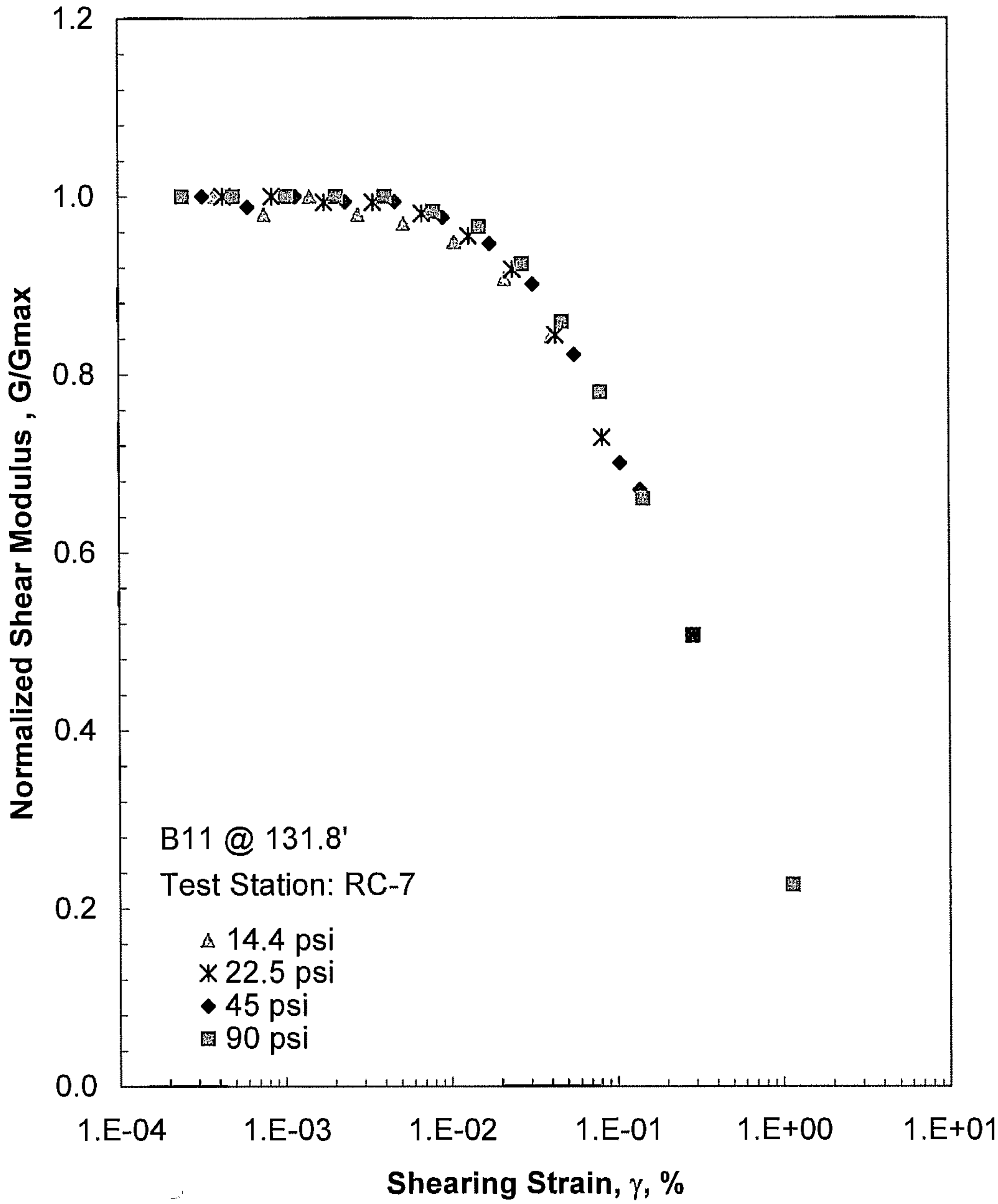


Figure B.9 Comparison of the Variation in Normalized Shear Modulus with Shearing Strain and Isotropic Confining Pressure from the Resonant Column Tests

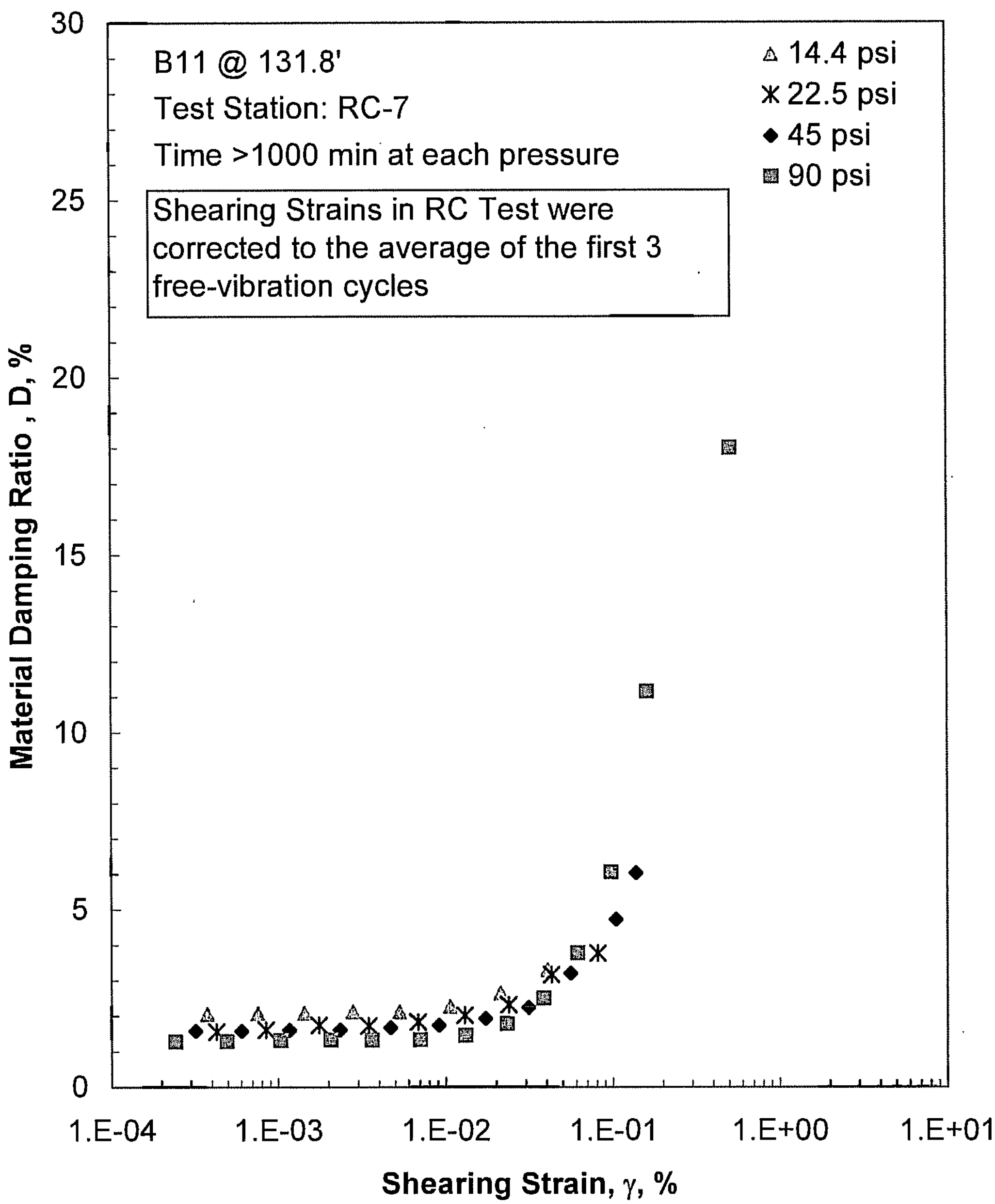


Figure B.10 Comparison of the Variation in Material Damping Ratio with Shearing Strain and Isotropic Confining Pressure from the Resonant Column Tests

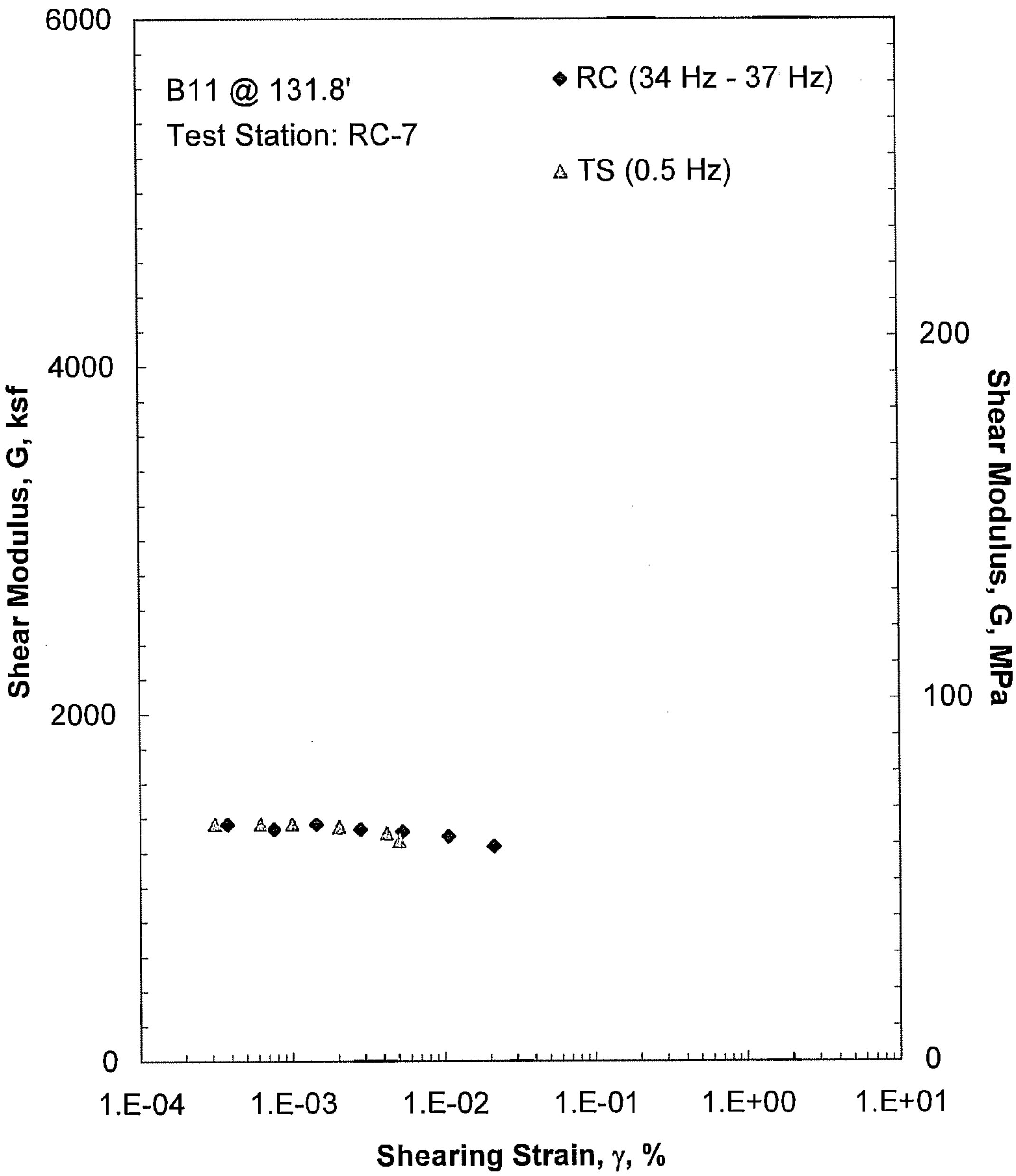


Figure B.11 Comparison of the Variation in Shear Modulus with Shearing Strain at an Isotropic Confining Pressure of 14.4 psi from the Combined RCTS Tests

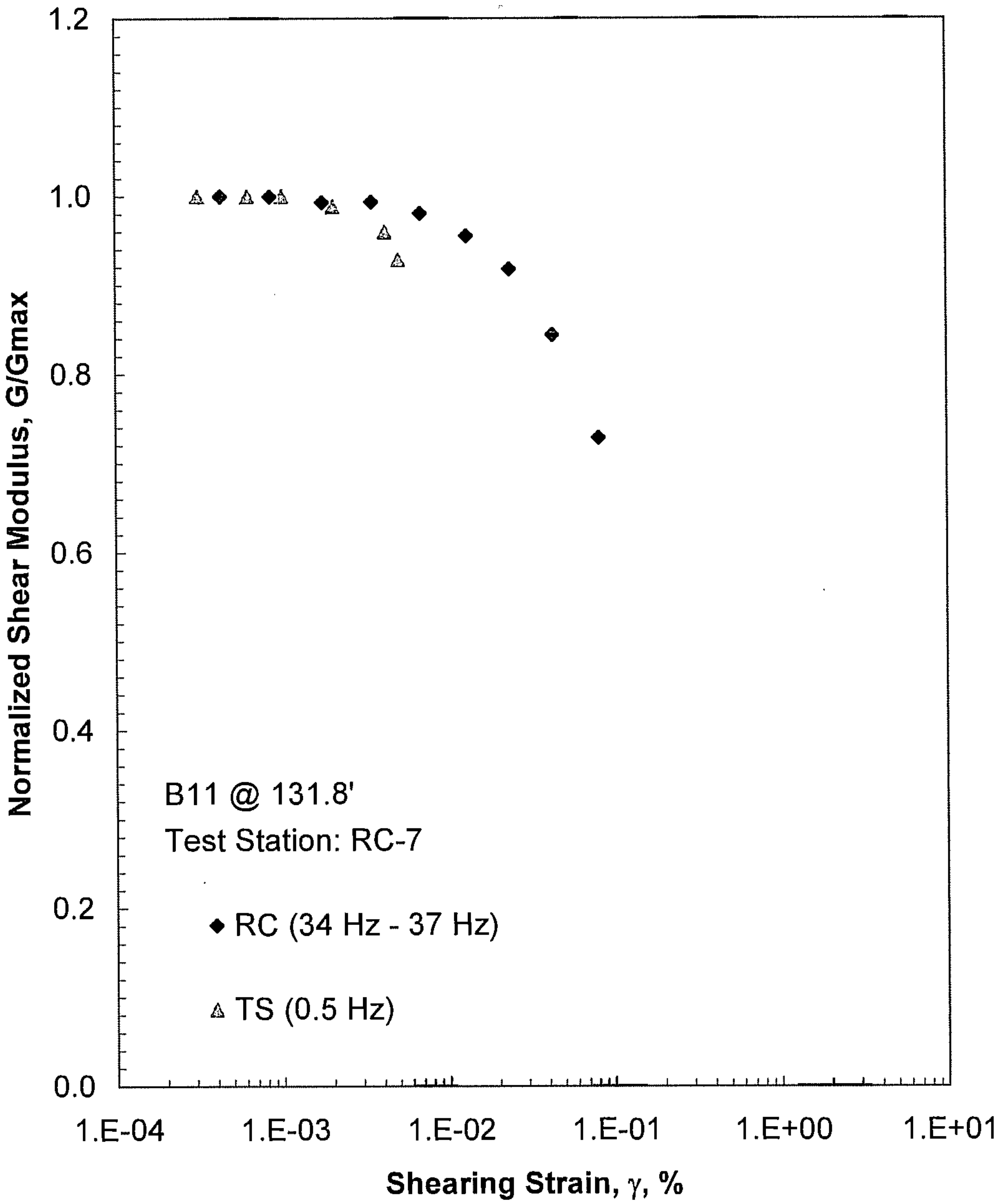


Figure B.12 Comparison of the Variation in Normalized Shear Modulus with Shearing Strain at an Isotropic Confining Pressure of 14.4 psi from the Combined RCTS Tests

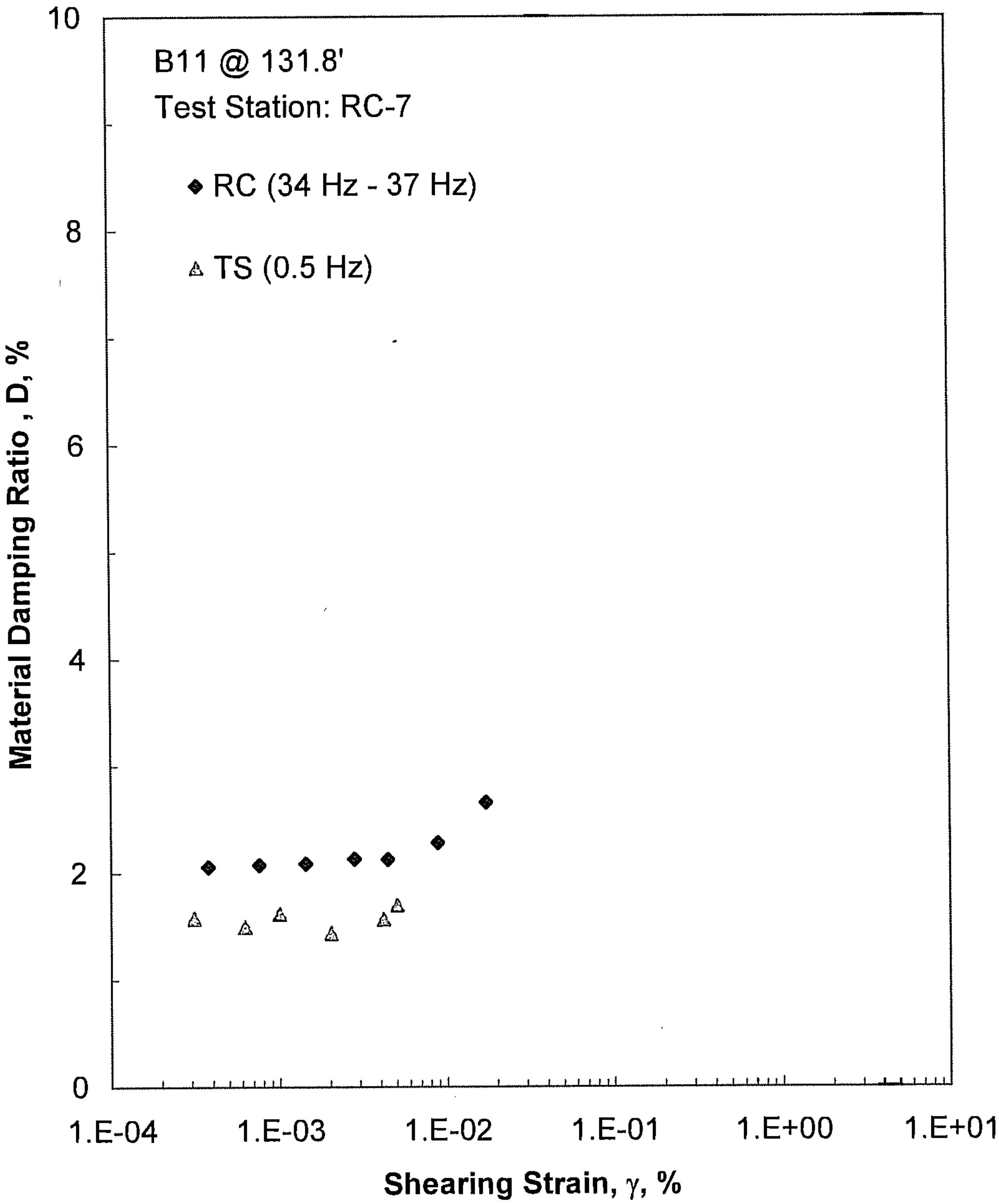


Figure B.13 Comparison of the Variation in Material Damping Ratio with Shearing Strain at an Isotropic Confining Pressure of 14.4 psi from the Combined RCTS Tests

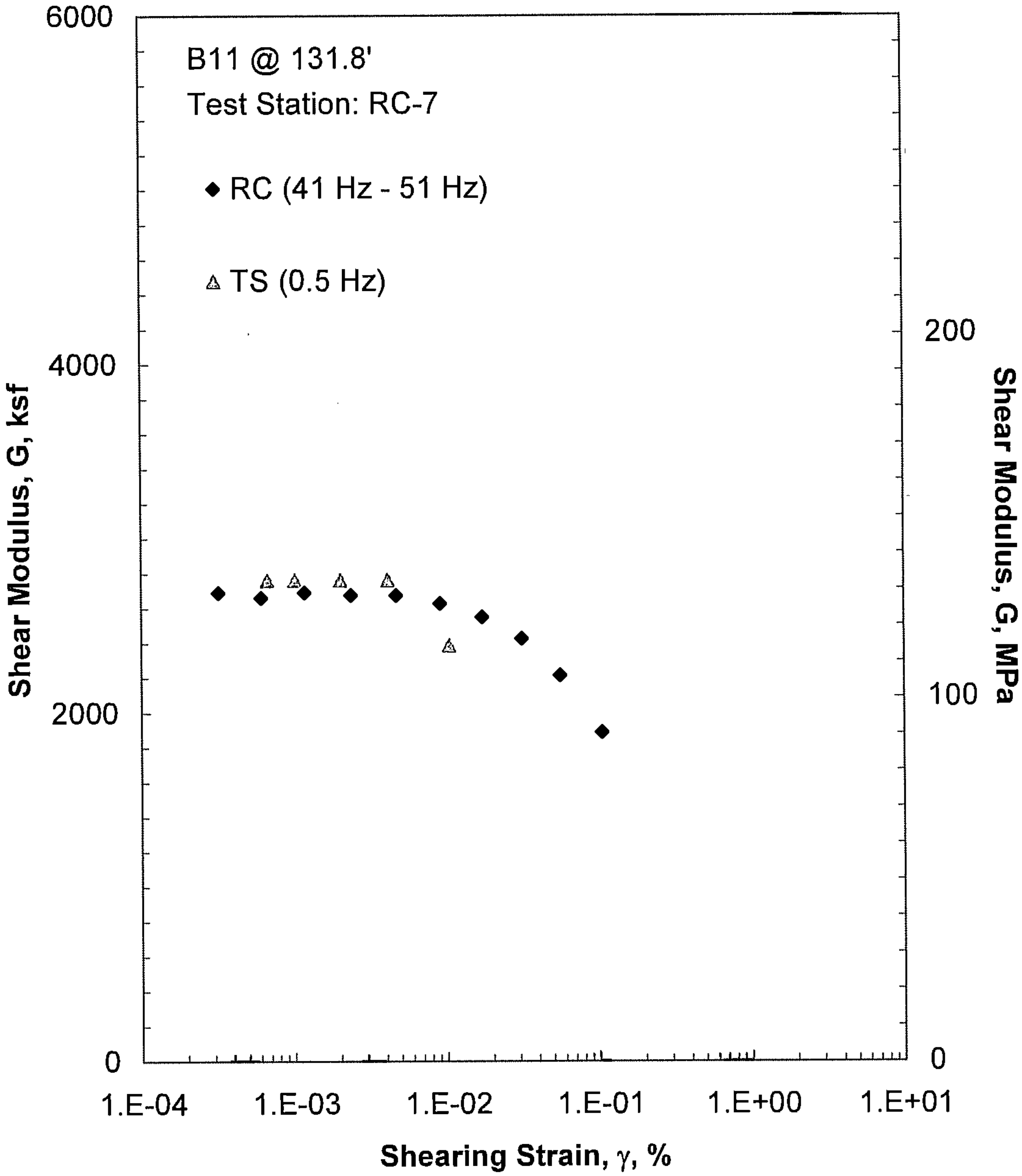


Figure B.14 Comparison of the Variation in Shear Modulus with Shearing Strain at an Isotropic Confining Pressure of 45 psi from the Combined RCTS Tests

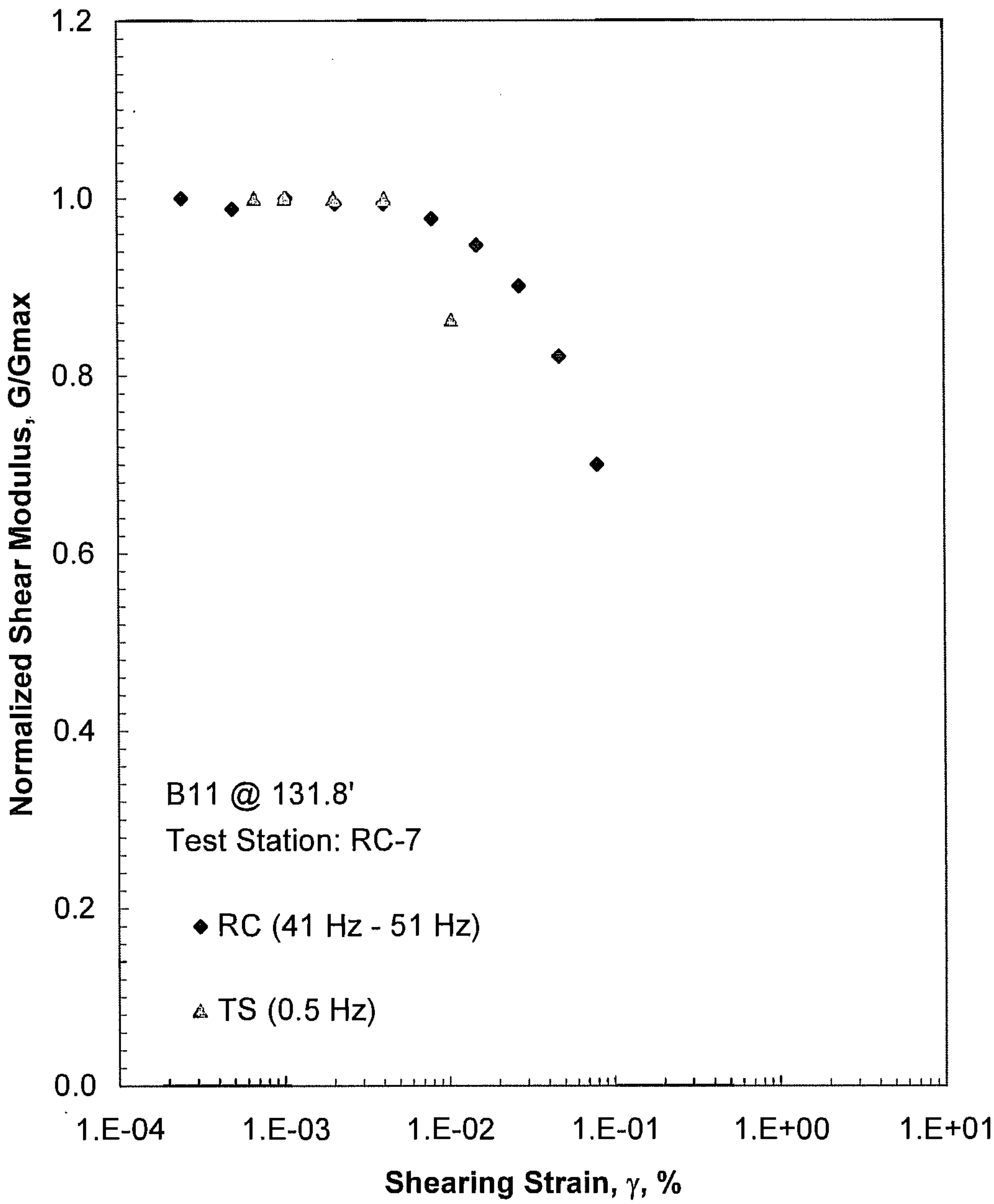


Figure B.15 Comparison of the Variation in Normalized Shear Modulus with Shearing Strain at an Isotropic Confining Pressure of 45 psi from the Combined RCTS Tests

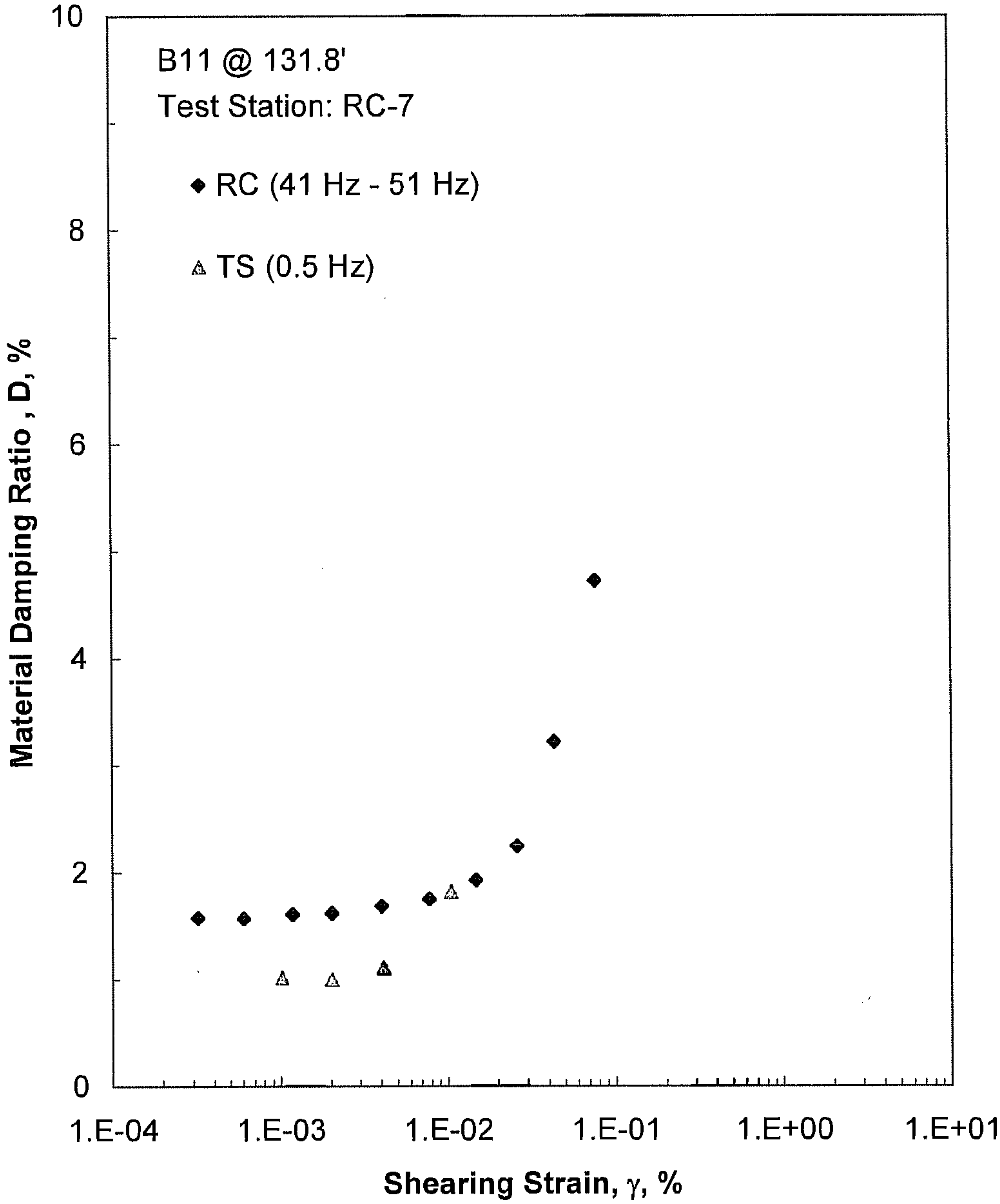


Figure B.16 Comparison of the Variation in Material Damping Ratio with Shearing Strain at an Isotropic Confining Pressure of 45 psi from the Combined RCTS Tests

Table B.1 Variation in Low-Amplitude Shear Wave Velocity, Low-Amplitude Shear Modulus, Low-Amplitude Material Damping Ratio and Estimated Void Ratio with Isotropic Confining Pressure from RC Tests of Specimen B11@131.8'

Isotropic Confining Pressure, σ_o			Low-Amplitude Shear Modulus, G_{max}		Low-Amplitude Shear Wave Velocity, Vs	Low-Amplitude Material Damping Ratio, Dmin	Estimated Void Ratio, e
(psi)	(psf)	(kPa)	(ksf)	(MPa)	(fps)	(%)	
14.4	2074	99	1351	65	653	2.06	1.66
22.5	3240	155	1769	85	744	1.73	1.64
45	6480	310	2669	128	906	1.59	1.59
90	12960	620	3914	188	1083	1.30	1.52

Table B.2 Variation in Shear Modulus and Material Damping Ratio with Shearing Strain from RC Tests of Specimen B11 @ 131.8'; Isoptropic Confining Pressure, σ_o= 14.4 psi

Peak Shearing Strain, %	Shear Modulus, G, ksf	Normalized Shear Modulus, G/G_{max}	Average+ Shearing Strain, %	Material Damping Ratio^x, D, %
3.76E-04	1365	1.00	3.76E-04	2.06
7.58E-04	1337	0.98	7.58E-04	2.08
1.43E-03	1365	1.00	1.43E-03	2.09
2.80E-03	1337	0.98	2.80E-03	2.13
5.28E-03	1323	0.97	4.43E-03	2.12
1.06E-02	1296	0.95	8.83E-03	2.28
2.12E-02	1238	0.91	1.72E-02	2.66
4.03E-02	1150	0.84	3.14E-02	3.29

+ Average Shearing Strain from the First Three Cycles of the Free Vibration Decay Curve

^{x} Average Damping Ratio from the First Three Cycles of the Free Vibration Decay Curve

Table B.3 Variation in Shear Modulus and Material Damping Ratio with Shearing Strain from RC Tests of Specimen B11 @ 131.8'; Isoptropic Confining Pressure, σ_o= 22.5 psi

Peak Shearing Strain, %	Shear Modulus, G, ksf	Normalized Shear Modulus, G/G_{max}	Average+ Shearing Strain, %	Material Damping Ratio^x, D, %
4.27E-04	1804	1.00	4.27E-04	1.57
8.48E-04	1804	1.00	8.48E-04	1.62
1.75E-03	1793	0.99	1.47E-03	1.75
3.46E-03	1793	0.99	2.90E-03	1.73
6.79E-03	1770	0.98	5.91E-03	1.84
1.29E-02	1724	0.96	1.10E-02	2.02
2.36E-02	1657	0.92	1.92E-02	2.32
4.27E-02	1523	0.84	3.33E-02	3.17
8.13E-02	1315	0.73	5.86E-02	3.78

+ Average Shearing Strain from the First Three Cycles of the Free Vibration Decay Curve

x Average Damping Ratio from the First Three Cycles of the Free Vibration Decay Curve

Table B.4 Variation in Shear Modulus and Material Damping Ratio with Shearing Strain from RC Tests of Specimen B11 @ 131.8'; Isoptropic Confining Pressure, σ_o= 45 psi

Peak Shearing Strain, %	Shear Modulus, G, ksf	Normalized Shear Modulus, G/G_{max}	Average+ Shearing Strain, %	Material Damping Ratiox, D, %
3.21E-04	2691	1.00	3.21E-04	1.58
6.04E-04	2659	0.99	6.04E-04	1.57
1.17E-03	2691	1.00	1.17E-03	1.61
2.35E-03	2675	0.99	2.02E-03	1.62
4.67E-03	2675	0.99	4.01E-03	1.69
9.09E-03	2628	0.98	7.72E-03	1.75
1.72E-02	2549	0.95	1.46E-02	1.93
3.11E-02	2426	0.90	2.58E-02	2.25
5.53E-02	2212	0.82	4.31E-02	3.22
1.04E-01	1885	0.70	7.61E-02	4.73
1.38E-01	1804	0.67	9.37E-02	6.04

+ Average Shearing Strain from the First Three Cycles of the Free Vibration Decay Curve

x Average Damping Ratio from the First Three Cycles of the Free Vibration Decay Curve

Table B.5 Variation in Shear Modulus and Material Damping Ratio with Shearing Strain from RC Tests of Specimen B11 @ 131.8'; Isoptropic Confining Pressure, σ_o= 90 psi

Peak Shearing Strain, %	Shear Modulus, G, ksf	Normalized Shear Modulus, G/G_{max}	Average+ Shearing Strain, %	Material Damping Ratiox, D, %
2.43E-04	4203	1.00	2.43E-04	1.29
4.93E-04	4203	1.00	4.93E-04	1.29
1.04E-03	4203	1.00	1.04E-03	1.32
2.06E-03	4203	1.00	2.06E-03	1.32
4.07E-03	4203	1.00	3.62E-03	1.33
8.00E-03	4130	0.98	7.04E-03	1.33
1.49E-02	4059	0.97	1.31E-02	1.46
2.70E-02	3883	0.92	2.32E-02	1.79
4.68E-02	3609	0.86	3.83E-02	2.51
7.96E-02	3278	0.78	6.13E-02	3.78
1.44E-01	2775	0.66	9.79E-02	6.06
2.89E-01	2128	0.51	1.62E-01	11.15
1.14E+00	952	0.23	5.12E-01	18.01

+ Average Shearing Strain from the First Three Cycles of the Free Vibration Decay Curve

x Average Damping Ratio from the First Three Cycles of the Free Vibration Decay Curve

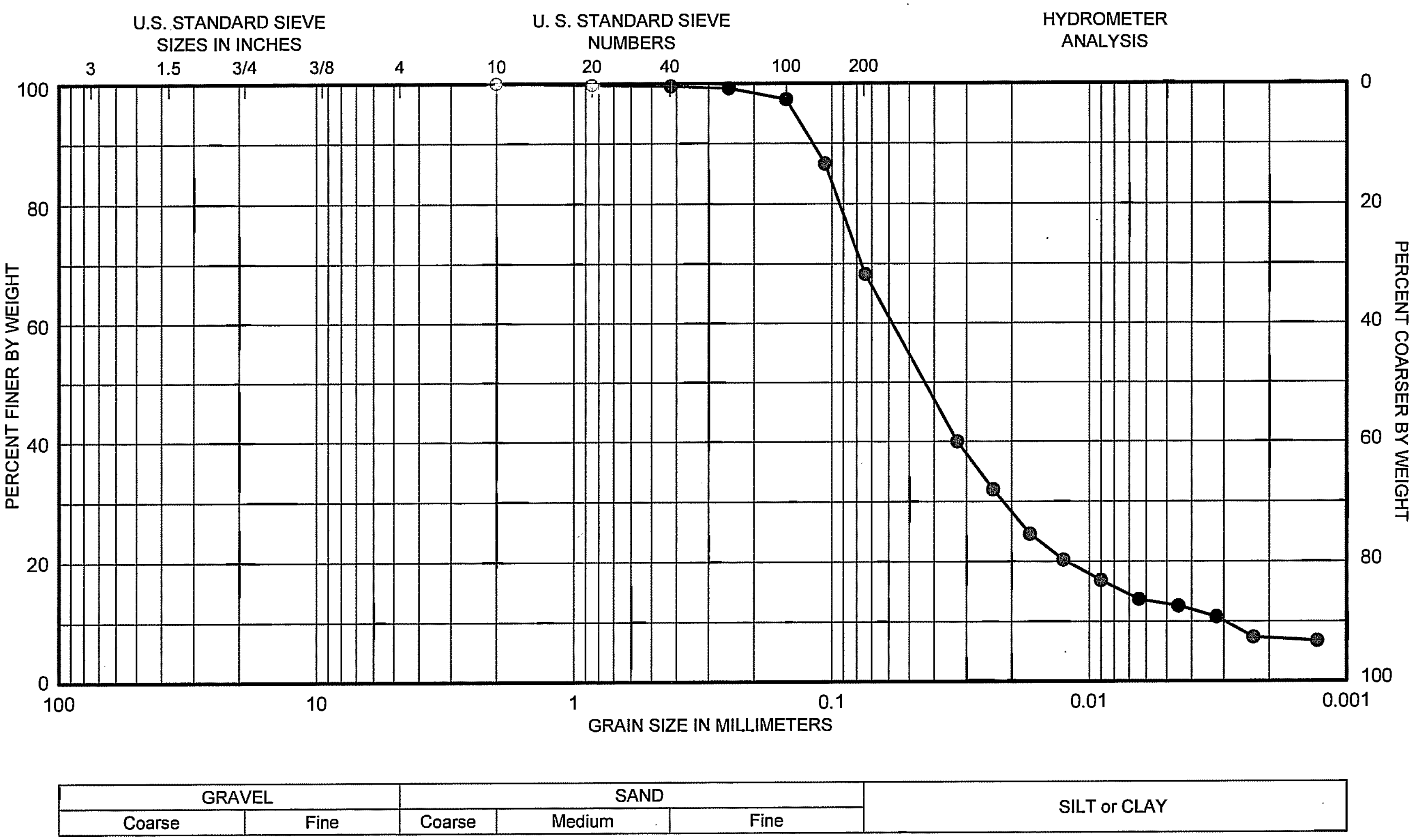
Table B.6 Variation in Shear Modulus, Normalized Shear Modulus and Material Damping Ratio with Shearing Strain from TS Tests of Specimen B11 @ 131.8; Isotropic Confining Pressure, σ_o= 14.4 psi

Peak Shearing Strain, %	Shear Modulus, G, ksf	Normalized Shear Modulus, G/G_{max}	Material Damping Ratio, D, %
3.11E-04	1366	1.00	1.58
6.23E-04	1366	1.00	1.50
1.00E-03	1366	1.00	1.62
2.02E-03	1350	0.99	1.44
4.17E-03	1312	0.96	1.57
5.03E-03	1269	0.93	1.70

Table B.7 Variation in Shear Modulus, Normalized Shear Modulus and Material Damping Ratio with Shearing Strain from TS Tests of Specimen B11 @ 131.8'; Isotropic Confining Pressure, σ_o= 45 psi

Peak Shearing Strain, %	Shear Modulus, G, ksf	Normalized Shear Modulus, G/G_{max}	Material Damping Ratio, D, %
6.69E-04	2763	1.00	1.07
1.02E-03	2763	1.00	1.02
2.02E-03	2763	1.00	1.00
4.13E-03	2763	1.00	1.11
1.05E-02	2385	0.86	1.82

Report No. 0411-08-1721



SYMBOL	BORING	DEPTH, FT	C_c	C_u	D_{50}	D_{90}	CLASSIFICATION
●	B-11	131.8	2.71	19.66	0.04	0.12	

GRAIN SIZE CURVE

PLATE

APPENDIX C

Borehole B11
Depth = 439 ft
Total Unit Weight = 98 lb/ft^3
Water Content = 55.2 %
LL=129, PL=49, PI=80

FUGRO JOB #: 0411-08-1721
Testing Station: RC7

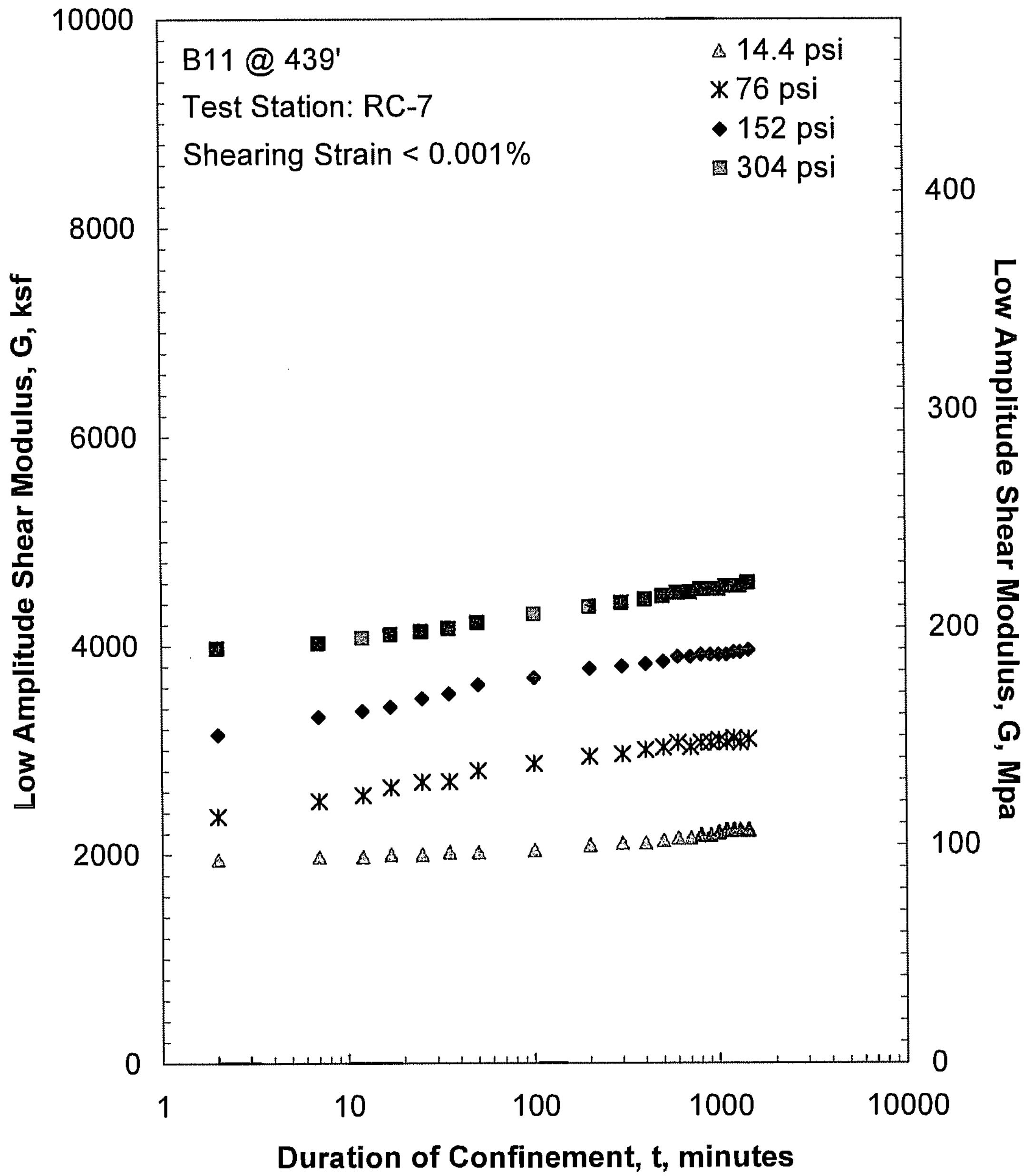


Figure C.1 Variation in Low-Amplitude Shear Modulus with Magnitude and Duration of Isotropic Confining Pressure from Resonant Column Tests

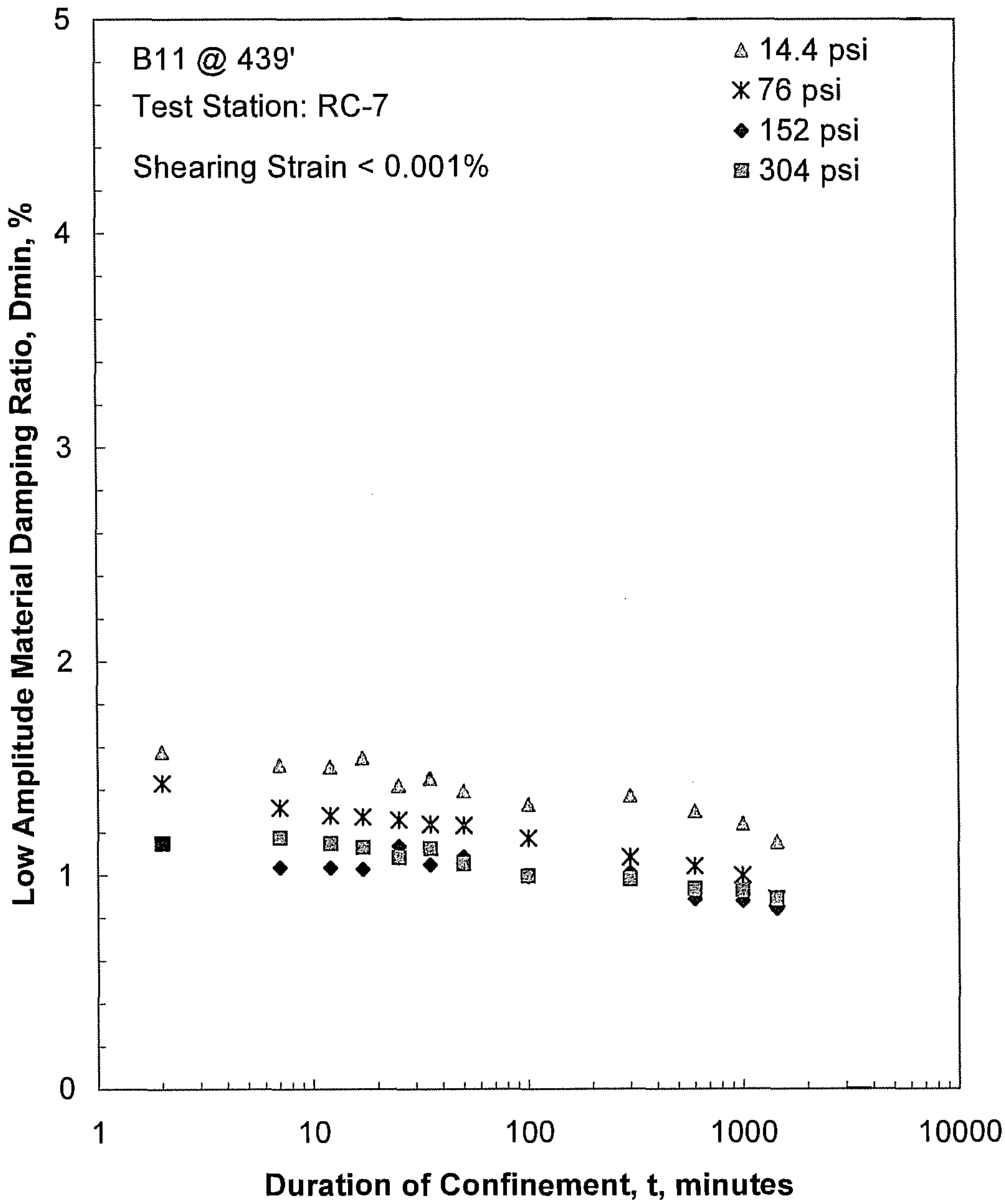


Figure C.2 Variation in Damping Ratio and Duration of Isotropic Confining Pressure from Resonant Column Tests

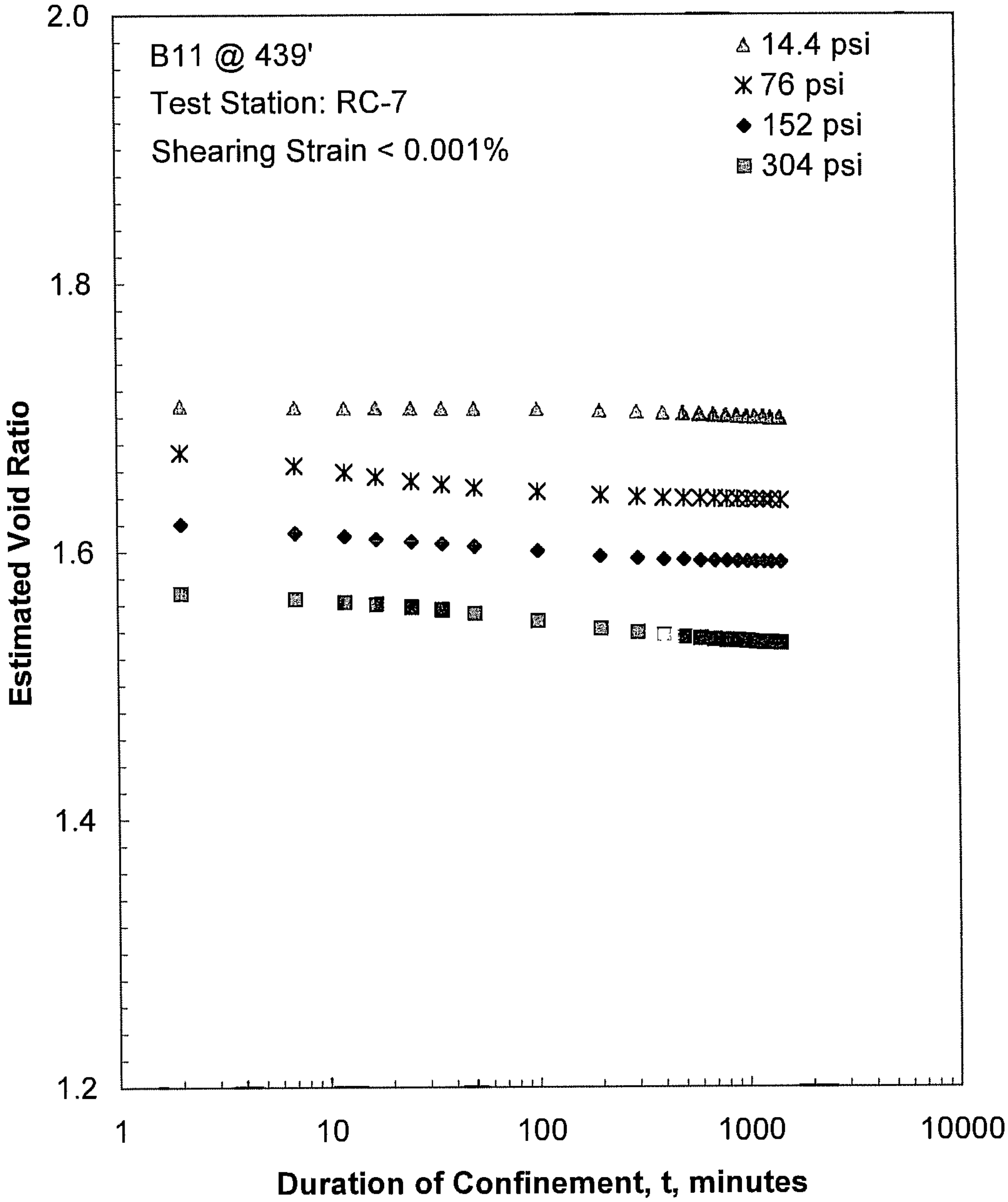


Figure C.3 Variation in Estimated Void Ratio and Duration of Isotropic Confining Pressure from Resonant Column Tests

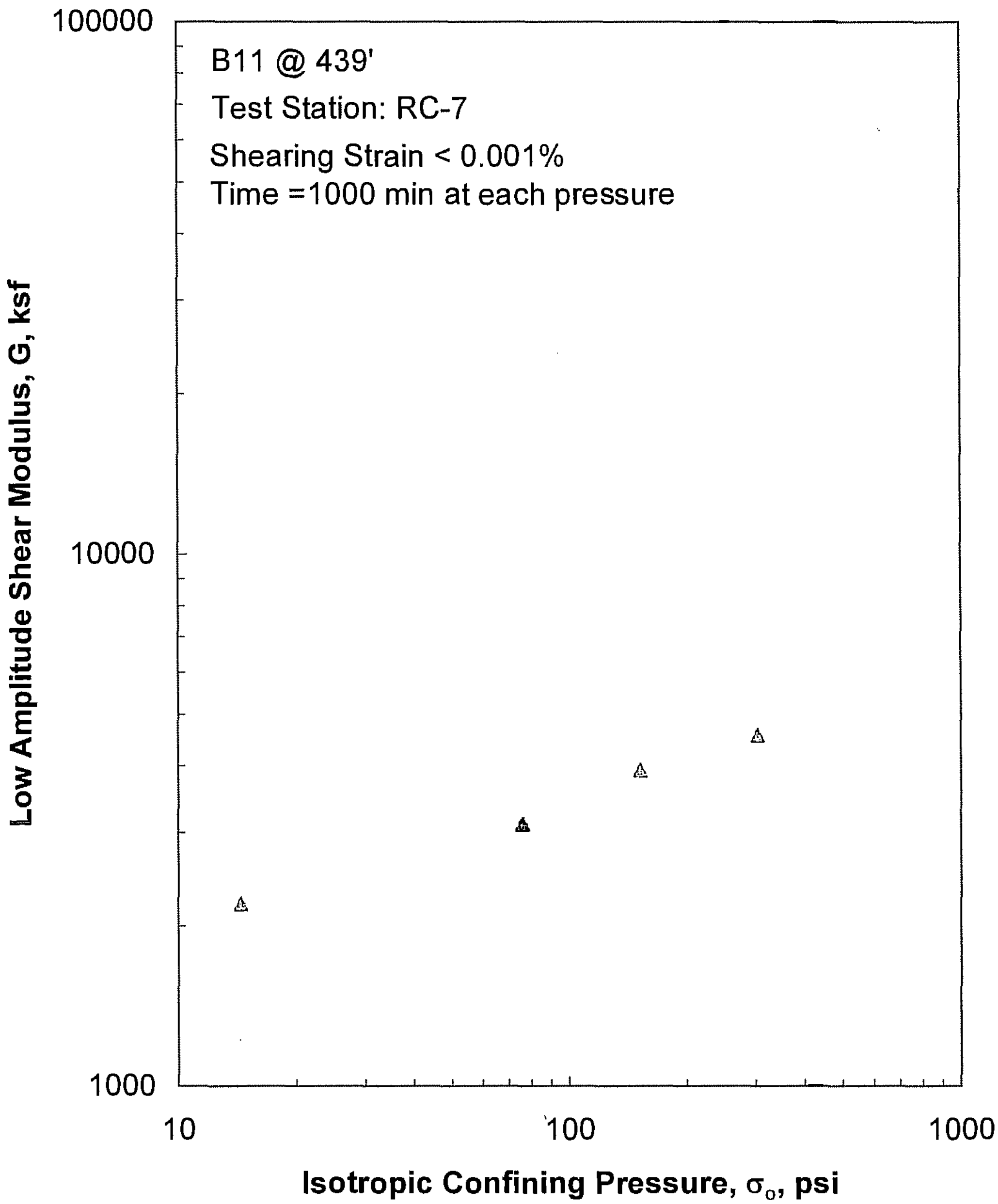


Figure C.4 Variation in Shear Modulus with Magnitude and Duration of Isotropic Confining Pressure from Resonant Column Tests

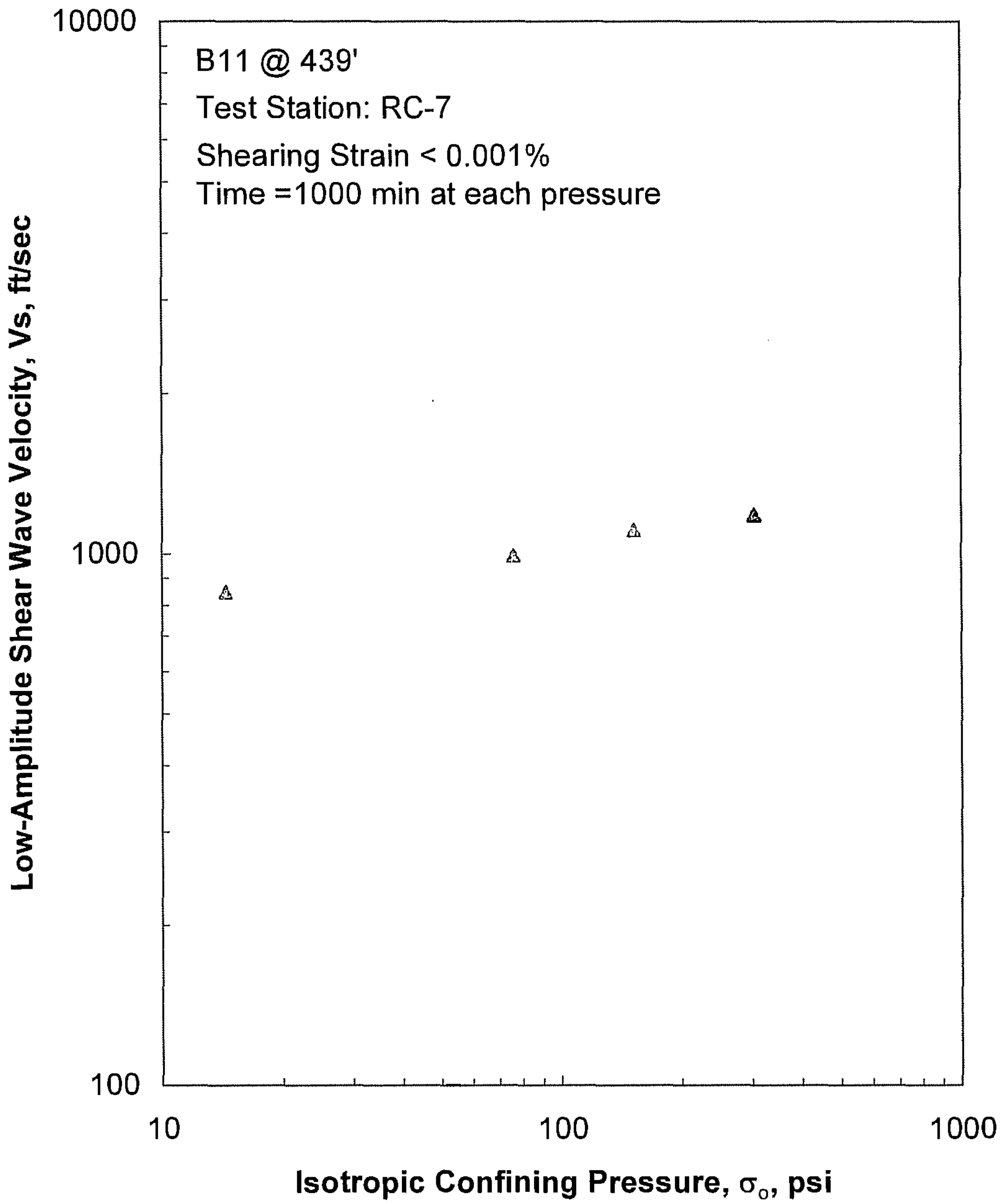


Figure C.5 Variation in Shear Wave Velocity with Magnitude and Duration of Isotropic Confining Pressure from Resonant Column Tests

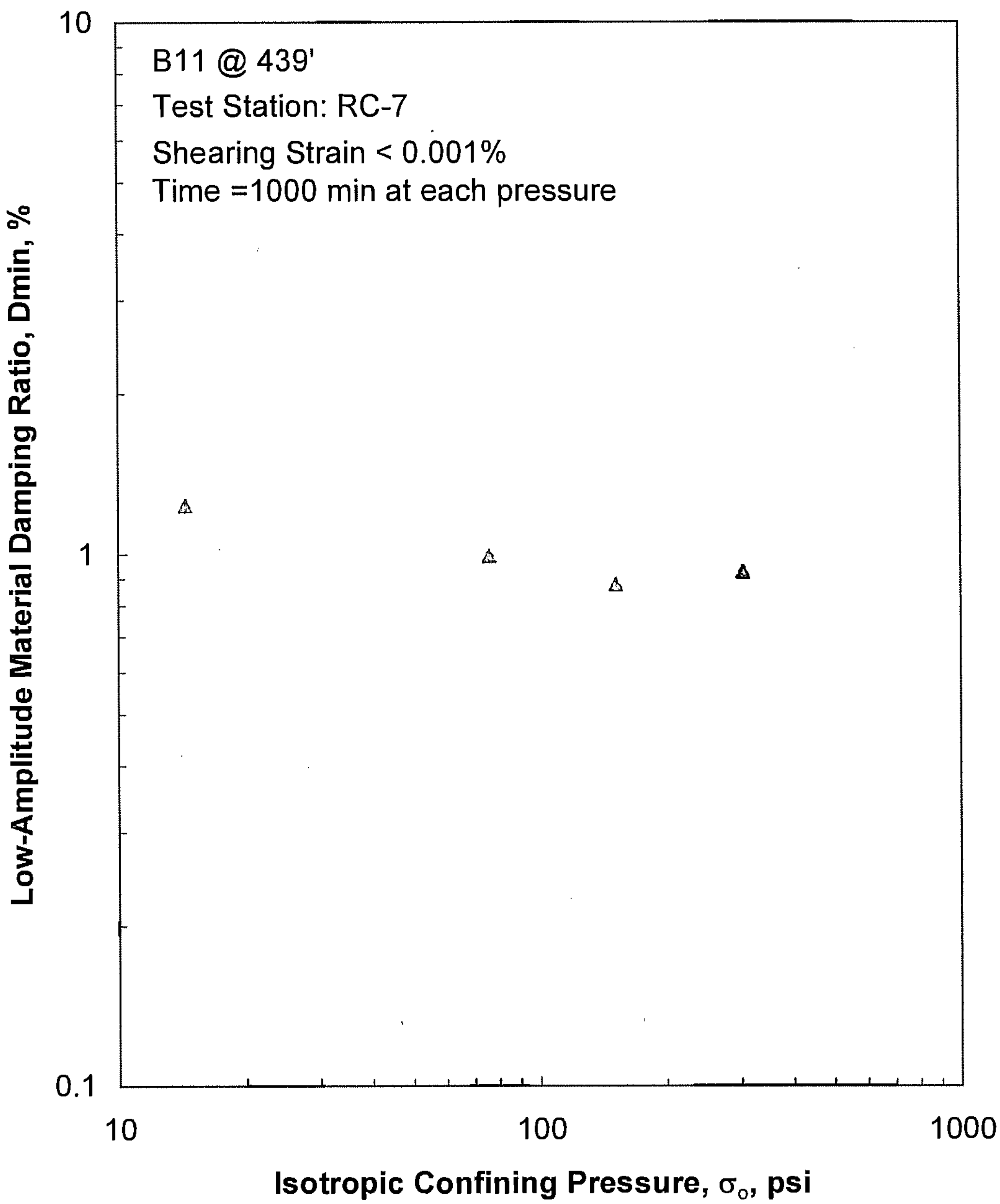


Figure C.6 Variation in Material Damping Ratio and Duration of Isotropic Confining Pressure from Resonant Column Tests

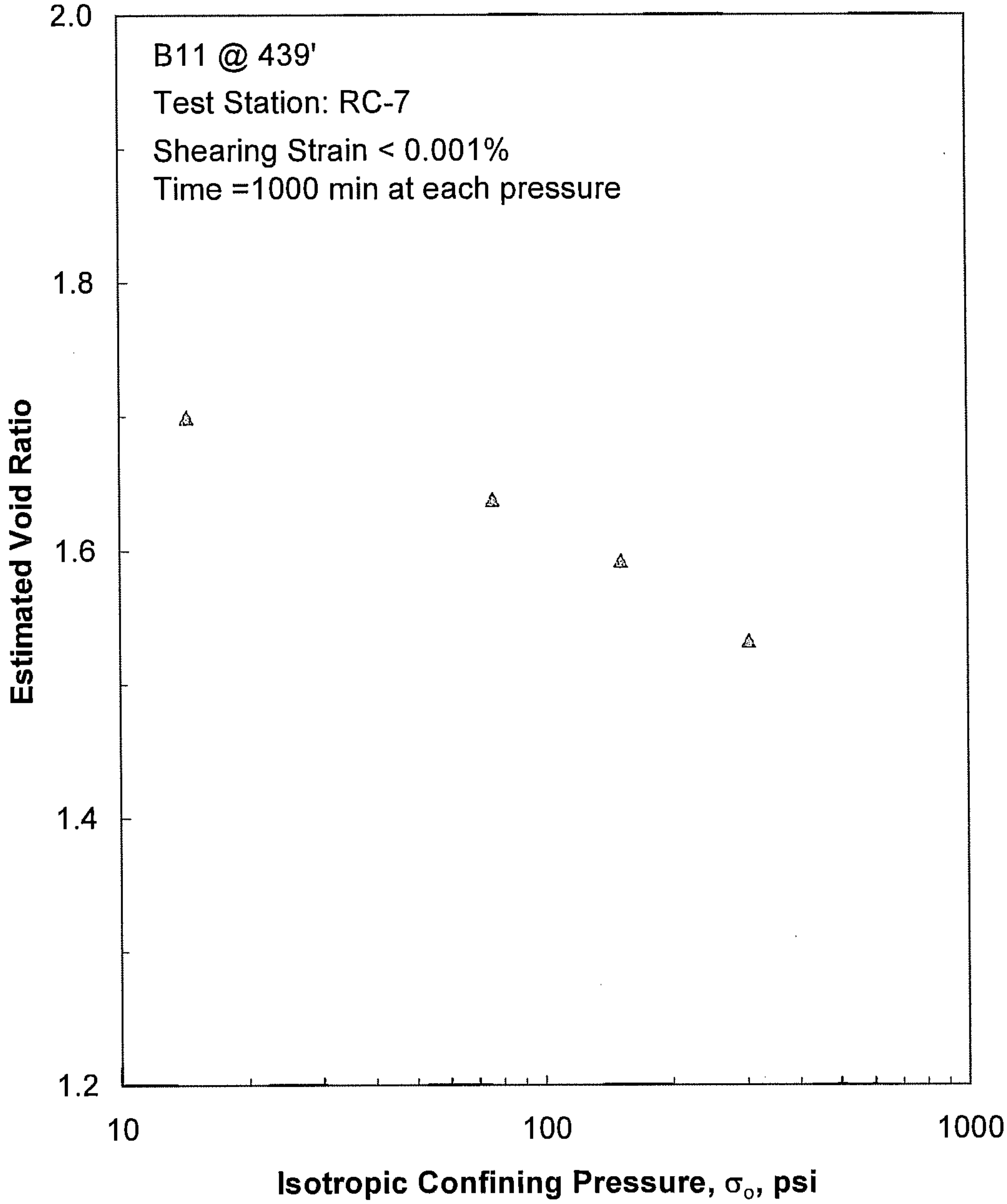


Figure C.7 Variation in Estimated Void Ratio with Magnitude and Duration of Isotropic Confining Pressure from Resonant Column Tests

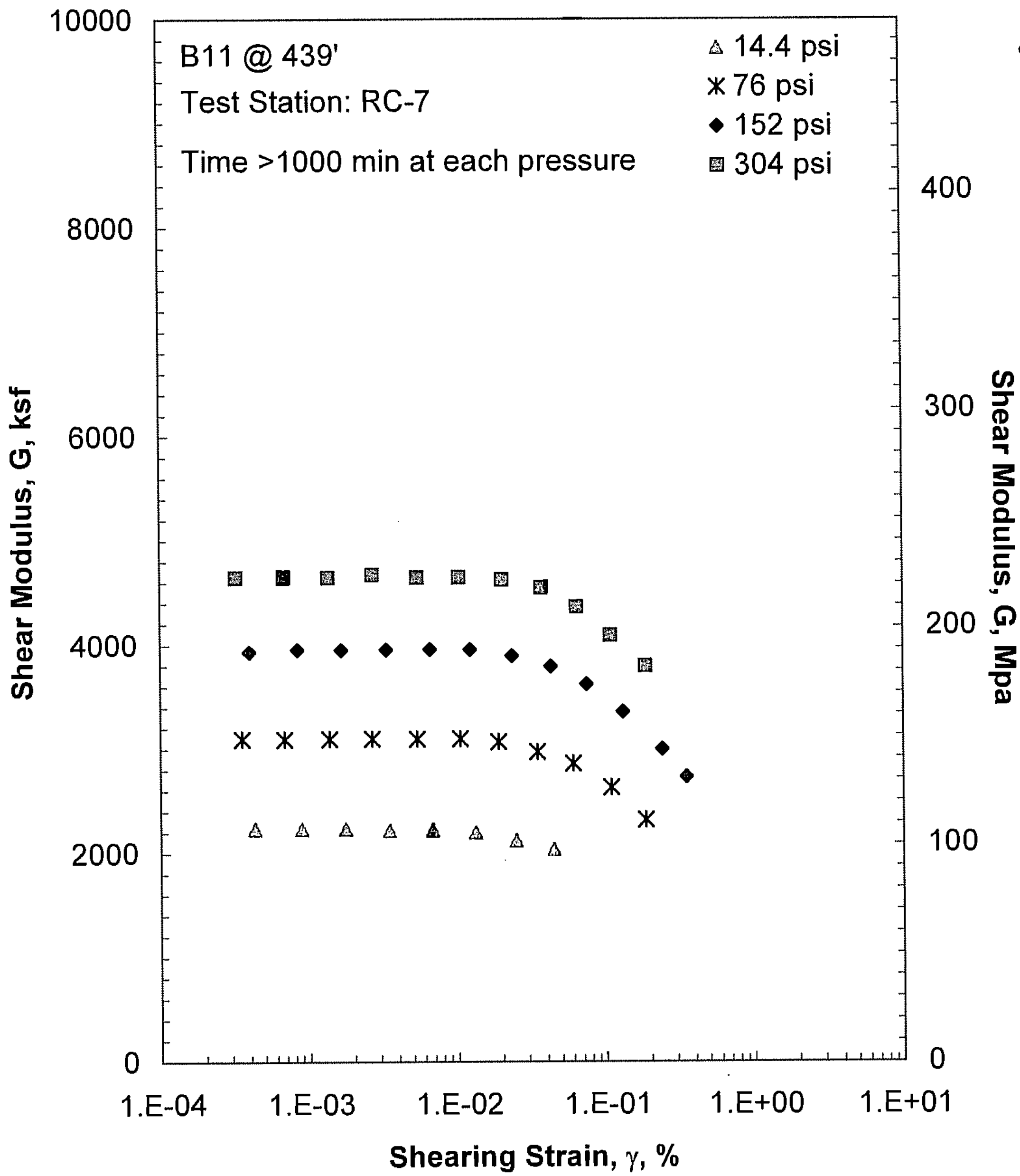


Figure C.8 Comparison of the Variation in Shear Modulus with Shearing Strain and Isotropic Confining Pressure from the Resonant Column Tests

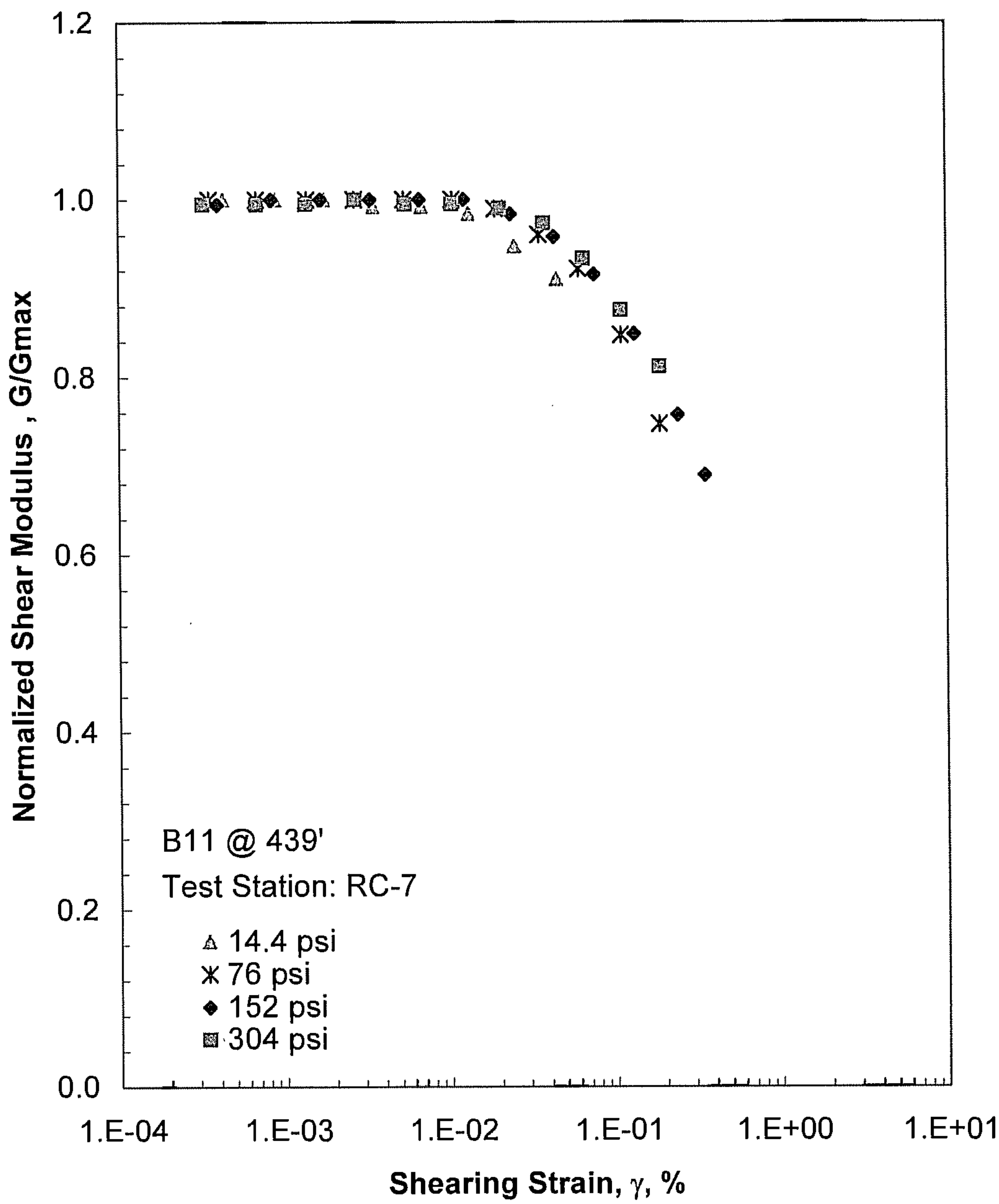


Figure C.9 Comparison of the Variation in Normalized Shear Modulus with Shearing Strain and Isotropic Confining Pressure from the Resonant Column Tests

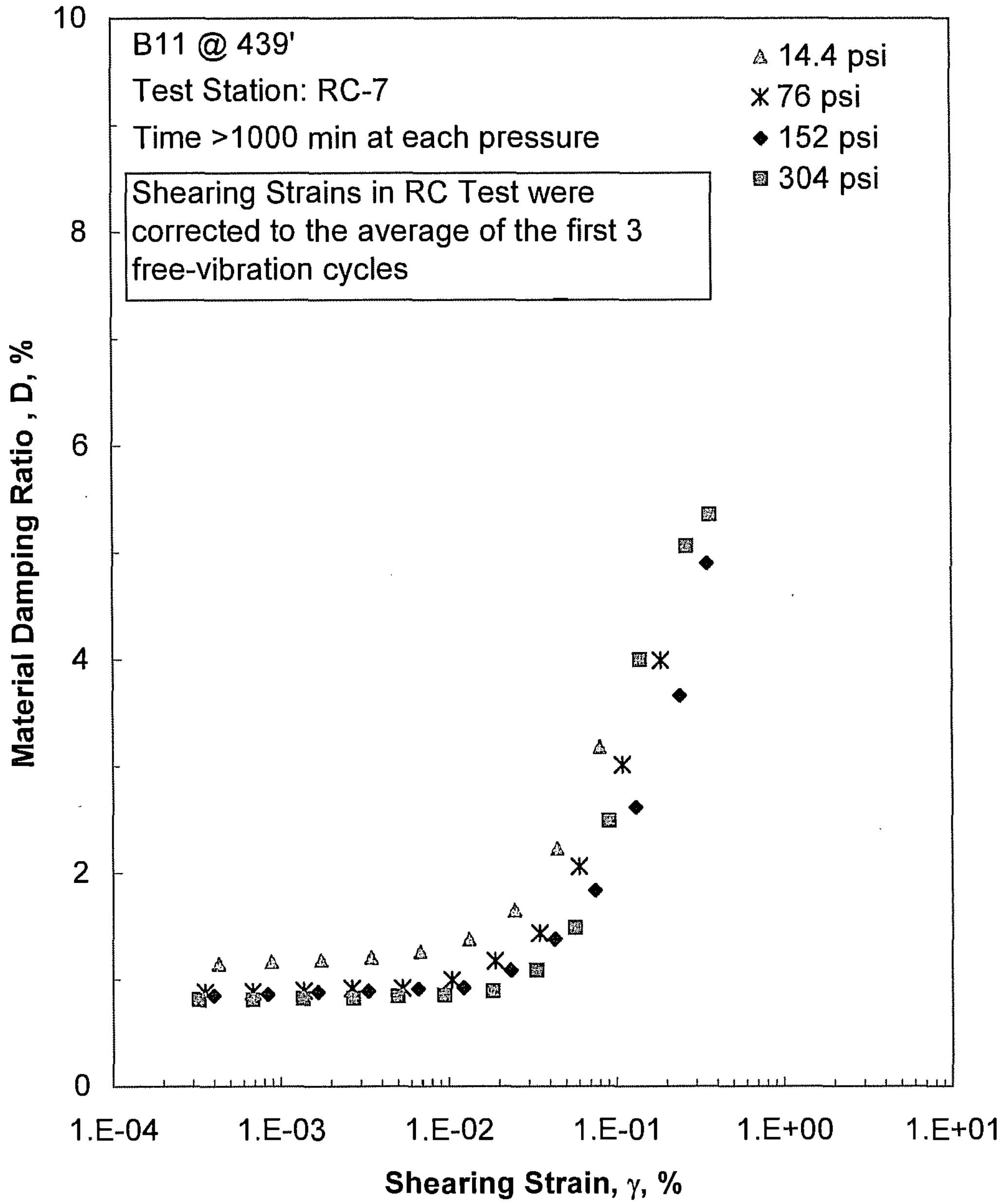


Figure C.10 Comparison of the Variation in Material Damping Ratio with Shearing Strain and Isotropic Confining Pressure from the Resonant Column Tests

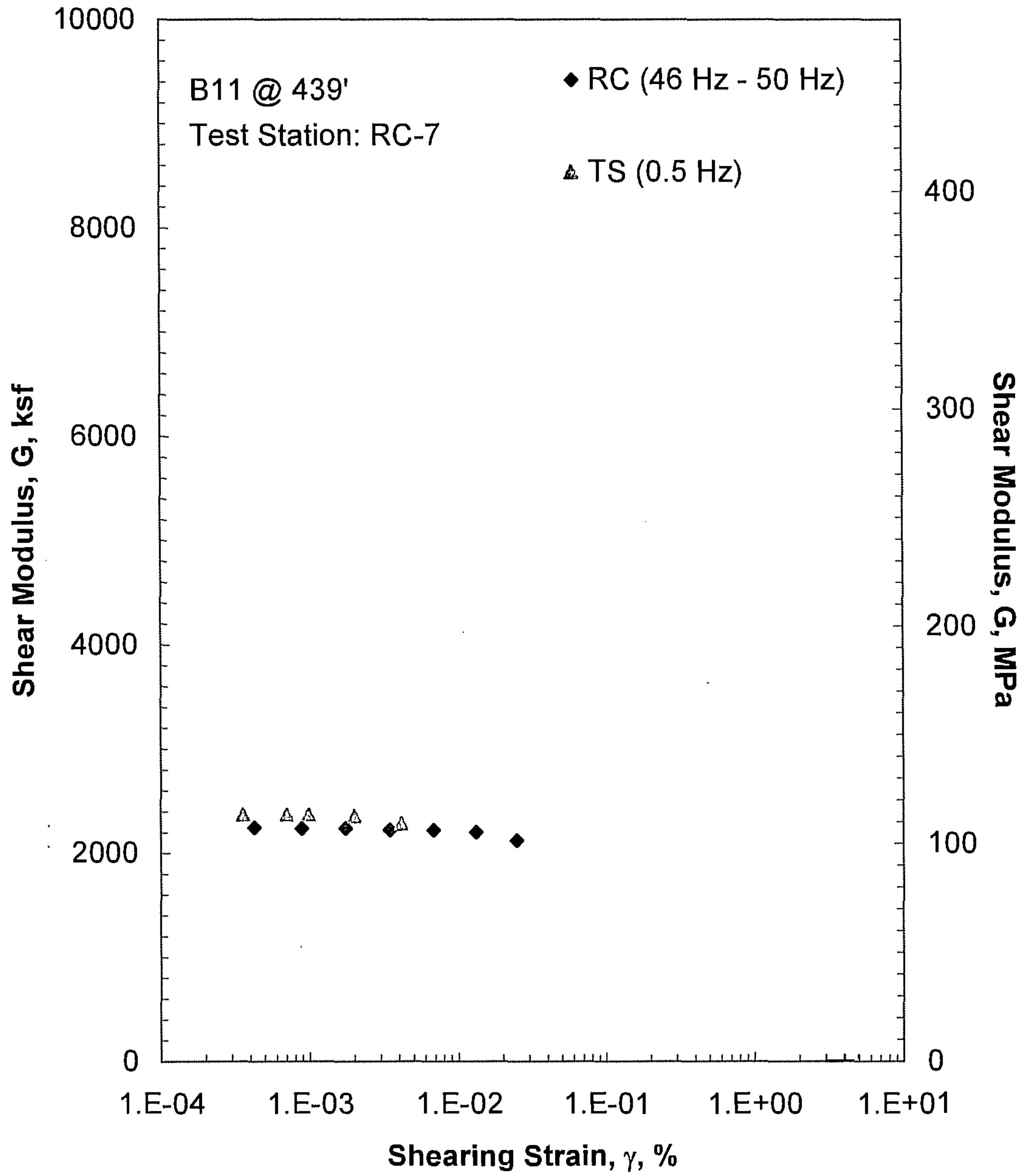


Figure C.11 Comparison of the Variation in Shear Modulus with Shearing Strain at an Isotropic Confining Pressure of 14.4 psi from the Combined RCTS Tests

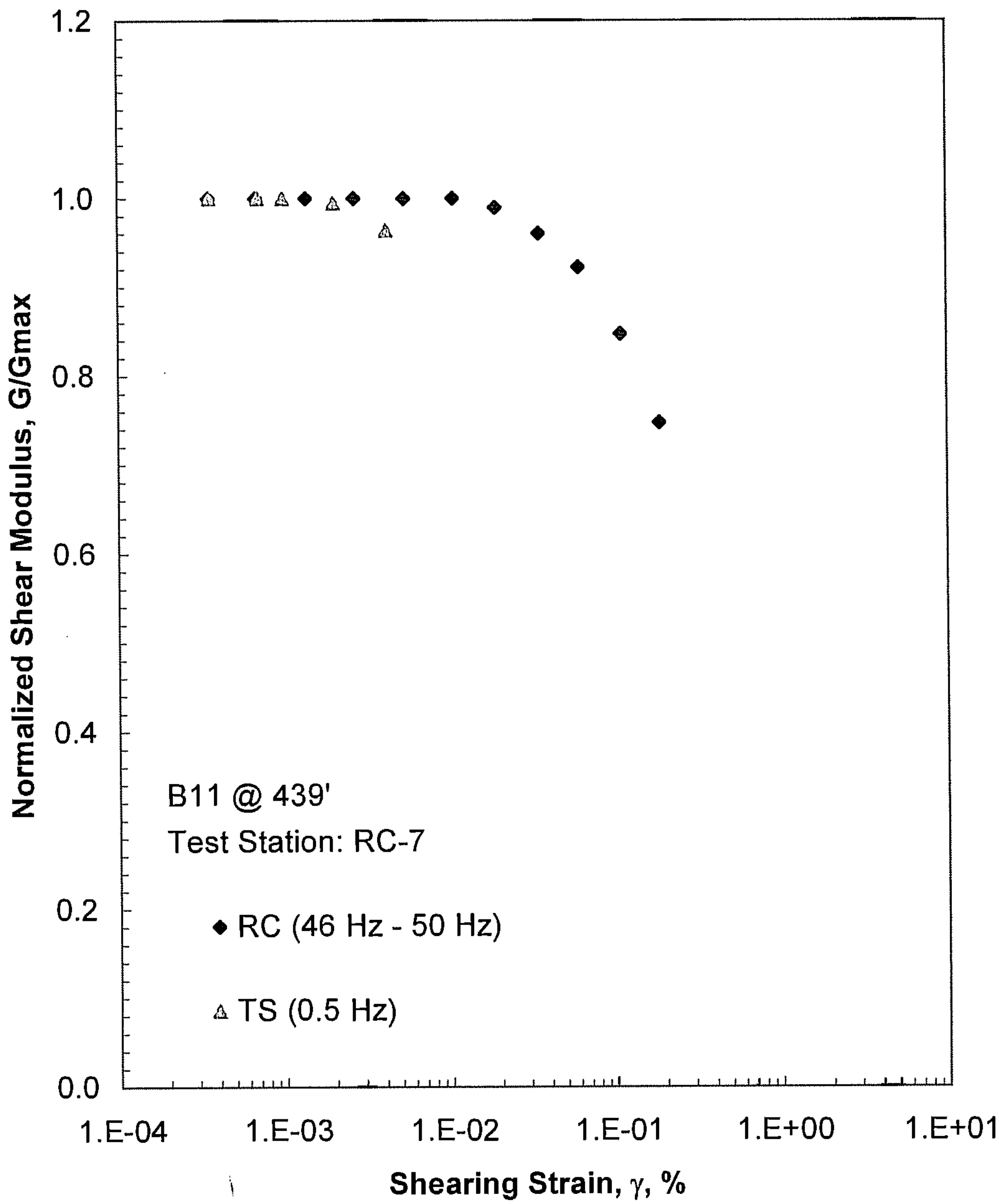


Figure C.12 Comparison of the Variation in Normalized Shear Modulus with Shearing Strain at an Isotropic Confining Pressure of 14.4 psi from the Combined RCTS Tests

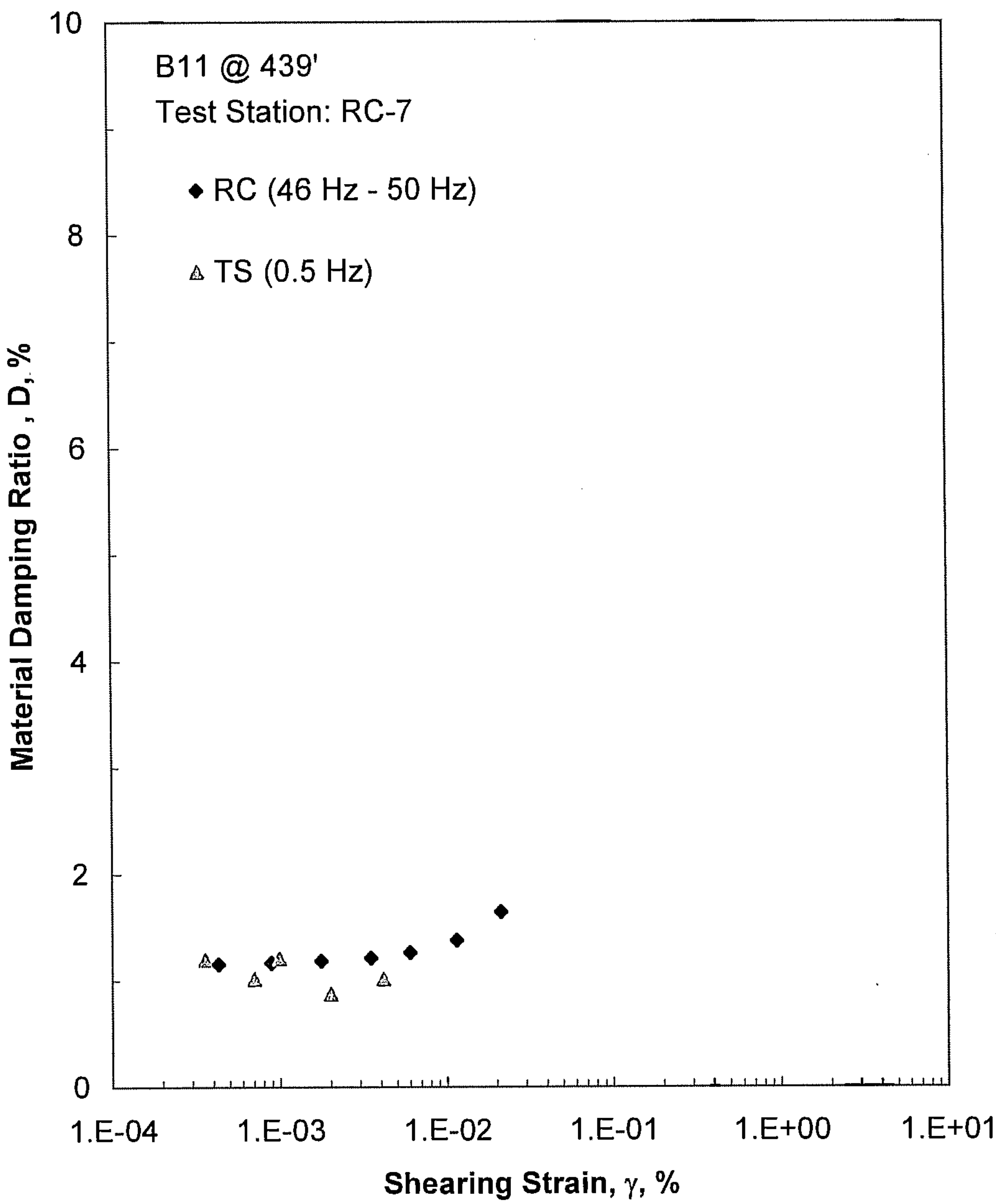


Figure C.13 Comparison of the Variation in Material Damping Ratio with Shearing Strain at an Isotropic Confining Pressure of 14.4 psi from the Combined RCTS Tests

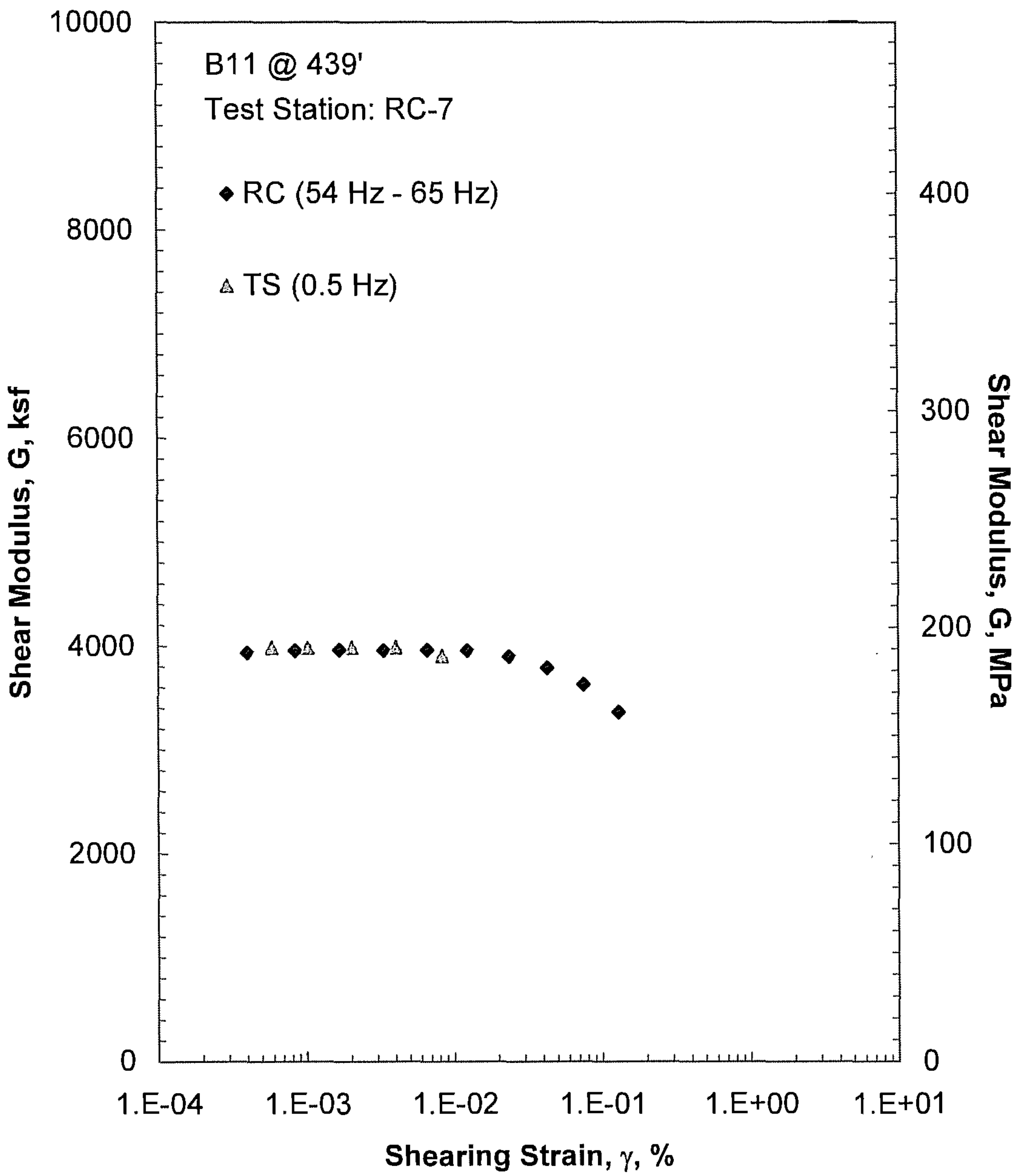


Figure C.14 Comparison of the Variation in Shear Modulus with Shearing Strain at an Isotropic Confining Pressure of 152 psi from the Combined RCTS Tests

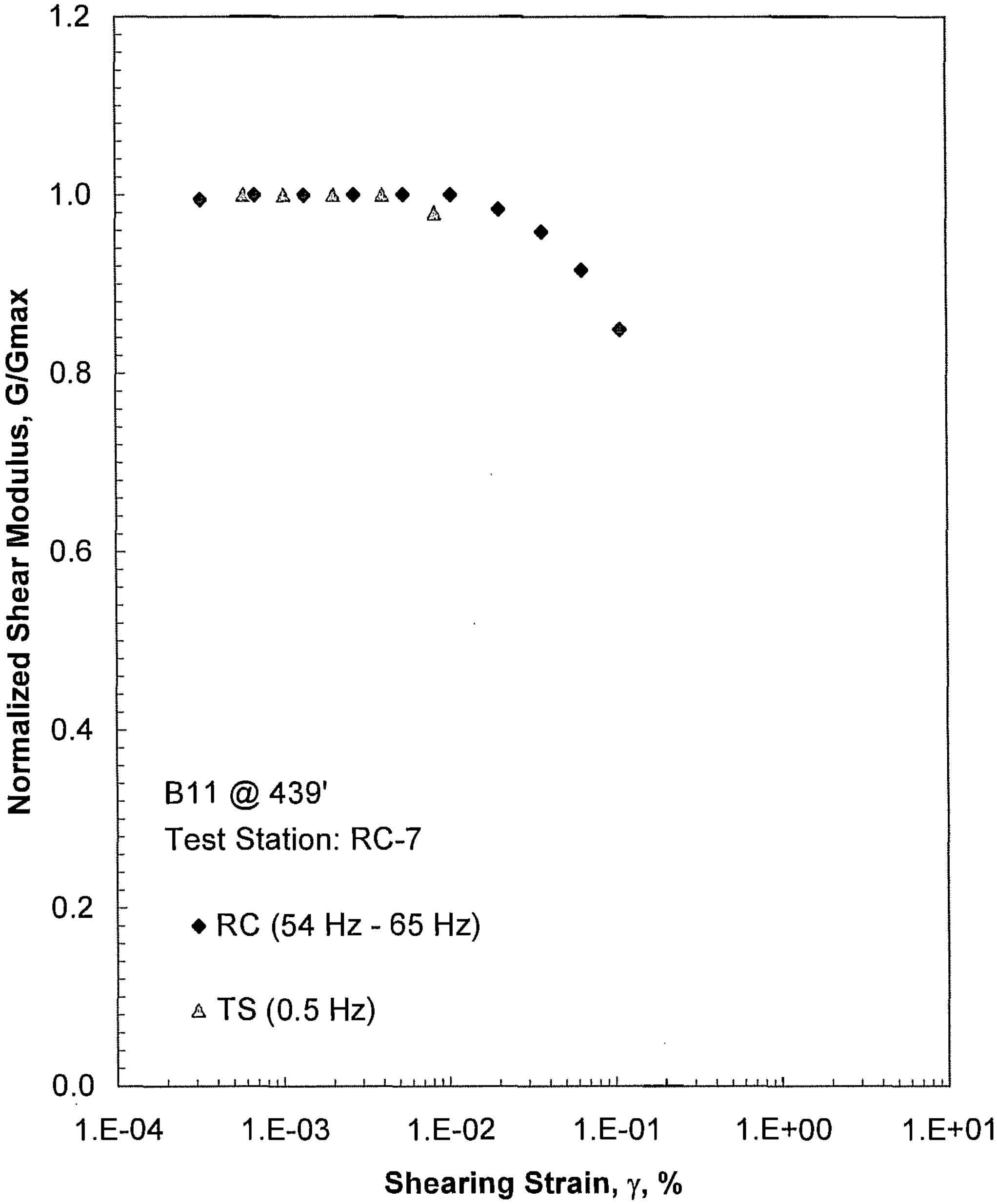


Figure C.15 Comparison of the Variation in Normalized Shear Modulus with Shearing Strain at an Isotropic Confining Pressure of 152 psi from the Combined RCTS Tests

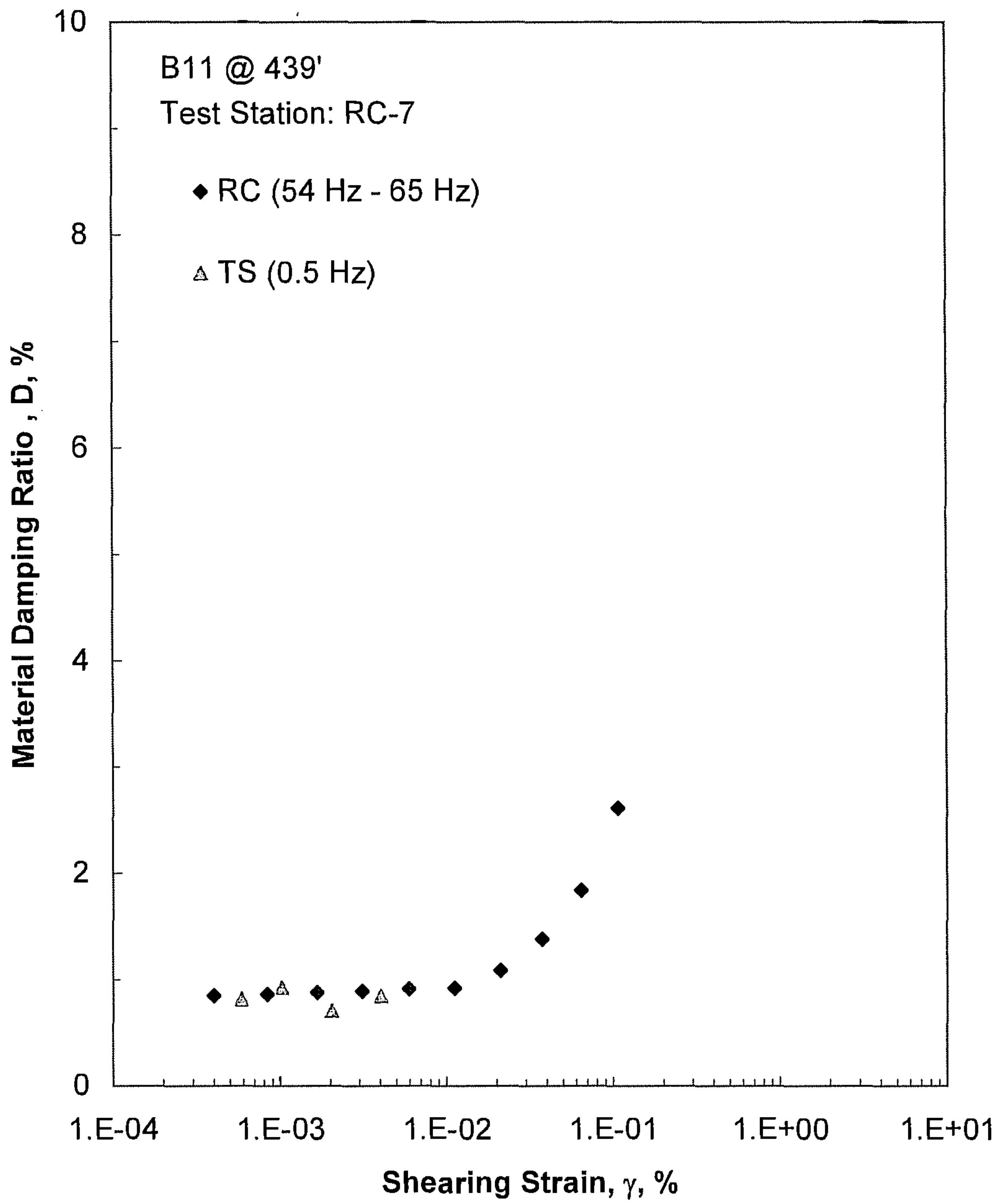


Figure C.16 Comparison of the Variation in Material Damping Ratio with Shearing Strain at an Isotropic Confining Pressure of 152 psi from the Combined RCTS Tests

Table C.1 Variation in Low-Amplitude Shear Wave Velocity, Low-Amplitude Shear Modulus, Low-Amplitude Material Damping Ratio and Estimated Void Ratio with Isotropic Confining Pressure from RC Tests of Specimen B11@439'

Isotropic Confining Pressure, σ_o			Low-Amplitude Shear Modulus, G_{max}		Low-Amplitude Shear Wave Velocity, Vs	Low-Amplitude Material Damping Ratio, Dmin	Estimated Void Ratio, e
(psi)	(psf)	(kPa)	(ksf)	(MPa)	(fps)	(%)	
14.4	2074	99	2199	106	847	1.23	1.70
76	10944	524	3088	148	992	0.99	1.64
152	21888	1047	3913	188	1107	0.88	1.59
304	43776	2095	4538	218	1178	0.93	1.53

Table C.2 Variation in Shear Modulus and Material Damping Ratio with Shearing Strain from RC Tests of Specimen B11 @ 439'; Isoptropic Confining Pressure, σ_o= 14.4 psi

Peak Shearing Strain, %	Shear Modulus, G, ksf	Normalized Shear Modulus, G/G_{max}	Average[+] Shearing Strain, %	Material Damping Ratio[x], D, %
4.27E-04	2236	1.00	4.27E-04	1.15
8.84E-04	2236	1.00	8.84E-04	1.17
1.74E-03	2236	1.00	1.74E-03	1.18
3.47E-03	2218	0.99	3.47E-03	1.21
6.79E-03	2218	0.99	5.98E-03	1.26
1.31E-02	2200	0.98	1.14E-02	1.38
2.47E-02	2119	0.95	2.13E-02	1.64
4.43E-02	2036	0.91	3.68E-02	2.22

[+] Average Shearing Strain from the First Three Cycles of the Free Vibration Decay Curve

[x] Average Damping Ratio from the First Three Cycles of the Free Vibration Decay Curve

Table C.3 Variation in Shear Modulus and Material Damping Ratio with Shearing Strain from RC Tests of Specimen B11 @ 439'; Isoptropic Confining Pressure, σ_o= 76 psi

Peak Shearing Strain, %	Shear Modulus, G, ksf	Normalized Shear Modulus, G/G_{max}	Average+ Shearing Strain, %	Material Damping Ratio^x, D, %
3.53E-04	3099	1.00	3.53E-04	0.88
6.80E-04	3099	1.00	6.80E-04	0.89
1.37E-03	3099	1.00	1.22E-03	0.90
2.66E-03	3098	1.00	2.42E-03	0.92
5.31E-03	3098	1.00	5.05E-03	0.92
1.04E-02	3098	1.00	9.60E-03	1.00
1.90E-02	3066	0.99	1.69E-02	1.17
3.47E-02	2975	0.96	3.05E-02	1.43
6.01E-02	2857	0.92	5.11E-02	2.06
1.08E-01	2626	0.85	8.67E-02	3.01
1.85E-01	2316	0.75	1.41E-01	3.99

+ Average Shearing Strain from the First Three Cycles of the Free Vibration Decay Curve

x Average Damping Ratio from the First Three Cycles of the Free Vibration Decay Curve

Table C.4 Variation in Shear Modulus and Material Damping Ratio with Shearing Strain from RC Tests of Specimen B11 @ 439'; Isoptropic Confining Pressure, σ_o= 152 psi

Peak Shearing Strain, %	Shear Modulus, G, ksf	Normalized Shear Modulus, G/G_{max}	Average⁺ Shearing Strain, %	Material Damping Ratio^x, D, %
3.96E-04	3935	0.99	3.96E-04	0.85
8.36E-04	3957	1.00	8.36E-04	0.86
1.66E-03	3957	1.00	1.66E-03	0.88
3.32E-03	3957	1.00	3.12E-03	0.89
6.60E-03	3957	1.00	5.94E-03	0.91
1.22E-02	3957	1.00	1.11E-02	0.92
2.34E-02	3893	0.98	2.11E-02	1.09
4.27E-02	3790	0.96	3.76E-02	1.38
7.44E-02	3623	0.92	6.40E-02	1.83
1.30E-01	3358	0.85	1.07E-01	2.61
2.39E-01	2999	0.76	1.86E-01	3.66
3.49E-01	2730	0.69	2.55E-01	4.89

⁺ Average Shearing Strain from the First Three Cycles of the Free Vibration Decay Curve

^{x} Average Damping Ratio from the First Three Cycles of the Free Vibration Decay Curve

Table C.5 Variation in Shear Modulus and Material Damping Ratio with Shearing Strain from RC Tests of Specimen B11 @ 439'; Isoptropic Confining Pressure, σ_o= 304 psi

Peak Shearing Strain, %	Shear Modulus, G, ksf	Normalized Shear Modulus, G/G_{max}	Average+ Shearing Strain, %	Material Damping Ratio^x, D, %
3.24E-04	4650	0.99	3.24E-04	0.81
6.81E-04	4650	0.99	6.81E-04	0.81
1.35E-03	4650	0.99	1.35E-03	0.82
2.70E-03	4674	1.00	2.70E-03	0.82
5.40E-03	4650	0.99	4.97E-03	0.84
1.04E-02	4650	0.99	9.43E-03	0.85
2.01E-02	4627	0.99	1.83E-02	0.89
3.71E-02	4548	0.97	3.33E-02	1.09
6.41E-02	4362	0.93	5.64E-02	1.48
1.08E-01	4091	0.88	8.99E-02	2.48
1.85E-01	3795	0.81	1.39E-01	3.99

+ Average Shearing Strain from the First Three Cycles of the Free Vibration Decay Curve

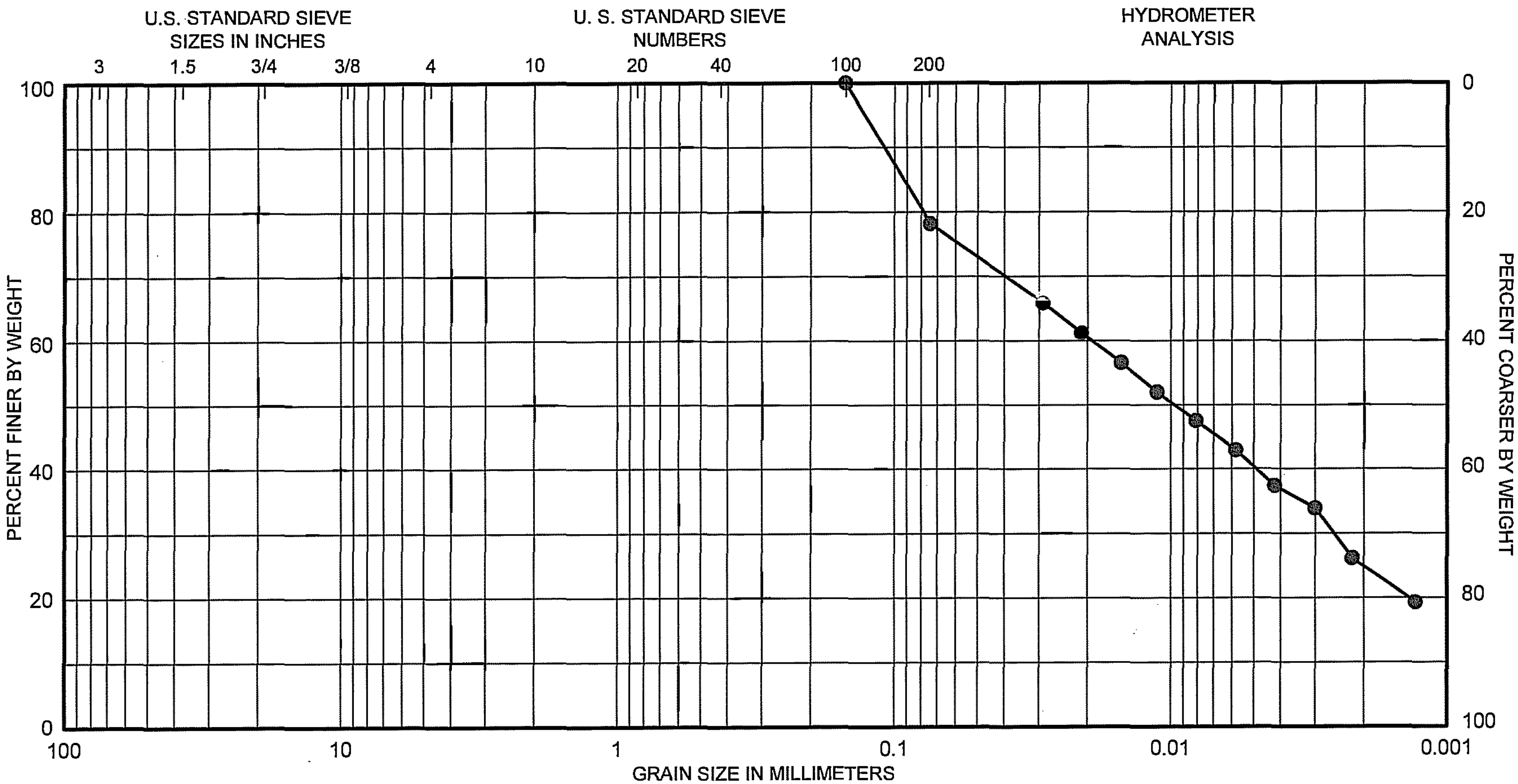
x Average Damping Ratio from the First Three Cycles of the Free Vibration Decay Curve

Table C.6 Variation in Shear Modulus, Normalized Shear Modulus and Material Damping Ratio with Shearing Strain from TS Tests of Specimen B11 @ 439; Isotropic Confining Pressure, σ_o= 14.4 psi

Peak Shearing Strain, %	Shear Modulus, G, ksf	Normalized Shear Modulus, G/G_{max}	Material Damping Ratio, D, %
3.57E-04	2370	1.00	1.20
7.01E-04	2370	1.00	1.02
9.88E-04	2370	1.00	1.21
2.01E-03	2357	0.99	0.88
4.14E-03	2284	0.96	1.02

Table C.7 Variation in Shear Modulus, Normalized Shear Modulus and Material Damping Ratio with Shearing Strain from TS Tests of Specimen B11 @ 439'; Isotropic Confining Pressure, σ_o= 152 psi

Peak Shearing Strain, %	Shear Modulus, G, ksf	Normalized Shear Modulus, G/G_{max}	Material Damping Ratio, D, %
5.83E-04	3986	1.00	0.82
1.02E-03	3986	1.00	0.92
2.03E-03	3986	1.00	0.71
4.03E-03	3986	1.00	0.85



GRAVEL		SAND			SILT or CLAY
Coarse	Fine	Coarse	Medium	Fine	

SYMBOL	BORING	DEPTH, FT	C_c	C_u	D_{50}	D_{90}	CLASSIFICATION
●	B-11	439			0.01	0.11	Clay, dark gray

GRAIN SIZE CURVE

PLATE

Appendix III – Laboratory Test Data

Sample Location	B-11	B-11	B-11	B-11	B-11	B-11	B-16	B-16	B-16	B-16
Sample Depth (ft)	**8.0**	**10.0**	**20.0**	**22.0**	**30.0**	**103.5**	**10.0**	**30.0**	**40.0**	**50.0**
Sample Type	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**
Natural Moisture Content (%)	26.8		90.9		96.7	59.0	20.7	69.5		66.4
Atterberg Limits										
Liquid Limit	26		56		66	NP		38		38
Plastic Limit	22		36		46	NP		30		29
Plasticity Index	4		20		20	NP		8		9
Gradation Analysis										
% Finer by Weight										
Sieve: 1/2 inch										
3/8 inch										
No. 4										100.0
No. 10	100.0		100.0				100.0	100.0		99.9
No. 20	99.9		99.6		100.0	100.0	90.7	99.8		99.0
No. 40	99.6		98.5		98.8	99.9	70.1	99.0		94.8
No. 60	99.2		96.8		96.9	99.6	64.8	97.8		86.6
No. 100	73.7		93.5		94.1	96.7	23.3	95.6		70.0
No. 200	28.6		87.6		89.1	77.4	10.9	80.6		63.1
Specific Gravity										
Organic Content (%)										
Moist Unit Weight (pcf)										
Corrosivity Testing										
pH		7.1		7.7					7.6	
Resistivity (ohm-cm)		1020		350					535	
Chloride (mg/L)										
Sulfate (mg/L)										
Compaction Test (ASTM D698)										
Maximum Dry Density (pcf)										
Optimum Moisture Content (%)										
USCS Soil Classification	**SM**		**MH**		**MH**	**ML**		**ML**		**ML**
AASHTO Soil Classification	**A-2-4 (0)**		**A-7-5 (22)**		**A-7-5 (25)**	**A-4 (0)**		**A-4 (7)**		**A-4 (5)**

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LABORATORY SUMMARY TABLE

Project: Port Access Road

Location: North Charleston, South Carolina

Number: 1131-08-554

Sample Location	B-16	B-18	B-18	B-18	B-18	B-18	B-18	B-19	B-19	B-19
Sample Depth (ft)	**90.0**	**13.5**	**23.5**	**33.5**	**43.5**	**48.5**	**78.5**	**10.0**	**15.0**	**35.0**
Sample Type	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**
Natural Moisture Content (%)	51.2	32.7	38.1	79.7	32.7	30.2		34.7	27.8	
Atterberg Limits										
Liquid Limit			NP	66						
Plastic Limit			NP	46						
Plasticity Index			NP	20						
Gradation Analysis										
% Finer by Weight										
Sieve: 1/2 inch										
3/8 inch										
No. 4	100.0	100.0							100.0	
No. 10	99.9	99.9							99.6	
No. 20	99.8	98.6			100.0	100.0			87.4	
No. 40	99.3	96.1			99.6	97.9			62.8	
No. 60	98.5	93.9			93.9	82.1			52.1	
No. 100	95.1	20.9			35.0	29.3			18.3	
No. 200	74.5	4.4			11.6	9.6			5.6	
Specific Gravity										
Organic Content (%)										
Moist Unit Weight (pcf)										
Corrosivity Testing										
pH							7.8			6.4
Resistivity (ohm-cm)							710			430
Chloride (mg/L)										
Sulfate (mg/L)										
Compaction Test (ASTM D698)										
Maximum Dry Density (pcf)										
Optimum Moisture Content (%)										
USCS Soil Classification		**SP**								
AASHTO Soil Classification			**()**	**()**						

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LABORATORY SUMMARY TABLE

Project: Port Access Road

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Number: 1131-08-554

Sample Location	B-19	B-19	B-19	B-2	B-2	B-2	B-2	B-23 Alt1	B-23 Alt1	B-23 Alt1
Sample Depth (ft)	**45.0**	**55.0**	**105.0**	**7.5**	**15.0**	**35.0**	**50.0**	**4.0**	**8.0**	**20.0**
Sample Type	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**
Natural Moisture Content (%)	38.2	32.7		21.0	62.1	88.5	47.9		27.2	26.1
Atterberg Limits										
Liquid Limit	NP					72			NP	NP
Plastic Limit	NP					44			NP	NP
Plasticity Index	NP					28			NP	NP
Gradation Analysis										
% Finer by Weight										
Sieve: 1/2 inch										
3/8 inch					100.0					
No. 4					99.9		100.0		100.0	100.0
No. 10				100.0	99.2	100.0	99.9		99.8	99.8
No. 20		100.0		99.6	98.7	99.8	99.7		98.5	98.9
No. 40		99.8		97.3	98.4	98.9	99.2		95.0	98.4
No. 60		96.1		92.7	97.9	98.1	96.8		92.4	97.6
No. 100		58.5		58.1	95.7	96.7	84.7		70.4	46.2
No. 200		25.9		19.9	74.7	94.5	57.0		27.5	8.7
Specific Gravity										
Organic Content (%)										
Moist Unit Weight (pcf)										
Corrosivity Testing										
pH			7.8					5.8		
Resistivity (ohm-cm)			520					3550		
Chloride (mg/L)										
Sulfate (mg/L)										
Compaction Test (ASTM D698)										
Maximum Dry Density (pcf)										
Optimum Moisture Content (%)										
USCS Soil Classification						**MH**			**SM**	**SP-SM**
AASHTO Soil Classification	**()**					**A-7-5 (35)**			**A-2-4 (0)**	**A-3 (0)**

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LABORATORY SUMMARY TABLE

Project: Port Access Road

Location: North Charleston, South Carolina

Number: 1131-08-554

Sample Location	B-23 Alt1	B-23 Alt1	B-23 Alt1	B-23 Alt1	B-29 Alt1	B-29 Alt1	B-29 Alt1	B-29 Alt1	B-29 Alt1	B-29 Alt1
Sample Depth (ft)	**22.0**	**34.0**	**50.0**	**73.5**	**7.5**	**15.0**	**20.0**	**35.0**	**40.0**	**65.0**
Sample Type	**Split Spoon**	**Split Spoon**	**3 in. Tube**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**
Natural Moisture Content (%)		35.4	34.7	45.8	46.4	135.2		34.3		43.6
Atterberg Limits										
Liquid Limit		NP	40	NP	NP	60		39		41
Plastic Limit		NP	29	NP	NP	42		35		34
Plasticity Index		NP	11	NP	NP	18		4		7
Gradation Analysis										
% Finer by Weight										
Sieve: 1/2 inch										
3/8 inch		100.0		100.0	100.0					100.0
No. 4		99.8		99.9	99.3					99.9
No. 10		99.7		97.9	99.2	100.0		100.0		98.4
No. 20		99.5		95.4	96.8	99.7		99.9		94.5
No. 40		98.9		92.9	89.2	99.3		99.6		91.6
No. 60		97.6		87.6	82.5	98.7		98.7		88.0
No. 100		75.0	100.0	75.7	45.3	95.9		93.7		83.3
No. 200		26.0	44.1	50.2	23.7	91.8		70.0		68.2
Specific Gravity			2.62							
Organic Content (%)			2.3							
Moist Unit Weight (pcf)			115.0							
Corrosivity Testing										
pH	8.1						8.2		7.5	
Resistivity (ohm-cm)	660						160		310	
Chloride (mg/L)										
Sulfate (mg/L)										
Compaction Test (ASTM D698)										
Maximum Dry Density (pcf)										
Optimum Moisture Content (%)										
USCS Soil Classification		**SM**	**SM**	**ML**	**SM**	**MH**		**ML**		**ML**
AASHTO Soil Classification		**A-2-4 (0)**	**A-6 (2)**	**A-4 (0)**	**A-2-4 (0)**	**A-7-5 (23)**		**A-4 (4)**		**A-5 (5)**

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LABORATORY SUMMARY TABLE

Project: Port Access Road

Location: North Charleston, South Carolina

Number: 1131-08-554

Sample Location	B-2A	B-2A	B-3	B-3	B-3	B-3	B-31	B-31	B-31	B-31
Sample Depth (ft)	**23.0**	**35.0**	**7.5**	**15.0**	**30.0**	**45.0**	**5.0**	**10.0**	**20.0**	**35.0**
Sample Type	**3 in. Tube**	**3 in. Tube**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**
Natural Moisture Content (%)	94.9	91.9	31.7	47.4	75.1	44.2	178.1	146.9		53.1
Atterberg Limits										
Liquid Limit	63	92		45	70			80		52
Plastic Limit	19	25		36	40			58		35
Plasticity Index	44	67		9	30			22		17
Gradation Analysis										
% Finer by Weight										
Sieve: 1/2 inch										
3/8 inch				100.0	100.0					
No. 4				99.6	99.9	100.0	100.0	100.0		
No. 10			100.0	98.5	98.7	99.4	99.7	99.9		100.0
No. 20			99.8	97.2	95.8	98.7	99.2	99.6		99.9
No. 40			99.6	95.5	94.3	97.2	98.2	99.2		99.7
No. 60			99.0	93.3	93.3	94.1	96.9	98.9		99.1
No. 100	100.0	100.0	80.2	87.6	90.9	82.4	94.7	97.9		95.4
No. 200	86.6	94.9	21.4	46.8	85.5	46.5	91.3	94.6		79.7
Specific Gravity	2.64	2.67								
Organic Content (%)	6.2	8.2						13.9		
Moist Unit Weight (pcf)	90.8	92.9								
Corrosivity Testing										
pH									8	
Resistivity (ohm-cm)									50	
Chloride (mg/L)										
Sulfate (mg/L)										
Compaction Test (ASTM D698)										
Maximum Dry Density (pcf)										
Optimum Moisture Content (%)										
USCS Soil Classification	**CH**	**CH**		**SM**	**MH**			**MH**		**MH**
AASHTO Soil Classification	**A-7-6 (41)**	**A-7-6 (73)**		**A-5 (2)**	**A-7-5 (32)**			**A-7-5 (34)**		**A-7-5 (16)**

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LABORATORY SUMMARY TABLE

Project: Port Access Road

Location: North Charleston, South Carolina

Number: 1131-08-554

Sample Location	B-31	B-33	B-33	B-33	B-33	B-33A	B-33A	B-33A	B-37	B-37
Sample Depth (ft)	**100.0**	**6.0**	**23.5**	**48.5**	**63.5**	**20.0**	**30.0**	**50.0**	**2.5**	**5.0**
Sample Type	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**3 in. Tube**	**3 in. Tube**	**3 in. Tube**	**Split Spoon**	**Split Spoon**
Natural Moisture Content (%)	49.0	13.4	162.6	55.6	43.3	161.3	149.1	70.7		141.5
Atterberg Limits										
Liquid Limit	50		78			152	141	118		57
Plastic Limit	32		58			66	43	50		38
Plasticity Index	18		20			86	98	68		19
Gradation Analysis										
% Finer by Weight										
Sieve: 1/2 inch										
3/8 inch		100.0								
No. 4		98.2		100.0	100.0					
No. 10	100.0	98.0		99.4	99.6					100.0
No. 20	99.9	97.1		98.2	99.2					99.3
No. 40	99.4	94.5	100.0	97.2	97.9					97.4
No. 60	97.9	90.5	99.9	95.9	93.7					94.8
No. 100	94.3	75.3	99.7	91.7	74.2	100.0	100.0	100.0		87.9
No. 200	81.2	53.8	99.4	72.3	45.8	97.9	98.3	73.7		70.6
Specific Gravity						2.62	2.62	2.65		
Organic Content (%)						12.1	13.8	1.2		
Moist Unit Weight (pcf)						83.1	82.7	96.4		
Corrosivity Testing										
pH									7.7	
Resistivity (ohm-cm)									65	
Chloride (mg/L)										
Sulfate (mg/L)										
Compaction Test (ASTM D698)										
Maximum Dry Density (pcf)										
Optimum Moisture Content (%)										
USCS Soil Classification	**MH**		**MH**			**MH**	**CH**	**MH**		**MH**
AASHTO Soil Classification	**A-7-5 (17)**		**A-7-5 (33)**			**A-7-5 (111)**	**A-7-5 (117)**	**A-7-5 (57)**		**A-7-5 (15)**

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LABORATORY SUMMARY TABLE

Project: Port Access Road

Location: North Charleston, South Carolina

Number: 1131-08-554

Sample Location	B-37	B-37	B-37	B-37	B-39	B-39	B-39	B-39	B-39A	B-39A
Sample Depth (ft)	**10.0**	**12.5**	**17.5**	**97.5**	**8.5**	**23.5**	**43.5**	**63.5**	**15.0**	**28.0**
Sample Type	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**3 in. Tube**	**3 in. Tube**
Natural Moisture Content (%)		23.3	39.2	43.2	34.6	148.3	44.8	48.0	118.8	148.3
Atterberg Limits										
Liquid Limit		26	NP	NP		70	41		149	149
Plastic Limit		24	NP	NP		47	32		43	64
Plasticity Index		2	NP	NP		23	9		106	85
Gradation Analysis										
% Finer by Weight										
Sieve: 1/2 inch										
3/8 inch		100.0			100.0					
No. 4		99.8			67.2	100.0	100.0	100.0		
No. 10		98.6	100.0	100.0	58.2	99.4	99.9	99.9		
No. 20		95.6	99.9	99.9	49.3	98.5	99.8	99.5		
No. 40		92.9	99.4	99.7	41.1	97.4	99.3	98.1		
No. 60		88.9	98.3	98.5	36.1	96.6	98.0	94.0		
No. 100		59.5	76.3	95.7	28.3	95.3	90.8	78.8	100.0	100.0
No. 200		31.9	16.9	72.9	18.4	92.7	54.8	52.8	99.2	52.4
Specific Gravity									2.63	2.60
Organic Content (%)									10.2	13.4
Moist Unit Weight (pcf)									84.5	83.7
Corrosivity Testing										
pH	7.8									
Resistivity (ohm-cm)	70									
Chloride (mg/L)										
Sulfate (mg/L)										
Compaction Test (ASTM D698)										
Maximum Dry Density (pcf)										
Optimum Moisture Content (%)										
USCS Soil Classification		**SM**	**SM**	**ML**		**MH**	**ML**		**CH**	**MH**
AASHTO Soil Classification		**A-2-4 (0)**	**A-2-4 (0)**	**A-4 (0)**		**A-7-5 (30)**	**A-5 (4)**		**A-7-5 (128)**	**A-7-5 (40)**

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LABORATORY SUMMARY TABLE

Project: Port Access Road

Location: North Charleston, South Carolina

Number: 1131-08-554

Sample Location	B-3A	B-3A	B-40A	B-40A	B-42 Alt1	B-42 Alt1	B-42 Alt1	B-42 Alt1	B-43 Alt1	B-43 Alt1
Sample Depth (ft)	**26.0**	**38.0**	**23.0**	**38.0**	**2.5**	**20.0**	**55.0**	**80.0**	**5.0**	**15.0**
Sample Type	**3 in. Tube**	**3 in. Tube**	**3 in. Tube**	**3 in. Tube**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**
Natural Moisture Content (%)	89.9	84.4	87.6	110.5	119.5	37.6	47.4	47.4	34.2	32.8
Atterberg Limits										
Liquid Limit	73	82	98	102						30
Plastic Limit	20	23	35	38						25
Plasticity Index	53	59	63	64						5
Gradation Analysis										
% Finer by Weight										
Sieve: 1/2 inch										
3/8 inch										
No. 4						100.0	100.0		100.0	
No. 10					100.0	99.9	99.9		99.0	100.0
No. 20					99.9	99.8	99.5	100.0	96.6	99.8
No. 40					99.0	99.2	98.1	99.8	93.4	99.2
No. 60					98.0	97.8	93.8	99.1	88.4	97.0
No. 100	100.0	100.0	100.0	100.0	95.7	81.1	78.4	96.9	71.4	80.1
No. 200	61.7	69.4	77.2	95.2	84.2	24.0	48.3	80.2	59.8	56.9
Specific Gravity	2.67	2.66	2.55	2.64						
Organic Content (%)	7.5	4.9								
Moist Unit Weight (pcf)	92.7	95.9	92.1	88.4						
Corrosivity Testing										
pH										
Resistivity (ohm-cm)										
Chloride (mg/L)										
Sulfate (mg/L)										
Compaction Test (ASTM D698)										
Maximum Dry Density (pcf)										
Optimum Moisture Content (%)										
USCS Soil Classification	**CH**	**CH**	**CH**	**CH**						**ML**
AASHTO Soil Classification	**A-7-6 (30)**	**A-7-6 (40)**	**A-7-5 (53)**	**A-7-5 (74)**						**A-4 (1)**

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LABORATORY SUMMARY TABLE

Project: Port Access Road

Location: North Charleston, South Carolina

Number: 1131-08-554

Sample Location	B-43 Alt1	B-43 Alt1	B-43 Alt2	B-43 Alt2	B-43 Alt2	B-43 Alt2	B-43 Alt2	B-43 Alt2	B-46	B-46
Sample Depth (ft)	**50.0**	**100.0**	**2.5**	**5.0**	**15.0**	**30.0**	**40.0**	**65.0**	**10.0**	**20.0**
Sample Type	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**
Natural Moisture Content (%)	27.1	46.9		139.6	32.2		35.6	48.7	30.3	57.3
Atterberg Limits										
Liquid Limit					30				NP	34
Plastic Limit					25				NP	23
Plasticity Index					5				NP	11
Gradation Analysis										
% Finer by Weight										
Sieve: 1/2 inch										
3/8 inch							100.0			
No. 4	100.0				100.0		99.4			100.0
No. 10	99.7			100.0	99.3		99.0	100.0	100.0	99.7
No. 20	98.7	100.0		99.9	98.4		98.4	99.7	99.5	97.3
No. 40	97.8	99.8		99.4	96.3		97.3	98.4	98.6	94.8
No. 60	95.8	99.0		98.7	92.7		94.9	96.5	97.2	92.6
No. 100	88.3	96.9		97.6	65.6		85.7	91.7	55.6	80.7
No. 200	55.5	86.5		96.0	41.5		53.2	68.7	18.0	63.4
Specific Gravity										
Organic Content (%)										
Moist Unit Weight (pcf)										
Corrosivity Testing										
pH			7			7.4				
Resistivity (ohm-cm)			1750			810				
Chloride (mg/L)										
Sulfate (mg/L)										
Compaction Test (ASTM D698)										
Maximum Dry Density (pcf)										
Optimum Moisture Content (%)										
USCS Soil Classification					**SM**				**SM**	**CL**
AASHTO Soil Classification					**A-4 (0)**				**A-2-4 (0)**	**A-6 (5)**

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LABORATORY SUMMARY TABLE

Project: Port Access Road

Location: North Charleston, South Carolina

Number: 1131-08-554

Sample Location	B-46	B-46	B-46	B-46	B-46	B-47	B-47	B-47	B-47	B-47
Sample Depth (ft)	**25.0**	**30.0**	**40.0**	**60.0**	**100.0**	**8.5**	**18.5**	**28.5**	**33.5**	**38.5**
Sample Type	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**
Natural Moisture Content (%)		39.3	47.4			19.5		40.1		36.0
Atterberg Limits										
Liquid Limit		NP	NP			24		NP		NP
Plastic Limit		NP	NP			20		NP		NP
Plasticity Index		NP	NP			4		NP		NP
Gradation Analysis										
% Finer by Weight										
Sieve: 1/2 inch										
3/8 inch								100.0		100.0
No. 4			100.0					99.4		99.8
No. 10		100.0	99.9			100.0		99.1		99.6
No. 20		99.9	99.7			99.5		98.9		99.4
No. 40		99.1	99.4			98.4		98.5		98.8
No. 60		97.7	98.7			93.5		97.7		96.9
No. 100		79.2	96.8			62.1		74.0		76.7
No. 200		24.0	83.4			38.1		26.5		24.0
Specific Gravity										
Organic Content (%)										
Moist Unit Weight (pcf)										
Corrosivity Testing										
pH	8.1			7.6	7.7		7.1		7.4	
Resistivity (ohm-cm)	1340			820	560		1390		450	
Chloride (mg/L)										
Sulfate (mg/L)										
Compaction Test (ASTM D698)										
Maximum Dry Density (pcf)										
Optimum Moisture Content (%)										
USCS Soil Classification		**SM**	**ML**			**SC-SM**		**SM**		**SM**
AASHTO Soil Classification		**A-2-4 (0)**	**A-4 (0)**			**A-4 (0)**		**A-2-4 (0)**		**A-2-4 (0)**

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LABORATORY SUMMARY TABLE

Project: Port Access Road

Location: North Charleston, South Carolina

Number: 1131-08-554

Sample Location	B-47	B-47A	B-50	B-50	B-50	B-50	B-51 Alt1	B-51 Alt1	B-51 Alt1	B-51 Alt1
Sample Depth (ft)	**43.5**	**24.0**	**6.0**	**13.5**	**33.5**	**43.5**	**10.0**	**15.0**	**25.0**	**45.0**
Sample Type	**Split Spoon**	**3 in. Tube**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**
Natural Moisture Content (%)	43.6	55.8	34.0	39.9	38.4	46.4	101.7	100.6	34.2	41.8
Atterberg Limits										
Liquid Limit	43	81	NP	NP	NP	44	NP	54	NP	NP
Plastic Limit	33	19	NP	NP	NP	28	NP	28	NP	NP
Plasticity Index	10	62	NP	NP	NP	16	NP	26	NP	NP
Gradation Analysis										
% Finer by Weight										
Sieve: 1/2 inch										
3/8 inch				100.0				100.0		
No. 4	100.0			99.8	100.0		100.0	99.8	100.0	100.0
No. 10	99.9			97.5	99.9	100.0	99.9	99.8	99.9	99.9
No. 20	99.8		100.0	95.6	99.8	99.9	99.4	99.4	99.3	99.6
No. 40	99.5		99.8	94.5	99.4	99.7	98.5	98.1	98.0	99.1
No. 60	98.5		98.9	93.1	98.4	99.0	97.7	96.5	96.7	97.7
No. 100	93.8	100.0	68.9	73.5	73.3	93.1	94.0	90.8	75.1	89.8
No. 200	69.8	98.5	15.2	41.4	23.6	56.5	82.6	83.2	35.4	48.2
Specific Gravity		2.70								
Organic Content (%)		5.3								
Moist Unit Weight (pcf)		103.9								
Corrosivity Testing										
pH										
Resistivity (ohm-cm)										
Chloride (mg/L)										
Sulfate (mg/L)										
Compaction Test (ASTM D698)										
Maximum Dry Density (pcf)										
Optimum Moisture Content (%)										
USCS Soil Classification	**ML**	**CH**	**SM**	**SM**	**SM**	**ML**	**ML**	**CH**	**SM**	**SM**
AASHTO Soil Classification	**A-5 (8)**	**A-7-6 (69)**	**A-2-4 (0)**	**A-4 (0)**	**A-2-4 (0)**	**A-7-6 (7)**	**A-4 (0)**	**A-7-6 (24)**	**A-2-4 (0)**	**A-4 (0)**

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LABORATORY SUMMARY TABLE

Project: Port Access Road

Location: North Charleston, South Carolina

Number: 1131-08-554

Sample Location	B-52	B-52	B-52	B-52	B-53	B-53	B-53	B-53	B-53A	B-55
Sample Depth (ft)	**15.0**	**25.0**	**35.0**	**45.0**	**5.0**	**25.0**	**40.0**	**48.5**	**32.0**	**7.5**
Sample Type	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**3 in. Tube**	**Split Spoon**
Natural Moisture Content (%)	32.4	34.6	40.7	33.5	23.9	39.5	71.6	44.2	76.1	27.1
Atterberg Limits										
Liquid Limit	NP	27	NP	NP	27		52		81	
Plastic Limit	NP	16	NP	NP	21		34		31	
Plasticity Index	NP	11	NP	NP	6		18		50	
Gradation Analysis										
% Finer by Weight										
Sieve: 1/2 inch										
3/8 inch		100.0		100.0		100.0				
No. 4	100.0	99.9		97.5	100.0	93.8				
No. 10	99.9	99.7	100.0	97.2	99.9	77.0	100.0	100.0		
No. 20	99.3	96.9	99.8	96.8	99.9	61.0	99.8	99.8		100.0
No. 40	98.6	92.7	99.3	95.6	99.5	55.5	99.7	99.4		98.9
No. 60	97.4	90.0	98.1	91.6	98.2	53.2	99.5	98.2		93.0
No. 100	76.6	68.5	80.6	60.5	82.0	29.3	95.4	90.3	100.0	20.4
No. 200	20.1	43.7	46.5	22.2	38.6	15.5	91.8	54.1	82.9	9.6
Specific Gravity									2.69	
Organic Content (%)										
Moist Unit Weight (pcf)									83.3	
Corrosivity Testing										
pH										
Resistivity (ohm-cm)										
Chloride (mg/L)										
Sulfate (mg/L)										
Compaction Test (ASTM D698)										
Maximum Dry Density (pcf)										
Optimum Moisture Content (%)										
USCS Soil Classification	**SM**	**SC**	**SM**	**SM**	**SC-SM**		**MH**		**CH**	
AASHTO Soil Classification	**A-2-4 (0)**	**A-6 (2)**	**A-4 (0)**	**A-2-4 (0)**	**A-4 (0)**		**A-7-5 (21)**		**A-7-5 (47)**	

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LABORATORY SUMMARY TABLE

Project: Port Access Road

Location: North Charleston, South Carolina

Number: 1131-08-554

Sample Location		B-55	B-55	B-55	B-55A	B-55B	B-65	B-65	B-65	B-65	B-66
Sample Depth (ft)		15.0	35.0	48.5	24.0	35.0	2.5	15.0	30.0	45.0	7.5
Sample Type		Split Spoon	Split Spoon	Split Spoon	3 in. Tube	3 in. Tube	Split Spoon	Split Spoon	Split Spoon	Split Spoon	Split Spoon
Natural Moisture Content (%)		36.9	86.1	34.9	30.0	83.8	24.3	34.2	42.4	47.5	23.4
Atterberg Limits											
Liquid Limit			76		39	104	29	NP	NP	43	
Plastic Limit			37		24	30	20	NP	NP	28	
Plasticity Index			39		15	74	9	NP	NP	15	
Gradation Analysis											
% Finer by Weight											
Sieve:	1/2 inch										
	3/8 inch	100.0								100.0	
	No. 4	99.5	100.0	100.0						99.8	
	No. 10	98.4	99.8	99.9			100.0		100.0	99.8	
	No. 20	97.7	99.1	99.7			99.8	100.0	99.4	99.6	100.0
	No. 40	97.4	98.7	99.1			99.7	99.7	96.8	99.0	99.6
	No. 60	97.0	98.3	97.9			97.0	97.8	93.0	97.7	97.3
	No. 100	52.9	96.1	91.7	100.0	100.0	70.1	62.9	35.5	90.7	38.0
	No. 200	17.2	93.1	60.8	50.9	98.9	45.2	25.4	24.9	63.6	11.6
Specific Gravity					2.66	2.63					
Organic Content (%)					1.7	8.4					
Moist Unit Weight (pcf)					114.0	90.4					
Corrosivity Testing											
pH											
Resistivity (ohm-cm)											
Chloride (mg/L)											
Sulfate (mg/L)											
Compaction Test (ASTM D698)											
Maximum Dry Density (pcf)											
Optimum Moisture Content (%)											
USCS Soil Classification			MH		CL	CH	SC	SM	SM	ML	
AASHTO Soil Classification			A-7-5 (45)		A-6 (5)	A-7-5 (87)	A-4 (1)	A-2-4 (0)	A-2-4 (0)	A-7-6 (9)	

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LABORATORY SUMMARY TABLE

Project: Port Access Road

Location: North Charleston, South Carolina

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Sample Location	B-66	B-66	B-66	B-68 Alt1	B-68 Alt1	B-68 Alt1	B-68 Alt1	B-68 Alt1	B-68 Alt1	B-68 Alt1
Sample Depth (ft)	**20.0**	**45.0**	**75.0**	**2.5**	**5.0**	**10.0**	**15.0**	**20.0**	**25.0**	**30.0**
Sample Type	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**
Natural Moisture Content (%)	94.3	34.3	47.5		22.9	25.7	28.7		107.2	64.6
Atterberg Limits										
Liquid Limit	69	NP	43			23			67	29
Plastic Limit	50	NP	34			20			50	24
Plasticity Index	19	NP	9			3			17	5
Gradation Analysis										
% Finer by Weight										
Sieve: 1/2 inch										
3/8 inch						100.0				
No. 4			100.0		100.0	99.7				
No. 10			99.9		99.8	99.2	100.0		100.0	100.0
No. 20	100.0	100.0	99.7		99.1	98.4	99.0		99.9	99.9
No. 40	99.4	99.9	98.8		96.3	95.2	95.6		99.2	99.6
No. 60	99.0	99.6	96.0		92.9	90.7	91.3		98.5	98.7
No. 100	98.0	69.3	89.8		59.5	52.7	44.9		96.9	96.3
No. 200	94.7	30.1	64.3		23.4	22.1	14.1		91.8	67.8
Specific Gravity										
Organic Content (%)										
Moist Unit Weight (pcf)										
Corrosivity Testing										
pH				7.7				7.7		
Resistivity (ohm-cm)				1880				270		
Chloride (mg/L)										
Sulfate (mg/L)										
Compaction Test (ASTM D698)										
Maximum Dry Density (pcf)										
Optimum Moisture Content (%)										
USCS Soil Classification	**MH**	**SM**	**ML**			**SM**			**MH**	**ML**
AASHTO Soil Classification	**A-7-5 (28)**	**A-2-4 (0)**	**A-5 (6)**			**A-2-4 (0)**			**A-7-5 (24)**	**A-4 (2)**

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LABORATORY SUMMARY TABLE

Project: Port Access Road

Location: North Charleston, South Carolina

Number: 1131-08-554

CLASS SUM TABLE CHARLESTON GINT PORT ACCESS ROAD.GPJ 12/10/08

Sample Location	B-68 Alt1	B-68 Alt1	B-68 Alt1	B-68 Alt1	B-72	B-72	B-72	B-72	B-72	B-74
Sample Depth (ft)	**40.0**	**45.0**	**50.0**	**55.0**	**5.0**	**7.5**	**10.0**	**35.0**	**65.0**	**5.0**
Sample Type	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**
Natural Moisture Content (%)	67.7	34.5		35.2	24.3		47.7	28.5	44.6	131.7
Atterberg Limits										
Liquid Limit	44	NP		NP			59		NP	
Plastic Limit	35	NP		NP			33		NP	
Plasticity Index	9	NP		NP			26		NP	
Gradation Analysis										
% Finer by Weight										
Sieve: 1/2 inch										
3/8 inch		100.0			100.0					
No. 4		99.1			99.8				100.0	100.0
No. 10		99.0		100.0	99.8			100.0	99.9	99.9
No. 20		98.5		99.9	99.8			99.6	99.4	99.6
No. 40		98.1		99.8	99.6		100.0	98.9	98.2	99.0
No. 60		96.5		99.0	95.9		99.8	95.9	94.0	98.5
No. 100		63.5		64.5	32.8		98.8	36.9	76.1	95.4
No. 200		28.2		20.9	11.2		91.5	30.0	53.7	92.3
Specific Gravity										
Organic Content (%)		2.5								
Moist Unit Weight (pcf)										
Corrosivity Testing										
pH			8			4.7				
Resistivity (ohm-cm)			880			5260				
Chloride (mg/L)										
Sulfate (mg/L)										
Compaction Test (ASTM D698)										
Maximum Dry Density (pcf)										
Optimum Moisture Content (%)										
USCS Soil Classification		**SM**		**SM**			**MH**		**ML**	
AASHTO Soil Classification	**()**	**A-2-4 (0)**		**A-2-4 (0)**			**A-7-5 (29)**		**A-4 (0)**	

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LABORATORY SUMMARY TABLE

Project: Port Access Road

Location: North Charleston, South Carolina

Number: 1131-08-554

Sample Location	B-74	B-74	B-74	B-74	B-74	B-74A	B-74A	Proctor 1	Proctor 2	W-1
Sample Depth (ft)	**20.0**	**40.0**	**50.0**	**85.0**	**115.0**	**8.0**	**65.0**	**0.0**	**0.0**	**0.0**
Sample Type	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**Split Spoon**	**3 in. Tube**	**3 in. Tube**	**Bulk**	**Bulk**	**Grab**
Natural Moisture Content (%)	106.5	22.2		47.5		124.8	45.1	1.3	1.9	
Atterberg Limits										
Liquid Limit	65	NP				86	59	NP	23	
Plastic Limit	45	NP				39	37	NP	20	
Plasticity Index	20	NP				47	22	NP	3	
Gradation Analysis										
% Finer by Weight										
Sieve: 1/2 inch										
3/8 inch		100.0								
No. 4		97.4		100.0						
No. 10		89.9		99.6						
No. 20	100.0	71.7		99.1						
No. 40	99.9	32.9		98.5						
No. 60	99.9	14.6		97.8						
No. 100	99.6	3.1		95.0		100.0	100.0	100.0	100.0	
No. 200	98.2	1.1		82.3		88.5	50.5	22.5	33.5	
Specific Gravity						2.48	2.71			
Organic Content (%)										
Moist Unit Weight (pcf)						83.9	109.1			
Corrosivity Testing										
pH			7.6		7.8					7.84
Resistivity (ohm-cm)			190		360					42
Chloride (mg/L)										9260
Sulfate (mg/L)										1190
Compaction Test (ASTM D698)										
Maximum Dry Density (pcf)								108.5	109.0	
Optimum Moisture Content (%)								15.5	16.0	
USCS Soil Classification	**MH**	**SP**				**MH**	**MH**	**SM**	**SM**	
AASHTO Soil Classification	**A-7-5 (29)**	**A-1-b (0)**				**A-7-5 (51)**	**A-7-5 (9)**	**A-2-4 (0)**	**A-2-4 (0)**	

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LABORATORY SUMMARY TABLE

Project: Port Access Road

Location: North Charleston, South Carolina

Number: 1131-08-554

Sample Location	W-2	W-3	W-4
Sample Depth (ft)	0.0	0.0	0.0
Sample Type	Grab	Grab	Grab
Natural Moisture Content (%)			
Atterberg Limits			
Liquid Limit			
Plastic Limit			
Plasticity Index			
Gradation Analysis			
% Finer by Weight			
Sieve: 1/2 inch			
3/8 inch			
No. 4			
No. 10			
No. 20			
No. 40			
No. 60			
No. 100			
No. 200			
Specific Gravity			
Organic Content (%)			
Moist Unit Weight (pcf)			
Corrosivity Testing			
pH	7.80	7.81	7.86
Resistivity (ohm-cm)	42	41.5	41.6
Chloride (mg/L)	8350	10200	8920
Sulfate (mg/L)	1070	1150	1110
Compaction Test (ASTM D698)			
Maximum Dry Density (pcf)			
Optimum Moisture Content (%)			
USCS Soil Classification			
AASHTO Soil Classification			

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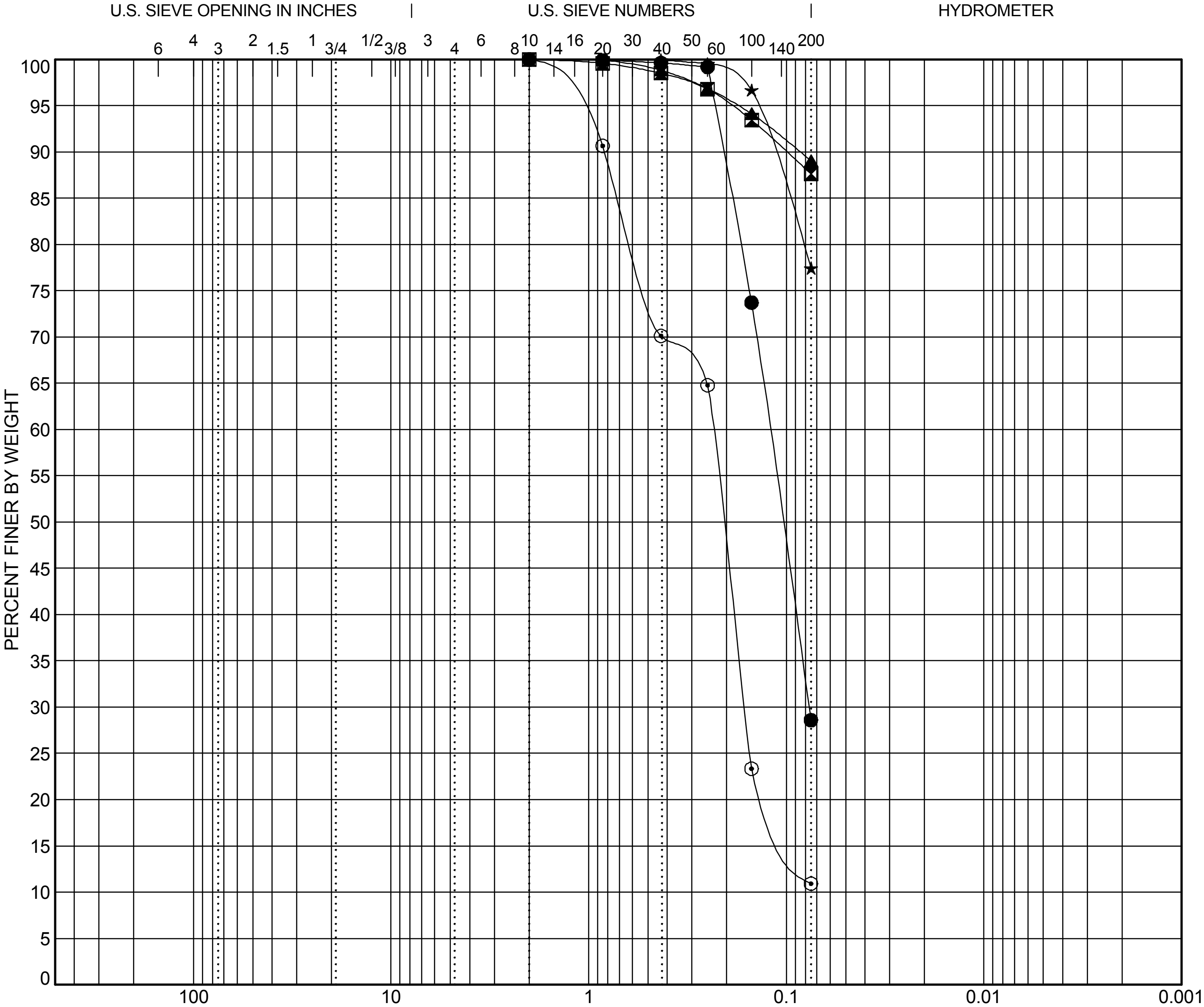
LABORATORY SUMMARY TABLE

Project: Port Access Road

Location: North Charleston, South Carolina

Number: 1131-08-554



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification	LL	PL	PI	Cc	Cu
● B-11	8	**SILTY SAND SM**	**26**	**22**	**4**		
⊠ B-11	20	**ELASTIC SILT MH**	**56**	**36**	**20**		
▲ B-11	30	**ELASTIC SILT MH**	**66**	**46**	**20**		
★ B-11	103.5	**SILT with SAND ML**	**NP**	**NP**	**NP**		
⊙ B-16	10					**1.58**	**3.31**

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● B-11	8	**2**	**0.122**	**0.077**		**0.0**	**71.4**	**28.6**	
⊠ B-11	20	**2**				**0.0**	**12.4**	**87.6**	
▲ B-11	30	**0.85**				**0.0**	**10.9**	**89.1**	
★ B-11	103.5	**0.85**				**0.0**	**22.5**	**77.4**	
⊙ B-16	10	**2**	**0.236**	**0.163**		**0.0**	**89.1**	**10.9**	

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GRAIN SIZE DISTRIBUTION

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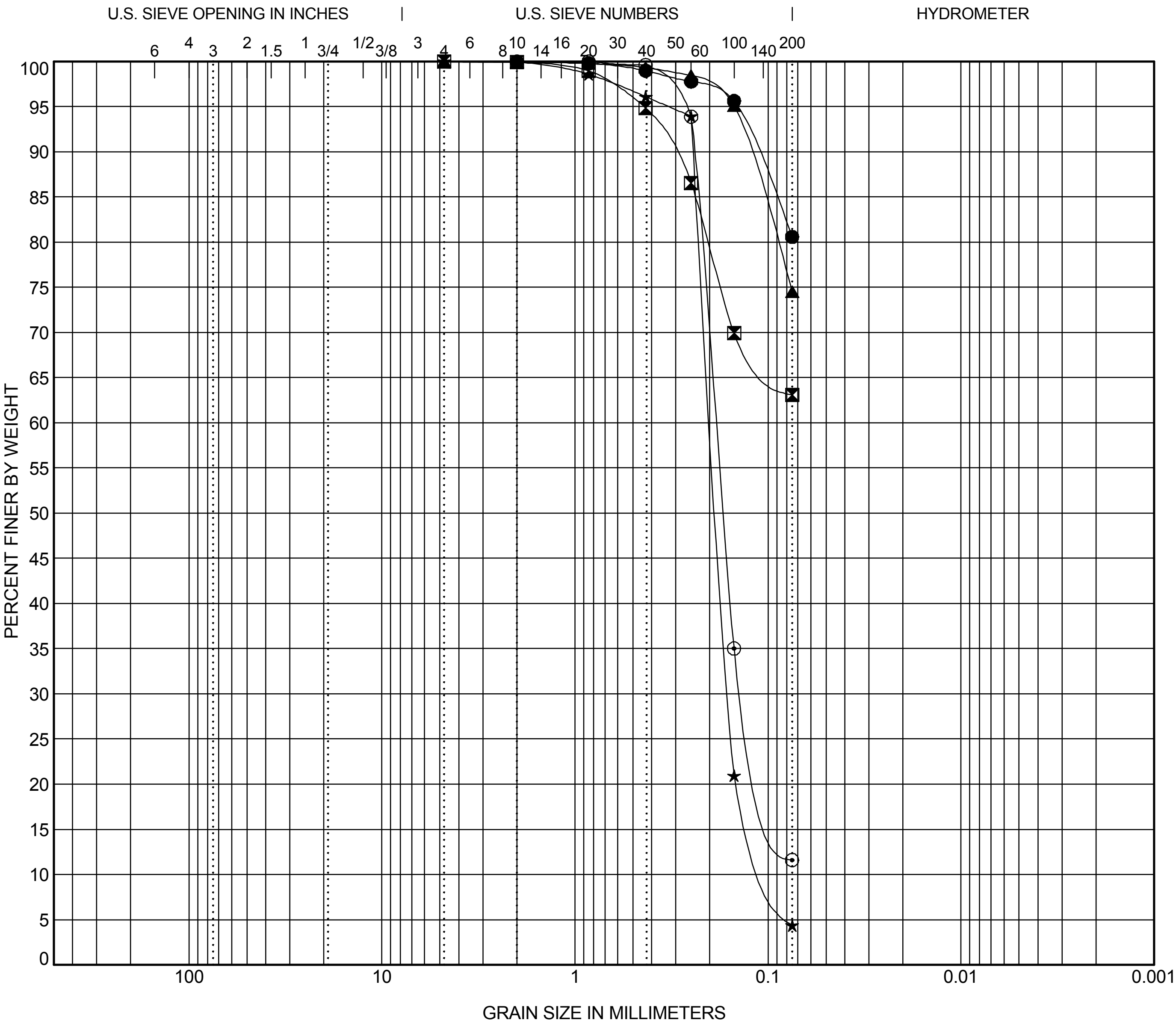
Number: 1131-08-554

GSA (HYDROM = 0.002) GINT PORT ACCESS ROAD.GPJ 12/10/08



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-16	30	SILT with SAND ML	38	30	8		
⧗	B-16	50	SANDY SILT ML	38	29	9		
▲	B-16	90						
★	B-18	13.5	POORLY GRADED SAND SP				1.36	2.08
⊙	B-18	43.5					1.25	2.60

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-16	30	2				0.0	19.4	80.6	
⧗	B-16	50	4.75				0.0	36.9	63.1	
▲	B-16	90	4.75				0.0	25.5	74.5	
★	B-18	13.5	4.75	0.197	0.16	0.095	0.0	95.6	4.4	
⊙	B-18	43.5	0.85	0.186	0.129		0.0	88.4	11.6	

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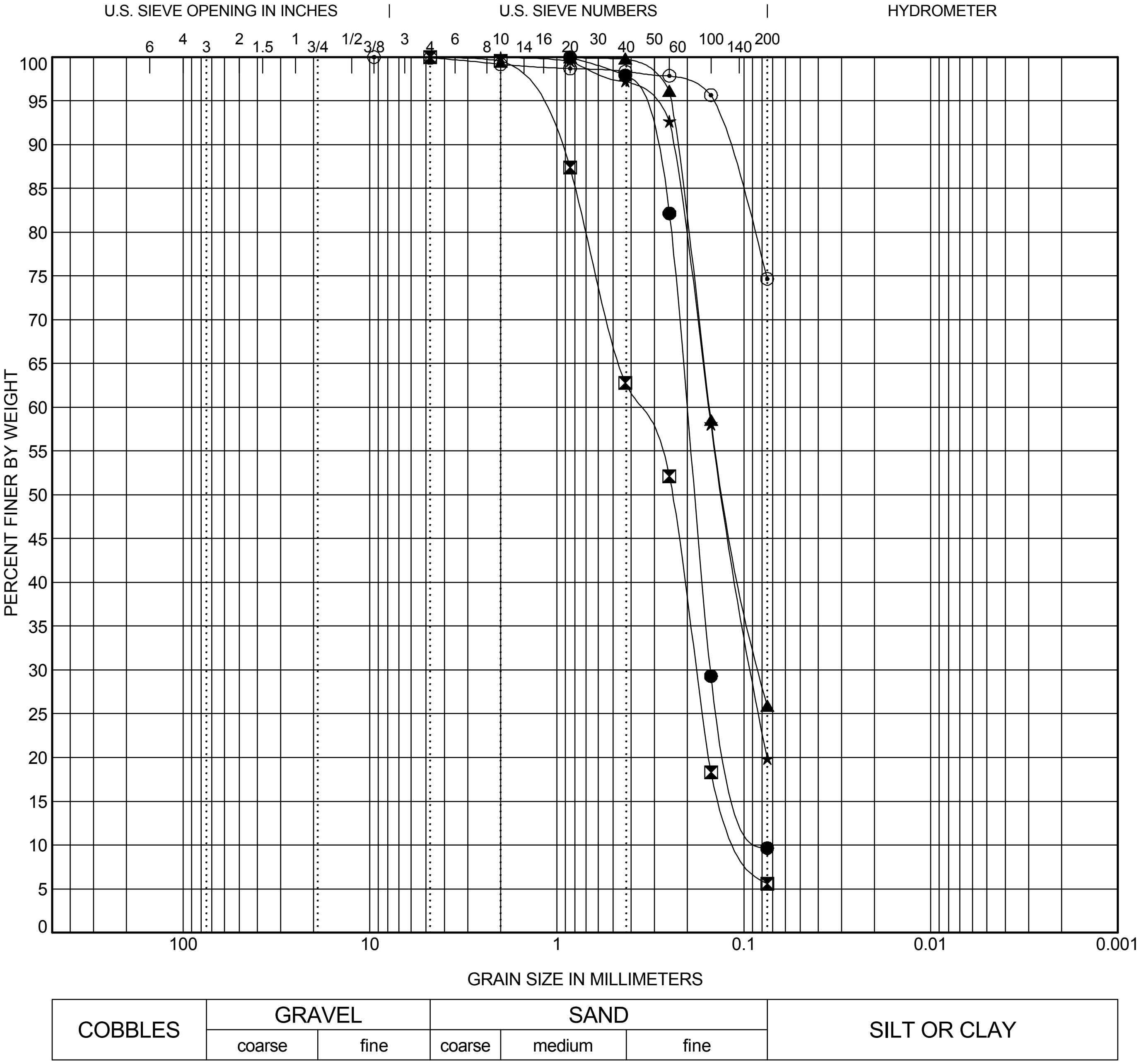

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-18	48.5					1.49	2.66
⊠	B-19	15					0.90	3.91
▲	B-19	55						
★	B-2	7.5						
⊙	B-2	15						

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-18	48.5	0.85	0.202	0.151	0.076	0.0	90.3	9.6	
⊠	B-19	15	4.75	0.373	0.179	0.095	0.0	94.4	5.6	
▲	B-19	55	0.85	0.153	0.082		0.0	74.1	25.9	
★	B-2	7.5	2	0.154	0.09		0.0	80.1	19.9	
⊙	B-2	15	9.5				0.1	25.2	74.7	

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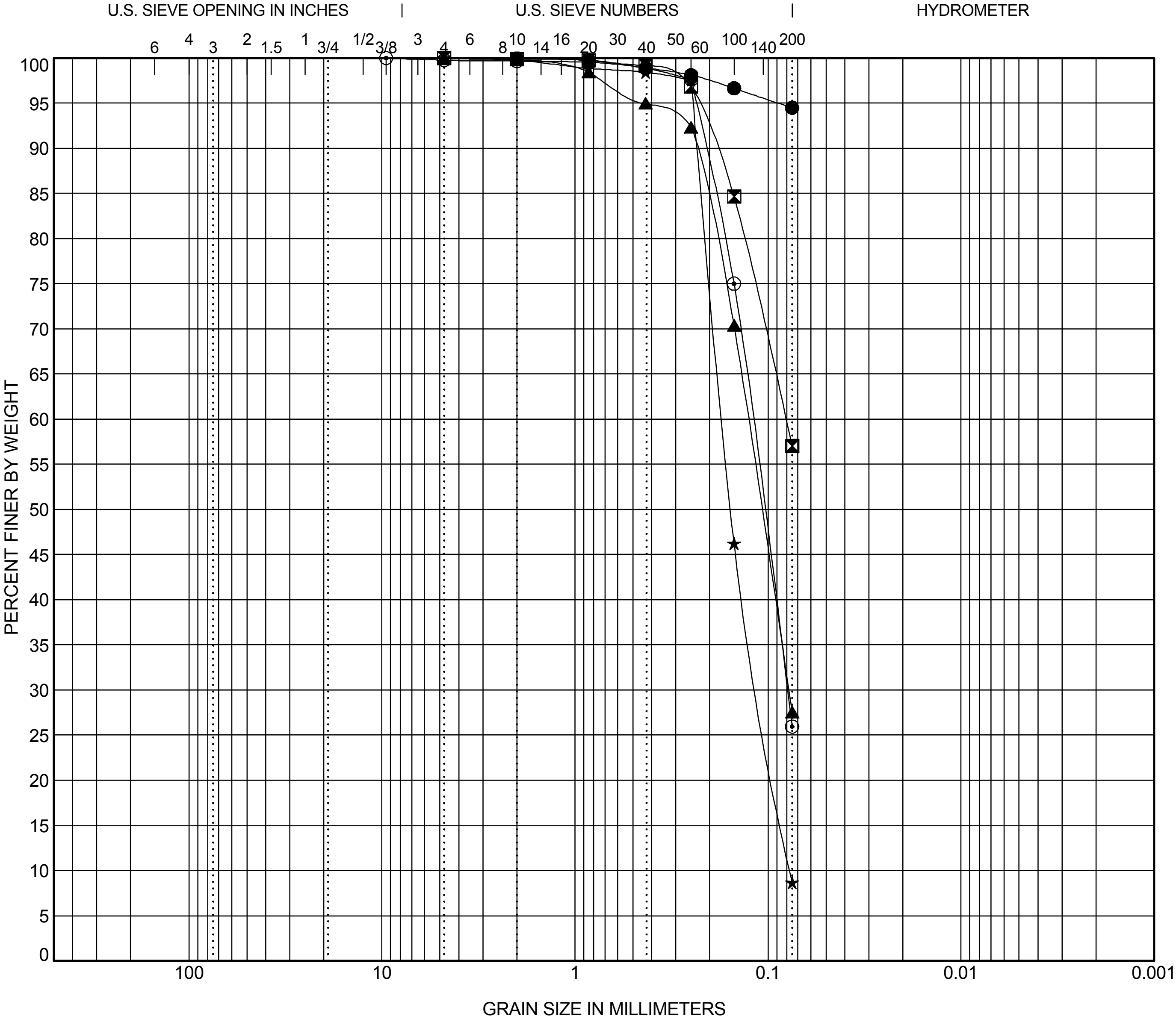

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-2	35	**ELASTIC SILT MH**	72	44	28		
⊠	B-2	50						
▲	B-23 Alt1	8	**SILTY SAND SM**	NP	NP	NP		
★	B-23 Alt1	20	**POORLY GRADED SAND with SILT SP-SM**	NP	NP	NP	0.93	2.24
⊙	B-23 Alt1	34	**SILTY SAND SM**	NP	NP	NP		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-2	35	2				0.0	5.5	94.5	
⊠	B-2	50	4.75	0.081			0.0	43.0	57.0	
▲	B-23 Alt1	8	4.75	0.127	0.078		0.0	72.5	27.5	
★	B-23 Alt1	20	4.75	0.172	0.111	0.077	0.0	91.3	8.7	
⊙	B-23 Alt1	34	9.5	0.121	0.079		0.2	73.8	26.0	

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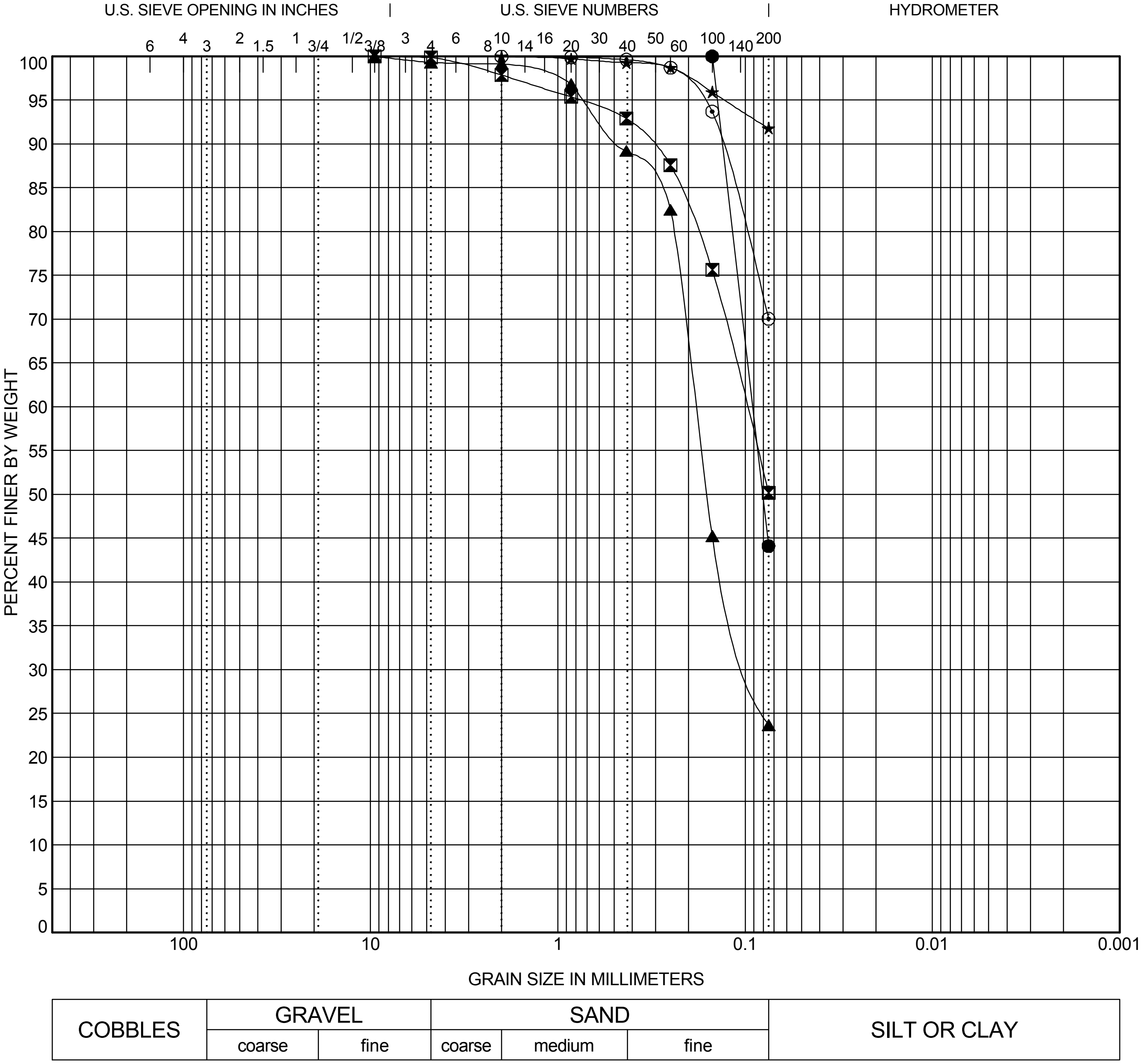

Specimen Identification			Classification	LL	PL	PI	Cc	Cu
●	**B-23 Alt1**	**50**	**SILTY SAND SM**	**40**	**29**	**11**		
⊠	**B-23 Alt1**	**73.5**	**SANDY SILT ML**	**NP**	**NP**	**NP**		
▲	**B-29 Alt1**	**7.5**	**SILTY SAND SM**	**NP**	**NP**	**NP**		
★	**B-29 Alt1**	**15**	**ELASTIC SILT MH**	**60**	**42**	**18**		
⊙	**B-29 Alt1**	**35**	**SILT with SAND ML**	**39**	**35**	**4**		

Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-23 Alt1**	**50**	**0.15**	**0.091**			**0.0**	**55.9**	**44.1**	
⊠	**B-23 Alt1**	**73.5**	**9.5**	**0.098**			**0.1**	**49.7**	**50.2**	
▲	**B-29 Alt1**	**7.5**	**9.5**	**0.184**	**0.092**		**0.7**	**75.6**	**23.7**	
★	**B-29 Alt1**	**15**	**2**				**0.0**	**8.2**	**91.8**	
⊙	**B-29 Alt1**	**35**	**2**				**0.0**	**29.9**	**70.0**	

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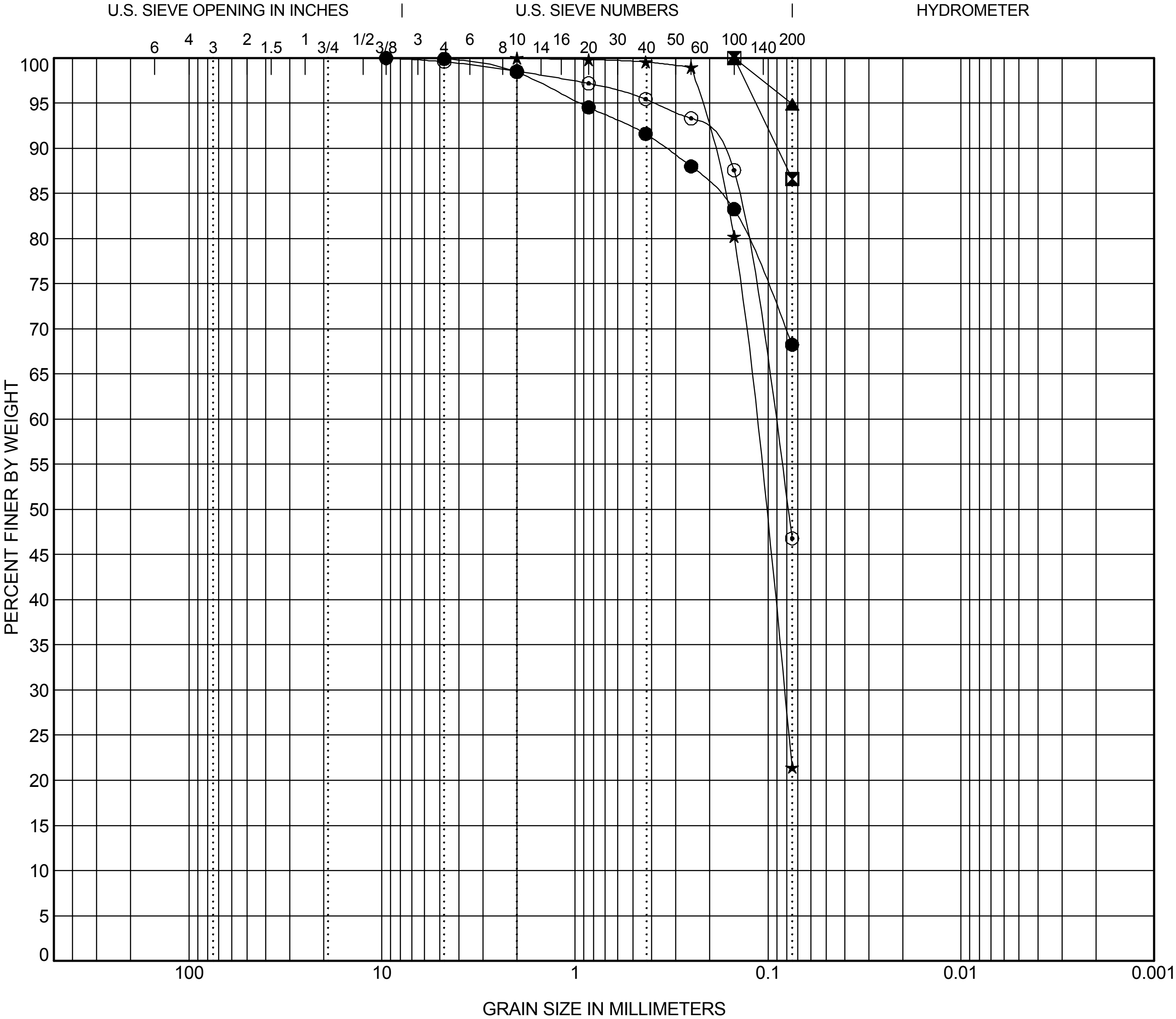

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-29 Alt1	65	SANDY SILT ML	41	34	7		
⊠	B-2A	23	FAT CLAY CH	63	19	44		
▲	B-2A	35	FAT CLAY CH	92	25	67		
★	B-3	7.5						
⊙	B-3	15	SILTY SAND SM	45	36	9		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-29 Alt1	65	9.5				0.1	31.7	68.2	
⊠	B-2A	23	0.15				0.0	13.4	86.6	
▲	B-2A	35	0.15				0.0	5.1	94.9	
★	B-3	7.5	2	0.118	0.083		0.0	78.6	21.4	
⊙	B-3	15	9.5	0.094			0.4	52.8	46.8	

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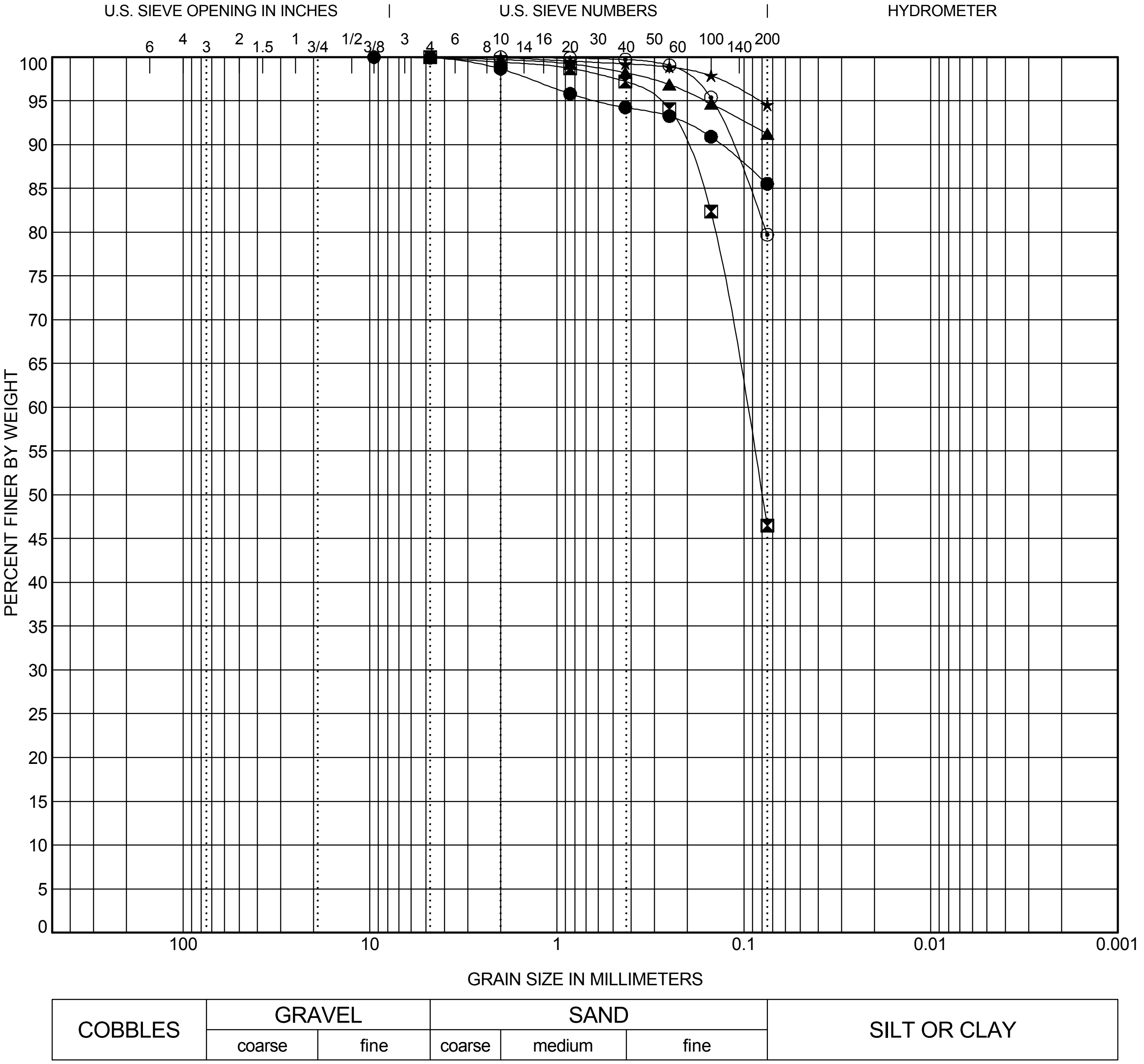

Specimen Identification			Classification	LL	PL	PI	Cc	Cu
●	B-3	30	**ELASTIC SILT MH**	70	40	30		
⊠	B-3	45						
▲	B-31	5						
★	B-31	10	**ELASTIC SILT MH**	80	58	22		
⊙	B-31	35	**ELASTIC SILT with SAND MH**	52	35	17		

Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-3	30	9.5				0.1	14.4	85.5	
⊠	B-3	45	4.75	0.097			0.0	53.5	46.5	
▲	B-31	5	4.75				0.0	8.7	91.3	
★	B-31	10	4.75				0.0	5.4	94.6	
⊙	B-31	35	2				0.0	20.3	79.7	

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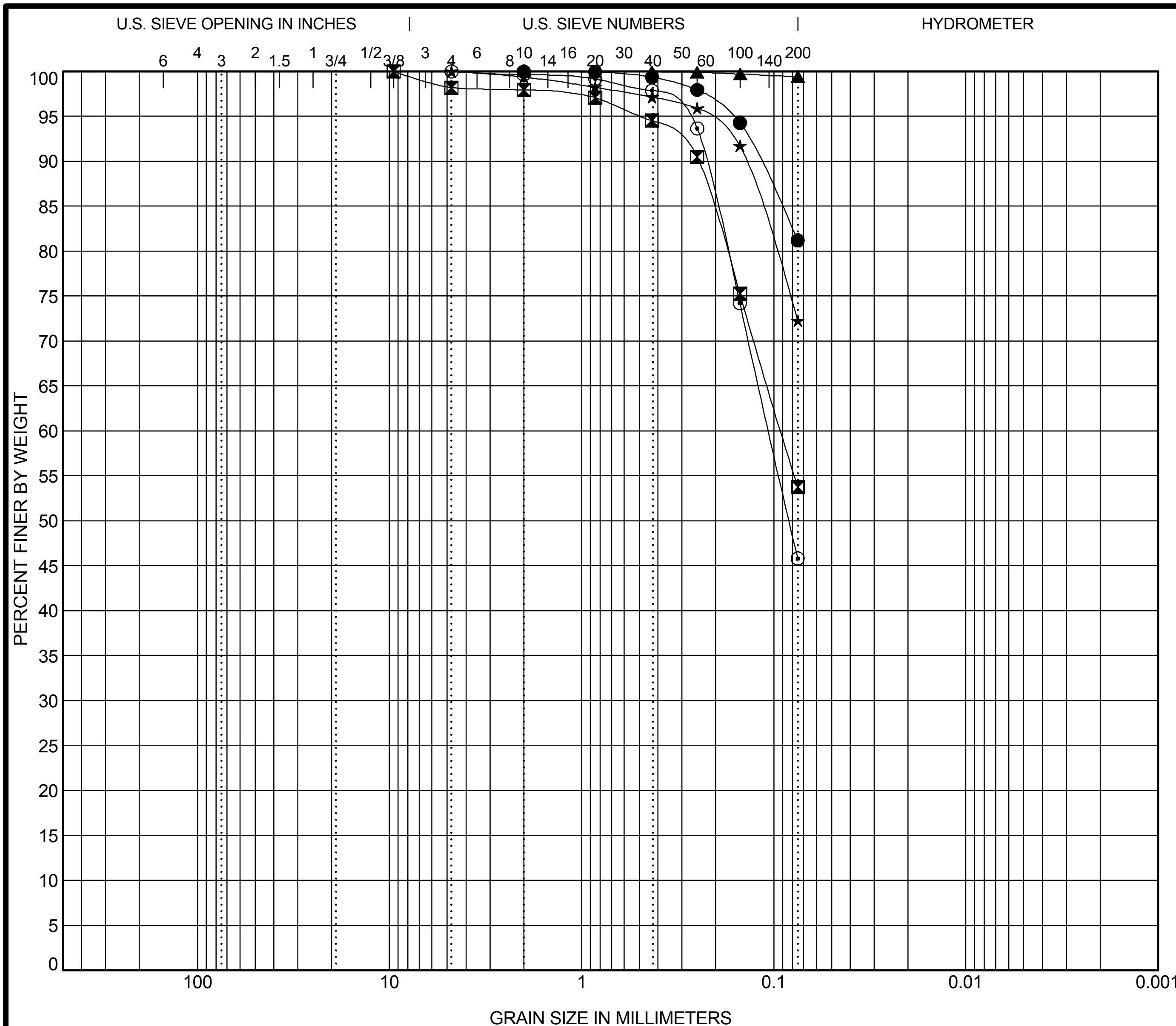

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	**B-31**	**100**	**ELASTIC SILT with SAND MH**	**50**	**32**	**18**		
⧗	**B-33**	**6**						
▲	**B-33**	**23.5**	**ELASTIC SILT MH**	**78**	**58**	**20**		
★	**B-33**	**48.5**						
⊙	**B-33**	**63.5**						

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-31**	**100**	**2**				**0.0**	**18.8**	**81.2**	
⧗	**B-33**	**6**	**9.5**	**0.092**			**1.8**	**44.4**	**53.8**	
▲	**B-33**	**23.5**	**0.43**				**0.0**	**0.6**	**99.4**	
★	**B-33**	**48.5**	**4.75**				**0.0**	**27.7**	**72.3**	
⊙	**B-33**	**63.5**	**4.75**	**0.106**			**0.0**	**54.2**	**45.8**	

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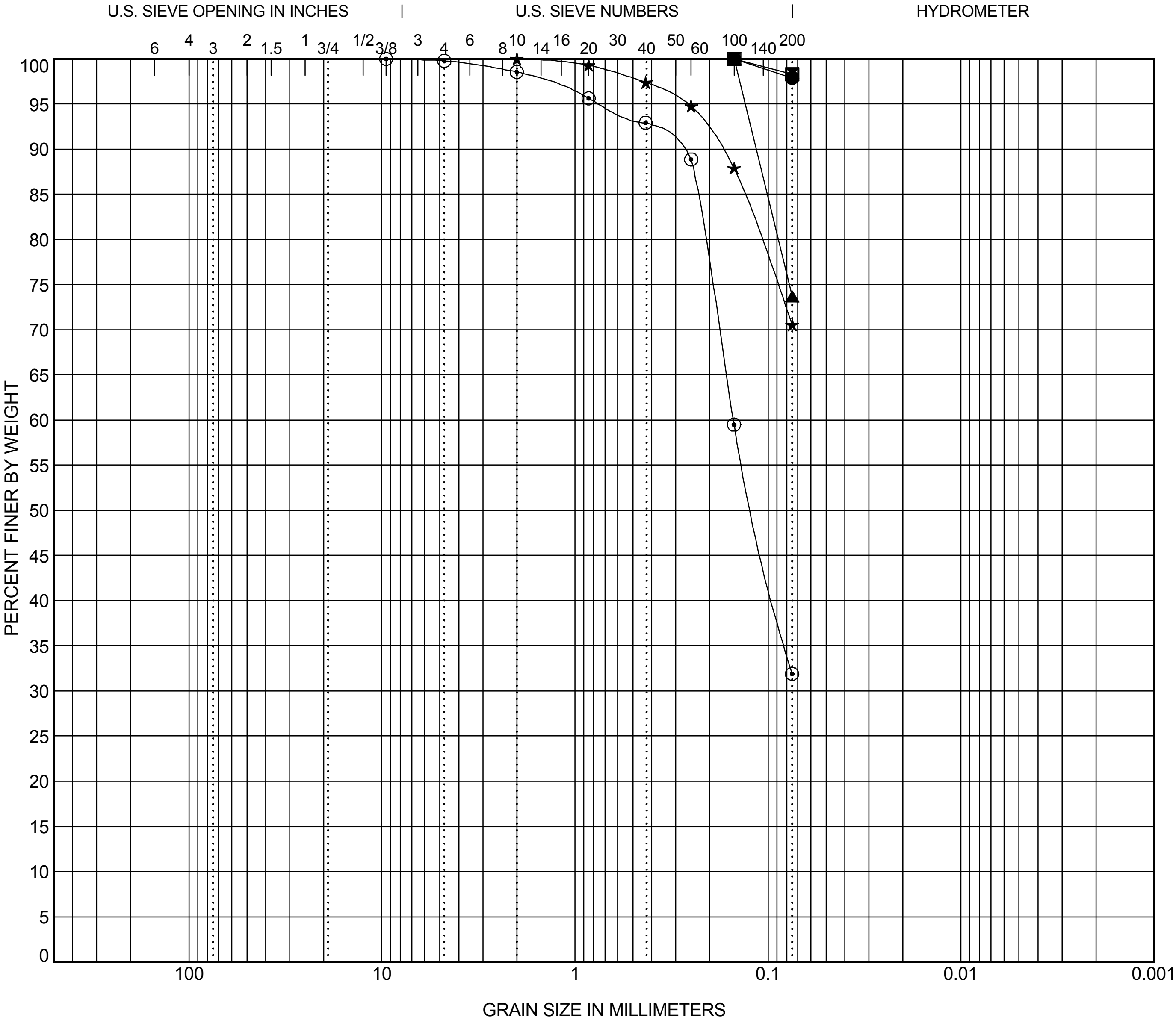

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-33A	20	ELASTIC SILT MH	152	66	86		
⊠	B-33A	30	FAT CLAY CH	141	43	98		
▲	B-33A	50	ELASTIC SILT with SAND MH	118	50	68		
★	B-37	5	ELASTIC SILT with SAND MH	57	38	19		
⊙	B-37	12.5	SILTY SAND SM	26	24	2		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-33A	20	0.15				0.0	2.1	97.9	
⊠	B-33A	30	0.15				0.0	1.7	98.3	
▲	B-33A	50	0.15				0.0	26.3	73.7	
★	B-37	5	2				0.0	29.4	70.6	
⊙	B-37	12.5	9.5	0.151			0.2	67.9	31.9	

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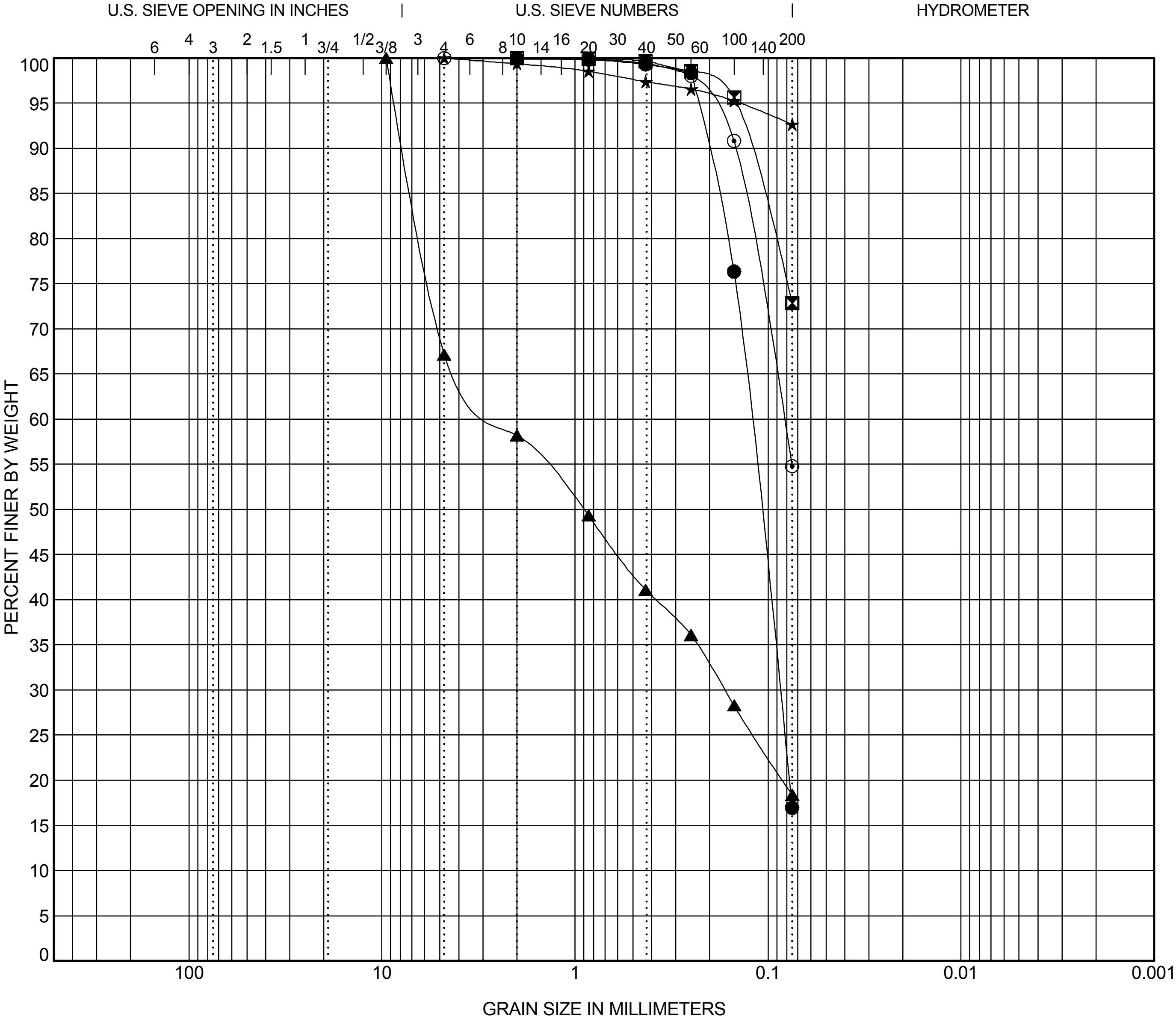

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-37	17.5	**SILTY SAND SM**	**NP**	**NP**	**NP**		
⊠	B-37	97.5	**SILT with SAND ML**	**NP**	**NP**	**NP**		
▲	B-39	8.5						
★	B-39	23.5	**ELASTIC SILT MH**	**70**	**47**	**23**		
⊙	B-39	43.5	**SANDY SILT ML**	**41**	**32**	**9**		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-37	17.5	**2**	**0.124**	**0.087**		**0.0**	**83.0**	**16.9**	
⊠	B-37	97.5	**2**				**0.0**	**27.1**	**72.9**	
▲	B-39	8.5	**9.5**	**2.376**	**0.168**		**32.8**	**48.7**	**18.4**	
★	B-39	23.5	**4.75**				**0.0**	**7.3**	**92.7**	
⊙	B-39	43.5	**4.75**	**0.083**			**0.0**	**45.2**	**54.8**	

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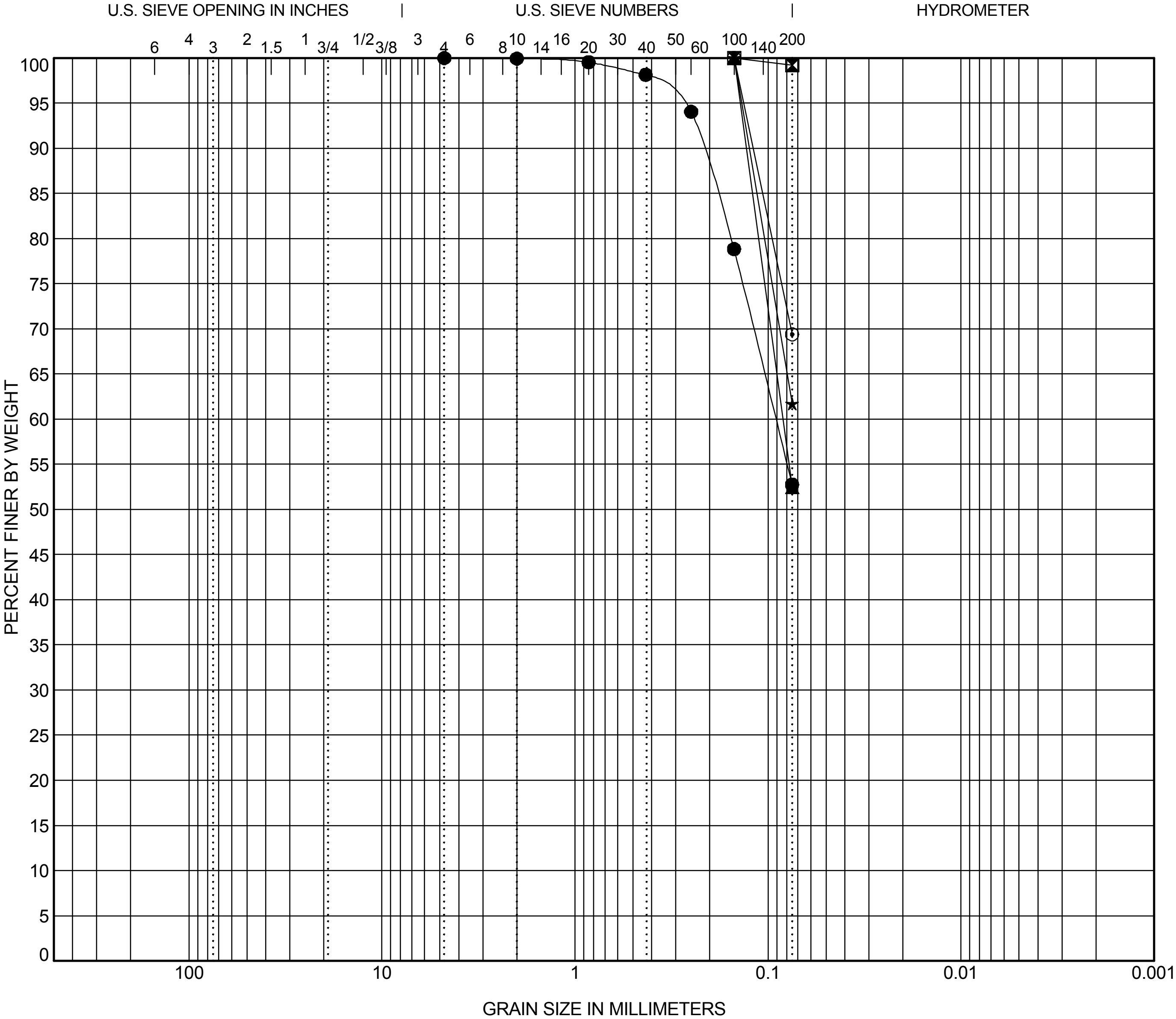

Specimen Identification		Classification	LL	PL	PI	Cc	Cu
● B-39	63.5						
⧗ B-39A	15	**FAT CLAY CH**	**149**	**43**	**106**		
▲ B-39A	28	**SANDY ELASTIC SILT MH**	**149**	**64**	**85**		
★ B-3A	26	**SANDY FAT CLAY CH**	**73**	**20**	**53**		
⊙ B-3A	38	**SANDY FAT CLAY CH**	**82**	**23**	**59**		

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● B-39	63.5	**4.75**	**0.091**			**0.0**	**47.2**	**52.8**	
⧗ B-39A	15	**0.15**				**0.0**	**0.8**	**99.2**	
▲ B-39A	28	**0.15**	**0.084**			**0.0**	**47.6**	**52.4**	
★ B-3A	26	**0.15**				**0.0**	**38.3**	**61.7**	
⊙ B-3A	38	**0.15**				**0.0**	**30.6**	**69.4**	

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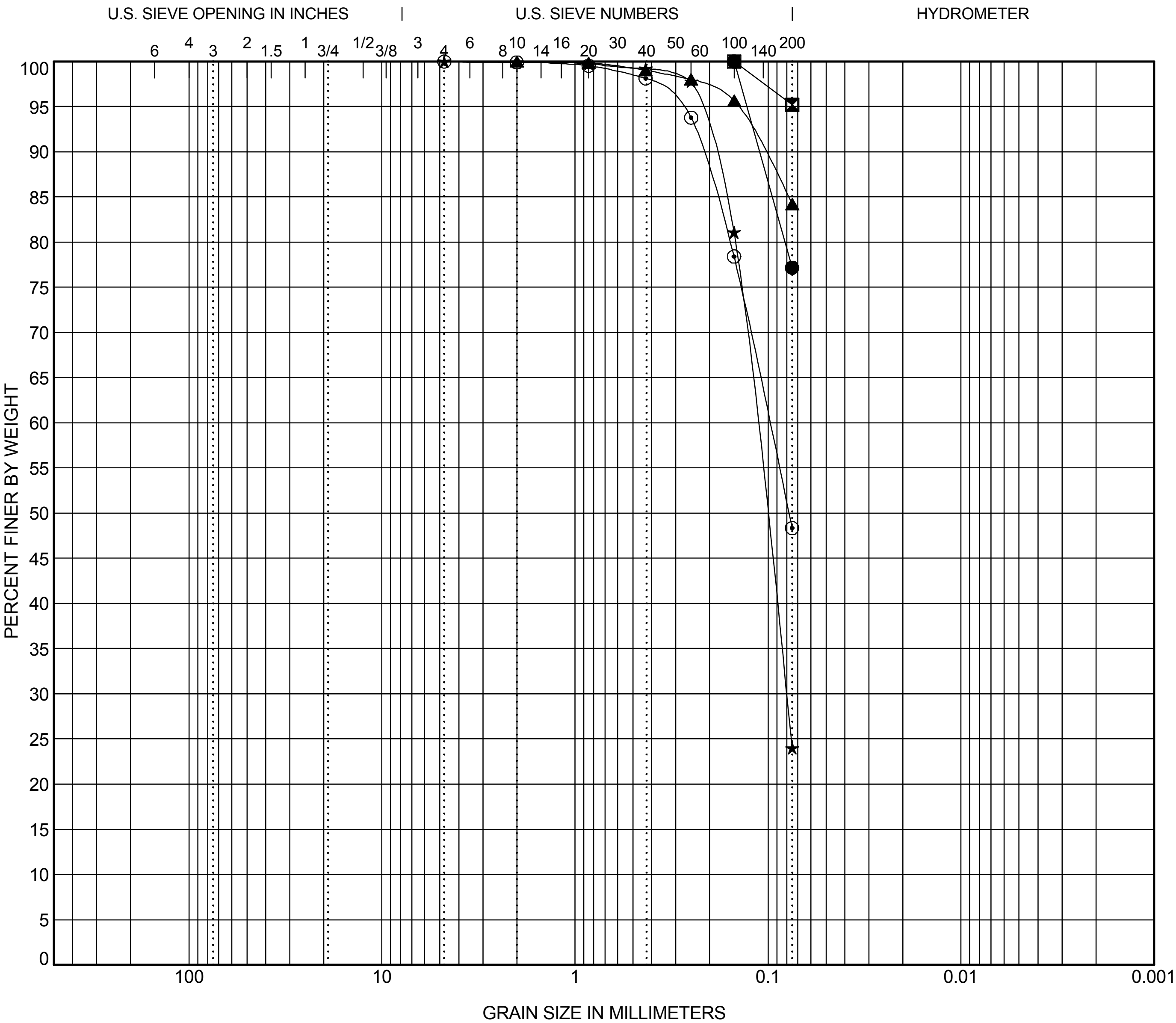

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification	LL	PL	PI	Cc	Cu
● B-40A	23	**FAT CLAY with SAND CH**	98	35	63		
⊠ B-40A	38	**FAT CLAY CH**	102	38	64		
▲ B-42 Alt1	2.5						
★ B-42 Alt1	20						
⊙ B-42 Alt1	55						

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● B-40A	23	0.15				0.0	22.8	77.2	
⊠ B-40A	38	0.15				0.0	4.8	95.2	
▲ B-42 Alt1	2.5	2				0.0	15.8	84.2	
★ B-42 Alt1	20	4.75	0.116	0.081		0.0	76.0	24.0	
⊙ B-42 Alt1	55	4.75	0.098			0.0	51.7	48.3	

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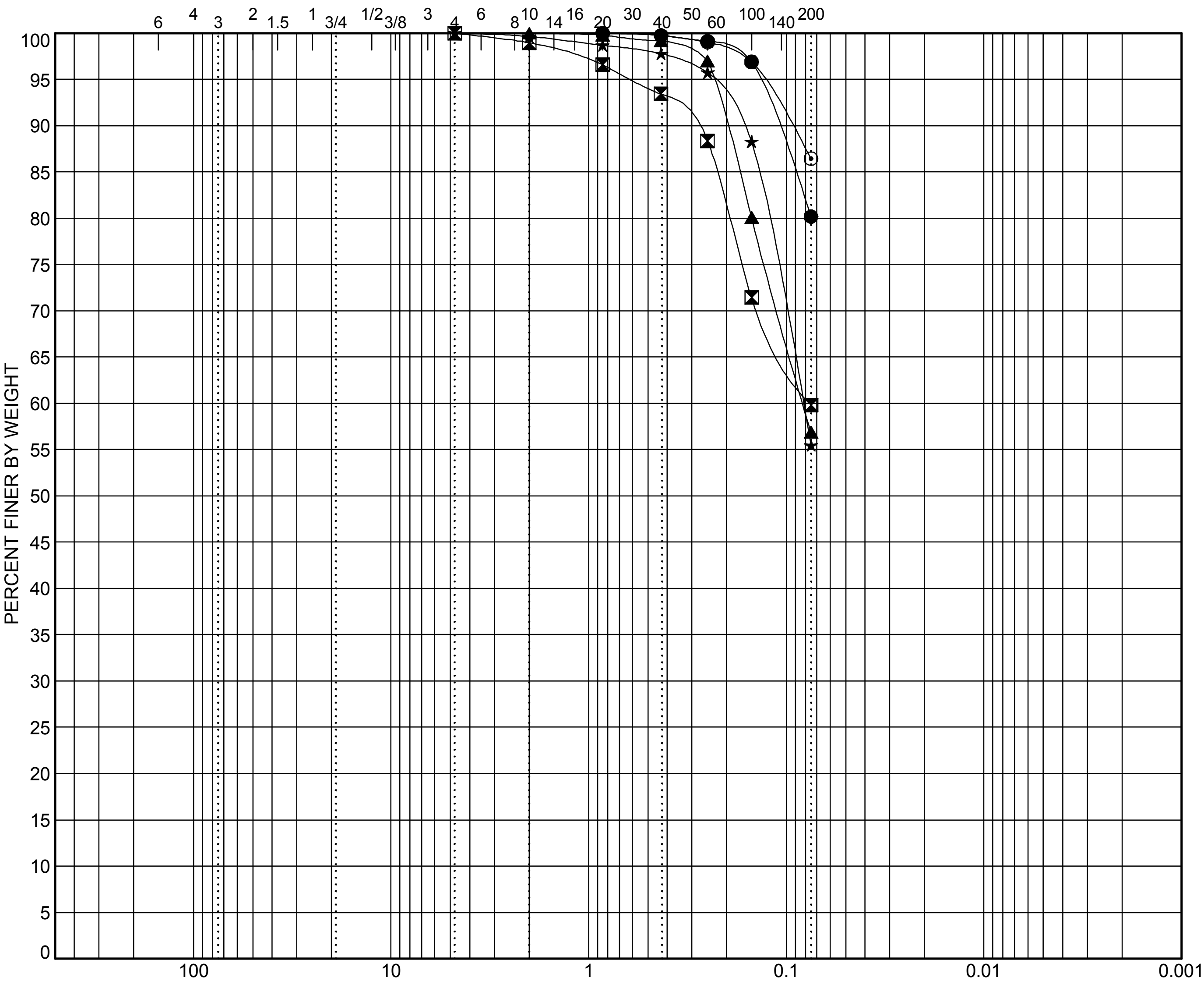

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-42 Alt1	80						
⊠	B-43 Alt1	5						
▲	B-43 Alt1	15	SANDY SILT ML	30	25	5		
★	B-43 Alt1	50						
⊙	B-43 Alt1	100						

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-42 Alt1	80	0.85				0.0	19.8	80.2	
⊠	B-43 Alt1	5	4.75	0.076			0.0	40.2	59.8	
▲	B-43 Alt1	15	2	0.082			0.0	43.1	56.9	
★	B-43 Alt1	50	4.75	0.083			0.0	44.5	55.5	
⊙	B-43 Alt1	100	0.85				0.0	13.5	86.5	

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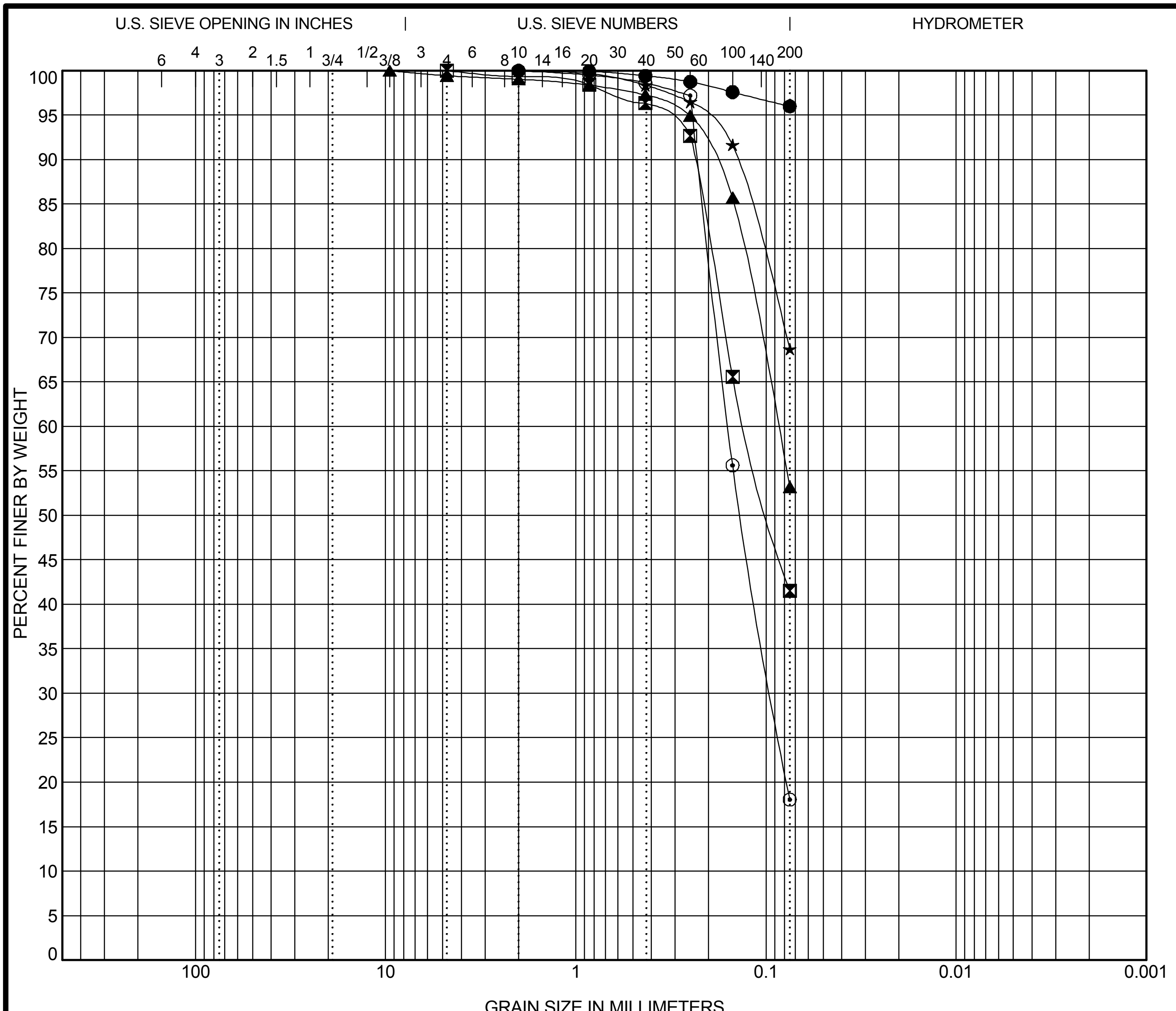

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification	LL	PL	PI	Cc	Cu
● B-43 Alt2	5						
⧗ B-43 Alt2	15	**SILTY SAND SM**	**30**	**25**	**5**		
▲ B-43 Alt2	40						
★ B-43 Alt2	65						
⊙ B-46	10	**SILTY SAND SM**	**NP**	**NP**	**NP**		

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● B-43 Alt2	5	**2**				**0.0**	**4.0**	**96.0**	
⧗ B-43 Alt2	15	**4.75**	**0.128**			**0.0**	**58.5**	**41.5**	
▲ B-43 Alt2	40	**9.5**	**0.087**			**0.6**	**46.3**	**53.2**	
★ B-43 Alt2	65	**2**				**0.0**	**31.3**	**68.7**	
⊙ B-46	10	**2**	**0.158**	**0.094**		**0.0**	**82.0**	**18.0**	

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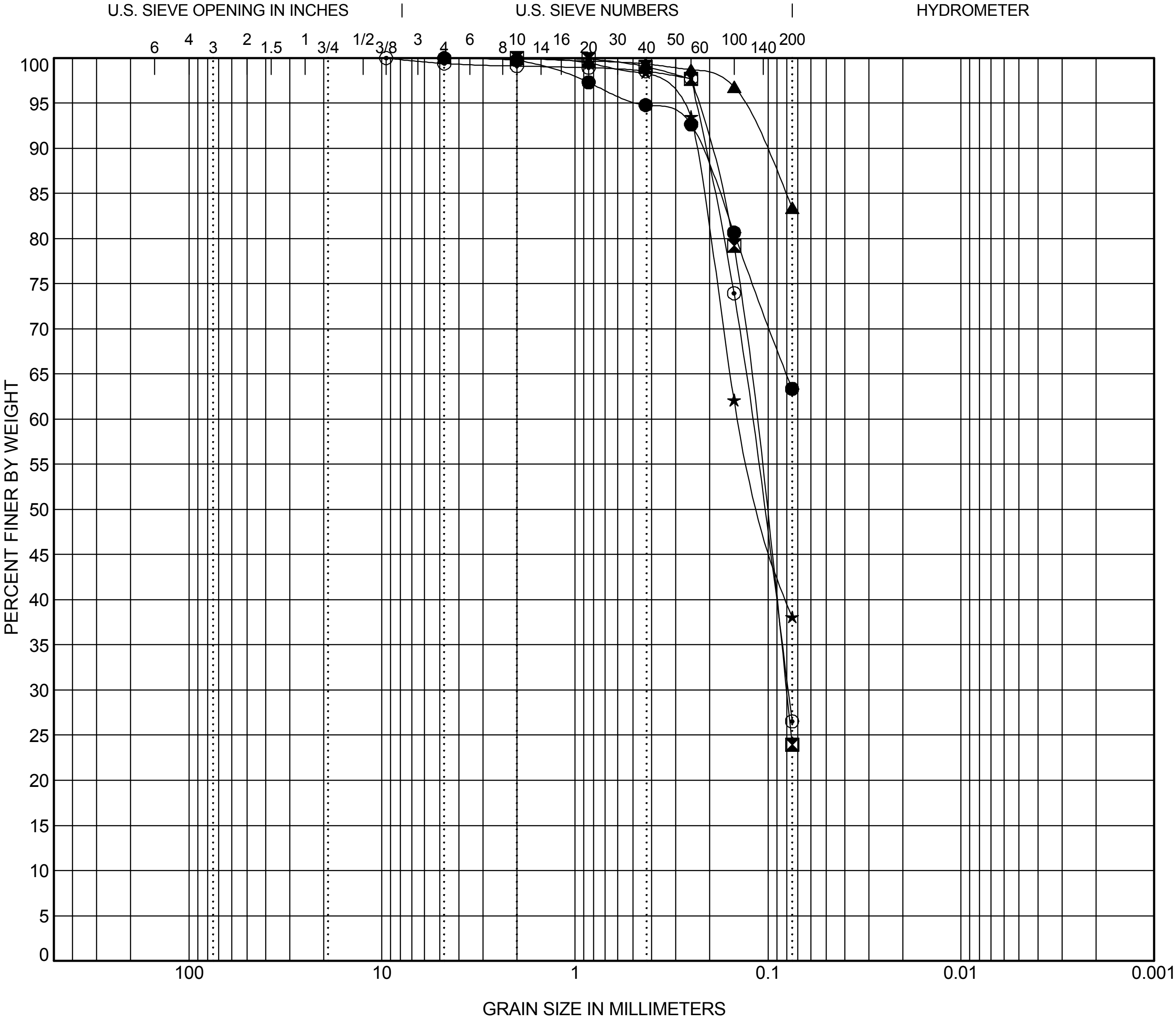
Number: 1131-08-554



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-46	20	**SANDY LEAN CLAY CL**	34	23	11		
⊠	B-46	30	**SILTY SAND SM**	NP	NP	NP		
▲	B-46	40	**SILT with SAND ML**	NP	NP	NP		
★	B-47	8.5	**SILTY, CLAYEY SAND SC-SM**	24	20	4		
⊙	B-47	28.5	**SILTY SAND SM**	NP	NP	NP		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-46	20	4.75				0.0	36.6	63.4	
⊠	B-46	30	2	0.118	0.081		0.0	76.0	24.0	
▲	B-46	40	4.75				0.0	16.6	83.4	
★	B-47	8.5	2	0.141			0.0	61.9	38.1	
⊙	B-47	28.5	9.5	0.122	0.079		0.6	72.9	26.5	

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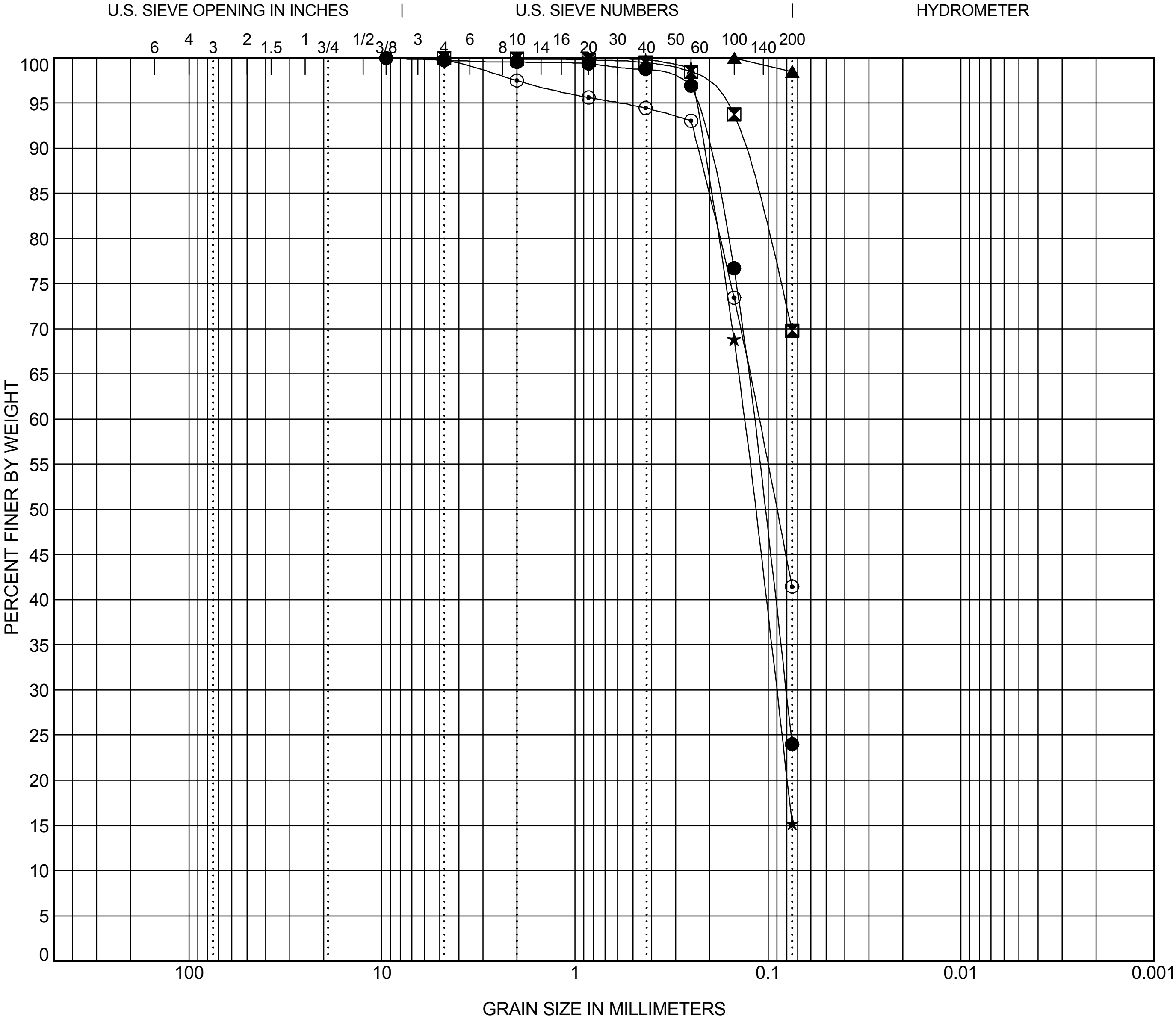

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-47	38.5	SILTY SAND SM	NP	NP	NP		
⊠	B-47	43.5	SANDY SILT ML	43	33	10		
▲	B-47A	24	FAT CLAY CH	81	19	62		
★	B-50	6	SILTY SAND SM	NP	NP	NP		
⊙	B-50	13.5	SILTY SAND SM	NP	NP	NP		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-47	38.5	9.5	0.12	0.081		0.2	75.8	24.0	
⊠	B-47	43.5	4.75				0.0	30.2	69.8	
▲	B-47A	24	0.15				0.0	1.5	98.5	
★	B-50	6	0.85	0.134	0.091		0.0	84.8	15.2	
⊙	B-50	13.5	9.5	0.112			0.2	58.3	41.4	

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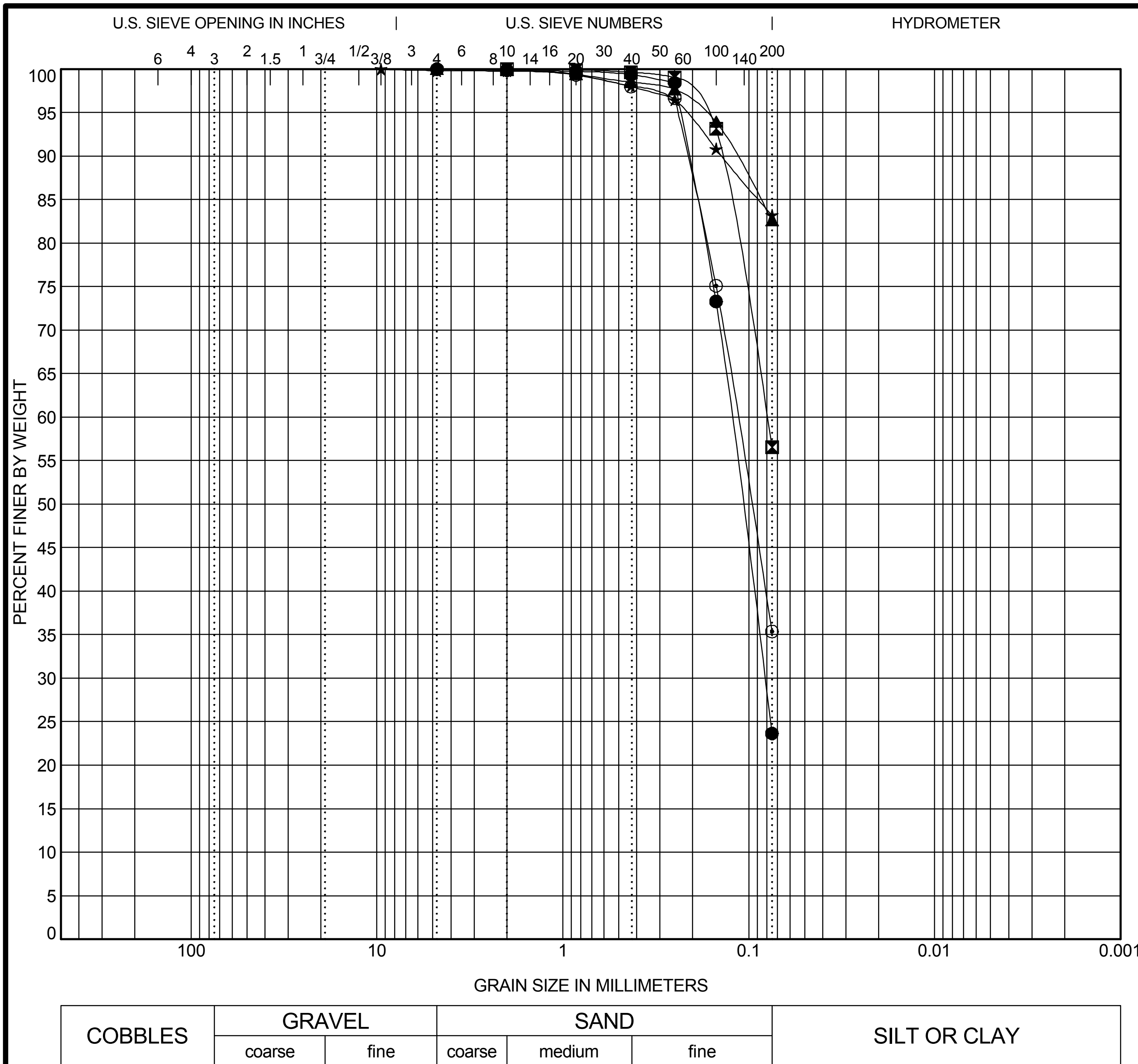

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-50	33.5	**SILTY SAND SM**	**NP**	**NP**	**NP**		
⊠	B-50	43.5	**SANDY SILT ML**	**44**	**28**	**16**		
▲	B-51 Alt1	10	**SILT with SAND ML**	**NP**	**NP**	**NP**		
★	B-51 Alt1	15	**FAT CLAY with SAND CH**	**54**	**28**	**26**		
⊙	B-51 Alt1	25	**SILTY SAND SM**	**NP**	**NP**	**NP**		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-50	33.5	**4.75**	**0.125**	**0.082**		**0.0**	**76.4**	**23.6**	
⊠	B-50	43.5	**2**	**0.08**			**0.0**	**43.5**	**56.5**	
▲	B-51 Alt1	10	**4.75**				**0.0**	**17.4**	**82.6**	
★	B-51 Alt1	15	**9.5**				**0.2**	**16.6**	**83.2**	
⊙	B-51 Alt1	25	**4.75**	**0.115**			**0.0**	**64.6**	**35.4**	

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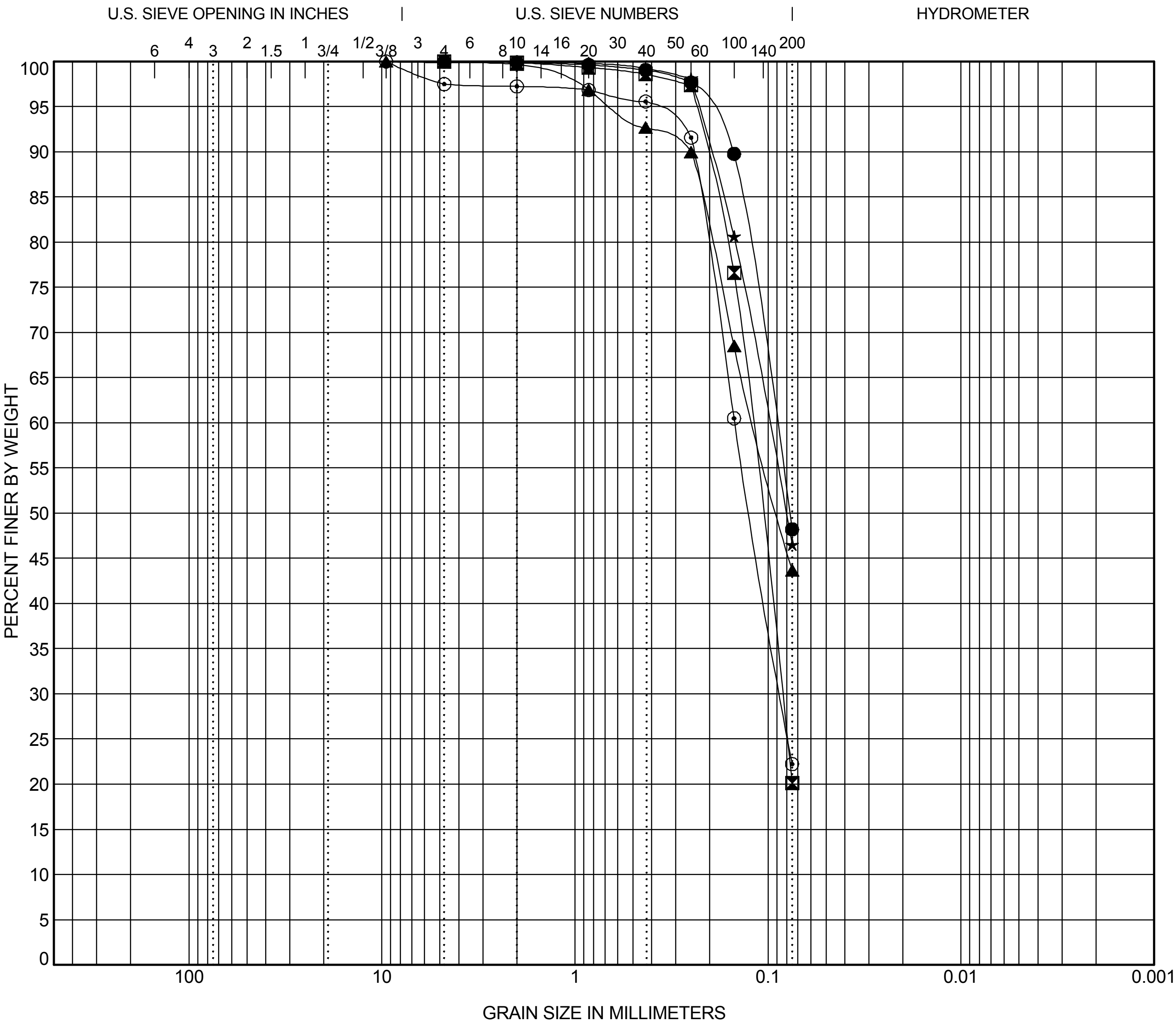

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-51 Alt1	45	SILTY SAND SM	NP	NP	NP		
⧗	B-52	15	SILTY SAND SM	NP	NP	NP		
▲	B-52	25	CLAYEY SAND SC	27	16	11		
★	B-52	35	SILTY SAND SM	NP	NP	NP		
⊙	B-52	45	SILTY SAND SM	NP	NP	NP		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-51 Alt1	45	4.75	0.091			0.0	51.8	48.2	
⧗	B-52	15	4.75	0.122	0.085		0.0	79.9	20.1	
▲	B-52	25	9.5	0.118			0.1	56.2	43.7	
★	B-52	35	2	0.099			0.0	53.4	46.5	
⊙	B-52	45	9.5	0.149	0.086		2.5	75.3	22.2	

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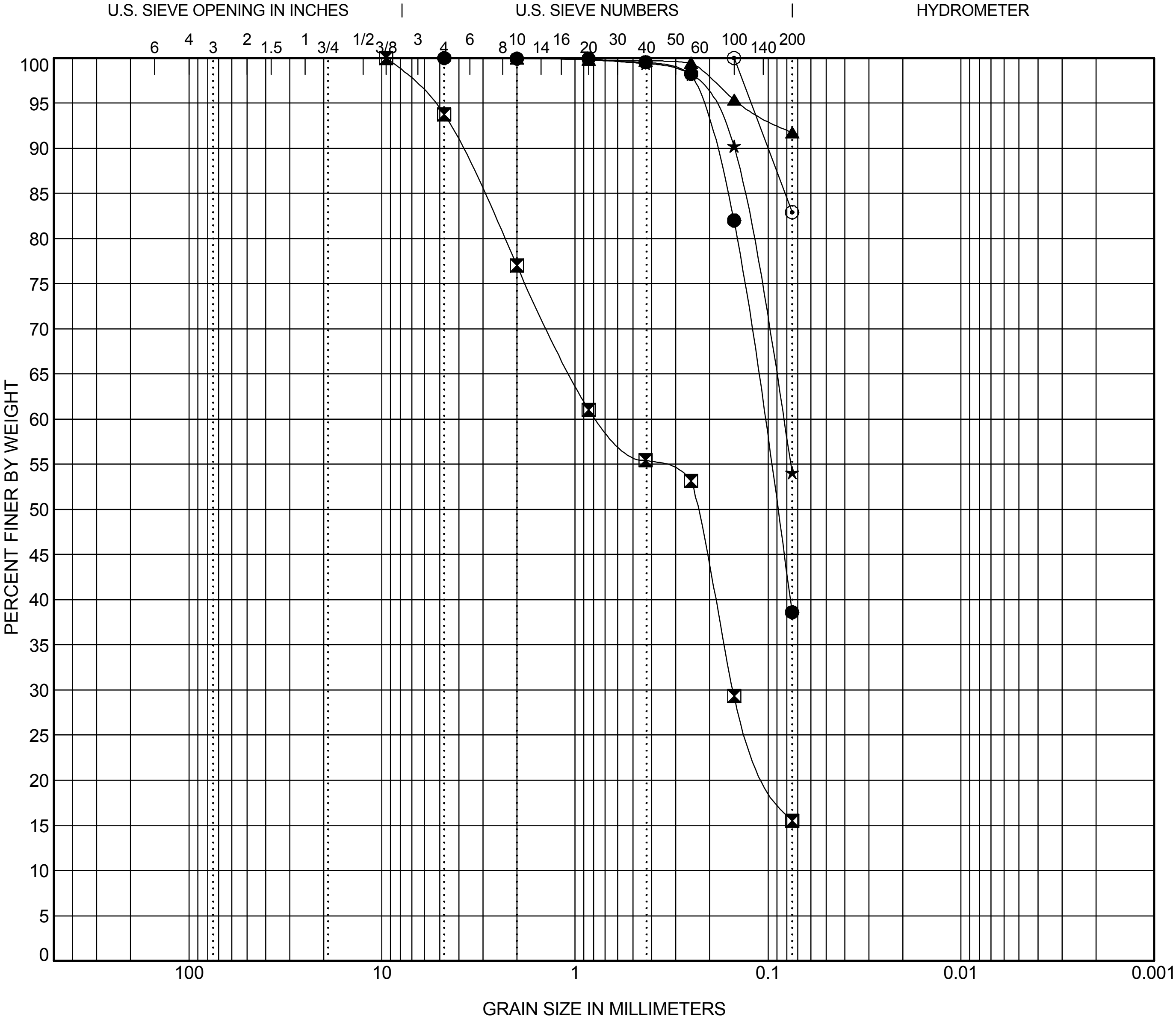

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification			Classification	LL	PL	PI	Cc	Cu
●	B-53	5	**SILTY, CLAYEY SAND SC-SM**	27	21	6		
⊠	B-53	25						
▲	B-53	40	**ELASTIC SILT MH**	52	34	18		
★	B-53	48.5						
⊙	B-53A	32	**FAT CLAY with SAND CH**	81	31	50		

Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-53	5	4.75	0.106			0.0	61.4	38.6	
⊠	B-53	25	9.5	0.748	0.152		6.2	78.2	15.5	
▲	B-53	40	2				0.0	8.2	91.8	
★	B-53	48.5	2	0.084			0.0	45.9	54.1	
⊙	B-53A	32	0.15				0.0	17.1	82.9	

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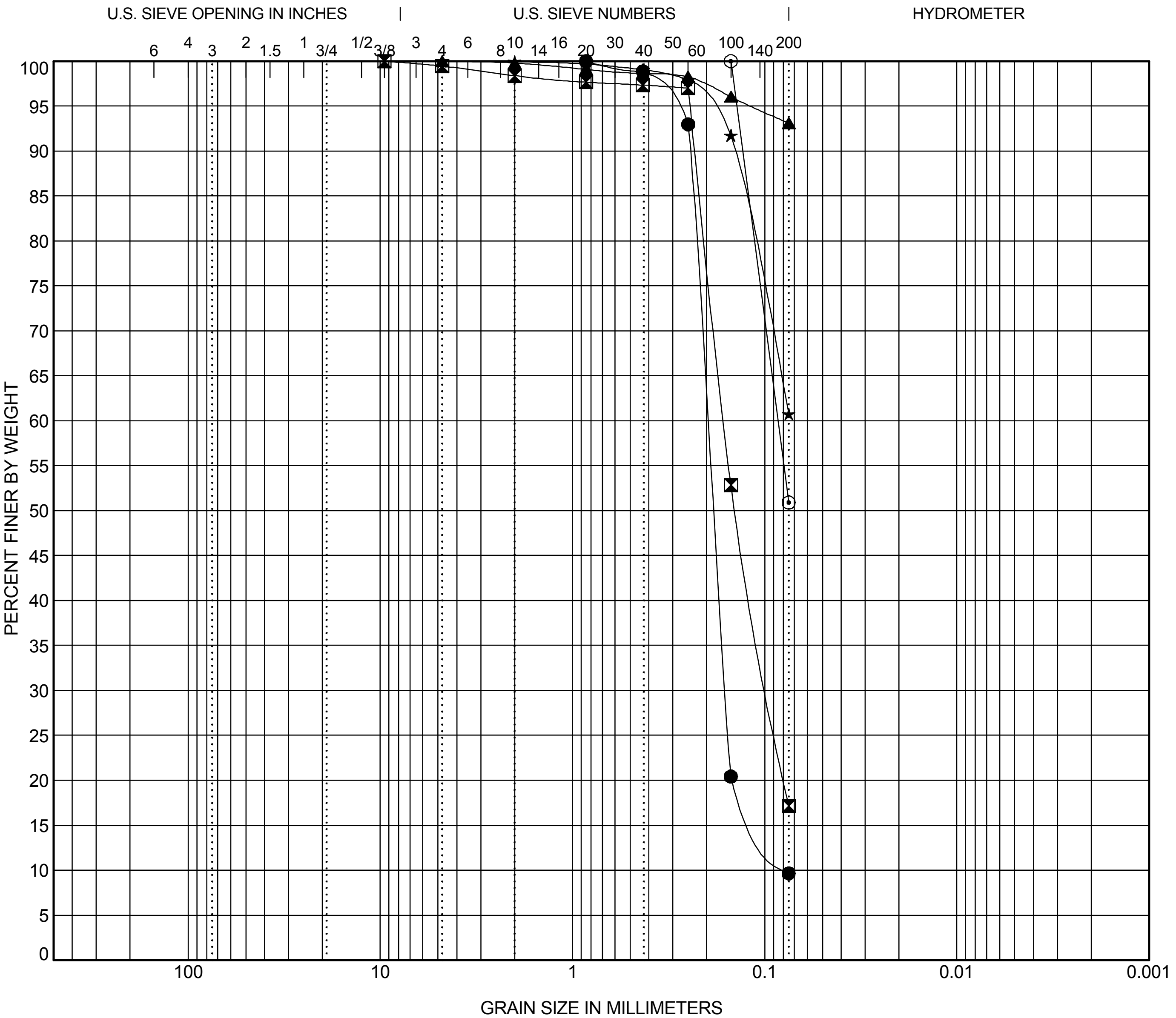

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-55	7.5					1.69	2.58
⧗	B-55	15						
▲	B-55	35	ELASTIC SILT MH	76	37	39		
★	B-55	48.5						
⊙	B-55A	24	SANDY LEAN CLAY CL	39	24	15		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-55	7.5	0.85	0.198	0.16	0.077	0.0	90.3	9.6	
⧗	B-55	15	9.5	0.163	0.096		0.5	82.3	17.2	
▲	B-55	35	4.75				0.0	6.9	93.1	
★	B-55	48.5	4.75				0.0	39.2	60.8	
⊙	B-55A	24	0.15	0.085			0.0	49.1	50.9	

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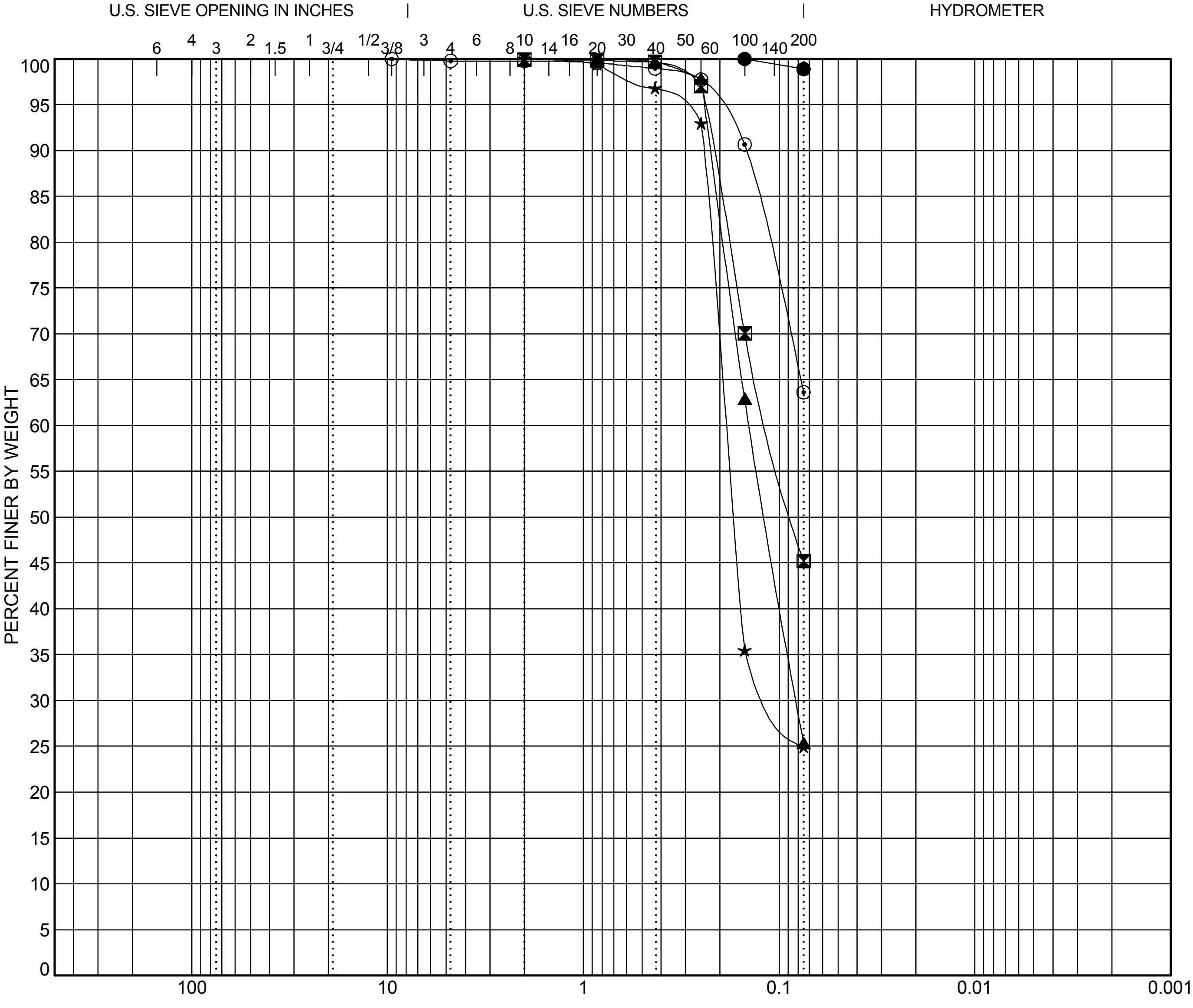

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification			Classification	LL	PL	PI	Cc	Cu
●	**B-55B**	**35**	**FAT CLAY CH**	**104**	**30**	**74**		
⊠	**B-65**	**2.5**	**CLAYEY SAND SC**	**29**	**20**	**9**		
▲	**B-65**	**15**	**SILTY SAND SM**	**NP**	**NP**	**NP**		
★	**B-65**	**30**	**SILTY SAND SM**	**NP**	**NP**	**NP**		
⊙	**B-65**	**45**	**SANDY SILT ML**	**43**	**28**	**15**		

Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-55B**	**35**	**0.15**				**0.0**	**1.1**	**98.9**	
⊠	**B-65**	**2.5**	**2**	**0.113**			**0.0**	**54.8**	**45.2**	
▲	**B-65**	**15**	**0.85**	**0.142**	**0.082**		**0.0**	**74.6**	**25.4**	
★	**B-65**	**30**	**2**	**0.186**	**0.105**		**0.0**	**75.1**	**24.9**	
⊙	**B-65**	**45**	**9.5**				**0.2**	**36.2**	**63.6**	

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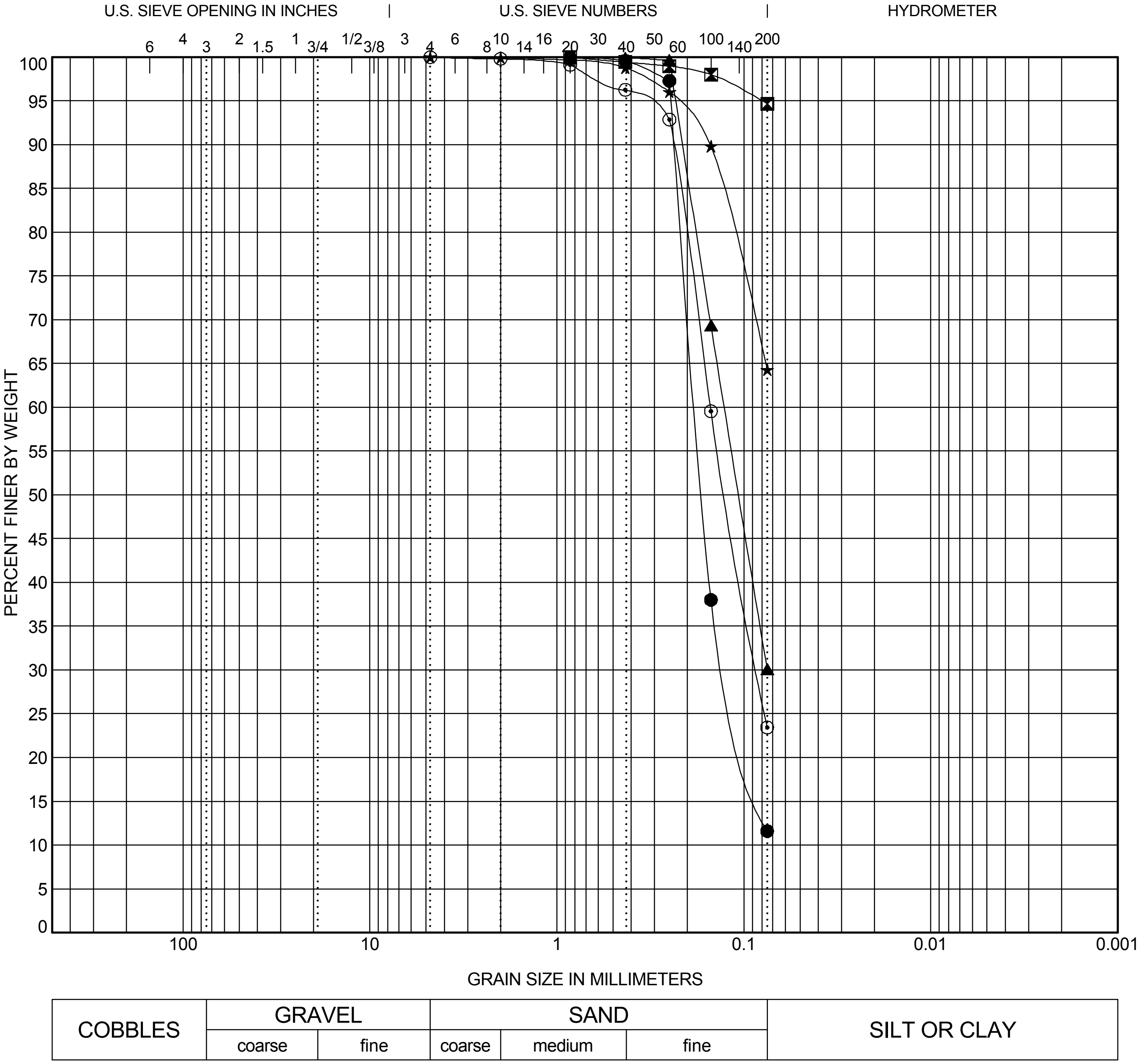

Specimen Identification		Classification	LL	PL	PI	Cc	Cu
● B-66	7.5					1.13	2.52
⧗ B-66	20	ELASTIC SILT MH	69	50	19		
▲ B-66	45	SILTY SAND SM	NP	NP	NP		
★ B-66	75	SANDY SILT ML	43	34	9		
⊙ B-68 Alt1	5						

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● B-66	7.5	0.85	0.181	0.122		0.0	88.4	11.6	
⧗ B-66	20	0.85				0.0	5.3	94.7	
▲ B-66	45	0.85	0.127			0.0	69.9	30.1	
★ B-66	75	4.75				0.0	35.7	64.3	
⊙ B-68 Alt1	5	4.75	0.151	0.085		0.0	76.6	23.4	

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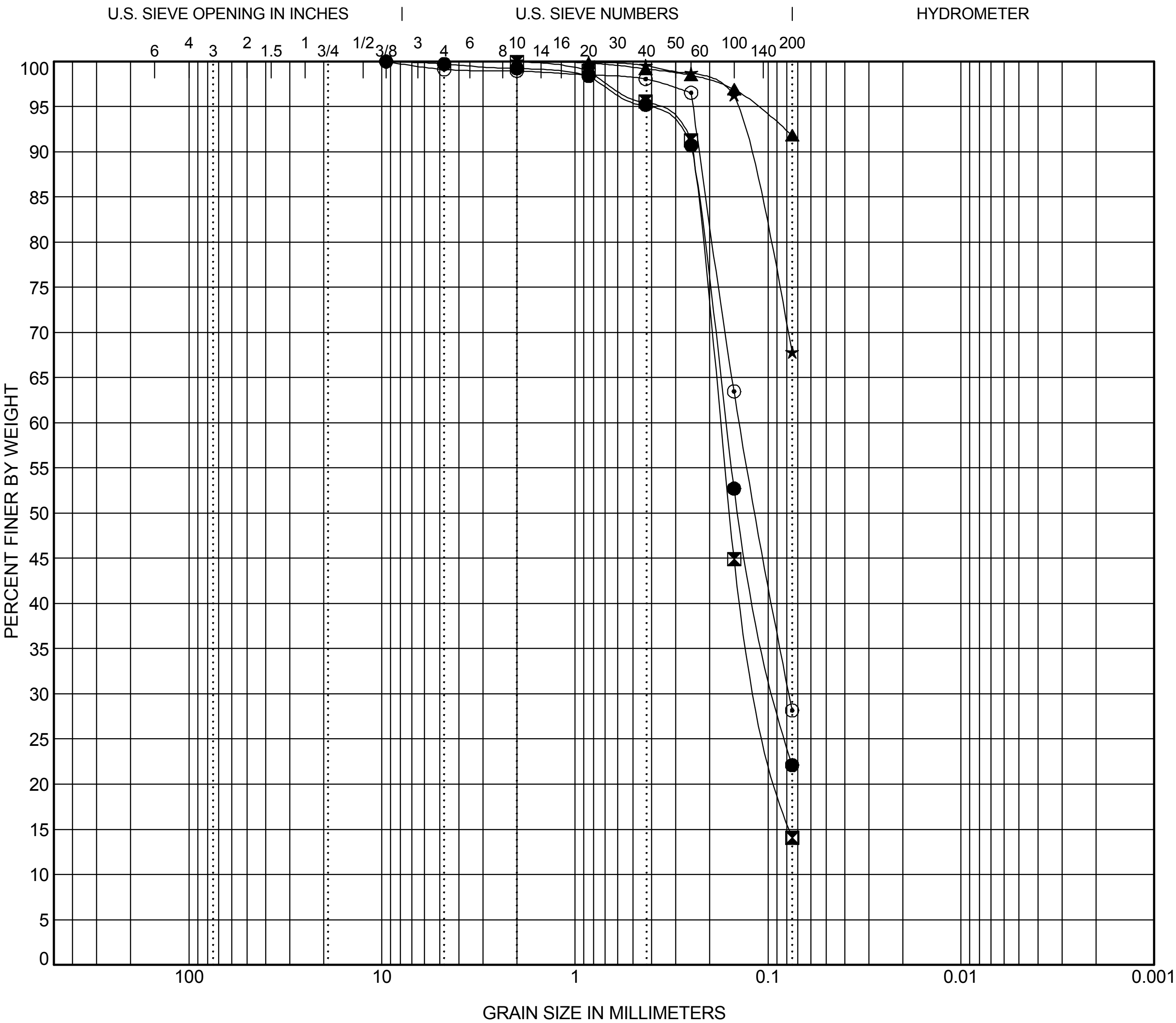

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-68 Alt1	10	SILTY SAND SM	23	20	3		
⊠	B-68 Alt1	15						
▲	B-68 Alt1	25	ELASTIC SILT MH	67	50	17		
★	B-68 Alt1	30	SANDY SILT ML	29	24	5		
⊙	B-68 Alt1	45	SILTY SAND SM	NP	NP	NP		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-68 Alt1	10	9.5	0.165	0.09		0.3	77.6	22.1	
⊠	B-68 Alt1	15	2	0.177	0.107		0.0	85.9	14.1	
▲	B-68 Alt1	25	2				0.0	8.2	91.8	
★	B-68 Alt1	30	2				0.0	32.2	67.8	
⊙	B-68 Alt1	45	9.5	0.14	0.078		0.9	71.0	28.2	

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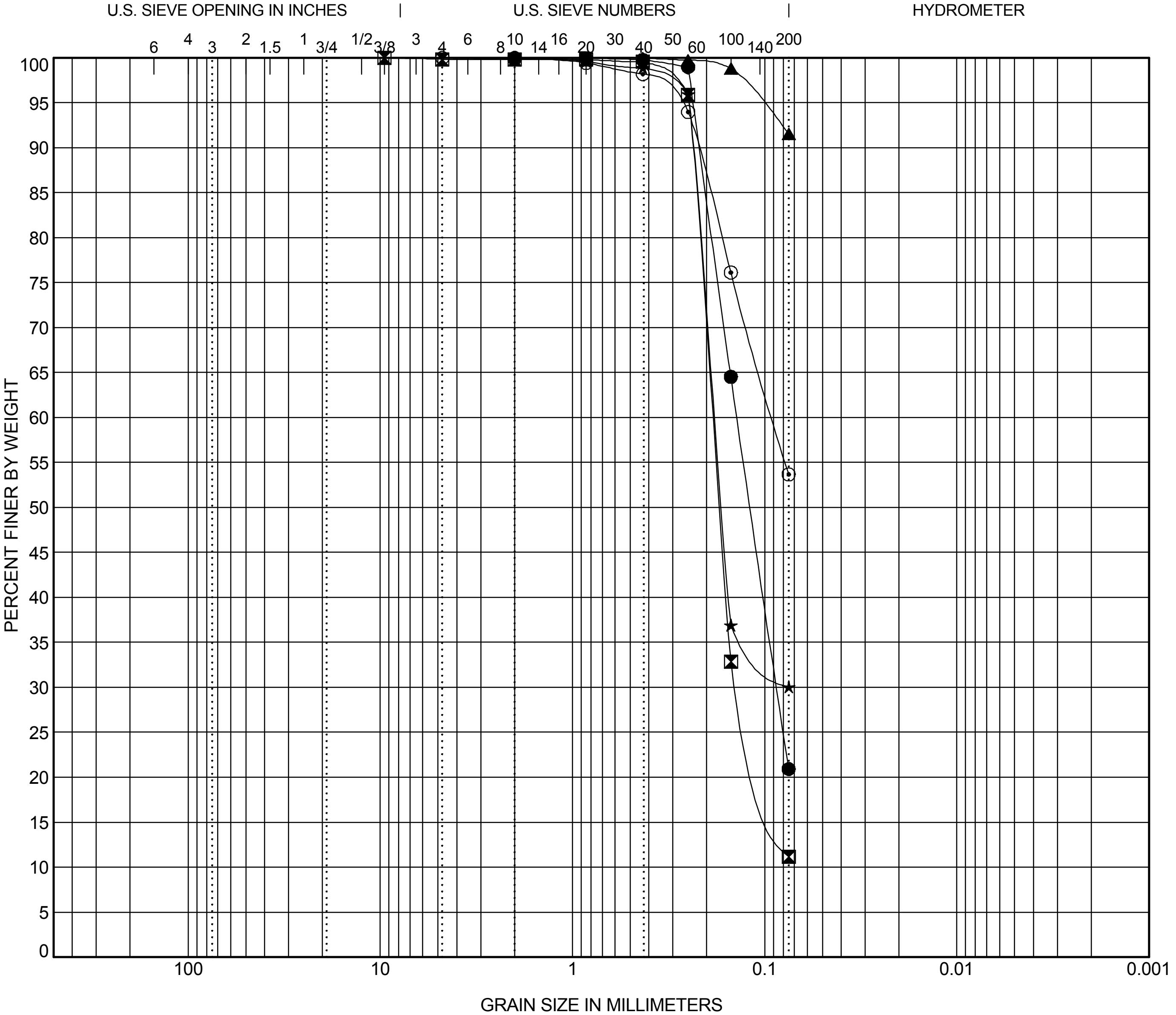

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	**B-68 Alt1**	**55**	**SILTY SAND SM**	**NP**	**NP**	**NP**		
⊠	**B-72**	**5**					**1.39**	**2.59**
▲	**B-72**	**10**	**ELASTIC SILT MH**	**59**	**33**	**26**		
★	**B-72**	**35**						
⊙	**B-72**	**65**	**SANDY SILT ML**	**NP**	**NP**	**NP**		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-68 Alt1**	**55**	**2**	**0.14**	**0.087**		**0.0**	**79.1**	**20.9**	
⊠	**B-72**	**5**	**9.5**	**0.187**	**0.137**		**0.2**	**88.7**	**11.2**	
▲	**B-72**	**10**	**0.43**				**0.0**	**8.5**	**91.5**	
★	**B-72**	**35**	**2**	**0.183**			**0.0**	**70.0**	**30.0**	
⊙	**B-72**	**65**	**4.75**	**0.091**			**0.0**	**46.3**	**53.7**	

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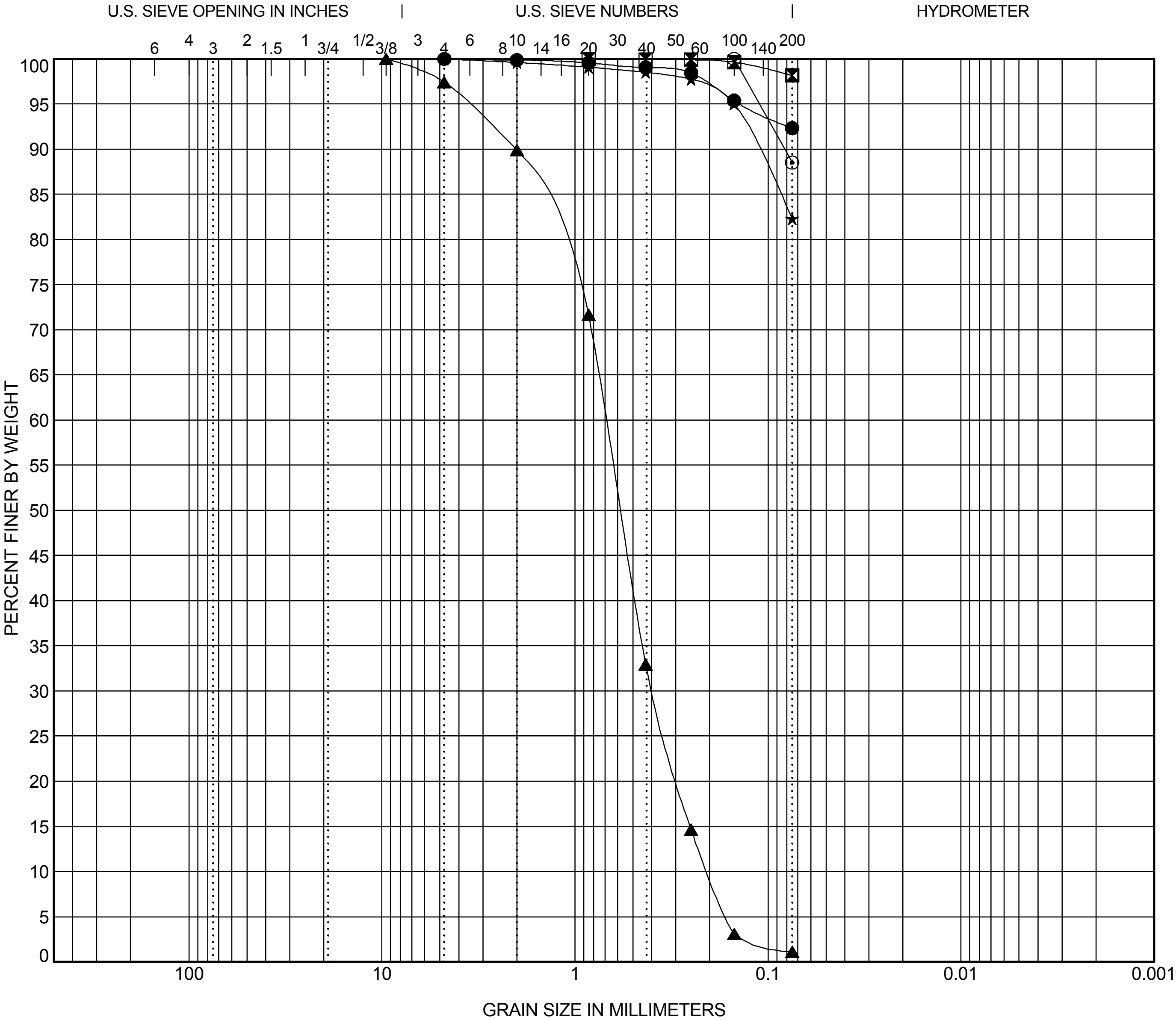

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-74	5						
⧗	B-74	20	**ELASTIC SILT MH**	**65**	**45**	**20**		
▲	B-74	40	**POORLY GRADED SAND SP**	**NP**	**NP**	**NP**	**1.10**	**3.40**
★	B-74	85						
⊙	B-74A	8	**ELASTIC SILT MH**	**86**	**39**	**47**		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-74	5	**4.75**				**0.0**	**7.7**	**92.3**	
⧗	B-74	20	**0.85**				**0.0**	**1.8**	**98.2**	
▲	B-74	40	**9.5**	**0.692**	**0.394**	**0.204**	**2.6**	**96.3**	**1.1**	
★	B-74	85	**4.75**				**0.0**	**17.7**	**82.3**	
⊙	B-74A	8	**0.15**				**0.0**	**11.5**	**88.5**	

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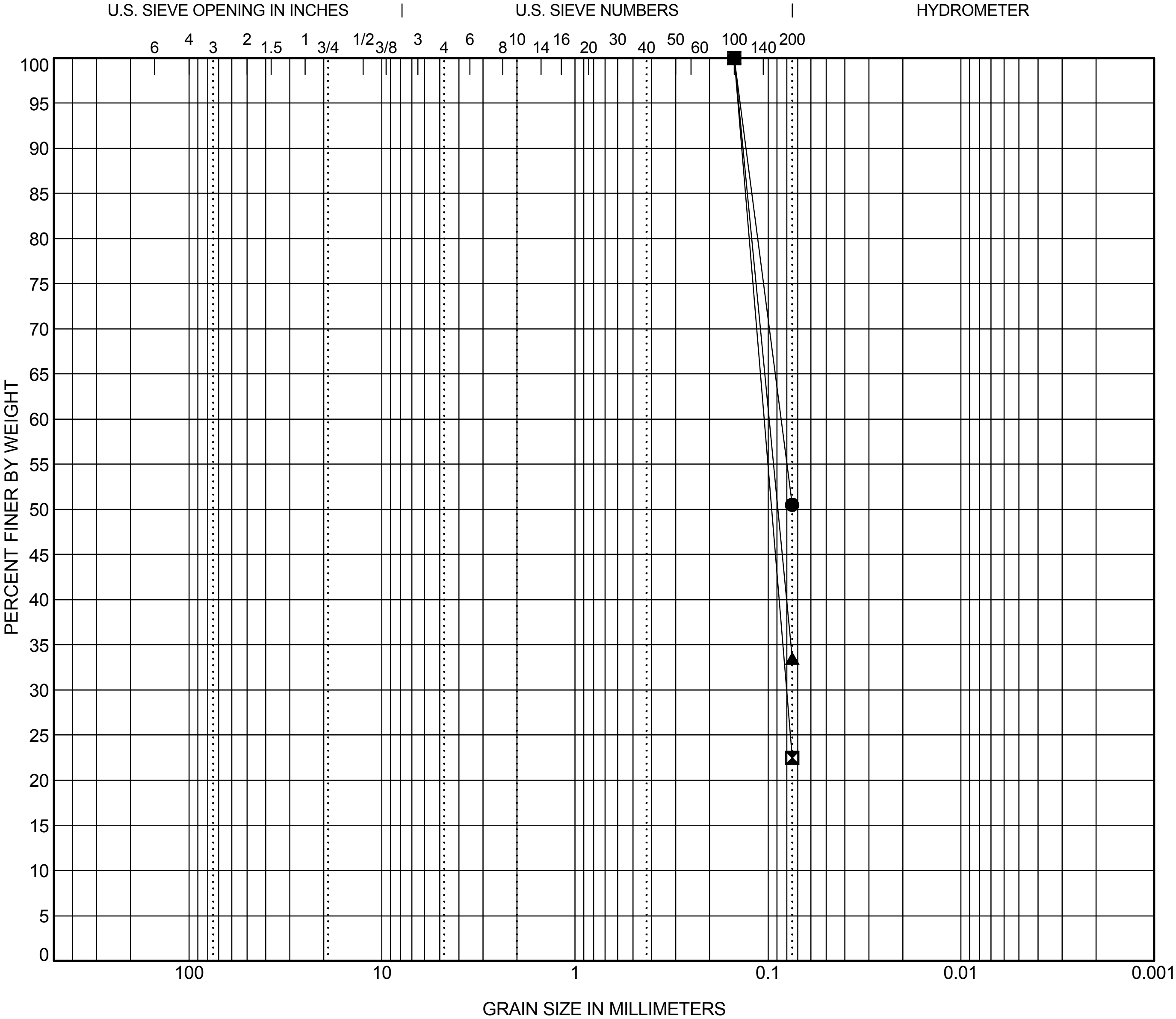

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	**B-74A**	**65**	**SANDY ELASTIC SILT MH**	**59**	**37**	**22**		
☒	**Proctor 1**	**0**	**SILTY SAND SM**	**NP**	**NP**	**NP**		
▲	**Proctor 2**	**0**	**SILTY SAND SM**	**23**	**20**	**3**		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-74A**	**65**	**0.15**	**0.086**			**0.0**	**49.5**	**50.5**	
☒	**Proctor 1**	**0**	**0.15**	**0.105**	**0.08**		**0.0**	**77.5**	**22.5**	
▲	**Proctor 2**	**0**	**0.15**	**0.099**			**0.0**	**66.5**	**33.5**	

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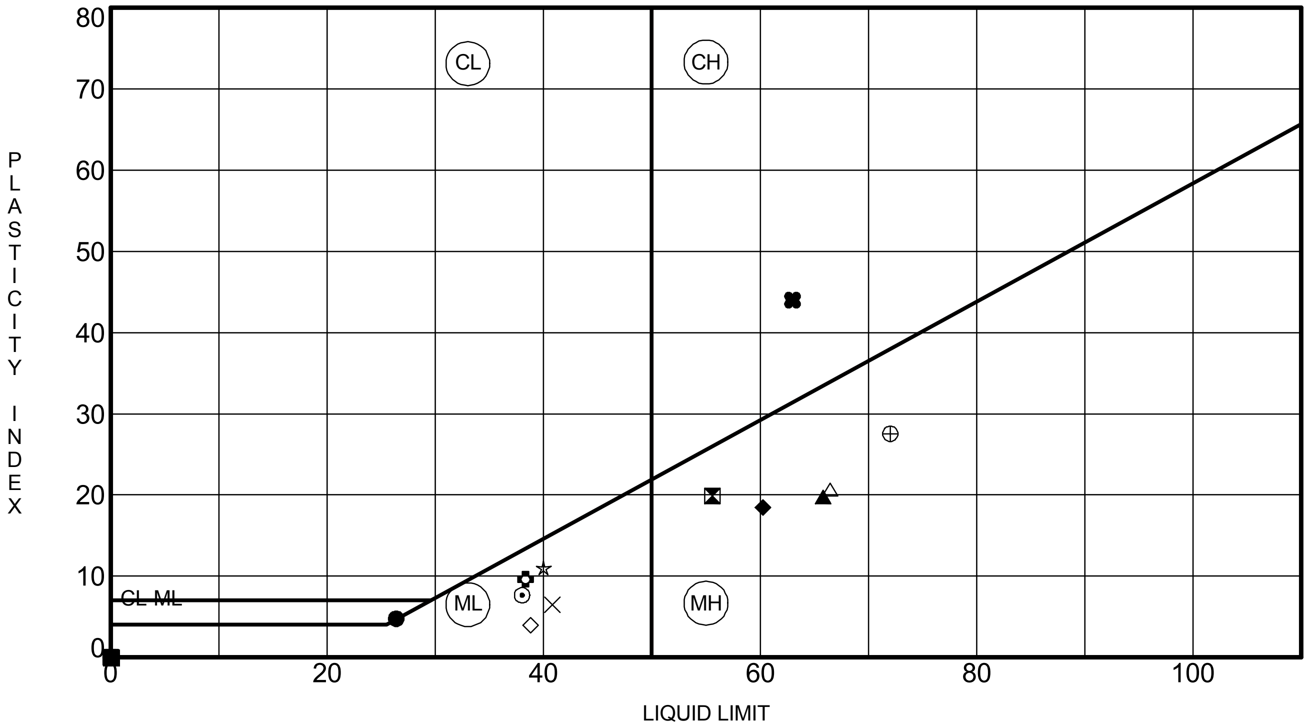

	Specimen Identification		LL	PL	PI	Fines	MC	Classification
●	B-11	8	26	22	4	29	26.8	SILTY SAND SM
⧗	B-11	20	56	36	20	88	90.9	ELASTIC SILT MH
▲	B-11	30	66	46	20	89	96.7	ELASTIC SILT MH
★	B-11	103.5	NP	NP	NP	77	59.0	SILT with SAND ML
⊙	B-16	30	38	30	8	81	69.5	SILT with SAND ML
✿	B-16	50	38	29	9	63	66.4	SANDY SILT ML
○	B-18	23.5	NP	NP	NP		38.1	
△	B-18	33.5	66	46	20		79.7	
⊗	B-19	45	NP	NP	NP		38.2	
⊕	B-2	35	72	44	28	94	88.5	ELASTIC SILT MH
□	B-23 Alt1	8	NP	NP	NP	28	27.2	SILTY SAND SM
◉	B-23 Alt1	20	NP	NP	NP	9	26.1	POORLY GRADED SAND with SILT SP-SM
◕	B-23 Alt1	34	NP	NP	NP	26	35.4	SILTY SAND SM
☆	B-23 Alt1	50	40	29	11	44	34.7	SILTY SAND SM
☋	B-23 Alt1	73.5	NP	NP	NP	50	45.8	SANDY SILT ML
■	B-29 Alt1	7.5	NP	NP	NP	24	46.4	SILTY SAND SM
◆	B-29 Alt1	15	60	42	18	92	135.2	ELASTIC SILT MH
◇	B-29 Alt1	35	39	35	4	70	34.3	SILT with SAND ML
×	B-29 Alt1	65	41	34	7	68	43.6	SANDY SILT ML
✖	B-2A	23	63	19	44	87	94.9	FAT CLAY CH

ATTERBERG LIMITS RESULTS

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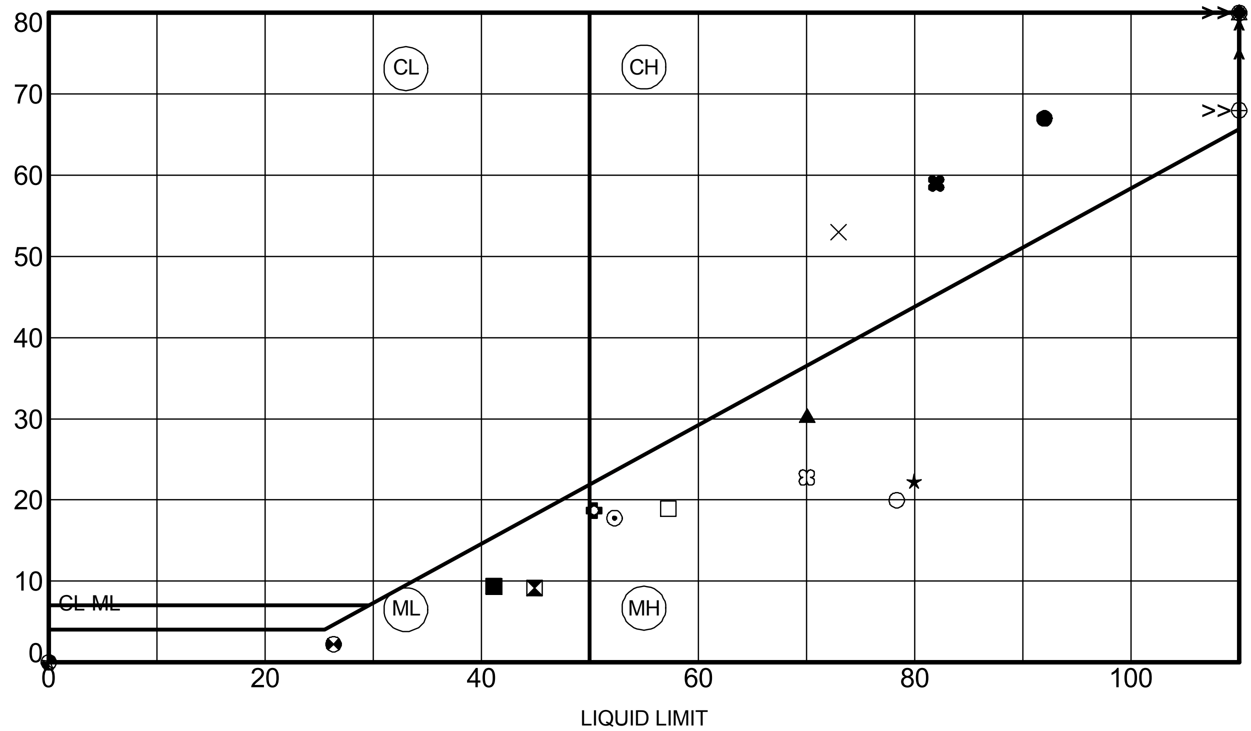
Project: Port Access Road

Location: North Charleston, South Carolina

Number: 1131-08-554



	Specimen Identification		LL	PL	PI	Fines	MC	Classification
●	**B-2A**	**35**	**92**	**25**	**67**	**95**	**91.9**	**FAT CLAY CH**
⧗	**B-3**	**15**	**45**	**36**	**9**	**47**	**47.4**	**SILTY SAND SM**
▲	**B-3**	**30**	**70**	**40**	**30**	**86**	**75.1**	**ELASTIC SILT MH**
★	**B-31**	**10**	**80**	**58**	**22**	**95**	**146.9**	**ELASTIC SILT MH**
⊙	**B-31**	**35**	**52**	**35**	**17**	**80**	**53.1**	**ELASTIC SILT with SAND MH**
✿	**B-31**	**100**	**50**	**32**	**18**	**81**	**49.0**	**ELASTIC SILT with SAND MH**
○	**B-33**	**23.5**	**78**	**58**	**20**	**99**	**162.6**	**ELASTIC SILT MH**
△	**B-33A**	**20**	**152**	**66**	**86**	**98**	**161.3**	**ELASTIC SILT MH**
⊗	**B-33A**	**30**	**141**	**43**	**98**	**98**	**149.1**	**FAT CLAY CH**
⊕	**B-33A**	**50**	**118**	**50**	**68**	**74**	**70.7**	**ELASTIC SILT with SAND MH**
□	**B-37**	**5**	**57**	**38**	**19**	**71**	**141.5**	**ELASTIC SILT with SAND MH**
◉	**B-37**	**12.5**	**26**	**24**	**2**	**32**	**23.3**	**SILTY SAND SM**
◕	**B-37**	**17.5**	**NP**	**NP**	**NP**	**17**	**39.2**	**SILTY SAND SM**
☆	**B-37**	**97.5**	**NP**	**NP**	**NP**	**73**	**43.2**	**SILT with SAND ML**
✤	**B-39**	**23.5**	**70**	**47**	**23**	**93**	**148.3**	**ELASTIC SILT MH**
■	**B-39**	**43.5**	**41**	**32**	**9**	**55**	**44.8**	**SANDY SILT ML**
◆	**B-39A**	**15**	**149**	**43**	**106**	**99**	**118.8**	**FAT CLAY CH**
◇	**B-39A**	**28**	**149**	**64**	**85**	**52**	**148.3**	**SANDY ELASTIC SILT MH**
×	**B-3A**	**26**	**73**	**20**	**53**	**62**	**89.9**	**SANDY FAT CLAY CH**
✖	**B-3A**	**38**	**82**	**23**	**59**	**69**	**84.4**	**SANDY FAT CLAY CH**

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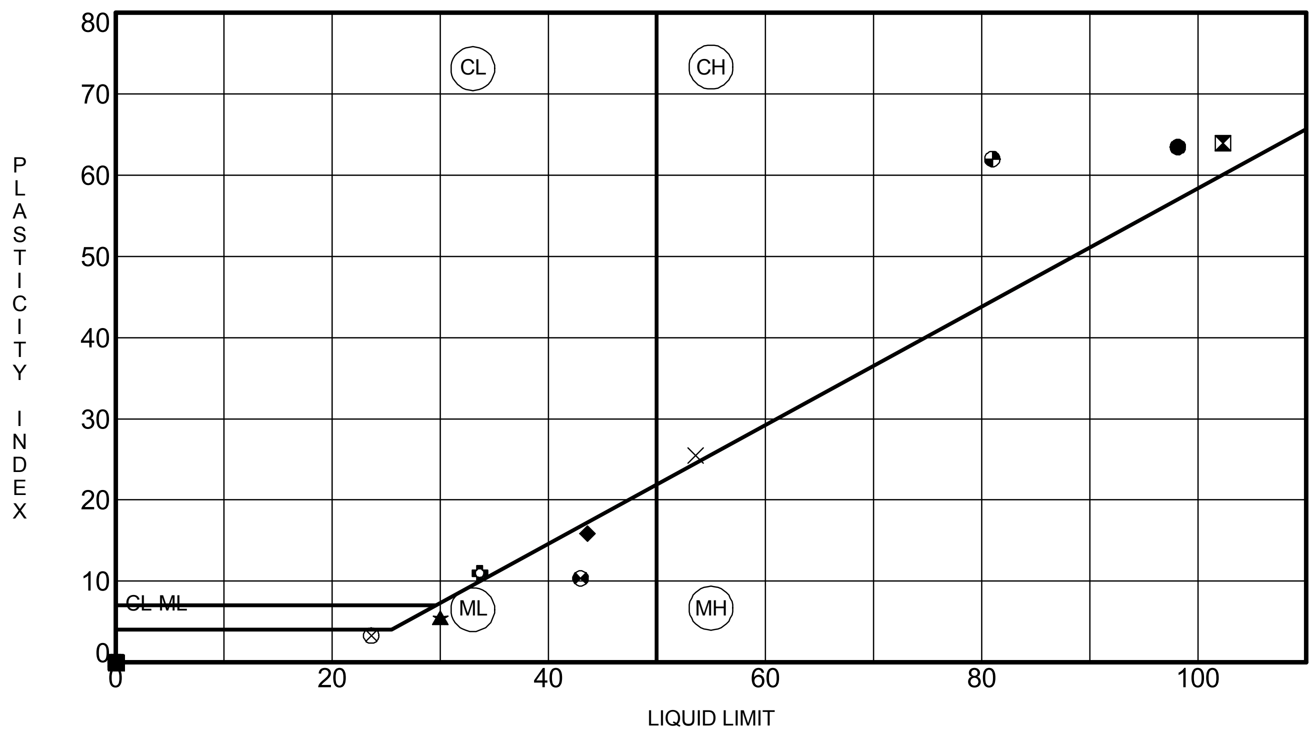
ATTERBERG LIMITS RESULTS

Project: Port Access Road

Location: North Charleston, South Carolina

Number: 1131-08-554



	Specimen Identification		LL	PL	PI	Fines	MC	Classification
●	**B-40A**	**23**	**98**	**35**	**63**	**77**	**87.6**	**FAT CLAY with SAND CH**
⧗	**B-40A**	**38**	**102**	**38**	**64**	**95**	**110.5**	**FAT CLAY CH**
▲	**B-43 Alt1**	**15**	**30**	**25**	**5**	**57**	**32.8**	**SANDY SILT ML**
★	**B-43 Alt2**	**15**	**30**	**25**	**5**	**42**	**32.2**	**SILTY SAND SM**
⊙	**B-46**	**10**	**NP**	**NP**	**NP**	**18**	**30.3**	**SILTY SAND SM**
✿	**B-46**	**20**	**34**	**23**	**11**	**63**	**57.3**	**SANDY LEAN CLAY CL**
○	**B-46**	**30**	**NP**	**NP**	**NP**	**24**	**39.3**	**SILTY SAND SM**
△	**B-46**	**40**	**NP**	**NP**	**NP**	**83**	**47.4**	**SILT with SAND ML**
⊗	**B-47**	**8.5**	**24**	**20**	**4**	**38**	**19.5**	**SILTY, CLAYEY SAND SC-SM**
⊕	**B-47**	**28.5**	**NP**	**NP**	**NP**	**27**	**40.1**	**SILTY SAND SM**
□	**B-47**	**38.5**	**NP**	**NP**	**NP**	**24**	**36.0**	**SILTY SAND SM**
⊗	**B-47**	**43.5**	**43**	**33**	**10**	**70**	**43.6**	**SANDY SILT ML**
◕	**B-47A**	**24**	**81**	**19**	**62**	**99**	**55.8**	**FAT CLAY CH**
☆	**B-50**	**6**	**NP**	**NP**	**NP**	**15**	**34.0**	**SILTY SAND SM**
✥	**B-50**	**13.5**	**NP**	**NP**	**NP**	**41**	**39.9**	**SILTY SAND SM**
■	**B-50**	**33.5**	**NP**	**NP**	**NP**	**24**	**38.4**	**SILTY SAND SM**
◆	**B-50**	**43.5**	**44**	**28**	**16**	**57**	**46.4**	**SANDY SILT ML**
◇	**B-51 Alt1**	**10**	**NP**	**NP**	**NP**	**83**	**101.7**	**SILT with SAND ML**
×	**B-51 Alt1**	**15**	**54**	**28**	**26**	**83**	**100.6**	**FAT CLAY with SAND CH**
✖	**B-51 Alt1**	**25**	**NP**	**NP**	**NP**	**35**	**34.2**	**SILTY SAND SM**

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ATTERBERG LIMITS RESULTS

Project: Port Access Road

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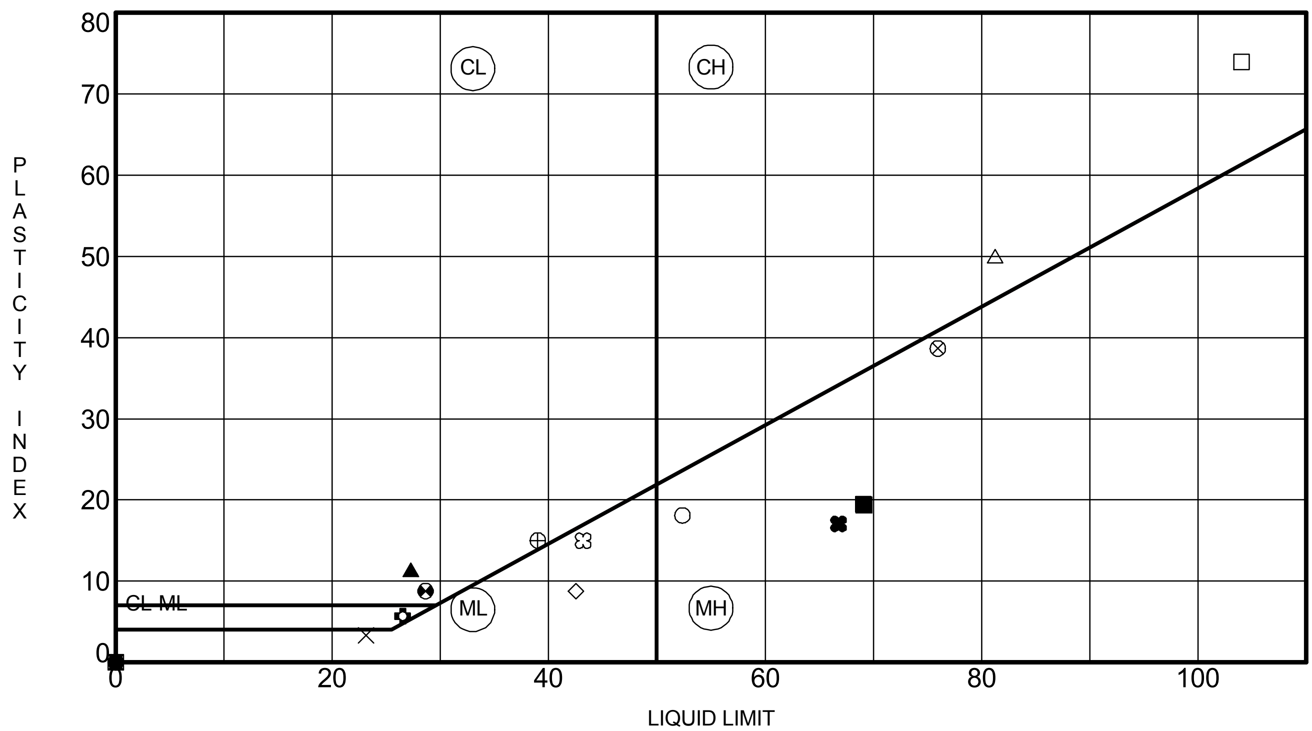
Number: 1131-08-554



	Specimen Identification		LL	PL	PI	Fines	MC	Classification
●	B-51 Alt1	45	NP	NP	NP	48	41.8	SILTY SAND SM
⧗	B-52	15	NP	NP	NP	20	32.4	SILTY SAND SM
▲	B-52	25	27	16	11	44	34.6	CLAYEY SAND SC
★	B-52	35	NP	NP	NP	47	40.7	SILTY SAND SM
⊙	B-52	45	NP	NP	NP	22	33.5	SILTY SAND SM
✿	B-53	5	27	21	6	39	23.9	SILTY, CLAYEY SAND SC-SM
○	B-53	40	52	34	18	92	71.6	ELASTIC SILT MH
△	B-53A	32	81	31	50	83	76.1	FAT CLAY with SAND CH
⊗	B-55	35	76	37	39	93	86.1	ELASTIC SILT MH
⊕	B-55A	24	39	24	15	51	30.0	SANDY LEAN CLAY CL
□	B-55B	35	104	30	74	99	83.8	FAT CLAY CH
⊛	B-65	2.5	29	20	9	45	24.3	CLAYEY SAND SC
◕	B-65	15	NP	NP	NP	25	34.2	SILTY SAND SM
☆	B-65	30	NP	NP	NP	25	42.4	SILTY SAND SM
⌘	B-65	45	43	28	15	64	47.5	SANDY SILT ML
■	B-66	20	69	50	19	95	94.3	ELASTIC SILT MH
◆	B-66	45	NP	NP	NP	30	34.3	SILTY SAND SM
◇	B-66	75	43	34	9	64	47.5	SANDY SILT ML
×	B-68 Alt1	10	23	20	3	22	25.7	SILTY SAND SM
✖	B-68 Alt1	25	67	50	17	92	107.2	ELASTIC SILT MH

ATTERBERG LIMITS RESULTS

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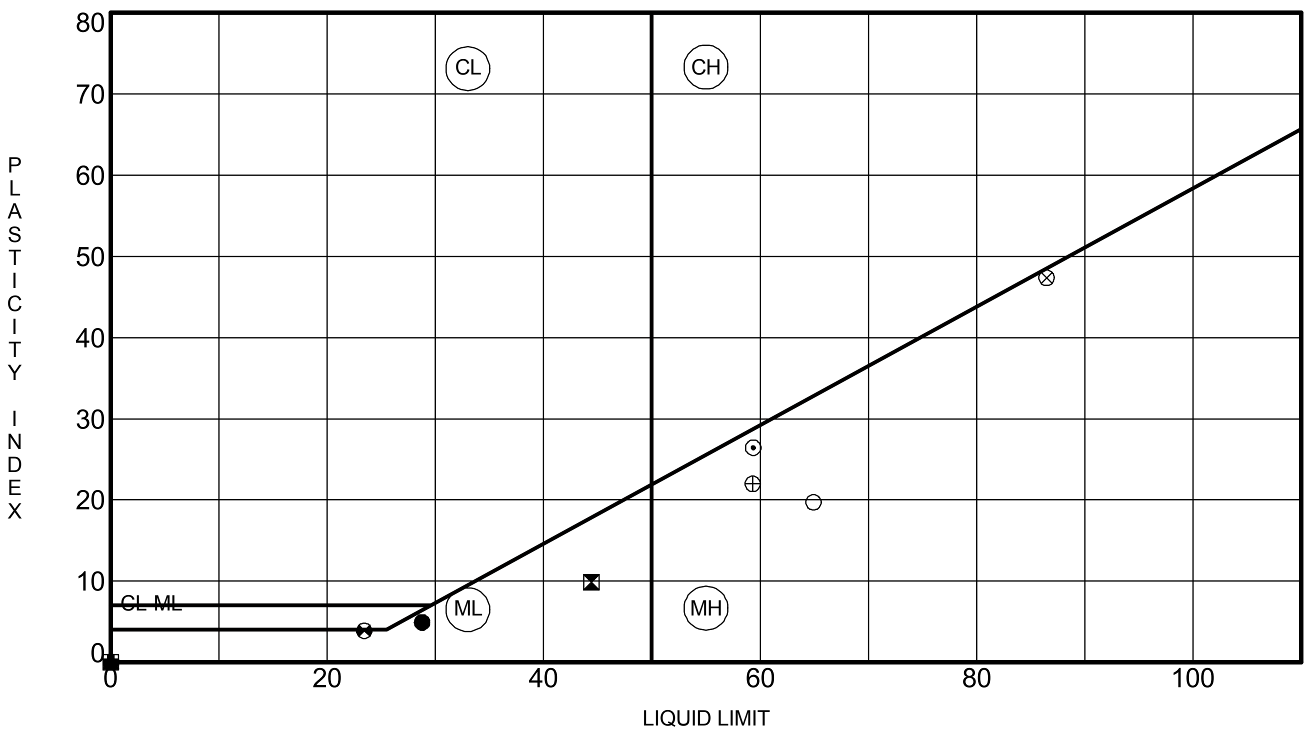
Project: Port Access Road

Location: North Charleston, South Carolina

Number: 1131-08-554



	Specimen Identification		LL	PL	PI	Fines	MC	Classification
●	**B-68 Alt1**	**30**	**29**	**24**	**5**	**68**	**64.6**	**SANDY SILT ML**
⧗	**B-68 Alt1**	**40**	**44**	**35**	**9**		**67.7**	
▲	**B-68 Alt1**	**45**	**NP**	**NP**	**NP**	**28**	**34.5**	**SILTY SAND SM**
★	**B-68 Alt1**	**55**	**NP**	**NP**	**NP**	**21**	**35.2**	**SILTY SAND SM**
⊙	**B-72**	**10**	**59**	**33**	**26**	**92**	**47.7**	**ELASTIC SILT MH**
✿	**B-72**	**65**	**NP**	**NP**	**NP**	**54**	**44.6**	**SANDY SILT ML**
○	**B-74**	**20**	**65**	**45**	**20**	**98**	**106.5**	**ELASTIC SILT MH**
△	**B-74**	**40**	**NP**	**NP**	**NP**	**1**	**22.2**	**POORLY GRADED SAND SP**
⊗	**B-74A**	**8**	**86**	**39**	**47**	**89**	**124.8**	**ELASTIC SILT MH**
⊕	**B-74A**	**65**	**59**	**37**	**22**	**51**	**45.1**	**SANDY ELASTIC SILT MH**
□	**Proctor 1**	**0**	**NP**	**NP**	**NP**	**23**	**1.3**	**SILTY SAND SM**
⊛	**Proctor 2**	**0**	**23**	**20**	**3**	**34**	**1.9**	**SILTY SAND SM**

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ATTERBERG LIMITS RESULTS

Project: Port Access Road

Location: North Charleston, South Carolina

Number: 1131-08-554

Moisture - Density Report

S&ME

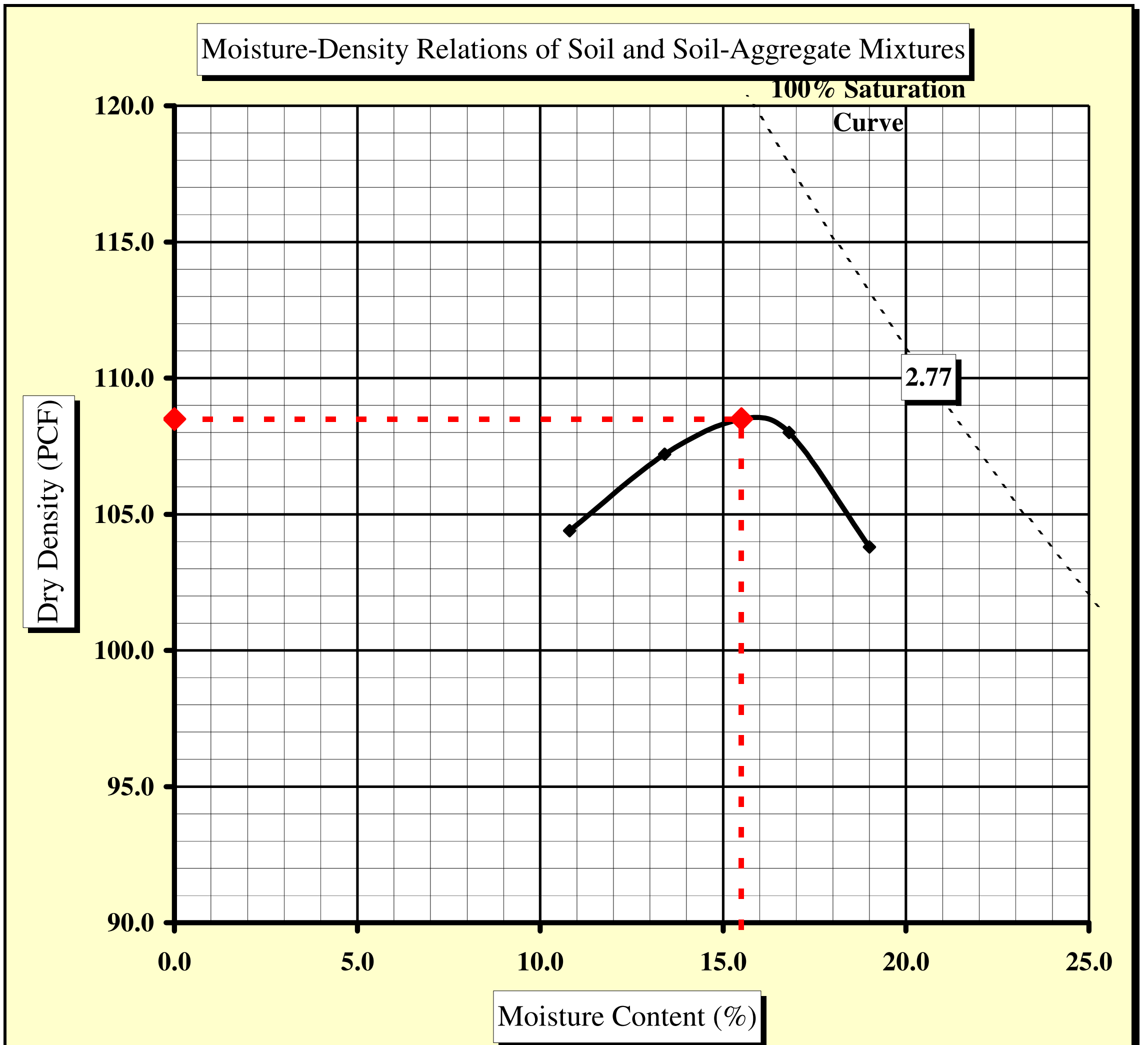
S&ME Project #: **1131-08-554**
Project Name: **Port Access Road**
Client Name: SCDOT
Location: North Charleston, South Carolina

Report Date: October 20, 2008
Test Date(s): October 20, 2008

Boring #:	N/A	Sample #:	1	Sample Date:	October 14, 2008
Location:	N/A	Offset:	N/A	Depth:	N/A
Sample Description:	Brown Silty Sand with Shell				

Maximum Dry Density 108.5 PCF. **Optimum Moisture Content 15.5 %**

ASTM D 698 Method A



Soil Properties

Natural Moisture Content:	N/A
Liquid Limit:	NP
Plastic Limit:	NP
Plastic Index:	NP
Specific Gravity:	N/A

% Passing
#4
#10
#20
#40
#60
#100
#200

Oversize Fraction
Bulk Sp. Gravity
% Moisture
Oversize Fraction
MDD
Opt. MC

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Oversize Fraction (ASTM D 4718) ☐
Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/8 inch Sieve ☐ 3/4 inch Sieve ☐
Mechanical Hammer ☒ Manual Hammer ☐ Moist Preparation ☐ Dry Preparation ☐

References: ASTM D 698: Laboratory Compaction Characteristics of Soil Using Standard Effort

Soil Discription is based on a visual classification.

Technical Responsibility: ____________ ____________ ____________
Signature Position

Moisture - Density Report

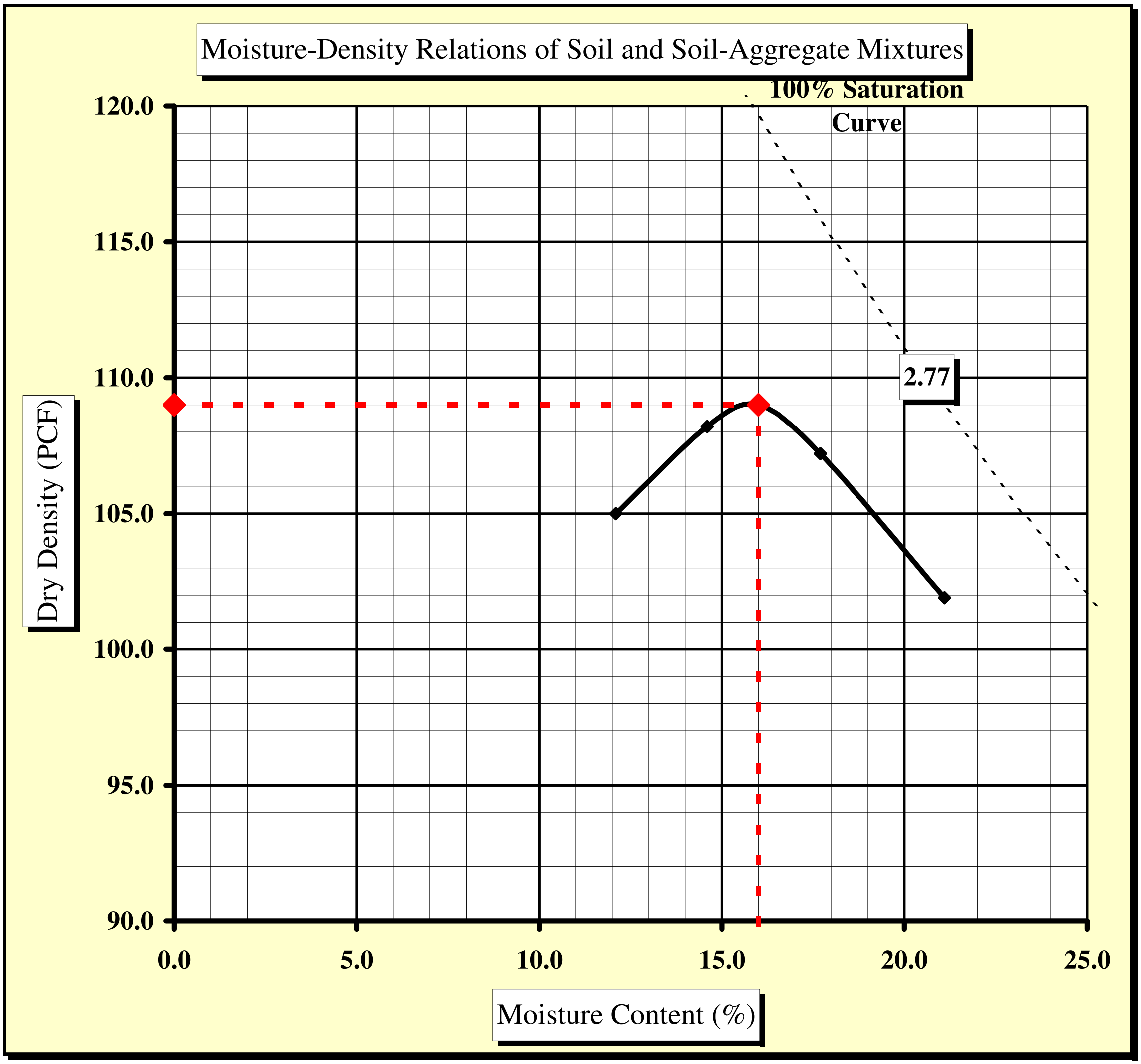
S&ME Project #: **1131-08-554**
Project Name: **Port Access Road**
Client Name: SCDOT
Location: North Charleston, South Carolina

Report Date: October 20, 2008
Test Date(s): October 20, 2008

Boring #:	N/A	Sample #:	2	Sample Date:	October 14, 2008
Location:	N/A	Offset:	N/A	Depth:	N/A
Sample Description:	Brown Silty Sand with Shell				

Maximum Dry Density 109.0 PCF. **Optimum Moisture Content 16.0 %**

ASTM D 698 Method A



Soil Properties

Natural Moisture Content:	N/A
Liquid Limit:	N/A
Plastic Limit:	N/A
Plastic Index:	N/A
Specific Gravity:	N/A

% Passing

Oversize Fraction

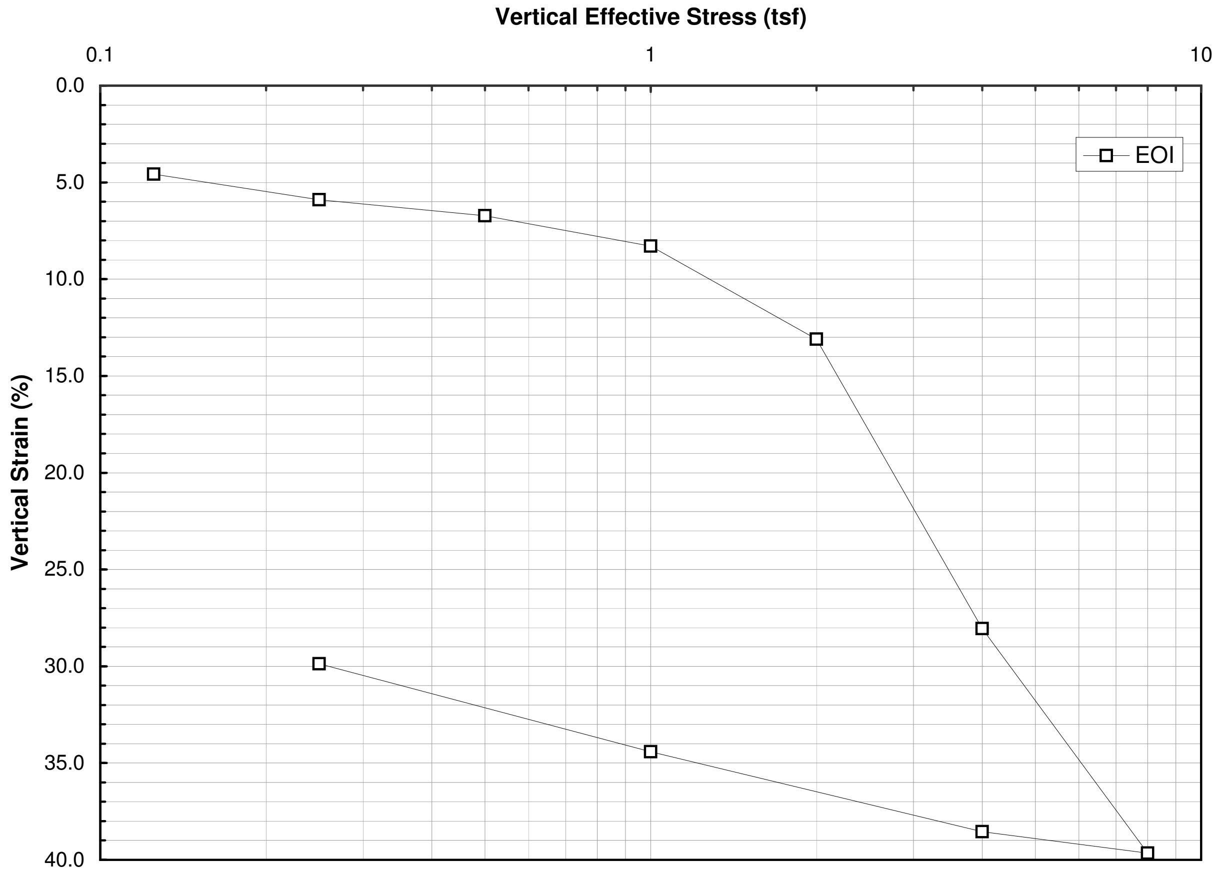
Bulk Sp. Gravity
% Moisture
Oversize Fraction
MDD
Opt. MC

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Oversize Fraction (ASTM D 4718) ☐
Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/8 inch Sieve ☐ 3/4 inch Sieve ☐
Mechanical Hammer ☒ Manual Hammer ☐ Moist Preparation ☐ Dry Preparation ☐

References: ASTM D 698: Laboratory Compaction Characteristics of Soil Using Standard Effort

Soil Discription is based on a visual classification.

Technical Responsibility: ____________ ____________ ____________
Signature *Position*



CONSOLIDATION PARAMETERS

Probable Preconsolidation Stress, P'_c (tsf):	1.8
Approx. Hydrostatic Effective Stress, P'_o (tsf)	0.5
Vertical Strain at P'_o (%):	6.7
Compression Ratio (CR):	0.48
Recompression Ratio (RR):	0.072
Over Consolidation Ratio (OCR):	3.5

TEST METHOD

Test Method:	ASTM D-2435 A
Trimming Procedure:	2.5-inch Trimming Lathe
Pressure at Inundation:	0.125 tsf
Method to Compute C_v:	ASTM D-2435 12.3.2

SAMPLE ID

Test No.:	SCI B-2A, 24'
Sample No.:	UD1
Exploration No.:	B-2A
Depth:	23 to 25 feet
USCS Description:	Fat CLAY (CH)

SAMPLE DATA

Sample Diameter (cm):	6.35
Sample Area (cm^2):	31.67
Measured Specific Gravity:	2.64
Trimmings Moisture (%):	85.2
% Passing #200 Sieve:	86.6
Liquid Limit:	63
Plastic Limit:	19
Plasticity Index:	44

	Initial	Final
Water Content (%):	94.9	66.5
Est. % Saturation:	98.9	100.0
Sample Height (cm):	2.540	1.781
Wet Sample Weight (g):	117.2	100.1
Dry Sample Weight (g):	60.1	60.1
Dry Unit Weight (pcf):	46.6	66.5
Void Ratio, e:	2.53	1.48
Solids Height (cm):	0.719	0.719

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ONE-DIMENSIONAL CONSOLIDATION TEST

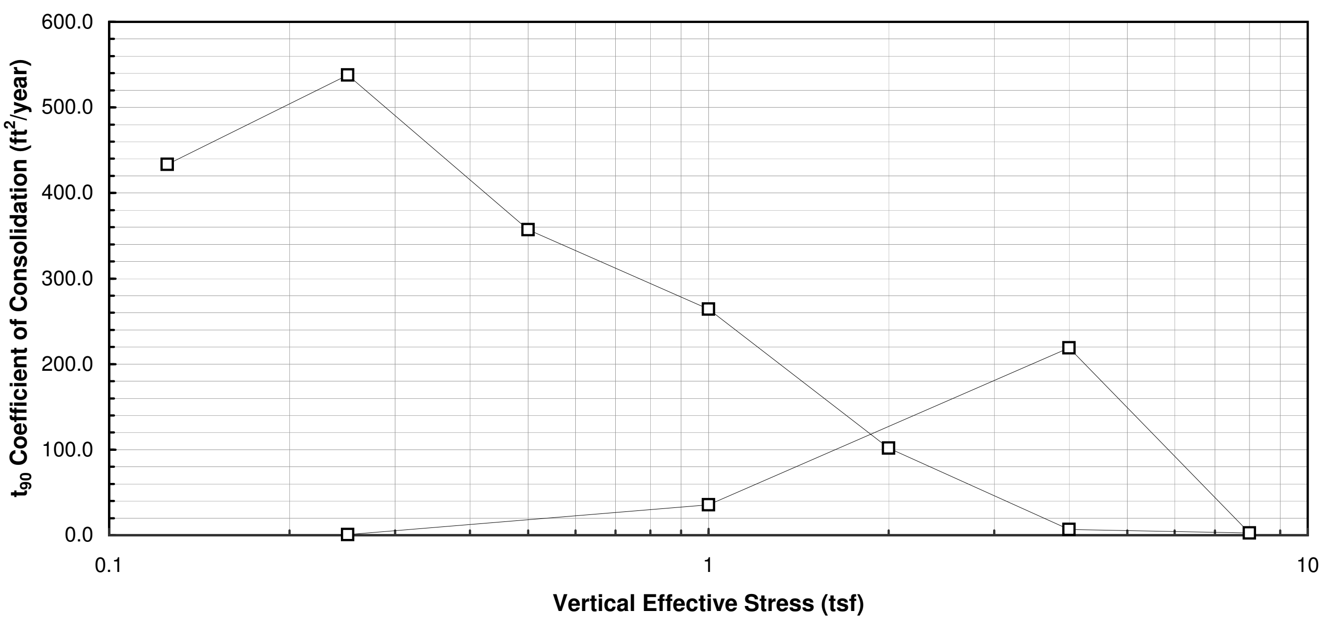
Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

Test No.:	SCI B-2A, 24'
Sample No.:	UD1
Exploration No.:	B-2A
Depth:	23 to 25 feet

LOAD INC.	STRESS DURATION (Hr - min)	VERTICAL STRESS (tsf)	VERTICAL STRAIN (EOI*)	VERTICAL STRAIN (EOP*)	VOID RATIO e (EOI*)	VOID RATIO e (EOP*)	STRESS RATIO (P'/P'c)	TAYLOR COEFFICIENT OF CONSOLIDATION (ft^2/year)
1	24-00	0.125	4.6	4.2	2.37	2.38	0.07	433.5
2	24-00	0.25	5.9	5.0	2.32	2.36	0.14	537.9
3	24-00	0.5	6.7	6.4	2.29	2.31	0.28	357.0
4	24-03	1	8.3	7.7	2.24	2.26	0.56	264.4
5	24-00	2	13.1	10.6	2.07	2.16	1.11	101.9
6	24-00	4	28.1	23.2	1.54	1.71	2.22	6.8
7	24-03	8	39.7	37.9	1.13	1.19	4.44	2.4
8	24-00	4	38.6	39.3	1.17	1.14	2.22	218.9
9	24-03	1	34.4	37.4	1.32	1.21	0.56	35.6
10	24-03	0.25	29.9	30.0	1.48	1.47	0.14	0.6

*EOI = End of Increment

*EOP = End of Primary



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ONE-DIMENSIONAL CONSOLIDATION TEST

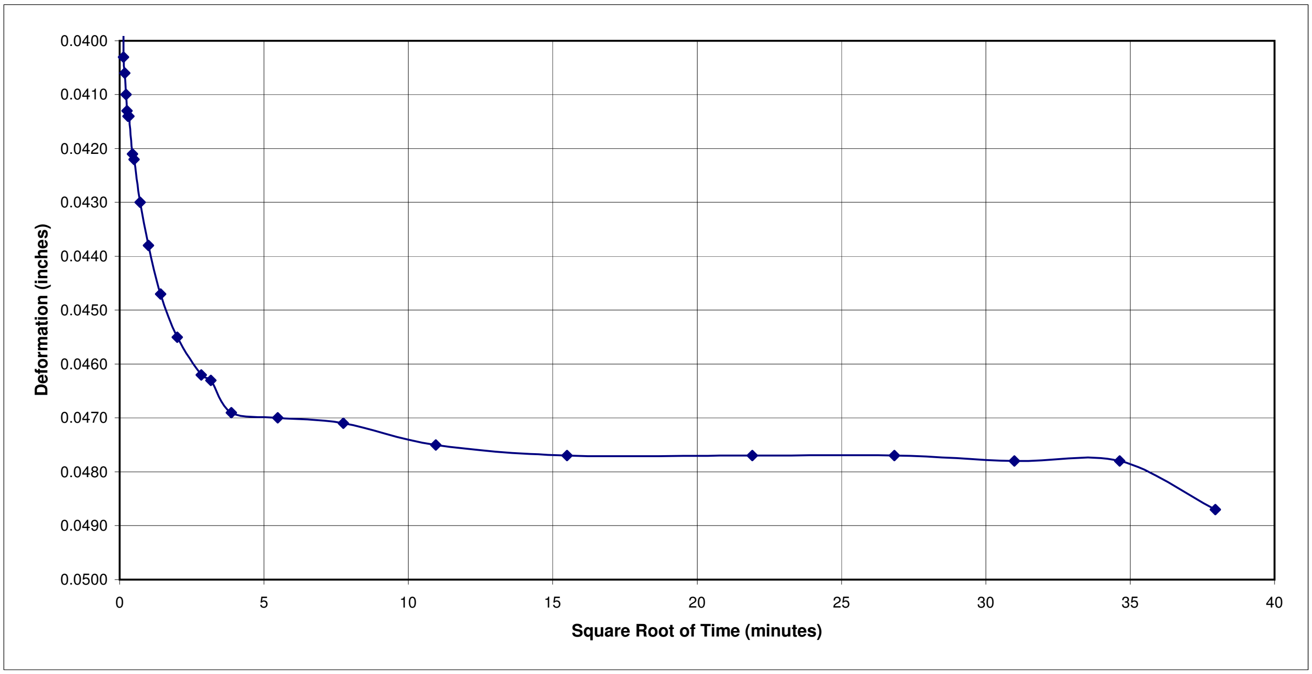
Project: Port Access Road

Client: SCDOT

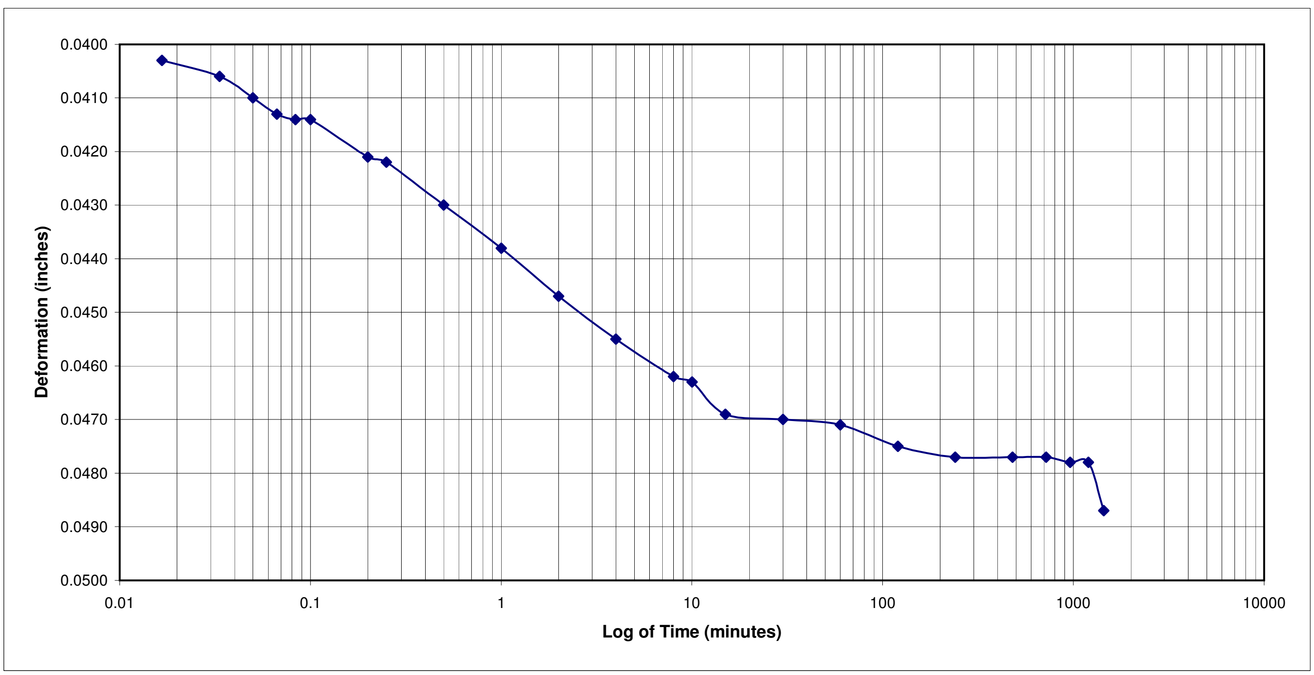
Location: North Charleston, South Carolina

Project No. 1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-2A, 23 to 25 feet
LOAD = 0.125 TSF



DEFORMATION VS. LOG OF TIME
B-2A, 23 to 25 feet
LOAD = 0.125 TSF



Sample No.: SCI B-2A, 24'
Exploration No.: B-2A
Depth: 23 - 25 feet

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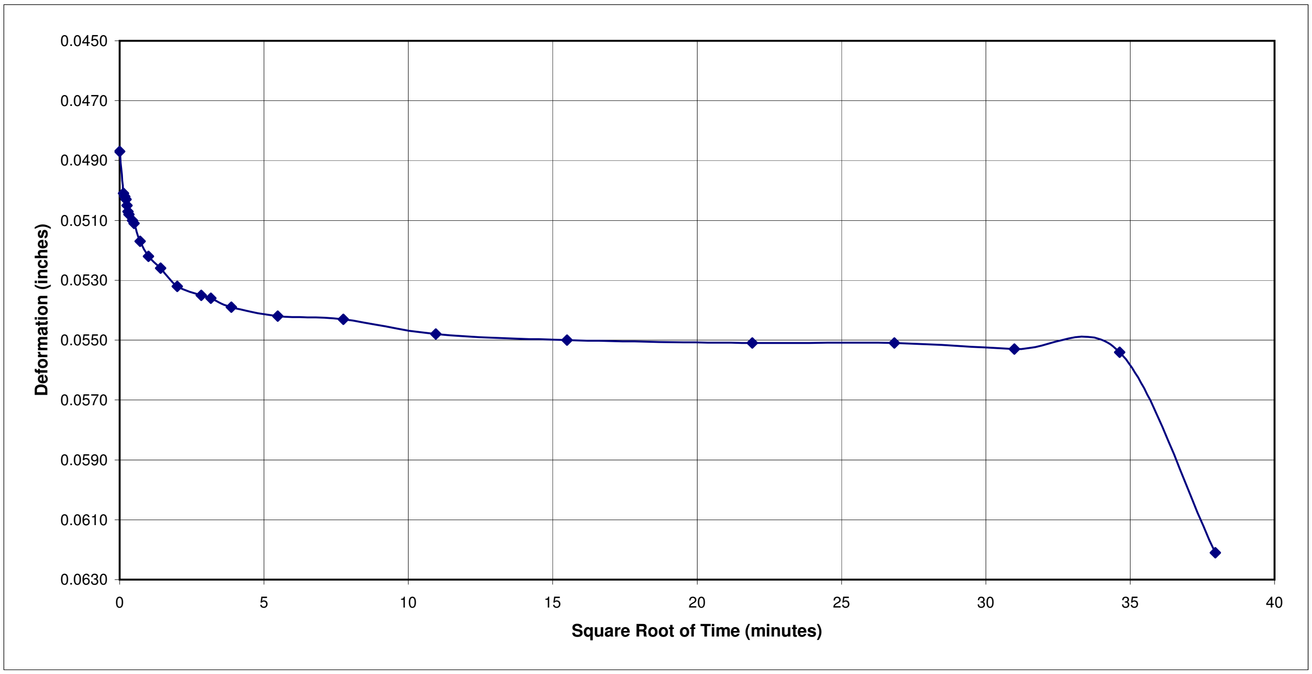
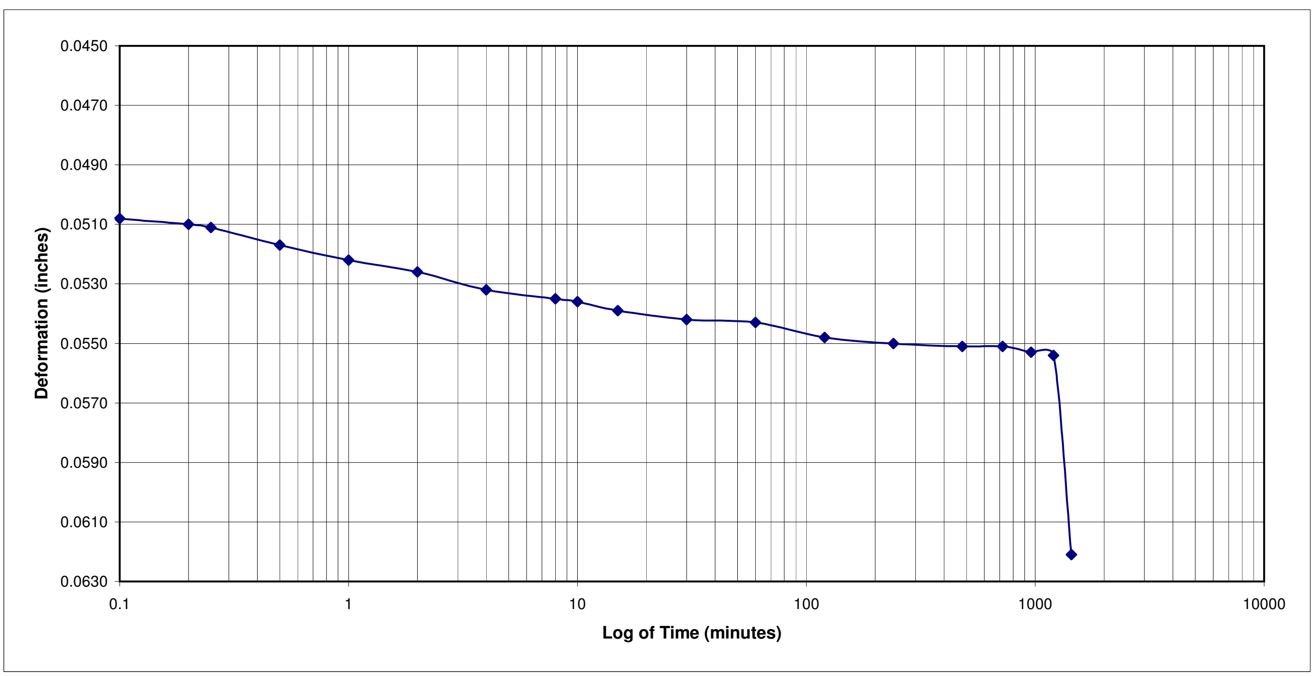
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-2A, 23 to 25 feet
LOAD = 0.25 TSF



DEFORMATION VS. LOG OF TIME
B-2A, 23 to 25 feet
LOAD = 0.25 TSF



Sample No.:	SCI B-2A, 24'
Exploration No.:	B-2A
Depth:	23 - 25 feet

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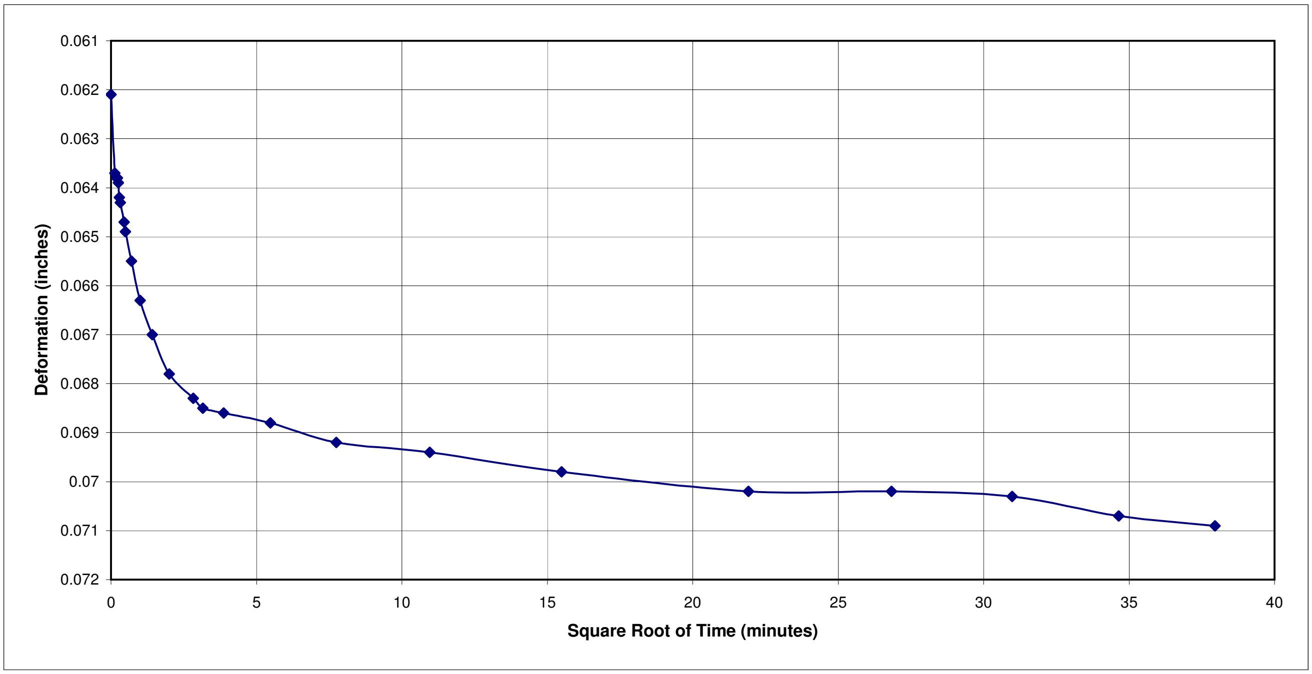
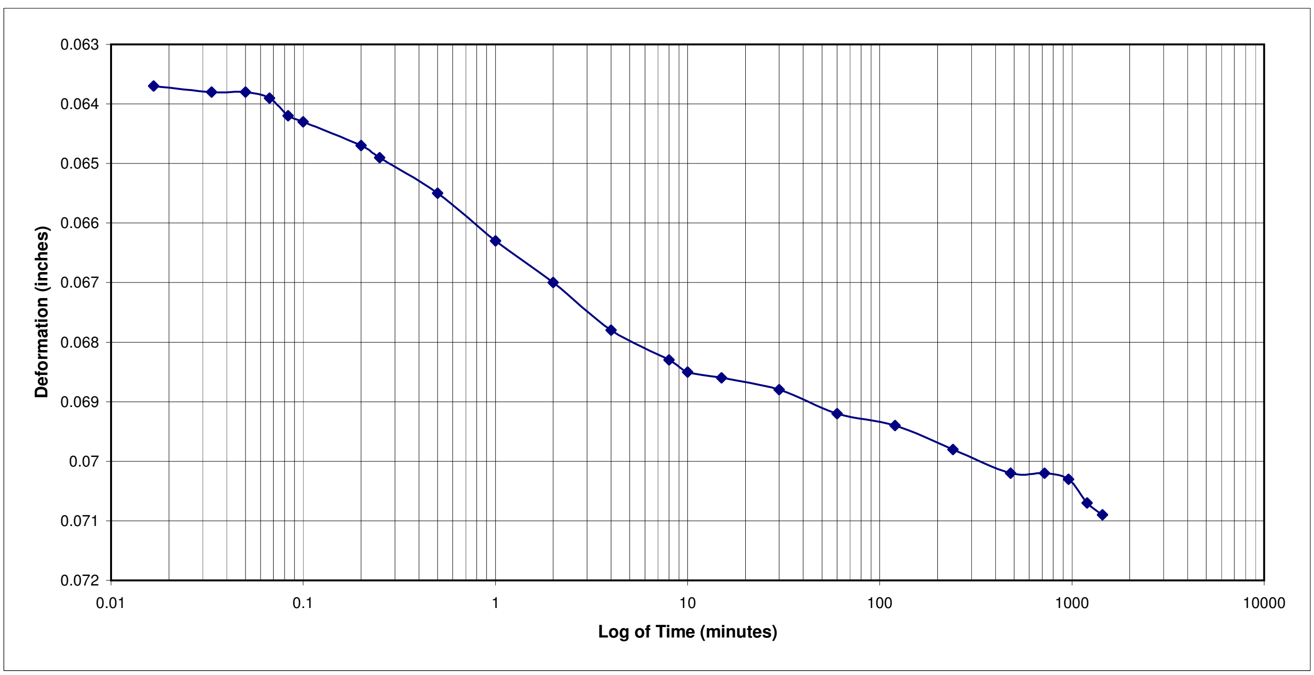
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-2A, 23 to 25 feet
LOAD = 0.5 TSF



DEFORMATION VS. LOG OF TIME
B-2A, 23 to 25 feet
LOAD = 0.5 TSF



Sample No.:	SCI B-2A, 24'
Exploration No.:	B-2A
Depth:	23 - 25 feet

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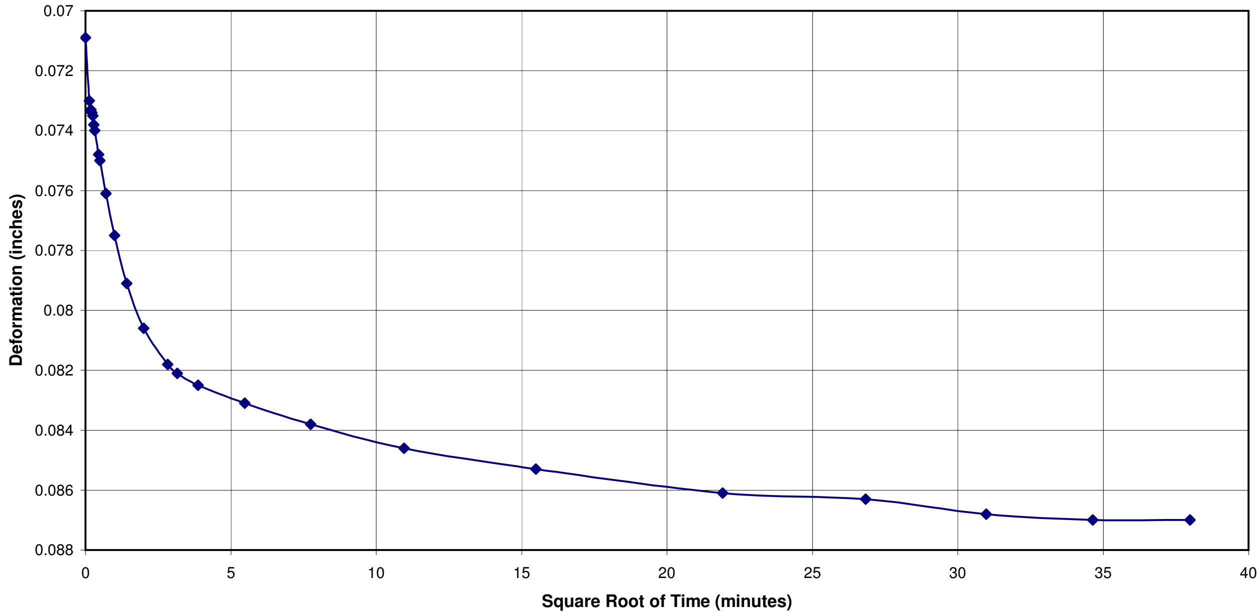
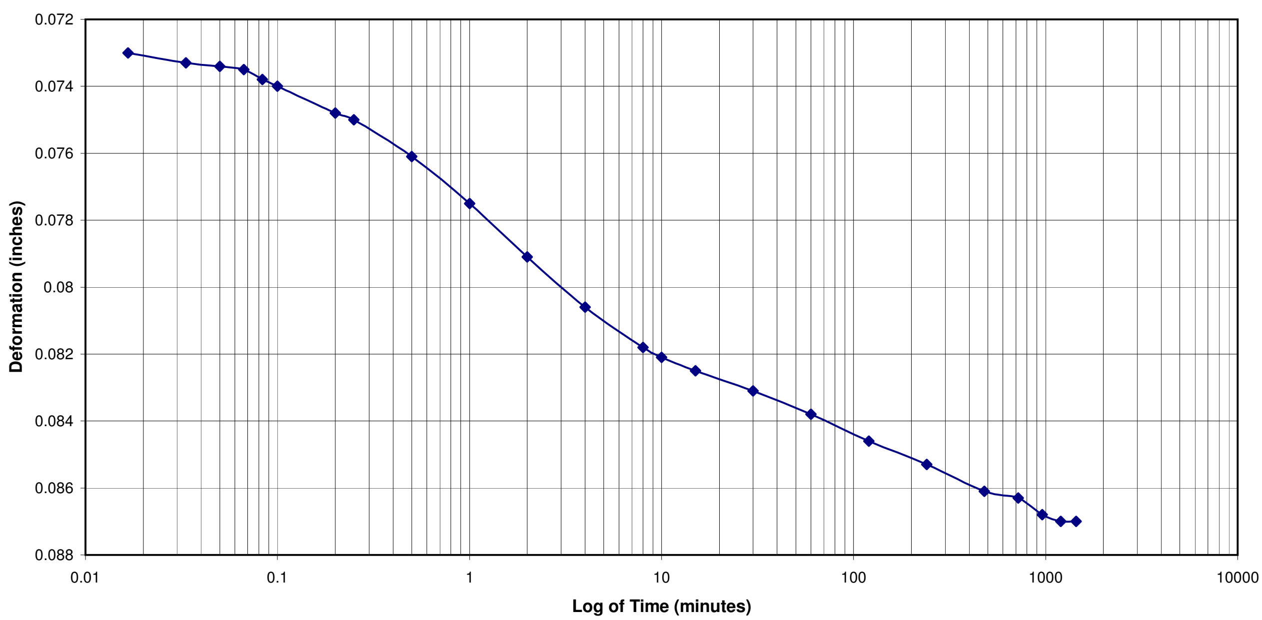
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-2A, 23 to 25 feet
LOAD = 1.0 TSF



DEFORMATION VS. LOG OF TIME
B-2A, 23 to 25 feet
LOAD = 1.0 TSF



Sample No.:	SCI B-2A, 24'
Exploration No.:	B-2A
Depth:	23 - 25 feet

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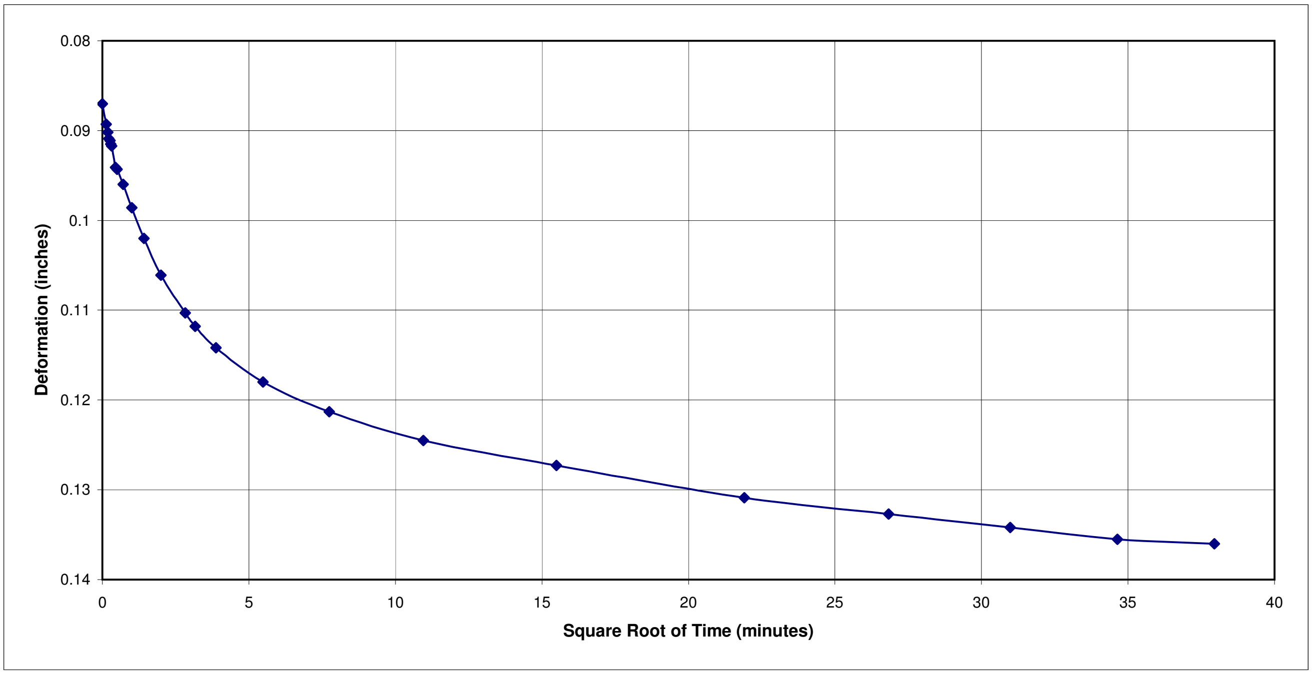
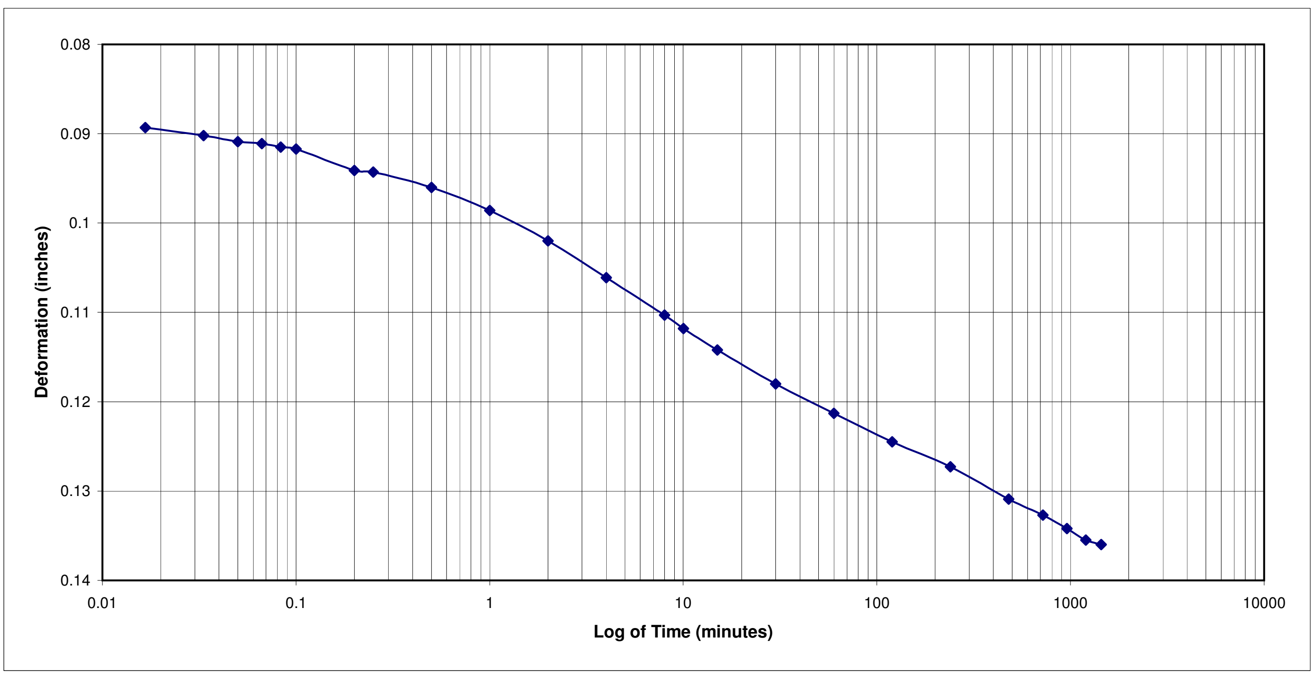
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-2A, 23 to 25 feet
LOAD = 2.0 TSF



DEFORMATION VS. LOG OF TIME
B-2A, 23 to 25 feet
LOAD = 2.0 TSF



Sample No.:	SCI B-2A, 24'
Exploration No.:	B-2A
Depth:	23 - 25 feet

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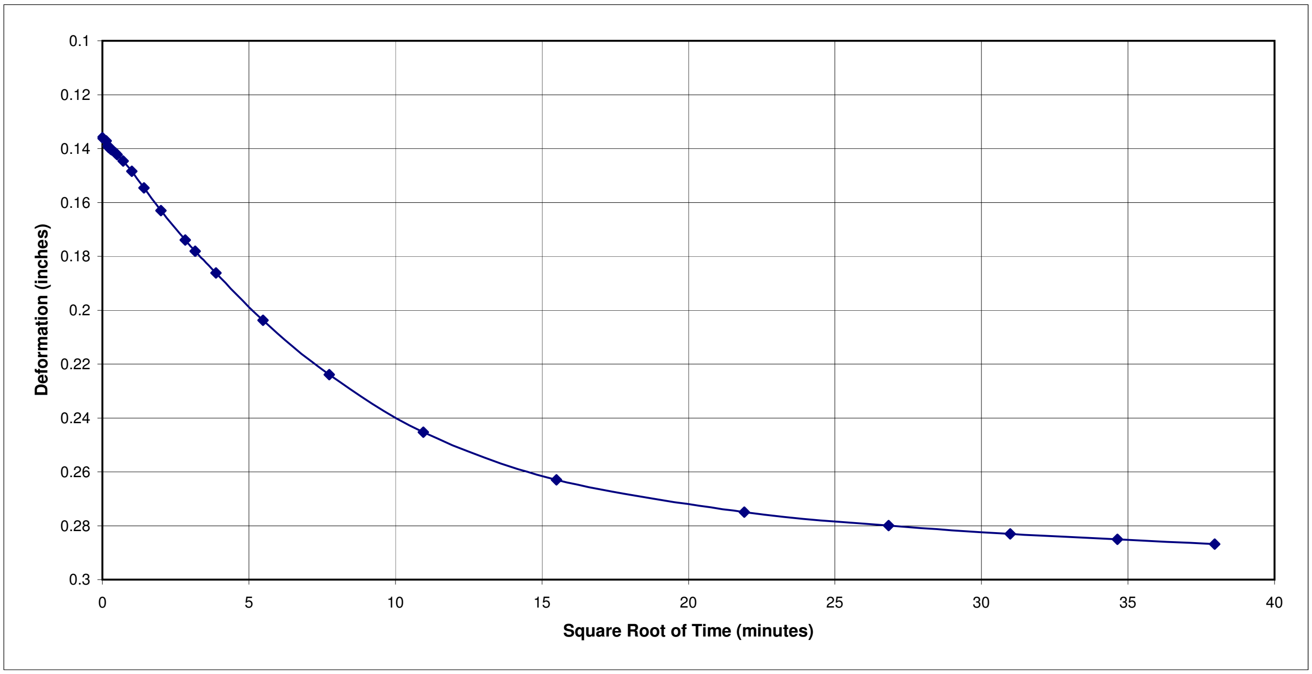
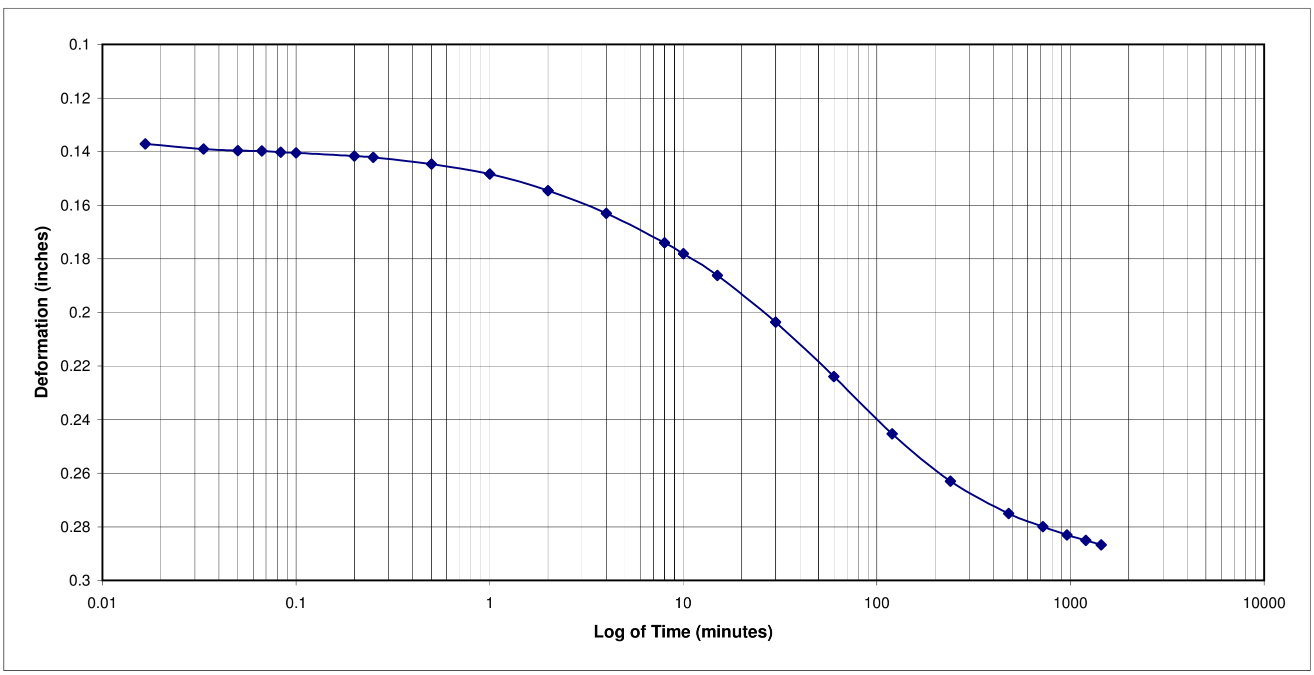
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-2A, 23 to 25 feet
LOAD = 4.0 TSF



DEFORMATION VS. LOG OF TIME
B-2A, 23 to 25 feet
LOAD = 4.0 TSF



Sample No.:	SCI B-2A, 24'
Exploration No.:	B-2A
Depth:	23 - 25 feet

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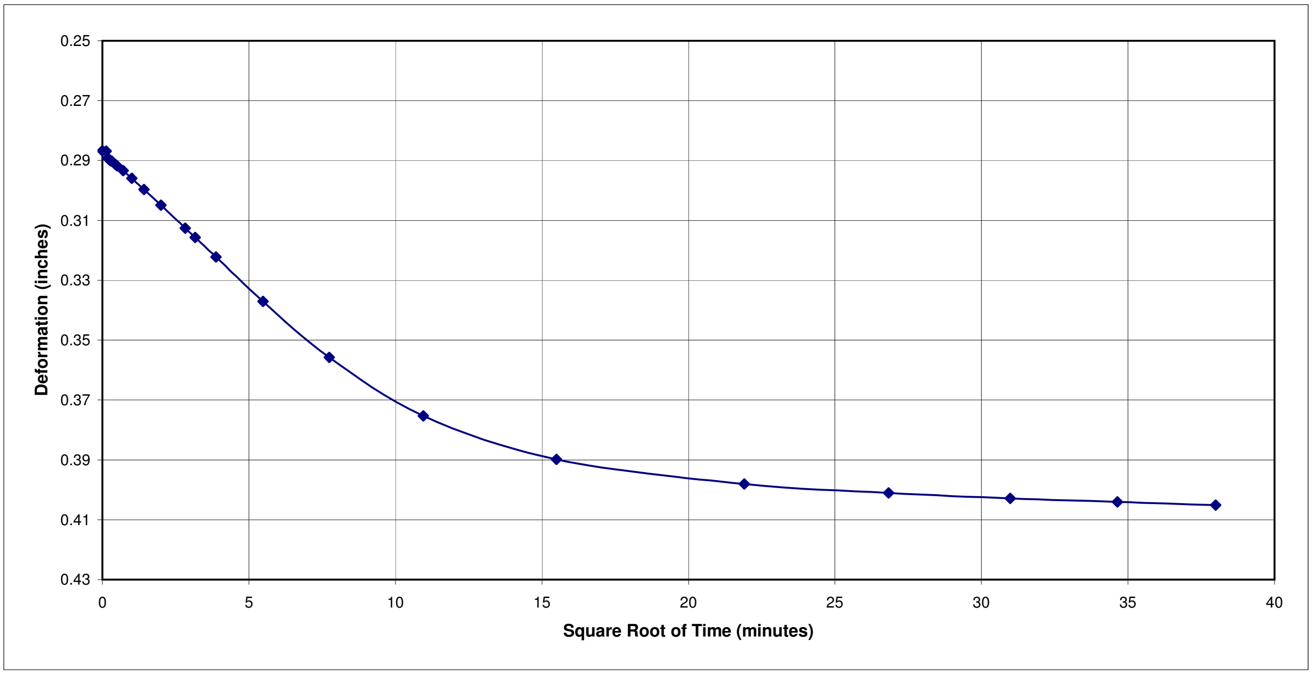
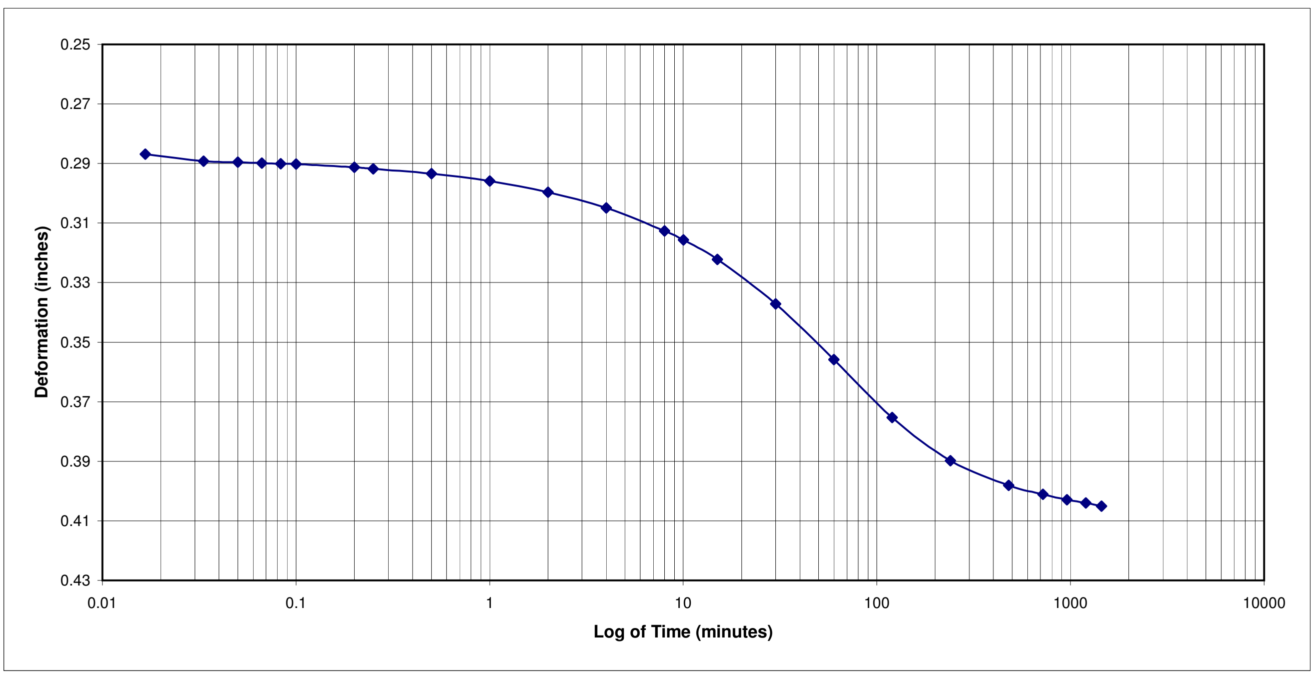
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-2A, 23 to 25 feet
LOAD = 8.0 TSF



DEFORMATION VS. LOG OF TIME
B-2A, 23 to 25 feet
LOAD = 8.0 TSF



Sample No.:	SCI B-2A, 24'
Exploration No.:	B-2A
Depth:	23 - 25 feet

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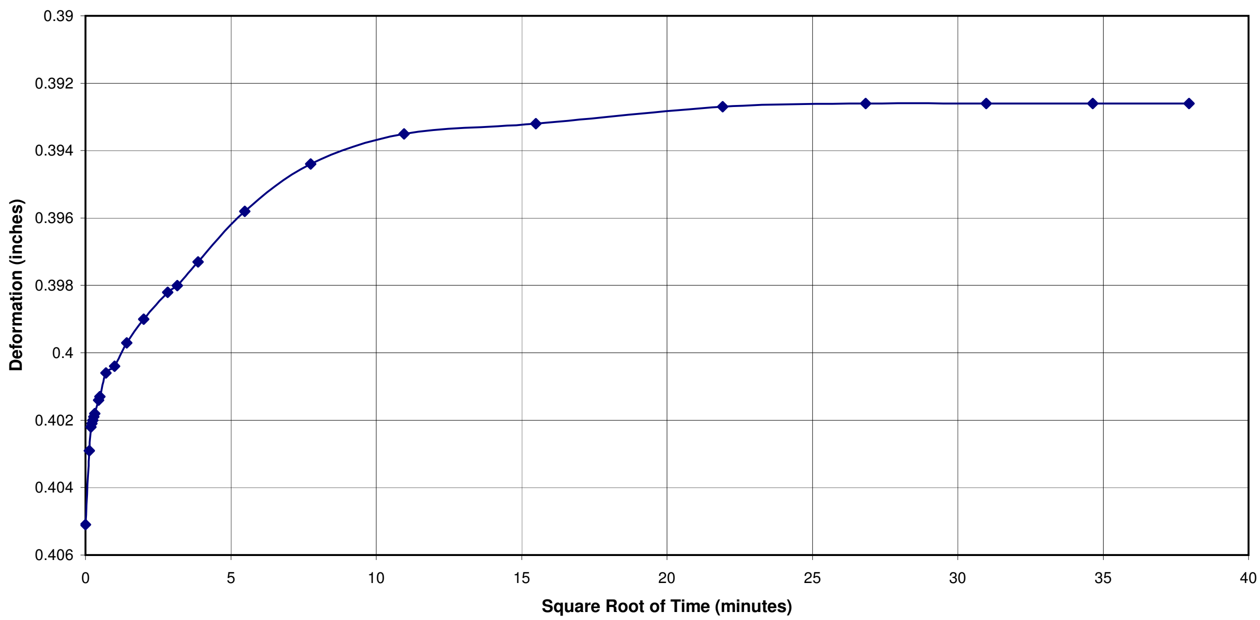
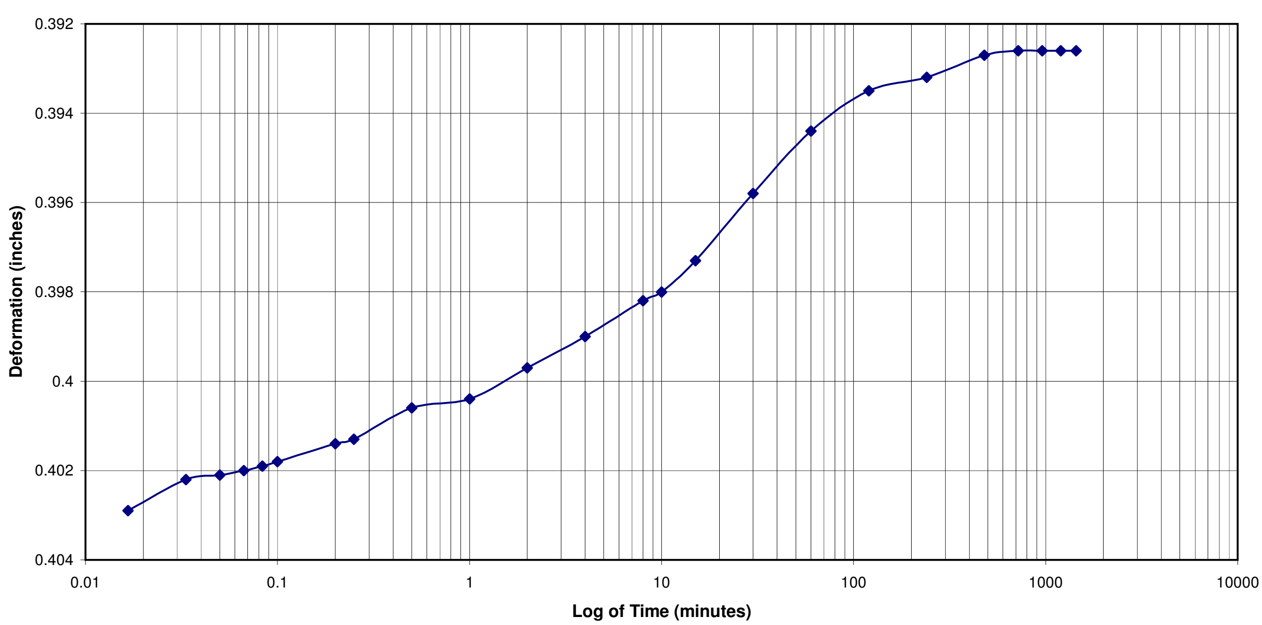
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-2A, 23 to 25 feet
LOAD = 4.0 TSF



DEFORMATION VS. LOG OF TIME
B-2A, 23 to 25 feet
LOAD = 4.0 TSF



Sample No.:	SCI B-2A, 24'
Exploration No.:	B-2A
Depth:	23 - 25 feet

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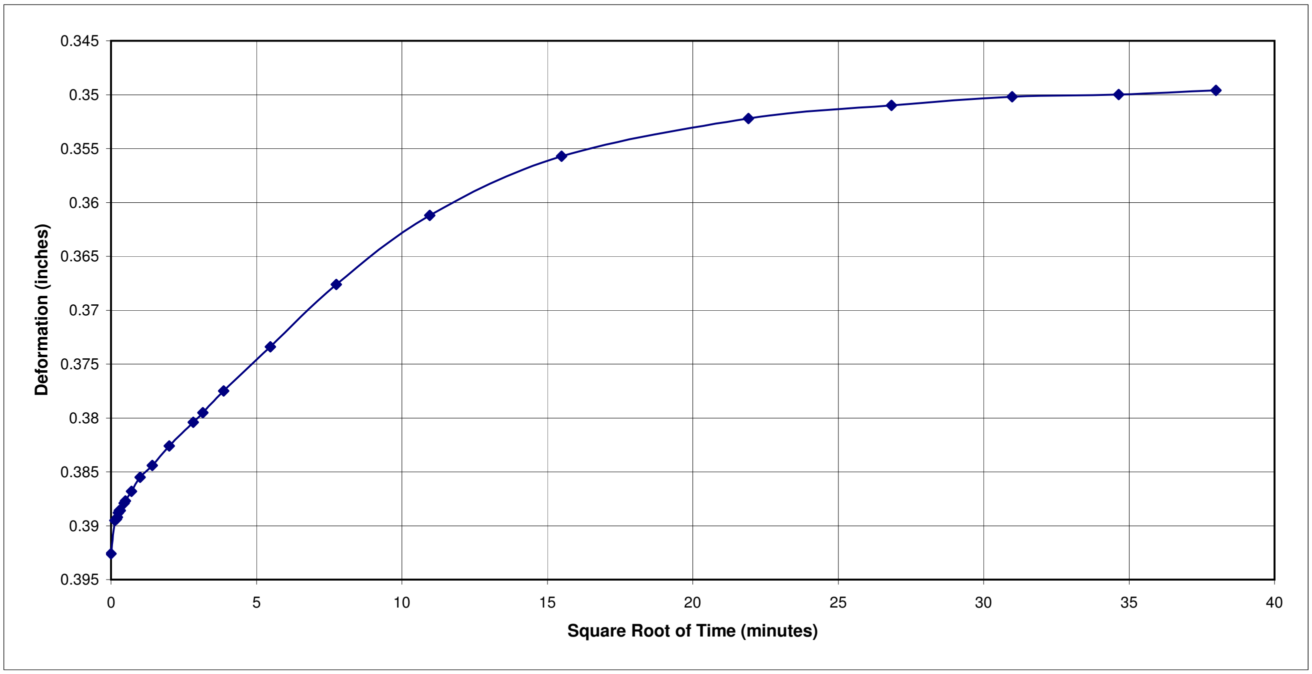
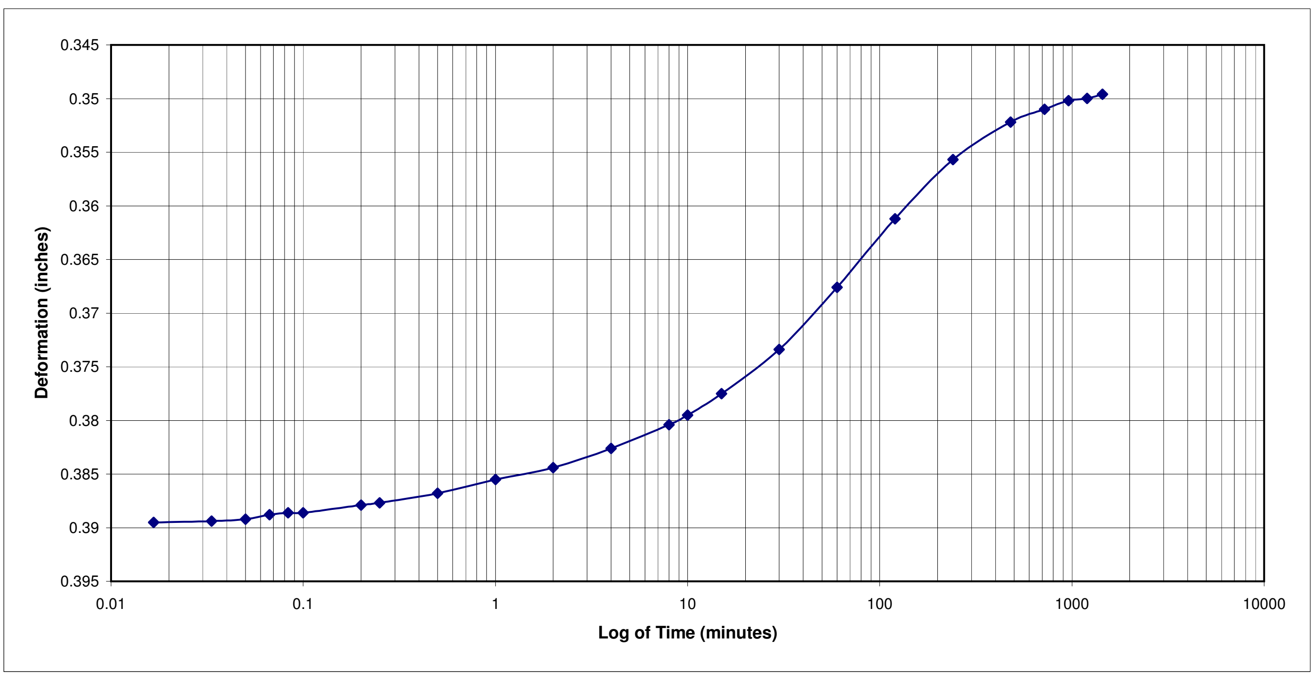
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-2A, 23 to 25 feet
LOAD = 1.0 TSF



DEFORMATION VS. LOG OF TIME
B-2A, 23 to 25 feet
LOAD = 1.0 TSF



Sample No.:	SCI B-2A, 24'
Exploration No.:	B-2A
Depth:	23 - 25 feet

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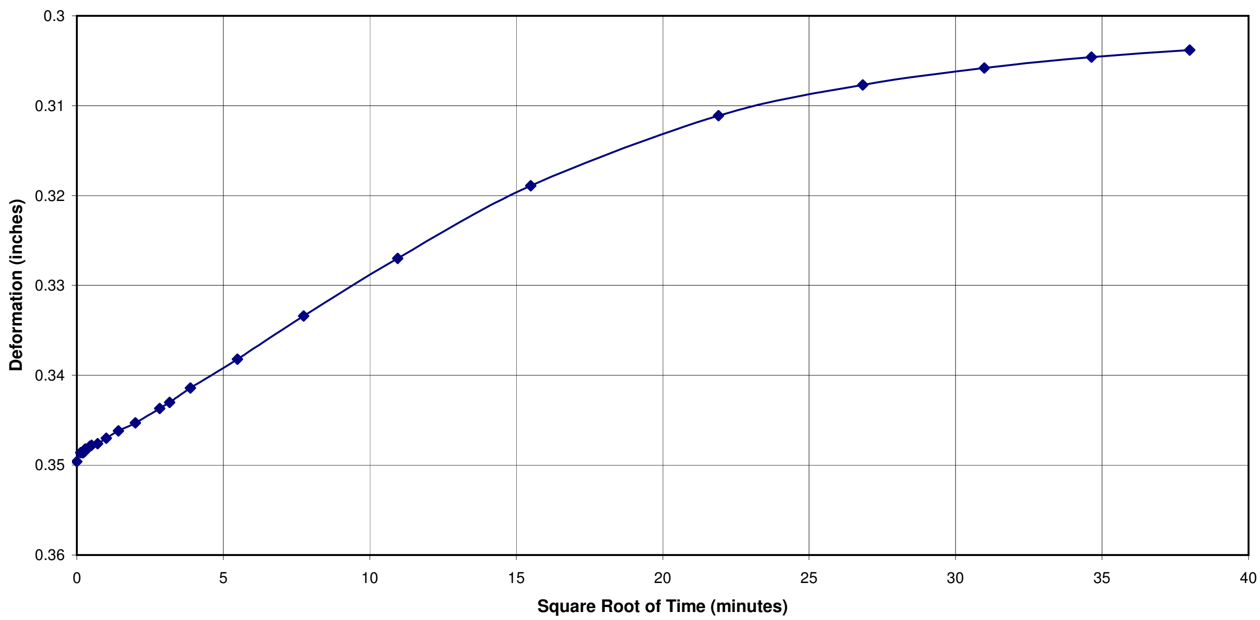
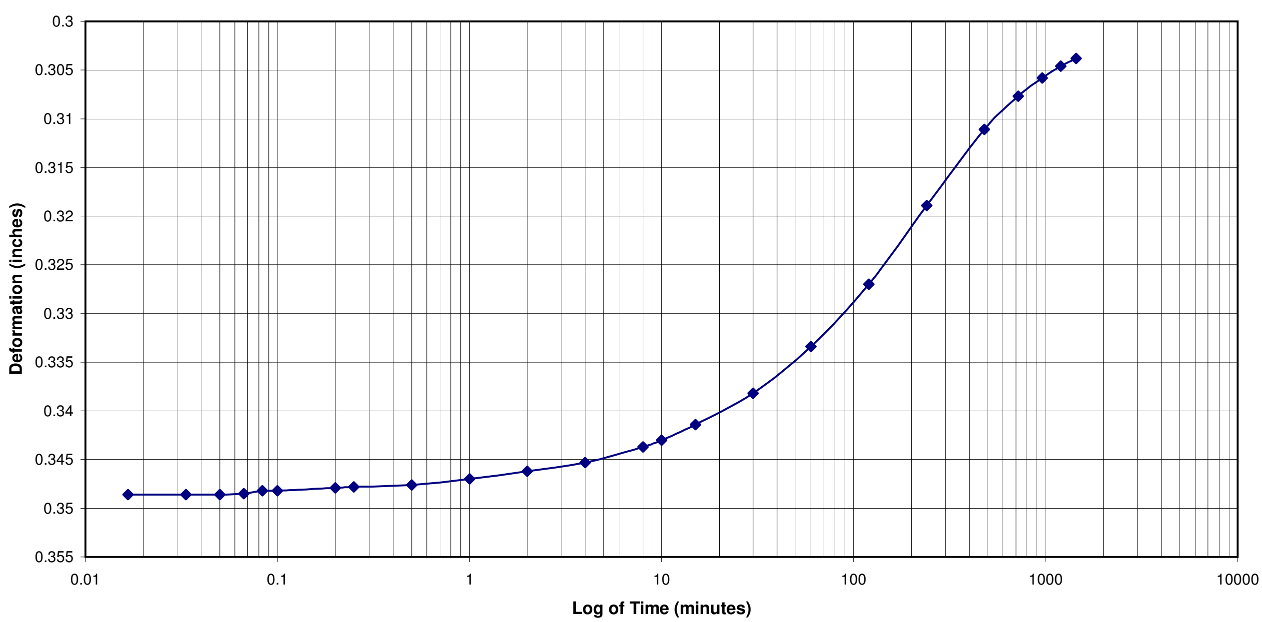
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-2A, 23 to 25 feet
LOAD = 0.25 TSF



DEFORMATION VS. LOG OF TIME
B-2A, 23 to 25 feet
LOAD = 0.25 TSF



Sample No.:	SCI B-2A, 24'
Exploration No.:	B-2A
Depth:	23 - 25 feet

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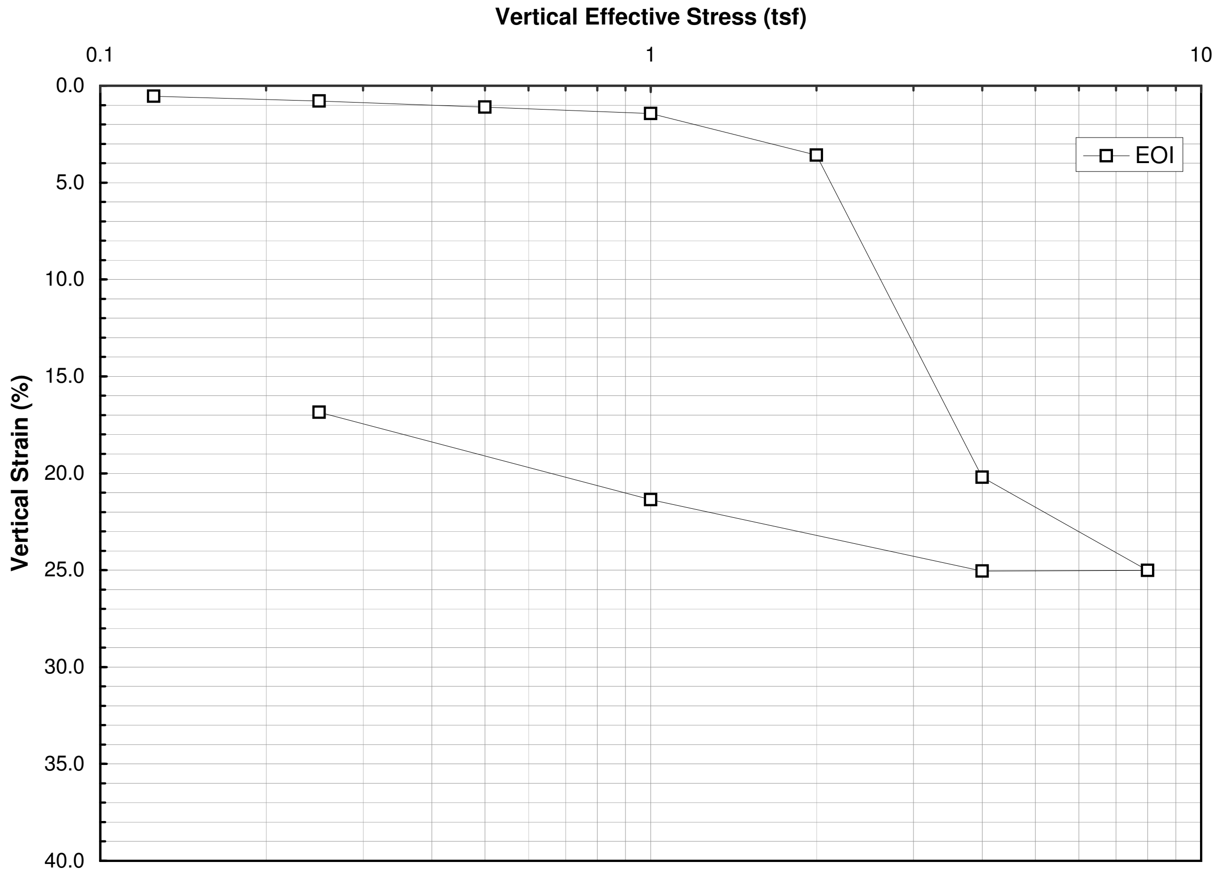
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554



CONSOLIDATION PARAMETERS

Probable Preconsolidation Stress, P'_c (tsf):	1.9
Approx. Hydrostatic Effective Stress, P'_o (tsf)	0.7
Vertical Strain at P'_o (%):	1.2
Compression Ratio (CR):	0.55
Recompression Ratio (RR):	0.067
Over Consolidation Ratio (OCR):	2.6

TEST METHOD

Test Method:	ASTM D-2435 A
Trimming Procedure:	2.5-inch Trimming Lathe
Pressure at Inundation:	0.125 tsf
Method to Compute C_v:	ASTM D-2435 12.3.2

SAMPLE ID

Test No.:	SCI B-2A, 36'
Sample No.:	UD2
Exploration No.:	B-2A
Depth:	35 to 37 feet
USCS Description:	Fat CLAY (CH)

SAMPLE DATA

Sample Diameter (cm):	6.35
Sample Area (cm^2):	31.67
Measured Specific Gravity:	2.67
Trimmings Moisture (%):	83.1
% Passing #200 Sieve:	94.9
Liquid Limit:	92
Plastic Limit:	25
Plasticity Index:	67

	Initial	Final
Water Content (%):	91.9	76.3
Est. % Saturation:	100.0	100.0
Sample Height (cm):	2.540	2.112
Wet Sample Weight (g):	119.9	110.1
Dry Sample Weight (g):	62.5	62.5
Dry Unit Weight (pcf):	48.4	58.2
Void Ratio, e:	2.44	1.86
Solids Height (cm):	0.739	0.739

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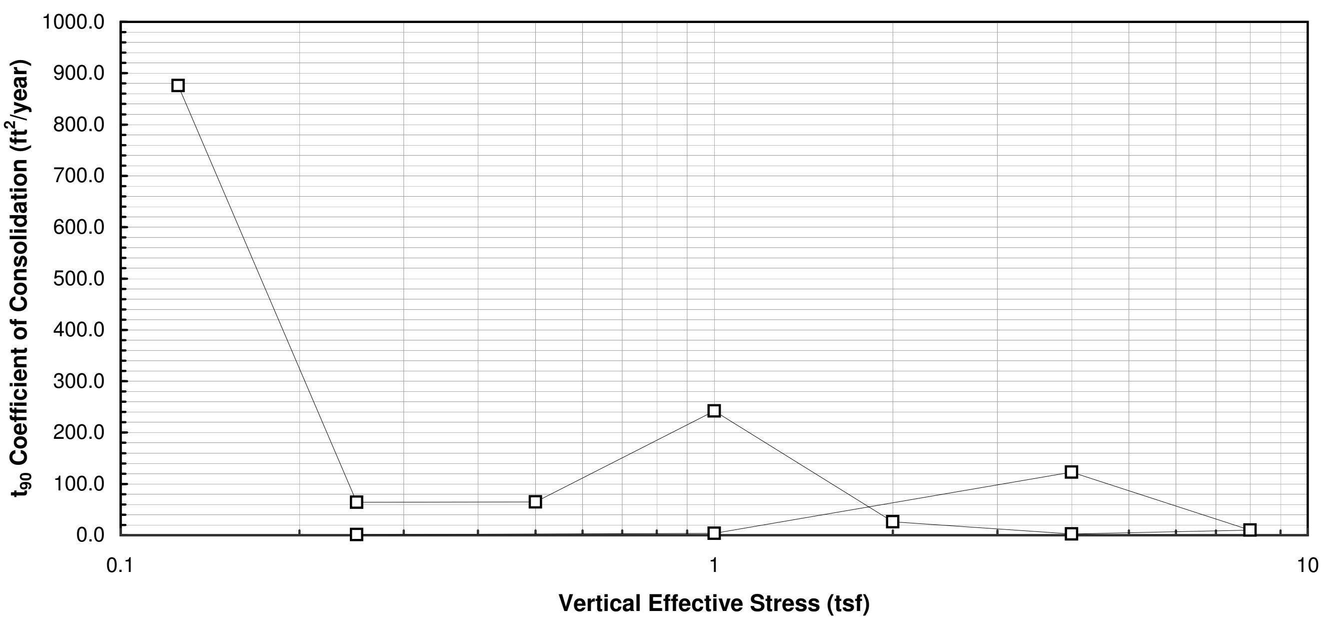
ONE-DIMENSIONAL CONSOLIDATION TEST

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

Test No.: SCI B-2A, 36'
Sample No.: UD2
Exploration No.: B-2A
Depth: 35 to 37 feet

LOAD INC.	STRESS DURATION (Hr - min)	VERTICAL STRESS (tsf)	VERTICAL STRAIN (EOI*)	VERTICAL STRAIN (EOP*)	VOID RATIO e (EOI*)	VOID RATIO e (EOP*)	STRESS RATIO (P'/P'c)	TAYLOR COEFFICIENT OF CONSOLIDATION (ft^2/year)
1	24-00	0.125	0.6	0.2	2.42	2.43	0.07	875.8
2	24-00	0.25	0.8	0.7	2.41	2.41	0.13	64.1
3	24-00	0.5	1.1	1.0	2.40	2.40	0.26	65.2
4	24-03	1	1.4	1.3	2.39	2.40	0.53	242.1
5	24-00	2	3.6	2.7	2.32	2.34	1.05	26.3
6	24-00	4	20.2	17.4	1.74	1.84	2.11	2.7
7	24-03	8	25.0	25.0	1.58	1.58	4.21	9.9
8	24-03	4	25.0	25.1	1.58	1.58	2.11	123.1
9	24-03	1	21.4	21.9	1.70	1.69	0.53	3.7
10	24-03	0.25	16.9	17.0	1.86	1.86	0.13	1.0

*EOI = End of Increment
*EOP = End of Primary



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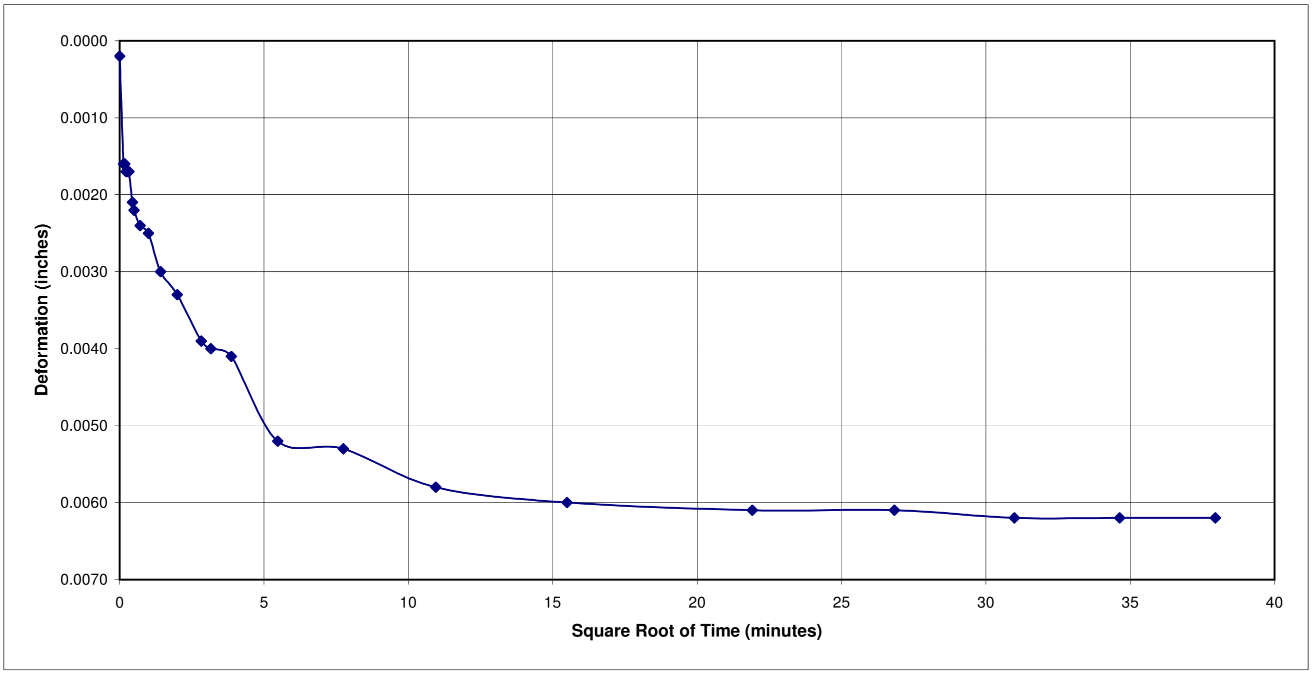
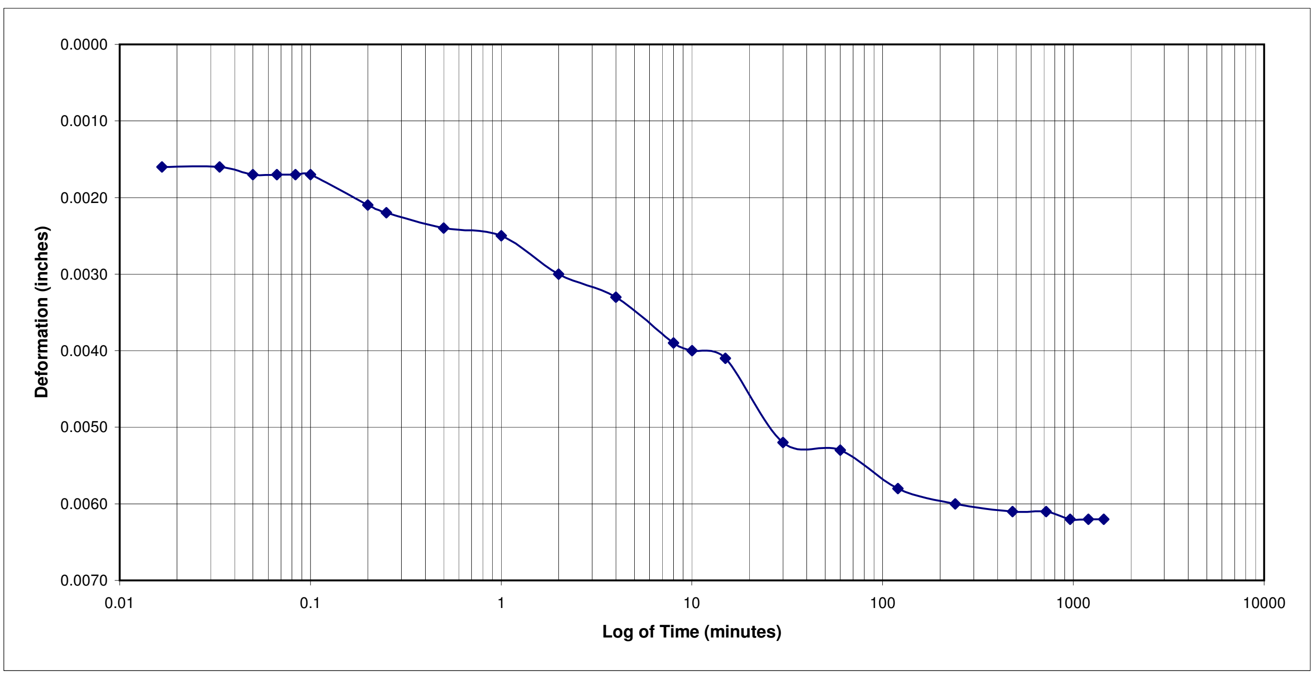
ONE-DIMENSIONAL CONSOLIDATION TEST

Project: Port Access Road
Client: SCDOT
Location: North Charleston, South Carolina
Project No. 1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-2A, 35 to 37 feet
LOAD = 0.125 TSF



DEFORMATION VS. LOG OF TIME
B-2A, 35 to 37 feet
LOAD = 0.125 TSF



Sample No.:	SCI B-2A, 36'
Exploration No.:	B-2A
Depth:	35 - 37 feet

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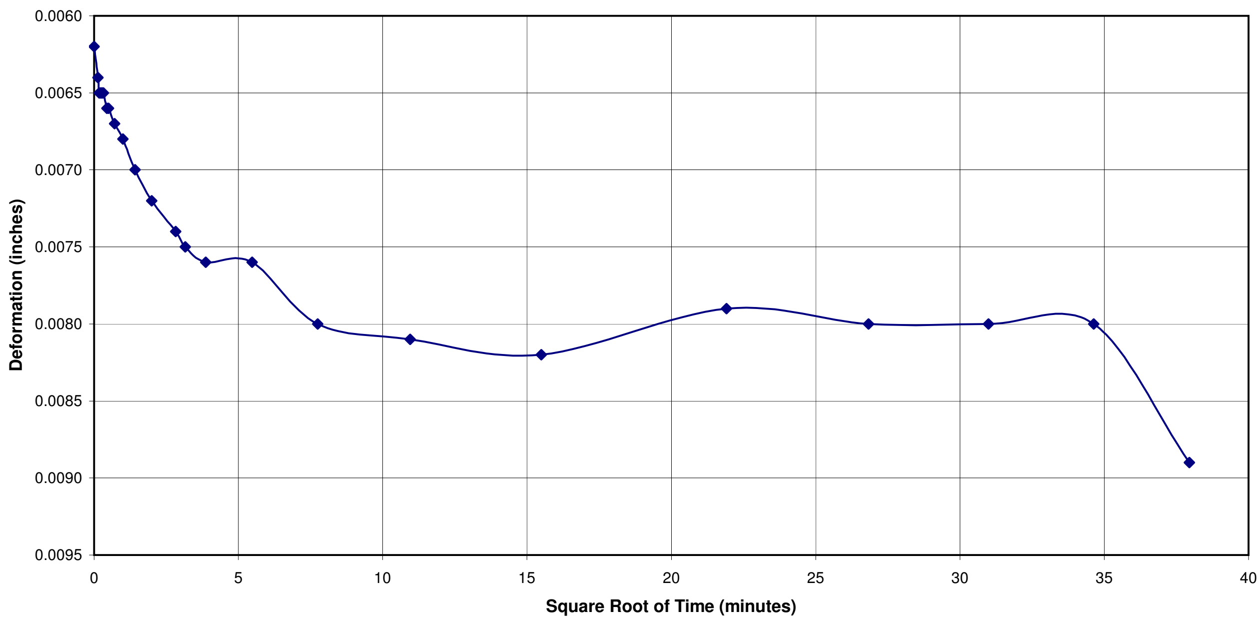
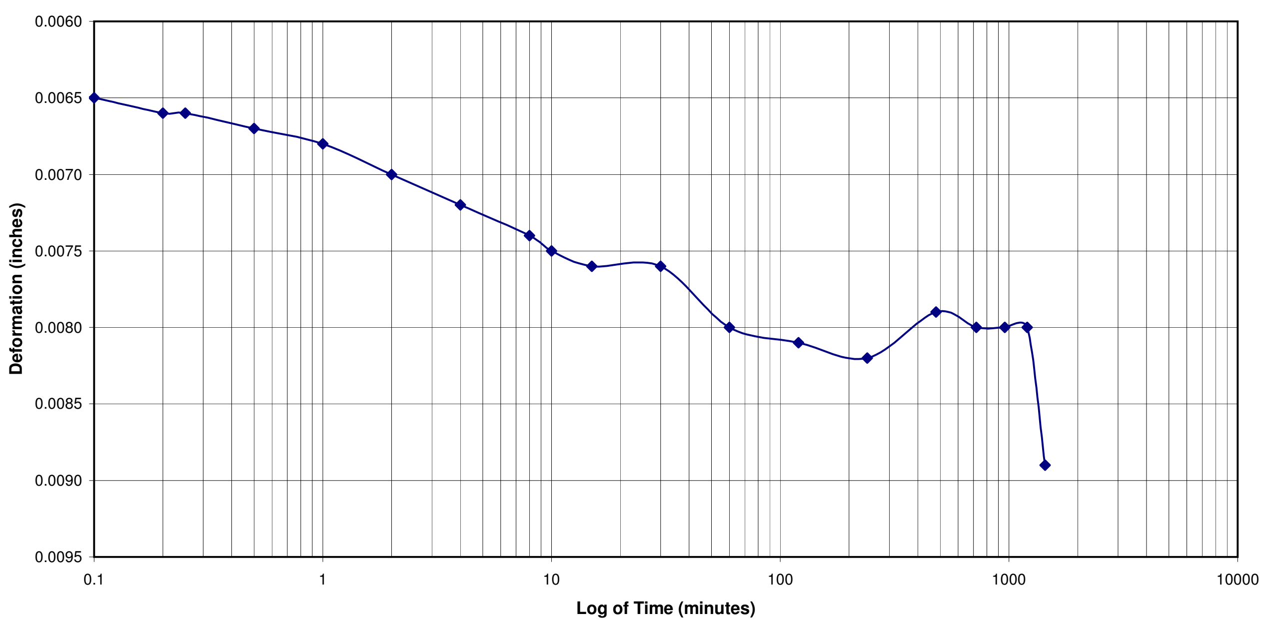
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-2A, 35 to 37 feet
LOAD = 0.25 TSF



DEFORMATION VS. LOG OF TIME
B-2A, 35 to 37 feet
LOAD = 0.25 TSF



Sample No.:	SCI B-2A, 36'
Exploration No.:	B-2A
Depth:	35 - 37 feet

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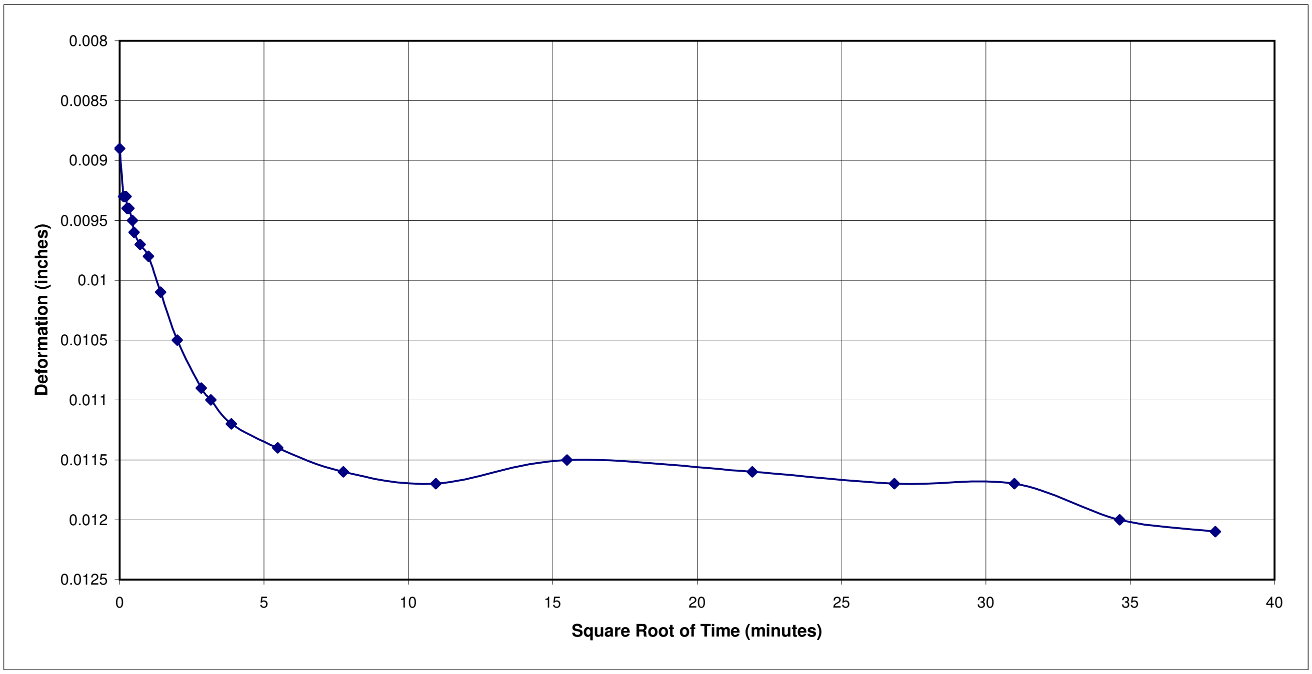
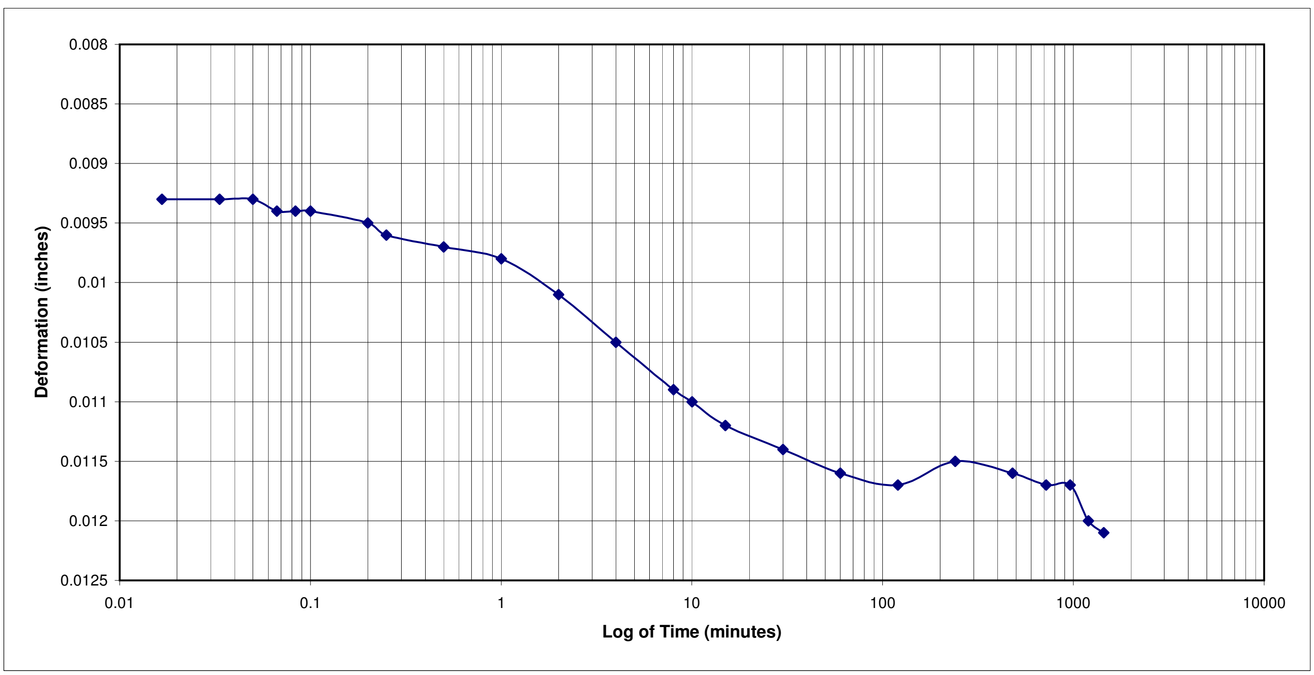
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-2A, 35 to 37 feet
LOAD = 0.5 TSF



DEFORMATION VS. LOG OF TIME
B-2A, 35 to 37 feet
LOAD = 0.5 TSF



Sample No.:	SCI B-2A, 36'
Exploration No.:	B-2A
Depth:	35 - 37 feet

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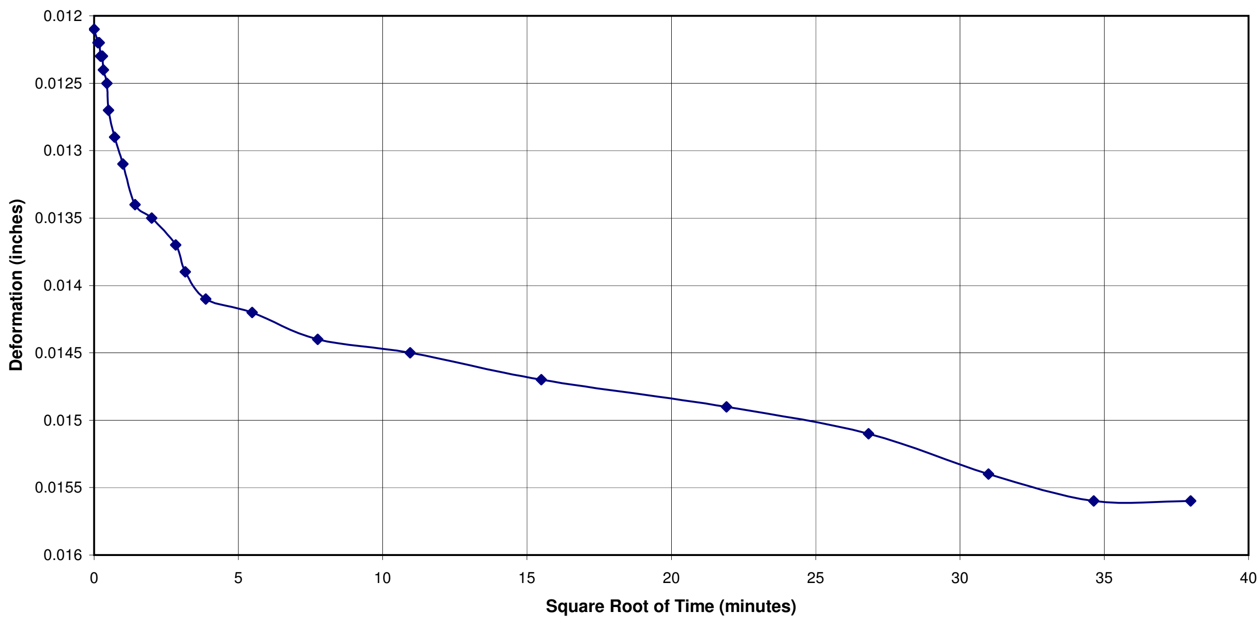
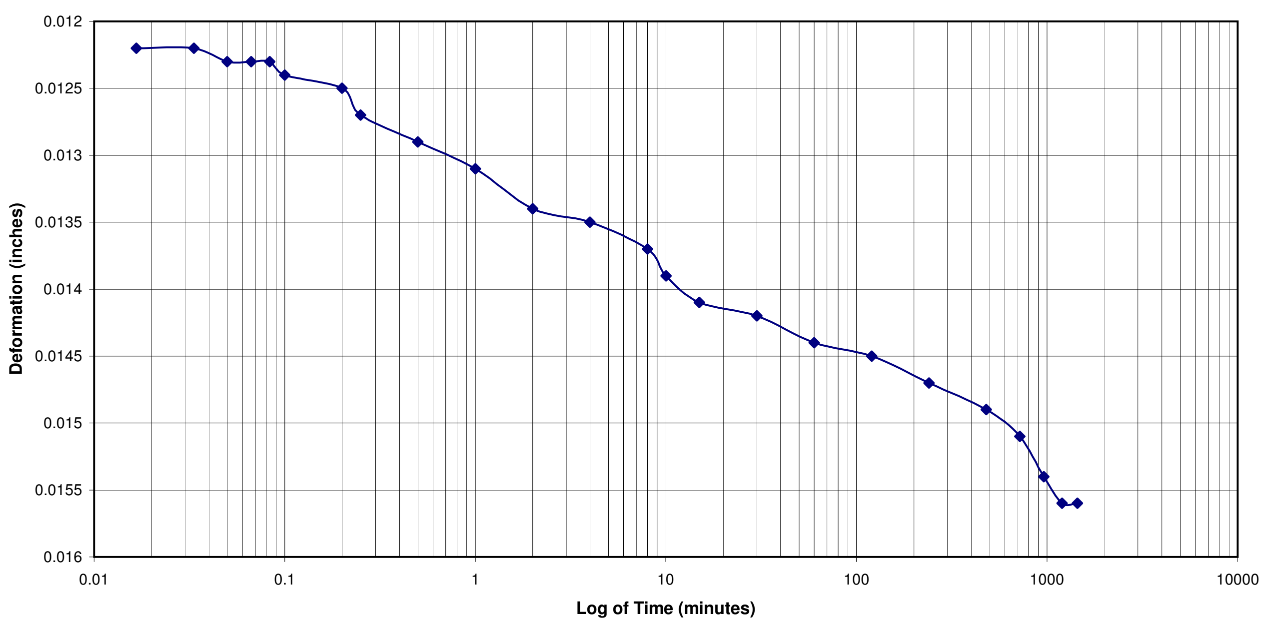
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-2A, 35 to 37 feet
LOAD = 1.0 TSF



DEFORMATION VS. LOG OF TIME
B-2A, 35 to 37 feet
LOAD = 1.0 TSF



Sample No.:	SCI B-2A, 36'
Exploration No.:	B-2A
Depth:	35 - 37 feet

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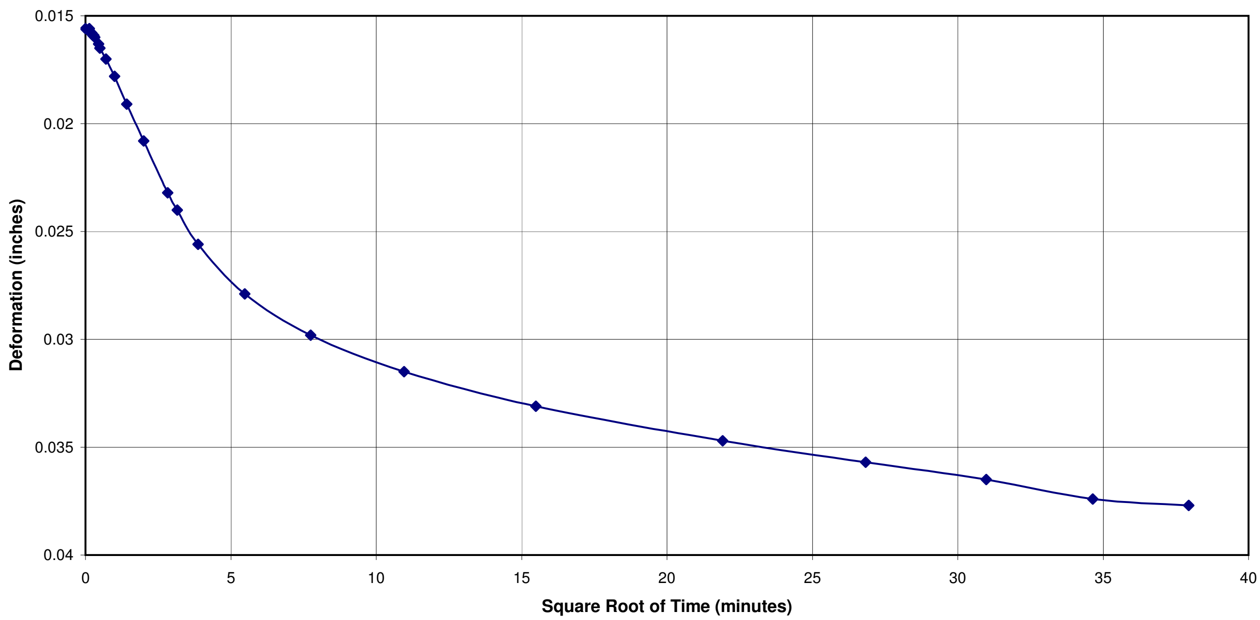
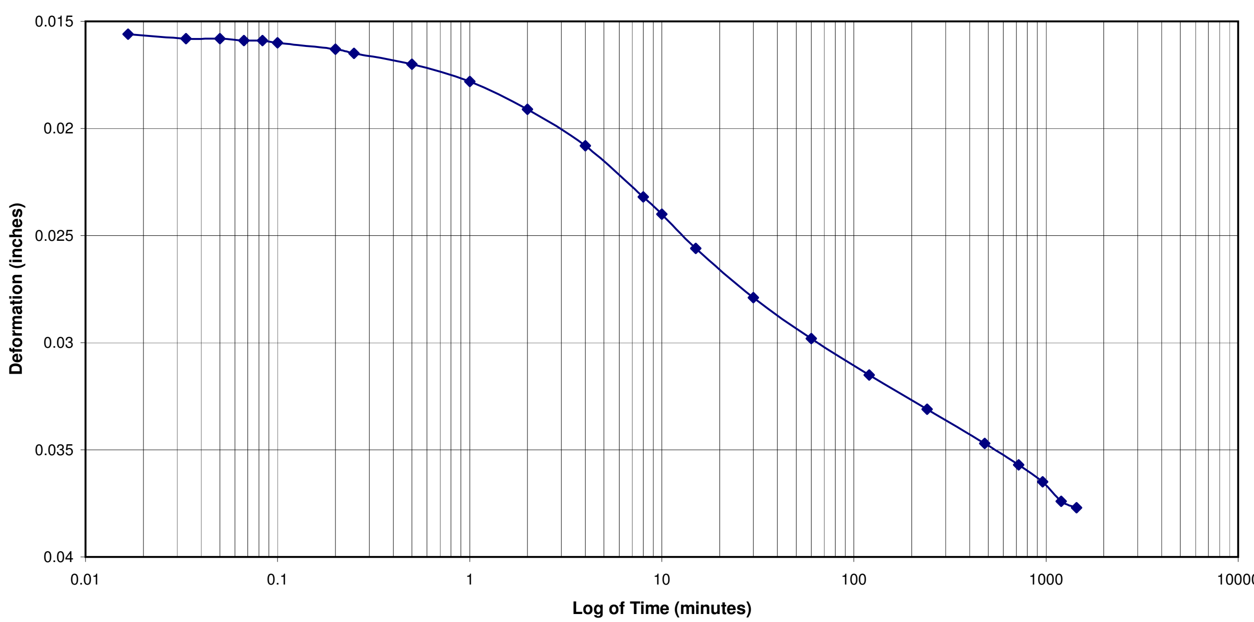
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-2A, 35 to 37 feet
LOAD = 2.0 TSF



DEFORMATION VS. LOG OF TIME
B-2A, 35 to 37 feet
LOAD = 2.0 TSF



Sample No.:	SCI B-2A, 36'
Exploration No.:	B-2A
Depth:	35 - 37 feet

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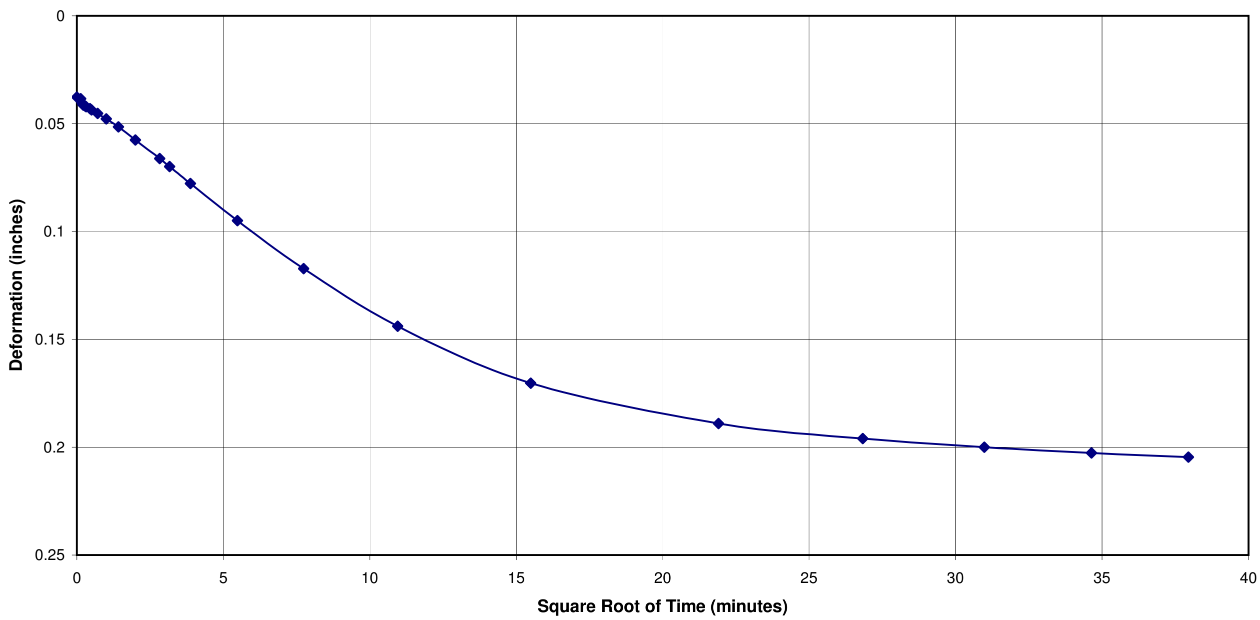
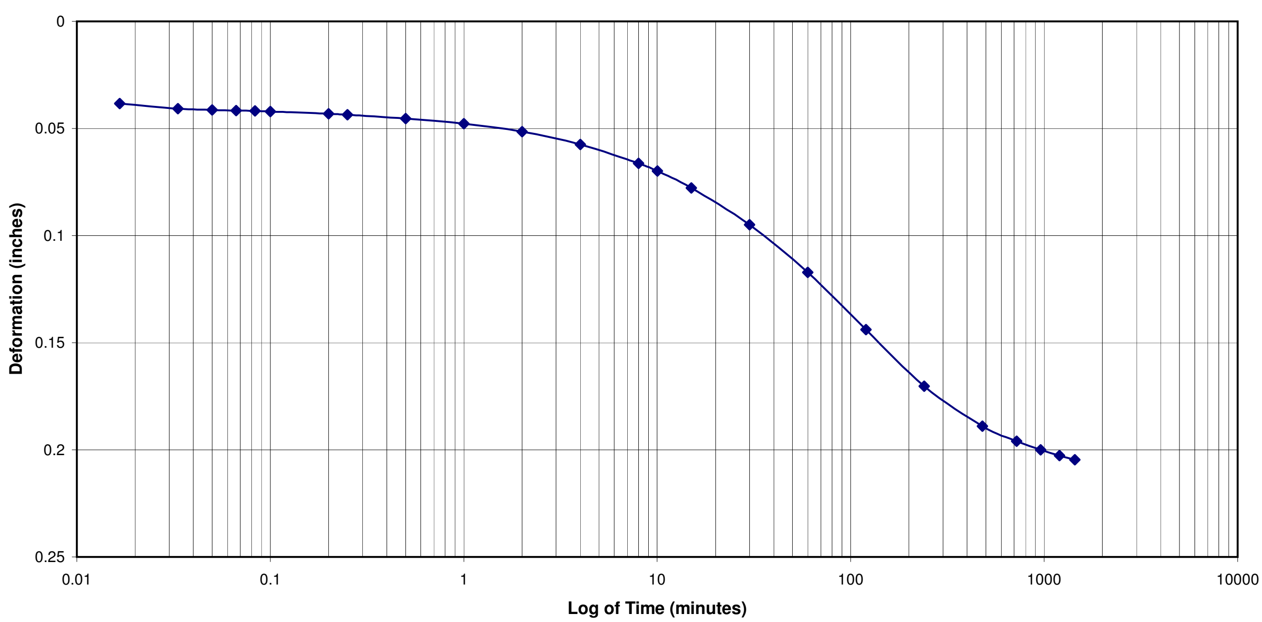
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-2A, 35 to 37 feet
LOAD = 4.0 TSF



DEFORMATION VS. LOG OF TIME
B-2A, 35 to 37 feet
LOAD = 4.0 TSF



Sample No.:	SCI B-2A, 36'
Exploration No.:	B-2A
Depth:	35 - 37 feet

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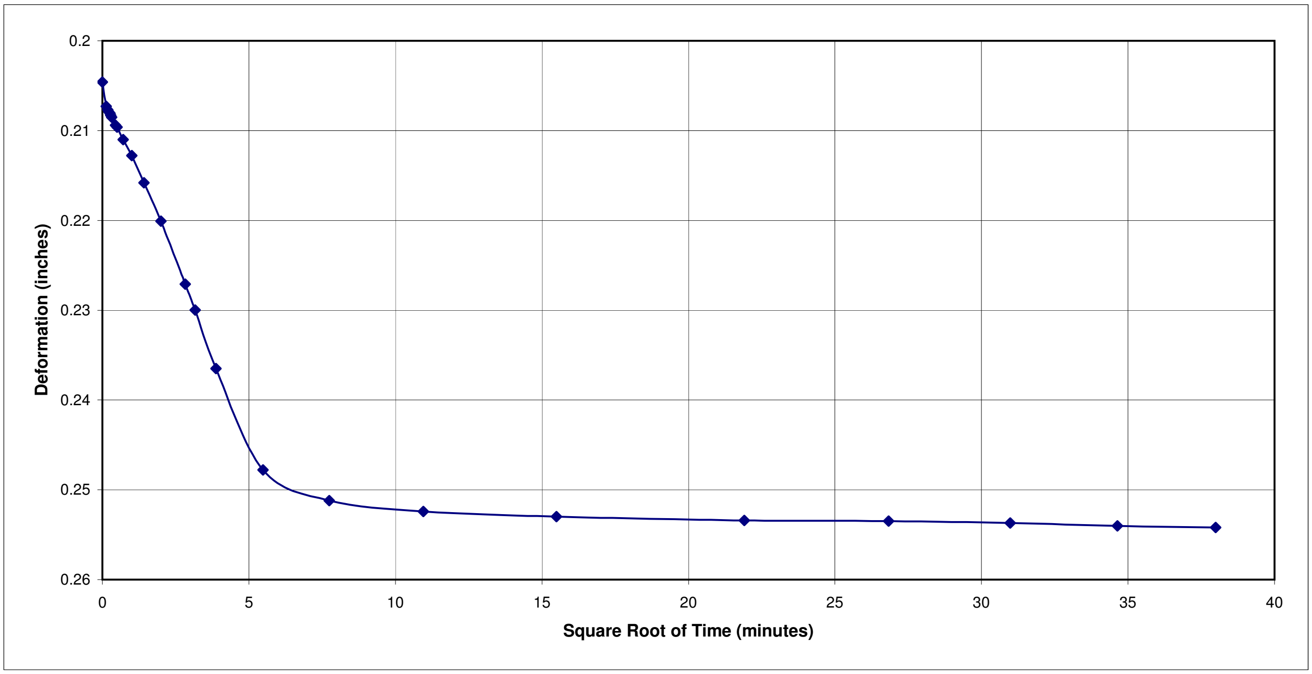
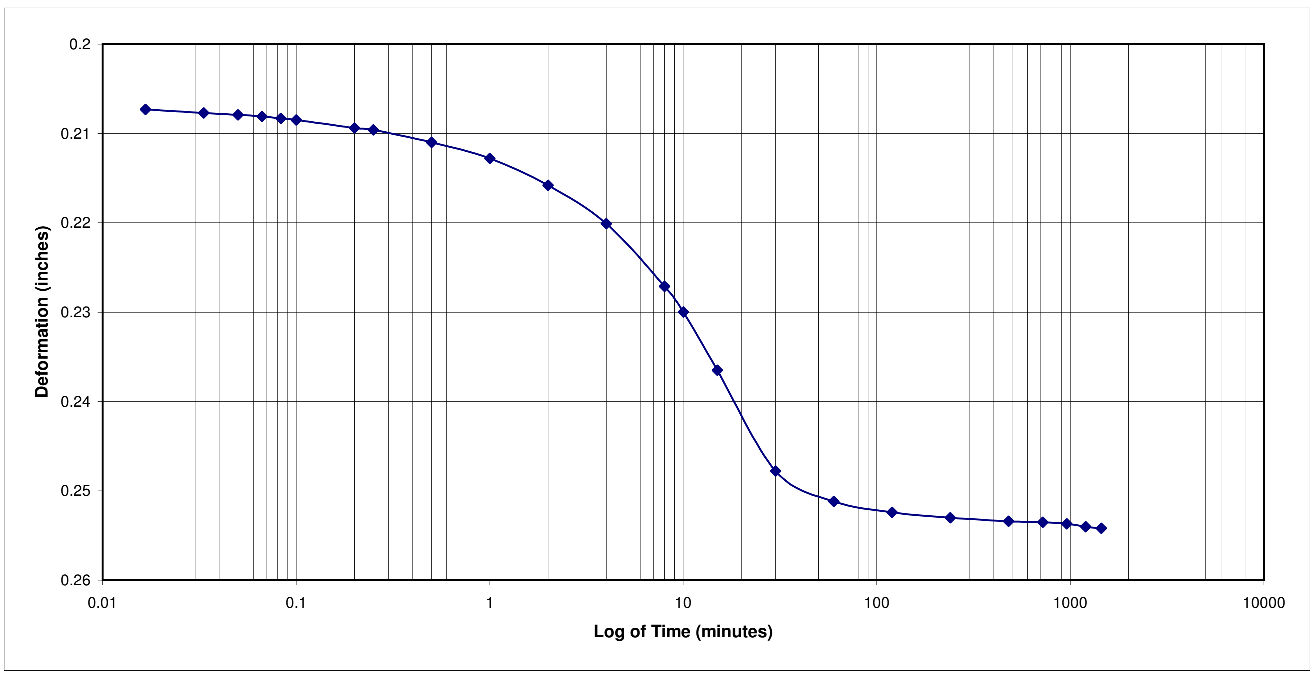
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-2A, 35 to 37 feet
LOAD = 8.0 TSF



DEFORMATION VS. LOG OF TIME
B-2A, 35 to 37 feet
LOAD = 8.0 TSF



Sample No.:	SCI B-2A, 36'
Exploration No.:	B-2A
Depth:	35 - 37 feet

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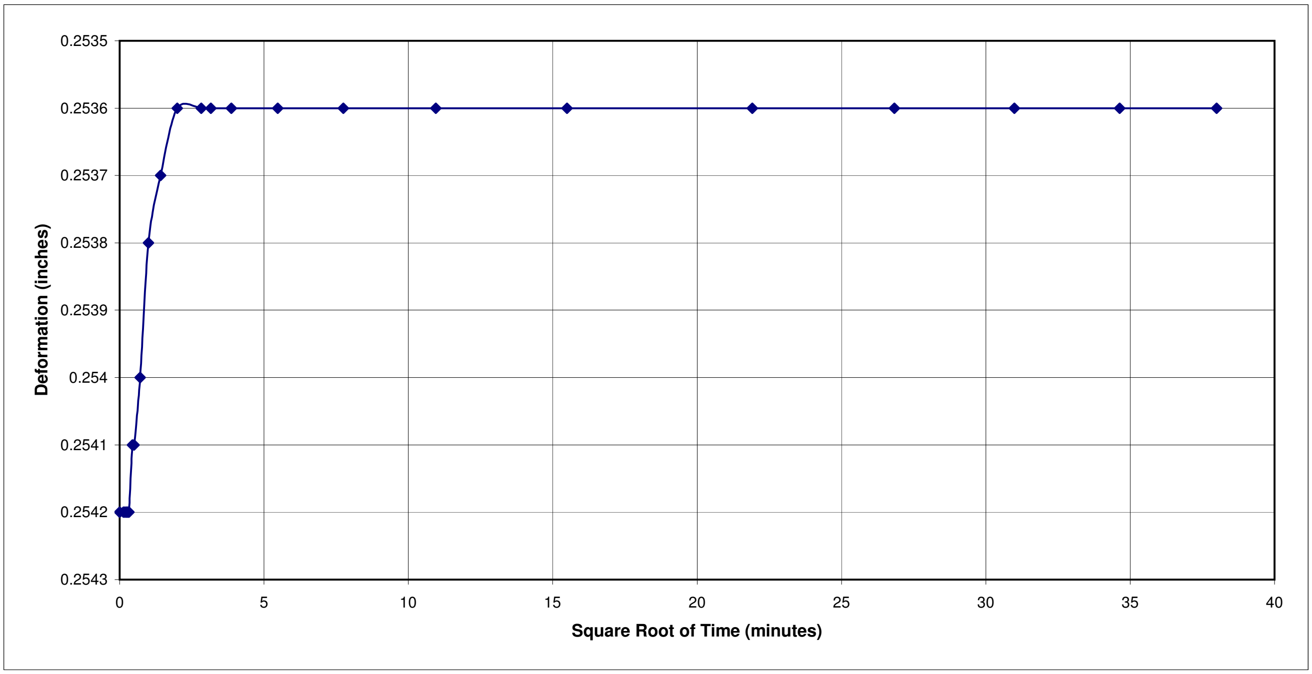
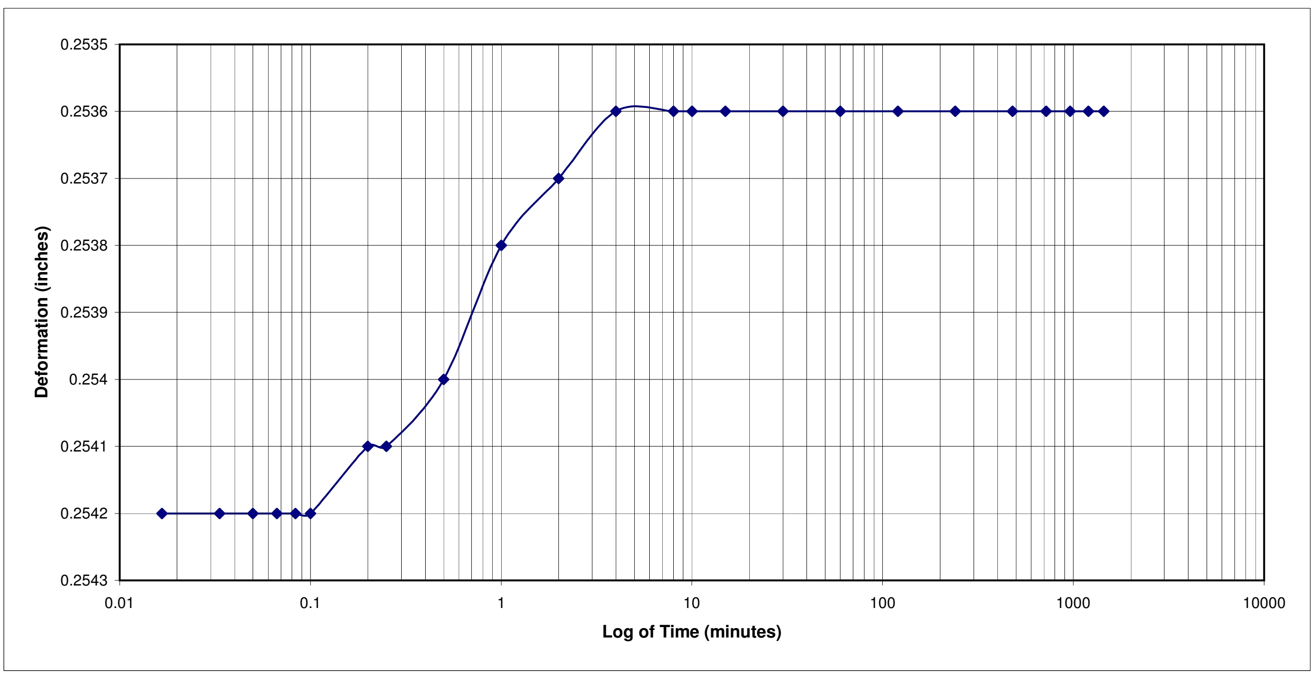
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-2A, 35 to 37 feet
LOAD = 4.0 TSF



DEFORMATION VS. LOG OF TIME
B-2A, 35 to 37 feet
LOAD = 4.0 TSF



Sample No.:	SCI B-2A, 36'
Exploration No.:	B-2A
Depth:	35 - 37 feet

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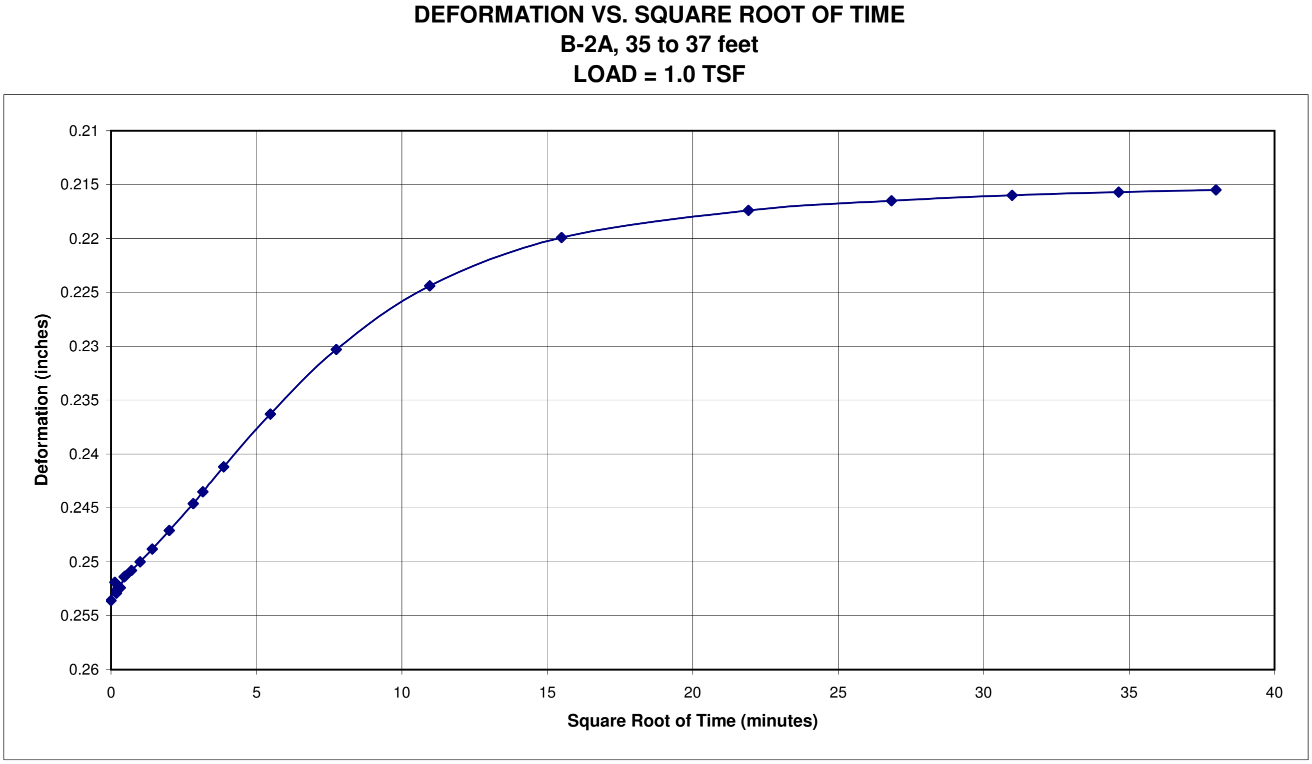
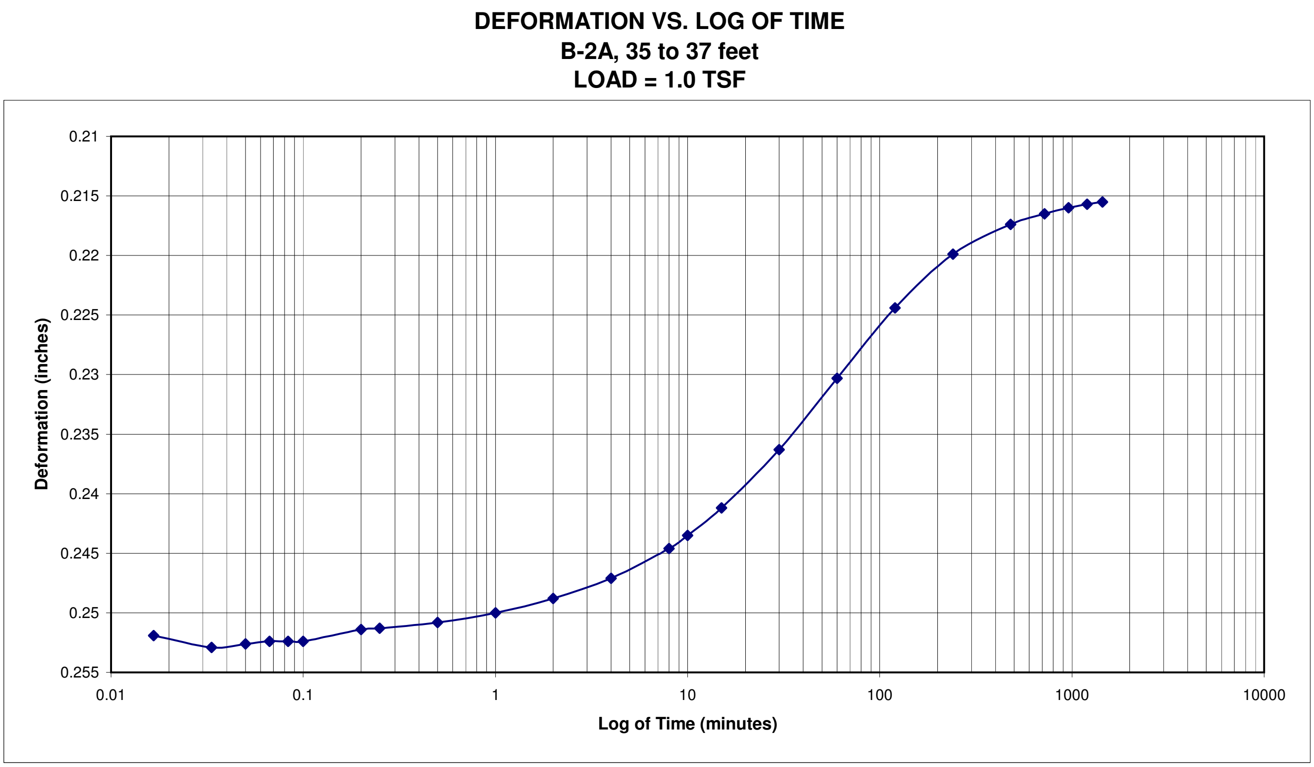
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554





Sample No.:	SCI B-2A, 36'
Exploration No.:	B-2A
Depth:	35 - 37 feet

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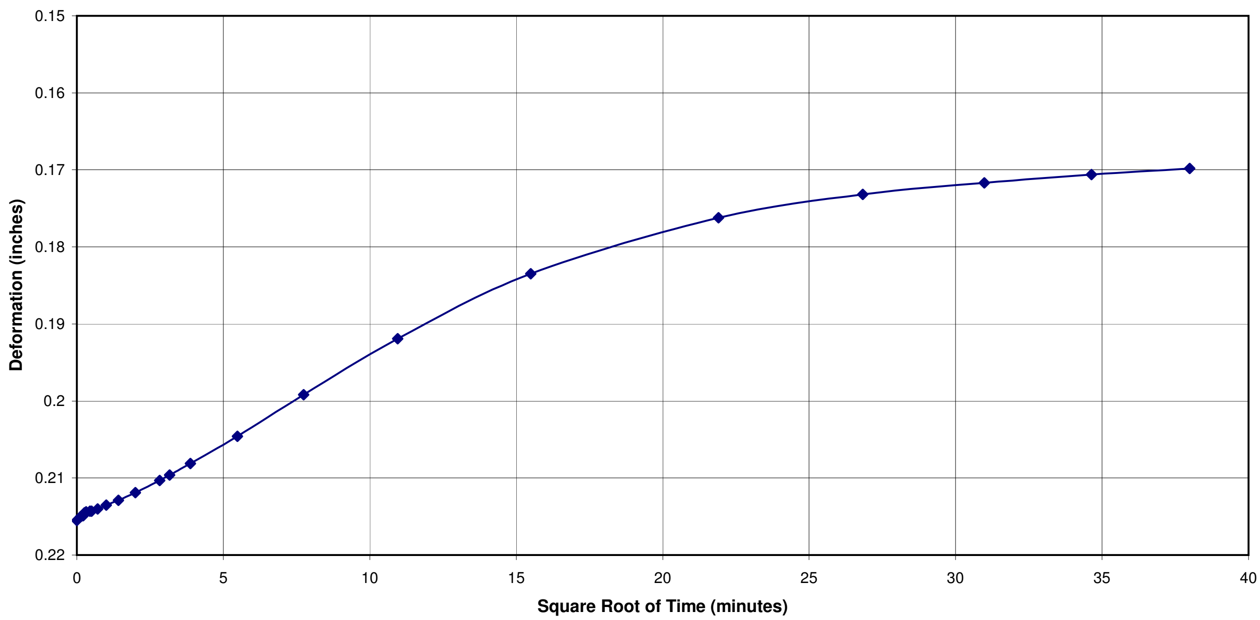
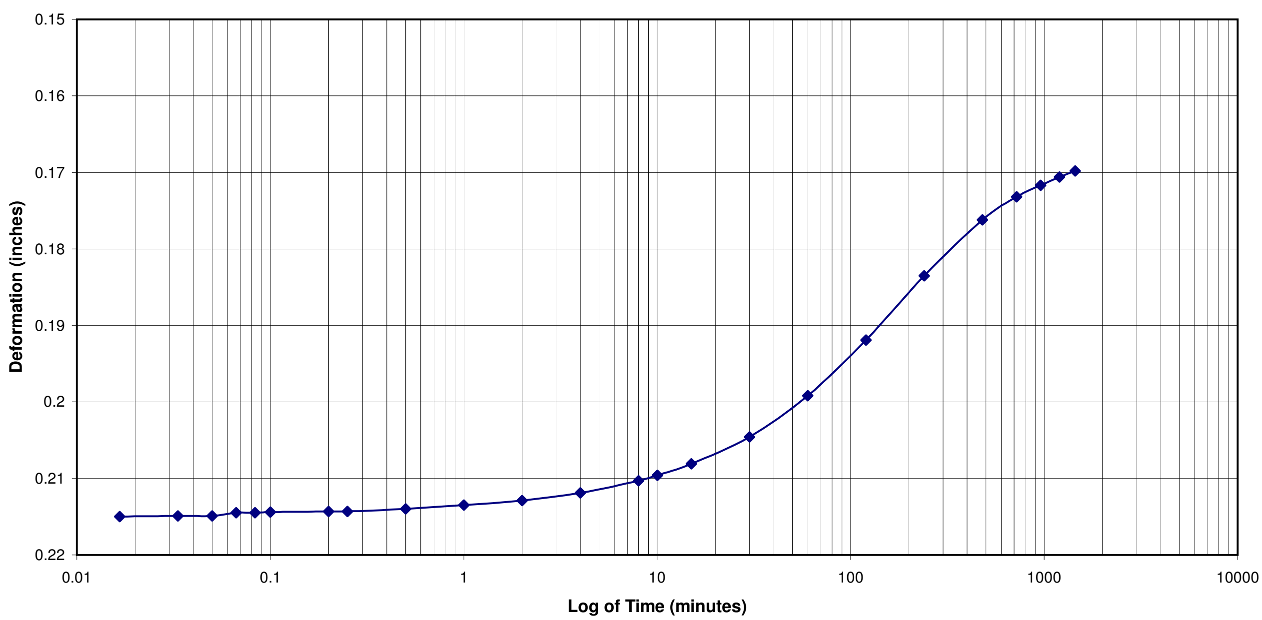
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-2A, 35 to 37 feet
LOAD = 0.25 TSF



DEFORMATION VS. LOG OF TIME
B-2A, 35 to 37 feet
LOAD = 0.25 TSF



Sample No.:	SCI B-2A, 36'
Exploration No.:	B-2A
Depth:	35 - 37 feet

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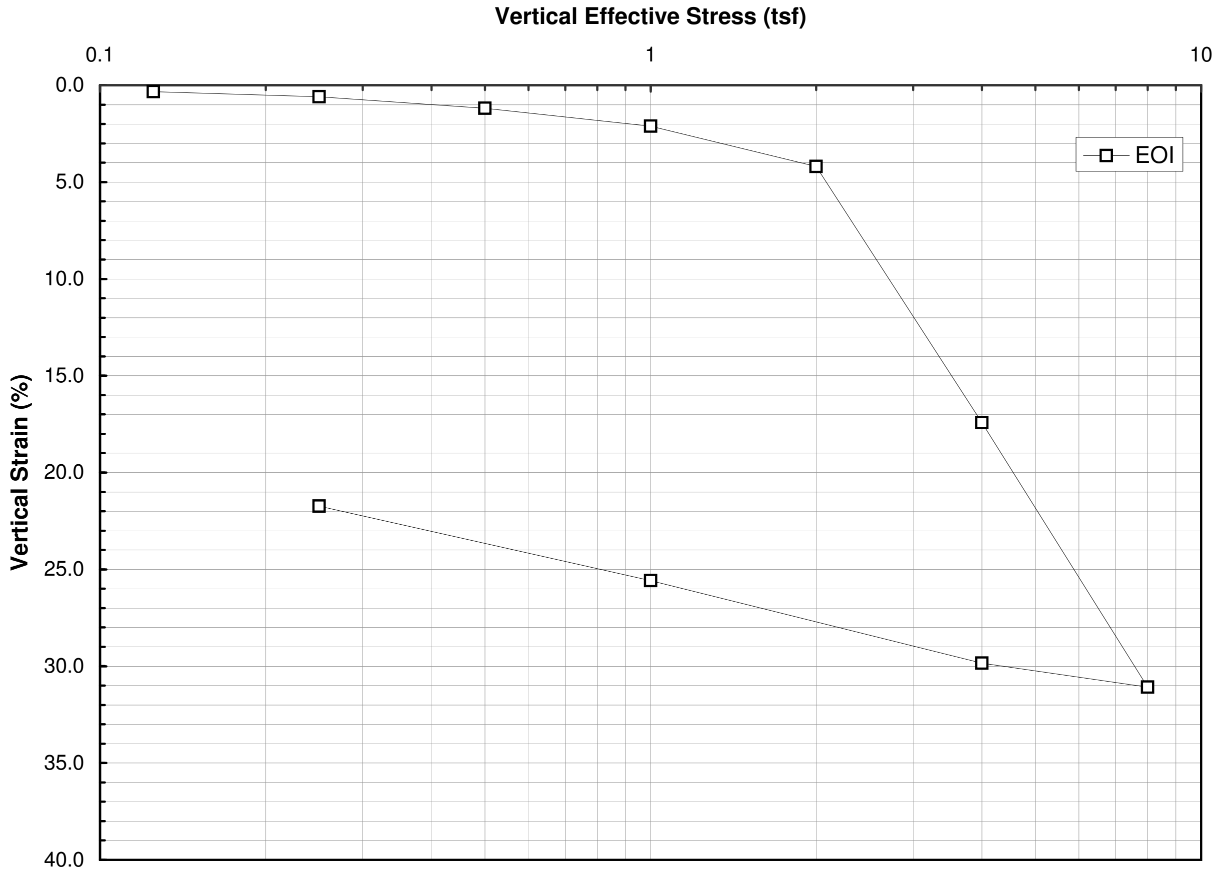
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554



CONSOLIDATION PARAMETERS

Probable Preconsolidation Stress, P'_c (tsf):	1.9
Approx. Hydrostatic Effective Stress, P'_o (tsf)	0.6
Vertical Strain at P'_o (%):	1.5
Compression Ratio (CR):	0.30
Recompression Ratio (RR):	0.067
Over Consolidation Ratio (OCR):	3.3

TEST METHOD

Test Method:	ASTM D-2435 A
Trimming Procedure:	2.5-inch Trimming Lathe
Pressure at Inundation:	0.125 tsf
Method to Compute C_v:	ASTM D-2435 12.3.2

SAMPLE ID

Test No.:	SCI B-3A, 27'
Sample No.:	UD1
Exploration No.:	B-3A
Depth:	26 to 28 feet
USCS Description:	Sandy fat CLAY (CH)

SAMPLE DATA

Sample Diameter (cm):	6.35
Sample Area (cm^2):	31.67
Measured Specific Gravity:	2.67
Trimmings Moisture (%):	85.7
% Passing #200 Sieve:	61.7
Liquid Limit:	73
Plastic Limit:	20
Plasticity Index:	53

	Initial	Final
Water Content (%):	89.9	63.8
Est. % Saturation:	99.5	100.0
Sample Height (cm):	2.540	1.988
Wet Sample Weight (g):	119.6	103.1
Dry Sample Weight (g):	62.9	62.9
Dry Unit Weight (pcf):	48.8	62.4
Void Ratio, e:	2.41	1.67
Solids Height (cm):	0.744	0.744

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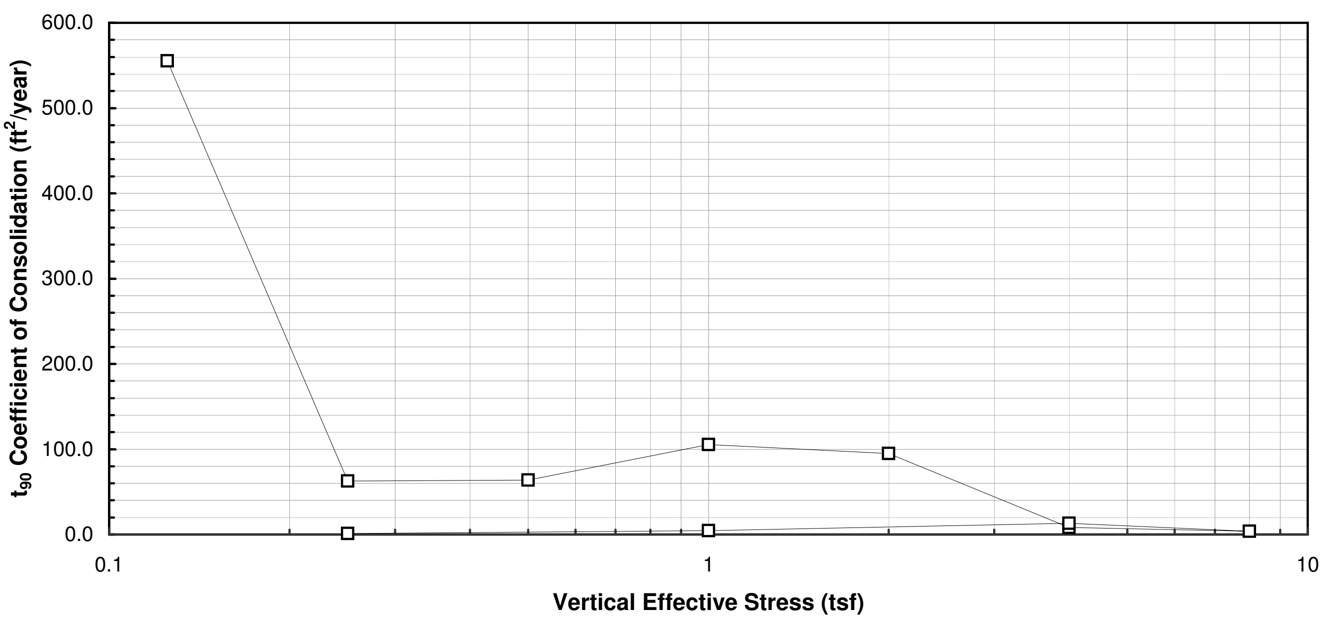
ONE-DIMENSIONAL CONSOLIDATION TEST

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

Test No.: SCI B-3A, 27'
Sample No.: UD1
Exploration No.: B-3A
Depth: 26 to 28 feet

LOAD INC.	STRESS DURATION (Hr - min)	VERTICAL STRESS (tsf)	VERTICAL STRAIN (EOI*)	VERTICAL STRAIN (EOP*)	VOID RATIO e (EOI*)	VOID RATIO e (EOP*)	STRESS RATIO (P'/P'c)	TAYLOR COEFFICIENT OF CONSOLIDATION (ft^2/year)
1	23-52	0.125	0.3	0.0	2.40	2.41	0.07	555.5
2	21-51	0.25	0.6	0.5	2.39	2.39	0.13	62.5
3	23-25	0.5	1.2	1.0	2.37	2.38	0.26	63.7
4	24-01	1	2.1	1.9	2.34	2.35	0.53	105.4
5	21-31	2	4.2	3.4	2.27	2.30	1.05	95.0
6	20-01	4	17.4	13.3	1.82	1.96	2.11	8.2
7	24-01	8	31.1	29.2	1.35	1.42	4.21	3.8
8	24-01	4	29.8	30.1	1.39	1.39	2.11	13.0
9	24-01	1	25.6	26.5	1.54	1.51	0.53	4.5
10	24-01	0.25	21.7	21.9	1.67	1.66	0.13	0.9

*EOI = End of Increment
*EOP = End of Primary



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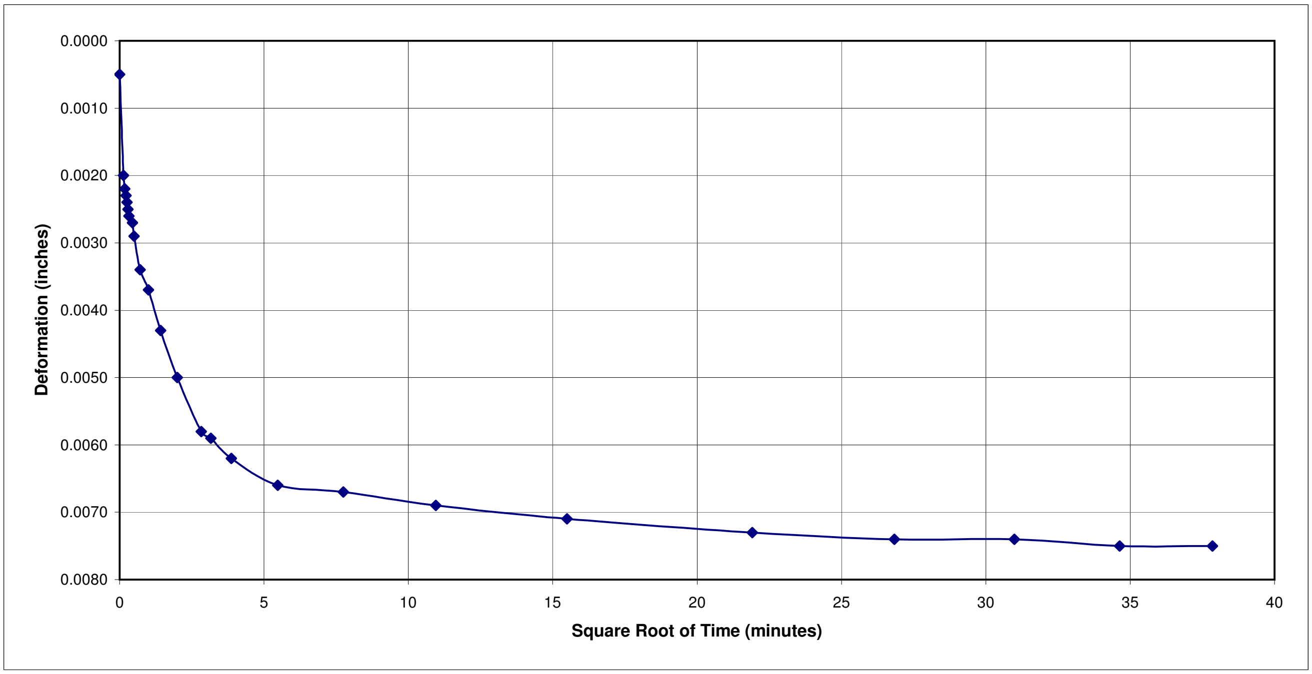
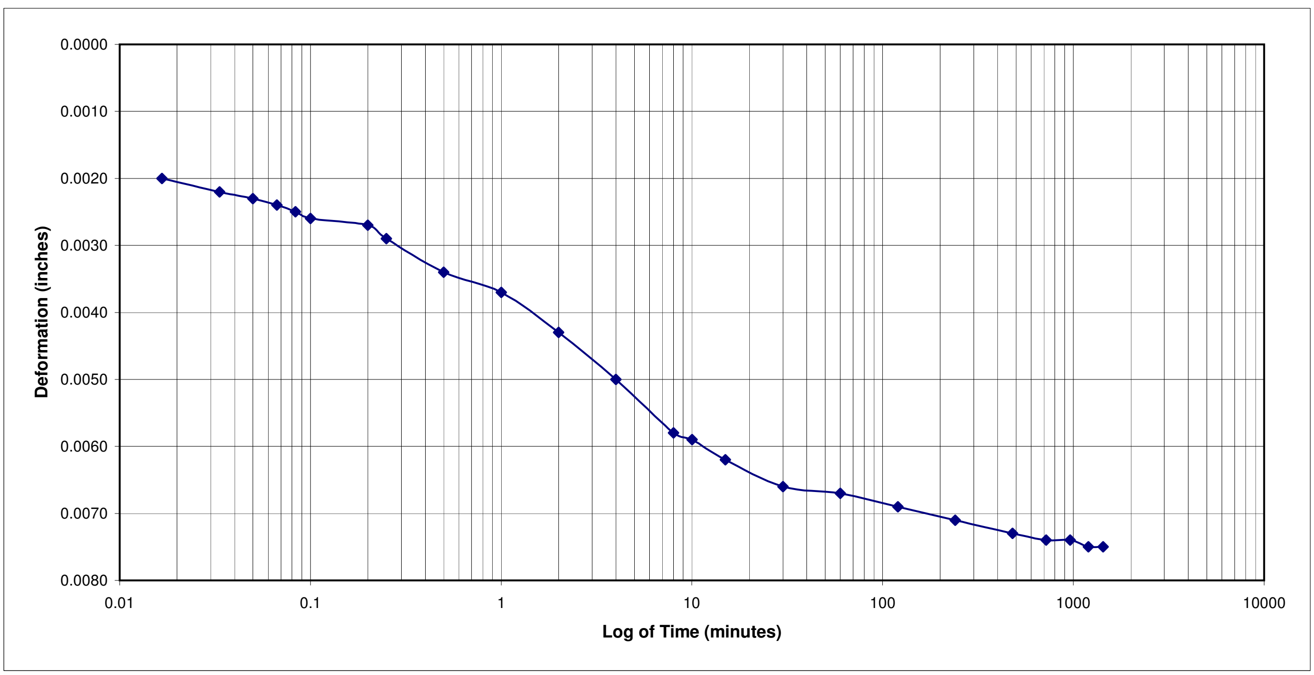
ONE-DIMENSIONAL CONSOLIDATION TEST

Project: Port Access Road
Client: SCDOT
Location: North Charleston, South Carolina
Project No. 1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-3A, 26 to 28 feet
LOAD = 0.125 TSF



DEFORMATION VS. LOG OF TIME
B-3A, 26 to 28 feet
LOAD = 0.125 TSF



Sample No.:	SCI B-3A, 27'
Exploration No.:	B-3A
Depth:	26 - 28 feet

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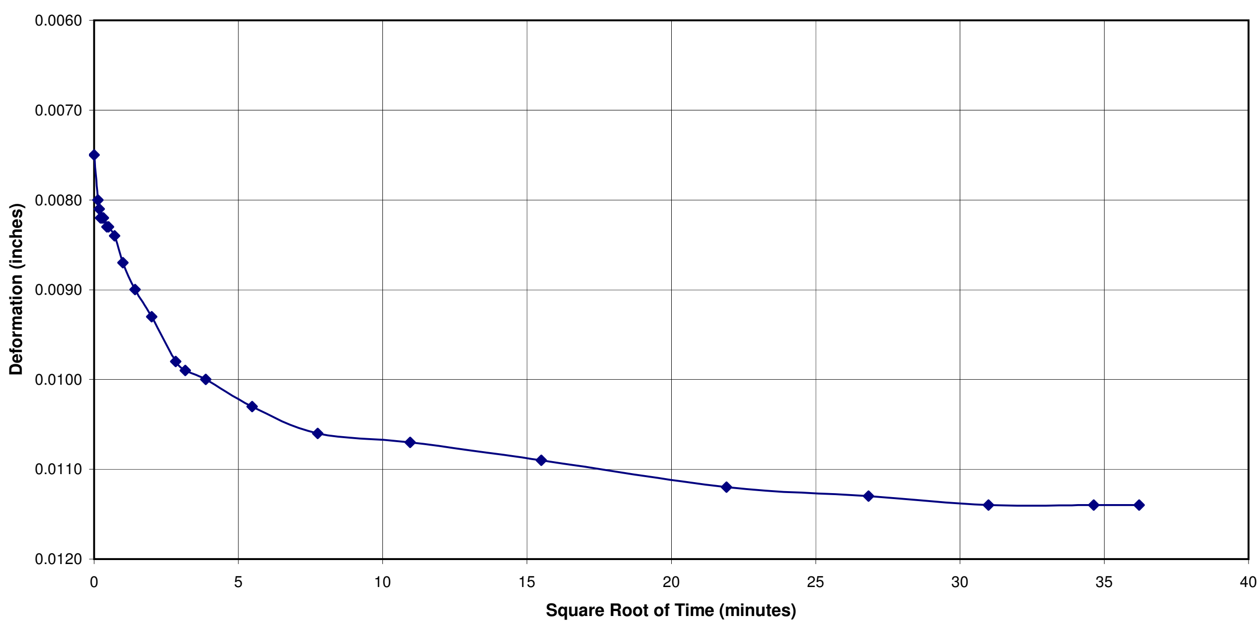
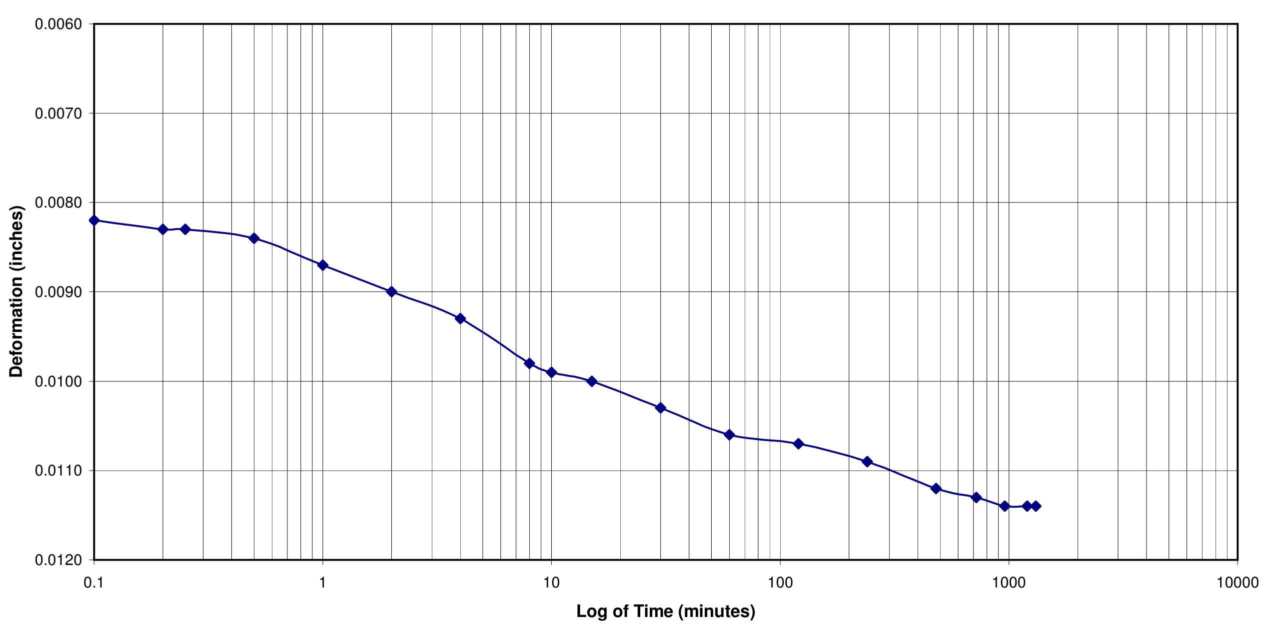
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-3A, 26 to 28 feet
LOAD = 0.25 TSF



DEFORMATION VS. LOG OF TIME
B-3A, 26 to 28 feet
LOAD = 0.25 TSF



Sample No.:	SCI B-3A, 27'
Exploration No.:	B-3A
Depth:	26 - 28 feet

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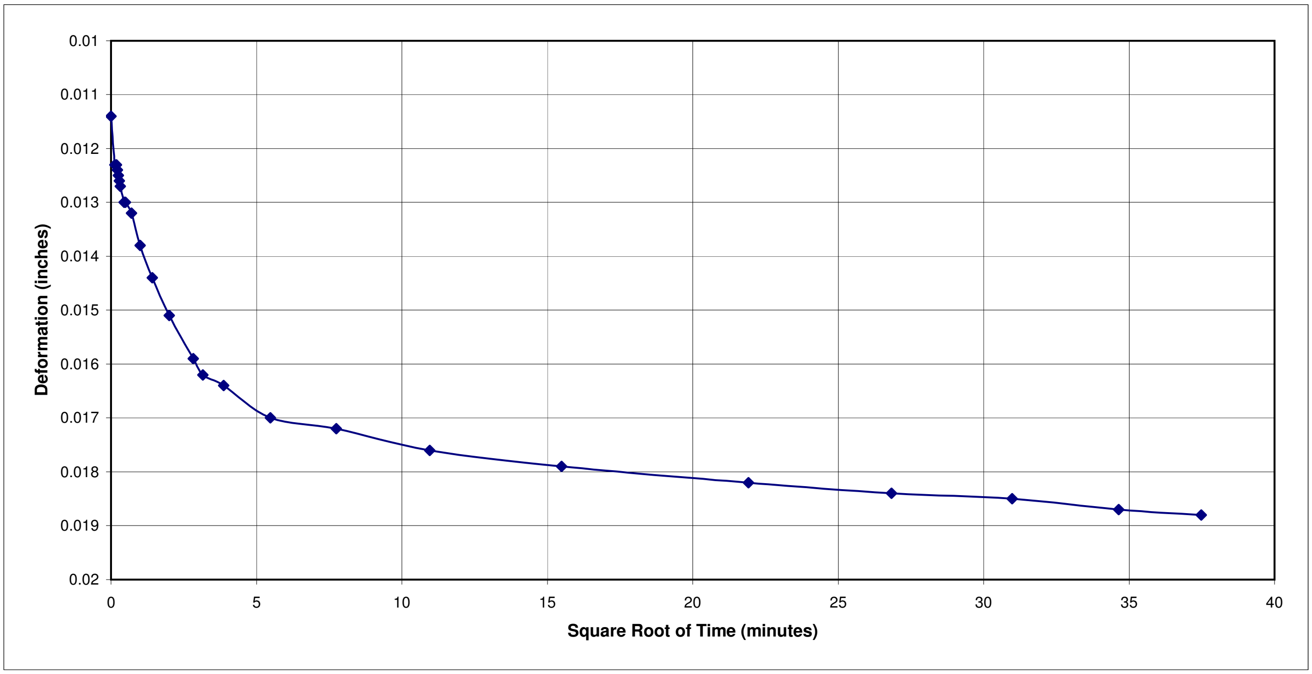
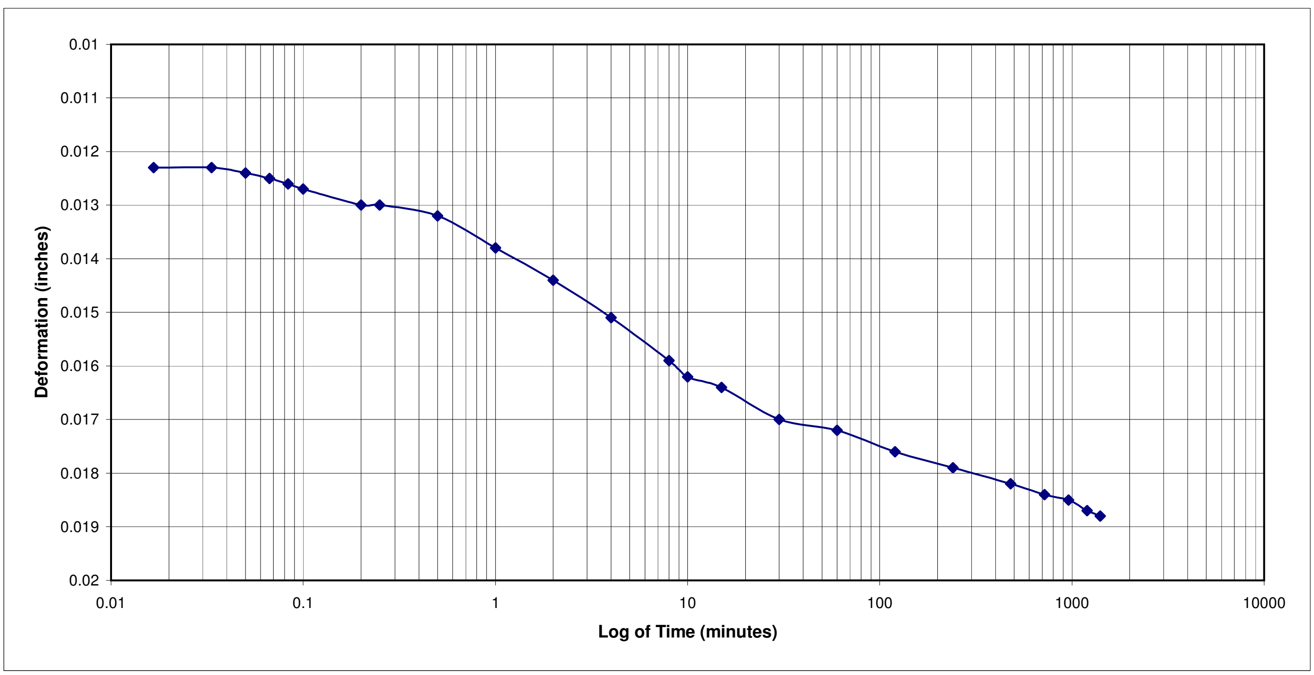
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-3A, 26 to 28 feet
LOAD = 0.5 TSF



DEFORMATION VS. LOG OF TIME
B-3A, 26 to 28 feet
LOAD = 0.5 TSF



Sample No.:	SCI B-3A, 27'
Exploration No.:	B-3A
Depth:	26 - 28 feet

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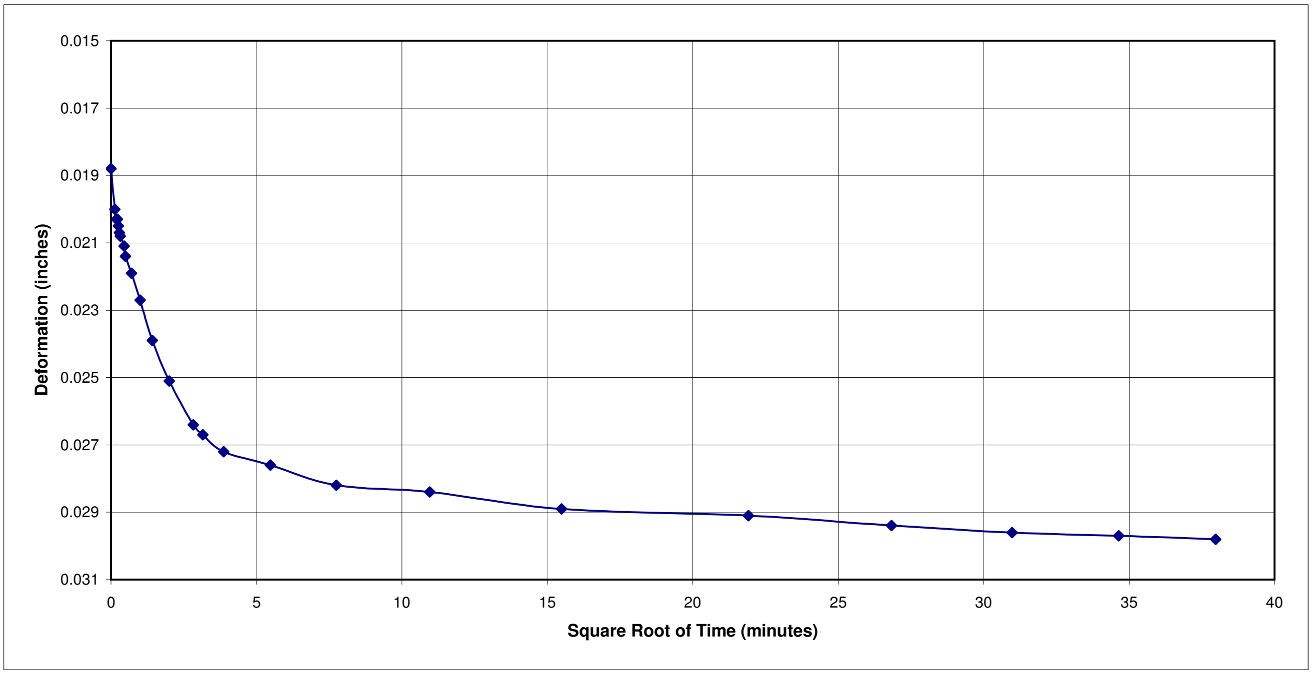
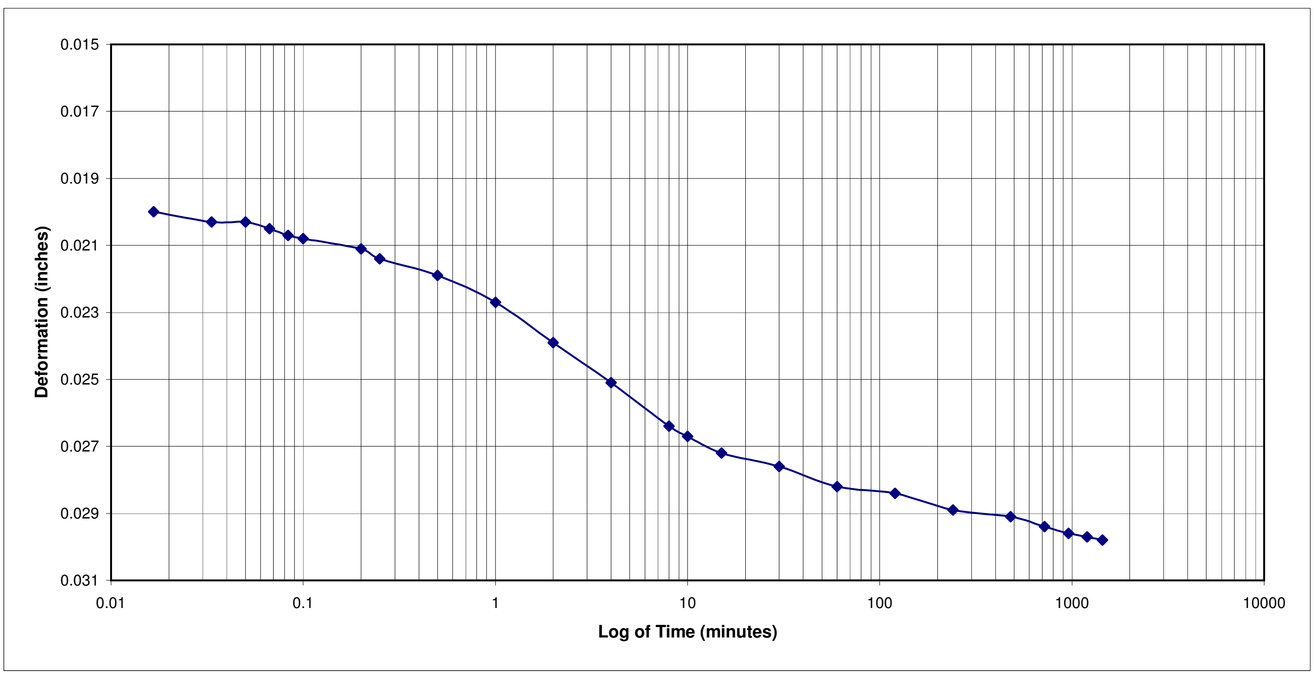
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-3A, 26 to 28 feet
LOAD = 1.0 TSF



DEFORMATION VS. LOG OF TIME
B-3A, 26 to 28 feet
LOAD = 1.0 TSF



Sample No.:	SCI B-3A, 27'
Exploration No.:	B-3A
Depth:	26 - 28 feet

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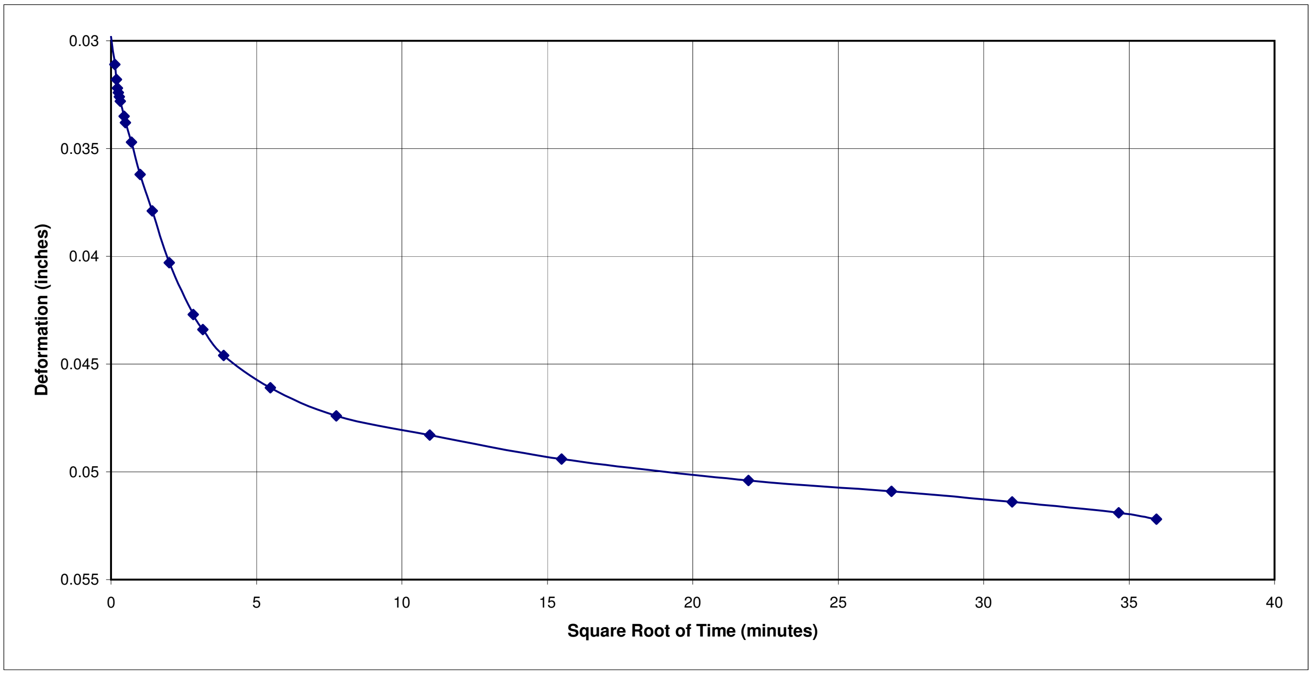
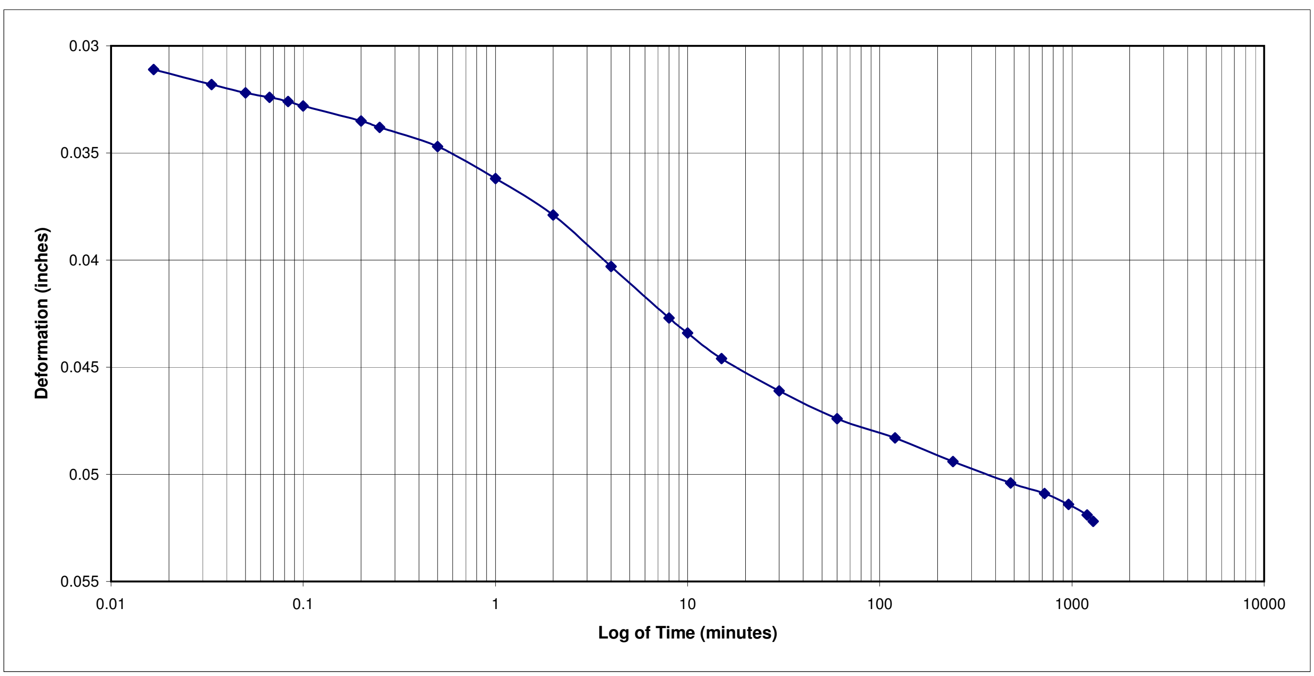
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-3A, 26 to 28 feet
LOAD = 2.0 TSF



DEFORMATION VS. LOG OF TIME
B-3A, 26 to 28 feet
LOAD = 2.0 TSF



Sample No.:	SCI B-3A, 27'
Exploration No.:	B-3A
Depth:	26 - 28 feet

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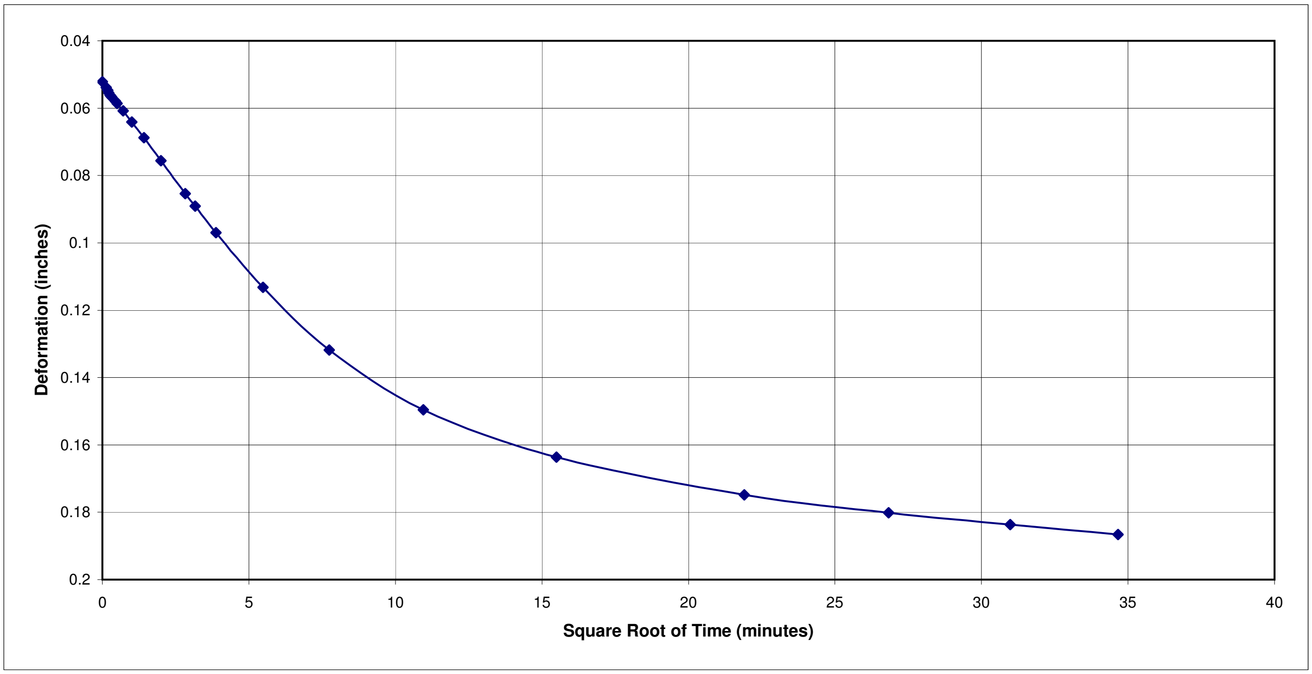
1-D CONSOLIDATION TIME-DEFORMATION CURVES

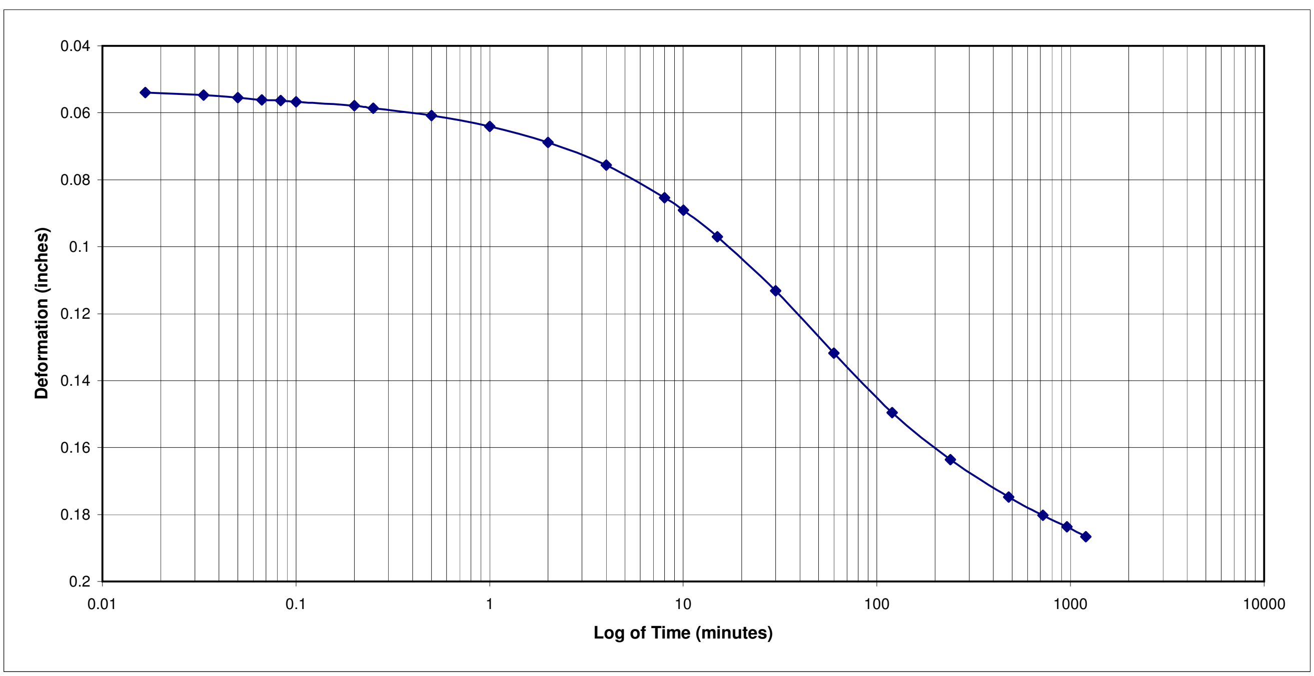
Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

X:\LB\Job Files\1131-08-554 Port Access Road\Consolidation\Time Plots\[Manual Consolidation Time Plots - B-3A, 26 to 28 feet - SCI.xls]Load Increment 5

DEFORMATION VS. SQUARE ROOT OF TIME
B-3A, 26 to 28 feet
LOAD = 4.0 TSF



DEFORMATION VS. LOG OF TIME
B-3A, 26 to 28 feet
LOAD = 4.0 TSF



Sample No.:	SCI B-3A, 27'
Exploration No.:	B-3A
Depth:	26 - 28 feet

1-D CONSOLIDATION TIME-DEFORMATION CURVES

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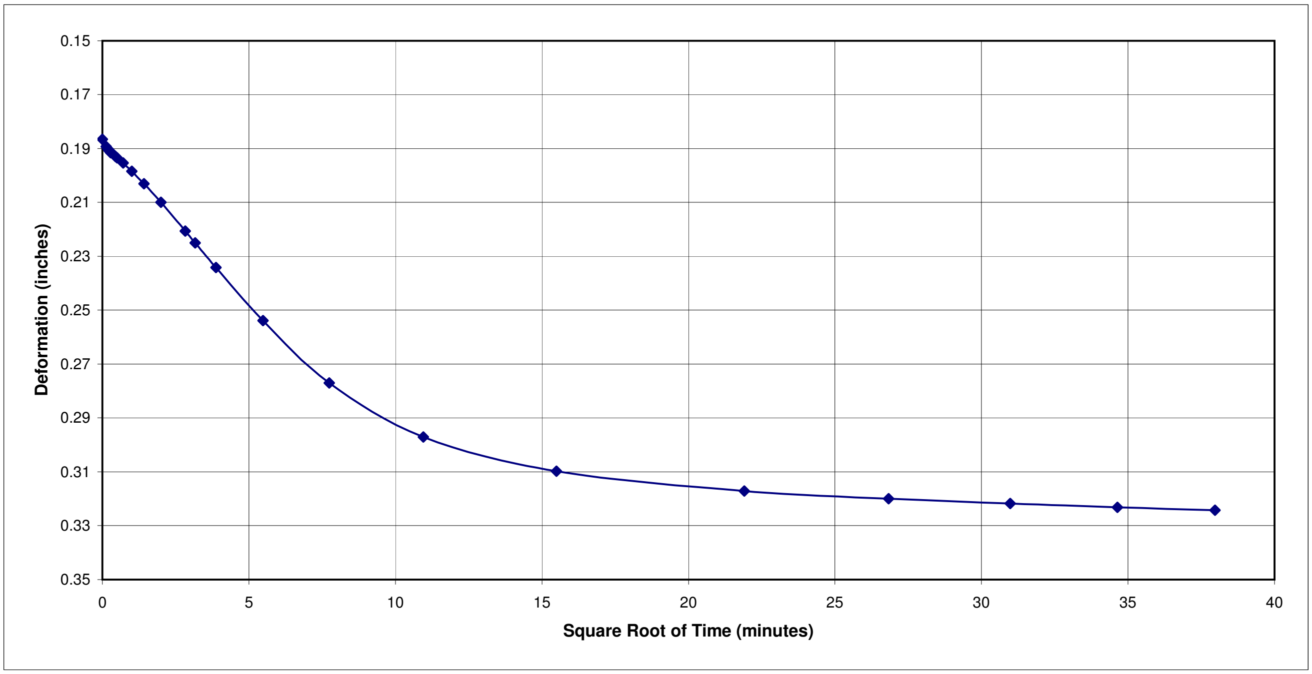
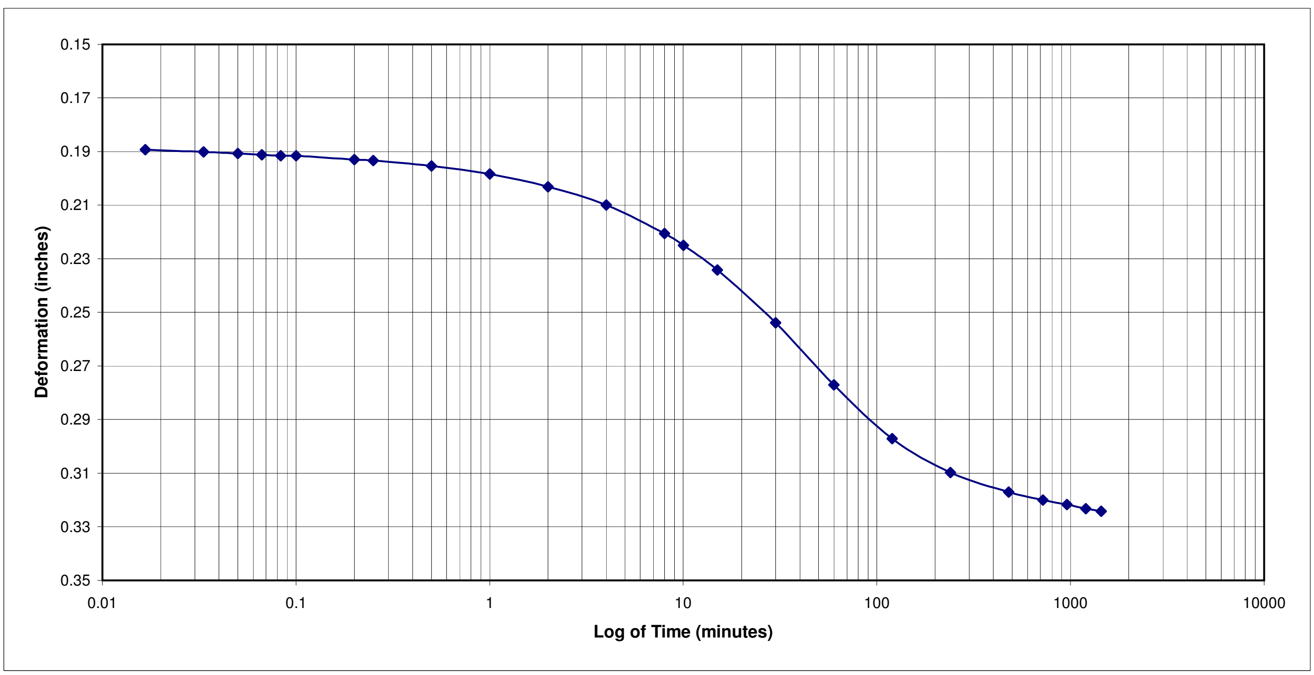
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-3A, 26 to 28 feet
LOAD = 8.0 TSF



DEFORMATION VS. LOG OF TIME
B-3A, 26 to 28 feet
LOAD = 8.0 TSF



Sample No.:	SCI B-3A, 27'
Exploration No.:	B-3A
Depth:	26 - 28 feet

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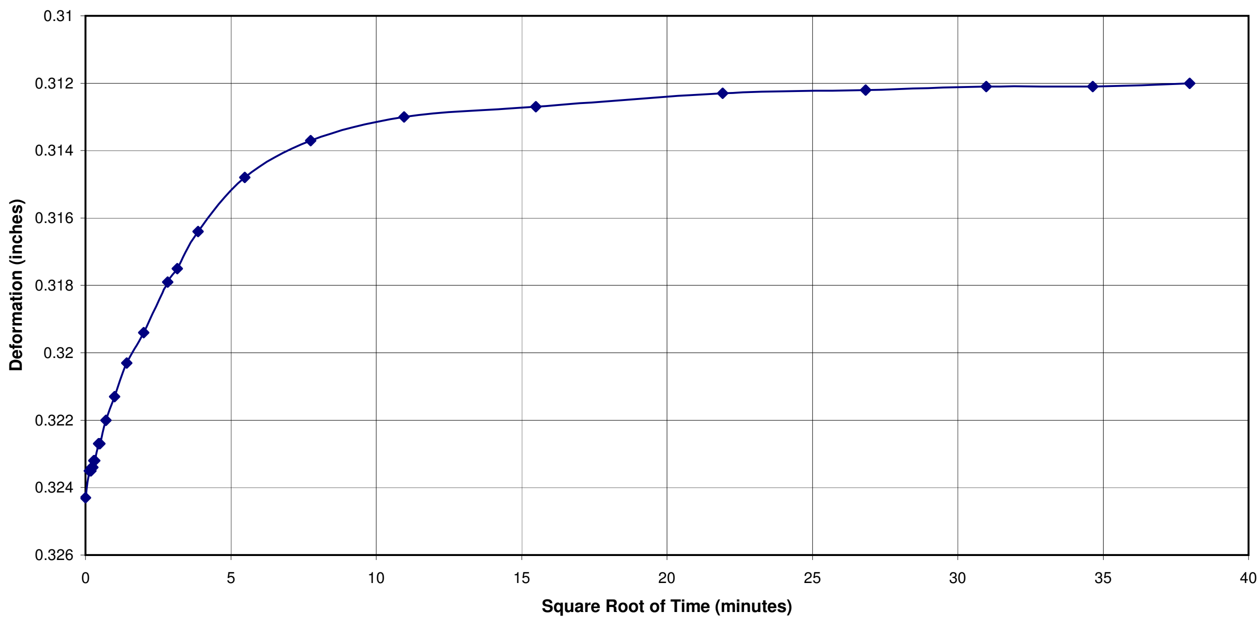
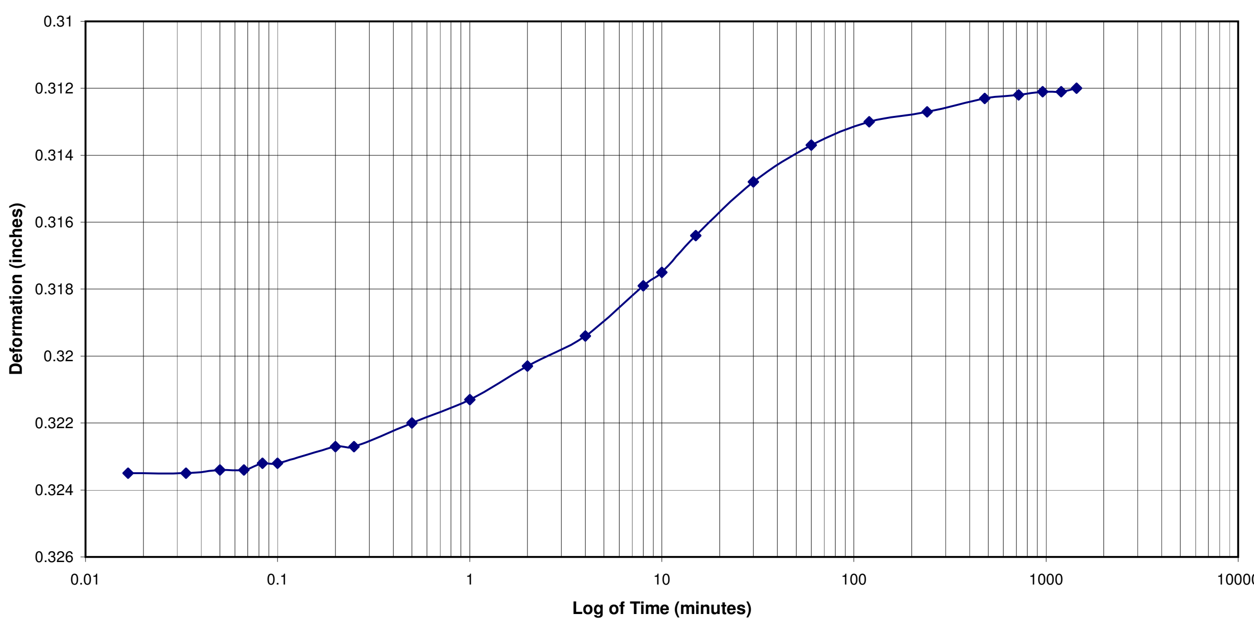
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-3A, 26 to 28 feet
LOAD = 4.0 TSF



DEFORMATION VS. LOG OF TIME
B-3A, 26 to 28 feet
LOAD = 4.0 TSF



Sample No.:	SCI B-3A, 27'
Exploration No.:	B-3A
Depth:	26 - 28 feet

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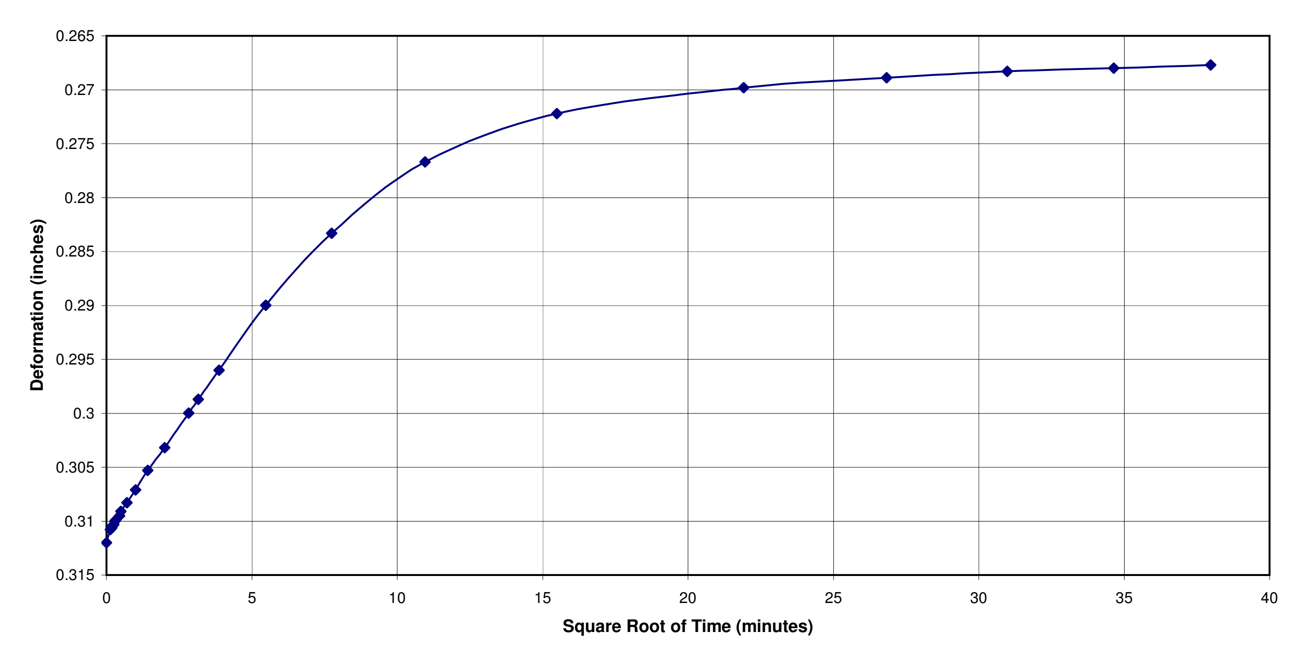
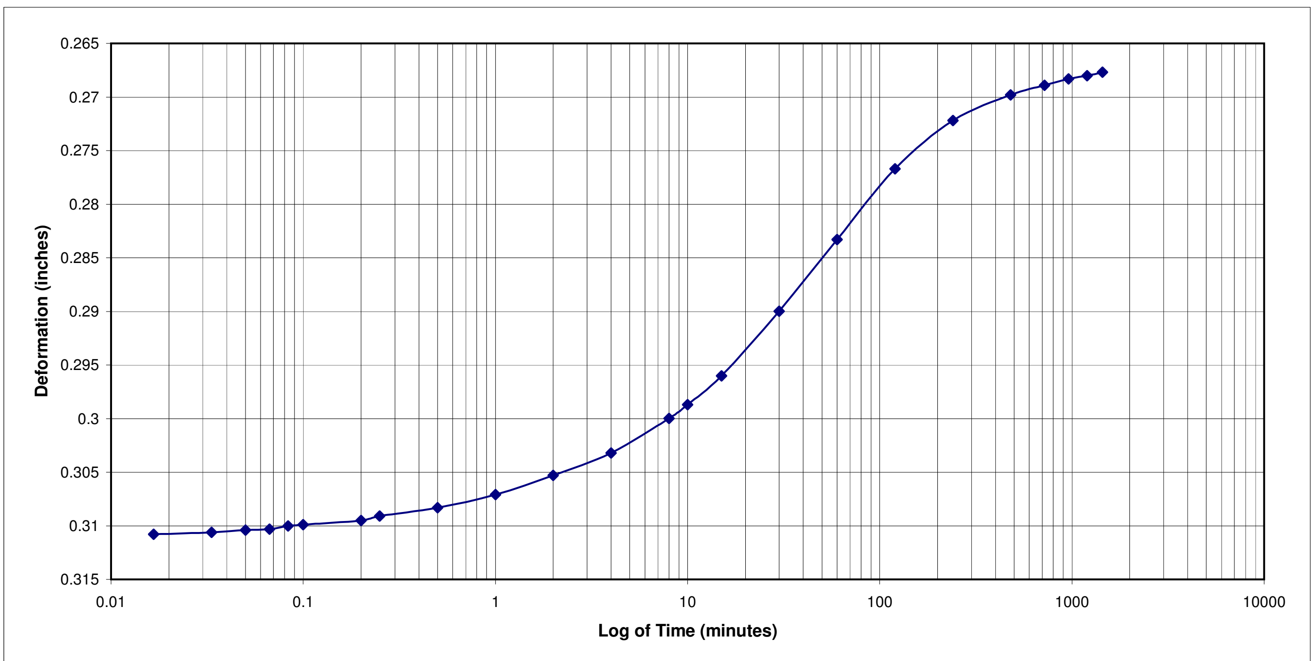
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-3A, 26 to 28 feet
LOAD = 1.0 TSF



DEFORMATION VS. LOG OF TIME
B-3A, 26 to 28 feet
LOAD = 1.0 TSF



Sample No.:	SCI B-3A, 27'
Exploration No.:	B-3A
Depth:	26 - 28 feet

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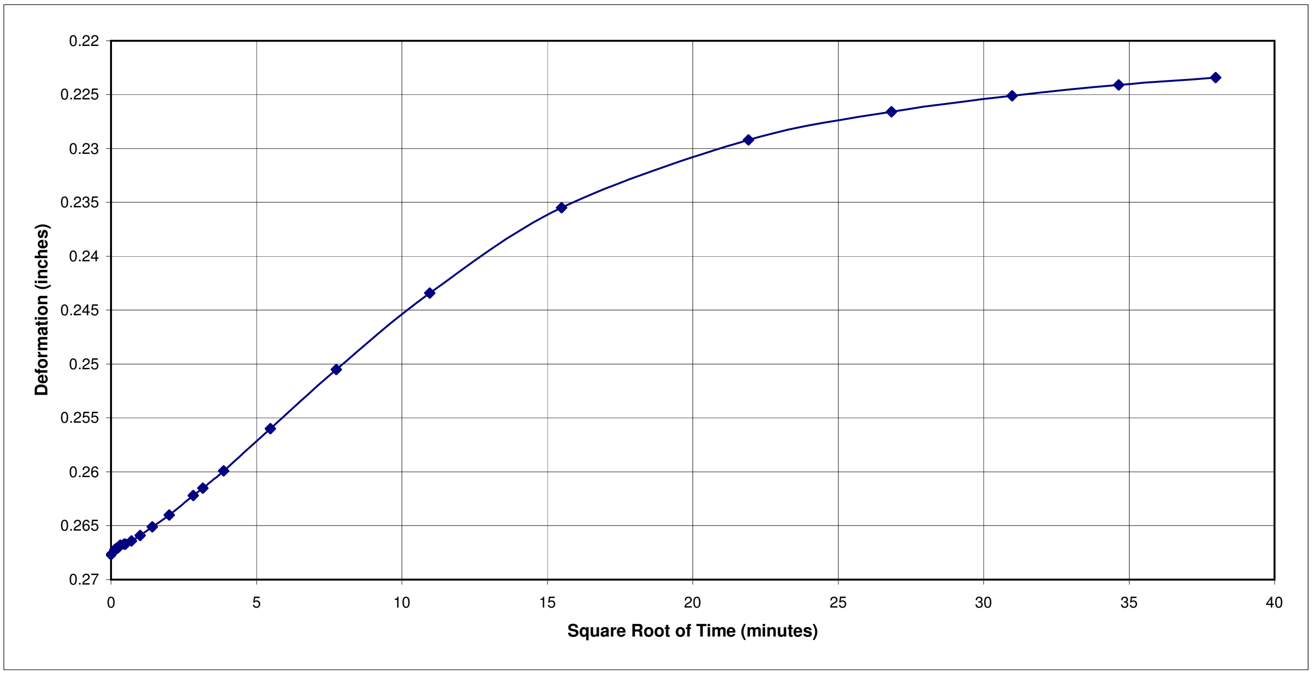
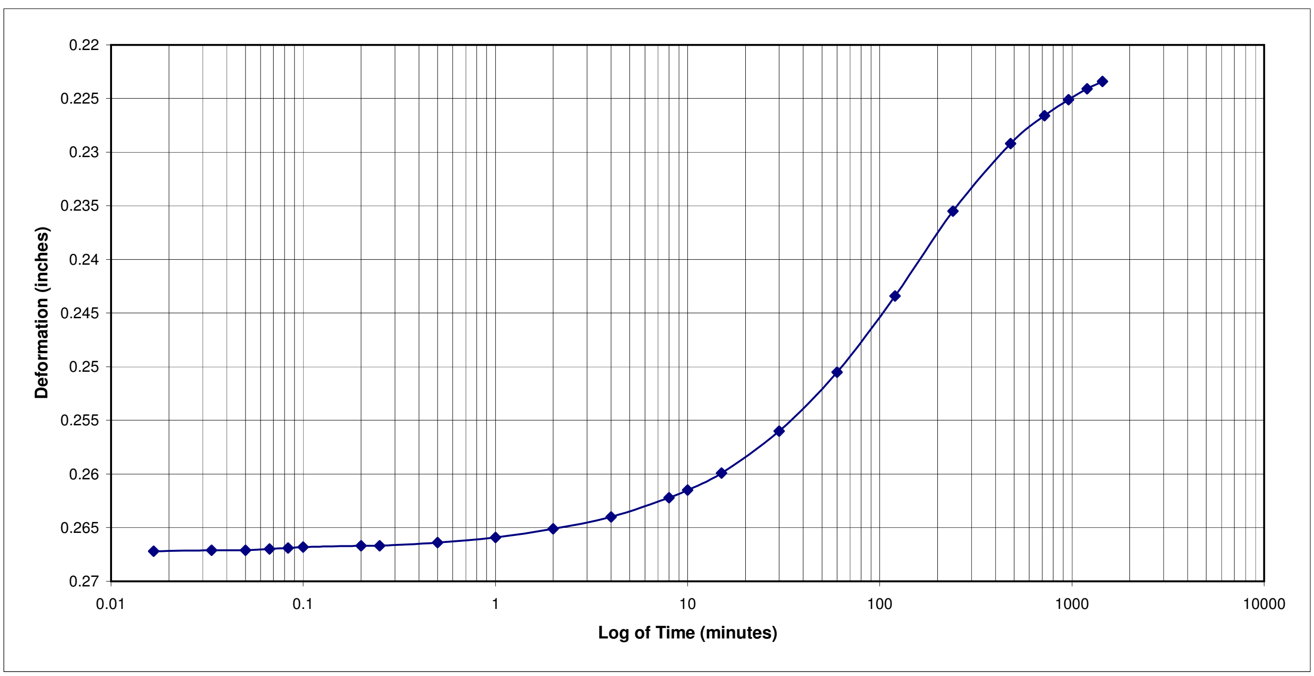
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-3A, 26 to 28 feet
LOAD = 0.25 TSF



DEFORMATION VS. LOG OF TIME
B-3A, 26 to 28 feet
LOAD = 0.25 TSF



Sample No.:	SCI B-3A, 27'
Exploration No.:	B-3A
Depth:	26 - 28 feet

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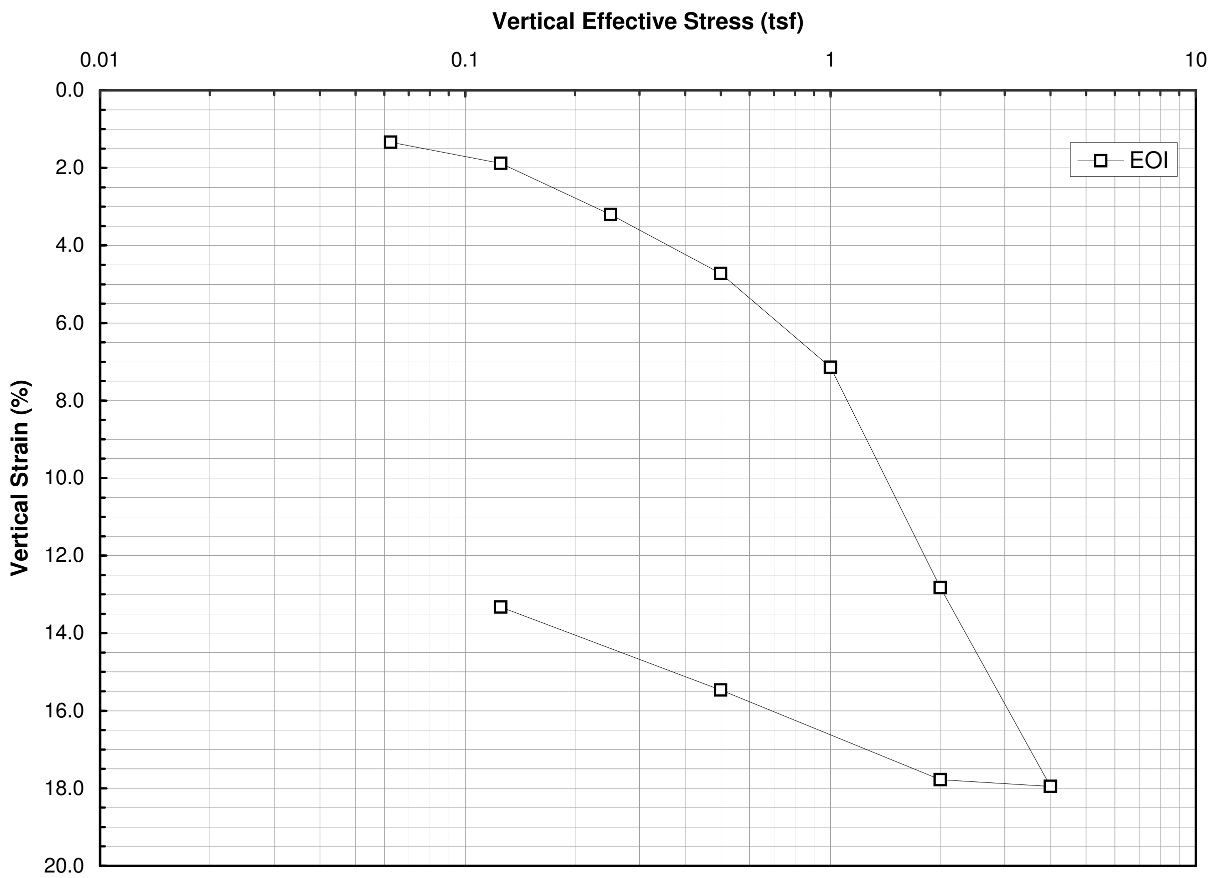
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554



CONSOLIDATION PARAMETERS

Probable Preconsolidation Stress, P'_c (tsf):	0.9
Approx. Hydrostatic Effective Stress, P'_o (tsf)	0.8
Vertical Strain at P'_o (%):	6.3
Compression Ratio (CR):	0.17
Recompression Ratio (RR):	0.037
Over Consolidation Ratio (OCR):	1.1

TEST METHOD

Test Method:	ASTM D-2435 A
Trimming Procedure:	2.5-inch Trimming Lathe
Pressure at Inundation:	0.0625 tsf
Method to Compute C_v:	ASTM D-2435 12.3.2

SAMPLE ID

Test No.:	SCI B-3A, 39'
Sample No.:	UD2
Exploration No.:	B-3A
Depth:	38 to 40 feet
USCS Description:	Sandy fat CLAY (CH)

SAMPLE DATA

Sample Diameter (cm):	6.35
Sample Area (cm^2):	31.67
Measured Specific Gravity:	2.66
Trimmings Moisture (%):	82.4
% Passing #200 Sieve:	69.4
Liquid Limit:	82
Plastic Limit:	23
Plasticity Index:	59

	Initial	Final
Water Content (%):	84.4	72.3
Est. % Saturation:	100.0	100.0
Sample Height (cm):	2.540	2.201
Wet Sample Weight (g):	123.7	115.6
Dry Sample Weight (g):	67.1	67.1
Dry Unit Weight (pcf):	52.0	60.0
Void Ratio, e:	2.19	1.76
Solids Height (cm):	0.796	0.796

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ONE-DIMENSIONAL CONSOLIDATION TEST

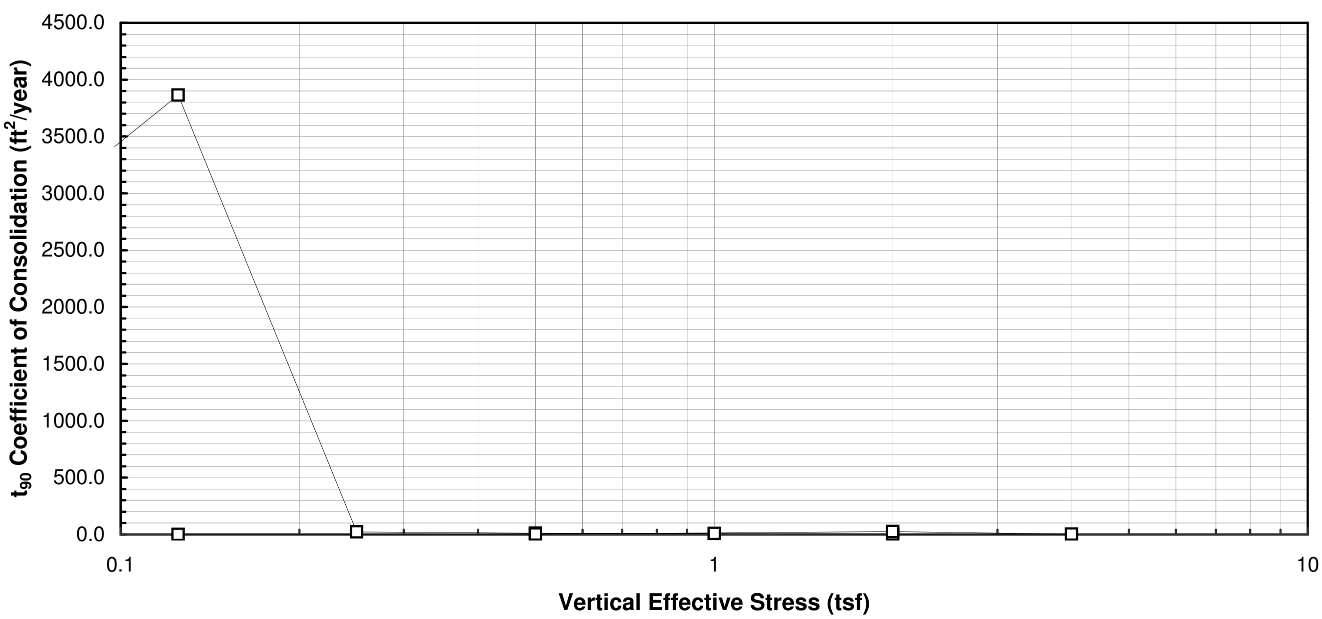
Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

Test No.:	SCI B-3A, 39'
Sample No.:	UD2
Exploration No.:	B-3A
Depth:	38 to 40 feet

LOAD INC.	STRESS DURATION (Hr - min)	VERTICAL STRESS (tsf)	VERTICAL STRAIN (EOI*)	VERTICAL STRAIN (EOP*)	VOID RATIO e (EOI*)	VOID RATIO e (EOP*)	STRESS RATIO (P'/P'c)	TAYLOR COEFFICIENT OF CONSOLIDATION (ft^2/year)
1	23-48	0.0625	1.3	1.2	2.15	2.15	0.07	2590.9
2	21-56	0.125	1.9	1.7	2.13	2.14	0.15	3864.5
3	23-27	0.25	3.2	2.9	2.09	2.10	0.29	23.5
4	24-01	0.5	4.7	4.5	2.04	2.05	0.59	10.6
5	21-20	1	7.1	6.8	1.96	1.97	1.18	7.3
6	20-01	2	12.8	11.9	1.78	1.81	2.35	2.9
7	24-01	4	18.0	17.3	1.62	1.64	4.71	2.9
8	24-01	2	17.8	18.0	1.62	1.62	2.35	26.4
9	24-01	0.5	15.5	15.7	1.70	1.69	0.59	2.4
10	24-01	0.125	13.3	13.6	1.76	1.75	0.15	0.5

*EOI = End of Increment

*EOP = End of Primary



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ONE-DIMENSIONAL CONSOLIDATION TEST

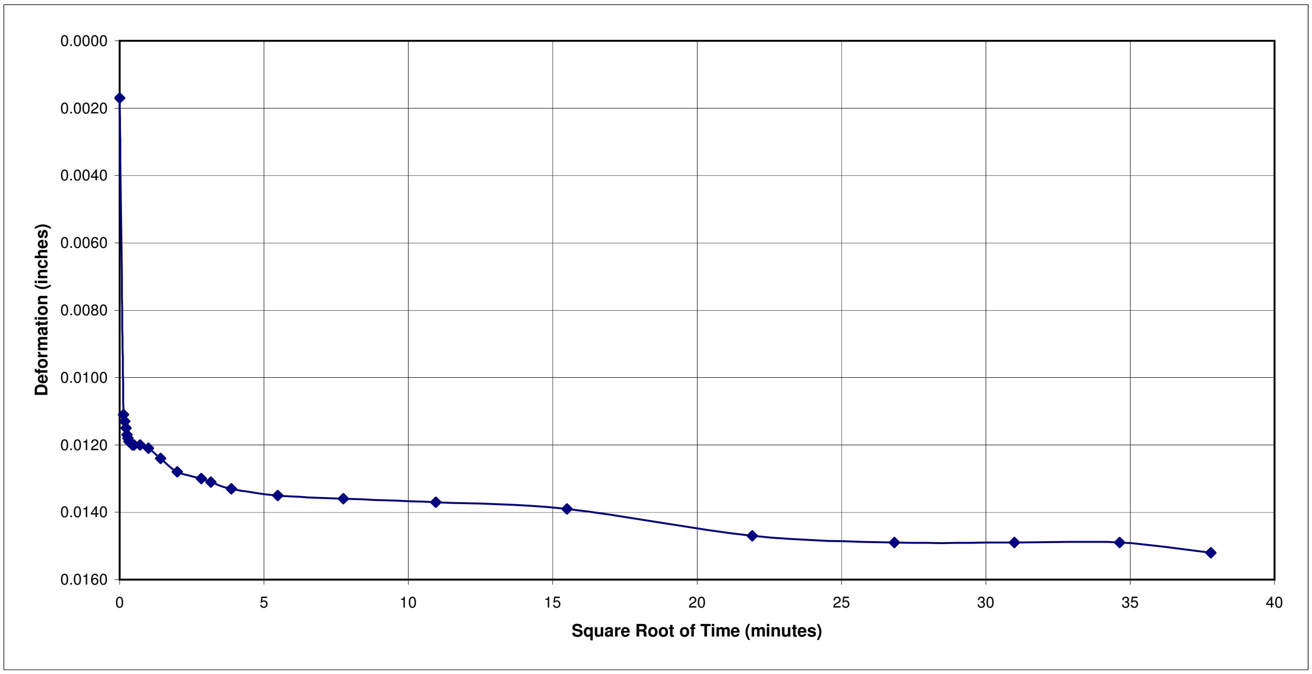
Project: Port Access Road

Client: SCDOT

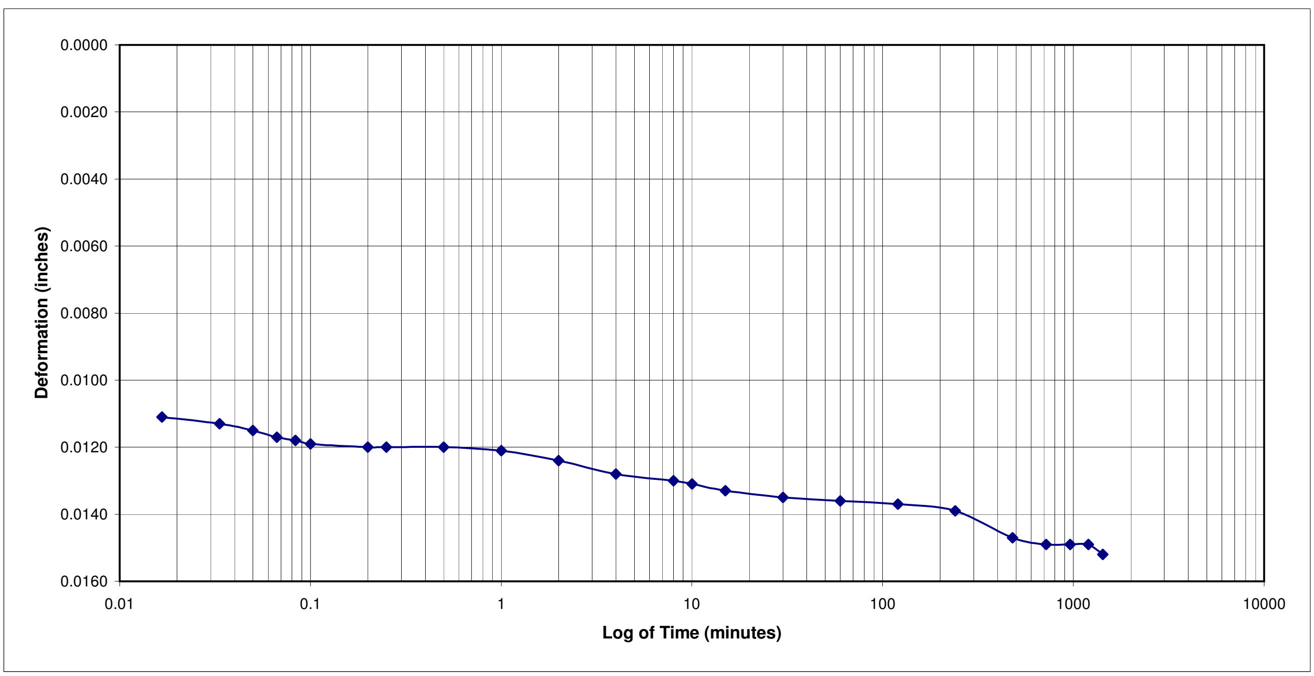
Location: North Charleston, South Carolina

Project No. 1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-3A, 38 to 40 feet
LOAD = 0.0625 TSF



DEFORMATION VS. LOG OF TIME
B-3A, 38 to 40 feet
LOAD = 0.0625 TSF



Sample No.:	SCI B-3A, 39'
Exploration No.:	B-3A
Depth:	38 - 40 feet

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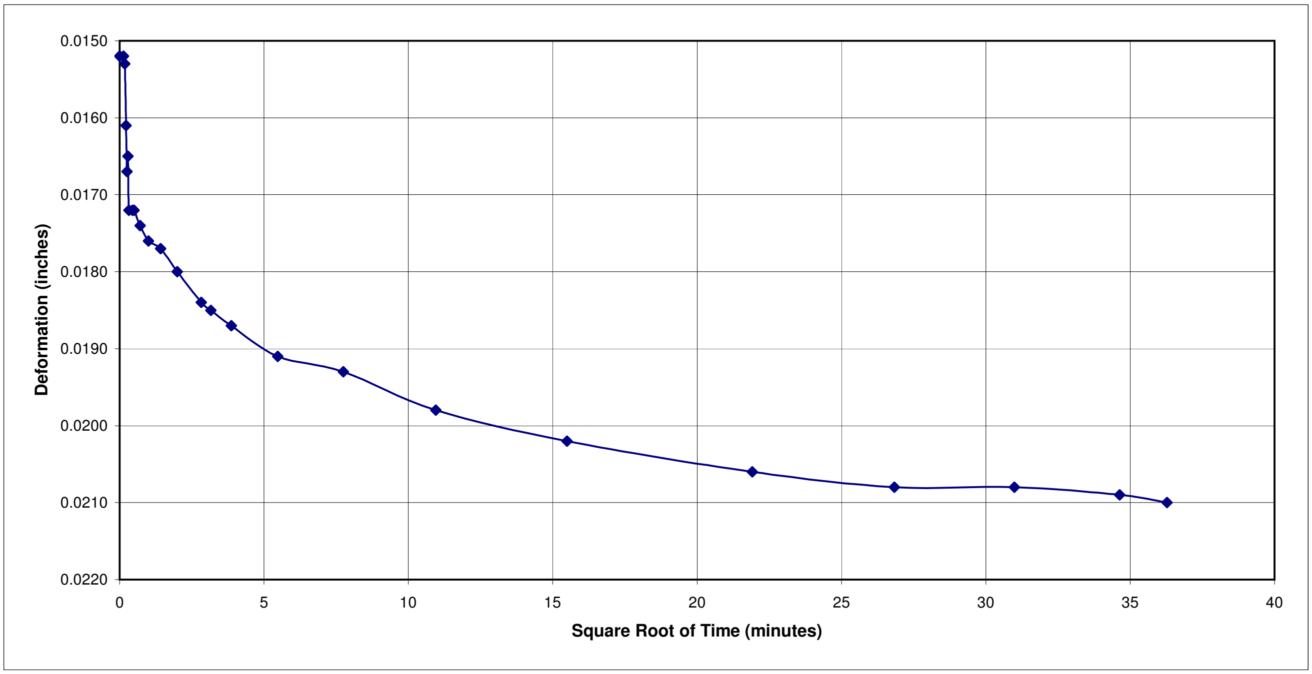
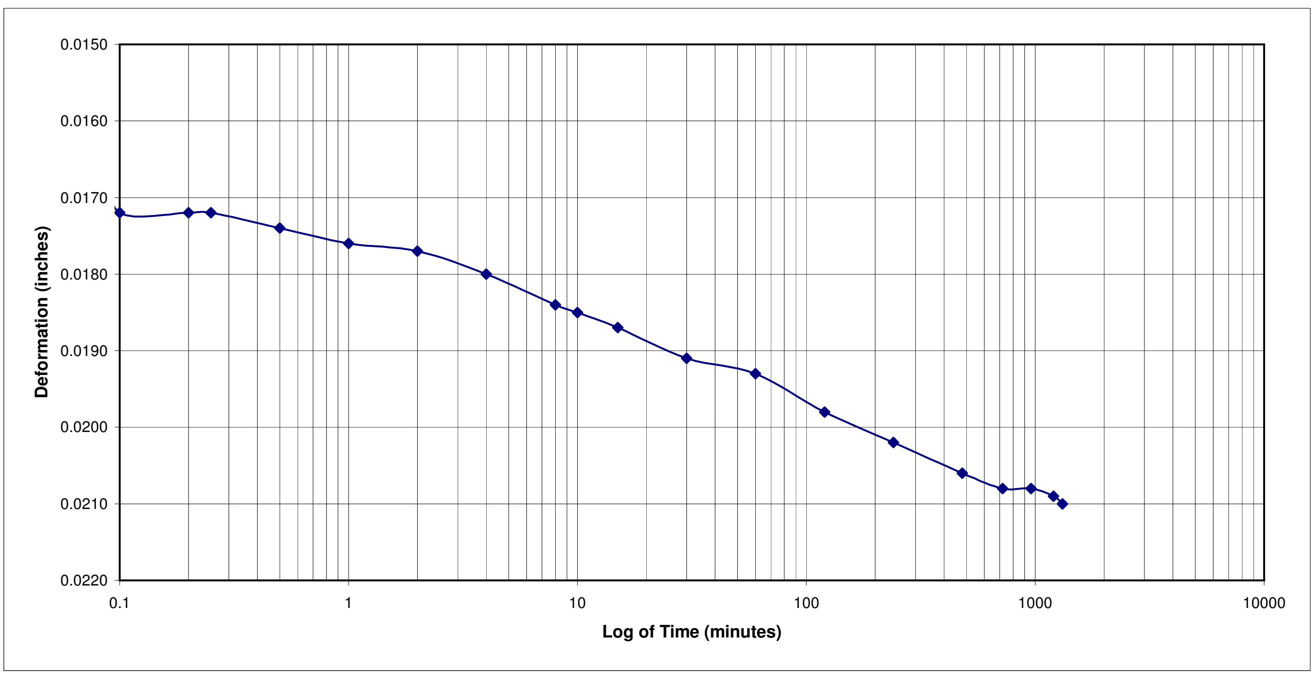
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-3A, 38 to 40 feet
LOAD = 0.125 TSF



DEFORMATION VS. LOG OF TIME
B-3A, 38 to 40 feet
LOAD = 0.125 TSF



Sample No.:	SCI B-3A, 39'
Exploration No.:	B-3A
Depth:	38 - 40 feet

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1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
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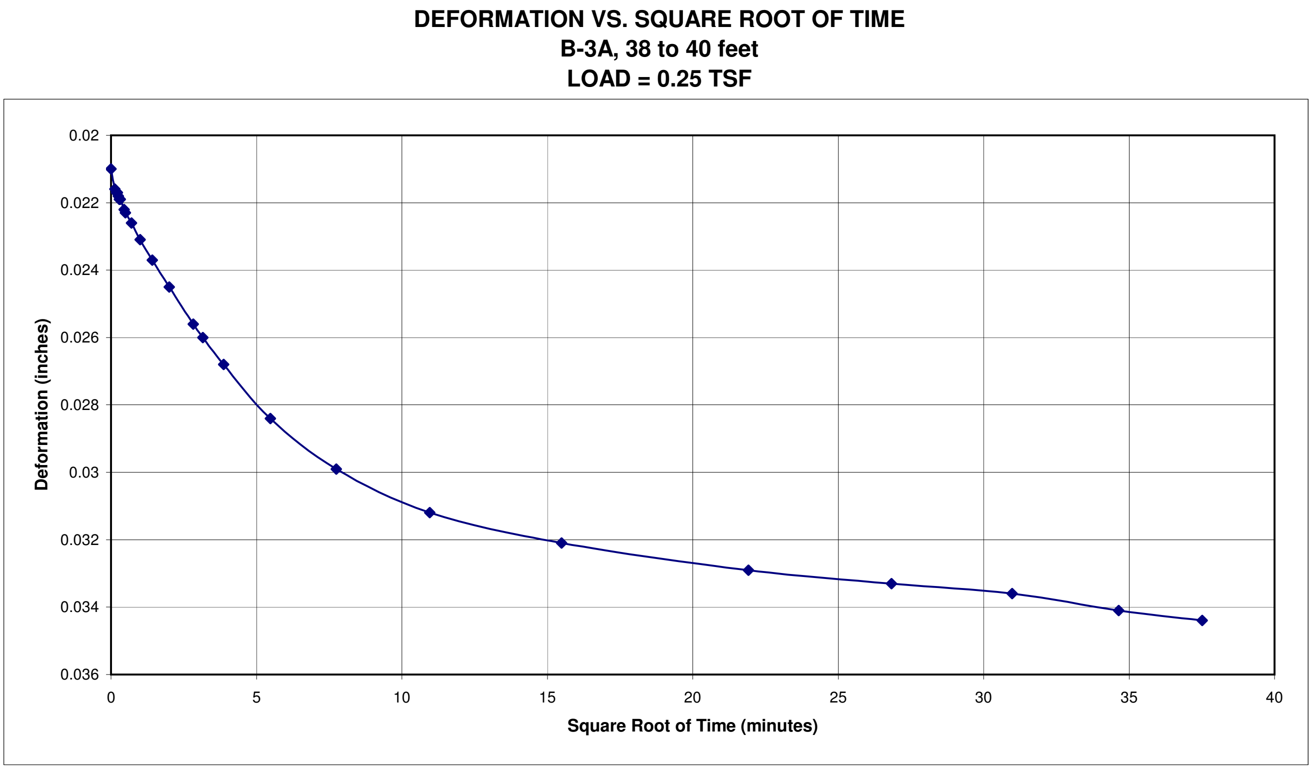
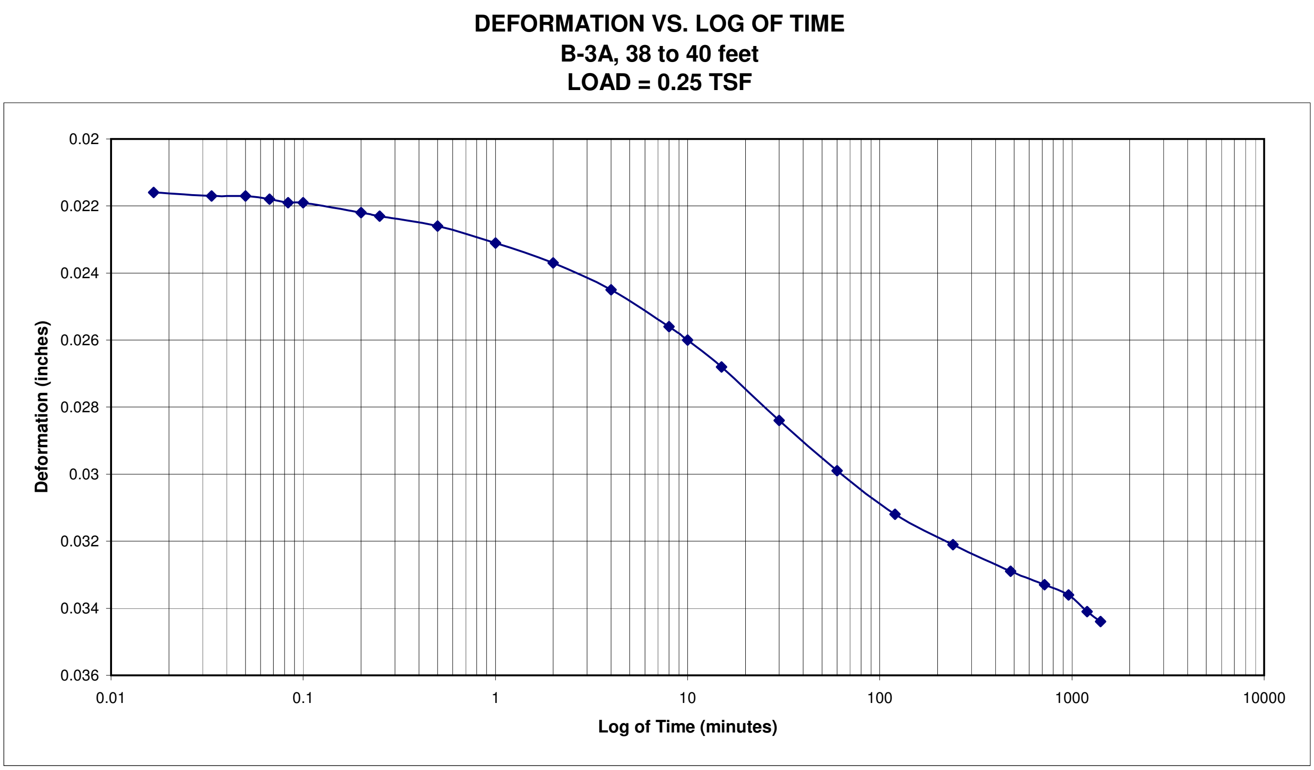
Location:	North Charleston, South Carolina
Project No.:	1131-08-554





Sample No.:	SCI B-3A, 39'
Exploration No.:	B-3A
Depth:	38 - 40 feet

1-D CONSOLIDATION TIME-DEFORMATION CURVES

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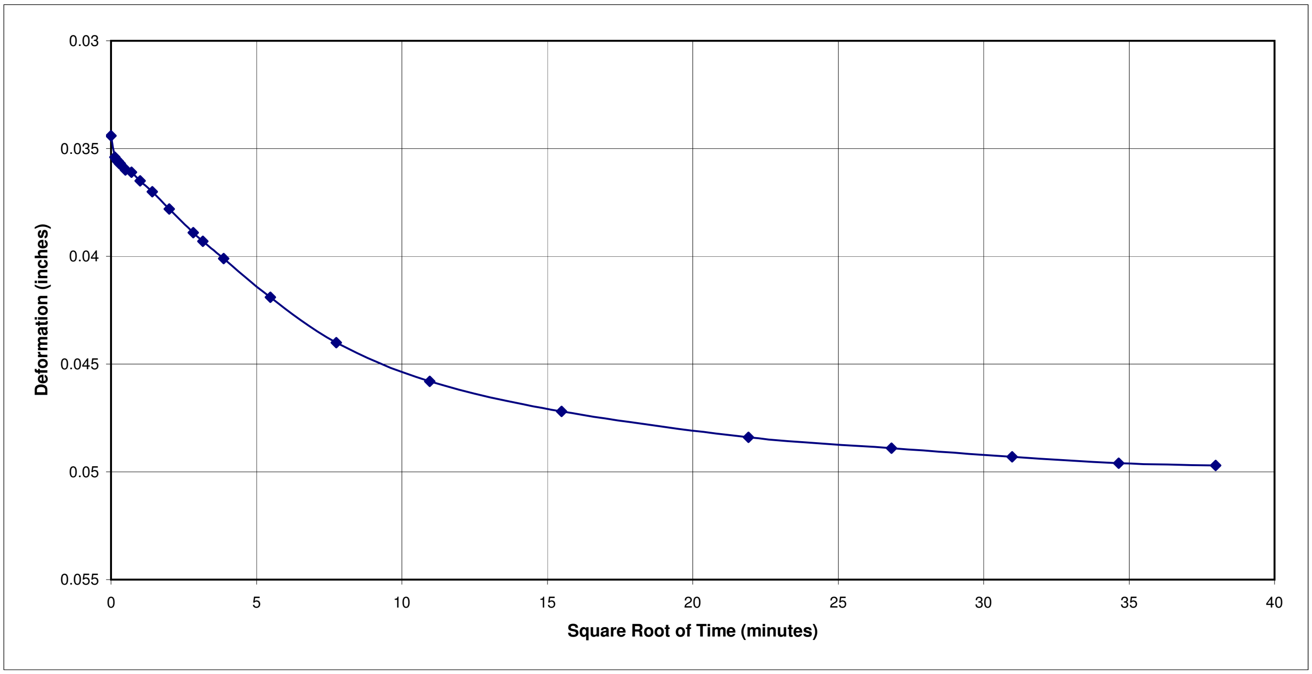
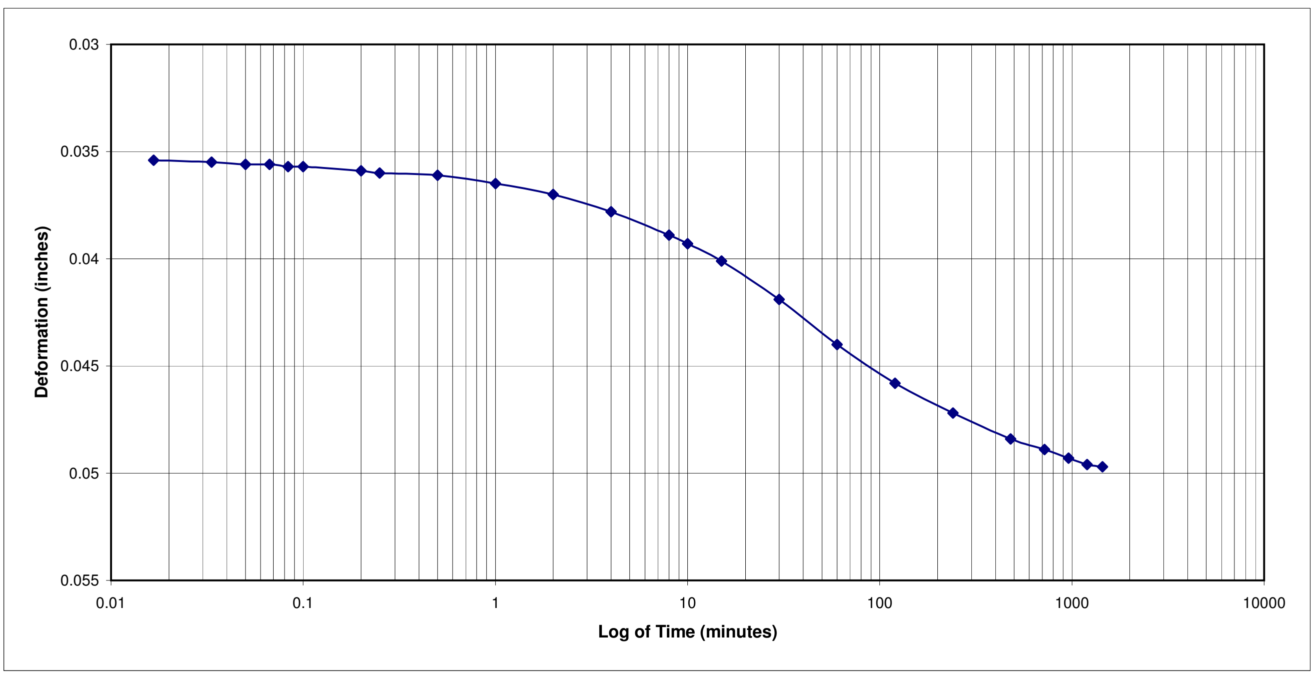
Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-3A, 38 to 40 feet
LOAD = 0.5 TSF



DEFORMATION VS. LOG OF TIME
B-3A, 38 to 40 feet
LOAD = 0.5 TSF



Sample No.:	SCI B-3A, 39'
Exploration No.:	B-3A
Depth:	38 - 40 feet

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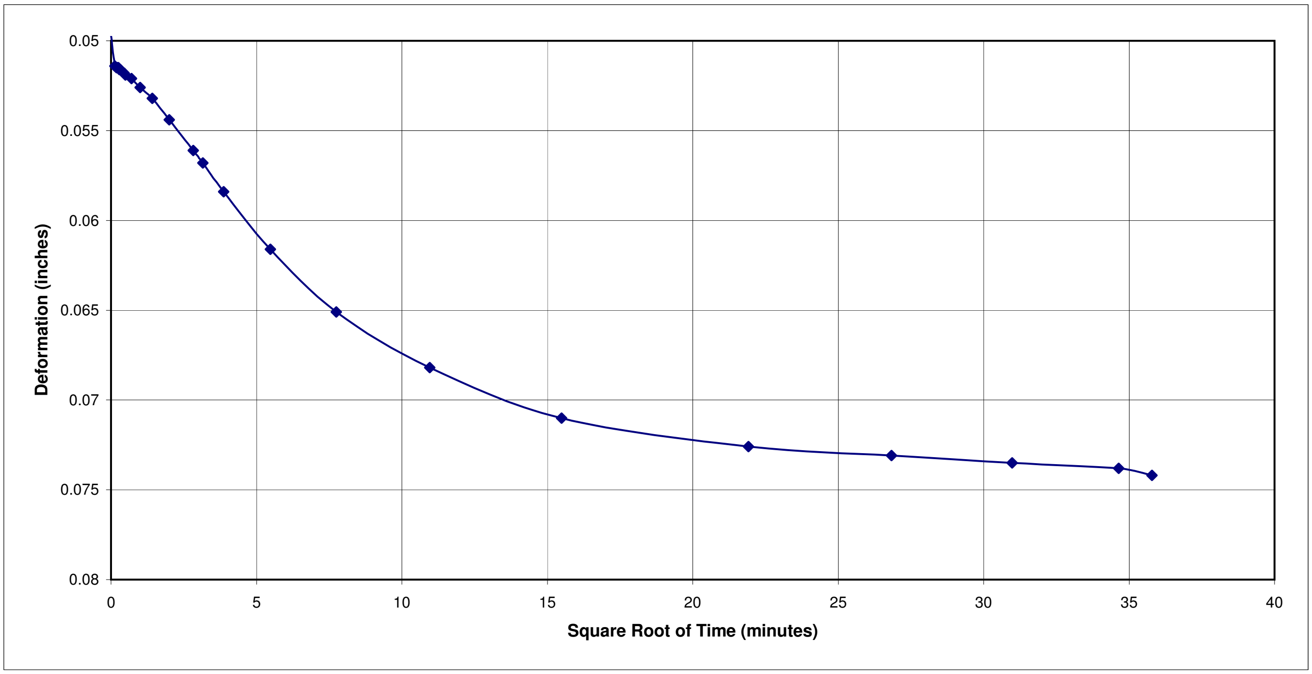
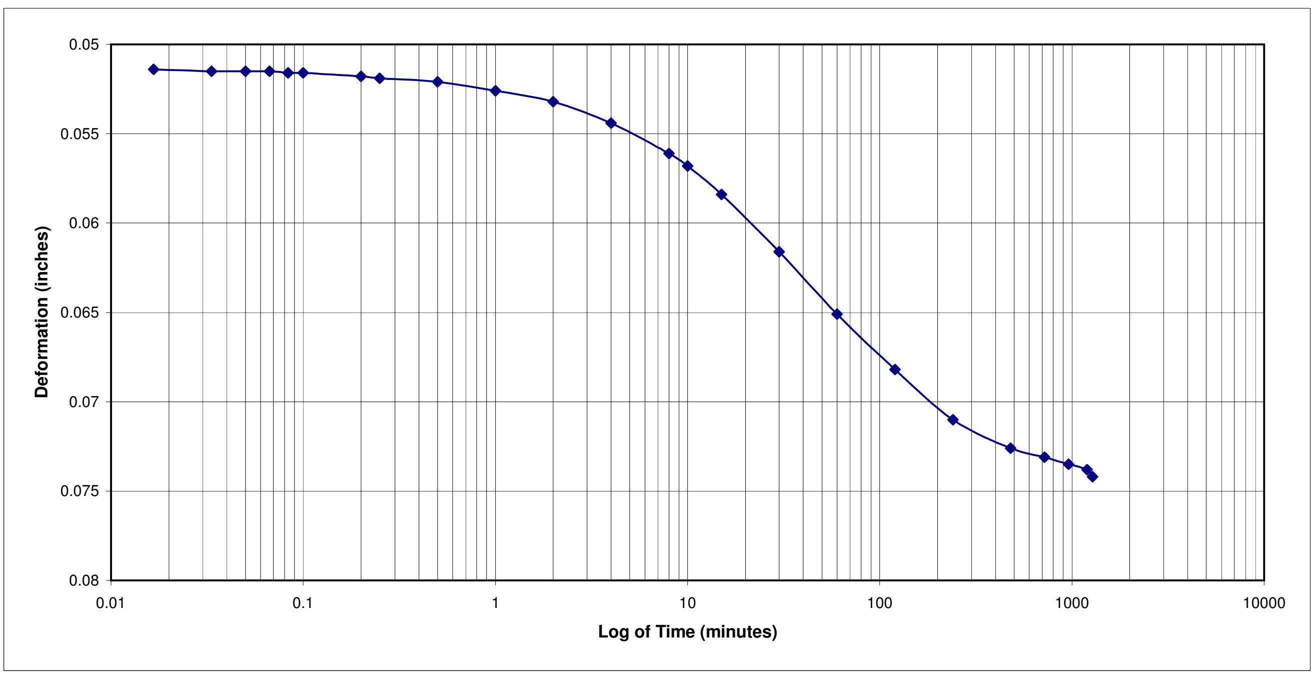
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-3A, 38 to 40 feet
LOAD = 1.0 TSF



DEFORMATION VS. LOG OF TIME
B-3A, 38 to 40 feet
LOAD = 1.0 TSF



Sample No.: SCI B-3A, 39'
Exploration No.: B-3A
Depth: 38 - 40 feet

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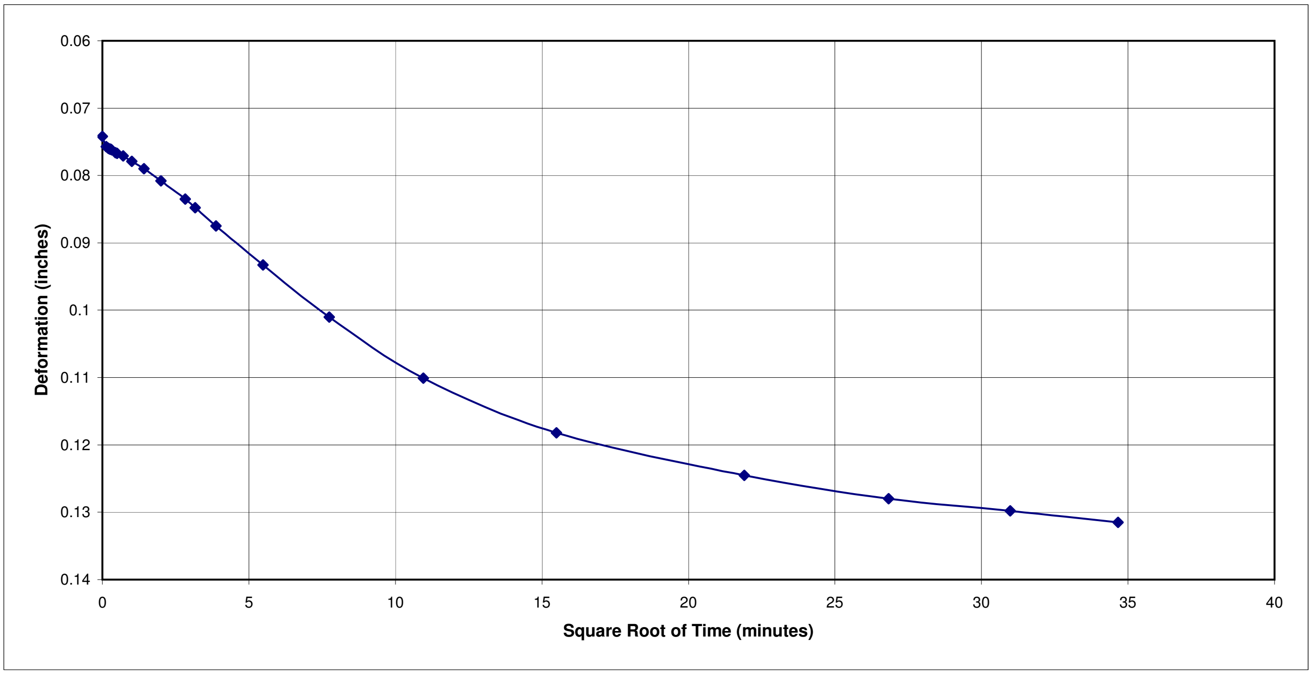
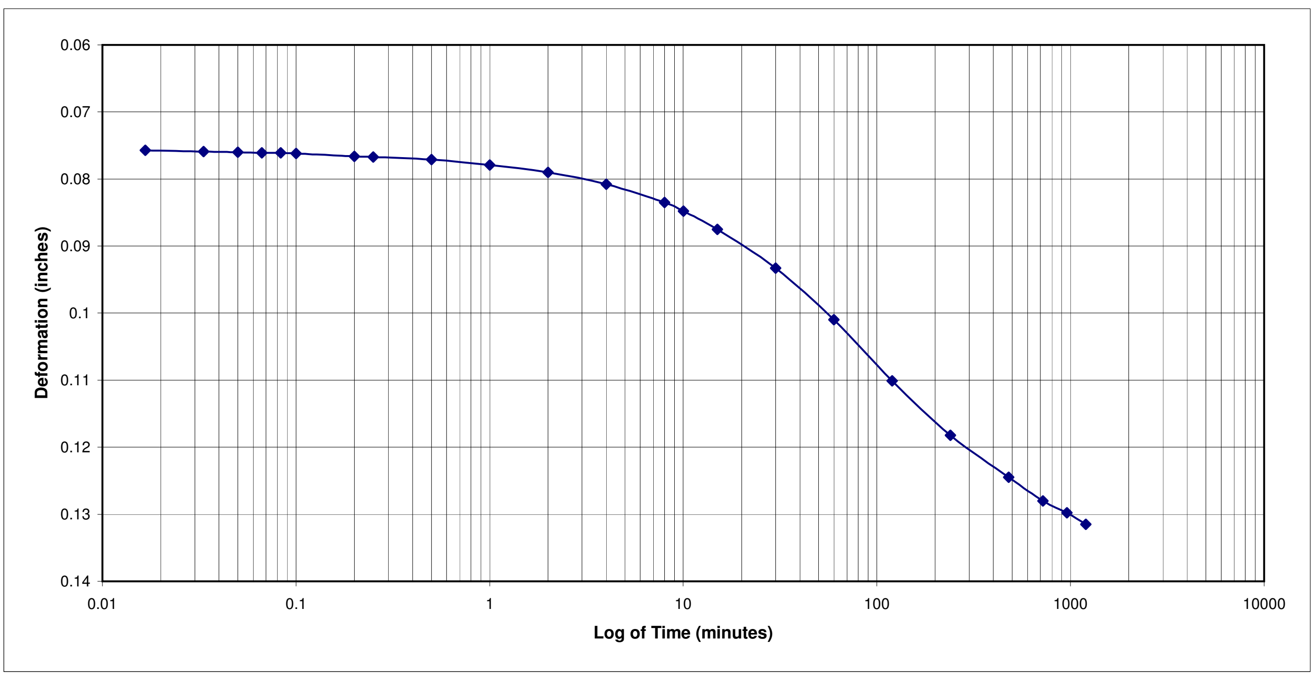
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-3A, 38 to 40 feet
LOAD = 2.0 TSF



DEFORMATION VS. LOG OF TIME
B-3A, 38 to 40 feet
LOAD = 2.0 TSF



Sample No.:	SCI B-3A, 39'
Exploration No.:	B-3A
Depth:	38 - 40 feet

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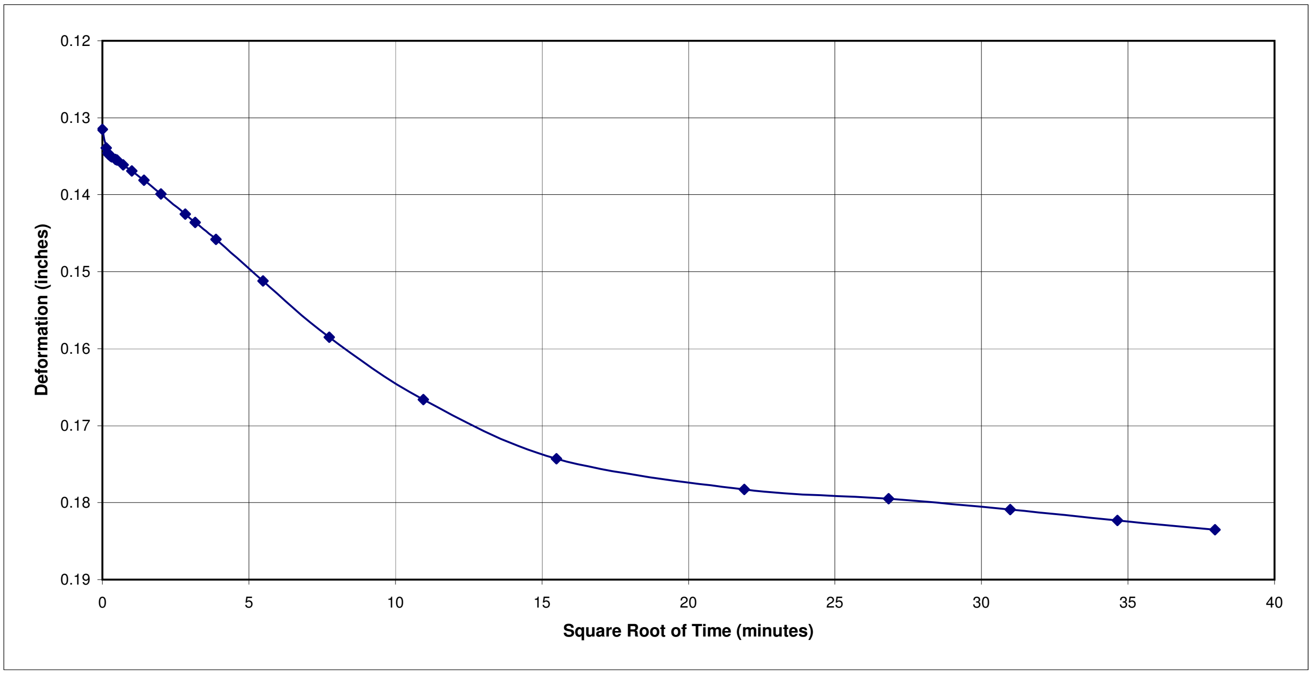
Fax: 804.261.5569

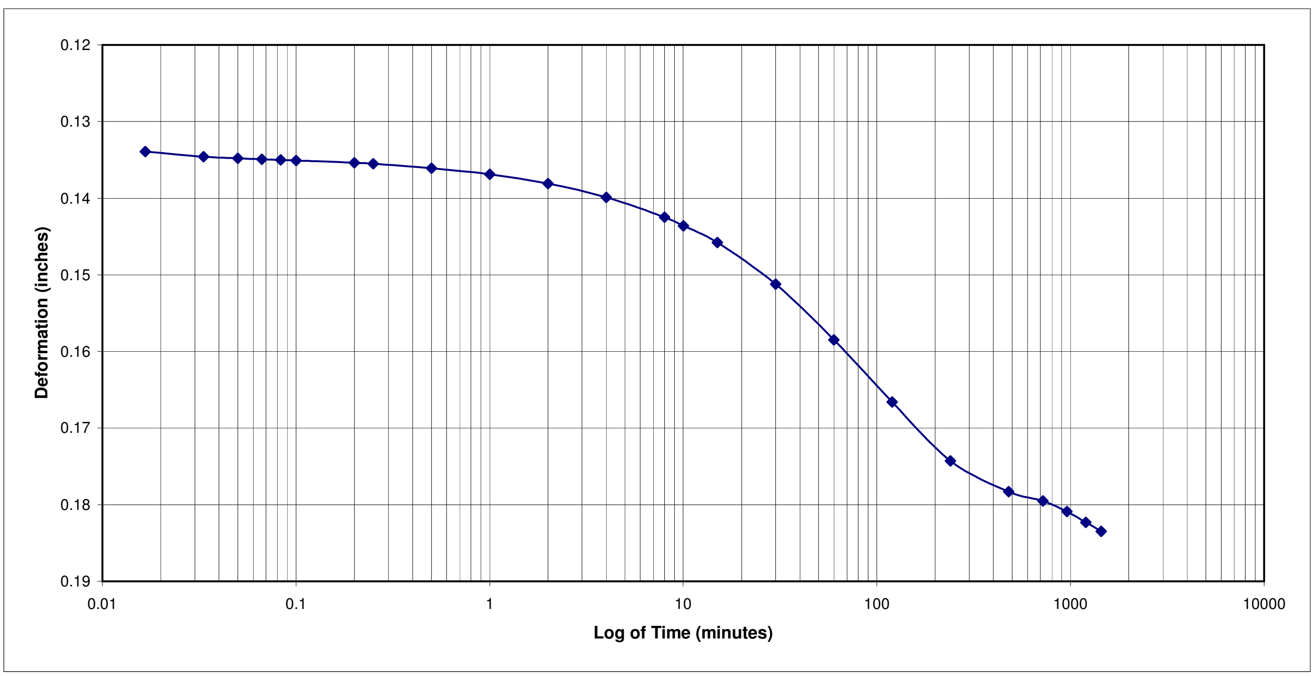
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-3A, 38 to 40 feet
LOAD = 4.0 TSF



DEFORMATION VS. LOG OF TIME
B-3A, 38 to 40 feet
LOAD = 4.0 TSF



Sample No.:	SCI B-3A, 39'
Exploration No.:	B-3A
Depth:	38 - 40 feet

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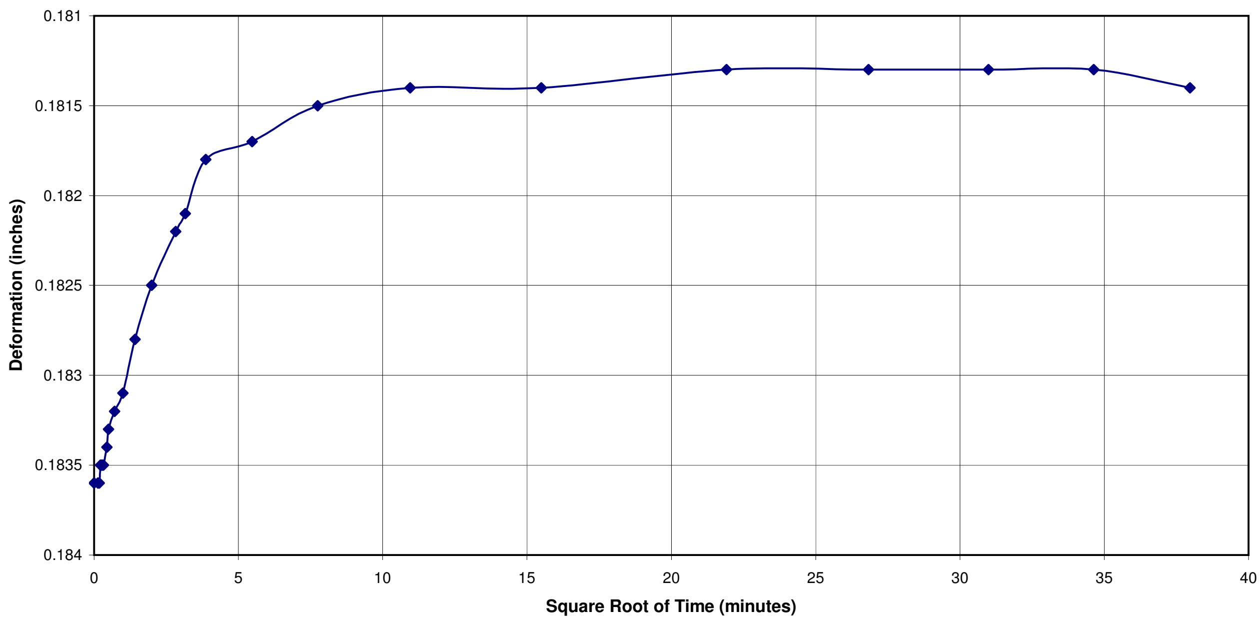
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-3A, 38 to 40 feet
LOAD = 2.0 TSF



DEFORMATION VS. LOG OF TIME
B-3A, 38 to 40 feet
LOAD = 2.0 TSF

Sample No.:	SCI B-3A, 39'
Exploration No.:	B-3A
Depth:	38 - 40 feet

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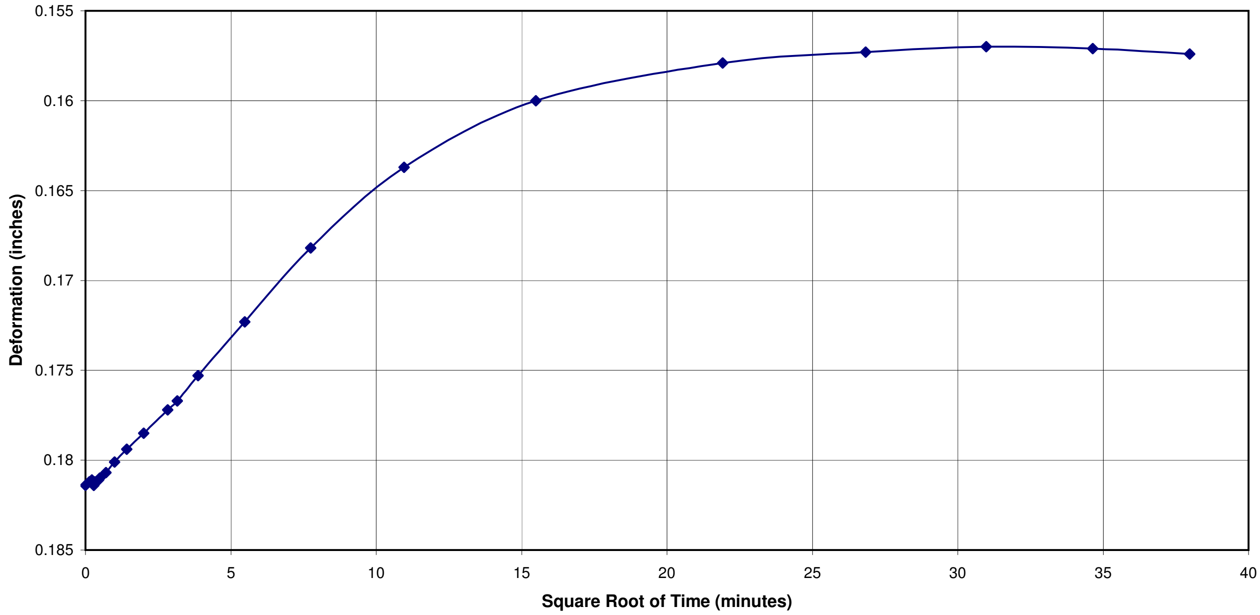
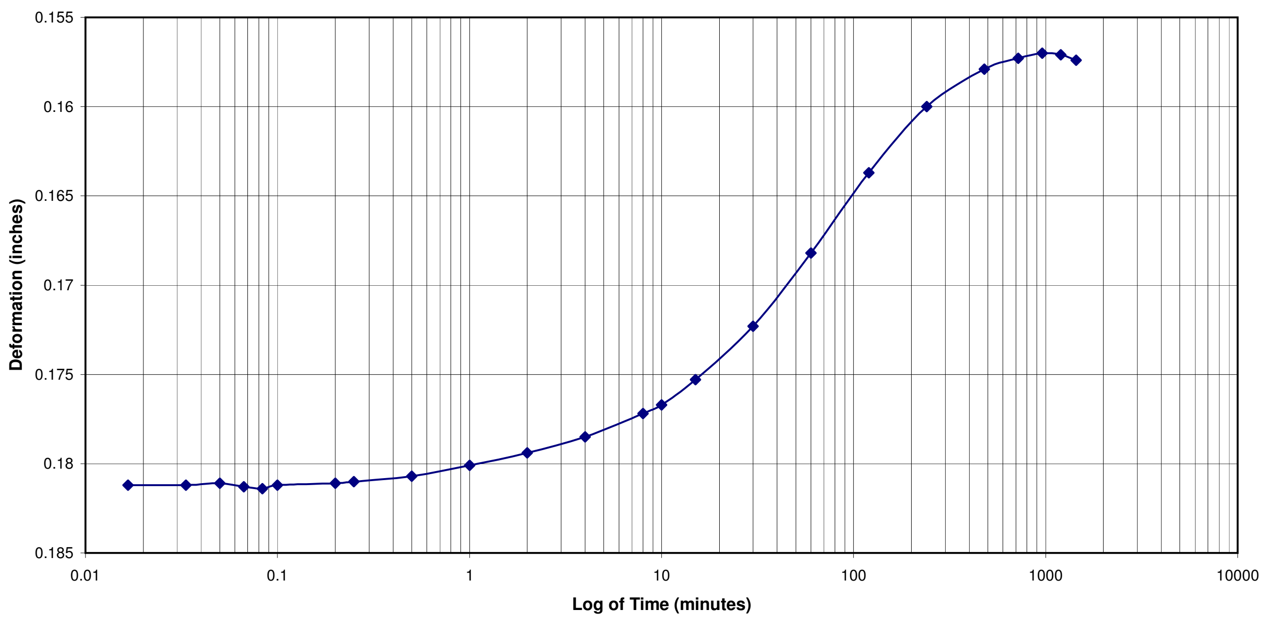
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-3A, 38 to 40 feet
LOAD = 0.5 TSF



DEFORMATION VS. LOG OF TIME
B-3A, 38 to 40 feet
LOAD = 0.5 TSF



Sample No.:	SCI B-3A, 39'
Exploration No.:	B-3A
Depth:	38 - 40 feet

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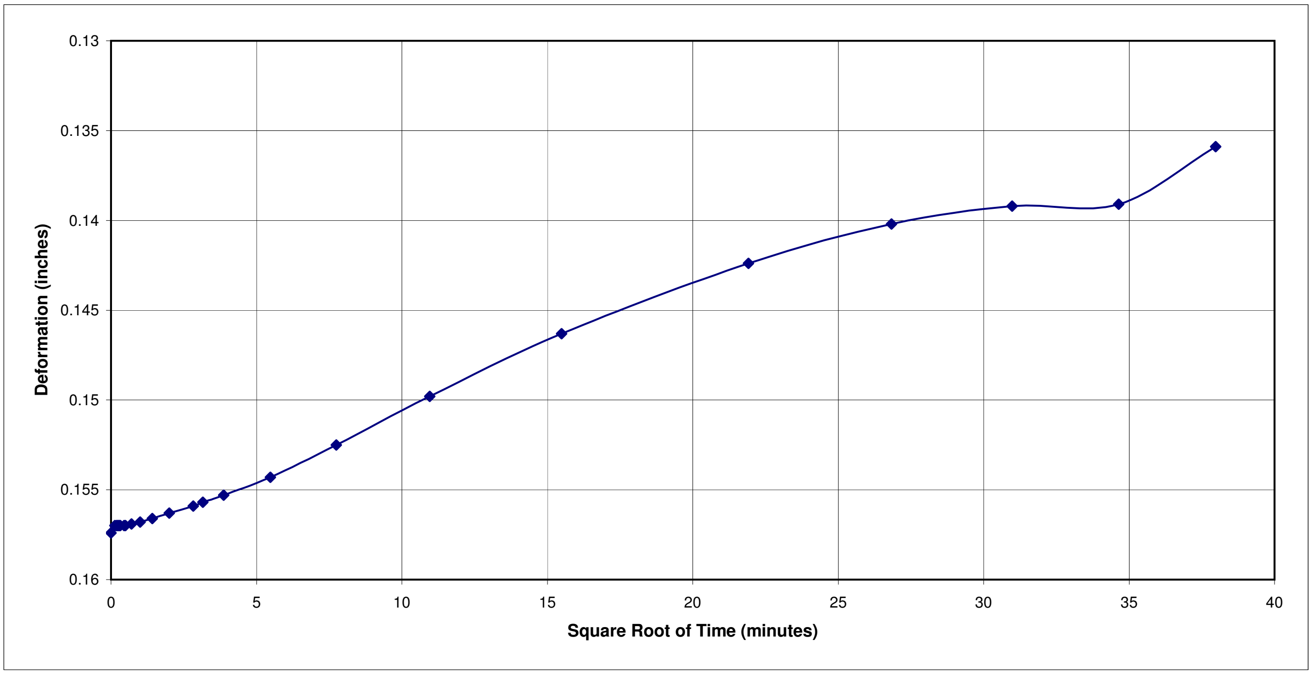
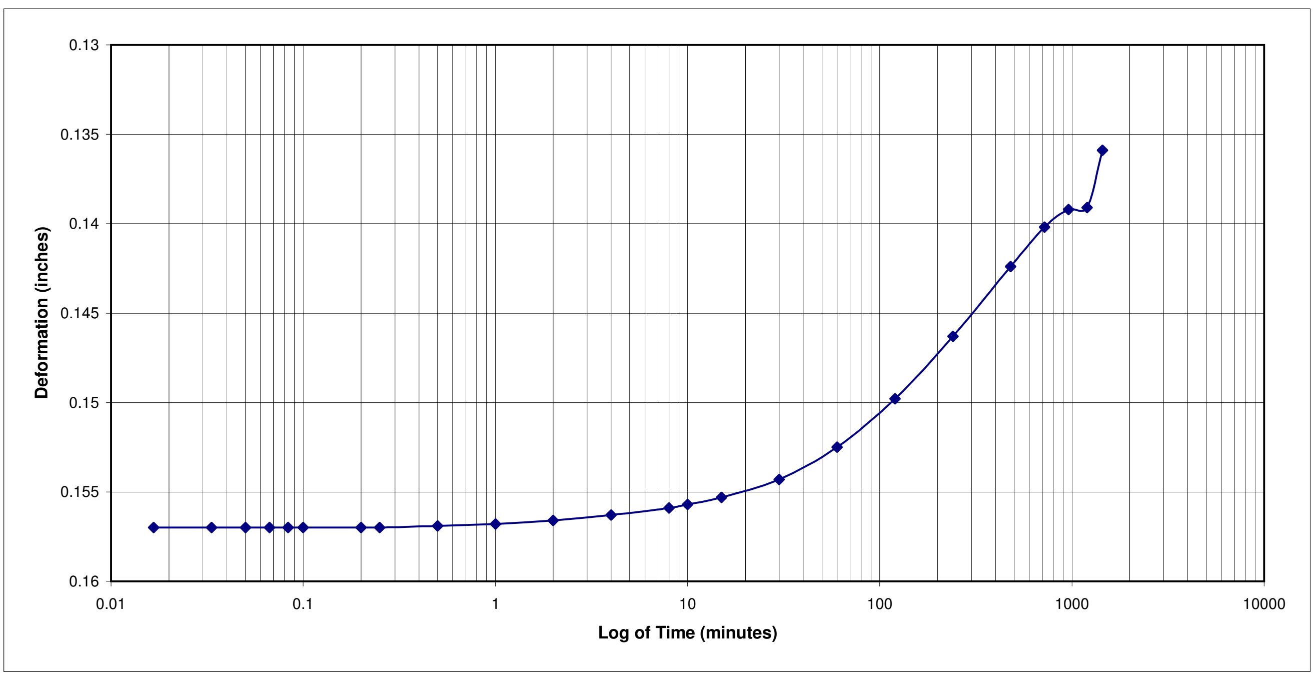
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-3A, 38 to 40 feet
LOAD = 0.125 TSF



DEFORMATION VS. LOG OF TIME
B-3A, 38 to 40 feet
LOAD = 0.125 TSF



Sample No.:	SCI B-3A, 39'
Exploration No.:	B-3A
Depth:	38 - 40 feet

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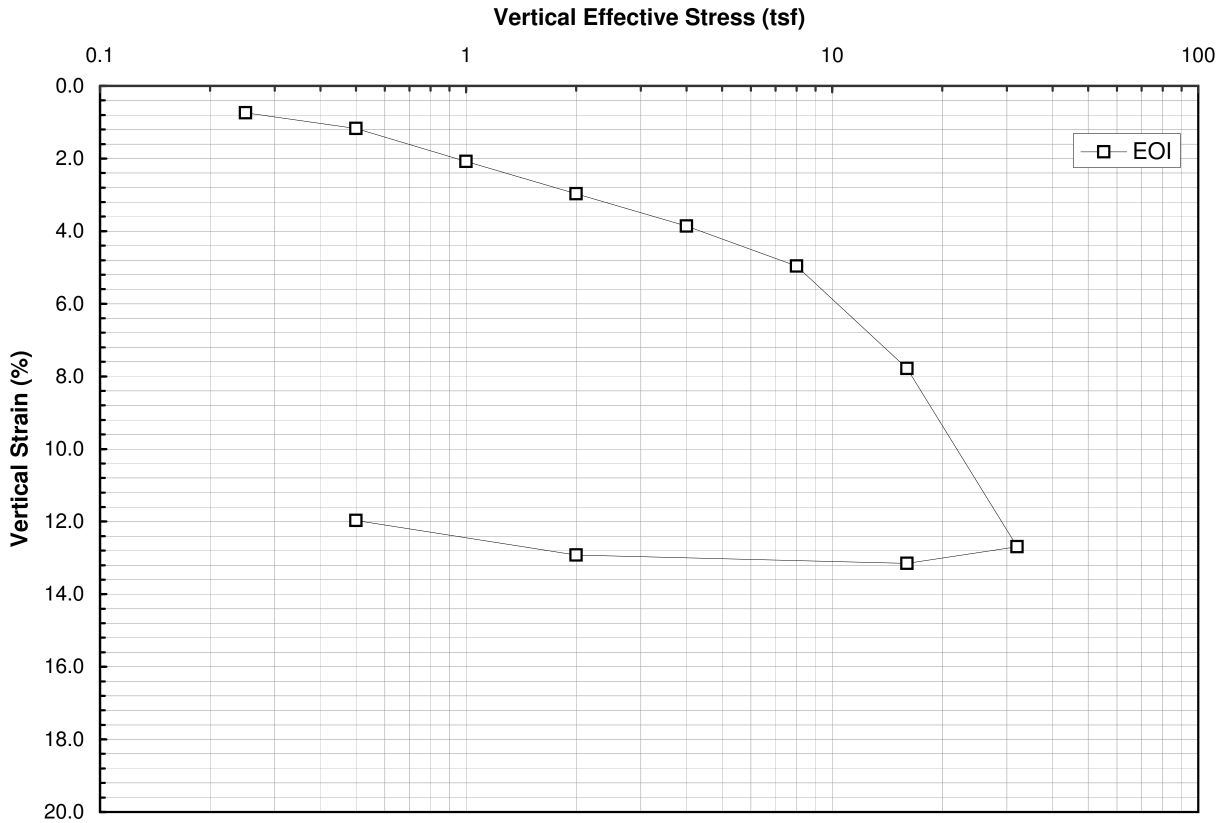
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554



CONSOLIDATION PARAMETERS

Probable Preconsolidation Stress, P'_c (tsf):	11.5
Approx. Hydrostatic Effective Stress, P'_o (tsf)	1.1
Vertical Strain at P'_o (%):	2.2
Compression Ratio (CR):	0.16
Recompression Ratio (RR):	0.008
Over Consolidation Ratio (OCR):	10.0

TEST METHOD

Test Method:	ASTM D-2435 A
Trimming Procedure:	2.5-inch Trimming Lathe
Pressure at Inundation:	0.25 tsf
Method to Compute C_v:	ASTM D-2435 12.3.2

SAMPLE ID

Test No.:	SCI B-23 Alt1, 51'
Sample No.:	UD1
Exploration No.:	B-23 Alt1
Depth:	50 to 52 feet
USCS Description:	Silty SAND (SM)

SAMPLE DATA

Sample Diameter (cm):	6.35
Sample Area (cm^2):	31.67
Measured Specific Gravity:	2.62
Trimmings Moisture (%):	35.8
% Passing #200 Sieve:	44.1
Liquid Limit:	40
Plastic Limit:	29
Plasticity Index:	11

	Initial	Final
Water Content (%):	34.7	28.1
Est. % Saturation:	99.3	100.0
Sample Height (cm):	2.540	2.236
Wet Sample Weight (g):	148.3	141.1
Dry Sample Weight (g):	110.1	110.1
Dry Unit Weight (pcf):	85.4	97.0
Void Ratio, e:	0.91	0.69
Solids Height (cm):	1.327	1.327

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ONE-DIMENSIONAL CONSOLIDATION TEST

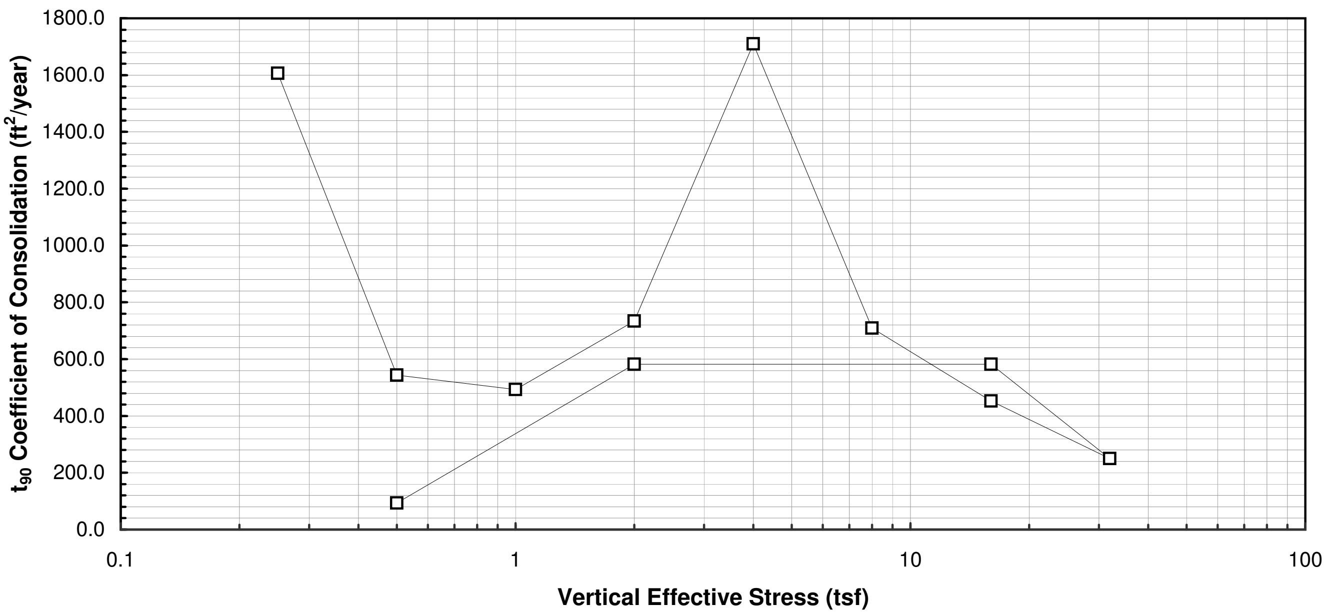
Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

Test No.:	SCI B-23 Alt1, 51'
Sample No.:	UD1
Exploration No.:	B-23 Alt1
Depth:	50 to 52 feet

LOAD INC.	STRESS DURATION (Hr - min)	VERTICAL STRESS (tsf)	VERTICAL STRAIN (EOI*)	VERTICAL STRAIN (EOP*)	VOID RATIO e (EOI*)	VOID RATIO e (EOP*)	STRESS RATIO (P'/P'c)	TAYLOR COEFFICIENT OF CONSOLIDATION (ft^2/year)
1	23-44	0.25	0.7	0.7	0.90	0.90	0.02	1606.5
2	21-57	0.5	1.2	1.1	0.89	0.89	0.04	544.2
3	23-27	1	2.1	1.8	0.87	0.88	0.09	493.3
4	24-01	2	3.0	2.6	0.86	0.86	0.17	734.4
5	21-07	4	3.9	3.4	0.84	0.85	0.35	1710.5
6	20-01	8	5.0	4.3	0.82	0.83	0.70	708.8
7	24-01	16	7.8	6.1	0.77	0.80	1.39	452.0
8	24-01	32	12.7	10.5	0.67	0.71	2.78	249.9
9	20-01	16	13.2	13.2	0.66	0.66	1.39	582.2
10	22-31	2	12.9	13.2	0.67	0.66	0.17	581.8
11	24-01	0.5	12.0	12.5	0.69	0.67	0.04	93.1

*EOI = End of Increment

*EOP = End of Primary



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ONE-DIMENSIONAL CONSOLIDATION TEST

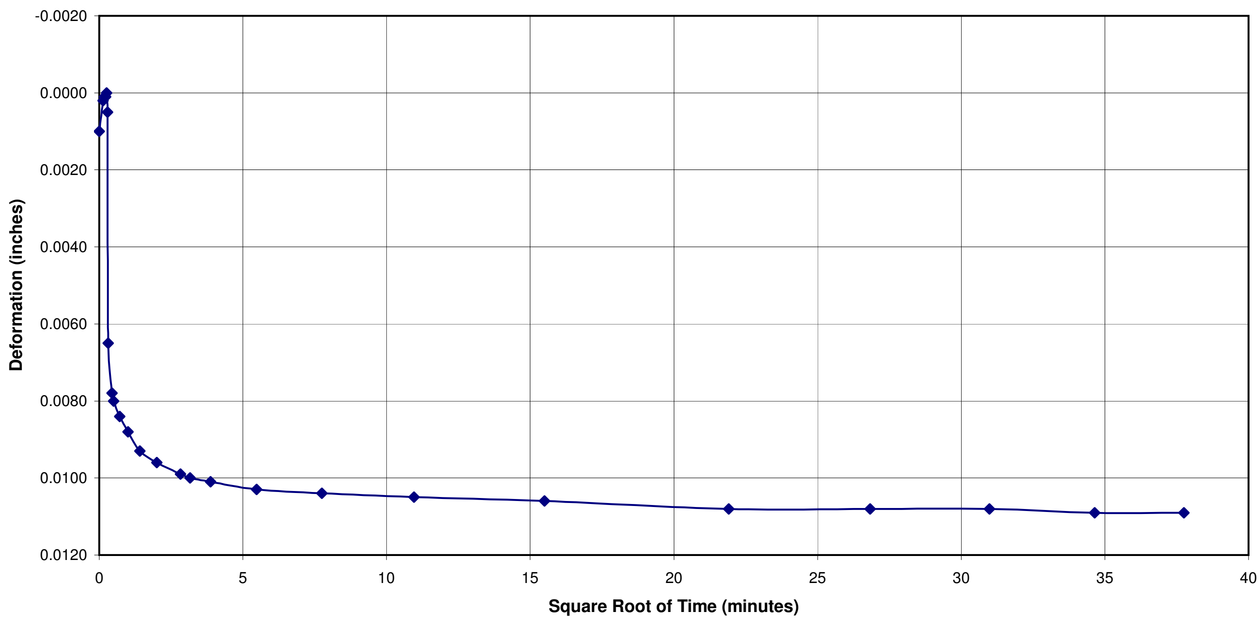
Project: Port Access Road

Client: SCDOT

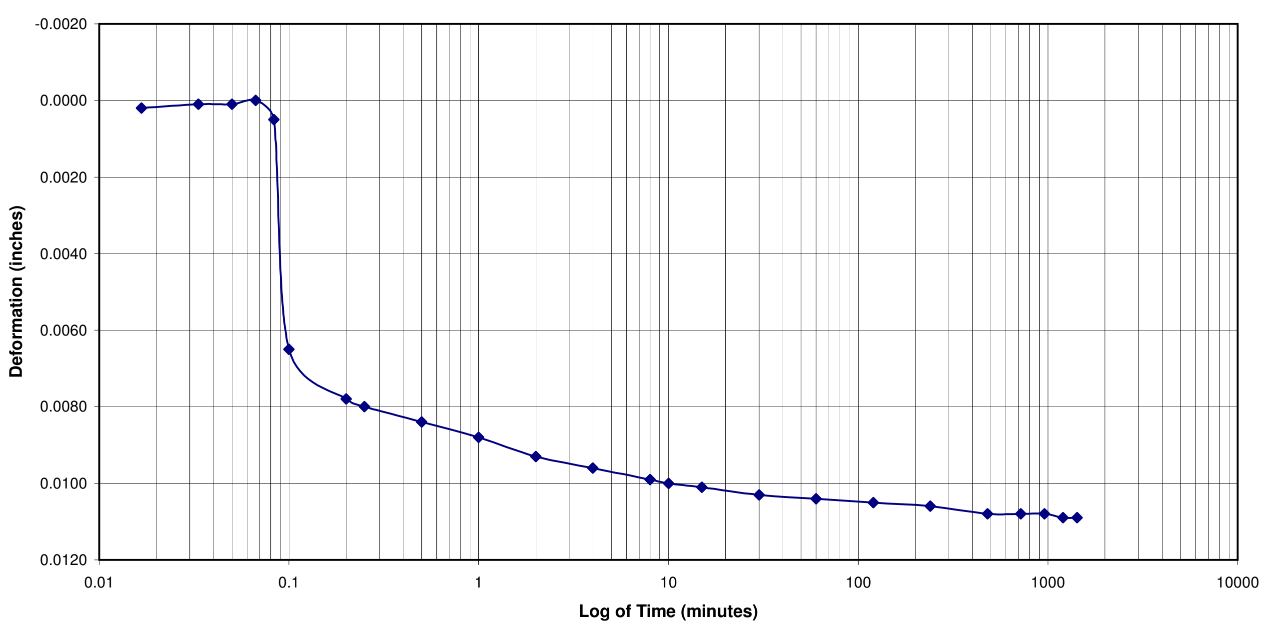
Location: North Charleston, South Carolina

Project No. 1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-23 Alt1, 50 to 52 feet
LOAD = 0.25 TSF



DEFORMATION VS. LOG OF TIME
B-23 Alt1, 50 to 52 feet
LOAD = 0.25 TSF



Sample No.: SCI B-23 Alt1, 51'
Exploration No.: B-23 Alt1
Depth: 50 - 52 feet

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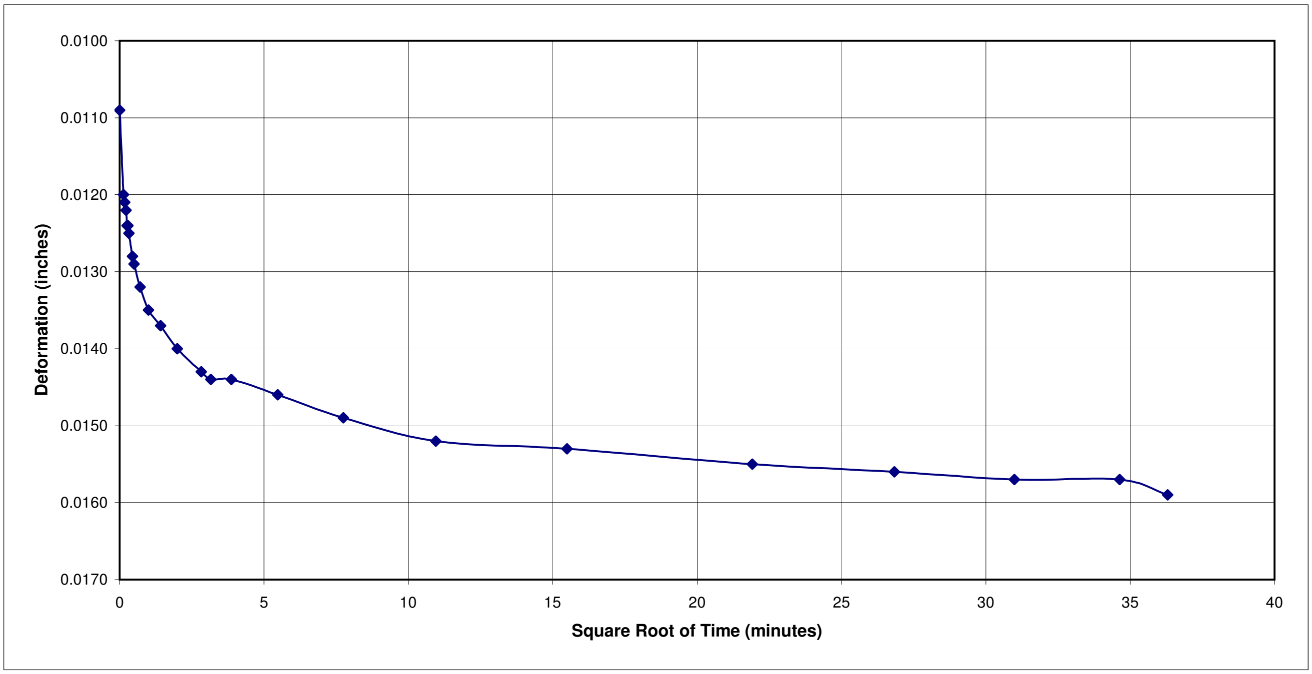
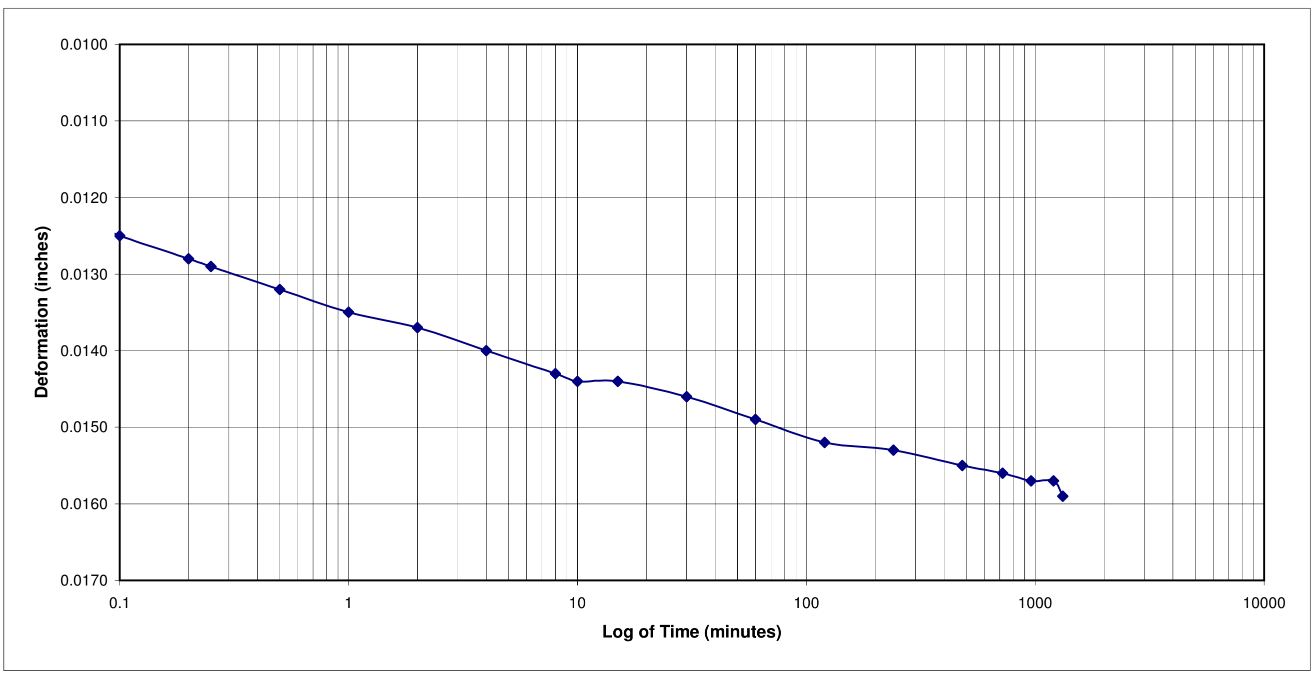
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-23 Alt1, 50 to 52 feet
LOAD = 0.5 TSF



DEFORMATION VS. LOG OF TIME
B-23 Alt1, 50 to 52 feet
LOAD = 0.5 TSF



Sample No.:	SCI B-23 Alt1, 51'
Exploration No.:	B-23 Alt1
Depth:	50 - 52 feet

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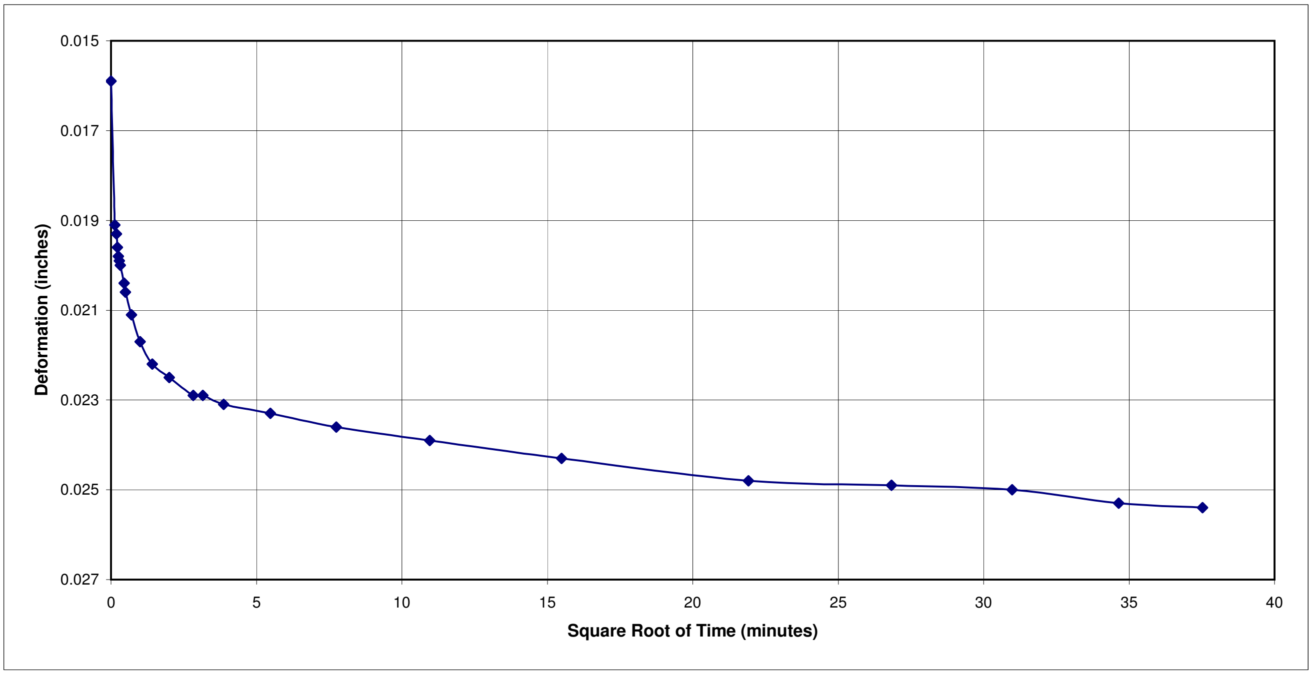
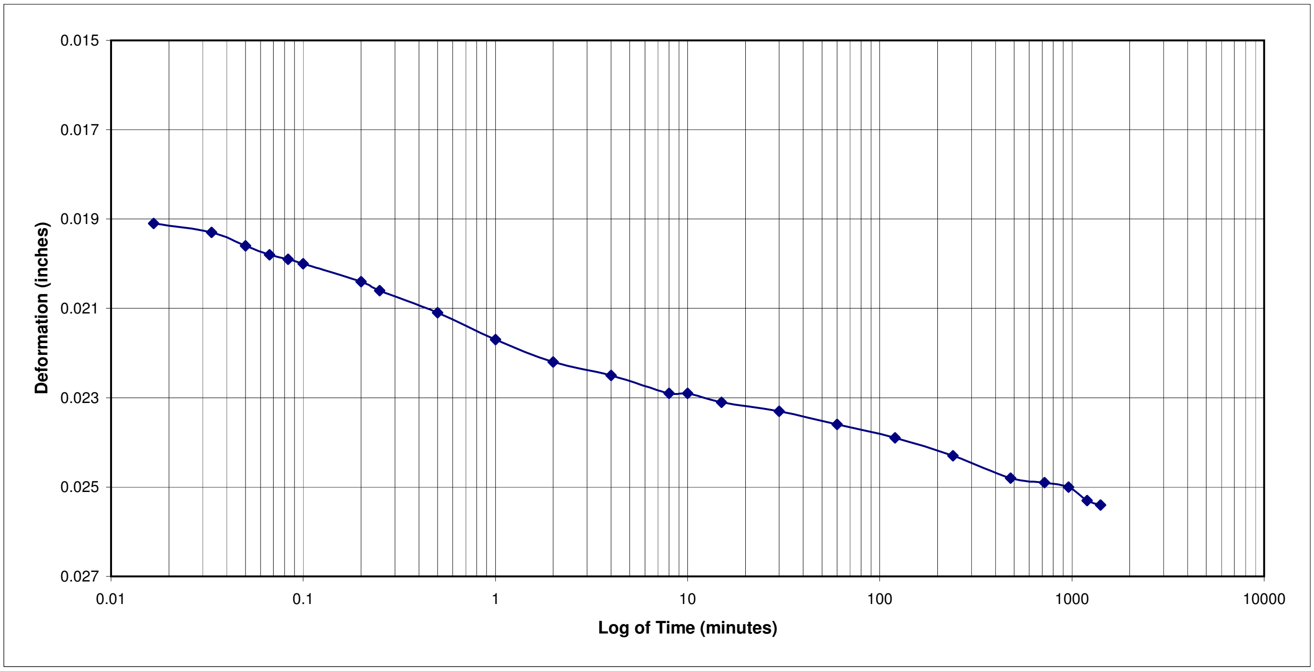
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-23 Alt1, 50 to 52 feet
LOAD = 1.0 TSF



DEFORMATION VS. LOG OF TIME
B-23 Alt1, 50 to 52 feet
LOAD = 1.0 TSF



Sample No.:	SCI B-23 Alt1, 51'
Exploration No.:	B-23 Alt1
Depth:	50 - 52 feet

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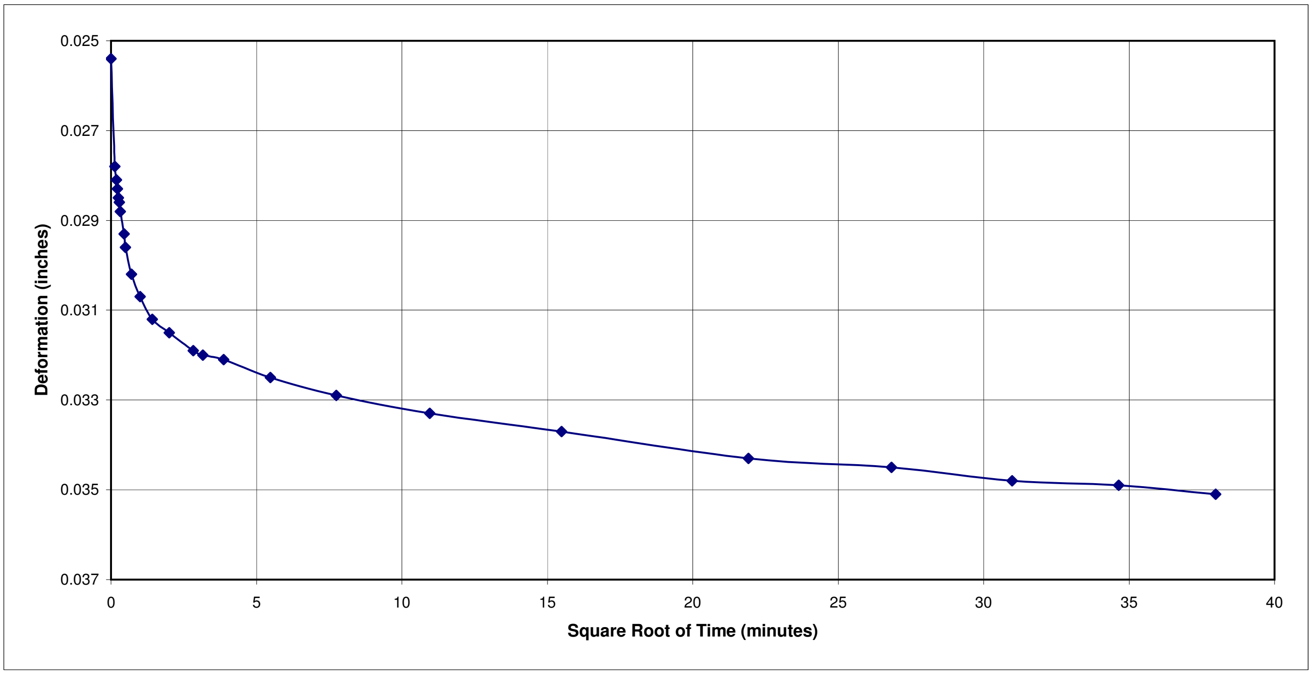
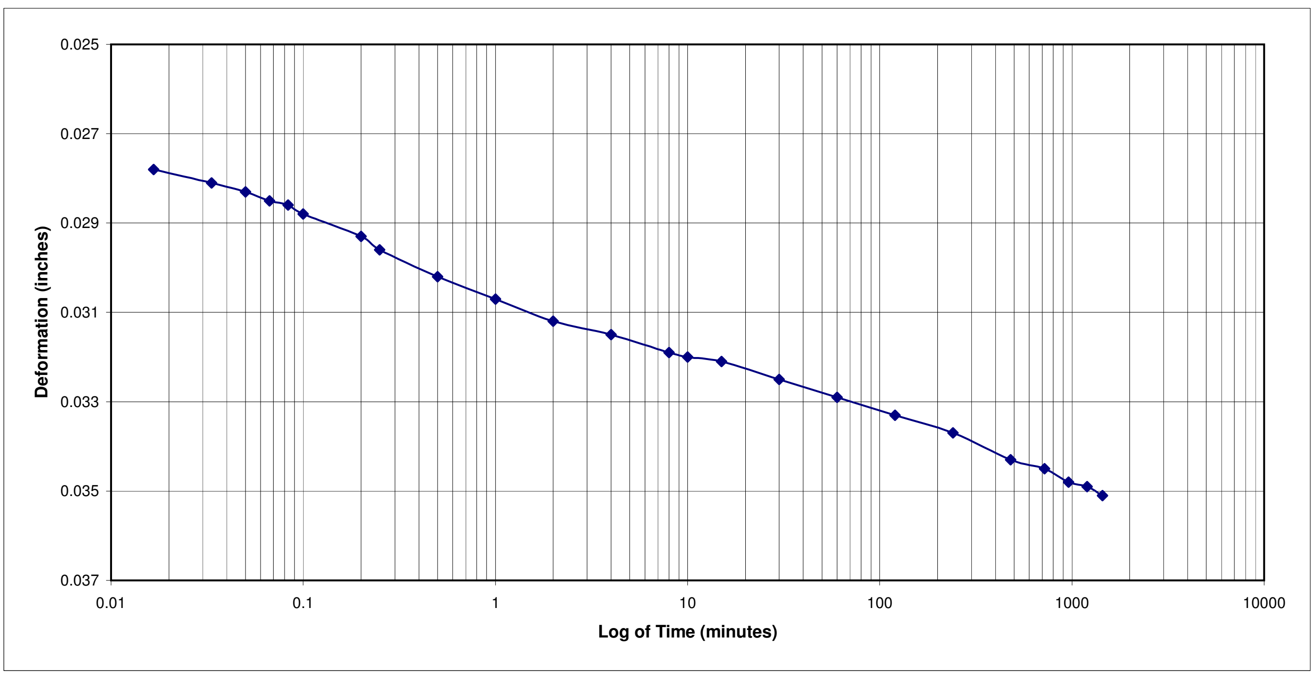
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-23 Alt1, 50 to 52 feet
LOAD = 2.0 TSF



DEFORMATION VS. LOG OF TIME
B-23 Alt1, 50 to 52 feet
LOAD = 2.0 TSF



Sample No.:	SCI B-23 Alt1, 51'
Exploration No.:	B-23 Alt1
Depth:	50 - 52 feet

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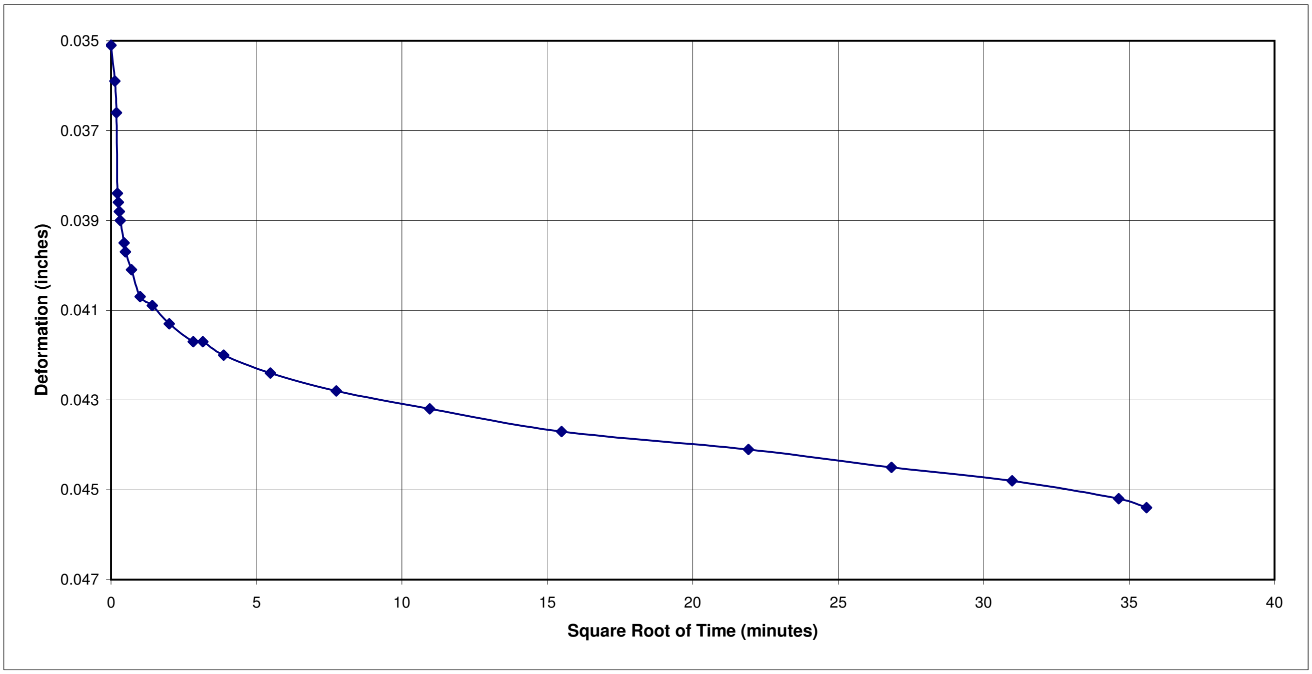
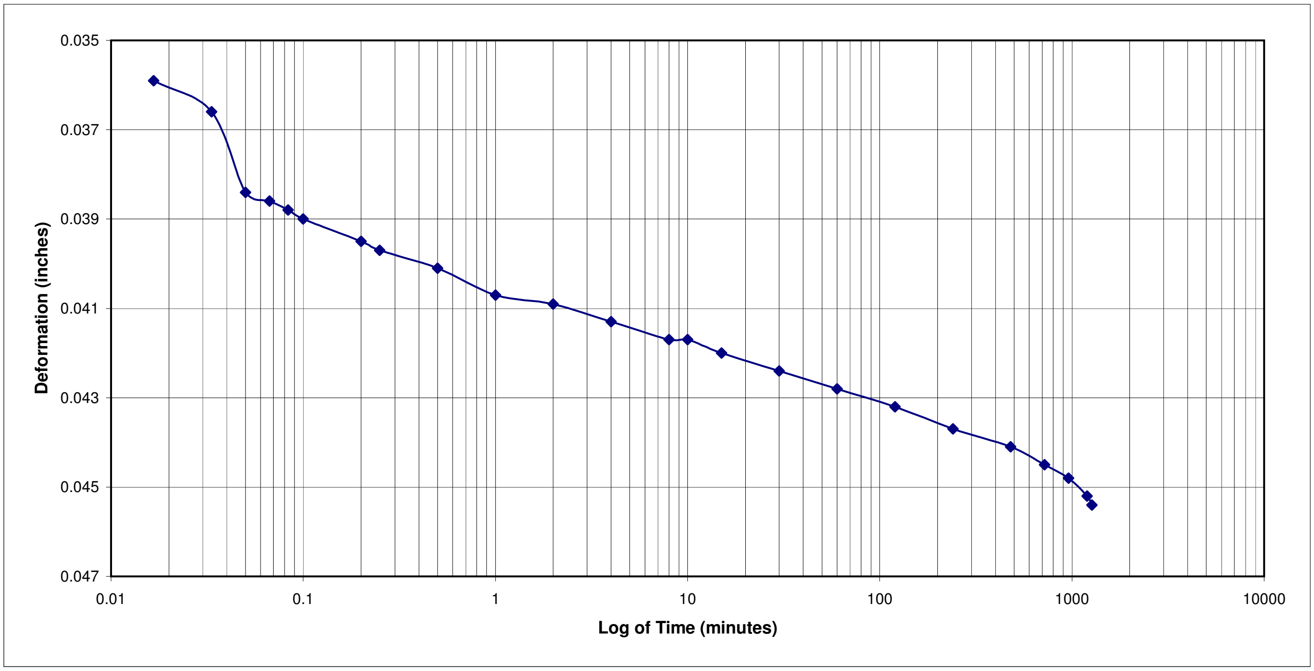
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-23 Alt1, 50 to 52 feet
LOAD = 4.0 TSF



DEFORMATION VS. LOG OF TIME
B-23 Alt1, 50 to 52 feet
LOAD = 4.0 TSF



Sample No.: SCI B-23 Alt1, 51'
Exploration No.: B-23 Alt1
Depth: 50 - 52 feet

1-D CONSOLIDATION TIME-DEFORMATION CURVES

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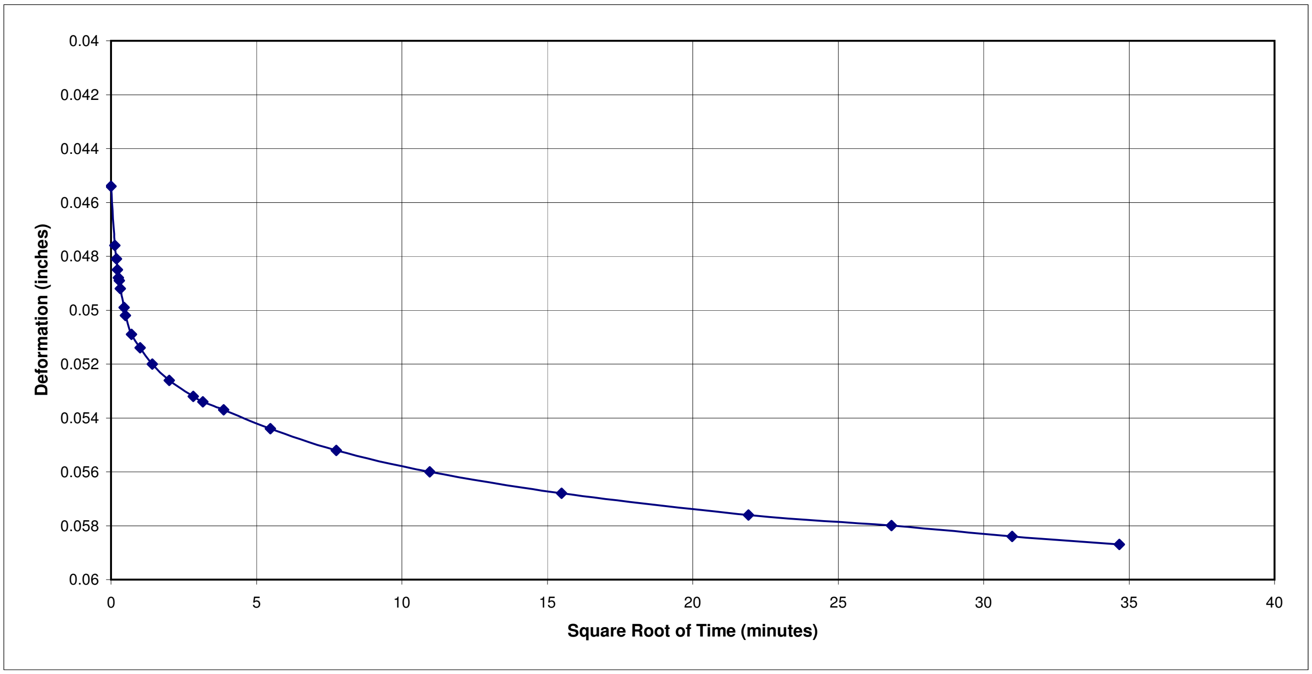
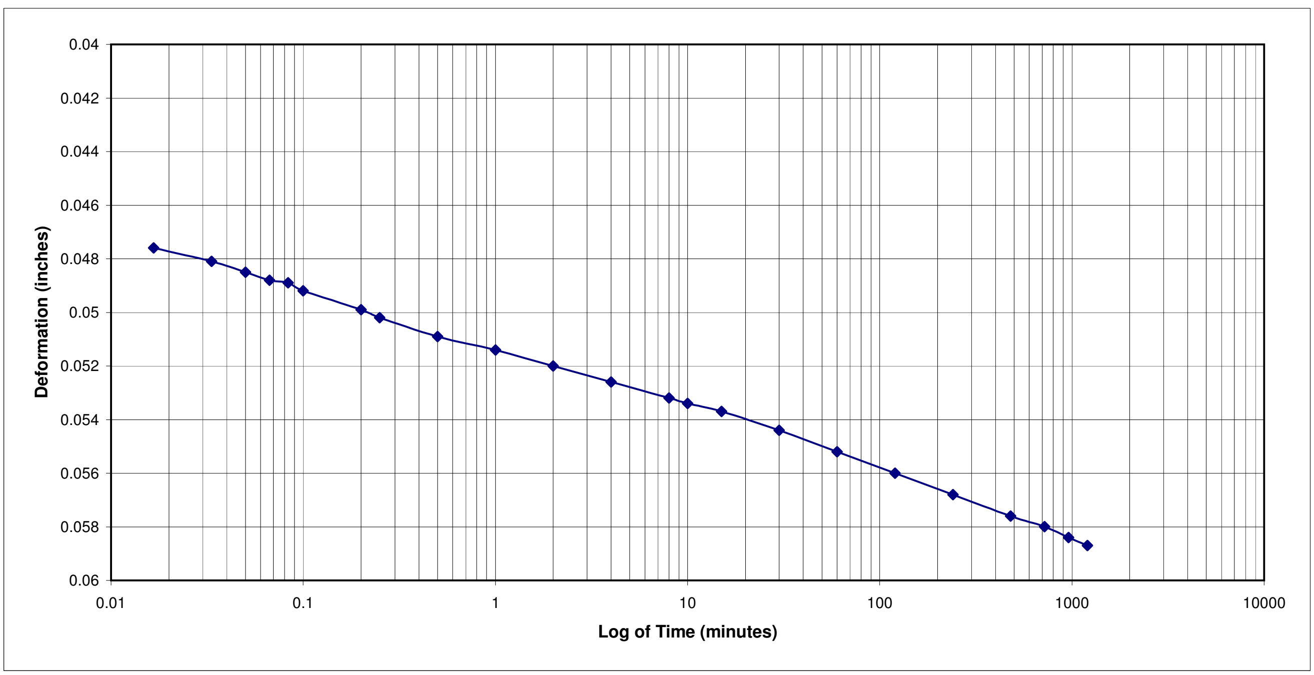
Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-23 Alt1, 50 to 52 feet
LOAD = 8.0 TSF



DEFORMATION VS. LOG OF TIME
B-23 Alt1, 50 to 52 feet
LOAD = 8.0 TSF



Sample No.:	SCI B-23 Alt1, 51'
Exploration No.:	B-23 Alt1
Depth:	50 - 52 feet

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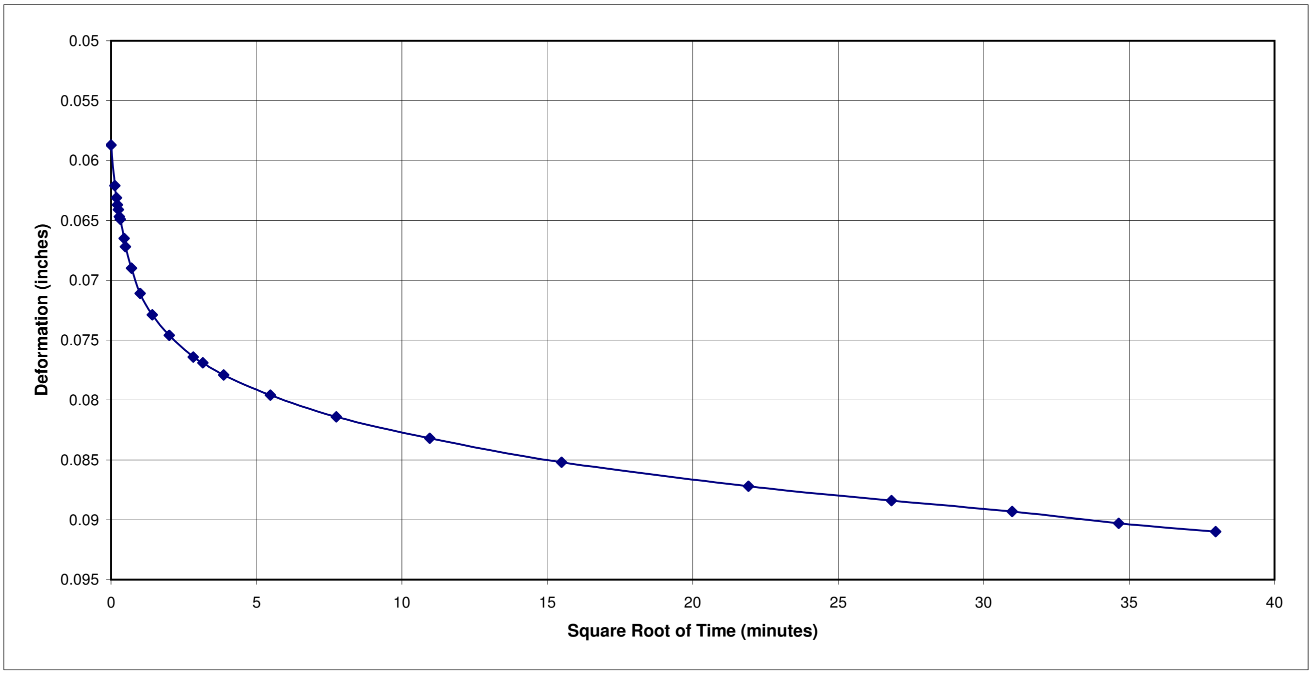
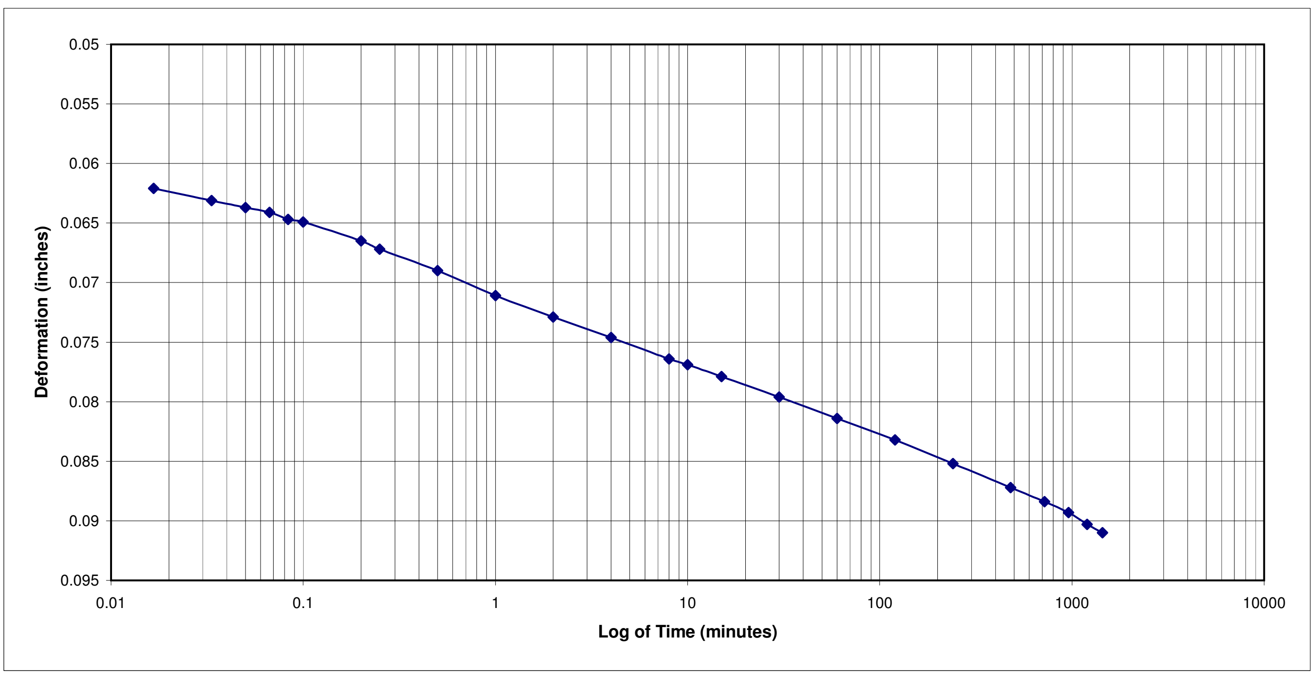
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-23 Alt1, 50 to 52 feet
LOAD = 16.0 TSF



DEFORMATION VS. LOG OF TIME
B-23 Alt1, 50 to 52 feet
LOAD = 16.0 TSF



Sample No.:	SCI B-23 Alt1, 51'
Exploration No.:	B-23 Alt1
Depth:	50 - 52 feet

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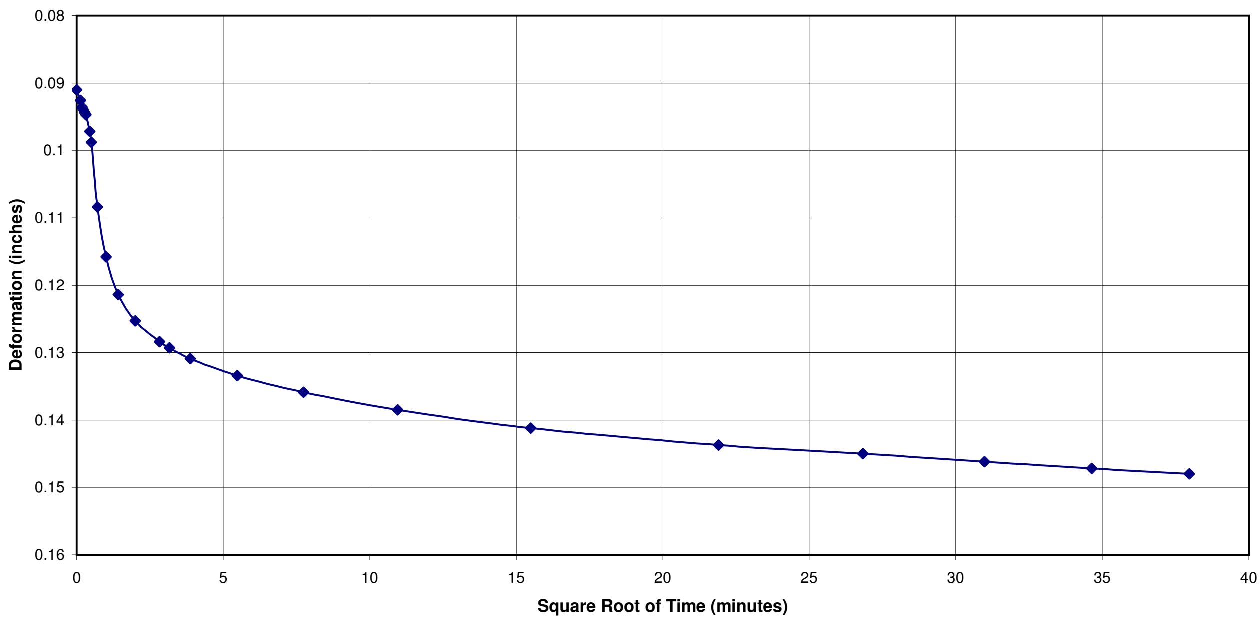
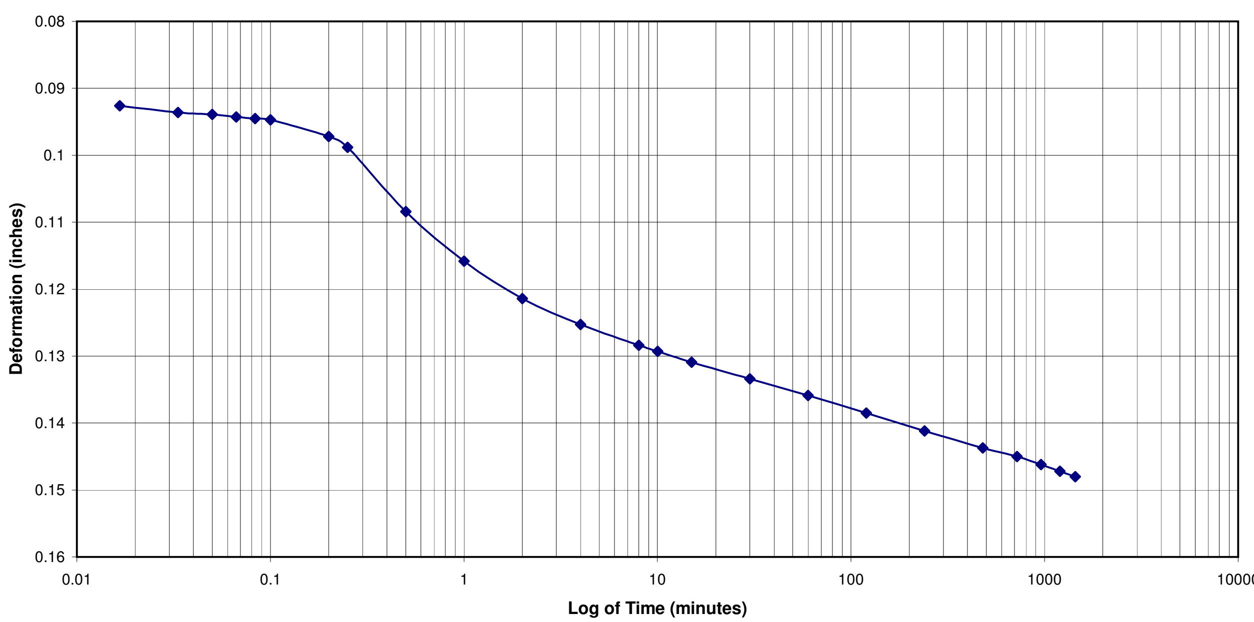
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-23 Alt1, 50 to 52 feet
LOAD = 32.0 TSF



DEFORMATION VS. LOG OF TIME
B-23 Alt1, 50 to 52 feet
LOAD = 32.0 TSF



Sample No.:	SCI B-23 Alt1, 51'
Exploration No.:	B-23 Alt1
Depth:	50 - 52 feet

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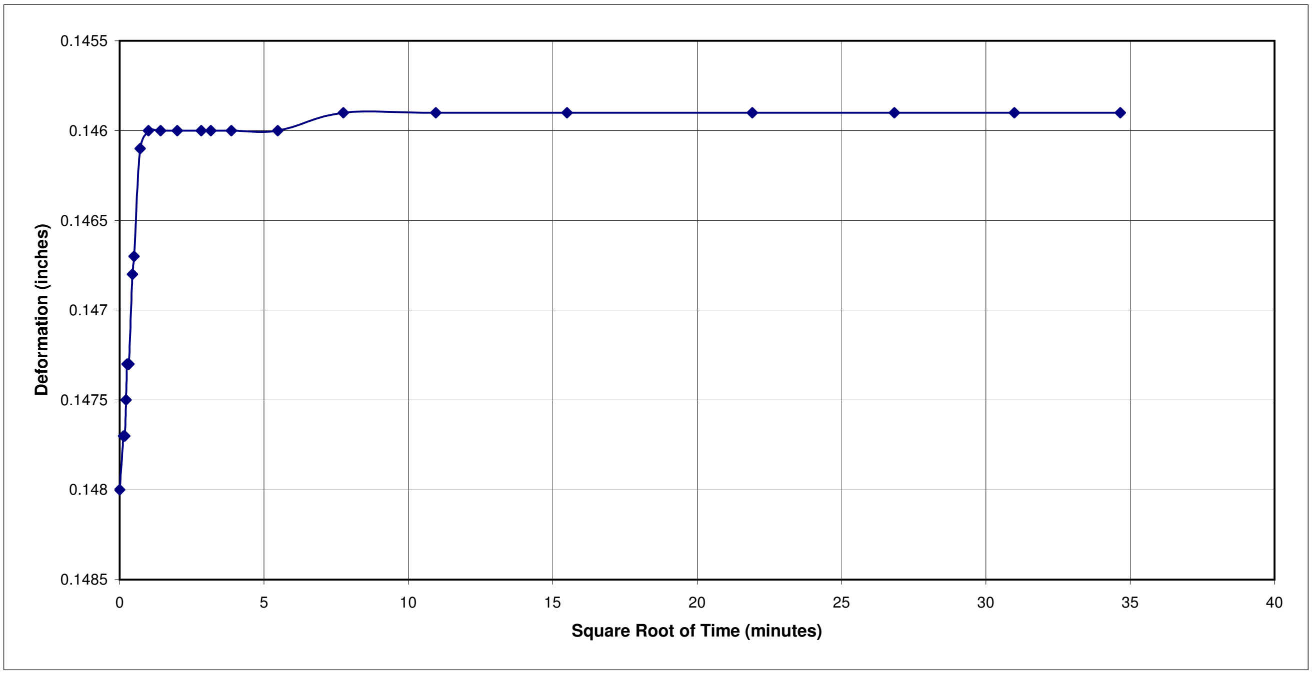
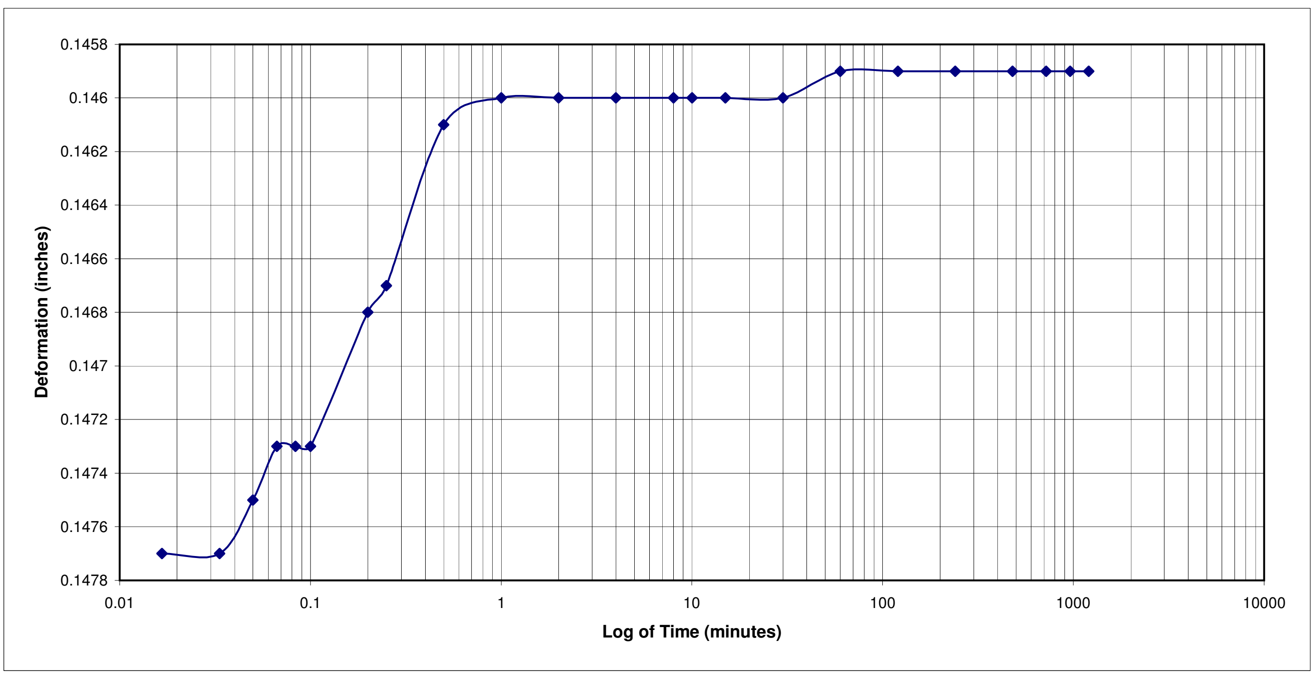
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-23 Alt1, 50 to 52 feet
LOAD = 16.0 TSF



DEFORMATION VS. LOG OF TIME
B-23 Alt1, 50 to 52 feet
LOAD = 16.0 TSF



Sample No.:	SCI B-23 Alt1, 51'
Exploration No.:	B-23 Alt1
Depth:	50 - 52 feet

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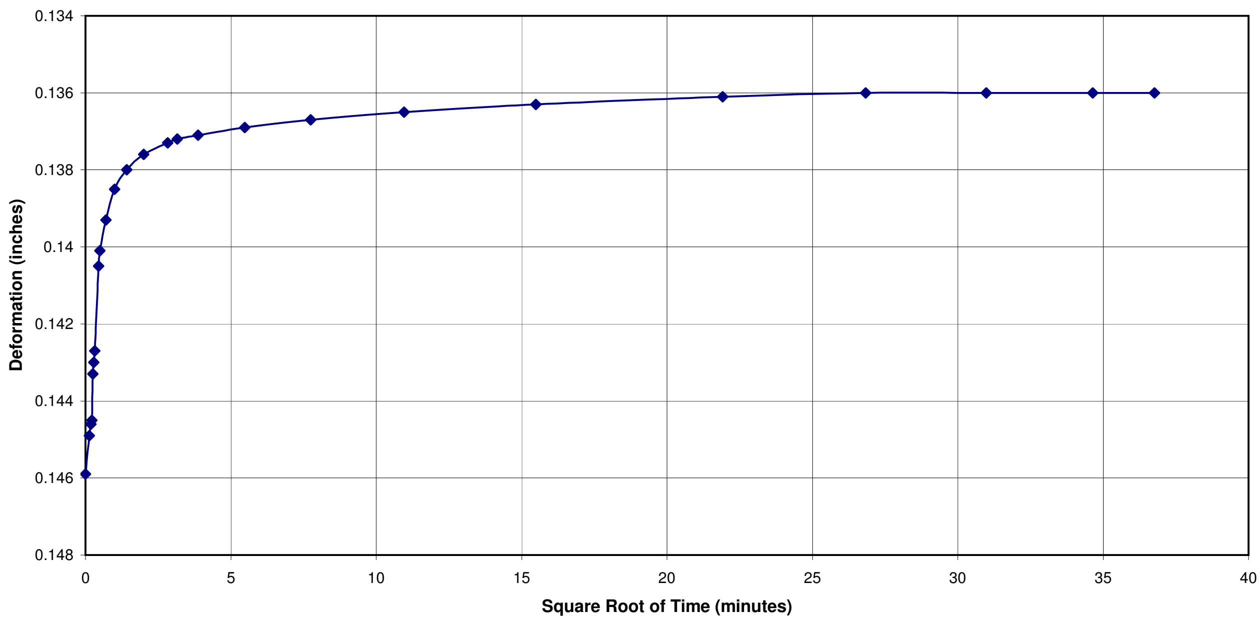
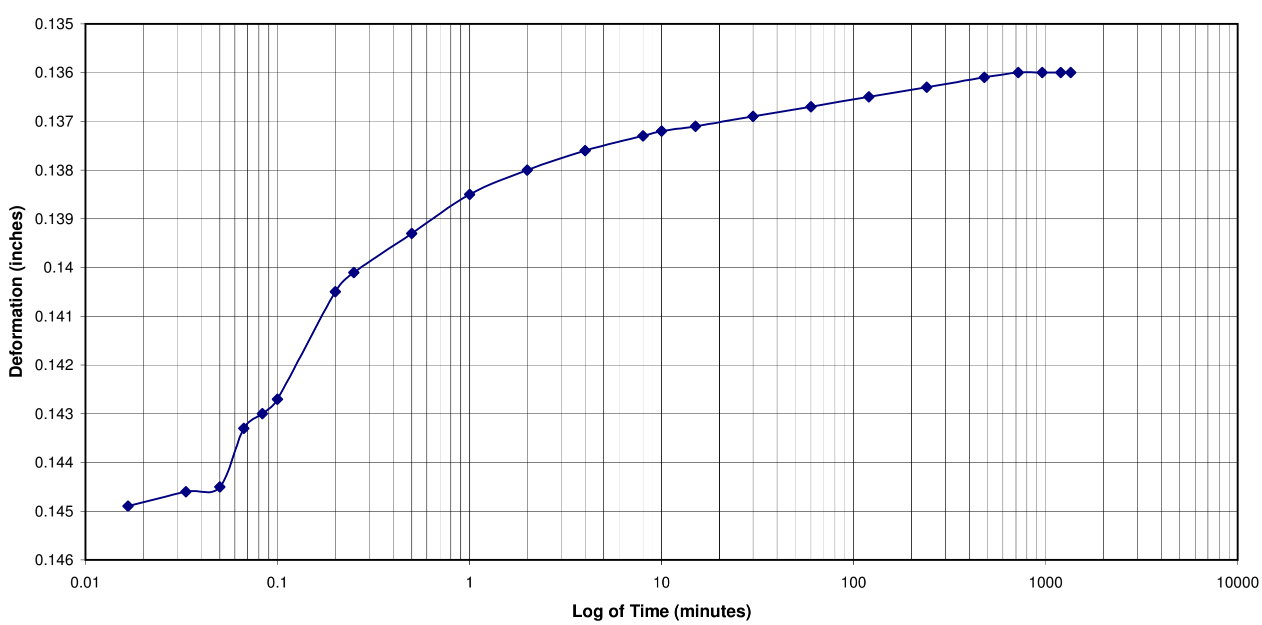
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-23 Alt1, 50 to 52 feet
LOAD = 2.0 TSF



DEFORMATION VS. LOG OF TIME
B-23 Alt1, 50 to 52 feet
LOAD = 2.0 TSF



Sample No.: SCI B-23 Alt1, 51'
Exploration No.: B-23 Alt1
Depth: 50 - 52 feet

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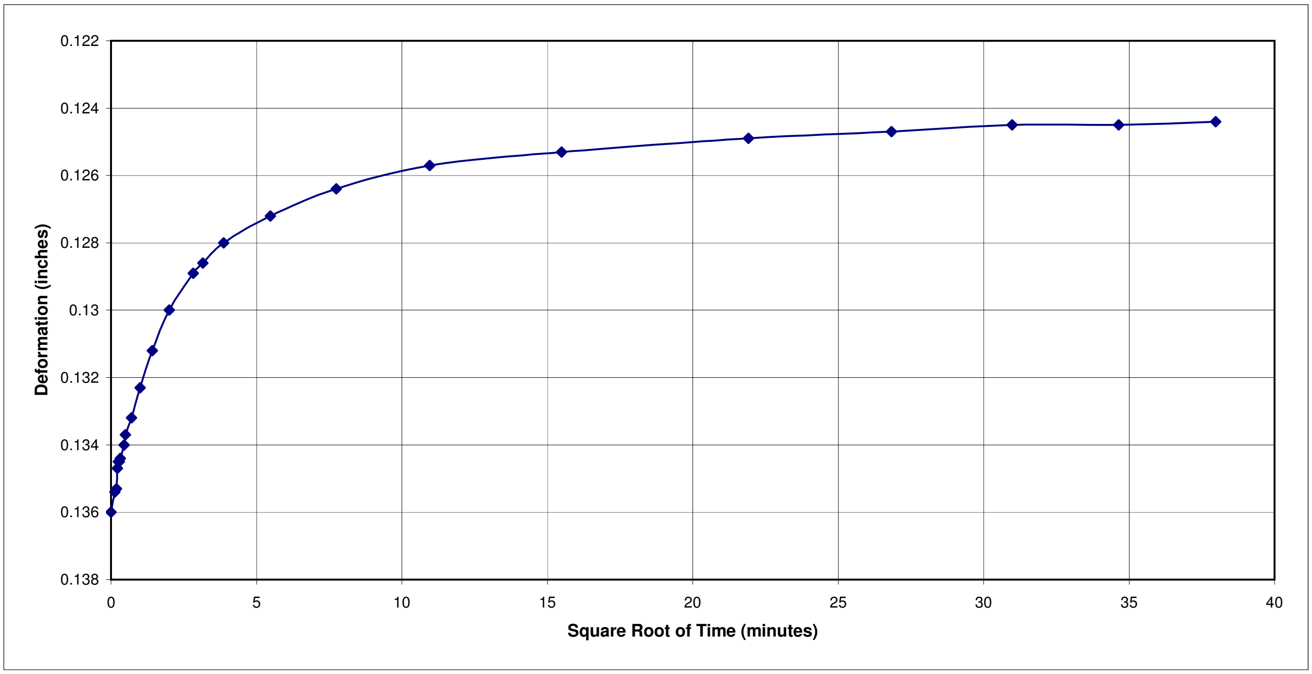
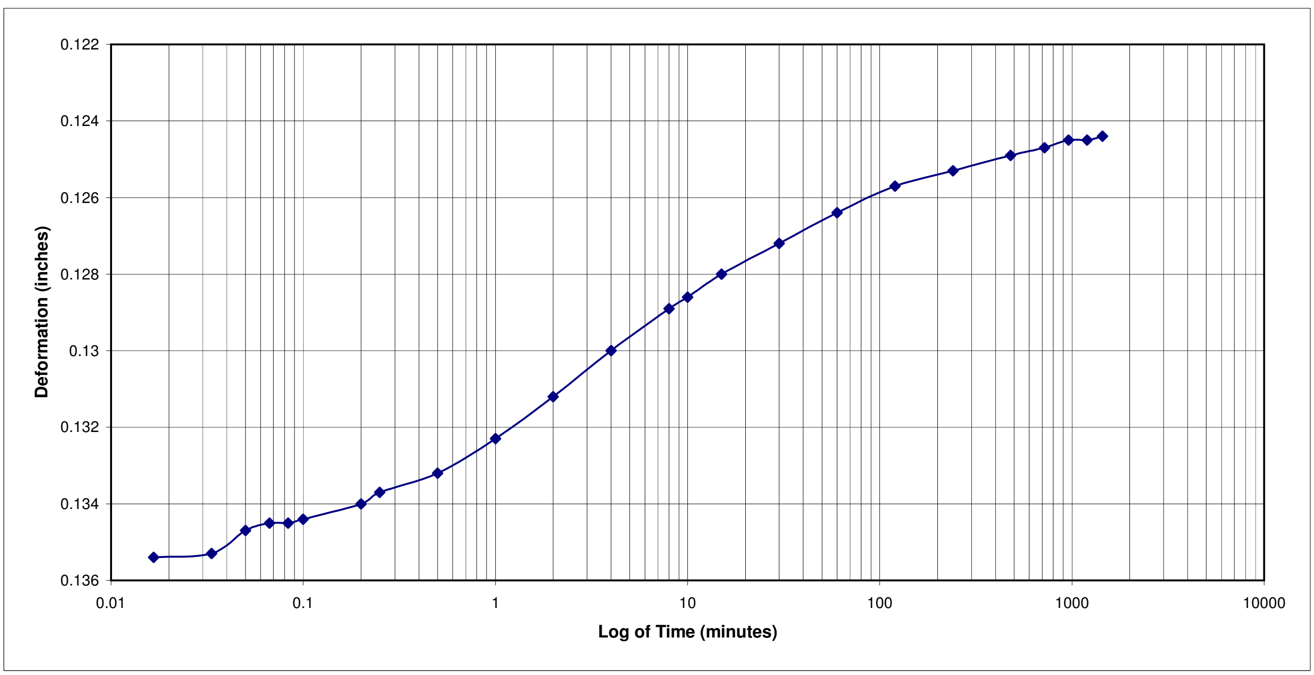
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project: Port Access Road
Client: SCDOT
Location: North Charleston, South Carolina
Project No.: 1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-23 Alt1, 50 to 52 feet
LOAD = 0.5 TSF



DEFORMATION VS. LOG OF TIME
B-23 Alt1, 50 to 52 feet
LOAD = 0.5 TSF



Sample No.:	SCI B-23 Alt1, 51'
Exploration No.:	B-23 Alt1
Depth:	50 - 52 feet

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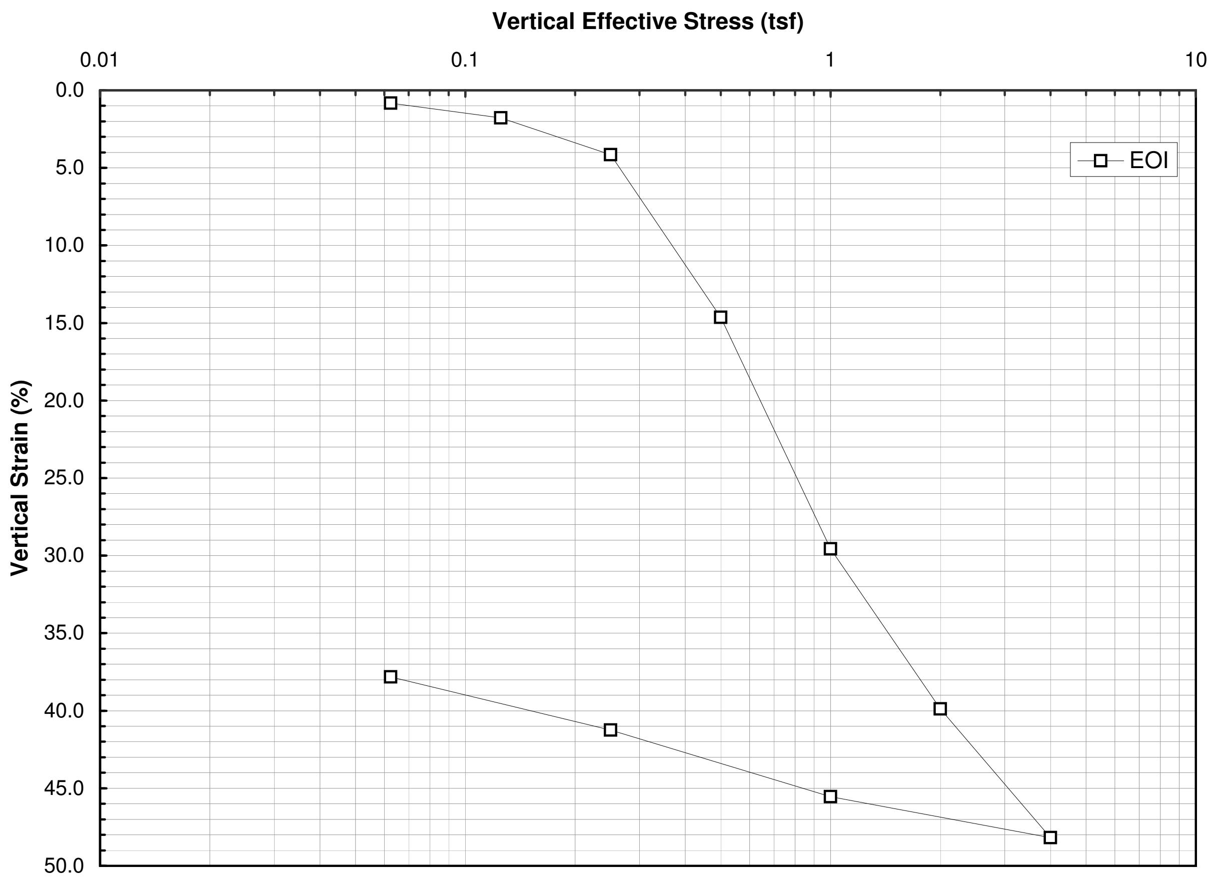
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554



CONSOLIDATION PARAMETERS	
Probable Preconsolidation Stress, P'_c (tsf):	0.3
Approx. Hydrostatic Effective Stress, P'_o (tsf)	0.4
Vertical Strain at P'_o (%):	11.5
Compression Ratio (CR):	0.25
Recompression Ratio (RR):	0.064
Over Consolidation Ratio (OCR):	0.6

TEST METHOD	
Test Method:	ASTM D-2435 A
Trimming Procedure:	2.5-inch Trimming Lathe
Pressure at Inundation:	0.0625 tsf
Method to Compute C_v:	ASTM D-2435 12.3.2

SAMPLE ID	
Test No.:	GTX 33A, 21'
Sample No.:	UD1
Exploration No.:	B-33A
Depth:	20 to 22 feet
USCS Description:	Elastic SILT (MH)

SAMPLE DATA		
Sample Diameter (cm):	6.35	
Sample Area (cm^2):	31.67	
Measured Specific Gravity:	2.62	
Trimmings Moisture (%):	152.5	
% Passing #200 Sieve:	97.9	
Liquid Limit:	152	
Plastic Limit:	66	
Plasticity Index:	86	
	Initial	Final
Water Content (%):	161.3	88.0
Est. % Saturation:	100.0	100.0
Sample Height (cm):	2.540	1.580
Wet Sample Weight (g):	107.3	77.2
Dry Sample Weight (g):	41.1	41.1
Dry Unit Weight (pcf):	31.8	51.2
Void Ratio, e:	4.13	2.19
Solids Height (cm):	0.495	0.495

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ONE-DIMENSIONAL CONSOLIDATION TEST

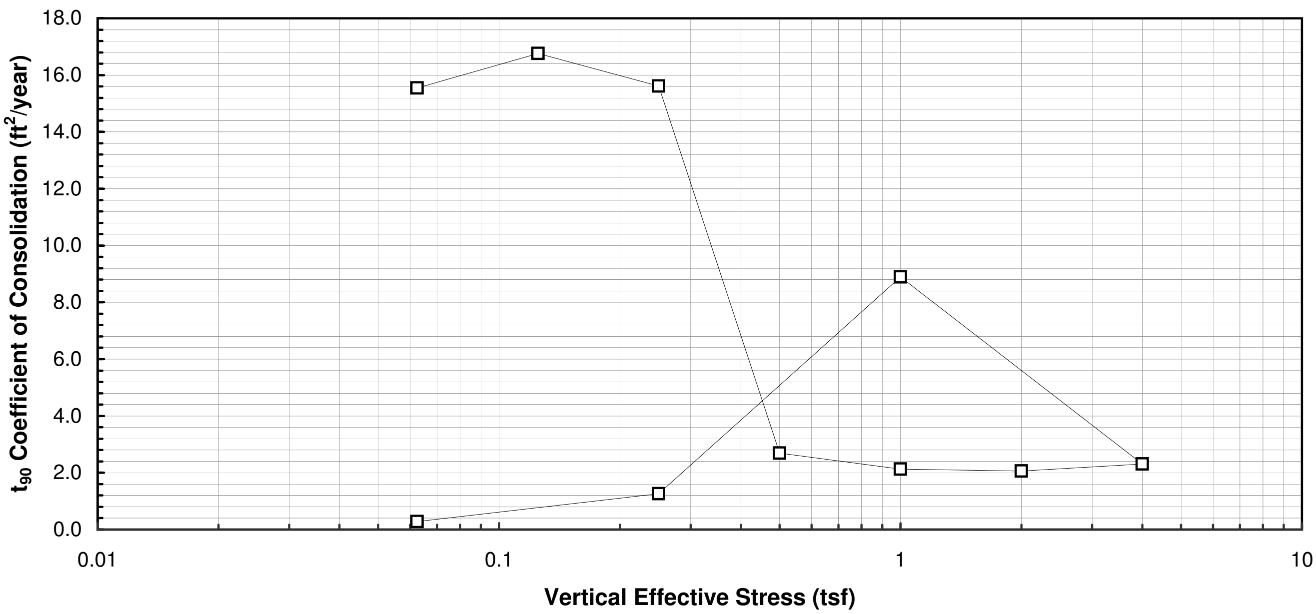
Project: Port Access Road
Client: SCDOT
Location: North Charleston, South Carolina
Project No.: 1131-08-554

Test No.:	GTX 33A, 21'
Sample No.:	UD1
Exploration No.:	B-33A
Depth:	20 to 22 feet

LOAD INC.	STRESS DURATION (Hr - min)	VERTICAL STRESS (tsf)	VERTICAL STRAIN (EOI*)	VERTICAL STRAIN (EOP*)	VOID RATIO e (EOI*)	VOID RATIO e (EOP*)	STRESS RATIO (P'/P'c)	TAYLOR COEFFICIENT OF CONSOLIDATION (ft^2/year)
1	24-00	0.0625	0.8	0.8	4.09	4.09	0.23	15.5
2	24-00	0.125	1.8	1.4	4.04	4.06	0.46	16.8
3	24-00	0.25	4.2	3.6	3.92	3.95	0.93	15.6
4	24-00	0.5	14.6	11.7	3.38	3.53	1.85	2.7
5	24-00	1	29.6	27.3	2.62	2.73	3.70	2.1
6	24-00	2	39.9	38.4	2.09	2.16	7.41	2.1
7	24-00	4	48.2	46.6	1.66	1.74	14.81	2.3
8	24-00	1	45.5	46.2	1.80	1.76	3.70	8.9
9	24-00	0.25	41.2	42.0	2.02	1.98	0.93	1.3
10	24-00	0.0625	37.8	37.6	2.19	2.20	0.23	0.3

*EOI = End of Increment

*EOP = End of Primary



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ONE-DIMENSIONAL CONSOLIDATION TEST

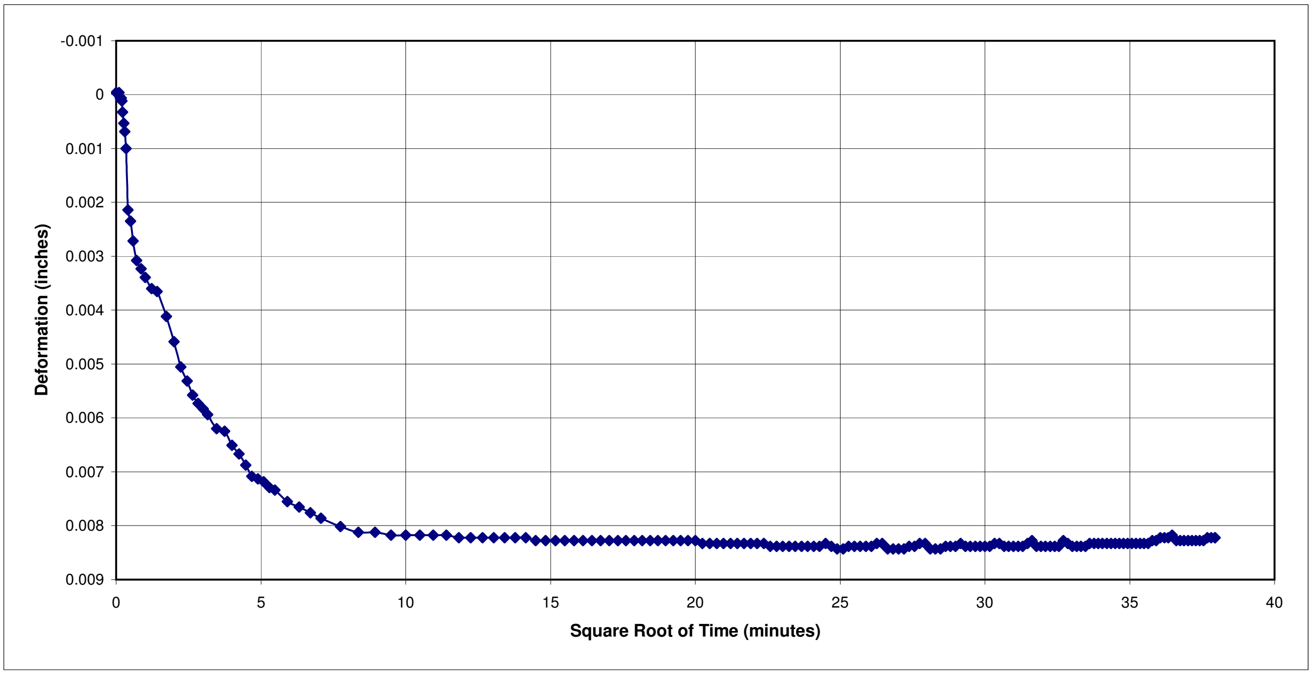
Project: Port Access Road

Client: SCDOT

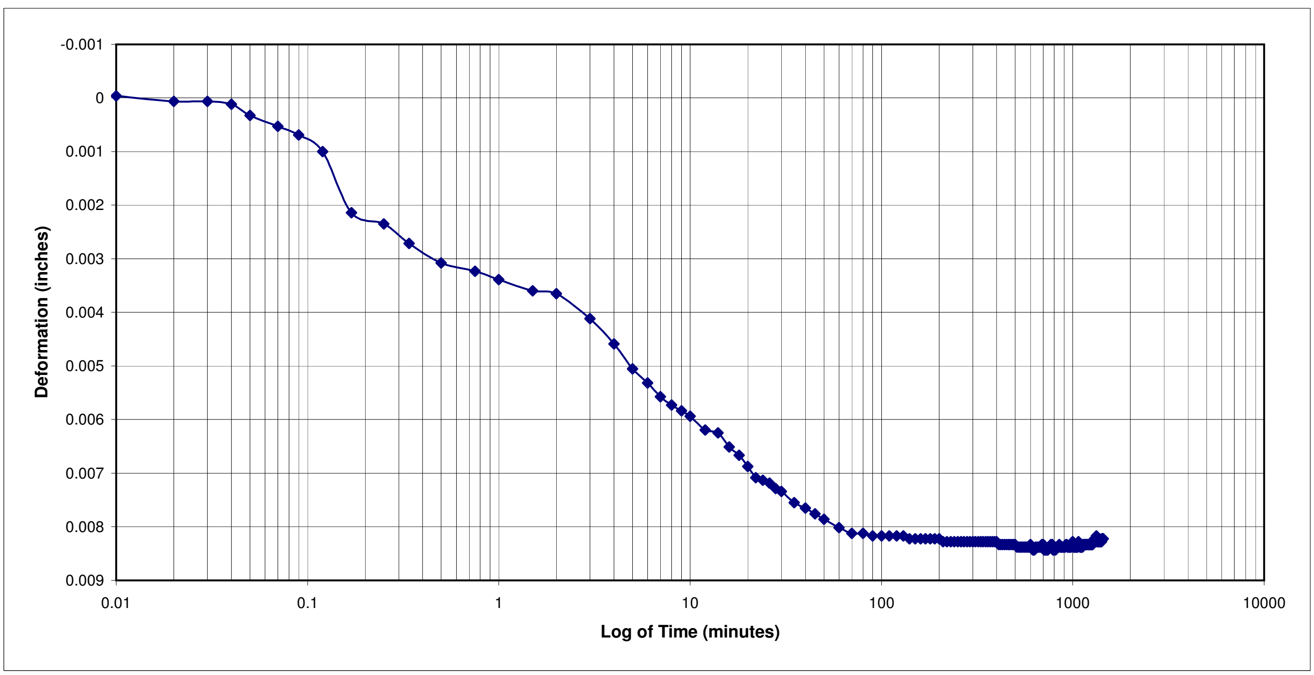
Location: North Charleston, South Carolina

Project No. 1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-33A, 20 to 22 feet
LOAD = 0.0625 TSF



DEFORMATION VS. LOG OF TIME
B-33A, 20 to 22 feet
LOAD = 0.0625 TSF



Sample No.:	GTX B-33A, 21'
Exploration No.:	B-33A
Depth:	20 - 22 feet

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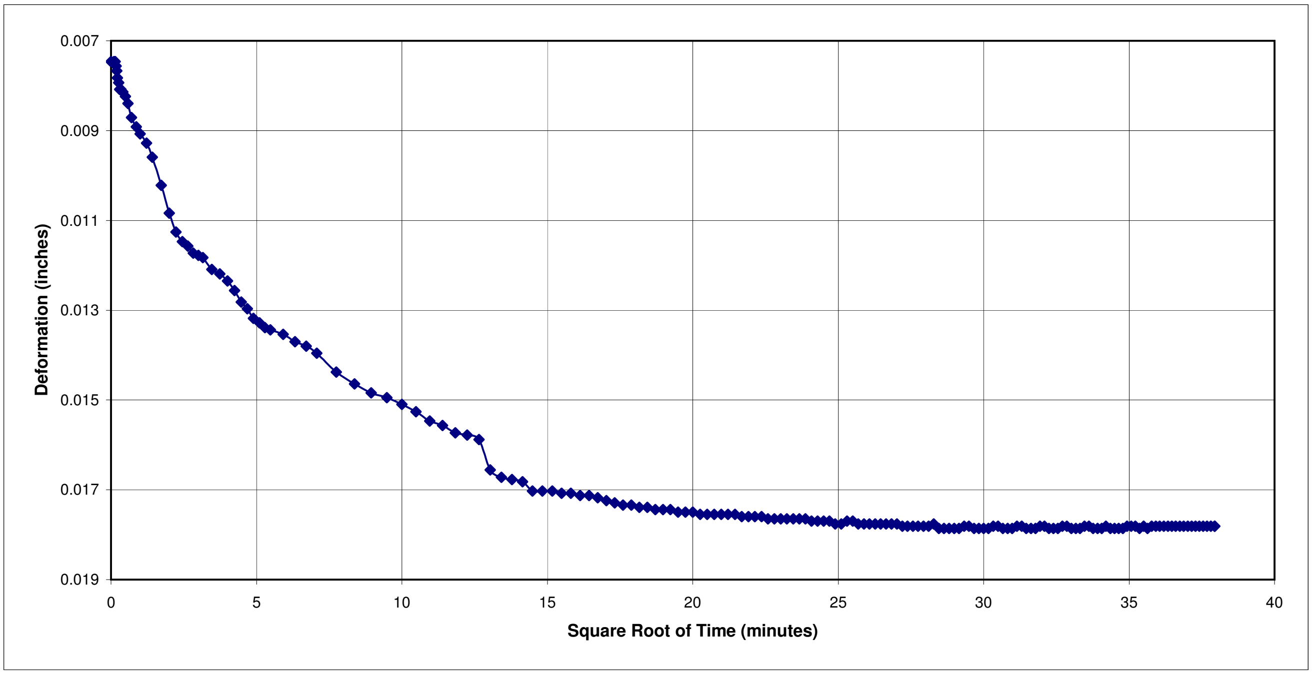
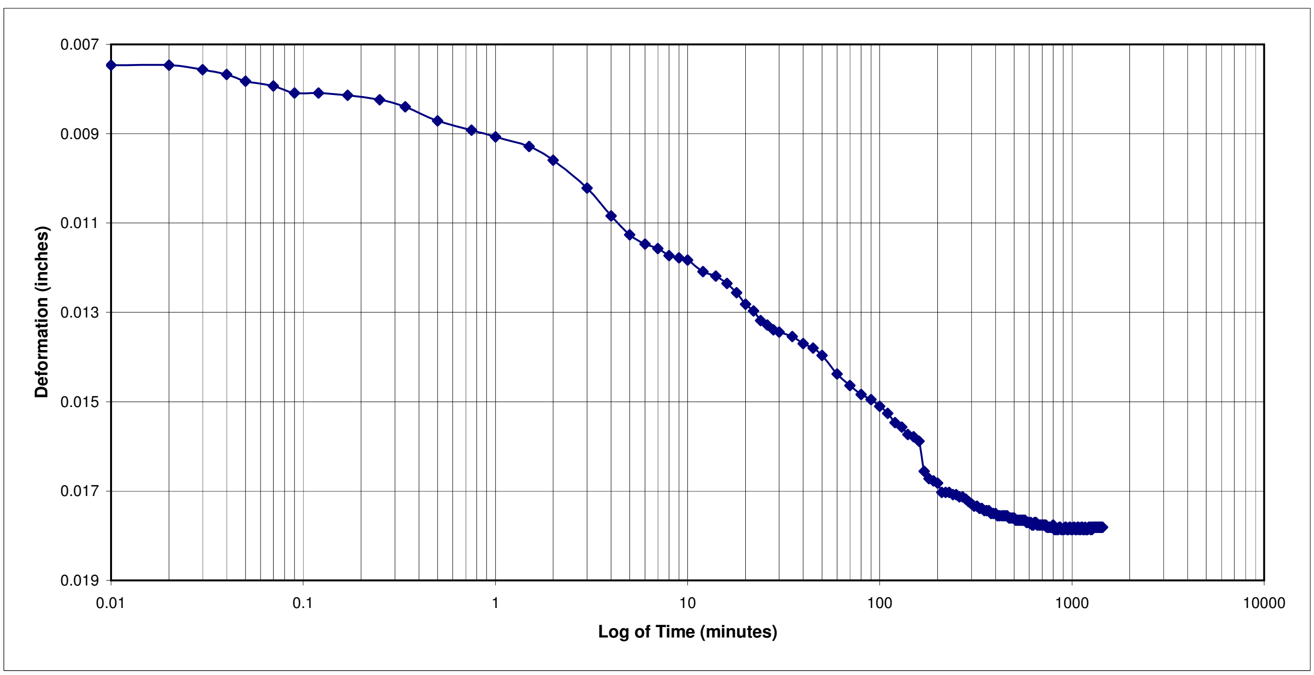
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-33A, 20 to 22 feet
LOAD = 0.125 TSF



DEFORMATION VS. LOG OF TIME
B-33A, 20 to 22 feet
LOAD = 0.125 TSF



Sample No.:	GTX B-33A, 21'
Exploration No.:	B-33A
Depth:	20 - 22 feet

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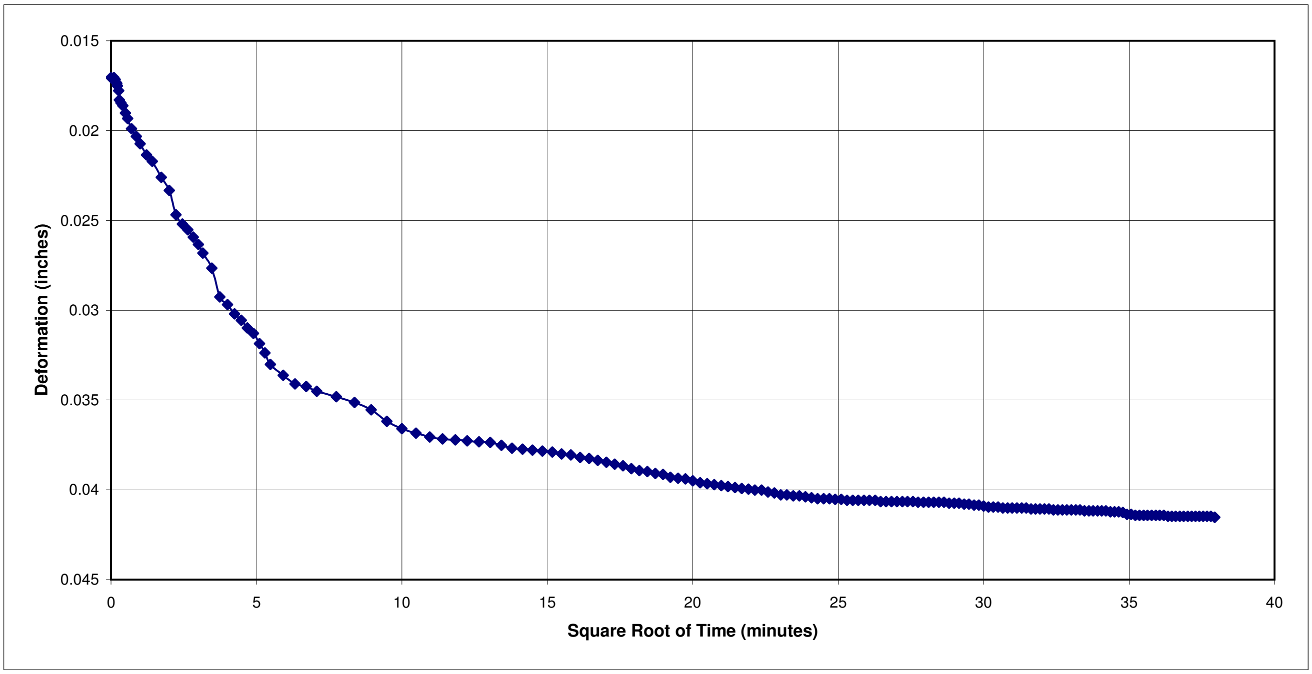
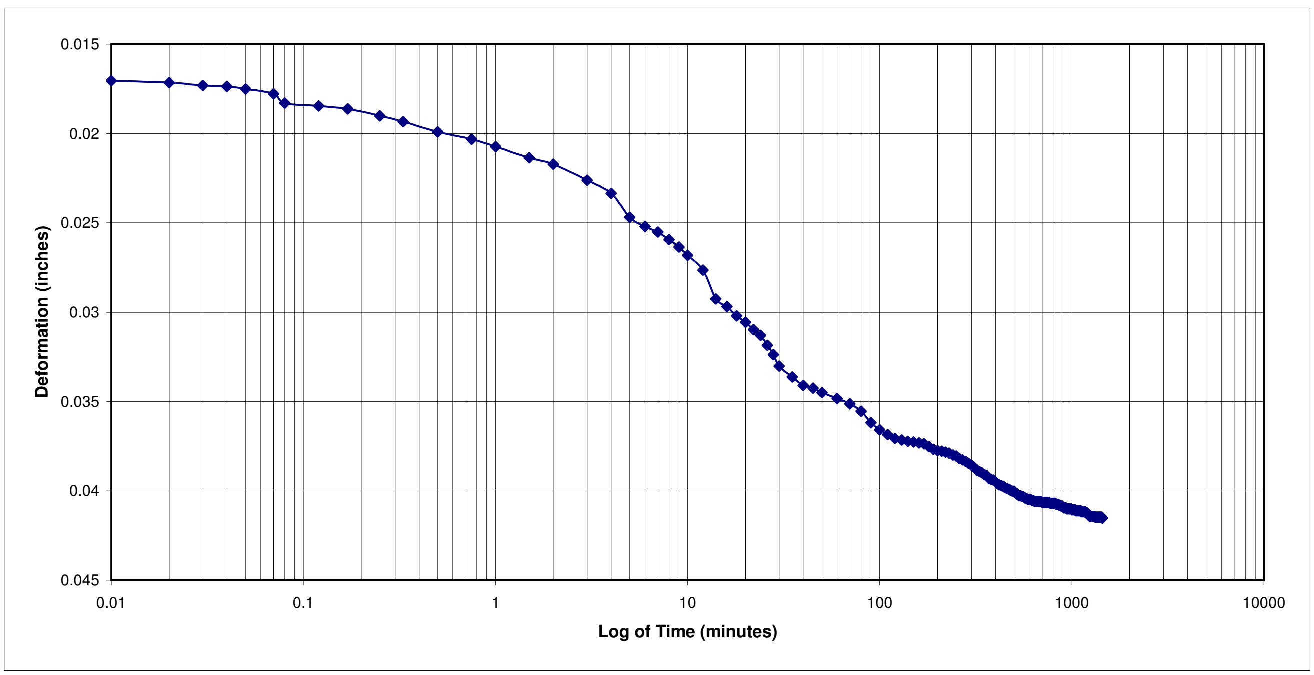
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-33A, 20 to 22 feet
LOAD = 0.25 TSF



DEFORMATION VS. LOG OF TIME
B-33A, 20 to 22 feet
LOAD = 0.25 TSF



Sample No.:	GTX B-33A, 21'
Exploration No.:	B-33A
Depth:	20 - 22 feet

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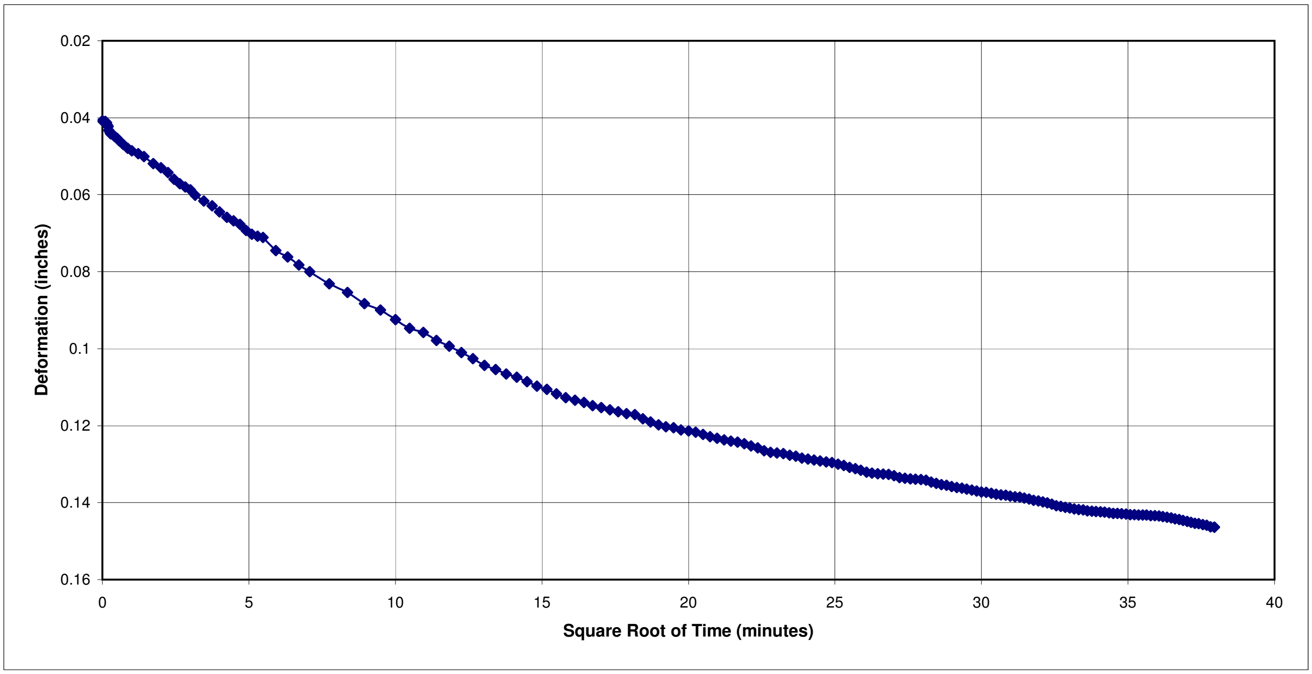
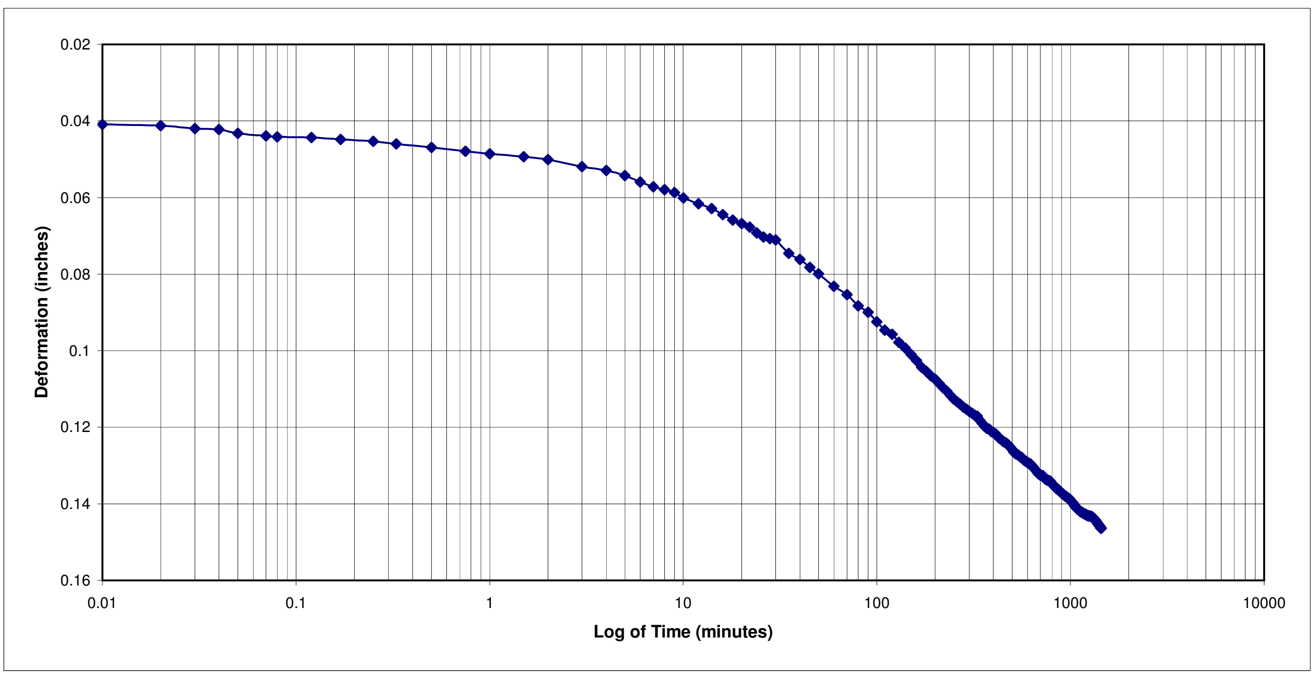
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-33A, 20 to 22 feet
LOAD = 0.5 TSF



DEFORMATION VS. LOG OF TIME
B-33A, 20 to 22 feet
LOAD = 0.5 TSF



Sample No.:	GTX B-33A, 21'
Exploration No.:	B-33A
Depth:	20 - 22 feet

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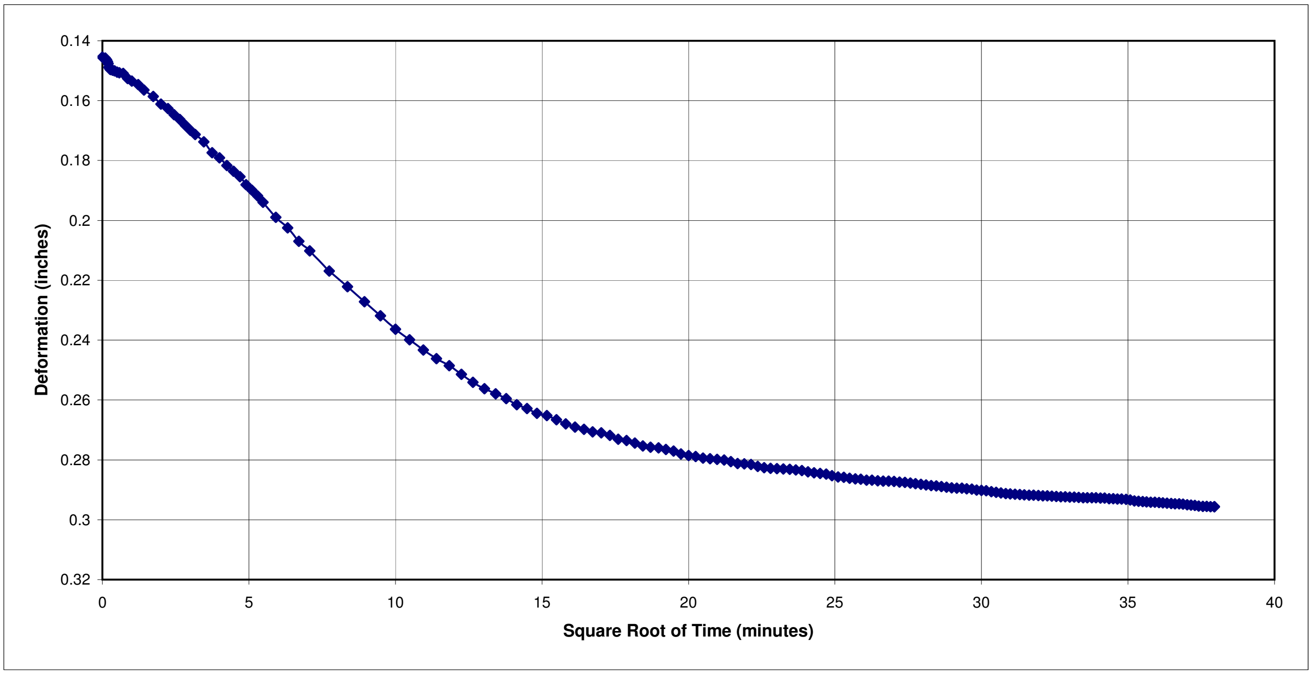
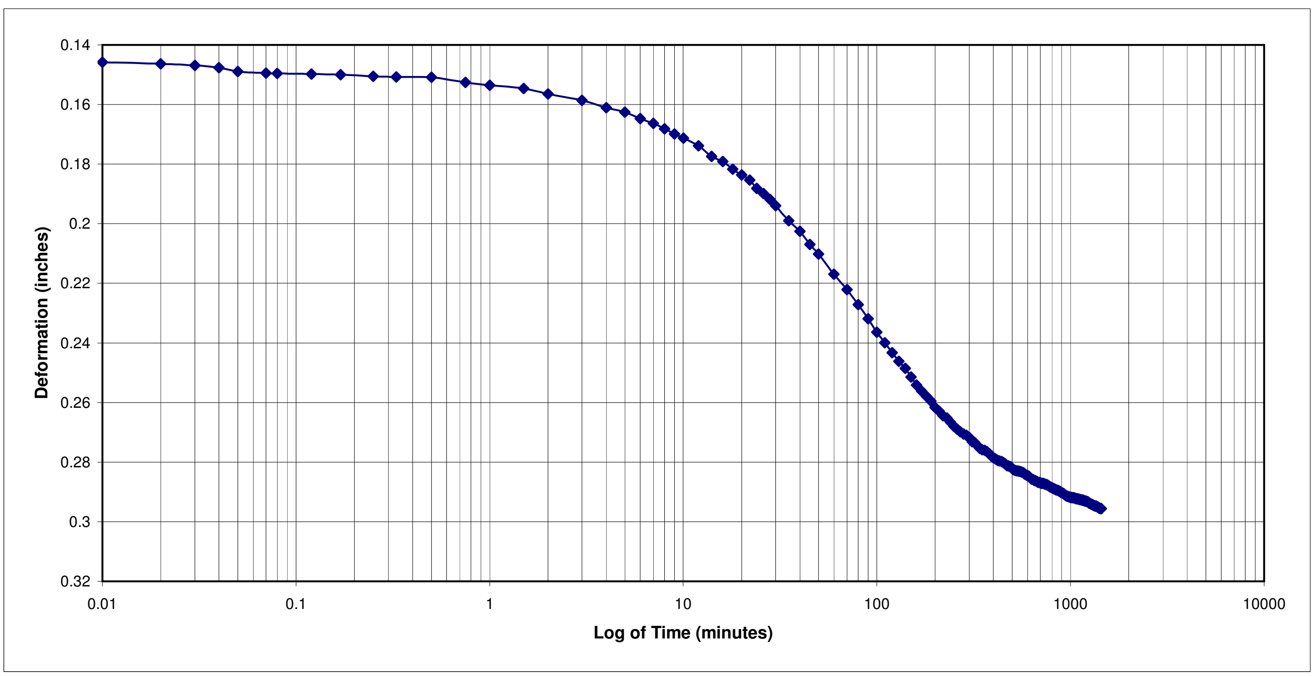
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-33A, 20 to 22 feet
LOAD = 1.0 TSF



DEFORMATION VS. LOG OF TIME
B-33A, 20 to 22 feet
LOAD = 1.0 TSF



Sample No.:	GTX B-33A, 21'
Exploration No.:	B-33A
Depth:	20 - 22 feet

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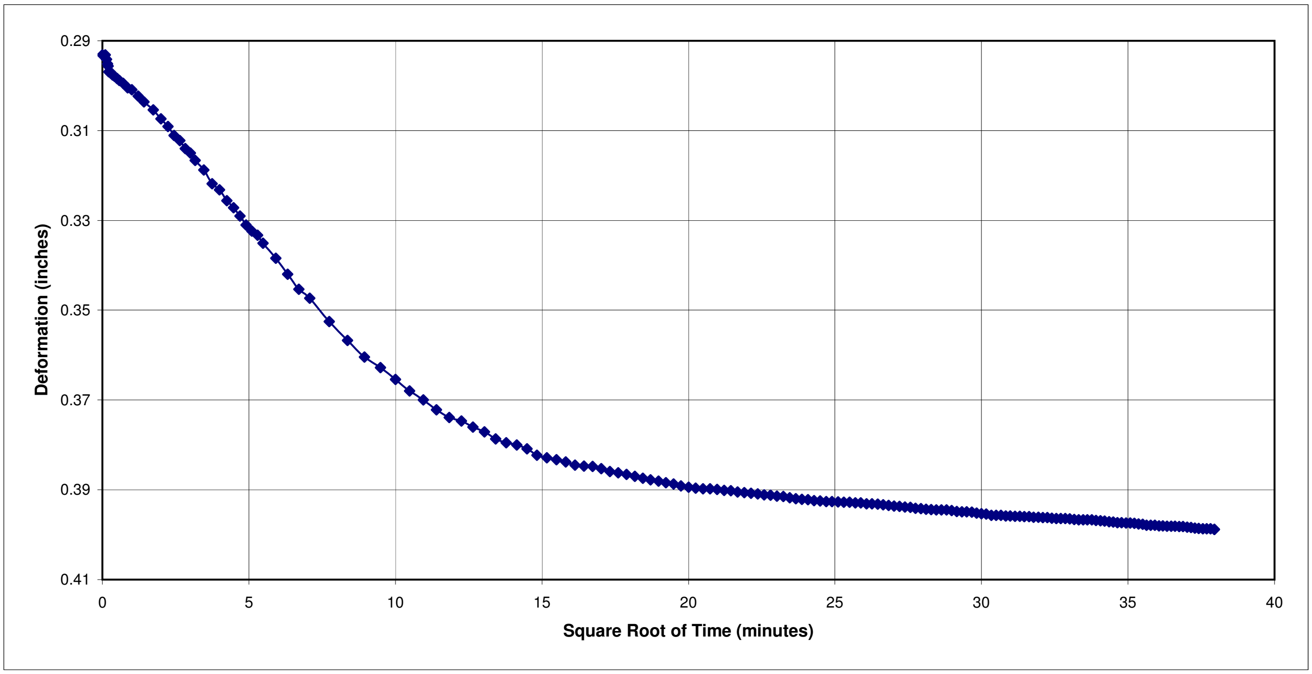
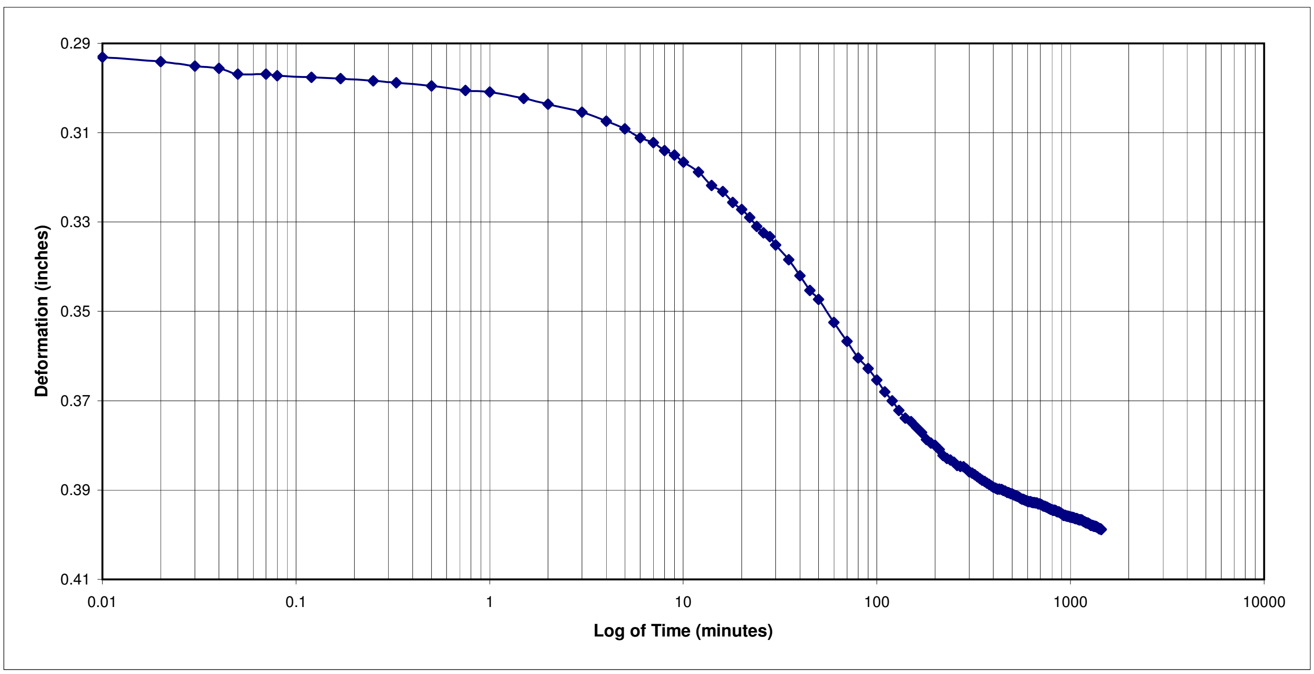
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-33A, 20 to 22 feet
LOAD = 2.0 TSF



DEFORMATION VS. LOG OF TIME
B-33A, 20 to 22 feet
LOAD = 2.0 TSF



Sample No.:	GTX B-33A, 21'
Exploration No.:	B-33A
Depth:	20 - 22 feet

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1-D CONSOLIDATION TIME-DEFORMATION CURVES

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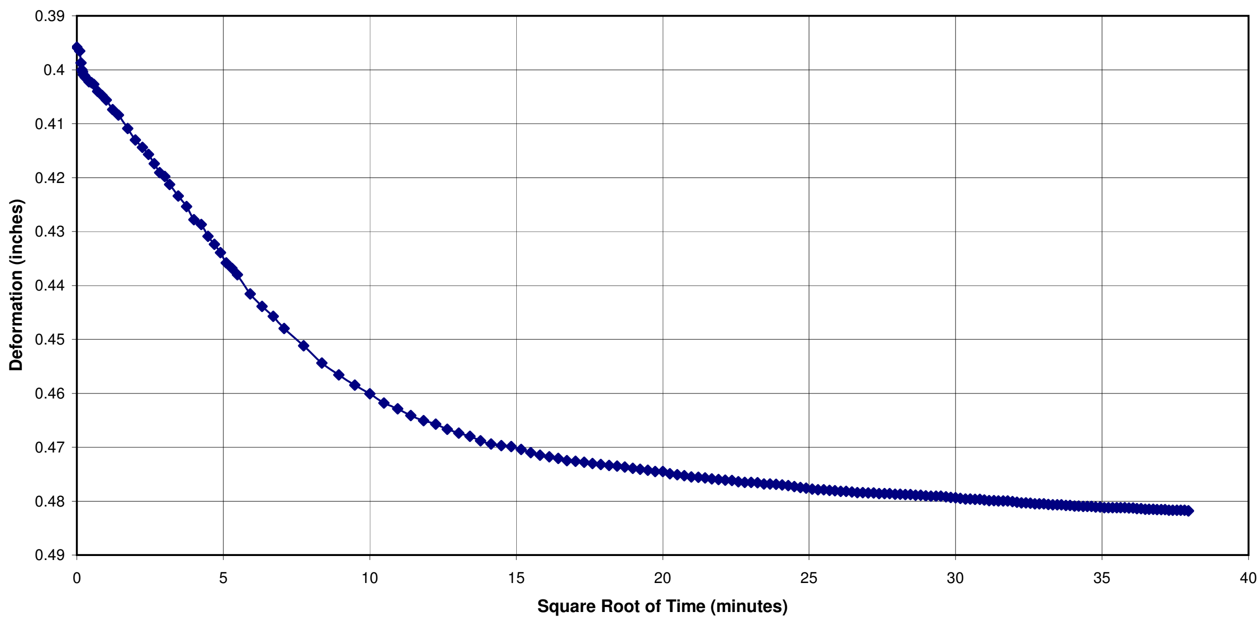
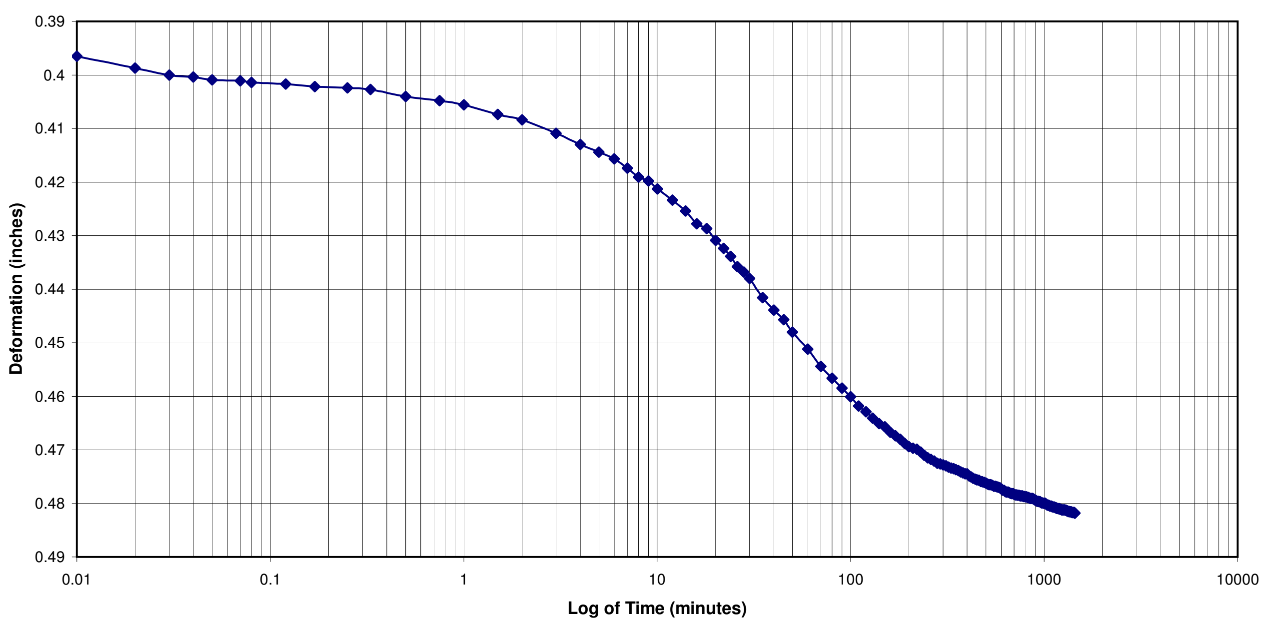
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-33A, 20 to 22 feet
LOAD = 4.0 TSF



DEFORMATION VS. LOG OF TIME
B-33A, 20 to 22 feet
LOAD = 4.0 TSF



Sample No.:	GTX B-33A, 21'
Exploration No.:	B-33A
Depth:	20 - 22 feet

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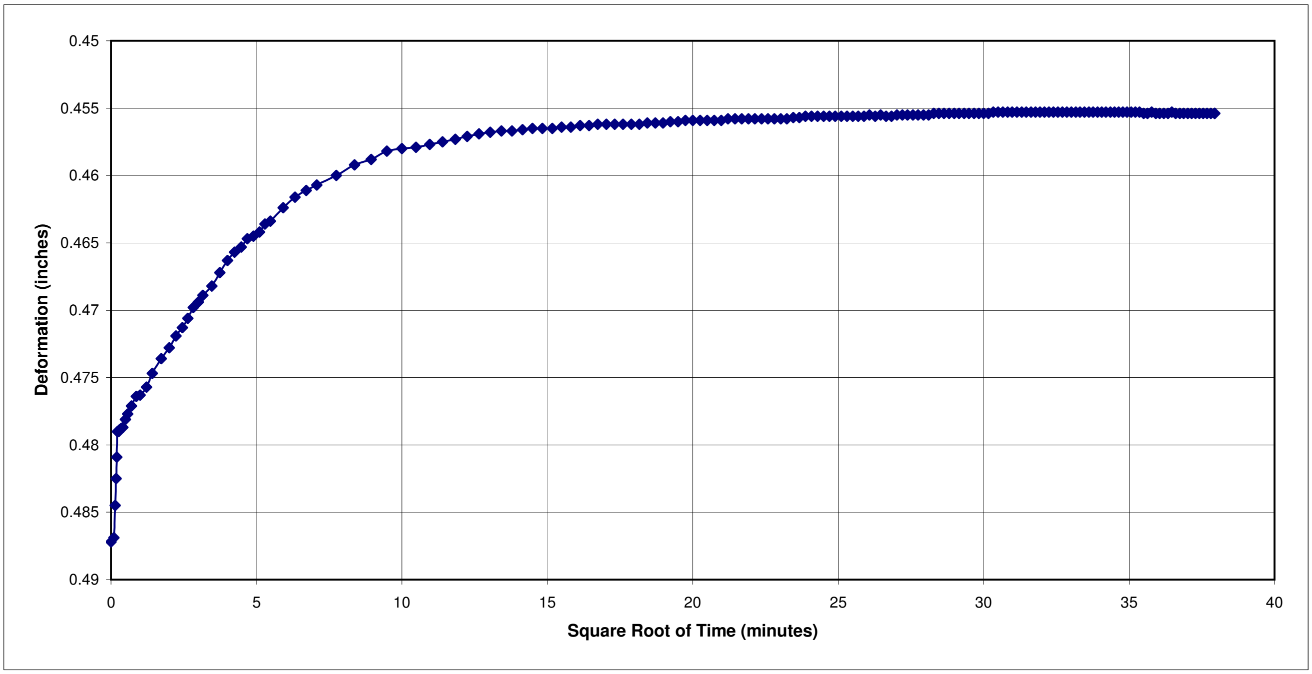

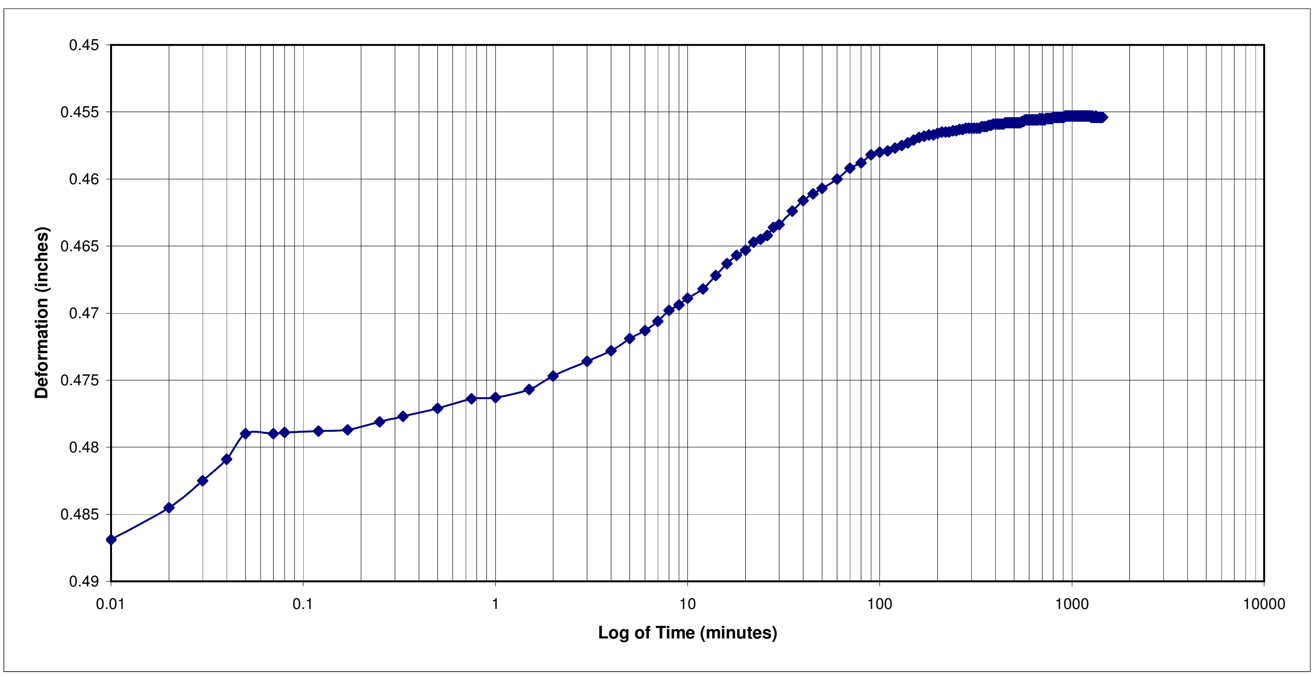

Sample No.:	GTX B-33A, 21'
Exploration No.:	B-33A
Depth:	20 - 22 feet

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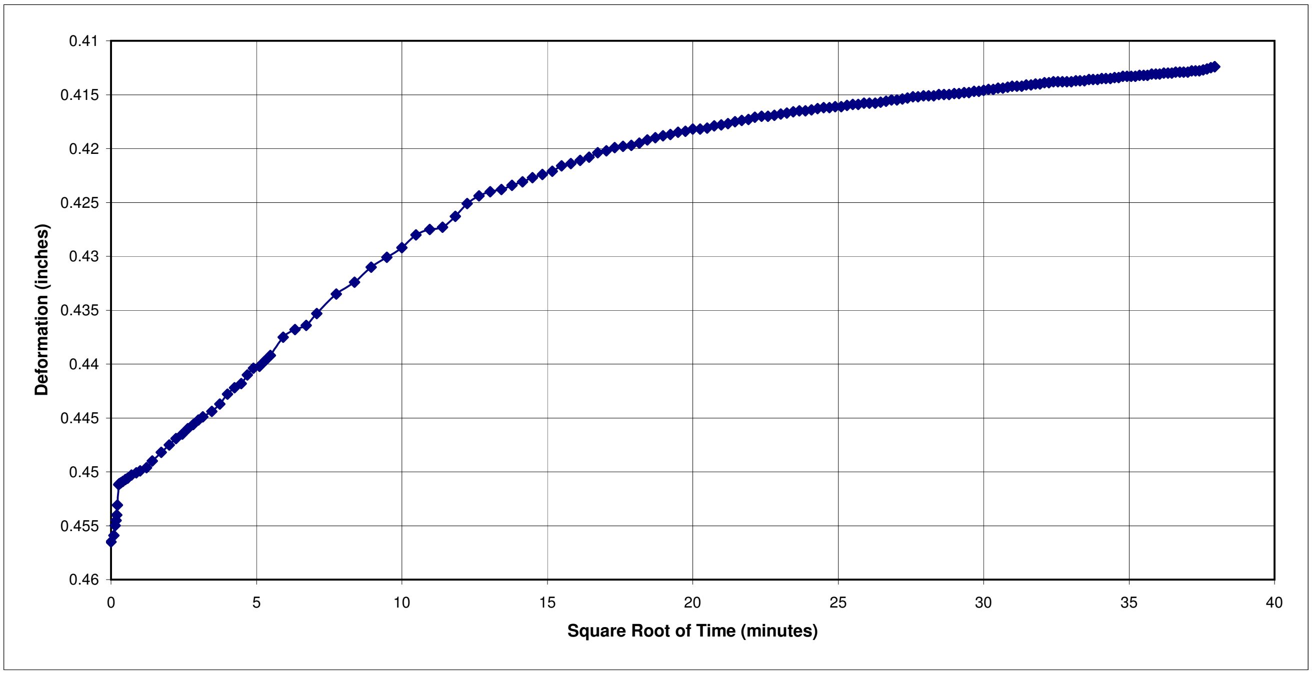
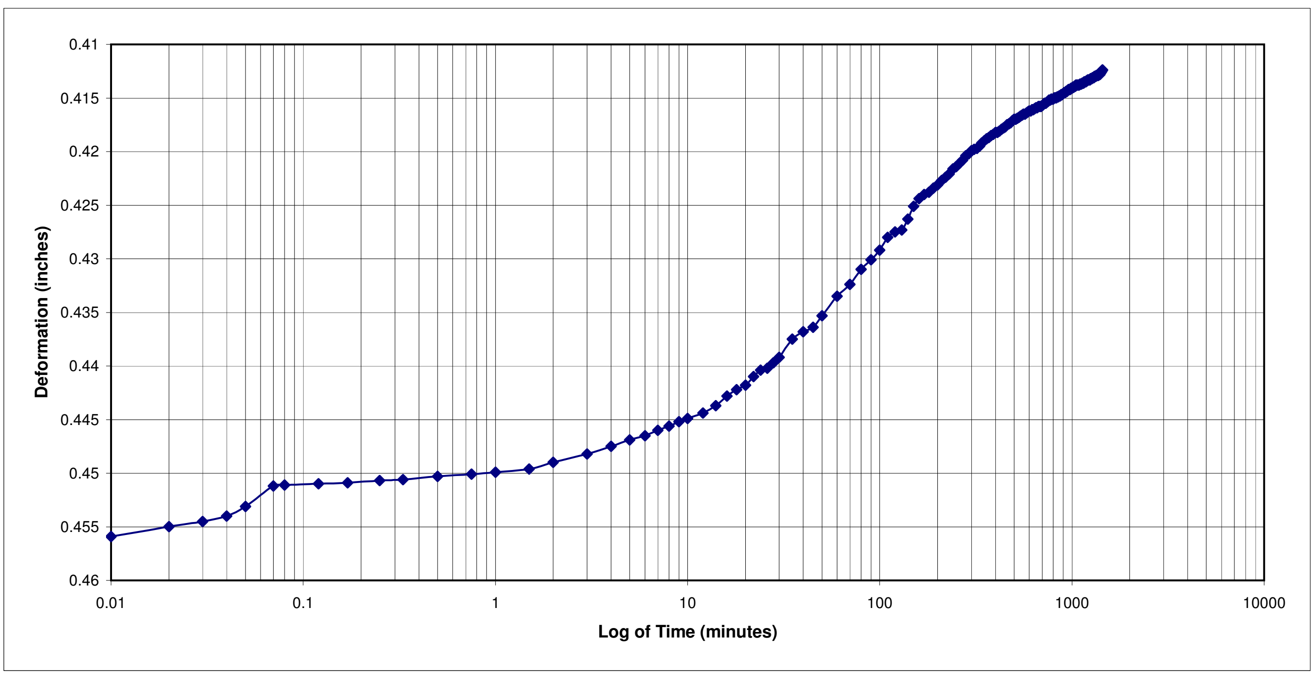
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-33A, 20 to 22 feet
LOAD = 0.25 TSF



DEFORMATION VS. LOG OF TIME
B-33A, 20 to 22 feet
LOAD = 0.25 TSF



Sample No.:	GTX B-33A, 21'
Exploration No.:	B-33A
Depth:	20 - 22 feet

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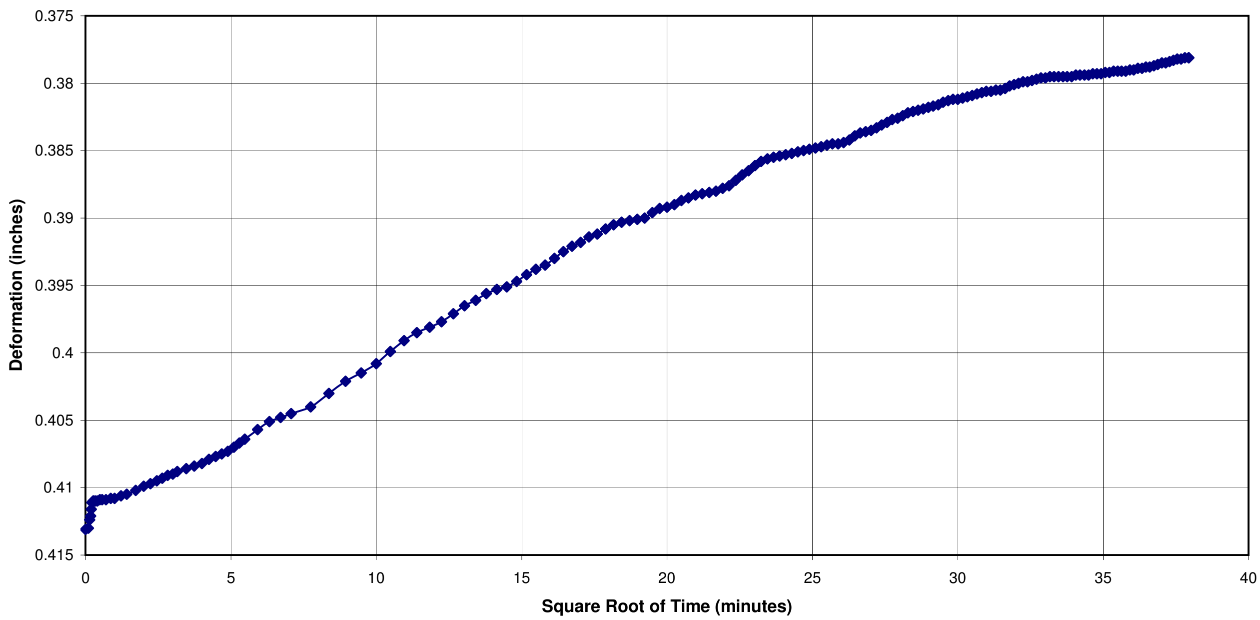
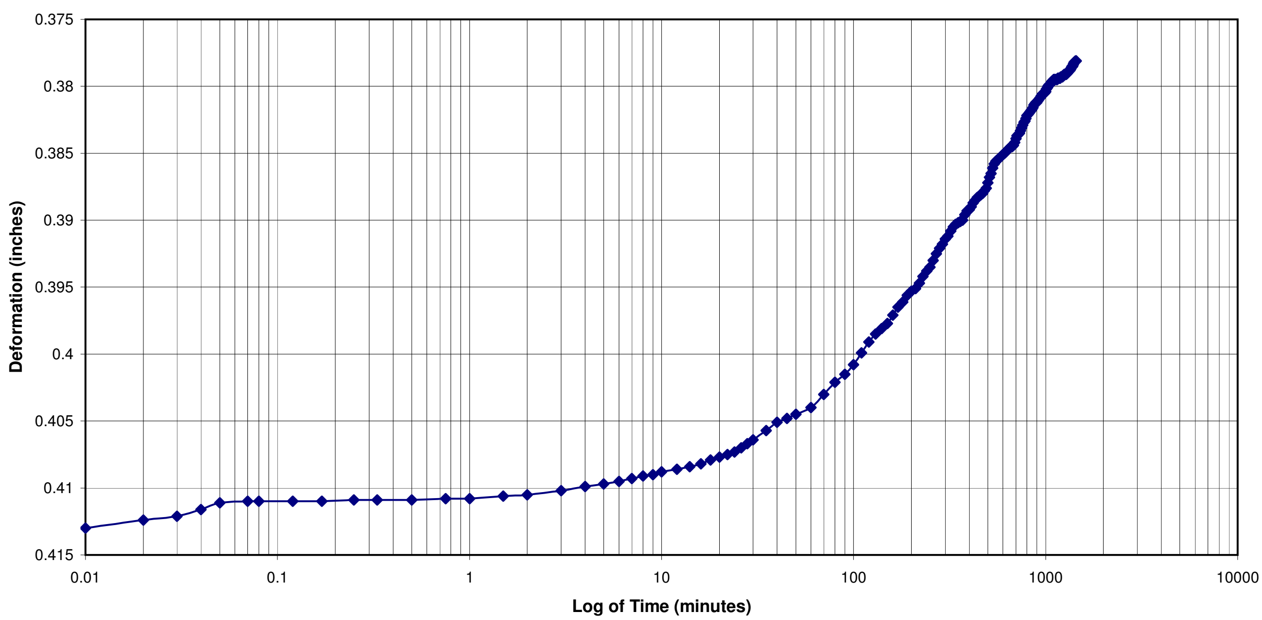
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-33A, 20 to 22 feet
LOAD = 0.0625 TSF



DEFORMATION VS. LOG OF TIME
B-33A, 20 to 22 feet
LOAD = 0.0625 TSF



Sample No.:	GTX B-33A, 21'
Exploration No.:	B-33A
Depth:	20 - 22 feet

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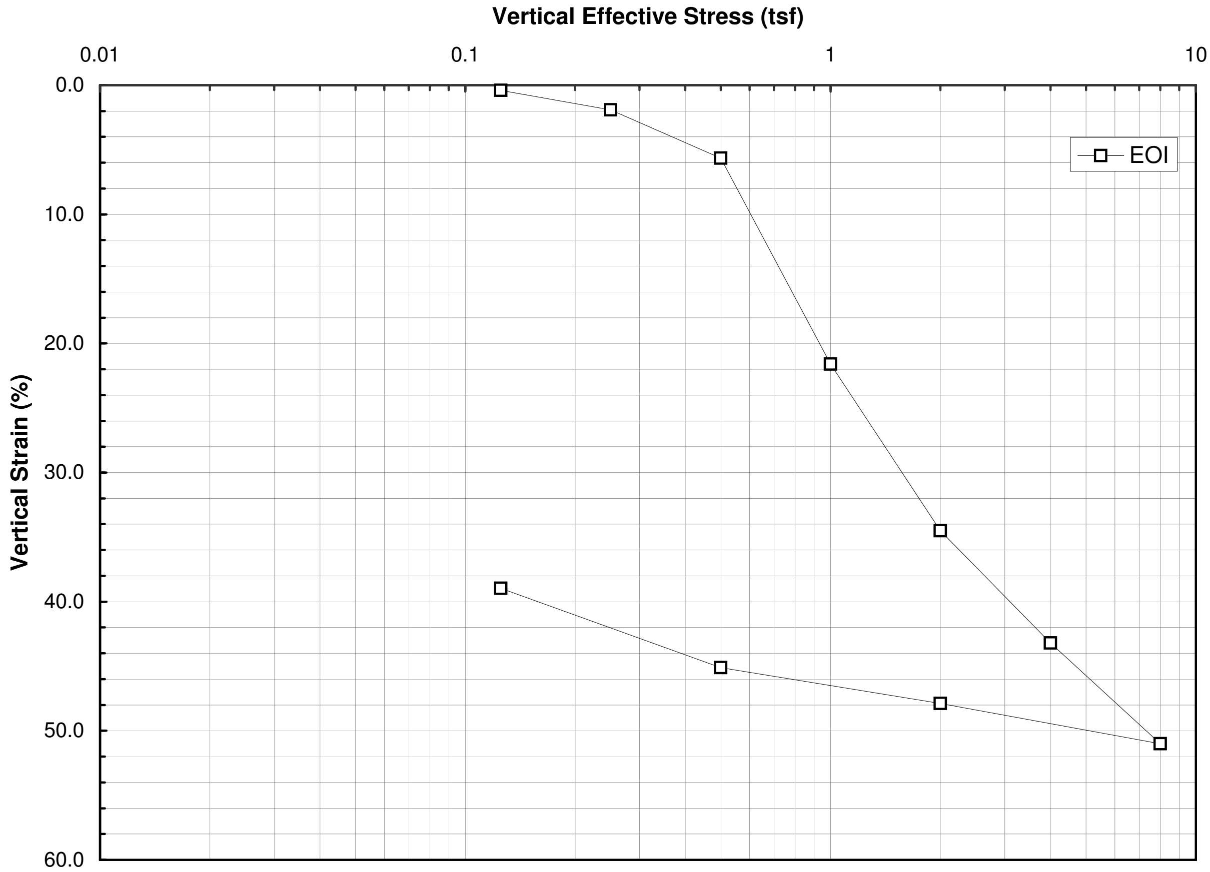
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554



CONSOLIDATION PARAMETERS

Probable Preconsolidation Stress, P'_c (tsf):	0.5
Approx. Hydrostatic Effective Stress, P'_o (tsf)	0.6
Vertical Strain at P'_o (%):	10.0
Compression Ratio	0.48
Recompression Ratio	0.049
Over Consolidation Ratio (OCR):	0.8

TEST METHOD

Test Method:	ASTM D-2435 A
Trimming Procedure:	2.5-inch Trimming Lathe
Pressure at Inundation:	0.125 tsf
Method to Compute C_v:	ASTM D-2435 12.3.2

SAMPLE ID

Test No.:	GTX 33A, 31'
Sample No.:	UD2
Exploration No.:	B-33A
Depth:	30 to 32 feet
USCS Description:	Fat CLAY (CH)

SAMPLE DATA

Sample Diameter (cm):	6.35
Sample Area (cm^2):	31.67
Measured Specific Gravity:	2.62
Trimmings Moisture (%):	151.6
% Passing #200 Sieve:	98.3
Liquid Limit:	141
Plastic Limit:	43
Plasticity Index:	98

	Initial	Final
Water Content (%):	149.1	83.4
Est. % Saturation:	99.5	100.0
Sample Height (cm):	2.540	1.550
Wet Sample Weight (g):	106.6	78.5
Dry Sample Weight (g):	42.8	42.8
Dry Unit Weight (pcf):	33.2	54.4
Void Ratio, e:	3.92	2.00
Solids Height (cm):	0.516	0.516

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ONE-DIMENSIONAL CONSOLIDATION TEST

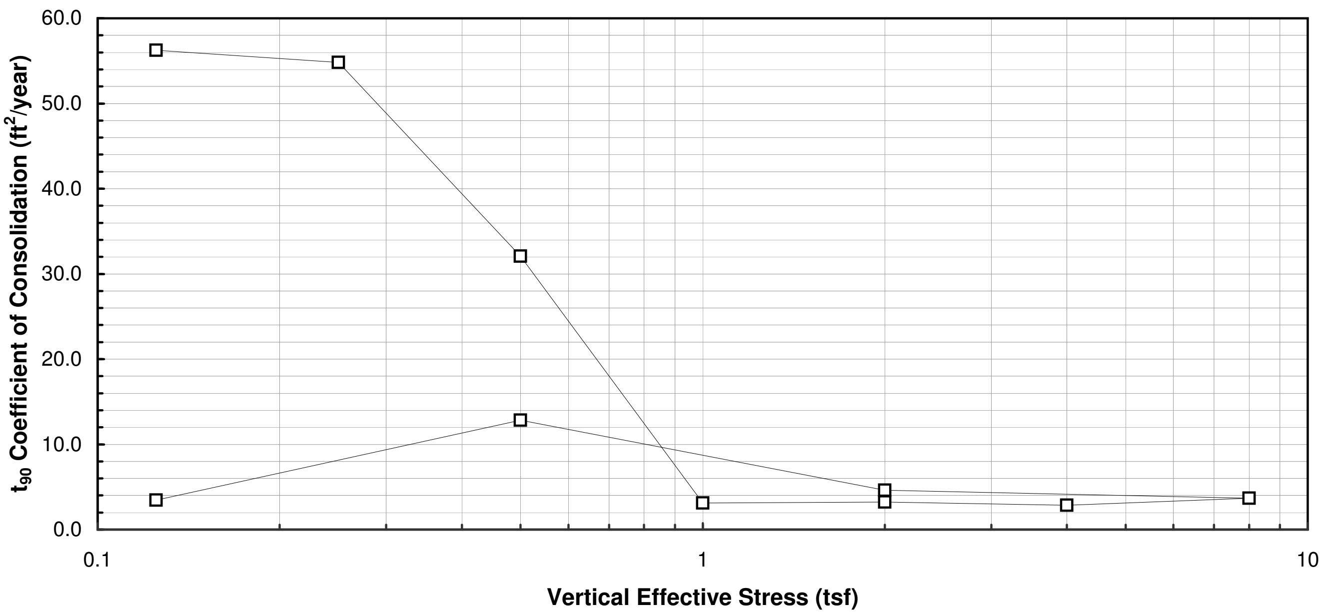
Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

Test No.:	GTX 33A, 31'
Sample No.:	UD2
Exploration No.:	B-33A
Depth:	30 to 32 feet

LOAD INC.	STRESS DURATION (Hr - min)	VERTICAL STRESS (tsf)	VERTICAL STRAIN (EOI*)	VERTICAL STRAIN (EOP*)	VOID RATIO e (EOI*)	VOID RATIO e (EOP*)	STRESS RATIO (P'/P'c)	TAYLOR COEFFICIENT OF CONSOLIDATION (ft^2/year)
1	24-00	0.125	0.4	0.3	3.90	3.91	0.25	56.2
2	23-50	0.25	1.9	1.6	3.83	3.84	0.50	54.8
3	24-00	0.5	5.7	4.6	3.64	3.70	1.00	32.1
4	24-00	1	21.6	19.6	2.86	2.96	2.00	3.1
5	24-00	2	34.5	32.3	2.22	2.33	4.00	3.2
6	24-00	4	43.2	41.6	1.80	1.88	8.00	2.8
7	24-00	8	51.0	48.9	1.41	1.52	16.00	3.7
8	24-00	2	47.9	48.3	1.57	1.55	4.00	4.6
9	24-00	0.5	45.1	45.7	1.70	1.67	1.00	12.8
10	24-00	0.125	39.0	40.3	2.00	1.94	0.25	3.4

*EOI = End of Increment

*EOP = End of Primary



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ONE-DIMENSIONAL CONSOLIDATION TEST

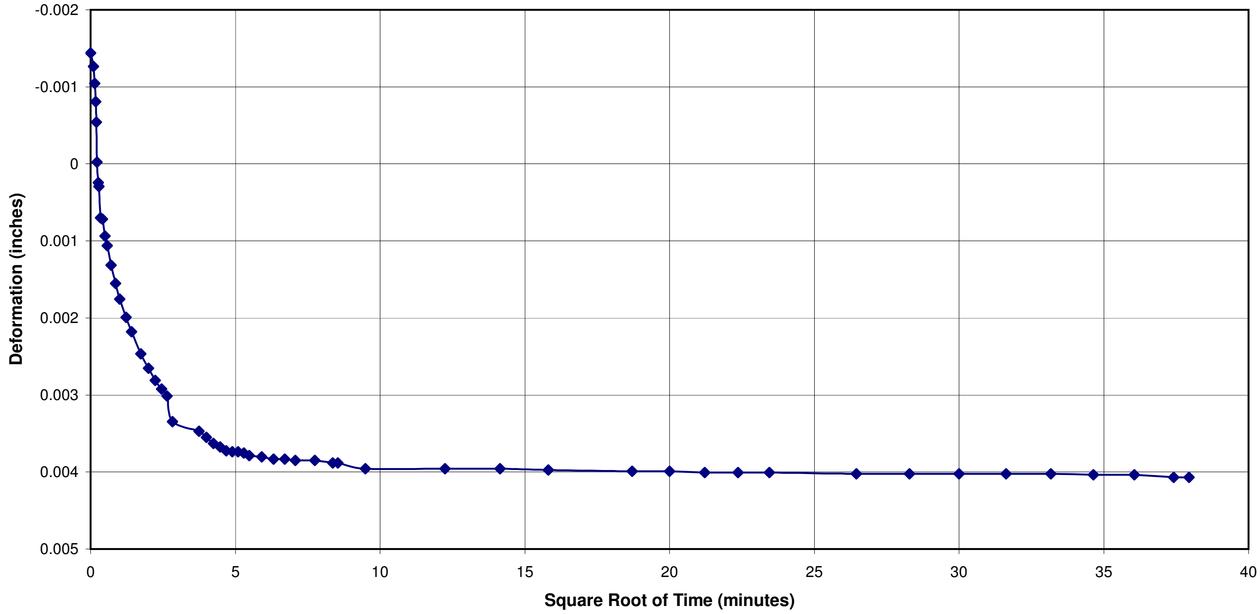
Project: Port Access Road

Client: SCDOT

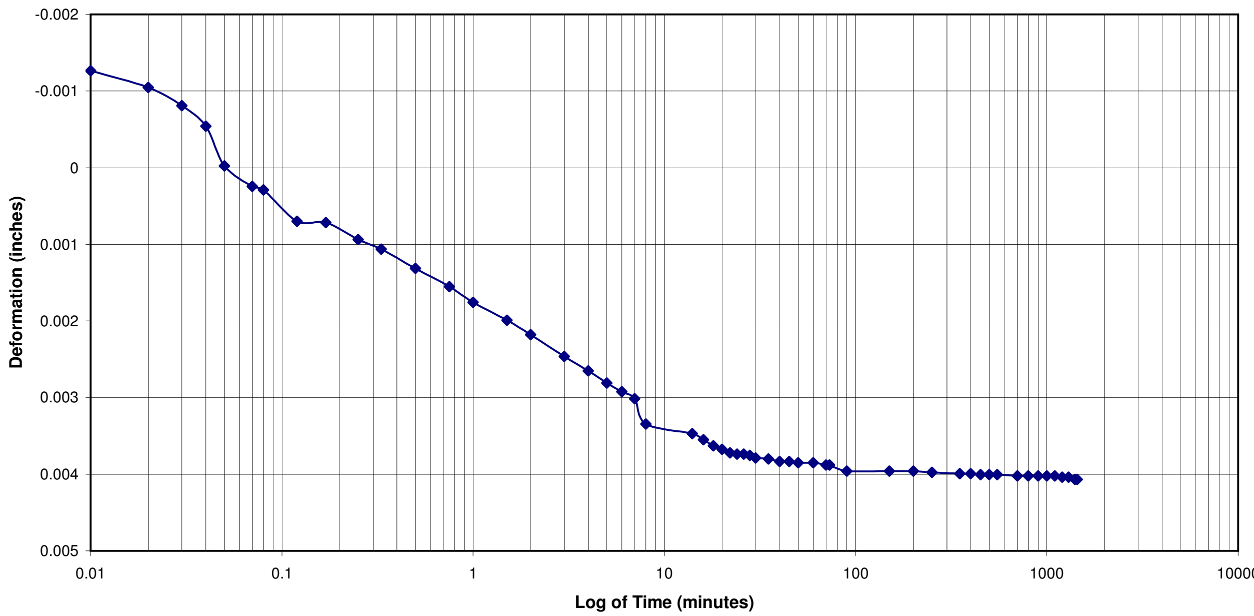
Location: North Charleston, South Carolina

Project No. 1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-33A, 30 to 32 feet
LOAD = 0.125 TSF



DEFORMATION VS. LOG OF TIME
B-33A, 30 to 32 feet
LOAD = 0.125 TSF



Sample No.:	GTX B-33A, 31'
Exploration No.:	B-33A
Depth:	30 - 32 feet

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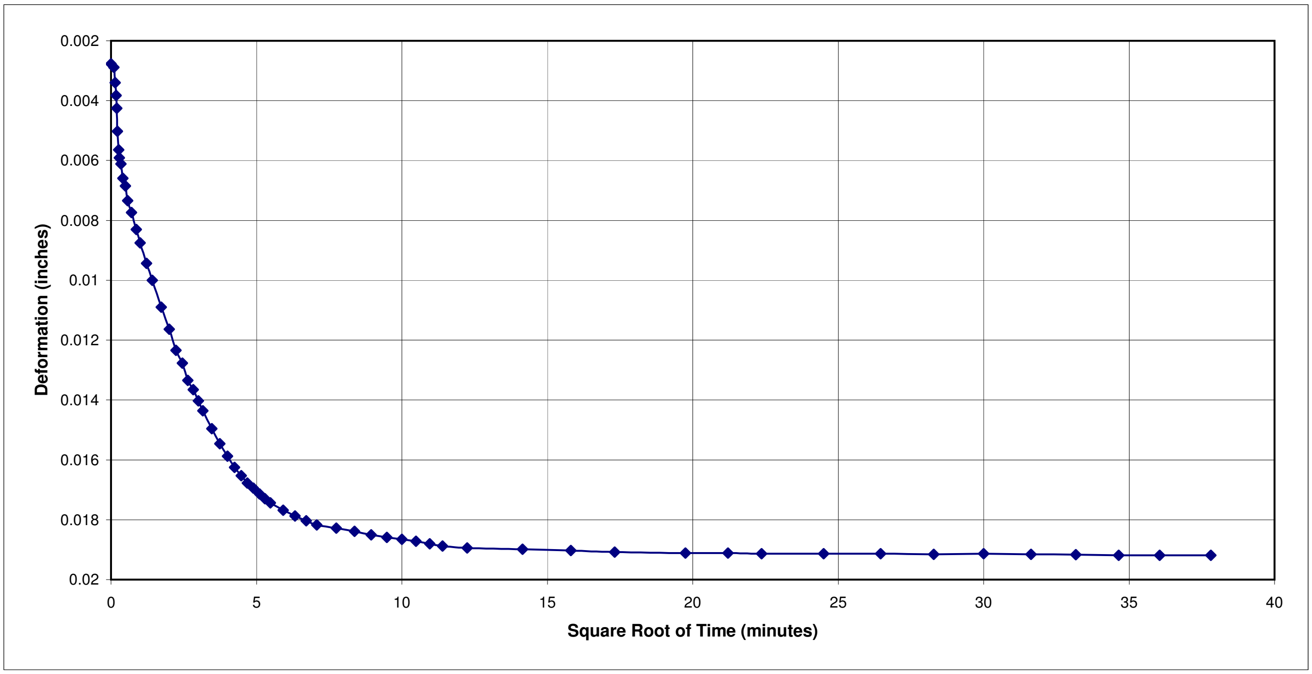
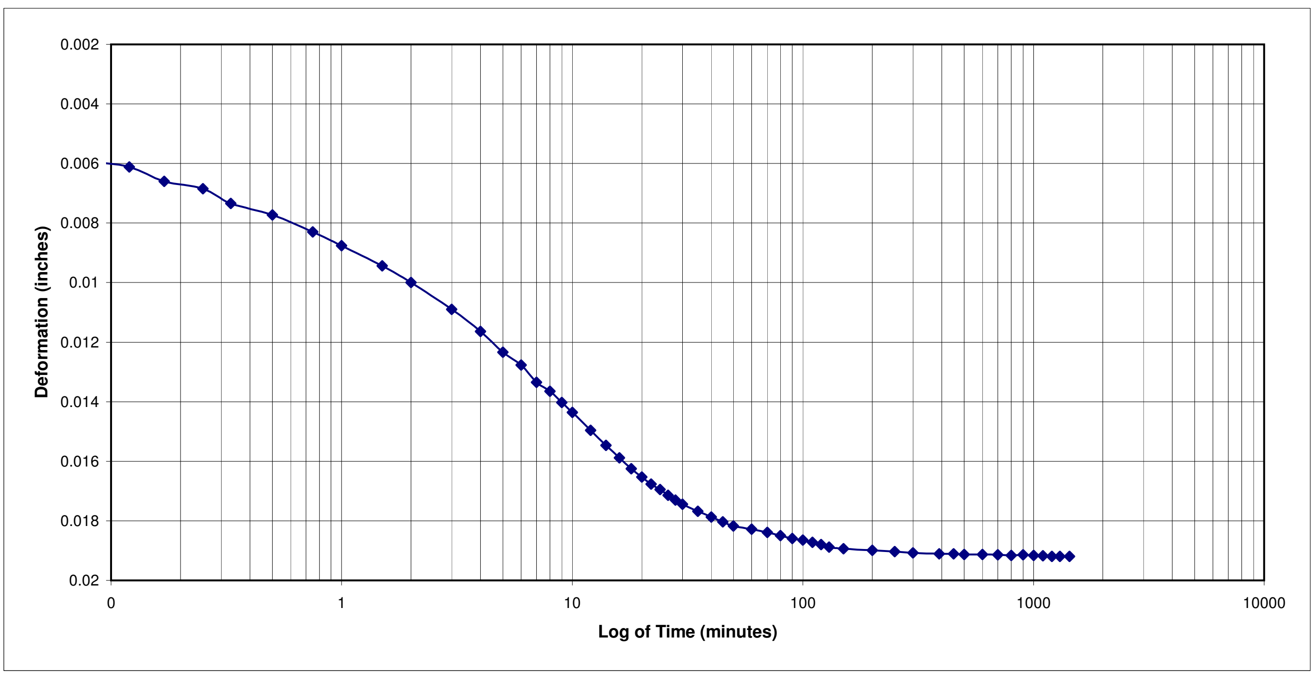
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-33A, 30 to 32 feet
LOAD = 0.25 TSF



DEFORMATION VS. LOG OF TIME
B-33A, 30 to 32 feet
LOAD = 0.25 TSF



Sample No.:	GTX B-33A, 31'
Exploration No.:	B-33A
Depth:	30 - 32 feet

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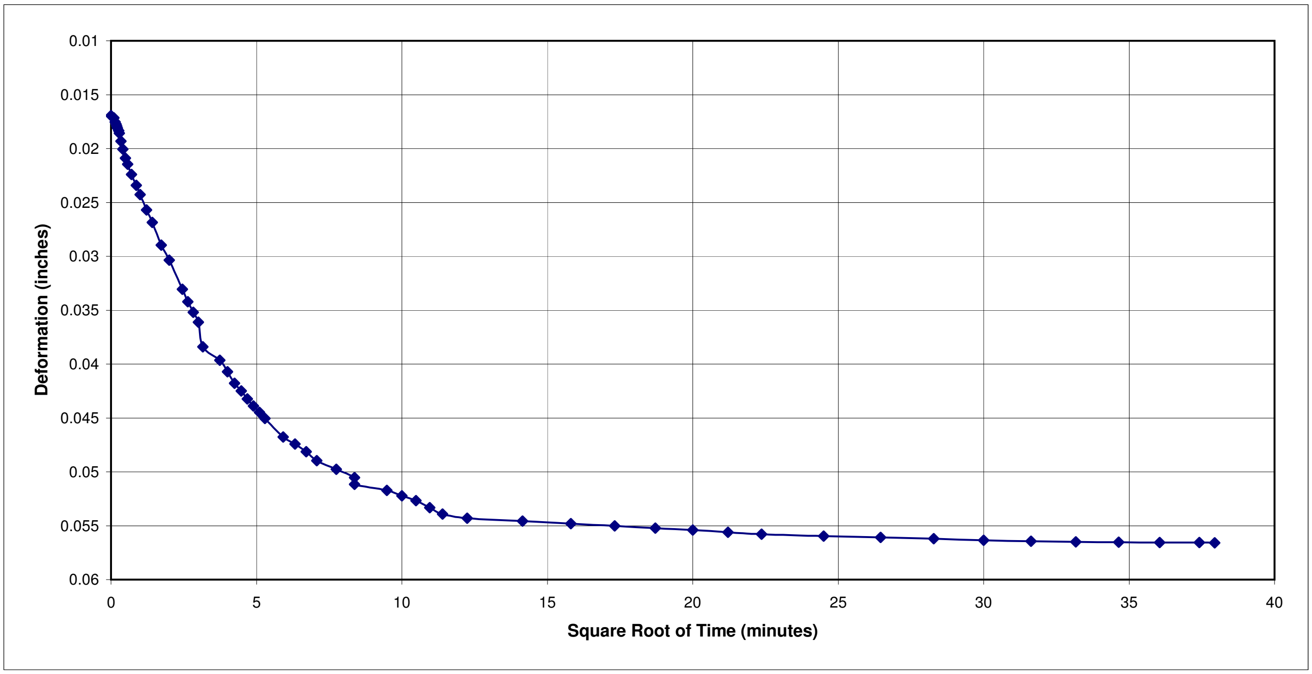
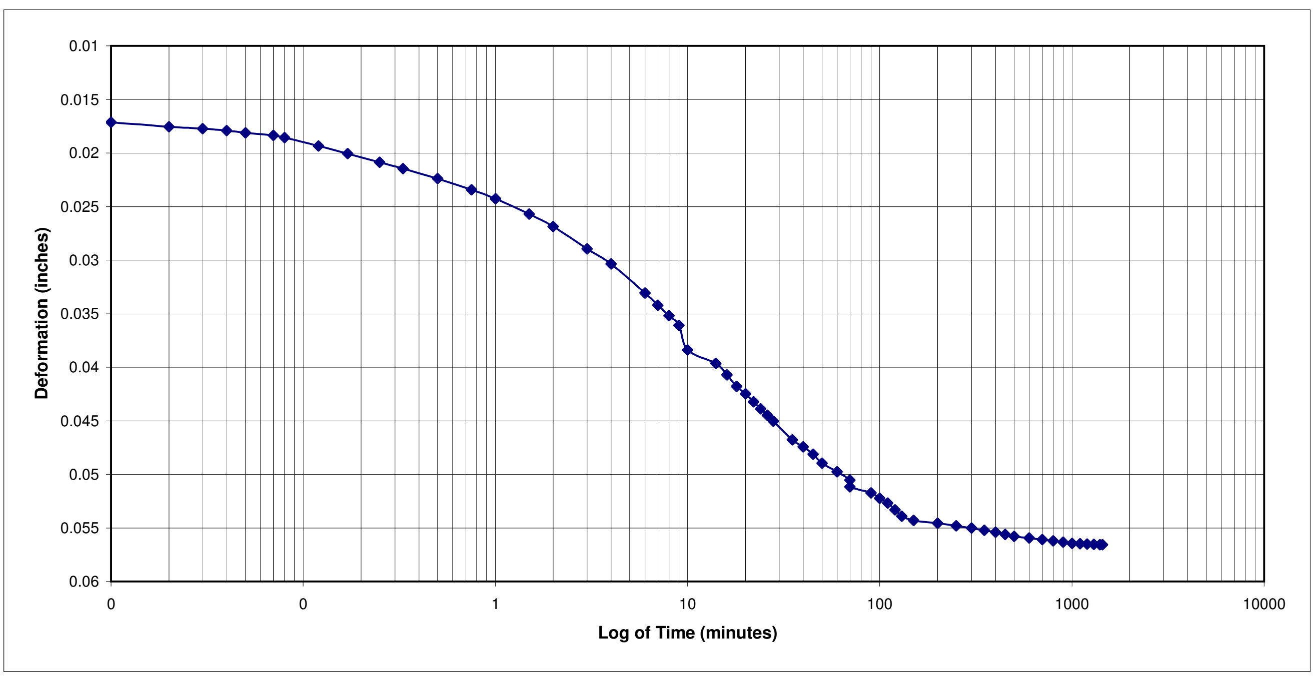
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-33A, 30 to 32 feet
LOAD = 0.5 TSF



DEFORMATION VS. LOG OF TIME
B-33A, 30 to 32 feet
LOAD = 0.5 TSF



Sample No.:	GTX B-33A, 31'
Exploration No.:	B-33A
Depth:	30 - 32 feet

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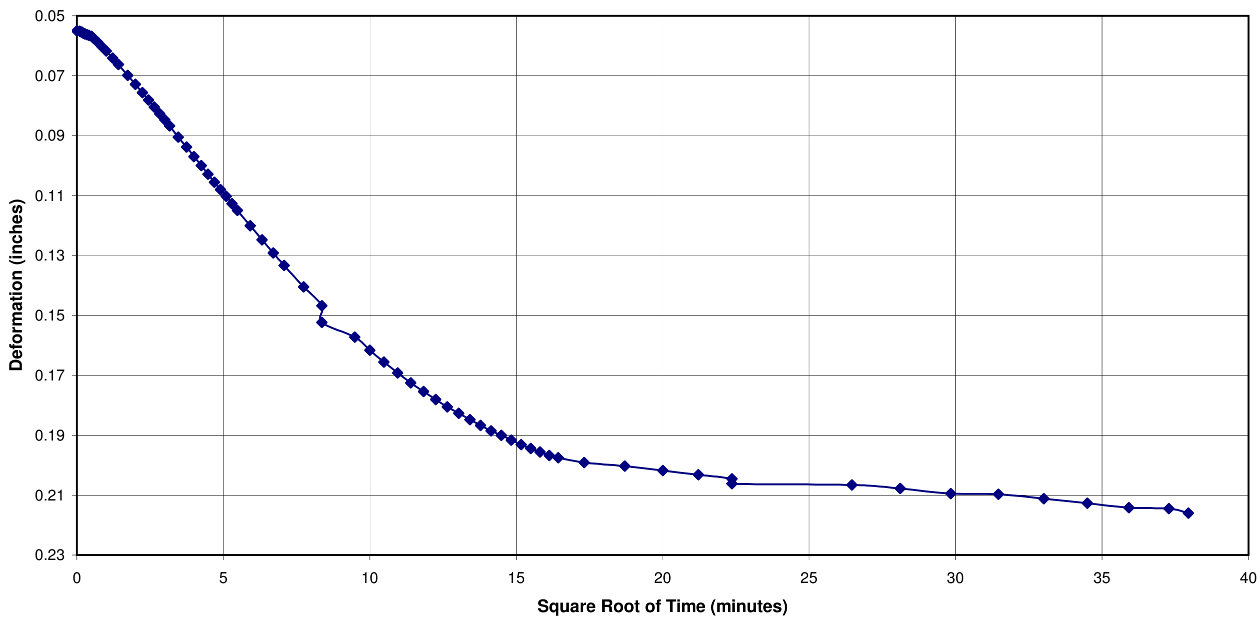
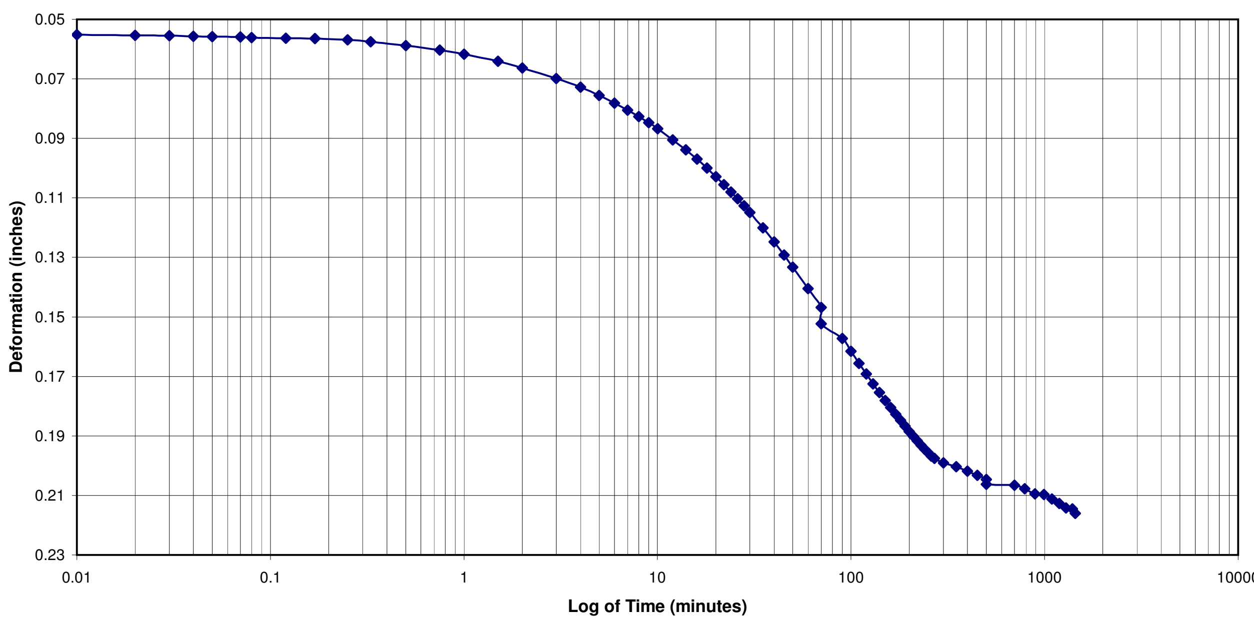
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-33A, 30 to 32 feet
LOAD = 1.0 TSF



DEFORMATION VS. LOG OF TIME
B-33A, 30 to 32 feet
LOAD = 1.0 TSF



Sample No.:	GTX B-33A, 31'
Exploration No.:	B-33A
Depth:	30 - 32 feet

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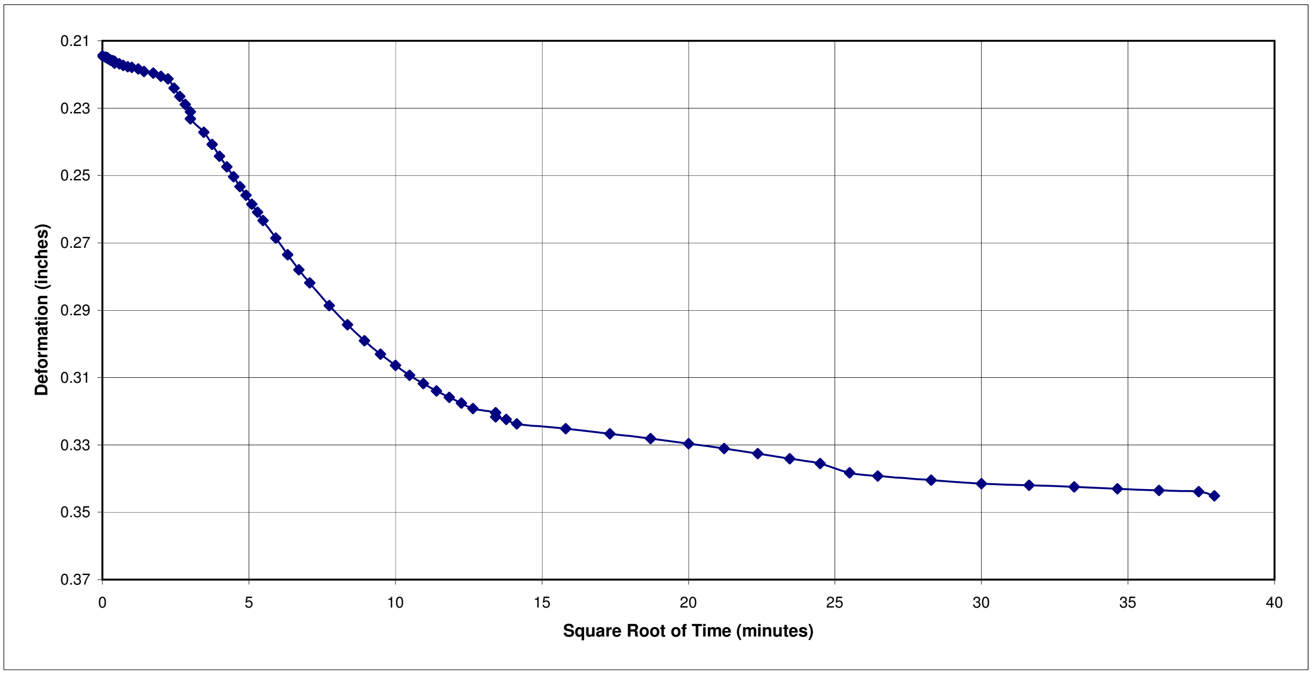
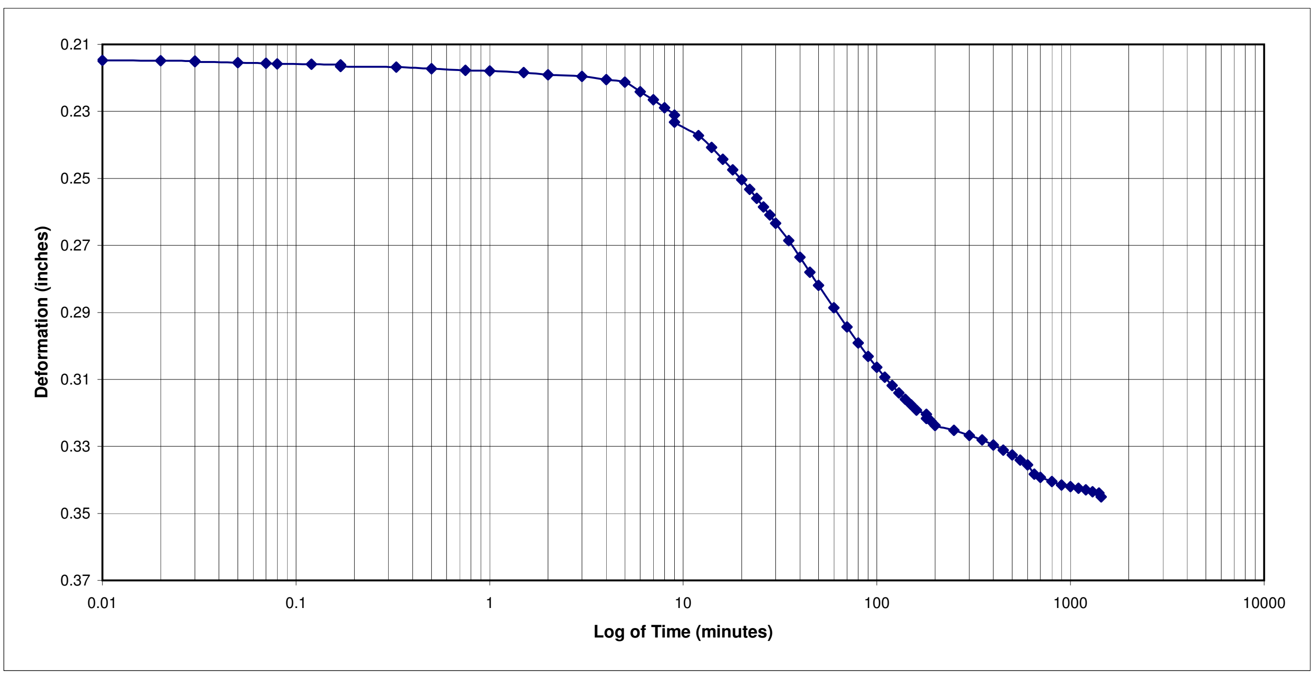
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-33A, 30 to 32 feet
LOAD = 2.0 TSF



DEFORMATION VS. LOG OF TIME
B-33A, 30 to 32 feet
LOAD = 2.0 TSF



Sample No.:	GTX B-33A, 31'
Exploration No.:	B-33A
Depth:	30 - 32 feet

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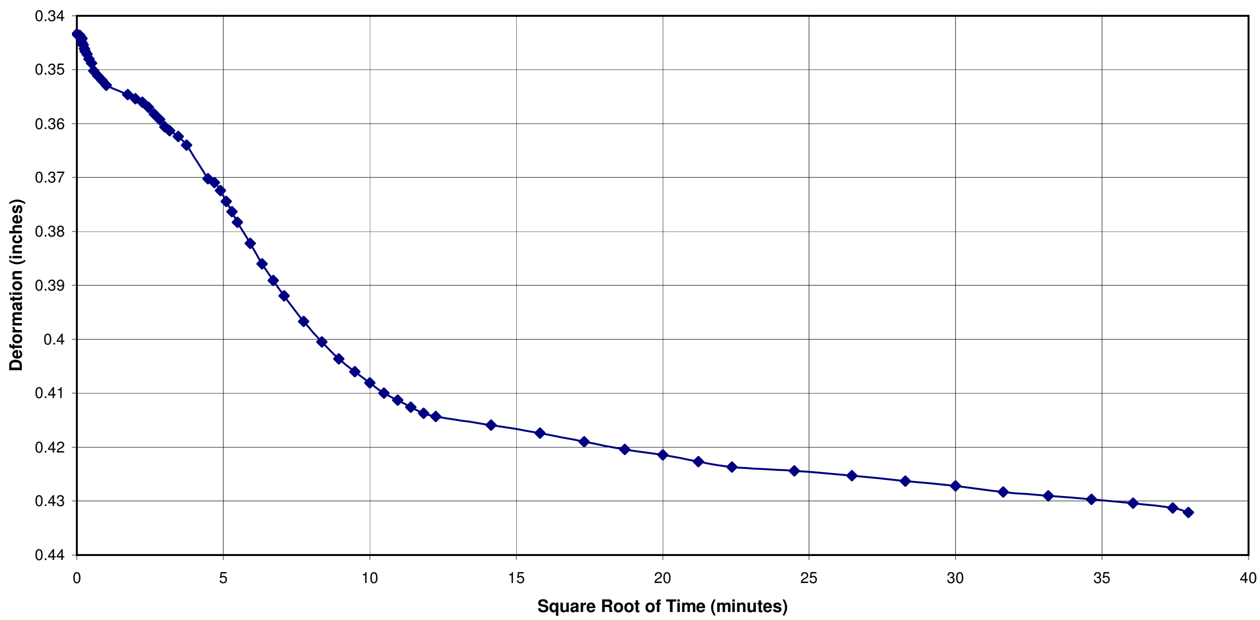
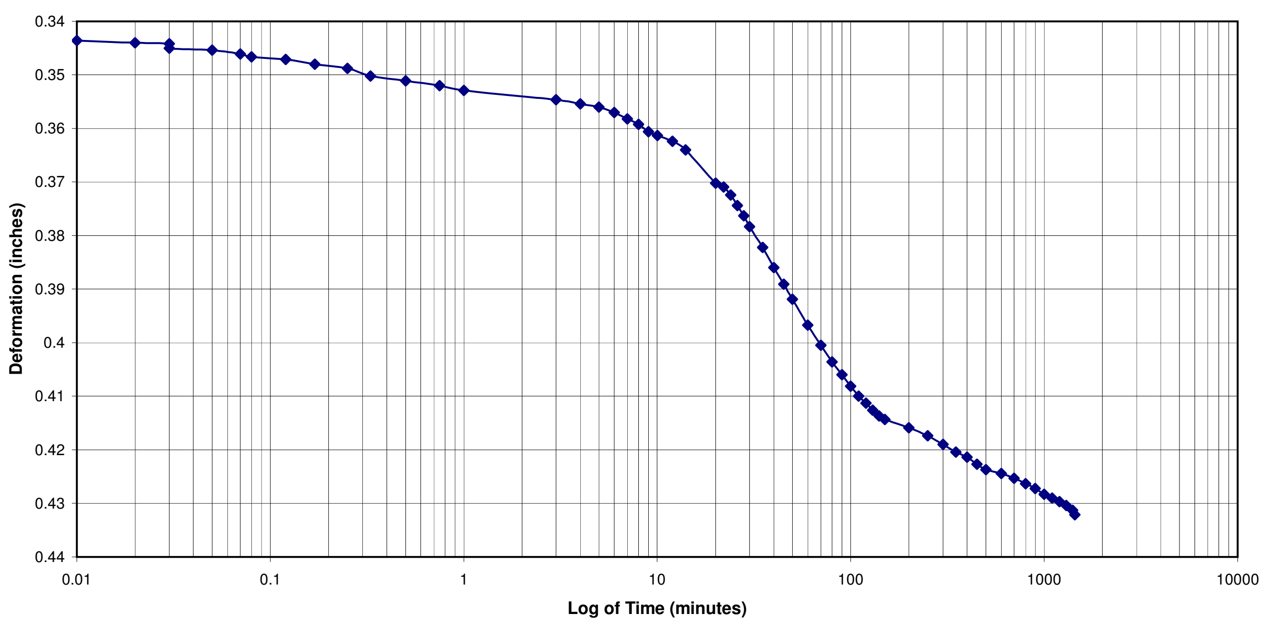
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-33A, 30 to 32 feet
LOAD = 4.0 TSF



DEFORMATION VS. LOG OF TIME
B-33A, 30 to 32 feet
LOAD = 4.0 TSF



Sample No.:	GTX B-33A, 31'
Exploration No.:	B-33A
Depth:	30 - 32 feet

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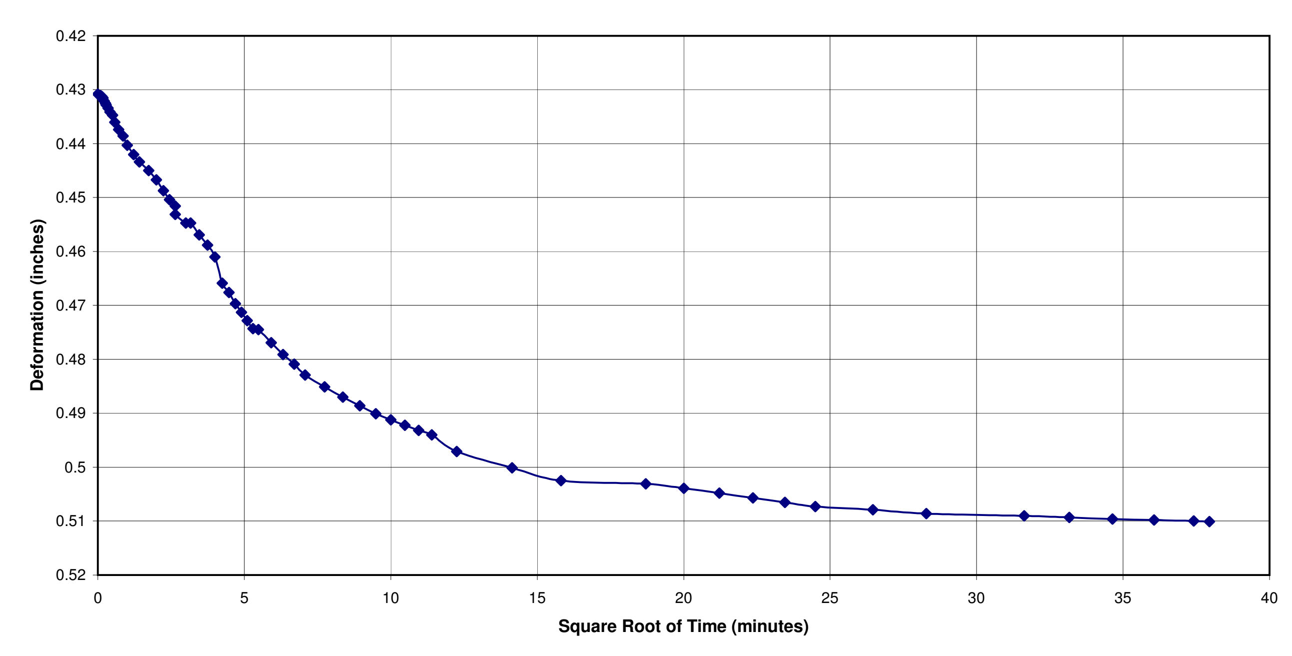
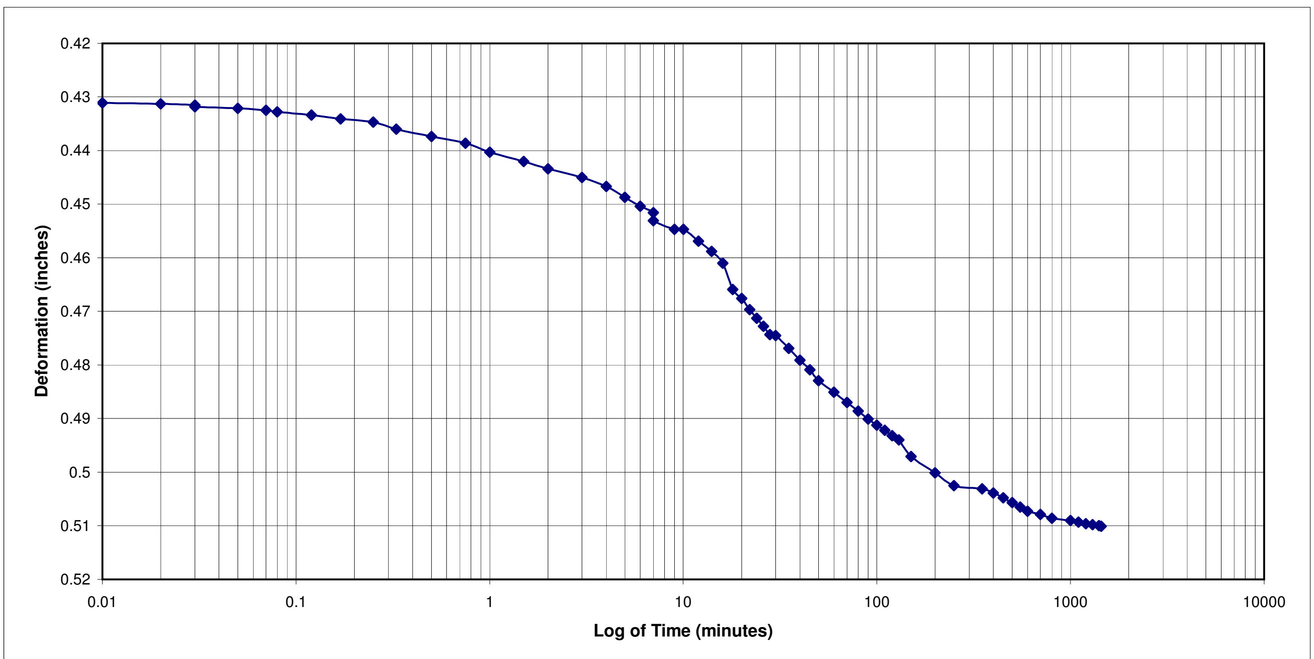
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-33A, 30 to 32 feet
LOAD = 8.0 TSF



DEFORMATION VS. LOG OF TIME
B-33A, 30 to 32 feet
LOAD = 8.0 TSF



Sample No.:	GTX B-33A, 31'
Exploration No.:	B-33A
Depth:	30 - 32 feet

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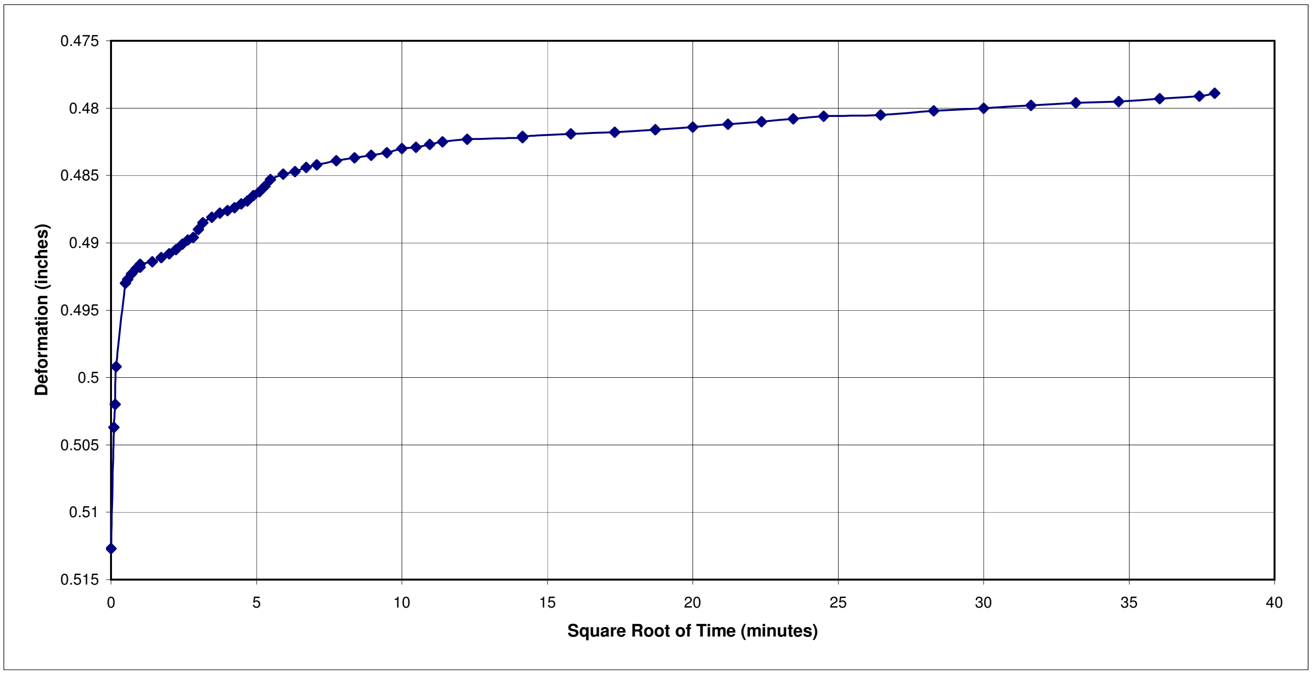
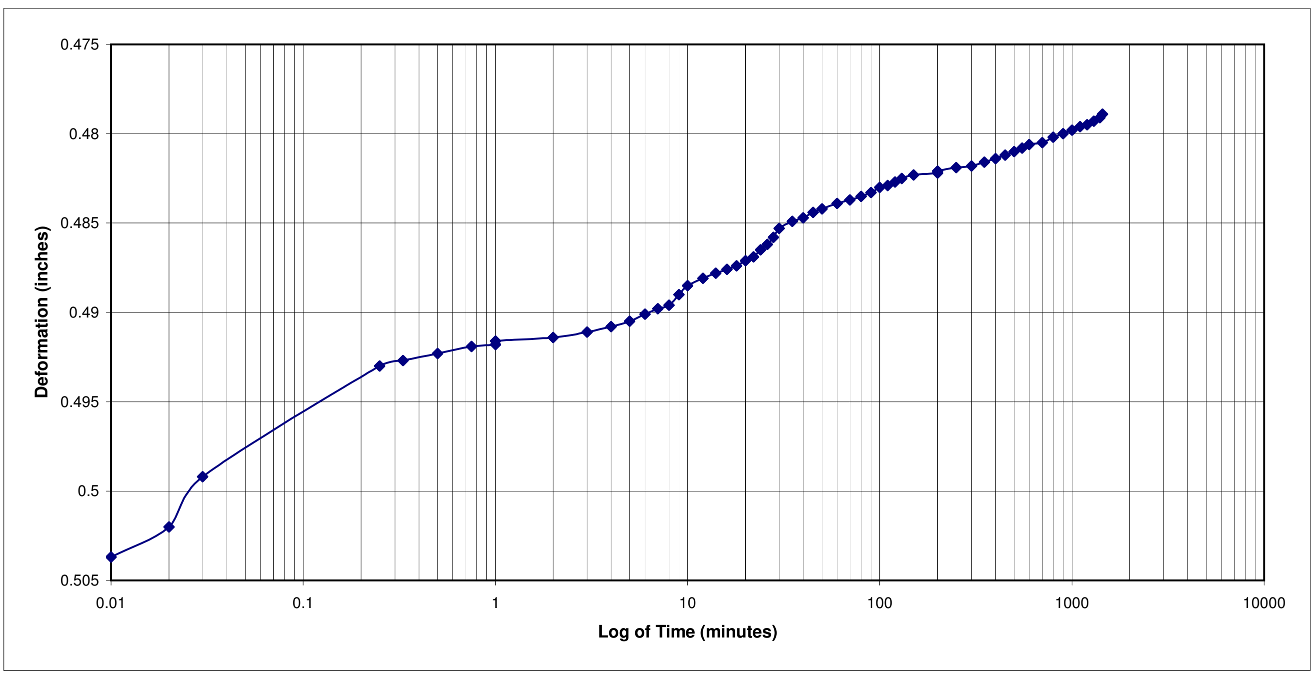
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-33A, 30 to 32 feet
LOAD = 2.0 TSF



DEFORMATION VS. LOG OF TIME
B-33A, 30 to 32 feet
LOAD = 2.0 TSF



Sample No.:	GTX B-33A, 31'
Exploration No.:	B-33A
Depth:	30 - 32 feet

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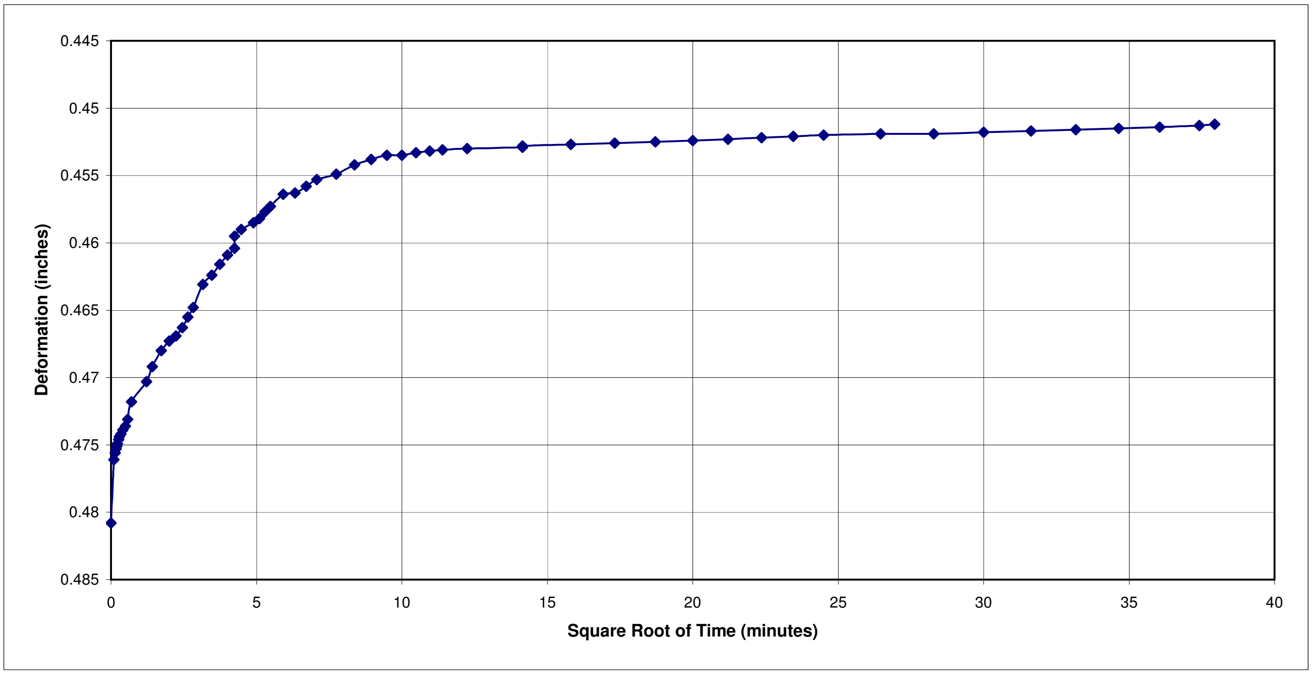
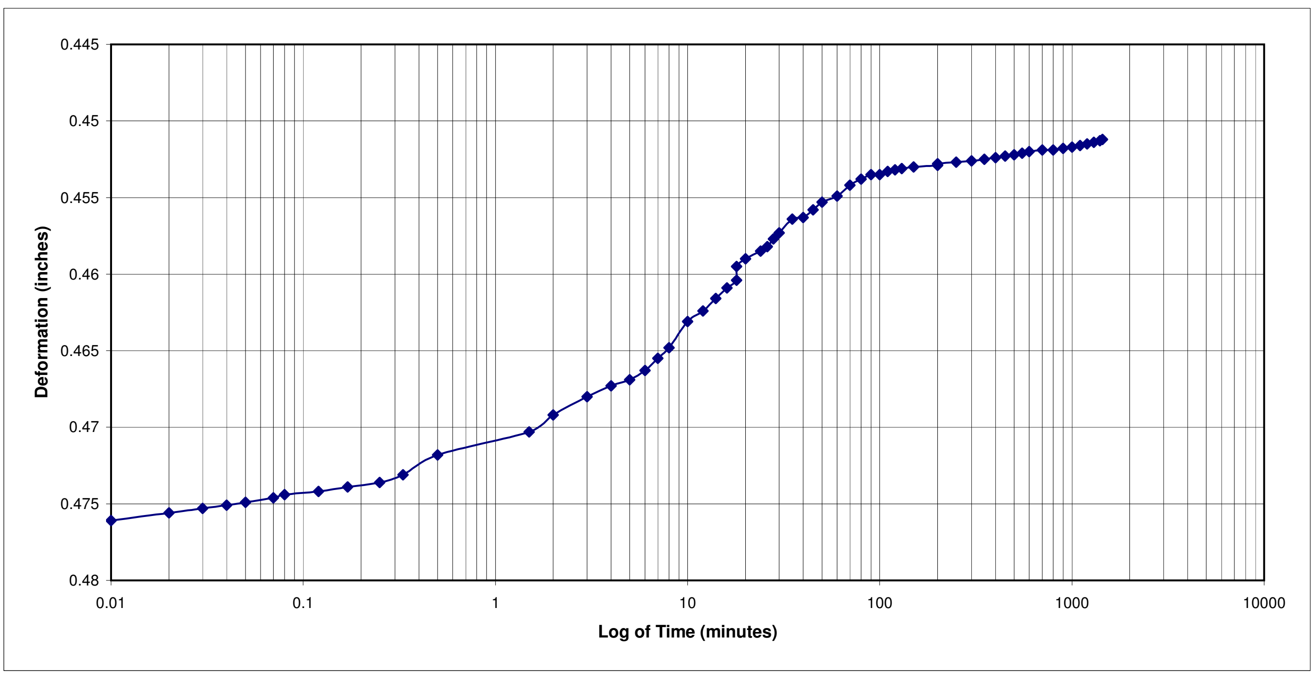
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-33A, 30 to 32 feet
LOAD = 0.5 TSF



DEFORMATION VS. LOG OF TIME
B-33A, 30 to 32 feet
LOAD = 0.5 TSF



Sample No.:	GTX B-33A, 31'
Exploration No.:	B-33A
Depth:	30 - 32 feet

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1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
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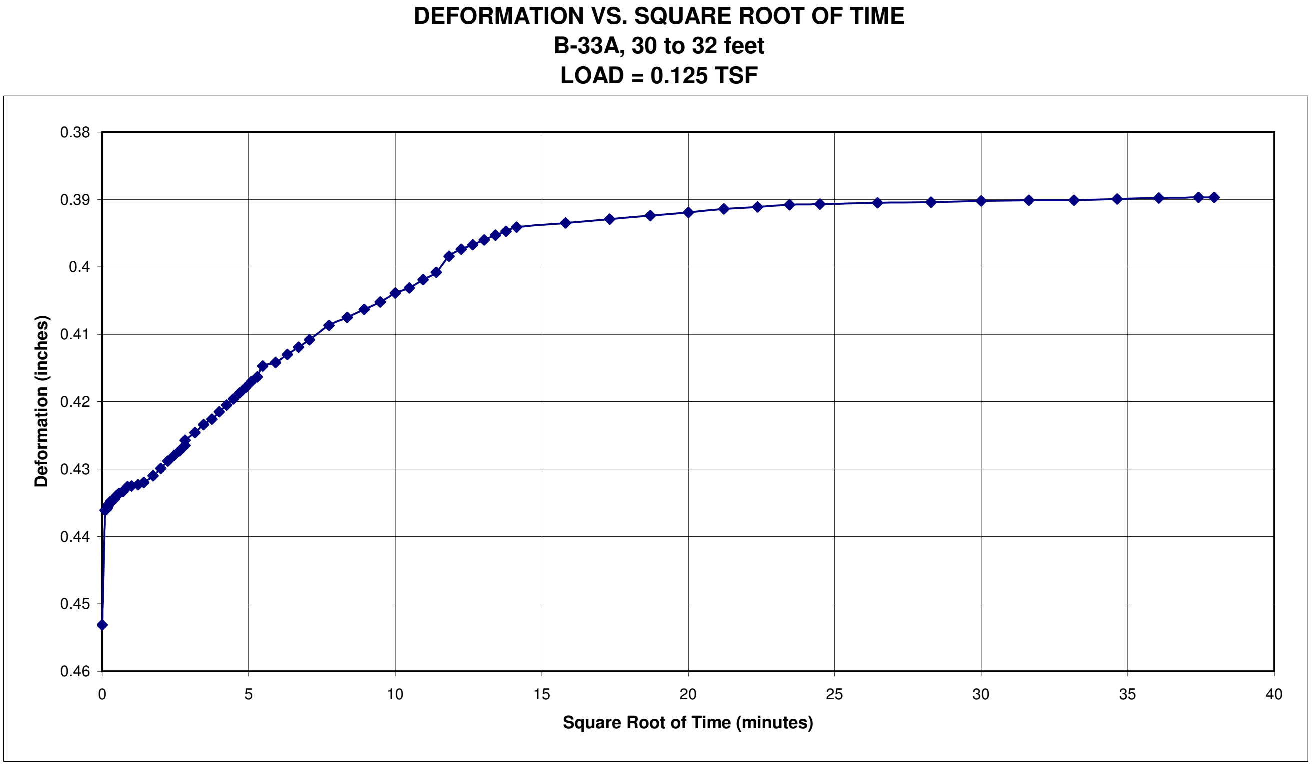
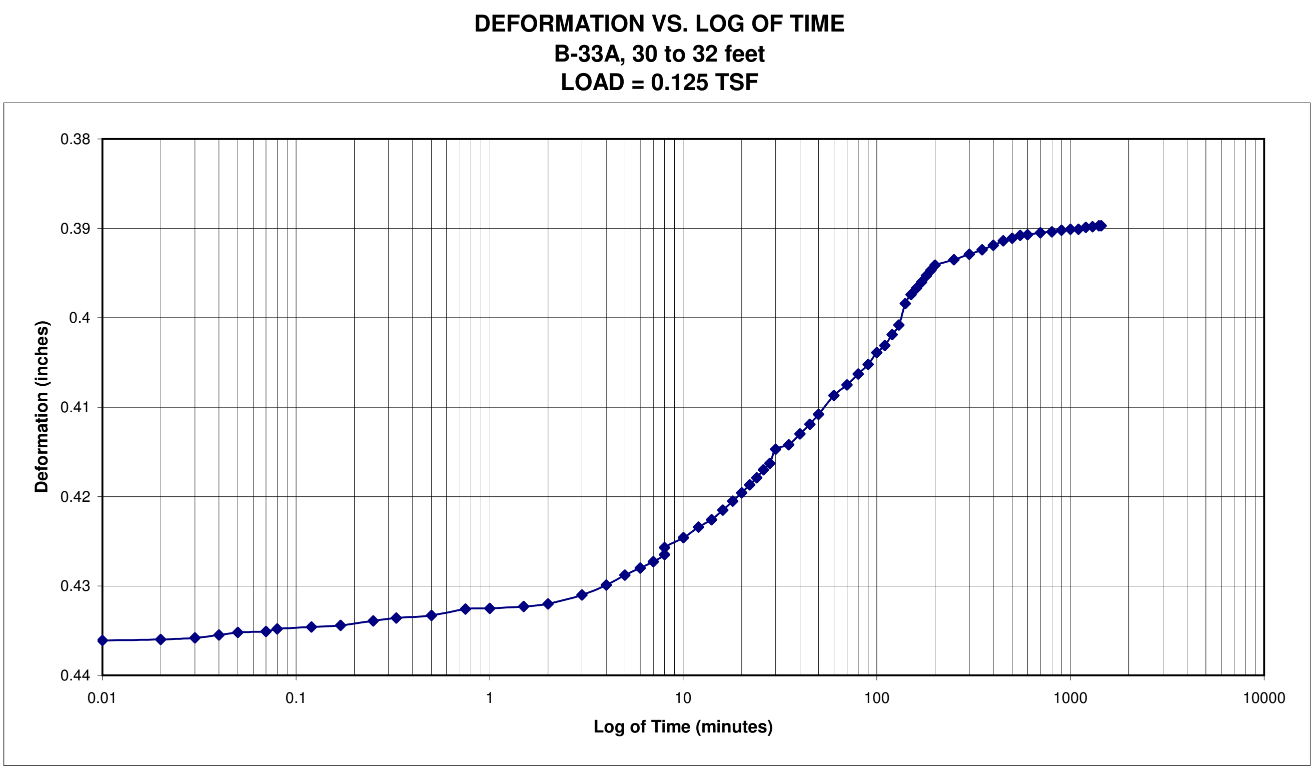
Project No.:	1131-08-554





Sample No.:	GTX B-33A, 31'
Exploration No.:	B-33A
Depth:	30 - 32 feet

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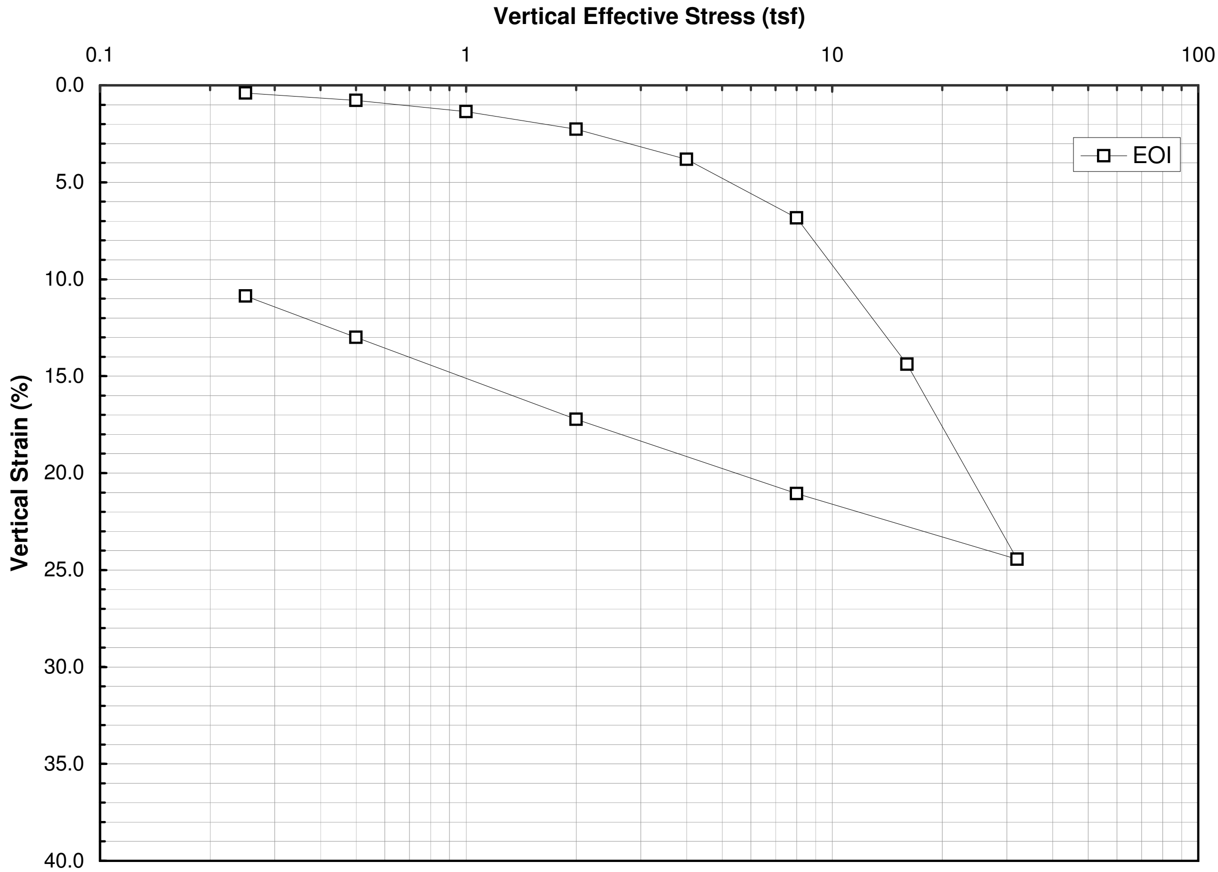
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554



CONSOLIDATION PARAMETERS	
Probable Preconsolidation Stress, P'_c (tsf):	7.3
Approx. Hydrostatic Effective Stress, P'_o (tsf)	1.0
Vertical Strain at P'_o (%):	1.4
Compression Ratio (CR):	0.28
Recompression Ratio (RR):	0.070
Over Consolidation Ratio (OCR):	7.4

TEST METHOD	
Test Method:	ASTM D-2435 A
Trimming Procedure:	2.5-inch Trimming Lathe
Pressure at Inundation:	0.25 tsf
Method to Compute C_v:	ASTM D-2435 12.3.2

SAMPLE ID	
Test No.:	GTX B-33A, 51'
Sample No.:	UD3
Exploration No.:	B-33A
Depth:	50 to 51.8 feet
USCS Description:	Elastic SILT with sand (MH)

SAMPLE DATA		
Sample Diameter (cm):	6.35	
Sample Area (cm^2):	31.67	
Measured Specific Gravity:	2.65	
Trimmings Moisture (%):	76.5	
% Passing #200 Sieve:	73.7	
Liquid Limit:	118	
Plastic Limit:	50	
Plasticity Index:	68	
	Initial	Final
Water Content (%):	70.7	67.8
Est. % Saturation:	97.3	100.0
Sample Height (cm):	2.540	2.264
Wet Sample Weight (g):	124.4	122.3
Dry Sample Weight (g):	72.9	72.9
Dry Unit Weight (pcf):	56.5	63.4
Void Ratio, e:	1.93	1.61
Solids Height (cm):	0.868	0.868

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ONE-DIMENSIONAL CONSOLIDATION TEST

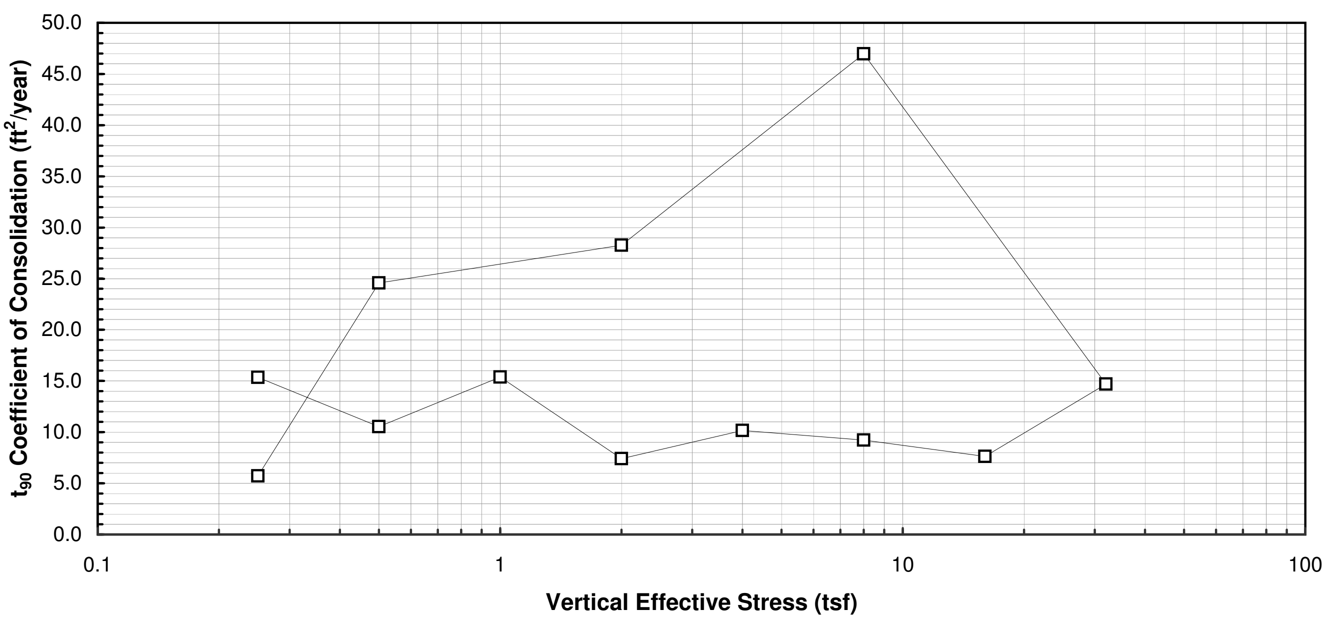
Project: Port Access Road
Client: SCDOT
Location: North Charleston, South Carolina
Project No.: 1131-08-554

Test No.:	GTX B-33A, 51'
Sample No.:	UD3
Exploration No.:	B-33A
Depth:	50 to 51.8 feet

LOAD INC.	STRESS DURATION (Hr - min)	VERTICAL STRESS (tsf)	VERTICAL STRAIN (EOI*)	VERTICAL STRAIN (EOP*)	VOID RATIO e (EOI*)	VOID RATIO e (EOP*)	STRESS RATIO (P'/P'c)	TAYLOR COEFFICIENT OF CONSOLIDATION (ft^2/year)
1	24-00	0.25	0.4	0.4	1.91	1.91	0.03	15.4
2	24-00	0.5	0.8	0.8	1.90	1.90	0.07	10.5
3	24-00	1	1.4	1.3	1.89	1.89	0.14	15.4
4	24-00	2	2.3	2.2	1.86	1.86	0.27	7.4
5	24-00	4	3.8	3.8	1.81	1.82	0.55	10.2
6	24-00	8	6.8	6.7	1.73	1.73	1.10	9.2
7	24-00	16	14.4	13.8	1.51	1.52	2.19	7.6
8	24-00	32	24.5	23.1	1.21	1.25	4.38	14.7
9	24-00	8	21.1	21.1	1.31	1.31	1.10	47.0
10	24-00	2	17.2	17.6	1.42	1.41	0.27	28.3
11	24-00	0.5	13.0	14.1	1.55	1.51	0.07	24.6
12	24-00	0.25	10.9	11.3	1.61	1.60	0.03	5.7

*EOI = End of Increment

*EOP = End of Primary



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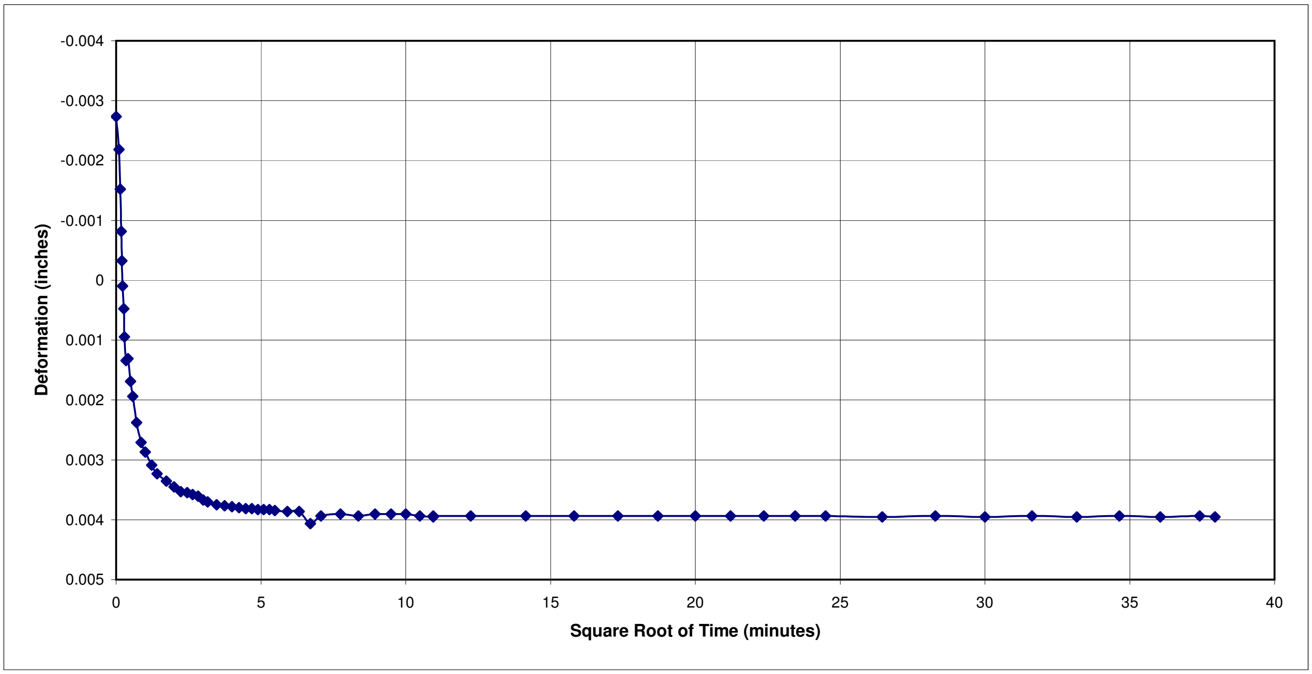
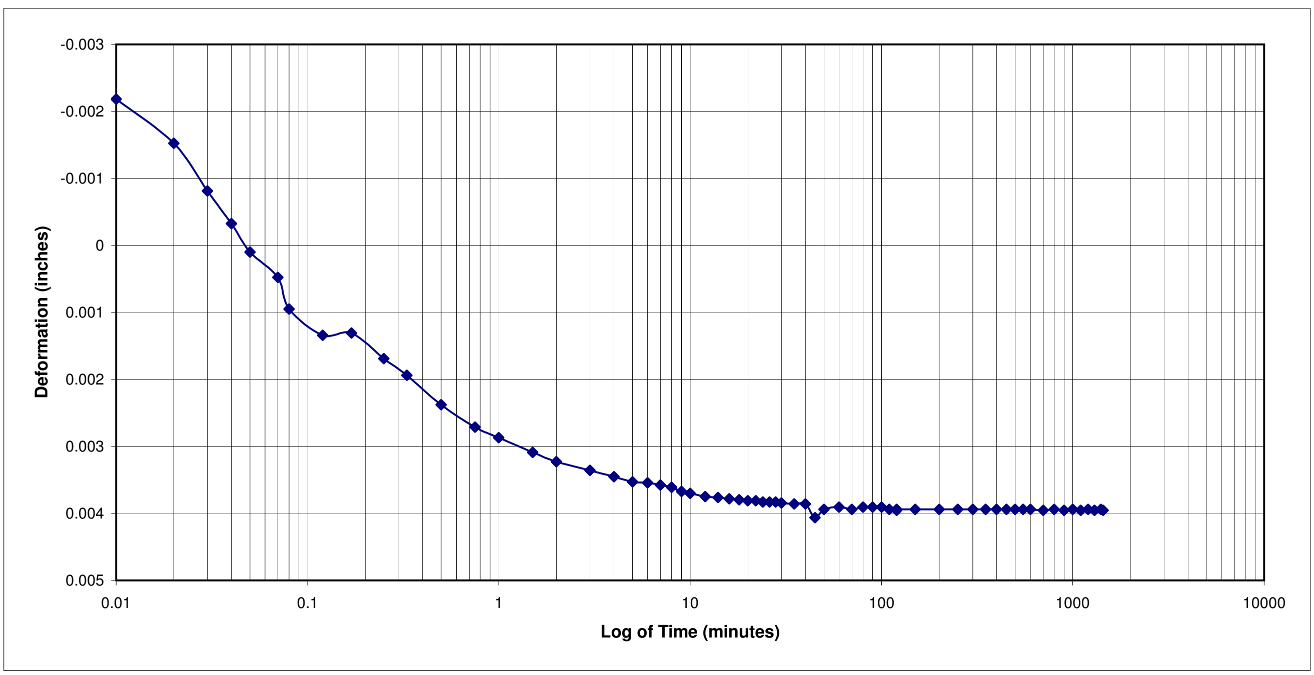
ONE-DIMENSIONAL CONSOLIDATION TEST

Project: Port Access Road
Client: SCDOT
Location: North Charleston, South Carolina
Project No. 1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-33A, 50 to 52 feet
LOAD = 0.25 TSF



DEFORMATION VS. LOG OF TIME
B-33A, 50 to 52 feet
LOAD = 0.25 TSF



Sample No.:	GTX B-33A, 51'
Exploration No.:	B-33A
Depth:	50 - 52 feet

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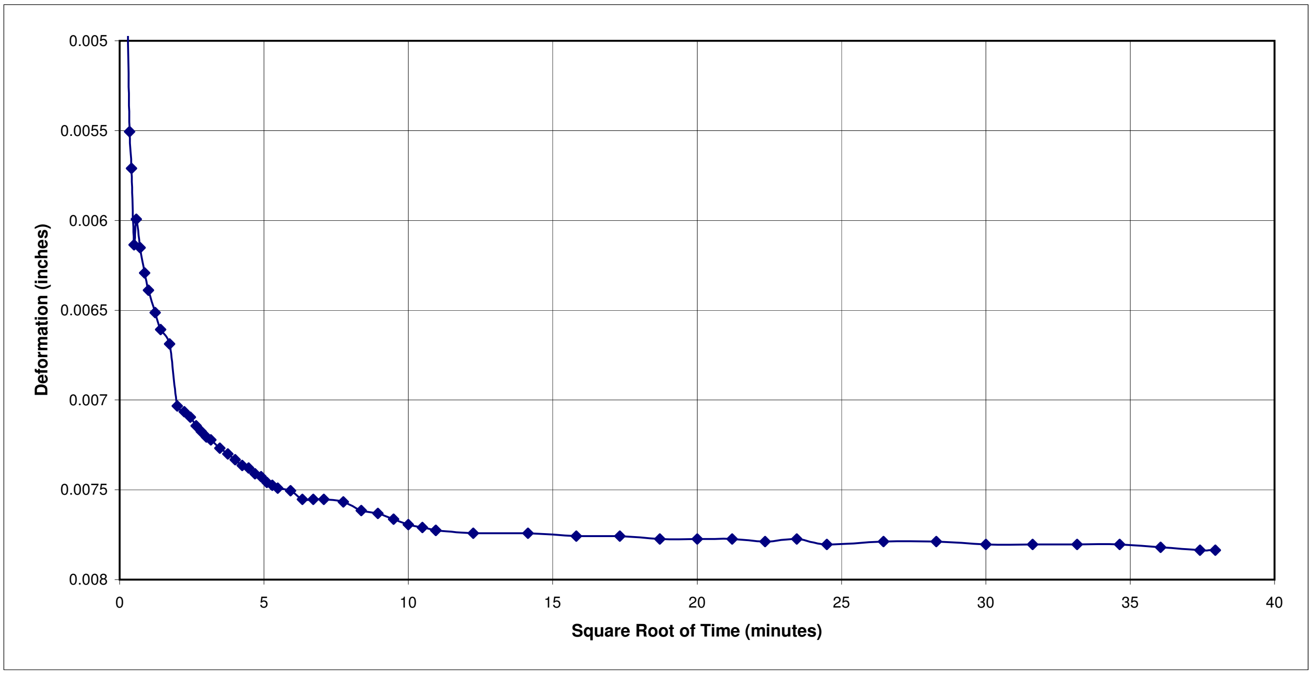
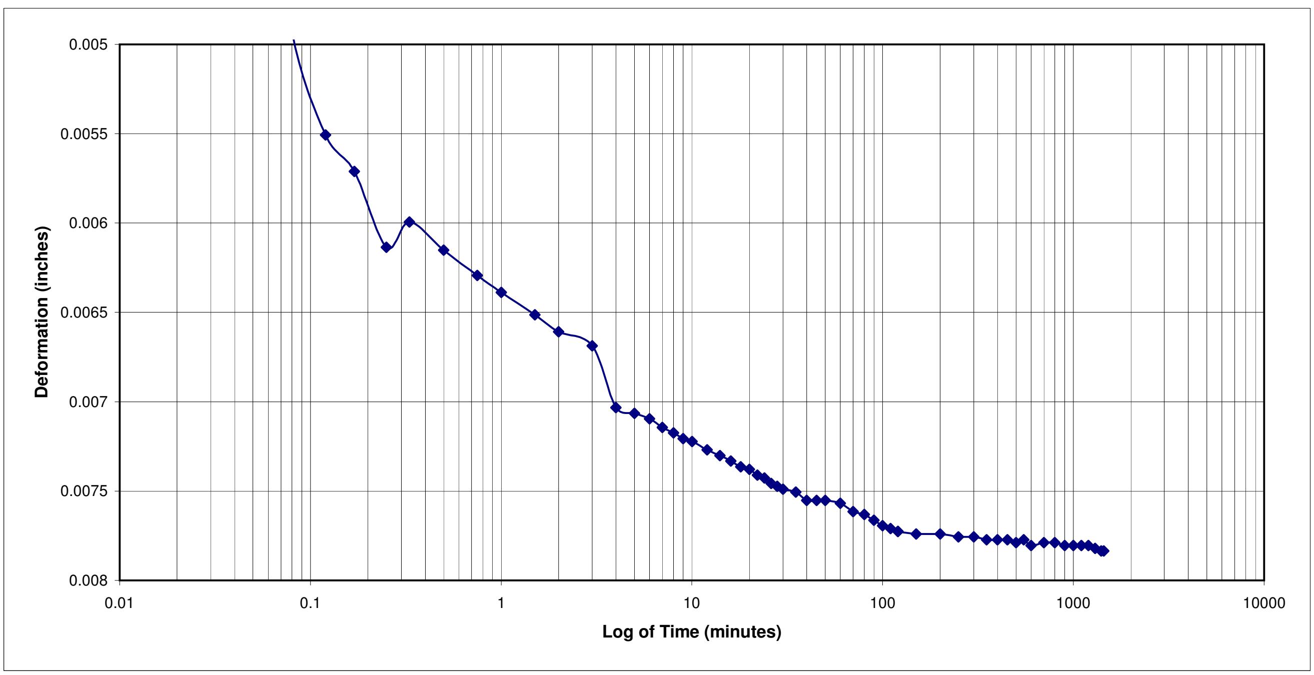
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-33A, 50 to 52 feet
LOAD = 0.5 TSF



DEFORMATION VS. LOG OF TIME
B-33A, 50 to 52 feet
LOAD = 0.5 TSF



Sample No.:	GTX B-33A, 51'
Exploration No.:	B-33A
Depth:	50 - 52 feet

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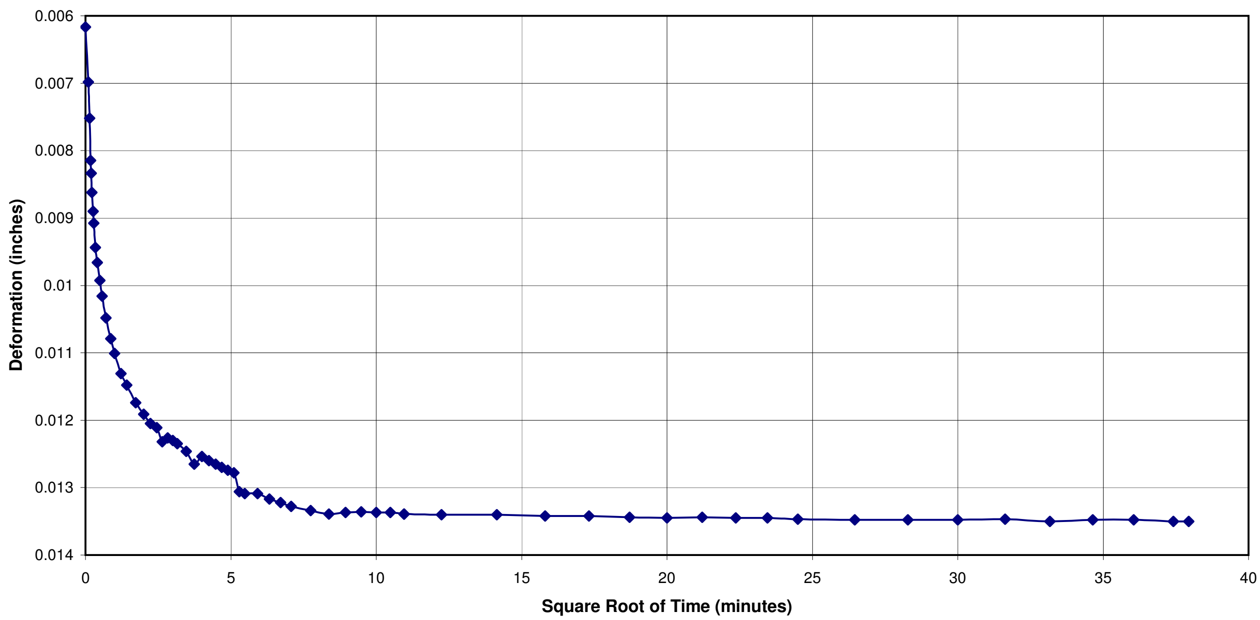
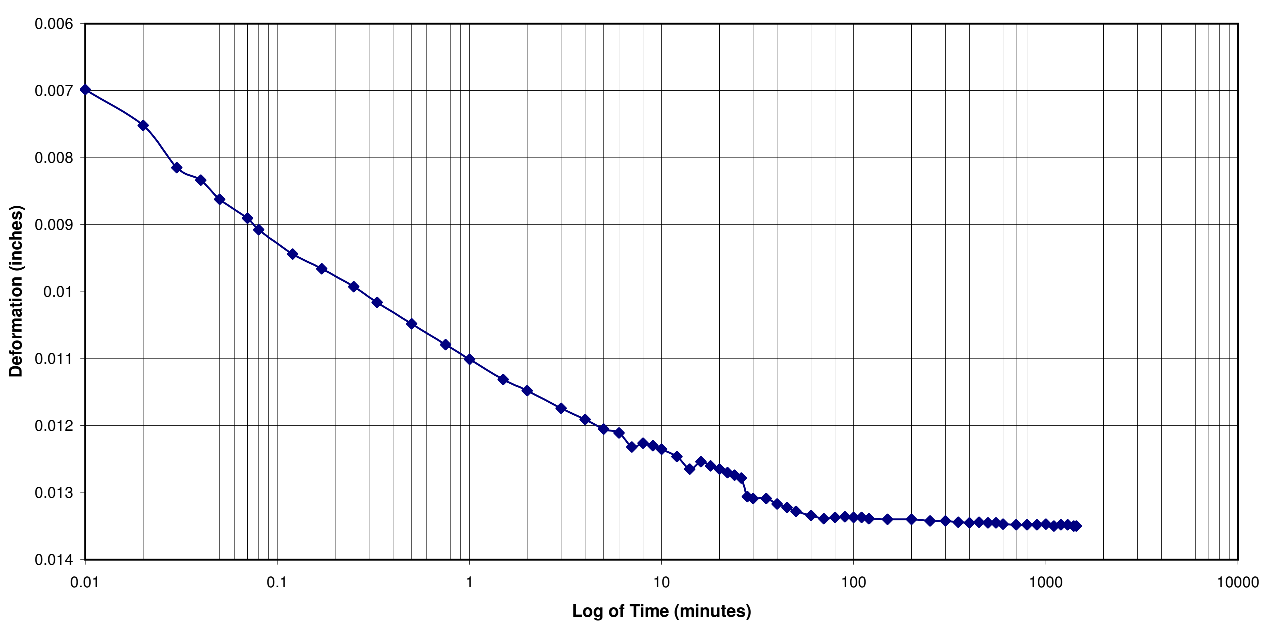
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-33A, 50 to 52 feet
LOAD = 1.0 TSF



DEFORMATION VS. LOG OF TIME
B-33A, 50 to 52 feet
LOAD = 1.0 TSF



Sample No.:	GTX B-33A, 51'
Exploration No.:	B-33A
Depth:	50 - 52 feet

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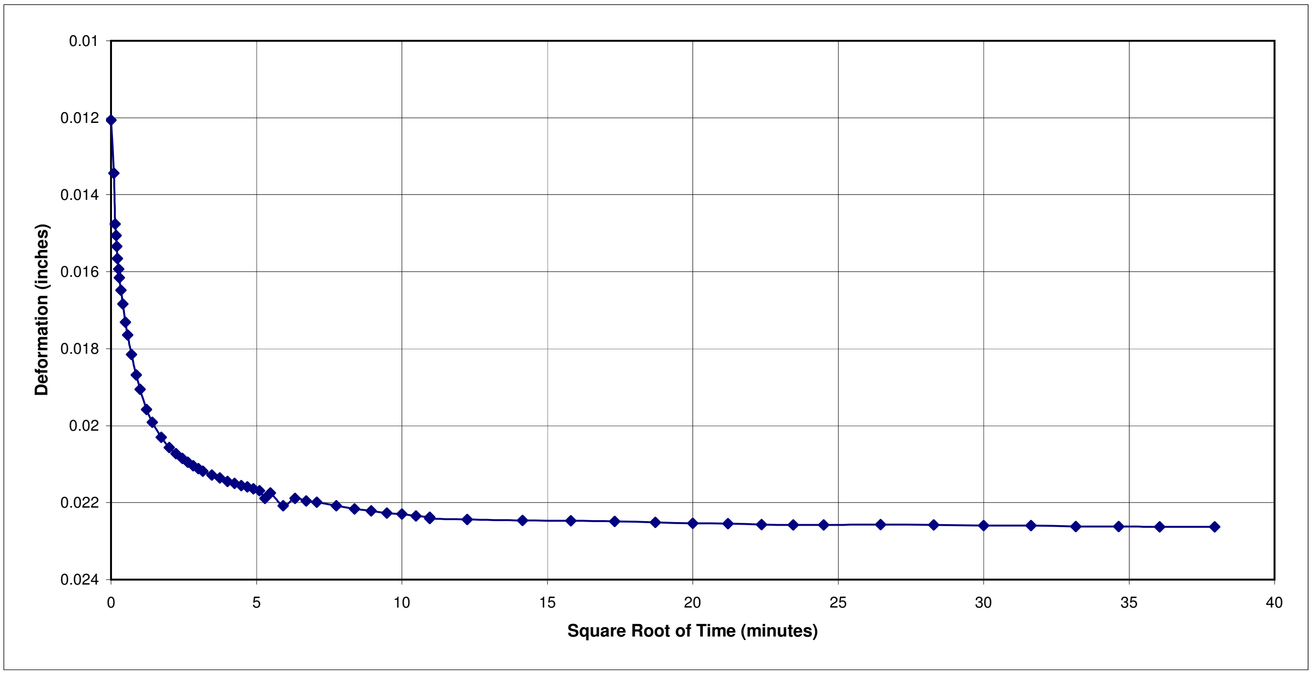
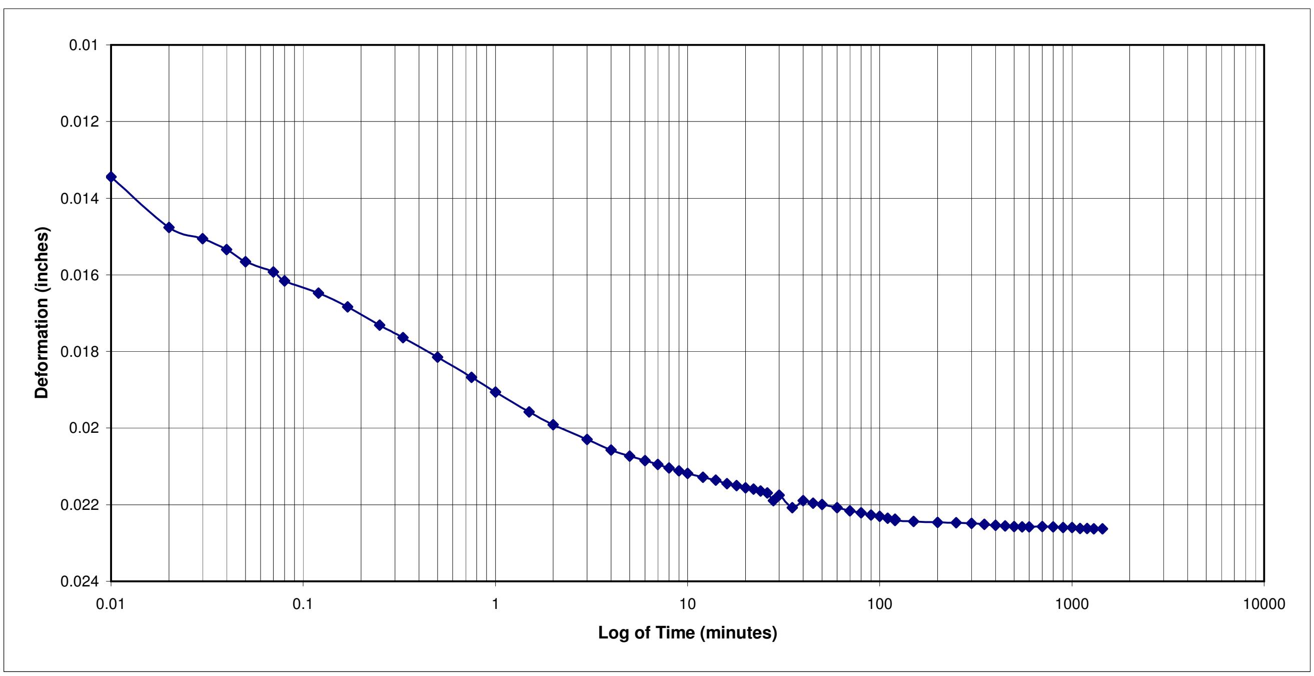
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-33A, 50 to 52 feet
LOAD = 2.0 TSF



DEFORMATION VS. LOG OF TIME
B-33A, 50 to 52 feet
LOAD = 2.0 TSF



Sample No.:	GTX B-33A, 51'
Exploration No.:	B-33A
Depth:	50 - 52 feet

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1-D CONSOLIDATION TIME-DEFORMATION CURVES

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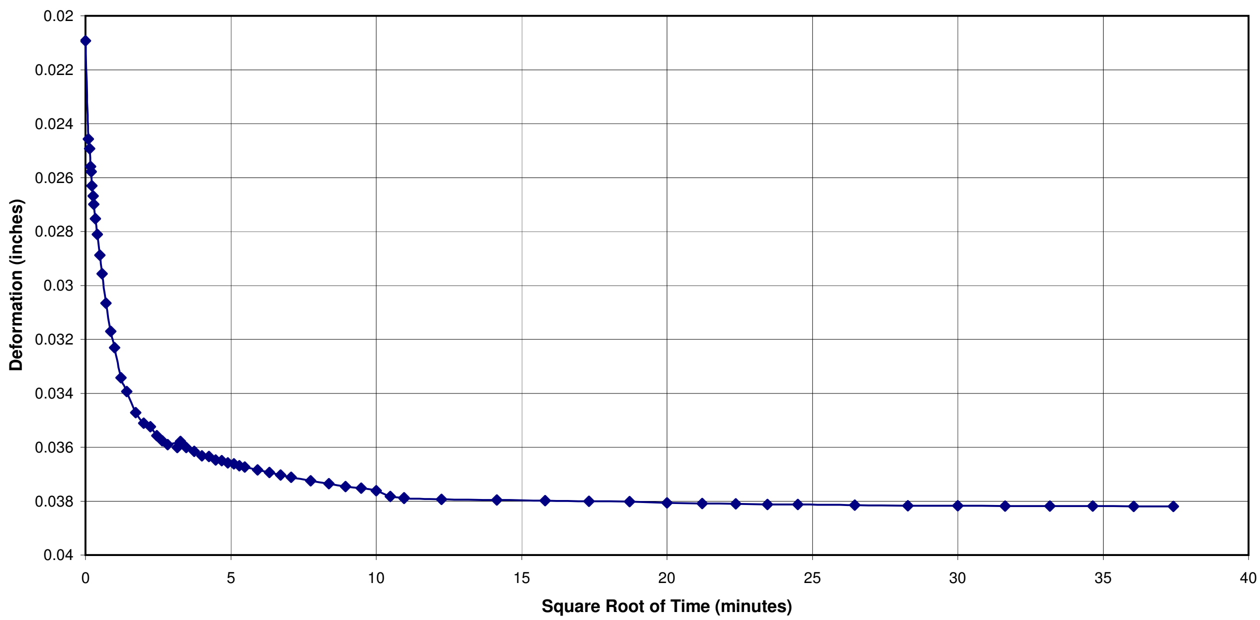
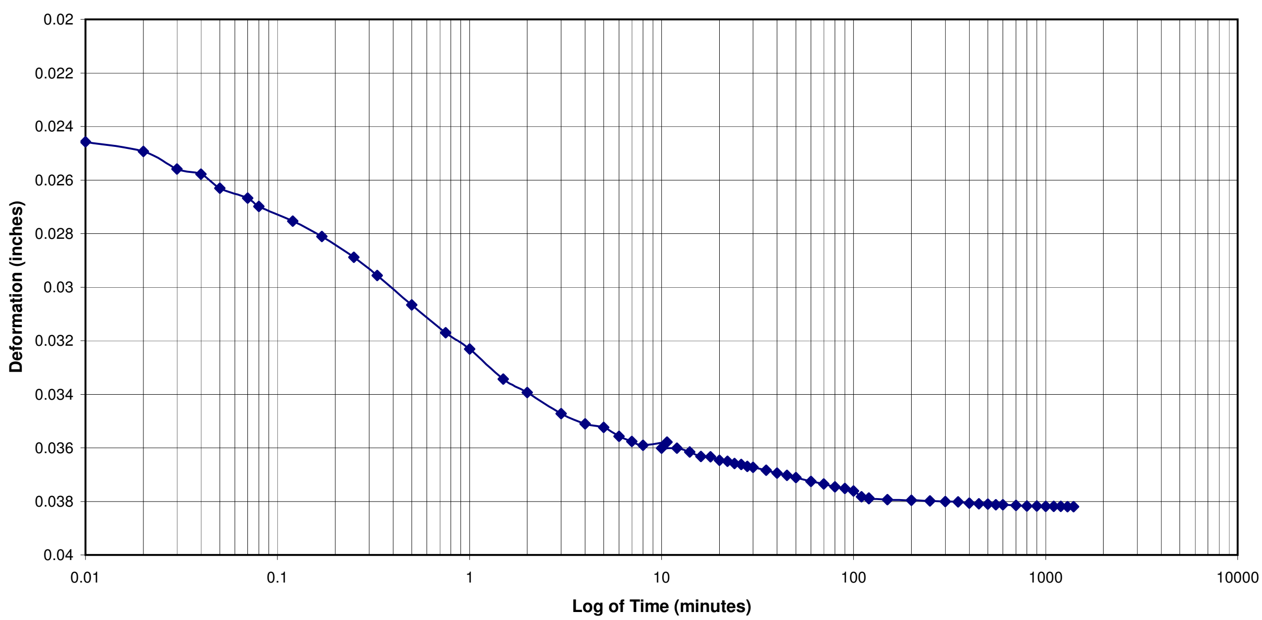
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-33A, 50 to 52 feet
LOAD = 4.0 TSF



DEFORMATION VS. LOG OF TIME
B-33A, 50 to 52 feet
LOAD = 4.0 TSF



Sample No.: GTX B-33A, 51'
Exploration No.: B-33A
Depth: 50 - 52 feet

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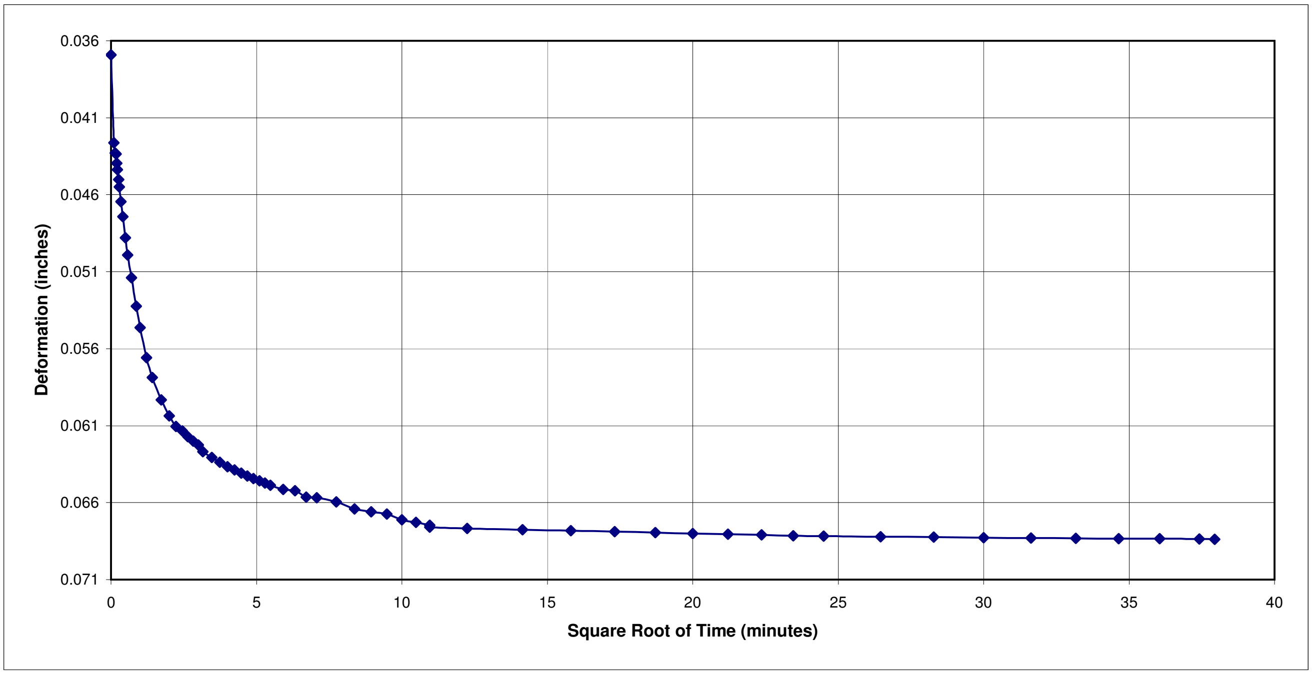
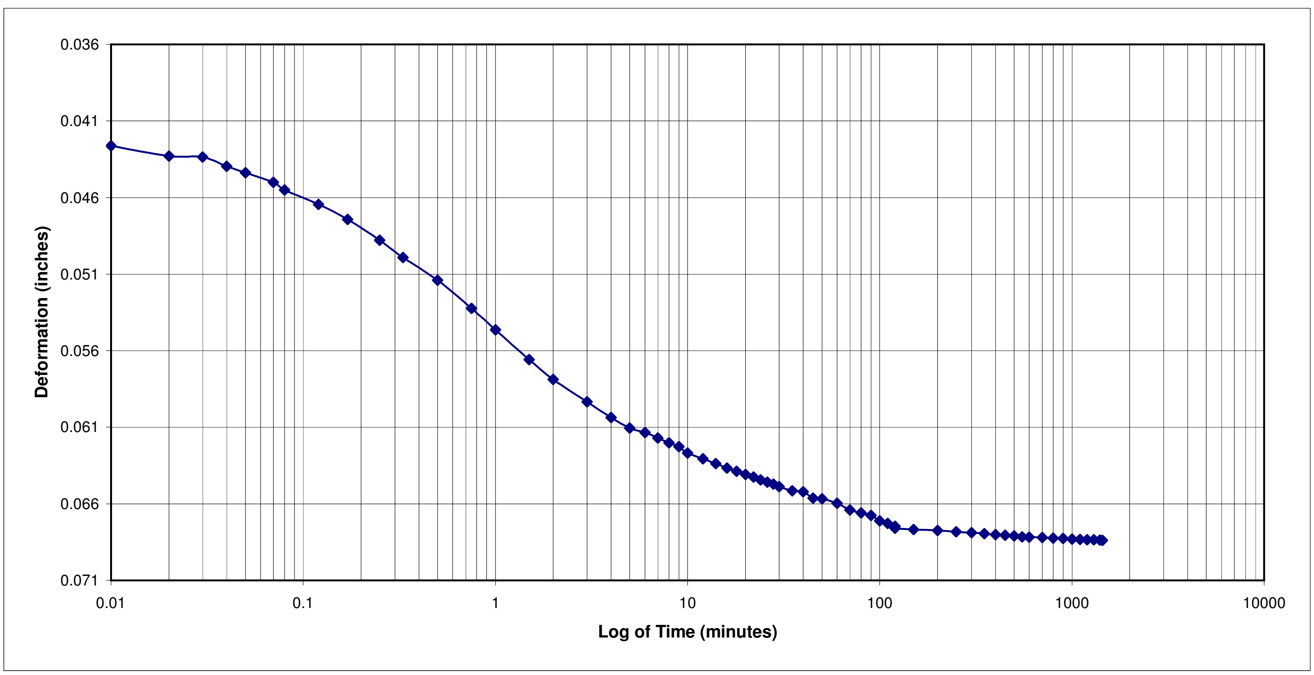
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-33A, 50 to 52 feet
LOAD = 8.0 TSF



DEFORMATION VS. LOG OF TIME
B-33A, 50 to 52 feet
LOAD = 8.0 TSF



Sample No.:	GTX B-33A, 51'
Exploration No.:	B-33A
Depth:	50 - 52 feet

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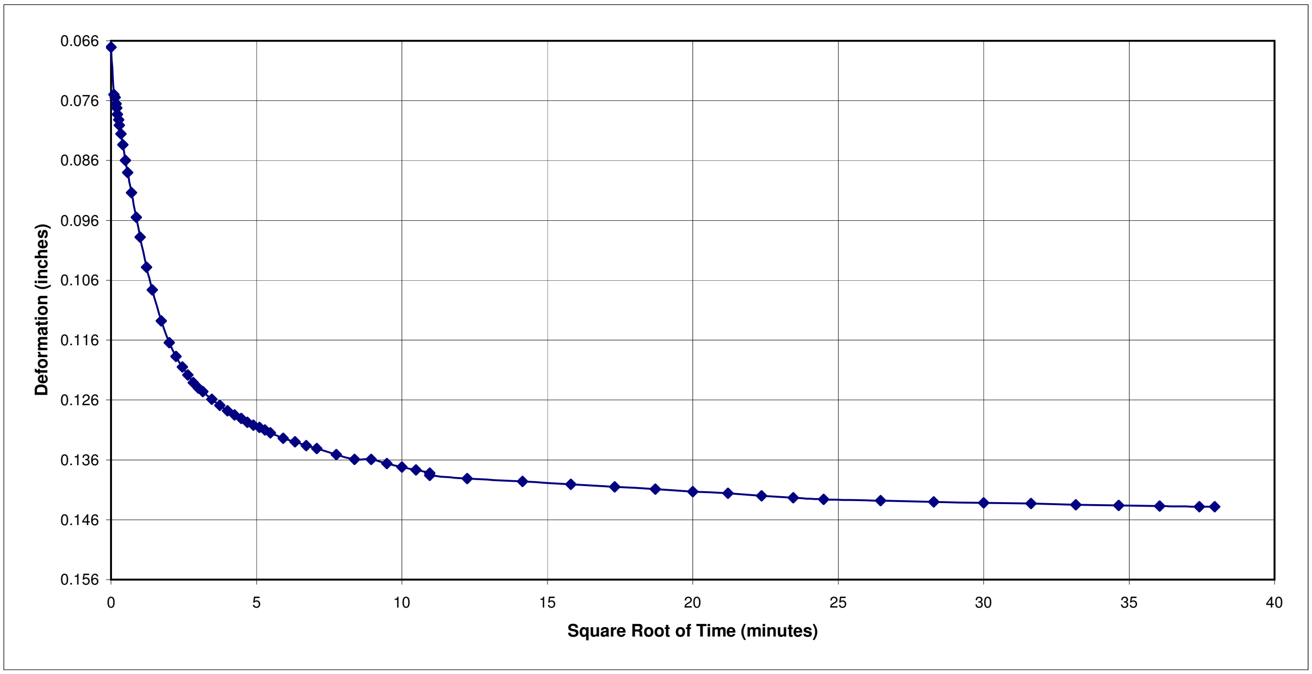
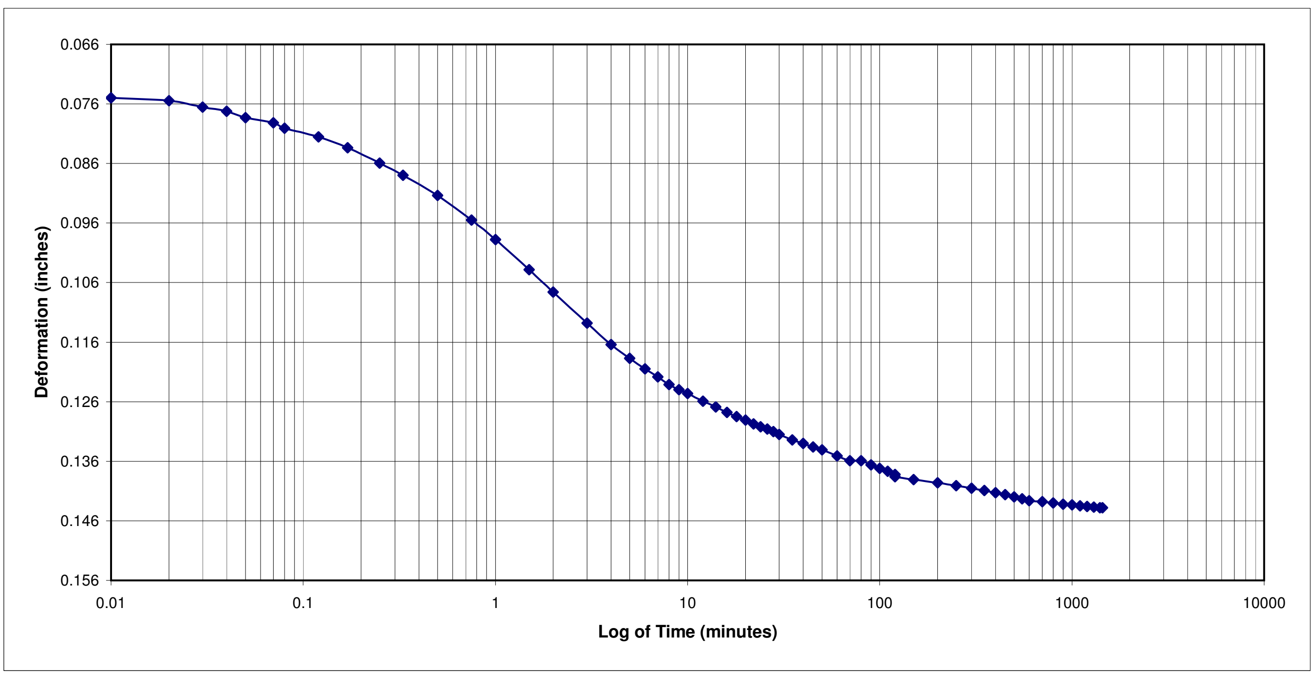
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-33A, 50 to 52 feet
LOAD = 16.0 TSF



DEFORMATION VS. LOG OF TIME
B-33A, 50 to 52 feet
LOAD = 16.0 TSF



Sample No.:	GTX B-33A, 51'
Exploration No.:	B-33A
Depth:	50 - 52 feet

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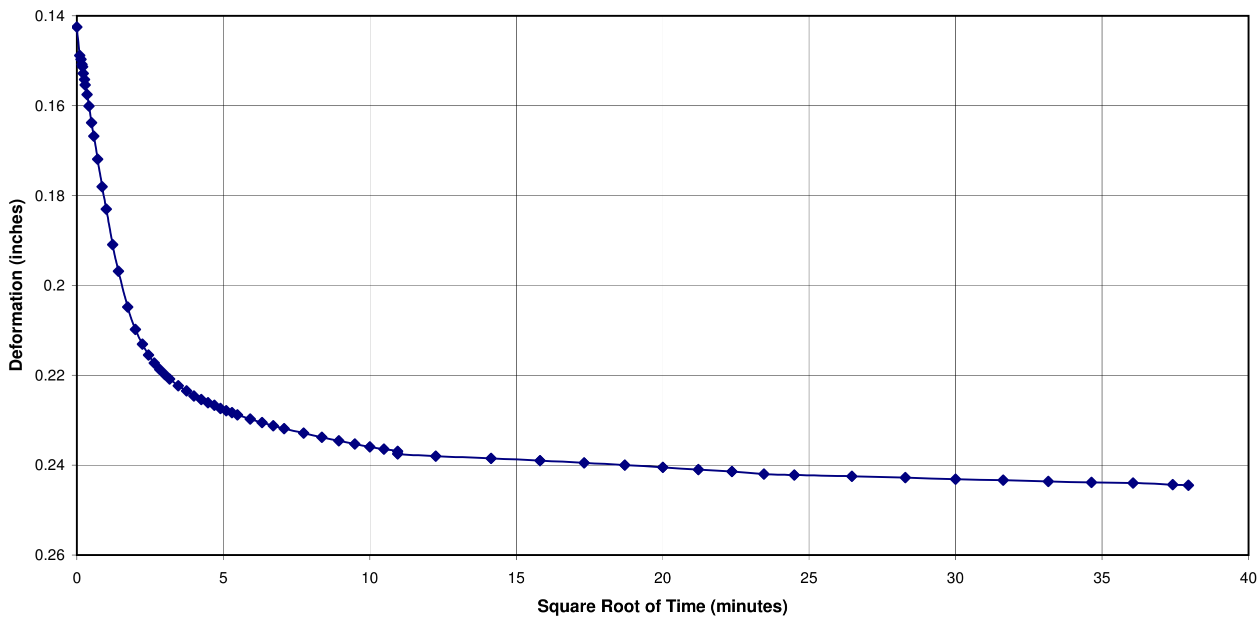
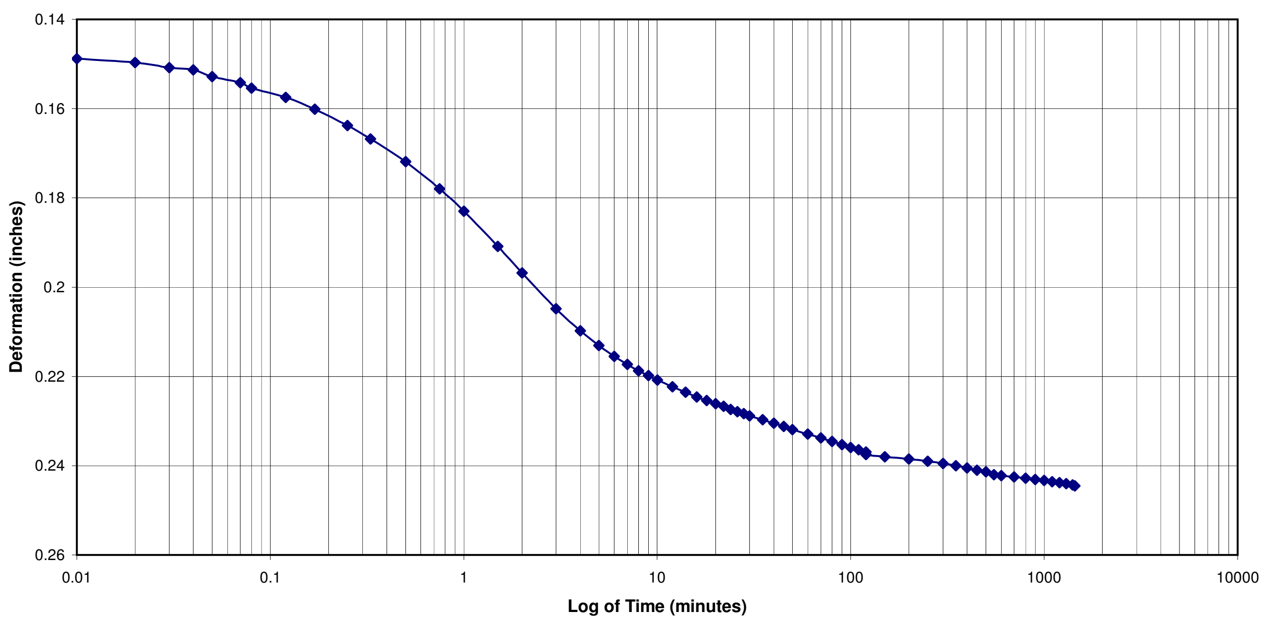
DEFORMATION VS. SQUARE ROOT OF TIME
B-33A, 50 to 52 feet
LOAD = 32.0 TSF



DEFORMATION VS. LOG OF TIME
B-33A, 50 to 52 feet
LOAD = 32.0 TSF



Sample No.:	GTX B-33A, 51'
Exploration No.:	B-33A
Depth:	50 - 52 feet

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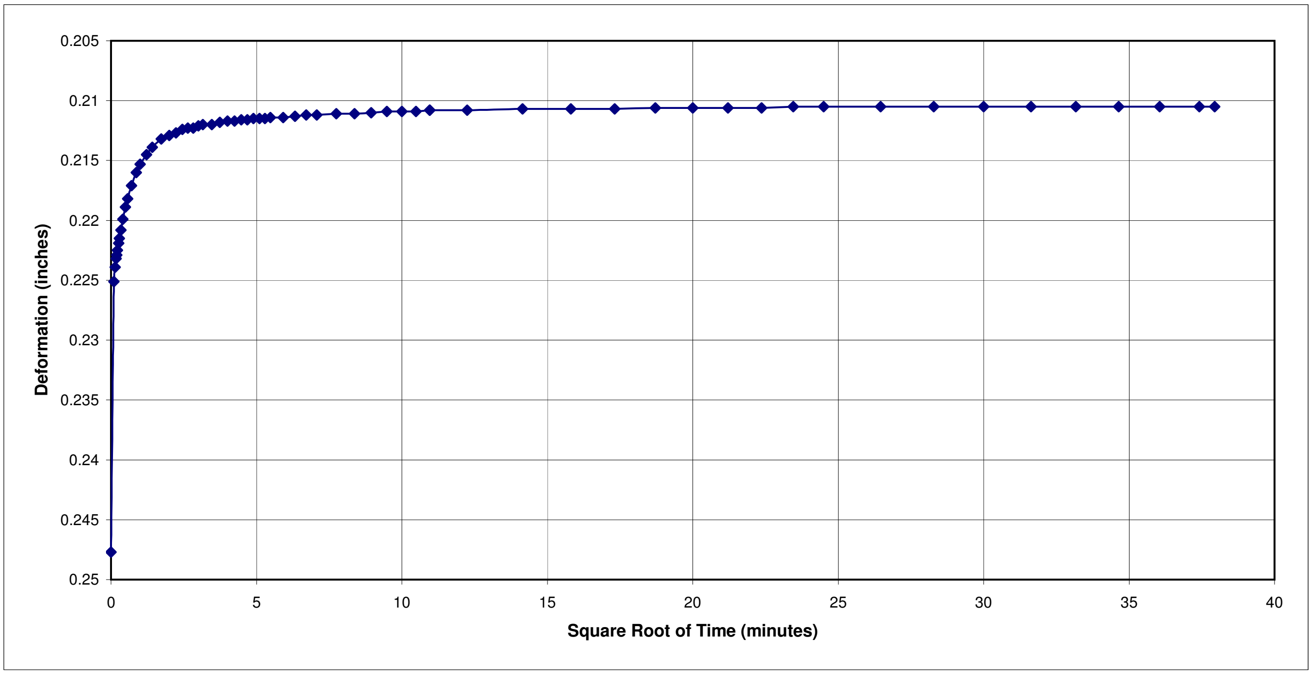
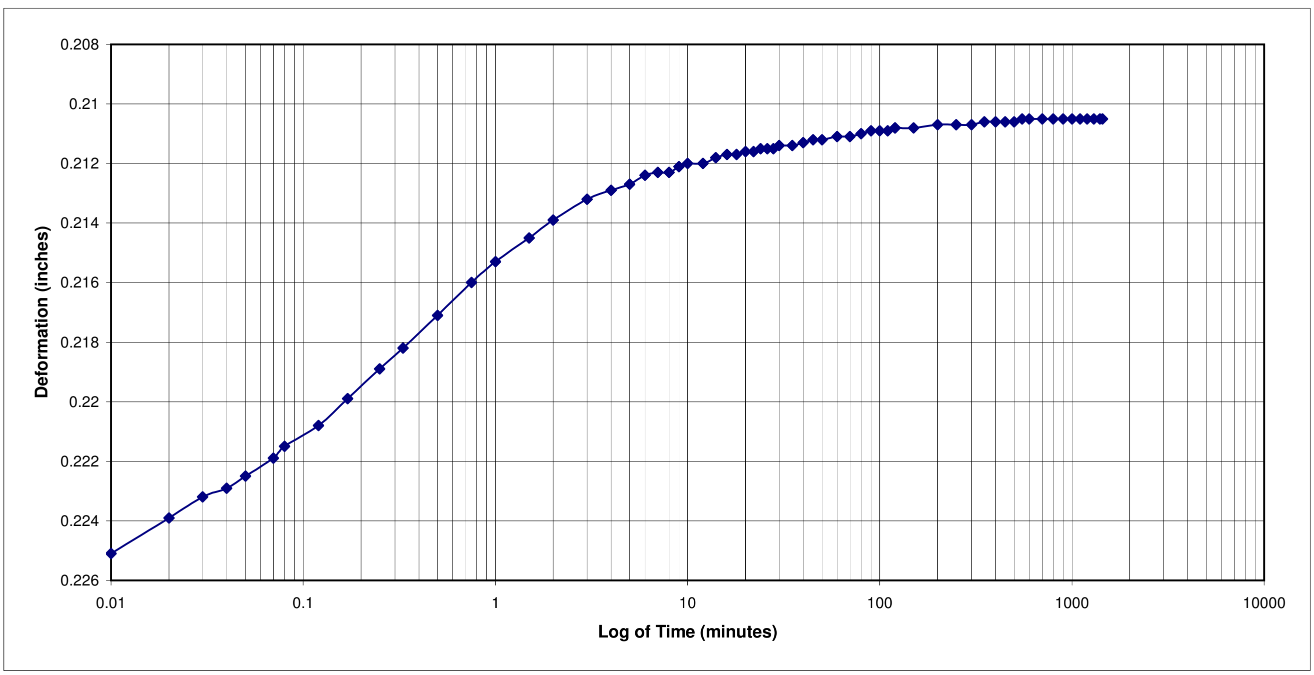
DEFORMATION VS. SQUARE ROOT OF TIME
B-33A, 50 to 52 feet
LOAD = 8.0 TSF



DEFORMATION VS. LOG OF TIME
B-33A, 50 to 52 feet
LOAD = 8.0 TSF



Sample No.:	GTX B-33A, 51'
Exploration No.:	B-33A
Depth:	50 - 52 feet

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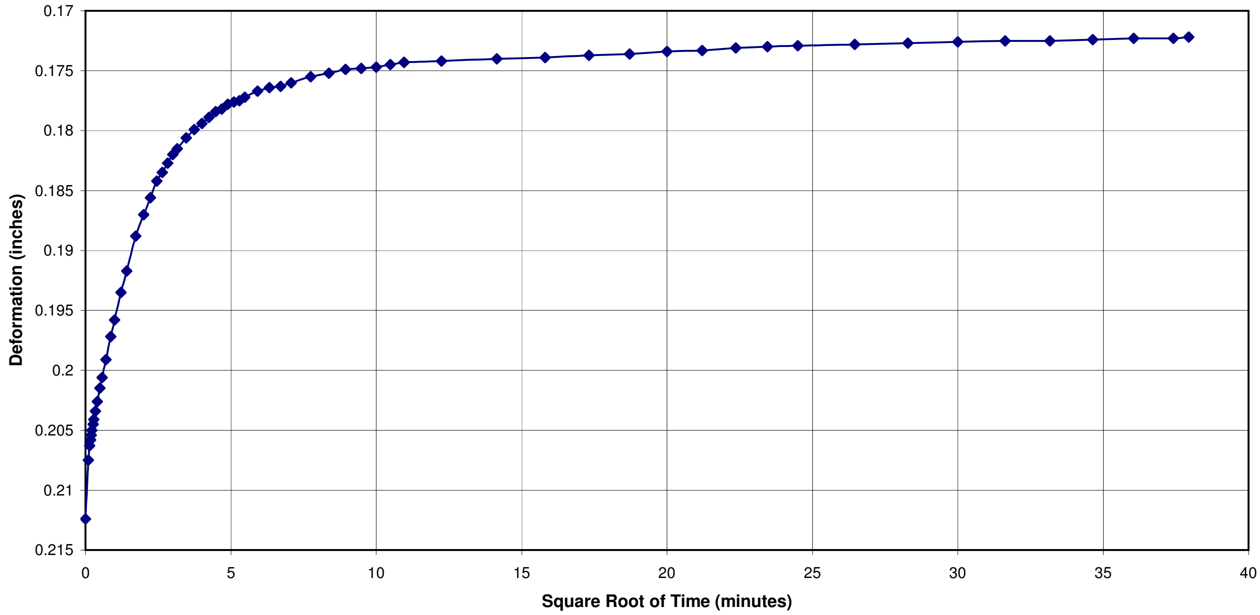
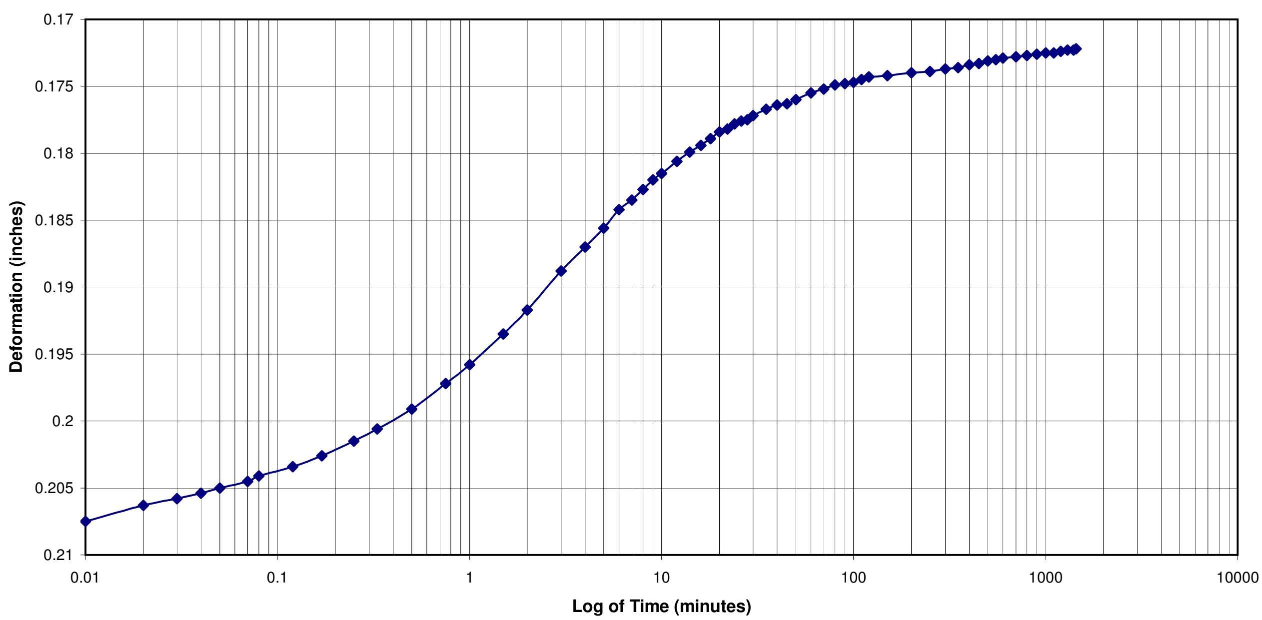
DEFORMATION VS. SQUARE ROOT OF TIME
B-33A, 50 to 52 feet
LOAD = 2.0 TSF



DEFORMATION VS. LOG OF TIME
B-33A, 50 to 52 feet
LOAD = 2.0 TSF



Sample No.:	GTX B-33A, 51'
Exploration No.:	B-33A
Depth:	50 - 52 feet

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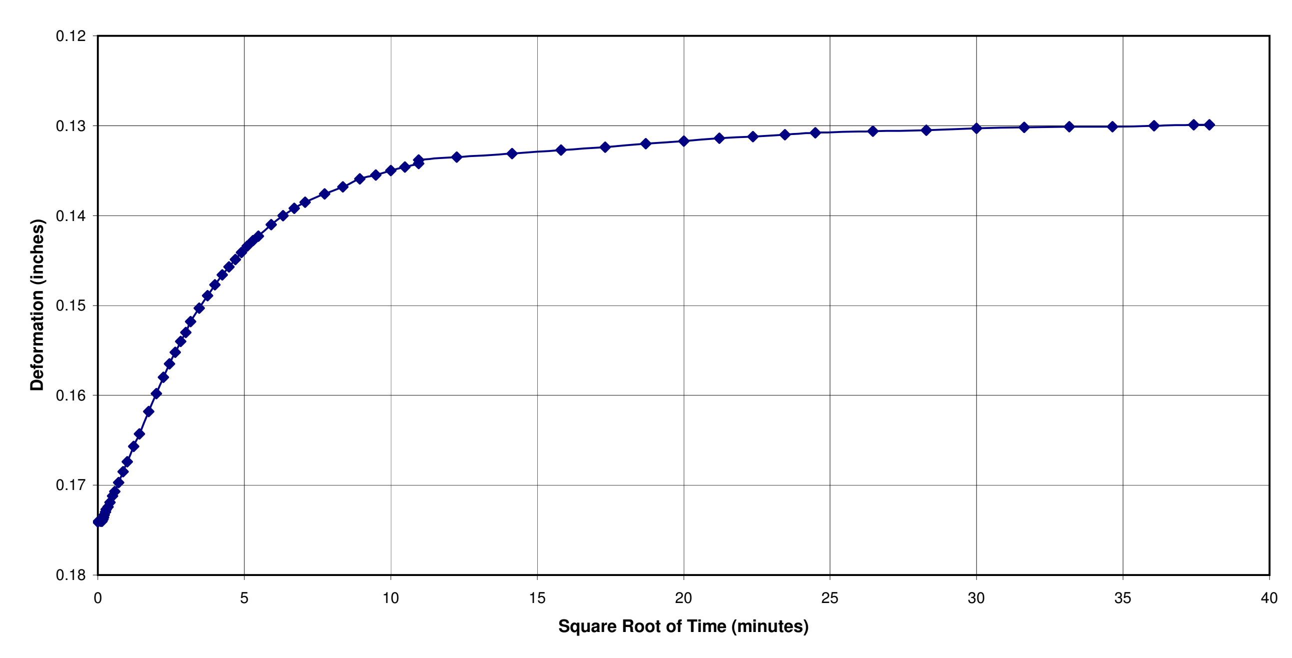
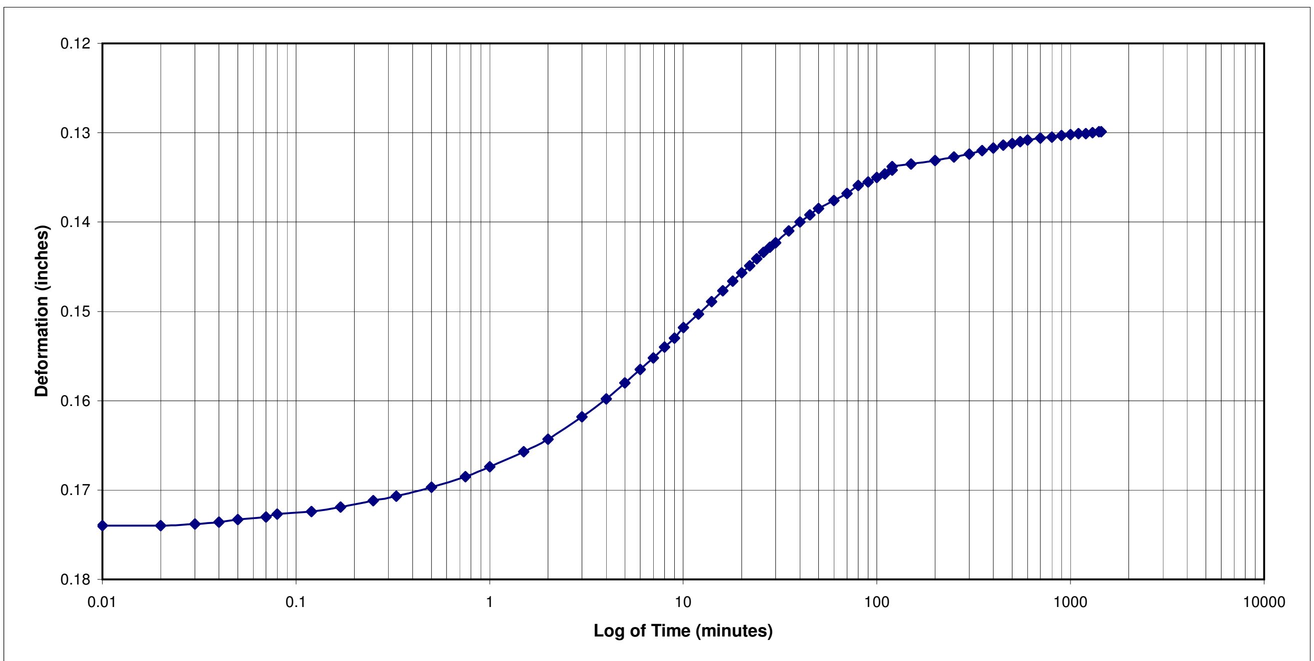
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-33A, 50 to 52 feet
LOAD = 0.5 TSF



DEFORMATION VS. LOG OF TIME
B-33A, 50 to 52 feet
LOAD = 0.5 TSF



Sample No.:	GTX B-33A, 51'
Exploration No.:	B-33A
Depth:	50 - 52 feet

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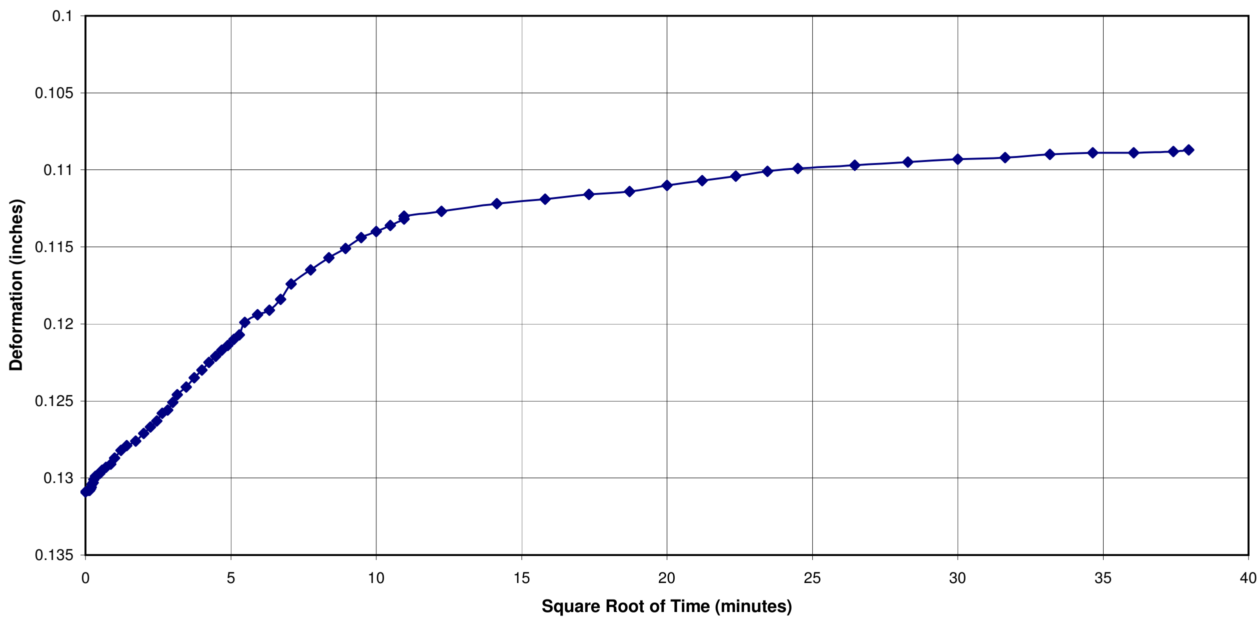
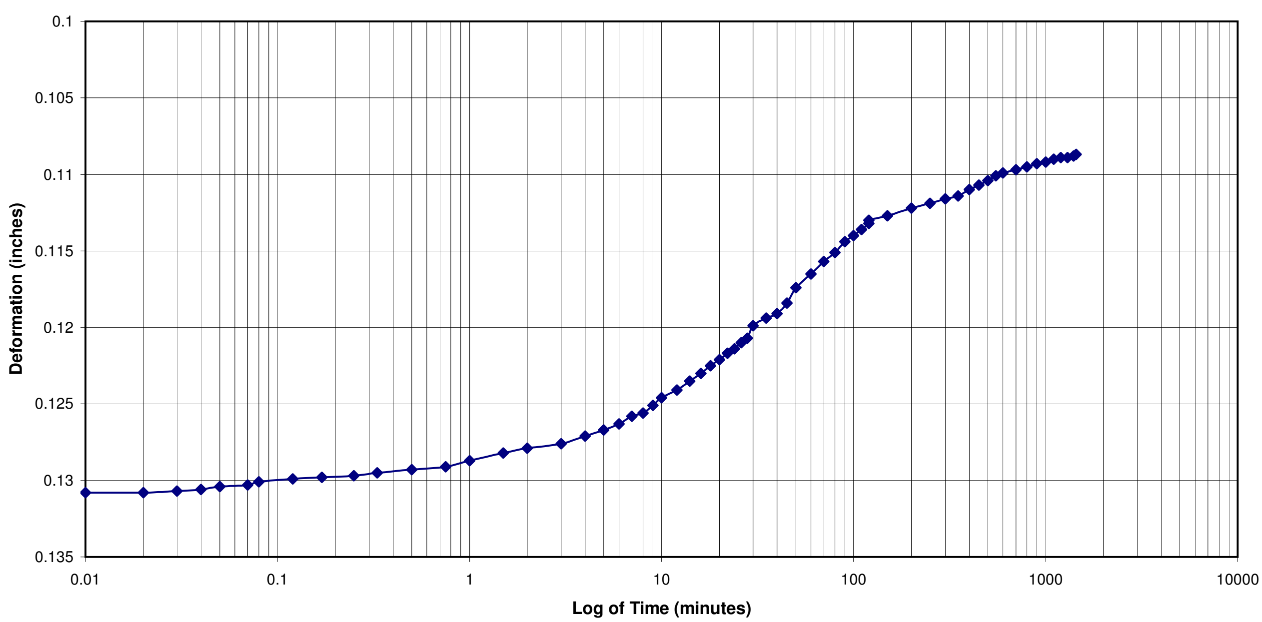
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-33A, 50 to 52 feet
LOAD = 0.25 TSF



DEFORMATION VS. LOG OF TIME
B-33A, 50 to 52 feet
LOAD = 0.25 TSF



Sample No.:	GTX B-33A, 51'
Exploration No.:	B-33A
Depth:	50 - 52 feet

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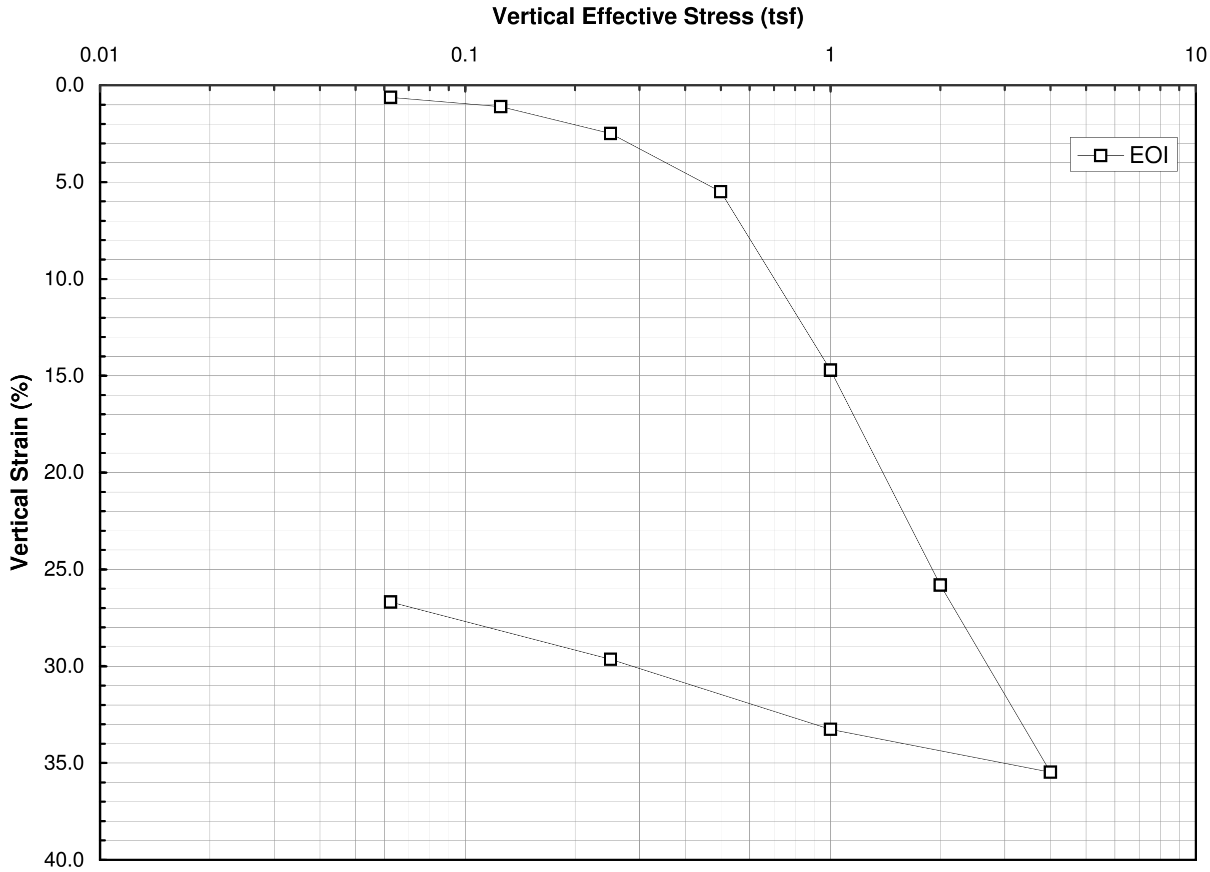
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554



CONSOLIDATION PARAMETERS

Probable Preconsolidation Stress, P'_c (tsf):	0.5
Approx. Hydrostatic Effective Stress, P'_o (tsf)	0.3
Vertical Strain at P'_o (%):	3.4
Compression Ratio	0.35
Recompression Ratio	0.055
Over Consolidation Ratio (OCR):	1.5

TEST METHOD

Test Method:	ASTM D-2435 A
Trimming Procedure:	2.5-inch Trimming Lathe
Pressure at Inundation:	0.0625 tsf
Method to Compute C_v:	ASTM D-2435 12.3.2

SAMPLE ID

Test No.:	GTX B-39A, 16'
Sample No.:	UD1
Exploration No.:	B-39A
Depth:	15 to 17 feet
USCS Description:	Fat CLAY (CH)

SAMPLE DATA

Sample Diameter (cm):	6.35
Sample Area (cm^2):	31.67
Measured Specific Gravity:	2.63
Trimmings Moisture (%):	117.0
% Passing #200 Sieve:	99.2
Liquid Limit:	149
Plastic Limit:	43
Plasticity Index:	106

	Initial	Final
Water Content (%):	118.8	80.7
Est. % Saturation:	96.3	100.0
Sample Height (cm):	2.540	1.862
Wet Sample Weight (g):	109.1	90.1
Dry Sample Weight (g):	49.8	49.8
Dry Unit Weight (pcf):	38.6	52.7
Void Ratio, e:	3.24	2.11
Solids Height (cm):	0.598	0.598

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ONE-DIMENSIONAL CONSOLIDATION TEST

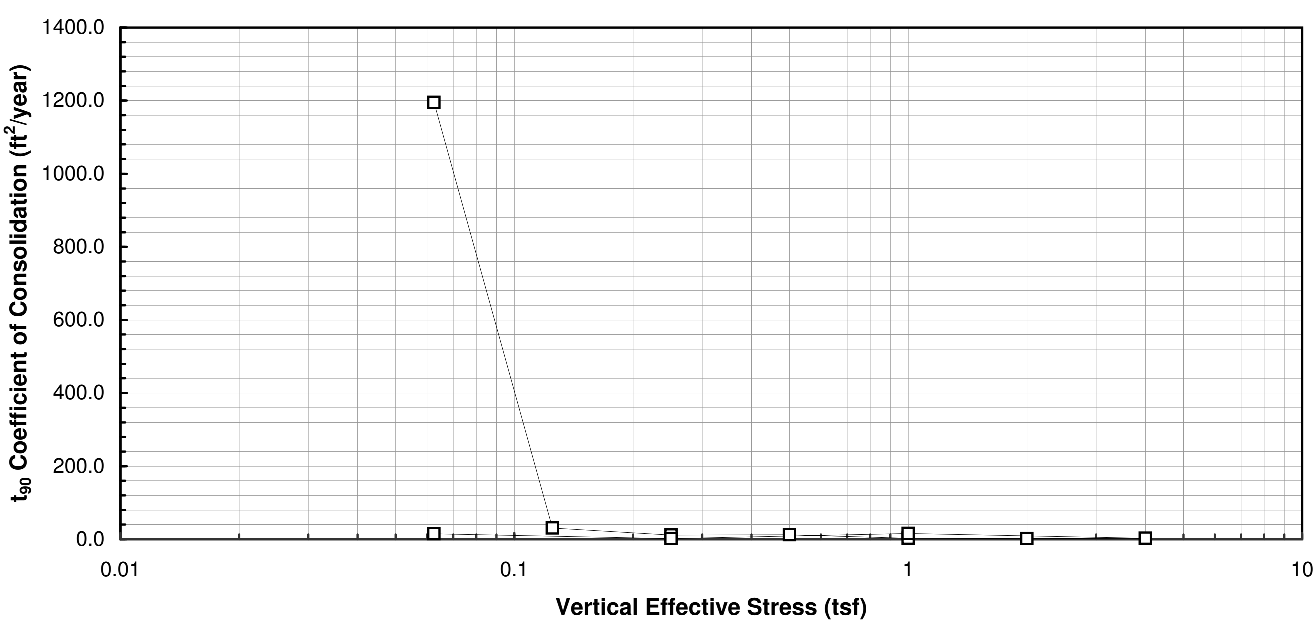
Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

Test No.:	GTX B-39A, 16'
Sample No.:	UD1
Exploration No.:	B-39A
Depth:	15 to 17 feet

LOAD INC.	STRESS DURATION (Hr - min)	VERTICAL STRESS (tsf)	VERTICAL STRAIN (EOI*)	VERTICAL STRAIN (EOP*)	VOID RATIO e (EOI*)	VOID RATIO e (EOP*)	STRESS RATIO (P'/P'c)	TAYLOR COEFFICIENT OF CONSOLIDATION (ft^2/year)
1	24-00	0.0625	0.6	0.6	3.22	3.22	0.13	1195.3
2	24-00	0.125	1.1	1.0	3.20	3.20	0.25	30.3
3	24-00	0.25	2.5	2.5	3.14	3.14	0.50	11.8
4	24-00	0.5	5.5	4.3	3.01	3.06	1.00	12.7
5	24-00	1	14.7	13.1	2.62	2.69	2.00	2.3
6	24-00	2	25.8	24.2	2.15	2.22	4.00	2.2
7	24-00	4	35.5	33.8	1.74	1.81	8.00	2.3
8	24-00	1	33.3	34.0	1.83	1.80	2.00	15.7
9	24-00	0.25	29.7	30.3	1.99	1.96	0.50	1.4
10	24-00	0.0625	26.7	26.9	2.11	2.10	0.13	15.2

*EOI = End of Increment

*EOP = End of Primary



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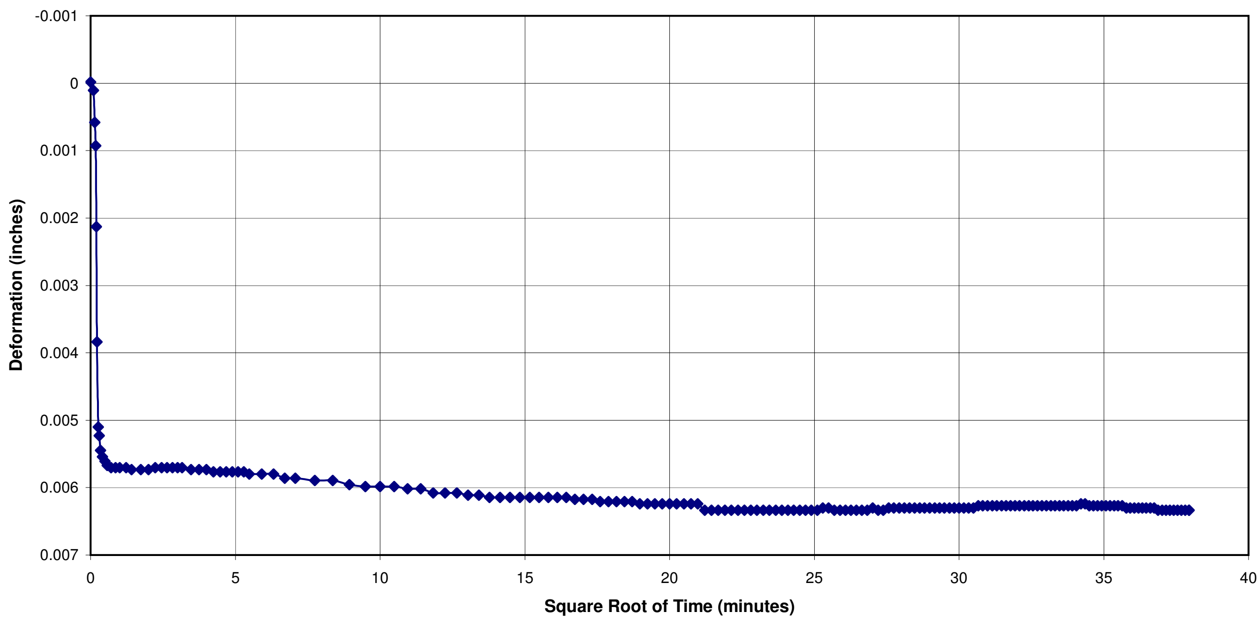
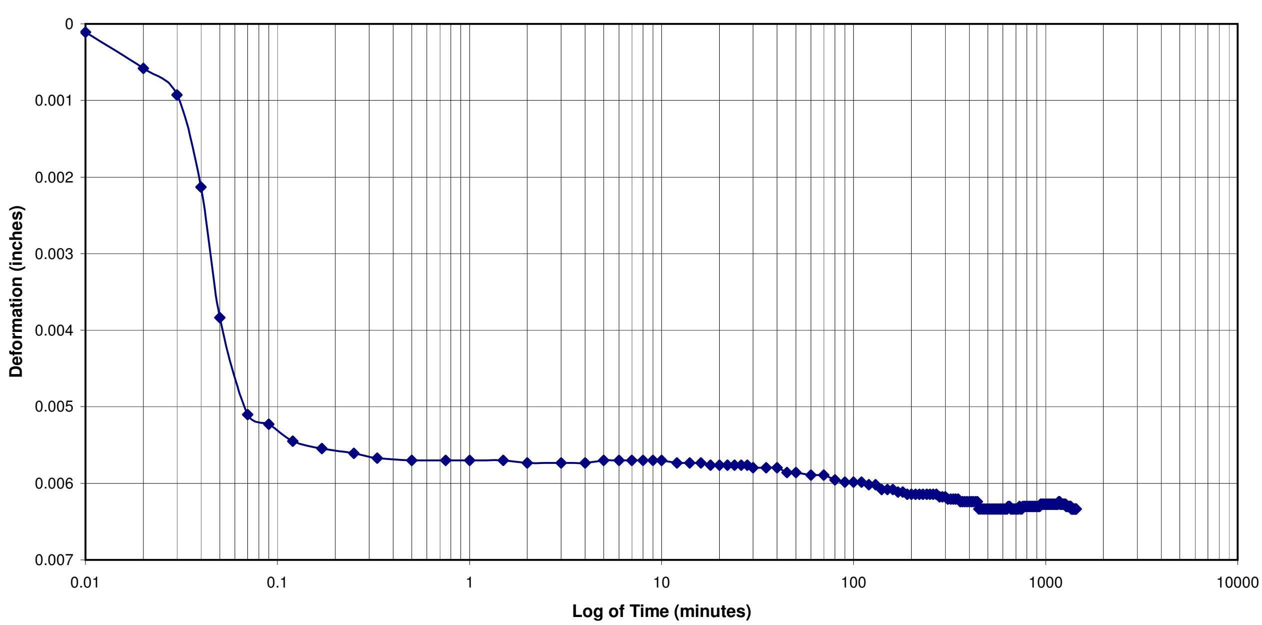
ONE-DIMENSIONAL CONSOLIDATION TEST

Project: Port Access Road
Client: SCDOT
Location: North Charleston, South Carolina
Project No. 1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-39A, 15 to 17 feet
LOAD = 0.0625 TSF



DEFORMATION VS. LOG OF TIME
B-39A, 15 to 17 feet
LOAD = 0.0625 TSF



Sample No.: GTX B-39A, 16'
Exploration No.: B-39A
Depth: 15 - 17 feet

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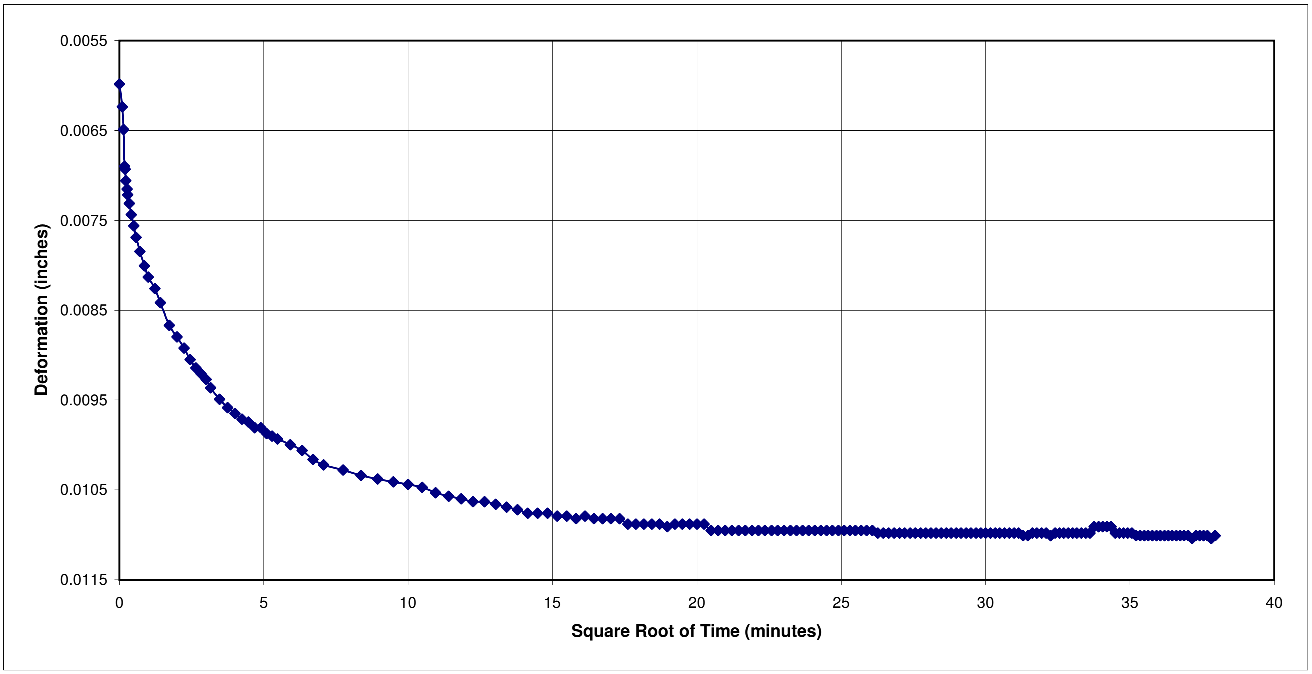
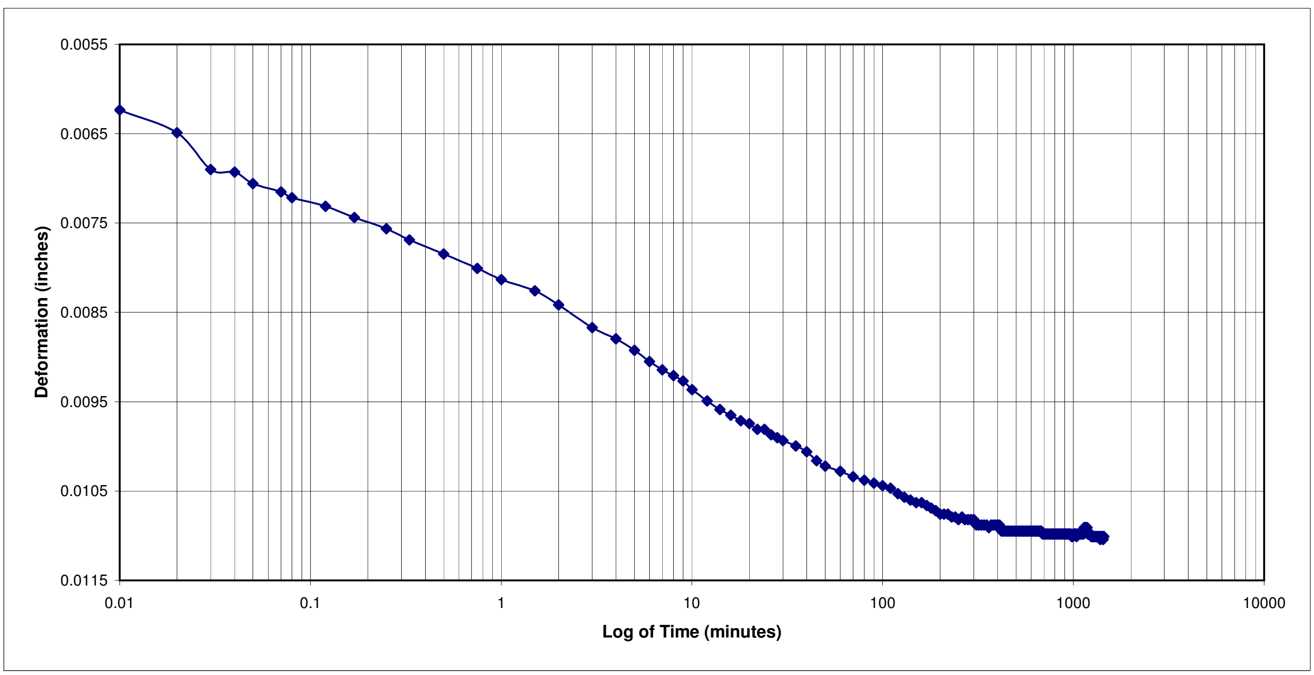
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-39A, 15 to 17 feet
LOAD = 0.125 TSF



DEFORMATION VS. LOG OF TIME
B-39A, 15 to 17 feet
LOAD = 0.125 TSF



Sample No.:	GTX B-39A, 16'
Exploration No.:	B-39A
Depth:	15 - 17 feet

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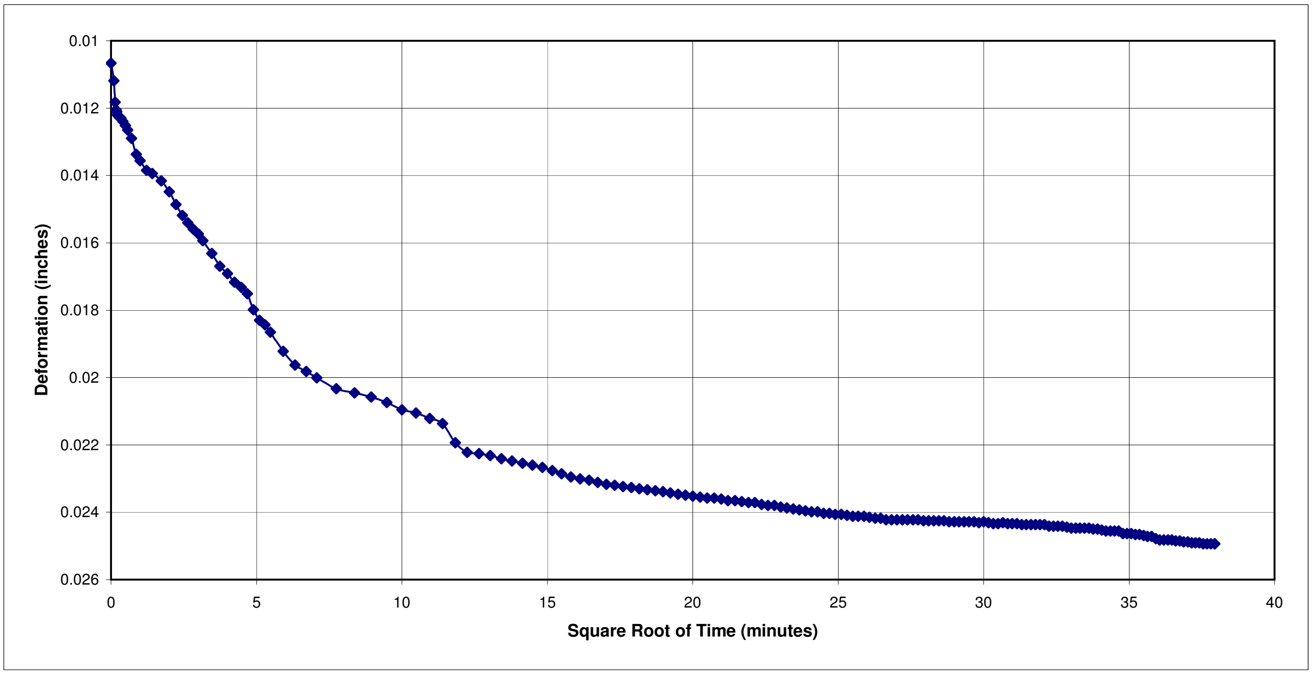
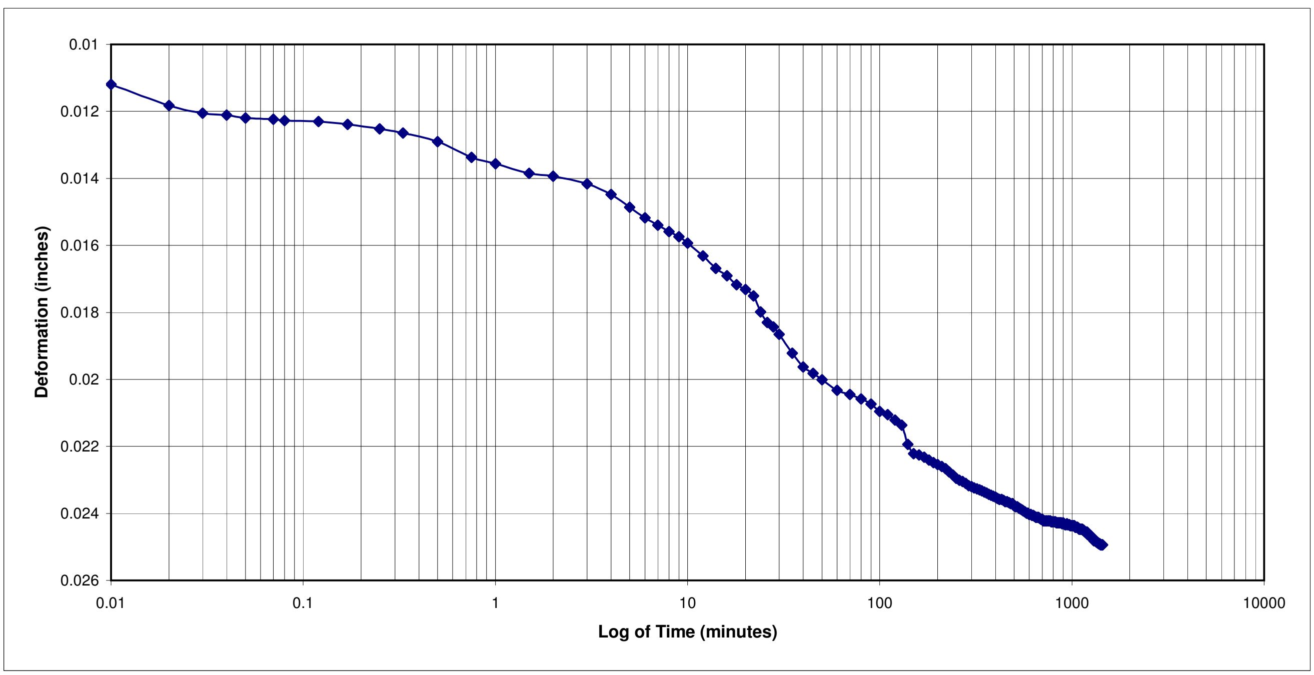
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-39A, 15 to 17 feet
LOAD = 0.25 TSF



DEFORMATION VS. LOG OF TIME
B-39A, 15 to 17 feet
LOAD = 0.25 TSF



Sample No.:	GTX B-39A, 16'
Exploration No.:	B-39A
Depth:	15 - 17 feet

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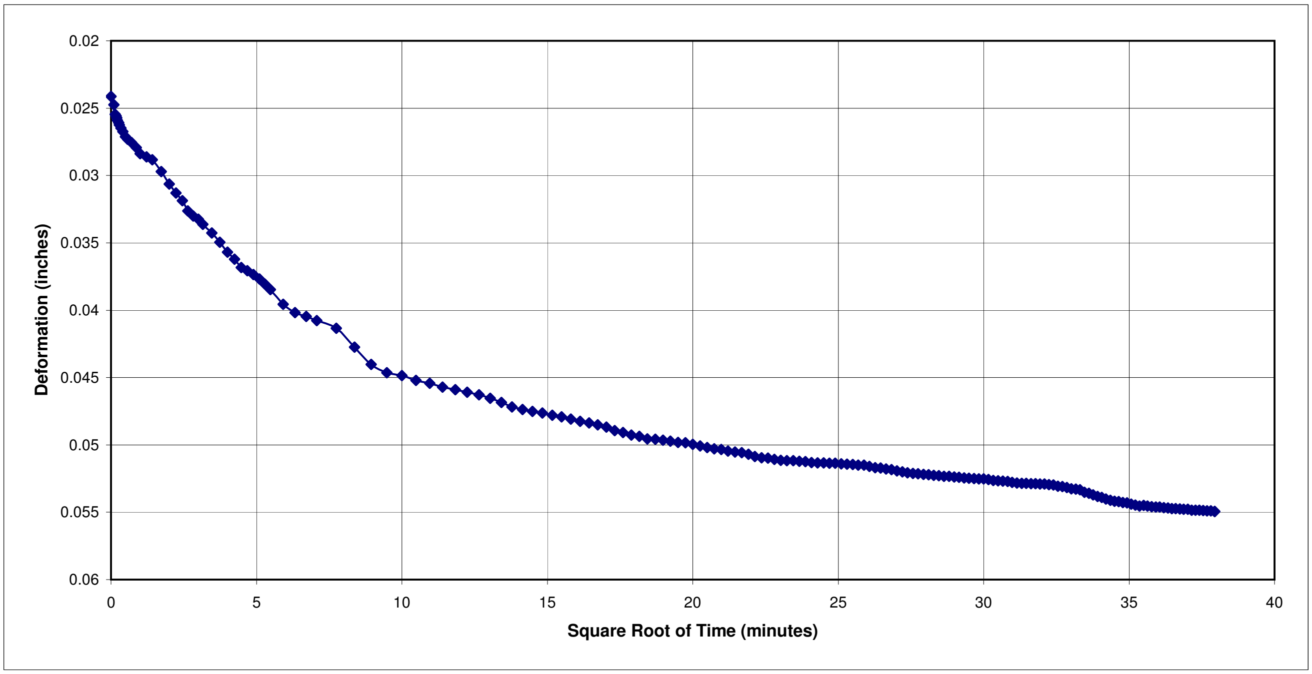
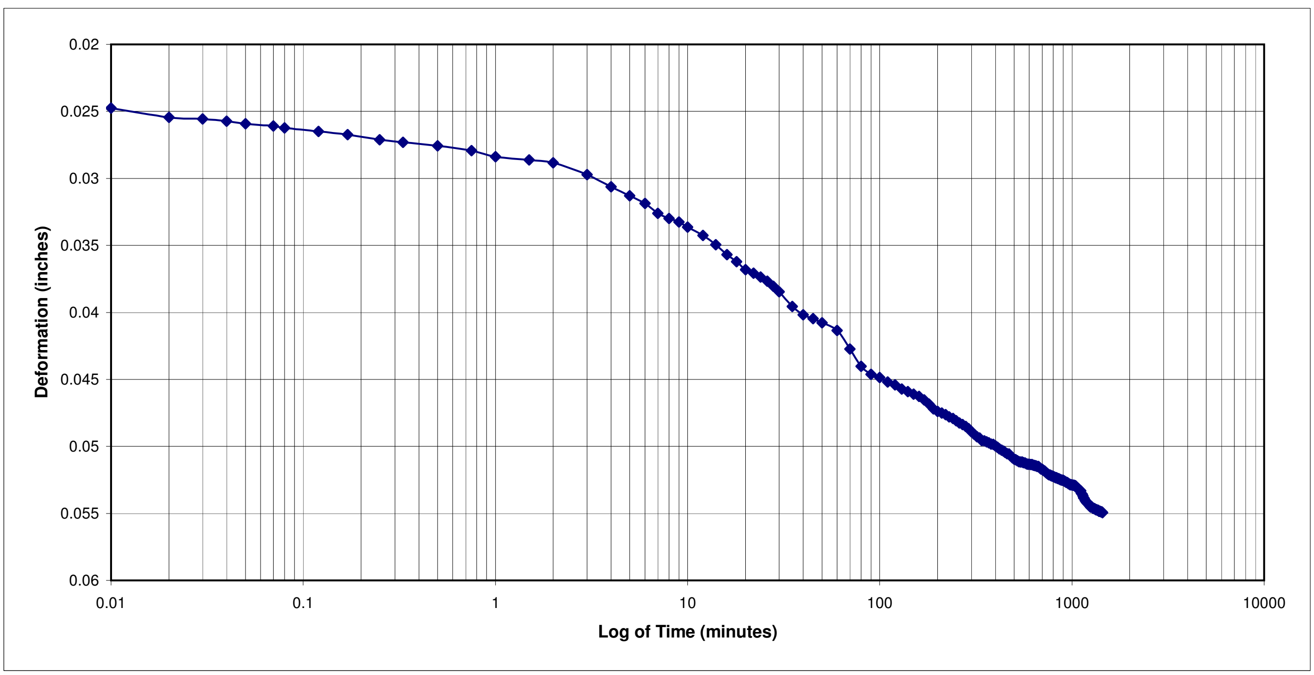
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-39A, 15 to 17 feet
LOAD = 0.5 TSF



DEFORMATION VS. LOG OF TIME
B-39A, 15 to 17 feet
LOAD = 0.5 TSF



Sample No.:	GTX B-39A, 16'
Exploration No.:	B-39A
Depth:	15 - 17 feet

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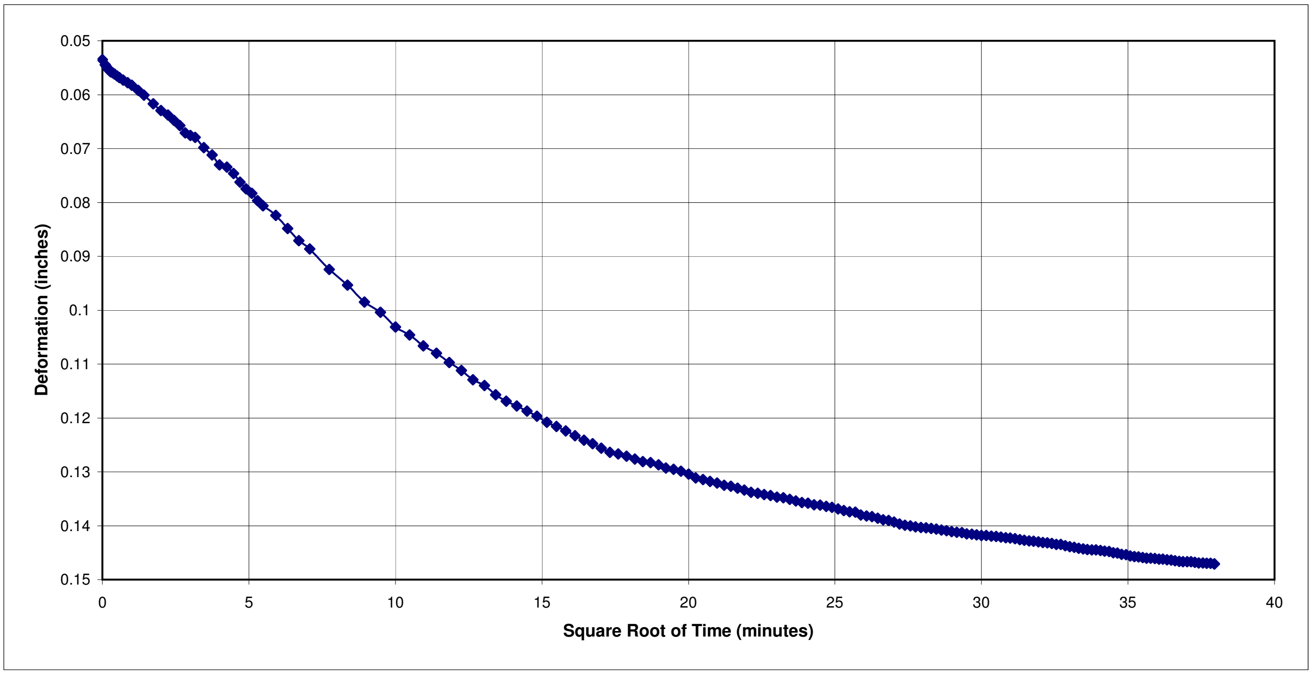
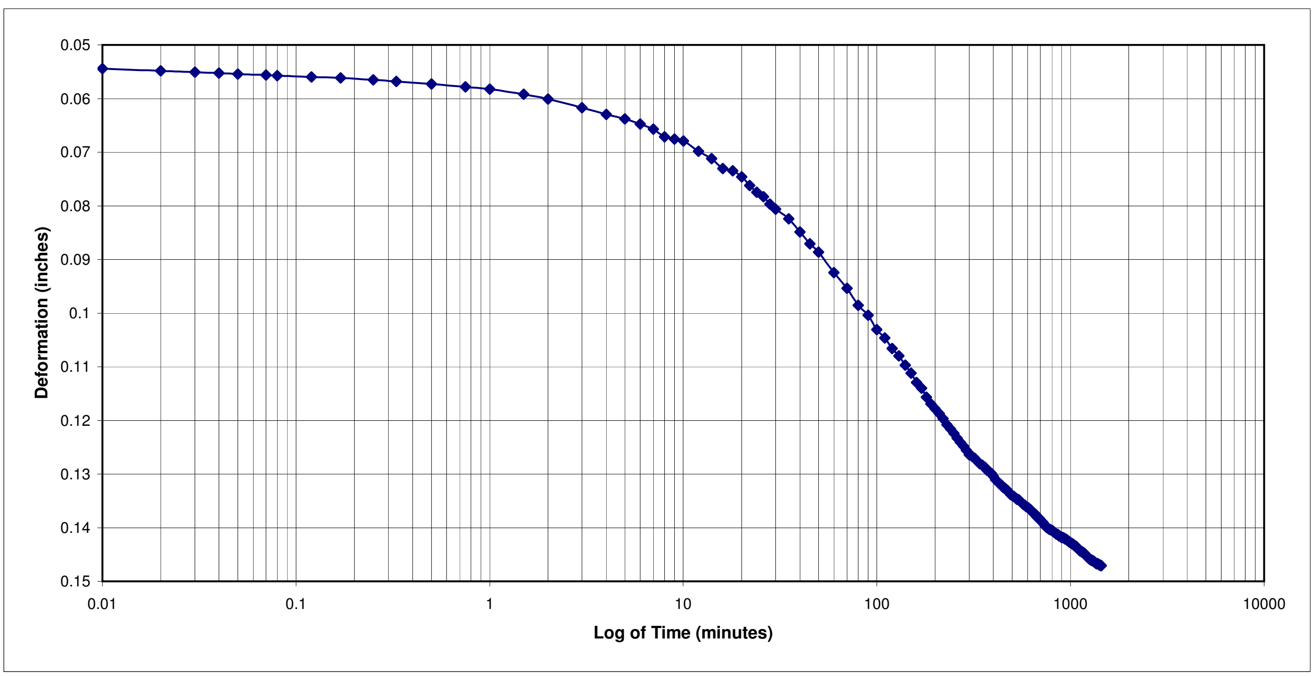
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-39A, 15 to 17 feet
LOAD = 1.0 TSF



DEFORMATION VS. LOG OF TIME
B-39A, 15 to 17 feet
LOAD = 1.0 TSF



Sample No.:	GTX B-39A, 16'
Exploration No.:	B-39A
Depth:	15 - 17 feet

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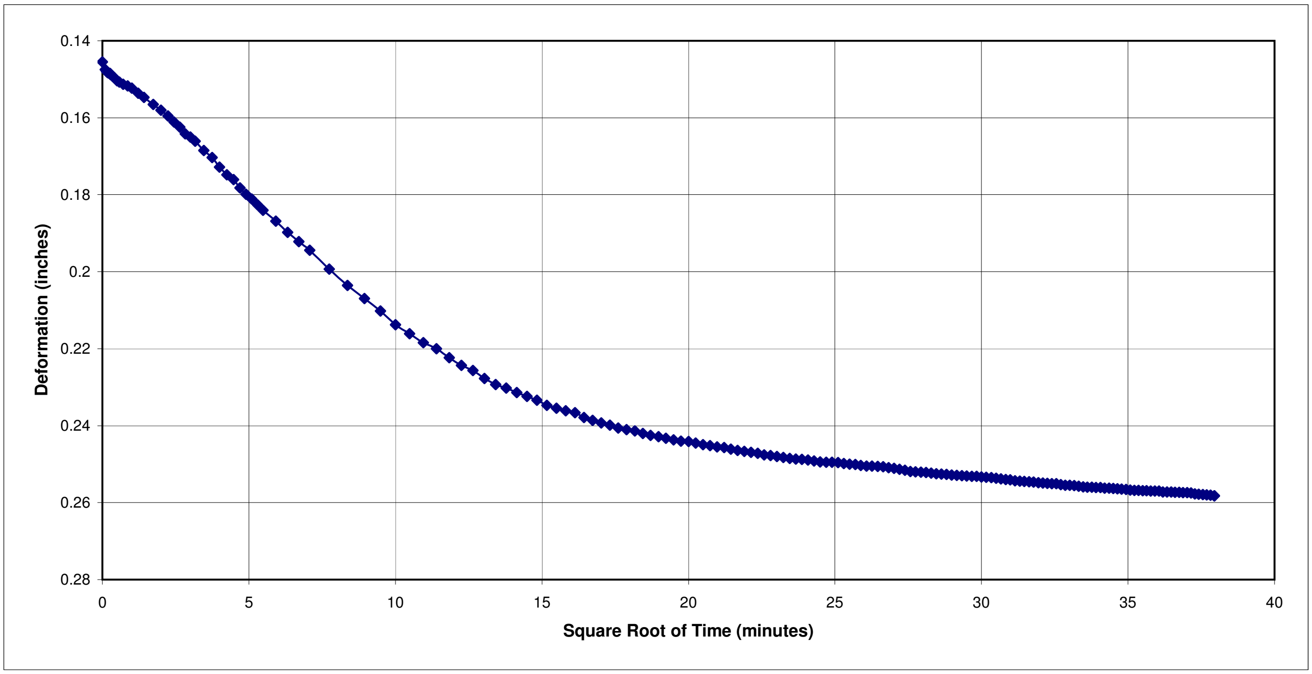
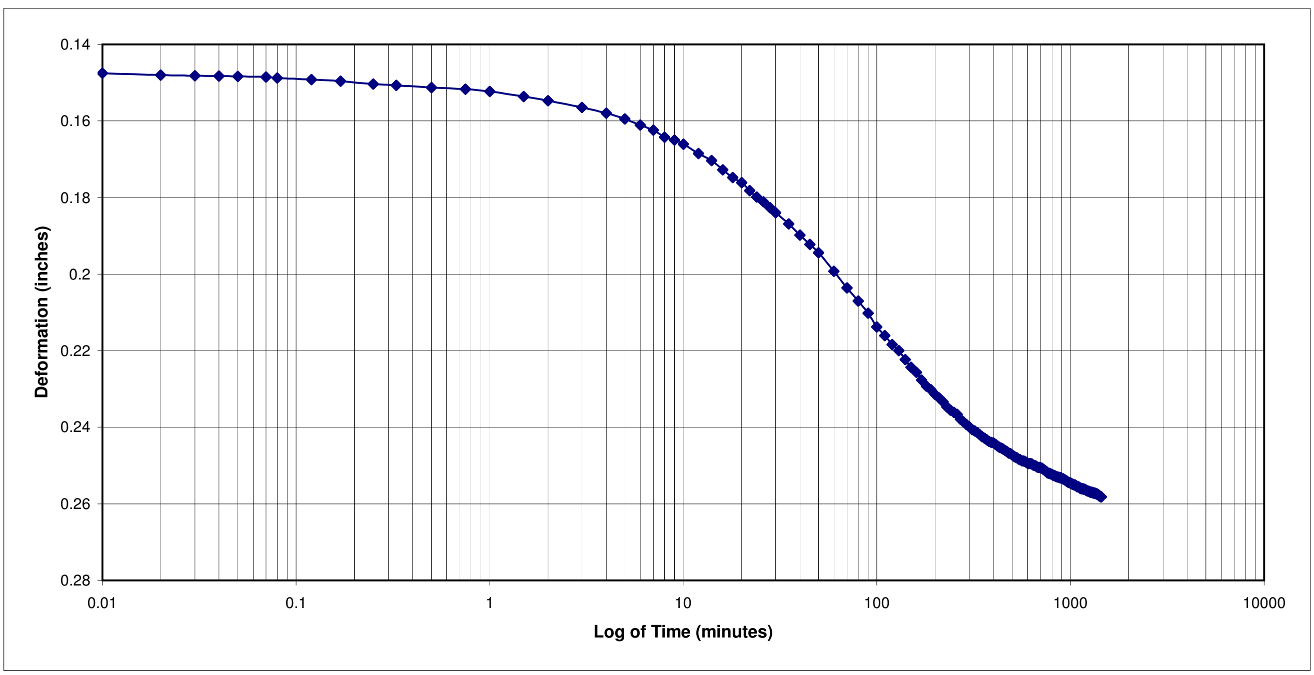
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-39A, 15 to 17 feet
LOAD = 2.0 TSF



DEFORMATION VS. LOG OF TIME
B-39A, 15 to 17 feet
LOAD = 2.0 TSF



Sample No.:	GTX B-39A, 16'
Exploration No.:	B-39A
Depth:	15 - 17 feet

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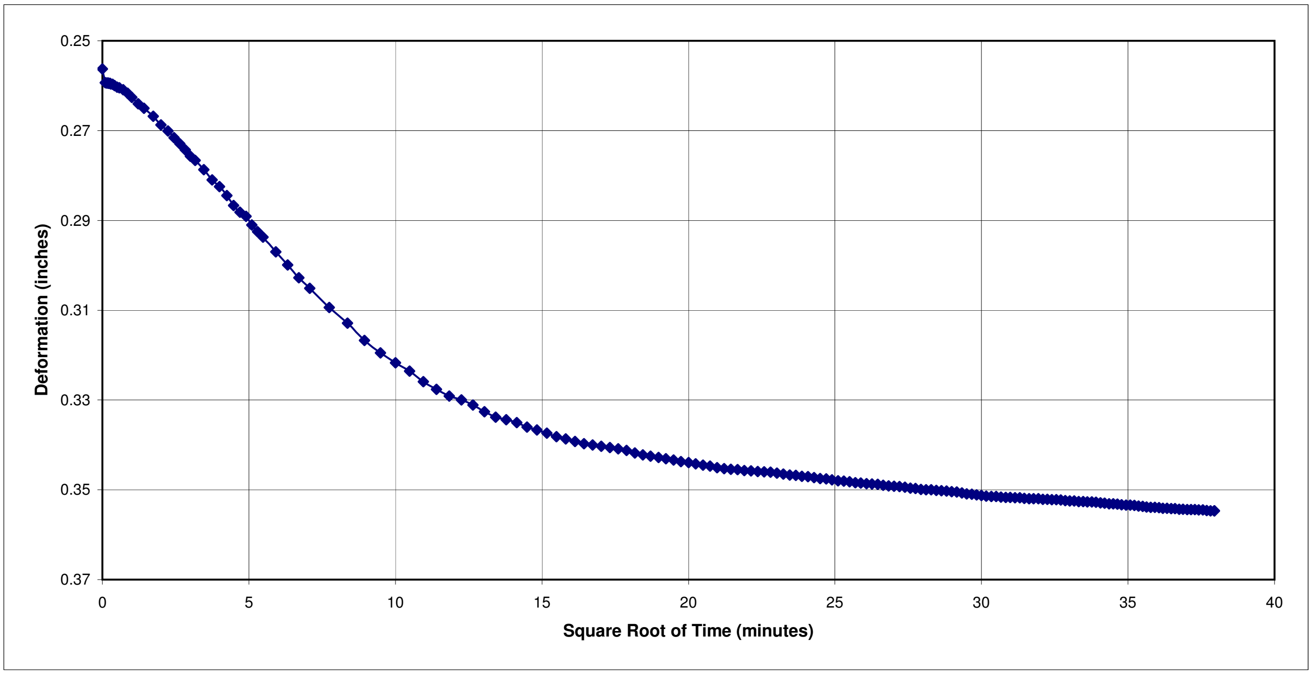
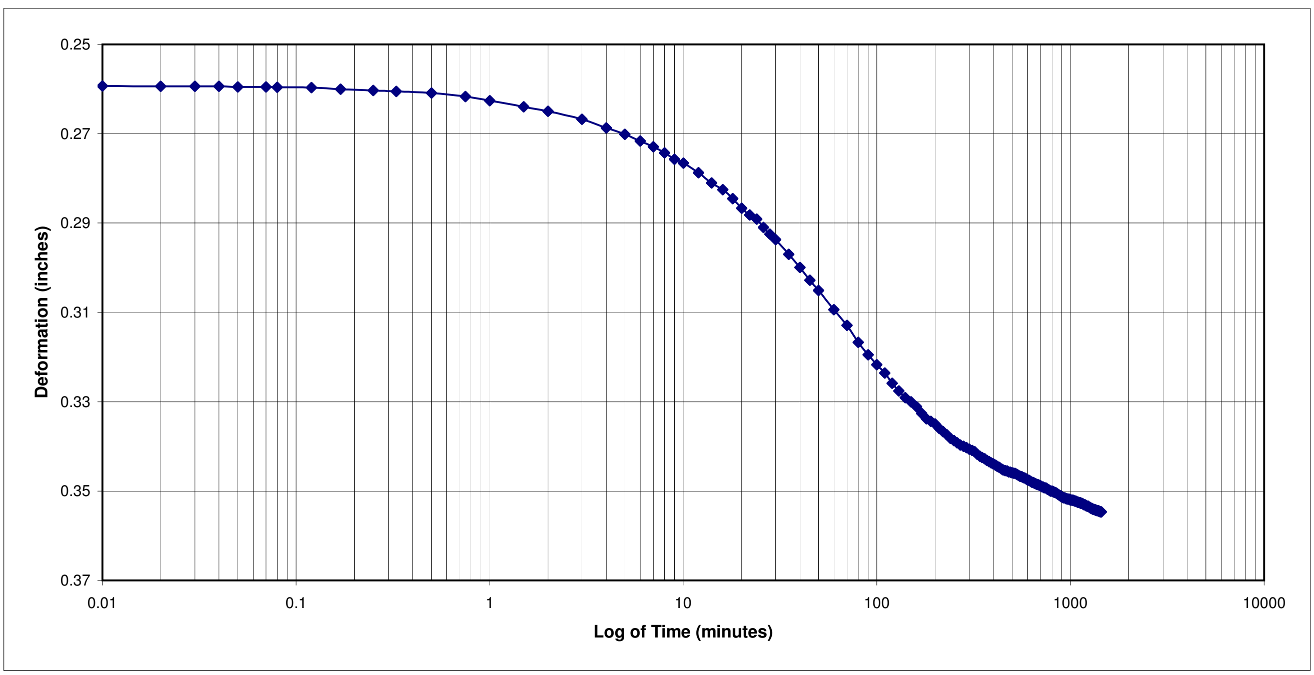
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-39A, 15 to 17 feet
LOAD = 4.0 TSF



DEFORMATION VS. LOG OF TIME
B-39A, 15 to 17 feet
LOAD = 4.0 TSF



Sample No.:	GTX B-39A, 16'
Exploration No.:	B-39A
Depth:	15 - 17 feet

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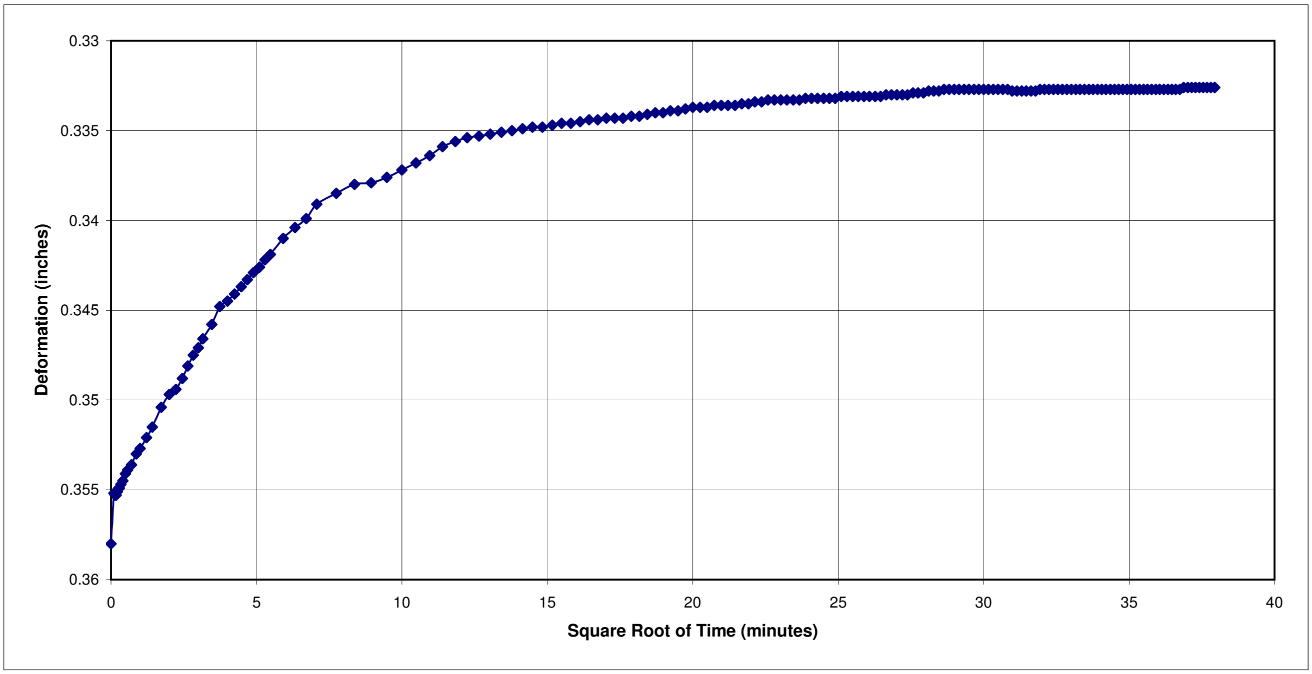
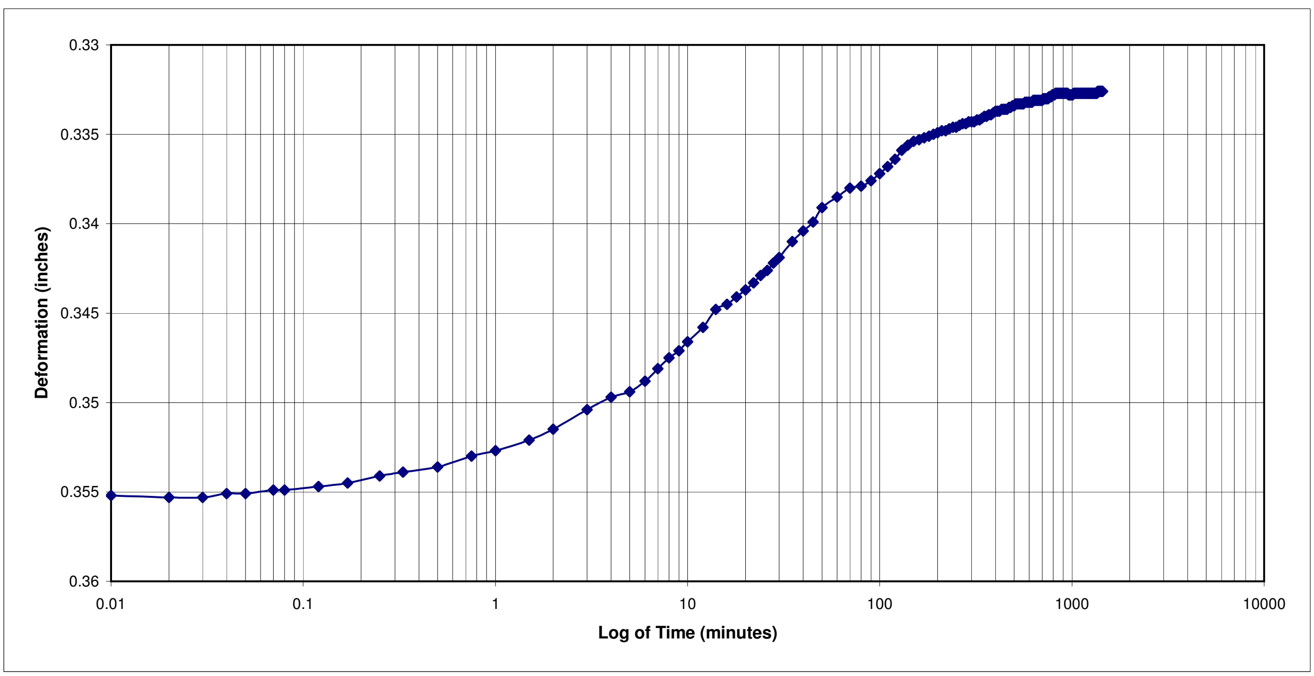
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-39A, 15 to 17 feet
LOAD = 1.0 TSF



DEFORMATION VS. LOG OF TIME
B-39A, 15 to 17 feet
LOAD = 1.0 TSF



Sample No.:	GTX B-39A, 16'
Exploration No.:	B-39A
Depth:	15 - 17 feet

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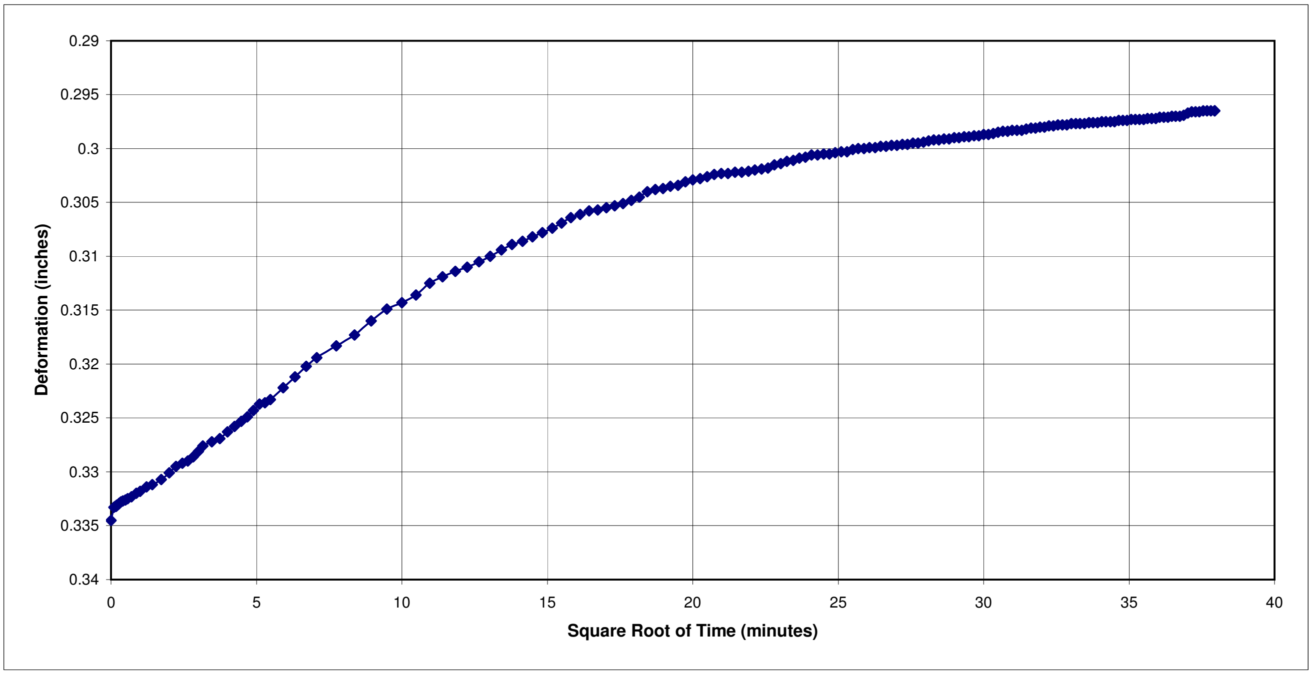
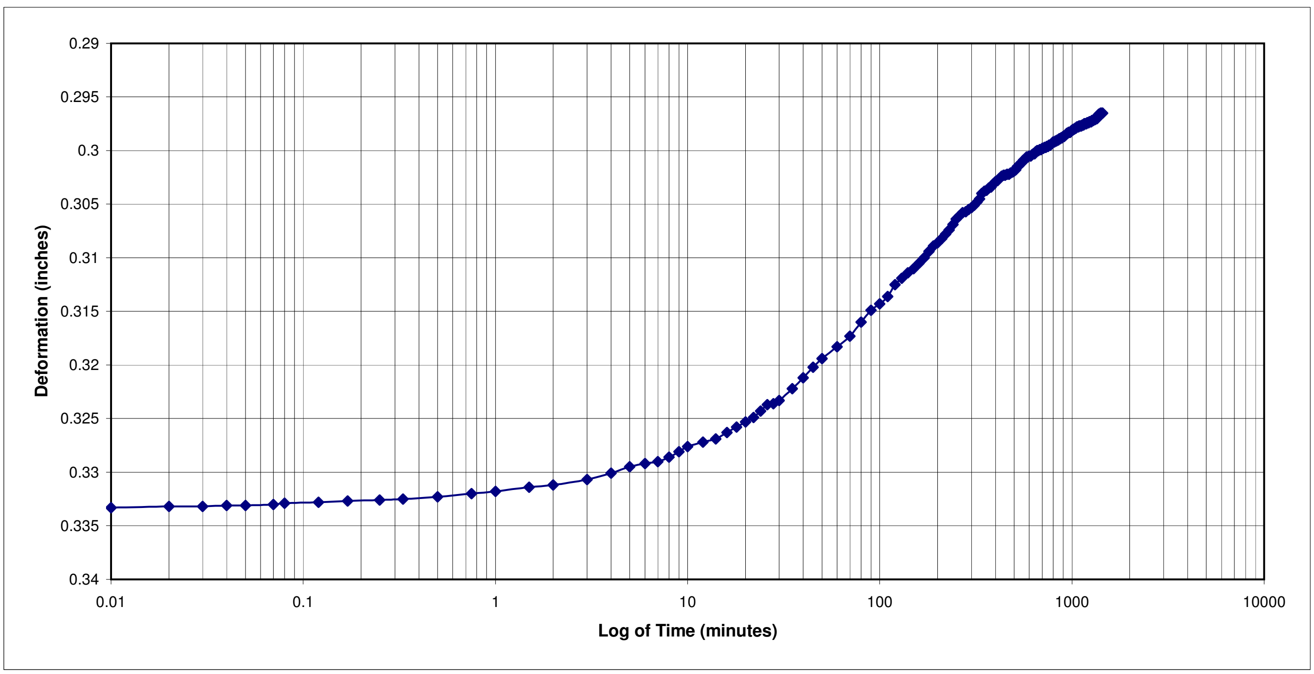
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-39A, 15 to 17 feet
LOAD = 0.25 TSF



DEFORMATION VS. LOG OF TIME
B-39A, 15 to 17 feet
LOAD = 0.25 TSF



Sample No.:	GTX B-39A, 16'
Exploration No.:	B-39A
Depth:	15 - 17 feet

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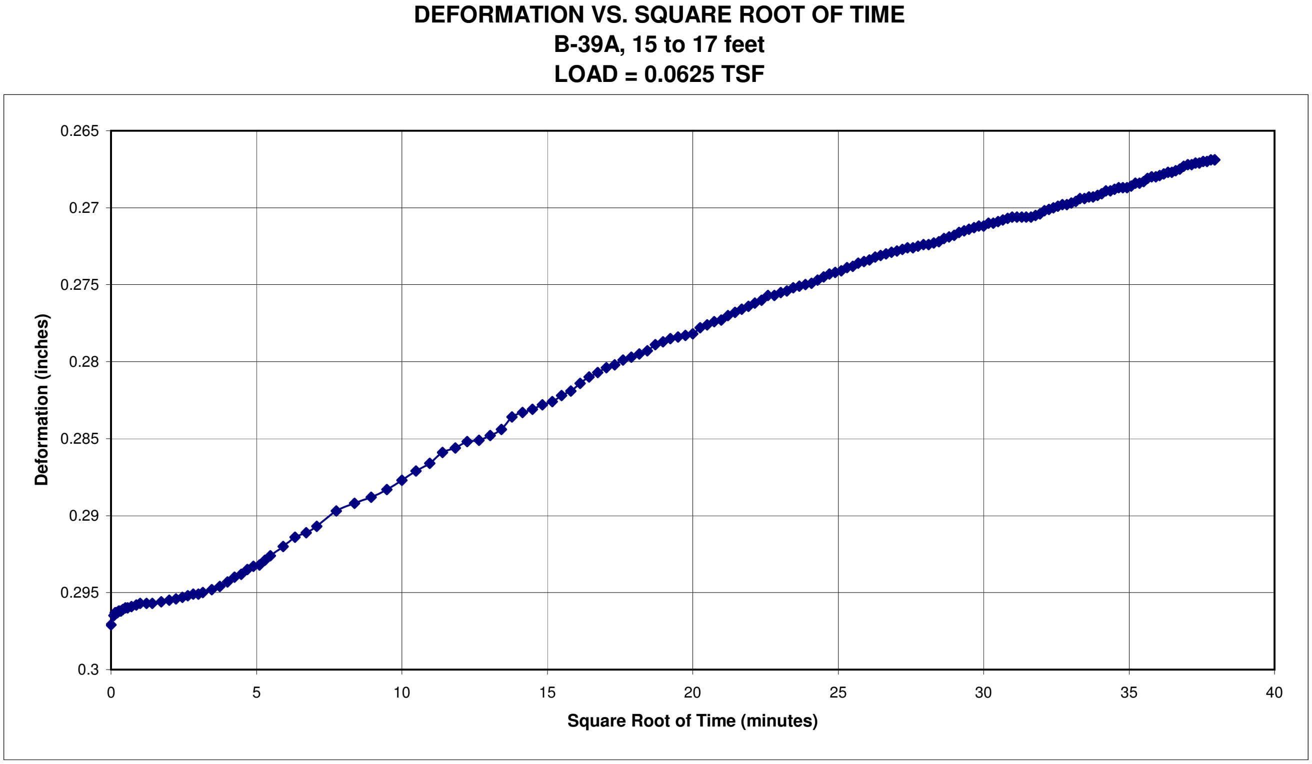
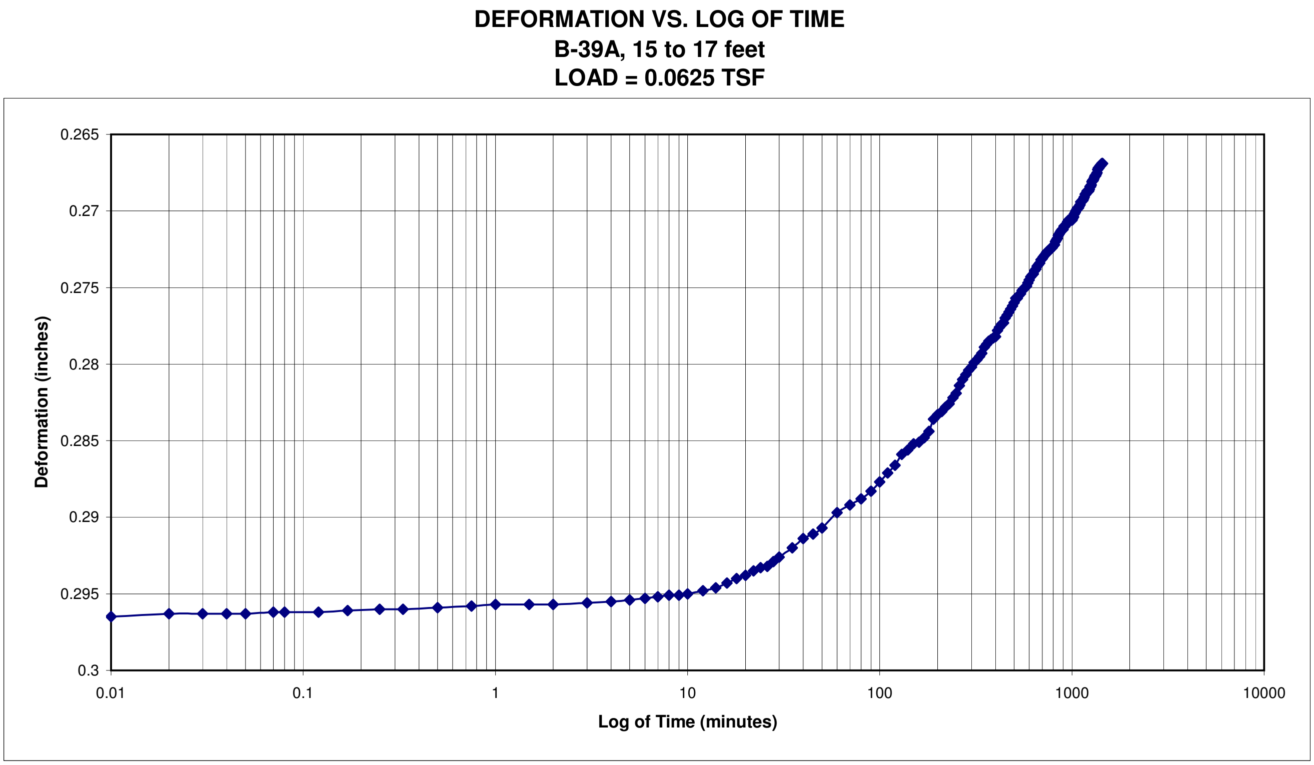
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554





Sample No.:	GTX B-39A, 16'
Exploration No.:	B-39A
Depth:	15 - 17 feet

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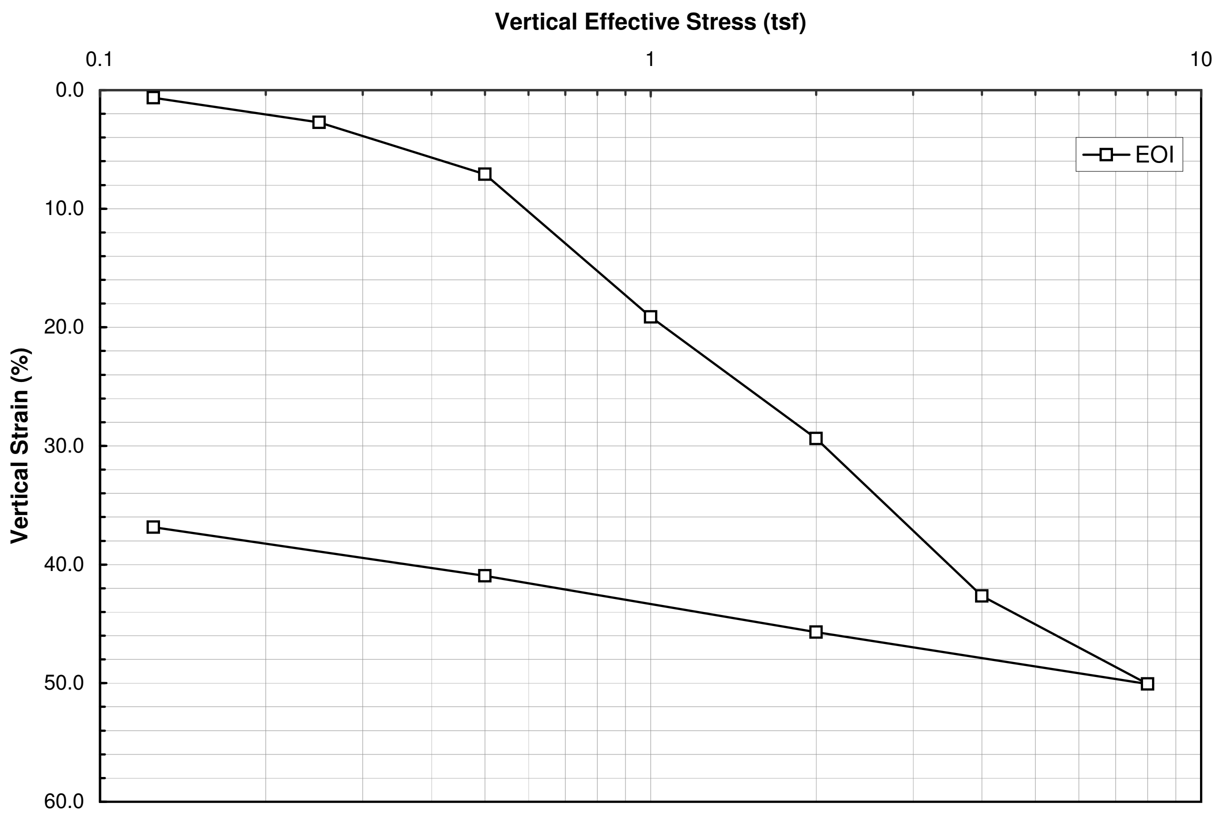
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554



CONSOLIDATION PARAMETERS

Probable Preconsolidation Stress, P'_c (tsf):	0.5
Approx. Hydrostatic Effective Stress, P'_o (tsf)	0.6
Vertical Strain at P'_o (%):	10.0
Compression Ratio (CR):	0.39
Recompression Ratio (RR):	0.074
Over Consolidation Ratio (OCR):	0.9

TEST METHOD

Test Method:	ASTM D-2435 A
Trimming Procedure:	2.5-inch Trimming Lathe
Pressure at Inundation:	0.125 tsf
Method to Compute C_v:	ASTM D-2435 12.3.2

SAMPLE ID

Test No.:	GTX B-39A, 29'
Sample No.:	UD2
Exploration No.:	B-39A
Depth:	28 to 30 feet
USCS Description:	Sandy elastic SILT (MH)

SAMPLE DATA

Sample Diameter (cm):	6.35
Sample Area (cm^2):	31.67
Measured Specific Gravity:	2.60
Trimmings Moisture (%):	148.3
% Passing #200 Sieve:	52.4
Liquid Limit:	149
Plastic Limit:	64
Plasticity Index:	85

	Initial	Final
Water Content (%):	148.3	81.9
Est. % Saturation:	100.0	100.0
Sample Height (cm):	2.540	1.604
Wet Sample Weight (g):	107.9	79.1
Dry Sample Weight (g):	43.5	43.5
Dry Unit Weight (pcf):	33.7	53.4
Void Ratio, e:	3.82	2.04
Solids Height (cm):	0.527	0.527

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ONE-DIMENSIONAL CONSOLIDATION TEST

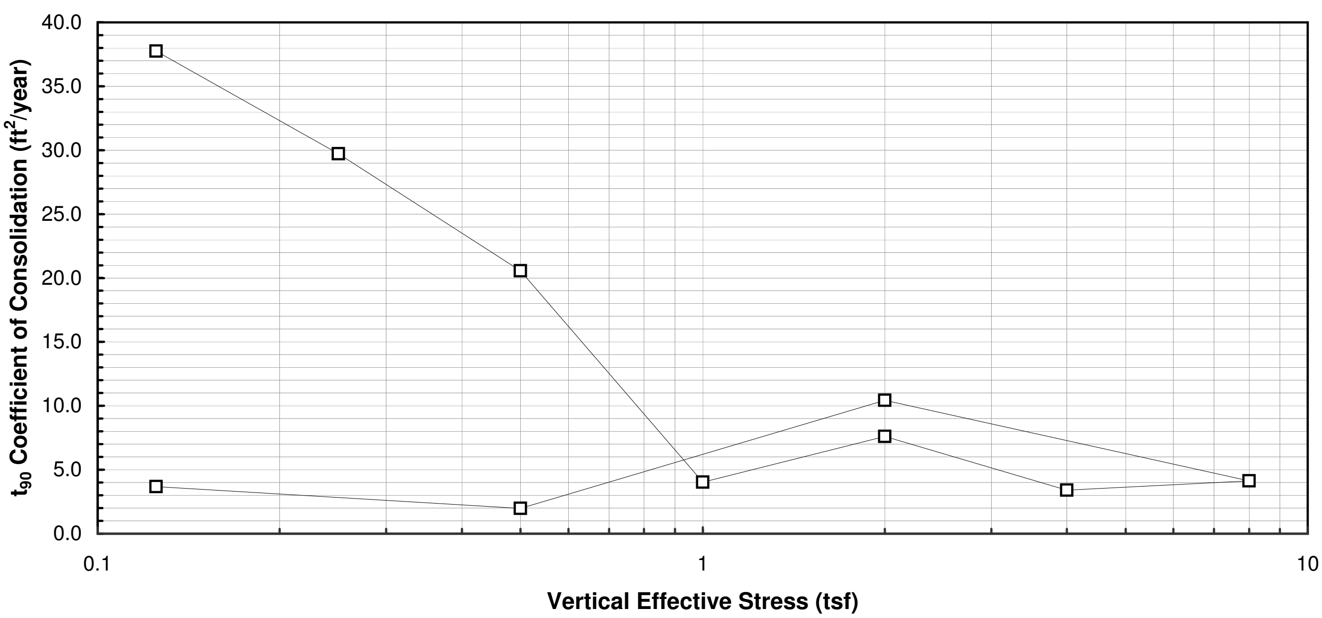
Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

Test No.:	GTX B-39A, 29'
Sample No.:	UD2
Exploration No.:	B-39A
Depth:	28 to 30 feet

LOAD INC.	STRESS DURATION (Hr - min)	VERTICAL STRESS (tsf)	VERTICAL STRAIN (EOI*)	VERTICAL STRAIN (EOP*)	VOID RATIO e (EOI*)	VOID RATIO e (EOP*)	STRESS RATIO (P'/P'c)	TAYLOR COEFFICIENT OF CONSOLIDATION (ft^2/year)
1	24-00	0.125	0.7	0.6	3.79	3.79	0.25	37.8
2	24-00	0.25	2.7	2.1	3.69	3.72	0.50	29.7
3	24-00	0.5	7.1	5.8	3.48	3.54	1.00	20.6
4	24-00	1	19.1	18.1	2.90	2.95	2.00	4.0
5	24-00	2	29.4	26.4	2.40	2.55	4.00	7.6
6	24-00	4	42.7	39.9	1.76	1.90	8.00	3.4
7	24-00	8	50.1	47.1	1.41	1.55	16.00	4.1
8	24-00	2	45.7	46.4	1.62	1.58	4.00	10.4
9	24-00	0.5	41.0	41.6	1.85	1.82	1.00	2.0
10	24-00	0.125	36.9	38.3	2.04	1.97	0.25	3.7

*EOI = End of Increment

*EOP = End of Primary



ONE-DIMENSIONAL CONSOLIDATION TEST

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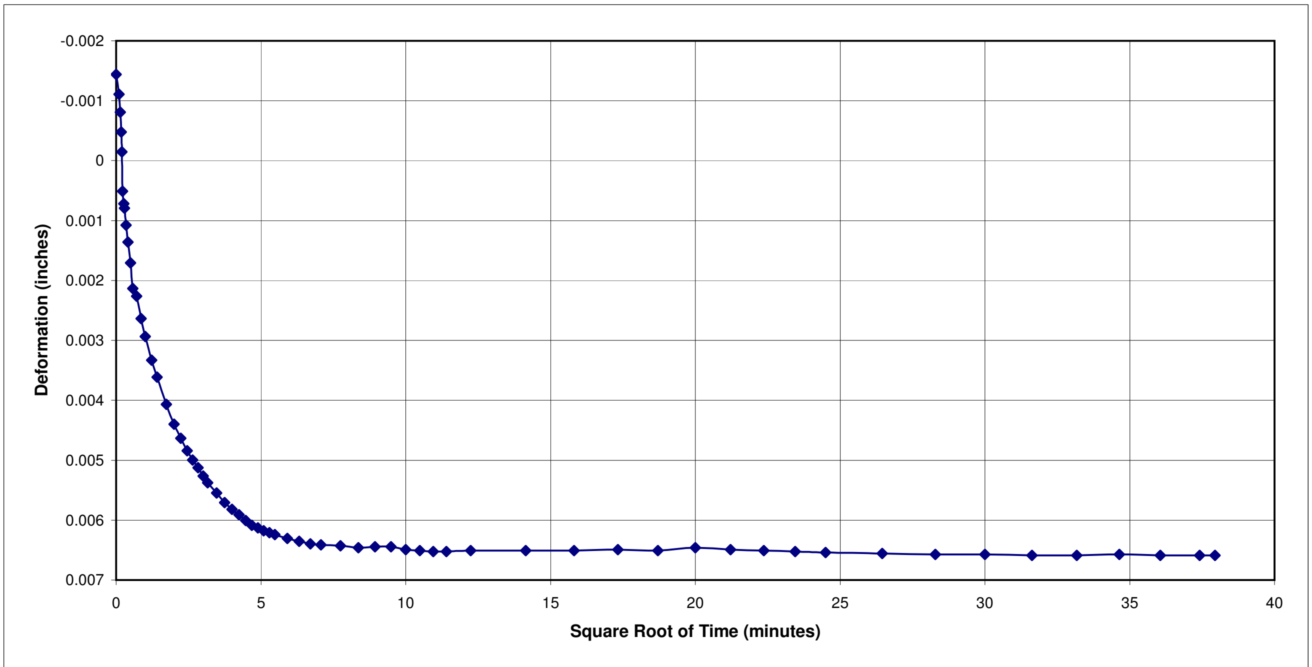
Project: Port Access Road

Client: SCDOT

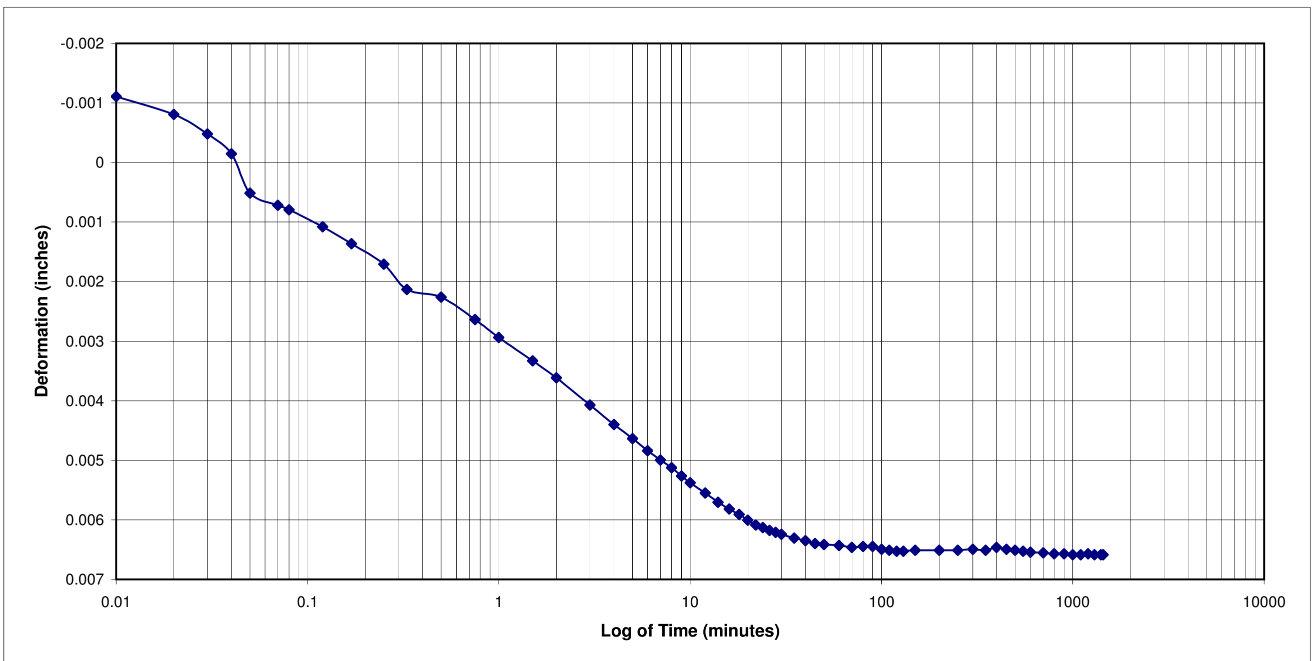
Location: North Charleston, South Carolina

Project No. 1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-39A, 28 to 30 feet
LOAD = 0.125 TSF



DEFORMATION VS. LOG OF TIME
B-39A, 28 to 30 feet
LOAD = 0.125 TSF



Sample No.:	GTX B-39A, 29'
Exploration No.:	B-39A
Depth:	28 - 30 feet

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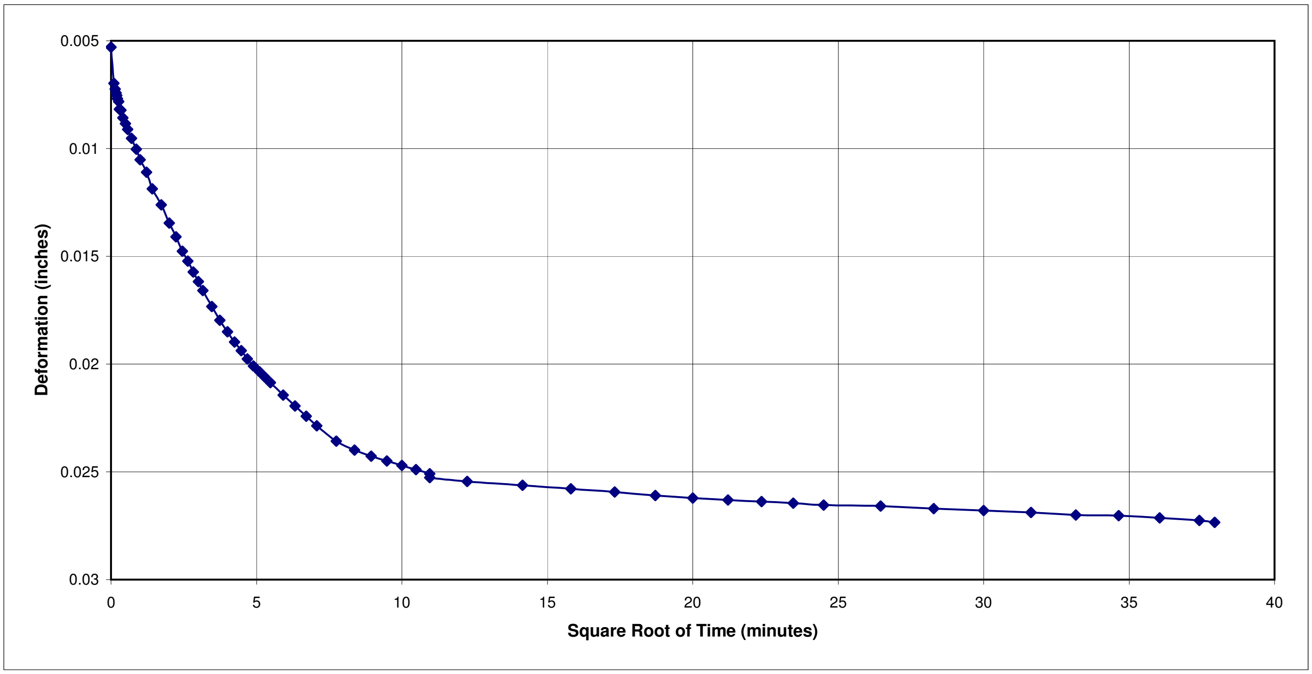
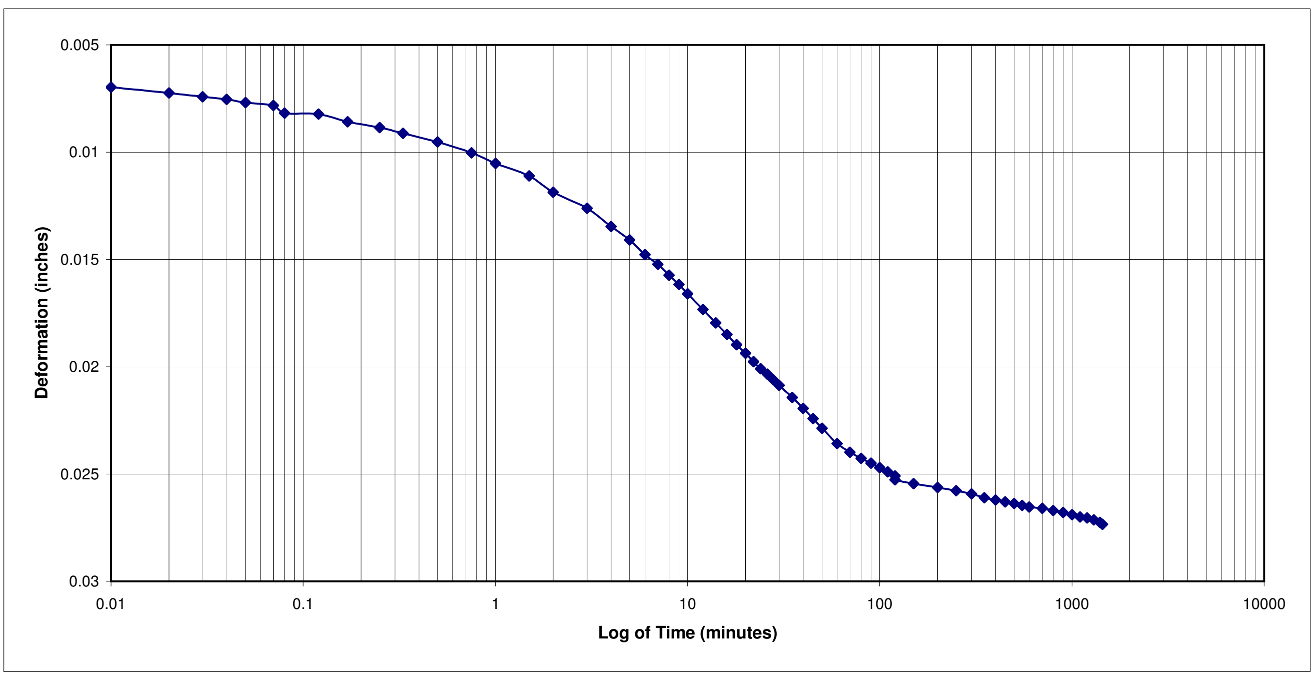
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-39A, 28 to 30 feet
LOAD = 0.25 TSF



DEFORMATION VS. LOG OF TIME
B-39A, 28 to 30 feet
LOAD = 0.25 TSF



Sample No.:	GTX B-39A, 29'
Exploration No.:	B-39A
Depth:	28 - 30 feet

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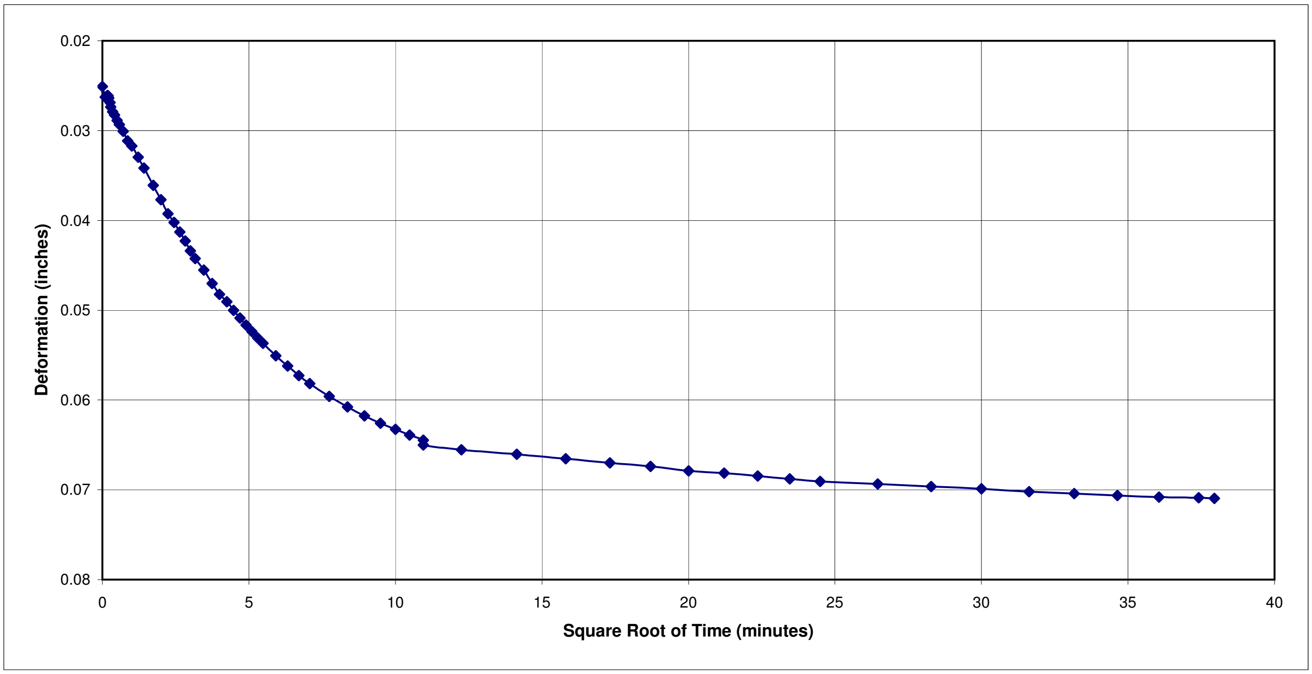
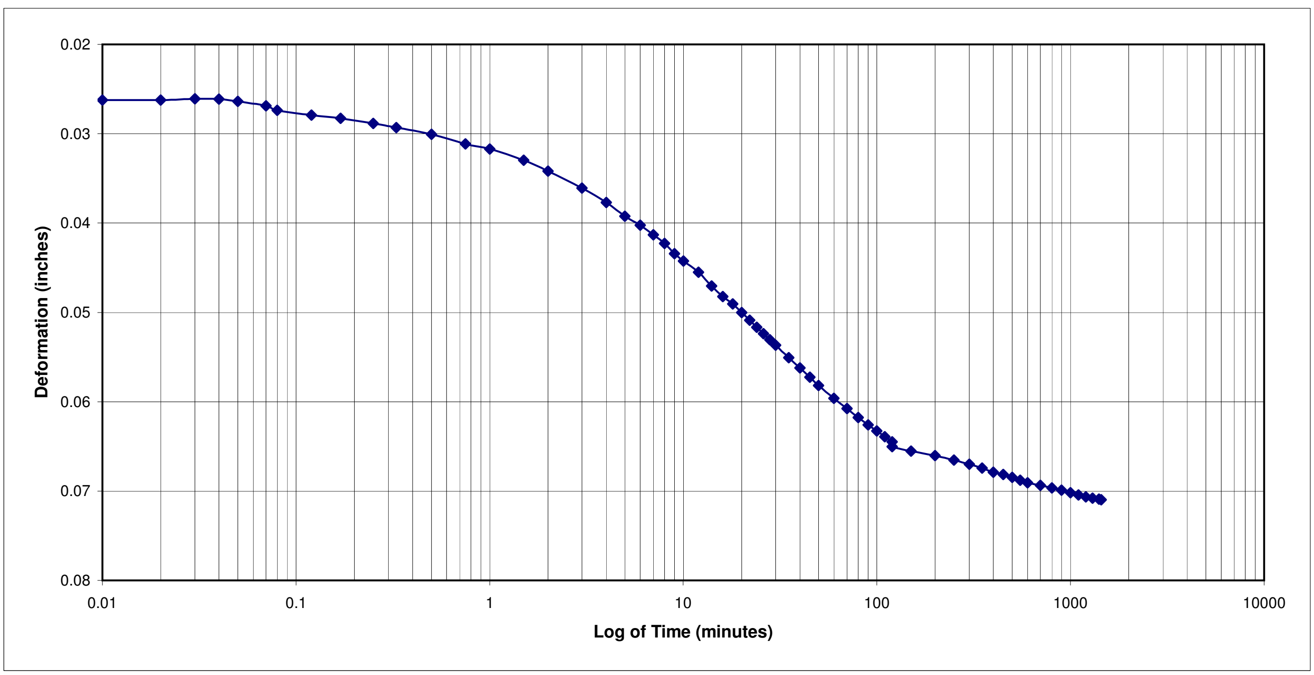
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-39A, 28 to 30 feet
LOAD = 0.5 TSF



DEFORMATION VS. LOG OF TIME
B-39A, 28 to 30 feet
LOAD = 0.5 TSF



Sample No.:	GTX B-39A, 29'
Exploration No.:	B-39A
Depth:	28 - 30 feet

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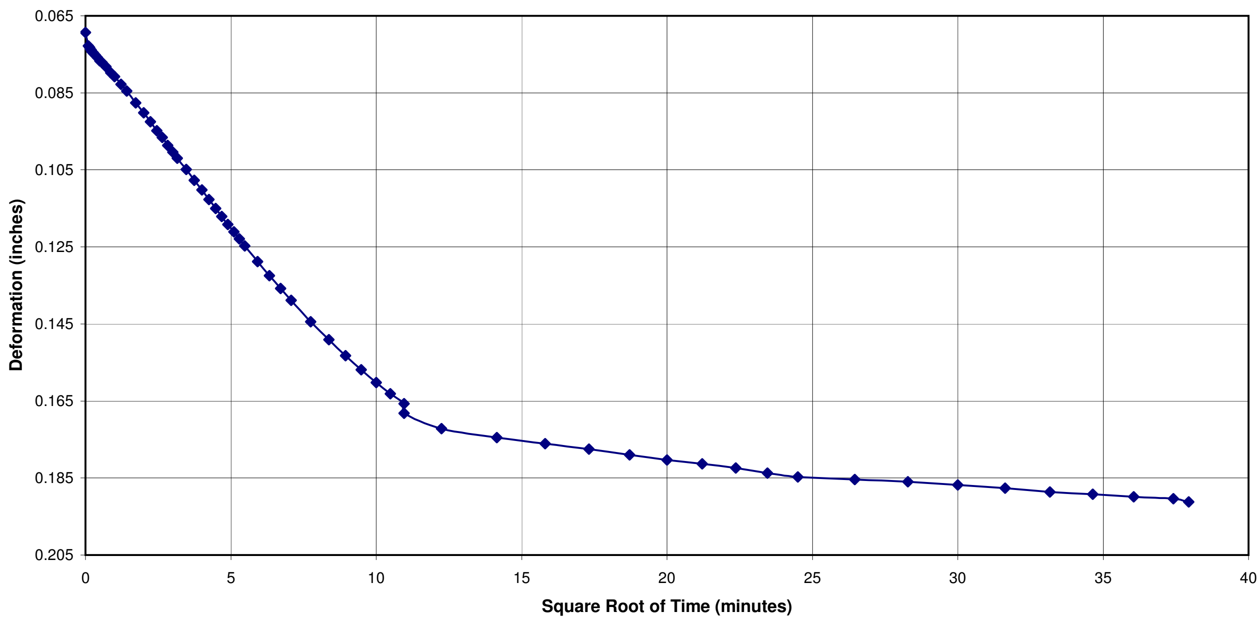
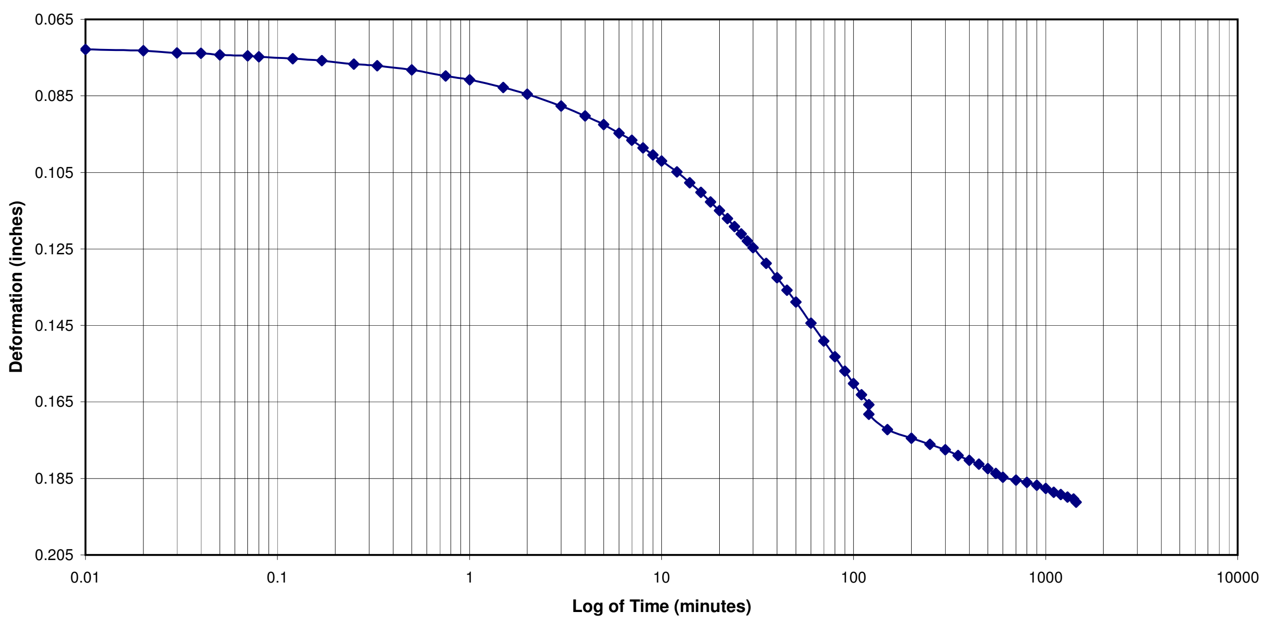
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-39A, 28 to 30 feet
LOAD = 1.0 TSF



DEFORMATION VS. LOG OF TIME
B-39A, 28 to 30 feet
LOAD = 1.0 TSF



Sample No.:	GTX B-39A, 29'
Exploration No.:	B-39A
Depth:	28 - 30 feet

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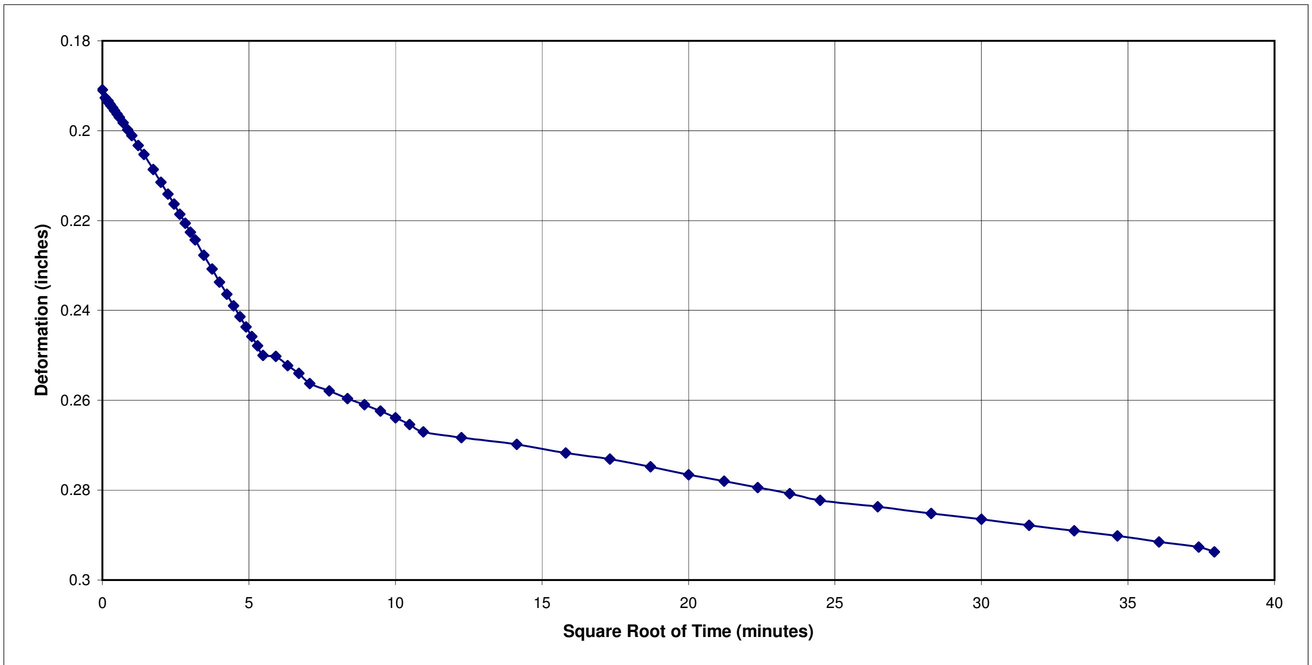
Tel: 804.266.2199
Fax: 804.261.5569

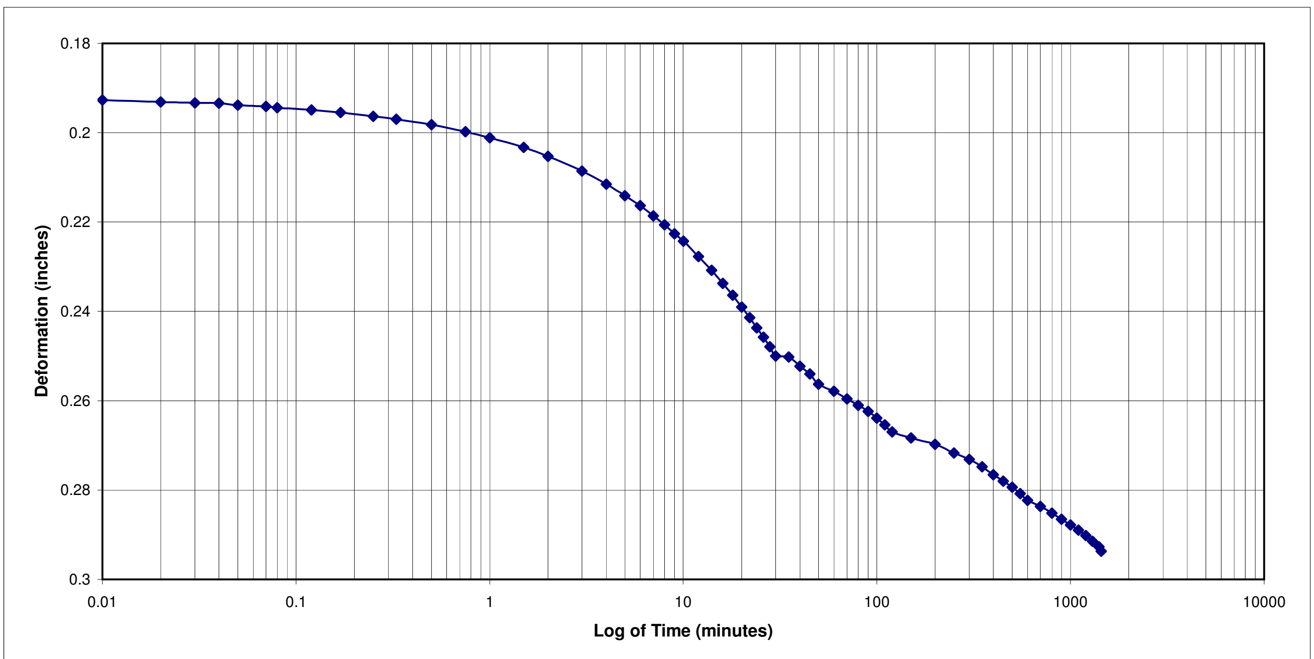
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-39A, 28 to 30 feet
LOAD = 2.0 TSF



DEFORMATION VS. LOG OF TIME
B-39A, 28 to 30 feet
LOAD = 2.0 TSF



Sample No.:	GTX B-39A, 29'
Exploration No.:	B-39A
Depth:	28 - 30 feet

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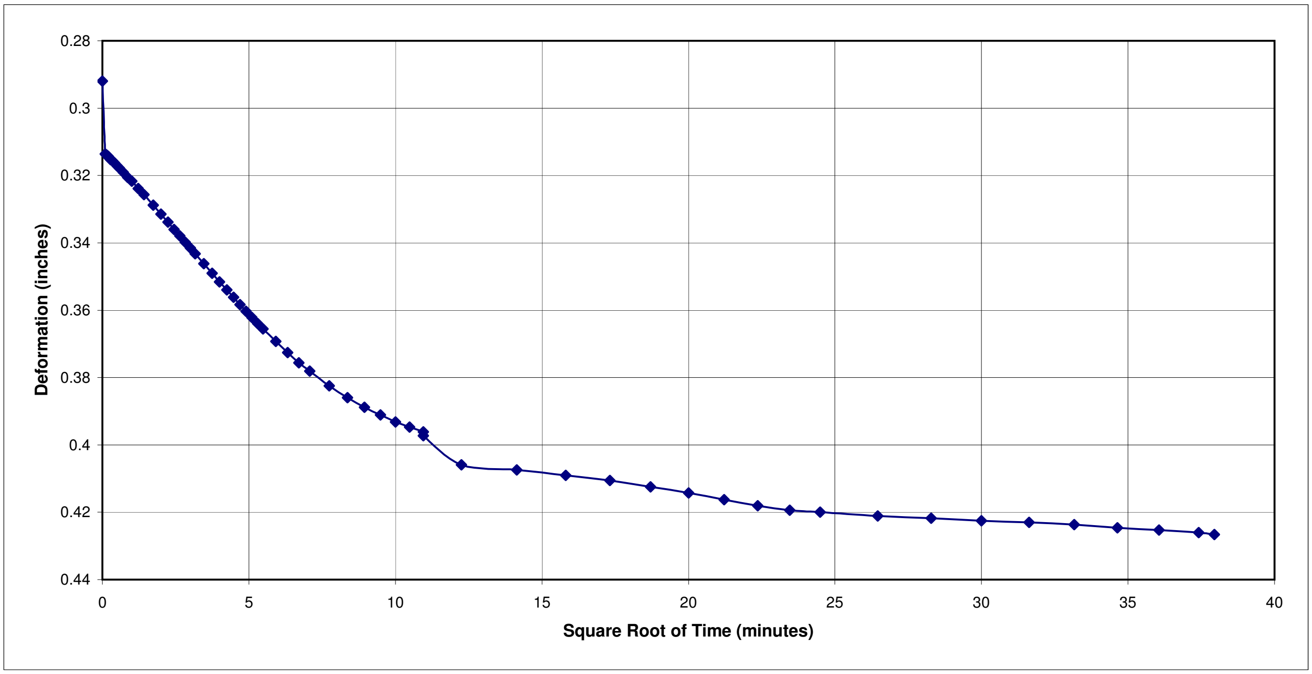
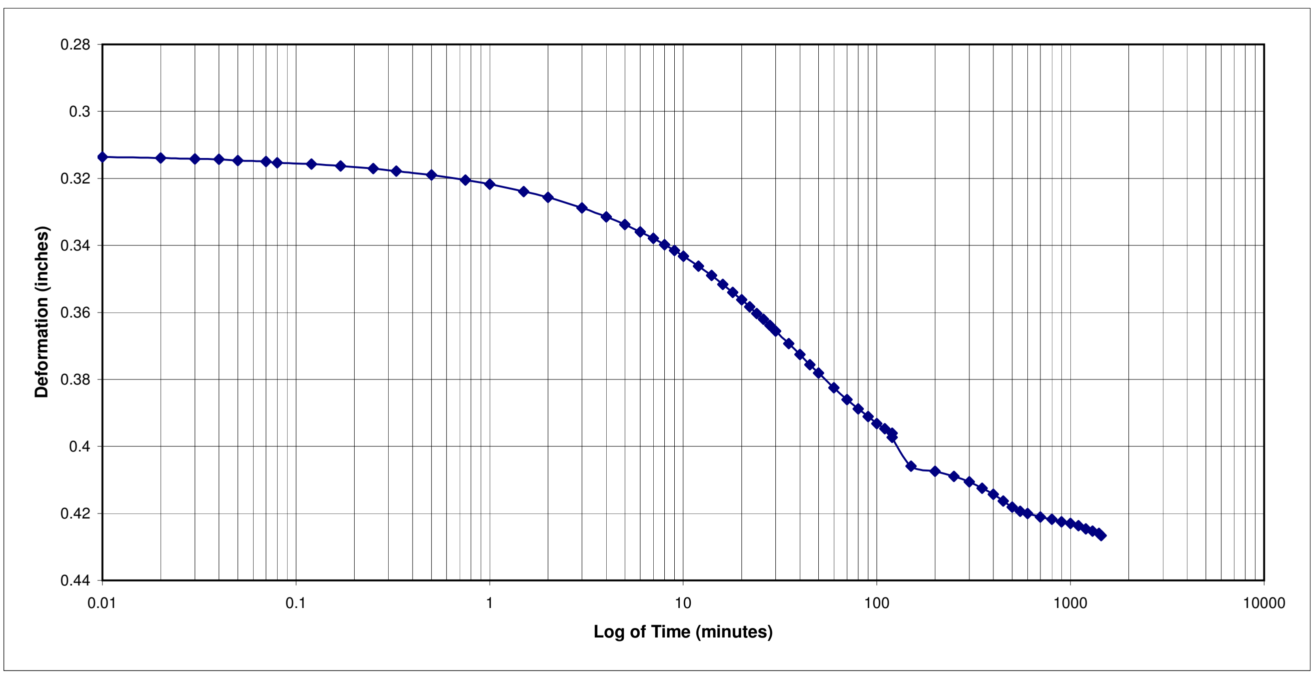
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-39A, 28 to 30 feet
LOAD = 4.0 TSF



DEFORMATION VS. LOG OF TIME
B-39A, 28 to 30 feet
LOAD = 4.0 TSF



Sample No.:	GTX B-39A, 29'
Exploration No.:	B-39A
Depth:	28 - 30 feet

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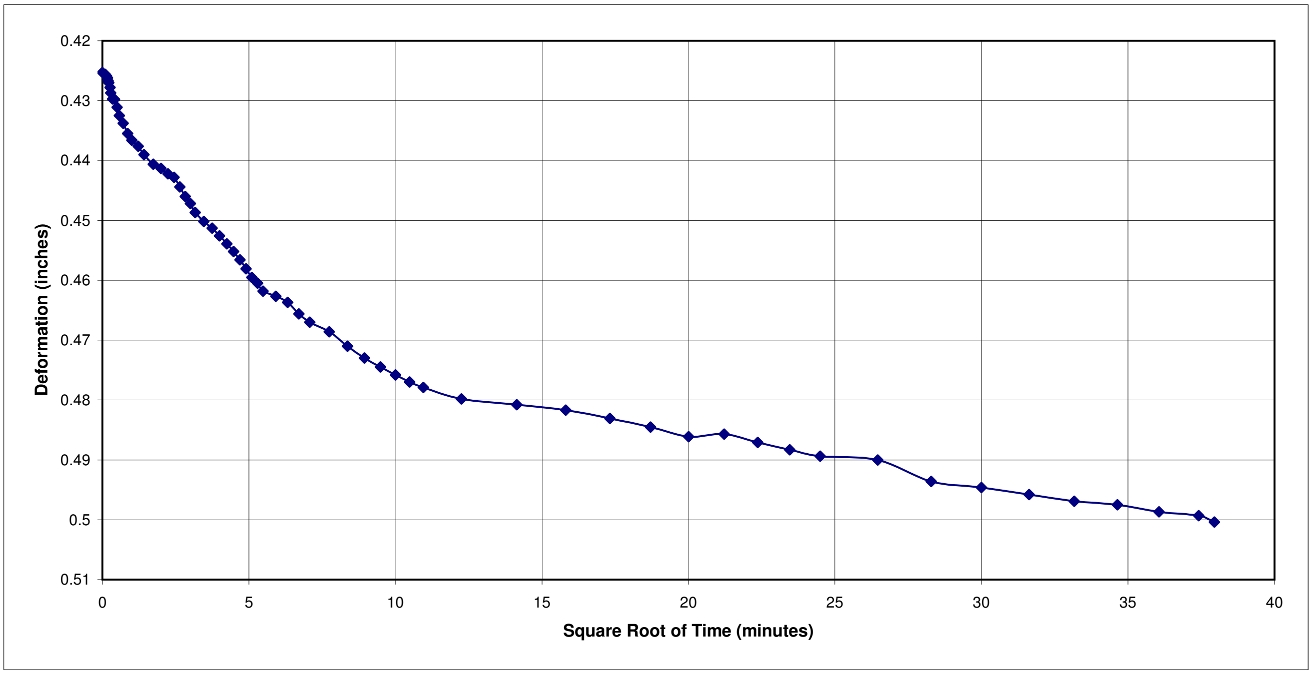
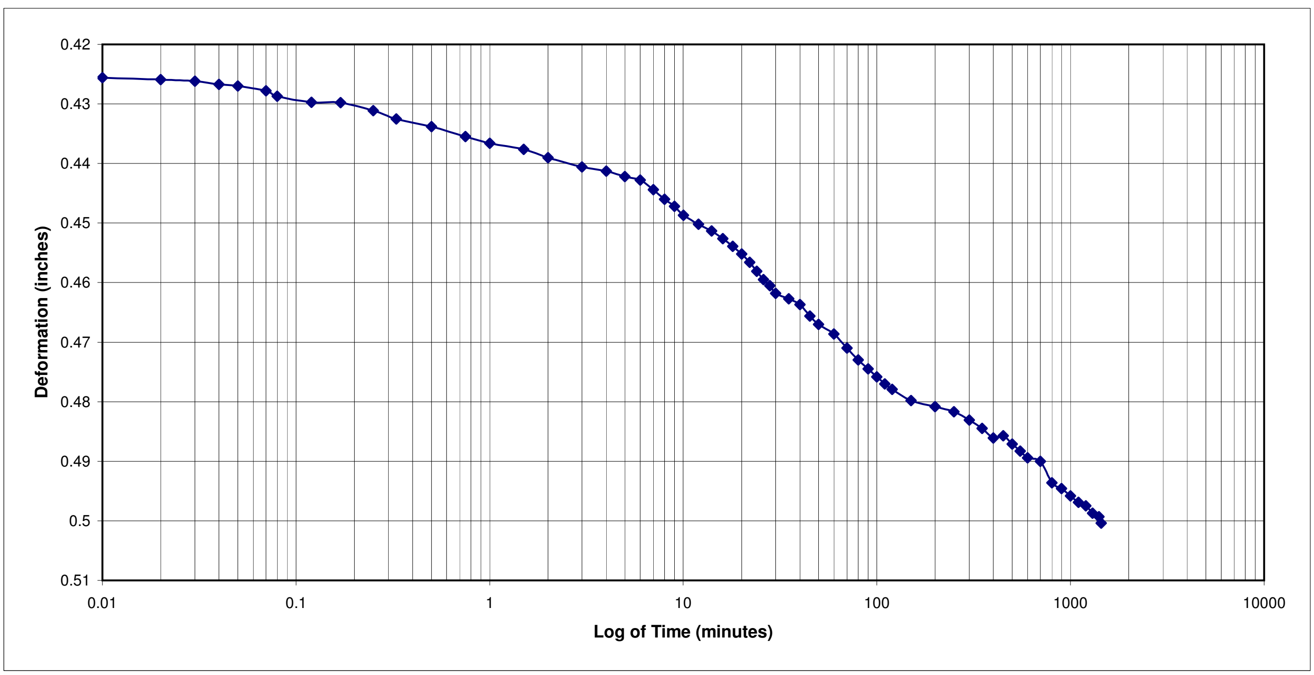
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-39A, 28 to 30 feet
LOAD = 8.0 TSF



DEFORMATION VS. LOG OF TIME
B-39A, 28 to 30 feet
LOAD = 8.0 TSF



Sample No.:	GTX B-39A, 29'
Exploration No.:	B-39A
Depth:	28 - 30 feet

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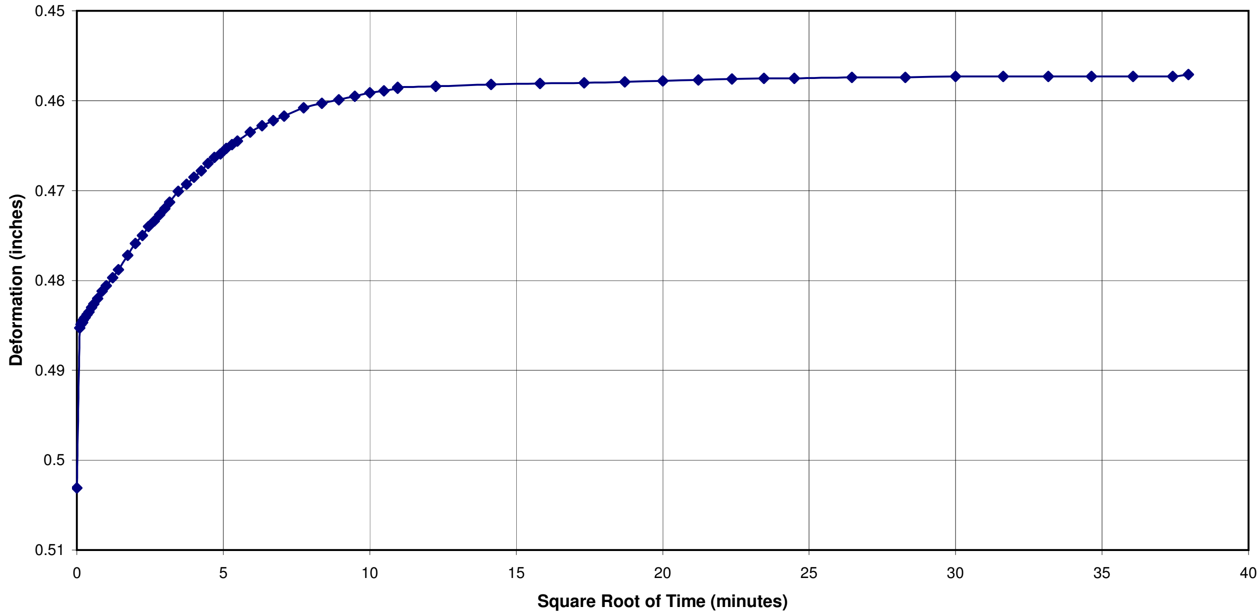
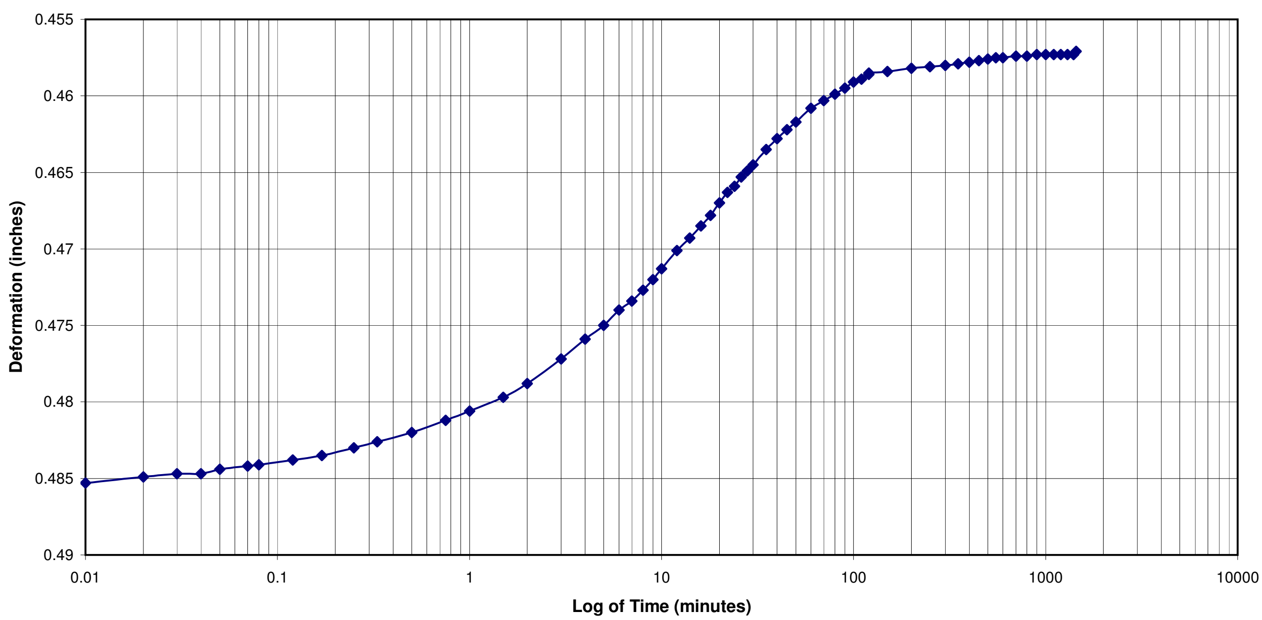
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-39A, 28 to 30 feet
LOAD = 2.0 TSF



DEFORMATION VS. LOG OF TIME
B-39A, 28 to 30 feet
LOAD = 2.0 TSF



Sample No.:	GTX B-39A, 29'
Exploration No.:	B-39A
Depth:	28 - 30 feet

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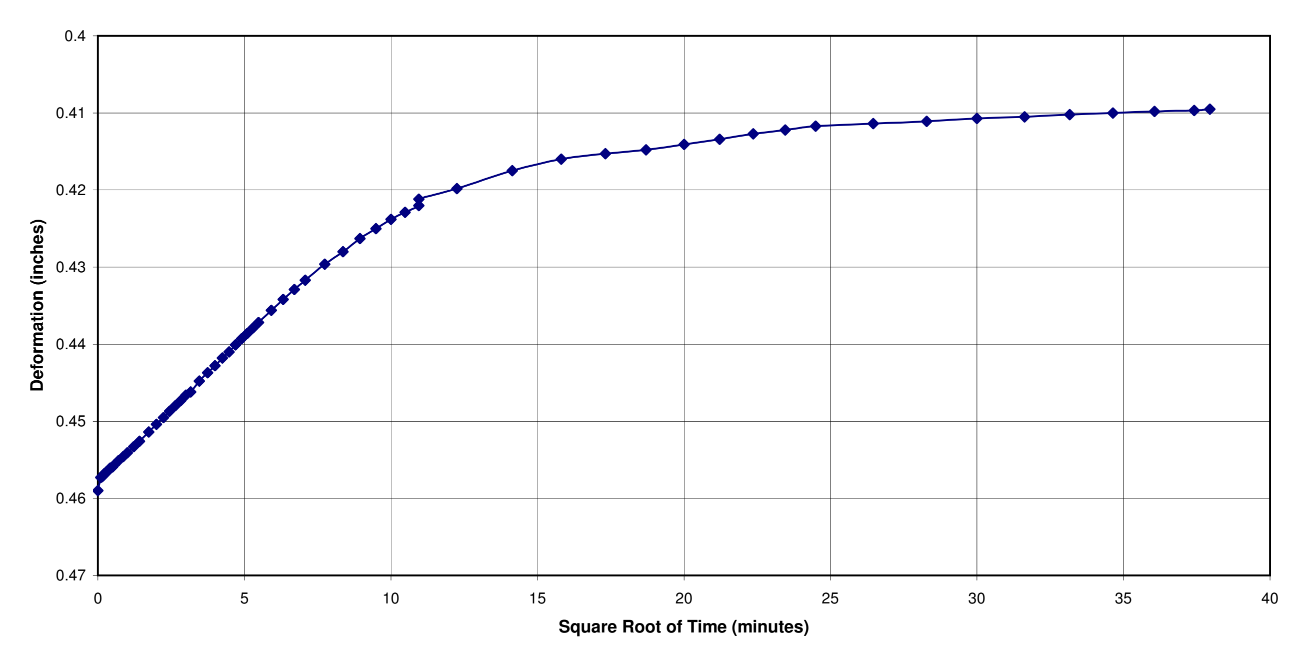
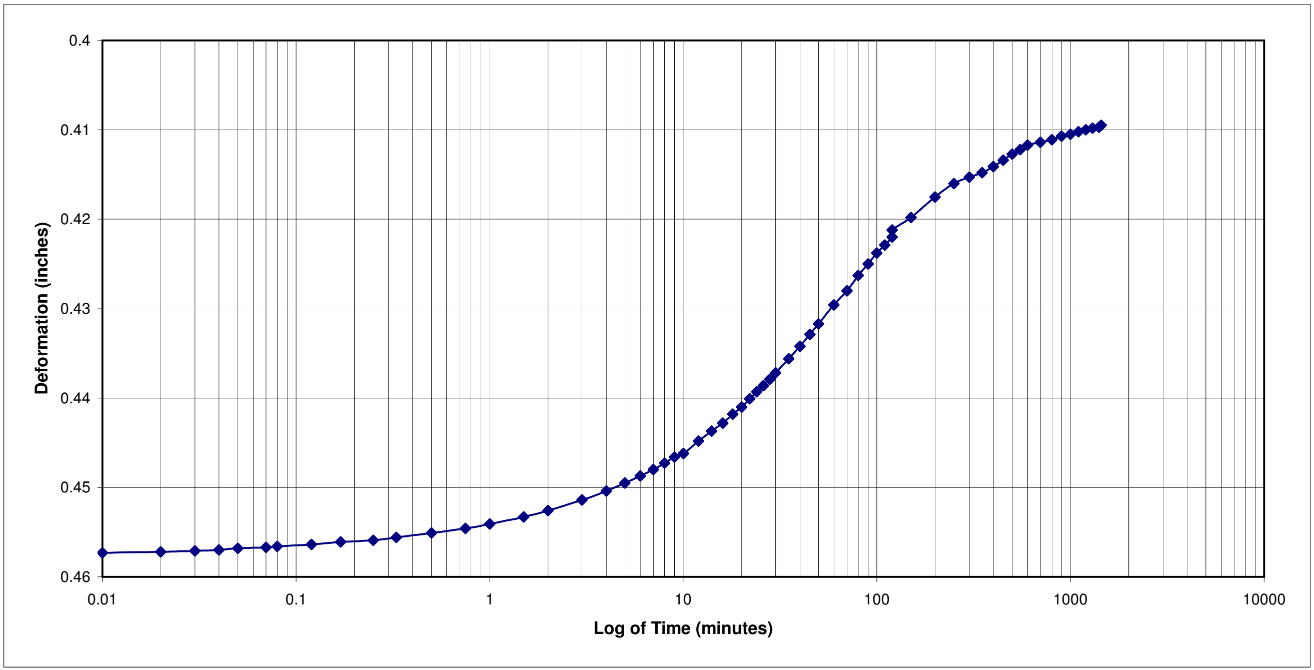
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-39A, 28 to 30 feet
LOAD = 0.5 TSF



DEFORMATION VS. LOG OF TIME
B-39A, 28 to 30 feet
LOAD = 0.5 TSF



Sample No.:	GTX B-39A, 29'
Exploration No.:	B-39A
Depth:	28 - 30 feet

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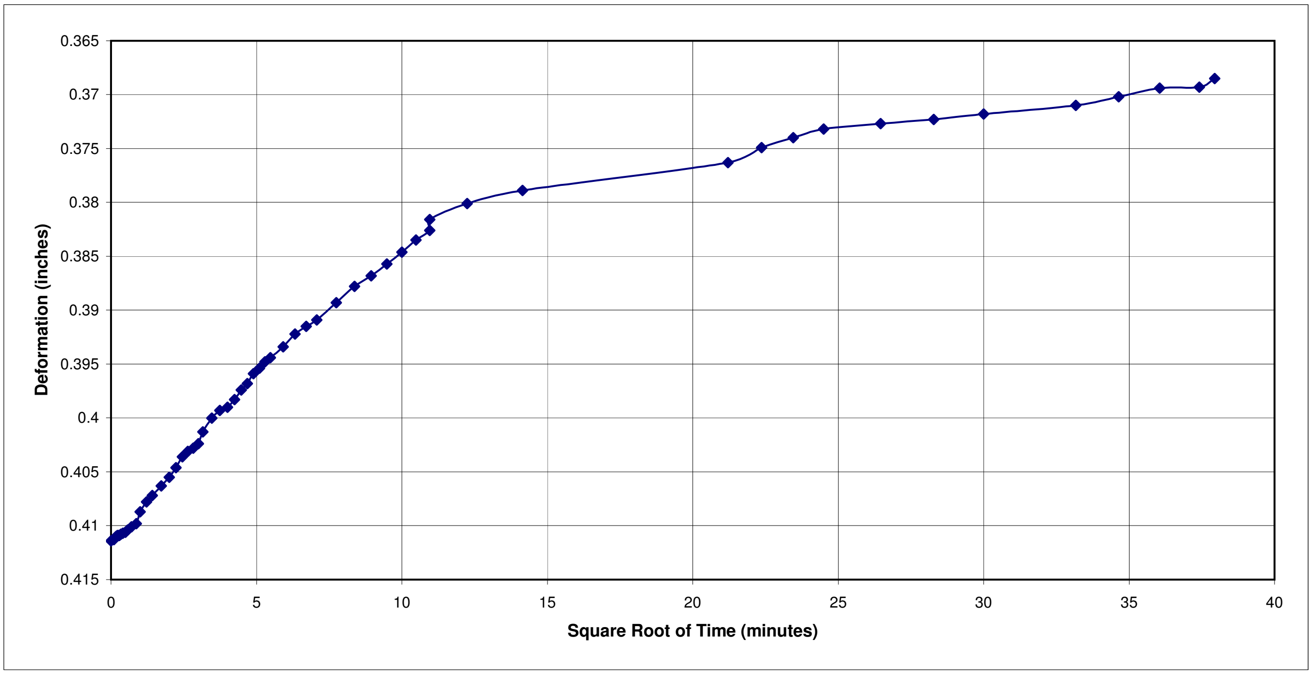
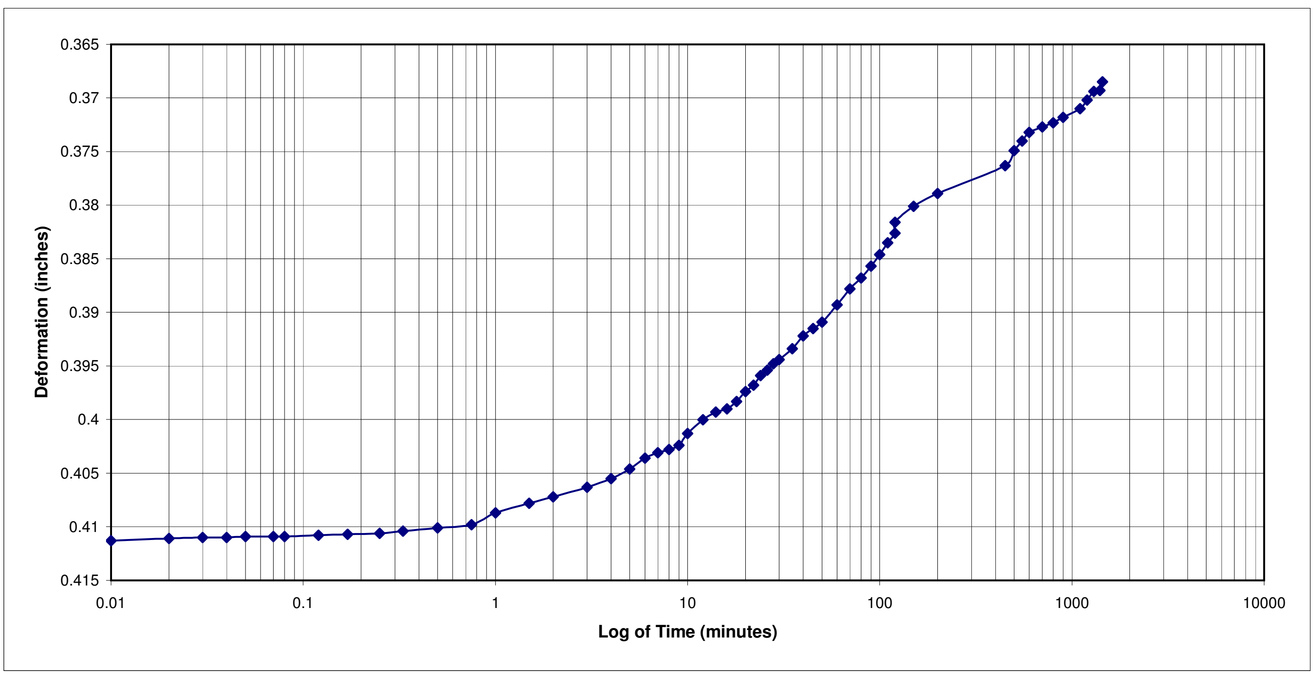
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-39A, 28 to 30 feet
LOAD = 0.125 TSF



DEFORMATION VS. LOG OF TIME
B-39A, 28 to 30 feet
LOAD = 0.125 TSF



Sample No.:	GTX B-39A, 29'
Exploration No.:	B-39A
Depth:	28 - 30 feet

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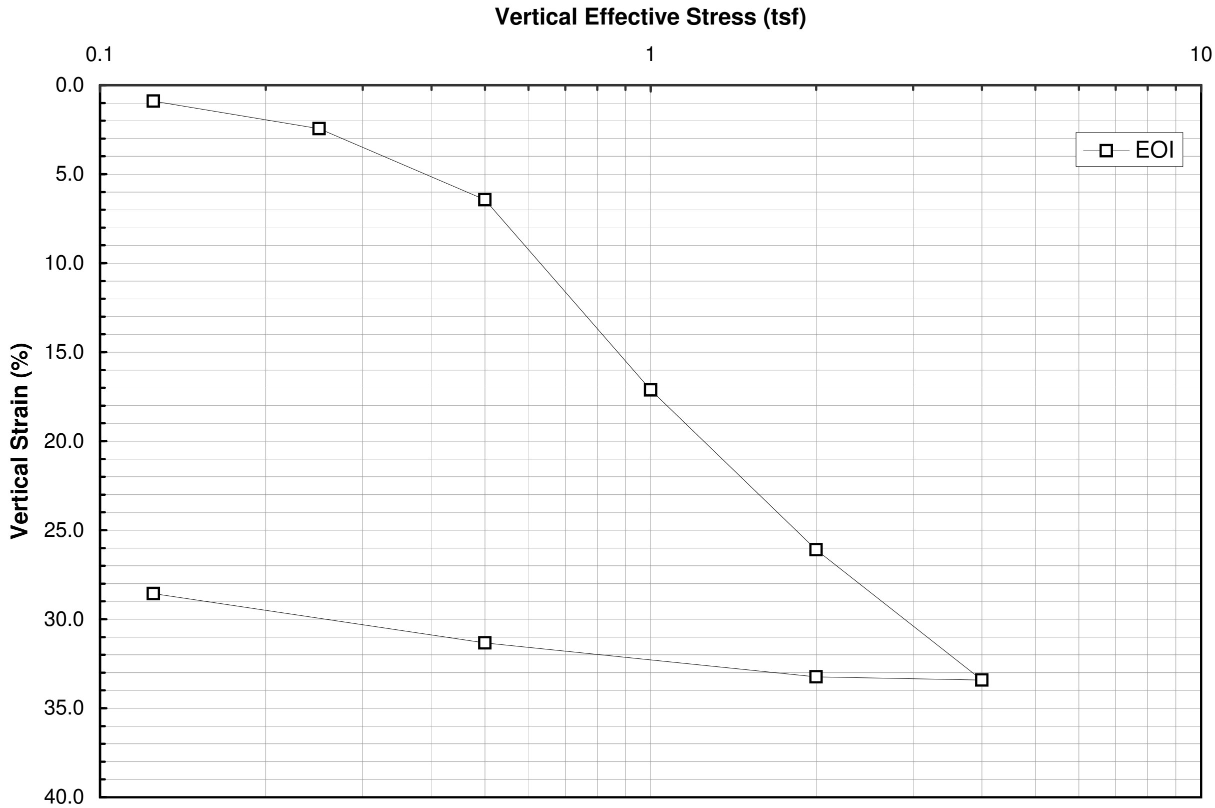
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554



CONSOLIDATION PARAMETERS

Probable Preconsolidation Stress, P'_c (tsf):	0.5
Approx. Hydrostatic Effective Stress, P'_o (tsf)	0.5
Vertical Strain at P'_o (%):	6.4
Compression Ratio (CR):	0.33
Recompression Ratio (RR):	0.038
Over Consolidation Ratio (OCR):	1.0

TEST METHOD

Test Method:	ASTM D-2435 A
Trimming Procedure:	2.5-inch Trimming Lathe
Pressure at Inundation:	0.014 tsf
Method to Compute C_v:	ASTM D-2435 12.3.2

SAMPLE ID

Test No.:	S&ME B-40A, 24'
Sample No.:	UD1
Exploration No.:	B-40A
Depth:	23 to 25 feet
USCS Description:	Fat CLAY with sand (CH)

SAMPLE DATA

Sample Diameter (cm):	6.35
Sample Area (cm^2):	31.67
Measured Specific Gravity:	2.55
Trimmings Moisture (%):	87.4
% Passing #200 Sieve:	77.2
Liquid Limit:	98
Plastic Limit:	35
Plasticity Index:	63

	Initial	Final
Water Content (%):	87.6	54.7
Est. % Saturation:	99.7	100.0
Sample Height (cm):	2.540	1.815
Wet Sample Weight (g):	118.8	97.9
Dry Sample Weight (g):	63.3	63.3
Dry Unit Weight (pcf):	49.1	68.7
Void Ratio, e:	2.24	1.31
Solids Height (cm):	0.784	0.784

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ONE-DIMENSIONAL CONSOLIDATION TEST

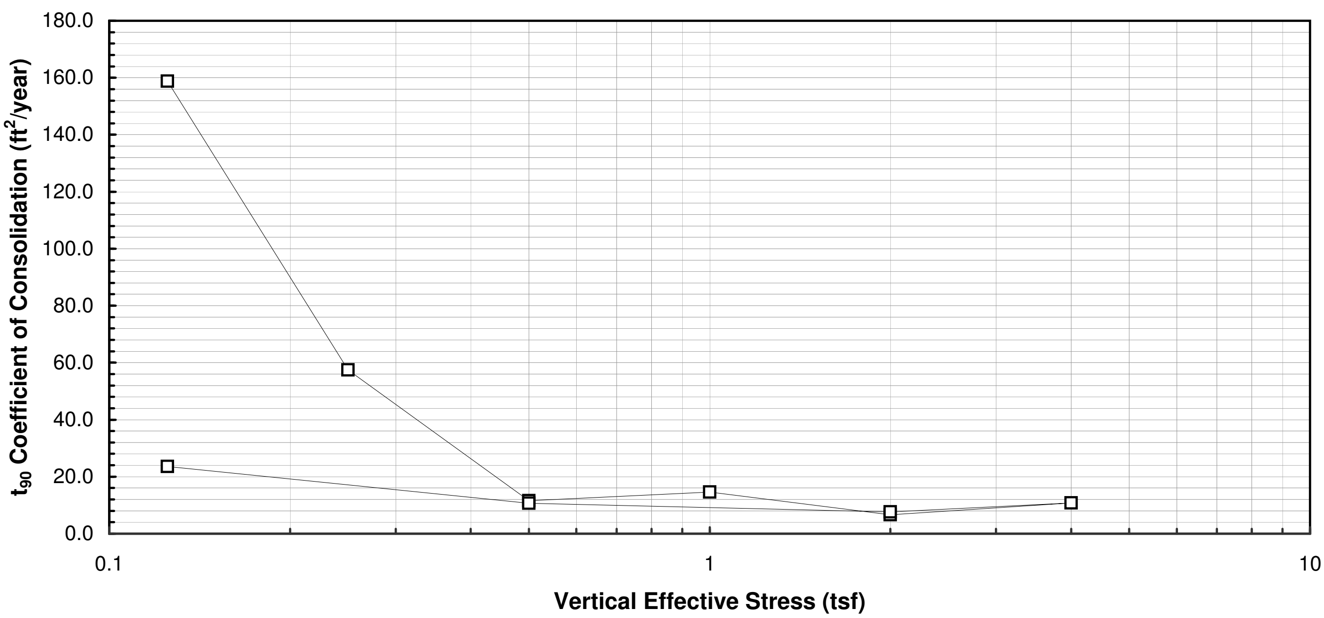
Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

Test No.:	S&ME B-40A, 24'
Sample No.:	UD1
Exploration No.:	B-40A
Depth:	23 to 25 feet

LOAD INC.	STRESS DURATION (Hr - min)	VERTICAL STRESS (tsf)	VERTICAL STRAIN (EOI*)	VERTICAL STRAIN (EOP*)	VOID RATIO e (EOI*)	VOID RATIO e (EOP*)	STRESS RATIO (P'/P'c)	TAYLOR COEFFICIENT OF CONSOLIDATION (ft^2/year)
1	23-58	0.125	0.9	0.4	2.21	2.23	0.27	158.8
2	24-02	0.25	2.4	1.9	2.16	2.18	0.53	57.5
3	24-01	0.5	6.4	5.0	2.03	2.08	1.06	11.5
4	24-00	1	17.1	14.0	1.69	1.79	2.13	14.6
5	24-00	2	26.1	24.4	1.40	1.45	4.26	6.6
6	24-00	4	33.4	31.8	1.16	1.21	8.51	10.8
7	24-05	2	33.2	33.3	1.16	1.16	4.26	7.7
8	23-59	0.5	31.3	31.8	1.23	1.21	1.06	10.7
9	24-00	0.125	28.6	30.1	1.31	1.26	0.27	23.5

*EOI = End of Increment

*EOP = End of Primary



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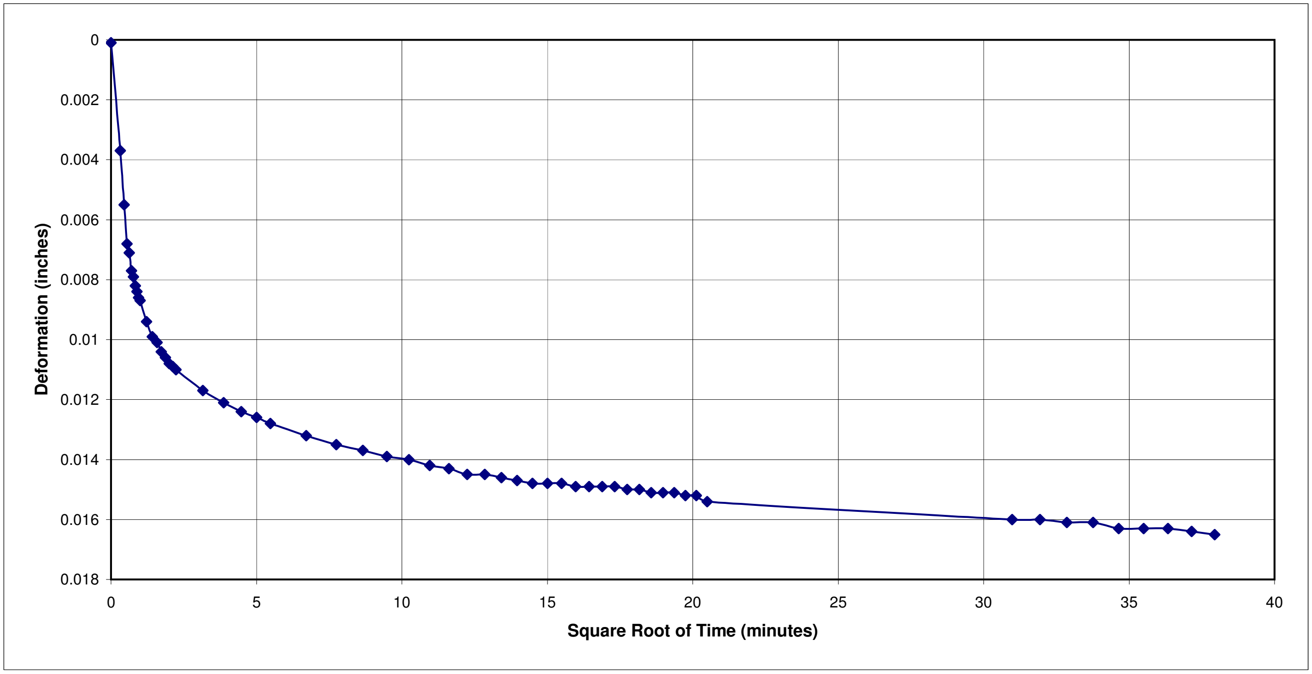
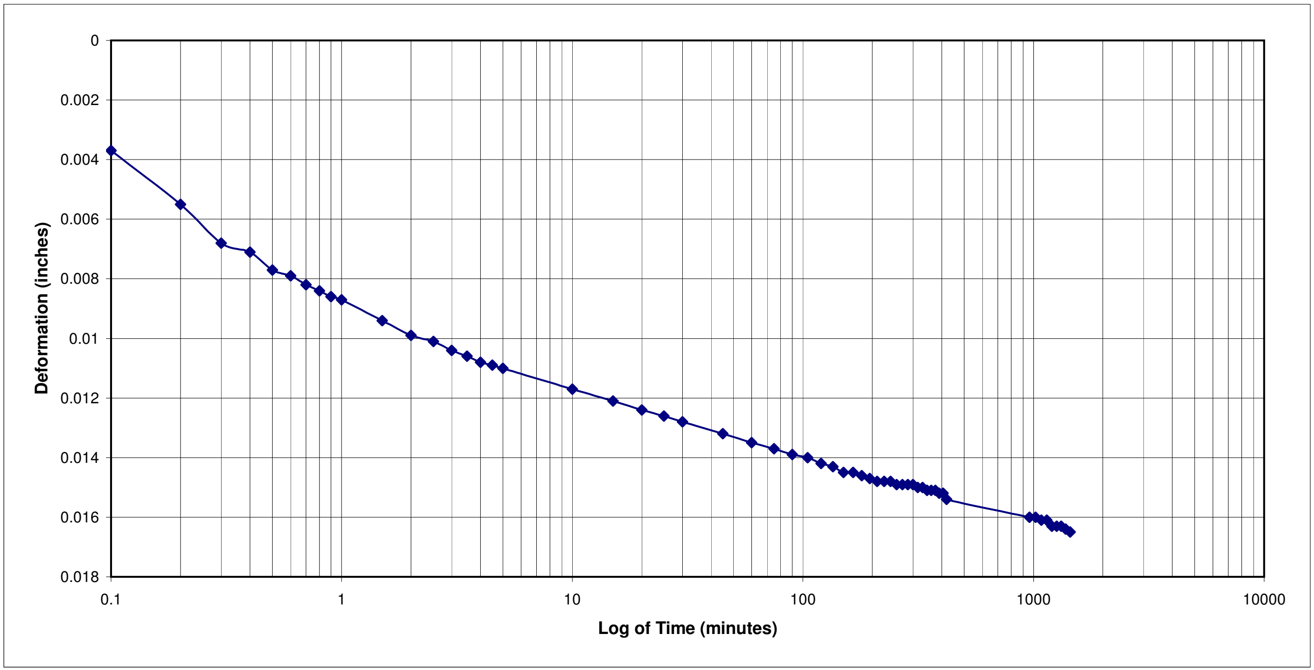
ONE-DIMENSIONAL CONSOLIDATION TEST

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-40A, 23 to 25 feet
LOAD = 0.125 TSF



DEFORMATION VS. LOG OF TIME
B-40A, 23 to 25 feet
LOAD = 0.125 TSF



Sample No.:	S&ME B-40A, 24'
Exploration No.:	B-40A
Depth:	23 - 25 feet

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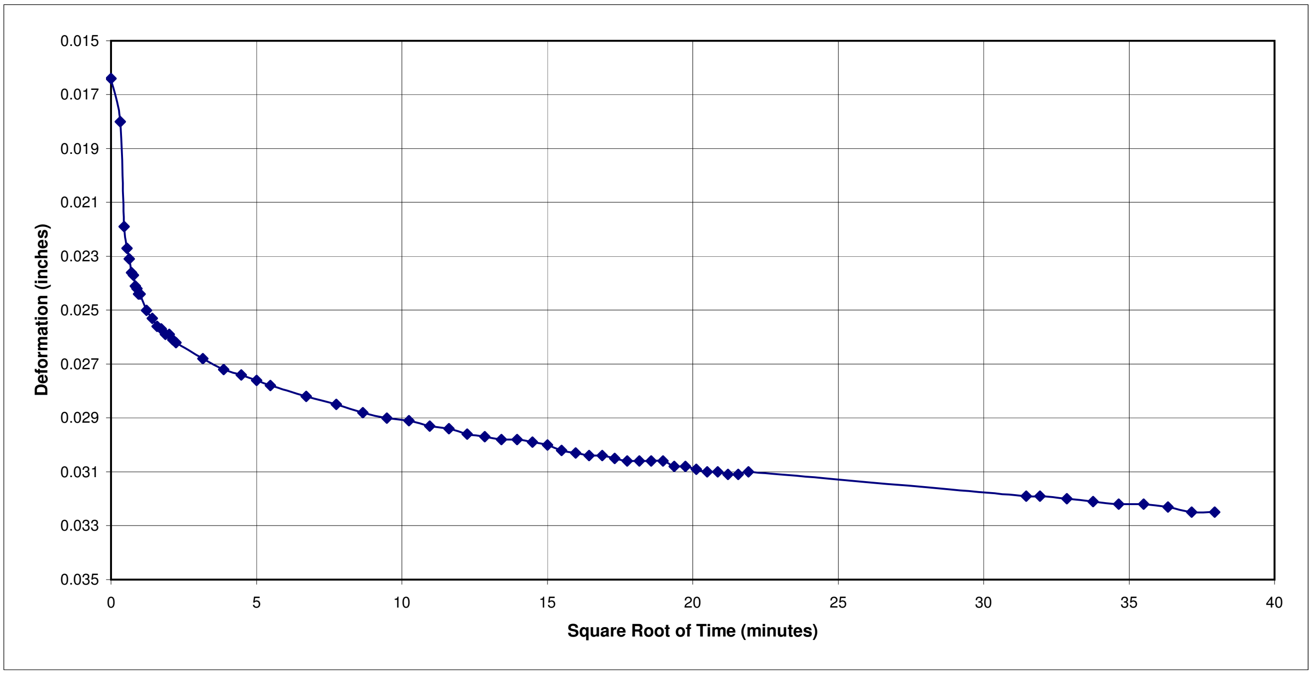
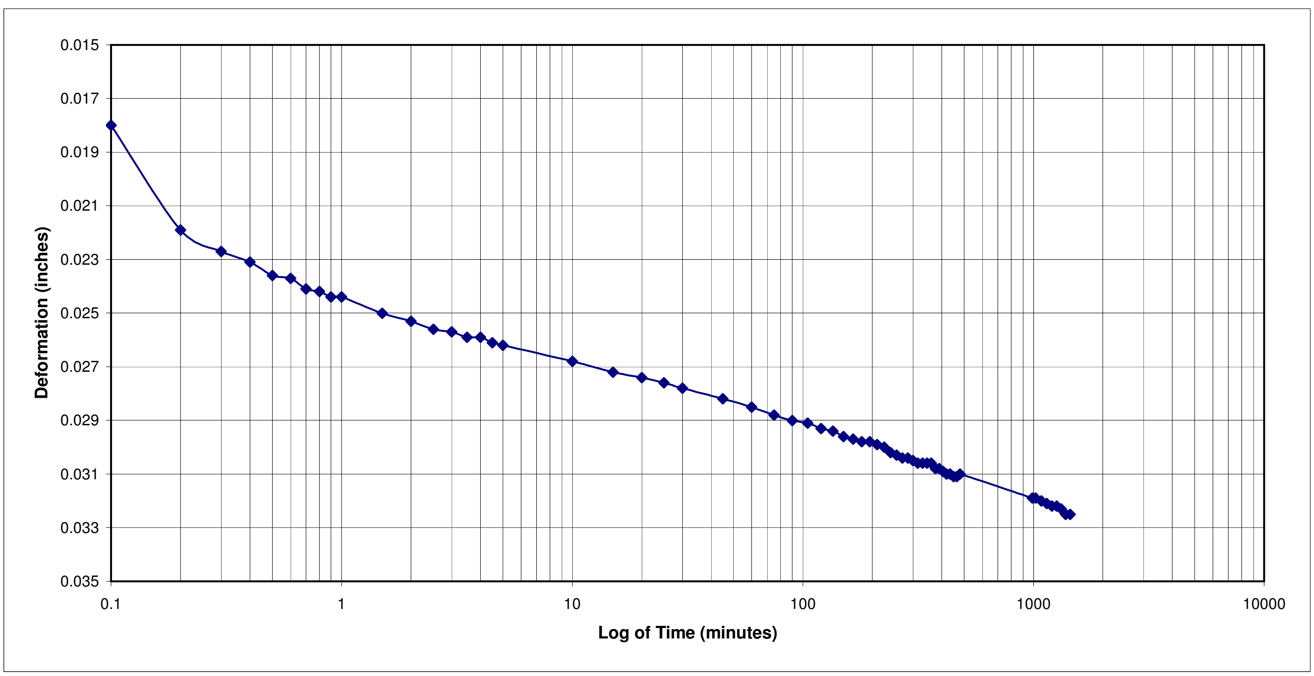
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-40A, 23 to 25 feet
LOAD = 0.25 TSF



DEFORMATION VS. LOG OF TIME
B-40A, 23 to 25 feet
LOAD = 0.25 TSF



Sample No.:	S&ME B-40A, 24'
Exploration No.:	B-40A
Depth:	23 - 25 feet

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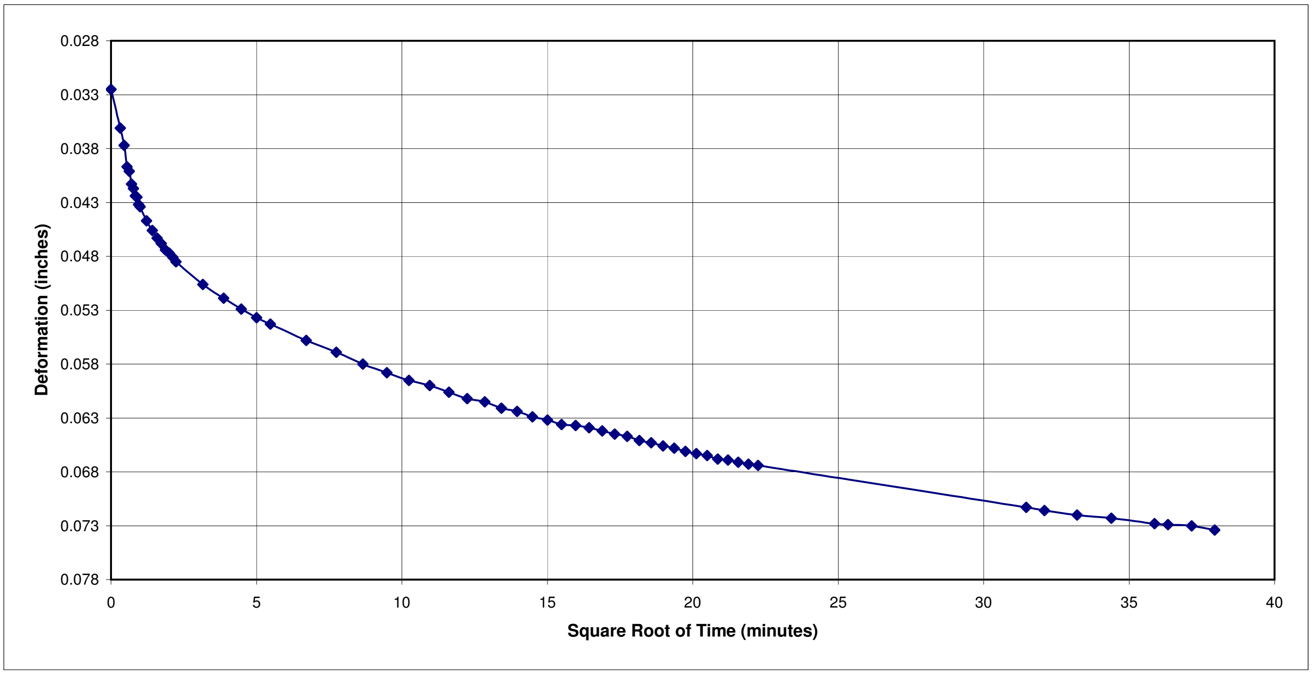
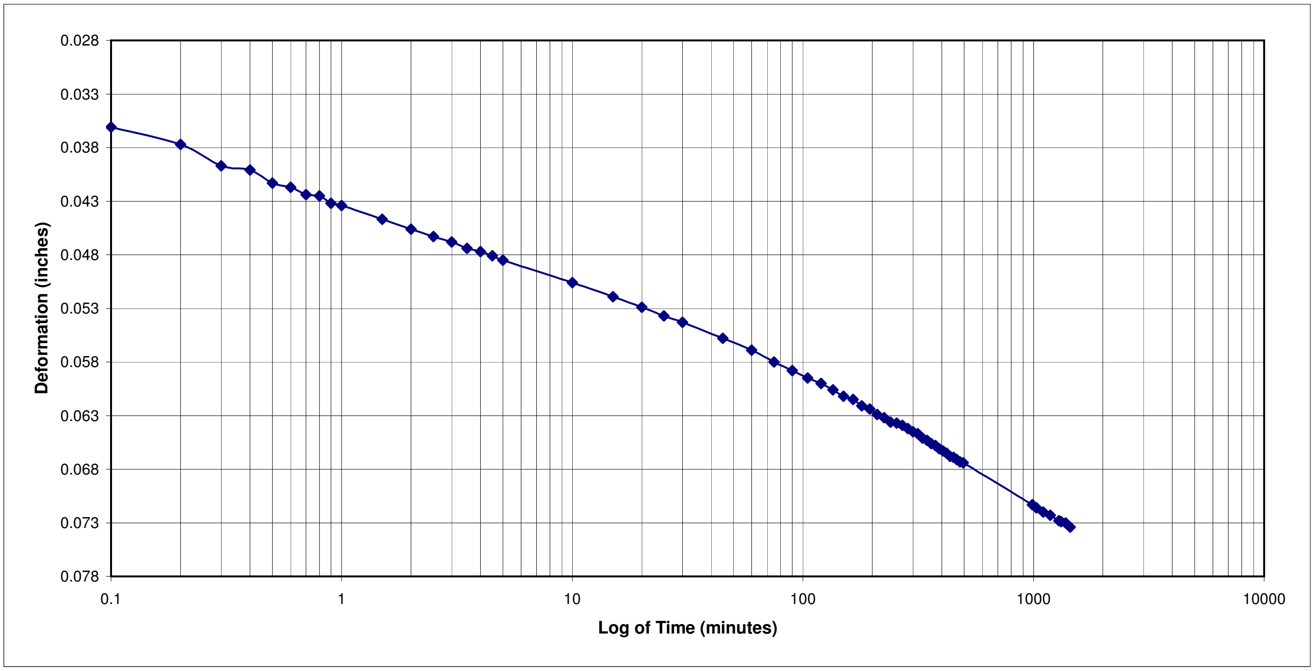
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-40A, 23 to 25 feet
LOAD = 0.5 TSF



DEFORMATION VS. LOG OF TIME
B-40A, 23 to 25 feet
LOAD = 0.5 TSF



Sample No.: S&ME B-40A, 24'
Exploration No.: B-40A
Depth: 23 - 25 feet

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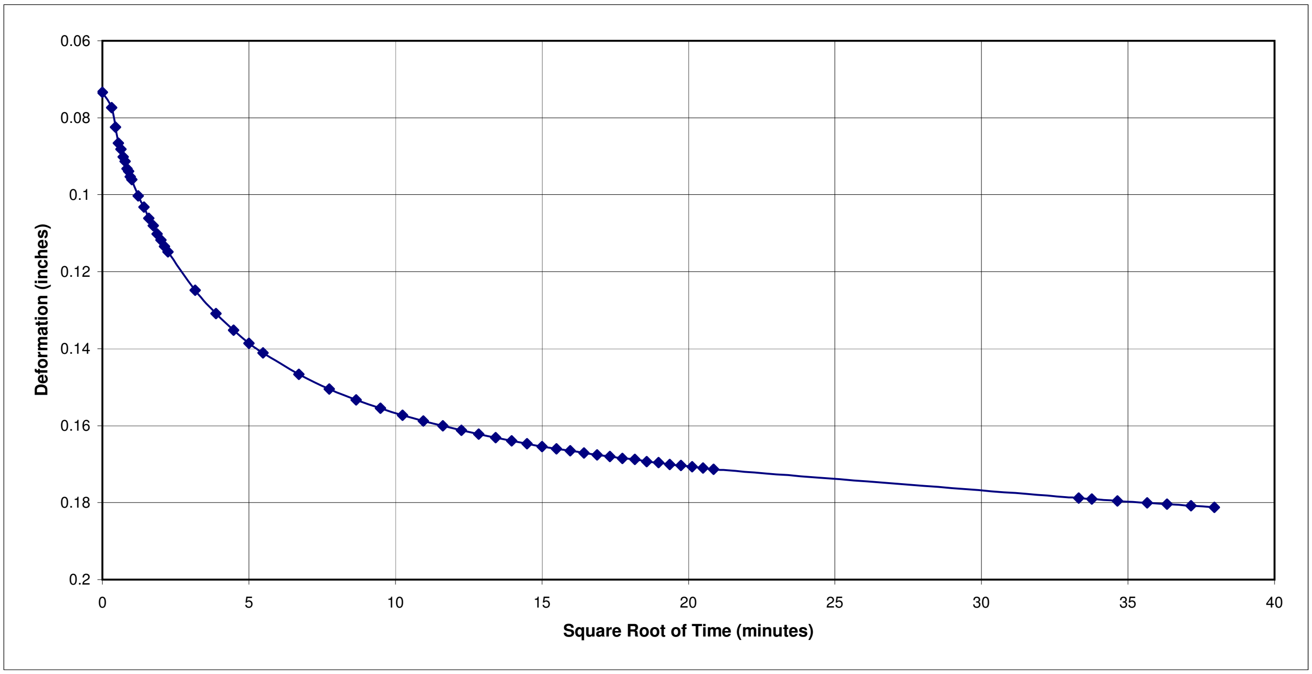
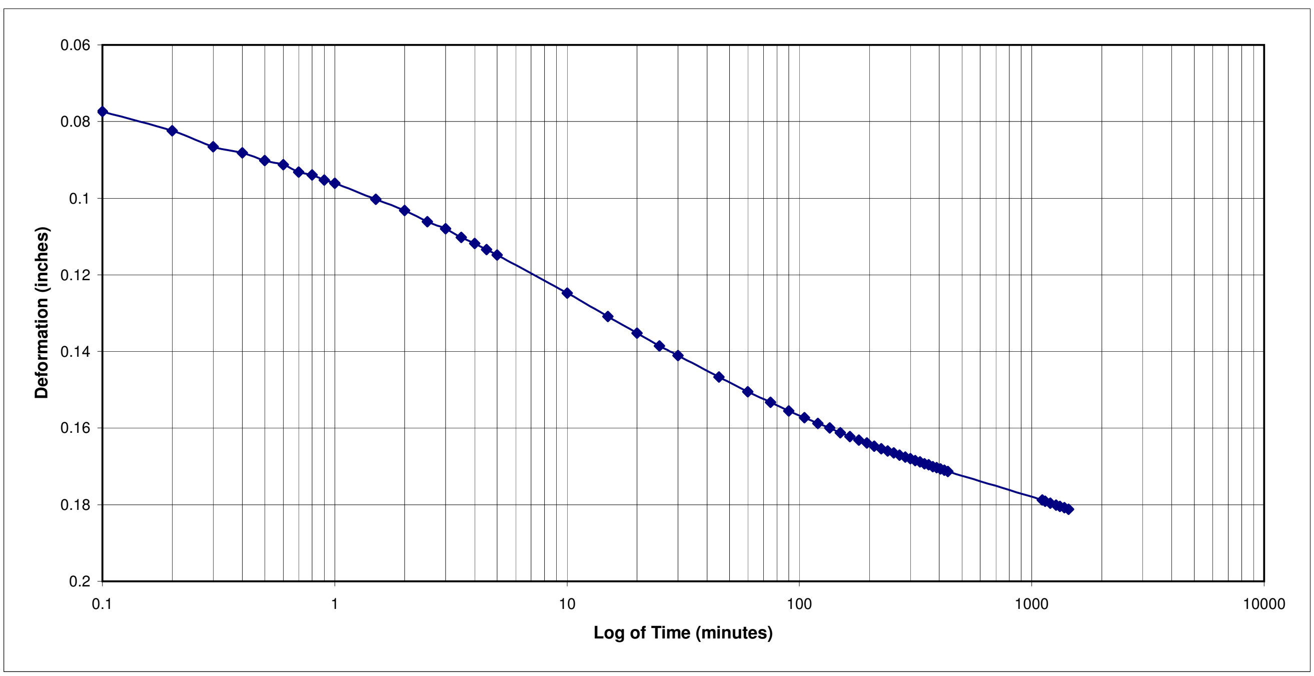
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-40A, 23 to 25 feet
LOAD = 1.0 TSF



DEFORMATION VS. LOG OF TIME
B-40A, 23 to 25 feet
LOAD = 1.0 TSF



Sample No.:	S&ME B-40A, 24'
Exploration No.:	B-40A
Depth:	23 - 25 feet

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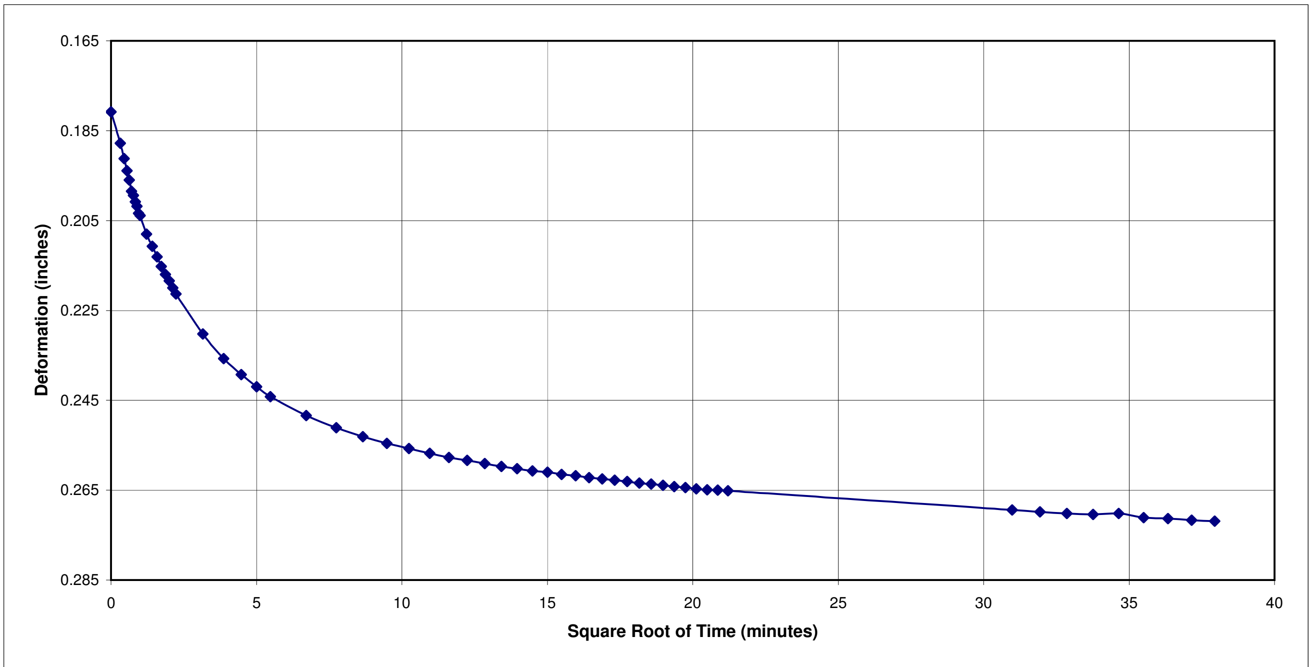
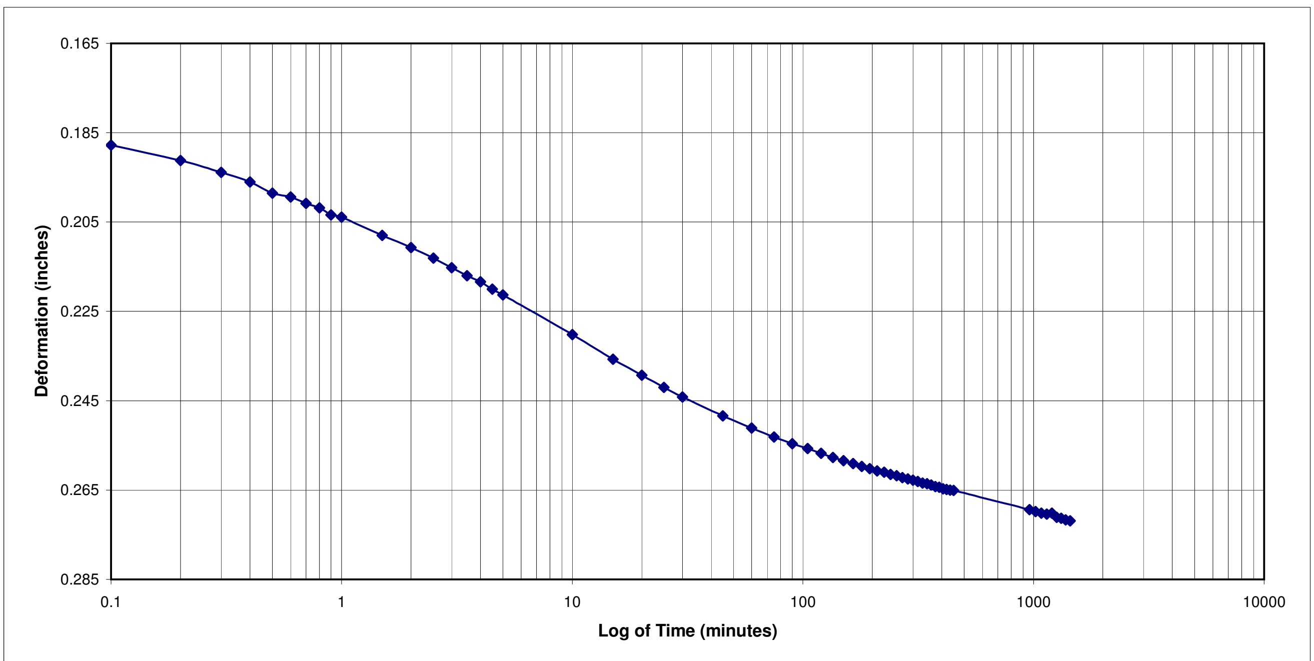
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-40A, 23 to 25 feet
LOAD = 2.0 TSF



DEFORMATION VS. LOG OF TIME
B-40A, 23 to 25 feet
LOAD = 2.0 TSF



Sample No.:	S&ME B-40A, 24'
Exploration No.:	B-40A
Depth:	23 - 25 feet

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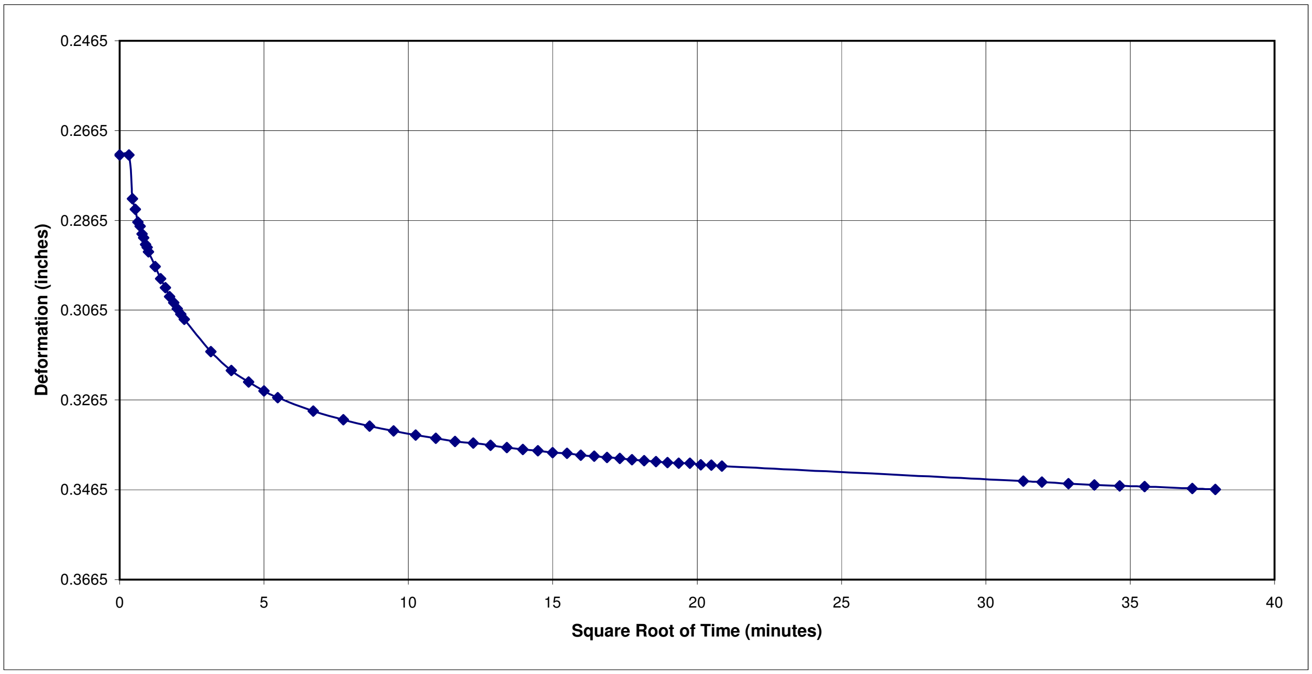
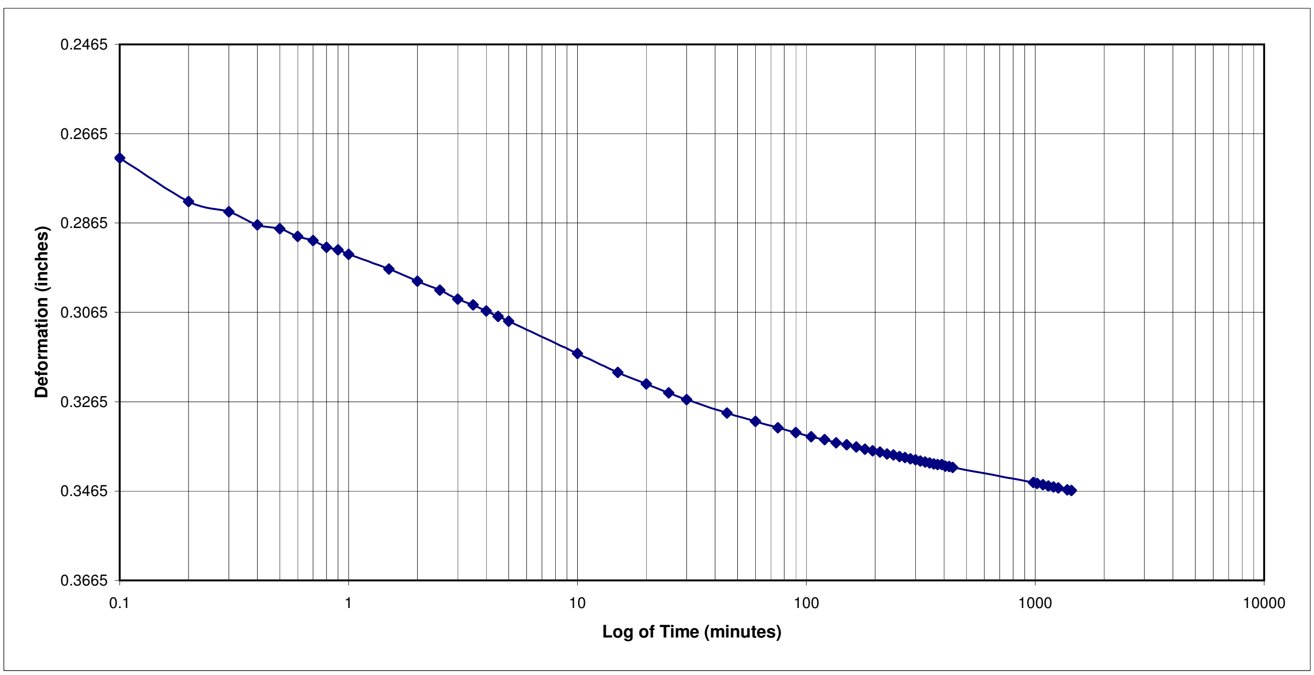
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-40A, 23 to 25 feet
LOAD = 4.0 TSF



DEFORMATION VS. LOG OF TIME
B-40A, 23 to 25 feet
LOAD = 4.0 TSF



Sample No.:	S&ME B-40A, 24'
Exploration No.:	B-40A
Depth:	23 - 25 feet

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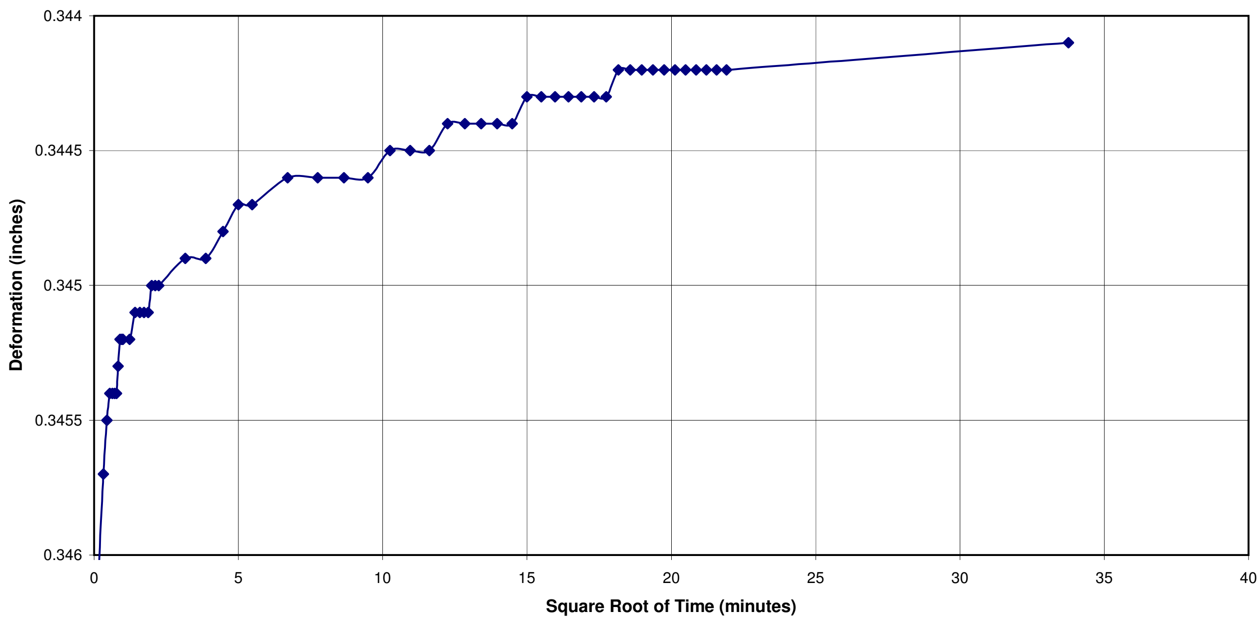
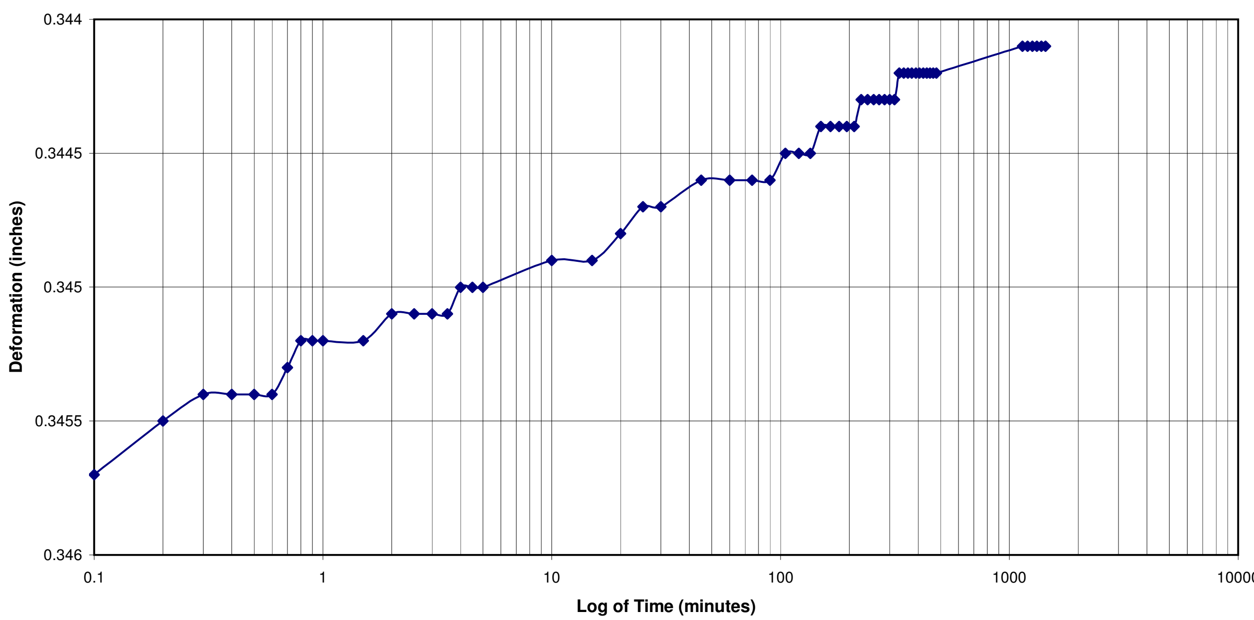
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-40A, 23 to 25 feet
LOAD = 2.0 TSF



DEFORMATION VS. LOG OF TIME
B-40A, 23 to 25 feet
LOAD = 2.0 TSF



Sample No.:	S&ME B-40A, 24'
Exploration No.:	B-40A
Depth:	23 - 25 feet

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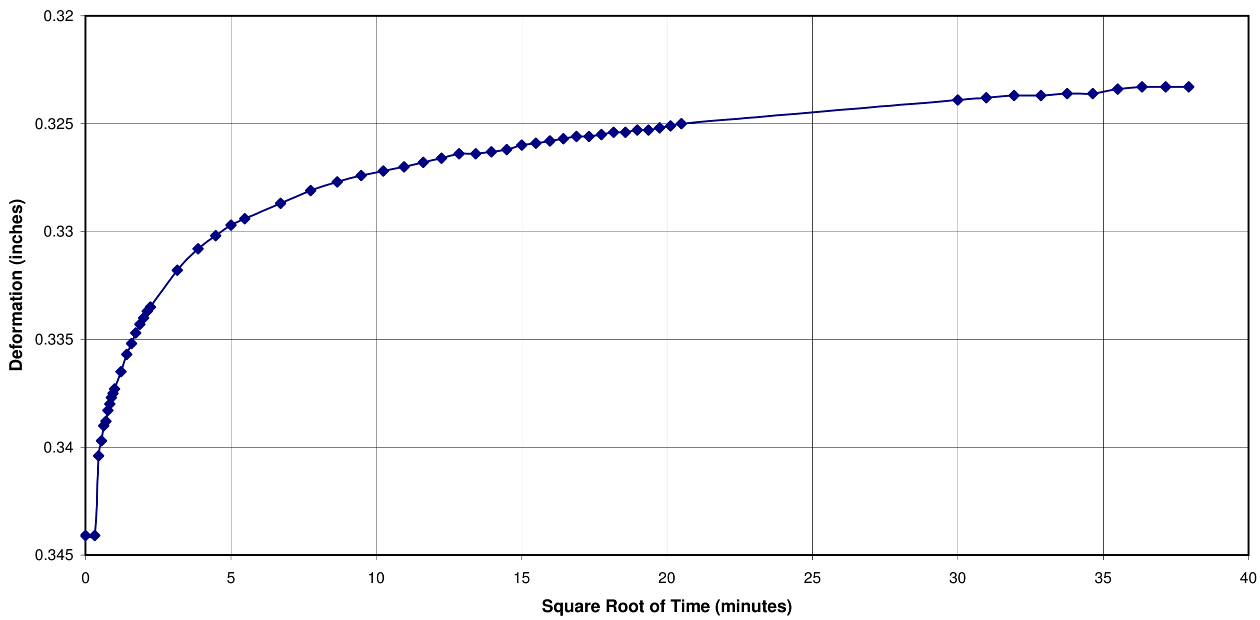
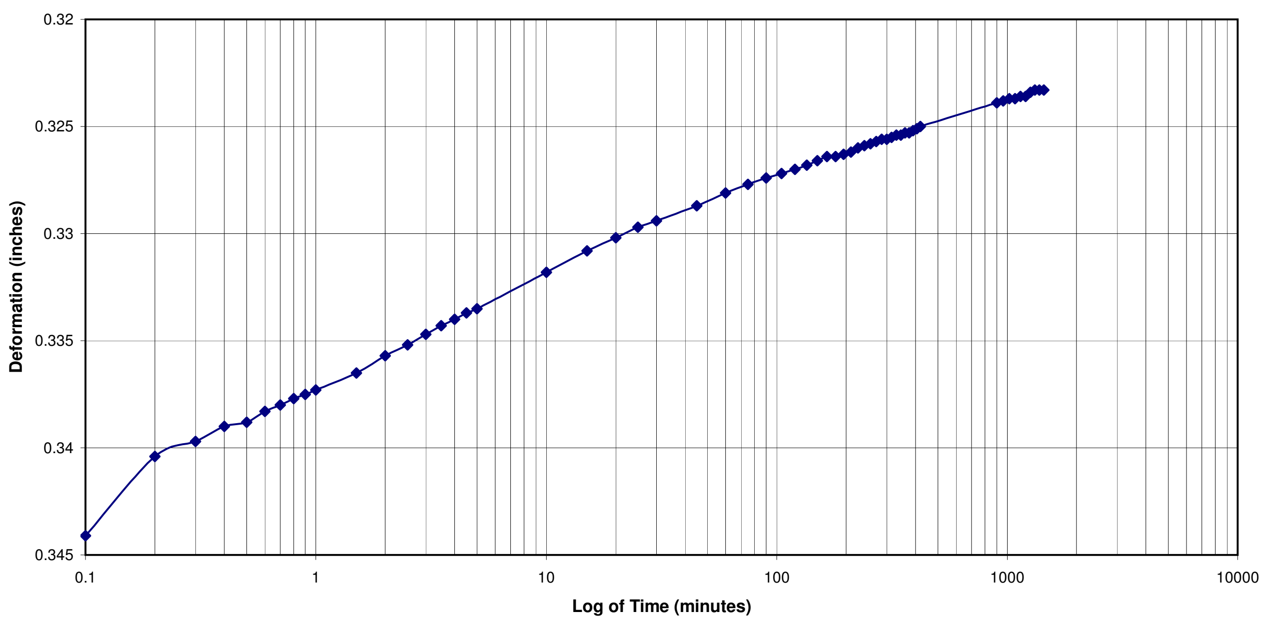
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-40A, 23 to 25 feet
LOAD = 0.5 TSF



DEFORMATION VS. LOG OF TIME
B-40A, 23 to 25 feet
LOAD = 0.5 TSF



Sample No.:	S&ME B-40A, 24'
Exploration No.:	B-40A
Depth:	23 - 25 feet

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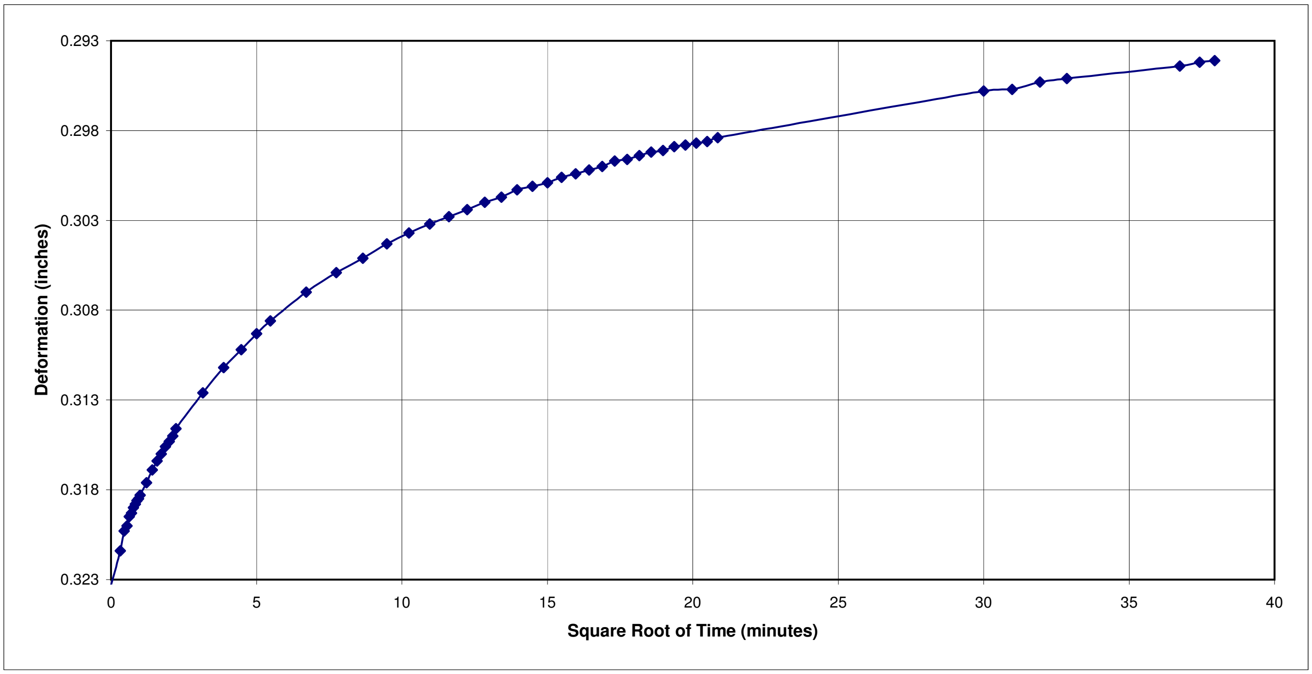
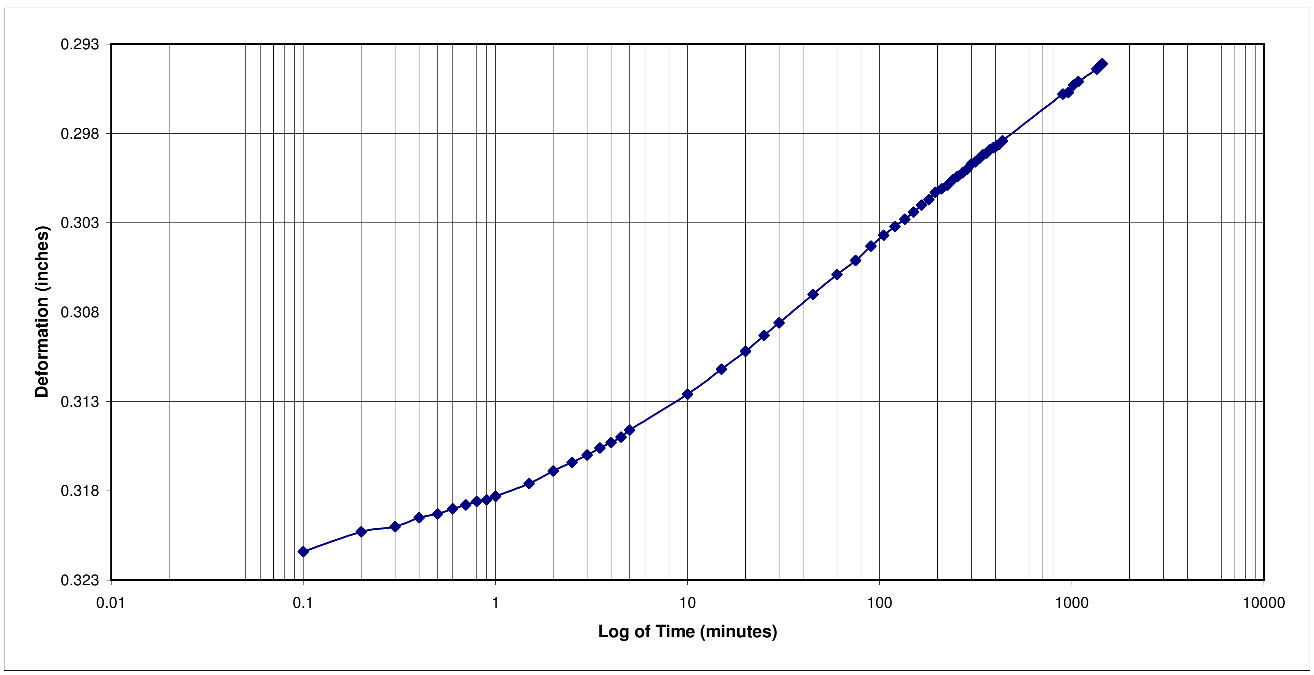
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-40A, 23 to 25 feet
LOAD = 0.125 TSF



DEFORMATION VS. LOG OF TIME
B-40A, 23 to 25 feet
LOAD = 0.125 TSF



Sample No.:	S&ME B-40A, 24'
Exploration No.:	B-40A
Depth:	23 - 25 feet

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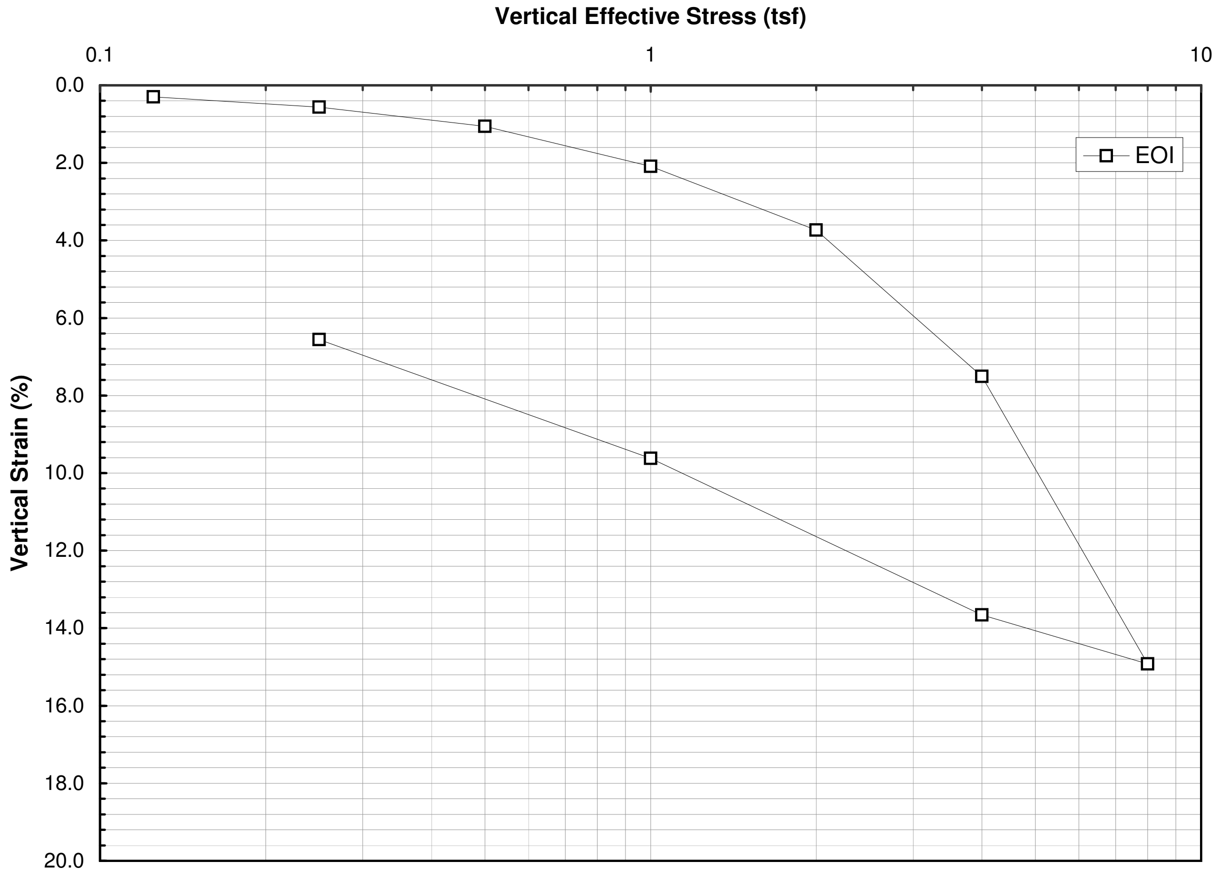
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554



CONSOLIDATION PARAMETERS

Probable Preconsolidation Stress, P'_c (tsf):	3.3
Approx. Hydrostatic Effective Stress, P'_o (tsf)	0.6
Vertical Strain at P'_o (%):	1.3
Compression Ratio (CR):	0.24
Recompression Ratio (RR):	0.059
Over Consolidation Ratio (OCR):	5.4

TEST METHOD

Test Method:	ASTM D-2435 A
Trimming Procedure:	2.5-inch Trimming Lathe
Pressure at Inundation:	0.125 tsf
Method to Compute C_v:	ASTM D-2435 12.3.2

SAMPLE ID

Test No.:	SCI B-47A, 25'
Sample No.:	UD1
Exploration No.:	B-47A
Depth:	24 to 26 feet
USCS Description:	Fat CLAY (CH)

SAMPLE DATA

Sample Diameter (cm):	6.35
Sample Area (cm^2):	31.67
Measured Specific Gravity:	2.70
Trimmings Moisture (%):	54.4
% Passing #200 Sieve:	98.5
Liquid Limit:	81
Plastic Limit:	19
Plasticity Index:	62

	Initial	Final
Water Content (%):	55.8	52.7
Est. % Saturation:	98.8	100.0
Sample Height (cm):	2.540	2.373
Wet Sample Weight (g):	134.0	131.4
Dry Sample Weight (g):	86.0	86.0
Dry Unit Weight (pcf):	66.7	71.4
Void Ratio, e:	1.52	1.36
Solids Height (cm):	1.006	1.006

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ONE-DIMENSIONAL CONSOLIDATION TEST

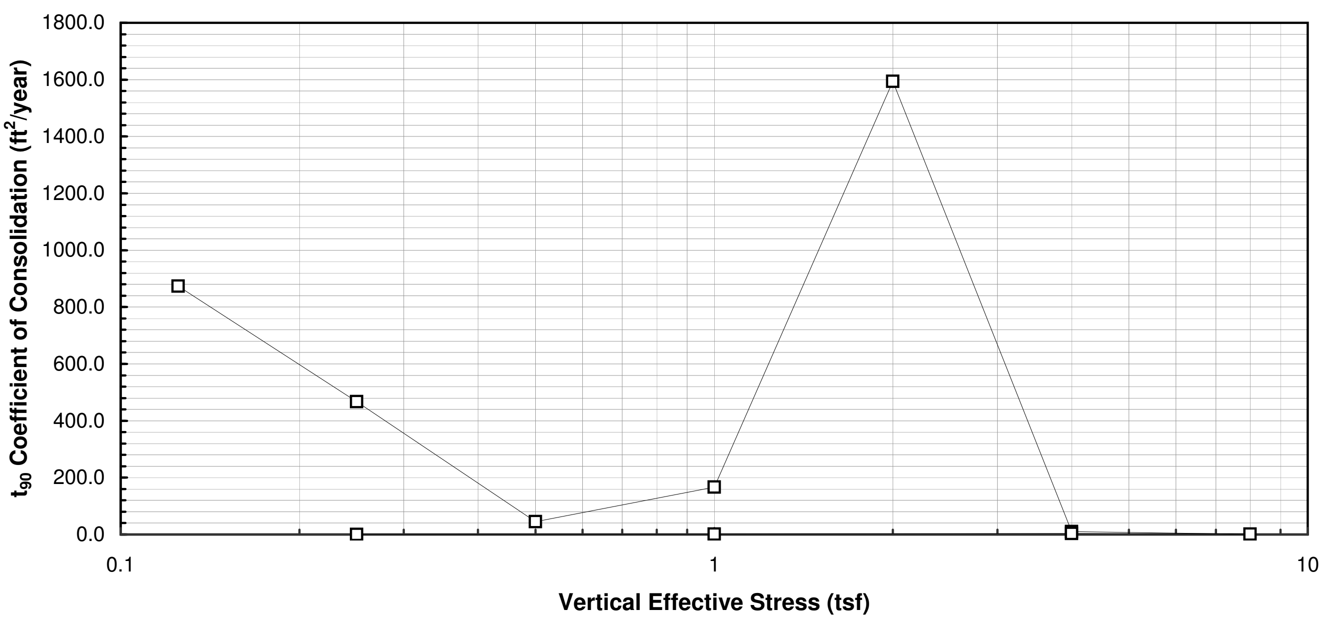
Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

Test No.:	SCI B-47A, 25'
Sample No.:	UD1
Exploration No.:	B-47A
Depth:	24 to 26 feet

LOAD INC.	STRESS DURATION (Hr - min)	VERTICAL STRESS (tsf)	VERTICAL STRAIN (EOI*)	VERTICAL STRAIN (EOP*)	VOID RATIO e (EOI*)	VOID RATIO e (EOP*)	STRESS RATIO (P'/P'c)	TAYLOR COEFFICIENT OF CONSOLIDATION (ft^2/year)
1	23-55	0.125	0.3	0.2	1.52	1.52	0.04	873.3
2	21-46	0.25	0.6	0.5	1.51	1.51	0.08	467.5
3	23-23	0.5	1.1	0.9	1.50	1.50	0.15	45.2
4	24-01	1	2.1	1.6	1.47	1.48	0.30	166.9
5	20-01	2	3.7	2.4	1.43	1.46	0.61	1594.4
6	24-01	4	7.5	6.3	1.33	1.37	1.21	10.2
7	24-01	8	14.9	14.6	1.15	1.16	2.42	1.3
8	24-01	4	13.7	13.8	1.18	1.18	1.21	3.6
9	24-01	1	9.6	9.9	1.28	1.27	0.30	1.3
10	24-01	0.25	6.6	6.2	1.36	1.37	0.08	0.5

*EOI = End of Increment

*EOP = End of Primary



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ONE-DIMENSIONAL CONSOLIDATION TEST

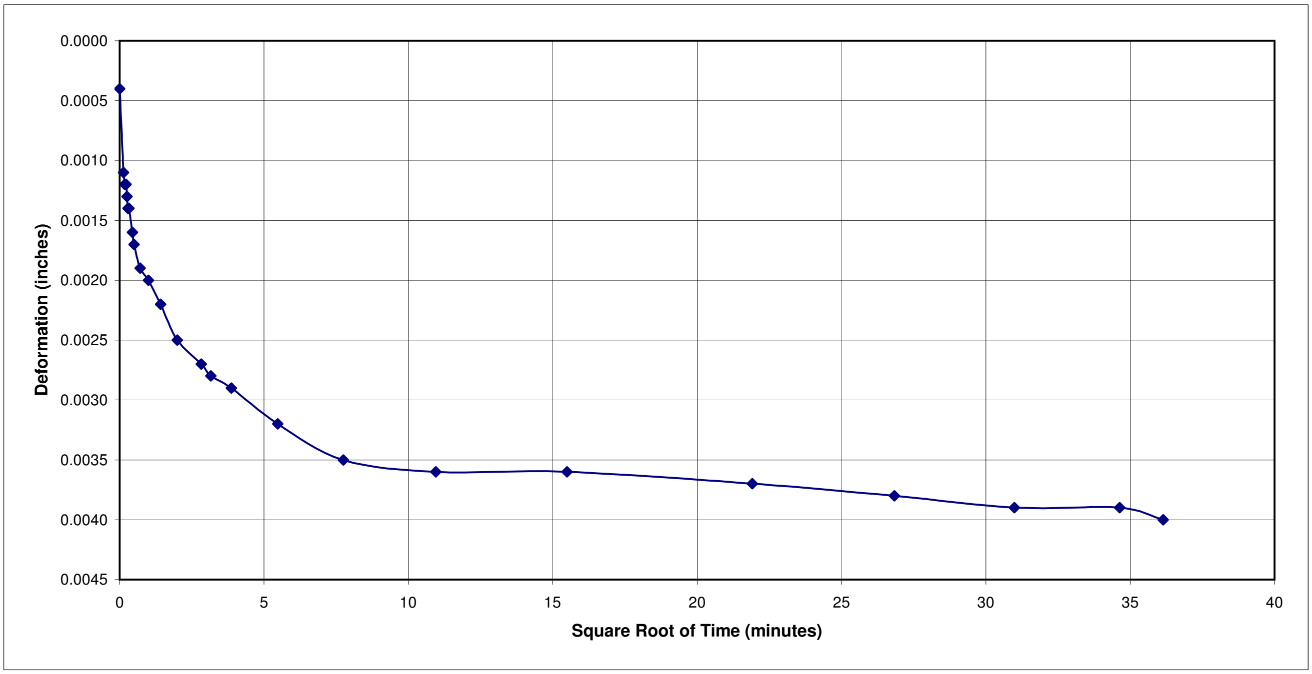
Project: Port Access Road

Client: SCDOT

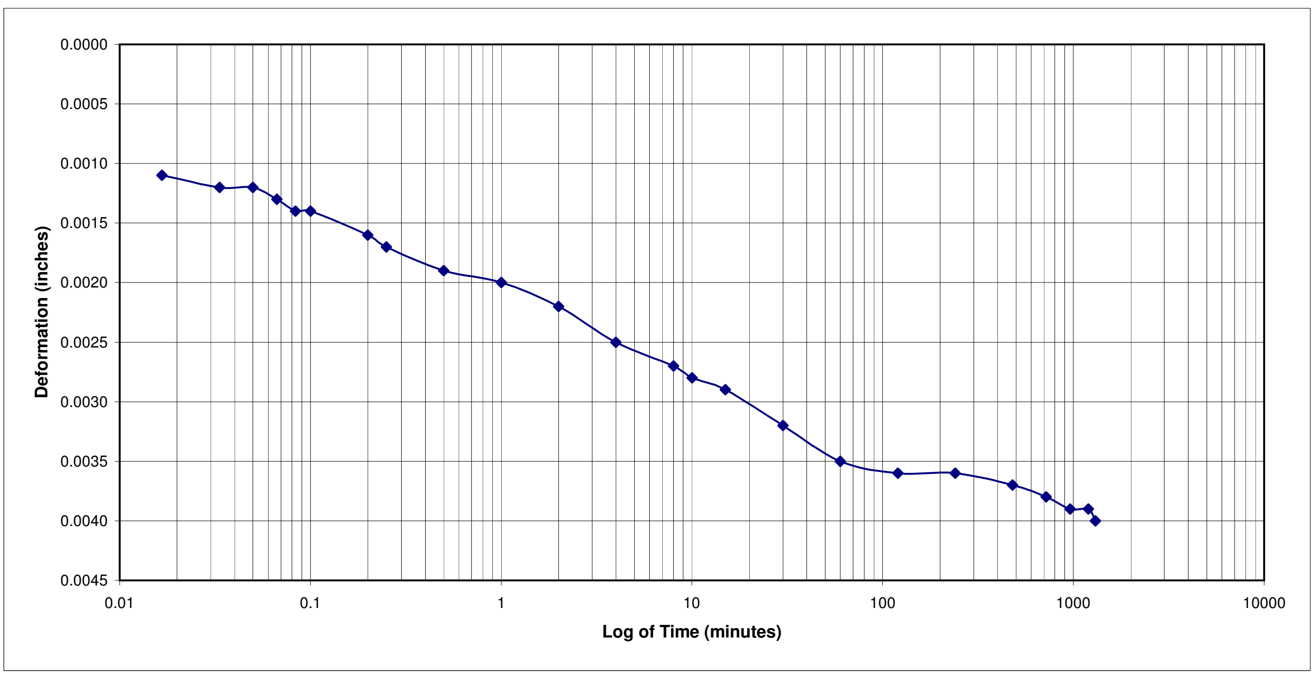
Location: North Charleston, South Carolina

Project No. 1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-47A, 24 to 26 feet
LOAD = 0.125 TSF



DEFORMATION VS. LOG OF TIME
B-47A, 24 to 26 feet
LOAD = 0.125 TSF



Sample No.:	SCI B-47A, 25'
Exploration No.:	B-47A
Depth:	24 - 26 feet

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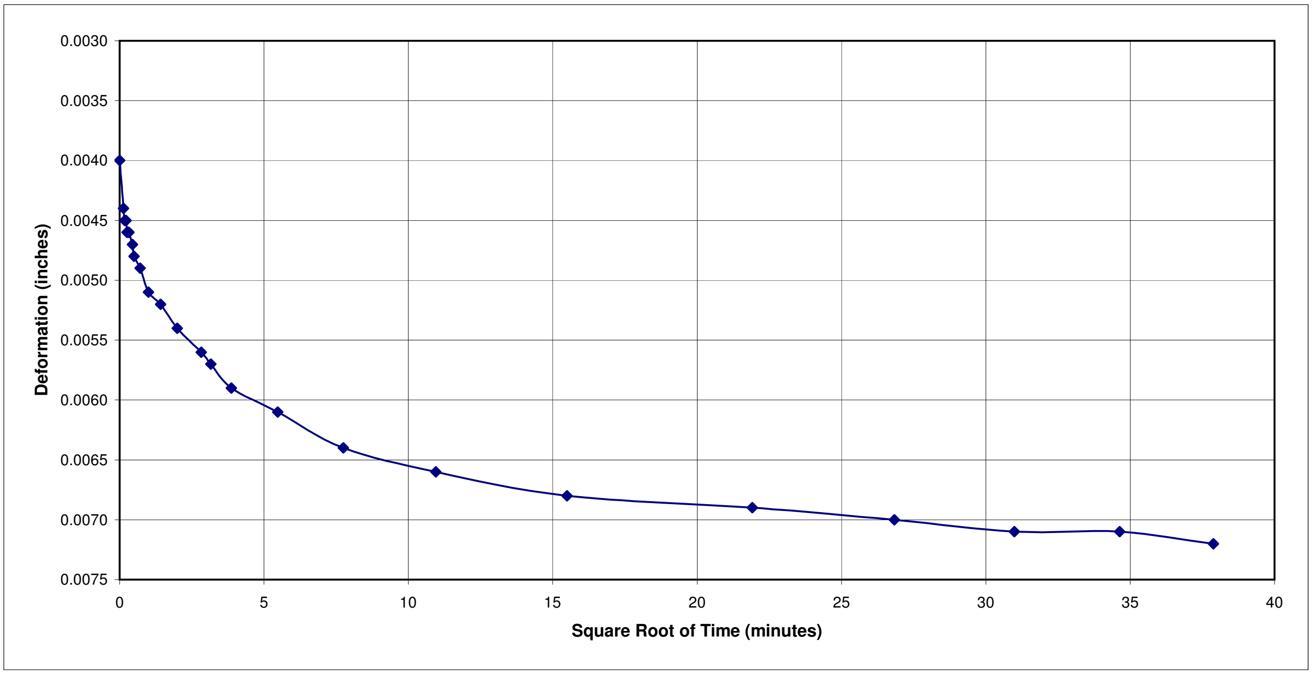
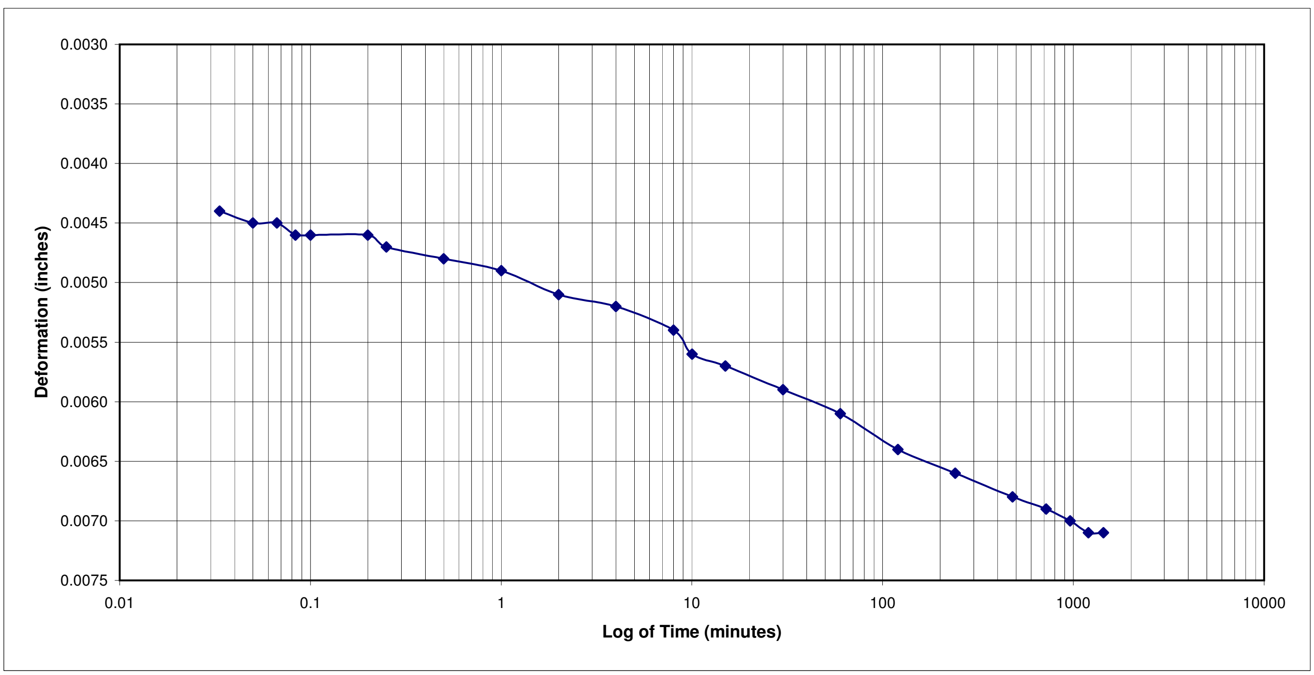
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-47A, 24 to 26 feet
LOAD = 0.25 TSF



DEFORMATION VS. LOG OF TIME
B-47A, 24 to 26 feet
LOAD = 0.25 TSF



Sample No.:	SCI B-47A, 25'
Exploration No.:	B-47A
Depth:	24 - 26 feet

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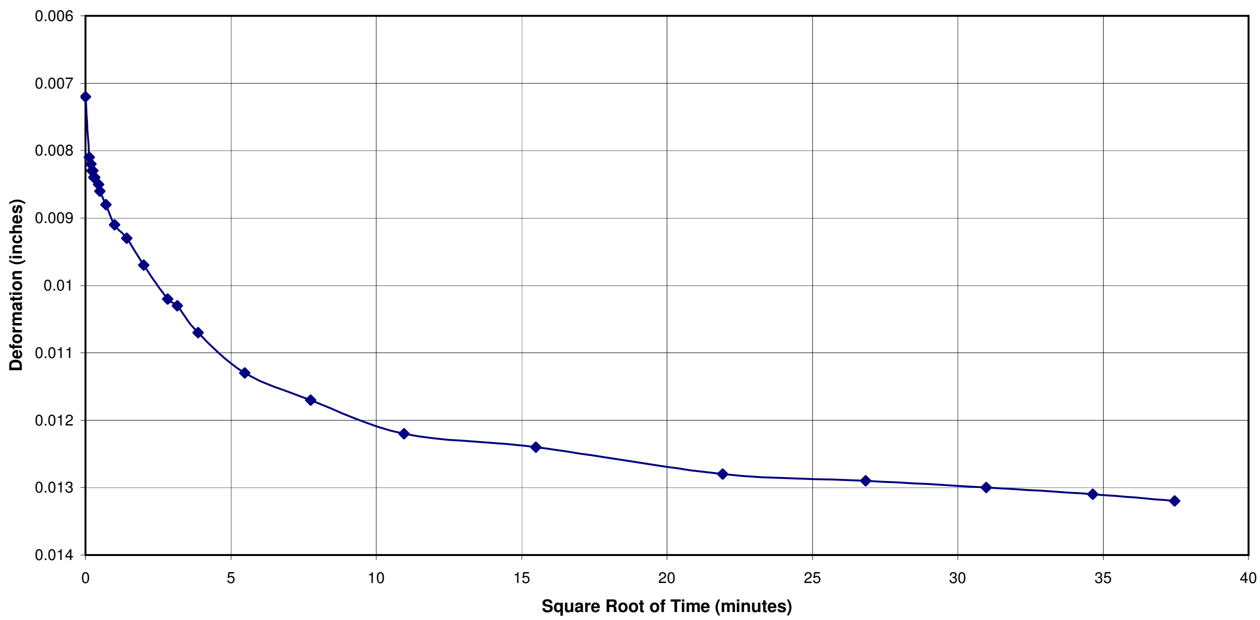
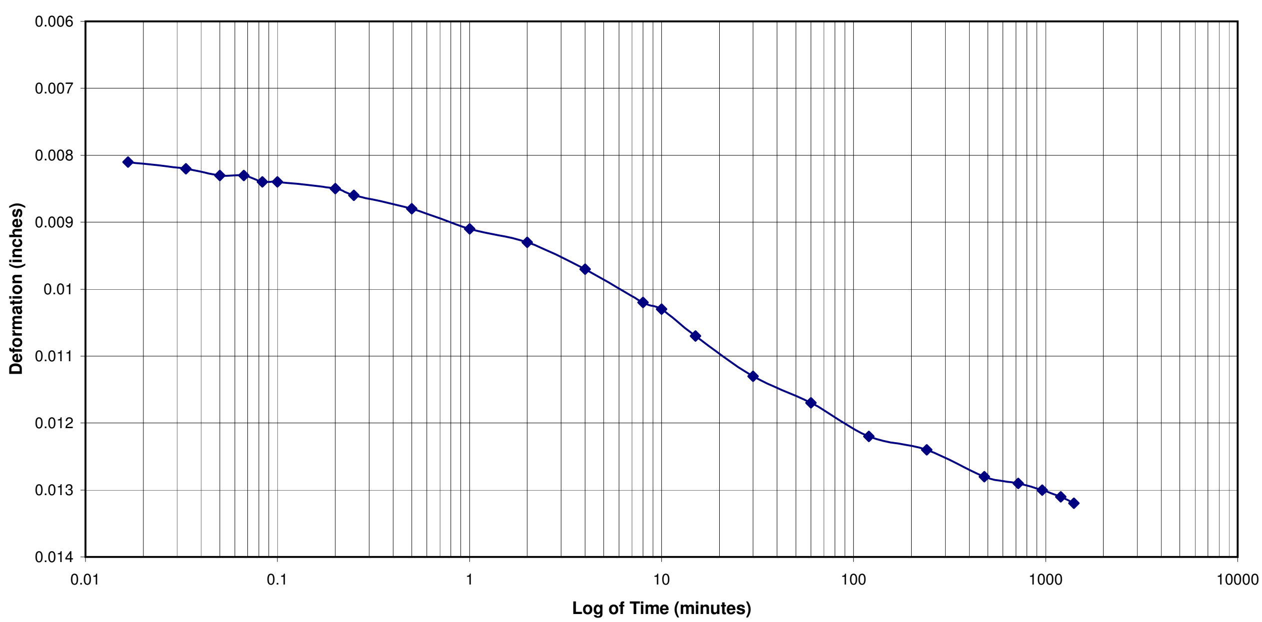
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-47A, 24 to 26 feet
LOAD = 0.5 TSF



DEFORMATION VS. LOG OF TIME
B-47A, 24 to 26 feet
LOAD = 0.5 TSF



Sample No.:	SCI B-47A, 25'
Exploration No.:	B-47A
Depth:	24 - 26 feet

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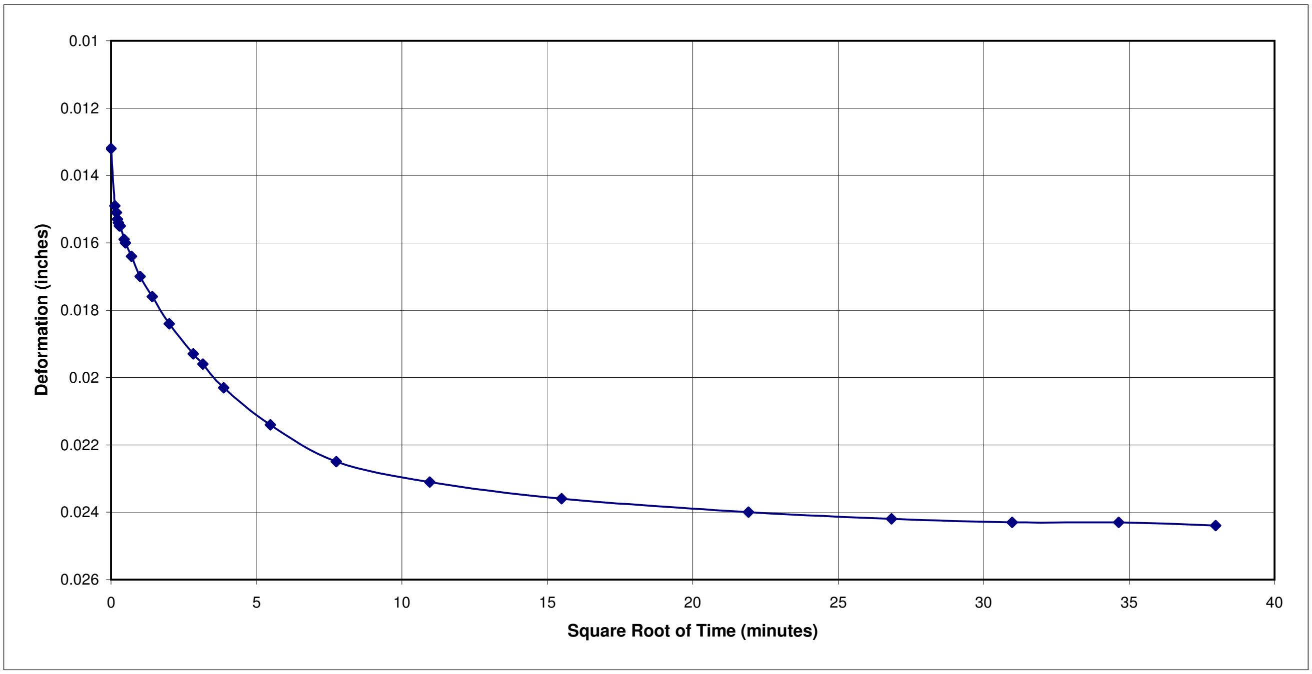
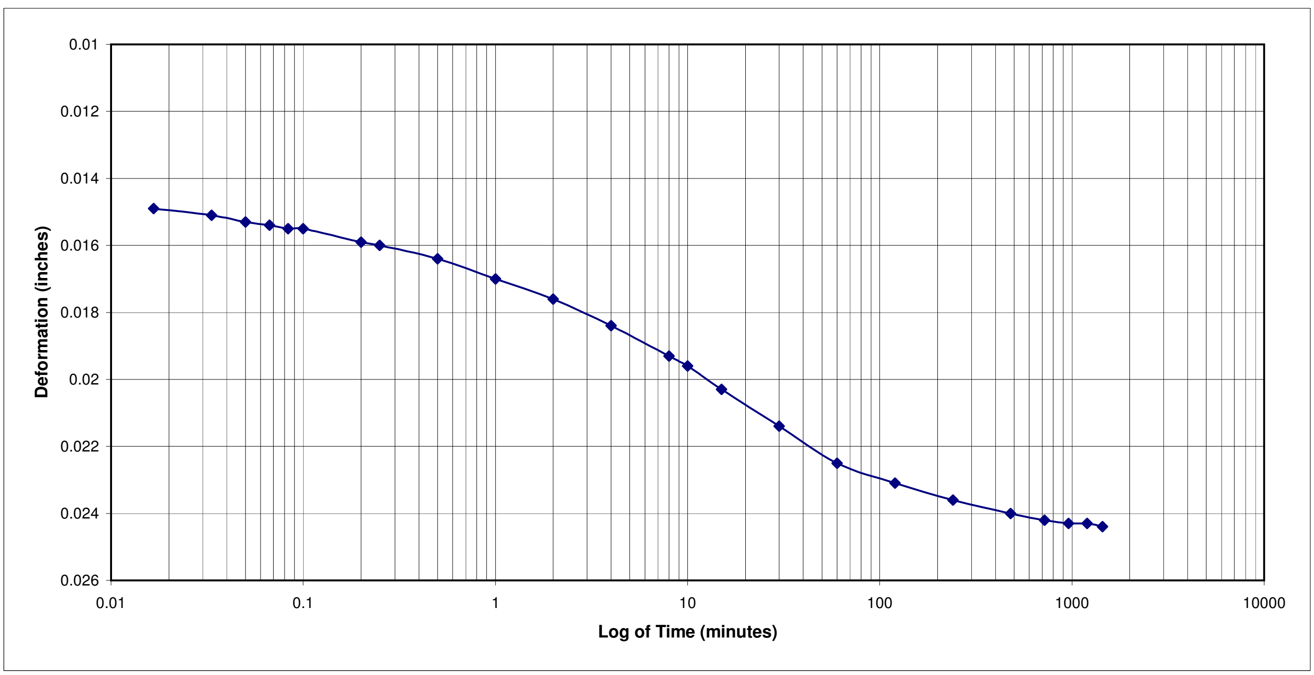
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-47A, 24 to 26 feet
LOAD = 1.0 TSF



DEFORMATION VS. LOG OF TIME
B-47A, 24 to 26 feet
LOAD = 1.0 TSF



Sample No.:	SCI B-47A, 25'
Exploration No.:	B-47A
Depth:	24 - 26 feet

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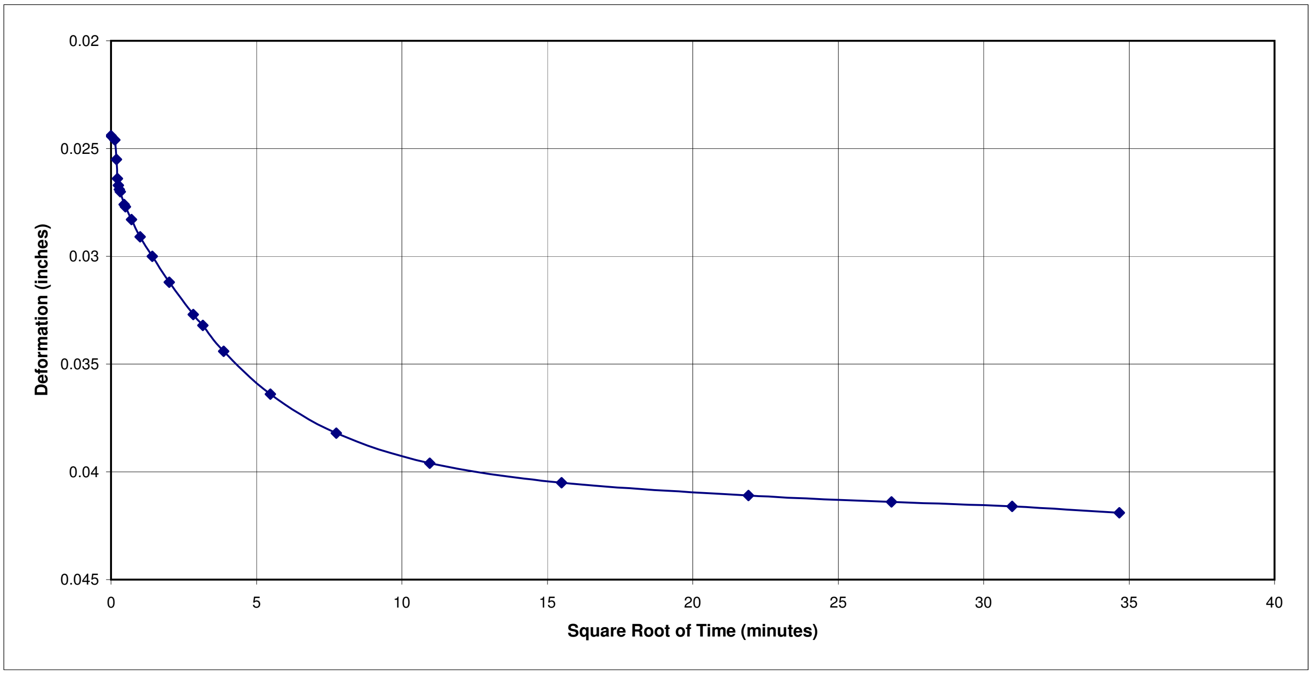
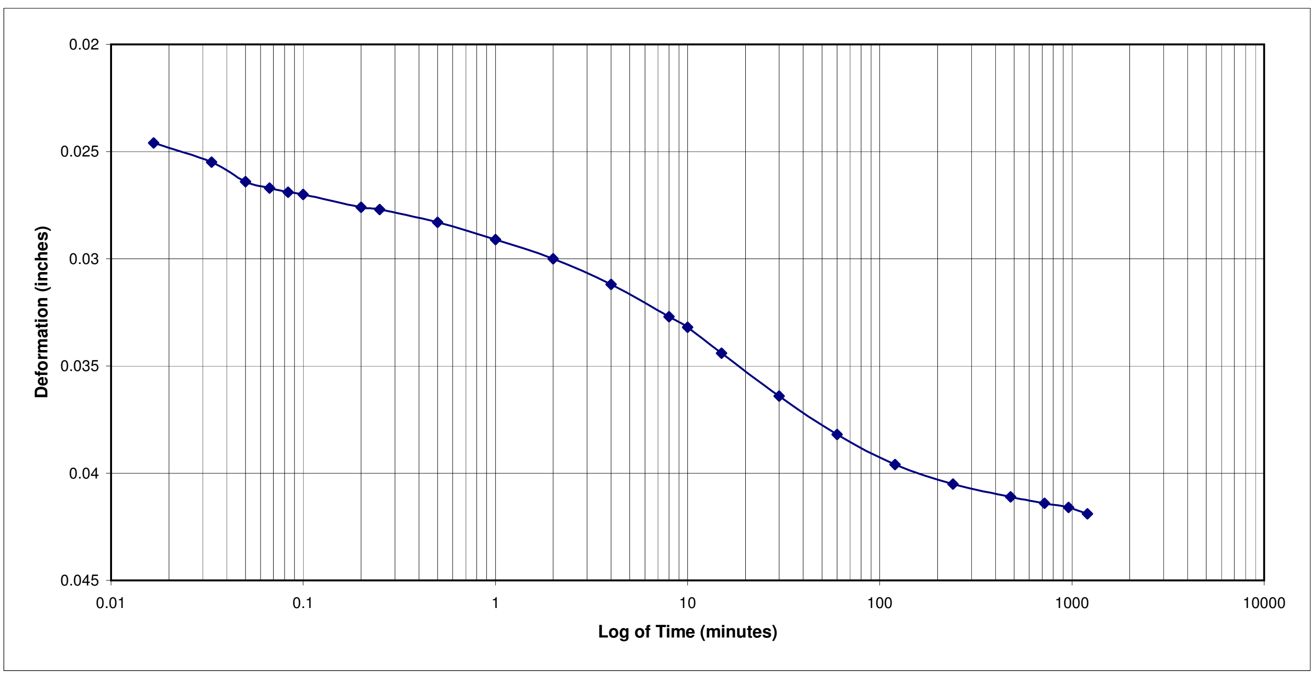
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-47A, 24 to 26 feet
LOAD = 2.0 TSF



DEFORMATION VS. LOG OF TIME
B-47A, 24 to 26 feet
LOAD = 2.0 TSF



Sample No.:	SCI B-47A, 25'
Exploration No.:	B-47A
Depth:	24 - 26 feet

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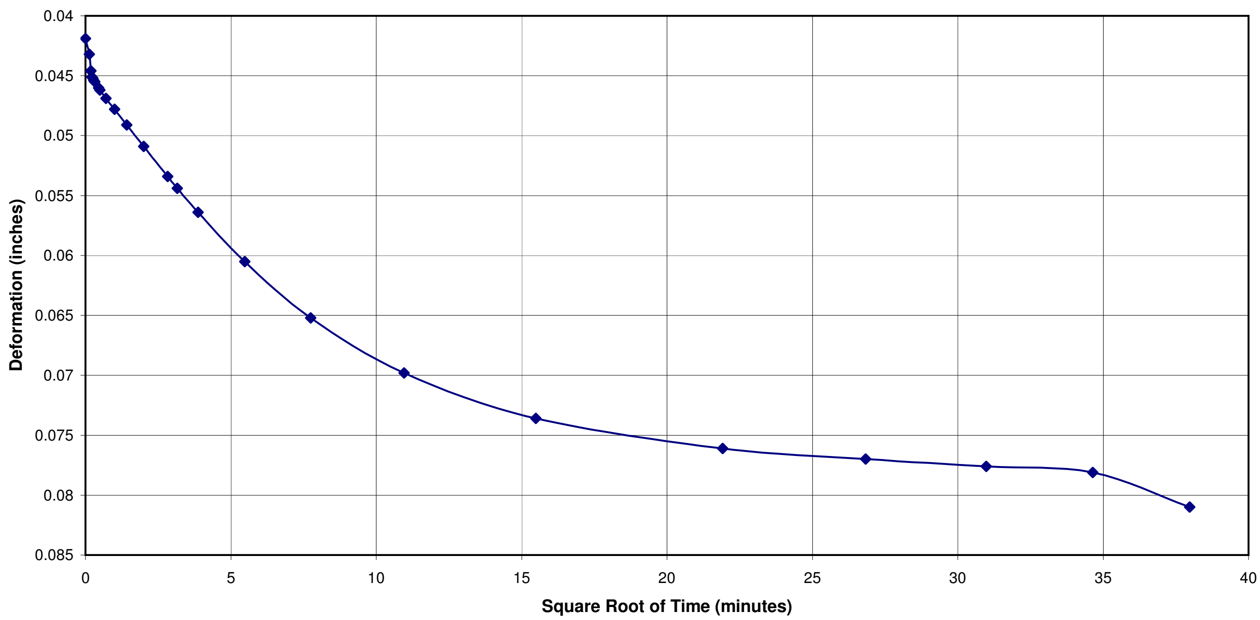
1-D CONSOLIDATION TIME-DEFORMATION CURVES

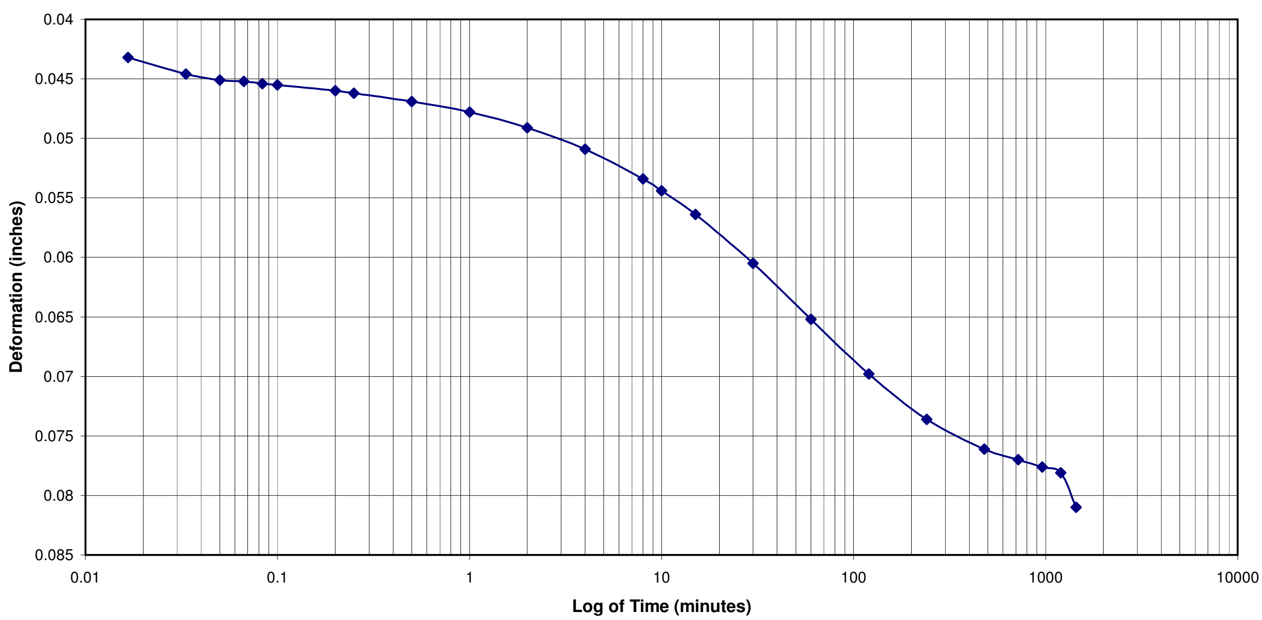
Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

X:\LB\Job Files\1131-08-554 Port Access Road\Consolidation\Time Plots\[Manual Consolidation Time Plots - B-47A, 24 to 26 feet - SCI.xls]Load Increment 5

DEFORMATION VS. SQUARE ROOT OF TIME
B-47A, 24 to 26 feet
LOAD = 4.0 TSF



DEFORMATION VS. LOG OF TIME
B-47A, 24 to 26 feet
LOAD = 4.0 TSF



Sample No.:	SCI B-47A, 25'
Exploration No.:	B-47A
Depth:	24 - 26 feet

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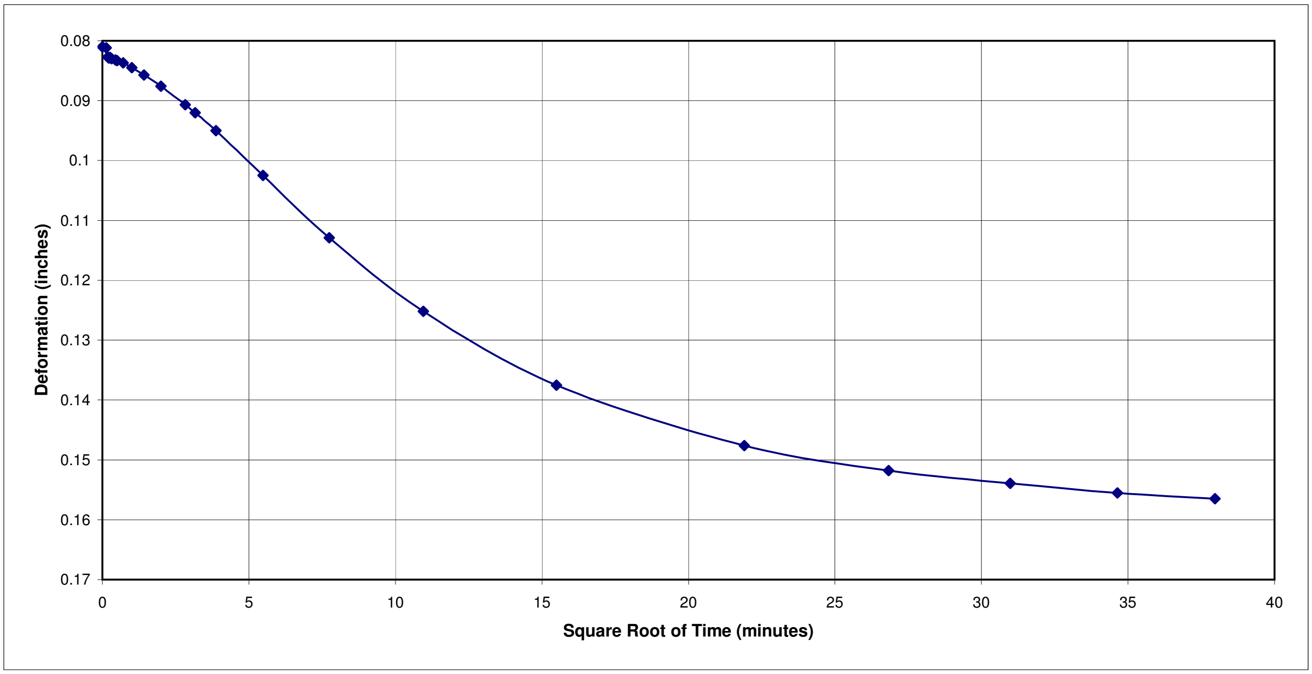
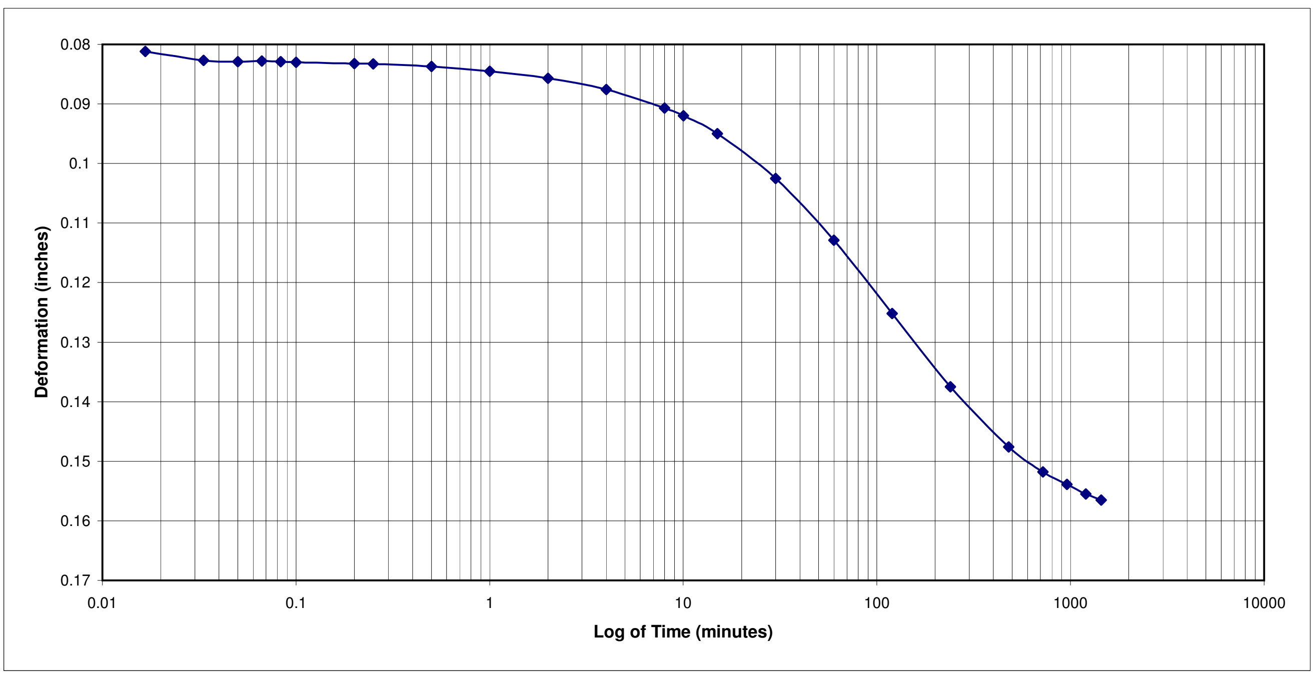
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-47A, 24 to 26 feet
LOAD = 8.0 TSF



DEFORMATION VS. LOG OF TIME
B-47A, 24 to 26 feet
LOAD = 8.0 TSF



Sample No.: SCI B-47A, 25'
Exploration No.: B-47A
Depth: 24 - 26 feet

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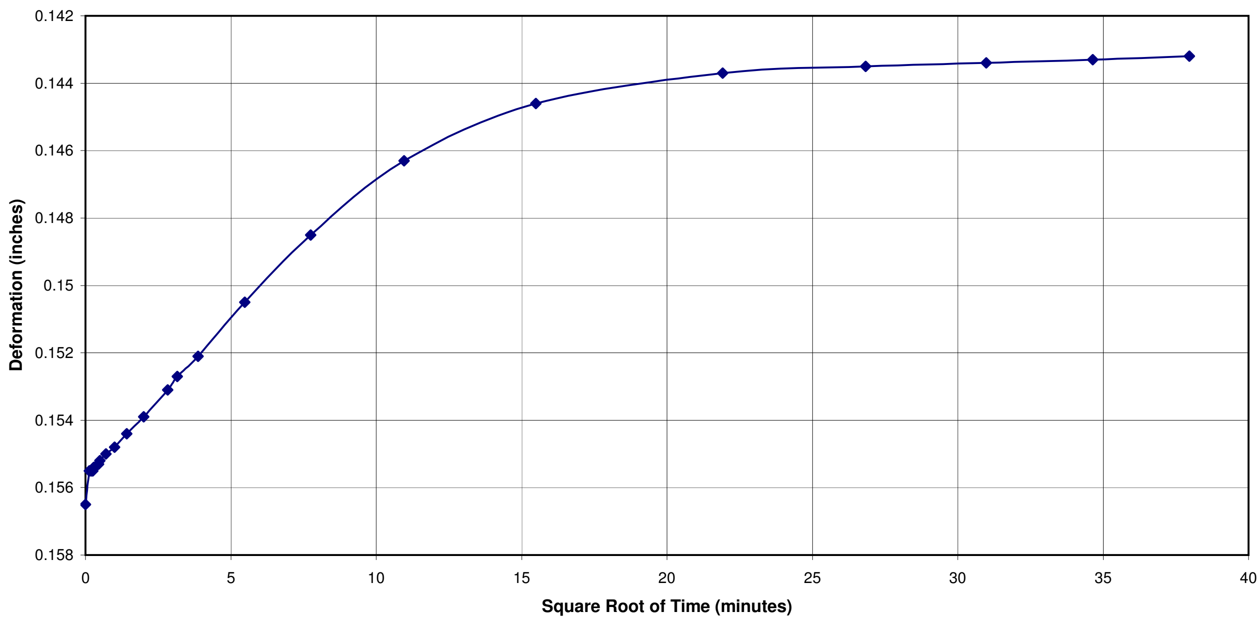
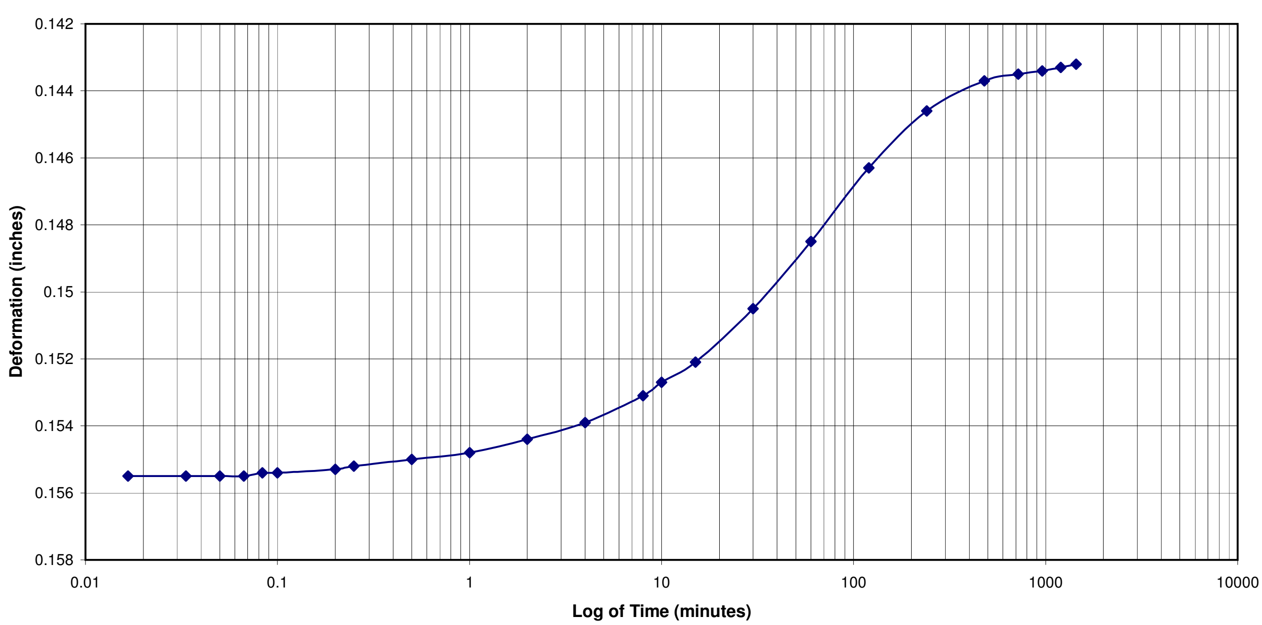
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-47A, 24 to 26 feet
LOAD = 4.0 TSF



DEFORMATION VS. LOG OF TIME
B-47A, 24 to 26 feet
LOAD = 4.0 TSF



Sample No.:	SCI B-47A, 25'
Exploration No.:	B-47A
Depth:	24 - 26 feet

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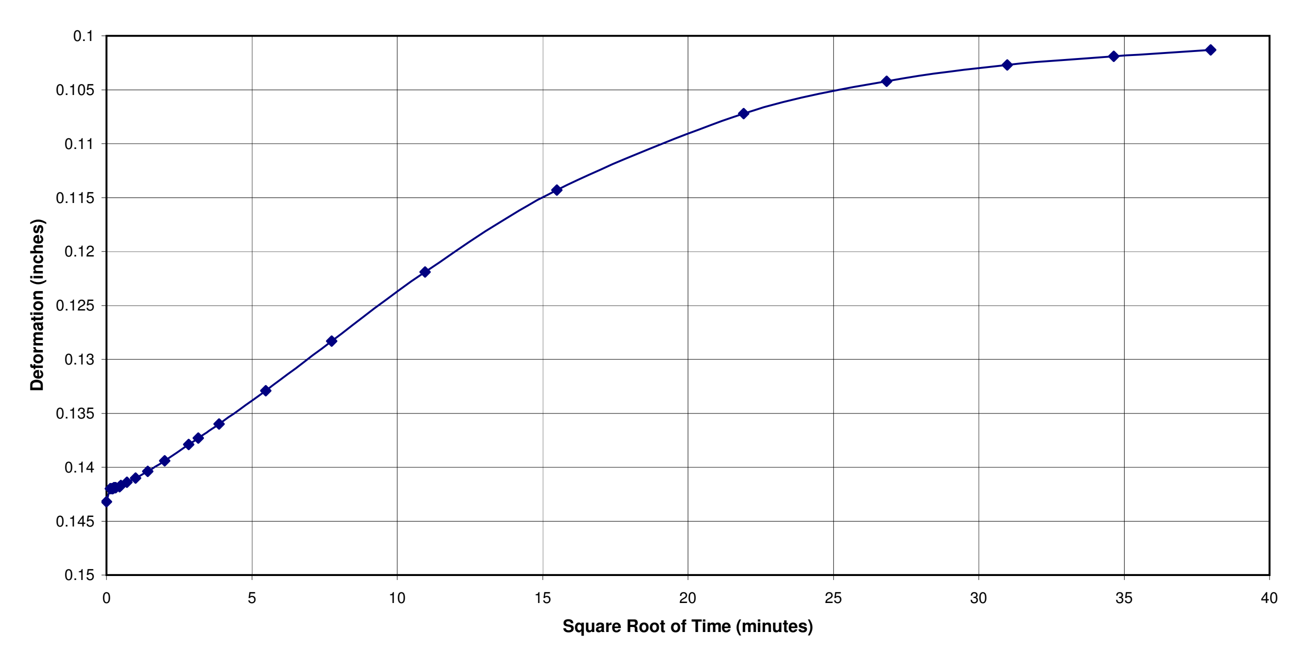
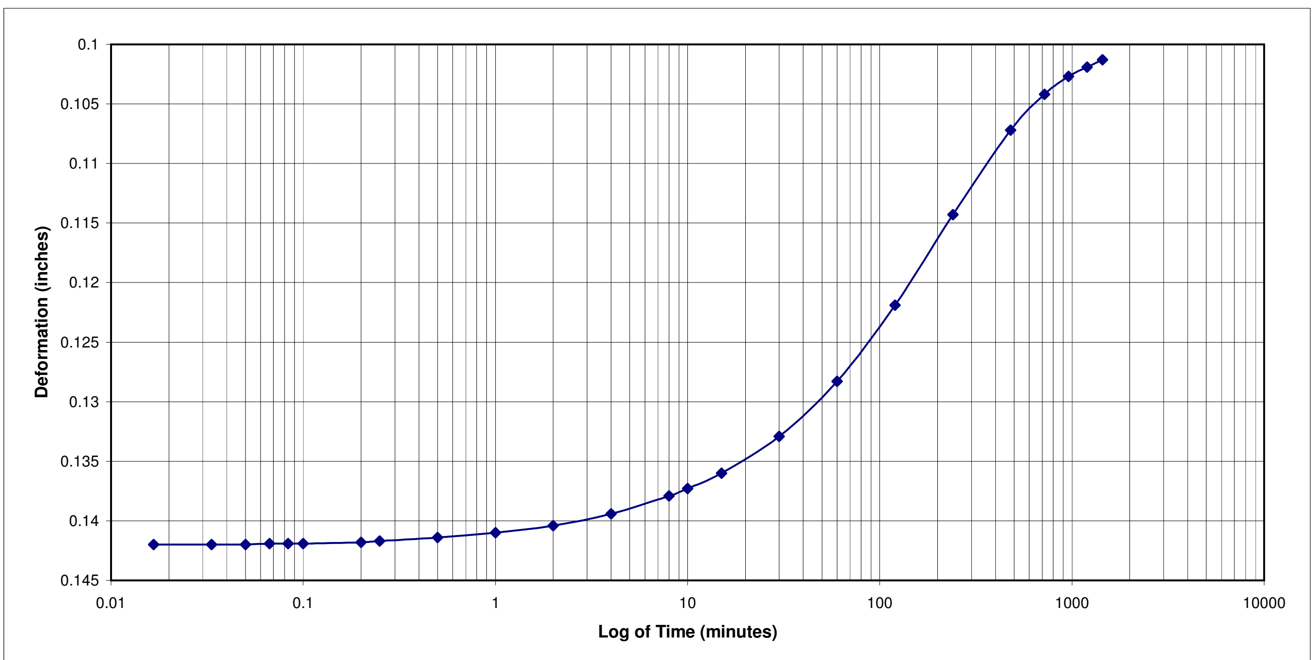
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-47A, 24 to 26 feet
LOAD = 1.0 TSF



DEFORMATION VS. LOG OF TIME
B-47A, 24 to 26 feet
LOAD = 1.0 TSF



Sample No.:	SCI B-47A, 25'
Exploration No.:	B-47A
Depth:	24 - 26 feet

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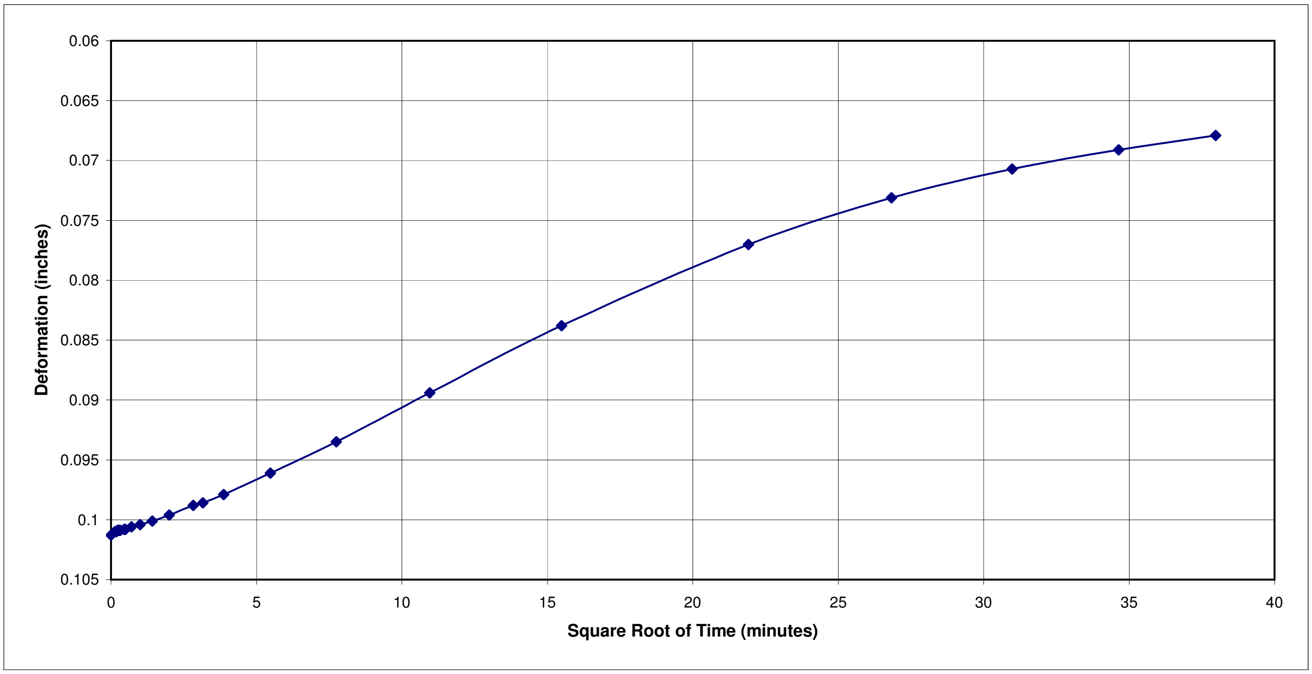
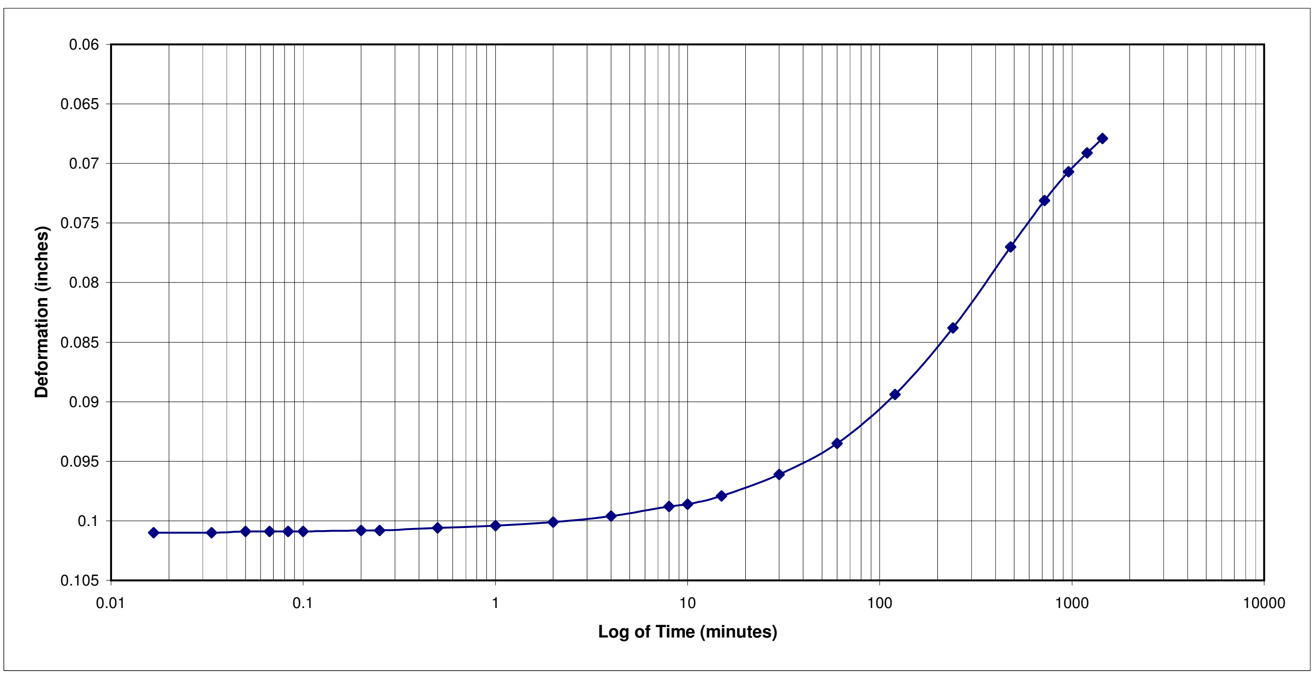
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-47A, 24 to 26 feet
LOAD = 0.25 TSF



DEFORMATION VS. LOG OF TIME
B-47A, 24 to 26 feet
LOAD = 0.25 TSF



Sample No.:	SCI B-47A, 25'
Exploration No.:	B-47A
Depth:	24 - 26 feet

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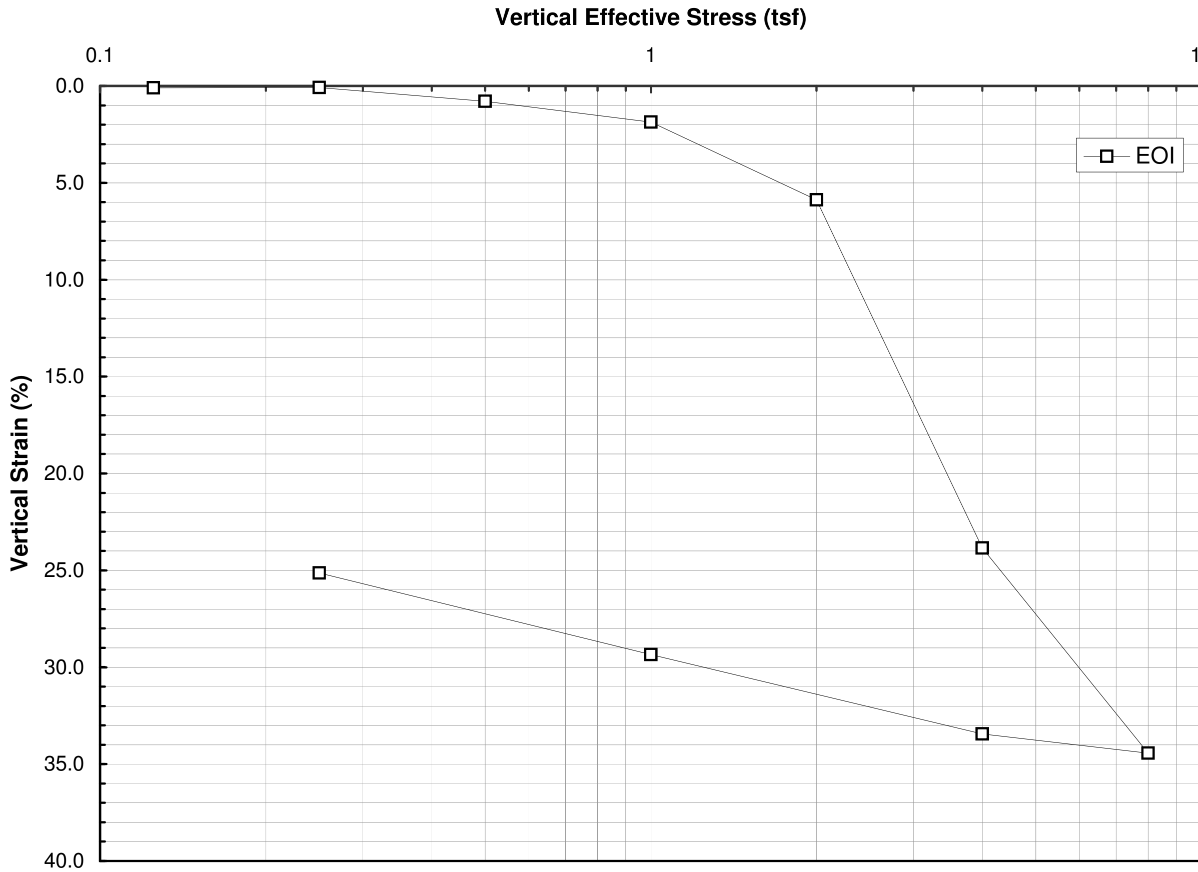
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554



CONSOLIDATION PARAMETERS

Probable Preconsolidation Stress, P'_c (tsf):	1.8
Approx. Hydrostatic Effective Stress, P'_o (tsf)	0.7
Vertical Strain at P'_o (%):	1.3
Compression Ratio (CR):	0.59
Recompression Ratio (RR):	0.069
Over Consolidation Ratio (OCR):	2.6

TEST METHOD

Test Method:	ASTM D-2435 A
Trimming Procedure:	2.5-inch Trimming Lathe
Pressure at Inundation:	0.015 tsf
Method to Compute C_v:	ASTM D-2435 12.3.2

SAMPLE ID

Test No.:	S&ME B-53A, 33'
Sample No.:	UD1
Exploration No.:	B-53A
Depth:	32 to 34 feet
USCS Description:	Fat CLAY with sand (CH)

SAMPLE DATA

Sample Diameter (cm):	6.35
Sample Area (cm^2):	31.67
Measured Specific Gravity:	2.69
Trimmings Moisture (%):	76.9
% Passing #200 Sieve:	82.9
Liquid Limit:	81
Plastic Limit:	31
Plasticity Index:	50

	Initial	Final
Water Content (%):	76.1	63.4
Est. % Saturation:	80.4	100.0
Sample Height (cm):	2.540	1.901
Wet Sample Weight (g):	107.5	99.7
Dry Sample Weight (g):	61.0	61.0
Dry Unit Weight (pcf):	47.3	63.2
Void Ratio, e:	2.55	1.66
Solids Height (cm):	0.716	0.716

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ONE-DIMENSIONAL CONSOLIDATION TEST

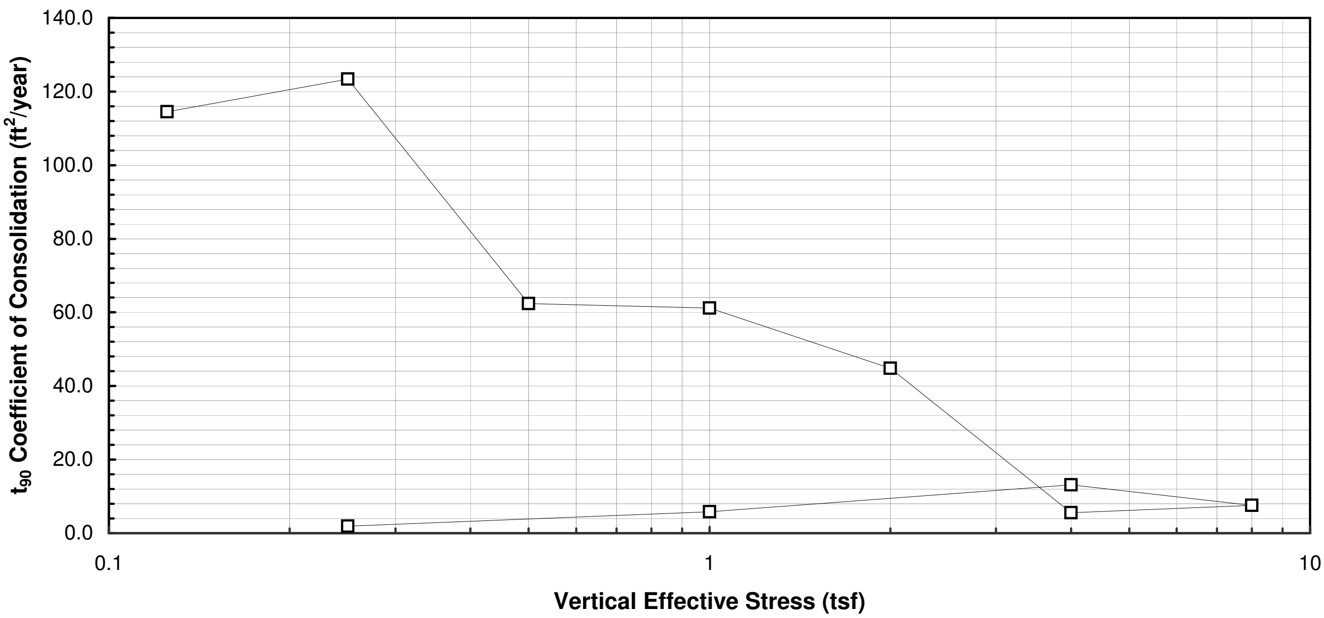
Project: Port Access Road
Client: SCDOT
Location: North Charleston, South Carolina
Project No.: 1131-08-554

Test No.:	S&ME B-53A, 33'
Sample No.:	UD1
Exploration No.:	B-53A
Depth:	32 to 34 feet

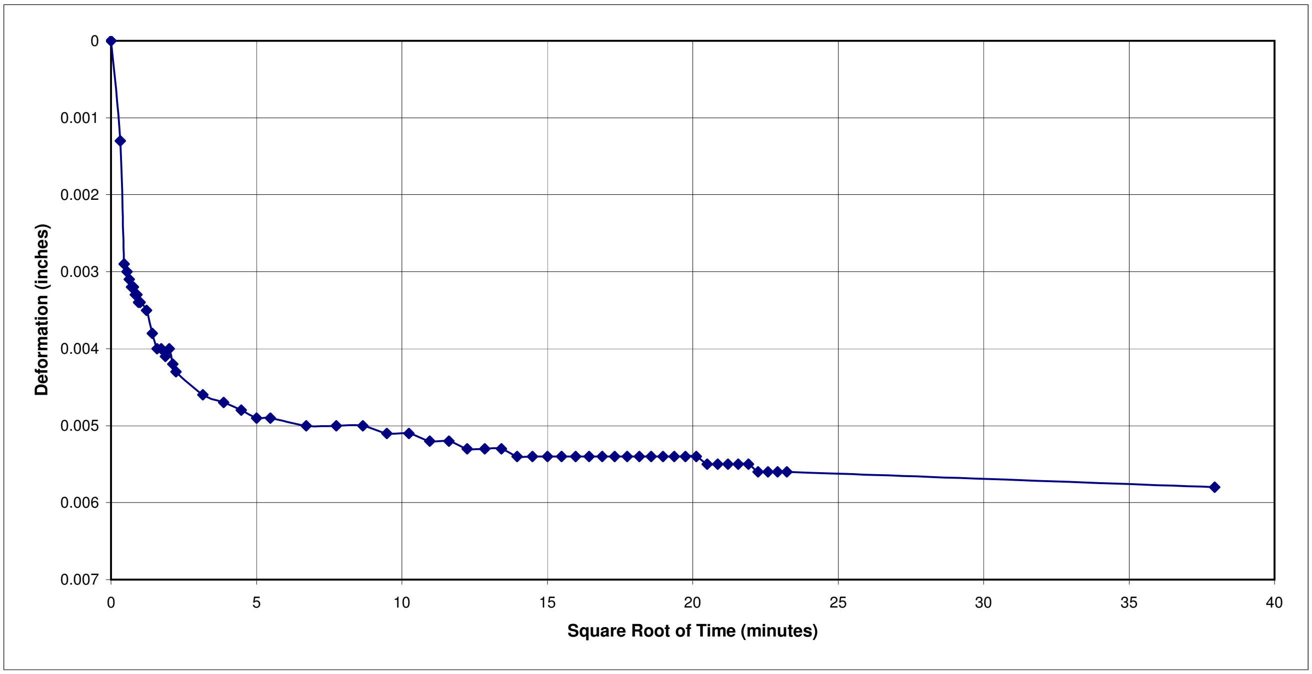
LOAD INC.	STRESS DURATION (Hr - min)	VERTICAL STRESS (tsf)	VERTICAL STRAIN (EOI*)	VERTICAL STRAIN (EOP*)	VOID RATIO e (EOI*)	VOID RATIO e (EOP*)	STRESS RATIO (P'/P'c)	TAYLOR COEFFICIENT OF CONSOLIDATION (ft^2/year)
1	24-00	0.125	0.1	0.0	2.54	2.55	0.07	114.5
2	24-00	0.25	0.1	0.2	2.54	2.54	0.14	123.4
3	24-10	0.5	0.8	0.7	2.52	2.52	0.28	62.3
4	24-00	1	1.9	1.7	2.48	2.49	0.56	61.1
5	24-28	2	5.9	3.9	2.34	2.41	1.11	44.8
6	24-22	4	23.8	20.7	1.70	1.81	2.22	5.6
7	24-04	8	34.4	31.6	1.33	1.43	4.44	7.6
8	24-00	4	33.4	33.6	1.36	1.36	2.22	13.1
9	64-15	1	29.4	30.1	1.51	1.48	0.56	5.8
10	24-00	0.25	25.1	25.9	1.66	1.63	0.14	1.9

*EOI = End of Increment

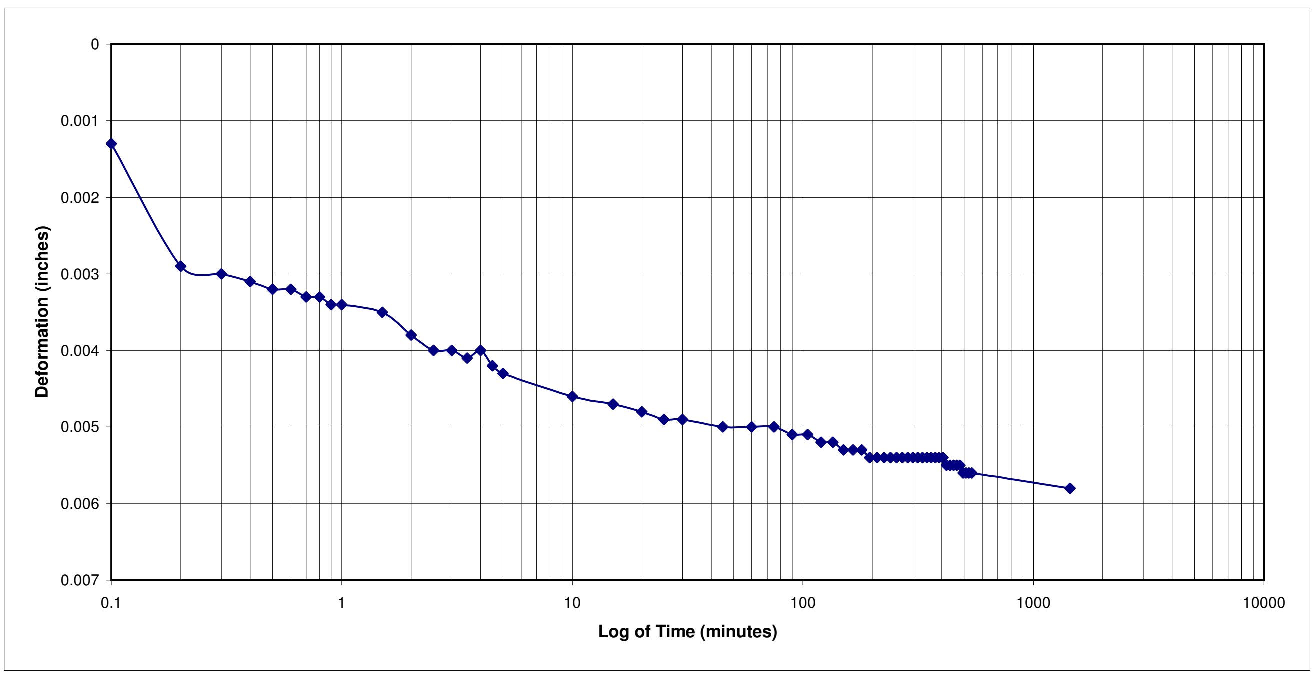
*EOP = End of Primary



DEFORMATION VS. SQUARE ROOT OF TIME
B-53A, 32 to 34 feet
LOAD = 0.125 TSF



DEFORMATION VS. LOG OF TIME
B-53A, 32 to 34 feet
LOAD = 0.125 TSF



Sample No.:	S&ME B-53A, 33'
Exploration No.:	B-53A
Depth:	32 - 34 feet

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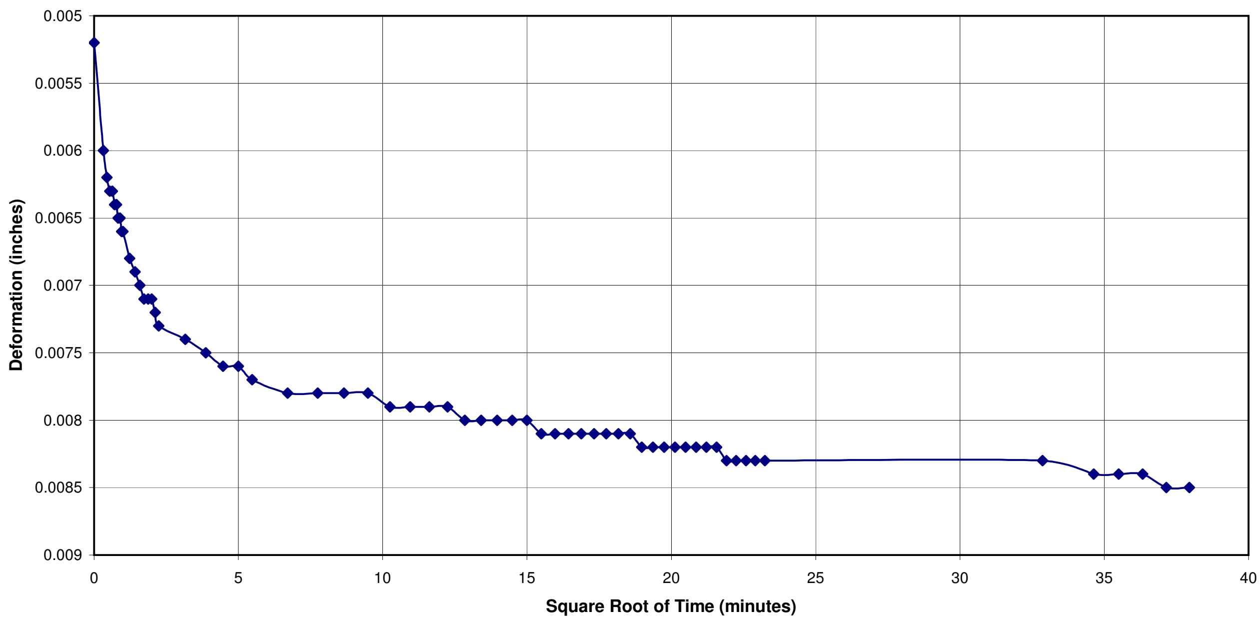
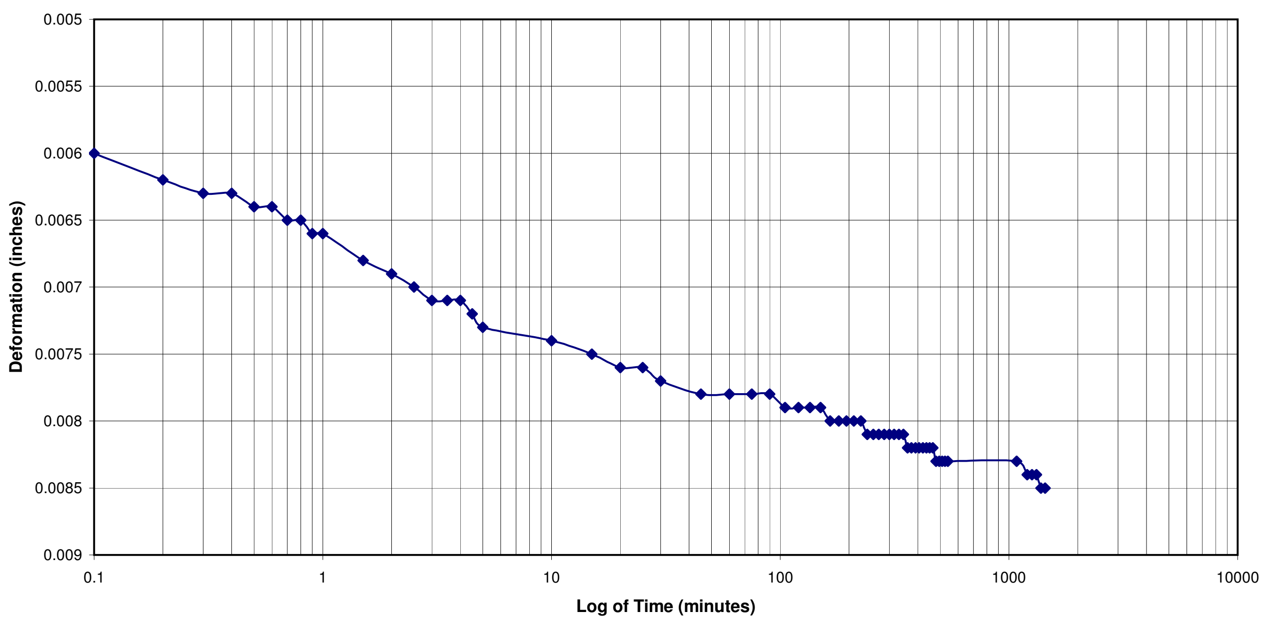
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-53A, 32 to 34 feet
LOAD = 0.25 TSF



DEFORMATION VS. LOG OF TIME
B-53A, 32 to 34 feet
LOAD = 0.25 TSF



Sample No.:	S&ME B-53A, 33'
Exploration No.:	B-53A
Depth:	32 - 34 feet

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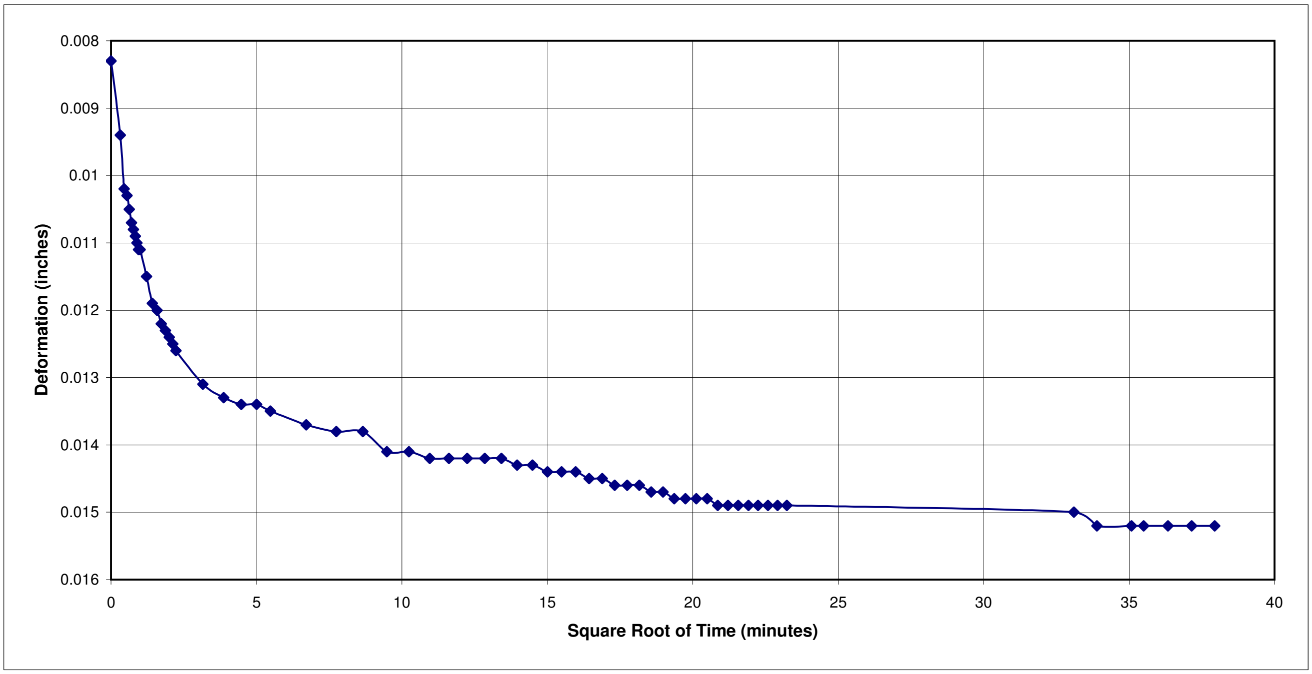
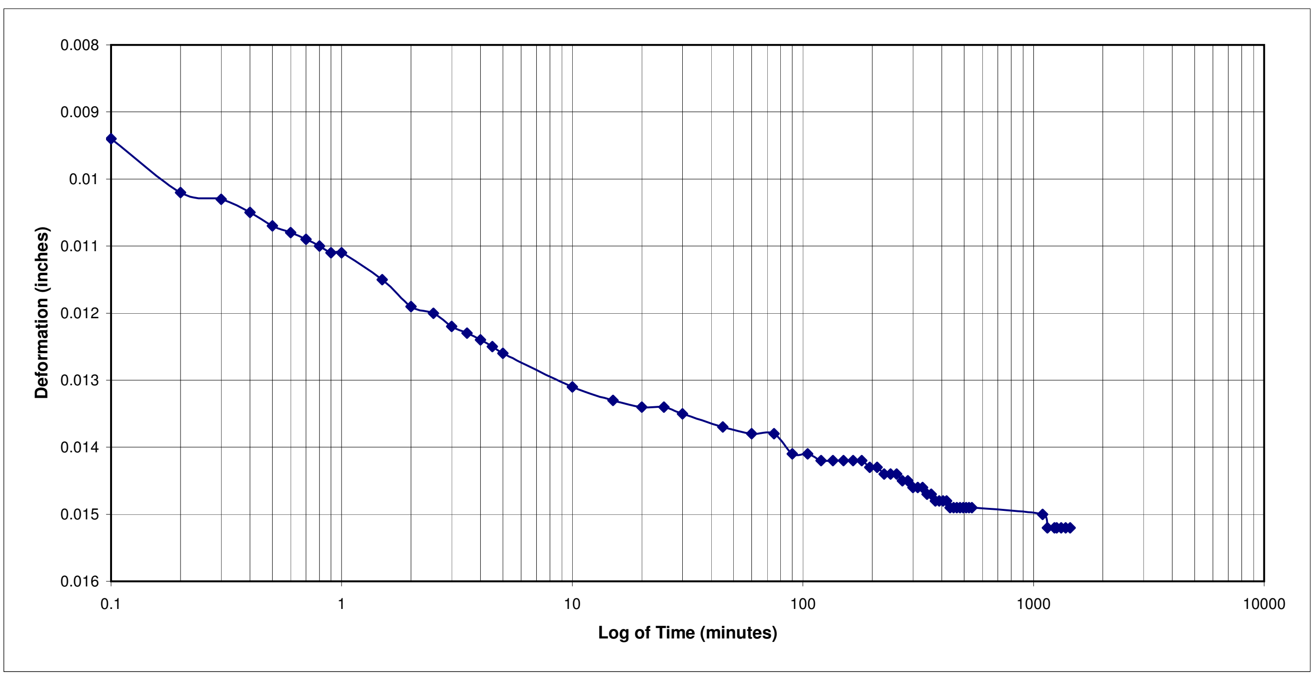
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-53A, 32 to 34 feet
LOAD = 0.5 TSF



DEFORMATION VS. LOG OF TIME
B-53A, 32 to 34 feet
LOAD = 0.5 TSF



Sample No.:	S&ME B-53A, 33'
Exploration No.:	B-53A
Depth:	32 - 34 feet

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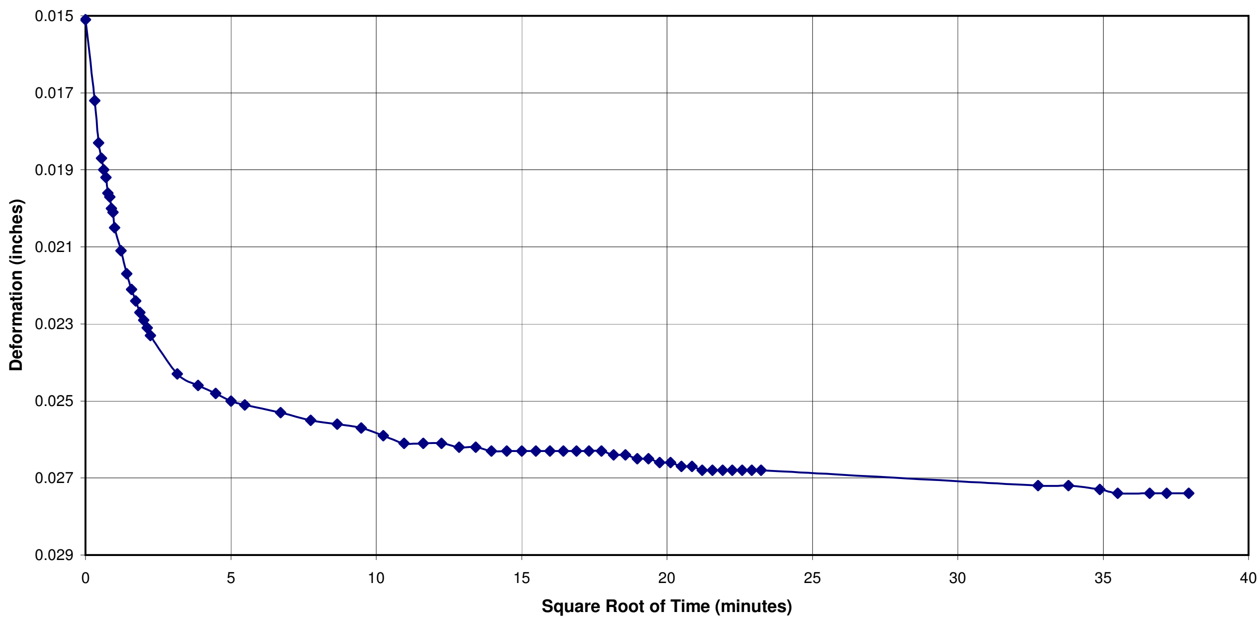
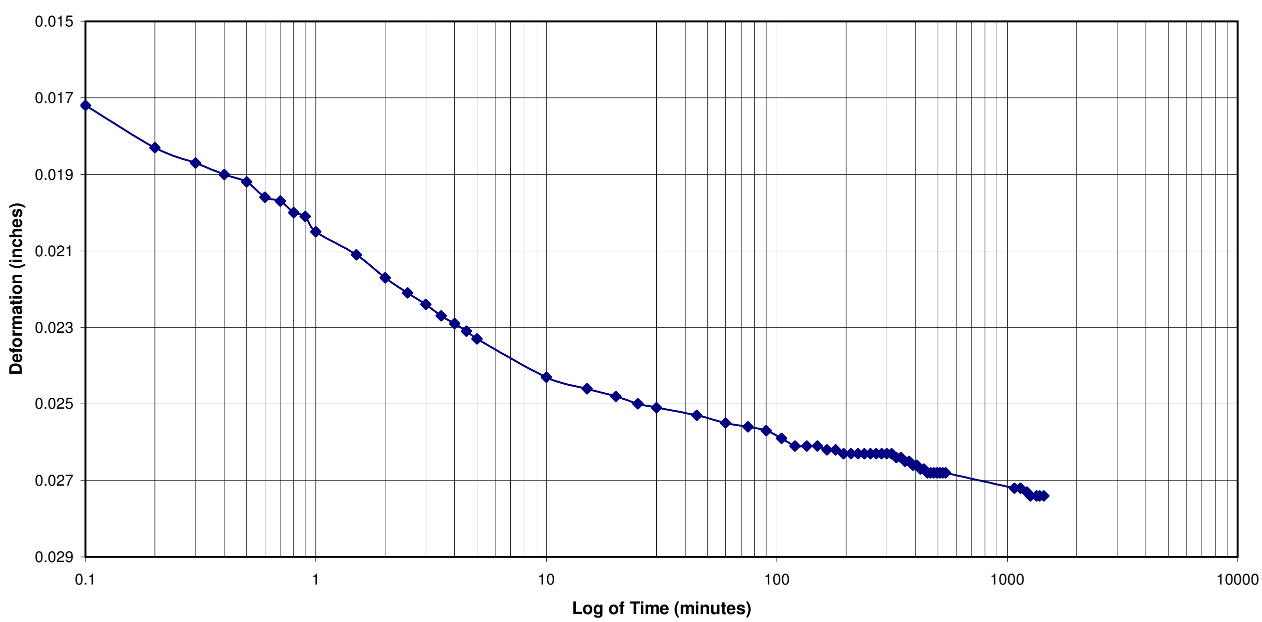
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-53A, 32 to 34 feet
LOAD = 1.0 TSF



DEFORMATION VS. LOG OF TIME
B-53A, 32 to 34 feet
LOAD = 1.0 TSF



Sample No.:	S&ME B-53A, 33'
Exploration No.:	B-53A
Depth:	32 - 34 feet

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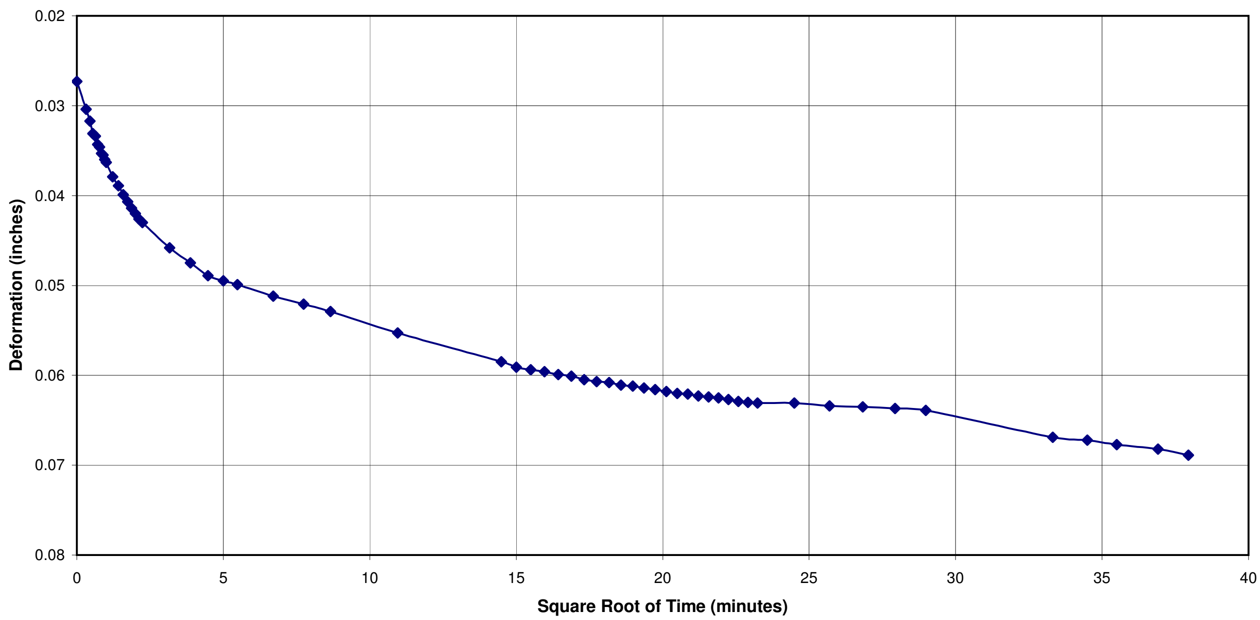
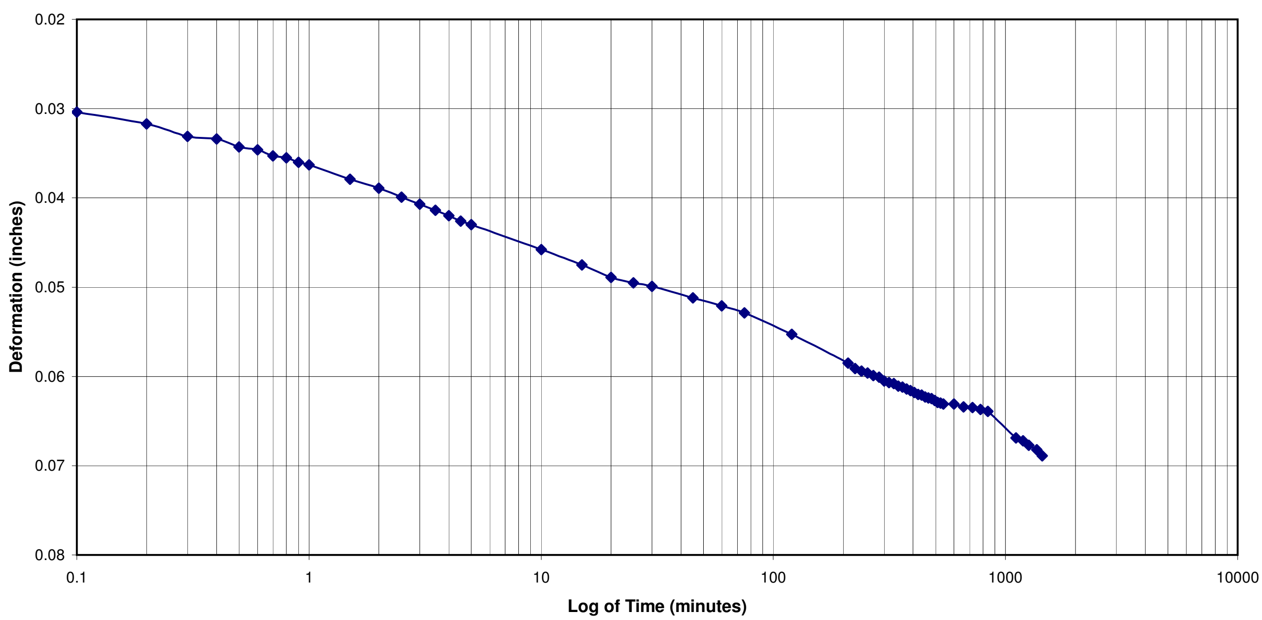
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-53A, 32 to 34 feet
LOAD = 2.0 TSF



DEFORMATION VS. LOG OF TIME
B-53A, 32 to 34 feet
LOAD = 2.0 TSF



Sample No.:	S&ME B-53A, 33'
Exploration No.:	B-53A
Depth:	32 - 34 feet

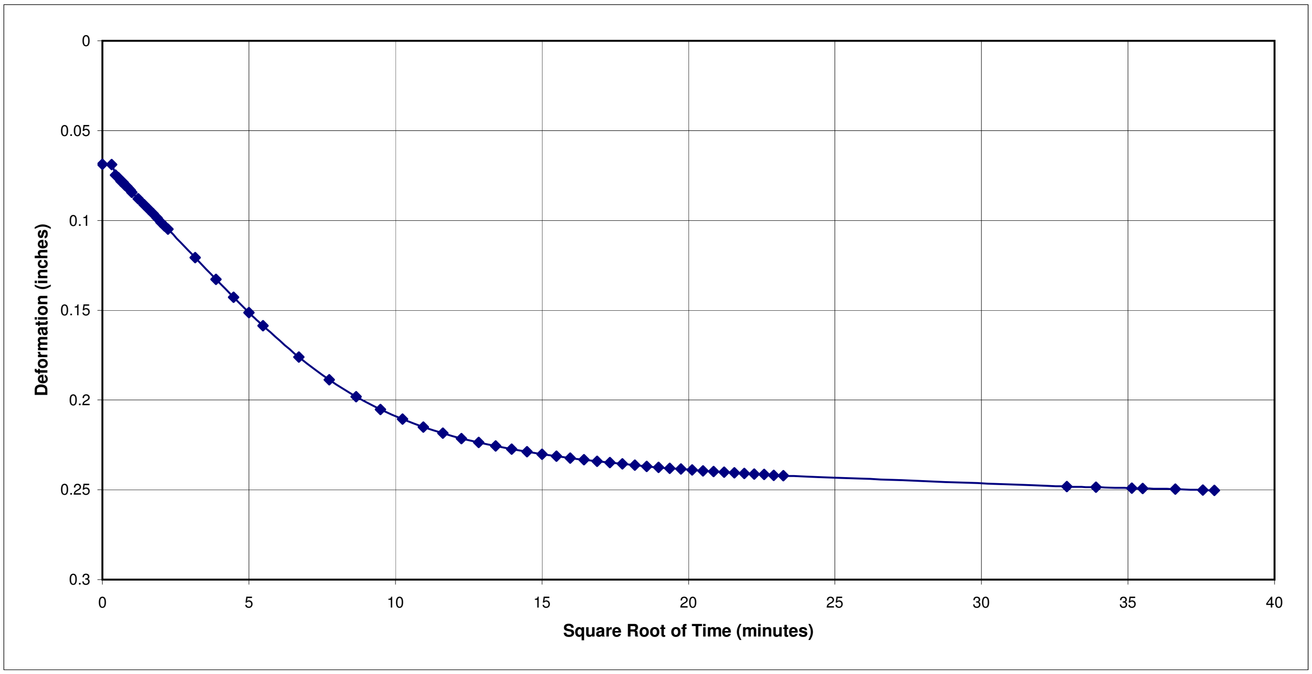
S&ME

8211 Hermitage Road
Richmond, Virginia 23228
Tel: 804.266.2199
Fax: 804.261.5569

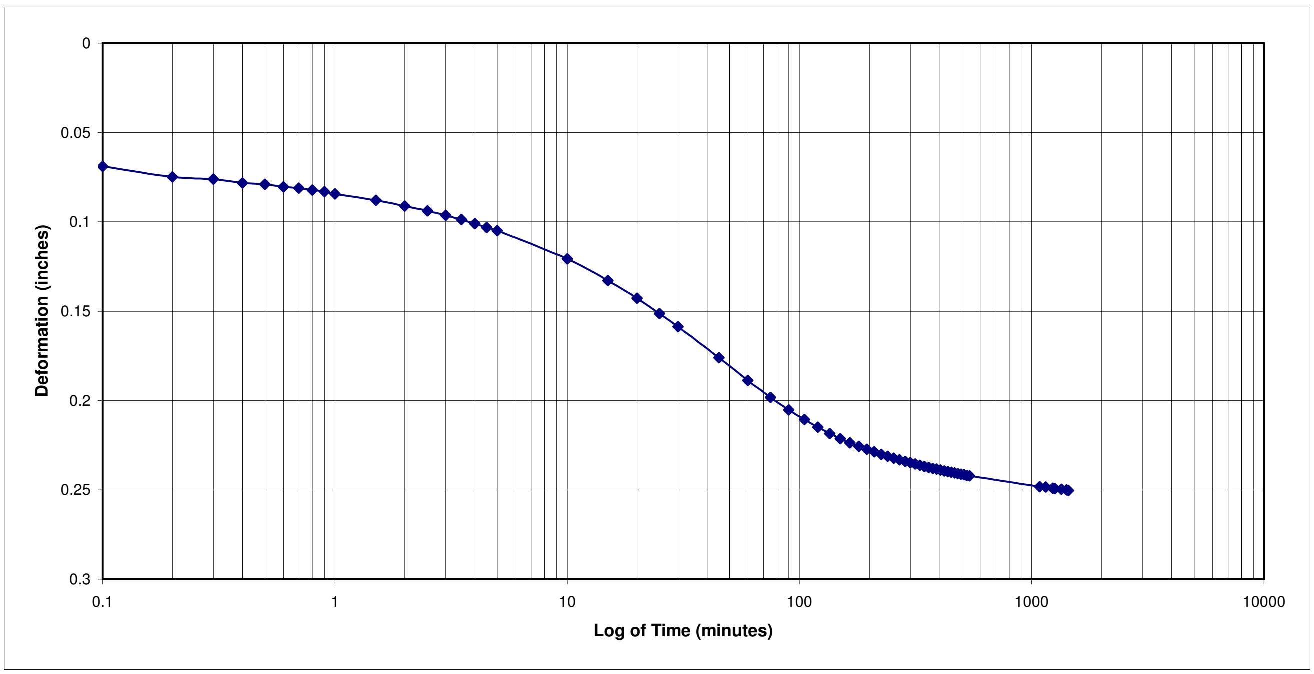
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-53A, 32 to 34 feet
LOAD = 4.0 TSF



DEFORMATION VS. LOG OF TIME
B-53A, 32 to 34 feet
LOAD = 4.0 TSF



Sample No.:	S&ME B-53A, 33'
Exploration No.:	B-53A
Depth:	32 - 34 feet

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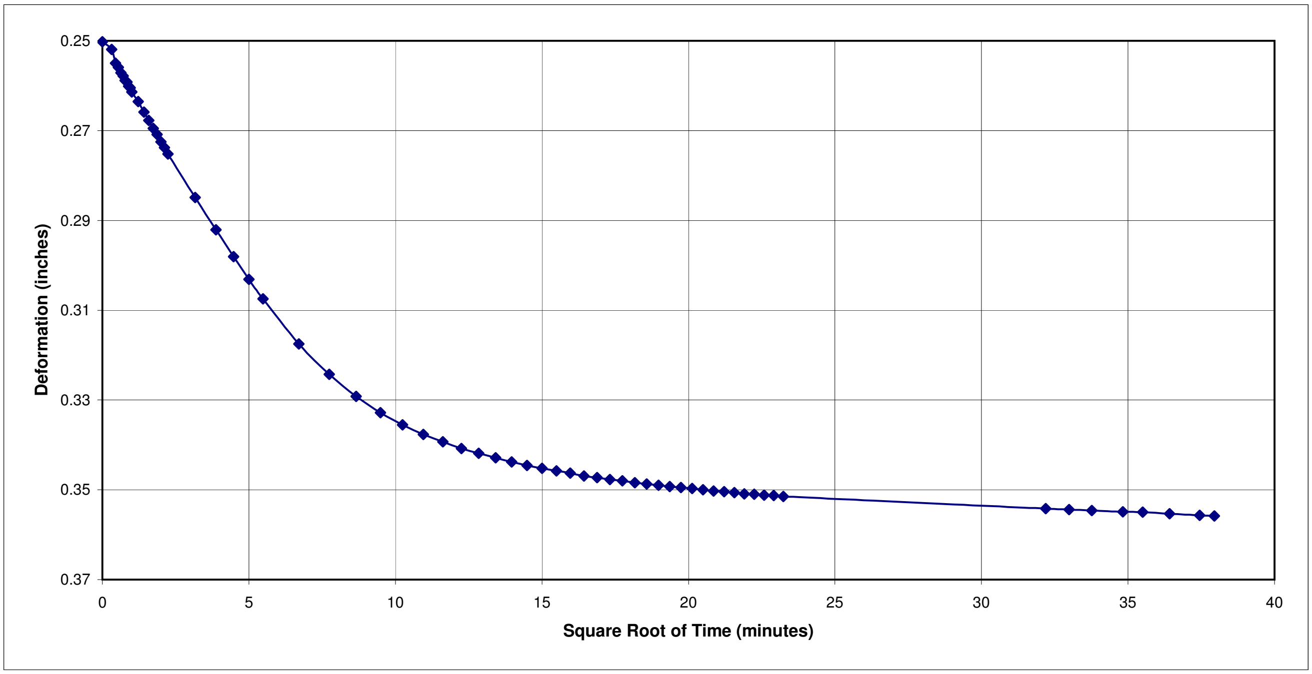
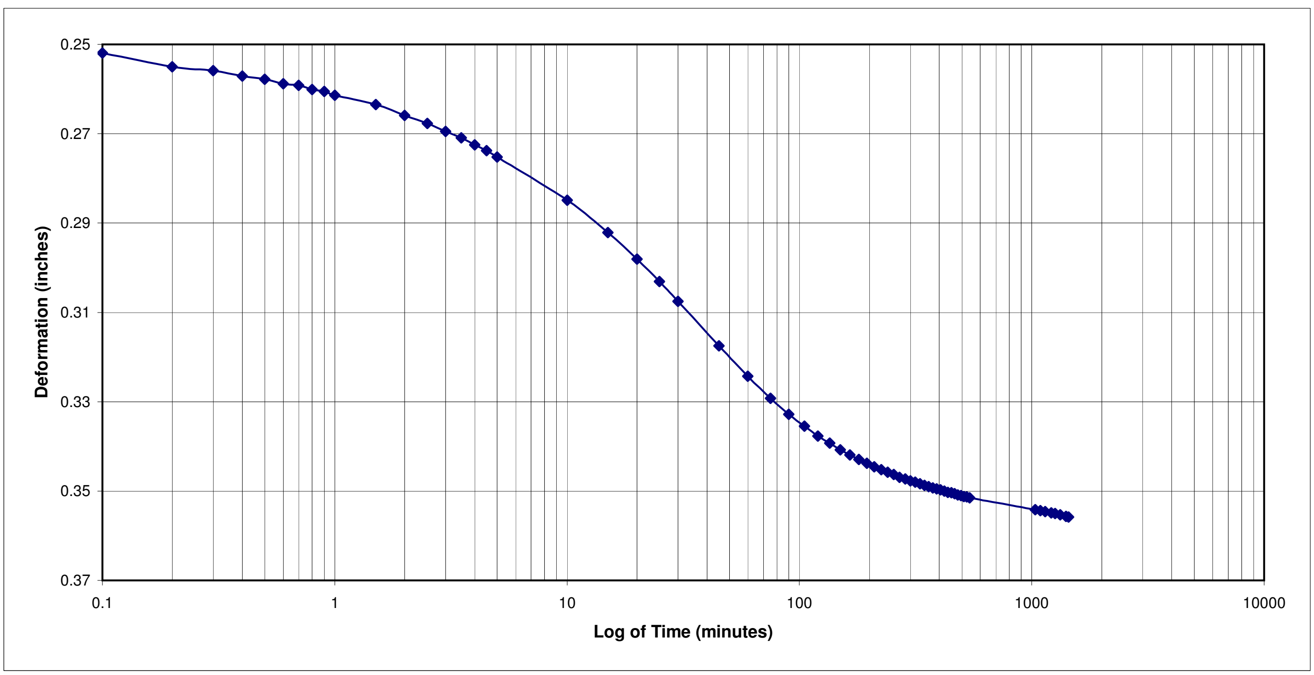
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-53A, 32 to 34 feet
LOAD = 8.0 TSF



DEFORMATION VS. LOG OF TIME
B-53A, 32 to 34 feet
LOAD = 8.0 TSF



Sample No.:	S&ME B-53A, 33'
Exploration No.:	B-53A
Depth:	32 - 34 feet

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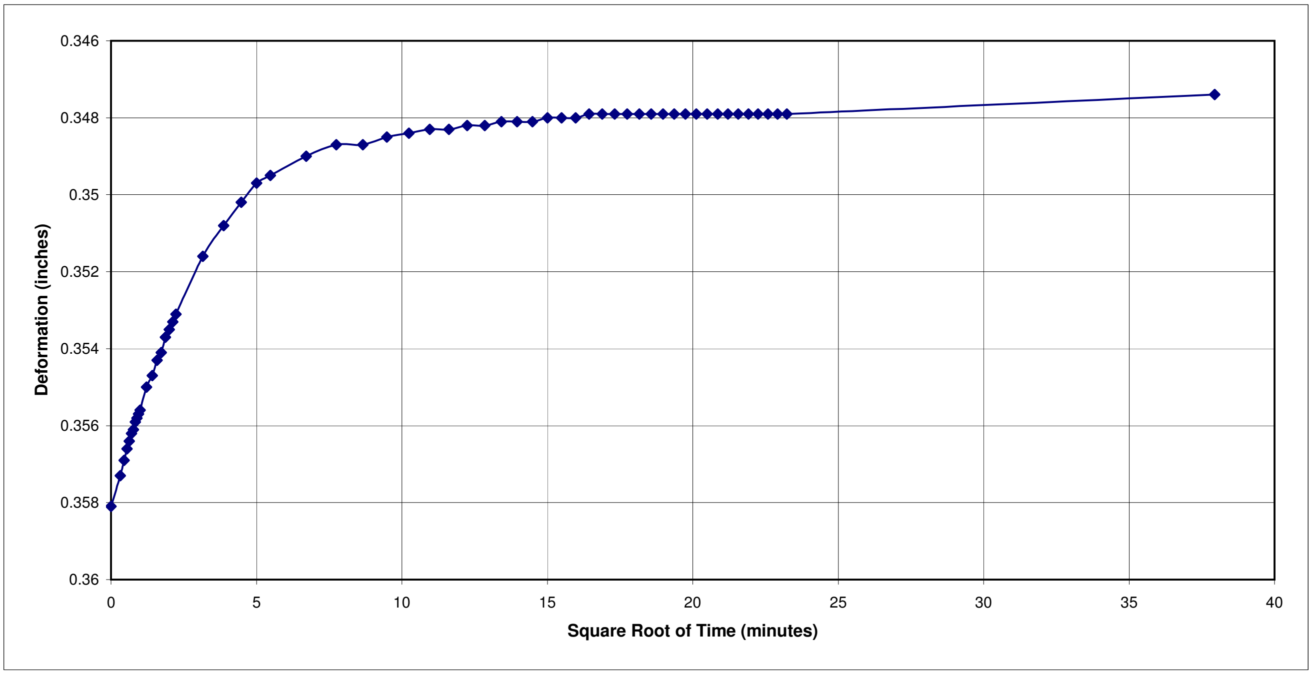
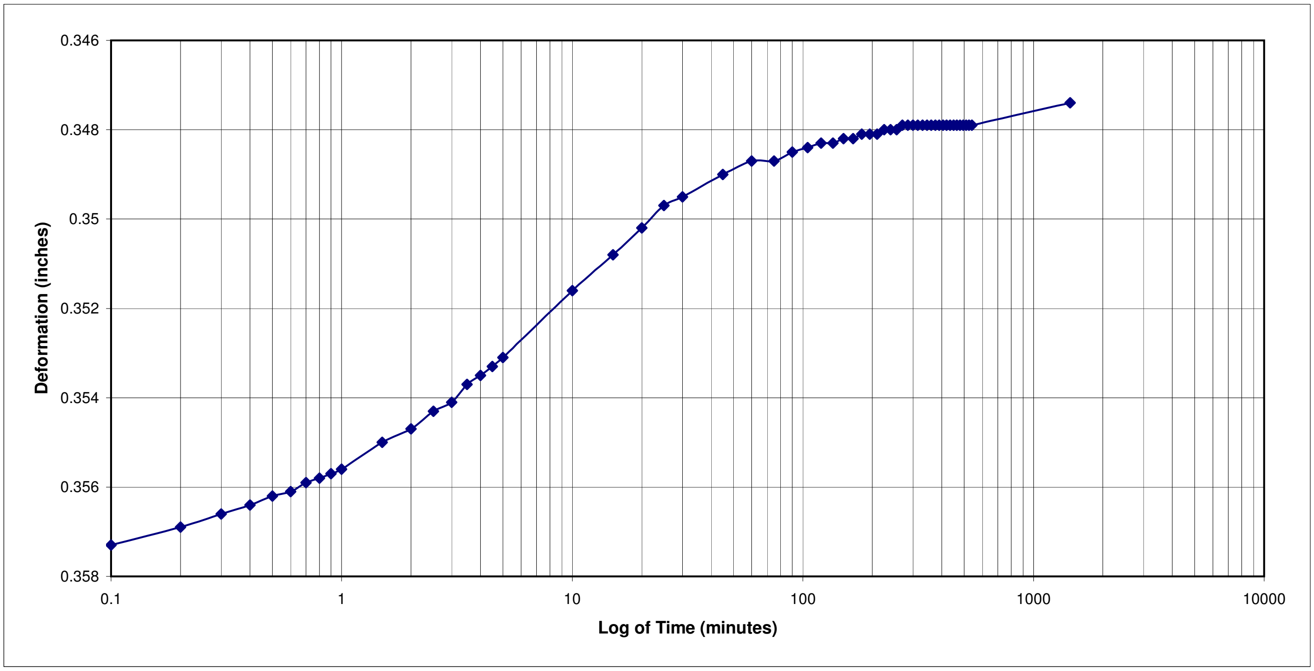
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-53A, 32 to 34 feet
LOAD = 4.0 TSF



DEFORMATION VS. LOG OF TIME
B-53A, 32 to 34 feet
LOAD = 4.0 TSF



Sample No.:	S&ME B-53A, 33'
Exploration No.:	B-53A
Depth:	32 - 34 feet

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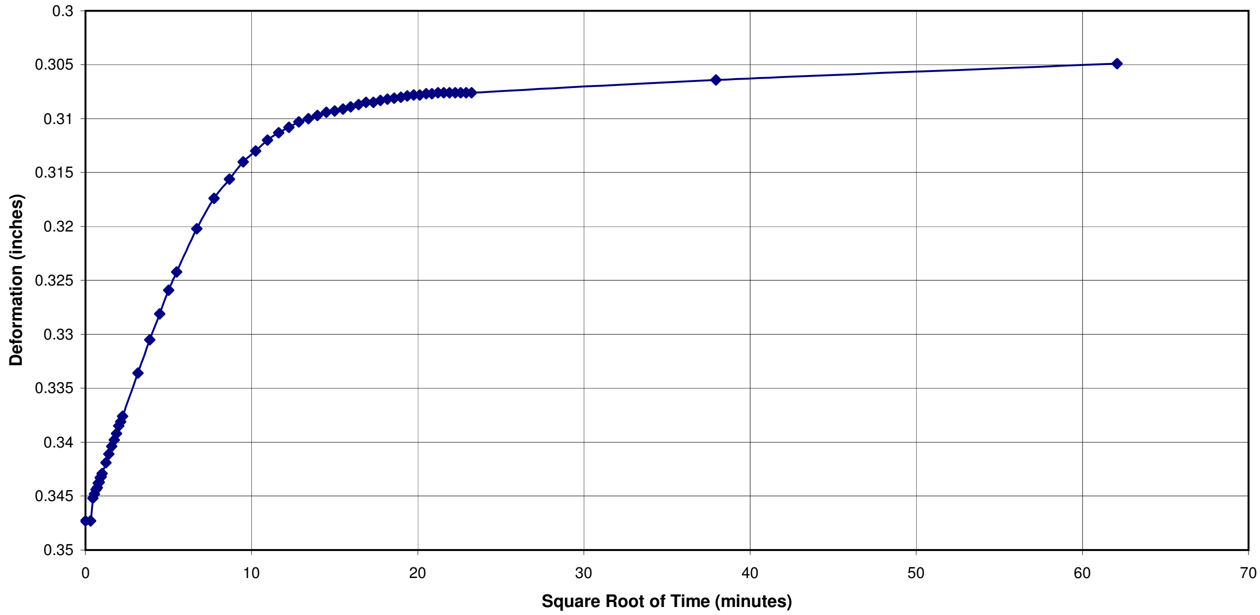
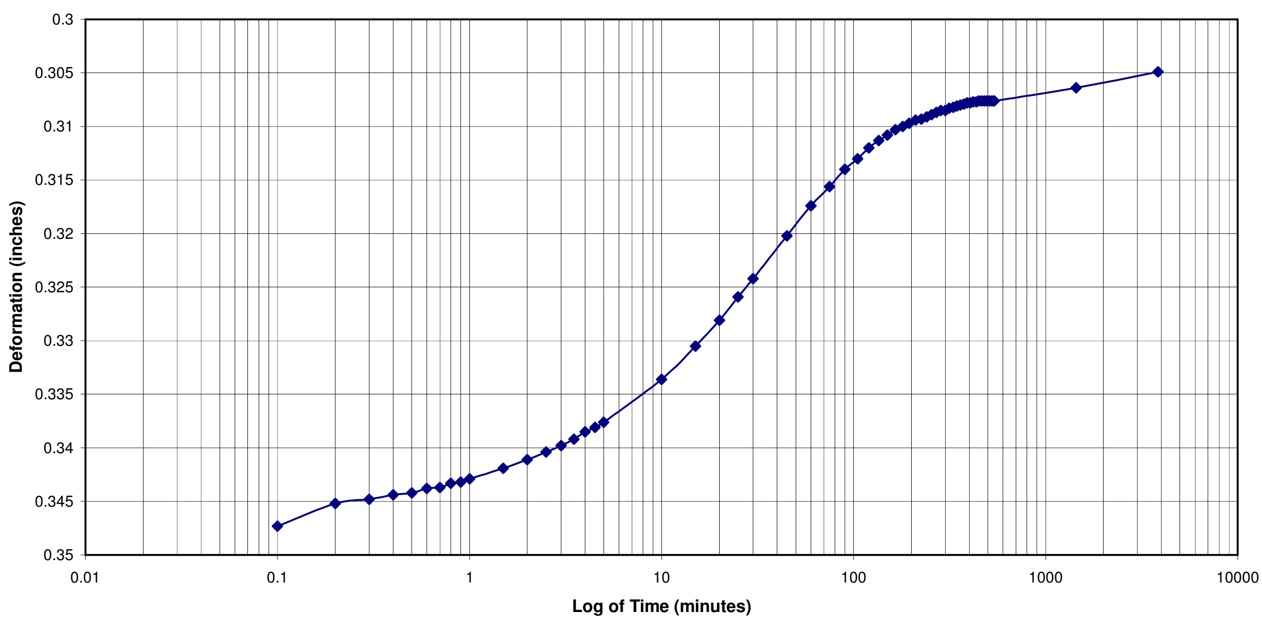
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-53A, 32 to 34 feet
LOAD = 1.0 TSF



DEFORMATION VS. LOG OF TIME
B-53A, 32 to 34 feet
LOAD = 1.0 TSF



Sample No.:	S&ME B-53A, 33'
Exploration No.:	B-53A
Depth:	32 - 34 feet

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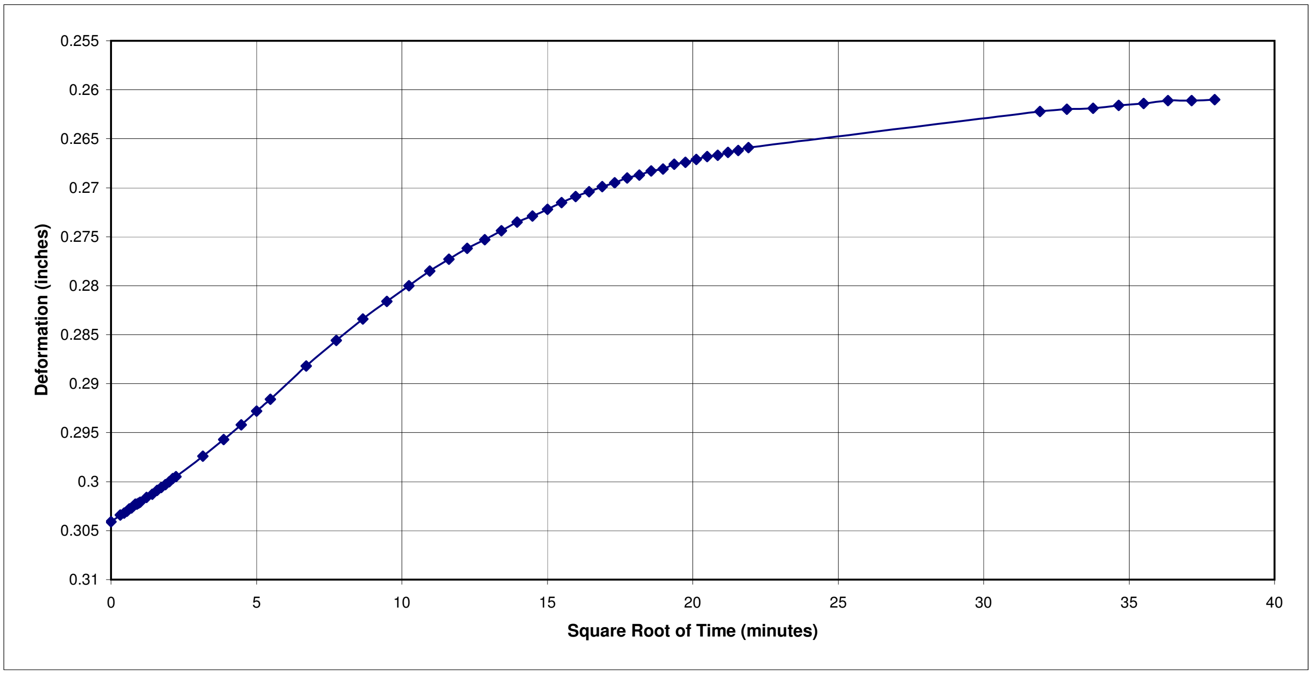
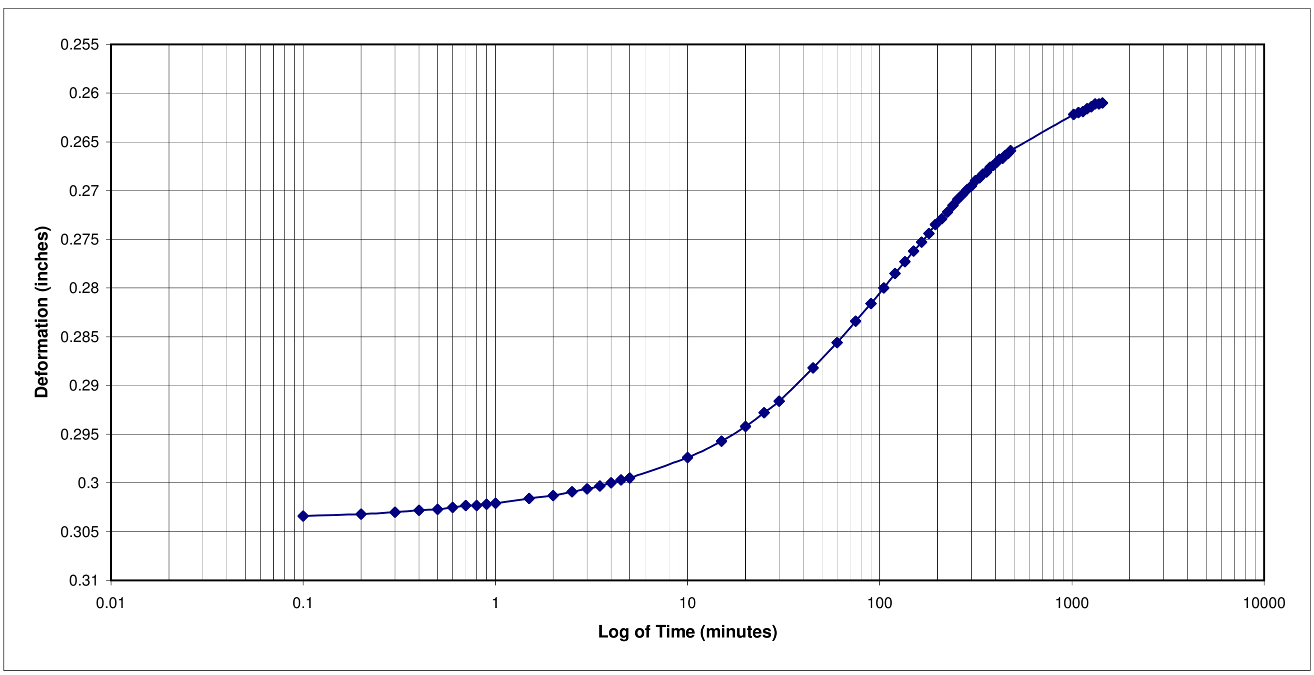
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-53A, 32 to 34 feet
LOAD = 0.25 TSF



DEFORMATION VS. LOG OF TIME
B-53A, 32 to 34 feet
LOAD = 0.25 TSF



Sample No.:	S&ME B-53A, 33'
Exploration No.:	B-53A
Depth:	32 - 34 feet

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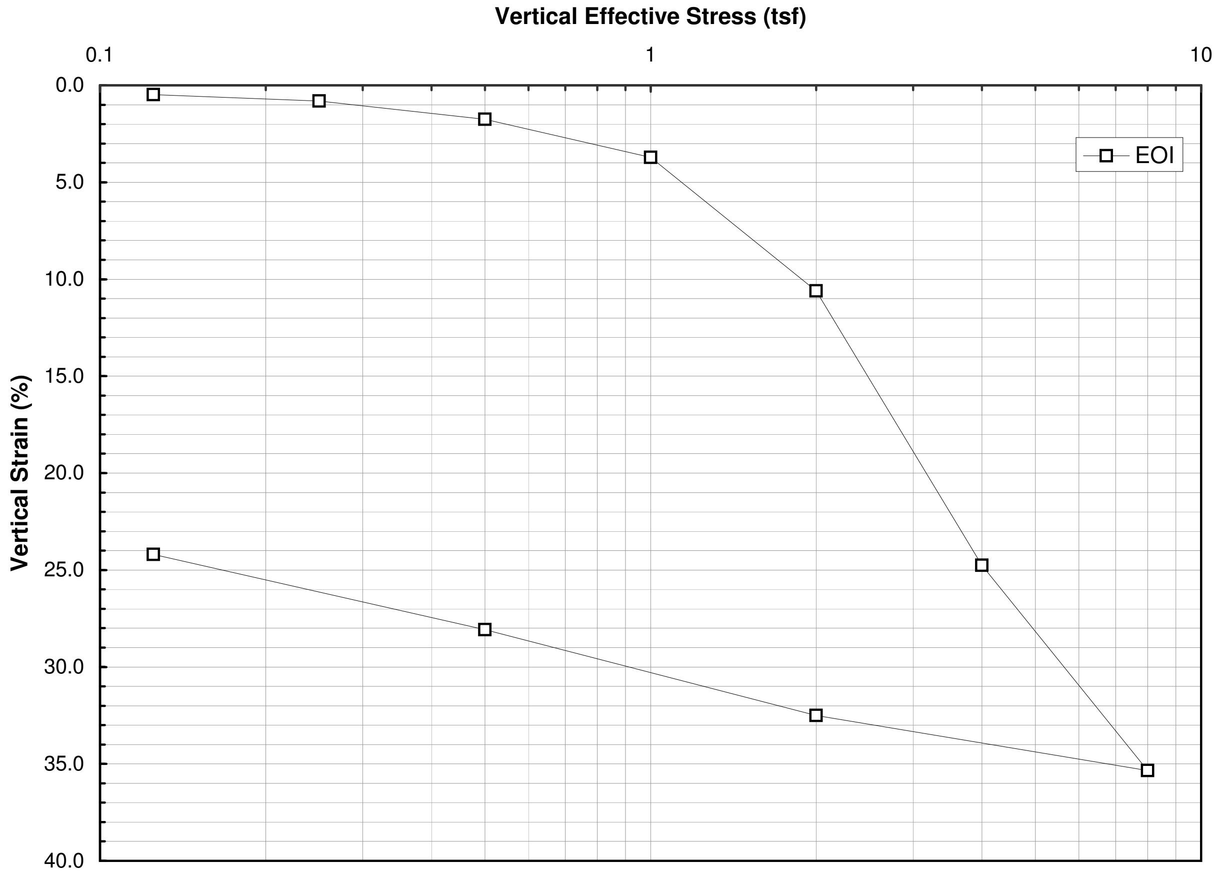
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554



CONSOLIDATION PARAMETERS

Probable Preconsolidation Stress, P'_c (tsf):	1.4
Approx. Hydrostatic Effective Stress, P'_o (tsf)	0.7
Vertical Strain at P'_o (%):	2.7
Compression Ratio	0.44
Recompression Ratio	0.055
Over Consolidation Ratio (OCR):	1.9

TEST METHOD

Test Method:	ASTM D-2435 A
Trimming Procedure:	2.5-inch Trimming Lathe
Pressure at Inundation:	0.125 tsf
Method to Compute C_v:	ASTM D-2435 12.3.2

SAMPLE ID

Test No.:	GTX B-55B, 36'
Sample No.:	UD1
Exploration No.:	B-55B
Depth:	35 to 37 feet
USCS Description:	Fat CLAY (CH)

SAMPLE DATA

Sample Diameter (cm):	6.35
Sample Area (cm^2):	31.67
Measured Specific Gravity:	2.63
Trimmings Moisture (%):	77.6
% Passing #200 Sieve:	98.9
Liquid Limit:	104
Plastic Limit:	30
Plasticity Index:	74

	Initial	Final
Water Content (%):	83.8	61.3
Est. % Saturation:	94.5	100.0
Sample Height (cm):	2.540	1.926
Wet Sample Weight (g):	116.7	102.4
Dry Sample Weight (g):	63.5	63.5
Dry Unit Weight (pcf):	49.2	64.9
Void Ratio, e:	2.33	1.53
Solids Height (cm):	0.762	0.762

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ONE-DIMENSIONAL CONSOLIDATION TEST

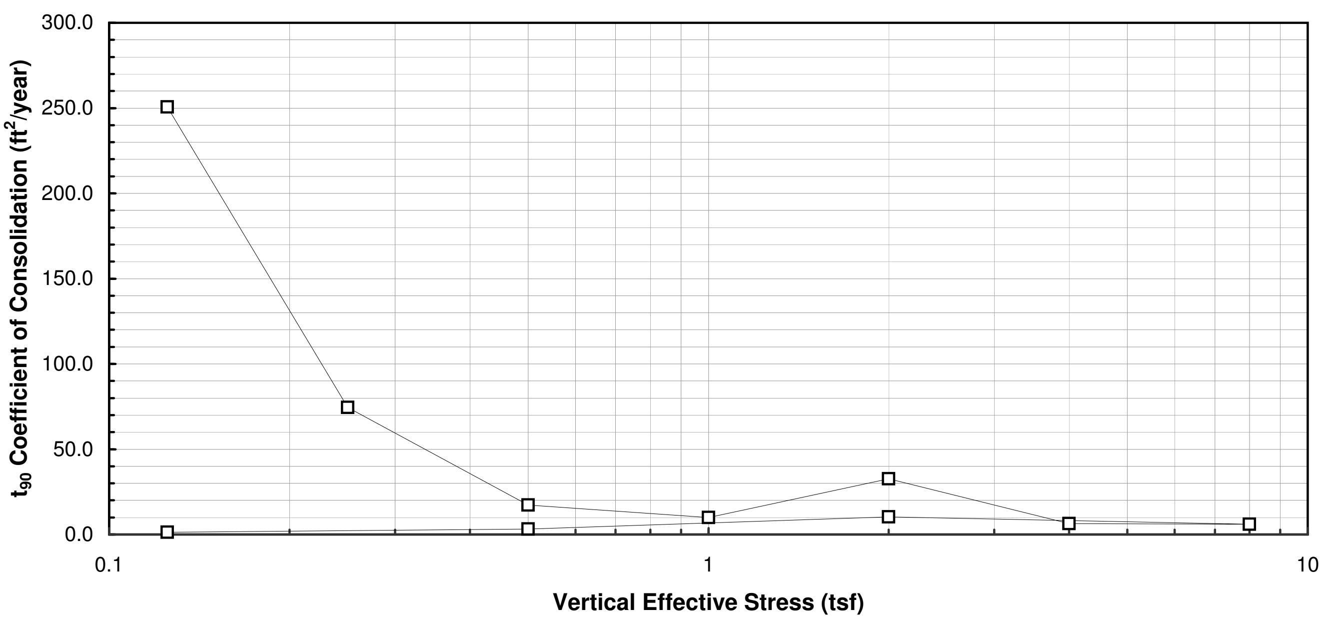
Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

Test No.:	GTX B-55B, 36'
Sample No.:	UD1
Exploration No.:	B-55B
Depth:	35 to 37 feet

LOAD INC.	STRESS DURATION (Hr - min)	VERTICAL STRESS (tsf)	VERTICAL STRAIN (EOI*)	VERTICAL STRAIN (EOP*)	VOID RATIO e (EOI*)	VOID RATIO e (EOP*)	STRESS RATIO (P'/P'c)	TAYLOR COEFFICIENT OF CONSOLIDATION (ft^2/year)
1	24-00	0.125	0.5	0.5	2.32	2.32	0.09	250.6
2	24-00	0.25	0.8	0.7	2.31	2.31	0.18	74.5
3	24-00	0.5	1.8	1.6	2.27	2.28	0.36	17.2
4	24-00	1	3.7	3.4	2.21	2.22	0.71	10.0
5	24-00	2	10.6	7.9	1.98	2.07	1.43	32.6
6	24-00	4	24.8	21.9	1.51	1.60	2.86	6.4
7	24-00	8	35.3	33.0	1.15	1.23	5.71	5.9
8	24-00	2	32.5	33.0	1.25	1.23	1.43	10.3
9	24-00	0.5	28.1	28.9	1.40	1.37	0.36	3.1
10	24-00	0.125	24.2	24.8	1.53	1.51	0.09	1.3

*EOI = End of Increment

*EOP = End of Primary



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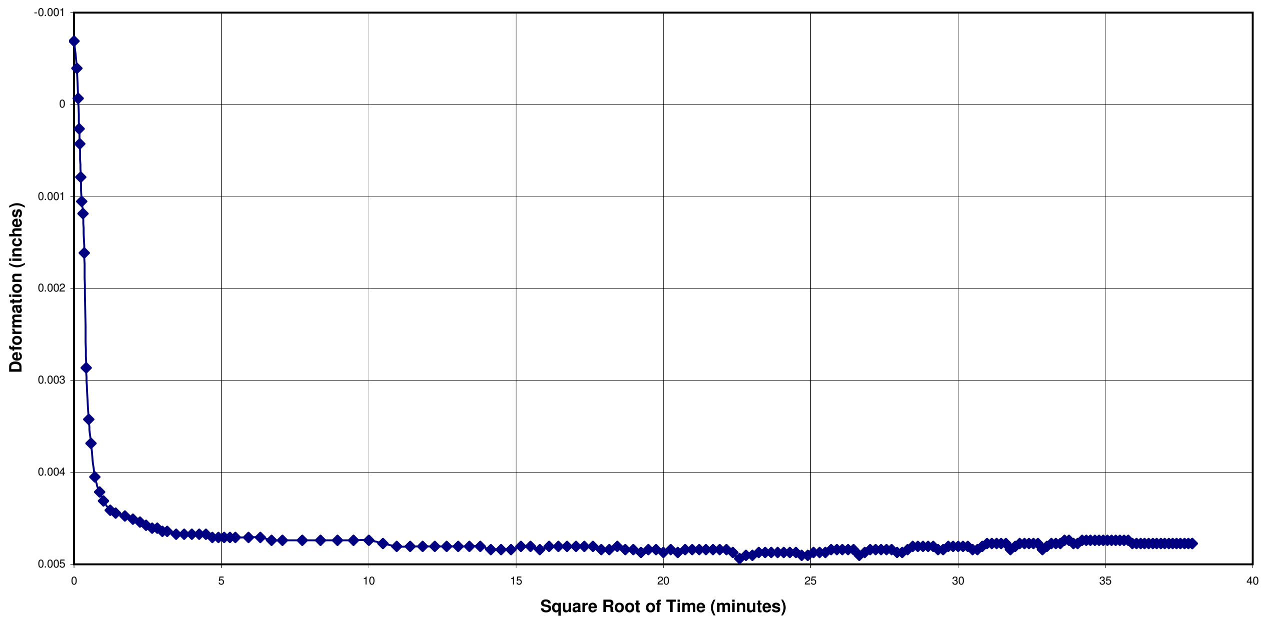
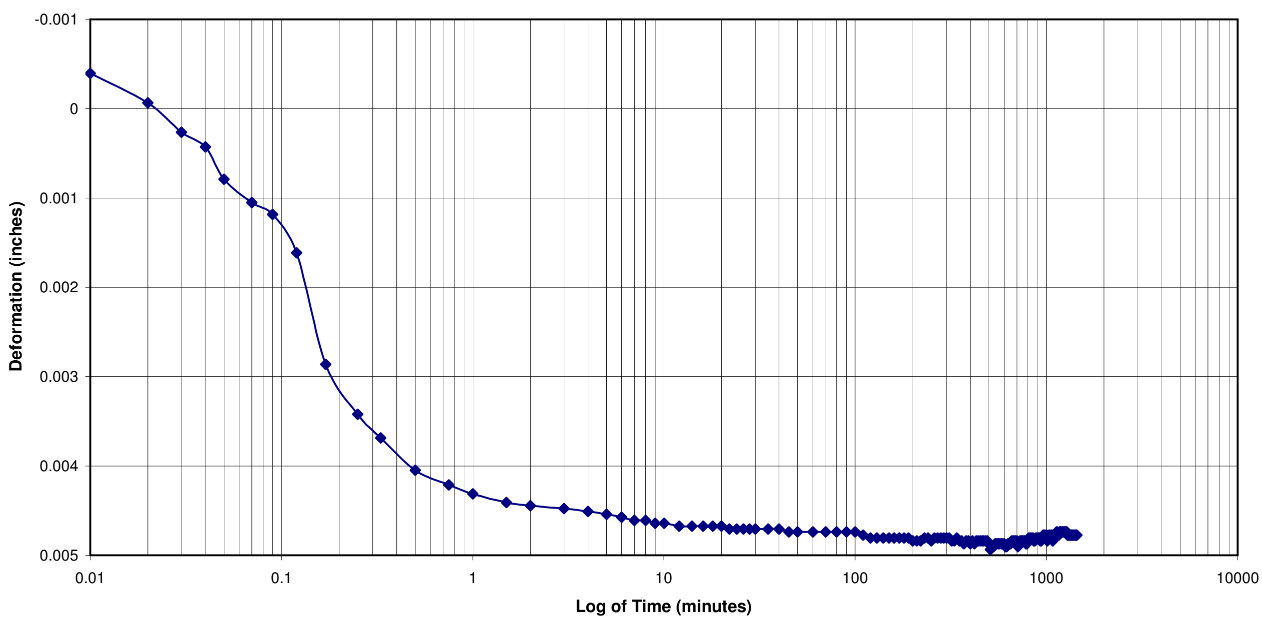
ONE-DIMENSIONAL CONSOLIDATION TEST

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-55B, 35 to 37 feet
LOAD = 0.125 TSF



DEFORMATION VS. LOG OF TIME
B-55B, 35 to 37 feet
LOAD = 0.125 TSF



Sample No.:	GTX B-55B, 36'
Exploration No.:	B-33B
Depth:	35 - 37 feet

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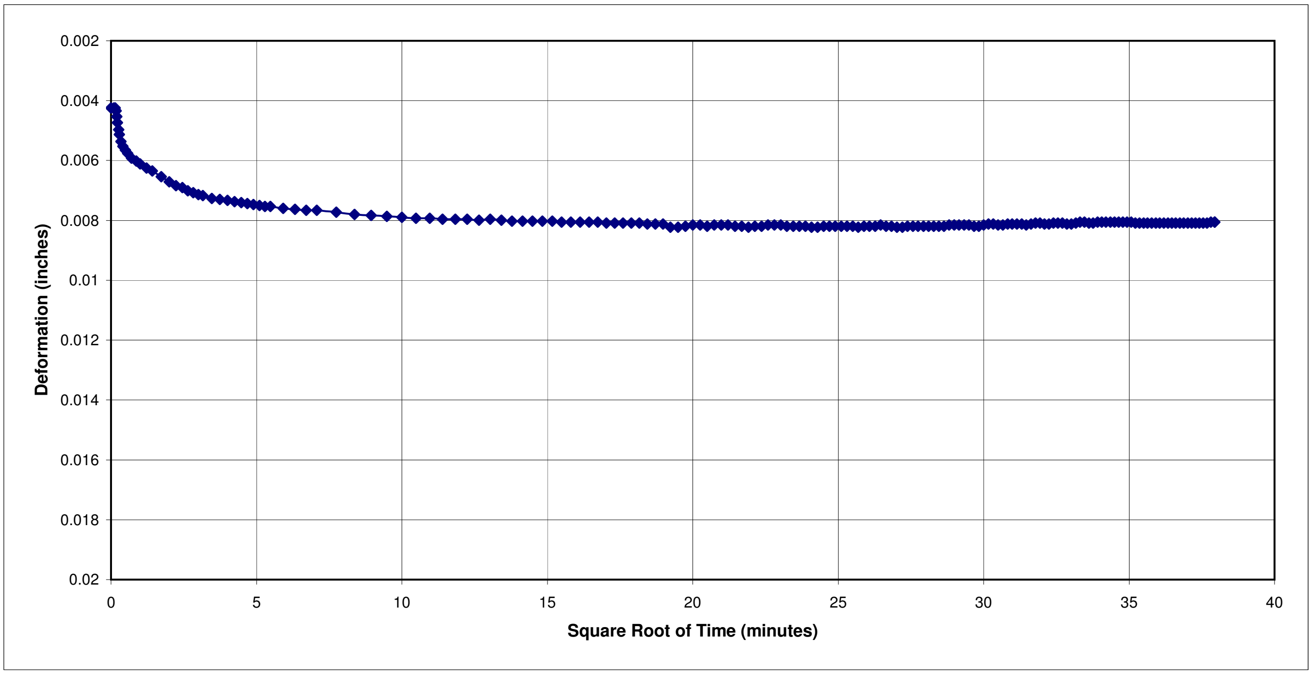
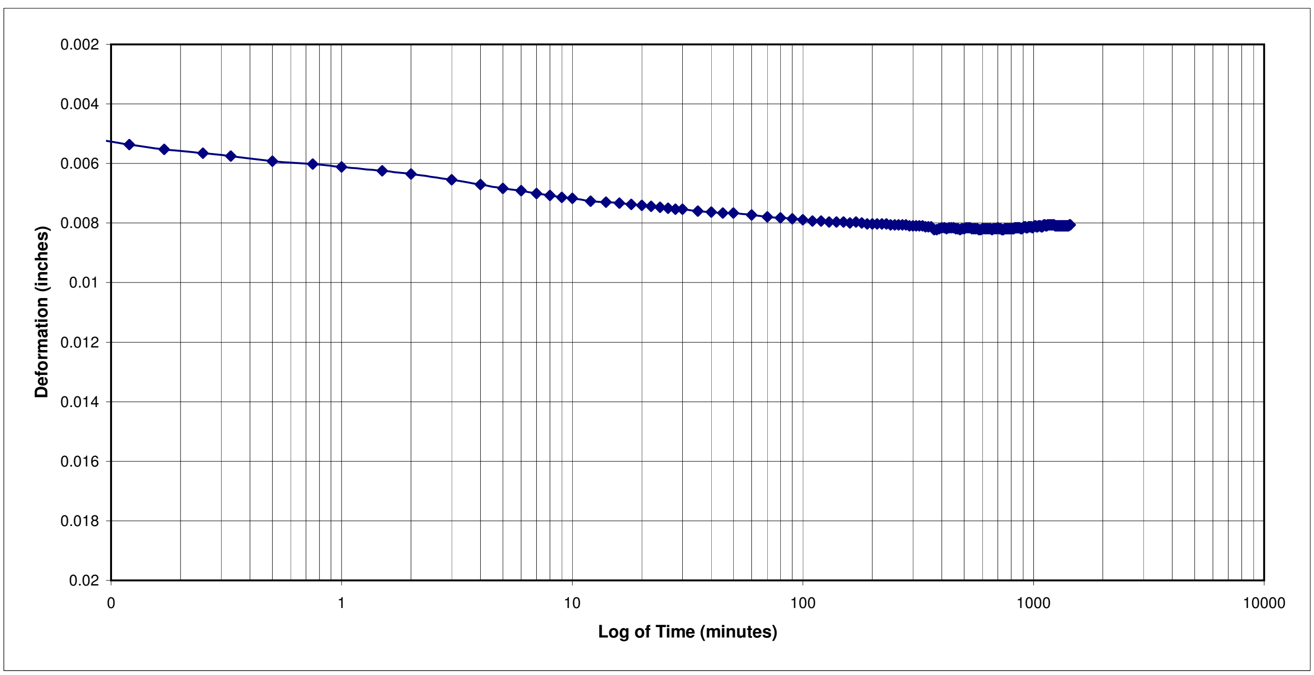
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-55B, 35 to 37 feet
LOAD = 0.25 TSF



DEFORMATION VS. LOG OF TIME
B-55B, 35 to 37 feet
LOAD = 0.25 TSF



Sample No.:	GTX B-55B, 36'
Exploration No.:	B-33B
Depth:	35 - 37 feet

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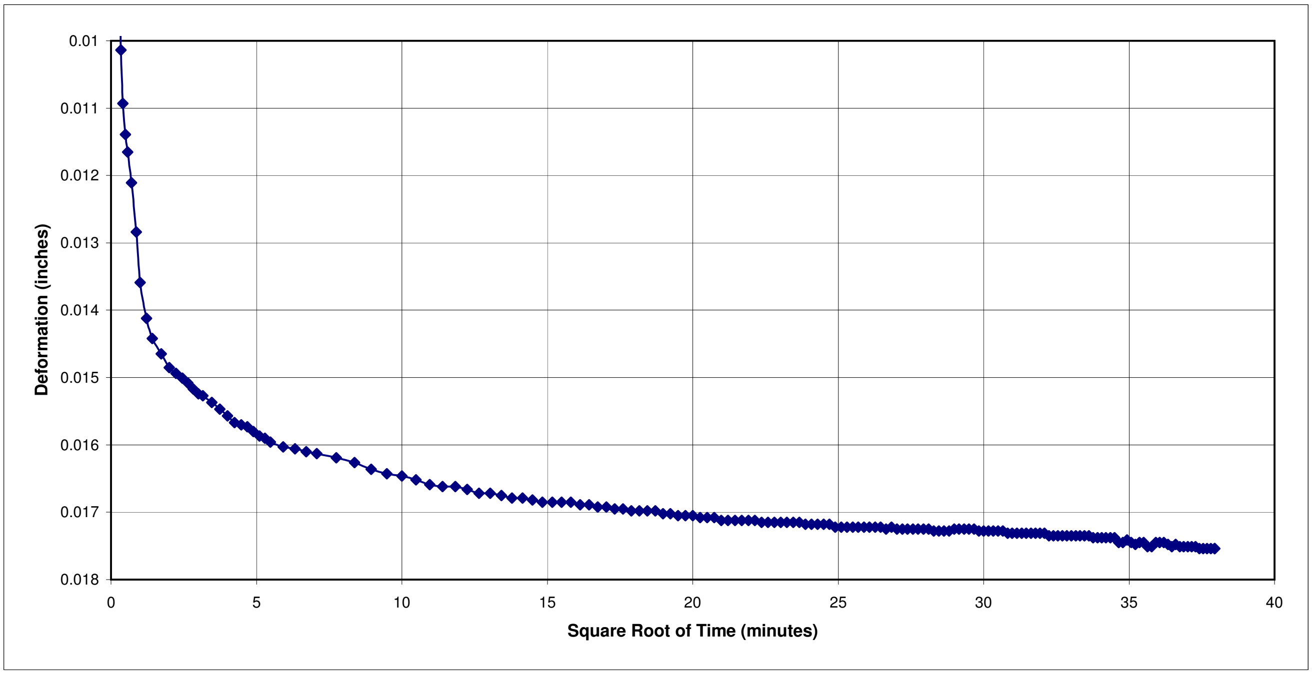
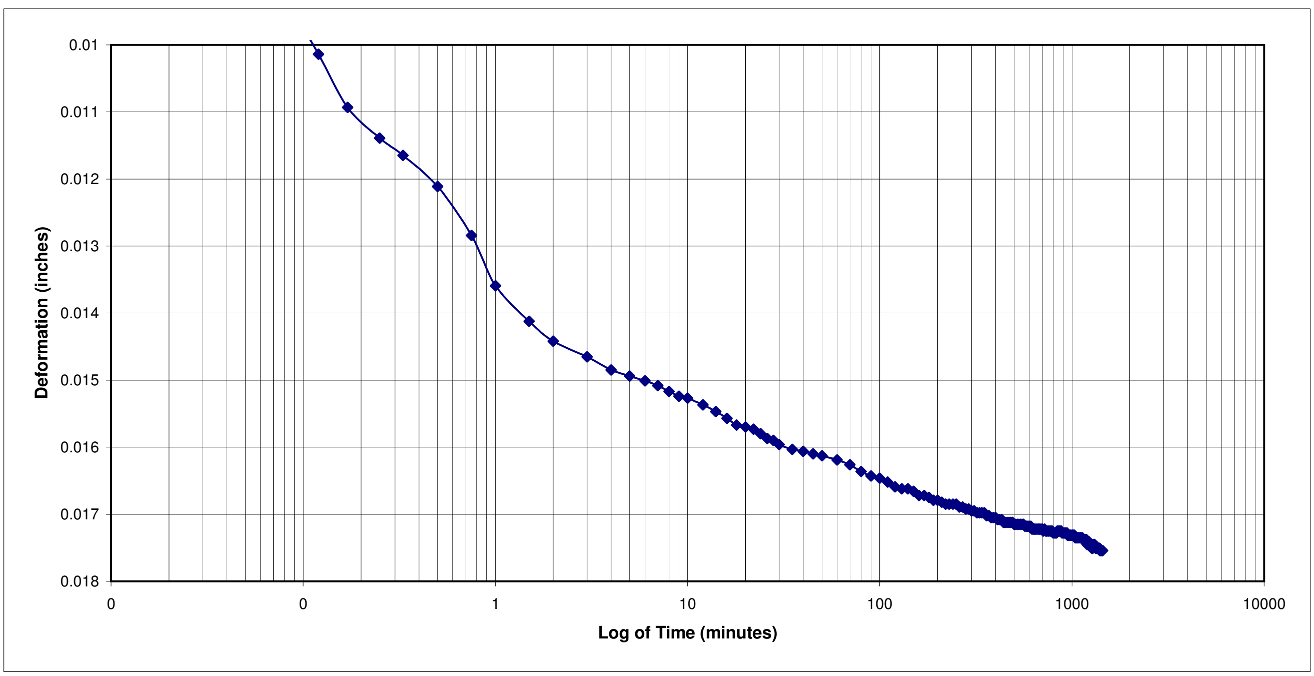
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-55B, 35 to 37 feet
LOAD = 0.5 TSF



DEFORMATION VS. LOG OF TIME
B-55B, 35 to 37 feet
LOAD = 0.5 TSF



Sample No.:	GTX B-55B, 36'
Exploration No.:	B-33B
Depth:	35 - 37 feet

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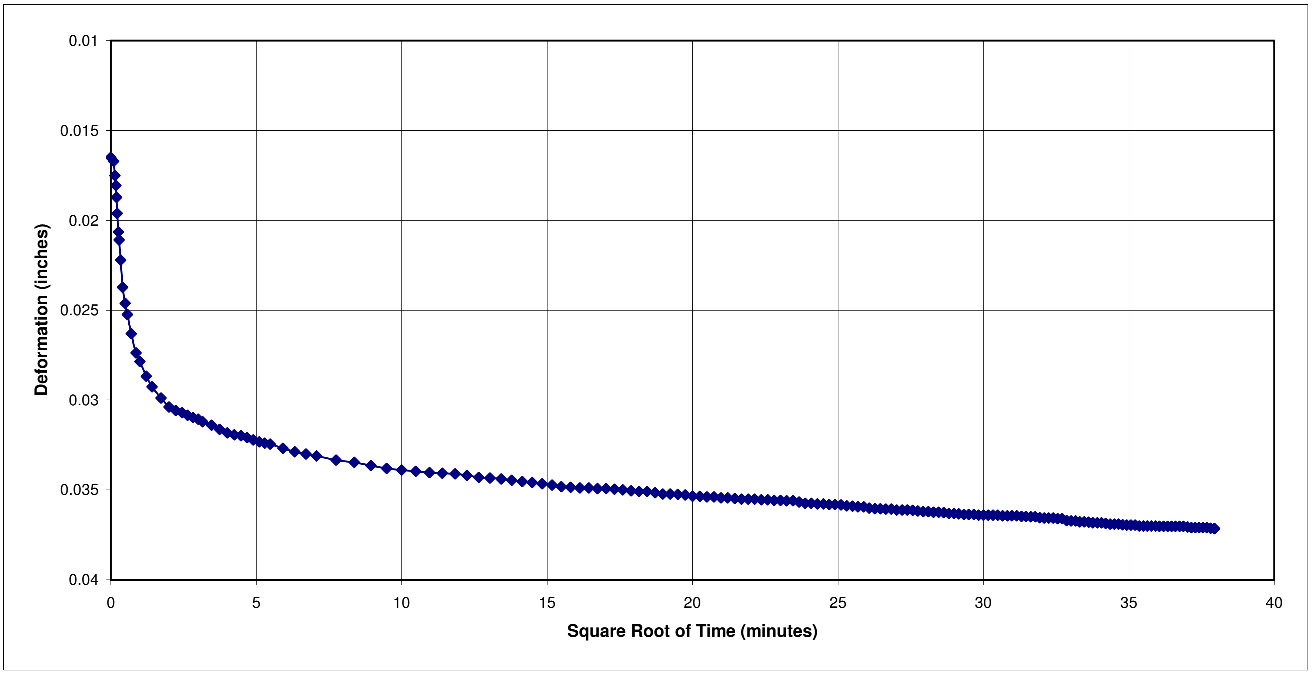
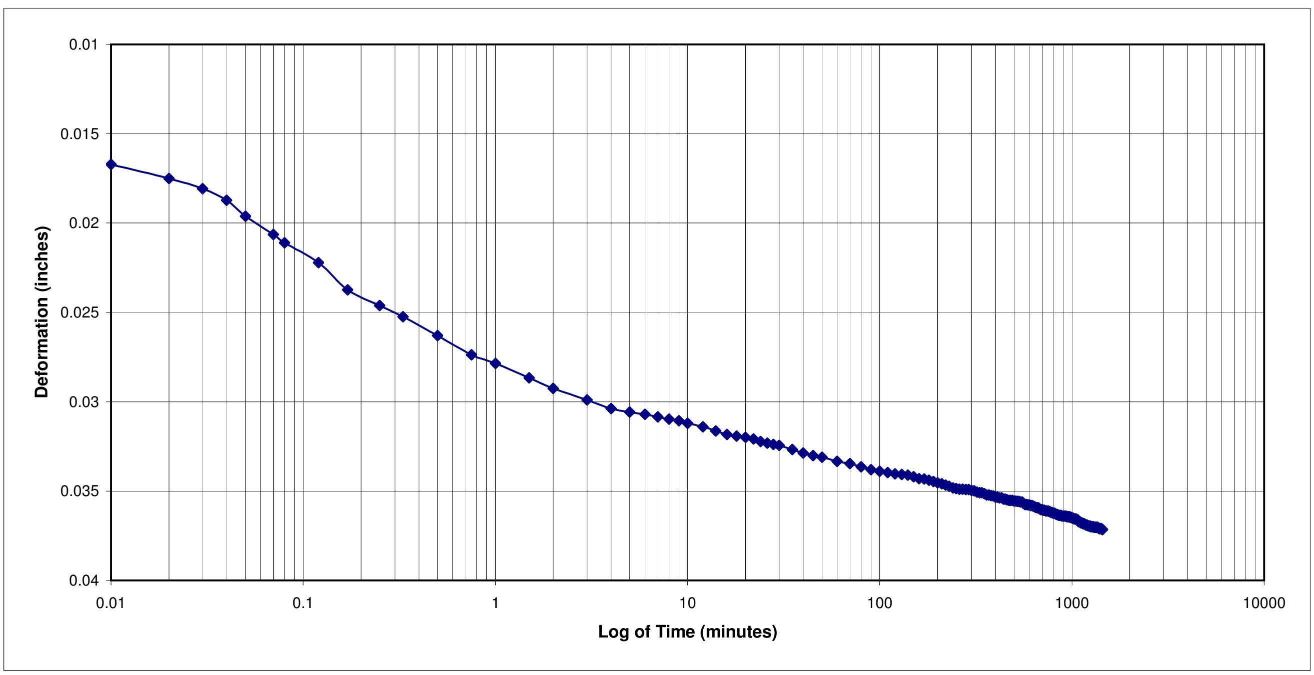
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-55B, 35 to 37 feet
LOAD = 1.0 TSF



DEFORMATION VS. LOG OF TIME
B-55B, 35 to 37 feet
LOAD = 1.0 TSF



Sample No.:	GTX B-55B, 36'
Exploration No.:	B-33B
Depth:	35 - 37 feet

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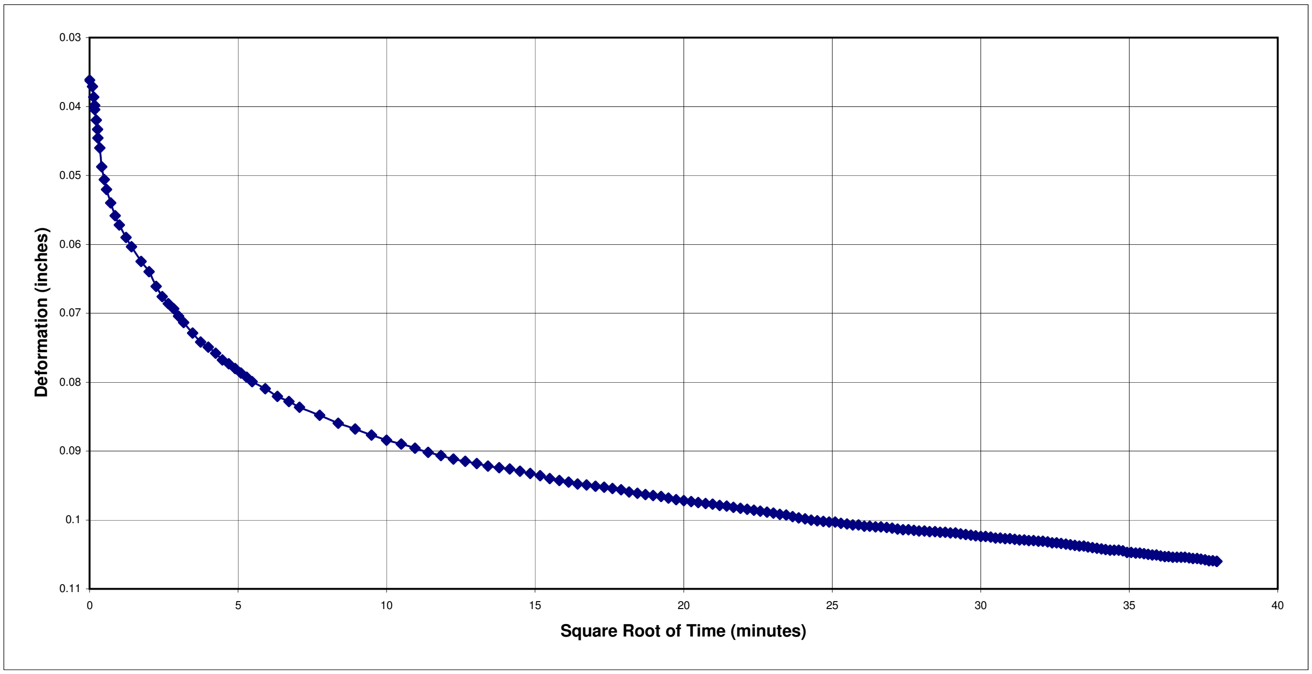
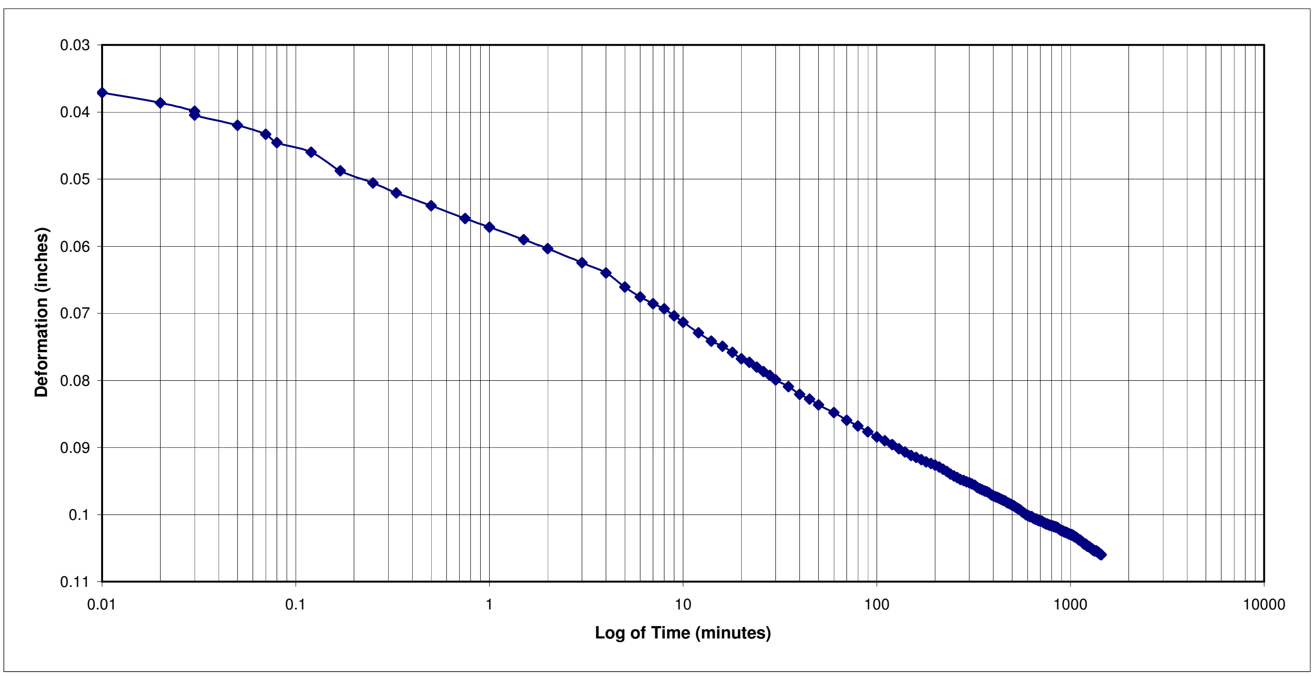
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-55B, 35 to 37 feet
LOAD = 2.0 TSF



DEFORMATION VS. LOG OF TIME
B-55B, 35 to 37 feet
LOAD = 2.0 TSF



Sample No.:	GTX B-55B, 36'
Exploration No.:	B-33B
Depth:	35 - 37 feet

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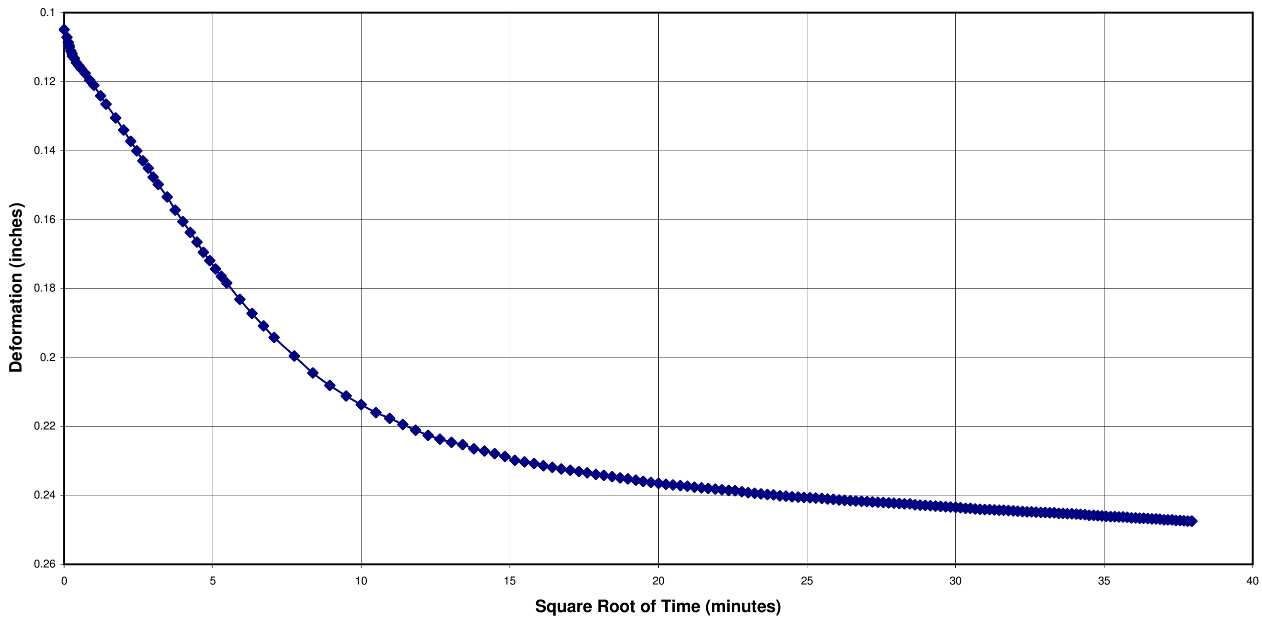
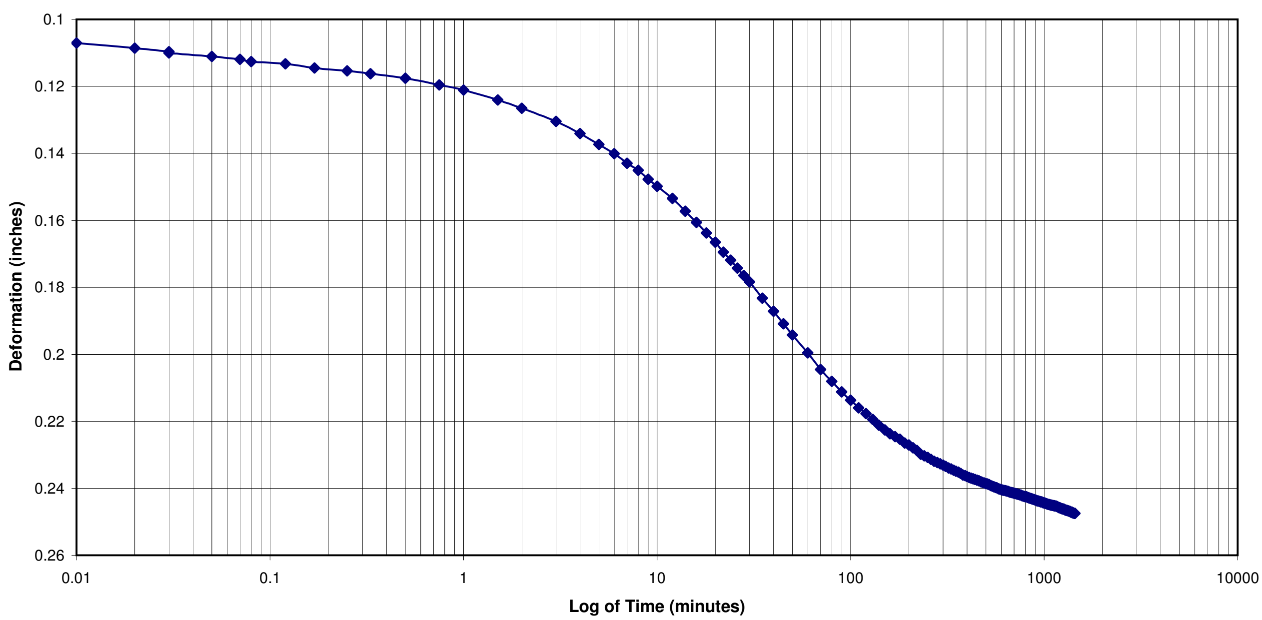
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-55B, 35 to 37 feet
LOAD = 4.0 TSF



DEFORMATION VS. LOG OF TIME
B-55B, 35 to 37 feet
LOAD = 4.0 TSF



Sample No.:	GTX B-55B, 36'
Exploration No.:	B-33B
Depth:	35 - 37 feet

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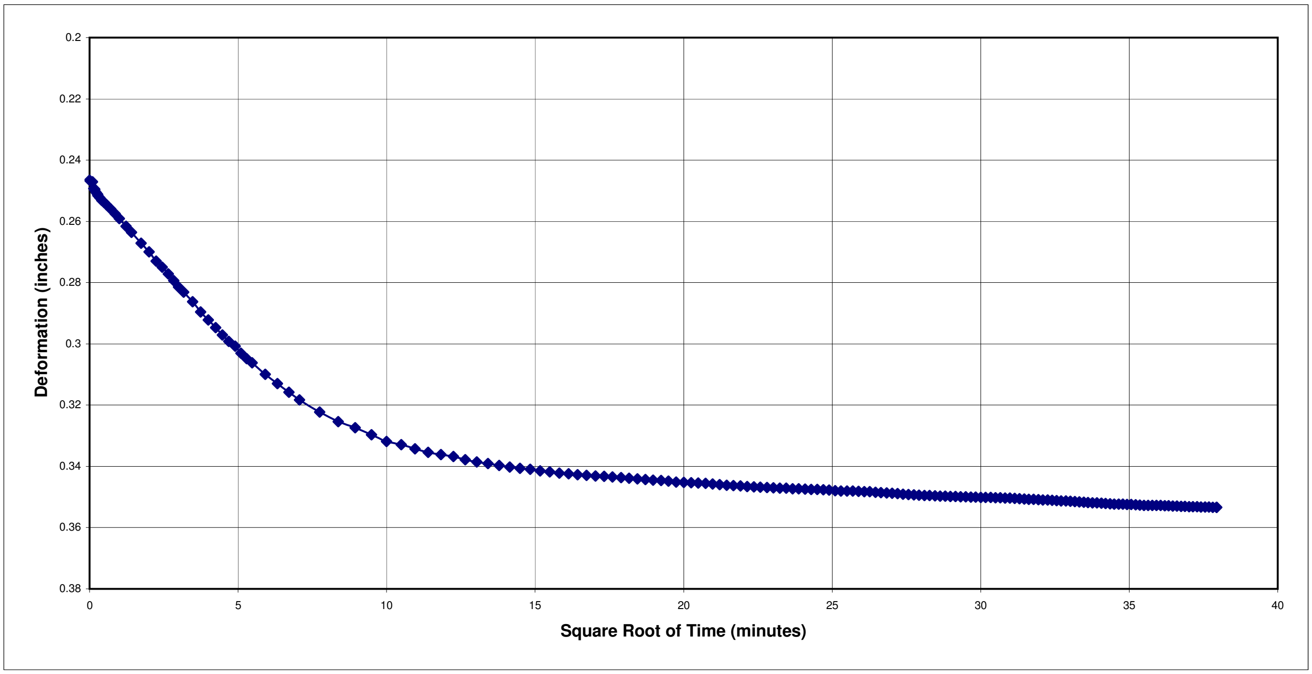
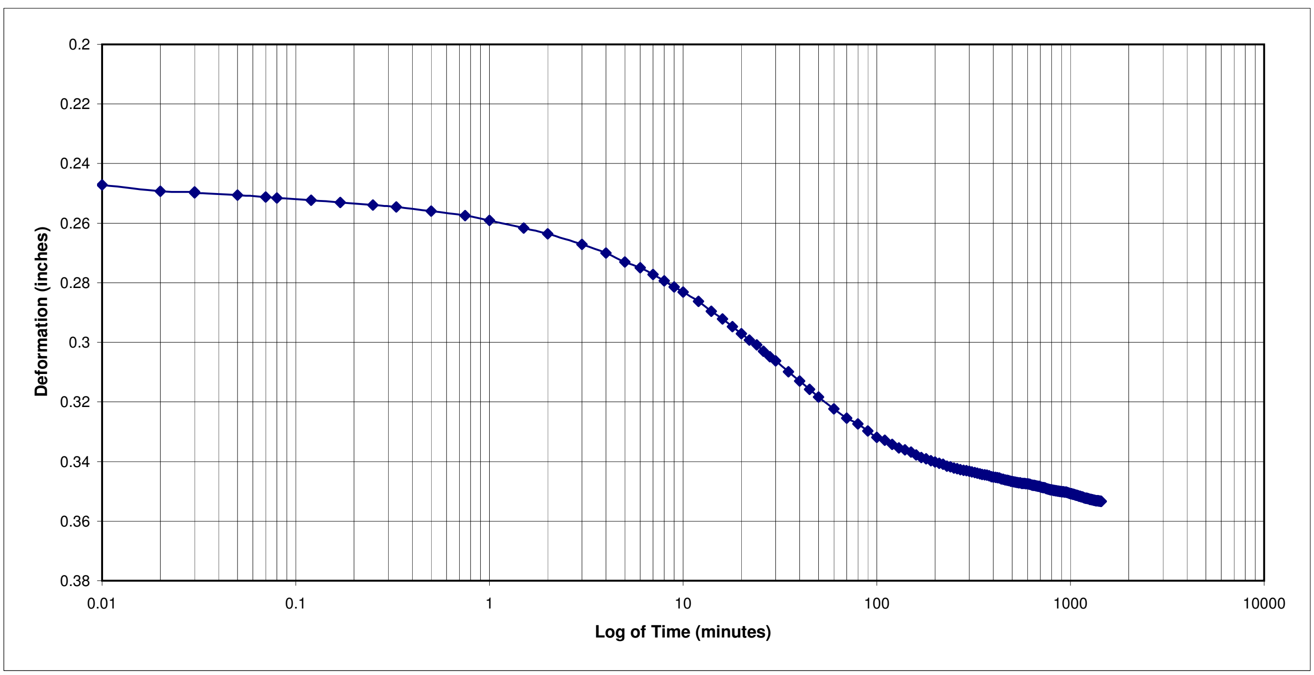
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-55B, 35 to 37 feet
LOAD = 8.0 TSF



DEFORMATION VS. LOG OF TIME
B-55B, 35 to 37 feet
LOAD = 8.0 TSF



Sample No.:	GTX B-55B, 36'
Exploration No.:	B-33B
Depth:	35 - 37 feet

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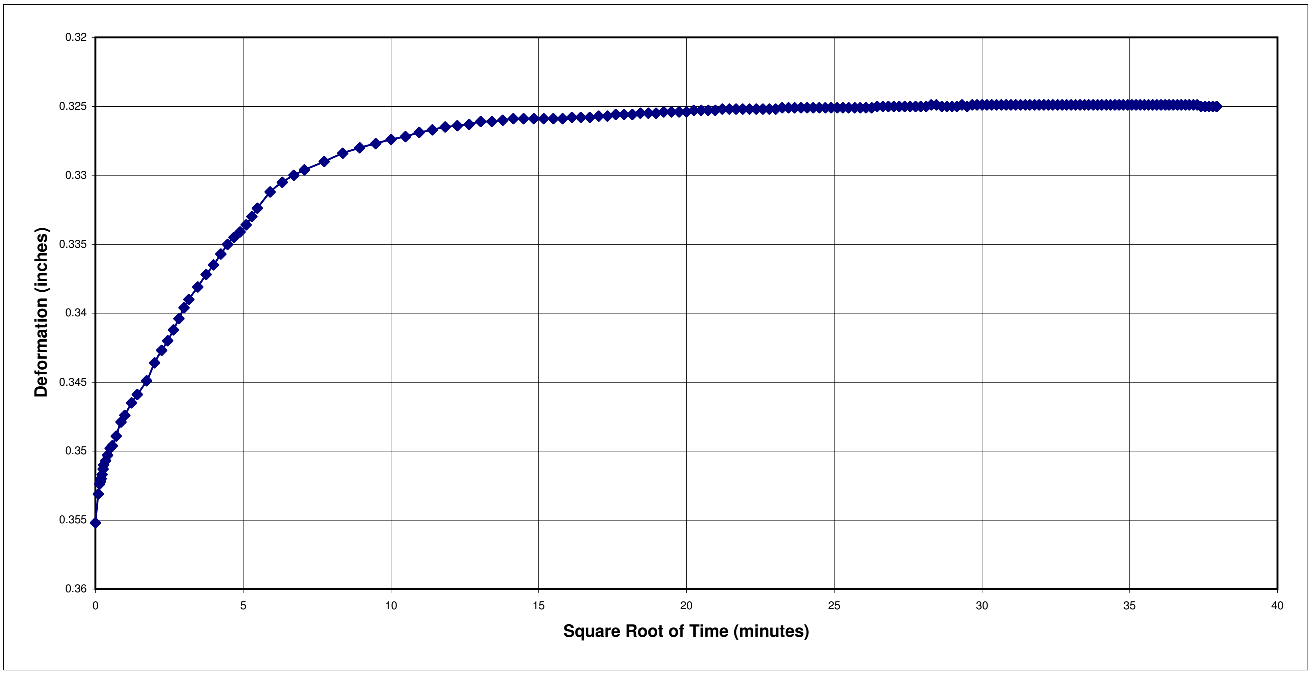
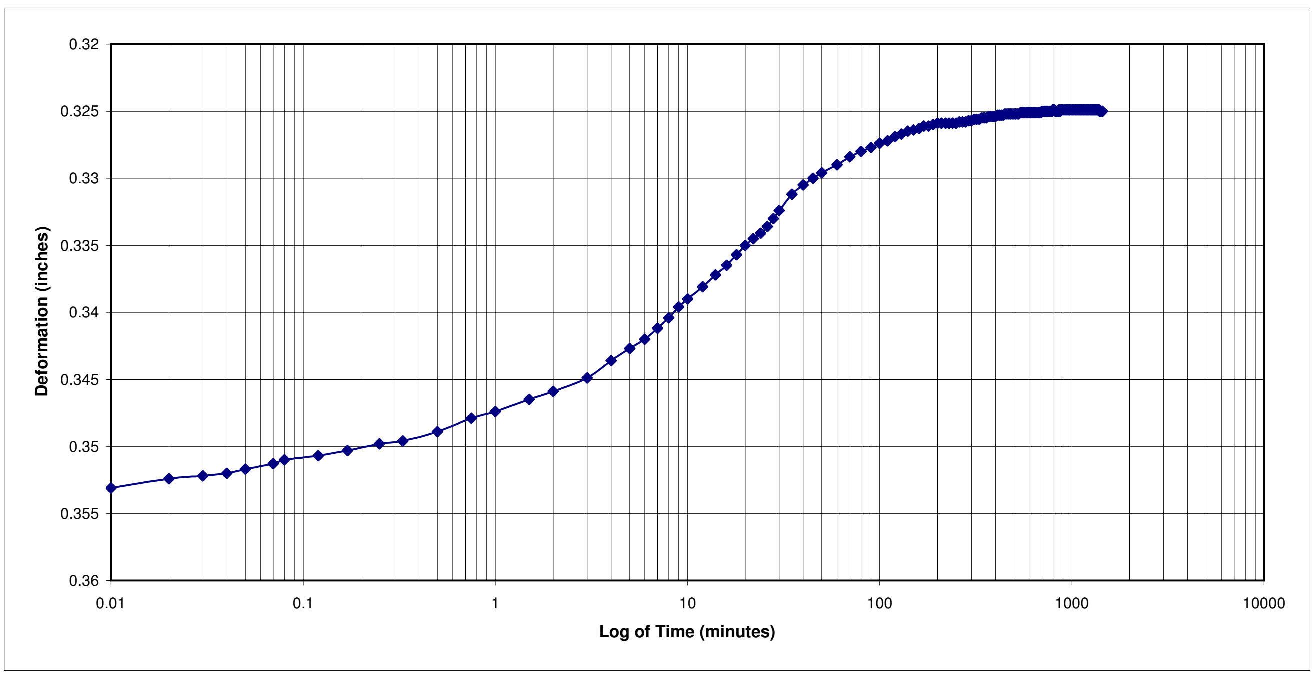
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-55B, 35 to 37 feet
LOAD = 2.0 TSF



DEFORMATION VS. LOG OF TIME
B-55B, 35 to 37 feet
LOAD = 2.0 TSF



Sample No.:	GTX B-55B, 36'
Exploration No.:	B-33B
Depth:	35 - 37 feet

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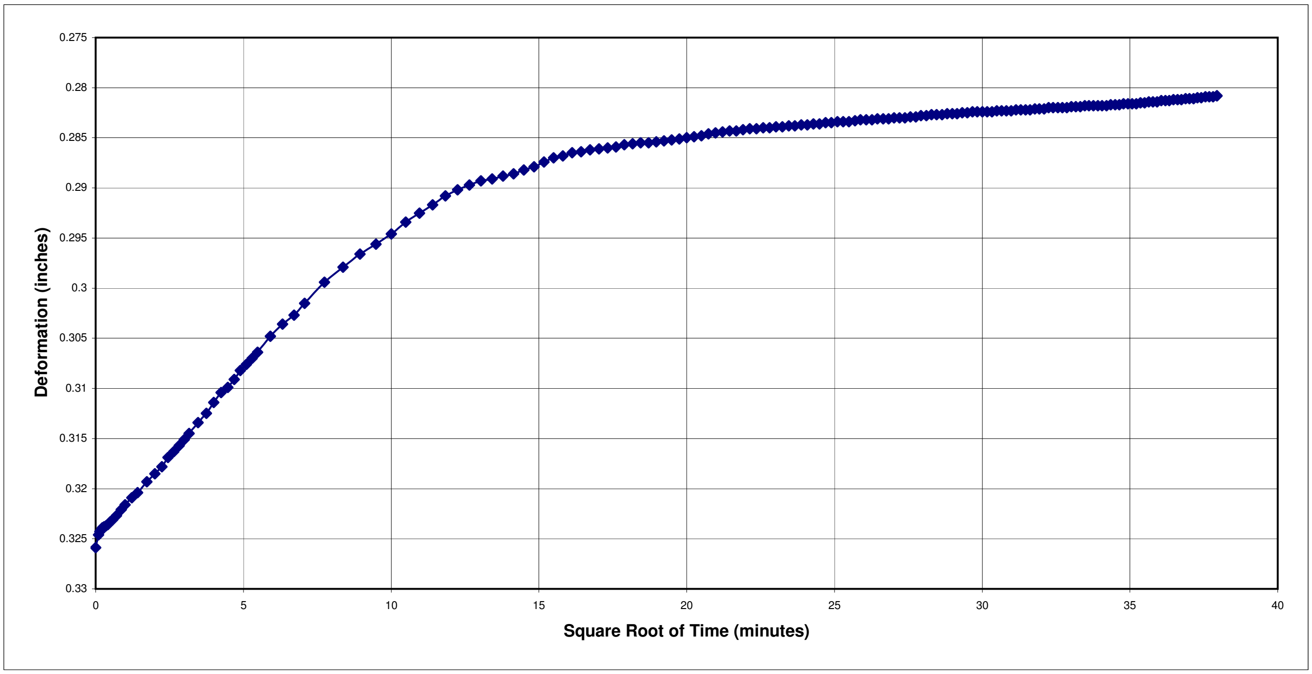
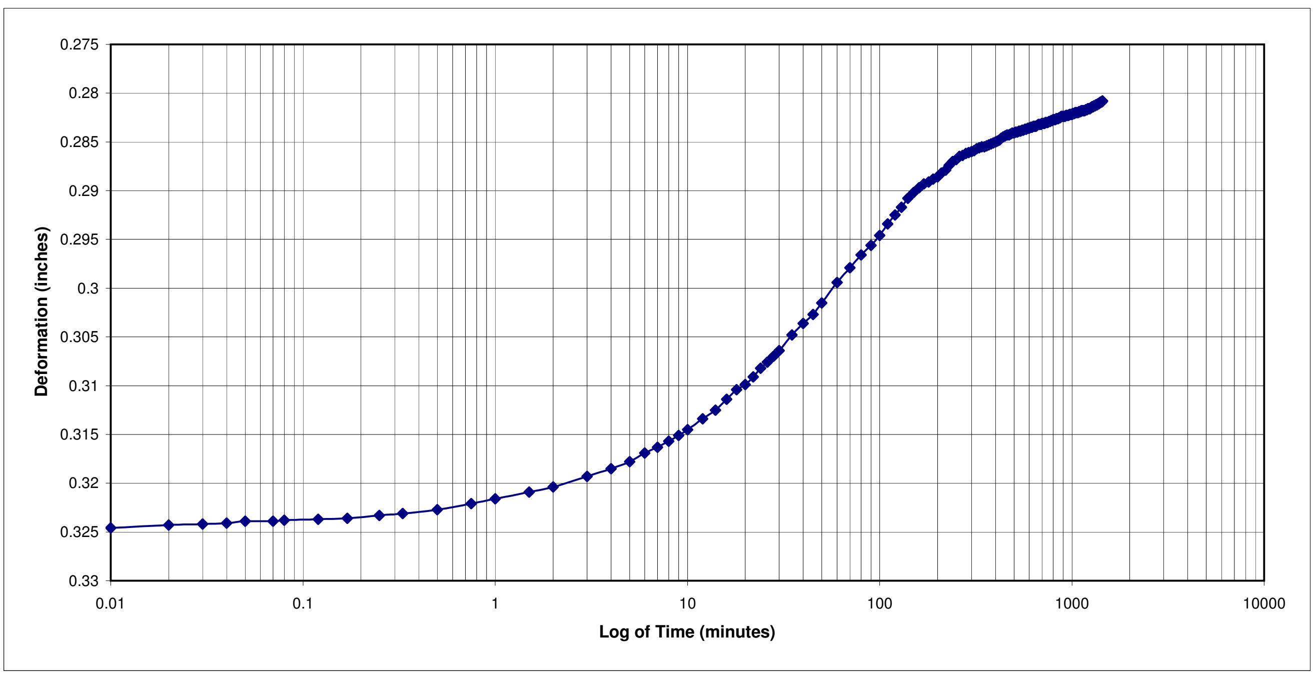
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-55B, 35 to 37 feet
LOAD = 0.5 TSF



DEFORMATION VS. LOG OF TIME
B-55B, 35 to 37 feet
LOAD = 0.5 TSF



Sample No.:	GTX B-55B, 36'
Exploration No.:	B-33B
Depth:	35 - 37 feet

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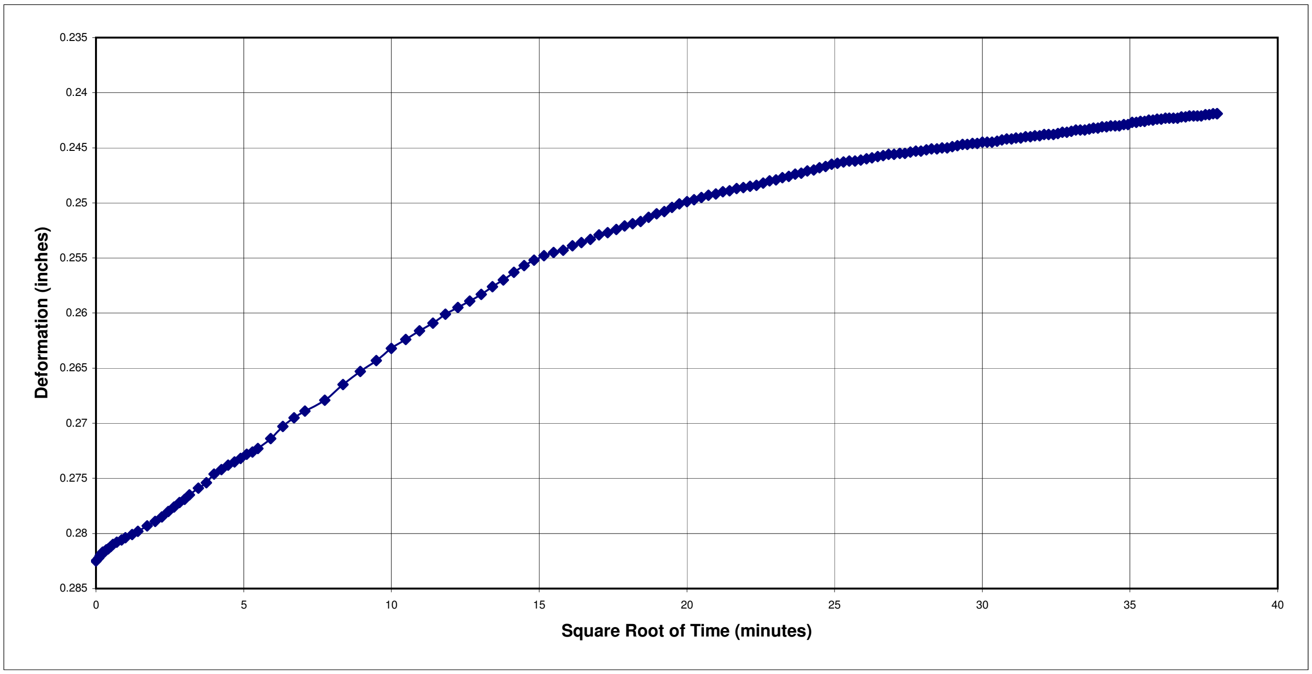
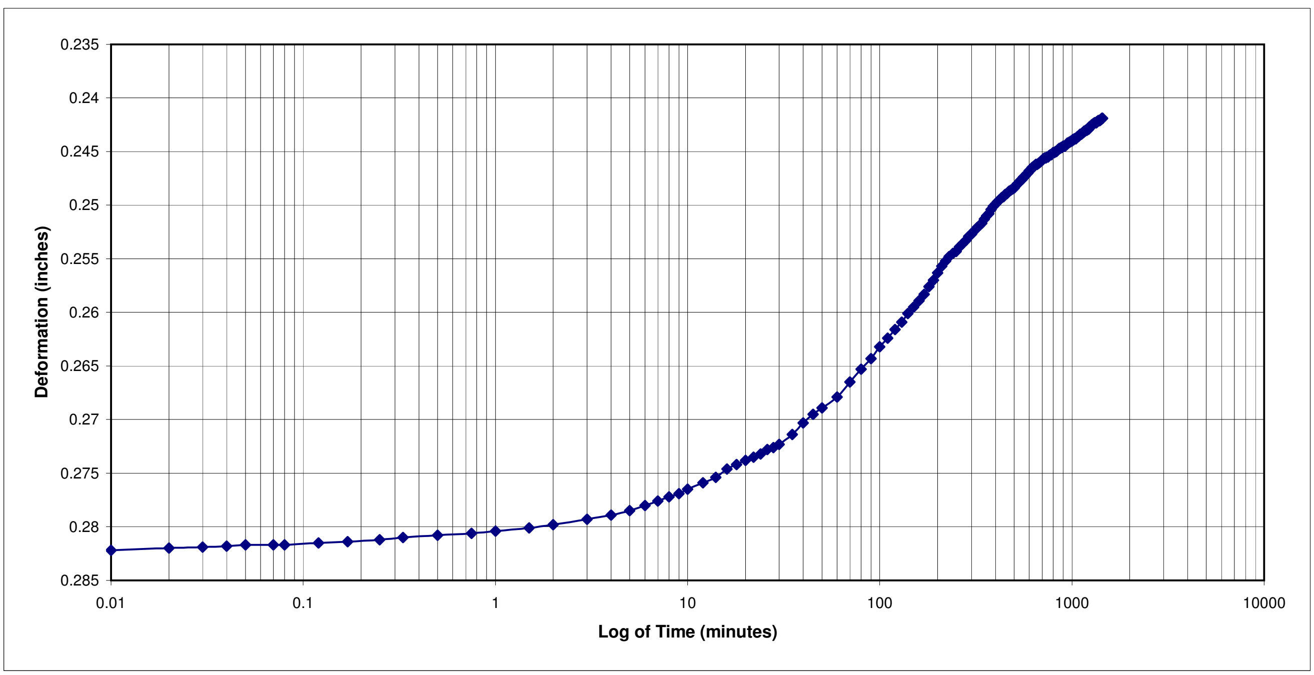
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-55B, 35 to 37 feet
LOAD = 0.125 TSF



DEFORMATION VS. LOG OF TIME
B-55B, 35 to 37 feet
LOAD = 0.125 TSF



Sample No.:	GTX B-55B, 36'
Exploration No.:	B-33B
Depth:	35 - 37 feet

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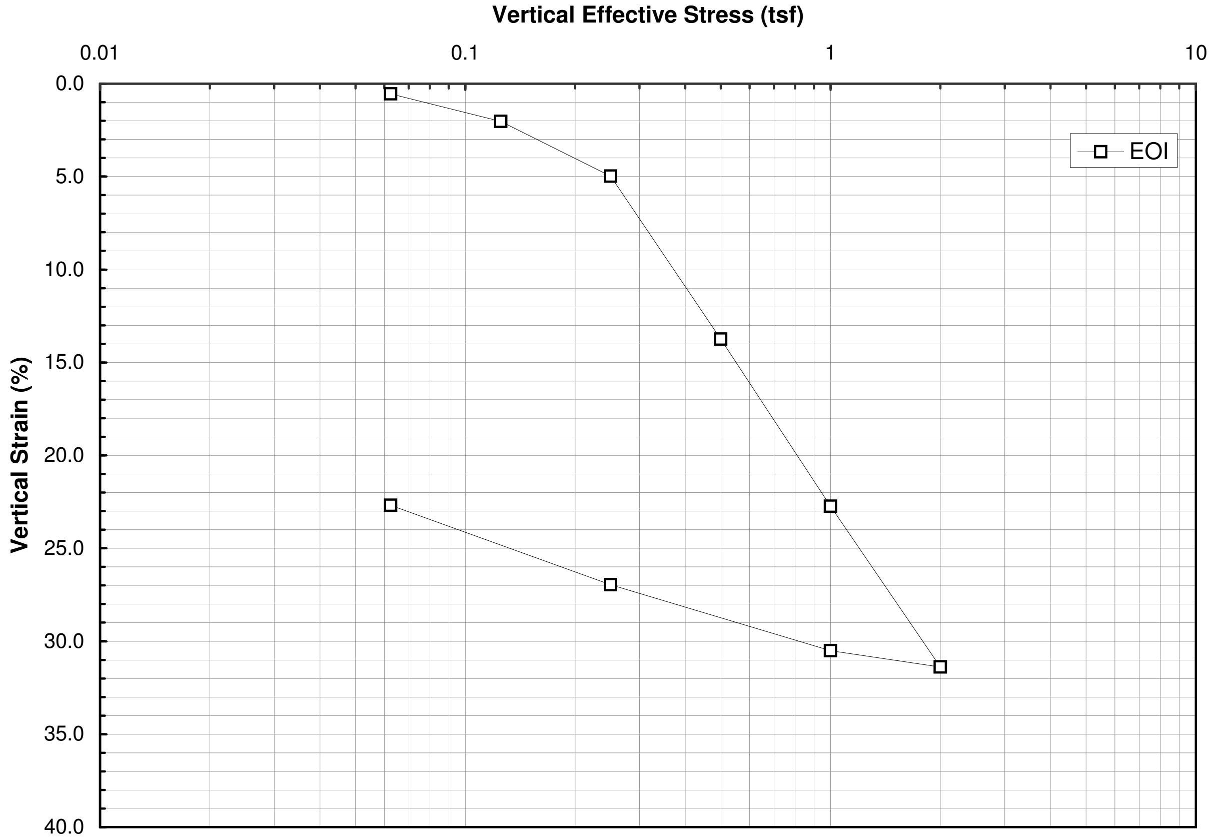
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554



CONSOLIDATION PARAMETERS

Probable Preconsolidation Stress, P'_c (tsf):	0.2
Approx. Hydrostatic Effective Stress, P'_o (tsf)	0.2
Vertical Strain at P'_o (%):	4.0
Compression Ratio (CR):	0.29
Recompression Ratio (RR):	0.065
Over Consolidation Ratio (OCR):	1.0

TEST METHOD

Test Method:	ASTM D-2435 A
Trimming Procedure:	2.5-inch Trimming Lathe
Pressure at Inundation:	0.014 tsf
Method to Compute C_v:	ASTM D-2435 12.3.2

SAMPLE ID

Test No.:	S&ME B-74A, 9'
Sample No.:	UD1
Exploration No.:	B-74A
Depth:	8 to 10 feet
USCS Description:	Elastic SILT (MH)

SAMPLE DATA

Sample Diameter (cm):	6.35
Sample Area (cm^2):	31.67
Measured Specific Gravity:	2.48
Trimmings Moisture (%):	108.2
% Passing #200 Sieve:	88.5
Liquid Limit:	86
Plastic Limit:	39
Plasticity Index:	47

	Initial	Final
Water Content (%):	124.8	91.3
Est. % Saturation:	98.3	100.0
Sample Height (cm):	2.540	1.964
Wet Sample Weight (g):	108.1	92.0
Dry Sample Weight (g):	48.1	48.1
Dry Unit Weight (pcf):	37.3	48.2
Void Ratio, e:	3.15	2.21
Solids Height (cm):	0.612	0.612

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Fax: 804.261.5569

ONE-DIMENSIONAL CONSOLIDATION TEST

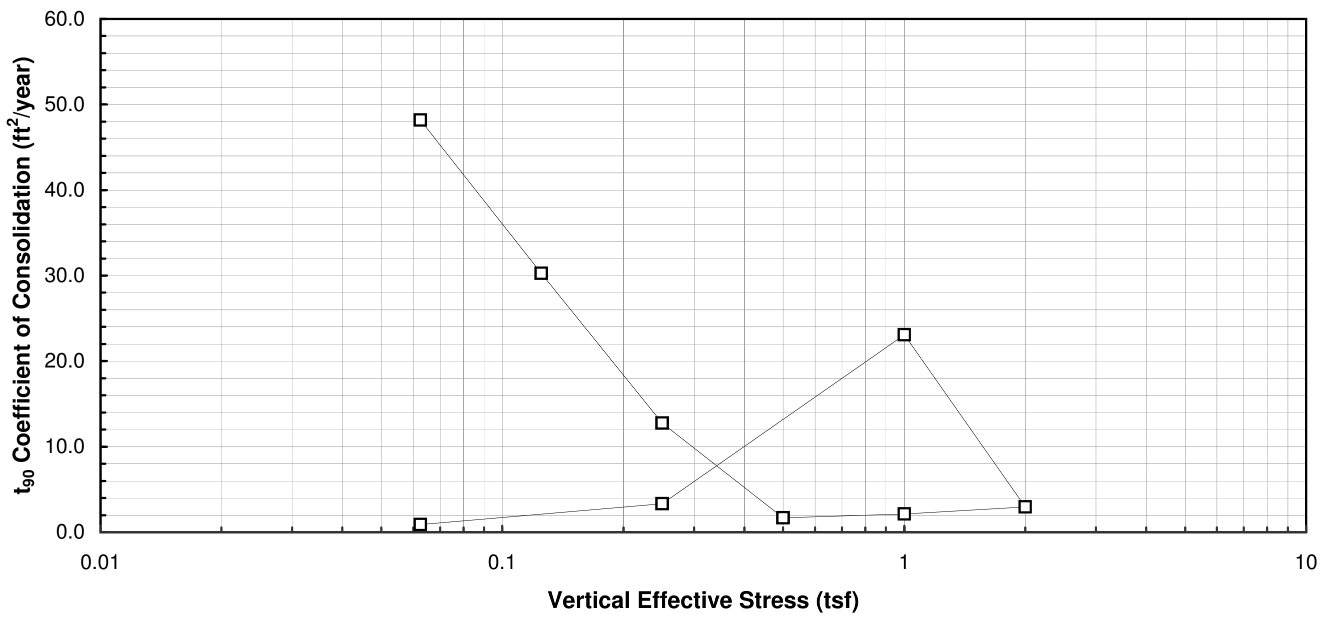
Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

Test No.:	S&ME B-74A, 9'
Sample No.:	UD1
Exploration No.:	B-74A
Depth:	8 to 10 feet

LOAD INC.	STRESS DURATION (Hr - min)	VERTICAL STRESS (tsf)	VERTICAL STRAIN (EOI*)	VERTICAL STRAIN (EOP*)	VOID RATIO e (EOI*)	VOID RATIO e (EOP*)	STRESS RATIO (P'/P'c)	TAYLOR COEFFICIENT OF CONSOLIDATION (ft^2/year)
1	24-00	0.0625	0.6	0.2	3.13	3.14	0.3	48.2
2	24-00	0.125	2.0	1.2	3.06	3.10	0.6	30.3
3	24-10	0.25	5.0	3.9	2.94	2.99	1.1	12.8
4	24-00	0.5	13.8	12.6	2.58	2.62	2.3	1.7
5	24-28	1	22.7	22.0	2.20	2.23	4.5	2.1
6	24-22	2	31.4	30.9	1.85	1.86	9.1	3.0
7	24-04	1	30.5	30.8	1.88	1.87	4.5	23.1
8	24-00	0.25	27.0	27.8	2.03	2.00	1.1	3.3
9	64-15	0.0625	22.7	23.7	2.21	2.17	0.3	0.9

*EOI = End of Increment

*EOP = End of Primary



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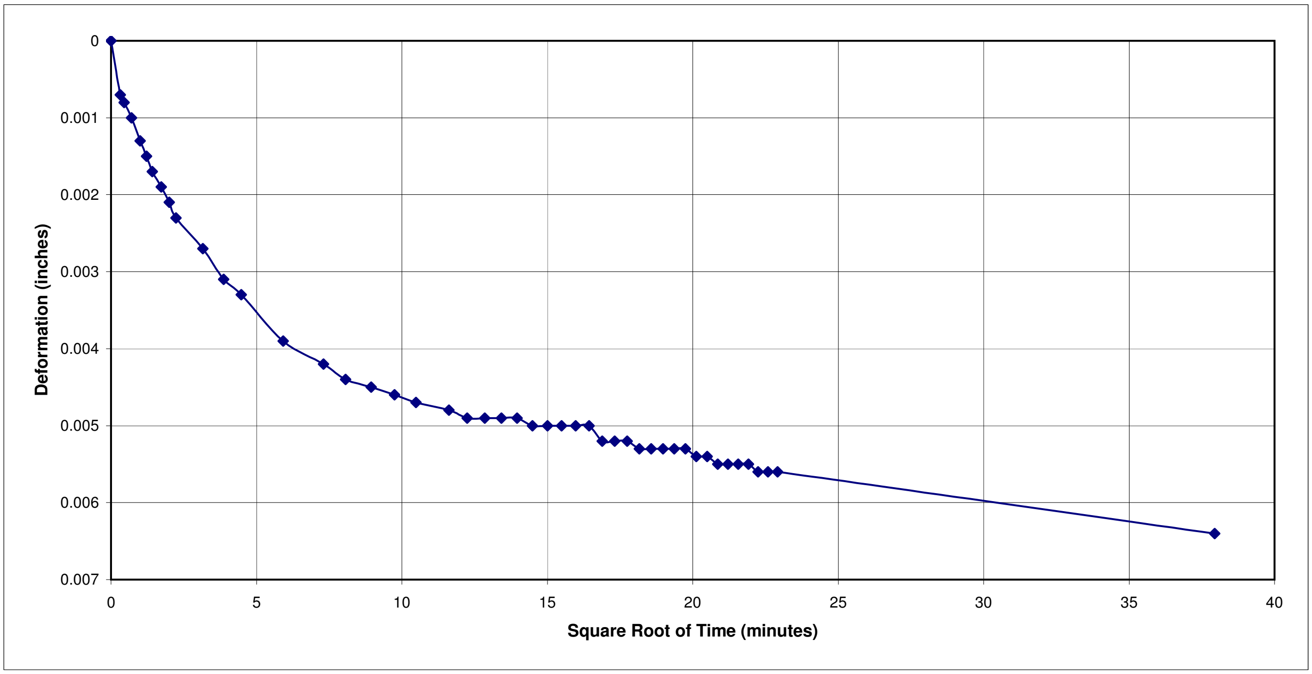
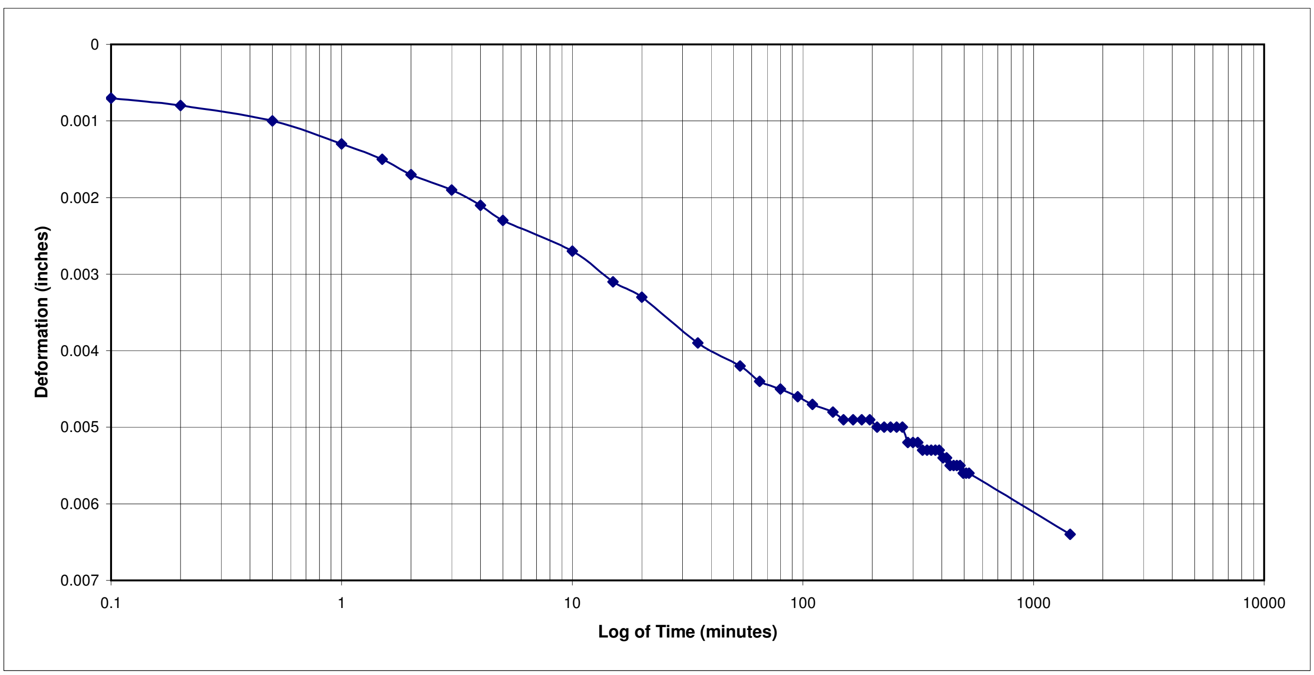
ONE-DIMENSIONAL CONSOLIDATION TEST

Project: Port Access Road
Client: SCDOT
Location: North Charleston, South Carolina
Project No. 1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-74A, 8 to 10 feet
LOAD = 0.0625 TSF



DEFORMATION VS. LOG OF TIME
B-74A, 8 to 10 feet
LOAD = 0.0625 TSF



Sample No.:	S&ME B-74A, 9'
Exploration No.:	B-74A
Depth:	8 - 10 feet

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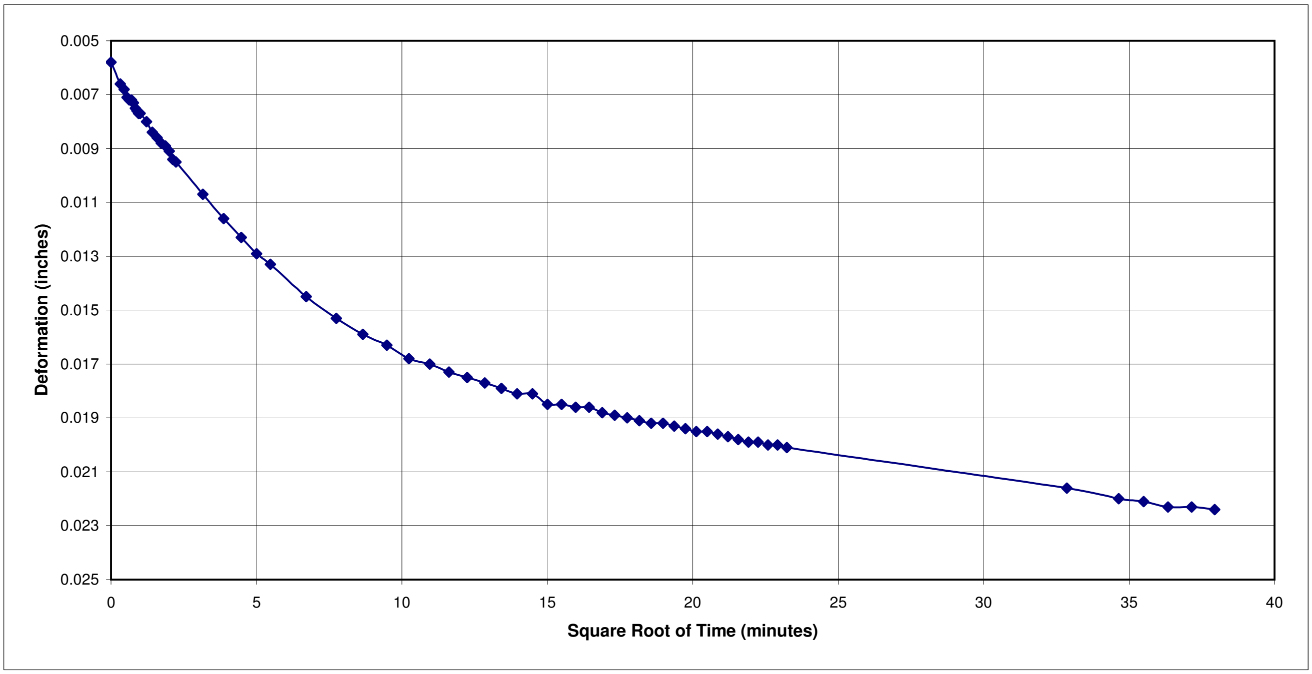
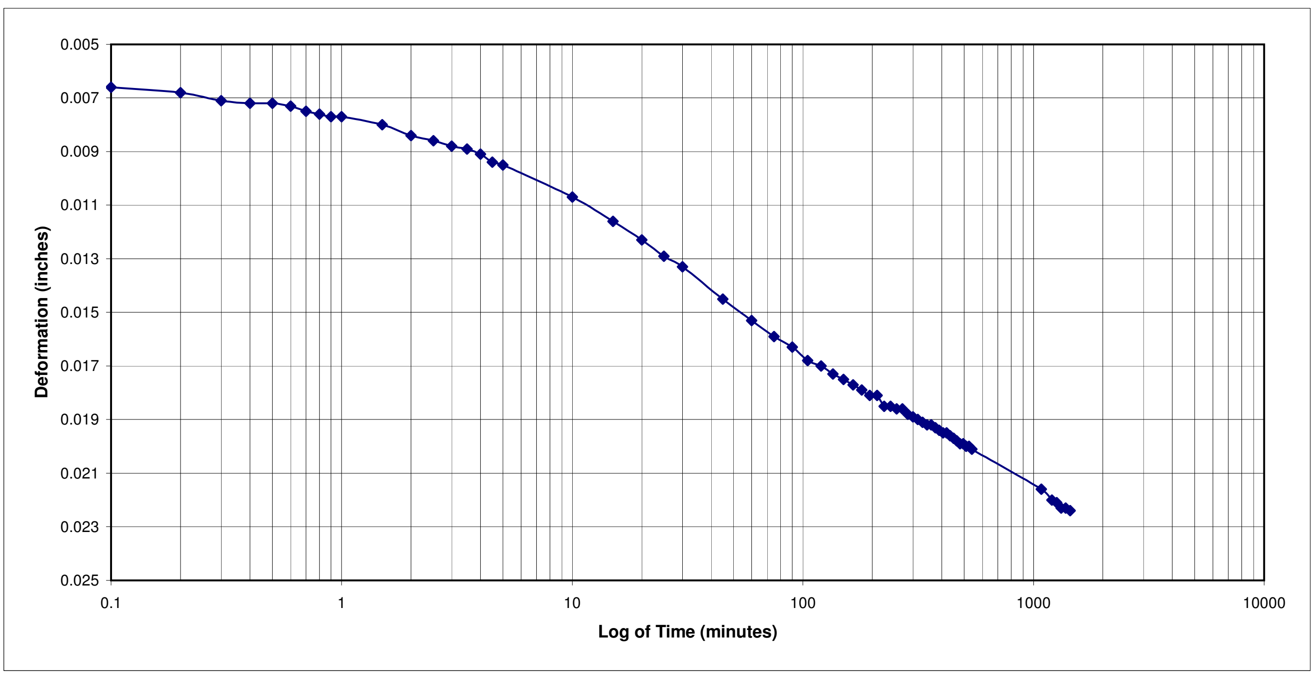
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-74A, 8 to 10 feet
LOAD = 0.125 TSF



DEFORMATION VS. LOG OF TIME
B-74A, 8 to 10 feet
LOAD = 0.125 TSF



Sample No.:	S&ME B-74A, 9'
Exploration No.:	B-74A
Depth:	8 - 10 feet

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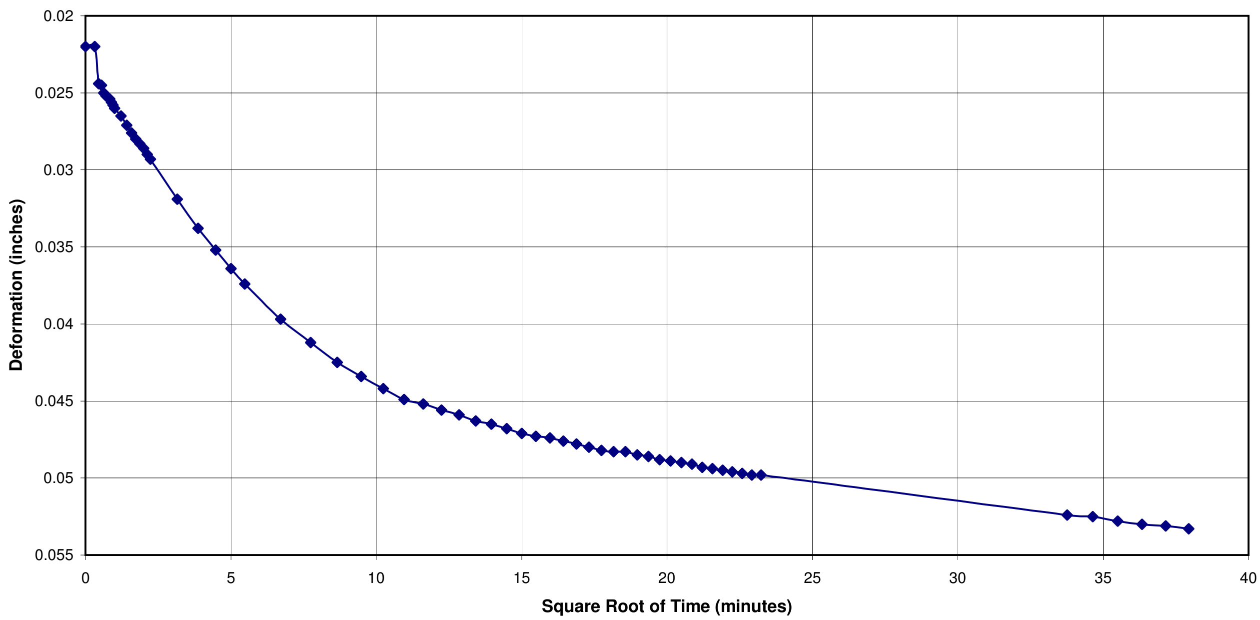
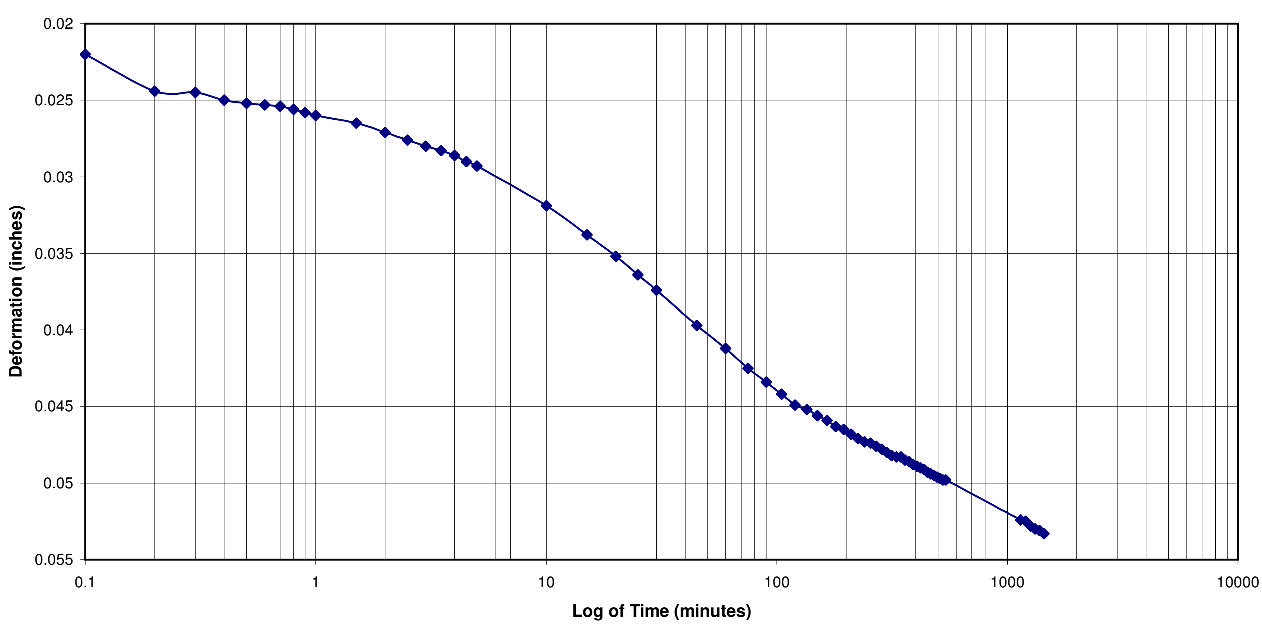
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-74A, 8 to 10 feet
LOAD = 0.25 TSF



DEFORMATION VS. LOG OF TIME
B-74A, 8 to 10 feet
LOAD = 0.25 TSF



Sample No.:	S&ME B-74A, 9'
Exploration No.:	B-74A
Depth:	8 - 10 feet

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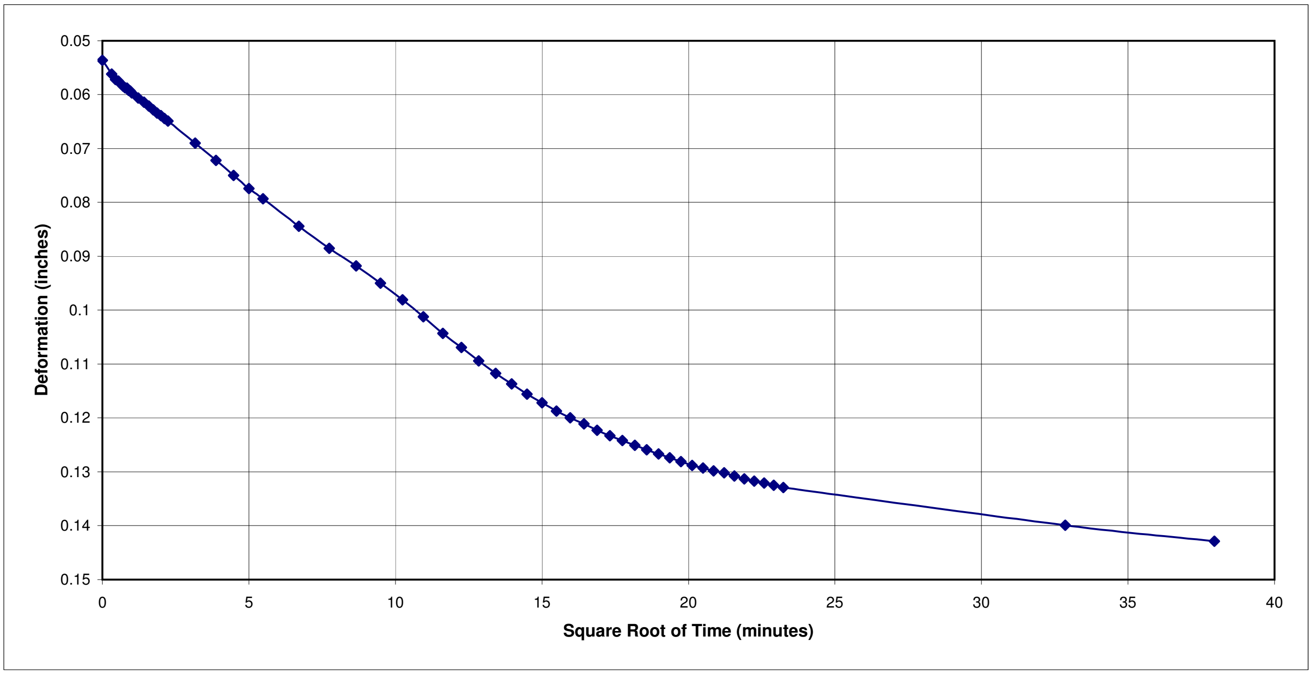
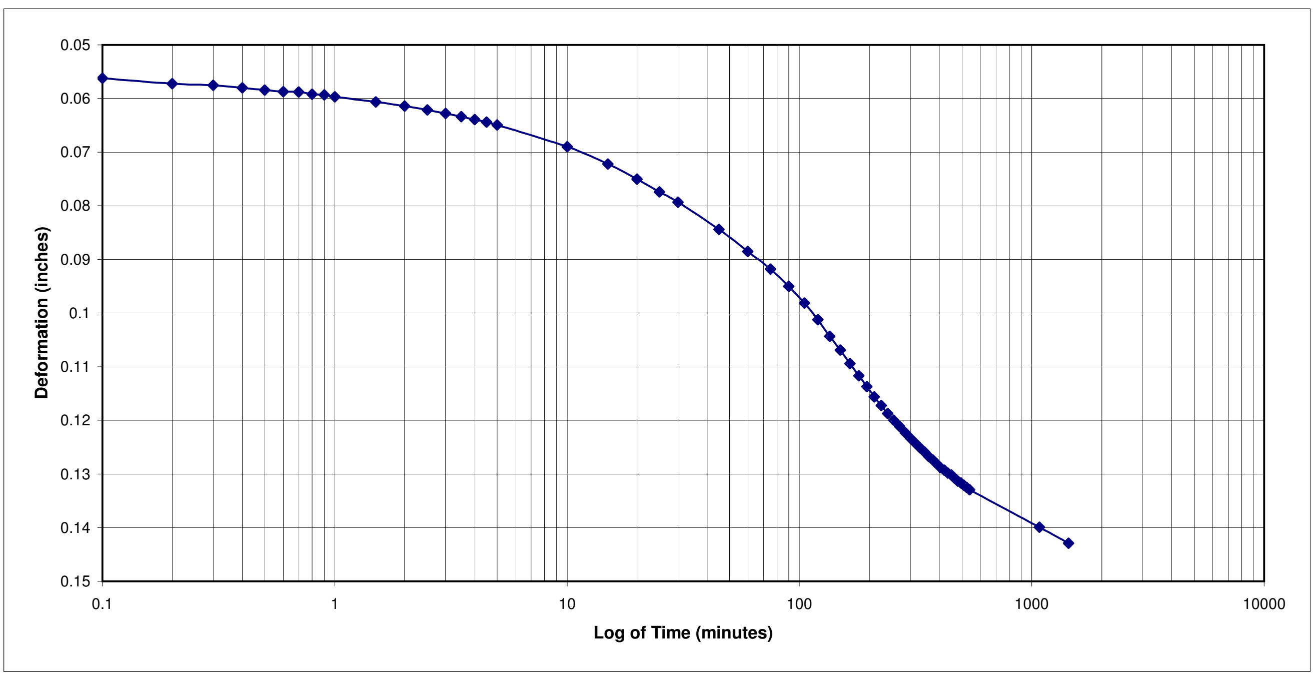
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-74A, 8 to 10 feet
LOAD = 0.5 TSF



DEFORMATION VS. LOG OF TIME
B-74A, 8 to 10 feet
LOAD = 0.5 TSF



Sample No.:	S&ME B-74A, 9'
Exploration No.:	B-74A
Depth:	8 - 10 feet

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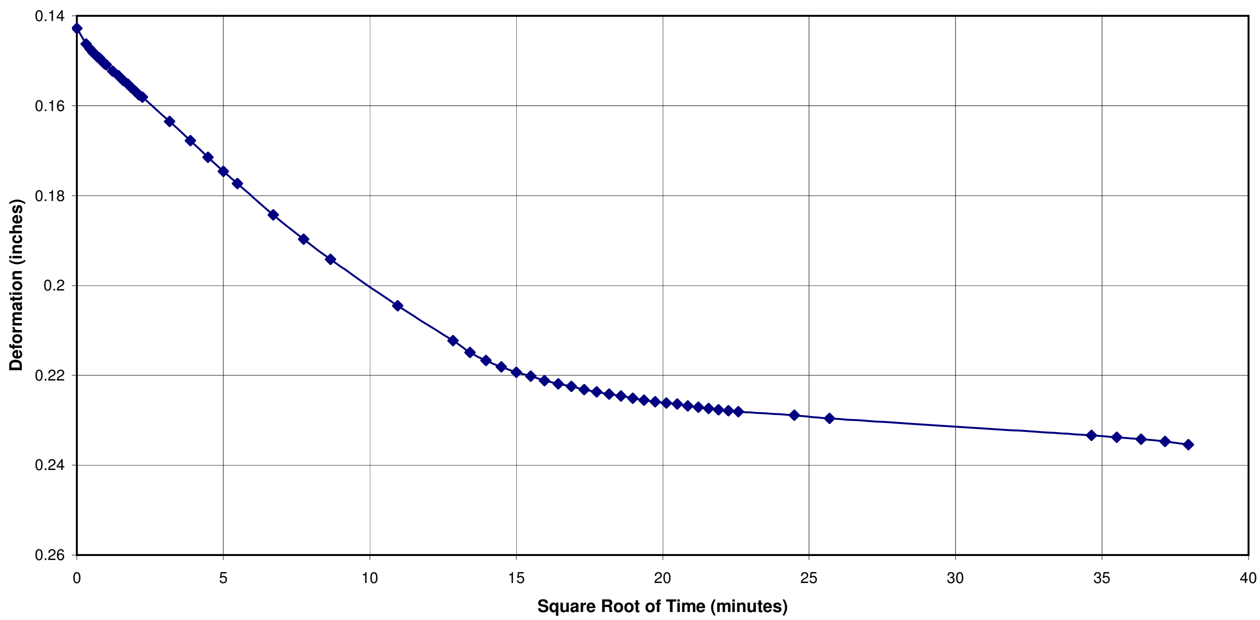
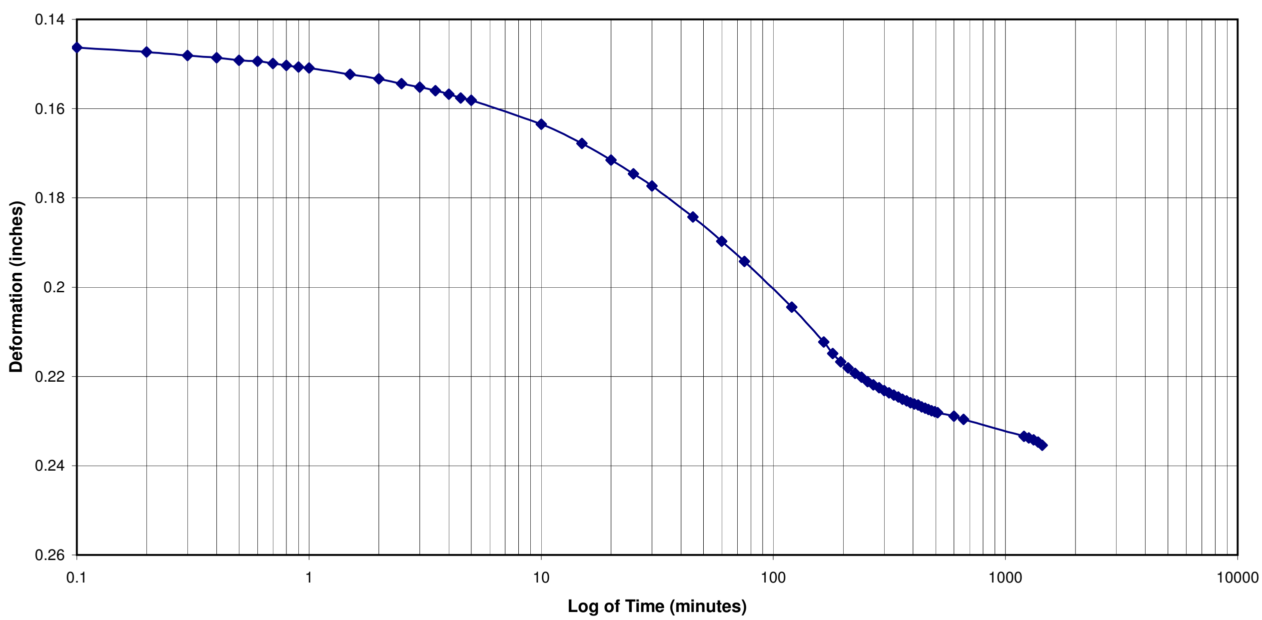
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-74A, 8 to 10 feet
LOAD = 1.0 TSF



DEFORMATION VS. LOG OF TIME
B-74A, 8 to 10 feet
LOAD = 1.0 TSF



Sample No.:	S&ME B-74A, 9'
Exploration No.:	B-74A
Depth:	8 - 10 feet

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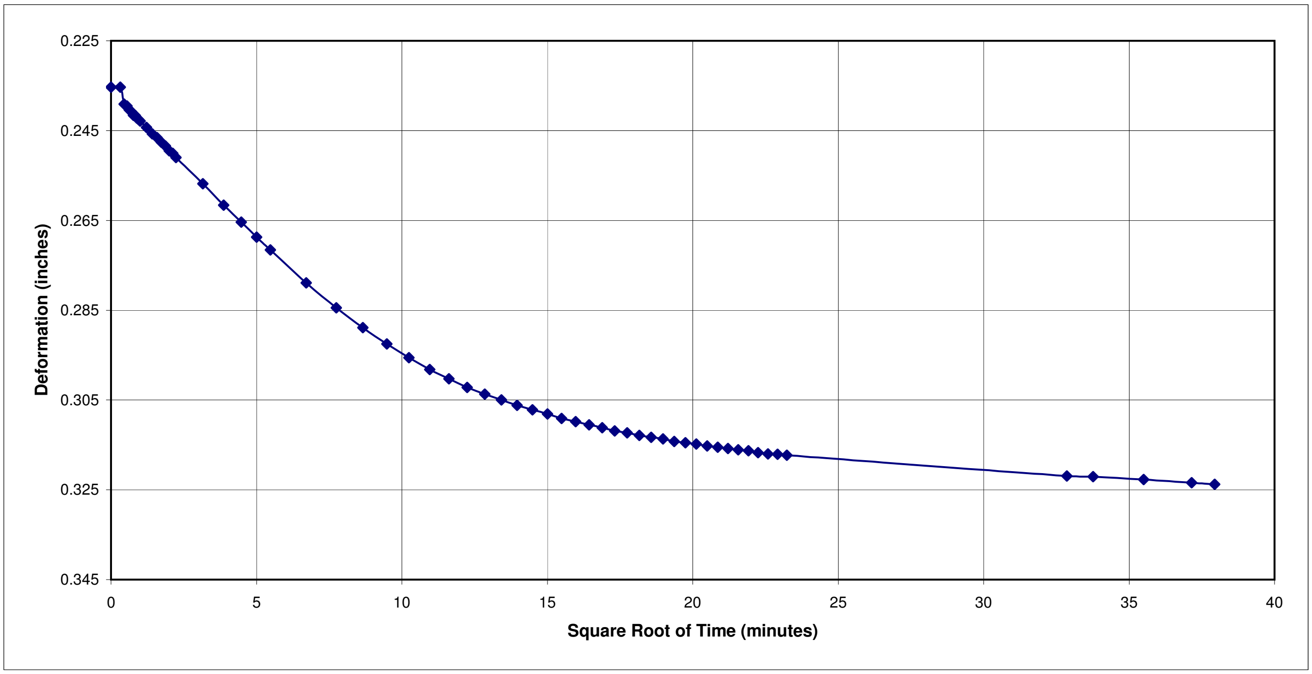
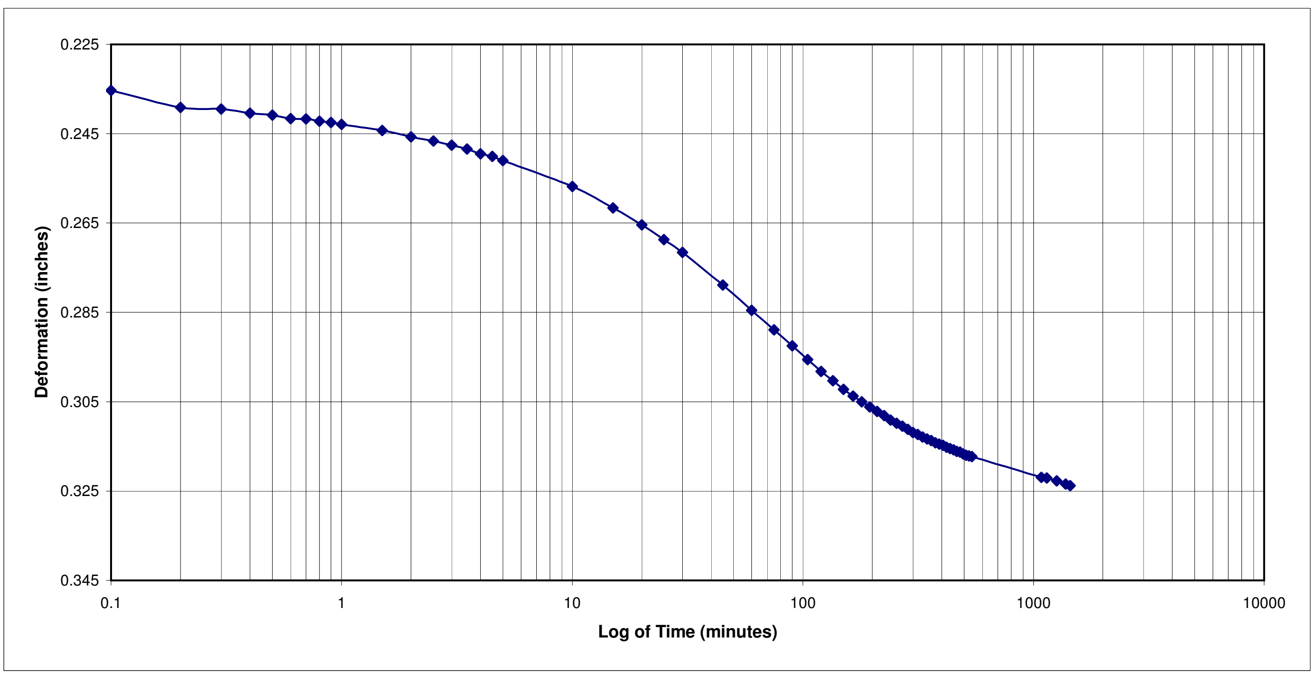
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-74A, 8 to 10 feet
LOAD = 2.0 TSF



DEFORMATION VS. LOG OF TIME
B-74A, 8 to 10 feet
LOAD = 2.0 TSF



Sample No.:	S&ME B-74A, 9'
Exploration No.:	B-74A
Depth:	8 - 10 feet

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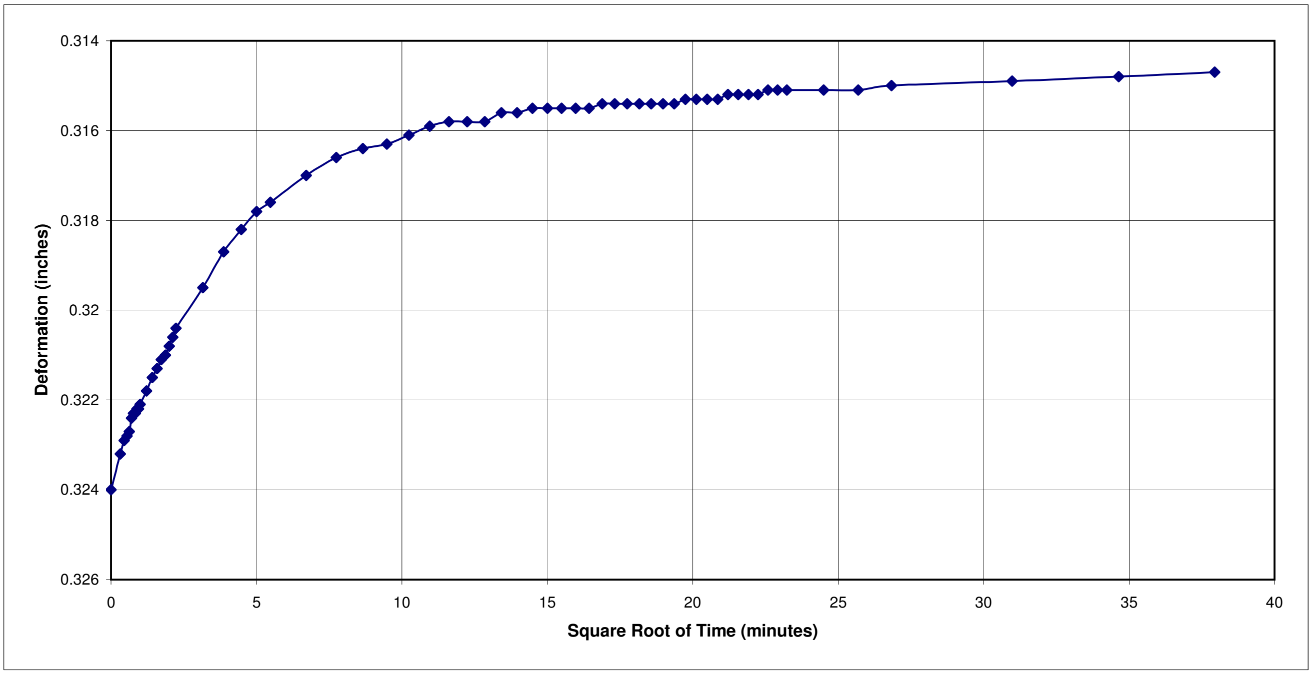
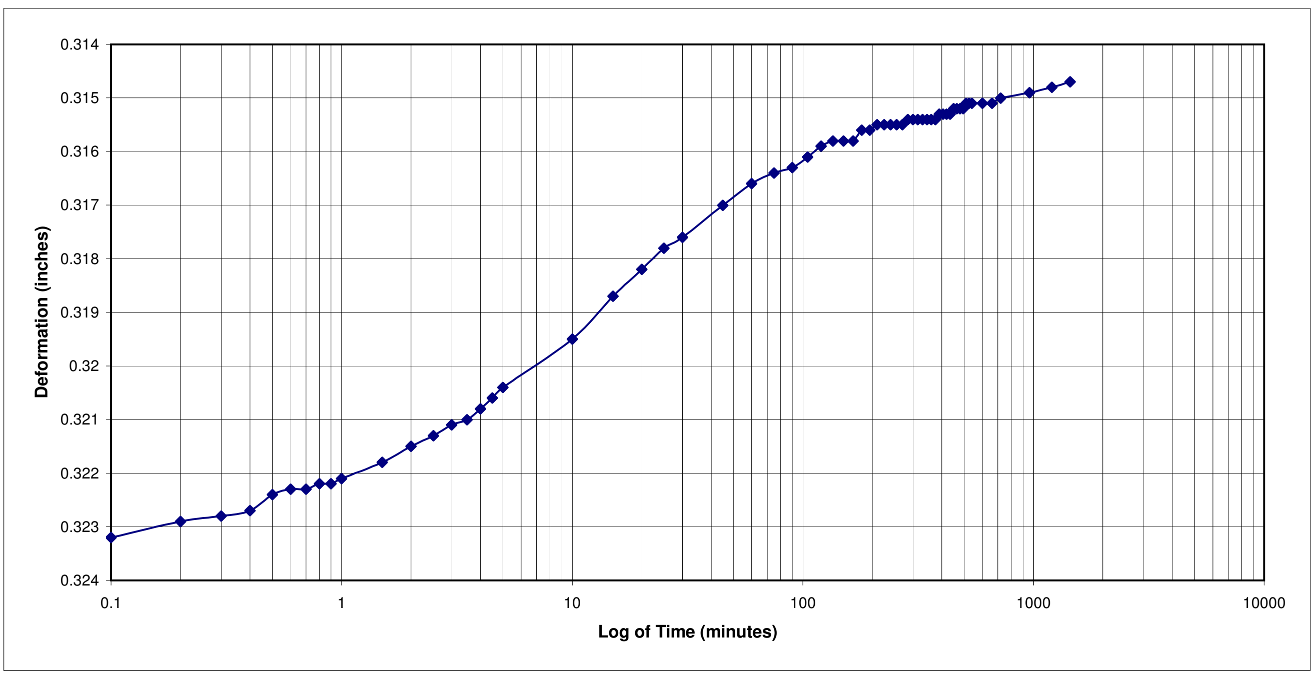
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-74A, 8 to 10 feet
LOAD = 1.0 TSF



DEFORMATION VS. LOG OF TIME
B-74A, 8 to 10 feet
LOAD = 1.0 TSF



Sample No.:	S&ME B-74A, 9'
Exploration No.:	B-74A
Depth:	8 - 10 feet

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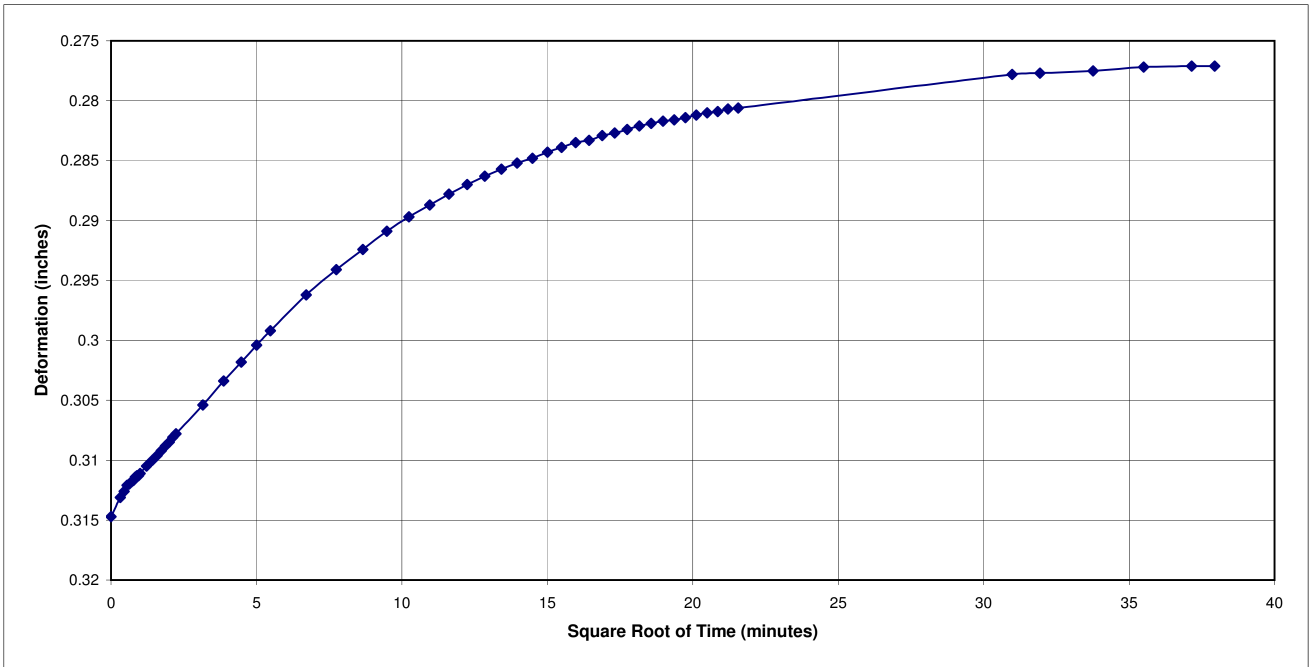
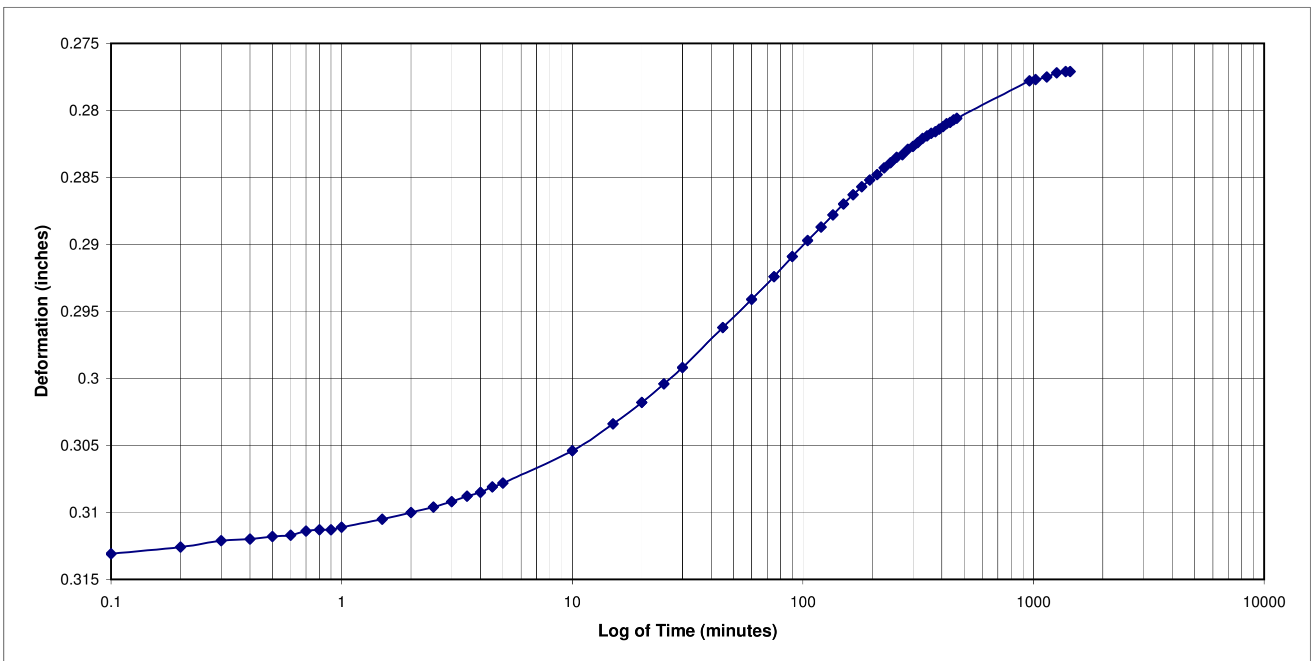
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-74A, 8 to 10 feet
LOAD = 0.25 TSF



DEFORMATION VS. LOG OF TIME
B-74A, 8 to 10 feet
LOAD = 0.25 TSF



Sample No.:	S&ME B-74A, 9'
Exploration No.:	B-74A
Depth:	8 - 10 feet

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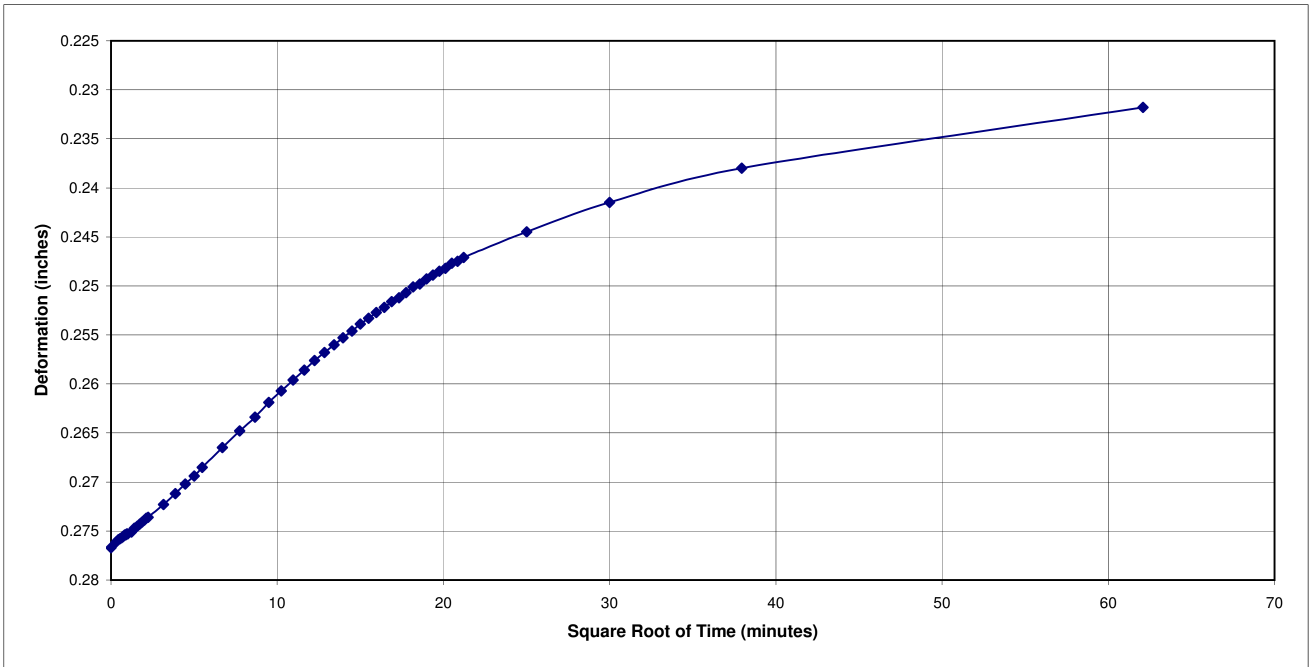
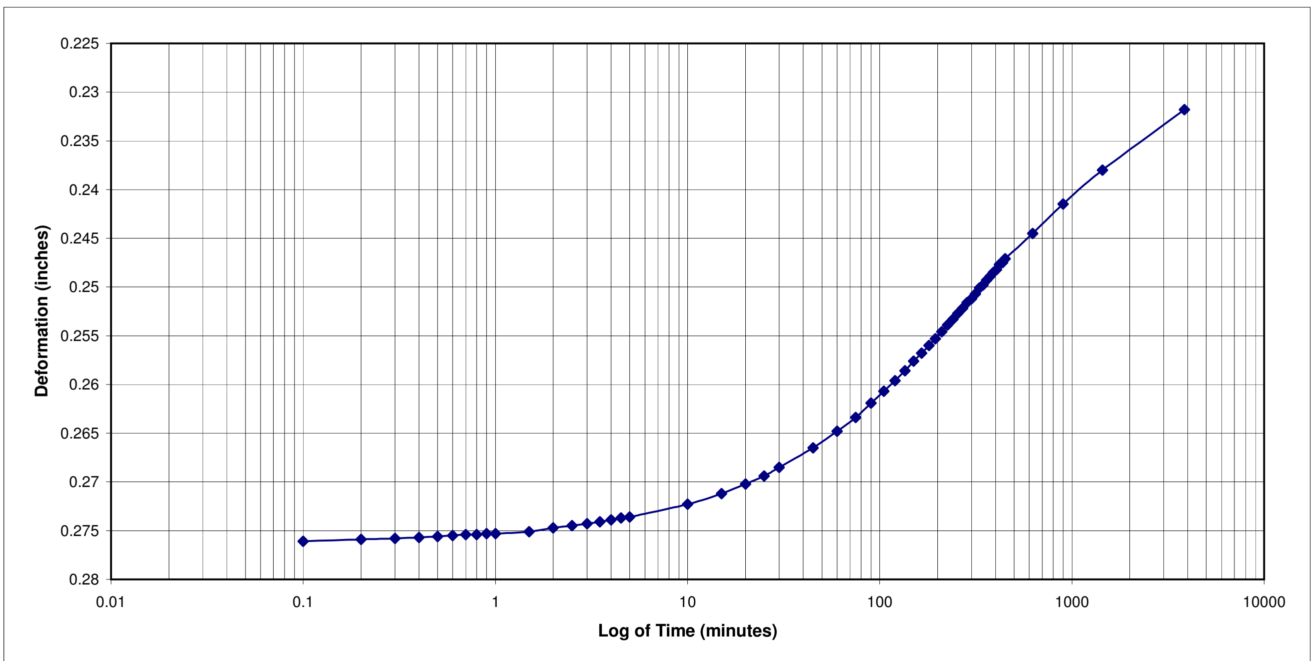
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

DEFORMATION VS. SQUARE ROOT OF TIME
B-74A, 8 to 10 feet
LOAD = 0.0625 TSF



DEFORMATION VS. LOG OF TIME
B-74A, 8 to 10 feet
LOAD = 0.0625 TSF



Sample No.:	S&ME B-74A, 9'
Exploration No.:	B-74A
Depth:	8 - 10 feet

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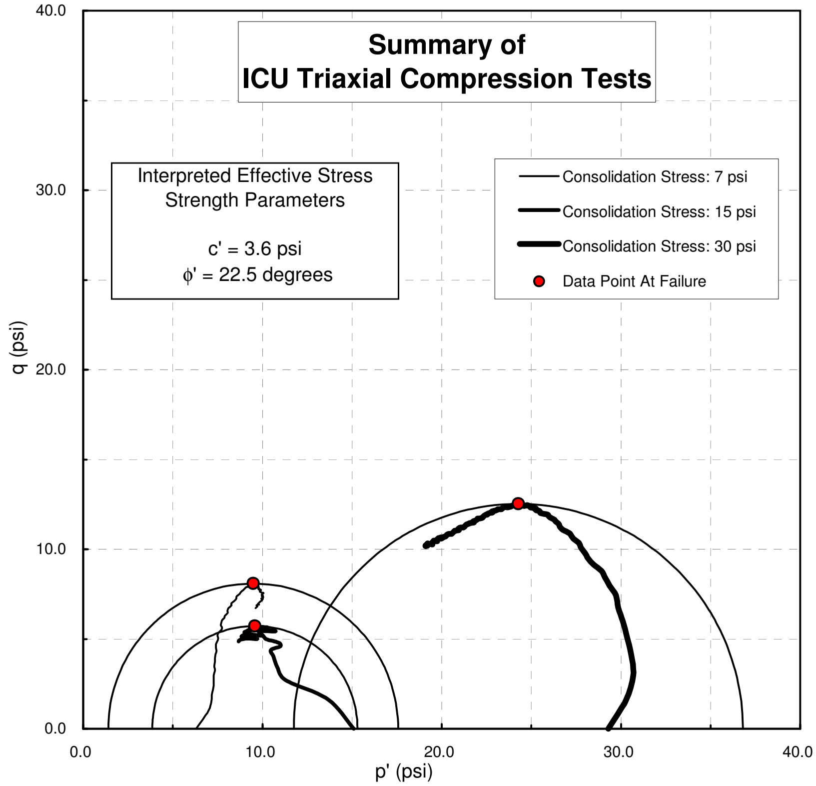
1-D CONSOLIDATION TIME-DEFORMATION CURVES

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554



SAMPLE ID

Lab Sample No.:	SCI B-2A, 24'
Exploration No.:	B-2A
Sample Depth:	23 to 25 feet
USCS Classification:	Gray, fat CLAY (CH)

INITIAL SAMPLE

Sample No.	A	B	C
Wet Weight, g	115.4	137.5	121.8
Dry Weight, g	66.1	82.7	77.9
Water Content, %	74.6	66.2	56.4
Wet Density, pcf	99.4	97.2	98.0
Dry Density, pcf	56.9	58.5	62.7
Saturation, %	100.0	96.2	91.4
Void Ratio	1.97	1.82	1.63
Diameter, in	1.400	1.400	1.375
Height, in	2.875	3.500	3.188

* Water content data obtained using entire sample

AFTER CONSOLIDATION

	A	B	C
Wet Weight, g	113.6	135.5	117.6
Dry Weight, g	66.1	82.7	77.9
Water Content, %	71.9	63.8	50.9
Wet Density, pcf	103.5	98.0	103.1
Dry Density, pcf	60.2	59.8	68.3
Saturation, %	100.0	96.1	95.2
Void Ratio	1.90	1.75	1.41
Area, in^2	1.485	1.517	1.389
Diameter, in	1.375	1.390	1.330
Height, in	2.816	3.471	3.128

* Water content data obtained using entire sample

CLASSIFICATION

Sieve Size	%-Passing	Atterberg Limits	
3/8-in (9.5-mm)		Liquid Limit, %	63
No. 4 (4.75-mm)		Plastic Limit, %	19
No. 10 (2.0-mm)		Plasticity Index, %	44
No. 40 (0.425-mm)		Classification	CH
No. 100 (0.150-mm)		Measured Gs	2.64
No. 200 (0.075-mm)	86.6		

Notes:

TEST SUMMARY

Sample No.	A	B	C
Saturation Method	Wet	Wet	Wet
B-Parameter	1.00	1.00	1.00
t_{50}, minutes	28.1	106.8	61.4
Strain Rate, in/min	0.0001	0.0001	0.0001
Cell Pressure, psi	37.0	45.0	60.0
Back Pressure, psi	30.0	30.0	30.0
Consolidation Stress, psi	7.0	15.0	30.0
Failure Criteria	σ_{DMAX}	σ_{DMAX}	σ_{DMAX}
Deviator Stress at Failure, psi	16.2	11.5	25.1
Axial Strain at Failure, %	3.2	0.8	2.5
σ'_{1F}, psi	17.6	15.3	36.8
σ'_{3F}, psi	1.4	3.9	11.8

* Membrane correction subtracted from deviator stress for Samples A-C

REMARKS

The effective stress strength parameters indicated on this sheet represent S&ME's interpretation. Effective stress strength parameters must be determined by the geotechnical engineer of record for specific application to the referenced project.

ISOTROPICALLY CONSOLIDATED, UNDRAINED TRIAXIAL TEST

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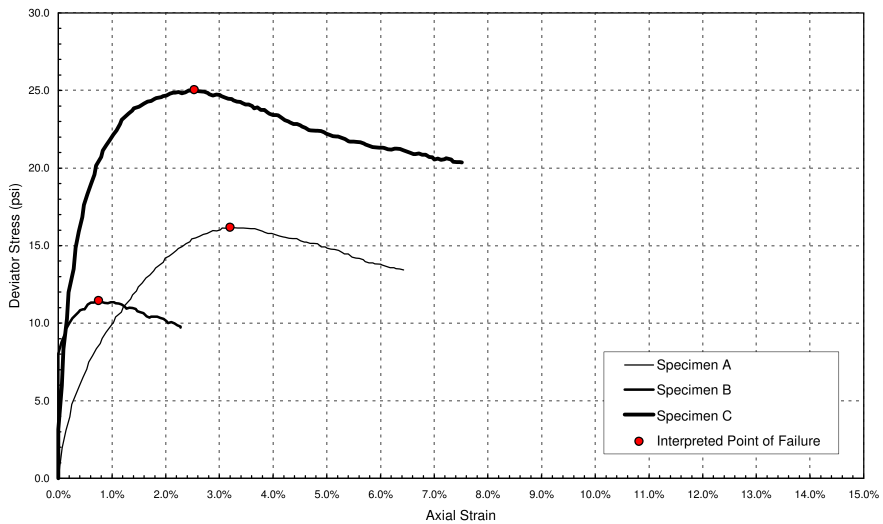
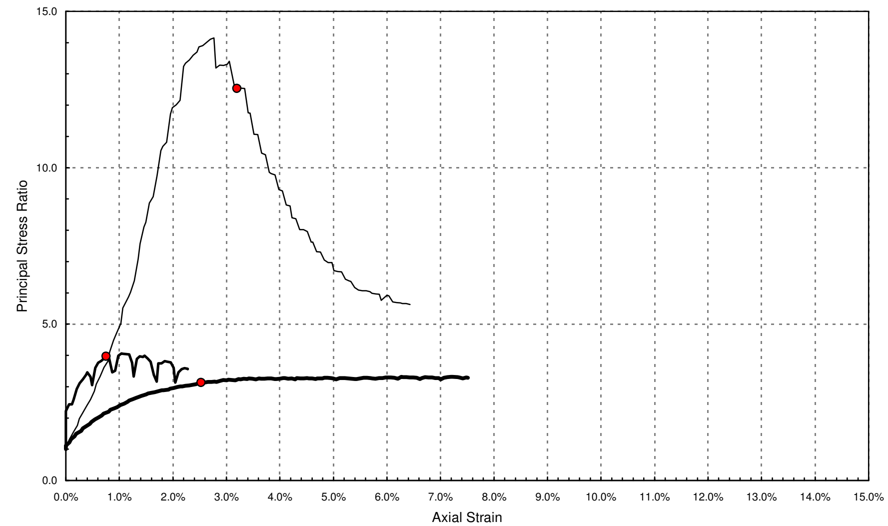
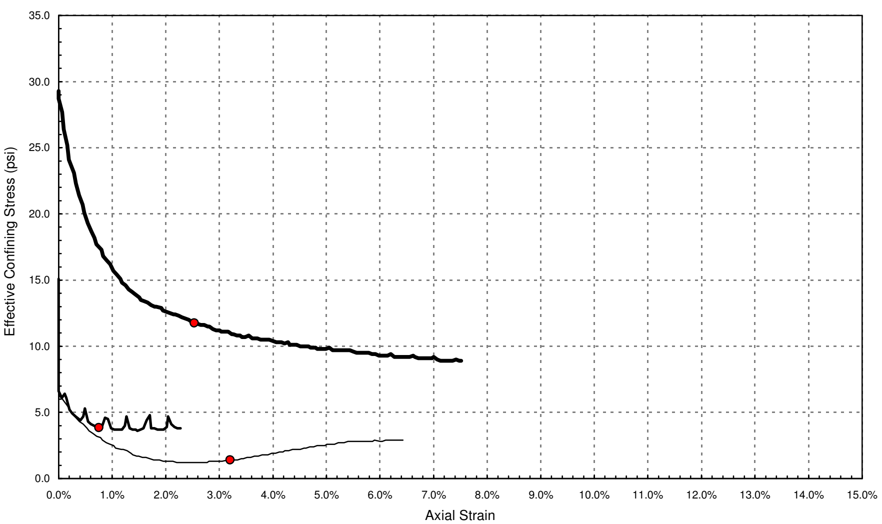
Richmond, Virginia 23228
Tel: 804.266.2199
Fax: 804.261.5569

Project: Port Access Road
Client: SCDOT
Location: North Charleston, South Carolina
Project No.: 1131-08-554

Lab Sample No.: SCI B-2A, 24'
Exploration No.: B-2A
Sample Depth: 23 to 25 feet







SPECIMEN PHOTOGRAPHS (AFTER SHEARING)

A

B

C

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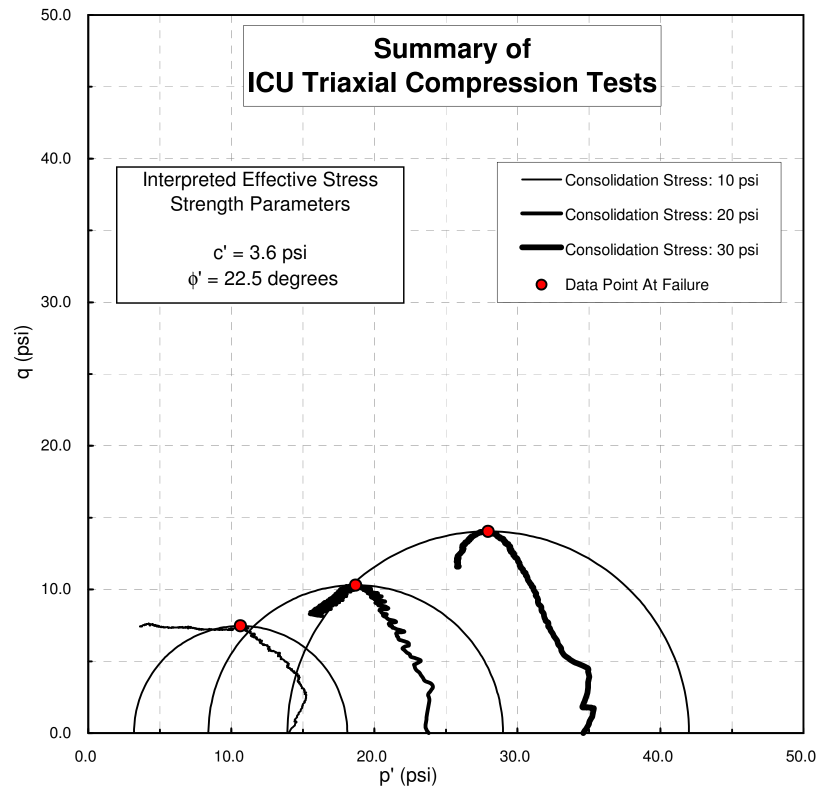
ISOTROPICALLY CONSOLIDATED, UNDRAINED TRIAXIAL TEST

Project: Port Access Road
Client: SCDOT
Location: North Charleston, South Carolina
Project No.: 1131-08-554



SAMPLE ID

Lab Sample No.:	SCI B-2A, 36'
Exploration No.:	B-2A
Sample Depth:	35 to 37 feet
USCS Classification:	Gray, fat CLAY (CH)

CLASSIFICATION

Sieve Size	%-Passing
3/8-in (9.5-mm)	
No. 4 (4.75-mm)	
No. 10 (2.0-mm)	
No. 40 (0.425-mm)	
No. 100 (0.150-mm)	
No. 200 (0.075-mm)	94.9

Atterberg Limits	
Liquid Limit, %	92
Plastic Limit, %	25
Plasticity Index, %	67
Classification	CH
Measured Gs	2.67

Notes:

INITIAL SAMPLE

Sample No.	A	B	C
Wet Weight, g	123.3	130.1	133.0
Dry Weight, g	66.4	69.2	72.1
Water Content, %	85.5	88.1	84.5
Wet Density, pcf	97.6	92.0	94.0
Dry Density, pcf	52.6	48.9	51.0
Saturation, %	100.0	97.8	99.4
Void Ratio	2.28	2.41	2.27
Diameter, in	1.400	1.400	1.400
Height, in	3.125	3.500	3.500

* Water content data obtained using entire sample

TEST SUMMARY

Sample No.	A	B	C
Saturation Method	Wet	Wet	Wet
B-Parameter	0.95	0.95	0.95
t_{50}, minutes	380.7	286.1	200.6
Strain Rate, in/min	0.0007	0.0007	0.0007
Cell Pressure, psi	36.5	46.5	56.5
Back Pressure, psi	26.5	26.5	26.5
Consolidation Stress, psi	10.0	20.0	30.0
Failure Criteria	σ_{DMAX}	σ_{DMAX}	σ_{DMAX}
Deviator Stress at Failure, psi	14.9	20.6	28.1
Axial Strain at Failure, %	5.1	1.4	2.9
σ'_{1F}, psi	18.1	29.0	42.0
σ'_{3F}, psi	3.2	8.4	13.9

* Membrane correction subtracted from deviator stress for Samples A-C

AFTER CONSOLIDATION

	A	B	C
Wet Weight, g	118.9	125.1	125.7
Dry Weight, g	66.4	69.2	72.1
Water Content, %	78.9	80.9	74.4
Wet Density, pcf	114.3	96.5	99.8
Dry Density, pcf	63.9	53.3	57.2
Saturation, %	100.0	100.0	100.0
Void Ratio	2.11	2.16	1.99
Area, in^2	1.356	1.444	1.408
Diameter, in	1.314	1.356	1.339
Height, in	2.922	3.422	3.406

* Water content data obtained using entire sample

REMARKS

The effective stress strength parameters indicated on this sheet represent S&ME's interpretation. Effective stress strength parameters must be determined by the geotechnical engineer of record for specific application to the referenced project.

POINT A - Designing engineer should confirm the reliability of data as the plot of PSR is not consitent with Points B and C.

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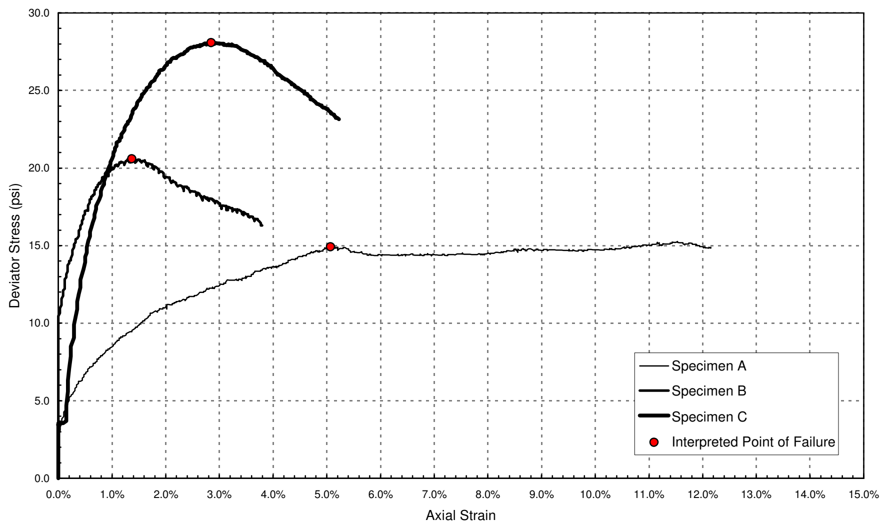
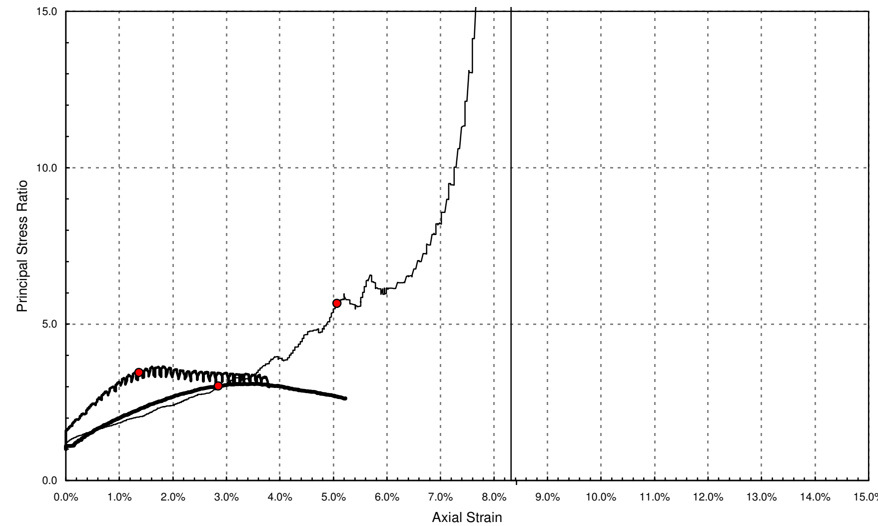
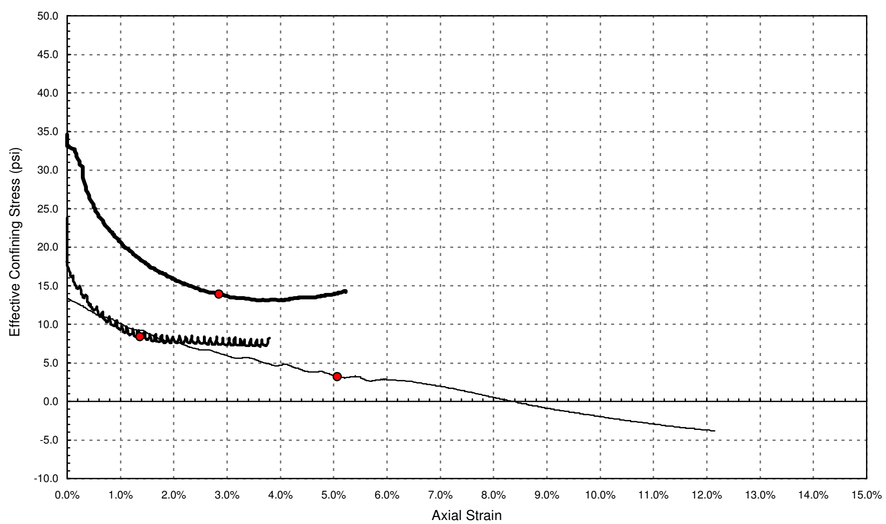
ISOTROPICALLY CONSOLIDATED, UNDRAINED TRIAXIAL TEST

Project: Port Access Road
Client: SCDOT
Location: North Charleston, South Carolina
Project No.: 1131-08-554

Lab Sample No.: SCI B-2A, 36'
Exploration No.: B-2A
Sample Depth: 35 to 37 feet







SPECIMEN PHOTOGRAPHS (AFTER SHEARING)

A

B

C

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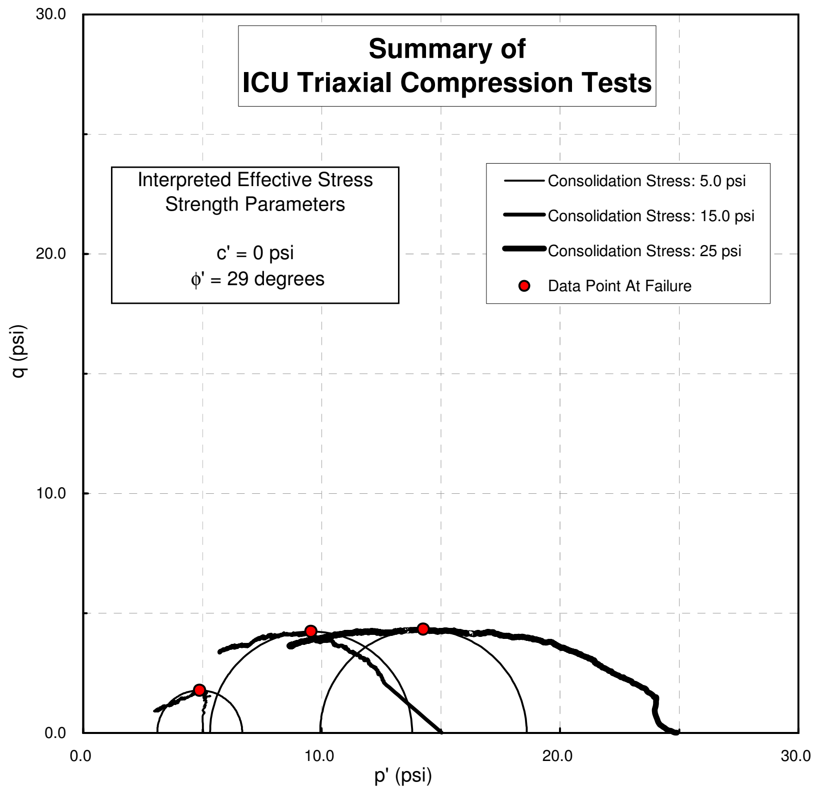
Fax: 804.261.5569

ISOTROPICALLY CONSOLIDATED, UNDRAINED TRIAXIAL TEST

Project: Port Access Road
Client: SCDOT
Location: North Charleston, South Carolina
Project No.: 1131-08-554



SAMPLE ID	
Lab Sample No.:	GTX B-33A, 21'
Exploration No.:	B-33A
Sample Depth:	20 to 22 feet
USCS Classification:	Gray, elastic SILT (MH)

CLASSIFICATION			
Sieve Size	%-Passing	Atterberg Limits	
3/8-in (9.5-mm)		Liquid Limit, %	152
No. 4 (4.75-mm)		Plastic Limit, %	66
No. 10 (2.0-mm)		Plasticity Index, %	86
No. 40 (0.425-mm)		Classification	MH
No. 100 (0.150-mm)		Measured Gs	2.62
No. 200 (0.075-mm)	97.9		

Notes:

INITIAL SAMPLE

Sample No.	A	B	C
Wet Weight, g	101.9	105.2	102.6
Dry Weight, g	43.8	44.8	42.2
Water Content, %	132.9	134.5	143.0
Wet Density, pcf	84.1	84.0	79.8
Dry Density, pcf	36.1	35.8	32.9
Saturation, %	98.7	98.8	94.2
Void Ratio	3.53	3.57	3.98
Diameter, in	1.400	1.400	1.400
Height, in	3.000	3.100	3.180

* Water content data obtained using entire sample

AFTER CONSOLIDATION

	A	B	C
Wet Weight, g	96.8	87.9	72.4
Dry Weight, g	43.8	44.8	42.2
Water Content, %	121.1	96.0	71.5
Wet Density, pcf	89.0	94.3	97.4
Dry Density, pcf	40.2	48.1	56.8
Saturation, %	100.0	100.0	99.8
Void Ratio	3.17	2.52	1.88
Area, in^2	1.400	1.200	0.950
Diameter, in	1.335	1.236	1.100
Height, in	2.960	2.960	2.980

* Water content data obtained using entire sample

TEST SUMMARY

Sample No.	A	B	C
Saturation Method	Wet	Wet	Wet
B-Parameter	0.96	0.97	0.95
t_{50}, minutes	52.0	61.0	89.0
Strain Rate, in/min	0.004	0.004	0.004
Cell Pressure, psi	90.0	43.0	98.0
Back Pressure, psi	85.0	28.0	73.0
Consolidation Stress, psi	5.0	15.0	25.0
Failure Criteria	σ_{DMAX}	σ_{DMAX}	σ_{DMAX}
Deviator Stress at Failure, psi	3.6	8.5	8.7
Axial Strain at Failure, %	4.0	4.5	4.7
σ'_{1F}, psi	6.7	13.8	18.6
σ'_{3F}, psi	3.1	5.3	9.9

* Membrane correction subtracted from deviator stress for Samples A-C

REMARKS

The effective stress strength parameters indicated on this sheet represent S&ME's interpretation. Effective stress strength parameters must be determined by the geotechnical engineer of record for specific application to the referenced project.

POINT C - Not included for interpretation of c' and ϕ'

ISOTROPICALLY CONSOLIDATED, UNDRAINED TRIAXIAL TEST

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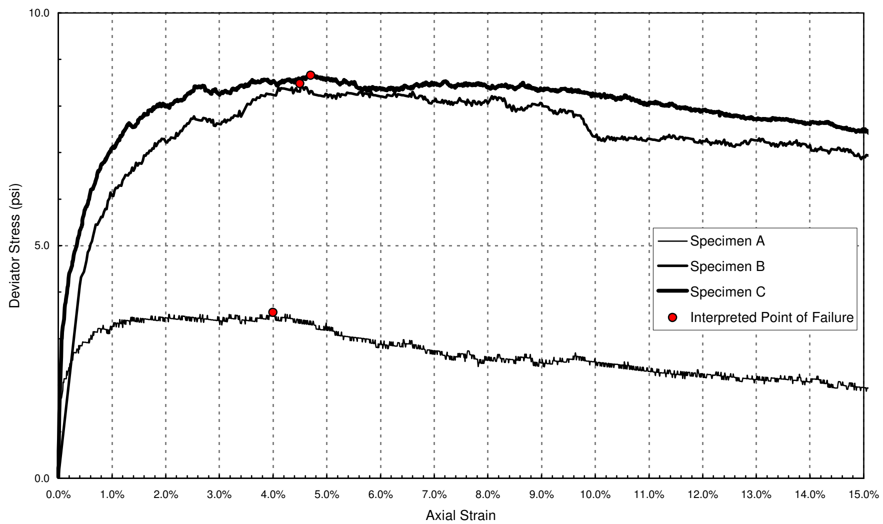
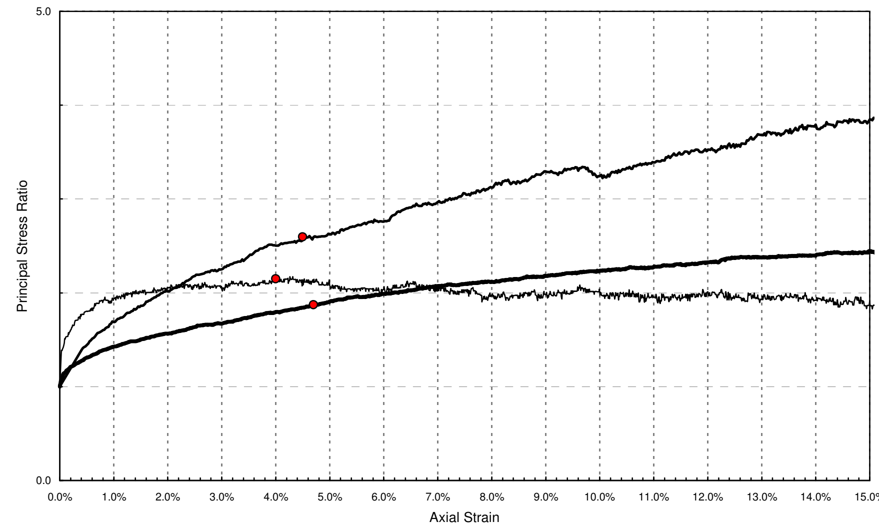
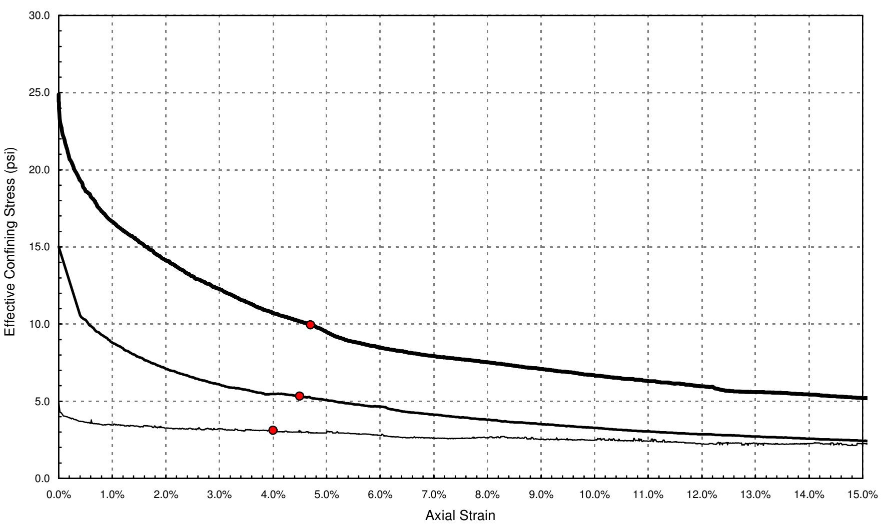
Fax: 804.261.5569

Project: Port Access Road
Client: SCDOT
Location: North Charleston, South Carolina
Project No.: 1131-08-554

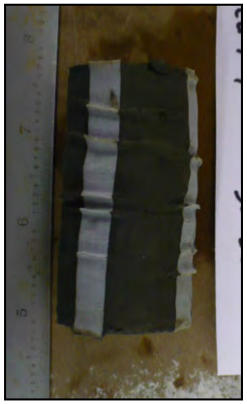
Lab Sample No.: GTX B-33A, 21'
Exploration No.: B-33A
Sample Depth: 20 to 22 feet







SPECIMEN PHOTOGRAPHS (AFTER SHEARING)



A

B

C

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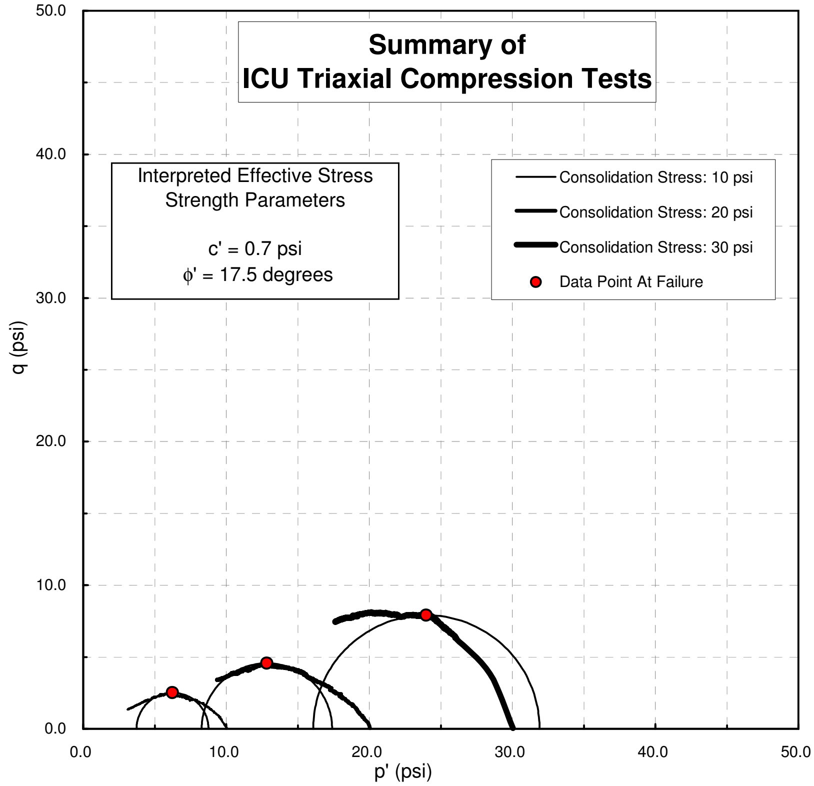
ISOTROPICALLY CONSOLIDATED, UNDRAINED TRIAXIAL TEST

Project: Port Access Road
Client: SCDOT
Location: North Charleston, South Carolina
Project No.: 1131-08-554



SAMPLE ID

Lab Sample No.:	GTX B-33A, 31'
Exploration No.:	B-33A
Sample Depth:	30 to 32 feet
USCS Classification:	Gray, fat CLAY (CH)

CLASSIFICATION

Sieve Size	%-Passing
3/8-in (9.5-mm)	
No. 4 (4.75-mm)	
No. 10 (2.0-mm)	
No. 40 (0.425-mm)	
No. 100 (0.150-mm)	
No. 200 (0.075-mm)	98.3

Atterberg Limits	
Liquid Limit, %	141
Plastic Limit, %	43
Plasticity Index, %	98
Classification	CH
Measured Gs	2.62

Notes:

INITIAL SAMPLE

Sample No.	A	B	C
Wet Weight, g	106.0	105.8	104.2
Dry Weight, g	45.3	44.9	45.5
Water Content, %	134.2	135.8	129.0
Wet Density, pcf	85.8	85.6	82.8
Dry Density, pcf	36.6	36.3	36.1
Saturation, %	100.0	100.0	96.0
Void Ratio	3.51	3.55	3.51
Diameter, in	1.400	1.400	1.399
Height, in	3.060	3.060	3.120

* Water content data obtained using entire sample

AFTER CONSOLIDATION

	A	B	C
Wet Weight, g	97.1	92.2	79.7
Dry Weight, g	45.3	44.9	45.5
Water Content, %	114.6	105.6	75.1
Wet Density, pcf	91.1	95.0	99.2
Dry Density, pcf	42.5	46.2	56.7
Saturation, %	100.0	100.0	100.0
Void Ratio	3.00	2.76	1.97
Area, in^2	1.430	1.370	0.990
Diameter, in	1.349	1.321	1.123
Height, in	2.840	2.700	3.090

* Water content data obtained using entire sample

TEST SUMMARY

Sample No.	A	B	C
Saturation Method	Wet	Wet	Wet
B-Parameter	0.96	0.95	0.96
t_{50}, minutes	51.0	62.0	75.0
Strain Rate, in/min	0.005	0.005	0.005
Cell Pressure, psi	95.0	102.0	58.0
Back Pressure, psi	85.0	82.0	28.0
Consolidation Stress, psi	10.0	20.0	30.0
Failure Criteria	σ_{DMAX}	σ_{DMAX}	σ_{DMAX}
Deviator Stress at Failure, psi	5.0	9.1	15.8
Axial Strain at Failure, %	5.0	7.1	4.0
σ'_{1F}, psi	8.8	17.4	31.9
σ'_{3F}, psi	3.7	8.3	16.1

* Membrane correction subtracted from deviator stress for Samples A-C

REMARKS

The effective stress strength parameters indicated on this sheet represent S&ME's interpretation. Effective stress strength parameters must be determined by the geotechnical engineer of record for specific application to the referenced project.

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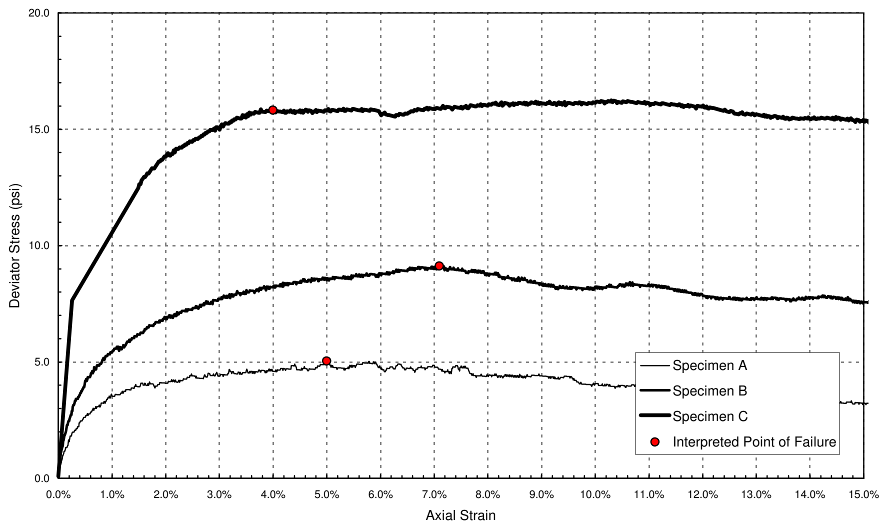
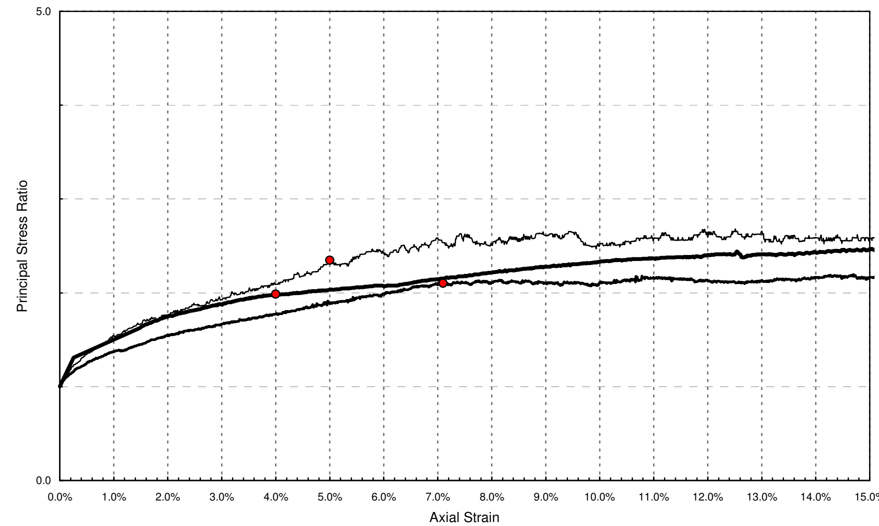
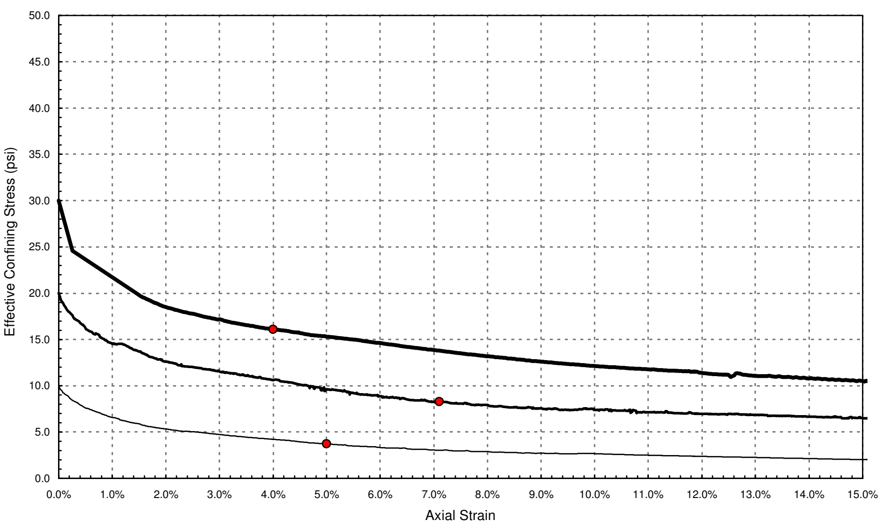
Project: Port Access Road
Client: SCDOT
Location: North Charleston, South Carolina
Project No.: 1131-08-554

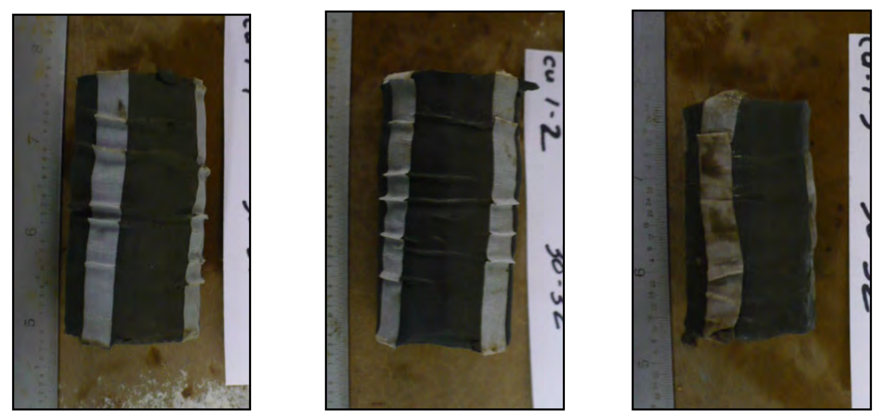
Lab Sample No.: GTX B-33A, 31'
Exploration No.: B-33A
Sample Depth: 30 to 32 feet







SPECIMEN PHOTOGRAPHS (AFTER SHEARING)



A B C

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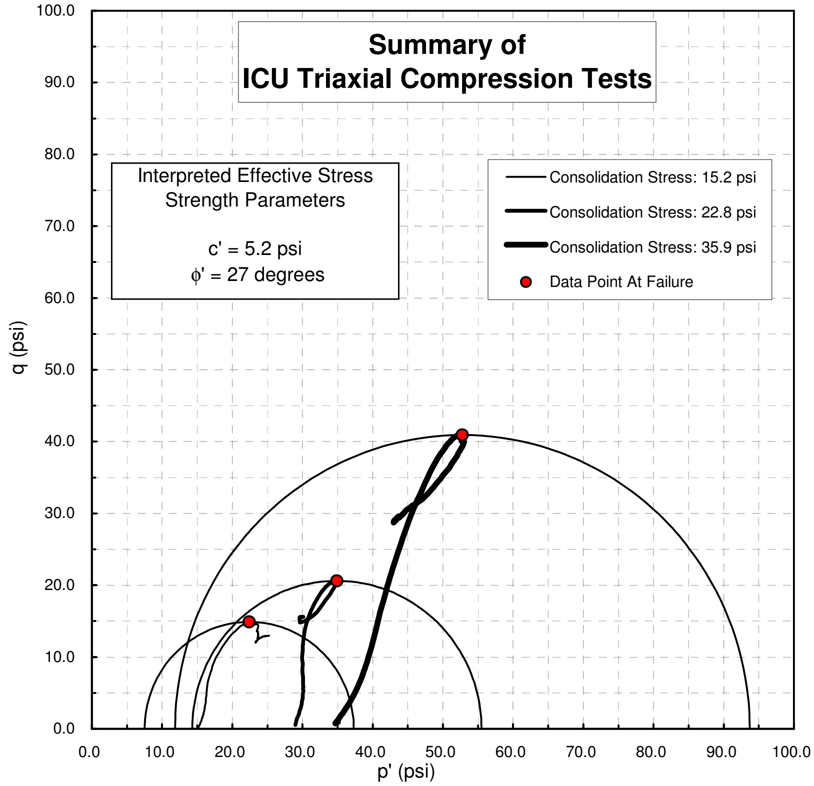
ISOTROPICALLY CONSOLIDATED, UNDRAINED TRIAXIAL TEST

Project: Port Access Road
Client: SCDOT
Location: North Charleston, South Carolina
Project No.: 1131-08-554



SAMPLE ID

Lab Sample No.:	GTX B-33A, 51'
Exploration No.:	B-33A
Sample Depth:	50 to 52 feet
USCS Classification:	Olive-gray, elastic SILT with sand (MH)

CLASSIFICATION

Sieve Size	%-Passing	Atterberg Limits	
3/8-in (9.5-mm)		Liquid Limit, %	118
No. 4 (4.75-mm)		Plastic Limit, %	50
No. 10 (2.0-mm)		Plasticity Index, %	68
No. 40 (0.425-mm)		Classification	MH
No. 100 (0.150-mm)		Measured Gs	2.65
No. 200 (0.075-mm)	73.7		

Notes:

INITIAL SAMPLE

Sample No.	A	B	C
Wet Weight, g	113.4	116.1	113.8
Dry Weight, g	67.2	66.6	67.4
Water Content, %	68.8	74.2	68.9
Wet Density, pcf	96.4	102.6	98.4
Dry Density, pcf	57.1	58.9	58.3
Saturation, %	96.2	100.0	99.3
Void Ratio	1.90	1.97	1.84
Diameter, in	1.396	1.400	1.394
Height, in	2.929	2.800	2.886

* Water content data obtained using entire sample

AFTER CONSOLIDATION

	A	B	C
Wet Weight, g	114.6	114.3	114.3
Dry Weight, g	67.2	66.6	67.4
Water Content, %	70.6	71.6	69.6
Wet Density, pcf	98.1	98.1	98.6
Dry Density, pcf	57.5	57.2	58.1
Saturation, %	99.7	100.0	100.0
Void Ratio	1.88	1.90	1.85
Area, in^2	1.540	1.620	1.560
Diameter, in	1.400	1.436	1.409
Height, in	2.890	2.740	2.830

* Water content data obtained using entire sample

TEST SUMMARY

Sample No.	A	B	C
Saturation Method	Wet	Wet	Wet
B-Parameter	0.86	0.65	0.74
t_{50}, minutes	0.9	2.6	3.2
Strain Rate, in/min	0.05	0.05	0.05
Cell Pressure, psi	149.0	144.0	148.0
Back Pressure, psi	133.8	121.2	112.1
Consolidation Stress, psi	15.2	22.8	35.9
Failure Criteria	σ_{DMAX}	σ_{DMAX}	σ_{DMAX}
Deviator Stress at Failure, psi	29.8	41.2	81.9
Axial Strain at Failure, %	2.1	2.6	2.9
σ'_{1F}, psi	37.3	55.5	93.7
σ'_{3F}, psi	7.5	14.3	11.9

* Membrane correction subtracted from deviator stress for Samples A-C

REMARKS

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POINT C - Not included for interpretation of c' and ϕ'

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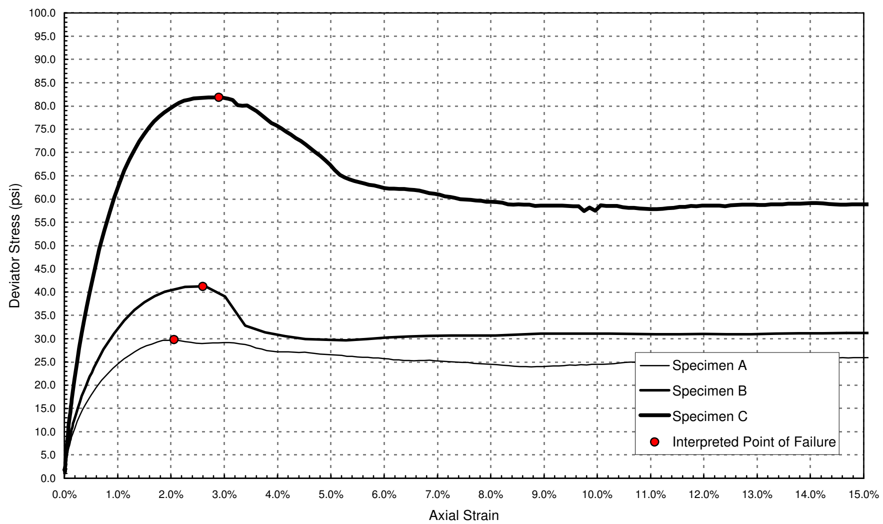
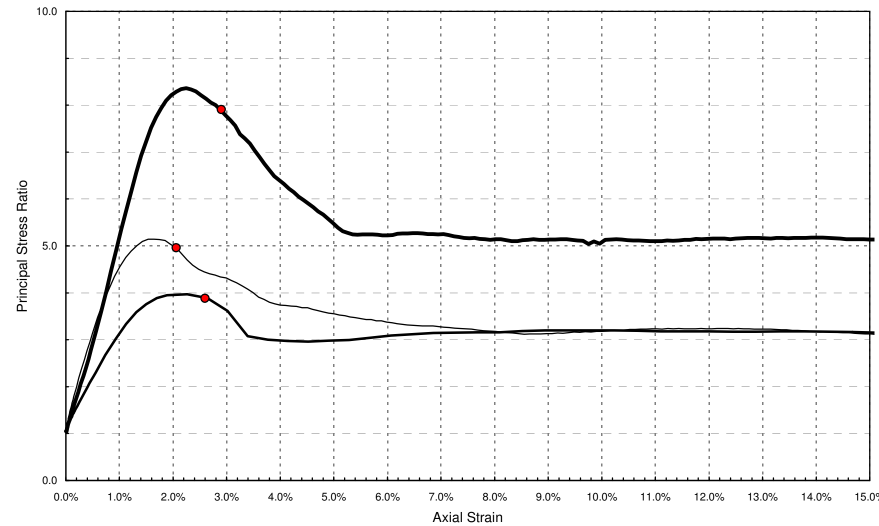
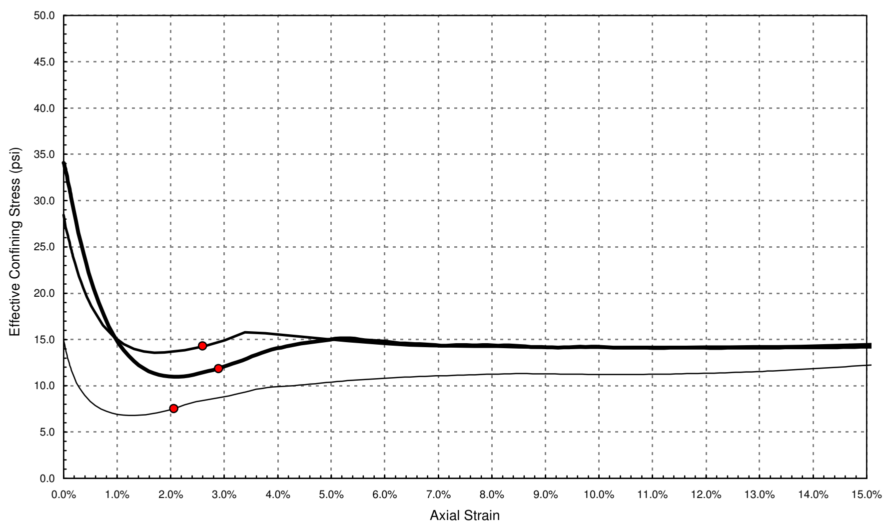
ISOTROPICALLY CONSOLIDATED, UNDRAINED TRIAXIAL TEST

Project: Port Access Road
Client: SCDOT
Location: North Charleston, South Carolina
Project No.: 1131-08-554

Lab Sample No.: GTX B-33A, 51'
Exploration No.: B-33A
Sample Depth: 50 to 52 feet







SPECIMEN PHOTOGRAPHS (AFTER SHEARING)

A

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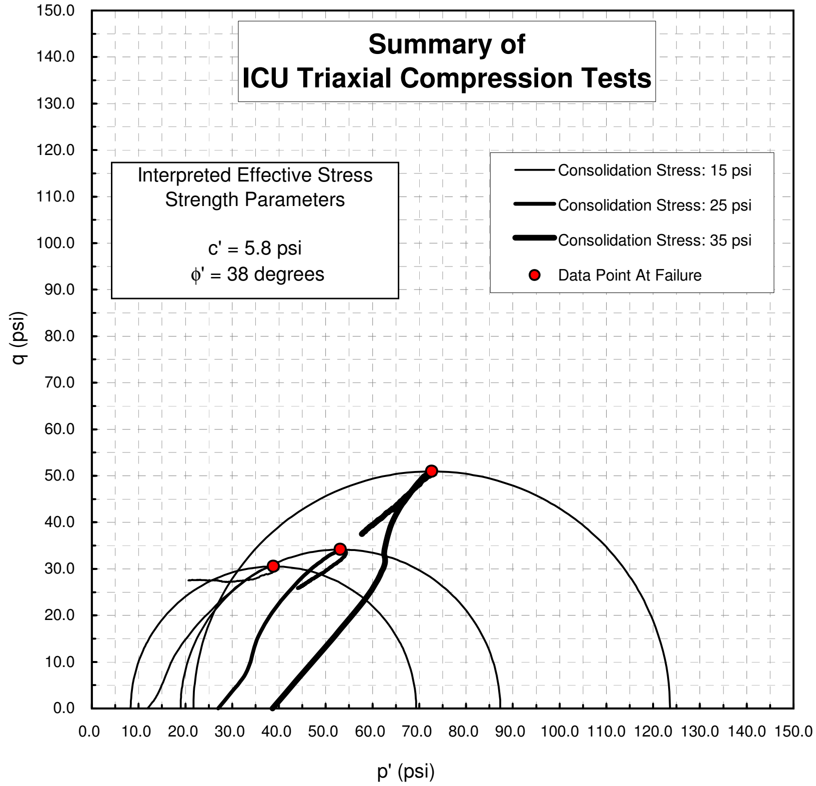
ISOTROPICALLY CONSOLIDATED, UNDRAINED TRIAXIAL TEST

Project: Port Access Road
Client: SCDOT
Location: North Charleston, South Carolina
Project No.: 1131-08-554



SAMPLE ID

Lab Sample No.:	SCI B-23 Alt-1, 51'
Exploration No.:	B-23 Alt-1
Sample Depth:	50 to 52 feet
USCS Classification:	Yellow brown, silty SAND (SM)

INITIAL SAMPLE

Sample No.	A	B	C
Wet Weight, g	153.0	151.4	156.1
Dry Weight, g	112.3	107.9	112.9
Water Content, %	36.3	40.3	38.3
Wet Density, pcf	108.2	107.0	110.4
Dry Density, pcf	79.4	76.3	79.9
Saturation, %	89.8	92.4	95.7
Void Ratio	1.06	1.14	1.05
Diameter, in	1.400	1.400	1.400
Height, in	3.500	3.500	3.500

* Water content data obtained using entire sample

AFTER CONSOLIDATION

	A	B	C
Wet Weight, g	151.7	149.4	153.8
Dry Weight, g	112.3	107.9	112.9
Water Content, %	35.1	38.4	36.2
Wet Density, pcf	109.0	108.1	111.7
Dry Density, pcf	80.7	78.1	82.0
Saturation, %	89.6	92.0	95.4
Void Ratio	1.03	1.09	0.99
Area, in^2	1.528	1.517	1.520
Diameter, in	1.395	1.390	1.391
Height, in	3.469	3.469	3.453

* Water content data obtained using entire sample

CLASSIFICATION

Sieve Size	%-Passing
3/8-in (9.5-mm)	
No. 4 (4.75-mm)	
No. 10 (2.0-mm)	
No. 40 (0.425-mm)	
No. 100 (0.150-mm)	
No. 200 (0.075-mm)	44.1

Atterberg Limits	
Liquid Limit, %	40
Plastic Limit, %	29
Plasticity Index, %	11
Classification	ML
Measured Gs	2.62

Notes:

TEST SUMMARY

Sample No.	A	B	C
Saturation Method	Wet	Wet	Wet
B-Parameter	0.95	0.96	0.97
t_{50}, minutes	36.9	11.0	17.0
Strain Rate, in/min	0.0007	0.0007	0.0007
Cell Pressure, psi	40.0	50.0	60.0
Back Pressure, psi	25.0	25.0	25.0
Consolidation Stress, psi	15.0	25.0	35.0
Failure Criteria	σ_{DMAX}	σ_{DMAX}	σ_{DMAX}
Deviator Stress at Failure, psi	61.0	68.3	101.9
Axial Strain at Failure, %	3.0	3.0	2.9
σ'_{1F}, psi	69.3	87.3	123.6
σ'_{3F}, psi	8.3	19.0	21.7

* Membrane correction subtracted from deviator stress for Samples A-C

REMARKS

The effective stress strength parameters indicated on this sheet represent S&ME's interpretation. Effective stress strength parameters must be determined by the geotechnical engineer of record for specific application to the referenced project.

POINT A - Designing engineer should confirm the reliability of data as the plot of PSR is not consitent with Points B and C.

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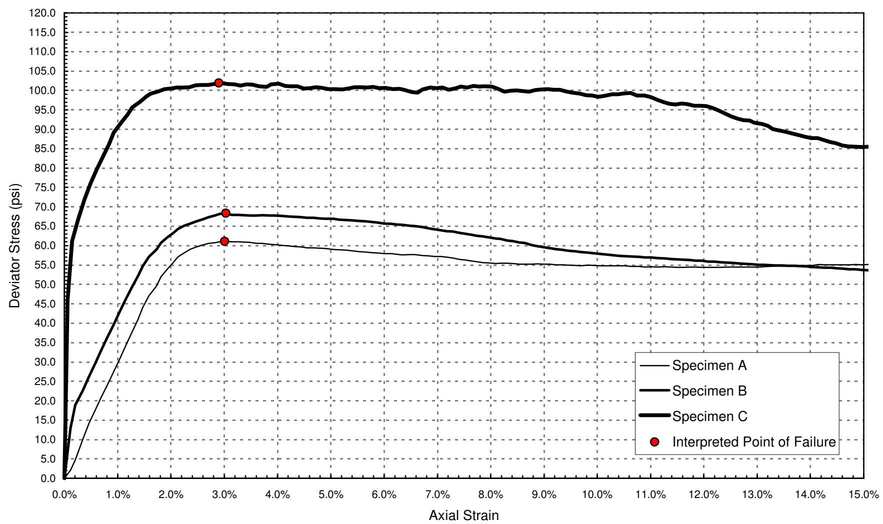
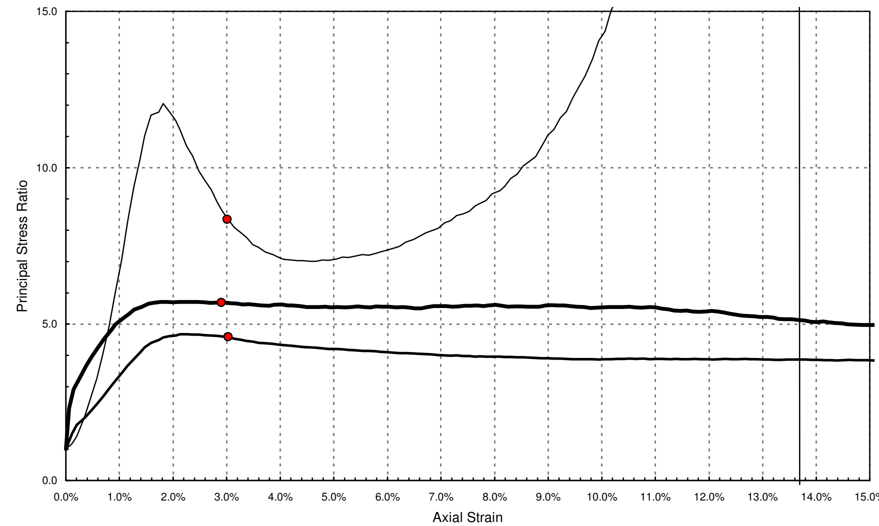
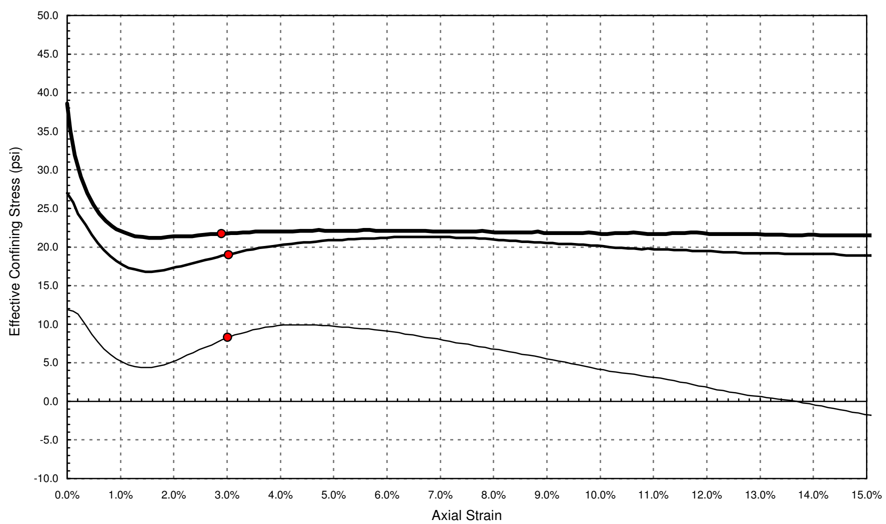
ISOTROPICALLY CONSOLIDATED, UNDRAINED TRIAXIAL TEST

Project: Port Access Road
Client: SCDOT
Location: North Charleston, South Carolina
Project No.: 1131-08-554

Lab Sample No.: SCI B-23 Alt-1, 51'
Exploration No.: B-23 Alt-1
Sample Depth: 50 to 52 feet







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A


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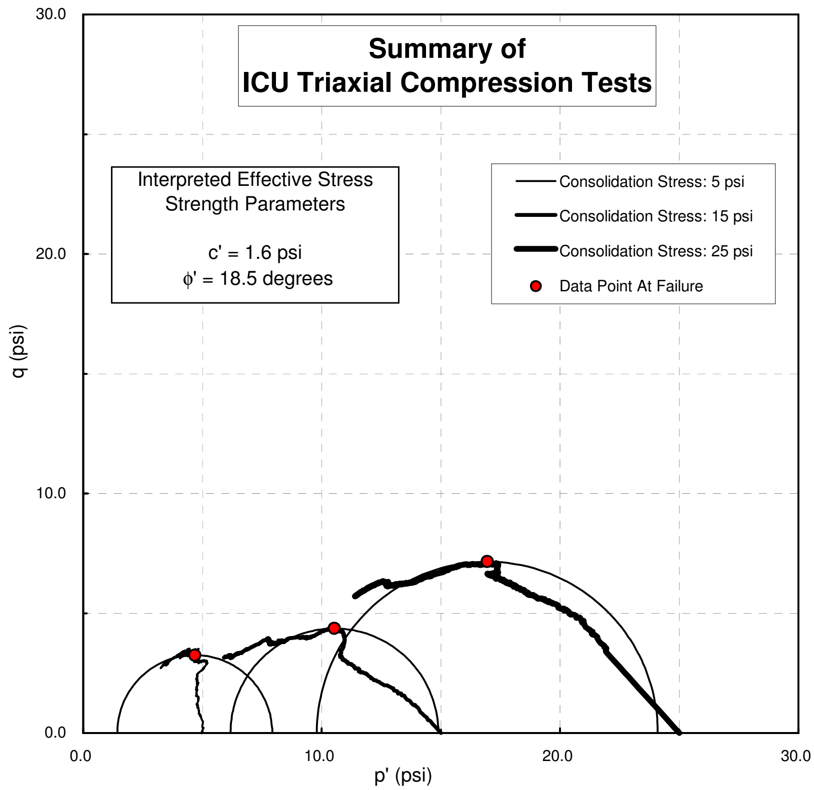
ISOTROPICALLY CONSOLIDATED, UNDRAINED TRIAXIAL TEST

Project: Port Access Road
Client: SCDOT
Location: North Charleston, South Carolina
Project No.: 1131-08-554



SAMPLE ID

Lab Sample No.:	GTX B-39A, 16'
Exploration No.:	B-39A
Sample Depth:	15 to 17 feet
USCS Classification:	Gray, fat CLAY (CH)

CLASSIFICATION

Sieve Size	%-Passing
3/8-in (9.5-mm)	
No. 4 (4.75-mm)	
No. 10 (2.0-mm)	
No. 40 (0.425-mm)	
No. 100 (0.150-mm)	
No. 200 (0.075-mm)	99.2

Atterberg Limits	
Liquid Limit, %	149
Plastic Limit, %	43
Plasticity Index, %	106
Classification	CH
Measured Gs	2.63

Notes:

INITIAL SAMPLE

Sample No.	A	B	C
Wet Weight, g	109.5	109.5	116.4
Dry Weight, g	53.4	53.3	62.9
Water Content, %	105.1	105.3	85.0
Wet Density, pcf	89.7	89.7	94.2
Dry Density, pcf	43.7	43.7	50.9
Saturation, %	100.0	100.0	100.0
Void Ratio	2.76	2.77	2.23
Diameter, in	1.400	1.400	1.400
Height, in	3.020	3.020	3.060

* Water content data obtained using entire sample

AFTER CONSOLIDATION

Wet Weight, g	105.2	104.6	117.1
Dry Weight, g	53.4	53.3	62.9
Water Content, %	97.1	96.2	86.1
Wet Density, pcf	91.8	93.6	96.3
Dry Density, pcf	46.6	47.7	51.8
Saturation, %	100.0	100.0	100.0
Void Ratio	2.55	2.53	2.26
Area, in^2	1.460	1.510	1.620
Diameter, in	1.363	1.387	1.436
Height, in	2.990	2.820	2.860

* Water content data obtained using entire sample

TEST SUMMARY

Sample No.	A	B	C
Saturation Method	Wet	Wet	Wet
B-Parameter	0.93	0.95	0.95
t_{50}, minutes	50.0	66.0	98.0
Strain Rate, in/min	0.004	0.004	0.004
Cell Pressure, psi	123.0	73.0	56.0
Back Pressure, psi	118.0	58.0	31.0
Consolidation Stress, psi	5.0	15.0	25.0
Failure Criteria	σ_{DMAX}	σ_{DMAX}	σ_{DMAX}
Deviator Stress at Failure, psi	6.5	8.7	14.3
Axial Strain at Failure, %	5.0	4.4	5.9
σ'_{1F}, psi	7.9	14.9	24.1
σ'_{3F}, psi	1.4	6.2	9.8

* Membrane correction subtracted from deviator stress for Samples A-C

REMARKS

The effective stress strength parameters indicated on this sheet represent S&ME's interpretation. Effective stress strength parameters must be determined by the geotechnical engineer of record for specific application to the referenced project.

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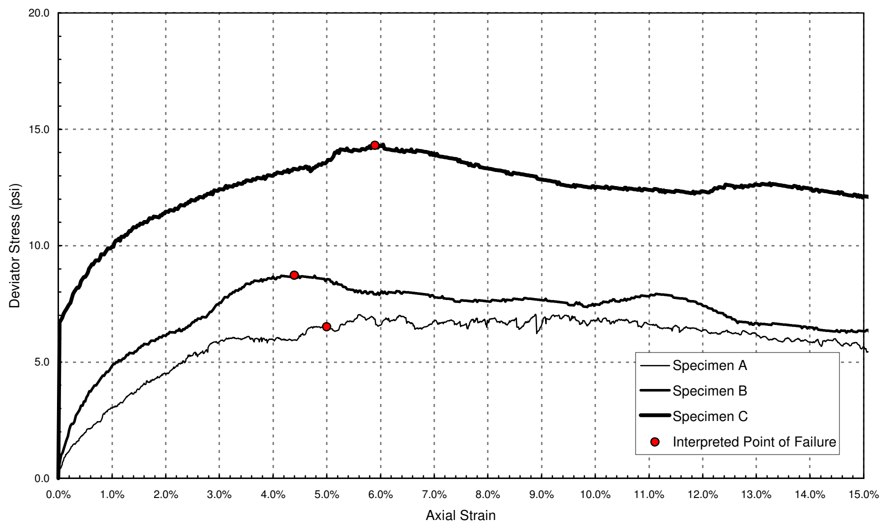
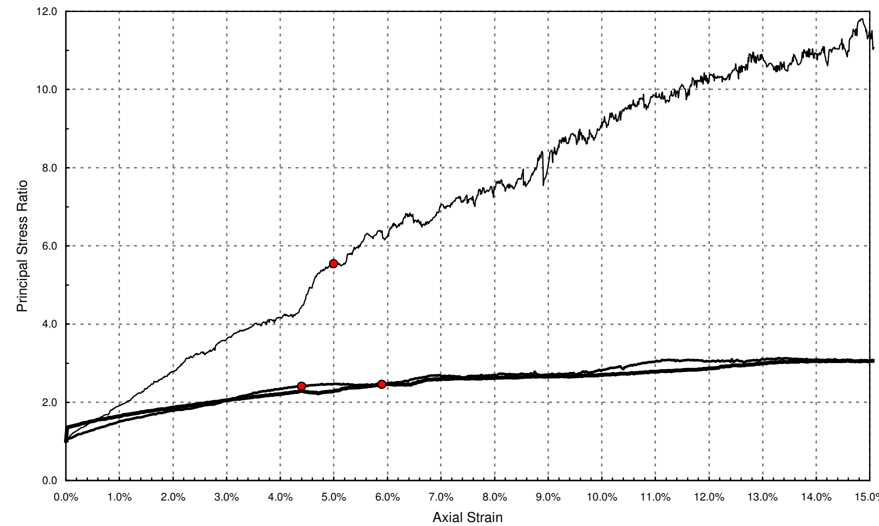
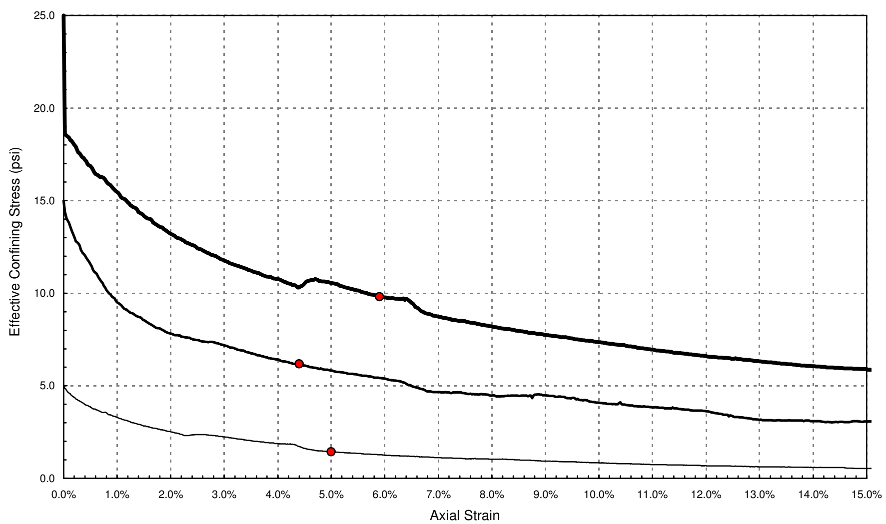
Client: SCDOT
Location: North Charleston, South Carolina
Project No.: 1131-08-554

Lab Sample No.: GTX B-39A, 16'
Exploration No.: B-39A
Sample Depth: 15 to 17 feet







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A


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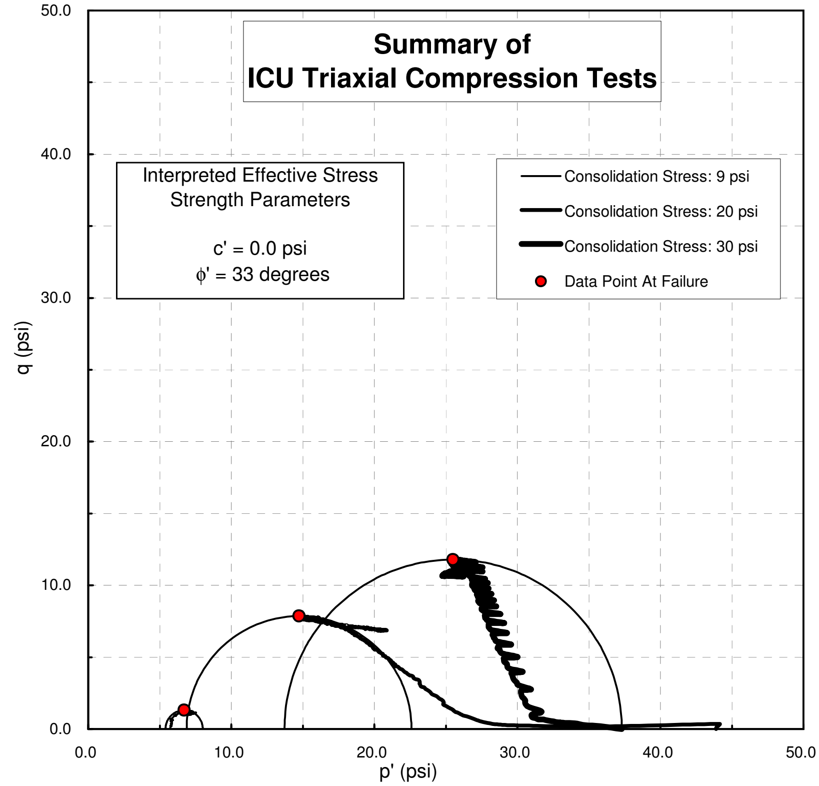
ISOTROPICALLY CONSOLIDATED, UNDRAINED TRIAXIAL TEST

Project: Port Access Road
Client: SCDOT
Location: North Charleston, South Carolina
Project No.: 1131-08-554



SAMPLE ID

Lab Sample No.:	SCI B-47A, 25'
Exploration No.:	B-47A
Sample Depth:	24 to 26 feet
USCS Classification:	Gray, fat CLAY (CH)

CLASSIFICATION

Sieve Size	%-Passing	Atterberg Limits	
3/8-in (9.5-mm)		Liquid Limit, %	81
No. 4 (4.75-mm)		Plastic Limit, %	19
No. 10 (2.0-mm)		Plasticity Index, %	62
No. 40 (0.425-mm)		Classification	CH
No. 100 (0.150-mm)		Measured Gs	2.70
No. 200 (0.075-mm)	98.5		

Notes:

INITIAL SAMPLE

Sample No.	A	B	C
Wet Weight, g	147.3	141.9	142.7
Dry Weight, g	95.3	91.6	93.7
Water Content, %	54.6	54.9	52.3
Wet Density, pcf	104.1	102.1	101.1
Dry Density, pcf	67.4	65.9	66.4
Saturation, %	98.2	95.2	91.7
Void Ratio	1.50	1.56	1.54
Diameter, in	1.400	1.388	1.399
Height, in	3.500	3.500	3.500

* Water content data obtained using entire sample

AFTER CONSOLIDATION

Sample No.	A	B	C
Wet Weight, g	145.8	136.6	140.0
Dry Weight, g	95.3	91.6	93.7
Water Content, %	53.1	49.2	49.4
Wet Density, pcf	104.8	104.5	102.2
Dry Density, pcf	68.4	70.1	68.4
Saturation, %	98.1	94.6	91.2
Void Ratio	1.46	1.40	1.46
Area, in^2	1.515	1.436	1.504
Diameter, in	1.389	1.352	1.384
Height, in	3.500	3.469	3.469

* Water content data obtained using entire sample

TEST SUMMARY

Sample No.	A	B	C
Saturation Method	Wet	Wet	Wet
B-Parameter	0.95	0.97	0.95
t_{50}, minutes	779.4	12.9	151.8
Strain Rate, in/min	0.0001	0.0001	0.0001
Cell Pressure, psi	44.0	55.0	65.0
Back Pressure, psi	35.0	35.0	35.0
Consolidation Stress, psi	9.0	20.0	30.0
Failure Criteria	σ_{DMAX}	σ_{DMAX}	σ_{DMAX}
Deviator Stress at Failure, psi	2.6	15.7	23.6
Axial Strain at Failure, %	1.1	1.0	0.9
σ'_{1F}, psi	8.0	22.6	37.3
σ'_{3F}, psi	5.4	6.9	13.7

* Membrane correction subtracted from deviator stress for Samples A-C

REMARKS

The effective stress strength parameters indicated on this sheet represent S&ME's interpretation. Effective stress strength parameters must be determined by the geotechnical engineer of record for specific application to the referenced project.

Point B - Designing engineer should confirm the reliability of data as the initial pore pressure of the sample at the start of shearing was lower than the back pressure during consolidation due to a kink in the pressure line.

ISOTROPICALLY CONSOLIDATED, UNDRAINED TRIAXIAL TEST

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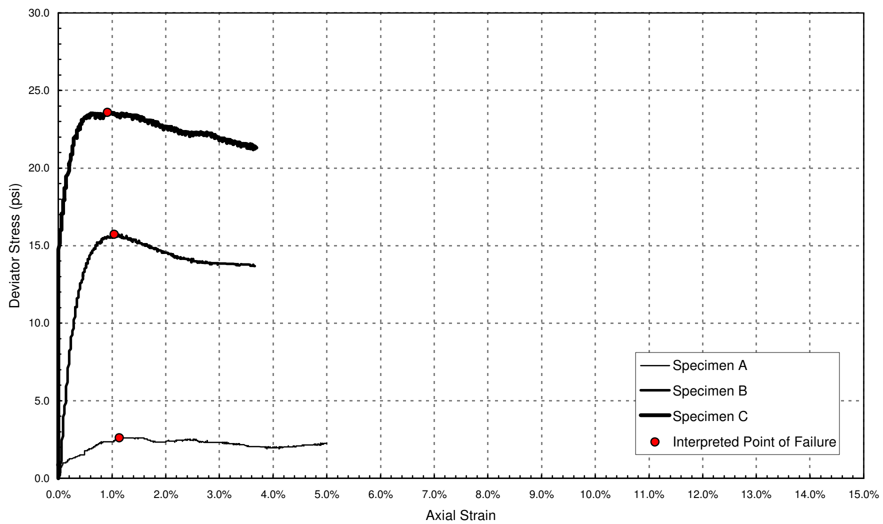
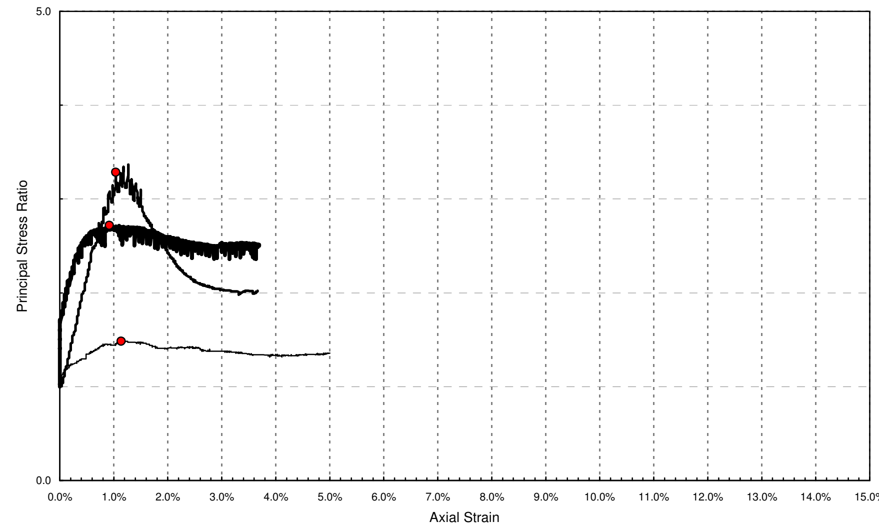
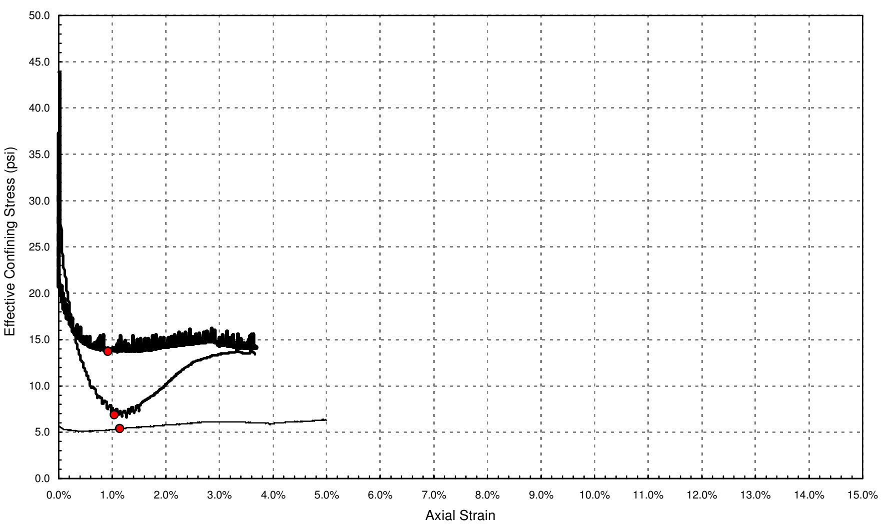
Project: Port Access Road
Client: SCDOT
Location: North Charleston, South Carolina
Project No.: 1131-08-554

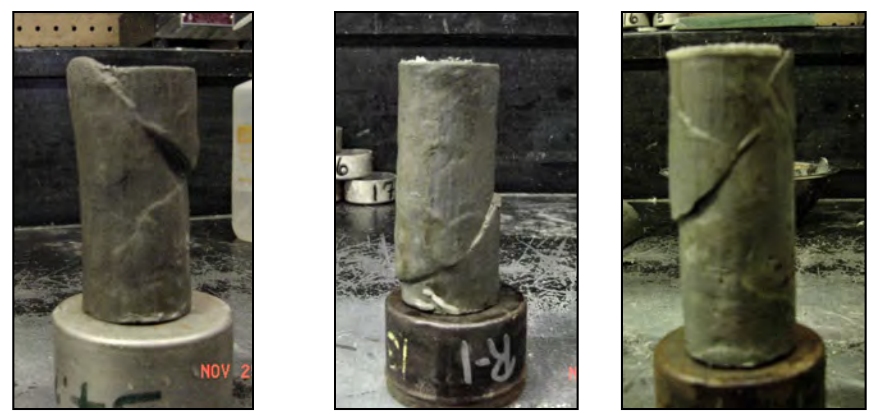
Lab Sample No.: SCI B-47A, 25'
Exploration No.: B-47A
Sample Depth: 24 to 26 feet







SPECIMEN PHOTOGRAPHS (AFTER SHEARING)



A B C

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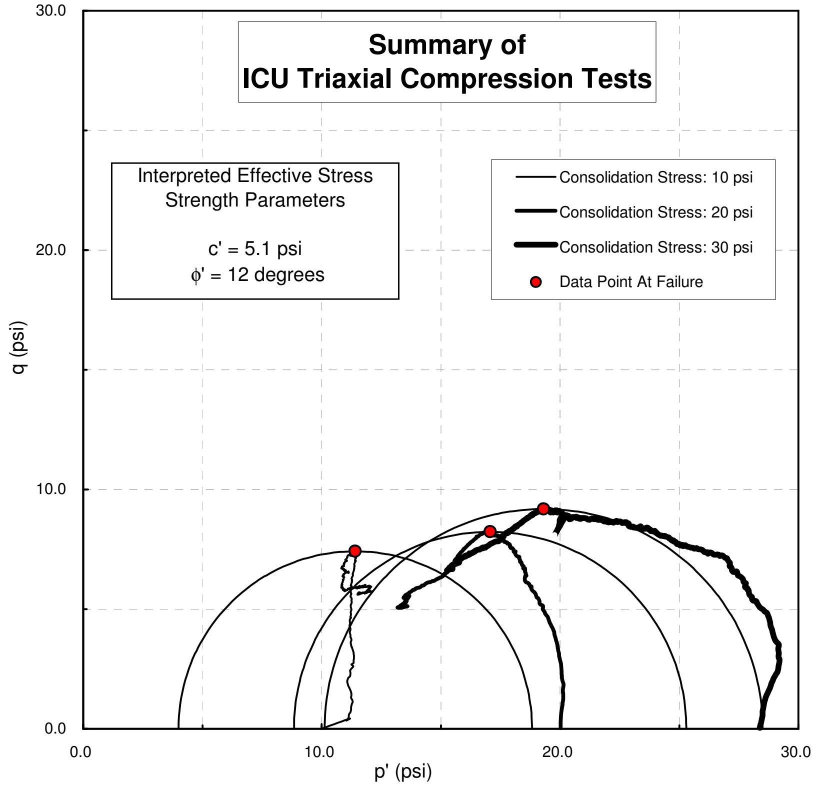
ISOTROPICALLY CONSOLIDATED, UNDRAINED TRIAXIAL TEST

Project: Port Access Road
Client: SCDOT
Location: North Charleston, South Carolina
Project No.: 1131-08-554



SAMPLE ID

Lab Sample No.:	GTX B-55B, 36'
Exploration No.:	B-55B
Sample Depth:	35 to 37 feet
USCS Classification:	Gray, fat CLAY (CH)

CLASSIFICATION

Sieve Size	%-Passing
3/8-in (9.5-mm)	
No. 4 (4.75-mm)	
No. 10 (2.0-mm)	
No. 40 (0.425-mm)	
No. 100 (0.150-mm)	
No. 200 (0.075-mm)	98.9

Atterberg Limits	
Liquid Limit, %	104
Plastic Limit, %	30
Plasticity Index, %	74
Classification	CH
Measured Gs	2.63

Notes:

INITIAL SAMPLE

Sample No.	A	B	C
Wet Weight, g	125.3	117.8	115.4
Dry Weight, g	71.7	67.2	62.3
Water Content, %	74.7	75.2	85.1
Wet Density, pcf	99.7	99.5	95.2
Dry Density, pcf	57.1	56.8	51.4
Saturation, %	100.0	100.0	100.0
Void Ratio	1.97	1.98	2.24
Diameter, in	1.400	1.400	1.400
Height, in	3.110	2.930	3.000

* Water content data obtained using entire sample

AFTER CONSOLIDATION

Wet Weight, g	134.5	126.5	113.6
Dry Weight, g	71.7	67.2	62.3
Water Content, %	87.6	88.1	82.2
Wet Density, pcf	95.8	96.8	98.5
Dry Density, pcf	51.1	51.4	54.1
Saturation, %	100.0	100.0	100.0
Void Ratio	2.30	2.32	2.16
Area, in^2	1.720	1.760	1.510
Diameter, in	1.480	1.497	1.387
Height, in	3.110	2.830	2.910

* Water content data obtained using entire sample

TEST SUMMARY

Sample No.	A	B	C
Saturation Method	Wet	Wet	Wet
B-Parameter	0.89	0.96	0.94
t_{50}, minutes	58.0	71.0	122.0
Strain Rate, in/min	0.003	0.003	0.003
Cell Pressure, psi	139.0	96.0	109.0
Back Pressure, psi	129.0	76.0	79.0
Consolidation Stress, psi	10.0	20.0	30.0
Failure Criteria	σ_{DMAX}	σ_{DMAX}	σ_{DMAX}
Deviator Stress at Failure, psi	14.8	16.5	18.4
Axial Strain at Failure, %	2.5	2.4	7.0
σ'_{1F}, psi	18.8	25.3	28.5
σ'_{3F}, psi	4.0	8.8	10.1

* Membrane correction subtracted from deviator stress for Samples A-C

REMARKS

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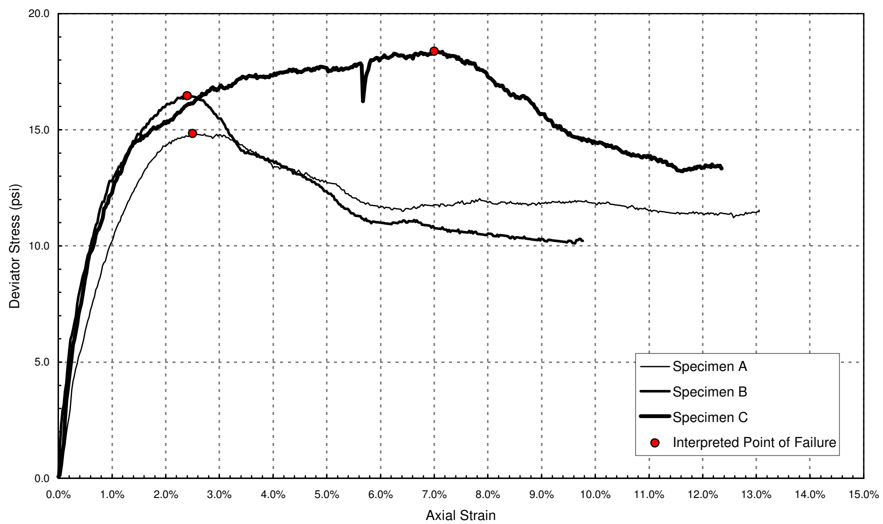
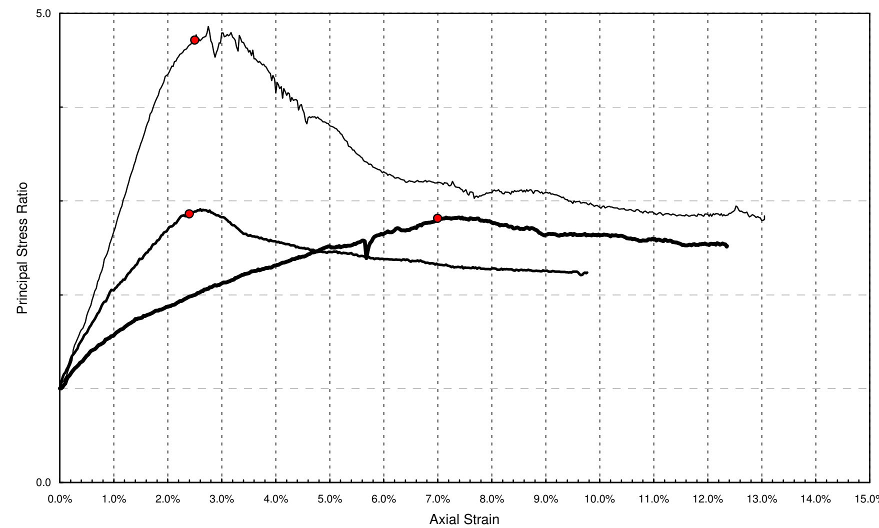
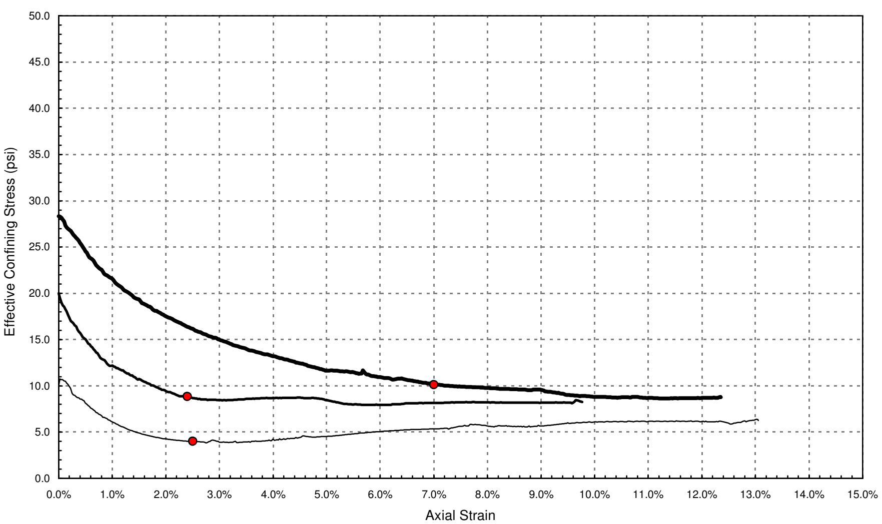
ISOTROPICALLY CONSOLIDATED, UNDRAINED TRIAXIAL TEST

Project: Port Access Road
Client: SCDOT
Location: North Charleston, South Carolina
Project No.: 1131-08-554

Lab Sample No.:	GTX B-55B, 36'
Exploration No.:	B-55B
Sample Depth:	35 to 37 feet







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A B C

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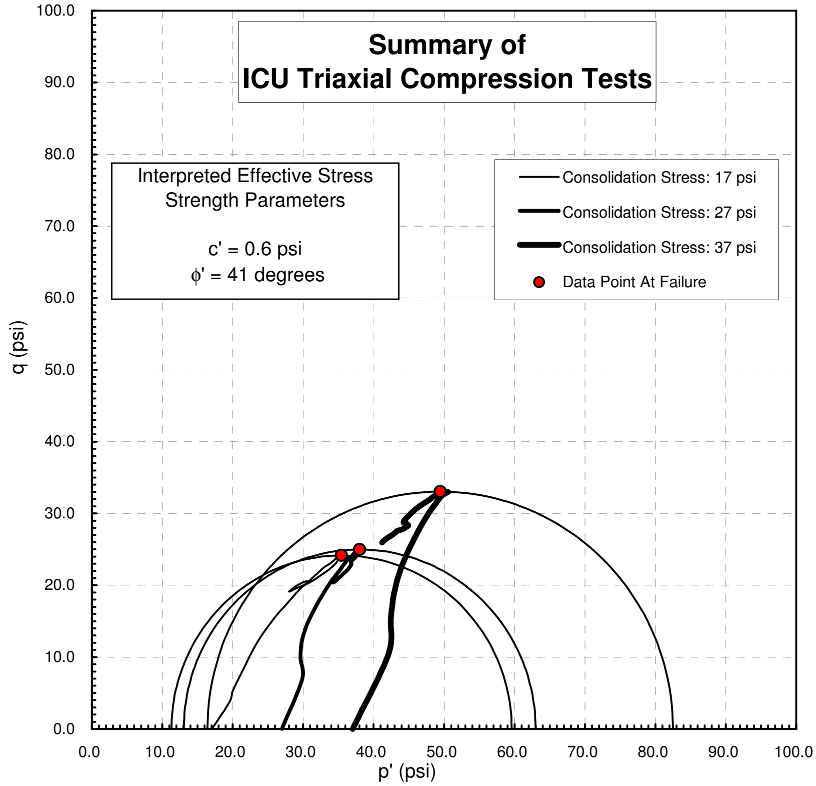
Project: Port Access Road
Client: SCDOT
Location: North Charleston, South Carolina
Project No.: 1131-08-554



SAMPLE ID

Lab Sample No.:	S&ME B-74A, 66'
Exploration No.:	B-74A
Sample Depth:	65 to 66.2 feet
USCS Classification:	Yellow-brown, sandy elastic SILT (MH)

CLASSIFICATION

Sieve Size	%-Passing
3/8-in (9.5-mm)	
No. 4 (4.75-mm)	
No. 10 (2.0-mm)	
No. 40 (0.425-mm)	
No. 100 (0.150-mm)	
No. 200 (0.075-mm)	50.5

Atterberg Limits	
Liquid Limit, %	59
Plastic Limit, %	37
Plasticity Index, %	22
Classification	MH
Measured Gs	2.71

Notes:

INITIAL SAMPLE

Sample No.	A	B	C
Wet Weight, g	142.2	130.4	137.9
Dry Weight, g	95.6	87.9	95.2
Water Content, %	48.6	48.4	44.8
Wet Density, pcf	108.1	107.7	111.5
Dry Density, pcf	72.7	72.6	77.0
Saturation, %	99.5	98.6	100.0
Void Ratio	1.32	1.33	1.21
Diameter, in	1.378	1.368	1.343
Height, in	3.360	3.140	3.326

AFTER CONSOLIDATION

Wet Weight, g	141.2	129.5	136.4
Dry Weight, g	95.6	87.9	95.2
Water Content, %	47.6	47.4	43.3
Wet Density, pcf	110.1	110.7	114.3
Dry Density, pcf	74.6	75.1	79.8
Saturation, %	100.0	100.0	100.0
Void Ratio	1.29	1.28	1.17
Area, in^2	1.468	1.443	1.388
Diameter, in	1.367	1.355	1.329
Height, in	3.328	3.089	3.276

TEST SUMMARY

Sample No.	A	B	C
Saturation Method	Wet	Wet	Wet
B-Parameter	0.95	0.96	1.00
t_{50}, minutes	4.0	2.6	2.6
Strain Rate, in/min	0.003	0.003	0.003
Cell Pressure, psi	51.0	61.0	71.0
Back Pressure, psi	34.0	34.0	34.0
Consolidation Stress, psi	17.0	27.0	37.0
Failure Criteria	σ_{DMAX}	σ_{DMAX}	σ_{DMAX}
Deviator Stress at Failure, psi	48.3	49.9	66.1
Axial Strain at Failure, %	4.4	3.2	3.5
σ'_{1F}, psi	59.6	63.0	82.5
σ'_{3F}, psi	11.3	13.1	16.4

* Membrane correction subtracted from deviator stress for Samples A-C

REMARKS

The effective stress strength parameters indicated on this sheet represent S&ME's interpretation. Effective stress strength parameters must be determined by the geotechnical engineer of record for specific application to the referenced project.

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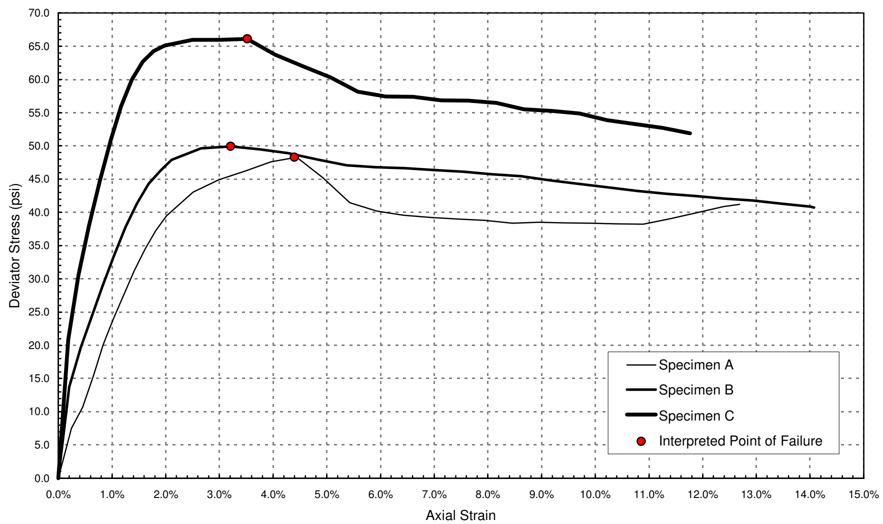
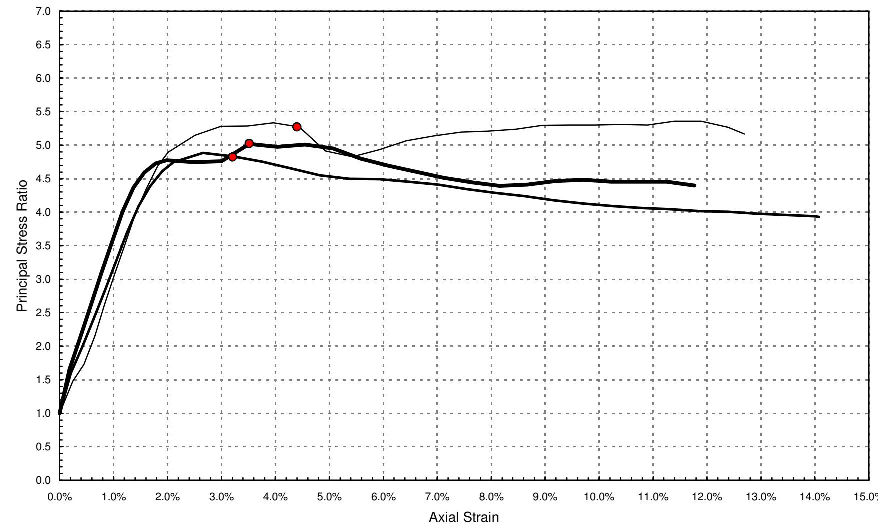
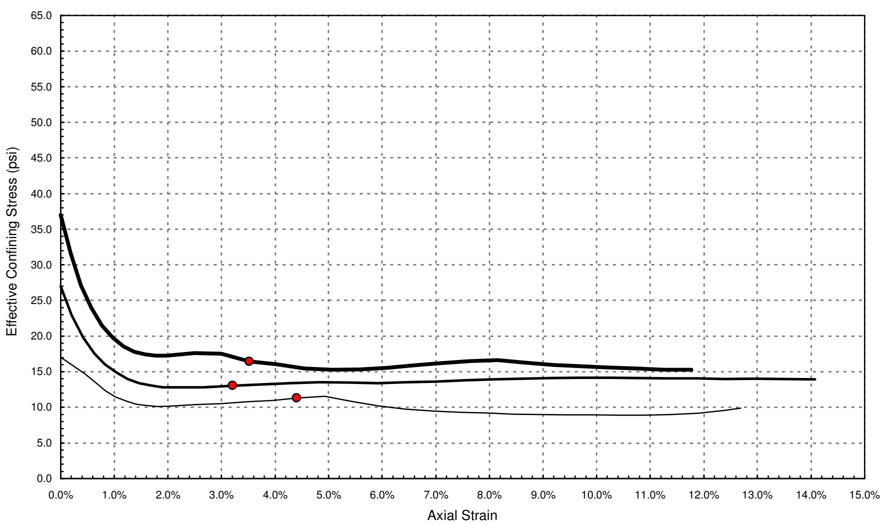
ISOTROPICALLY CONSOLIDATED, UNDRAINED TRIAXIAL TEST

Project: Port Access Road
Client: SCDOT
Location: North Charleston, South Carolina
Project No.: 1131-08-554

Lab Sample No.: S&ME B-74A, 66'
Exploration No.: B-74A
Sample Depth: 65 to 66.2 feet







SPECIMEN PHOTOGRAPHS (AFTER SHEARING)


A


B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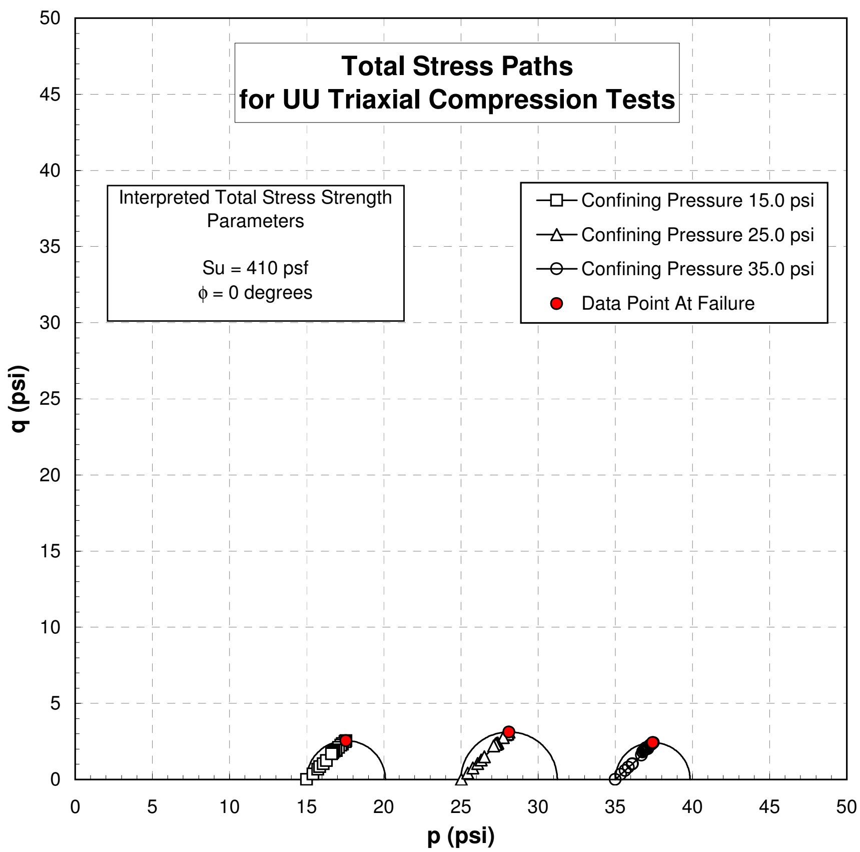
ISOTROPICALLY CONSOLIDATED, UNDRAINED TRIAXIAL TEST

Project: Port Access Road
Client: SCDOT
Location: North Charleston, South Carolina
Project No.: 1131-08-554



SAMPLE ID

Sample No.:	S&ME B-40A, 24'
Exploration No.:	B-40A
Sample Depth:	23 to 25 feet
Soil Description:	Gray, fat CLAY with sand (CH)

SAMPLE INFORMATION

Sample Number	A	B	C
Wet Weight, g	103.6	113.4	110.4
Dry Weight, g	52.0	57.4	57.2
Water Content, %	99.3	97.5	93.0
Wet Density, pcf	89.3	90.0	90.4
Dry Density, pcf	44.8	45.6	46.8
Saturation, %	99.3	99.8	98.9
Void Ratio	2.55	2.49	2.40
Diameter, in	1.400	1.399	1.398
Height, in	2.870	3.122	3.031
Area, in^2	1.540	1.538	1.534

CLASSIFICATION

Sieve Size	%-Passing	Atterberg Limits & Gs	
3/8-in (9.5-mm)		Liquid Limit, %	98
No. 4 (4.75-mm)		Plastic Limit, %	35
No. 10 (2.0-mm)		Plasticity Index, %	63
No. 40 (0.425-mm)		USCS Classification	CH
No. 100 (0.150-mm)			
No. 200 (0.075-mm)	77.2	Measured Gs	2.55

Notes:

TEST SUMMARY

Sample Number	A	B	C
Strain Rate, %/min	1.00	1.00	1.00
Confining Pressure, psi	15.0	25.0	35.0
Failure Criteria	σ_{DMAX}	σ_{DMAX}	σ_{DMAX}
σ_D At Failure, psi*	5.1	6.2	4.8
Axial Strain at Failure, %	2.5	2.1	3.2
σ_{1F}, psi	20.1	31.2	39.8
σ_{3F}, psi	15.0	25.0	35.0

REMARKS

Membrane correction subtracted from deviator stress for Samples A - C.

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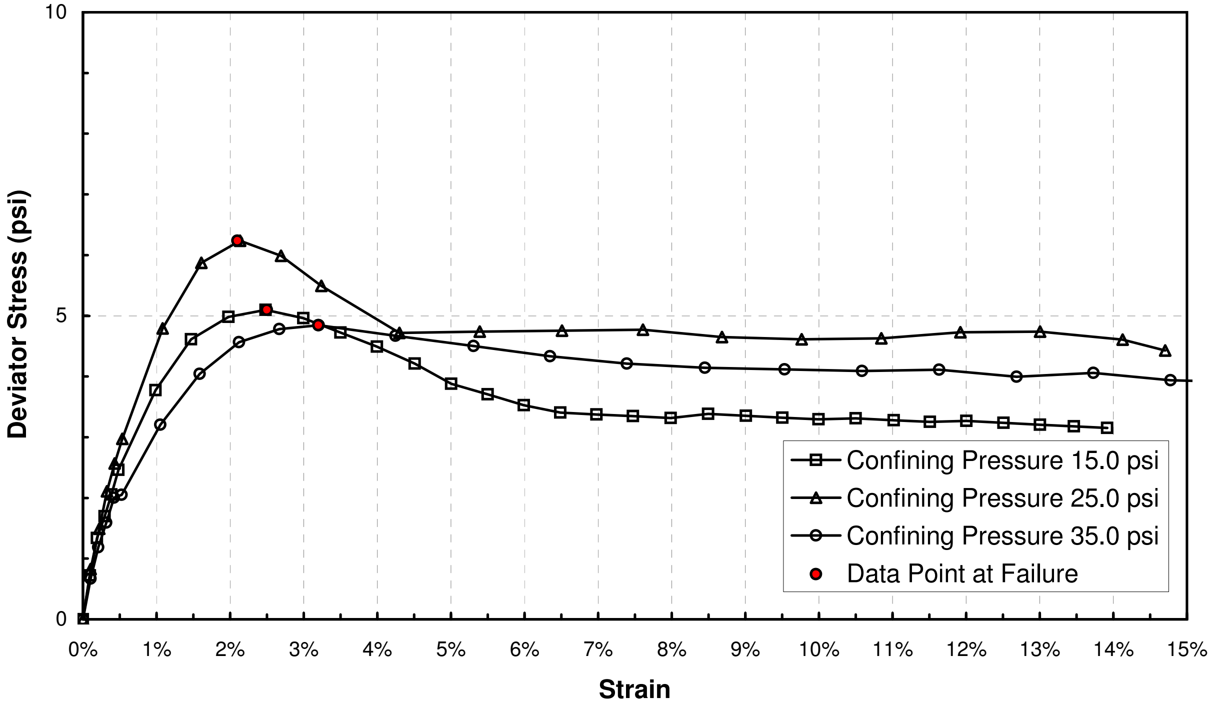
UNCONSOLIDATED UNDRAINED (UU) TRIAXIAL TEST

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

Sample No.: S&ME B-40A, 24'
Exploration No.: B-40A
Sample I.D. / Depth: 23 to 25 feet



SPECIMEN PHOTOGRAPHS (AFTER SHEARING)

A

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C

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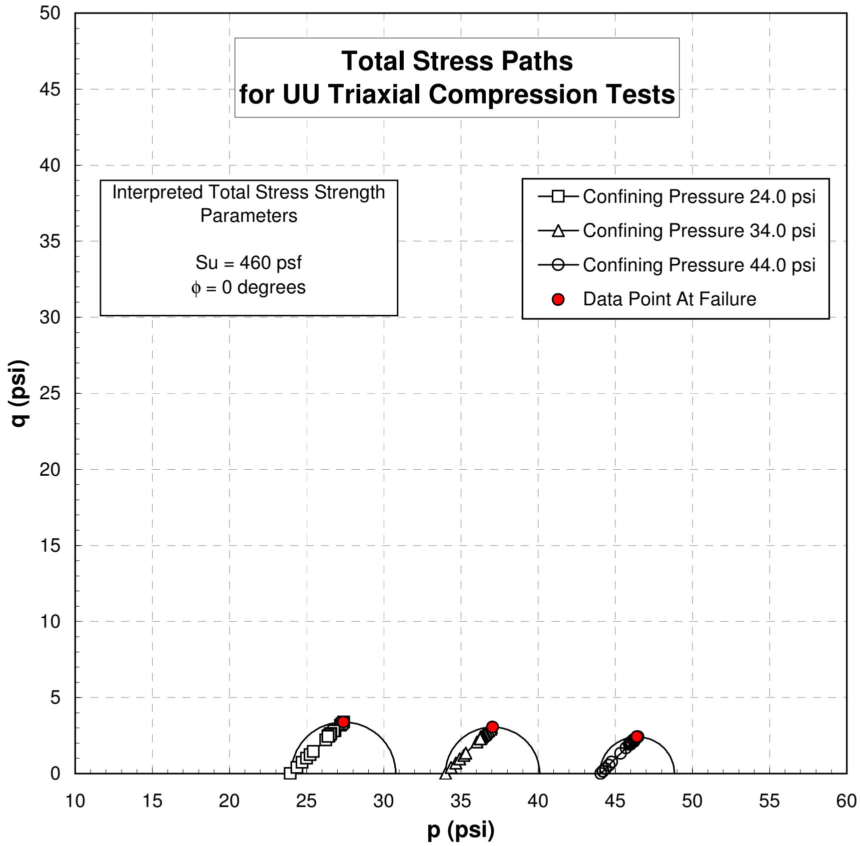
UNCONSOLIDATED UNDRAINED (UU) TRIAXIAL TEST

Project: Port Access Road
Client: SCDOT
Location: North Charleston, South Carolina
Project No.: 1131-08-554



SAMPLE ID

Sample No.:	S&ME B-40A, 39'
Exploration No.:	B-40A
Sample Depth:	38 to 40 feet
Soil Description:	Gray, fat CLAY (CH)

SAMPLE INFORMATION

Sample Number	A	B	C
Wet Weight, g	106.4	112.2	104.1
Dry Weight, g	51.7	55.1	49.3
Water Content, %	105.7	103.5	111.0
Wet Density, pcf	88.8	88.7	87.8
Dry Density, pcf	43.2	43.6	41.6
Saturation, %	99.1	98.3	99.0
Void Ratio	2.82	2.78	2.96
Diameter, in	1.395	1.397	1.390
Height, in	2.988	3.145	2.974
Area, in^2	1.528	1.532	1.518

CLASSIFICATION

Sieve Size	%-Passing	Atterberg Limits & Gs	
3/8-in (9.5-mm)		Liquid Limit, %	102
No. 4 (4.75-mm)		Plastic Limit, %	38
No. 10 (2.0-mm)		Plasticity Index, %	64
No. 40 (0.425-mm)		USCS Classification	CH
No. 100 (0.150-mm)			
No. 200 (0.075-mm)	95.2	Measured Gs	2.64

Notes:

TEST SUMMARY

Sample Number	A	B	C
Strain Rate, %/min	1.00	1.00	1.00
Confining Pressure, psi	24.0	34.0	44.0
Failure Criteria	σ_{DMAX}	σ_{DMAX}	σ_{DMAX}
σ_D At Failure, psi*	6.8	6.1	4.8
Axial Strain at Failure, %	2.5	2.6	4.0
σ_{1F}, psi	30.8	40.1	48.8
σ_{3F}, psi	24.0	34.0	44.0

REMARKS

Membrane correction subtracted from deviator stress for Samples A - C.

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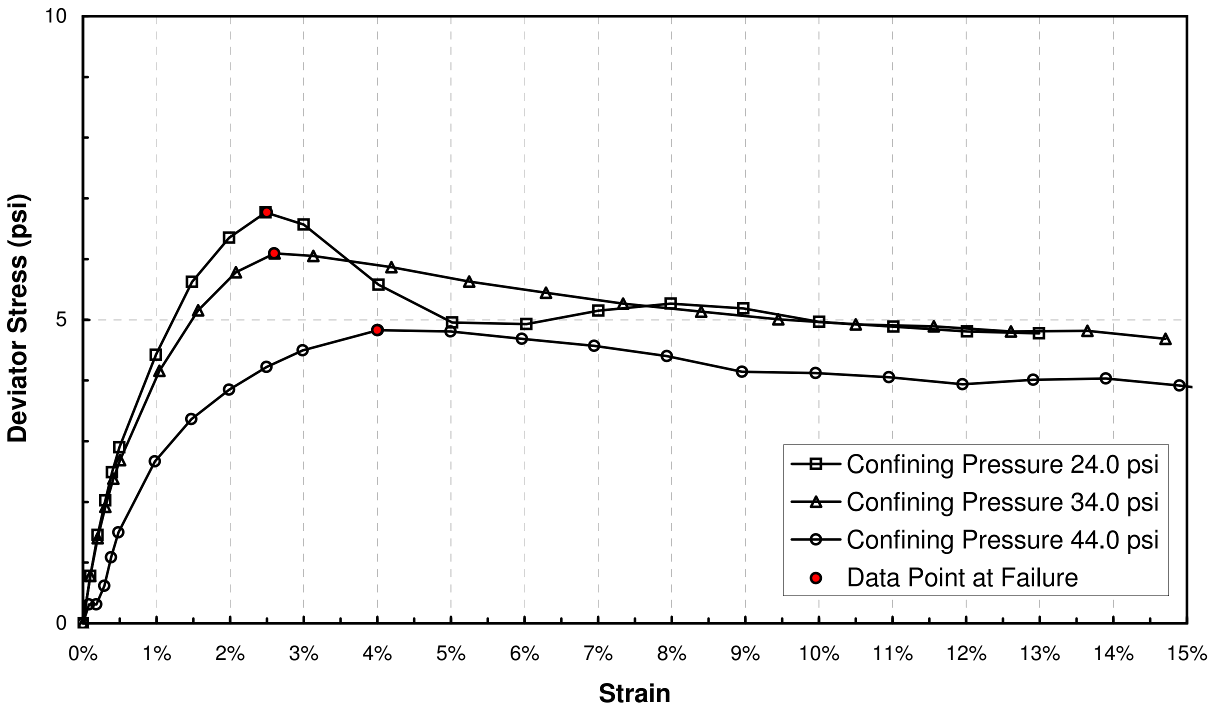
UNCONSOLIDATED UNDRAINED (UU) TRIAXIAL TEST

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

Sample No.:	S&ME B-40A, 39'
Exploration No.:	B-40A
Sample I.D. / Depth:	38 to 40 feet



SPECIMEN PHOTOGRAPHS (AFTER SHEARING)


A


B


C

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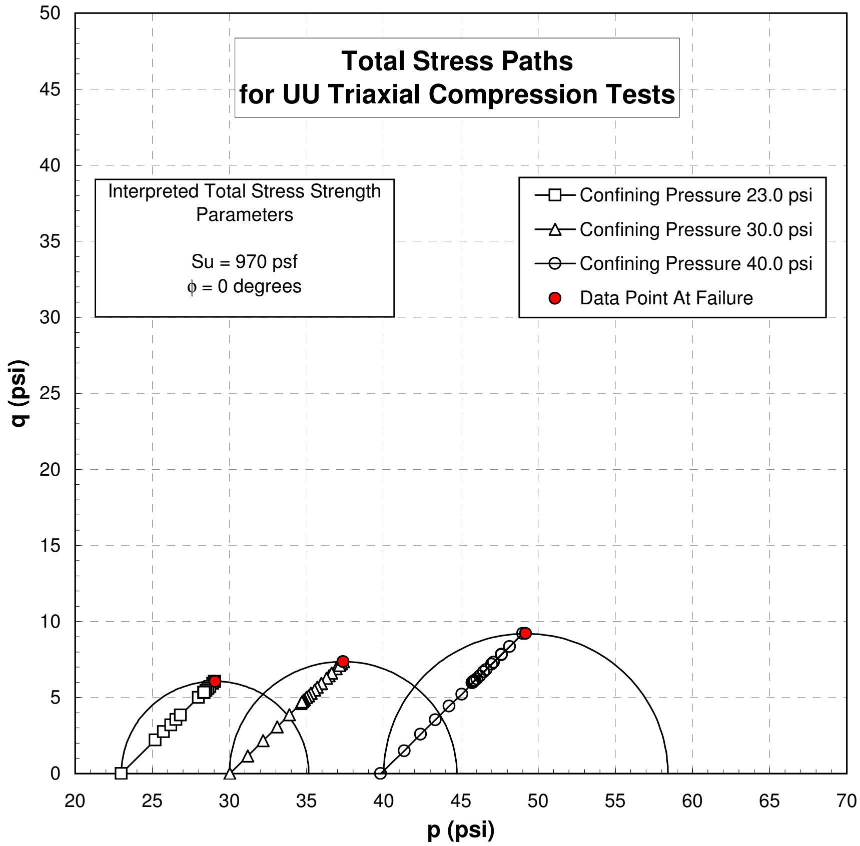
UNCONSOLIDATED UNDRAINED (UU) TRIAXIAL TEST

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554



SAMPLE ID

Sample No.:	S&ME B-53A, 33'
Exploration No.:	B-53A
Sample Depth:	32 to 34 feet
Soil Description:	Gray, fat CLAY with sand (CH)

SAMPLE INFORMATION

Sample Number	A	B	C
Wet Weight, g	126.3	117.4	112.5
Dry Weight, g	76.1	67.2	61.2
Water Content, %	66.0	74.7	83.7
Wet Density, pcf	99.2	98.0	94.5
Dry Density, pcf	59.8	56.1	51.4
Saturation, %	98.2	100.0	99.4
Void Ratio	1.81	2.01	2.27
Diameter, in	1.400	1.402	1.407
Height, in	3.148	2.960	2.917
Area, in^2	1.540	1.543	1.555

CLASSIFICATION

Sieve Size	%-Passing	Atterberg Limits & Gs	
3/8-in (9.5-mm)		Liquid Limit, %	81
No. 4 (4.75-mm)		Plastic Limit, %	31
No. 10 (2.0-mm)		Plasticity Index, %	50
No. 40 (0.425-mm)		USCS Classification	CH
No. 100 (0.150-mm)			
No. 200 (0.075-mm)	82.9	Measured Gs	2.69

Notes:

TEST SUMMARY

Sample Number	A	B	C
Strain Rate, %/min	1.00	1.00	1.00
Confining Pressure, psi	23.0	30.0	40.0
Failure Criteria	σ_{DMAX}	σ_{DMAX}	σ_{DMAX}
σ_D At Failure, psi*	12.1	14.7	18.4
Axial Strain at Failure, %	3.0	1.1	1.4
σ_{1F}, psi	35.1	44.7	58.4
σ_{3F}, psi	23.0	30.0	40.0

REMARKS

Membrane correction subtracted from deviator stress for Samples A - C.

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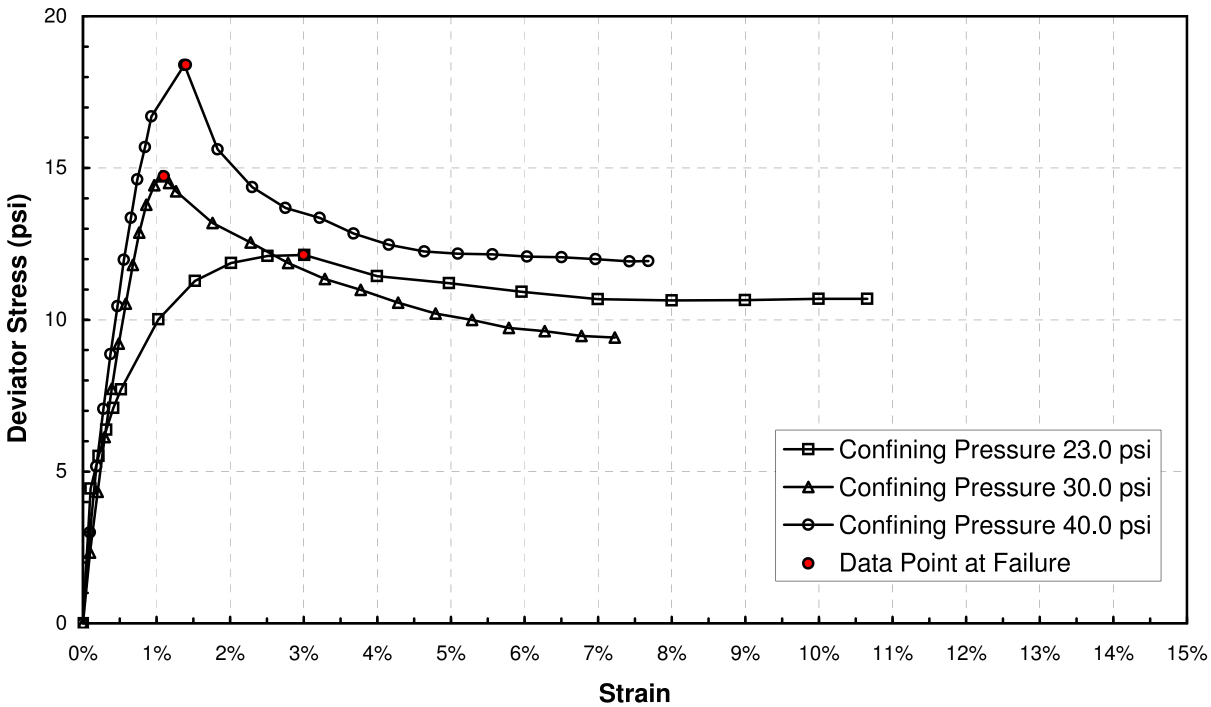
UNCONSOLIDATED UNDRAINED (UU) TRIAXIAL TEST

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

Sample No.:	S&ME B-53A, 33'
Exploration No.:	B-53A
Sample I.D. / Depth:	32 to 34 feet



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UNCONSOLIDATED UNDRAINED (UU) TRIAXIAL TEST

Project:	Port Access Road
Client:	SCDOT
Location:	North Charleston, South Carolina
Project No.:	1131-08-554

Appendix IV – IDW Environmental Characterization Parameters; Charleston Naval Complex LUC Area Construction Permit; City of North Charleston Encroachment Permit

TestAmerica

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December 15, 2008 4:56:39PM

Client: S&ME, Inc. (2420)
620 Wando Park Blvd.
Mt. Pleasant, SC 29464
Attn: Andrew Wertz

Work Order: NRL0326
Project Name: Former Crosby's Gas
Project Nbr: 1131-08-554
P/O Nbr: 32106
Date Received: 12/03/08

SAMPLE IDENTIFICATION	LAB NUMBER	COLLECTION DATE AND TIME
Gas-Mud-Grab	NRL0326-01	12/02/08 08:50
Gas-Mud-Comp	NRL0326-02	12/02/08 09:15

An executed copy of the chain of custody, the project quality control data, and the sample receipt form are also included as an addendum to this report. If you have any questions relating to this analytical report, please contact your Laboratory Project Manager at 1-800-765-0980. Any opinions, if expressed, are outside the scope of the Laboratory's accreditation.

The Chain(s) of Custody, 3 pages, are included and are an integral part of this report.

These results relate only to the items tested. This report shall not be reproduced except in full and with permission of the laboratory.

All solids results are reported in wet weight unless specifically stated.
Estimated uncertainty is available upon request.
This report has been electronically signed.
Report Approved By:

Ken A. Hayes

Senior Project Manager

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2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

Client	S&ME, Inc. (2420)	Work Order:	NRL0326
	620 Wando Park Blvd.	Project Name:	Former Crosby's Gas
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

ANALYTICAL REPORT

Analyte	Result	Flag	Units	MRL	Dilution Factor	Analysis Date/Time	Method	Batch
Sample ID: NRL0326-01 (Gas-Mud-Grab - Soil) Sampled: 12/02/08 08:50								
TCLP Volatile Organic Compounds by EPA Method 1311/8260B								
Benzene	ND		mg/L	0.0100	10	12/06/08 22:09	W846 1311/8260	8120939
2-Butanone	ND		mg/L	0.250	10	12/06/08 22:09	W846 1311/8260	8120939
Carbon Tetrachloride	ND		mg/L	0.0100	10	12/06/08 22:09	W846 1311/8260	8120939
Chlorobenzene	ND		mg/L	0.0100	10	12/06/08 22:09	W846 1311/8260	8120939
Chloroform	ND		mg/L	0.0100	10	12/06/08 22:09	W846 1311/8260	8120939
1,2-Dichloroethane	ND		mg/L	0.0100	10	12/06/08 22:09	W846 1311/8260	8120939
1,1-Dichloroethene	ND		mg/L	0.0100	10	12/06/08 22:09	W846 1311/8260	8120939
Tetrachloroethene	ND		mg/L	0.0100	10	12/06/08 22:09	W846 1311/8260	8120939
Trichloroethene	ND		mg/L	0.0100	10	12/06/08 22:09	W846 1311/8260	8120939
Vinyl chloride	ND		mg/L	0.0100	10	12/06/08 22:09	W846 1311/8260	8120939
Surr: 1,2-Dichloroethane-d4 (60-140%)	*98 %*					*12/06/08 22:09*	*W846 1311/8260*	*8120939*
Surr: Dibromofluoromethane (75-124%)	*96 %*					*12/06/08 22:09*	*W846 1311/8260*	*8120939*
Surr: Toluene-d8 (78-121%)	*92 %*					*12/06/08 22:09*	*W846 1311/8260*	*8120939*
Surr: 4-Bromofluorobenzene (79-124%)	*100 %*					*12/06/08 22:09*	*W846 1311/8260*	*8120939*
Sample ID: NRL0326-02 (Gas-Mud-Comp - Soil) Sampled: 12/02/08 09:15								
TCLP Metals by 6000/7000 Series Methods								
Arsenic	ND		mg/L	0.100	1	12/05/08 23:50	W846 1311/6010	8120922
Barium	**0.204**		mg/L	0.100	1	12/05/08 23:50	W846 1311/6010	8120922
Cadmium	**0.0100**		mg/L	0.0100	1	12/05/08 23:50	W846 1311/6010	8120922
Chromium	ND		mg/L	0.0500	1	12/05/08 23:50	W846 1311/6010	8120922
Lead	ND		mg/L	0.0500	1	12/05/08 23:50	W846 1311/6010	8120922
Selenium	ND		mg/L	0.100	1	12/05/08 23:50	W846 1311/6010	8120922
Silver	ND		mg/L	0.0500	1	12/05/08 23:50	W846 1311/6010	8120922
Mercury	ND		mg/L	0.0100	1	12/05/08 17:13	W846 1311/7470	8120910
TCLP Semivolatile Organic Compounds by EPA Method 1311/8270C								
Cresol(s)	ND		mg/L	0.0200	2	12/12/08 00:10	W846 1311/8270	8121008
1,4-Dichlorobenzene	ND		mg/L	0.0200	2	12/12/08 00:10	W846 1311/8270	8121008
2,4-Dinitrotoluene	ND		mg/L	0.0200	2	12/12/08 00:10	W846 1311/8270	8121008
Hexachlorobenzene	ND		mg/L	0.0200	2	12/12/08 00:10	W846 1311/8270	8121008
Hexachlorobutadiene	ND		mg/L	0.0200	2	12/12/08 00:10	W846 1311/8270	8121008
Hexachloroethane	ND		mg/L	0.0200	2	12/12/08 00:10	W846 1311/8270	8121008
Nitrobenzene	ND		mg/L	0.0200	2	12/12/08 00:10	W846 1311/8270	8121008
Pentachlorophenol	ND		mg/L	0.0200	2	12/12/08 00:10	W846 1311/8270	8121008
Pyridine	ND		mg/L	0.0200	2	12/12/08 00:10	W846 1311/8270	8121008
2,4,6-Trichlorophenol	ND		mg/L	0.0200	2	12/12/08 00:10	W846 1311/8270	8121008
2,4,5-Trichlorophenol	ND		mg/L	0.0200	2	12/12/08 00:10	W846 1311/8270	8121008
Surr: Terphenyl-d14 (21-123%)	*72 %*					*12/12/08 00:10*	*W846 1311/8270*	*8121008*
Surr: 2,4,6-Tribromophenol (23-129%)	*84 %*					*12/12/08 00:10*	*W846 1311/8270*	*8121008*
Surr: Phenol-d5 (10-100%)	*45 %*					*12/12/08 00:10*	*W846 1311/8270*	*8121008*
Surr: 2-Fluorobiphenyl (34-108%)	*73 %*					*12/12/08 00:10*	*W846 1311/8270*	*8121008*
Surr: 2-Fluorophenol (34-108%)	*53 %*					*12/12/08 00:10*	*W846 1311/8270*	*8121008*
Surr: Nitrobenzene-d5 (29-116%)	*75 %*					*12/12/08 00:10*	*W846 1311/8270*	*8121008*

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Client	S&ME, Inc. (2420)	Work Order:	NRL0326
	620 Wando Park Blvd.	Project Name:	Former Crosby's Gas
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

SAMPLE EXTRACTION DATA

Parameter	Batch	Lab Number	Wt/Vol Extracted	Extracted Vol	Date	Analyst	Extraction Method
TCLP Extraction by EPA 1311							
SW846 1311	8120675	NRL0326-01	25.00	500.00	12/04/08 15:35	AML	EPA 1311
SW846 1311	8120675	NRL0326-02	100.00	2000.00	12/04/08 15:35	AML	EPA 1311
TCLP Metals by 6000/7000 Series Methods							
SW846 1311/6010B	8120675	NRL0326-02	100.00	2000.00	12/04/08 15:35	AML	EPA 1311
SW846 1311/6010B	8120922	NRL0326-02	5.00	50.00	12/05/08 14:20	JLS	EPA 3015
SW846 1311/6010B	8120922	NRL0326-02	5.00	50.00	12/05/08 14:20	JLS	EPA 3015
SW846 1311/6010B	8120922	NRL0326-02	5.00	50.00	12/05/08 14:20	JLS	EPA 3015
SW846 1311/6010B	8120922	NRL0326-02	5.00	50.00	12/05/08 14:20	JLS	EPA 3015
SW846 1311/6010B	8120922	NRL0326-02	5.00	50.00	12/05/08 14:20	JLS	EPA 3015
SW846 1311/6010B	8120922	NRL0326-02	5.00	50.00	12/05/08 14:20	JLS	EPA 3015
SW846 1311/6010B	8120922	NRL0326-02	5.00	50.00	12/05/08 14:20	JLS	EPA 3015
SW846 1311/7470A	8120910	NRL0326-02	3.00	30.00	12/05/08 09:36	JMR	EPA 7470
TCLP Semivolatile Organic Compounds by EPA Method 1311/8270C							
SW846 1311/8270C	8120675	NRL0326-02	100.00	2000.00	12/04/08 15:35	AML	EPA 1311
SW846 1311/8270C	8121008	NRL0326-02	500.00	1.00	12/11/08 12:45	DXP	EPA 3510C Leachate

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	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
Blank

Analyte	Blank Value	Q	Units	Q.C. Batch	Lab Number	Analyzed Date/Time
TCLP Metals by 6000/7000 Series Methods						
8120910-BLK1						
Mercury	<0.00150		mg/L	8120910	8120910-BLK1	12/05/08 15:47
8120922-BLK1						
Arsenic	<0.0500		mg/L	8120922	8120922-BLK1	12/05/08 23:05
Barium	<0.0150		mg/L	8120922	8120922-BLK1	12/05/08 23:05
Cadmium	<0.00500		mg/L	8120922	8120922-BLK1	12/05/08 23:05
Chromium	<0.0150		mg/L	8120922	8120922-BLK1	12/05/08 23:05
Lead	<0.0280		mg/L	8120922	8120922-BLK1	12/05/08 23:05
Selenium	<0.0430		mg/L	8120922	8120922-BLK1	12/05/08 23:05
Silver	<0.0160		mg/L	8120922	8120922-BLK1	12/05/08 23:05
TCLP Volatile Organic Compounds by EPA Method 1311/8260B						
8120939-BLK1						
Benzene	<0.000270		mg/L	8120939	8120939-BLK1	12/06/08 18:29
2-Butanone	<0.00240		mg/L	8120939	8120939-BLK1	12/06/08 18:29
Carbon Tetrachloride	<0.000350		mg/L	8120939	8120939-BLK1	12/06/08 18:29
Chlorobenzene	<0.000180		mg/L	8120939	8120939-BLK1	12/06/08 18:29
Chloroform	0.00154		mg/L	8120939	8120939-BLK1	12/06/08 18:29
1,2-Dichloroethane	<0.000370		mg/L	8120939	8120939-BLK1	12/06/08 18:29
1,1-Dichloroethene	<0.000340		mg/L	8120939	8120939-BLK1	12/06/08 18:29
Tetrachloroethene	<0.000230		mg/L	8120939	8120939-BLK1	12/06/08 18:29
Trichloroethene	0.000470		mg/L	8120939	8120939-BLK1	12/06/08 18:29
Vinyl chloride	<0.000290		mg/L	8120939	8120939-BLK1	12/06/08 18:29
Surrogate: 1,2-Dichloroethane-d4	104%			8120939	8120939-BLK1	12/06/08 18:29
Surrogate: Dibromofluoromethane	99%			8120939	8120939-BLK1	12/06/08 18:29
Surrogate: Toluene-d8	100%			8120939	8120939-BLK1	12/06/08 18:29
Surrogate: 4-Bromofluorobenzene	101%			8120939	8120939-BLK1	12/06/08 18:29
TCLP Semivolatile Organic Compounds by EPA Method 1311/8270C						
8121008-BLK1						
Cresol(s)	<0.0188		mg/L	8121008	8121008-BLK1	12/11/08 23:24
1,4-Dichlorobenzene	<0.0116		mg/L	8121008	8121008-BLK1	12/11/08 23:24
2,4-Dinitrotoluene	<0.00660		mg/L	8121008	8121008-BLK1	12/11/08 23:24
Benzo (a) pyrene	<0.00200		mg/L	8121008	8121008-BLK1	12/11/08 23:24
Hexachlorobenzene	<0.00600		mg/L	8121008	8121008-BLK1	12/11/08 23:24
Hexachlorobutadiene	<0.0102		mg/L	8121008	8121008-BLK1	12/11/08 23:24
Hexachloroethane	<0.0118		mg/L	8121008	8121008-BLK1	12/11/08 23:24
Nitrobenzene	<0.00700		mg/L	8121008	8121008-BLK1	12/11/08 23:24
Pentachlorophenol	<0.00660		mg/L	8121008	8121008-BLK1	12/11/08 23:24
Pyridine	<0.00740		mg/L	8121008	8121008-BLK1	12/11/08 23:24
2,4,6-Trichlorophenol	<0.00660		mg/L	8121008	8121008-BLK1	12/11/08 23:24

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	Mt. Pleasant, SC 29464		Project Number:	1131-08-554
Attn	Andrew Wertz		Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
Blank - Cont.

Analyte	Blank Value	Q	Units	Q.C. Batch	Lab Number	Analyzed Date/Time
TCLP Semivolatile Organic Compounds by EPA Method 1311/8270C						
8121008-BLK1						
2,4,5-Trichlorophenol	<0.00660		mg/L	8121008	8121008-BLK1	12/11/08 23:24
Surrogate: Terphenyl-d14	69%			8121008	8121008-BLK1	12/11/08 23:24
Surrogate: 2,4,6-Tribromophenol	71%			8121008	8121008-BLK1	12/11/08 23:24
Surrogate: Phenol-d5	45%			8121008	8121008-BLK1	12/11/08 23:24
Surrogate: 2-Fluorobiphenyl	70%			8121008	8121008-BLK1	12/11/08 23:24
Surrogate: 2-Fluorophenol	57%			8121008	8121008-BLK1	12/11/08 23:24
Surrogate: Nitrobenzene-d5	74%			8121008	8121008-BLK1	12/11/08 23:24

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	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
LCS

Analyte	Known Val.	Analyzed Val	Q	Units	% Rec.	Target Range	Batch	Analyzed Date/Time
TCLP Metals by 6000/7000 Series Methods								
8120910-BS1								
Mercury	0.0200	0.0185		mg/L	92%	78 - 124	8120910	12/05/08 16:39
8120922-BS1								
Arsenic	10.0	10.0		mg/L	100%	80 - 120	8120922	12/05/08 23:09
Barium	50.0	51.4		mg/L	103%	80 - 120	8120922	12/05/08 23:09
Cadmium	10.0	9.90		mg/L	99%	80 - 120	8120922	12/05/08 23:09
Chromium	50.0	52.2		mg/L	104%	80 - 120	8120922	12/05/08 23:09
Lead	50.0	50.4		mg/L	101%	80 - 120	8120922	12/05/08 23:09
Selenium	10.0	10.1		mg/L	101%	80 - 120	8120922	12/05/08 23:09
Silver	10.0	10.2		mg/L	102%	80 - 120	8120922	12/05/08 23:09
TCLP Volatile Organic Compounds by EPA Method 1311/8260B								
8120939-BS1								
Benzene	50.0	41.5		ug/L	83%	76 - 129	8120939	12/06/08 12:58
2-Butanone	250	208		ug/L	83%	63 - 138	8120939	12/06/08 12:58
Carbon Tetrachloride	50.0	44.0		ug/L	88%	56 - 150	8120939	12/06/08 12:58
Chlorobenzene	50.0	42.2		ug/L	84%	80 - 120	8120939	12/06/08 12:58
Chloroform	50.0	42.3	B	ug/L	85%	78 - 138	8120939	12/06/08 12:58
1,2-Dichloroethane	50.0	42.4		ug/L	85%	70 - 135	8120939	12/06/08 12:58
1,1-Dichloroethene	50.0	42.3		ug/L	85%	77 - 137	8120939	12/06/08 12:58
Tetrachloroethene	50.0	45.5		ug/L	91%	83 - 126	8120939	12/06/08 12:58
Trichloroethene	50.0	42.9		ug/L	86%	78 - 137	8120939	12/06/08 12:58
Vinyl chloride	50.0	43.8		ug/L	88%	62 - 124	8120939	12/06/08 12:58
Surrogate: 1,2-Dichloroethane-d4	25.0	25.2			101%	60 - 140	8120939	12/06/08 12:58
Surrogate: Dibromofluoromethane	25.0	25.0			100%	75 - 124	8120939	12/06/08 12:58
Surrogate: Toluene-d8	25.0	22.6			90%	78 - 121	8120939	12/06/08 12:58
Surrogate: 4-Bromofluorobenzene	25.0	24.6			98%	79 - 124	8120939	12/06/08 12:58
TCLP Semivolatile Organic Compounds by EPA Method 1311/8270C								
8121008-BS1								
Cresol(s)	0.400	0.329		mg/L	82%	38 - 113	8121008	12/11/08 23:47
1,4-Dichlorobenzene	0.200	0.126		mg/L	63%	23 - 104	8121008	12/11/08 23:47
2,4-Dinitrotoluene	0.200	0.176		mg/L	88%	49 - 123	8121008	12/11/08 23:47
Hexachlorobenzene	0.200	0.156		mg/L	78%	50 - 125	8121008	12/11/08 23:47
Hexachlorobutadiene	0.200	0.123		mg/L	62%	19 - 117	8121008	12/11/08 23:47
Hexachloroethane	0.200	0.123		mg/L	62%	20 - 108	8121008	12/11/08 23:47
Nitrobenzene	0.200	0.142		mg/L	71%	35 - 110	8121008	12/11/08 23:47
Pentachlorophenol	0.200	0.150		mg/L	75%	39 - 146	8121008	12/11/08 23:47
Pyridine	0.200	0.0772		mg/L	39%	10 - 100	8121008	12/11/08 23:47
2,4,6-Trichlorophenol	0.200	0.167		mg/L	83%	34 - 131	8121008	12/11/08 23:47
2,4,5-Trichlorophenol	0.200	0.174		mg/L	87%	37 - 130	8121008	12/11/08 23:47

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	620 Wando Park Blvd.	Project Name:	Former Crosby's Gas
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
LCS - Cont.

Analyte	Known Val.	Analyzed Val	Q	Units	% Rec.	Target Range	Batch	Analyzed Date/Time
TCLP Semivolatile Organic Compounds by EPA Method 1311/8270C								
8121008-BS1								
Surrogate: Terphenyl-d14	0.100	0.0668			67%	21 - 123	8121008	12/11/08 23:47
Surrogate: 2,4,6-Tribromophenol	0.100	0.0865			87%	23 - 129	8121008	12/11/08 23:47
Surrogate: Phenol-d5	0.100	0.0432			43%	10 - 100	8121008	12/11/08 23:47
Surrogate: 2-Fluorobiphenyl	0.100	0.0716			72%	34 - 108	8121008	12/11/08 23:47
Surrogate: 2-Fluorophenol	0.100	0.0516			52%	34 - 108	8121008	12/11/08 23:47
Surrogate: Nitrobenzene-d5	0.100	0.0683			68%	29 - 116	8121008	12/11/08 23:47

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	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
LCS Dup

Analyte	Orig. Val.	Duplicate	Q	Units	Spike Conc	% Rec.	Target Range	RPD	Limit	Batch	Sample Duplicated	Analyzed Date/Time
TCLP Metals by 6000/7000 Series Methods												
8120910-BSD1												
Mercury		0.0203		mg/L	0.0200	102%	78 - 124	9	22	8120910		12/05/08 17:42
TCLP Volatile Organic Compounds by EPA Method 1311/8260B												
8120939-BSD1												
Benzene		41.9		ug/L	50.0	84%	76 - 129	1	50	8120939		12/06/08 13:26
2-Butanone		217		ug/L	250	87%	63 - 138	4	50	8120939		12/06/08 13:26
Carbon Tetrachloride		44.6		ug/L	50.0	89%	56 - 150	1	50	8120939		12/06/08 13:26
Chlorobenzene		42.3		ug/L	50.0	85%	80 - 120	0.2	50	8120939		12/06/08 13:26
Chloroform		42.9	B	ug/L	50.0	86%	78 - 138	1	50	8120939		12/06/08 13:26
1,2-Dichloroethane		43.2		ug/L	50.0	86%	70 - 135	2	50	8120939		12/06/08 13:26
1,1-Dichloroethene		44.0		ug/L	50.0	88%	77 - 137	4	50	8120939		12/06/08 13:26
Tetrachloroethene		46.4		ug/L	50.0	93%	83 - 126	2	50	8120939		12/06/08 13:26
Trichloroethene		43.4		ug/L	50.0	87%	78 - 137	1	50	8120939		12/06/08 13:26
Vinyl chloride		45.3		ug/L	50.0	91%	62 - 124	3	50	8120939		12/06/08 13:26
Surrogate: 1,2-Dichloroethane-d4		25.2		ug/L	25.0	101%	60 - 140			8120939		12/06/08 13:26
Surrogate: Dibromofluoromethane		25.0		ug/L	25.0	100%	75 - 124			8120939		12/06/08 13:26
Surrogate: Toluene-d8		22.9		ug/L	25.0	92%	78 - 121			8120939		12/06/08 13:26
Surrogate: 4-Bromofluorobenzene		24.5		ug/L	25.0	98%	79 - 124			8120939		12/06/08 13:26

2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

Client	S&ME, Inc. (2420)	Work Order:	NRL0326
	620 Wando Park Blvd.	Project Name:	Former Crosby's Gas
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
Matrix Spike

Analyte	Orig. Val.	MS Val	Q	Units	Spike Conc	% Rec.	Target Range	Batch	Sample Spiked	Analyzed Date/Time
TCLP Metals by 6000/7000 Series Methods										
8120910-MS1										
Mercury	ND	0.0207		mg/L	0.0200	104%	63 - 138	8120910	NRL0126-01	12/05/08 16:54
8120922-MS1										
Arsenic	ND	10.0		mg/L	10.0	100%	75 - 125	8120922	NRL0410-02	12/06/08 00:59
Barium	0.0350	50.5		mg/L	50.0	101%	75 - 125	8120922	NRL0410-02	12/06/08 00:59
Cadmium	ND	9.83		mg/L	10.0	98%	75 - 125	8120922	NRL0410-02	12/06/08 00:59
Chromium	ND	51.7		mg/L	50.0	103%	75 - 125	8120922	NRL0410-02	12/06/08 00:59
Lead	ND	50.5		mg/L	50.0	101%	75 - 125	8120922	NRL0410-02	12/06/08 00:59
Selenium	ND	10.2		mg/L	10.0	102%	75 - 125	8120922	NRL0410-02	12/06/08 00:59
Silver	ND	10.0		mg/L	10.0	100%	75 - 125	8120922	NRL0410-02	12/06/08 00:59
TCLP Volatile Organic Compounds by EPA Method 1311/8260B										
8120939-MS1										
Benzene	ND	0.0486		mg/L	0.0500	97%	18 - 167	8120939	NRL0332-01	12/07/08 09:08
2-Butanone	ND	0.216		mg/L	0.250	86%	10 - 160	8120939	NRL0332-01	12/07/08 09:08
Carbon Tetrachloride	ND	0.0510		mg/L	0.0500	102%	10 - 189	8120939	NRL0332-01	12/07/08 09:08
Chlorobenzene	ND	0.0501		mg/L	0.0500	100%	23 - 160	8120939	NRL0332-01	12/07/08 09:08
Chloroform	ND	0.0494	B	mg/L	0.0500	99%	17 - 175	8120939	NRL0332-01	12/07/08 09:08
1,2-Dichloroethane	ND	0.0491		mg/L	0.0500	98%	14 - 151	8120939	NRL0332-01	12/07/08 09:08
1,1-Dichloroethene	ND	0.0465		mg/L	0.0500	93%	10 - 185	8120939	NRL0332-01	12/07/08 09:08
Tetrachloroethene	ND	0.0529		mg/L	0.0500	106%	16 - 170	8120939	NRL0332-01	12/07/08 09:08
Trichloroethene	0.00390	0.0494		mg/L	0.0500	91%	10 - 192	8120939	NRL0332-01	12/07/08 09:08
Vinyl chloride	ND	0.0382		mg/L	0.0500	76%	10 - 171	8120939	NRL0332-01	12/07/08 09:08
Surrogate: 1,2-Dichloroethane-d4		24.4		ug/L	25.0	98%	60 - 140	8120939	NRL0332-01	12/07/08 09:08
Surrogate: Dibromofluoromethane		24.9		ug/L	25.0	100%	75 - 124	8120939	NRL0332-01	12/07/08 09:08
Surrogate: Toluene-d8		22.3		ug/L	25.0	89%	78 - 121	8120939	NRL0332-01	12/07/08 09:08
Surrogate: 4-Bromofluorobenzene		24.0		ug/L	25.0	96%	79 - 124	8120939	NRL0332-01	12/07/08 09:08

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

Client	S&ME, Inc. (2420)	Work Order:	NRL0326
	620 Wando Park Blvd.	Project Name:	Former Crosby's Gas
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
Matrix Spike Dup

Analyte	Orig. Val.	Duplicate	Q	Units	Spike Conc	% Rec.	Target Range	RPD	Limit	Batch	Sample Duplicated	Analyzed Date/Time
TCLP Metals by 6000/7000 Series Methods												
8120910-MSD1												
Mercury	ND	0.0203		mg/L	0.0200	102%	63 - 138	2	22	8120910	NRL0126-01	12/05/08 16:56
8120922-MSD1												
Arsenic	ND	10.1		mg/L	10.0	101%	75 - 125	0.6	20	8120922	NRL0410-02	12/06/08 01:03
Barium	0.0350	51.2		mg/L	50.0	102%	75 - 125	1	20	8120922	NRL0410-02	12/06/08 01:03
Cadmium	ND	9.92		mg/L	10.0	99%	75 - 125	0.9	20	8120922	NRL0410-02	12/06/08 01:03
Chromium	ND	52.3		mg/L	50.0	105%	75 - 125	1	20	8120922	NRL0410-02	12/06/08 01:03
Lead	ND	51.0		mg/L	50.0	102%	75 - 125	1	20	8120922	NRL0410-02	12/06/08 01:03
Selenium	ND	10.3		mg/L	10.0	103%	75 - 125	1	20	8120922	NRL0410-02	12/06/08 01:03
Silver	ND	10.2		mg/L	10.0	102%	75 - 125	2	20	8120922	NRL0410-02	12/06/08 01:03
TCLP Volatile Organic Compounds by EPA Method 1311/8260B												
8120939-MSD1												
Benzene	ND	0.0468		mg/L	0.0500	94%	18 - 167	4	50	8120939	NRL0332-01	12/07/08 09:35
2-Butanone	ND	0.223		mg/L	0.250	89%	10 - 160	3	50	8120939	NRL0332-01	12/07/08 09:35
Carbon Tetrachloride	ND	0.0488		mg/L	0.0500	98%	10 - 189	4	50	8120939	NRL0332-01	12/07/08 09:35
Chlorobenzene	ND	0.0479		mg/L	0.0500	96%	23 - 160	4	50	8120939	NRL0332-01	12/07/08 09:35
Chloroform	ND	0.0475	B	mg/L	0.0500	95%	17 - 175	4	50	8120939	NRL0332-01	12/07/08 09:35
1,2-Dichloroethane	ND	0.0482		mg/L	0.0500	96%	14 - 151	2	50	8120939	NRL0332-01	12/07/08 09:35
1,1-Dichloroethene	ND	0.0462		mg/L	0.0500	92%	10 - 185	0.5	50	8120939	NRL0332-01	12/07/08 09:35
Tetrachloroethene	ND	0.0494		mg/L	0.0500	99%	16 - 170	7	50	8120939	NRL0332-01	12/07/08 09:35
Trichloroethene	0.00390	0.0472		mg/L	0.0500	87%	10 - 192	5	50	8120939	NRL0332-01	12/07/08 09:35
Vinyl chloride	ND	0.0384		mg/L	0.0500	77%	10 - 171	0.6	50	8120939	NRL0332-01	12/07/08 09:35
Surrogate: 1,2-Dichloroethane-d4		24.7		ug/L	25.0	99%	60 - 140			8120939	NRL0332-01	12/07/08 09:35
Surrogate: Dibromofluoromethane		25.2		ug/L	25.0	101%	75 - 124			8120939	NRL0332-01	12/07/08 09:35
Surrogate: Toluene-d8		22.2		ug/L	25.0	89%	78 - 121			8120939	NRL0332-01	12/07/08 09:35
Surrogate: 4-Bromofluorobenzene		24.1		ug/L	25.0	96%	79 - 124			8120939	NRL0332-01	12/07/08 09:35

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THE LEADER IN ENVIRONMENTAL TESTING

2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

Client	S&ME, Inc. (2420)	Work Order:	NRL0326
	620 Wando Park Blvd.	Project Name:	Former Crosby's Gas
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

CERTIFICATION SUMMARY

TestAmerica Nashville

Method	Matrix	AIHA	Nelac	South Carolina
SW846 1311/6010B	Soil	N/A	X	X
SW846 1311/7470A	Soil	N/A	X	X
SW846 1311/8260B	Soil	N/A	X	X
SW846 1311/8270C	Soil	N/A	X	X
SW846 1311	Soil	N/A	X	X

2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

Client	S&ME, Inc. (2420)	Work Order:	NRL0326
	620 Wando Park Blvd.	Project Name:	Former Crosby's Gas
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

TCLP REGULATORY LIMITS

Analyte	Regulatory Limit
1,1-Dichloroethene	0.7
1,2-Dichloroethane	0.5
1,4-Dichlorobenzene	7.5
2,4,5-Trichlorophenol	400
2,4,6-Trichlorophenol	2
2,4-Dinitrotoluene	0.13
2-Butanone	200
Arsenic	5
Barium	100
Benzene	0.5
Cadmium	1
Carbon Tetrachloride	0.5
Chlorobenzene	100
Chloroform	6
Chromium	5
Cresol(s)	200
Hexachlorobenzene	0.13
Hexachlorobutadiene	0.5
Hexachloroethane	3
Lead	5
Mercury	0.2
Nitrobenzene	2
Pentachlorophenol	100
Pyridine	5
Selenium	1
Silver	5
Tetrachloroethene	0.7
Trichloroethene	0.5
Vinyl chloride	0.2

2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

Client	S&ME, Inc. (2420)	Work Order:	NRL0326
	620 Wando Park Blvd.	Project Name:	Former Crosby's Gas
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

DATA QUALIFIERS AND DEFINITIONS

B Analyte was detected in the associated Method Blank.

ND Not detected at the reporting limit (or method detection limit if shown)

METHOD MODIFICATION NOTES

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Nashville, TN

COOLER RECE

NRL0326

Cooler Received/Opened On 12 / 03/ 08 @ 8:00

1. Tracking # 3167 (last 4 digits, FedEx)

Courier: FED-EX IR Gun ID 90942856

2. Temperature of rep. sample or temp blank when opened: 3.2 Degrees Celsius
3. If Item #2 temperature is 0°C or less, was the representative sample or temp blank frozen? YES NO...NA
4. Were custody seals on outside of cooler? YES...NO...NA

   If yes, how many and where: 2 frnt

5. Were the seals intact, signed, and dated correctly? YES...NO...NA
6. Were custody papers inside cooler? YES...NO...NA

I certify that I opened the cooler and answered questions 1-6 (intial) ____

7. Were custody seals on containers: YES NO and Intact YES...NO...NA

   Were these signed and dated correctly? YES...NO...NA

8. Packing mat'l used? Bubblewrap Plastic bag Peanuts Vermiculite Foam Insert Paper Other None
9. Cooling process: Ice Ice-pack Ice (direct contact) Dry ice Other None
10. Did all containers arrive in good condition (unbroken)? YES...NO...NA
11. Were all container labels complete (#, date, signed, pres., etc)? YES...NO...NA
12. Did all container labels and tags agree with custody papers? YES...NO...NA

13a. Were VOA vials received? YES...NO...NA

b. Was there any observable headspace present in any VOA vial? YES...NO...NA

14. Was there a Trip Blank in this cooler? YES...NO...NA If multiple coolers, sequence # NA

only 1 jar for 01 only 2 jars for 01

I certify that I unloaded the cooler and answered questions 7-14 (intial) ____

15a. On pres'd bottles, did pH test strips suggest preservation reached the correct pH level? YES..NO..NA

b. Did the bottle labels indicate that the correct preservatives were used YES...NO...NA

If preservation in-house was needed, record standard ID of preservative used here____

16. Was residual chlorine present? YES...NO...NA

I certify that I checked for chlorine and pH as per SOP and answered questions 15-16 (intial) ____

17. Were custody papers properly filled out (ink, signed, etc)? YES...NO...NA
18. Did you sign the custody papers in the appropriate place? YES...NO...NA
19. Were correct containers used for the analysis requested? YES...NO...NA
20. Was sufficient amount of sample sent in each container? YES...NO...NA

I certify that I entered this project into LIMS and answered questions 17-20 (intial) ____

I certify that I attached a label with the unique LIMS number to each container (intial) ____

21. Were there Non-Conformance issues at login? YES..NO Was a PIPE generated? YES...NO...#____

BIS = Broken in shipment

NRL0326
12/17/08 23:59

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Nashville Division
2960 Foster Creighton
Nashville, TN 37204

Phone: 615-726-0177
Toll Free: 800-765-0980
Fax: 615-726-3404

To assist us in using the proper analytical methods, is this work being conducted for regulatory purposes?

Compliance Monitoring? Yes ____ No _
Enforcement Action? Yes ____ No _

Client Name/Account #: S&ME # 2420
Address: 620 Wando Park Road
City/State/Zip: Mt. Pleasant, SC 29464
Project Manager: Andrew Wertz email: awertz@smeinc.com
Telephone Number: 843.884.0005 **Fax No.:** 843.884-1696
Sampler Name: (Print) F. Slaughter
Sampler Signature: F. Slg

Site State: SC
PO#: 32106
TA Quote #:
Project ID: FORMER CROSBY'S GAS STATION
Project #: 1131-08-554

std TAT

Sample ID / Description	Date Sampled	Time Sampled	No. of Containers Shipped	Grab	Composite	Field Filtered	Preservative: Ice	HNO_3 (Red Label)	HCl (Blue Label)	NaOH (Orange Label)	H_2SO_4 Plastic (Yellow Label)	H_2SO_4 Glass (Yellow Label)	None (Black Label)	Other (Specify)	Matrix: Groundwater	Wastewater	Drinking Water	Sludge	Soil	Other (specify):	Analyze For: TCLP METALS	TCLP VOCS	TCLP SVOCS									RUSH TAT (Pre-Schedule)
Gas-Mud-Grab	12/2/08	850	2	X			x						2					x				X					1					
Gas-Mud-Comp	12/2/08	915	4		X		x						4					x			X		X				2					

Special Instructions:

Method of Shipment: FEDEX

Relinquished by:	Date	Time	Received by:	Date	Time
F. Slaughter	12/2/08	1400	J Brailsford	12/2/08	1400
Relinquished by: J Brailsford	12/2/08	1730	**Received by TestAmerica:** M	12/2/08	0800

Laboratory Comments:
Temperature Upon Receipt:
VOCs Free of Headspace? Y

FedEx to Test America - Nashville

NRL0326
12/17/08 23:59

Macalloy Site

Analyze 1 semi-solid ~~(drilling~~ mud) sample and 1 water sample for :

Total Metals by 6010B/7470A	TCLP Metals by 6010B/7470A
Arsenic	Arsenic
Antimony	Barium
Barium	Cadmium
Cadmium	Chromium
Chromium	Lead
Hexavalent Chromium	Selenium
Iron	Silver
Lead	Mercury
Manganese	
Nickel	
Selenium	
Silver	
Mercury	

Former Crosby's Gas Station

Analyze 1 semi-solid (drilling mud) sample ~~and 1 water sample for~~ :

TCLP VOCs by 8260B	TCLP SVOCs by 8270C	TCLP Metals by 6010B/7470A
1,1-dichloroethene	cresols	Arsenic
1,2-dichloroethane	1,4-dichlorobenzene	Barium
benzene	2,4-dinitrotoluene	Cadmium
chlorobenzene	hexachlorobenzene	Chromium
trichloroethene	hexachlorobutadiene	Lead
vinyl chloride	hexachloroethane	Selenium
2-butanone	nitrobenzene	Silver
carbon tetrachloride	pentachlorophenol	Mercury
chloroform	pyridine	
tetrachloroethene	2,4,5-trichlorophenol	
	2,4,6-trichlorophenol	

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THE LEADER IN ENVIRONMENTAL TESTING

2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

December 16, 2008 10:45:48AM

Client:	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Nbr:	1131-08-554
Attn:	Andrew Wertz	P/O Nbr:	32106
		Date Received:	12/03/08

SAMPLE IDENTIFICATION	LAB NUMBER	COLLECTION DATE AND TIME
CNC-SWS-Grab	NRL0332-01	12/02/08 09:55
CNC-TWR-Grab	NRL0332-02	12/02/08 10:50
CNC-661-Grab	NRL0332-03	12/02/08 11:40
CNC-Decon-Grab	NRL0332-04	12/02/08 12:15
CNC-Mid-Comp	NRL0332-05	12/02/08 12:00
CNC-Decon-Comp	NRL0332-06	12/02/08 12:00
Trip Blank	NRL0332-07	12/02/08 00:01

An executed copy of the chain of custody, the project quality control data, and the sample receipt form are also included as an addendum to this report. If you have any questions relating to this analytical report, please contact your Laboratory Project Manager at 1-800-765-0980. Any opinions, if expressed, are outside the scope of the Laboratory's accreditation.

The Chain(s) of Custody, 3 pages, are included and are an integral part of this report.

These results relate only to the items tested. This report shall not be reproduced except in full and with permission of the laboratory.

All solids results are reported in wet weight unless specifically stated.
Estimated uncertainty is available upon request.
This report has been electronically signed.
Report Approved By:

Ken A. Hayes

Senior Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

ANALYTICAL REPORT

Analyte	Result	Flag	Units	MRL	Dilution Factor	Analysis Date/Time	Method	Batch
Sample ID: NRL0332-01 (CNC-SWS-Grab - Soil) Sampled: 12/02/08 09:55								
General Chemistry Parameters								
% Dry Solids	**68.7**		%	0.500	1	12/12/08 06:46	SW-846	8121669
Volatile Organic Compounds by EPA Method 8260B								
Benzene	**0.00784**		mg/kg dry	0.00270	1	12/10/08 04:59	SW846 8260B	8121404
2-Butanone	ND		mg/kg dry	0.0674	1	12/10/08 04:59	SW846 8260B	8121404
Carbon Tetrachloride	ND		mg/kg dry	0.00270	1	12/10/08 04:59	SW846 8260B	8121404
Chlorobenzene	ND		mg/kg dry	0.00270	1	12/10/08 04:59	SW846 8260B	8121404
Chloroform	ND		mg/kg dry	0.00270	1	12/10/08 04:59	SW846 8260B	8121404
1,2-Dichloroethane	ND		mg/kg dry	0.00270	1	12/10/08 04:59	SW846 8260B	8121404
cis-1,2-Dichloroethene	ND		mg/kg dry	0.00270	1	12/10/08 04:59	SW846 8260B	8121404
1,1-Dichloroethene	ND		mg/kg dry	0.00270	1	12/10/08 04:59	SW846 8260B	8121404
Methylene Chloride	ND		mg/kg dry	0.0135	1	12/10/08 04:59	SW846 8260B	8121404
Naphthalene	ND		mg/kg dry	0.00674	1	12/10/08 04:59	SW846 8260B	8121404
Tetrachloroethene	ND		mg/kg dry	0.00268	1	12/10/08 15:23	SW846 8260B	8120937
Trichloroethene	ND		mg/kg dry	0.00270	1	12/10/08 04:59	SW846 8260B	8121404
Vinyl chloride	ND		mg/kg dry	0.00270	1	12/10/08 04:59	SW846 8260B	8121404
1,2-Dichloroethene (total)	ND		mg/kg dry	0.00270	1	12/10/08 04:59	SW846 8260B	8121404
Surr: 1,2-Dichloroethane-d4 (41-150%)	*81 %*					*12/10/08 04:59*	*SW846 8260B*	*8121404*
Surr: 1,2-Dichloroethane-d4 (41-150%)	*93 %*					*12/10/08 15:23*	*SW846 8260B*	*8120937*
Surr: Dibromofluoromethane (55-139%)	*93 %*					*12/10/08 04:59*	*SW846 8260B*	*8121404*
Surr: Dibromofluoromethane (55-139%)	*105 %*					*12/10/08 15:23*	*SW846 8260B*	*8120937*
Surr: Toluene-d8 (57-148%)	*106 %*					*12/10/08 04:59*	*SW846 8260B*	*8121404*
Surr: Toluene-d8 (57-148%)	*103 %*					*12/10/08 15:23*	*SW846 8260B*	*8120937*
Surr: 4-Bromofluorobenzene (58-150%)	*113 %*					*12/10/08 04:59*	*SW846 8260B*	*8121404*
Surr: 4-Bromofluorobenzene (58-150%)	*107 %*					*12/10/08 15:23*	*SW846 8260B*	*8120937*
TCLP Volatile Organic Compounds by EPA Method 1311/8260B								
Benzene	ND		mg/L	0.0100	10	12/06/08 22:36	W846 1311/8260	8120939
2-Butanone	ND		mg/L	0.250	10	12/06/08 22:36	W846 1311/8260	8120939
Carbon Tetrachloride	ND		mg/L	0.0100	10	12/06/08 22:36	W846 1311/8260	8120939
Chlorobenzene	ND		mg/L	0.0100	10	12/06/08 22:36	W846 1311/8260	8120939
Chloroform	ND	B	mg/L	0.0100	10	12/06/08 22:36	W846 1311/8260	8120939
1,2-Dichloroethane	ND		mg/L	0.0100	10	12/06/08 22:36	W846 1311/8260	8120939
1,1-Dichloroethene	ND		mg/L	0.0100	10	12/06/08 22:36	W846 1311/8260	8120939
Tetrachloroethene	ND		mg/L	0.0100	10	12/06/08 22:36	W846 1311/8260	8120939
Trichloroethene	ND		mg/L	0.0100	10	12/06/08 22:36	W846 1311/8260	8120939
Vinyl chloride	ND		mg/L	0.0100	10	12/06/08 22:36	W846 1311/8260	8120939
Surr: 1,2-Dichloroethane-d4 (60-140%)	*98 %*					*12/06/08 22:36*	*W846 1311/8260*	*8120939*
Surr: Dibromofluoromethane (75-124%)	*98 %*					*12/06/08 22:36*	*W846 1311/8260*	*8120939*
Surr: Toluene-d8 (78-121%)	*95 %*					*12/06/08 22:36*	*W846 1311/8260*	*8120939*
Surr: 4-Bromofluorobenzene (79-124%)	*98 %*					*12/06/08 22:36*	*W846 1311/8260*	*8120939*

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THE LEADER IN ENVIRONMENTAL TESTING

2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

Client	S&ME, Inc. (2420) 620 Wando Park Blvd. Mt. Pleasant, SC 29464	Work Order:	NRL0332
		Project Name:	Charleston Naval Complex
		Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

ANALYTICAL REPORT

Analyte	Result	Flag	Units	MRL	Dilution Factor	Analysis Date/Time	Method	Batch
Sample ID: NRL0332-02 (CNC-TWR-Grab - Soil) Sampled: 12/02/08 10:50								
General Chemistry Parameters								
% Dry Solids	**23.9**		%	0.500	1	12/12/08 06:46	SW-846	8121669
Volatile Organic Compounds by EPA Method 8260B								
Benzene	**0.0210**		mg/kg dry	0.0108	1	12/10/08 05:29	SW846 8260B	8121404
2-Butanone	ND		mg/kg dry	0.270	1	12/10/08 05:29	SW846 8260B	8121404
Carbon Tetrachloride	ND		mg/kg dry	0.0108	1	12/10/08 05:29	SW846 8260B	8121404
Chlorobenzene	ND		mg/kg dry	0.0108	1	12/10/08 05:29	SW846 8260B	8121404
Chloroform	ND		mg/kg dry	0.0108	1	12/10/08 05:29	SW846 8260B	8121404
1,2-Dichloroethane	ND		mg/kg dry	0.0108	1	12/10/08 05:29	SW846 8260B	8121404
cis-1,2-Dichloroethene	ND		mg/kg dry	0.0108	1	12/10/08 05:29	SW846 8260B	8121404
1,1-Dichloroethene	ND		mg/kg dry	0.0108	1	12/10/08 05:29	SW846 8260B	8121404
Methylene Chloride	ND		mg/kg dry	0.0541	1	12/10/08 05:29	SW846 8260B	8121404
Naphthalene	ND		mg/kg dry	0.0270	1	12/10/08 05:29	SW846 8260B	8121404
Tetrachloroethene	ND		mg/kg dry	0.0103	1	12/10/08 15:53	SW846 8260B	8120937
Trichloroethene	ND		mg/kg dry	0.0108	1	12/10/08 05:29	SW846 8260B	8121404
Vinyl chloride	ND		mg/kg dry	0.0108	1	12/10/08 05:29	SW846 8260B	8121404
1,2-Dichloroethene (total)	ND		mg/kg dry	0.0108	1	12/10/08 05:29	SW846 8260B	8121404
Surr: 1,2-Dichloroethane-d4 (41-150%)	*74 %*					*12/10/08 05:29*	*SW846 8260B*	*8121404*
Surr: 1,2-Dichloroethane-d4 (41-150%)	*89 %*					*12/10/08 15:53*	*SW846 8260B*	*8120937*
Surr: Dibromofluoromethane (55-139%)	*90 %*					*12/10/08 05:29*	*SW846 8260B*	*8121404*
Surr: Dibromofluoromethane (55-139%)	*107 %*					*12/10/08 15:53*	*SW846 8260B*	*8120937*
Surr: Toluene-d8 (57-148%)	*117 %*					*12/10/08 05:29*	*SW846 8260B*	*8121404*
Surr: Toluene-d8 (57-148%)	*109 %*					*12/10/08 15:53*	*SW846 8260B*	*8120937*
Surr: 4-Bromofluorobenzene (58-150%)	*138 %*					*12/10/08 05:29*	*SW846 8260B*	*8121404*
Surr: 4-Bromofluorobenzene (58-150%)	*129 %*					*12/10/08 15:53*	*SW846 8260B*	*8120937*
TCLP Volatile Organic Compounds by EPA Method 1311/8260B								
Benzene	ND		mg/L	0.0100	10	12/06/08 23:04	W846 1311/8260	8120939
2-Butanone	ND		mg/L	0.250	10	12/06/08 23:04	W846 1311/8260	8120939
Carbon Tetrachloride	ND		mg/L	0.0100	10	12/06/08 23:04	W846 1311/8260	8120939
Chlorobenzene	ND		mg/L	0.0100	10	12/06/08 23:04	W846 1311/8260	8120939
Chloroform	ND	B	mg/L	0.0100	10	12/06/08 23:04	W846 1311/8260	8120939
1,2-Dichloroethane	ND		mg/L	0.0100	10	12/06/08 23:04	W846 1311/8260	8120939
1,1-Dichloroethene	ND		mg/L	0.0100	10	12/06/08 23:04	W846 1311/8260	8120939
Tetrachloroethene	ND		mg/L	0.0100	10	12/06/08 23:04	W846 1311/8260	8120939
Trichloroethene	ND		mg/L	0.0100	10	12/06/08 23:04	W846 1311/8260	8120939
Vinyl chloride	ND		mg/L	0.0100	10	12/06/08 23:04	W846 1311/8260	8120939
Surr: 1,2-Dichloroethane-d4 (60-140%)	*100 %*					*12/06/08 23:04*	*W846 1311/8260*	*8120939*
Surr: Dibromofluoromethane (75-124%)	*98 %*					*12/06/08 23:04*	*W846 1311/8260*	*8120939*
Surr: Toluene-d8 (78-121%)	*93 %*					*12/06/08 23:04*	*W846 1311/8260*	*8120939*
Surr: 4-Bromofluorobenzene (79-124%)	*101 %*					*12/06/08 23:04*	*W846 1311/8260*	*8120939*

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2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

ANALYTICAL REPORT

Analyte	Result	Flag	Units	MRL	Dilution Factor	Analysis Date/Time	Method	Batch
Sample ID: NRL0332-03 (CNC-661-Grab - Soil) Sampled: 12/02/08 11:40								
General Chemistry Parameters								
% Dry Solids	**23.2**		%	0.500	1	12/12/08 06:46	SW-846	8121669
Volatile Organic Compounds by EPA Method 8260B								
Benzene	**0.0273**		mg/kg dry	0.0133	1	12/10/08 06:00	SW846 8260B	8121404
2-Butanone	ND		mg/kg dry	0.333	1	12/10/08 06:00	SW846 8260B	8121404
Carbon Tetrachloride	ND		mg/kg dry	0.0133	1	12/10/08 06:00	SW846 8260B	8121404
Chlorobenzene	ND		mg/kg dry	0.0133	1	12/10/08 06:00	SW846 8260B	8121404
Chloroform	ND		mg/kg dry	0.0133	1	12/10/08 06:00	SW846 8260B	8121404
1,2-Dichloroethane	ND		mg/kg dry	0.0133	1	12/10/08 06:00	SW846 8260B	8121404
cis-1,2-Dichloroethene	ND		mg/kg dry	0.0133	1	12/10/08 06:00	SW846 8260B	8121404
1,1-Dichloroethene	ND		mg/kg dry	0.0133	1	12/10/08 06:00	SW846 8260B	8121404
Methylene Chloride	**0.0869**		mg/kg dry	0.0665	1	12/10/08 06:00	SW846 8260B	8121404
Naphthalene	ND		mg/kg dry	0.0333	1	12/10/08 06:00	SW846 8260B	8121404
Tetrachloroethene	ND		mg/kg dry	0.00933	1	12/10/08 16:22	SW846 8260B	8120937
Trichloroethene	ND		mg/kg dry	0.0133	1	12/10/08 06:00	SW846 8260B	8121404
Vinyl chloride	ND		mg/kg dry	0.0133	1	12/10/08 06:00	SW846 8260B	8121404
1,2-Dichloroethene (total)	ND		mg/kg dry	0.0133	1	12/10/08 06:00	SW846 8260B	8121404
Surr: 1,2-Dichloroethane-d4 (41-150%)	*74 %*					*12/10/08 06:00*	*SW846 8260B*	*8121404*
Surr: 1,2-Dichloroethane-d4 (41-150%)	*87 %*					*12/10/08 16:22*	*SW846 8260B*	*8120937*
Surr: Dibromofluoromethane (55-139%)	*92 %*					*12/10/08 06:00*	*SW846 8260B*	*8121404*
Surr: Dibromofluoromethane (55-139%)	*92 %*					*12/10/08 16:22*	*SW846 8260B*	*8120937*
Surr: Toluene-d8 (57-148%)	*113 %*					*12/10/08 06:00*	*SW846 8260B*	*8121404*
Surr: Toluene-d8 (57-148%)	*109 %*					*12/10/08 16:22*	*SW846 8260B*	*8120937*
Surr: 4-Bromofluorobenzene (58-150%)	*131 %*					*12/10/08 06:00*	*SW846 8260B*	*8121404*
Surr: 4-Bromofluorobenzene (58-150%)	*120 %*					*12/10/08 16:22*	*SW846 8260B*	*8120937*
TCLP Volatile Organic Compounds by EPA Method 1311/8260B								
Benzene	ND		mg/L	0.0100	10	12/06/08 23:31	W846 1311/8260	8120939
2-Butanone	ND		mg/L	0.250	10	12/06/08 23:31	W846 1311/8260	8120939
Carbon Tetrachloride	ND		mg/L	0.0100	10	12/06/08 23:31	W846 1311/8260	8120939
Chlorobenzene	ND		mg/L	0.0100	10	12/06/08 23:31	W846 1311/8260	8120939
Chloroform	ND	B	mg/L	0.0100	10	12/06/08 23:31	W846 1311/8260	8120939
1,2-Dichloroethane	ND		mg/L	0.0100	10	12/06/08 23:31	W846 1311/8260	8120939
1,1-Dichloroethene	ND		mg/L	0.0100	10	12/06/08 23:31	W846 1311/8260	8120939
Tetrachloroethene	ND		mg/L	0.0100	10	12/06/08 23:31	W846 1311/8260	8120939
Trichloroethene	ND		mg/L	0.0100	10	12/06/08 23:31	W846 1311/8260	8120939
Vinyl chloride	ND		mg/L	0.0100	10	12/06/08 23:31	W846 1311/8260	8120939
Surr: 1,2-Dichloroethane-d4 (60-140%)	*100 %*					*12/06/08 23:31*	*W846 1311/8260*	*8120939*
Surr: Dibromofluoromethane (75-124%)	*98 %*					*12/06/08 23:31*	*W846 1311/8260*	*8120939*
Surr: Toluene-d8 (78-121%)	*99 %*					*12/06/08 23:31*	*W846 1311/8260*	*8120939*
Surr: 4-Bromofluorobenzene (79-124%)	*100 %*					*12/06/08 23:31*	*W846 1311/8260*	*8120939*

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Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

ANALYTICAL REPORT

Analyte	Result	Flag	Units	MRL	Dilution Factor	Analysis Date/Time	Method	Batch
Sample ID: NRL0332-04 (CNC-Decon-Grab - Water) Sampled: 12/02/08 12:15								
Volatile Organic Compounds by EPA Method 8260B								
Benzene	ND		ug/L	1.00	1	12/06/08 04:05	SW846 8260B	8120667
2-Butanone	ND		ug/L	50.0	1	12/06/08 04:05	SW846 8260B	8120667
Carbon Tetrachloride	ND		ug/L	1.00	1	12/06/08 04:05	SW846 8260B	8120667
Chlorobenzene	ND		ug/L	1.00	1	12/06/08 04:05	SW846 8260B	8120667
Chloroform	ND		ug/L	1.00	1	12/06/08 04:05	SW846 8260B	8120667
1,2-Dichloroethane	ND		ug/L	1.00	1	12/06/08 04:05	SW846 8260B	8120667
cis-1,2-Dichloroethene	ND		ug/L	1.00	1	12/06/08 04:05	SW846 8260B	8120667
1,1-Dichloroethene	ND		ug/L	1.00	1	12/06/08 04:05	SW846 8260B	8120667
Methylene Chloride	ND		ug/L	5.00	1	12/06/08 04:05	SW846 8260B	8120667
Naphthalene	ND		ug/L	5.00	1	12/06/08 04:05	SW846 8260B	8120667
Tetrachloroethene	ND		ug/L	1.00	1	12/06/08 04:05	SW846 8260B	8120667
Trichloroethene	ND		ug/L	1.00	1	12/06/08 04:05	SW846 8260B	8120667
Vinyl chloride	ND		ug/L	1.00	1	12/06/08 04:05	SW846 8260B	8120667
1,2-Dichloroethene (total)	ND		ug/L	1.00	1	12/06/08 04:05	SW846 8260B	8120667
Surr: 1,2-Dichloroethane-d4 (60-140%)	*95 %*					*12/06/08 04:05*	*SW846 8260B*	*8120667*
Surr: Dibromofluoromethane (75-124%)	*96 %*					*12/06/08 04:05*	*SW846 8260B*	*8120667*
Surr: Toluene-d8 (78-121%)	*103 %*					*12/06/08 04:05*	*SW846 8260B*	*8120667*
Surr: 4-Bromofluorobenzene (79-124%)	*108 %*					*12/06/08 04:05*	*SW846 8260B*	*8120667*
TCLP Volatile Organic Compounds by EPA Method 1311/8260B								
Benzene	ND		mg/L	0.0100	10	12/06/08 23:59	W846 1311/8260	8120939
2-Butanone	ND		mg/L	0.250	10	12/06/08 23:59	W846 1311/8260	8120939
Carbon Tetrachloride	ND		mg/L	0.0100	10	12/06/08 23:59	W846 1311/8260	8120939
Chlorobenzene	ND		mg/L	0.0100	10	12/06/08 23:59	W846 1311/8260	8120939
Chloroform	ND	B	mg/L	0.0100	10	12/06/08 23:59	W846 1311/8260	8120939
1,2-Dichloroethane	ND		mg/L	0.0100	10	12/06/08 23:59	W846 1311/8260	8120939
1,1-Dichloroethene	ND		mg/L	0.0100	10	12/06/08 23:59	W846 1311/8260	8120939
Tetrachloroethene	ND		mg/L	0.0100	10	12/06/08 23:59	W846 1311/8260	8120939
Trichloroethene	ND		mg/L	0.0100	10	12/06/08 23:59	W846 1311/8260	8120939
Vinyl chloride	ND		mg/L	0.0100	10	12/06/08 23:59	W846 1311/8260	8120939
Surr: 1,2-Dichloroethane-d4 (60-140%)	*99 %*					*12/06/08 23:59*	*W846 1311/8260*	*8120939*
Surr: Dibromofluoromethane (75-124%)	*97 %*					*12/06/08 23:59*	*W846 1311/8260*	*8120939*
Surr: Toluene-d8 (78-121%)	*92 %*					*12/06/08 23:59*	*W846 1311/8260*	*8120939*
Surr: 4-Bromofluorobenzene (79-124%)	*100 %*					*12/06/08 23:59*	*W846 1311/8260*	*8120939*

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2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

ANALYTICAL REPORT

Sample ID: NRL0332-05 (CNC-Mid-Comp - Soil) Sampled: 12/02/08 12:00

Analyte	Result	Flag	Units	MRL	Dilution Factor	Analysis Date/Time	Method	Batch
General Chemistry Parameters								
% Dry Solids	**55.7**		%	0.500	1	12/12/08 06:46	SW-846	8121669
Total Metals by EPA Method 6010B								
Antimony	ND		mg/kg dry	18.0	1	12/11/08 12:07	SW846 6010B	8121573
Arsenic	**4.78**		mg/kg dry	1.80	1	12/11/08 12:07	SW846 6010B	8121573
Barium	**22.8**		mg/kg dry	3.59	1	12/11/08 12:07	SW846 6010B	8121573
Cadmium	ND		mg/kg dry	1.80	1	12/11/08 12:07	SW846 6010B	8121573
Chromium	**29.1**		mg/kg dry	1.80	1	12/11/08 12:07	SW846 6010B	8121573
Lead	**6.82**		mg/kg dry	1.80	1	12/11/08 12:07	SW846 6010B	8121573
Selenium	ND		mg/kg dry	3.59	1	12/11/08 12:07	SW846 6010B	8121573
Silver	ND		mg/kg dry	1.80	1	12/11/08 12:07	SW846 6010B	8121573
Mercury by EPA Methods 7470A/7471A								
Mercury	ND		mg/kg dry	0.177	1	12/04/08 15:10	SW846 7471A	8120735
TCLP Metals by 6000/7000 Series Methods								
Arsenic	ND		mg/L	0.100	1	12/05/08 23:59	W846 1311/6010	8120922
Barium	**0.122**		mg/L	0.100	1	12/05/08 23:59	W846 1311/6010	8120922
Cadmium	ND		mg/L	0.0100	1	12/05/08 23:59	W846 1311/6010	8120922
Chromium	ND		mg/L	0.0500	1	12/05/08 23:59	W846 1311/6010	8120922
Lead	ND		mg/L	0.0500	1	12/05/08 23:59	W846 1311/6010	8120922
Selenium	ND		mg/L	0.100	1	12/05/08 23:59	W846 1311/6010	8120922
Silver	ND		mg/L	0.0500	1	12/05/08 23:59	W846 1311/6010	8120922
Mercury	ND		mg/L	0.0100	1	12/05/08 17:18	W846 1311/7470	8120910
Semivolatile Organic Compounds by EPA Method 8270C								
Acenaphthene	ND		mg/kg dry	1.16	1	12/05/08 19:26	SW846 8270C	8120320
Acenaphthylene	ND		mg/kg dry	1.16	1	12/05/08 19:26	SW846 8270C	8120320
Anthracene	ND		mg/kg dry	1.16	1	12/05/08 19:26	SW846 8270C	8120320
Benzo (a) anthracene	ND		mg/kg dry	1.16	1	12/05/08 19:26	SW846 8270C	8120320
Benzo (a) pyrene	ND		mg/kg dry	1.16	1	12/05/08 19:26	SW846 8270C	8120320
Benzo (b) fluoranthene	ND		mg/kg dry	1.16	1	12/05/08 19:26	SW846 8270C	8120320
Benzo (g,h,i) perylene	ND		mg/kg dry	1.16	1	12/05/08 19:26	SW846 8270C	8120320
Benzo (k) fluoranthene	ND		mg/kg dry	1.16	1	12/05/08 19:26	SW846 8270C	8120320
2-Chlorophenol	ND		mg/kg dry	1.16	1	12/05/08 19:26	SW846 8270C	8120320
Chrysene	ND		mg/kg dry	1.16	1	12/05/08 19:26	SW846 8270C	8120320
Dibenz (a,h) anthracene	ND		mg/kg dry	1.16	1	12/05/08 19:26	SW846 8270C	8120320
1,4-Dichlorobenzene	ND		mg/kg dry	1.16	1	12/05/08 19:26	SW846 8270C	8120320
2,4-Dimethylphenol	ND		mg/kg dry	1.16	1	12/05/08 19:26	SW846 8270C	8120320
2,4-Dinitrotoluene	ND		mg/kg dry	1.16	1	12/05/08 19:26	SW846 8270C	8120320
Fluoranthene	ND		mg/kg dry	1.16	1	12/05/08 19:26	SW846 8270C	8120320
Fluorene	ND		mg/kg dry	1.16	1	12/05/08 19:26	SW846 8270C	8120320
Hexachlorobenzene	ND		mg/kg dry	1.16	1	12/05/08 19:26	SW846 8270C	8120320
Hexachlorobutadiene	ND		mg/kg dry	1.16	1	12/05/08 19:26	SW846 8270C	8120320
Hexachloroethane	ND		mg/kg dry	1.16	1	12/05/08 19:26	SW846 8270C	8120320

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Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

ANALYTICAL REPORT

Analyte	Result	Flag	Units	MRL	Dilution Factor	Analysis Date/Time	Method	Batch
Sample ID: NRL0332-05 (CNC-Mid-Comp - Soil) - cont. Sampled: 12/02/08 12:00								
Semivolatile Organic Compounds by EPA Method 8270C - cont.								
Indeno (1,2,3-cd) pyrene	ND		mg/kg dry	1.16	1	12/05/08 19:26	SW846 8270C	8120320
2-Methylnaphthalene	ND		mg/kg dry	1.16	1	12/05/08 19:26	SW846 8270C	8120320
2-Methylphenol	ND		mg/kg dry	1.16	1	12/05/08 19:26	SW846 8270C	8120320
3/4-Methylphenol	ND		mg/kg dry	1.16	1	12/05/08 19:26	SW846 8270C	8120320
Naphthalene	ND		mg/kg dry	1.16	1	12/05/08 19:26	SW846 8270C	8120320
Nitrobenzene	ND		mg/kg dry	1.16	1	12/05/08 19:26	SW846 8270C	8120320
Pentachlorophenol	ND		mg/kg dry	2.91	1	12/05/08 19:26	SW846 8270C	8120320
Phenanthrene	ND		mg/kg dry	1.16	1	12/05/08 19:26	SW846 8270C	8120320
Pyrene	ND		mg/kg dry	1.16	1	12/05/08 19:26	SW846 8270C	8120320
Pyridine	ND		mg/kg dry	2.33	1	12/05/08 19:26	SW846 8270C	8120320
1-Methylnaphthalene	ND		mg/kg dry	1.16	1	12/05/08 19:26	SW846 8270C	8120320
2,4,6-Trichlorophenol	ND		mg/kg dry	1.16	1	12/05/08 19:26	SW846 8270C	8120320
2,4,5-Trichlorophenol	ND		mg/kg dry	2.91	1	12/05/08 19:26	SW846 8270C	8120320
Surr: Terphenyl-d14 (26-128%)	*69 %*					*12/05/08 19:26*	*SW846 8270C*	*8120320*
Surr: 2,4,6-Tribromophenol (20-132%)	*71 %*					*12/05/08 19:26*	*SW846 8270C*	*8120320*
Surr: Phenol-d5 (23-113%)	*71 %*					*12/05/08 19:26*	*SW846 8270C*	*8120320*
Surr: 2-Fluorobiphenyl (19-109%)	*63 %*					*12/05/08 19:26*	*SW846 8270C*	*8120320*
Surr: 2-Fluorophenol (19-105%)	*69 %*					*12/05/08 19:26*	*SW846 8270C*	*8120320*
Surr: Nitrobenzene-d5 (22-104%)	*63 %*					*12/05/08 19:26*	*SW846 8270C*	*8120320*
TCLP Semivolatile Organic Compounds by EPA Method 1311/8270C								
Cresol(s)	ND		mg/L	0.0200	2	12/12/08 00:33	W846 1311/8270	8121008
1,4-Dichlorobenzene	ND		mg/L	0.0200	2	12/12/08 00:33	W846 1311/8270	8121008
2,4-Dinitrotoluene	ND		mg/L	0.0200	2	12/12/08 00:33	W846 1311/8270	8121008
Hexachlorobenzene	ND		mg/L	0.0200	2	12/12/08 00:33	W846 1311/8270	8121008
Hexachlorobutadiene	ND		mg/L	0.0200	2	12/12/08 00:33	W846 1311/8270	8121008
Hexachloroethane	ND		mg/L	0.0200	2	12/12/08 00:33	W846 1311/8270	8121008
Nitrobenzene	ND		mg/L	0.0200	2	12/12/08 00:33	W846 1311/8270	8121008
Pentachlorophenol	ND		mg/L	0.0200	2	12/12/08 00:33	W846 1311/8270	8121008
Pyridine	ND		mg/L	0.0200	2	12/12/08 00:33	W846 1311/8270	8121008
2,4,6-Trichlorophenol	ND		mg/L	0.0200	2	12/12/08 00:33	W846 1311/8270	8121008
2,4,5-Trichlorophenol	ND		mg/L	0.0200	2	12/12/08 00:33	W846 1311/8270	8121008
Surr: Terphenyl-d14 (21-123%)	*29 %*					*12/12/08 00:33*	*W846 1311/8270*	*8121008*
Surr: 2,4,6-Tribromophenol (23-129%)	*85 %*					*12/12/08 00:33*	*W846 1311/8270*	*8121008*
Surr: Phenol-d5 (10-100%)	*45 %*					*12/12/08 00:33*	*W846 1311/8270*	*8121008*
Surr: 2-Fluorobiphenyl (34-108%)	*70 %*					*12/12/08 00:33*	*W846 1311/8270*	*8121008*
Surr: 2-Fluorophenol (34-108%)	*58 %*					*12/12/08 00:33*	*W846 1311/8270*	*8121008*
Surr: Nitrobenzene-d5 (29-116%)	*74 %*					*12/12/08 00:33*	*W846 1311/8270*	*8121008*

2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

Client	S&ME, Inc. (2420) 620 Wando Park Blvd. Mt. Pleasant, SC 29464	Work Order:	NRL0332
		Project Name:	Charleston Naval Complex
		Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

ANALYTICAL REPORT

Analyte	Result	Flag	Units	MRL	Dilution Factor	Analysis Date/Time	Method	Batch
Sample ID: NRL0332-06 (CNC-Decon-Comp - Water) Sampled: 12/02/08 12:00								
Total Metals by EPA Method 6010B								
Antimony	ND		mg/L	0.0100	1	12/05/08 00:06	SW846 6010B	8120688
Arsenic	ND		mg/L	0.0100	1	12/05/08 00:06	SW846 6010B	8120688
Barium	**0.206**		mg/L	0.0100	1	12/05/08 00:06	SW846 6010B	8120688
Cadmium	ND		mg/L	0.00100	1	12/05/08 00:06	SW846 6010B	8120688
Chromium	**0.0398**		mg/L	0.00500	1	12/05/08 00:06	SW846 6010B	8120688
Lead	**0.0115**		mg/L	0.00500	1	12/05/08 00:06	SW846 6010B	8120688
Selenium	ND		mg/L	0.0100	1	12/05/08 00:06	SW846 6010B	8120688
Silver	ND		mg/L	0.00500	1	12/05/08 00:06	SW846 6010B	8120688
Mercury by EPA Methods 7470A/7471A								
Mercury	ND		mg/L	0.000200	1	12/04/08 19:16	SW846 7470A	8120683
TCLP Metals by 6000/7000 Series Methods								
Arsenic	ND		mg/L	0.100	1	12/06/08 00:03	W846 1311/6010	8120922
Barium	**0.274**		mg/L	0.100	1	12/06/08 00:03	W846 1311/6010	8120922
Cadmium	ND		mg/L	0.0100	1	12/06/08 00:03	W846 1311/6010	8120922
Chromium	ND		mg/L	0.0500	1	12/06/08 00:03	W846 1311/6010	8120922
Lead	ND		mg/L	0.0500	1	12/06/08 00:03	W846 1311/6010	8120922
Selenium	ND		mg/L	0.100	1	12/06/08 00:03	W846 1311/6010	8120922
Silver	ND		mg/L	0.0500	1	12/06/08 00:03	W846 1311/6010	8120922
Mercury	ND		mg/L	0.0100	1	12/05/08 17:20	W846 1311/7470.	8120910
Semivolatile Organic Compounds by EPA Method 8270C								
Acenaphthene	ND		ug/L	10.0	1	12/04/08 21:21	SW846 8270C	8120709
Acenaphthylene	ND		ug/L	10.0	1	12/04/08 21:21	SW846 8270C	8120709
Anthracene	ND		ug/L	10.0	1	12/04/08 21:21	SW846 8270C	8120709
Benzo (a) anthracene	ND		ug/L	10.0	1	12/04/08 21:21	SW846 8270C	8120709
Benzo (a) pyrene	ND		ug/L	10.0	1	12/04/08 21:21	SW846 8270C	8120709
Benzo (b) fluoranthene	ND		ug/L	10.0	1	12/04/08 21:21	SW846 8270C	8120709
Benzo (g,h,i) perylene	ND		ug/L	10.0	1	12/04/08 21:21	SW846 8270C	8120709
Benzo (k) fluoranthene	ND		ug/L	10.0	1	12/04/08 21:21	SW846 8270C	8120709
2-Chlorophenol	ND		ug/L	10.0	1	12/04/08 21:21	SW846 8270C	8120709
Chrysene	ND		ug/L	10.0	1	12/04/08 21:21	SW846 8270C	8120709
Dibenz (a,h) anthracene	ND		ug/L	10.0	1	12/04/08 21:21	SW846 8270C	8120709
1,4-Dichlorobenzene	ND		ug/L	10.0	1	12/04/08 21:21	SW846 8270C	8120709
2,4-Dimethylphenol	ND		ug/L	10.0	1	12/04/08 21:21	SW846 8270C	8120709
2,4-Dinitrotoluene	ND		ug/L	10.0	1	12/04/08 21:21	SW846 8270C	8120709
Fluoranthene	ND		ug/L	10.0	1	12/04/08 21:21	SW846 8270C	8120709
Fluorene	ND		ug/L	10.0	1	12/04/08 21:21	SW846 8270C	8120709
Hexachlorobenzene	ND		ug/L	10.0	1	12/04/08 21:21	SW846 8270C	8120709
Hexachlorobutadiene	ND		ug/L	10.0	1	12/04/08 21:21	SW846 8270C	8120709
Hexachloroethane	ND		ug/L	10.0	1	12/04/08 21:21	SW846 8270C	8120709
Indeno (1,2,3-cd) pyrene	ND		ug/L	10.0	1	12/04/08 21:21	SW846 8270C	8120709
2-Methylnaphthalene	ND		ug/L	10.0	1	12/04/08 21:21	SW846 8270C	8120709
2-Methylphenol	ND		ug/L	10.0	1	12/04/08 21:21	SW846 8270C	8120709

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2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

ANALYTICAL REPORT

Analyte	Result	Flag	Units	MRL	Dilution Factor	Analysis Date/Time	Method	Batch
Sample ID: NRL0332-06 (CNC-Decon-Comp - Water) - cont. Sampled: 12/02/08 12:00								
Semivolatile Organic Compounds by EPA Method 8270C - cont.								
3/4-Methylphenol	ND		ug/L	10.0	1	12/04/08 21:21	SW846 8270C	8120709
Naphthalene	ND		ug/L	10.0	1	12/04/08 21:21	SW846 8270C	8120709
Nitrobenzene	ND		ug/L	10.0	1	12/04/08 21:21	SW846 8270C	8120709
Pentachlorophenol	ND		ug/L	25.0	1	12/04/08 21:21	SW846 8270C	8120709
Phenanthrene	ND		ug/L	10.0	1	12/04/08 21:21	SW846 8270C	8120709
Pyrene	ND		ug/L	10.0	1	12/04/08 21:21	SW846 8270C	8120709
Pyridine	ND		ug/L	10.0	1	12/04/08 21:21	SW846 8270C	8120709
1-Methylnaphthalene	ND		ug/L	10.0	1	12/04/08 21:21	SW846 8270C	8120709
2,4,6-Trichlorophenol	ND		ug/L	10.0	1	12/04/08 21:21	SW846 8270C	8120709
2,4,5-Trichlorophenol	ND		ug/L	25.0	1	12/04/08 21:21	SW846 8270C	8120709
Surr: Terphenyl-d14 (21-123%)	*40 %*					*12/04/08 21:21*	*SW846 8270C*	*8120709*
Surr: 2,4,6-Tribromophenol (23-129%)	*77 %*					*12/04/08 21:21*	*SW846 8270C*	*8120709*
Surr: Phenol-d5 (10-100%)	*27 %*					*12/04/08 21:21*	*SW846 8270C*	*8120709*
Surr: 2-Fluorobiphenyl (34-108%)	*62 %*					*12/04/08 21:21*	*SW846 8270C*	*8120709*
Surr: 2-Fluorophenol (10-100%)	*36 %*					*12/04/08 21:21*	*SW846 8270C*	*8120709*
Surr: Nitrobenzene-d5 (29-116%)	*72 %*					*12/04/08 21:21*	*SW846 8270C*	*8120709*
TCLP Semivolatile Organic Compounds by EPA Method 1311/8270C								
Cresol(s)	ND		mg/L	0.0200	2	12/12/08 00:56	W846 1311/8270	8121008
1,4-Dichlorobenzene	ND		mg/L	0.0200	2	12/12/08 00:56	W846 1311/8270	8121008
2,4-Dinitrotoluene	ND		mg/L	0.0200	2	12/12/08 00:56	W846 1311/8270	8121008
Hexachlorobenzene	ND		mg/L	0.0200	2	12/12/08 00:56	W846 1311/8270	8121008
Hexachlorobutadiene	ND		mg/L	0.0200	2	12/12/08 00:56	W846 1311/8270	8121008
Hexachloroethane	ND		mg/L	0.0200	2	12/12/08 00:56	W846 1311/8270	8121008
Nitrobenzene	ND		mg/L	0.0200	2	12/12/08 00:56	W846 1311/8270	8121008
Pentachlorophenol	ND		mg/L	0.0200	2	12/12/08 00:56	W846 1311/8270	8121008
Pyridine	ND		mg/L	0.0200	2	12/12/08 00:56	W846 1311/8270	8121008
2,4,6-Trichlorophenol	ND		mg/L	0.0200	2	12/12/08 00:56	W846 1311/8270	8121008
2,4,5-Trichlorophenol	ND		mg/L	0.0200	2	12/12/08 00:56	W846 1311/8270	8121008
Surr: Terphenyl-d14 (21-123%)	*59 %*					*12/12/08 00:56*	*W846 1311/8270*	*8121008*
Surr: 2,4,6-Tribromophenol (23-129%)	*82 %*					*12/12/08 00:56*	*W846 1311/8270*	*8121008*
Surr: Phenol-d5 (10-100%)	*44 %*					*12/12/08 00:56*	*W846 1311/8270*	*8121008*
Surr: 2-Fluorobiphenyl (34-108%)	*65 %*					*12/12/08 00:56*	*W846 1311/8270*	*8121008*
Surr: 2-Fluorophenol (34-108%)	*54 %*					*12/12/08 00:56*	*W846 1311/8270*	*8121008*
Surr: Nitrobenzene-d5 (29-116%)	*64 %*					*12/12/08 00:56*	*W846 1311/8270*	*8121008*

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2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

ANALYTICAL REPORT

Sample ID: NRL0332-07 (Trip Blank - Water) Sampled: 12/02/08 00:01

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Flag	Units	MRL	Dilution Factor	Analysis Date/Time	Method	Batch
Benzene	ND		ug/L	1.00	1	12/05/08 19:48	SW846 8260B	8120667
2-Butanone	ND		ug/L	50.0	1	12/05/08 19:48	SW846 8260B	8120667
Carbon Tetrachloride	ND		ug/L	1.00	1	12/05/08 19:48	SW846 8260B	8120667
Chlorobenzene	ND		ug/L	1.00	1	12/05/08 19:48	SW846 8260B	8120667
Chloroform	ND		ug/L	1.00	1	12/05/08 19:48	SW846 8260B	8120667
1,2-Dichloroethane	ND		ug/L	1.00	1	12/05/08 19:48	SW846 8260B	8120667
cis-1,2-Dichloroethene	ND		ug/L	1.00	1	12/05/08 19:48	SW846 8260B	8120667
1,1-Dichloroethene	ND		ug/L	1.00	1	12/05/08 19:48	SW846 8260B	8120667
Methylene Chloride	ND		ug/L	5.00	1	12/05/08 19:48	SW846 8260B	8120667
Naphthalene	ND		ug/L	5.00	1	12/05/08 19:48	SW846 8260B	8120667
Tetrachloroethene	ND		ug/L	1.00	1	12/05/08 19:48	SW846 8260B	8120667
Trichloroethene	ND		ug/L	1.00	1	12/05/08 19:48	SW846 8260B	8120667
Vinyl chloride	ND		ug/L	1.00	1	12/05/08 19:48	SW846 8260B	8120667
1,2-Dichloroethene (total)	ND		ug/L	1.00	1	12/05/08 19:48	SW846 8260B	8120667
Surr: 1,2-Dichloroethane-d4 (60-140%)	*93 %*					*12/05/08 19:48*	*SW846 8260B*	*8120667*
Surr: Dibromofluoromethane (75-124%)	*95 %*					*12/05/08 19:48*	*SW846 8260B*	*8120667*
Surr: Toluene-d8 (78-121%)	*104 %*					*12/05/08 19:48*	*SW846 8260B*	*8120667*
Surr: 4-Bromofluorobenzene (79-124%)	*111 %*					*12/05/08 19:48*	*SW846 8260B*	*8120667*

Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

SAMPLE EXTRACTION DATA

Parameter	Batch	Lab Number	Wt/Vol Extracted	Extracted Vol	Date	Analyst	Extraction Method
Mercury by EPA Methods 7470A/7471A							
SW846 7470A	8120683	NRL0332-06	30.00	30.00	12/04/08 09:35	JMR	EPA 7470
SW846 7471A	8120735	NRL0332-05	0.61	100.00	12/04/08 12:00	JMR	EPA 7471
Semivolatile Organic Compounds by EPA Method 8270C							
SW846 8270C	8120320	NRL0332-05	15.42	1.00	12/04/08 12:10	DMG	EPA 3550B
SW846 8270C	8120709	NRL0332-06	1000.00	1.00	12/04/08 11:55	DXP	EPA 3510C
TCLP Extraction by EPA 1311							
SW846 1311	8120674	NRL0332-01	100.00	2000.00	12/04/08 15:35	AML	EPA 1311
SW846 1311	8120674	NRL0332-02	100.00	2000.00	12/04/08 15:35	AML	EPA 1311
SW846 1311	8120674	NRL0332-03	100.00	2000.00	12/04/08 15:35	AML	EPA 1311
SW846 1311	8120674	NRL0332-04	1.00	1.00	12/04/08 15:35	AML	EPA 1311
SW846 1311	8120674	NRL0332-05	100.00	2000.00	12/04/08 15:35	AML	EPA 1311
SW846 1311	8120674	NRL0332-06	1.00	1.00	12/04/08 15:35	AML	EPA 1311
TCLP Metals by 6000/7000 Series Methods							
SW846 1311/6010B	8120922	NRL0332-05	5.00	50.00	12/05/08 14:20	JLS	EPA 3015
SW846 1311/6010B	8120922	NRL0332-05	5.00	50.00	12/05/08 14:20	JLS	EPA 3015
SW846 1311/6010B	8120922	NRL0332-05	5.00	50.00	12/05/08 14:20	JLS	EPA 3015
SW846 1311/6010B	8120922	NRL0332-05	5.00	50.00	12/05/08 14:20	JLS	EPA 3015
SW846 1311/6010B	8120922	NRL0332-05	5.00	50.00	12/05/08 14:20	JLS	EPA 3015
SW846 1311/6010B	8120922	NRL0332-05	5.00	50.00	12/05/08 14:20	JLS	EPA 3015
SW846 1311/6010B	8120922	NRL0332-05	5.00	50.00	12/05/08 14:20	JLS	EPA 3015
SW846 1311/6010B	8120674	NRL0332-05	100.00	2000.00	12/04/08 15:35	AML	EPA 1311
SW846 1311/6010B	8120922	NRL0332-06	5.00	50.00	12/05/08 14:20	JLS	EPA 3015
SW846 1311/6010B	8120922	NRL0332-06	5.00	50.00	12/05/08 14:20	JLS	EPA 3015
SW846 1311/6010B	8120922	NRL0332-06	5.00	50.00	12/05/08 14:20	JLS	EPA 3015
SW846 1311/6010B	8120922	NRL0332-06	5.00	50.00	12/05/08 14:20	JLS	EPA 3015
SW846 1311/6010B	8120922	NRL0332-06	5.00	50.00	12/05/08 14:20	JLS	EPA 3015
SW846 1311/6010B	8120922	NRL0332-06	5.00	50.00	12/05/08 14:20	JLS	EPA 3015
SW846 1311/6010B	8120922	NRL0332-06	5.00	50.00	12/05/08 14:20	JLS	EPA 3015
SW846 1311/6010B	8120674	NRL0332-06	1.00	1.00	12/04/08 15:35	AML	EPA 1311
SW846 1311/7470A	8120910	NRL0332-05	3.00	30.00	12/05/08 09:36	JMR	EPA 7470
SW846 1311/7470A	8120910	NRL0332-06	3.00	30.00	12/05/08 09:36	JMR	EPA 7470
TCLP Semivolatile Organic Compounds by EPA Method 1311/8270C							
SW846 1311/8270C	8120674	NRL0332-05	100.00	2000.00	12/04/08 15:35	AML	EPA 1311
SW846 1311/8270C	8121008	NRL0332-05	500.00	1.00	12/11/08 12:45	DXP	EPA 3510C Leachate
SW846 1311/8270C	8121008	NRL0332-06	500.00	1.00	12/11/08 12:45	DXP	EPA 3510C Leachate
SW846 1311/8270C	8120674	NRL0332-06	1.00	1.00	12/04/08 15:35	AML	EPA 1311
Total Metals by EPA Method 6010B							
SW846 6010B	8121573	NRL0332-05	0.50	100.00	12/10/08 19:30	JLS	EPA 3051 / 6010
SW846 6010B	8121573	NRL0332-05	0.50	100.00	12/10/08 19:30	JLS	EPA 3051 / 6010
SW846 6010B	8121573	NRL0332-05	0.50	100.00	12/10/08 19:30	JLS	EPA 3051 / 6010
SW846 6010B	8121573	NRL0332-05	0.50	100.00	12/10/08 19:30	JLS	EPA 3051 / 6010
SW846 6010B	8121573	NRL0332-05	0.50	100.00	12/10/08 19:30	JLS	EPA 3051 / 6010
SW846 6010B	8121573	NRL0332-05	0.50	100.00	12/10/08 19:30	JLS	EPA 3051 / 6010
SW846 6010B	8121573	NRL0332-05	0.50	100.00	12/10/08 19:30	JLS	EPA 3051 / 6010

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Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

SAMPLE EXTRACTION DATA

Parameter	Batch	Lab Number	Wt/Vol Extracted	Extracted Vol	Date	Analyst	Extraction Method
SW846 6010B	8121573	NRL0332-05	0.50	100.00	12/10/08 19:30	JLS	EPA 3051 / 6010
SW846 6010B	8120688	NRL0332-06	50.00	50.00	12/04/08 11:53	LTB	EPA 3010A / 6010
SW846 6010B	8120688	NRL0332-06	50.00	50.00	12/04/08 11:53	LTB	EPA 3010A / 6010
SW846 6010B	8120688	NRL0332-06	50.00	50.00	12/04/08 11:53	LTB	EPA 3010A / 6010
SW846 6010B	8120688	NRL0332-06	50.00	50.00	12/04/08 11:53	LTB	EPA 3010A / 6010
SW846 6010B	8120688	NRL0332-06	50.00	50.00	12/04/08 11:53	LTB	EPA 3010A / 6010
SW846 6010B	8120688	NRL0332-06	50.00	50.00	12/04/08 11:53	LTB	EPA 3010A / 6010
SW846 6010B	8120688	NRL0332-06	50.00	50.00	12/04/08 11:53	LTB	EPA 3010A / 6010
SW846 6010B	8120688	NRL0332-06	50.00	50.00	12/04/08 11:53	LTB	EPA 3010A / 6010
Volatile Organic Compounds by EPA Method 8260B							
SW846 8260B	8121404	NRL0332-01	5.40	5.00	12/02/08 09:55	JRL	EPA 5035
SW846 8260B	8120937	NRL0332-01RE1	5.44	5.00	12/02/08 09:55	JRL	EPA 5035
SW846 8260B	8121404	NRL0332-02	3.87	5.00	12/02/08 10:50	JRL	EPA 5035
SW846 8260B	8120937	NRL0332-02RE1	4.07	5.00	12/02/08 10:50	JRL	EPA 5035
SW846 8260B	8121404	NRL0332-03	3.24	5.00	12/02/08 11:40	JRL	EPA 5035
SW846 8260B	8120937	NRL0332-03RE1	4.62	5.00	12/02/08 11:40	JRL	EPA 5035

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Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
Blank

Analyte	Blank Value	Q	Units	Q.C. Batch	Lab Number	Analyzed Date/Time
Total Metals by EPA Method 6010B						
8120688-BLK1						
Antimony	<0.00380		mg/L	8120688	8120688-BLK1	12/04/08 21:04
Arsenic	<0.00450		mg/L	8120688	8120688-BLK1	12/04/08 21:04
Barium	<0.00150		mg/L	8120688	8120688-BLK1	12/04/08 21:04
Cadmium	<0.000500		mg/L	8120688	8120688-BLK1	12/04/08 21:04
Chromium	<0.00150		mg/L	8120688	8120688-BLK1	12/04/08 21:04
Lead	<0.00280		mg/L	8120688	8120688-BLK1	12/04/08 21:04
Selenium	<0.00430		mg/L	8120688	8120688-BLK1	12/04/08 21:04
Silver	<0.00160		mg/L	8120688	8120688-BLK1	12/04/08 21:04
8121573-BLK1						
Antimony	<1.41		mg/kg wet	8121573	8121573-BLK1	12/11/08 11:28
Arsenic	<0.904		mg/kg wet	8121573	8121573-BLK1	12/11/08 11:28
Barium	<0.502		mg/kg wet	8121573	8121573-BLK1	12/11/08 11:28
Cadmium	0.120		mg/kg wet	8121573	8121573-BLK1	12/11/08 11:28
Chromium	0.361		mg/kg wet	8121573	8121573-BLK1	12/11/08 11:28
Lead	<0.703		mg/kg wet	8121573	8121573-BLK1	12/11/08 11:28
Selenium	<0.863		mg/kg wet	8121573	8121573-BLK1	12/11/08 11:28
Silver	<0.301		mg/kg wet	8121573	8121573-BLK1	12/11/08 11:28
Mercury by EPA Methods 7470A/7471A						
8120683-BLK1						
Mercury	<0.000150		mg/L	8120683	8120683-BLK1	12/04/08 18:21
8120735-BLK1						
Mercury	<0.0240		mg/kg wet	8120735	8120735-BLK1	12/04/08 15:03
TCLP Metals by 6000/7000 Series Methods						
8120910-BLK1						
Mercury	<0.00150		mg/L	8120910	8120910-BLK1	12/05/08 15:47
8120922-BLK1						
Arsenic	<0.0500		mg/L	8120922	8120922-BLK1	12/05/08 23:05
Barium	<0.0150		mg/L	8120922	8120922-BLK1	12/05/08 23:05
Cadmium	<0.00500		mg/L	8120922	8120922-BLK1	12/05/08 23:05
Chromium	<0.0150		mg/L	8120922	8120922-BLK1	12/05/08 23:05
Lead	<0.0280		mg/L	8120922	8120922-BLK1	12/05/08 23:05
Selenium	<0.0430		mg/L	8120922	8120922-BLK1	12/05/08 23:05
Silver	<0.0160		mg/L	8120922	8120922-BLK1	12/05/08 23:05
Volatile Organic Compounds by EPA Method 8260B						
8120667-BLK1						
Acetone	<25.0		ug/L	8120667	8120667-BLK1	12/05/08 19:21

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2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
Blank - Cont.

Analyte	Blank Value	Q	Units	Q.C. Batch	Lab Number	Analyzed Date/Time
Volatile Organic Compounds by EPA Method 8260B						
8120667-BLK1						
Benzene	<0.270		ug/L	8120667	8120667-BLK1	12/05/08 19:21
Bromobenzene	<0.360		ug/L	8120667	8120667-BLK1	12/05/08 19:21
Bromochloromethane	<0.400		ug/L	8120667	8120667-BLK1	12/05/08 19:21
Bromodichloromethane	<0.350		ug/L	8120667	8120667-BLK1	12/05/08 19:21
Bromoform	<0.430		ug/L	8120667	8120667-BLK1	12/05/08 19:21
Bromomethane	<0.420		ug/L	8120667	8120667-BLK1	12/05/08 19:21
2-Butanone	<2.40		ug/L	8120667	8120667-BLK1	12/05/08 19:21
sec-Butylbenzene	<0.140		ug/L	8120667	8120667-BLK1	12/05/08 19:21
n-Butylbenzene	<0.280		ug/L	8120667	8120667-BLK1	12/05/08 19:21
tert-Butylbenzene	<0.330		ug/L	8120667	8120667-BLK1	12/05/08 19:21
Carbon disulfide	<0.380		ug/L	8120667	8120667-BLK1	12/05/08 19:21
Carbon Tetrachloride	<0.350		ug/L	8120667	8120667-BLK1	12/05/08 19:21
Chlorobenzene	<0.180		ug/L	8120667	8120667-BLK1	12/05/08 19:21
Chlorodibromomethane	<0.280		ug/L	8120667	8120667-BLK1	12/05/08 19:21
Chloroethane	<0.450		ug/L	8120667	8120667-BLK1	12/05/08 19:21
Chloroform	<0.280		ug/L	8120667	8120667-BLK1	12/05/08 19:21
Chloromethane	<0.380		ug/L	8120667	8120667-BLK1	12/05/08 19:21
2-Chlorotoluene	<0.300		ug/L	8120667	8120667-BLK1	12/05/08 19:21
4-Chlorotoluene	<0.330		ug/L	8120667	8120667-BLK1	12/05/08 19:21
1,2-Dibromo-3-chloropropane	<0.860		ug/L	8120667	8120667-BLK1	12/05/08 19:21
1,2-Dibromoethane (EDB)	<0.390		ug/L	8120667	8120667-BLK1	12/05/08 19:21
Dibromomethane	<0.350		ug/L	8120667	8120667-BLK1	12/05/08 19:21
1,4-Dichlorobenzene	<0.380		ug/L	8120667	8120667-BLK1	12/05/08 19:21
1,3-Dichlorobenzene	<0.350		ug/L	8120667	8120667-BLK1	12/05/08 19:21
1,2-Dichlorobenzene	<0.500		ug/L	8120667	8120667-BLK1	12/05/08 19:21
Dichlorodifluoromethane	<0.460		ug/L	8120667	8120667-BLK1	12/05/08 19:21
1,1-Dichloroethane	<0.540		ug/L	8120667	8120667-BLK1	12/05/08 19:21
1,2-Dichloroethane	<0.370		ug/L	8120667	8120667-BLK1	12/05/08 19:21
cis-1,2-Dichloroethene	<0.390		ug/L	8120667	8120667-BLK1	12/05/08 19:21
1,1-Dichloroethene	<0.340		ug/L	8120667	8120667-BLK1	12/05/08 19:21
trans-1,2-Dichloroethene	<0.470		ug/L	8120667	8120667-BLK1	12/05/08 19:21
1,3-Dichloropropane	<0.290		ug/L	8120667	8120667-BLK1	12/05/08 19:21
1,2-Dichloropropane	<0.320		ug/L	8120667	8120667-BLK1	12/05/08 19:21
2,2-Dichloropropane	<0.420		ug/L	8120667	8120667-BLK1	12/05/08 19:21
cis-1,3-Dichloropropene	<0.290		ug/L	8120667	8120667-BLK1	12/05/08 19:21
trans-1,3-Dichloropropene	<0.330		ug/L	8120667	8120667-BLK1	12/05/08 19:21
1,1-Dichloropropene	<0.310		ug/L	8120667	8120667-BLK1	12/05/08 19:21
Ethylbenzene	<0.240		ug/L	8120667	8120667-BLK1	12/05/08 19:21
Hexachlorobutadiene	3.44		ug/L	8120667	8120667-BLK1	12/05/08 19:21
2-Hexanone	<16.7		ug/L	8120667	8120667-BLK1	12/05/08 19:21
Isopropylbenzene	<0.300		ug/L	8120667	8120667-BLK1	12/05/08 19:21

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Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
Blank - Cont.

Analyte	Blank Value	Q	Units	Q.C. Batch	Lab Number	Analyzed Date/Time
Volatile Organic Compounds by EPA Method 8260B						
8120667-BLK1						
p-Isopropyltoluene	<0.220		ug/L	8120667	8120667-BLK1	12/05/08 19:21
Methyl tert-Butyl Ether	<0.420		ug/L	8120667	8120667-BLK1	12/05/08 19:21
Methylene Chloride	<0.830		ug/L	8120667	8120667-BLK1	12/05/08 19:21
4-Methyl-2-pentanone	<3.49		ug/L	8120667	8120667-BLK1	12/05/08 19:21
Naphthalene	<0.540		ug/L	8120667	8120667-BLK1	12/05/08 19:21
n-Propylbenzene	<0.290		ug/L	8120667	8120667-BLK1	12/05/08 19:21
Styrene	<0.330		ug/L	8120667	8120667-BLK1	12/05/08 19:21
1,1,1,2-Tetrachloroethane	<0.290		ug/L	8120667	8120667-BLK1	12/05/08 19:21
1,1,2,2-Tetrachloroethane	<0.290		ug/L	8120667	8120667-BLK1	12/05/08 19:21
Tetrachloroethene	<0.230		ug/L	8120667	8120667-BLK1	12/05/08 19:21
Toluene	<0.280		ug/L	8120667	8120667-BLK1	12/05/08 19:21
1,2,3-Trichlorobenzene	<0.940		ug/L	8120667	8120667-BLK1	12/05/08 19:21
1,2,4-Trichlorobenzene	<0.500		ug/L	8120667	8120667-BLK1	12/05/08 19:21
1,1,2-Trichloroethane	<0.400		ug/L	8120667	8120667-BLK1	12/05/08 19:21
1,1,1-Trichloroethane	<0.370		ug/L	8120667	8120667-BLK1	12/05/08 19:21
Trichloroethene	<0.230		ug/L	8120667	8120667-BLK1	12/05/08 19:21
Trichlorofluoromethane	<0.350		ug/L	8120667	8120667-BLK1	12/05/08 19:21
1,2,3-Trichloropropane	<0.290		ug/L	8120667	8120667-BLK1	12/05/08 19:21
1,3,5-Trimethylbenzene	<0.160		ug/L	8120667	8120667-BLK1	12/05/08 19:21
1,2,4-Trimethylbenzene	<0.170		ug/L	8120667	8120667-BLK1	12/05/08 19:21
Vinyl chloride	<0.290		ug/L	8120667	8120667-BLK1	12/05/08 19:21
Xylenes, total	<0.860		ug/L	8120667	8120667-BLK1	12/05/08 19:21
Surrogate: 1,2-Dichloroethane-d4	100%			8120667	8120667-BLK1	12/05/08 19:21
Surrogate: Dibromofluoromethane	100%			8120667	8120667-BLK1	12/05/08 19:21
Surrogate: Toluene-d8	106%			8120667	8120667-BLK1	12/05/08 19:21
Surrogate: 4-Bromofluorobenzene	109%			8120667	8120667-BLK1	12/05/08 19:21
8120937-BLK1						
Acetone	<0.0250		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
Benzene	<0.000670		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
Bromobenzene	<0.000670		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
Bromochloromethane	<0.000670		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
Bromodichloromethane	<0.000670		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
Bromoform	<0.000530		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
Bromomethane	<0.00157		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
2-Butanone	<0.00500		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
sec-Butylbenzene	<0.000670		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
n-Butylbenzene	<0.000670		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
tert-Butylbenzene	<0.000670		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
Carbon disulfide	<0.000670		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
Carbon Tetrachloride	<0.000670		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53

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Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
Blank - Cont.

Volatile Organic Compounds by EPA Method 8260B

8120937-BLK1

Analyte	Blank Value	Q	Units	Q.C. Batch	Lab Number	Analyzed Date/Time
Chlorobenzene	<0.000670		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
Chlorodibromomethane	<0.000670		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
Chloroethane	<0.000670		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
Chloroform	<0.000670		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
Chloromethane	<0.000880		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
2-Chlorotoluene	<0.000670		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
4-Chlorotoluene	<0.000670		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
1,2-Dibromo-3-chloropropane	<0.00100		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
1,2-Dibromoethane (EDB)	<0.000670		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
Dibromomethane	<0.000540		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
1,4-Dichlorobenzene	<0.000640		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
1,3-Dichlorobenzene	<0.000530		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
1,2-Dichlorobenzene	<0.000670		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
Dichlorodifluoromethane	<0.000930		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
1,1-Dichloroethane	<0.000670		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
1,2-Dichloroethane	<0.000800		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
cis-1,2-Dichloroethene	<0.000670		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
1,1-Dichloroethene	<0.000670		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
trans-1,2-Dichloroethene	<0.000670		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
1,3-Dichloropropane	<0.000670		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
1,2-Dichloropropane	<0.000670		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
2,2-Dichloropropane	<0.000420		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
cis-1,3-Dichloropropene	<0.000670		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
trans-1,3-Dichloropropene	<0.000670		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
1,1-Dichloropropene	<0.000670		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
Ethylbenzene	<0.000670		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
Hexachlorobutadiene	<0.000630		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
2-Hexanone	<0.00407		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
Isopropylbenzene	<0.000670		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
p-Isopropyltoluene	<0.000670		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
Methyl tert-Butyl Ether	<0.000670		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
Methylene Chloride	0.00373		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
4-Methyl-2-pentanone	<0.00426		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
Naphthalene	<0.00151		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
n-Propylbenzene	<0.000530		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
Styrene	<0.000670		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
1,1,1,2-Tetrachloroethane	<0.000500		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
1,1,2,2-Tetrachloroethane	<0.000670		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
Tetrachloroethene	<0.000670		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
Toluene	<0.000670		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
1,2,3-Trichlorobenzene	<0.000660		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53

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Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
Blank - Cont.

Analyte	Blank Value	Q	Units	Q.C. Batch	Lab Number	Analyzed Date/Time
Volatile Organic Compounds by EPA Method 8260B						
8120937-BLK1						
1,2,4-Trichlorobenzene	<0.000650		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
1,1,2-Trichloroethane	<0.00102		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
1,1,1-Trichloroethane	<0.000670		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
Trichloroethene	<0.000280		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
Trichlorofluoromethane	<0.000670		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
1,2,3-Trichloropropane	<0.000550		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
1,3,5-Trimethylbenzene	<0.000670		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
1,2,4-Trimethylbenzene	<0.00127		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
Vinyl chloride	<0.000710		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
Xylenes, total	<0.00172		mg/kg wet	8120937	8120937-BLK1	12/10/08 14:53
Surrogate: 1,2-Dichloroethane-d4	92%			8120937	8120937-BLK1	12/10/08 14:53
Surrogate: Dibromofluoromethane	108%			8120937	8120937-BLK1	12/10/08 14:53
Surrogate: Toluene-d8	101%			8120937	8120937-BLK1	12/10/08 14:53
Surrogate: 4-Bromofluorobenzene	100%			8120937	8120937-BLK1	12/10/08 14:53
8121404-BLK1						
Acetone	<0.0250		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
Benzene	<0.000670		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
Bromobenzene	<0.000670		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
Bromochloromethane	<0.000670		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
Bromodichloromethane	<0.000670		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
Bromoform	<0.000530		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
Bromomethane	<0.00157		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
2-Butanone	0.00677		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
sec-Butylbenzene	<0.000670		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
n-Butylbenzene	<0.000670		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
tert-Butylbenzene	<0.000670		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
Carbon disulfide	<0.000670		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
Carbon Tetrachloride	<0.000670		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
Chlorobenzene	<0.000670		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
Chlorodibromomethane	<0.000670		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
Chloroethane	<0.000670		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
Chloroform	<0.000670		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
Chloromethane	<0.000880		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
2-Chlorotoluene	<0.000670		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
4-Chlorotoluene	<0.000670		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
1,2-Dibromo-3-chloropropane	<0.00100		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
1,2-Dibromoethane (EDB)	<0.000670		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
Dibromomethane	<0.000540		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
1,4-Dichlorobenzene	<0.000640		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
1,3-Dichlorobenzene	<0.000530		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
Blank - Cont.

Analyte	Blank Value	Q	Units	Q.C. Batch	Lab Number	Analyzed Date/Time
Volatile Organic Compounds by EPA Method 8260B						
8121404-BLK1						
1,2-Dichlorobenzene	<0.000670		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
Dichlorodifluoromethane	<0.000930		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
1,1-Dichloroethane	<0.000670		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
1,2-Dichloroethane	<0.000800		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
cis-1,2-Dichloroethene	<0.000670		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
1,1-Dichloroethene	<0.000670		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
trans-1,2-Dichloroethene	<0.000670		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
1,3-Dichloropropane	<0.000670		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
1,2-Dichloropropane	<0.000670		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
2,2-Dichloropropane	<0.000420		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
cis-1,3-Dichloropropene	<0.000670		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
trans-1,3-Dichloropropene	<0.000670		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
1,1-Dichloropropene	<0.000670		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
Ethylbenzene	<0.000670		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
Hexachlorobutadiene	<0.000630		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
2-Hexanone	<0.00407		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
Isopropylbenzene	<0.000670		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
p-Isopropyltoluene	<0.000670		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
Methyl tert-Butyl Ether	<0.000670		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
Methylene Chloride	<0.00348		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
4-Methyl-2-pentanone	<0.00426		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
Naphthalene	<0.00151		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
n-Propylbenzene	<0.000530		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
Styrene	<0.000670		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
1,1,1,2-Tetrachloroethane	<0.000500		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
1,1,2,2-Tetrachloroethane	<0.000670		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
Tetrachloroethene	<0.000670		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
Toluene	<0.000670		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
1,2,3-Trichlorobenzene	<0.000660		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
1,2,4-Trichlorobenzene	<0.000650		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
1,1,2-Trichloroethane	<0.00102		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
1,1,1-Trichloroethane	<0.000670		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
Trichloroethene	<0.000280		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
Trichlorofluoromethane	<0.000670		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
1,2,3-Trichloropropane	<0.000550		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
1,3,5-Trimethylbenzene	<0.000670		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
1,2,4-Trimethylbenzene	<0.00127		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
Vinyl chloride	<0.000710		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
Xylenes, total	<0.00172		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
1,1,2-Trifluorotrichloroethane	<0.000610		mg/kg wet	8121404	8121404-BLK1	12/10/08 01:26
Surrogate: 1,2-Dichloroethane-d4	89%			8121404	8121404-BLK1	12/10/08 01:26

Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
Blank - Cont.

Analyte	Blank Value	Q	Units	Q.C. Batch	Lab Number	Analyzed Date/Time
Volatile Organic Compounds by EPA Method 8260B						
8121404-BLK1						
Surrogate: Dibromofluoromethane	95%			8121404	8121404-BLK1	12/10/08 01:26
Surrogate: Toluene-d8	105%			8121404	8121404-BLK1	12/10/08 01:26
Surrogate: 4-Bromofluorobenzene	105%			8121404	8121404-BLK1	12/10/08 01:26
Semivolatile Organic Compounds by EPA Method 8270C						
8120320-BLK1						
Acenaphthene	<0.0310		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
Acenaphthylene	<0.0320		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
Anthracene	<0.0330		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
Benzo (a) anthracene	<0.0380		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
Benzo (a) pyrene	<0.0290		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
Benzo (b) fluoranthene	<0.0320		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
Benzo (g,h,i) perylene	<0.0290		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
Benzo (k) fluoranthene	<0.0290		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
4-Bromophenyl phenyl ether	<0.111		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
Butyl benzyl phthalate	<0.0890		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
Carbazole	<0.165		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
4-Chloro-3-methylphenol	<0.100		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
4-Chloroaniline	<0.289		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
Bis(2-chloroethoxy)methane	<0.111		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
Bis(2-chloroethyl)ether	<0.135		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
Bis(2-chloroisopropyl)ether	<0.102		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
2-Chloronaphthalene	<0.0680		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
2-Chlorophenol	<0.109		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
4-Chlorophenyl phenyl ether	<0.111		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
Chrysene	<0.0390		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
Dibenz (a,h) anthracene	<0.0310		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
Dibenzofuran	<0.0890		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
Di-n-butyl phthalate	<0.0860		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
1,4-Dichlorobenzene	<0.115		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
1,2-Dichlorobenzene	<0.0880		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
1,3-Dichlorobenzene	<0.0800		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
3,3-Dichlorobenzidine	<0.270		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
2,4-Dichlorophenol	<0.0870		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
Diethyl phthalate	<0.0500		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
2,4-Dimethylphenol	<0.281		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
Dimethyl phthalate	<0.0880		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
4,6-Dinitro-2-methylphenol	<0.0910		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
2,4-Dinitrophenol	<0.135		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
2,6-Dinitrotoluene	<0.111		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
2,4-Dinitrotoluene	<0.0880		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
Blank - Cont.

Analyte	Blank Value	Q	Units	Q.C. Batch	Lab Number	Analyzed Date/Time
Semivolatile Organic Compounds by EPA Method 8270C						
8120320-BLK1						
Di-n-octyl phthalate	<0.132		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
Bis(2-ethylhexyl)phthalate	<0.111		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
Fluoranthene	<0.0340		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
Fluorene	<0.0390		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
Hexachlorobenzene	<0.0830		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
Hexachlorobutadiene	<0.108		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
Hexachlorocyclopentadiene	<0.111		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
Hexachloroethane	<0.105		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
Indeno (1,2,3-cd) pyrene	<0.0310		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
Isophorone	<0.100		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
2-Methylnaphthalene	<0.0330		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
2-Methylphenol	<0.0990		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
3/4-Methylphenol	<0.145		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
Naphthalene	<0.0410		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
3-Nitroaniline	<0.110		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
2-Nitroaniline	<0.111		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
4-Nitroaniline	<0.275		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
Nitrobenzene	<0.106		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
4-Nitrophenol	<0.276		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
2-Nitrophenol	<0.197		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
N-Nitrosodiphenylamine	<0.109		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
N-Nitrosodi-n-propylamine	<0.122		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
Pentachlorophenol	<0.0740		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
Phenanthrene	<0.0340		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
Phenol	<0.0690		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
Pyrene	<0.0410		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
Pyridine	<0.0940		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
1,2,4-Trichlorobenzene	<0.111		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
1-Methylnaphthalene	<0.0320		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
2,4,6-Trichlorophenol	<0.0870		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
2,4,5-Trichlorophenol	<0.0680		mg/kg wet	8120320	8120320-BLK1	12/05/08 13:37
Surrogate: Terphenyl-d14	75%			8120320	8120320-BLK1	12/05/08 13:37
Surrogate: 2,4,6-Tribromophenol	85%			8120320	8120320-BLK1	12/05/08 13:37
Surrogate: Phenol-d5	83%			8120320	8120320-BLK1	12/05/08 13:37
Surrogate: 2-Fluorobiphenyl	78%			8120320	8120320-BLK1	12/05/08 13:37
Surrogate: 2-Fluorophenol	82%			8120320	8120320-BLK1	12/05/08 13:37
Surrogate: Nitrobenzene-d5	76%			8120320	8120320-BLK1	12/05/08 13:37
8120709-BLK1						
Acenaphthene	<1.00		ug/L	8120709	8120709-BLK1	12/04/08 18:50
Acenaphthylene	<1.00		ug/L	8120709	8120709-BLK1	12/04/08 18:50

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
Blank - Cont.

Analyte	Blank Value	Q	Units	Q.C. Batch	Lab Number	Analyzed Date/Time
Semivolatile Organic Compounds by EPA Method 8270C						
8120709-BLK1						
Anthracene	<1.00		ug/L	8120709	8120709-BLK1	12/04/08 18:50
Benzo (a) anthracene	<1.00		ug/L	8120709	8120709-BLK1	12/04/08 18:50
Benzo (a) pyrene	<1.00		ug/L	8120709	8120709-BLK1	12/04/08 18:50
Benzo (b) fluoranthene	<1.00		ug/L	8120709	8120709-BLK1	12/04/08 18:50
Benzo (g,h,i) perylene	<1.00		ug/L	8120709	8120709-BLK1	12/04/08 18:50
Benzo (k) fluoranthene	<1.00		ug/L	8120709	8120709-BLK1	12/04/08 18:50
4-Bromophenyl phenyl ether	<3.30		ug/L	8120709	8120709-BLK1	12/04/08 18:50
Butyl benzyl phthalate	<3.30		ug/L	8120709	8120709-BLK1	12/04/08 18:50
Carbazole	<3.30		ug/L	8120709	8120709-BLK1	12/04/08 18:50
4-Chloro-3-methylphenol	<4.50		ug/L	8120709	8120709-BLK1	12/04/08 18:50
4-Chloroaniline	<4.50		ug/L	8120709	8120709-BLK1	12/04/08 18:50
Bis(2-chloroethoxy)methane	<4.20		ug/L	8120709	8120709-BLK1	12/04/08 18:50
Bis(2-chloroethyl)ether	<4.70		ug/L	8120709	8120709-BLK1	12/04/08 18:50
Bis(2-chloroisopropyl)ether	<4.20		ug/L	8120709	8120709-BLK1	12/04/08 18:50
2-Chloronaphthalene	<3.50		ug/L	8120709	8120709-BLK1	12/04/08 18:50
2-Chlorophenol	<4.10		ug/L	8120709	8120709-BLK1	12/04/08 18:50
4-Chlorophenyl phenyl ether	<2.60		ug/L	8120709	8120709-BLK1	12/04/08 18:50
Chrysene	<1.00		ug/L	8120709	8120709-BLK1	12/04/08 18:50
Dibenz (a,h) anthracene	<1.00		ug/L	8120709	8120709-BLK1	12/04/08 18:50
Dibenzofuran	<2.90		ug/L	8120709	8120709-BLK1	12/04/08 18:50
Di-n-butyl phthalate	<3.30		ug/L	8120709	8120709-BLK1	12/04/08 18:50
1,4-Dichlorobenzene	<5.80		ug/L	8120709	8120709-BLK1	12/04/08 18:50
1,2-Dichlorobenzene	<6.30		ug/L	8120709	8120709-BLK1	12/04/08 18:50
1,3-Dichlorobenzene	<6.00		ug/L	8120709	8120709-BLK1	12/04/08 18:50
3,3-Dichlorobenzidine	<2.00		ug/L	8120709	8120709-BLK1	12/04/08 18:50
2,4-Dichlorophenol	<3.30		ug/L	8120709	8120709-BLK1	12/04/08 18:50
Diethyl phthalate	<3.30		ug/L	8120709	8120709-BLK1	12/04/08 18:50
2,4-Dimethylphenol	<4.10		ug/L	8120709	8120709-BLK1	12/04/08 18:50
Dimethyl phthalate	<3.30		ug/L	8120709	8120709-BLK1	12/04/08 18:50
4,6-Dinitro-2-methylphenol	<3.30		ug/L	8120709	8120709-BLK1	12/04/08 18:50
2,4-Dinitrophenol	<3.40		ug/L	8120709	8120709-BLK1	12/04/08 18:50
2,6-Dinitrotoluene	<2.20		ug/L	8120709	8120709-BLK1	12/04/08 18:50
2,4-Dinitrotoluene	<3.30		ug/L	8120709	8120709-BLK1	12/04/08 18:50
Di-n-octyl phthalate	<3.30		ug/L	8120709	8120709-BLK1	12/04/08 18:50
Bis(2-ethylhexyl)phthalate	<3.30		ug/L	8120709	8120709-BLK1	12/04/08 18:50
Fluoranthene	<1.00		ug/L	8120709	8120709-BLK1	12/04/08 18:50
Fluorene	<1.00		ug/L	8120709	8120709-BLK1	12/04/08 18:50
Hexachlorobenzene	<3.00		ug/L	8120709	8120709-BLK1	12/04/08 18:50
Hexachlorobutadiene	<5.10		ug/L	8120709	8120709-BLK1	12/04/08 18:50
Hexachlorocyclopentadiene	<3.30		ug/L	8120709	8120709-BLK1	12/04/08 18:50
Hexachloroethane	<5.90		ug/L	8120709	8120709-BLK1	12/04/08 18:50

Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
Blank - Cont.

Analyte	Blank Value	Q	Units	Q.C. Batch	Lab Number	Analyzed Date/Time
Semivolatile Organic Compounds by EPA Method 8270C						
8120709-BLK1						
Indeno (1,2,3-cd) pyrene	<1.00		ug/L	8120709	8120709-BLK1	12/04/08 18:50
Isophorone	<4.70		ug/L	8120709	8120709-BLK1	12/04/08 18:50
2-Methylnaphthalene	<1.00		ug/L	8120709	8120709-BLK1	12/04/08 18:50
2-Methylphenol	<3.50		ug/L	8120709	8120709-BLK1	12/04/08 18:50
3/4-Methylphenol	<4.60		ug/L	8120709	8120709-BLK1	12/04/08 18:50
Naphthalene	<1.00		ug/L	8120709	8120709-BLK1	12/04/08 18:50
3-Nitroaniline	<3.30		ug/L	8120709	8120709-BLK1	12/04/08 18:50
2-Nitroaniline	<3.30		ug/L	8120709	8120709-BLK1	12/04/08 18:50
4-Nitroaniline	<3.30		ug/L	8120709	8120709-BLK1	12/04/08 18:50
Nitrobenzene	<3.50		ug/L	8120709	8120709-BLK1	12/04/08 18:50
4-Nitrophenol	<4.30		ug/L	8120709	8120709-BLK1	12/04/08 18:50
2-Nitrophenol	<3.20		ug/L	8120709	8120709-BLK1	12/04/08 18:50
N-Nitrosodiphenylamine	<3.30		ug/L	8120709	8120709-BLK1	12/04/08 18:50
N-Nitrosodi-n-propylamine	<3.90		ug/L	8120709	8120709-BLK1	12/04/08 18:50
Pentachlorophenol	<3.30		ug/L	8120709	8120709-BLK1	12/04/08 18:50
Phenanthrene	<1.00		ug/L	8120709	8120709-BLK1	12/04/08 18:50
Phenol	<3.30		ug/L	8120709	8120709-BLK1	12/04/08 18:50
Pyrene	<1.00		ug/L	8120709	8120709-BLK1	12/04/08 18:50
1,2,4-Trichlorobenzene	<4.30		ug/L	8120709	8120709-BLK1	12/04/08 18:50
1-Methylnaphthalene	<1.00		ug/L	8120709	8120709-BLK1	12/04/08 18:50
2,4,6-Trichlorophenol	<3.30		ug/L	8120709	8120709-BLK1	12/04/08 18:50
2,4,5-Trichlorophenol	<3.30		ug/L	8120709	8120709-BLK1	12/04/08 18:50
Surrogate: Terphenyl-d14	68%			8120709	8120709-BLK1	12/04/08 18:50
Surrogate: 2,4,6-Tribromophenol	48%			8120709	8120709-BLK1	12/04/08 18:50
Surrogate: Phenol-d5	26%			8120709	8120709-BLK1	12/04/08 18:50
Surrogate: 2-Fluorobiphenyl	74%			8120709	8120709-BLK1	12/04/08 18:50
Surrogate: 2-Fluorophenol	29%			8120709	8120709-BLK1	12/04/08 18:50
Surrogate: Nitrobenzene-d5	86%			8120709	8120709-BLK1	12/04/08 18:50
TCLP Volatile Organic Compounds by EPA Method 1311/8260B						
8120939-BLK1						
Benzene	<0.000270		mg/L	8120939	8120939-BLK1	12/06/08 18:29
2-Butanone	<0.00240		mg/L	8120939	8120939-BLK1	12/06/08 18:29
Carbon Tetrachloride	<0.000350		mg/L	8120939	8120939-BLK1	12/06/08 18:29
Chlorobenzene	<0.000180		mg/L	8120939	8120939-BLK1	12/06/08 18:29
Chloroform	0.00154		mg/L	8120939	8120939-BLK1	12/06/08 18:29
1,2-Dichloroethane	<0.000370		mg/L	8120939	8120939-BLK1	12/06/08 18:29
1,1-Dichloroethene	<0.000340		mg/L	8120939	8120939-BLK1	12/06/08 18:29
Tetrachloroethene	<0.000230		mg/L	8120939	8120939-BLK1	12/06/08 18:29
Trichloroethene	0.000470		mg/L	8120939	8120939-BLK1	12/06/08 18:29
Vinyl chloride	<0.000290		mg/L	8120939	8120939-BLK1	12/06/08 18:29

Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
Blank - Cont.

Analyte	Blank Value	Q	Units	Q.C. Batch	Lab Number	Analyzed Date/Time
TCLP Volatile Organic Compounds by EPA Method 1311/8260B						
8120939-BLK1						
Surrogate: 1,2-Dichloroethane-d4	104%			8120939	8120939-BLK1	12/06/08 18:29
Surrogate: Dibromofluoromethane	99%			8120939	8120939-BLK1	12/06/08 18:29
Surrogate: Toluene-d8	100%			8120939	8120939-BLK1	12/06/08 18:29
Surrogate: 4-Bromofluorobenzene	101%			8120939	8120939-BLK1	12/06/08 18:29
TCLP Semivolatile Organic Compounds by EPA Method 1311/8270C						
8121008-BLK1						
Cresol(s)	<0.0188		mg/L	8121008	8121008-BLK1	12/11/08 23:24
1,4-Dichlorobenzene	<0.0116		mg/L	8121008	8121008-BLK1	12/11/08 23:24
2,4-Dinitrotoluene	<0.00660		mg/L	8121008	8121008-BLK1	12/11/08 23:24
Benzo (a) pyrene	<0.00200		mg/L	8121008	8121008-BLK1	12/11/08 23:24
Hexachlorobenzene	<0.00600		mg/L	8121008	8121008-BLK1	12/11/08 23:24
Hexachlorobutadiene	<0.0102		mg/L	8121008	8121008-BLK1	12/11/08 23:24
Hexachloroethane	<0.0118		mg/L	8121008	8121008-BLK1	12/11/08 23:24
Nitrobenzene	<0.00700		mg/L	8121008	8121008-BLK1	12/11/08 23:24
Pentachlorophenol	<0.00660		mg/L	8121008	8121008-BLK1	12/11/08 23:24
Pyridine	<0.00740		mg/L	8121008	8121008-BLK1	12/11/08 23:24
2,4,6-Trichlorophenol	<0.00660		mg/L	8121008	8121008-BLK1	12/11/08 23:24
2,4,5-Trichlorophenol	<0.00660		mg/L	8121008	8121008-BLK1	12/11/08 23:24
Surrogate: Terphenyl-d14	69%			8121008	8121008-BLK1	12/11/08 23:24
Surrogate: 2,4,6-Tribromophenol	71%			8121008	8121008-BLK1	12/11/08 23:24
Surrogate: Phenol-d5	45%			8121008	8121008-BLK1	12/11/08 23:24
Surrogate: 2-Fluorobiphenyl	70%			8121008	8121008-BLK1	12/11/08 23:24
Surrogate: 2-Fluorophenol	57%			8121008	8121008-BLK1	12/11/08 23:24
Surrogate: Nitrobenzene-d5	74%			8121008	8121008-BLK1	12/11/08 23:24

Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
Duplicate

Analyte	Orig. Val.	Duplicate	Q	Units	RPD	Limit	Batch	Sample Duplicated	Analyzed Date/Time
General Chemistry Parameters									
8121669-DUP1									
% Dry Solids	90.4	90.0		%	0.4	20	8121669	NRL0150-04	12/12/08 06:46

Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
LCS

Analyte	Known Val.	Analyzed Val	Q	Units	% Rec.	Target Range	Batch	Analyzed Date/Time
Total Metals by EPA Method 6010B								
8120688-BS1								
Antimony	0.100	0.104		mg/L	104%	80 - 120	8120688	12/04/08 21:09
Arsenic	0.0500	0.0441		mg/L	88%	80 - 120	8120688	12/04/08 21:09
Barium	2.00	2.02		mg/L	101%	80 - 120	8120688	12/04/08 21:09
Cadmium	0.0500	0.0489		mg/L	98%	80 - 120	8120688	12/04/08 21:09
Chromium	0.200	0.206		mg/L	103%	80 - 120	8120688	12/04/08 21:09
Lead	0.0500	0.0479		mg/L	96%	80 - 120	8120688	12/04/08 21:09
Selenium	0.0500	0.0481		mg/L	96%	80 - 120	8120688	12/04/08 21:09
Silver	0.0500	0.0475		mg/L	95%	80 - 120	8120688	12/04/08 21:09
8121573-BS1								
Antimony	100	98.9		mg/kg wet	99%	80 - 120	8121573	12/11/08 11:33
Arsenic	20.0	19.4		mg/kg wet	97%	80 - 120	8121573	12/11/08 11:33
Barium	400	405		mg/kg wet	101%	80 - 120	8121573	12/11/08 11:33
Cadmium	20.0	21.2		mg/kg wet	106%	80 - 120	8121573	12/11/08 11:33
Chromium	40.0	43.2		mg/kg wet	108%	80 - 120	8121573	12/11/08 11:33
Lead	100	107		mg/kg wet	107%	80 - 120	8121573	12/11/08 11:33
Selenium	20.0	18.7		mg/kg wet	93%	80 - 120	8121573	12/11/08 11:33
Silver	10.0	10.6		mg/kg wet	106%	75 - 125	8121573	12/11/08 11:33
Mercury by EPA Methods 7470A/7471A								
8120683-BS1								
Mercury	0.00100	0.000968		mg/L	97%	78 - 124	8120683	12/04/08 18:23
8120735-BS1								
Mercury	0.167	0.177		mg/kg wet	106%	78 - 120	8120735	12/04/08 15:05
TCLP Metals by 6000/7000 Series Methods								
8120910-BS1								
Mercury	0.0200	0.0185		mg/L	92%	78 - 124	8120910	12/05/08 16:39
8120922-BS1								
Arsenic	10.0	10.0		mg/L	100%	80 - 120	8120922	12/05/08 23:09
Barium	50.0	51.4		mg/L	103%	80 - 120	8120922	12/05/08 23:09
Cadmium	10.0	9.90		mg/L	99%	80 - 120	8120922	12/05/08 23:09
Chromium	50.0	52.2		mg/L	104%	80 - 120	8120922	12/05/08 23:09
Lead	50.0	50.4		mg/L	101%	80 - 120	8120922	12/05/08 23:09
Selenium	10.0	10.1		mg/L	101%	80 - 120	8120922	12/05/08 23:09
Silver	10.0	10.2		mg/L	102%	80 - 120	8120922	12/05/08 23:09
Volatile Organic Compounds by EPA Method 8260B								
8120667-BS1								
Acetone	250	280		ug/L	112%	62 - 150	8120667	12/05/08 17:37

Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
LCS - Cont.

Analyte	Known Val.	Analyzed Val	Q	Units	% Rec.	Target Range	Batch	Analyzed Date/Time
Volatile Organic Compounds by EPA Method 8260B								
8120667-BS1								
Benzene	50.0	53.2		ug/L	106%	80 - 137	8120667	12/05/08 17:37
Bromobenzene	50.0	51.8		ug/L	104%	74 - 131	8120667	12/05/08 17:37
Bromochloromethane	50.0	54.2		ug/L	108%	80 - 128	8120667	12/05/08 17:37
Bromodichloromethane	50.0	45.7		ug/L	91%	80 - 129	8120667	12/05/08 17:37
Bromoform	50.0	38.3		ug/L	77%	69 - 127	8120667	12/05/08 17:37
Bromomethane	50.0	50.9		ug/L	102%	62 - 148	8120667	12/05/08 17:37
2-Butanone	250	274		ug/L	110%	77 - 141	8120667	12/05/08 17:37
sec-Butylbenzene	50.0	52.0		ug/L	104%	78 - 133	8120667	12/05/08 17:37
n-Butylbenzene	50.0	55.2		ug/L	110%	72 - 136	8120667	12/05/08 17:37
tert-Butylbenzene	50.0	50.6		ug/L	101%	77 - 135	8120667	12/05/08 17:37
Carbon disulfide	50.0	58.7		ug/L	117%	80 - 126	8120667	12/05/08 17:37
Carbon Tetrachloride	50.0	51.6		ug/L	103%	76 - 143	8120667	12/05/08 17:37
Chlorobenzene	50.0	50.8		ug/L	102%	80 - 120	8120667	12/05/08 17:37
Chlorodibromomethane	50.0	42.9		ug/L	86%	76 - 123	8120667	12/05/08 17:37
Chloroethane	50.0	54.5		ug/L	109%	77 - 127	8120667	12/05/08 17:37
Chloroform	50.0	52.3		ug/L	105%	80 - 133	8120667	12/05/08 17:37
Chloromethane	50.0	41.9		ug/L	84%	33 - 125	8120667	12/05/08 17:37
2-Chlorotoluene	50.0	51.8		ug/L	104%	80 - 127	8120667	12/05/08 17:37
4-Chlorotoluene	50.0	51.0		ug/L	102%	80 - 127	8120667	12/05/08 17:37
1,2-Dibromo-3-chloropropane	50.0	37.7		ug/L	75%	60 - 136	8120667	12/05/08 17:37
1,2-Dibromoethane (EDB)	50.0	51.8		ug/L	104%	80 - 125	8120667	12/05/08 17:37
Dibromomethane	50.0	50.2		ug/L	100%	80 - 124	8120667	12/05/08 17:37
1,4-Dichlorobenzene	50.0	46.8		ug/L	94%	80 - 120	8120667	12/05/08 17:37
1,3-Dichlorobenzene	50.0	47.1		ug/L	94%	80 - 123	8120667	12/05/08 17:37
1,2-Dichlorobenzene	50.0	47.7		ug/L	95%	80 - 122	8120667	12/05/08 17:37
Dichlorodifluoromethane	50.0	36.2		ug/L	72%	36 - 120	8120667	12/05/08 17:37
1,1-Dichloroethane	50.0	55.6		ug/L	111%	76 - 130	8120667	12/05/08 17:37
1,2-Dichloroethane	50.0	49.3		ug/L	99%	69 - 136	8120667	12/05/08 17:37
cis-1,2-Dichloroethene	50.0	57.4		ug/L	115%	80 - 129	8120667	12/05/08 17:37
1,1-Dichloroethene	50.0	56.2		ug/L	112%	80 - 127	8120667	12/05/08 17:37
trans-1,2-Dichloroethene	50.0	56.1		ug/L	112%	80 - 131	8120667	12/05/08 17:37
1,3-Dichloropropane	50.0	52.4		ug/L	105%	80 - 122	8120667	12/05/08 17:37
1,2-Dichloropropane	50.0	49.0		ug/L	98%	80 - 120	8120667	12/05/08 17:37
2,2-Dichloropropane	50.0	62.2		ug/L	124%	62 - 142	8120667	12/05/08 17:37
cis-1,3-Dichloropropene	50.0	52.9		ug/L	106%	76 - 135	8120667	12/05/08 17:37
trans-1,3-Dichloropropene	50.0	47.3		ug/L	95%	70 - 137	8120667	12/05/08 17:37
1,1-Dichloropropene	50.0	55.0		ug/L	110%	80 - 127	8120667	12/05/08 17:37
Ethylbenzene	50.0	53.6		ug/L	107%	80 - 128	8120667	12/05/08 17:37
Hexachlorobutadiene	50.0	44.8	B	ug/L	90%	68 - 148	8120667	12/05/08 17:37
2-Hexanone	250	271		ug/L	108%	69 - 148	8120667	12/05/08 17:37
Isopropylbenzene	50.0	56.0		ug/L	112%	80 - 121	8120667	12/05/08 17:37

Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
LCS - Cont.

Analyte	Known Val.	Analyzed Val	Q	Units	% Rec.	Target Range	Batch	Analyzed Date/Time
Volatile Organic Compounds by EPA Method 8260B								
8120667-BS1								
p-Isopropyltoluene	50.0	50.8		ug/L	102%	79 - 127	8120667	12/05/08 17:37
Methyl tert-Butyl Ether	50.0	57.1		ug/L	114%	70 - 129	8120667	12/05/08 17:37
Methylene Chloride	50.0	48.0		ug/L	96%	76 - 135	8120667	12/05/08 17:37
4-Methyl-2-pentanone	250	268		ug/L	107%	67 - 143	8120667	12/05/08 17:37
Naphthalene	50.0	47.5		ug/L	95%	62 - 141	8120667	12/05/08 17:37
n-Propylbenzene	50.0	52.6		ug/L	105%	80 - 132	8120667	12/05/08 17:37
Styrene	50.0	57.3		ug/L	115%	80 - 139	8120667	12/05/08 17:37
1,1,1,2-Tetrachloroethane	50.0	46.2		ug/L	92%	80 - 135	8120667	12/05/08 17:37
1,1,2,2-Tetrachloroethane	50.0	52.3		ug/L	105%	65 - 145	8120667	12/05/08 17:37
Tetrachloroethene	50.0	49.1		ug/L	98%	80 - 125	8120667	12/05/08 17:37
Toluene	50.0	53.0		ug/L	106%	80 - 125	8120667	12/05/08 17:37
1,2,3-Trichlorobenzene	50.0	44.9		ug/L	90%	57 - 144	8120667	12/05/08 17:37
1,2,4-Trichlorobenzene	50.0	45.2		ug/L	90%	60 - 140	8120667	12/05/08 17:37
1,1,2-Trichloroethane	50.0	50.6		ug/L	101%	80 - 122	8120667	12/05/08 17:37
1,1,1-Trichloroethane	50.0	57.2		ug/L	114%	80 - 131	8120667	12/05/08 17:37
Trichloroethene	50.0	51.4		ug/L	103%	80 - 131	8120667	12/05/08 17:37
Trichlorofluoromethane	50.0	43.4		ug/L	87%	68 - 125	8120667	12/05/08 17:37
1,2,3-Trichloropropane	50.0	49.0		ug/L	98%	60 - 127	8120667	12/05/08 17:37
1,3,5-Trimethylbenzene	50.0	52.3		ug/L	105%	80 - 129	8120667	12/05/08 17:37
1,2,4-Trimethylbenzene	50.0	52.1		ug/L	104%	80 - 128	8120667	12/05/08 17:37
Vinyl chloride	50.0	43.5		ug/L	87%	69 - 120	8120667	12/05/08 17:37
Xylenes, total	150	164		ug/L	110%	80 - 129	8120667	12/05/08 17:37
Surrogate: 1,2-Dichloroethane-d4	25.0	23.5			94%	60 - 140	8120667	12/05/08 17:37
Surrogate: Dibromofluoromethane	25.0	25.4			102%	75 - 124	8120667	12/05/08 17:37
Surrogate: Toluene-d8	25.0	25.6			102%	78 - 121	8120667	12/05/08 17:37
Surrogate: 4-Bromofluorobenzene	25.0	26.2			105%	79 - 124	8120667	12/05/08 17:37
8120937-BS1								
Acetone	250	244		ug/kg	98%	49 - 150	8120937	12/10/08 13:14
Benzene	50.0	43.9		ug/kg	88%	76 - 130	8120937	12/10/08 13:14
Bromobenzene	50.0	46.2		ug/kg	92%	80 - 128	8120937	12/10/08 13:14
Bromochloromethane	50.0	45.1		ug/kg	90%	70 - 135	8120937	12/10/08 13:14
Bromodichloromethane	50.0	46.9		ug/kg	94%	78 - 135	8120937	12/10/08 13:14
Bromoform	50.0	45.4		ug/kg	91%	67 - 143	8120937	12/10/08 13:14
Bromomethane	50.0	45.4		ug/kg	91%	58 - 150	8120937	12/10/08 13:14
2-Butanone	250	235		ug/kg	94%	61 - 143	8120937	12/10/08 13:14
sec-Butylbenzene	50.0	46.9		ug/kg	94%	80 - 134	8120937	12/10/08 13:14
n-Butylbenzene	50.0	46.4		ug/kg	93%	71 - 141	8120937	12/10/08 13:14
tert-Butylbenzene	50.0	46.6		ug/kg	93%	79 - 132	8120937	12/10/08 13:14
Carbon disulfide	50.0	42.4		ug/kg	85%	70 - 134	8120937	12/10/08 13:14
Carbon Tetrachloride	50.0	44.6		ug/kg	89%	75 - 137	8120937	12/10/08 13:14

TestAmerica
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2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
LCS - Cont.

Analyte	Known Val.	Analyzed Val	Q	Units	% Rec.	Target Range	Batch	Analyzed Date/Time
Volatile Organic Compounds by EPA Method 8260B								
8120937-BS1								
Chlorobenzene	50.0	46.2		ug/kg	92%	80 - 121	8120937	12/10/08 13:14
Chlorodibromomethane	50.0	48.7		ug/kg	97%	77 - 130	8120937	12/10/08 13:14
Chloroethane	50.0	46.1		ug/kg	92%	62 - 149	8120937	12/10/08 13:14
Chloroform	50.0	43.2		ug/kg	86%	75 - 130	8120937	12/10/08 13:14
Chloromethane	50.0	43.5		ug/kg	87%	35 - 130	8120937	12/10/08 13:14
2-Chlorotoluene	50.0	45.9		ug/kg	92%	80 - 131	8120937	12/10/08 13:14
4-Chlorotoluene	50.0	44.8		ug/kg	90%	80 - 129	8120937	12/10/08 13:14
1,2-Dibromo-3-chloropropane	50.0	49.5		ug/kg	99%	62 - 142	8120937	12/10/08 13:14
1,2-Dibromoethane (EDB)	50.0	48.6		ug/kg	97%	81 - 130	8120937	12/10/08 13:14
Dibromomethane	50.0	48.0		ug/kg	96%	77 - 133	8120937	12/10/08 13:14
1,4-Dichlorobenzene	50.0	45.0		ug/kg	90%	75 - 128	8120937	12/10/08 13:14
1,3-Dichlorobenzene	50.0	44.4		ug/kg	89%	79 - 128	8120937	12/10/08 13:14
1,2-Dichlorobenzene	50.0	46.1		ug/kg	92%	80 - 130	8120937	12/10/08 13:14
Dichlorodifluoromethane	50.0	47.1		ug/kg	94%	11 - 129	8120937	12/10/08 13:14
1,1-Dichloroethane	50.0	44.7		ug/kg	89%	68 - 150	8120937	12/10/08 13:14
1,2-Dichloroethane	50.0	45.3		ug/kg	91%	72 - 132	8120937	12/10/08 13:14
cis-1,2-Dichloroethene	50.0	45.5		ug/kg	91%	77 - 132	8120937	12/10/08 13:14
1,1-Dichloroethene	50.0	43.0		ug/kg	86%	75 - 133	8120937	12/10/08 13:14
trans-1,2-Dichloroethene	50.0	43.4		ug/kg	87%	79 - 133	8120937	12/10/08 13:14
1,3-Dichloropropane	50.0	47.8		ug/kg	96%	80 - 125	8120937	12/10/08 13:14
1,2-Dichloropropane	50.0	43.3		ug/kg	87%	75 - 124	8120937	12/10/08 13:14
2,2-Dichloropropane	50.0	43.7		ug/kg	87%	59 - 144	8120937	12/10/08 13:14
cis-1,3-Dichloropropene	50.0	47.9		ug/kg	96%	80 - 137	8120937	12/10/08 13:14
trans-1,3-Dichloropropene	50.0	47.6		ug/kg	95%	75 - 133	8120937	12/10/08 13:14
1,1-Dichloropropene	50.0	43.8		ug/kg	88%	76 - 133	8120937	12/10/08 13:14
Ethylbenzene	50.0	46.1		ug/kg	92%	80 - 128	8120937	12/10/08 13:14
Hexachlorobutadiene	50.0	50.8		ug/kg	102%	60 - 150	8120937	12/10/08 13:14
2-Hexanone	250	251		ug/kg	100%	63 - 149	8120937	12/10/08 13:14
Isopropylbenzene	50.0	48.3		ug/kg	97%	74 - 131	8120937	12/10/08 13:14
p-Isopropyltoluene	50.0	45.6		ug/kg	91%	75 - 133	8120937	12/10/08 13:14
Methyl tert-Butyl Ether	50.0	46.0		ug/kg	92%	67 - 130	8120937	12/10/08 13:14
Methylene Chloride	50.0	46.1		ug/kg	92%	65 - 144	8120937	12/10/08 13:14
4-Methyl-2-pentanone	250	244		ug/kg	98%	64 - 142	8120937	12/10/08 13:14
Naphthalene	50.0	45.2		ug/kg	90%	63 - 144	8120937	12/10/08 13:14
n-Propylbenzene	50.0	44.8		ug/kg	90%	80 - 131	8120937	12/10/08 13:14
Styrene	50.0	49.2		ug/kg	98%	80 - 144	8120937	12/10/08 13:14
1,1,1,2-Tetrachloroethane	50.0	47.8		ug/kg	96%	80 - 129	8120937	12/10/08 13:14
1,1,2,2-Tetrachloroethane	50.0	49.0		ug/kg	98%	73 - 139	8120937	12/10/08 13:14
Tetrachloroethene	50.0	43.2		ug/kg	86%	76 - 128	8120937	12/10/08 13:14
Toluene	50.0	45.3		ug/kg	91%	80 - 125	8120937	12/10/08 13:14
1,2,3-Trichlorobenzene	50.0	46.4		ug/kg	93%	64 - 136	8120937	12/10/08 13:14

2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
LCS - Cont.

Analyte	Known Val.	Analyzed Val	Q	Units	% Rec.	Target Range	Batch	Analyzed Date/Time
Volatile Organic Compounds by EPA Method 8260B								
8120937-BS1								
1,2,4-Trichlorobenzene	50.0	44.8		ug/kg	90%	58 - 145	8120937	12/10/08 13:14
1,1,2-Trichloroethane	50.0	47.8		ug/kg	96%	80 - 127	8120937	12/10/08 13:14
1,1,1-Trichloroethane	50.0	44.0		ug/kg	88%	76 - 134	8120937	12/10/08 13:14
Trichloroethene	50.0	49.6		ug/kg	99%	75 - 131	8120937	12/10/08 13:14
Trichlorofluoromethane	50.0	50.3		ug/kg	101%	63 - 130	8120937	12/10/08 13:14
1,2,3-Trichloropropane	50.0	43.0		ug/kg	86%	66 - 129	8120937	12/10/08 13:14
1,3,5-Trimethylbenzene	50.0	45.7		ug/kg	91%	78 - 133	8120937	12/10/08 13:14
1,2,4-Trimethylbenzene	50.0	45.6		ug/kg	91%	76 - 135	8120937	12/10/08 13:14
Vinyl chloride	50.0	42.1		ug/kg	84%	58 - 134	8120937	12/10/08 13:14
Xylenes, total	150	138		ug/kg	92%	79 - 130	8120937	12/10/08 13:14
Surrogate: 1,2-Dichloroethane-d4	50.0	50.0			100%	41 - 150	8120937	12/10/08 13:14
Surrogate: Dibromofluoromethane	50.0	49.9			100%	55 - 139	8120937	12/10/08 13:14
Surrogate: Toluene-d8	50.0	50.8			102%	57 - 148	8120937	12/10/08 13:14
Surrogate: 4-Bromofluorobenzene	50.0	49.9			100%	58 - 150	8120937	12/10/08 13:14
8121404-BS1								
Acetone	250	251		ug/kg	101%	49 - 150	8121404	12/09/08 23:54
Benzene	50.0	49.3		ug/kg	99%	76 - 130	8121404	12/09/08 23:54
Bromobenzene	50.0	56.8		ug/kg	114%	80 - 128	8121404	12/09/08 23:54
Bromochloromethane	50.0	42.2		ug/kg	84%	70 - 135	8121404	12/09/08 23:54
Bromodichloromethane	50.0	41.6		ug/kg	83%	78 - 135	8121404	12/09/08 23:54
Bromoform	50.0	39.4		ug/kg	79%	67 - 143	8121404	12/09/08 23:54
Bromomethane	50.0	42.9		ug/kg	86%	58 - 150	8121404	12/09/08 23:54
2-Butanone	250	237		ug/kg	95%	61 - 143	8121404	12/09/08 23:54
sec-Butylbenzene	50.0	52.9		ug/kg	106%	80 - 134	8121404	12/09/08 23:54
n-Butylbenzene	50.0	54.1		ug/kg	108%	71 - 141	8121404	12/09/08 23:54
tert-Butylbenzene	50.0	48.9		ug/kg	98%	79 - 132	8121404	12/09/08 23:54
Carbon disulfide	50.0	50.9		ug/kg	102%	70 - 134	8121404	12/09/08 23:54
Carbon Tetrachloride	50.0	41.6		ug/kg	83%	75 - 137	8121404	12/09/08 23:54
Chlorobenzene	50.0	47.3		ug/kg	95%	80 - 121	8121404	12/09/08 23:54
Chlorodibromomethane	50.0	43.2		ug/kg	86%	77 - 130	8121404	12/09/08 23:54
Chloroethane	50.0	59.6		ug/kg	119%	62 - 149	8121404	12/09/08 23:54
Chloroform	50.0	47.0		ug/kg	94%	75 - 130	8121404	12/09/08 23:54
Chloromethane	50.0	46.3		ug/kg	93%	35 - 130	8121404	12/09/08 23:54
2-Chlorotoluene	50.0	53.9		ug/kg	108%	80 - 131	8121404	12/09/08 23:54
4-Chlorotoluene	50.0	53.8		ug/kg	108%	80 - 129	8121404	12/09/08 23:54
1,2-Dibromo-3-chloropropane	50.0	44.5		ug/kg	89%	62 - 142	8121404	12/09/08 23:54
1,2-Dibromoethane (EDB)	50.0	46.2		ug/kg	92%	81 - 130	8121404	12/09/08 23:54
Dibromomethane	50.0	43.5		ug/kg	87%	77 - 133	8121404	12/09/08 23:54
1,4-Dichlorobenzene	50.0	49.5		ug/kg	99%	75 - 128	8121404	12/09/08 23:54
1,3-Dichlorobenzene	50.0	49.3		ug/kg	99%	79 - 128	8121404	12/09/08 23:54

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2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

Client	S&ME, Inc. (2420)		Work Order:	NRL0332
	620 Wando Park Blvd.		Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464		Project Number:	1131-08-554
Attn	Andrew Wertz		Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
LCS - Cont.

Analyte	Known Val.	Analyzed Val	Q	Units	% Rec.	Target Range	Batch	Analyzed Date/Time
Volatile Organic Compounds by EPA Method 8260B								
8121404-BS1								
1,2-Dichlorobenzene	50.0	49.4		ug/kg	99%	80 - 130	8121404	12/09/08 23:54
Dichlorodifluoromethane	50.0	49.1		ug/kg	98%	11 - 129	8121404	12/09/08 23:54
1,1-Dichloroethane	50.0	47.6		ug/kg	95%	68 - 150	8121404	12/09/08 23:54
1,2-Dichloroethane	50.0	40.8		ug/kg	82%	72 - 132	8121404	12/09/08 23:54
cis-1,2-Dichloroethene	50.0	48.5		ug/kg	97%	77 - 132	8121404	12/09/08 23:54
1,1-Dichloroethene	50.0	46.9		ug/kg	94%	75 - 133	8121404	12/09/08 23:54
trans-1,2-Dichloroethene	50.0	47.6		ug/kg	95%	79 - 133	8121404	12/09/08 23:54
1,3-Dichloropropane	50.0	48.7		ug/kg	97%	80 - 125	8121404	12/09/08 23:54
1,2-Dichloropropane	50.0	48.6		ug/kg	97%	75 - 124	8121404	12/09/08 23:54
2,2-Dichloropropane	50.0	42.5		ug/kg	85%	59 - 144	8121404	12/09/08 23:54
cis-1,3-Dichloropropene	50.0	50.9		ug/kg	102%	80 - 137	8121404	12/09/08 23:54
trans-1,3-Dichloropropene	50.0	45.8		ug/kg	92%	75 - 133	8121404	12/09/08 23:54
1,1-Dichloropropene	50.0	48.2		ug/kg	96%	76 - 133	8121404	12/09/08 23:54
Ethylbenzene	50.0	48.6		ug/kg	97%	80 - 128	8121404	12/09/08 23:54
Hexachlorobutadiene	50.0	42.7		ug/kg	85%	60 - 150	8121404	12/09/08 23:54
2-Hexanone	250	260		ug/kg	104%	63 - 149	8121404	12/09/08 23:54
Isopropylbenzene	50.0	48.2		ug/kg	96%	74 - 131	8121404	12/09/08 23:54
p-Isopropyltoluene	50.0	49.5		ug/kg	99%	75 - 133	8121404	12/09/08 23:54
Methyl tert-Butyl Ether	50.0	43.3		ug/kg	87%	67 - 130	8121404	12/09/08 23:54
Methylene Chloride	50.0	51.6		ug/kg	103%	65 - 144	8121404	12/09/08 23:54
4-Methyl-2-pentanone	250	258		ug/kg	103%	64 - 142	8121404	12/09/08 23:54
Naphthalene	50.0	48.6		ug/kg	97%	63 - 144	8121404	12/09/08 23:54
n-Propylbenzene	50.0	54.2		ug/kg	108%	80 - 131	8121404	12/09/08 23:54
Styrene	50.0	49.6		ug/kg	99%	80 - 144	8121404	12/09/08 23:54
1,1,1,2-Tetrachloroethane	50.0	44.2		ug/kg	88%	80 - 129	8121404	12/09/08 23:54
1,1,2,2-Tetrachloroethane	50.0	58.0		ug/kg	116%	73 - 139	8121404	12/09/08 23:54
Tetrachloroethene	50.0	40.3		ug/kg	81%	76 - 128	8121404	12/09/08 23:54
Toluene	50.0	49.5		ug/kg	99%	80 - 125	8121404	12/09/08 23:54
1,2,3-Trichlorobenzene	50.0	47.2		ug/kg	94%	64 - 136	8121404	12/09/08 23:54
1,2,4-Trichlorobenzene	50.0	47.6		ug/kg	95%	58 - 145	8121404	12/09/08 23:54
1,1,2-Trichloroethane	50.0	44.5		ug/kg	89%	80 - 127	8121404	12/09/08 23:54
1,1,1-Trichloroethane	50.0	41.7		ug/kg	83%	76 - 134	8121404	12/09/08 23:54
Trichloroethene	50.0	41.6		ug/kg	83%	75 - 131	8121404	12/09/08 23:54
Trichlorofluoromethane	50.0	46.1		ug/kg	92%	63 - 130	8121404	12/09/08 23:54
1,2,3-Trichloropropane	50.0	45.7		ug/kg	91%	66 - 129	8121404	12/09/08 23:54
1,3,5-Trimethylbenzene	50.0	51.8		ug/kg	104%	78 - 133	8121404	12/09/08 23:54
1,2,4-Trimethylbenzene	50.0	50.3		ug/kg	101%	76 - 135	8121404	12/09/08 23:54
Vinyl chloride	50.0	53.4		ug/kg	107%	58 - 134	8121404	12/09/08 23:54
Xylenes, total	150	140		ug/kg	94%	79 - 130	8121404	12/09/08 23:54
1,1,2-Trifluorotrichloroethane	50.0	46.8		ug/kg	94%	73 - 126	8121404	12/09/08 23:54
Surrogate: 1,2-Dichloroethane-d4	50.0	43.3			87%	41 - 150	8121404	12/09/08 23:54

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THE LEADER IN ENVIRONMENTAL TESTING

2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
LCS - Cont.

Analyte	Known Val.	Analyzed Val	Q	Units	% Rec.	Target Range	Batch	Analyzed Date/Time
Volatile Organic Compounds by EPA Method 8260B								
8121404-BS1								
Surrogate: Dibromofluoromethane	50.0	47.5			95%	55 - 139	8121404	12/09/08 23:54
Surrogate: Toluene-d8	50.0	51.8			104%	57 - 148	8121404	12/09/08 23:54
Surrogate: 4-Bromofluorobenzene	50.0	53.5			107%	58 - 150	8121404	12/09/08 23:54
Semivolatile Organic Compounds by EPA Method 8270C								
8120320-BS1								
Acenaphthene	1.67	1.47		mg/kg wet	88%	52 - 106	8120320	12/05/08 13:59
Acenaphthylene	1.67	1.52		mg/kg wet	91%	53 - 109	8120320	12/05/08 13:59
Anthracene	1.67	1.70		mg/kg wet	102%	54 - 124	8120320	12/05/08 13:59
Benzo (a) anthracene	1.67	1.58		mg/kg wet	95%	53 - 111	8120320	12/05/08 13:59
Benzo (a) pyrene	1.67	1.62		mg/kg wet	97%	52 - 122	8120320	12/05/08 13:59
Benzo (b) fluoranthene	1.67	1.54		mg/kg wet	92%	48 - 115	8120320	12/05/08 13:59
Benzo (g,h,i) perylene	1.67	1.66		mg/kg wet	99%	46 - 114	8120320	12/05/08 13:59
Benzo (k) fluoranthene	1.67	1.62		mg/kg wet	97%	41 - 121	8120320	12/05/08 13:59
4-Bromophenyl phenyl ether	1.67	1.43		mg/kg wet	86%	47 - 102	8120320	12/05/08 13:59
Butyl benzyl phthalate	1.67	1.75		mg/kg wet	105%	56 - 127	8120320	12/05/08 13:59
Carbazole	1.67	1.53		mg/kg wet	92%	53 - 113	8120320	12/05/08 13:59
4-Chloro-3-methylphenol	1.67	1.38		mg/kg wet	83%	42 - 121	8120320	12/05/08 13:59
4-Chloroaniline	1.67	1.13		mg/kg wet	68%	40 - 112	8120320	12/05/08 13:59
Bis(2-chloroethoxy)methane	1.67	1.31		mg/kg wet	79%	45 - 105	8120320	12/05/08 13:59
Bis(2-chloroethyl)ether	1.67	1.21		mg/kg wet	72%	45 - 106	8120320	12/05/08 13:59
Bis(2-chloroisopropyl)ether	1.67	1.25		mg/kg wet	75%	46 - 109	8120320	12/05/08 13:59
2-Chloronaphthalene	1.67	1.42		mg/kg wet	85%	49 - 105	8120320	12/05/08 13:59
2-Chlorophenol	1.67	1.29		mg/kg wet	77%	44 - 119	8120320	12/05/08 13:59
4-Chlorophenyl phenyl ether	1.67	1.56		mg/kg wet	94%	53 - 110	8120320	12/05/08 13:59
Chrysene	1.67	1.62		mg/kg wet	97%	49 - 113	8120320	12/05/08 13:59
Dibenz (a,h) anthracene	1.67	1.63		mg/kg wet	98%	47 - 117	8120320	12/05/08 13:59
Dibenzofuran	1.67	1.46		mg/kg wet	88%	55 - 111	8120320	12/05/08 13:59
Di-n-butyl phthalate	1.67	1.69		mg/kg wet	102%	54 - 150	8120320	12/05/08 13:59
1,4-Dichlorobenzene	1.67	1.08		mg/kg wet	65%	35 - 109	8120320	12/05/08 13:59
1,2-Dichlorobenzene	1.67	1.12		mg/kg wet	67%	36 - 112	8120320	12/05/08 13:59
1,3-Dichlorobenzene	1.67	1.07		mg/kg wet	64%	36 - 110	8120320	12/05/08 13:59
3,3-Dichlorobenzidine	1.67	1.44		mg/kg wet	87%	42 - 111	8120320	12/05/08 13:59
2,4-Dichlorophenol	1.67	1.24		mg/kg wet	74%	40 - 118	8120320	12/05/08 13:59
Diethyl phthalate	1.67	1.60		mg/kg wet	96%	43 - 122	8120320	12/05/08 13:59
2,4-Dimethylphenol	1.67	1.47		mg/kg wet	88%	31 - 128	8120320	12/05/08 13:59
Dimethyl phthalate	1.67	1.63		mg/kg wet	98%	54 - 111	8120320	12/05/08 13:59
4,6-Dinitro-2-methylphenol	1.67	1.49		mg/kg wet	89%	24 - 131	8120320	12/05/08 13:59
2,4-Dinitrophenol	1.67	1.54		mg/kg wet	93%	11 - 148	8120320	12/05/08 13:59
2,6-Dinitrotoluene	1.67	1.71		mg/kg wet	102%	51 - 119	8120320	12/05/08 13:59
2,4-Dinitrotoluene	1.67	1.69		mg/kg wet	101%	54 - 113	8120320	12/05/08 13:59

2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
LCS - Cont.

Analyte	Known Val.	Analyzed Val	Q	Units	% Rec.	Target Range	Batch	Analyzed Date/Time
Semivolatile Organic Compounds by EPA Method 8270C								
8120320-BS1								
Di-n-octyl phthalate	1.67	1.61		mg/kg wet	97%	45 - 134	8120320	12/05/08 13:59
Bis(2-ethylhexyl)phthalate	1.67	1.56		mg/kg wet	94%	52 - 122	8120320	12/05/08 13:59
Fluoranthene	1.67	1.63		mg/kg wet	98%	52 - 113	8120320	12/05/08 13:59
Fluorene	1.67	1.52		mg/kg wet	91%	54 - 107	8120320	12/05/08 13:59
Hexachlorobenzene	1.67	1.52		mg/kg wet	91%	51 - 117	8120320	12/05/08 13:59
Hexachlorobutadiene	1.67	1.06		mg/kg wet	64%	38 - 117	8120320	12/05/08 13:59
Hexachlorocyclopentadiene	1.67	1.18		mg/kg wet	71%	14 - 123	8120320	12/05/08 13:59
Hexachloroethane	1.67	1.04		mg/kg wet	63%	40 - 114	8120320	12/05/08 13:59
Indeno (1,2,3-cd) pyrene	1.67	1.64		mg/kg wet	99%	47 - 115	8120320	12/05/08 13:59
Isophorone	1.67	1.25		mg/kg wet	75%	35 - 107	8120320	12/05/08 13:59
2-Methylnaphthalene	1.67	1.16		mg/kg wet	69%	42 - 112	8120320	12/05/08 13:59
2-Methylphenol	1.67	1.41		mg/kg wet	85%	44 - 119	8120320	12/05/08 13:59
3/4-Methylphenol	1.67	1.66		mg/kg wet	100%	49 - 129	8120320	12/05/08 13:59
Naphthalene	1.67	1.15		mg/kg wet	69%	34 - 107	8120320	12/05/08 13:59
3-Nitroaniline	1.67	1.49		mg/kg wet	90%	50 - 123	8120320	12/05/08 13:59
2-Nitroaniline	1.67	1.50		mg/kg wet	90%	54 - 120	8120320	12/05/08 13:59
4-Nitroaniline	1.67	1.53		mg/kg wet	92%	46 - 124	8120320	12/05/08 13:59
Nitrobenzene	1.67	1.12		mg/kg wet	67%	35 - 102	8120320	12/05/08 13:59
4-Nitrophenol	1.67	1.70		mg/kg wet	102%	32 - 138	8120320	12/05/08 13:59
2-Nitrophenol	1.67	1.16		mg/kg wet	70%	34 - 119	8120320	12/05/08 13:59
N-Nitrosodiphenylamine	1.67	1.70		mg/kg wet	102%	61 - 139	8120320	12/05/08 13:59
N-Nitrosodi-n-propylamine	1.67	1.42		mg/kg wet	85%	44 - 117	8120320	12/05/08 13:59
Pentachlorophenol	1.67	1.58		mg/kg wet	95%	38 - 141	8120320	12/05/08 13:59
Phenanthrene	1.67	1.57		mg/kg wet	94%	53 - 108	8120320	12/05/08 13:59
Phenol	1.67	1.40		mg/kg wet	84%	43 - 122	8120320	12/05/08 13:59
Pyrene	1.67	1.59		mg/kg wet	95%	54 - 113	8120320	12/05/08 13:59
Pyridine	1.67	0.995		mg/kg wet	60%	30 - 103	8120320	12/05/08 13:59
1,2,4-Trichlorobenzene	1.67	1.09		mg/kg wet	65%	35 - 102	8120320	12/05/08 13:59
1-Methylnaphthalene	1.67	1.18		mg/kg wet	71%	36 - 100	8120320	12/05/08 13:59
2,4,6-Trichlorophenol	1.67	1.49		mg/kg wet	89%	50 - 122	8120320	12/05/08 13:59
2,4,5-Trichlorophenol	1.67	1.55		mg/kg wet	93%	45 - 122	8120320	12/05/08 13:59
Surrogate: Terphenyl-d14	1.67	1.19			72%	26 - 128	8120320	12/05/08 13:59
Surrogate: 2,4,6-Tribromophenol	1.67	1.44			86%	20 - 132	8120320	12/05/08 13:59
Surrogate: Phenol-d5	1.67	1.14			68%	23 - 113	8120320	12/05/08 13:59
Surrogate: 2-Fluorobiphenyl	1.67	1.12			67%	19 - 109	8120320	12/05/08 13:59
Surrogate: 2-Fluorophenol	1.67	1.05			63%	19 - 105	8120320	12/05/08 13:59
Surrogate: Nitrobenzene-d5	1.67	0.931			56%	22 - 104	8120320	12/05/08 13:59
8120709-BS1								
Acenaphthene	50.0	42.4	MNR1	ug/L	85%	49 - 107	8120709	12/04/08 19:20
Acenaphthylene	50.0	40.3	MNR1	ug/L	81%	50 - 108	8120709	12/04/08 19:20

2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
LCS - Cont.

Analyte	Known Val.	Analyzed Val	Q	Units	% Rec.	Target Range	Batch	Analyzed Date/Time
Semivolatile Organic Compounds by EPA Method 8270C								
8120709-BS1								
Anthracene	50.0	49.5	MNR1	ug/L	99%	45 - 133	8120709	12/04/08 19:20
Benzo (a) anthracene	50.0	42.2	MNR1	ug/L	84%	53 - 118	8120709	12/04/08 19:20
Benzo (a) pyrene	50.0	48.0	MNR1	ug/L	96%	35 - 138	8120709	12/04/08 19:20
Benzo (b) fluoranthene	50.0	50.3	MNR1	ug/L	101%	50 - 122	8120709	12/04/08 19:20
Benzo (g,h,i) perylene	50.0	36.2	MNR1	ug/L	72%	47 - 123	8120709	12/04/08 19:20
Benzo (k) fluoranthene	50.0	47.1	MNR1	ug/L	94%	46 - 125	8120709	12/04/08 19:20
4-Bromophenyl phenyl ether	50.0	42.6	MNR1	ug/L	85%	48 - 107	8120709	12/04/08 19:20
Butyl benzyl phthalate	50.0	53.7	MNR1	ug/L	107%	55 - 134	8120709	12/04/08 19:20
Carbazole	50.0	44.4	MNR1	ug/L	89%	55 - 119	8120709	12/04/08 19:20
4-Chloro-3-methylphenol	50.0	38.9	MNR1	ug/L	78%	33 - 122	8120709	12/04/08 19:20
4-Chloroaniline	50.0	29.9	MNR1	ug/L	60%	39 - 108	8120709	12/04/08 19:20
Bis(2-chloroethoxy)methane	50.0	43.2	MNR1	ug/L	86%	48 - 107	8120709	12/04/08 19:20
Bis(2-chloroethyl)ether	50.0	45.1	MNR1	ug/L	90%	48 - 104	8120709	12/04/08 19:20
Bis(2-chloroisopropyl)ether	50.0	44.6	MNR1	ug/L	89%	46 - 105	8120709	12/04/08 19:20
2-Chloronaphthalene	50.0	40.0	MNR1	ug/L	80%	42 - 103	8120709	12/04/08 19:20
2-Chlorophenol	50.0	39.6	MNR1	ug/L	79%	35 - 112	8120709	12/04/08 19:20
4-Chlorophenyl phenyl ether	50.0	45.7	MNR1	ug/L	91%	50 - 116	8120709	12/04/08 19:20
Chrysene	50.0	40.8	MNR1	ug/L	82%	53 - 116	8120709	12/04/08 19:20
Dibenz (a,h) anthracene	50.0	37.6	MNR1	ug/L	75%	50 - 124	8120709	12/04/08 19:20
Dibenzofuran	50.0	40.7	MNR1	ug/L	81%	53 - 114	8120709	12/04/08 19:20
Di-n-butyl phthalate	50.0	57.6	MNR1	ug/L	115%	56 - 126	8120709	12/04/08 19:20
1,4-Dichlorobenzene	50.0	35.6	MNR1	ug/L	71%	28 - 100	8120709	12/04/08 19:20
1,2-Dichlorobenzene	50.0	36.2	MNR1	ug/L	72%	29 - 100	8120709	12/04/08 19:20
1,3-Dichlorobenzene	50.0	34.4	MNR1	ug/L	69%	28 - 100	8120709	12/04/08 19:20
3,3-Dichlorobenzidine	50.0	30.7	MNR1	ug/L	61%	37 - 122	8120709	12/04/08 19:20
2,4-Dichlorophenol	50.0	35.7	MNR1	ug/L	71%	37 - 117	8120709	12/04/08 19:20
Diethyl phthalate	50.0	47.6	MNR1	ug/L	95%	49 - 119	8120709	12/04/08 19:20
2,4-Dimethylphenol	50.0	43.4	MNR1	ug/L	87%	10 - 131	8120709	12/04/08 19:20
Dimethyl phthalate	50.0	45.1	MNR1	ug/L	90%	42 - 126	8120709	12/04/08 19:20
4,6-Dinitro-2-methylphenol	50.0	49.7	MNR1	ug/L	99%	28 - 135	8120709	12/04/08 19:20
2,4-Dinitrophenol	50.0	48.5	MNR1	ug/L	97%	10 - 150	8120709	12/04/08 19:20
2,6-Dinitrotoluene	50.0	43.7	MNR1	ug/L	87%	56 - 122	8120709	12/04/08 19:20
2,4-Dinitrotoluene	50.0	46.4	MNR1	ug/L	93%	56 - 118	8120709	12/04/08 19:20
Di-n-octyl phthalate	50.0	58.5	MNR1	ug/L	117%	46 - 141	8120709	12/04/08 19:20
Bis(2-ethylhexyl)phthalate	50.0	48.9	MNR1	ug/L	98%	54 - 127	8120709	12/04/08 19:20
Fluoranthene	50.0	47.2	MNR1	ug/L	94%	55 - 120	8120709	12/04/08 19:20
Fluorene	50.0	42.4	MNR1	ug/L	85%	53 - 113	8120709	12/04/08 19:20
Hexachlorobenzene	50.0	45.7	MNR1	ug/L	91%	55 - 122	8120709	12/04/08 19:20
Hexachlorobutadiene	50.0	33.5	MNR1	ug/L	67%	23 - 106	8120709	12/04/08 19:20
Hexachlorocyclopentadiene	50.0	26.7	MNR1	ug/L	53%	10 - 106	8120709	12/04/08 19:20
Hexachloroethane	50.0	35.8	MNR1	ug/L	72%	25 - 100	8120709	12/04/08 19:20

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Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
LCS - Cont.

Analyte	Known Val.	Analyzed Val	Q	Units	% Rec.	Target Range	Batch	Analyzed Date/Time
Semivolatile Organic Compounds by EPA Method 8270C								
8120709-BS1								
Indeno (1,2,3-cd) pyrene	50.0	40.1	MNR1	ug/L	80%	50 - 123	8120709	12/04/08 19:20
Isophorone	50.0	42.5	MNR1	ug/L	85%	38 - 107	8120709	12/04/08 19:20
2-Methylnaphthalene	50.0	34.0	MNR1	ug/L	68%	35 - 105	8120709	12/04/08 19:20
2-Methylphenol	50.0	35.0	MNR1	ug/L	70%	21 - 108	8120709	12/04/08 19:20
3/4-Methylphenol	50.0	38.1	MNR1	ug/L	76%	20 - 109	8120709	12/04/08 19:20
Naphthalene	50.0	36.4	MNR1	ug/L	73%	39 - 150	8120709	12/04/08 19:20
3-Nitroaniline	50.0	38.1	MNR1	ug/L	76%	48 - 123	8120709	12/04/08 19:20
2-Nitroaniline	50.0	43.3	MNR1	ug/L	87%	56 - 125	8120709	12/04/08 19:20
4-Nitroaniline	50.0	39.5	MNR1	ug/L	79%	49 - 127	8120709	12/04/08 19:20
Nitrobenzene	50.0	43.5	MNR1	ug/L	87%	39 - 100	8120709	12/04/08 19:20
4-Nitrophenol	50.0	5.13	MNR1	ug/L	10%	10 - 100	8120709	12/04/08 19:20
2-Nitrophenol	50.0	38.9	MNR1	ug/L	78%	38 - 116	8120709	12/04/08 19:20
N-Nitrosodiphenylamine	50.0	50.5	MNR1	ug/L	101%	59 - 147	8120709	12/04/08 19:20
N-Nitrosodi-n-propylamine	50.0	49.5	MNR1	ug/L	99%	51 - 111	8120709	12/04/08 19:20
Pentachlorophenol	50.0	50.8	MNR1	ug/L	102%	34 - 147	8120709	12/04/08 19:20
Phenanthrene	50.0	46.9	MNR1	ug/L	94%	53 - 116	8120709	12/04/08 19:20
Phenol	50.0	19.0	MNR1	ug/L	38%	11 - 100	8120709	12/04/08 19:20
Pyrene	50.0	43.2	MNR1	ug/L	86%	53 - 123	8120709	12/04/08 19:20
1,2,4-Trichlorobenzene	50.0	30.5	MNR1	ug/L	61%	24 - 100	8120709	12/04/08 19:20
1-Methylnaphthalene	50.0	34.8	MNR1	ug/L	70%	28 - 100	8120709	12/04/08 19:20
2,4,6-Trichlorophenol	50.0	40.6	MNR1	ug/L	81%	51 - 121	8120709	12/04/08 19:20
2,4,5-Trichlorophenol	50.0	43.1	MNR1	ug/L	86%	45 - 127	8120709	12/04/08 19:20
Surrogate: Terphenyl-d14	50.0	32.2			64%	21 - 123	8120709	12/04/08 19:20
Surrogate: 2,4,6-Tribromophenol	50.0	44.4			89%	23 - 129	8120709	12/04/08 19:20
Surrogate: Phenol-d5	50.0	15.4			31%	10 - 100	8120709	12/04/08 19:20
Surrogate: 2-Fluorobiphenyl	50.0	34.9			70%	34 - 108	8120709	12/04/08 19:20
Surrogate: 2-Fluorophenol	50.0	21.7			43%	10 - 100	8120709	12/04/08 19:20
Surrogate: Nitrobenzene-d5	50.0	38.0			76%	29 - 116	8120709	12/04/08 19:20
TCLP Volatile Organic Compounds by EPA Method 1311/8260B								
8120939-BS1								
Benzene	50.0	41.5		ug/L	83%	76 - 129	8120939	12/06/08 12:58
2-Butanone	250	208		ug/L	83%	63 - 138	8120939	12/06/08 12:58
Carbon Tetrachloride	50.0	44.0		ug/L	88%	56 - 150	8120939	12/06/08 12:58
Chlorobenzene	50.0	42.2		ug/L	84%	80 - 120	8120939	12/06/08 12:58
Chloroform	50.0	42.3	B	ug/L	85%	78 - 138	8120939	12/06/08 12:58
1,2-Dichloroethane	50.0	42.4		ug/L	85%	70 - 135	8120939	12/06/08 12:58
1,1-Dichloroethene	50.0	42.3		ug/L	85%	77 - 137	8120939	12/06/08 12:58
Tetrachloroethene	50.0	45.5		ug/L	91%	83 - 126	8120939	12/06/08 12:58
Trichloroethene	50.0	42.9		ug/L	86%	78 - 137	8120939	12/06/08 12:58
Vinyl chloride	50.0	43.8		ug/L	88%	62 - 124	8120939	12/06/08 12:58

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2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
LCS - Cont.

Analyte	Known Val.	Analyzed Val	Q	Units	% Rec.	Target Range	Batch	Analyzed Date/Time
TCLP Volatile Organic Compounds by EPA Method 1311/8260B								
8120939-BS1								
Surrogate: 1,2-Dichloroethane-d4	25.0	25.2			101%	60 - 140	8120939	12/06/08 12:58
Surrogate: Dibromofluoromethane	25.0	25.0			100%	75 - 124	8120939	12/06/08 12:58
Surrogate: Toluene-d8	25.0	22.6			90%	78 - 121	8120939	12/06/08 12:58
Surrogate: 4-Bromofluorobenzene	25.0	24.6			98%	79 - 124	8120939	12/06/08 12:58
TCLP Semivolatile Organic Compounds by EPA Method 1311/8270C								
8121008-BS1								
Cresol(s)	0.400	0.329		mg/L	82%	38 - 113	8121008	12/11/08 23:47
1,4-Dichlorobenzene	0.200	0.126		mg/L	63%	23 - 104	8121008	12/11/08 23:47
2,4-Dinitrotoluene	0.200	0.176		mg/L	88%	49 - 123	8121008	12/11/08 23:47
Hexachlorobenzene	0.200	0.156		mg/L	78%	50 - 125	8121008	12/11/08 23:47
Hexachlorobutadiene	0.200	0.123		mg/L	62%	19 - 117	8121008	12/11/08 23:47
Hexachloroethane	0.200	0.123		mg/L	62%	20 - 108	8121008	12/11/08 23:47
Nitrobenzene	0.200	0.142		mg/L	71%	35 - 110	8121008	12/11/08 23:47
Pentachlorophenol	0.200	0.150		mg/L	75%	39 - 146	8121008	12/11/08 23:47
Pyridine	0.200	0.0772		mg/L	39%	10 - 100	8121008	12/11/08 23:47
2,4,6-Trichlorophenol	0.200	0.167		mg/L	83%	34 - 131	8121008	12/11/08 23:47
2,4,5-Trichlorophenol	0.200	0.174		mg/L	87%	37 - 130	8121008	12/11/08 23:47
Surrogate: Terphenyl-d14	0.100	0.0668			67%	21 - 123	8121008	12/11/08 23:47
Surrogate: 2,4,6-Tribromophenol	0.100	0.0865			87%	23 - 129	8121008	12/11/08 23:47
Surrogate: Phenol-d5	0.100	0.0432			43%	10 - 100	8121008	12/11/08 23:47
Surrogate: 2-Fluorobiphenyl	0.100	0.0716			72%	34 - 108	8121008	12/11/08 23:47
Surrogate: 2-Fluorophenol	0.100	0.0516			52%	34 - 108	8121008	12/11/08 23:47
Surrogate: Nitrobenzene-d5	0.100	0.0683			68%	29 - 116	8121008	12/11/08 23:47

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2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA

LCS Dup

Analyte	Orig. Val.	Duplicate	Q	Units	Spike Conc	% Rec.	Target Range	RPD	Limit	Batch	Sample Duplicated	Analyzed Date/Time
Total Metals by EPA Method 6010B												
8120688-BSD1												
Antimony		0.104		mg/L	0.100	104%	80 - 120	0	20	8120688		12/04/08 21:30
Arsenic		0.0442		mg/L	0.0500	88%	80 - 120	0.2	20	8120688		12/04/08 21:30
Barium		1.99		mg/L	2.00	99%	80 - 120	2	20	8120688		12/04/08 21:30
Cadmium		0.0485		mg/L	0.0500	97%	80 - 120	0.8	20	8120688		12/04/08 21:30
Chromium		0.204		mg/L	0.200	102%	80 - 120	0.7	20	8120688		12/04/08 21:30
Lead		0.0491		mg/L	0.0500	98%	80 - 120	2	20	8120688		12/04/08 21:30
Selenium		0.0488		mg/L	0.0500	98%	80 - 120	1	20	8120688		12/04/08 21:30
Silver		0.0479		mg/L	0.0500	96%	80 - 120	0.8	20	8120688		12/04/08 21:30
Mercury by EPA Methods 7470A/7471A												
8120683-BSD1												
Mercury		0.000783		mg/L	0.00100	78%	78 - 124	21	22	8120683		12/04/08 20:10
TCLP Metals by 6000/7000 Series Methods												
8120910-BSD1												
Mercury		0.0203		mg/L	0.0200	102%	78 - 124	9	22	8120910		12/05/08 17:42
Volatile Organic Compounds by EPA Method 8260B												
8120667-BSD1												
Acetone		295		ug/L	250	118%	62 - 150	5	29	8120667		12/05/08 18:03
Benzene		51.7		ug/L	50.0	103%	80 - 137	3	23	8120667		12/05/08 18:03
Bromobenzene		50.7		ug/L	50.0	101%	74 - 131	2	18	8120667		12/05/08 18:03
Bromochloromethane		52.2		ug/L	50.0	104%	80 - 128	4	18	8120667		12/05/08 18:03
Bromodichloromethane		46.8		ug/L	50.0	94%	80 - 129	2	18	8120667		12/05/08 18:03
Bromoform		38.6		ug/L	50.0	77%	69 - 127	0.9	24	8120667		12/05/08 18:03
Bromomethane		50.8		ug/L	50.0	102%	62 - 148	0.2	45	8120667		12/05/08 18:03
2-Butanone		283		ug/L	250	113%	77 - 141	3	36	8120667		12/05/08 18:03
sec-Butylbenzene		50.7		ug/L	50.0	101%	78 - 133	3	17	8120667		12/05/08 18:03
n-Butylbenzene		53.9		ug/L	50.0	108%	72 - 136	2	18	8120667		12/05/08 18:03
tert-Butylbenzene		48.6		ug/L	50.0	97%	77 - 135	4	17	8120667		12/05/08 18:03
Carbon disulfide		58.7		ug/L	50.0	117%	80 - 126	0.02	16	8120667		12/05/08 18:03
Carbon Tetrachloride		49.4		ug/L	50.0	99%	76 - 143	4	29	8120667		12/05/08 18:03
Chlorobenzene		48.9		ug/L	50.0	98%	80 - 120	4	27	8120667		12/05/08 18:03
Chlorodibromomethane		42.6		ug/L	50.0	85%	76 - 123	0.7	21	8120667		12/05/08 18:03
Chloroethane		54.7		ug/L	50.0	109%	77 - 127	0.3	32	8120667		12/05/08 18:03
Chloroform		49.4		ug/L	50.0	99%	80 - 133	6	28	8120667		12/05/08 18:03
Chloromethane		38.7		ug/L	50.0	77%	33 - 125	8	21	8120667		12/05/08 18:03
2-Chlorotoluene		49.4		ug/L	50.0	99%	80 - 127	5	16	8120667		12/05/08 18:03
4-Chlorotoluene		49.0		ug/L	50.0	98%	80 - 127	4	17	8120667		12/05/08 18:03
1,2-Dibromo-3-chloropropane		37.4		ug/L	50.0	75%	60 - 136	0.9	29	8120667		12/05/08 18:03
1,2-Dibromoethane (EDB)		52.6		ug/L	50.0	105%	80 - 125	1	21	8120667		12/05/08 18:03

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Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA

LCS Dup - Cont.

Volatile Organic Compounds by EPA Method 8260B

8120667-BSD1

Analyte	Orig. Val.	Duplicate	Q	Units	Spike Conc	% Rec.	Target Range	RPD	Limit	Batch	Sample Duplicated	Analyzed Date/Time
Dibromomethane		49.9		ug/L	50.0	100%	80 - 124	0.6	20	8120667		12/05/08 18:03
1,4-Dichlorobenzene		45.3		ug/L	50.0	91%	80 - 120	3	19	8120667		12/05/08 18:03
1,3-Dichlorobenzene		45.9		ug/L	50.0	92%	80 - 123	3	18	8120667		12/05/08 18:03
1,2-Dichlorobenzene		47.2		ug/L	50.0	94%	80 - 122	0.9	23	8120667		12/05/08 18:03
Dichlorodifluoromethane		35.5		ug/L	50.0	71%	36 - 120	2	14	8120667		12/05/08 18:03
1,1-Dichloroethane		53.2		ug/L	50.0	106%	76 - 130	5	15	8120667		12/05/08 18:03
1,2-Dichloroethane		49.3		ug/L	50.0	99%	69 - 136	0	26	8120667		12/05/08 18:03
cis-1,2-Dichloroethene		54.2		ug/L	50.0	108%	80 - 129	6	14	8120667		12/05/08 18:03
1,1-Dichloroethene		55.7		ug/L	50.0	111%	80 - 127	1	26	8120667		12/05/08 18:03
trans-1,2-Dichloroethene		54.4		ug/L	50.0	109%	80 - 131	3	14	8120667		12/05/08 18:03
1,3-Dichloropropane		52.0		ug/L	50.0	104%	80 - 122	0.8	21	8120667		12/05/08 18:03
1,2-Dichloropropane		48.1		ug/L	50.0	96%	80 - 120	2	16	8120667		12/05/08 18:03
2,2-Dichloropropane		59.2		ug/L	50.0	118%	62 - 142	5	14	8120667		12/05/08 18:03
cis-1,3-Dichloropropene		52.7		ug/L	50.0	105%	76 - 135	0.3	19	8120667		12/05/08 18:03
trans-1,3-Dichloropropene		46.9		ug/L	50.0	94%	70 - 137	0.9	20	8120667		12/05/08 18:03
1,1-Dichloropropene		51.9		ug/L	50.0	104%	80 - 127	6	14	8120667		12/05/08 18:03
Ethylbenzene		51.2		ug/L	50.0	102%	80 - 128	4	17	8120667		12/05/08 18:03
Hexachlorobutadiene		46.6	B	ug/L	50.0	93%	68 - 148	4	34	8120667		12/05/08 18:03
2-Hexanone		276		ug/L	250	111%	69 - 148	2	34	8120667		12/05/08 18:03
Isopropylbenzene		53.7		ug/L	50.0	107%	80 - 121	4	18	8120667		12/05/08 18:03
p-Isopropyltoluene		49.0		ug/L	50.0	98%	79 - 127	3	17	8120667		12/05/08 18:03
Methyl tert-Butyl Ether		61.7		ug/L	50.0	123%	70 - 129	8	32	8120667		12/05/08 18:03
Methylene Chloride		48.0		ug/L	50.0	96%	76 - 135	0.1	18	8120667		12/05/08 18:03
4-Methyl-2-pentanone		270		ug/L	250	108%	67 - 143	0.7	31	8120667		12/05/08 18:03
Naphthalene		48.9		ug/L	50.0	98%	62 - 141	3	39	8120667		12/05/08 18:03
n-Propylbenzene		50.3		ug/L	50.0	101%	80 - 132	4	17	8120667		12/05/08 18:03
Styrene		55.2		ug/L	50.0	110%	80 - 139	4	16	8120667		12/05/08 18:03
1,1,1,2-Tetrachloroethane		45.1		ug/L	50.0	90%	80 - 135	2	17	8120667		12/05/08 18:03
1,1,2,2-Tetrachloroethane		52.3		ug/L	50.0	105%	65 - 145	0.04	28	8120667		12/05/08 18:03
Tetrachloroethene		47.2		ug/L	50.0	94%	80 - 125	4	27	8120667		12/05/08 18:03
Toluene		50.7		ug/L	50.0	101%	80 - 125	4	19	8120667		12/05/08 18:03
1,2,3-Trichlorobenzene		46.8		ug/L	50.0	94%	57 - 144	4	31	8120667		12/05/08 18:03
1,2,4-Trichlorobenzene		45.9		ug/L	50.0	92%	60 - 140	1	26	8120667		12/05/08 18:03
1,1,2-Trichloroethane		50.2		ug/L	50.0	100%	80 - 122	0.8	21	8120667		12/05/08 18:03
1,1,1-Trichloroethane		55.7		ug/L	50.0	111%	80 - 131	3	16	8120667		12/05/08 18:03
Trichloroethene		49.4		ug/L	50.0	99%	80 - 131	4	28	8120667		12/05/08 18:03
Trichlorofluoromethane		43.5		ug/L	50.0	87%	68 - 125	0.1	20	8120667		12/05/08 18:03
1,2,3-Trichloropropane		48.5		ug/L	50.0	97%	60 - 127	0.9	26	8120667		12/05/08 18:03
1,3,5-Trimethylbenzene		50.4		ug/L	50.0	101%	80 - 129	4	16	8120667		12/05/08 18:03
1,2,4-Trimethylbenzene		50.2		ug/L	50.0	100%	80 - 128	4	22	8120667		12/05/08 18:03
Vinyl chloride		44.1		ug/L	50.0	88%	69 - 120	1	26	8120667		12/05/08 18:03

2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

Client	S&ME, Inc. (2420) 620 Wando Park Blvd. Mt. Pleasant, SC 29464	Work Order: Project Name: Project Number:	NRL0332 Charleston Naval Complex 1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
LCS Dup - Cont.

Analyte	Orig. Val.	Duplicate	Q	Units	Spike Conc	% Rec.	Target Range	RPD	Limit	Batch	Sample Duplicated	Analyzed Date/Time
Volatile Organic Compounds by EPA Method 8260B												
8120667-BSD1												
Xylenes, total		157		ug/L	150	104%	80 - 129	5	18	8120667		12/05/08 18:03
Surrogate: 1,2-Dichloroethane-d4		23.2		ug/L	25.0	93%	60 - 140			8120667		12/05/08 18:03
Surrogate: Dibromofluoromethane		25.3		ug/L	25.0	101%	75 - 124			8120667		12/05/08 18:03
Surrogate: Toluene-d8		25.6		ug/L	25.0	102%	78 - 121			8120667		12/05/08 18:03
Surrogate: 4-Bromofluorobenzene		26.3		ug/L	25.0	105%	79 - 124			8120667		12/05/08 18:03
8120937-BSD1												
Acetone		247		ug/kg	250	99%	49 - 150	1	45	8120937		12/10/08 13:43
Benzene		46.6		ug/kg	50.0	93%	76 - 130	6	43	8120937		12/10/08 13:43
Bromobenzene		46.9		ug/kg	50.0	94%	80 - 128	1	50	8120937		12/10/08 13:43
Bromochloromethane		50.7		ug/kg	50.0	101%	70 - 135	12	32	8120937		12/10/08 13:43
Bromodichloromethane		54.8		ug/kg	50.0	110%	78 - 135	15	37	8120937		12/10/08 13:43
Bromoform		44.4		ug/kg	50.0	89%	67 - 143	2	50	8120937		12/10/08 13:43
Bromomethane		54.6		ug/kg	50.0	109%	58 - 150	18	50	8120937		12/10/08 13:43
2-Butanone		242		ug/kg	250	97%	61 - 143	3	43	8120937		12/10/08 13:43
sec-Butylbenzene		48.8		ug/kg	50.0	98%	80 - 134	4	50	8120937		12/10/08 13:43
n-Butylbenzene		47.5		ug/kg	50.0	95%	71 - 141	2	50	8120937		12/10/08 13:43
tert-Butylbenzene		49.1		ug/kg	50.0	98%	79 - 132	5	50	8120937		12/10/08 13:43
Carbon disulfide		49.8		ug/kg	50.0	100%	70 - 134	16	47	8120937		12/10/08 13:43
Carbon Tetrachloride		45.8		ug/kg	50.0	92%	75 - 137	3	44	8120937		12/10/08 13:43
Chlorobenzene		48.2		ug/kg	50.0	96%	80 - 121	4	44	8120937		12/10/08 13:43
Chlorodibromomethane		50.6		ug/kg	50.0	101%	77 - 130	4	45	8120937		12/10/08 13:43
Chloroethane		53.9		ug/kg	50.0	108%	62 - 149	16	50	8120937		12/10/08 13:43
Chloroform		49.7		ug/kg	50.0	99%	75 - 130	14	36	8120937		12/10/08 13:43
Chloromethane		49.2		ug/kg	50.0	98%	35 - 130	12	50	8120937		12/10/08 13:43
2-Chlorotoluene		47.4		ug/kg	50.0	95%	80 - 131	3	50	8120937		12/10/08 13:43
4-Chlorotoluene		45.8		ug/kg	50.0	92%	80 - 129	2	50	8120937		12/10/08 13:43
1,2-Dibromo-3-chloropropane		46.1		ug/kg	50.0	92%	62 - 142	7	50	8120937		12/10/08 13:43
1,2-Dibromoethane (EDB)		49.2		ug/kg	50.0	98%	81 - 130	1	50	8120937		12/10/08 13:43
Dibromomethane		53.3		ug/kg	50.0	107%	77 - 133	10	45	8120937		12/10/08 13:43
1,4-Dichlorobenzene		46.0		ug/kg	50.0	92%	75 - 128	2	50	8120937		12/10/08 13:43
1,3-Dichlorobenzene		45.9		ug/kg	50.0	92%	79 - 128	3	50	8120937		12/10/08 13:43
1,2-Dichlorobenzene		47.7		ug/kg	50.0	95%	80 - 130	3	50	8120937		12/10/08 13:43
Dichlorodifluoromethane		53.3		ug/kg	50.0	107%	11 - 129	12	43	8120937		12/10/08 13:43
1,1-Dichloroethane		51.2		ug/kg	50.0	102%	68 - 150	14	37	8120937		12/10/08 13:43
1,2-Dichloroethane		45.0		ug/kg	50.0	90%	72 - 132	0.8	44	8120937		12/10/08 13:43
cis-1,2-Dichloroethene		52.2		ug/kg	50.0	104%	77 - 132	14	35	8120937		12/10/08 13:43
1,1-Dichloroethene		51.1		ug/kg	50.0	102%	75 - 133	17	41	8120937		12/10/08 13:43
trans-1,2-Dichloroethene		50.5		ug/kg	50.0	101%	79 - 133	15	37	8120937		12/10/08 13:43
1,3-Dichloropropane		48.0		ug/kg	50.0	96%	80 - 125	0.4	44	8120937		12/10/08 13:43
1,2-Dichloropropane		49.7		ug/kg	50.0	99%	75 - 124	14	35	8120937		12/10/08 13:43

Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA

LCS Dup - Cont.

Analyte	Orig. Val.	Duplicate	Q	Units	Spike Conc	% Rec.	Target Range	RPD	Limit	Batch	Sample Duplicated	Analyzed Date/Time
Volatile Organic Compounds by EPA Method 8260B												
8120937-BSD1												
2,2-Dichloropropane		50.3		ug/kg	50.0	101%	59 - 144	14	33	8120937		12/10/08 13:43
cis-1,3-Dichloropropene		50.5		ug/kg	50.0	101%	80 - 137	5	43	8120937		12/10/08 13:43
trans-1,3-Dichloropropene		49.5		ug/kg	50.0	99%	75 - 133	4	50	8120937		12/10/08 13:43
1,1-Dichloropropene		46.2		ug/kg	50.0	92%	76 - 133	5	41	8120937		12/10/08 13:43
Ethylbenzene		48.4		ug/kg	50.0	97%	80 - 128	5	48	8120937		12/10/08 13:43
Hexachlorobutadiene		51.9		ug/kg	50.0	104%	60 - 150	2	50	8120937		12/10/08 13:43
2-Hexanone		228		ug/kg	250	91%	63 - 149	9	50	8120937		12/10/08 13:43
Isopropylbenzene		50.5		ug/kg	50.0	101%	74 - 131	4	50	8120937		12/10/08 13:43
p-Isopropyltoluene		46.6		ug/kg	50.0	93%	75 - 133	2	50	8120937		12/10/08 13:43
Methyl tert-Butyl Ether		50.9		ug/kg	50.0	102%	67 - 130	10	45	8120937		12/10/08 13:43
Methylene Chloride		52.0		ug/kg	50.0	104%	65 - 144	12	39	8120937		12/10/08 13:43
4-Methyl-2-pentanone		227		ug/kg	250	91%	64 - 142	7	50	8120937		12/10/08 13:43
Naphthalene		44.1		ug/kg	50.0	88%	63 - 144	2	50	8120937		12/10/08 13:43
n-Propylbenzene		46.5		ug/kg	50.0	93%	80 - 131	4	50	8120937		12/10/08 13:43
Styrene		50.9		ug/kg	50.0	102%	80 - 144	3	50	8120937		12/10/08 13:43
1,1,1,2-Tetrachloroethane		49.9		ug/kg	50.0	100%	80 - 129	4	43	8120937		12/10/08 13:43
1,1,2,2-Tetrachloroethane		46.2		ug/kg	50.0	92%	73 - 139	6	50	8120937		12/10/08 13:43
Tetrachloroethene		45.6		ug/kg	50.0	91%	76 - 128	5	45	8120937		12/10/08 13:43
Toluene		48.4		ug/kg	50.0	97%	80 - 125	7	44	8120937		12/10/08 13:43
1,2,3-Trichlorobenzene		45.7		ug/kg	50.0	91%	64 - 136	1	50	8120937		12/10/08 13:43
1,2,4-Trichlorobenzene		44.6		ug/kg	50.0	89%	58 - 145	0.6	50	8120937		12/10/08 13:43
1,1,2-Trichloroethane		48.6		ug/kg	50.0	97%	80 - 127	2	41	8120937		12/10/08 13:43
1,1,1-Trichloroethane		51.3		ug/kg	50.0	103%	76 - 134	15	39	8120937		12/10/08 13:43
Trichloroethene		50.7		ug/kg	50.0	101%	75 - 131	2	40	8120937		12/10/08 13:43
Trichlorofluoromethane		58.9		ug/kg	50.0	118%	63 - 130	16	42	8120937		12/10/08 13:43
1,2,3-Trichloropropane		40.5		ug/kg	50.0	81%	66 - 129	6	50	8120937		12/10/08 13:43
1,3,5-Trimethylbenzene		47.7		ug/kg	50.0	95%	78 - 133	4	50	8120937		12/10/08 13:43
1,2,4-Trimethylbenzene		47.6		ug/kg	50.0	95%	76 - 135	4	50	8120937		12/10/08 13:43
Vinyl chloride		49.2		ug/kg	50.0	98%	58 - 134	16	41	8120937		12/10/08 13:43
Xylenes, total		144		ug/kg	150	96%	79 - 130	4	48	8120937		12/10/08 13:43
Surrogate: 1,2-Dichloroethane-d4		47.8		ug/kg	50.0	96%	41 - 150			8120937		12/10/08 13:43
Surrogate: Dibromofluoromethane		54.5		ug/kg	50.0	109%	55 - 139			8120937		12/10/08 13:43
Surrogate: Toluene-d8		51.5		ug/kg	50.0	103%	57 - 148			8120937		12/10/08 13:43
Surrogate: 4-Bromofluorobenzene		48.9		ug/kg	50.0	98%	58 - 150			8120937		12/10/08 13:43
8121404-BSD1												
Acetone		263		ug/kg	250	105%	49 - 150	4	45	8121404		12/10/08 00:25
Benzene		49.4		ug/kg	50.0	99%	76 - 130	0.2	43	8121404		12/10/08 00:25
Bromobenzene		56.3		ug/kg	50.0	113%	80 - 128	0.9	50	8121404		12/10/08 00:25
Bromochloromethane		41.8		ug/kg	50.0	84%	70 - 135	0.8	32	8121404		12/10/08 00:25
Bromodichloromethane		41.5		ug/kg	50.0	83%	78 - 135	0.2	37	8121404		12/10/08 00:25

Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA

LCS Dup - Cont.

Analyte	Orig. Val.	Duplicate	Q	Units	Spike Conc	% Rec.	Target Range	RPD	Limit	Batch	Sample Duplicated	Analyzed Date/Time
Volatile Organic Compounds by EPA Method 8260B												
8121404-BSD1												
Bromoform		40.1		ug/kg	50.0	80%	67 - 143	2	50	8121404		12/10/08 00:25
Bromomethane		44.0		ug/kg	50.0	88%	58 - 150	3	50	8121404		12/10/08 00:25
2-Butanone		246		ug/kg	250	98%	61 - 143	4	43	8121404		12/10/08 00:25
sec-Butylbenzene		52.1		ug/kg	50.0	104%	80 - 134	1	50	8121404		12/10/08 00:25
n-Butylbenzene		53.9		ug/kg	50.0	108%	71 - 141	0.3	50	8121404		12/10/08 00:25
tert-Butylbenzene		48.2		ug/kg	50.0	96%	79 - 132	1	50	8121404		12/10/08 00:25
Carbon disulfide		50.0		ug/kg	50.0	100%	70 - 134	2	47	8121404		12/10/08 00:25
Carbon Tetrachloride		41.9		ug/kg	50.0	84%	75 - 137	0.6	44	8121404		12/10/08 00:25
Chlorobenzene		47.1		ug/kg	50.0	94%	80 - 121	0.3	44	8121404		12/10/08 00:25
Chlorodibromomethane		44.0		ug/kg	50.0	88%	77 - 130	2	45	8121404		12/10/08 00:25
Chloroethane		59.5		ug/kg	50.0	119%	62 - 149	0.2	50	8121404		12/10/08 00:25
Chloroform		47.1		ug/kg	50.0	94%	75 - 130	0.1	36	8121404		12/10/08 00:25
Chloromethane		48.0		ug/kg	50.0	96%	35 - 130	4	50	8121404		12/10/08 00:25
2-Chlorotoluene		53.2		ug/kg	50.0	106%	80 - 131	1	50	8121404		12/10/08 00:25
4-Chlorotoluene		52.6		ug/kg	50.0	105%	80 - 129	2	50	8121404		12/10/08 00:25
1,2-Dibromo-3-chloropropane		46.6		ug/kg	50.0	93%	62 - 142	5	50	8121404		12/10/08 00:25
1,2-Dibromoethane (EDB)		46.8		ug/kg	50.0	94%	81 - 130	1	50	8121404		12/10/08 00:25
Dibromomethane		44.3		ug/kg	50.0	89%	77 - 133	2	45	8121404		12/10/08 00:25
1,4-Dichlorobenzene		48.3		ug/kg	50.0	97%	75 - 128	2	50	8121404		12/10/08 00:25
1,3-Dichlorobenzene		48.8		ug/kg	50.0	98%	79 - 128	1	50	8121404		12/10/08 00:25
1,2-Dichlorobenzene		49.5		ug/kg	50.0	99%	80 - 130	0.2	50	8121404		12/10/08 00:25
Dichlorodifluoromethane		49.5		ug/kg	50.0	99%	11 - 129	0.9	43	8121404		12/10/08 00:25
1,1-Dichloroethane		47.2		ug/kg	50.0	94%	68 - 150	0.9	37	8121404		12/10/08 00:25
1,2-Dichloroethane		40.8		ug/kg	50.0	82%	72 - 132	0.2	44	8121404		12/10/08 00:25
cis-1,2-Dichloroethene		48.3		ug/kg	50.0	97%	77 - 132	0.4	35	8121404		12/10/08 00:25
1,1-Dichloroethene		46.1		ug/kg	50.0	92%	75 - 133	2	41	8121404		12/10/08 00:25
trans-1,2-Dichloroethene		47.4		ug/kg	50.0	95%	79 - 133	0.4	37	8121404		12/10/08 00:25
1,3-Dichloropropane		49.9		ug/kg	50.0	100%	80 - 125	2	44	8121404		12/10/08 00:25
1,2-Dichloropropane		45.8		ug/kg	50.0	92%	75 - 124	6	35	8121404		12/10/08 00:25
2,2-Dichloropropane		41.9		ug/kg	50.0	84%	59 - 144	1	33	8121404		12/10/08 00:25
cis-1,3-Dichloropropene		51.3		ug/kg	50.0	103%	80 - 137	0.8	43	8121404		12/10/08 00:25
trans-1,3-Dichloropropene		46.0		ug/kg	50.0	92%	75 - 133	0.4	50	8121404		12/10/08 00:25
1,1-Dichloropropene		47.9		ug/kg	50.0	96%	76 - 133	0.6	41	8121404		12/10/08 00:25
Ethylbenzene		48.7		ug/kg	50.0	97%	80 - 128	0.2	48	8121404		12/10/08 00:25
Hexachlorobutadiene		40.4		ug/kg	50.0	81%	60 - 150	6	50	8121404		12/10/08 00:25
2-Hexanone		273		ug/kg	250	109%	63 - 149	5	50	8121404		12/10/08 00:25
Isopropylbenzene		48.2		ug/kg	50.0	96%	74 - 131	0.02	50	8121404		12/10/08 00:25
p-Isopropyltoluene		48.5		ug/kg	50.0	97%	75 - 133	2	50	8121404		12/10/08 00:25
Methyl tert-Butyl Ether		43.6		ug/kg	50.0	87%	67 - 130	0.6	45	8121404		12/10/08 00:25
Methylene Chloride		52.3		ug/kg	50.0	105%	65 - 144	1	39	8121404		12/10/08 00:25
4-Methyl-2-pentanone		270		ug/kg	250	108%	64 - 142	4	50	8121404		12/10/08 00:25

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THE LEADER IN ENVIRONMENTAL TESTING

2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA

LCS Dup - Cont.

Analyte	Orig. Val.	Duplicate	Q	Units	Spike Conc	% Rec.	Target Range	RPD	Limit	Batch	Sample Duplicated	Analyzed Date/Time
Volatile Organic Compounds by EPA Method 8260B												
8121404-BSD1												
Naphthalene		49.3		ug/kg	50.0	99%	63 - 144	1	50	8121404		12/10/08 00:25
n-Propylbenzene		52.9		ug/kg	50.0	106%	80 - 131	2	50	8121404		12/10/08 00:25
Styrene		49.9		ug/kg	50.0	100%	80 - 144	0.5	50	8121404		12/10/08 00:25
1,1,1,2-Tetrachloroethane		44.0		ug/kg	50.0	88%	80 - 129	0.4	43	8121404		12/10/08 00:25
1,1,2,2-Tetrachloroethane		59.3		ug/kg	50.0	119%	73 - 139	2	50	8121404		12/10/08 00:25
Tetrachloroethene		40.0		ug/kg	50.0	80%	76 - 128	0.7	45	8121404		12/10/08 00:25
Toluene		49.7		ug/kg	50.0	99%	80 - 125	0.4	44	8121404		12/10/08 00:25
1,2,3-Trichlorobenzene		45.8		ug/kg	50.0	92%	64 - 136	3	50	8121404		12/10/08 00:25
1,2,4-Trichlorobenzene		46.0		ug/kg	50.0	92%	58 - 145	3	50	8121404		12/10/08 00:25
1,1,2-Trichloroethane		45.4		ug/kg	50.0	91%	80 - 127	2	41	8121404		12/10/08 00:25
1,1,1-Trichloroethane		41.7		ug/kg	50.0	83%	76 - 134	0.1	39	8121404		12/10/08 00:25
Trichloroethene		41.6		ug/kg	50.0	83%	75 - 131	0.1	40	8121404		12/10/08 00:25
Trichlorofluoromethane		45.6		ug/kg	50.0	91%	63 - 130	1	42	8121404		12/10/08 00:25
1,2,3-Trichloropropane		46.6		ug/kg	50.0	93%	66 - 129	2	50	8121404		12/10/08 00:25
1,3,5-Trimethylbenzene		51.4		ug/kg	50.0	103%	78 - 133	0.9	50	8121404		12/10/08 00:25
1,2,4-Trimethylbenzene		49.4		ug/kg	50.0	99%	76 - 135	2	50	8121404		12/10/08 00:25
Vinyl chloride		53.8		ug/kg	50.0	108%	58 - 134	0.8	41	8121404		12/10/08 00:25
Xylenes, total		140		ug/kg	150	93%	79 - 130	0.2	48	8121404		12/10/08 00:25
1,1,2-Trifluorotrichloroethane		45.8		ug/kg	50.0	92%	73 - 126	2	50	8121404		12/10/08 00:25
Surrogate: 1,2-Dichloroethane-d4		44.2		ug/kg	50.0	88%	41 - 150			8121404		12/10/08 00:25
Surrogate: Dibromofluoromethane		47.1		ug/kg	50.0	94%	55 - 139			8121404		12/10/08 00:25
Surrogate: Toluene-d8		52.2		ug/kg	50.0	104%	57 - 148			8121404		12/10/08 00:25
Surrogate: 4-Bromofluorobenzene		53.0		ug/kg	50.0	106%	58 - 150			8121404		12/10/08 00:25
TCLP Volatile Organic Compounds by EPA Method 1311/8260B												
8120939-BSD1												
Benzene		41.9		ug/L	50.0	84%	76 - 129	1	50	8120939		12/06/08 13:26
2-Butanone		217		ug/L	250	87%	63 - 138	4	50	8120939		12/06/08 13:26
Carbon Tetrachloride		44.6		ug/L	50.0	89%	56 - 150	1	50	8120939		12/06/08 13:26
Chlorobenzene		42.3		ug/L	50.0	85%	80 - 120	0.2	50	8120939		12/06/08 13:26
Chloroform		42.9	B	ug/L	50.0	86%	78 - 138	1	50	8120939		12/06/08 13:26
1,2-Dichloroethane		43.2		ug/L	50.0	86%	70 - 135	2	50	8120939		12/06/08 13:26
1,1-Dichloroethene		44.0		ug/L	50.0	88%	77 - 137	4	50	8120939		12/06/08 13:26
Tetrachloroethene		46.4		ug/L	50.0	93%	83 - 126	2	50	8120939		12/06/08 13:26
Trichloroethene		43.4		ug/L	50.0	87%	78 - 137	1	50	8120939		12/06/08 13:26
Vinyl chloride		45.3		ug/L	50.0	91%	62 - 124	3	50	8120939		12/06/08 13:26
Surrogate: 1,2-Dichloroethane-d4		25.2		ug/L	25.0	101%	60 - 140			8120939		12/06/08 13:26
Surrogate: Dibromofluoromethane		25.0		ug/L	25.0	100%	75 - 124			8120939		12/06/08 13:26
Surrogate: Toluene-d8		22.9		ug/L	25.0	92%	78 - 121			8120939		12/06/08 13:26
Surrogate: 4-Bromofluorobenzene		24.5		ug/L	25.0	98%	79 - 124			8120939		12/06/08 13:26

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	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
Matrix Spike

Analyte	Orig. Val.	MS Val	Q	Units	Spike Conc	% Rec.	Target Range	Batch	Sample Spiked	Analyzed Date/Time
Total Metals by EPA Method 6010B										
8120688-MS1										
Antimony	ND	0.109		mg/L	0.100	109%	75 - 125	8120688	NRL0178-05	12/04/08 21:39
Arsenic	ND	0.0456		mg/L	0.0500	91%	75 - 125	8120688	NRL0178-05	12/04/08 21:39
Barium	0.0316	2.09		mg/L	2.00	103%	75 - 125	8120688	NRL0178-05	12/04/08 21:39
Cadmium	ND	0.0496		mg/L	0.0500	99%	75 - 125	8120688	NRL0178-05	12/04/08 21:39
Chromium	ND	0.207		mg/L	0.200	104%	75 - 125	8120688	NRL0178-05	12/04/08 21:39
Lead	ND	0.0547		mg/L	0.0500	109%	75 - 125	8120688	NRL0178-05	12/04/08 21:39
Selenium	0.00560	0.0518		mg/L	0.0500	92%	75 - 125	8120688	NRL0178-05	12/04/08 21:39
Silver	ND	0.0522		mg/L	0.0500	104%	75 - 125	8120688	NRL0178-05	12/04/08 21:39
8121573-MS1										
Antimony	ND	91.7		mg/kg wet	97.5	94%	75 - 125	8121573	NRL0510-02	12/11/08 12:29
Arsenic	12.5	31.5		mg/kg wet	19.5	97%	75 - 125	8121573	NRL0510-02	12/11/08 12:29
Barium	72.7	446		mg/kg wet	390	96%	75 - 125	8121573	NRL0510-02	12/11/08 12:29
Cadmium	ND	17.9		mg/kg wet	19.5	92%	75 - 125	8121573	NRL0510-02	12/11/08 12:29
Chromium	34.4	78.8		mg/kg wet	39.0	114%	75 - 125	8121573	NRL0510-02	12/11/08 12:29
Lead	18.7	119		mg/kg wet	97.5	103%	75 - 125	8121573	NRL0510-02	12/11/08 12:29
Selenium	ND	17.8		mg/kg wet	19.5	91%	75 - 125	8121573	NRL0510-02	12/11/08 12:29
Silver	0.516	10.0		mg/kg wet	9.75	98%	75 - 125	8121573	NRL0510-02	12/11/08 12:29
Mercury by EPA Methods 7470A/7471A										
8120683-MS1										
Mercury	0.000189	0.00111		mg/L	0.00100	92%	63 - 138	8120683	NRL0036-01	12/04/08 18:57
8120735-MS1										
Mercury	ND	0.342		mg/kg dry	0.287	119%	60 - 149	8120735	NRL0332-05	12/04/08 15:12
TCLP Metals by 6000/7000 Series Methods										
8120910-MS1										
Mercury	ND	0.0207		mg/L	0.0200	104%	63 - 138	8120910	NRL0126-01	12/05/08 16:54
8120922-MS1										
Arsenic	ND	10.0		mg/L	10.0	100%	75 - 125	8120922	NRL0410-02	12/06/08 00:59
Barium	0.0350	50.5		mg/L	50.0	101%	75 - 125	8120922	NRL0410-02	12/06/08 00:59
Cadmium	ND	9.83		mg/L	10.0	98%	75 - 125	8120922	NRL0410-02	12/06/08 00:59
Chromium	ND	51.7		mg/L	50.0	103%	75 - 125	8120922	NRL0410-02	12/06/08 00:59
Lead	ND	50.5		mg/L	50.0	101%	75 - 125	8120922	NRL0410-02	12/06/08 00:59
Selenium	ND	10.2		mg/L	10.0	102%	75 - 125	8120922	NRL0410-02	12/06/08 00:59
Silver	ND	10.0		mg/L	10.0	100%	75 - 125	8120922	NRL0410-02	12/06/08 00:59

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		Project Name:	Charleston Naval Complex
		Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
Matrix Spike - Cont.

Analyte	Orig. Val.	MS Val	Q	Units	Spike Conc	% Rec.	Target Range	Batch	Sample Spiked	Analyzed Date/Time
Volatile Organic Compounds by EPA Method 8260B										
8120937-MS1										
Benzene	ND	34.4		ug/kg	50.0	69%	33 - 146	8120937	NRL0877-03	12/10/08 23:11
2-Butanone	ND	125		ug/kg	250	50%	37 - 151	8120937	NRL0877-03	12/10/08 23:11
Carbon Tetrachloride	ND	35.5		ug/kg	50.0	71%	33 - 155	8120937	NRL0877-03	12/10/08 23:11
Chlorobenzene	ND	31.3		ug/kg	50.0	63%	23 - 147	8120937	NRL0877-03	12/10/08 23:11
Chloroform	0.861	32.2		ug/kg	50.0	63%	39 - 140	8120937	NRL0877-03	12/10/08 23:11
1,2-Dichloroethane	ND	28.9		ug/kg	50.0	58%	27 - 145	8120937	NRL0877-03	12/10/08 23:11
cis-1,2-Dichloroethene	ND	36.9		ug/kg	50.0	74%	39 - 143	8120937	NRL0877-03	12/10/08 23:11
1,1-Dichloroethene	ND	43.2		ug/kg	50.0	86%	42 - 145	8120937	NRL0877-03	12/10/08 23:11
Methylene Chloride	15.5	49.5		ug/kg	50.0	68%	31 - 160	8120937	NRL0877-03	12/10/08 23:11
Naphthalene	ND	8.86		ug/kg	50.0	18%	10 - 151	8120937	NRL0877-03	12/10/08 23:11
Tetrachloroethene	ND	34.4		ug/kg	50.0	69%	27 - 151	8120937	NRL0877-03	12/10/08 23:11
Trichloroethene	ND	39.1		ug/kg	50.0	78%	33 - 145	8120937	NRL0877-03	12/10/08 23:11
Vinyl chloride	ND	49.6		ug/kg	50.0	99%	32 - 144	8120937	NRL0877-03	12/10/08 23:11
1,2-Dichloroethene (total)	ND	77.1		ug/kg	100	77%	40 - 144	8120937	NRL0877-03	12/10/08 23:11
Surrogate: 1,2-Dichloroethane-d4		49.8		ug/kg	50.0	100%	41 - 150	8120937	NRL0877-03	12/10/08 23:11
Surrogate: Dibromofluoromethane		48.7		ug/kg	50.0	97%	55 - 139	8120937	NRL0877-03	12/10/08 23:11
Surrogate: Toluene-d8		49.9		ug/kg	50.0	100%	57 - 148	8120937	NRL0877-03	12/10/08 23:11
Surrogate: 4-Bromofluorobenzene		49.2		ug/kg	50.0	98%	58 - 150	8120937	NRL0877-03	12/10/08 23:11
8121404-MS1										
Acetone	ND	149		ug/kg	250	60%	32 - 163	8121404	NRL0745-08	12/10/08 09:03
Benzene	ND	44.6		ug/kg	50.0	89%	33 - 146	8121404	NRL0745-08	12/10/08 09:03
Bromobenzene	ND	55.0		ug/kg	50.0	110%	10 - 156	8121404	NRL0745-08	12/10/08 09:03
Bromochloromethane	ND	33.7		ug/kg	50.0	67%	43 - 138	8121404	NRL0745-08	12/10/08 09:03
Bromodichloromethane	ND	34.2		ug/kg	50.0	68%	31 - 149	8121404	NRL0745-08	12/10/08 09:03
Bromoform	ND	27.9		ug/kg	50.0	56%	14 - 167	8121404	NRL0745-08	12/10/08 09:03
Bromomethane	ND	37.6		ug/kg	50.0	75%	16 - 172	8121404	NRL0745-08	12/10/08 09:03
2-Butanone	4.02	143		ug/kg	250	56%	37 - 151	8121404	NRL0745-08	12/10/08 09:03
sec-Butylbenzene	ND	50.7		ug/kg	50.0	101%	18 - 165	8121404	NRL0745-08	12/10/08 09:03
n-Butylbenzene	ND	53.8		ug/kg	50.0	108%	10 - 168	8121404	NRL0745-08	12/10/08 09:03
tert-Butylbenzene	ND	46.4		ug/kg	50.0	93%	17 - 165	8121404	NRL0745-08	12/10/08 09:03
Carbon disulfide	ND	42.6		ug/kg	50.0	85%	34 - 147	8121404	NRL0745-08	12/10/08 09:03
Carbon Tetrachloride	ND	36.8		ug/kg	50.0	74%	33 - 155	8121404	NRL0745-08	12/10/08 09:03
Chlorobenzene	ND	43.0		ug/kg	50.0	86%	23 - 147	8121404	NRL0745-08	12/10/08 09:03
Chlorodibromomethane	ND	34.0		ug/kg	50.0	68%	21 - 155	8121404	NRL0745-08	12/10/08 09:03
Chloroethane	ND	51.4		ug/kg	50.0	103%	44 - 155	8121404	NRL0745-08	12/10/08 09:03
Chloroform	ND	41.1		ug/kg	50.0	82%	39 - 140	8121404	NRL0745-08	12/10/08 09:03

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	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
Matrix Spike - Cont.

Volatile Organic Compounds by EPA Method 8260B

8121404-MS1

Analyte	Orig. Val.	MS Val	Q	Units	Spike Conc	% Rec.	Target Range	Batch	Sample Spiked	Analyzed Date/Time
Chloromethane	ND	32.2		ug/kg	50.0	64%	14 - 143	8121404	NRL0745-08	12/10/08 09:03
2-Chlorotoluene	ND	49.8		ug/kg	50.0	100%	21 - 154	8121404	NRL0745-08	12/10/08 09:03
4-Chlorotoluene	ND	49.6		ug/kg	50.0	99%	10 - 156	8121404	NRL0745-08	12/10/08 09:03
1,2-Dibromo-3-chloropropane	ND	27.6		ug/kg	50.0	55%	10 - 159	8121404	NRL0745-08	12/10/08 09:03
1,2-Dibromoethane (EDB)	ND	34.5		ug/kg	50.0	69%	19 - 151	8121404	NRL0745-08	12/10/08 09:03
Dibromomethane	ND	32.1		ug/kg	50.0	64%	32 - 147	8121404	NRL0745-08	12/10/08 09:03
1,4-Dichlorobenzene	ND	44.8		ug/kg	50.0	90%	10 - 152	8121404	NRL0745-08	12/10/08 09:03
1,3-Dichlorobenzene	ND	45.4		ug/kg	50.0	91%	10 - 153	8121404	NRL0745-08	12/10/08 09:03
1,2-Dichlorobenzene	ND	43.5		ug/kg	50.0	87%	10 - 155	8121404	NRL0745-08	12/10/08 09:03
Dichlorodifluoromethane	ND	22.6		ug/kg	50.0	45%	10 - 143	8121404	NRL0745-08	12/10/08 09:03
1,1-Dichloroethane	ND	42.0		ug/kg	50.0	84%	49 - 156	8121404	NRL0745-08	12/10/08 09:03
1,2-Dichloroethane	ND	30.1		ug/kg	50.0	60%	27 - 145	8121404	NRL0745-08	12/10/08 09:03
cis-1,2-Dichloroethene	ND	42.1		ug/kg	50.0	84%	39 - 143	8121404	NRL0745-08	12/10/08 09:03
1,1-Dichloroethene	ND	41.9		ug/kg	50.0	84%	42 - 145	8121404	NRL0745-08	12/10/08 09:03
trans-1,2-Dichloroethene	ND	43.6		ug/kg	50.0	87%	41 - 146	8121404	NRL0745-08	12/10/08 09:03
1,3-Dichloropropane	ND	37.6		ug/kg	50.0	75%	30 - 143	8121404	NRL0745-08	12/10/08 09:03
1,2-Dichloropropane	ND	41.8		ug/kg	50.0	84%	37 - 136	8121404	NRL0745-08	12/10/08 09:03
2,2-Dichloropropane	ND	37.5		ug/kg	50.0	75%	30 - 145	8121404	NRL0745-08	12/10/08 09:03
cis-1,3-Dichloropropene	ND	43.4		ug/kg	50.0	87%	29 - 149	8121404	NRL0745-08	12/10/08 09:03
trans-1,3-Dichloropropene	ND	36.1		ug/kg	50.0	72%	17 - 146	8121404	NRL0745-08	12/10/08 09:03
1,1-Dichloropropene	ND	44.3		ug/kg	50.0	89%	36 - 147	8121404	NRL0745-08	12/10/08 09:03
Ethylbenzene	ND	45.8		ug/kg	50.0	92%	16 - 160	8121404	NRL0745-08	12/10/08 09:03
Hexachlorobutadiene	ND	40.9		ug/kg	50.0	82%	10 - 191	8121404	NRL0745-08	12/10/08 09:03
2-Hexanone	ND	158		ug/kg	250	63%	19 - 154	8121404	NRL0745-08	12/10/08 09:03
Isopropylbenzene	ND	45.6		ug/kg	50.0	91%	16 - 156	8121404	NRL0745-08	12/10/08 09:03
p-Isopropyltoluene	ND	48.2		ug/kg	50.0	96%	13 - 160	8121404	NRL0745-08	12/10/08 09:03
Methyl tert-Butyl Ether	ND	32.2		ug/kg	50.0	64%	30 - 136	8121404	NRL0745-08	12/10/08 09:03
Methylene Chloride	ND	44.9		ug/kg	50.0	90%	31 - 160	8121404	NRL0745-08	12/10/08 09:03
4-Methyl-2-pentanone	ND	164		ug/kg	250	66%	25 - 149	8121404	NRL0745-08	12/10/08 09:03
Naphthalene	ND	33.8		ug/kg	50.0	68%	10 - 151	8121404	NRL0745-08	12/10/08 09:03
n-Propylbenzene	ND	52.1		ug/kg	50.0	104%	17 - 158	8121404	NRL0745-08	12/10/08 09:03
Styrene	ND	44.9		ug/kg	50.0	90%	11 - 168	8121404	NRL0745-08	12/10/08 09:03
1,1,1,2-Tetrachloroethane	ND	38.4		ug/kg	50.0	77%	30 - 147	8121404	NRL0745-08	12/10/08 09:03
1,1,2,2-Tetrachloroethane	ND	42.8		ug/kg	50.0	86%	20 - 155	8121404	NRL0745-08	12/10/08 09:03
Tetrachloroethene	ND	41.2		ug/kg	50.0	82%	27 - 151	8121404	NRL0745-08	12/10/08 09:03
Toluene	ND	45.8		ug/kg	50.0	92%	30 - 145	8121404	NRL0745-08	12/10/08 09:03
1,2,3-Trichlorobenzene	ND	37.2		ug/kg	50.0	74%	10 - 158	8121404	NRL0745-08	12/10/08 09:03

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Matrix Spike - Cont.

Analyte	Orig. Val.	MS Val	Q	Units	Spike Conc	% Rec.	Target Range	Batch	Sample Spiked	Analyzed Date/Time
Volatile Organic Compounds by EPA Method 8260B										
8121404-MS1										
1,2,4-Trichlorobenzene	ND	41.6		ug/kg	50.0	83%	10 - 160	8121404	NRL0745-08	12/10/08 09:03
1,1,2-Trichloroethane	ND	34.4		ug/kg	50.0	69%	34 - 140	8121404	NRL0745-08	12/10/08 09:03
1,1,1-Trichloroethane	ND	36.7		ug/kg	50.0	73%	36 - 150	8121404	NRL0745-08	12/10/08 09:03
Trichloroethene	ND	39.0		ug/kg	50.0	78%	33 - 145	8121404	NRL0745-08	12/10/08 09:03
Trichlorofluoromethane	ND	40.0		ug/kg	50.0	80%	31 - 150	8121404	NRL0745-08	12/10/08 09:03
1,2,3-Trichloropropane	ND	30.8		ug/kg	50.0	62%	14 - 143	8121404	NRL0745-08	12/10/08 09:03
1,3,5-Trimethylbenzene	ND	49.1		ug/kg	50.0	98%	20 - 158	8121404	NRL0745-08	12/10/08 09:03
1,2,4-Trimethylbenzene	ND	46.5		ug/kg	50.0	93%	10 - 166	8121404	NRL0745-08	12/10/08 09:03
Vinyl chloride	ND	40.4		ug/kg	50.0	81%	32 - 144	8121404	NRL0745-08	12/10/08 09:03
Xylenes, total	ND	130		ug/kg	150	87%	16 - 159	8121404	NRL0745-08	12/10/08 09:03
1,1,2-Trifluorotrichloroethane	ND	42.9		ug/kg	50.0	86%	35 - 143	8121404	NRL0745-08	12/10/08 09:03
Surrogate: 1,2-Dichloroethane-d4		39.1		ug/kg	50.0	78%	41 - 150	8121404	NRL0745-08	12/10/08 09:03
Surrogate: Dibromofluoromethane		46.1		ug/kg	50.0	92%	55 - 139	8121404	NRL0745-08	12/10/08 09:03
Surrogate: Toluene-d8		52.8		ug/kg	50.0	106%	57 - 148	8121404	NRL0745-08	12/10/08 09:03
Surrogate: 4-Bromofluorobenzene		53.3		ug/kg	50.0	107%	58 - 150	8121404	NRL0745-08	12/10/08 09:03
Semivolatile Organic Compounds by EPA Method 8270C										
8120320-MS1										
Acenaphthene	ND	1.42		mg/kg wet	1.64	87%	28 - 117	8120320	NRL0191-01	12/05/08 17:59
Acenaphthylene	ND	1.48		mg/kg wet	1.64	90%	33 - 113	8120320	NRL0191-01	12/05/08 17:59
Anthracene	ND	1.63		mg/kg wet	1.64	100%	31 - 131	8120320	NRL0191-01	12/05/08 17:59
Benzo (a) anthracene	ND	1.57		mg/kg wet	1.64	96%	29 - 124	8120320	NRL0191-01	12/05/08 17:59
Benzo (a) pyrene	ND	1.59		mg/kg wet	1.64	97%	30 - 127	8120320	NRL0191-01	12/05/08 17:59
Benzo (b) fluoranthene	ND	1.65		mg/kg wet	1.64	101%	26 - 128	8120320	NRL0191-01	12/05/08 17:59
Benzo (g,h,i) perylene	ND	1.64		mg/kg wet	1.64	100%	21 - 122	8120320	NRL0191-01	12/05/08 17:59
Benzo (k) fluoranthene	ND	1.50		mg/kg wet	1.64	91%	20 - 130	8120320	NRL0191-01	12/05/08 17:59
4-Bromophenyl phenyl ether	ND	1.39		mg/kg wet	1.64	85%	30 - 106	8120320	NRL0191-01	12/05/08 17:59
Butyl benzyl phthalate	ND	1.78		mg/kg wet	1.64	109%	40 - 131	8120320	NRL0191-01	12/05/08 17:59
Carbazole	ND	1.51		mg/kg wet	1.64	92%	37 - 116	8120320	NRL0191-01	12/05/08 17:59
4-Chloro-3-methylphenol	ND	1.31		mg/kg wet	1.64	80%	19 - 128	8120320	NRL0191-01	12/05/08 17:59
4-Chloroaniline	ND	1.17		mg/kg wet	1.64	71%	10 - 119	8120320	NRL0191-01	12/05/08 17:59
Bis(2-chloroethoxy)methane	ND	1.31		mg/kg wet	1.64	80%	30 - 110	8120320	NRL0191-01	12/05/08 17:59
Bis(2-chloroethyl)ether	ND	1.37		mg/kg wet	1.64	84%	36 - 106	8120320	NRL0191-01	12/05/08 17:59
Bis(2-chloroisopropyl)ether	ND	1.42		mg/kg wet	1.64	86%	34 - 109	8120320	NRL0191-01	12/05/08 17:59
2-Chloronaphthalene	ND	1.40		mg/kg wet	1.64	85%	31 - 107	8120320	NRL0191-01	12/05/08 17:59
2-Chlorophenol	ND	1.37		mg/kg wet	1.64	84%	32 - 119	8120320	NRL0191-01	12/05/08 17:59
4-Chlorophenyl phenyl ether	ND	1.51		mg/kg wet	1.64	92%	35 - 113	8120320	NRL0191-01	12/05/08 17:59

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Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
Matrix Spike - Cont.

Semivolatile Organic Compounds by EPA Method 8270C

8120320-MS1

Analyte	Orig. Val.	MS Val	Q	Units	Spike Conc	% Rec.	Target Range	Batch	Sample Spiked	Analyzed Date/Time
Chrysene	ND	1.57		mg/kg wet	1.64	96%	30 - 119	8120320	NRL0191-01	12/05/08 17:59
Dibenz (a,h) anthracene	ND	1.65		mg/kg wet	1.64	101%	27 - 122	8120320	NRL0191-01	12/05/08 17:59
Dibenzofuran	ND	1.40		mg/kg wet	1.64	85%	33 - 121	8120320	NRL0191-01	12/05/08 17:59
Di-n-butyl phthalate	ND	1.68		mg/kg wet	1.64	103%	38 - 123	8120320	NRL0191-01	12/05/08 17:59
1,4-Dichlorobenzene	ND	1.29		mg/kg wet	1.64	79%	26 - 109	8120320	NRL0191-01	12/05/08 17:59
1,2-Dichlorobenzene	ND	1.32		mg/kg wet	1.64	81%	26 - 112	8120320	NRL0191-01	12/05/08 17:59
1,3-Dichlorobenzene	ND	1.30		mg/kg wet	1.64	79%	26 - 110	8120320	NRL0191-01	12/05/08 17:59
3,3-Dichlorobenzidine	ND	1.46		mg/kg wet	1.64	89%	10 - 112	8120320	NRL0191-01	12/05/08 17:59
2,4-Dichlorophenol	ND	1.20		mg/kg wet	1.64	73%	28 - 118	8120320	NRL0191-01	12/05/08 17:59
Diethyl phthalate	ND	1.58		mg/kg wet	1.64	97%	29 - 122	8120320	NRL0191-01	12/05/08 17:59
2,4-Dimethylphenol	ND	1.34		mg/kg wet	1.64	82%	10 - 128	8120320	NRL0191-01	12/05/08 17:59
Dimethyl phthalate	ND	1.60		mg/kg wet	1.64	98%	31 - 118	8120320	NRL0191-01	12/05/08 17:59
4,6-Dinitro-2-methylphenol	ND	1.51		mg/kg wet	1.64	92%	10 - 136	8120320	NRL0191-01	12/05/08 17:59
2,4-Dinitrophenol	ND	1.48		mg/kg wet	1.64	91%	10 - 148	8120320	NRL0191-01	12/05/08 17:59
2,6-Dinitrotoluene	ND	1.68		mg/kg wet	1.64	103%	28 - 125	8120320	NRL0191-01	12/05/08 17:59
2,4-Dinitrotoluene	ND	1.72		mg/kg wet	1.64	105%	30 - 119	8120320	NRL0191-01	12/05/08 17:59
Di-n-octyl phthalate	ND	1.70		mg/kg wet	1.64	104%	31 - 137	8120320	NRL0191-01	12/05/08 17:59
Bis(2-ethylhexyl)phthalate	ND	1.70		mg/kg wet	1.64	104%	38 - 125	8120320	NRL0191-01	12/05/08 17:59
Fluoranthene	ND	1.60		mg/kg wet	1.64	98%	23 - 132	8120320	NRL0191-01	12/05/08 17:59
Fluorene	ND	1.51		mg/kg wet	1.64	92%	38 - 110	8120320	NRL0191-01	12/05/08 17:59
Hexachlorobenzene	ND	1.51		mg/kg wet	1.64	92%	35 - 120	8120320	NRL0191-01	12/05/08 17:59
Hexachlorobutadiene	ND	1.16		mg/kg wet	1.64	71%	28 - 113	8120320	NRL0191-01	12/05/08 17:59
Hexachlorocyclopentadiene	ND	1.16		mg/kg wet	1.64	71%	10 - 123	8120320	NRL0191-01	12/05/08 17:59
Hexachloroethane	ND	1.28		mg/kg wet	1.64	78%	20 - 120	8120320	NRL0191-01	12/05/08 17:59
Indeno (1,2,3-cd) pyrene	ND	1.64		mg/kg wet	1.64	100%	24 - 122	8120320	NRL0191-01	12/05/08 17:59
Isophorone	ND	1.22		mg/kg wet	1.64	75%	23 - 108	8120320	NRL0191-01	12/05/08 17:59
2-Methylnaphthalene	ND	1.16		mg/kg wet	1.64	71%	26 - 116	8120320	NRL0191-01	12/05/08 17:59
2-Methylphenol	ND	1.44		mg/kg wet	1.64	88%	23 - 122	8120320	NRL0191-01	12/05/08 17:59
3/4-Methylphenol	ND	1.66		mg/kg wet	1.64	102%	23 - 138	8120320	NRL0191-01	12/05/08 17:59
Naphthalene	ND	1.19		mg/kg wet	1.64	73%	14 - 117	8120320	NRL0191-01	12/05/08 17:59
3-Nitroaniline	ND	1.52		mg/kg wet	1.64	93%	27 - 124	8120320	NRL0191-01	12/05/08 17:59
2-Nitroaniline	ND	1.47		mg/kg wet	1.64	90%	35 - 122	8120320	NRL0191-01	12/05/08 17:59
4-Nitroaniline	ND	1.59		mg/kg wet	1.64	97%	25 - 124	8120320	NRL0191-01	12/05/08 17:59
Nitrobenzene	ND	1.16		mg/kg wet	1.64	71%	19 - 105	8120320	NRL0191-01	12/05/08 17:59
4-Nitrophenol	ND	1.68		mg/kg wet	1.64	103%	14 - 144	8120320	NRL0191-01	12/05/08 17:59
2-Nitrophenol	ND	1.25		mg/kg wet	1.64	76%	23 - 119	8120320	NRL0191-01	12/05/08 17:59
N-Nitrosodiphenylamine	ND	1.64		mg/kg wet	1.64	100%	37 - 144	8120320	NRL0191-01	12/05/08 17:59

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Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
Matrix Spike - Cont.

Analyte	Orig. Val.	MS Val	Q	Units	Spike Conc	% Rec.	Target Range	Batch	Sample Spiked	Analyzed Date/Time
Semivolatile Organic Compounds by EPA Method 8270C										
8120320-MS1										
N-Nitrosodi-n-propylamine	ND	1.44		mg/kg wet	1.64	88%	28 - 121	8120320	NRL0191-01	12/05/08 17:59
Pentachlorophenol	ND	1.53		mg/kg wet	1.64	94%	13 - 149	8120320	NRL0191-01	12/05/08 17:59
Phenanthrene	ND	1.52		mg/kg wet	1.64	93%	21 - 130	8120320	NRL0191-01	12/05/08 17:59
Phenol	ND	1.44		mg/kg wet	1.64	88%	31 - 116	8120320	NRL0191-01	12/05/08 17:59
Pyrene	ND	1.58		mg/kg wet	1.64	97%	24 - 133	8120320	NRL0191-01	12/05/08 17:59
Pyridine	ND	0.987		mg/kg wet	1.64	60%	10 - 103	8120320	NRL0191-01	12/05/08 17:59
1,2,4-Trichlorobenzene	ND	1.14		mg/kg wet	1.64	70%	27 - 102	8120320	NRL0191-01	12/05/08 17:59
1-Methylnaphthalene	ND	1.16		mg/kg wet	1.64	71%	10 - 121	8120320	NRL0191-01	12/05/08 17:59
2,4,6-Trichlorophenol	ND	1.44		mg/kg wet	1.64	88%	32 - 122	8120320	NRL0191-01	12/05/08 17:59
2,4,5-Trichlorophenol	ND	1.51		mg/kg wet	1.64	92%	30 - 122	8120320	NRL0191-01	12/05/08 17:59
Surrogate: Terphenyl-d14		1.14		mg/kg wet	1.64	70%	26 - 128	8120320	NRL0191-01	12/05/08 17:59
Surrogate: 2,4,6-Tribromophenol		1.41		mg/kg wet	1.64	86%	20 - 132	8120320	NRL0191-01	12/05/08 17:59
Surrogate: Phenol-d5		1.14		mg/kg wet	1.64	70%	23 - 113	8120320	NRL0191-01	12/05/08 17:59
Surrogate: 2-Fluorobiphenyl		1.09		mg/kg wet	1.64	66%	19 - 109	8120320	NRL0191-01	12/05/08 17:59
Surrogate: 2-Fluorophenol		1.12		mg/kg wet	1.64	68%	19 - 105	8120320	NRL0191-01	12/05/08 17:59
Surrogate: Nitrobenzene-d5		0.967		mg/kg wet	1.64	59%	22 - 104	8120320	NRL0191-01	12/05/08 17:59
TCLP Volatile Organic Compounds by EPA Method 1311/8260B										
8120939-MS1										
Benzene	ND	0.0486		mg/L	0.0500	97%	18 - 167	8120939	NRL0332-01	12/07/08 09:08
2-Butanone	ND	0.216		mg/L	0.250	86%	10 - 160	8120939	NRL0332-01	12/07/08 09:08
Carbon Tetrachloride	ND	0.0510		mg/L	0.0500	102%	10 - 189	8120939	NRL0332-01	12/07/08 09:08
Chlorobenzene	ND	0.0501		mg/L	0.0500	100%	23 - 160	8120939	NRL0332-01	12/07/08 09:08
Chloroform	ND	0.0494	B	mg/L	0.0500	99%	17 - 175	8120939	NRL0332-01	12/07/08 09:08
1,2-Dichloroethane	ND	0.0491		mg/L	0.0500	98%	14 - 151	8120939	NRL0332-01	12/07/08 09:08
1,1-Dichloroethene	ND	0.0465		mg/L	0.0500	93%	10 - 185	8120939	NRL0332-01	12/07/08 09:08
Tetrachloroethene	ND	0.0529		mg/L	0.0500	106%	16 - 170	8120939	NRL0332-01	12/07/08 09:08
Trichloroethene	0.00390	0.0494		mg/L	0.0500	91%	10 - 192	8120939	NRL0332-01	12/07/08 09:08
Vinyl chloride	ND	0.0382		mg/L	0.0500	76%	10 - 171	8120939	NRL0332-01	12/07/08 09:08
Surrogate: 1,2-Dichloroethane-d4		24.4		ug/L	25.0	98%	60 - 140	8120939	NRL0332-01	12/07/08 09:08
Surrogate: Dibromofluoromethane		24.9		ug/L	25.0	100%	75 - 124	8120939	NRL0332-01	12/07/08 09:08
Surrogate: Toluene-d8		22.3		ug/L	25.0	89%	78 - 121	8120939	NRL0332-01	12/07/08 09:08
Surrogate: 4-Bromofluorobenzene		24.0		ug/L	25.0	96%	79 - 124	8120939	NRL0332-01	12/07/08 09:08

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Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
Matrix Spike Dup

Analyte	Orig. Val.	Duplicate	Q	Units	Spike Conc	% Rec.	Target Range	RPD	Limit	Batch	Sample Duplicated	Analyzed Date/Time
Total Metals by EPA Method 6010B												
8120688-MSD1												
Antimony	ND	0.103		mg/L	0.100	103%	75 - 125	6	20	8120688	NRL0178-05	12/04/08 21:44
Arsenic	ND	0.0429		mg/L	0.0500	86%	75 - 125	6	20	8120688	NRL0178-05	12/04/08 21:44
Barium	0.0316	1.95		mg/L	2.00	96%	75 - 125	7	20	8120688	NRL0178-05	12/04/08 21:44
Cadmium	ND	0.0468		mg/L	0.0500	94%	75 - 125	6	20	8120688	NRL0178-05	12/04/08 21:44
Chromium	ND	0.193		mg/L	0.200	97%	75 - 125	7	20	8120688	NRL0178-05	12/04/08 21:44
Lead	ND	0.0519		mg/L	0.0500	104%	75 - 125	5	20	8120688	NRL0178-05	12/04/08 21:44
Selenium	0.00560	0.0506		mg/L	0.0500	90%	75 - 125	2	20	8120688	NRL0178-05	12/04/08 21:44
Silver	ND	0.0480		mg/L	0.0500	96%	75 - 125	8	20	8120688	NRL0178-05	12/04/08 21:44
8121573-MSD1												
Antimony	ND	95.9		mg/kg wet	101	95%	75 - 125	4	20	8121573	NRL0510-02	12/11/08 12:33
Arsenic	12.5	32.6		mg/kg wet	20.2	100%	75 - 125	3	20	8121573	NRL0510-02	12/11/08 12:33
Barium	72.7	468		mg/kg wet	403	98%	75 - 125	5	20	8121573	NRL0510-02	12/11/08 12:33
Cadmium	ND	18.7		mg/kg wet	20.2	93%	75 - 125	4	20	8121573	NRL0510-02	12/11/08 12:33
Chromium	34.4	119	M1, R3	mg/kg wet	40.3	211%	75 - 125	41	20	8121573	NRL0510-02	12/11/08 12:33
Lead	18.7	123		mg/kg wet	101	103%	75 - 125	3	20	8121573	NRL0510-02	12/11/08 12:33
Selenium	ND	19.2		mg/kg wet	20.2	95%	75 - 125	7	20	8121573	NRL0510-02	12/11/08 12:33
Silver	0.516	10.4		mg/kg wet	10.1	98%	75 - 125	3	20	8121573	NRL0510-02	12/11/08 12:33
Mercury by EPA Methods 7470A/7471A												
8120683-MSD1												
Mercury	0.000189	0.00108		mg/L	0.00100	89%	63 - 138	3	22	8120683	NRL0036-01	12/04/08 19:00
8120735-MSD1												
Mercury	ND	0.373		mg/kg dry	0.299	125%	60 - 149	9	26	8120735	NRL0332-05	12/04/08 15:14
TCLP Metals by 6000/7000 Series Methods												
8120910-MSD1												
Mercury	ND	0.0203		mg/L	0.0200	102%	63 - 138	2	22	8120910	NRL0126-01	12/05/08 16:56
8120922-MSD1												
Arsenic	ND	10.1		mg/L	10.0	101%	75 - 125	0.6	20	8120922	NRL0410-02	12/06/08 01:03
Barium	0.0350	51.2		mg/L	50.0	102%	75 - 125	1	20	8120922	NRL0410-02	12/06/08 01:03
Cadmium	ND	9.92		mg/L	10.0	99%	75 - 125	0.9	20	8120922	NRL0410-02	12/06/08 01:03
Chromium	ND	52.3		mg/L	50.0	105%	75 - 125	1	20	8120922	NRL0410-02	12/06/08 01:03
Lead	ND	51.0		mg/L	50.0	102%	75 - 125	1	20	8120922	NRL0410-02	12/06/08 01:03
Selenium	ND	10.3		mg/L	10.0	103%	75 - 125	1	20	8120922	NRL0410-02	12/06/08 01:03
Silver	ND	10.2		mg/L	10.0	102%	75 - 125	2	20	8120922	NRL0410-02	12/06/08 01:03

Volatile Organic Compounds by EPA Method 8260B

8120937-MSD1

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Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA

Matrix Spike Dup - Cont.

Analyte	Orig. Val.	Duplicate	Q	Units	Spike Conc	% Rec.	Target Range	RPD	Limit	Batch	Sample Duplicated	Analyzed Date/Time
Volatile Organic Compounds by EPA Method 8260B												
8120937-MSD1												
Benzene	ND	31.0		ug/kg	50.0	62%	33 - 146	11	43	8120937	NRL0877-03	12/10/08 23:40
2-Butanone	ND	162		ug/kg	250	65%	37 - 151	25	43	8120937	NRL0877-03	12/10/08 23:40
Carbon Tetrachloride	ND	30.7		ug/kg	50.0	61%	33 - 155	15	44	8120937	NRL0877-03	12/10/08 23:40
Chlorobenzene	ND	30.0		ug/kg	50.0	60%	23 - 147	4	44	8120937	NRL0877-03	12/10/08 23:40
Chloroform	0.861	29.2		ug/kg	50.0	57%	39 - 140	10	36	8120937	NRL0877-03	12/10/08 23:40
1,2-Dichloroethane	ND	29.5		ug/kg	50.0	59%	27 - 145	2	44	8120937	NRL0877-03	12/10/08 23:40
cis-1,2-Dichloroethene	ND	35.3		ug/kg	50.0	71%	39 - 143	4	35	8120937	NRL0877-03	12/10/08 23:40
1,1-Dichloroethene	ND	36.3		ug/kg	50.0	73%	42 - 145	17	41	8120937	NRL0877-03	12/10/08 23:40
Methylene Chloride	15.5	46.7		ug/kg	50.0	62%	31 - 160	6	39	8120937	NRL0877-03	12/10/08 23:40
Naphthalene	ND	14.6		ug/kg	50.0	29%	10 - 151	49	50	8120937	NRL0877-03	12/10/08 23:40
Tetrachloroethene	ND	30.0		ug/kg	50.0	60%	27 - 151	14	45	8120937	NRL0877-03	12/10/08 23:40
Trichloroethene	ND	34.0		ug/kg	50.0	68%	33 - 145	14	40	8120937	NRL0877-03	12/10/08 23:40
Vinyl chloride	ND	41.1		ug/kg	50.0	82%	32 - 144	19	41	8120937	NRL0877-03	12/10/08 23:40
1,2-Dichloroethene (total)	ND	70.5		ug/kg	100	70%	40 - 144	9	35	8120937	NRL0877-03	12/10/08 23:40
Surrogate: 1,2-Dichloroethane-d4		48.2		ug/kg	50.0	96%	41 - 150			8120937	NRL0877-03	12/10/08 23:40
Surrogate: Dibromofluoromethane		48.4		ug/kg	50.0	97%	55 - 139			8120937	NRL0877-03	12/10/08 23:40
Surrogate: Toluene-d8		49.8		ug/kg	50.0	100%	57 - 148			8120937	NRL0877-03	12/10/08 23:40
Surrogate: 4-Bromofluorobenzene		48.4		ug/kg	50.0	97%	58 - 150			8120937	NRL0877-03	12/10/08 23:40
8121404-MSD1												
Acetone	ND	111		ug/kg	250	44%	32 - 163	29	45	8121404	NRL0745-08	12/10/08 09:33
Benzene	ND	39.5		ug/kg	50.0	79%	33 - 146	12	43	8121404	NRL0745-08	12/10/08 09:33
Bromobenzene	ND	42.4		ug/kg	50.0	85%	10 - 156	26	50	8121404	NRL0745-08	12/10/08 09:33
Bromochloromethane	ND	26.6		ug/kg	50.0	53%	43 - 138	24	32	8121404	NRL0745-08	12/10/08 09:33
Bromodichloromethane	ND	27.8		ug/kg	50.0	56%	31 - 149	21	37	8121404	NRL0745-08	12/10/08 09:33
Bromoform	ND	20.2		ug/kg	50.0	40%	14 - 167	32	50	8121404	NRL0745-08	12/10/08 09:33
Bromomethane	ND	32.2		ug/kg	50.0	64%	16 - 172	15	50	8121404	NRL0745-08	12/10/08 09:33
2-Butanone	3.90	106		ug/kg	250	41%	37 - 151	30	43	8121404	NRL0745-08	12/10/08 09:33
sec-Butylbenzene	ND	43.2		ug/kg	50.0	86%	18 - 165	16	50	8121404	NRL0745-08	12/10/08 09:33
n-Butylbenzene	ND	45.3		ug/kg	50.0	91%	10 - 168	17	50	8121404	NRL0745-08	12/10/08 09:33
tert-Butylbenzene	ND	39.4		ug/kg	50.0	79%	17 - 165	16	50	8121404	NRL0745-08	12/10/08 09:33
Carbon disulfide	ND	40.2		ug/kg	50.0	80%	34 - 147	6	47	8121404	NRL0745-08	12/10/08 09:33
Carbon Tetrachloride	ND	33.5		ug/kg	50.0	67%	33 - 155	9	44	8121404	NRL0745-08	12/10/08 09:33
Chlorobenzene	ND	36.1		ug/kg	50.0	72%	23 - 147	17	44	8121404	NRL0745-08	12/10/08 09:33
Chlorodibromomethane	ND	25.9		ug/kg	50.0	52%	21 - 155	27	45	8121404	NRL0745-08	12/10/08 09:33
Chloroethane	ND	46.2		ug/kg	50.0	92%	44 - 155	11	50	8121404	NRL0745-08	12/10/08 09:33
Chloroform	ND	35.0		ug/kg	50.0	70%	39 - 140	16	36	8121404	NRL0745-08	12/10/08 09:33
Chloromethane	ND	28.9		ug/kg	50.0	58%	14 - 143	11	50	8121404	NRL0745-08	12/10/08 09:33
2-Chlorotoluene	ND	41.8		ug/kg	50.0	84%	21 - 154	17	50	8121404	NRL0745-08	12/10/08 09:33
4-Chlorotoluene	ND	42.2		ug/kg	50.0	84%	10 - 156	16	50	8121404	NRL0745-08	12/10/08 09:33
1,2-Dibromo-3-chloropropane	ND	19.7		ug/kg	50.0	39%	10 - 159	34	50	8121404	NRL0745-08	12/10/08 09:33

2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA

Matrix Spike Dup - Cont.

Analyte	Orig. Val.	Duplicate	Q	Units	Spike Conc	% Rec.	Target Range	RPD	Limit	Batch	Sample Duplicated	Analyzed Date/Time
Volatile Organic Compounds by EPA Method 8260B												
8121404-MSD1												
1,2-Dibromoethane (EDB)	ND	26.0		ug/kg	50.0	52%	19 - 151	28	50	8121404	NRL0745-08	12/10/08 09:33
Dibromomethane	ND	25.0		ug/kg	50.0	50%	32 - 147	25	45	8121404	NRL0745-08	12/10/08 09:33
1,4-Dichlorobenzene	ND	36.7		ug/kg	50.0	73%	10 - 152	20	50	8121404	NRL0745-08	12/10/08 09:33
1,3-Dichlorobenzene	ND	37.7		ug/kg	50.0	75%	10 - 153	19	50	8121404	NRL0745-08	12/10/08 09:33
1,2-Dichlorobenzene	ND	34.0		ug/kg	50.0	68%	10 - 155	24	50	8121404	NRL0745-08	12/10/08 09:33
Dichlorodifluoromethane	ND	21.0		ug/kg	50.0	42%	10 - 143	7	43	8121404	NRL0745-08	12/10/08 09:33
1,1-Dichloroethane	ND	37.1		ug/kg	50.0	74%	49 - 156	12	37	8121404	NRL0745-08	12/10/08 09:33
1,2-Dichloroethane	ND	24.1		ug/kg	50.0	48%	27 - 145	22	44	8121404	NRL0745-08	12/10/08 09:33
cis-1,2-Dichloroethene	ND	36.3		ug/kg	50.0	73%	39 - 143	15	35	8121404	NRL0745-08	12/10/08 09:33
1,1-Dichloroethene	ND	38.6		ug/kg	50.0	77%	42 - 145	8	41	8121404	NRL0745-08	12/10/08 09:33
trans-1,2-Dichloroethene	ND	38.8		ug/kg	50.0	78%	41 - 146	11	37	8121404	NRL0745-08	12/10/08 09:33
1,3-Dichloropropane	ND	28.8		ug/kg	50.0	58%	30 - 143	27	44	8121404	NRL0745-08	12/10/08 09:33
1,2-Dichloropropane	ND	35.1		ug/kg	50.0	70%	37 - 136	17	35	8121404	NRL0745-08	12/10/08 09:33
2,2-Dichloropropane	ND	34.3		ug/kg	50.0	69%	30 - 145	9	33	8121404	NRL0745-08	12/10/08 09:33
cis-1,3-Dichloropropene	ND	34.7		ug/kg	50.0	69%	29 - 149	22	43	8121404	NRL0745-08	12/10/08 09:33
trans-1,3-Dichloropropene	ND	27.6		ug/kg	50.0	55%	17 - 146	27	50	8121404	NRL0745-08	12/10/08 09:33
1,1-Dichloropropene	ND	41.0		ug/kg	50.0	82%	36 - 147	8	41	8121404	NRL0745-08	12/10/08 09:33
Ethylbenzene	ND	40.2		ug/kg	50.0	80%	16 - 160	13	48	8121404	NRL0745-08	12/10/08 09:33
Hexachlorobutadiene	ND	30.1		ug/kg	50.0	60%	10 - 191	31	50	8121404	NRL0745-08	12/10/08 09:33
2-Hexanone	ND	112		ug/kg	250	45%	19 - 154	34	50	8121404	NRL0745-08	12/10/08 09:33
Isopropylbenzene	ND	40.2		ug/kg	50.0	80%	16 - 156	12	50	8121404	NRL0745-08	12/10/08 09:33
p-Isopropyltoluene	ND	40.4		ug/kg	50.0	81%	13 - 160	17	50	8121404	NRL0745-08	12/10/08 09:33
Methyl tert-Butyl Ether	ND	25.2		ug/kg	50.0	50%	30 - 136	25	45	8121404	NRL0745-08	12/10/08 09:33
Methylene Chloride	ND	36.9		ug/kg	50.0	74%	31 - 160	20	39	8121404	NRL0745-08	12/10/08 09:33
4-Methyl-2-pentanone	ND	117		ug/kg	250	47%	25 - 149	34	50	8121404	NRL0745-08	12/10/08 09:33
Naphthalene	ND	24.5		ug/kg	50.0	49%	10 - 151	32	50	8121404	NRL0745-08	12/10/08 09:33
n-Propylbenzene	ND	44.8		ug/kg	50.0	90%	17 - 158	15	50	8121404	NRL0745-08	12/10/08 09:33
Styrene	ND	37.5		ug/kg	50.0	75%	11 - 168	18	50	8121404	NRL0745-08	12/10/08 09:33
1,1,1,2-Tetrachloroethane	ND	31.0		ug/kg	50.0	62%	30 - 147	21	43	8121404	NRL0745-08	12/10/08 09:33
1,1,2,2-Tetrachloroethane	ND	30.0		ug/kg	50.0	60%	20 - 155	35	50	8121404	NRL0745-08	12/10/08 09:33
Tetrachloroethene	ND	37.3		ug/kg	50.0	75%	27 - 151	10	45	8121404	NRL0745-08	12/10/08 09:33
Toluene	ND	40.1		ug/kg	50.0	80%	30 - 145	13	44	8121404	NRL0745-08	12/10/08 09:33
1,2,3-Trichlorobenzene	ND	27.8		ug/kg	50.0	56%	10 - 158	29	50	8121404	NRL0745-08	12/10/08 09:33
1,2,4-Trichlorobenzene	ND	32.0		ug/kg	50.0	64%	10 - 160	26	50	8121404	NRL0745-08	12/10/08 09:33
1,1,2-Trichloroethane	ND	26.6		ug/kg	50.0	53%	34 - 140	25	41	8121404	NRL0745-08	12/10/08 09:33
1,1,1-Trichloroethane	ND	34.0		ug/kg	50.0	68%	36 - 150	7	39	8121404	NRL0745-08	12/10/08 09:33
Trichloroethene	ND	34.2		ug/kg	50.0	68%	33 - 145	13	40	8121404	NRL0745-08	12/10/08 09:33
Trichlorofluoromethane	ND	36.9		ug/kg	50.0	74%	31 - 150	8	42	8121404	NRL0745-08	12/10/08 09:33
1,2,3-Trichloropropane	ND	22.2		ug/kg	50.0	44%	14 - 143	33	50	8121404	NRL0745-08	12/10/08 09:33
1,3,5-Trimethylbenzene	ND	41.9		ug/kg	50.0	84%	20 - 158	16	50	8121404	NRL0745-08	12/10/08 09:33
1,2,4-Trimethylbenzene	ND	39.7		ug/kg	50.0	79%	10 - 166	16	50	8121404	NRL0745-08	12/10/08 09:33

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Client	S&ME, Inc. (2420)		Work Order:	NRL0332
	620 Wando Park Blvd.		Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464		Project Number:	1131-08-554
Attn	Andrew Wertz		Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA

Matrix Spike Dup - Cont.

Analyte	Orig. Val.	Duplicate	Q	Units	Spike Conc	% Rec.	Target Range	RPD	Limit	Batch	Sample Duplicated	Analyzed Date/Time
Volatile Organic Compounds by EPA Method 8260B												
8121404-MSD1												
Vinyl chloride	ND	37.4		ug/kg	50.0	75%	32 - 144	8	41	8121404	NRL0745-08	12/10/08 09:33
Xylenes, total	ND	114		ug/kg	150	76%	16 - 159	13	48	8121404	NRL0745-08	12/10/08 09:33
1,1,2-Trifluorotrichloroethane	ND	39.5		ug/kg	50.0	79%	35 - 143	8	50	8121404	NRL0745-08	12/10/08 09:33
Surrogate: 1,2-Dichloroethane-d4		40.3		ug/kg	50.0	81%	41 - 150			8121404	NRL0745-08	12/10/08 09:33
Surrogate: Dibromofluoromethane		46.7		ug/kg	50.0	93%	55 - 139			8121404	NRL0745-08	12/10/08 09:33
Surrogate: Toluene-d8		51.9		ug/kg	50.0	104%	57 - 148			8121404	NRL0745-08	12/10/08 09:33
Surrogate: 4-Bromofluorobenzene		52.7		ug/kg	50.0	105%	58 - 150			8121404	NRL0745-08	12/10/08 09:33
Semivolatile Organic Compounds by EPA Method 8270C												
8120320-MSD1												
Acenaphthene	ND	1.55		mg/kg wet	1.67	93%	28 - 117	9	33	8120320	NRL0191-01	12/05/08 18:21
Acenaphthylene	ND	1.61		mg/kg wet	1.67	97%	33 - 113	9	38	8120320	NRL0191-01	12/05/08 18:21
Anthracene	ND	1.67		mg/kg wet	1.67	100%	31 - 131	2	32	8120320	NRL0191-01	12/05/08 18:21
Benzo (a) anthracene	ND	1.60		mg/kg wet	1.67	96%	29 - 124	2	26	8120320	NRL0191-01	12/05/08 18:21
Benzo (a) pyrene	ND	1.62		mg/kg wet	1.67	97%	30 - 127	1	31	8120320	NRL0191-01	12/05/08 18:21
Benzo (b) fluoranthene	ND	1.52		mg/kg wet	1.67	91%	26 - 128	8	37	8120320	NRL0191-01	12/05/08 18:21
Benzo (g,h,i) perylene	ND	1.67		mg/kg wet	1.67	100%	21 - 122	2	28	8120320	NRL0191-01	12/05/08 18:21
Benzo (k) fluoranthene	ND	1.66		mg/kg wet	1.67	100%	20 - 130	10	35	8120320	NRL0191-01	12/05/08 18:21
4-Bromophenyl phenyl ether	ND	1.43		mg/kg wet	1.67	86%	30 - 106	3	38	8120320	NRL0191-01	12/05/08 18:21
Butyl benzyl phthalate	ND	1.79		mg/kg wet	1.67	108%	40 - 131	0.4	37	8120320	NRL0191-01	12/05/08 18:21
Carbazole	ND	1.53		mg/kg wet	1.67	92%	37 - 116	1	31	8120320	NRL0191-01	12/05/08 18:21
4-Chloro-3-methylphenol	ND	1.42		mg/kg wet	1.67	85%	19 - 128	8	38	8120320	NRL0191-01	12/05/08 18:21
4-Chloroaniline	ND	1.22		mg/kg wet	1.67	73%	10 - 119	4	44	8120320	NRL0191-01	12/05/08 18:21
Bis(2-chloroethoxy)methane	ND	1.44		mg/kg wet	1.67	86%	30 - 110	10	34	8120320	NRL0191-01	12/05/08 18:21
Bis(2-chloroethyl)ether	ND	1.57		mg/kg wet	1.67	95%	36 - 106	14	38	8120320	NRL0191-01	12/05/08 18:21
Bis(2-chloroisopropyl)ether	ND	1.60		mg/kg wet	1.67	96%	34 - 109	12	40	8120320	NRL0191-01	12/05/08 18:21
2-Chloronaphthalene	ND	1.53		mg/kg wet	1.67	92%	31 - 107	9	38	8120320	NRL0191-01	12/05/08 18:21
2-Chlorophenol	ND	1.57		mg/kg wet	1.67	94%	32 - 119	13	40	8120320	NRL0191-01	12/05/08 18:21
4-Chlorophenyl phenyl ether	ND	1.60		mg/kg wet	1.67	96%	35 - 113	6	37	8120320	NRL0191-01	12/05/08 18:21
Chrysene	ND	1.60		mg/kg wet	1.67	96%	30 - 119	1	31	8120320	NRL0191-01	12/05/08 18:21
Dibenz (a,h) anthracene	ND	1.66		mg/kg wet	1.67	99%	27 - 122	0.5	32	8120320	NRL0191-01	12/05/08 18:21
Dibenzofuran	ND	1.51		mg/kg wet	1.67	91%	33 - 121	8	35	8120320	NRL0191-01	12/05/08 18:21
Di-n-butyl phthalate	ND	1.73		mg/kg wet	1.67	104%	38 - 123	3	31	8120320	NRL0191-01	12/05/08 18:21
1,4-Dichlorobenzene	ND	1.45		mg/kg wet	1.67	87%	26 - 109	12	41	8120320	NRL0191-01	12/05/08 18:21
1,2-Dichlorobenzene	ND	1.50		mg/kg wet	1.67	90%	26 - 112	12	40	8120320	NRL0191-01	12/05/08 18:21
1,3-Dichlorobenzene	ND	1.47		mg/kg wet	1.67	88%	26 - 110	12	41	8120320	NRL0191-01	12/05/08 18:21
3,3-Dichlorobenzidine	ND	1.45		mg/kg wet	1.67	87%	10 - 112	0.8	48	8120320	NRL0191-01	12/05/08 18:21
2,4-Dichlorophenol	ND	1.35		mg/kg wet	1.67	81%	28 - 118	12	32	8120320	NRL0191-01	12/05/08 18:21
Diethyl phthalate	ND	1.64		mg/kg wet	1.67	98%	29 - 122	3	37	8120320	NRL0191-01	12/05/08 18:21
2,4-Dimethylphenol	ND	1.54		mg/kg wet	1.67	92%	10 - 128	14	50	8120320	NRL0191-01	12/05/08 18:21
Dimethyl phthalate	ND	1.69		mg/kg wet	1.67	102%	31 - 118	5	39	8120320	NRL0191-01	12/05/08 18:21

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Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA

Matrix Spike Dup - Cont.

Analyte	Orig. Val.	Duplicate	Q	Units	Spike Conc	% Rec.	Target Range	RPD	Limit	Batch	Sample Duplicated	Analyzed Date/Time
Semivolatile Organic Compounds by EPA Method 8270C												
8120320-MSD1												
4,6-Dinitro-2-methylphenol	ND	1.52		mg/kg wet	1.67	91%	10 - 136	0.6	45	8120320	NRL0191-01	12/05/08 18:21
2,4-Dinitrophenol	ND	1.57		mg/kg wet	1.67	94%	10 - 148	6	50	8120320	NRL0191-01	12/05/08 18:21
2,6-Dinitrotoluene	ND	1.76		mg/kg wet	1.67	106%	28 - 125	5	37	8120320	NRL0191-01	12/05/08 18:21
2,4-Dinitrotoluene	ND	1.74		mg/kg wet	1.67	105%	30 - 119	1	41	8120320	NRL0191-01	12/05/08 18:21
Di-n-octyl phthalate	ND	1.72		mg/kg wet	1.67	103%	31 - 137	1	34	8120320	NRL0191-01	12/05/08 18:21
Bis(2-ethylhexyl)phthalate	ND	1.69		mg/kg wet	1.67	102%	38 - 125	0.4	38	8120320	NRL0191-01	12/05/08 18:21
Fluoranthene	ND	1.62		mg/kg wet	1.67	97%	23 - 132	1	36	8120320	NRL0191-01	12/05/08 18:21
Fluorene	ND	1.56		mg/kg wet	1.67	94%	38 - 110	4	35	8120320	NRL0191-01	12/05/08 18:21
Hexachlorobenzene	ND	1.52		mg/kg wet	1.67	91%	35 - 120	1	37	8120320	NRL0191-01	12/05/08 18:21
Hexachlorobutadiene	ND	1.31		mg/kg wet	1.67	79%	28 - 113	12	35	8120320	NRL0191-01	12/05/08 18:21
Hexachlorocyclopentadiene	ND	1.29		mg/kg wet	1.67	77%	10 - 123	11	36	8120320	NRL0191-01	12/05/08 18:21
Hexachloroethane	ND	1.42		mg/kg wet	1.67	85%	20 - 120	11	42	8120320	NRL0191-01	12/05/08 18:21
Indeno (1,2,3-cd) pyrene	ND	1.67		mg/kg wet	1.67	100%	24 - 122	2	28	8120320	NRL0191-01	12/05/08 18:21
Isophorone	ND	1.35		mg/kg wet	1.67	81%	23 - 108	10	33	8120320	NRL0191-01	12/05/08 18:21
2-Methylnaphthalene	ND	1.28		mg/kg wet	1.67	77%	26 - 116	10	33	8120320	NRL0191-01	12/05/08 18:21
2-Methylphenol	ND	1.63		mg/kg wet	1.67	98%	23 - 122	13	43	8120320	NRL0191-01	12/05/08 18:21
3/4-Methylphenol	ND	1.89		mg/kg wet	1.67	113%	23 - 138	13	47	8120320	NRL0191-01	12/05/08 18:21
Naphthalene	ND	1.33		mg/kg wet	1.67	80%	14 - 117	11	34	8120320	NRL0191-01	12/05/08 18:21
3-Nitroaniline	ND	1.57		mg/kg wet	1.67	94%	27 - 124	3	41	8120320	NRL0191-01	12/05/08 18:21
2-Nitroaniline	ND	1.56		mg/kg wet	1.67	94%	35 - 122	6	33	8120320	NRL0191-01	12/05/08 18:21
4-Nitroaniline	ND	1.58		mg/kg wet	1.67	95%	25 - 124	0.7	35	8120320	NRL0191-01	12/05/08 18:21
Nitrobenzene	ND	1.31		mg/kg wet	1.67	79%	19 - 105	13	36	8120320	NRL0191-01	12/05/08 18:21
4-Nitrophenol	ND	1.70		mg/kg wet	1.67	102%	14 - 144	0.7	39	8120320	NRL0191-01	12/05/08 18:21
2-Nitrophenol	ND	1.39		mg/kg wet	1.67	83%	23 - 119	11	37	8120320	NRL0191-01	12/05/08 18:21
N-Nitrosodiphenylamine	ND	1.70		mg/kg wet	1.67	102%	37 - 144	3	32	8120320	NRL0191-01	12/05/08 18:21
N-Nitrosodi-n-propylamine	ND	1.63		mg/kg wet	1.67	98%	28 - 121	12	41	8120320	NRL0191-01	12/05/08 18:21
Pentachlorophenol	ND	1.54		mg/kg wet	1.67	93%	13 - 149	0.6	41	8120320	NRL0191-01	12/05/08 18:21
Phenanthrene	ND	1.56		mg/kg wet	1.67	94%	21 - 130	3	33	8120320	NRL0191-01	12/05/08 18:21
Phenol	ND	1.63		mg/kg wet	1.67	98%	31 - 116	13	40	8120320	NRL0191-01	12/05/08 18:21
Pyrene	ND	1.63		mg/kg wet	1.67	98%	24 - 133	3	36	8120320	NRL0191-01	12/05/08 18:21
Pyridine	ND	1.08		mg/kg wet	1.67	65%	10 - 103	9	50	8120320	NRL0191-01	12/05/08 18:21
1,2,4-Trichlorobenzene	ND	1.27		mg/kg wet	1.67	76%	27 - 102	11	34	8120320	NRL0191-01	12/05/08 18:21
1-Methylnaphthalene	ND	1.30		mg/kg wet	1.67	78%	10 - 121	11	34	8120320	NRL0191-01	12/05/08 18:21
2,4,6-Trichlorophenol	ND	1.56		mg/kg wet	1.67	94%	32 - 122	8	41	8120320	NRL0191-01	12/05/08 18:21
2,4,5-Trichlorophenol	ND	1.64		mg/kg wet	1.67	98%	30 - 122	8	39	8120320	NRL0191-01	12/05/08 18:21
Surrogate: Terphenyl-d14		1.21		mg/kg wet	1.67	73%	26 - 128			8120320	NRL0191-01	12/05/08 18:21
Surrogate: 2,4,6-Tribromophenol		1.46		mg/kg wet	1.67	88%	20 - 132			8120320	NRL0191-01	12/05/08 18:21
Surrogate: Phenol-d5		1.36		mg/kg wet	1.67	82%	23 - 113			8120320	NRL0191-01	12/05/08 18:21
Surrogate: 2-Fluorobiphenyl		1.27		mg/kg wet	1.67	76%	19 - 109			8120320	NRL0191-01	12/05/08 18:21
Surrogate: 2-Fluorophenol		1.34		mg/kg wet	1.67	80%	19 - 105			8120320	NRL0191-01	12/05/08 18:21
Surrogate: Nitrobenzene-d5		1.13		mg/kg wet	1.67	68%	22 - 104			8120320	NRL0191-01	12/05/08 18:21

2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA

Matrix Spike Dup - Cont.

Analyte	Orig. Val.	Duplicate	Q	Units	Spike Conc	% Rec.	Target Range	RPD	Limit	Batch	Sample Duplicated	Analyzed Date/Time
Semivolatile Organic Compounds by EPA Method 8270C												
TCLP Volatile Organic Compounds by EPA Method 1311/8260B												
8120939-MSD1												
Benzene	ND	0.0468		mg/L	0.0500	94%	18 - 167	4	50	8120939	NRL0332-01	12/07/08 09:35
2-Butanone	ND	0.223		mg/L	0.250	89%	10 - 160	3	50	8120939	NRL0332-01	12/07/08 09:35
Carbon Tetrachloride	ND	0.0488		mg/L	0.0500	98%	10 - 189	4	50	8120939	NRL0332-01	12/07/08 09:35
Chlorobenzene	ND	0.0479		mg/L	0.0500	96%	23 - 160	4	50	8120939	NRL0332-01	12/07/08 09:35
Chloroform	ND	0.0475	B	mg/L	0.0500	95%	17 - 175	4	50	8120939	NRL0332-01	12/07/08 09:35
1,2-Dichloroethane	ND	0.0482		mg/L	0.0500	96%	14 - 151	2	50	8120939	NRL0332-01	12/07/08 09:35
1,1-Dichloroethene	ND	0.0462		mg/L	0.0500	92%	10 - 185	0.5	50	8120939	NRL0332-01	12/07/08 09:35
Tetrachloroethene	ND	0.0494		mg/L	0.0500	99%	16 - 170	7	50	8120939	NRL0332-01	12/07/08 09:35
Trichloroethene	0.00390	0.0472		mg/L	0.0500	87%	10 - 192	5	50	8120939	NRL0332-01	12/07/08 09:35
Vinyl chloride	ND	0.0384		mg/L	0.0500	77%	10 - 171	0.6	50	8120939	NRL0332-01	12/07/08 09:35
Surrogate: 1,2-Dichloroethane-d4		24.7		ug/L	25.0	99%	60 - 140			8120939	NRL0332-01	12/07/08 09:35
Surrogate: Dibromofluoromethane		25.2		ug/L	25.0	101%	75 - 124			8120939	NRL0332-01	12/07/08 09:35
Surrogate: Toluene-d8		22.2		ug/L	25.0	89%	78 - 121			8120939	NRL0332-01	12/07/08 09:35
Surrogate: 4-Bromofluorobenzene		24.1		ug/L	25.0	96%	79 - 124			8120939	NRL0332-01	12/07/08 09:35

Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

CERTIFICATION SUMMARY

TestAmerica Nashville

Method	Matrix	AIHA	Nelac	South Carolina
SW846 1311/6010B	Soil	N/A	X	X
SW846 1311/6010B	Water	N/A	X	X
SW846 1311/7470A	Soil	N/A	X	X
SW846 1311/7470A	Water	N/A	X	X
SW846 1311/8260B	Soil	N/A	X	X
SW846 1311/8260B	Water	N/A	X	X
SW846 1311/8270C	Soil	N/A	X	X
SW846 1311/8270C	Water		X	X
SW846 1311	Soil	N/A	X	X
SW846 1311	Water	N/A	X	X
SW846 6010B	Soil	N/A	X	X
SW846 6010B	Water	N/A	X	X
SW846 7470A	Water	N/A	X	X
SW846 7471A	Soil		X	X
SW846 8260B	Soil	N/A	X	X
SW846 8260B	Water	N/A	X	X
SW846 8270C	Soil	N/A	X	X
SW846 8270C	Water	N/A	X	X
SW-846	Soil			

Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

TCLP REGULATORY LIMITS

Analyte	Regulatory Limit
1,1-Dichloroethene	0.7
1,2-Dichloroethane	0.5
1,4-Dichlorobenzene	7.5
2,4,5-Trichlorophenol	400
2,4,6-Trichlorophenol	2
2,4-Dinitrotoluene	0.13
2-Butanone	200
Arsenic	5
Barium	100
Benzene	0.5
Cadmium	1
Carbon Tetrachloride	0.5
Chlorobenzene	100
Chloroform	6
Chromium	5
Cresol(s)	200
Hexachlorobenzene	0.13
Hexachlorobutadiene	0.5
Hexachloroethane	3
Lead	5
Mercury	0.2
Nitrobenzene	2
Pentachlorophenol	100
Pyridine	5
Selenium	1
Silver	5
Tetrachloroethene	0.7
Trichloroethene	0.5
Vinyl chloride	0.2

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Client	S&ME, Inc. (2420)	Work Order:	NRL0332
	620 Wando Park Blvd.	Project Name:	Charleston Naval Complex
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

DATA QUALIFIERS AND DEFINITIONS

B	Analyte was detected in the associated Method Blank.
C	Calibration Verification recovery was above the method control limit for this analyte. Analyte not detected, data not impacted.
M1	The MS and/or MSD were above the acceptance limits due to sample matrix interference. See Blank Spike (LCS).
MNR1	There was no MS/MSD analyzed with this batch due to insufficient sample volume. See Blank Spike.
R3	The RPD exceeded the acceptance limit due to sample matrix effects.
ND	Not detected at the reporting limit (or method detection limit if shown)

METHOD MODIFICATION NOTES

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Nashville, TN

COOLER RECE

NRL0332

Cooler Received/Opened On 12 / 03/ 08 @ 8:00

1. Tracking # 3167 (last 4 digits, FedEx)

Courier: FED-EX IR Gun ID 90942856

2. Temperature of rep. sample or temp blank when opened: 3.2 *Degrees Celsius*

3. If item #2 temperature is 0°C or less, was the representative sample or temp blank frozen? YES NO..NA

4. Were custody seals on outside of cooler? YES..NO...NA

   If yes, how many and where: 2 fr. [illegible]

5. Were the seals intact, signed, and dated correctly? YES..NO...NA

6. Were custody papers inside cooler? YES..NO...NA

I certify that I opened the cooler and answered questions 1-6 (intial) [illegible]

7. Were custody seals on containers: YES NO and Intact YES...NO...NA

   Were these signed and dated correctly? YES...NO...NA

8. Packing mat'l used? Bubblewrap Plastic bag Peanuts Vermiculite Foam Insert Paper Other None

9. Cooling process: Ice Ice-pack Ice (direct contact) Dry ice Other None

10. Did all containers arrive in good condition (unbroken)? YES...NO...NA

11. Were all container labels complete (#, date, signed, pres., etc)? YES...NO...NA

12. Did all container labels and tags agree with custody papers? YES...NO...NA

13a. Were VOA vials received? YES..NO...NA

   b. Was there any observable headspace present in any VOA vial? YES...NO..NA

14. Was there a Trip Blank in this cooler? YES..NO...NA If multiple coolers, sequence #_______

I certify that I unloaded the cooler and answered questions 7-14 (intial) [illegible]

15a. On pres'd bottles, did pH test strips suggest preservation reached the correct pH level? YES..NO..NA

   b. Did the bottle labels indicate that the correct preservatives were used YES...NO...NA

   If preservation in-house was needed, record standard ID of preservative used here_______

16. Was residual chlorine present? YES..NO..NA

I certify that I checked for chlorine and pH as per SOP and answered questions 15-16 (intial) [illegible]

17. Were custody papers properly filled out (ink, signed, etc)? YES...NO...NA

18. Did you sign the custody papers in the appropriate place? YES...NO...NA

19. Were correct containers used for the analysis requested? YES..NO...NA

20. Was sufficient amount of sample sent in each container? YES...NO...NA

I certify that I entered this project into LIMS and answered questions 17-20 (intial) [illegible]

I certify that I attached a label with the unique LIMS number to each container (intial) [illegible]

21. Were there Non-Conformance issues at login? YES..NO Was a PIPE generated? YES...NO..#_______

BIS = Broken in shipment

NRL0332
12/17/08 23:59

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Nashville Division
2960 Foster Creighton
Nashville, TN 37204

Phone: 615-726-0177
Toll Free: 800-765-0980
Fax: 615-726-3404

To assist us in using the proper analytical methods, is this work being conducted for regulatory purposes?

Compliance Monitoring? Yes _____ No _

Enforcement Action? Yes _____ No _

Client Name/Account #: S&ME # 2420

Address: 620 Wando Park Road

City/State/Zip: Mt. Pleasant, SC 29464

Project Manager: Andrew Wertz email: awertz@smeinc.com

Telephone Number: 843.884.0005 **Fax No.:** 843.884-1696

Sampler Name: (Print) F. Slaughter

Sampler Signature: F. [signature]

Site State: SC

PO#: 32106

TA Quote #:

Project ID: CHARLESTON NAVAL COMPLEX

Project #: 1134-08-554

std TAT

Sample ID / Description	Date Sampled	Time Sampled	No. of Containers Shipped	Grab	Composite	Field Filtered	Preservative: Ice	Preservative: HNO_3 (Red Label)	Preservative: HCl (Blue Label)	Preservative: NaOH (Orange Label)	Preservative: H_2SO_4 Plastic (Yellow Label)	Preservative: H_2SO_4 Glass(Yellow Label)	Preservative: None (Black Label)	Preservative: Other (Specify) Sod Bis Methanol	Matrix: Groundwater	Matrix: Wastewater	Matrix: Drinking Water	Matrix: Sludge	Matrix: Soil	Matrix: Other (specify):	Analyze For: TOTAL VOCS *	Analyze For: TCLP VOCS	Analyze For: TOTAL SVOCS	Analyze For: TCLP SVOCS	Analyze For: TOTAL RCRA METALS +Sb	Analyze For: TCLP METALS						RUSH TAT (Pre-Schedule)
CNC - CWS - Grab	12/2/08	955		X									2	3				X			X	X							1			
CNC - TWE - Grab	↓	1050		X									2	3				X			X	X							2			
CNC - 661 - Grab	↓	1140		X									2	3				X			X	X							3			
CNC - Decon - Grab	↓	1115	4	X					3				1			X					X	X							4			
CNC - Mid - Comp.	↓	1200	4		X								4					X					X	X	X	X			5			
CNC - Decon - Comp	↓	1230	4		X			1					3			X							X	X	X	X			6			

Special Instructions: Total Metals are RCRA + Sb

Method of Shipment: FEDEX

Laboratory Comments:
Temperature Upon Receipt:
VOCs Free of Headspace? Y

Relinquished by:	Date	Time	Received by:	Date	Time
F. [signature]	12/2/08	1400	J. Brailsford	12/2/08	1400
Relinquished by: J. Brailsford	12/2/08	17:30	**Received by TestAmerica:** [signature]	12/3/08	0800

Fed ex to Test America - Nashville

* see attached VOC list

NRL0332
12/17/08 23:59

Charleston Naval Complex

Analyze 1 semi-solid (drilling mud) sample and 1 water sample for :

Total SVOCs by 8270C	TCLP SVOCs by 8270C	Total Metals by 6010B/7470A	TCLP Metals by 6010B/7470A
2,4-dimethylphenol	cresols	Arsenic	Arsenic
2-chlorophenol	1,4-dichlorobenzene	Antimony	Barium
2-methylnaphthalene	2,4-dinitrotoluene	Barium	Cadmium
2-methylphenol (o-cresol)	hexachlorobenzene	Cadmium	Chromium
4-methylphenol (p-cresol)	hexachlorobutadiene	Chromium	Lead
PAHs	hexachloroethane	Lead	Selenium
1,4-dichlorobenzene	nitrobenzene	Selenium	Silver
2,4-dinitrotoluene	pentachlorophenol	Silver	Mercury
hexachlorobenzene	pyridine	Mercury	
hexachlorobutadiene	2,4,5-trichlorophenol		
hexachloroethane	2,4,6-trichlorophenol		
nitrobenzene			
pentachlorophenol			
pyridine			
2,4,5-trichlorophenol			
2,4,6-trichlorophenol			

Analyze 3 semi-solid (drilling mud) samples and 1 water sample for :

Total VOCs by 8260B	TCLP VOCs by 8260B
1,1-dichloroethene	1,1-dichloroethene
1,2-dichloroethane	1,2-dichloroethane
1,2-dichloroethene (total)	benzene
benzene	chlorobenzene
chlorobenzene	trichloroethene
cis-1,2-dichloroethene	vinyl chloride
naphthalene	2-butanone
methylene chloride (dichloromethane)	carbon tetrachloride
trichloroethene	chloroform
vinyl chloride	tetrachloroethene
2-butanone	
carbon tetrachloride	
chloroform	
tetrachloroethene	

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THE LEADER IN ENVIRONMENTAL TESTING

2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

December 17, 2008 12:41:56PM

Client:	S&ME, Inc. (2420)	Work Order:	NRL0331
	620 Wando Park Blvd.	Project Name:	Macalloy Site
	Mt. Pleasant, SC 29464	Project Nbr:	1131-08-554
Attn:	Andrew Wertz	P/O Nbr:	32106
		Date Received:	12/03/08

SAMPLE IDENTIFICATION	LAB NUMBER	COLLECTION DATE AND TIME
Mac-Mud	NRL0331-01	12/02/08 13:15

An executed copy of the chain of custody, the project quality control data, and the sample receipt form are also included as an addendum to this report. If you have any questions relating to this analytical report, please contact your Laboratory Project Manager at 1-800-765-0980. Any opinions, if expressed, are outside the scope of the Laboratory's accreditation.

The Chain(s) of Custody, 3 pages, are included and are an integral part of this report.

These results relate only to the items tested. This report shall not be reproduced except in full and with permission of the laboratory.

All solids results are reported in wet weight unless specifically stated.
Estimated uncertainty is available upon request.
This report has been electronically signed.
Report Approved By:

Roxanne L. Connor

Roxanne Connor

Program Manager - Conventional Accounts

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Client	S&ME, Inc. (2420)	Work Order:	NRL0331
	620 Wando Park Blvd.	Project Name:	Macalloy Site
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

ANALYTICAL REPORT

Analyte	Result	Flag	Units	MRL	Dilution Factor	Analysis Date/Time	Method	Batch
Sample ID: NRL0331-01 (Mac-Mud - Soil) Sampled: 12/02/08 13:15								
General Chemistry Parameters								
% Dry Solids	**33.0**		%	0.500	1	12/12/08 06:46	SW-846	8121669
Chromium (VI)	ND		mg/kg dry	6.06	1	12/08/08 12:07	SW846 7196A	8120897
Total Metals by EPA Method 6010B								
Antimony	ND		mg/kg dry	29.5	1	12/11/08 11:37	SW846 6010B	8121573
Arsenic	**4.30**		mg/kg dry	2.95	1	12/11/08 11:37	SW846 6010B	8121573
Barium	**21.6**		mg/kg dry	5.90	1	12/11/08 11:37	SW846 6010B	8121573
Cadmium	ND		mg/kg dry	2.95	1	12/11/08 11:37	SW846 6010B	8121573
Chromium	**60.2**		mg/kg dry	2.95	1	12/11/08 11:37	SW846 6010B	8121573
Iron	**6690**		mg/kg dry	29.5	1	12/11/08 11:37	SW846 6010B	8121573
Lead	**6.30**		mg/kg dry	2.95	1	12/11/08 11:37	SW846 6010B	8121573
Manganese	**44.3**		mg/kg dry	2.95	1	12/11/08 11:37	SW846 6010B	8121573
Nickel	**19.0**		mg/kg dry	2.95	1	12/11/08 11:37	SW846 6010B	8121573
Selenium	ND		mg/kg dry	5.90	1	12/11/08 11:37	SW846 6010B	8121573
Silver	ND		mg/kg dry	2.95	1	12/11/08 11:37	SW846 6010B	8121573
Mercury by EPA Methods 7470A/7471A								
Mercury	ND		mg/kg dry	0.298	1	12/04/08 15:07	SW846 7471A	8120735
TCLP Metals by 6000/7000 Series Methods								
Arsenic	ND		mg/L	0.100	1	12/05/08 23:55	W846 1311/6010	8120922
Barium	**0.114**		mg/L	0.100	1	12/05/08 23:55	W846 1311/6010	8120922
Cadmium	ND		mg/L	0.0100	1	12/05/08 23:55	W846 1311/6010	8120922
Chromium	ND		mg/L	0.0500	1	12/05/08 23:55	W846 1311/6010	8120922
Lead	ND		mg/L	0.0500	1	12/05/08 23:55	W846 1311/6010	8120922
Selenium	ND		mg/L	0.100	1	12/05/08 23:55	W846 1311/6010	8120922
Silver	ND		mg/L	0.0500	1	12/05/08 23:55	W846 1311/6010	8120922
Mercury	ND		mg/L	0.0100	1	12/05/08 17:16	W846 1311/7470.	8120910

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Client	S&ME, Inc. (2420)	Work Order:	NRL0331
	620 Wando Park Blvd.	Project Name:	Macalloy Site
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

SAMPLE EXTRACTION DATA

Parameter	Batch	Lab Number	Wt/Vol Extracted	Extracted Vol	Date	Analyst	Extraction Method
Mercury by EPA Methods 7470A/7471A							
SW846 7471A	8120735	NRL0331-01	0.61	100.00	12/04/08 12:00	JMR	EPA 7471
TCLP Extraction by EPA 1311							
SW846 1311	8120675	NRL0331-01	100.00	2000.00	12/04/08 15:35	AML	EPA 1311
TCLP Metals by 6000/7000 Series Methods							
SW846 1311/6010B	8120922	NRL0331-01	5.00	50.00	12/05/08 14:20	JLS	EPA 3015
SW846 1311/6010B	8120922	NRL0331-01	5.00	50.00	12/05/08 14:20	JLS	EPA 3015
SW846 1311/6010B	8120922	NRL0331-01	5.00	50.00	12/05/08 14:20	JLS	EPA 3015
SW846 1311/6010B	8120922	NRL0331-01	5.00	50.00	12/05/08 14:20	JLS	EPA 3015
SW846 1311/6010B	8120922	NRL0331-01	5.00	50.00	12/05/08 14:20	JLS	EPA 3015
SW846 1311/6010B	8120922	NRL0331-01	5.00	50.00	12/05/08 14:20	JLS	EPA 3015
SW846 1311/6010B	8120922	NRL0331-01	5.00	50.00	12/05/08 14:20	JLS	EPA 3015
SW846 1311/6010B	8120675	NRL0331-01	100.00	2000.00	12/04/08 15:35	AML	EPA 1311
SW846 1311/7470A	8120910	NRL0331-01	3.00	30.00	12/05/08 09:36	JMR	EPA 7470
Total Metals by EPA Method 6010B							
SW846 6010B	8121573	NRL0331-01	0.51	100.00	12/10/08 19:30	JLS	EPA 3051 / 6010
SW846 6010B	8121573	NRL0331-01	0.51	100.00	12/10/08 19:30	JLS	EPA 3051 / 6010
SW846 6010B	8121573	NRL0331-01	0.51	100.00	12/10/08 19:30	JLS	EPA 3051 / 6010
SW846 6010B	8121573	NRL0331-01	0.51	100.00	12/10/08 19:30	JLS	EPA 3051 / 6010
SW846 6010B	8121573	NRL0331-01	0.51	100.00	12/10/08 19:30	JLS	EPA 3051 / 6010
SW846 6010B	8121573	NRL0331-01	0.51	100.00	12/10/08 19:30	JLS	EPA 3051 / 6010
SW846 6010B	8121573	NRL0331-01	0.51	100.00	12/10/08 19:30	JLS	EPA 3051 / 6010
SW846 6010B	8121573	NRL0331-01	0.51	100.00	12/10/08 19:30	JLS	EPA 3051 / 6010
SW846 6010B	8121573	NRL0331-01	0.51	100.00	12/10/08 19:30	JLS	EPA 3051 / 6010
SW846 6010B	8121573	NRL0331-01	0.51	100.00	12/10/08 19:30	JLS	EPA 3051 / 6010
SW846 6010B	8121573	NRL0331-01	0.51	100.00	12/10/08 19:30	JLS	EPA 3051 / 6010

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THE LEADER IN ENVIRONMENTAL TESTING

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Client	S&ME, Inc. (2420)	Work Order:	NRL0331
	620 Wando Park Blvd.	Project Name:	Macalloy Site
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
Blank

Analyte	Blank Value	Q	Units	Q.C. Batch	Lab Number	Analyzed Date/Time
General Chemistry Parameters						
8120897-BLK1						
Chromium (VI)	0.840		mg/kg wet	8120897	8120897-BLK1	12/08/08 12:07
Total Metals by EPA Method 6010B						
8121573-BLK1						
Antimony	<1.41		mg/kg wet	8121573	8121573-BLK1	12/11/08 11:28
Arsenic	<0.904		mg/kg wet	8121573	8121573-BLK1	12/11/08 11:28
Barium	<0.502		mg/kg wet	8121573	8121573-BLK1	12/11/08 11:28
Cadmium	0.120		mg/kg wet	8121573	8121573-BLK1	12/11/08 11:28
Chromium	0.361		mg/kg wet	8121573	8121573-BLK1	12/11/08 11:28
Iron	9.24		mg/kg wet	8121573	8121573-BLK1	12/11/08 11:28
Lead	<0.703		mg/kg wet	8121573	8121573-BLK1	12/11/08 11:28
Manganese	0.201		mg/kg wet	8121573	8121573-BLK1	12/11/08 11:28
Nickel	<0.502		mg/kg wet	8121573	8121573-BLK1	12/11/08 11:28
Selenium	<0.863		mg/kg wet	8121573	8121573-BLK1	12/11/08 11:28
Silver	<0.301		mg/kg wet	8121573	8121573-BLK1	12/11/08 11:28
Mercury by EPA Methods 7470A/7471A						
8120735-BLK1						
Mercury	<0.0240		mg/kg wet	8120735	8120735-BLK1	12/04/08 15:03
TCLP Metals by 6000/7000 Series Methods						
8120910-BLK1						
Mercury	<0.00150		mg/L	8120910	8120910-BLK1	12/05/08 15:47
8120922-BLK1						
Arsenic	<0.0500		mg/L	8120922	8120922-BLK1	12/05/08 23:05
Barium	<0.0150		mg/L	8120922	8120922-BLK1	12/05/08 23:05
Cadmium	<0.00500		mg/L	8120922	8120922-BLK1	12/05/08 23:05
Chromium	<0.0150		mg/L	8120922	8120922-BLK1	12/05/08 23:05
Lead	<0.0280		mg/L	8120922	8120922-BLK1	12/05/08 23:05
Selenium	<0.0430		mg/L	8120922	8120922-BLK1	12/05/08 23:05
Silver	<0.0160		mg/L	8120922	8120922-BLK1	12/05/08 23:05

Client	S&ME, Inc. (2420)	Work Order:	NRL0331
	620 Wando Park Blvd.	Project Name:	Macalloy Site
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
Duplicate

Analyte	Orig. Val.	Duplicate	Q	Units	RPD	Limit	Batch	Sample Duplicated	Analyzed Date/Time
General Chemistry Parameters									
8120897-DUP1									
Chromium (VI)	3.82	3.82		mg/kg dry	0	20	8120897	NRL0331-01	12/08/08 12:07
8121669-DUP1									
% Dry Solids	90.4	90.0		%	0.4	20	8121669	NRL0150-04	12/12/08 06:46

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Client	S&ME, Inc. (2420)	Work Order:	NRL0331
	620 Wando Park Blvd.	Project Name:	Macalloy Site
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
LCS

Analyte	Known Val.	Analyzed Val	Q	Units	% Rec.	Target Range	Batch	Analyzed Date/Time
General Chemistry Parameters								
8120897-BS1								
Chromium (VI)	40.0	43.6		mg/kg wet	109%	90 - 114	8120897	12/08/08 12:07
Total Metals by EPA Method 6010B								
8121573-BS1								
Antimony	100	98.9		mg/kg wet	99%	80 - 120	8121573	12/11/08 11:33
Arsenic	20.0	19.4		mg/kg wet	97%	80 - 120	8121573	12/11/08 11:33
Barium	400	405		mg/kg wet	101%	80 - 120	8121573	12/11/08 11:33
Cadmium	20.0	21.2		mg/kg wet	106%	80 - 120	8121573	12/11/08 11:33
Chromium	40.0	43.2		mg/kg wet	108%	80 - 120	8121573	12/11/08 11:33
Iron	200	227		mg/kg wet	114%	80 - 120	8121573	12/11/08 11:33
Lead	100	107		mg/kg wet	107%	80 - 120	8121573	12/11/08 11:33
Manganese	100	106		mg/kg wet	106%	80 - 120	8121573	12/11/08 11:33
Nickel	100	107		mg/kg wet	107%	80 - 120	8121573	12/11/08 11:33
Selenium	20.0	18.7		mg/kg wet	93%	80 - 120	8121573	12/11/08 11:33
Silver	10.0	10.6		mg/kg wet	106%	75 - 125	8121573	12/11/08 11:33
Mercury by EPA Methods 7470A/7471A								
8120735-BS1								
Mercury	0.167	0.177		mg/kg wet	106%	78 - 120	8120735	12/04/08 15:05
TCLP Metals by 6000/7000 Series Methods								
8120910-BS1								
Mercury	0.0200	0.0185		mg/L	92%	78 - 124	8120910	12/05/08 16:39
8120922-BS1								
Arsenic	10.0	10.0		mg/L	100%	80 - 120	8120922	12/05/08 23:09
Barium	50.0	51.4		mg/L	103%	80 - 120	8120922	12/05/08 23:09
Cadmium	10.0	9.90		mg/L	99%	80 - 120	8120922	12/05/08 23:09
Chromium	50.0	52.2		mg/L	104%	80 - 120	8120922	12/05/08 23:09
Lead	50.0	50.4		mg/L	101%	80 - 120	8120922	12/05/08 23:09
Selenium	10.0	10.1		mg/L	101%	80 - 120	8120922	12/05/08 23:09
Silver	10.0	10.2		mg/L	102%	80 - 120	8120922	12/05/08 23:09

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2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

Client	S&ME, Inc. (2420)	Work Order:	NRL0331
	620 Wando Park Blvd.	Project Name:	Macalloy Site
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
LCS Dup

Analyte	Orig. Val.	Duplicate	Q	Units	Spike Conc	% Rec.	Target Range	RPD	Limit	Batch	Sample Duplicated	Analyzed Date/Time
TCLP Metals by 6000/7000 Series Methods												
8120910-BSD1												
Mercury		0.0203		mg/L	0.0200	102%	78 - 124	9	22	8120910		12/05/08 17:42

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Client	S&ME, Inc. (2420)	Work Order:	NRL0331
	620 Wando Park Blvd.	Project Name:	Macalloy Site
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA
Matrix Spike

Analyte	Orig. Val.	MS Val	Q	Units	Spike Conc	% Rec.	Target Range	Batch	Sample Spiked	Analyzed Date/Time
General Chemistry Parameters										
8120897-MS1										
Chromium (VI)	0.520	41.1		mg/kg wet	40.0	101%	75 - 125	8120897	NRL0191-01	12/08/08 12:07
Total Metals by EPA Method 6010B										
8121573-MS1										
Antimony	ND	107		mg/kg dry	113	94%	75 - 125	8121573	NRL0510-02	12/11/08 12:29
Arsenic	14.5	36.6		mg/kg dry	22.7	97%	75 - 125	8121573	NRL0510-02	12/11/08 12:29
Barium	84.5	519		mg/kg dry	453	96%	75 - 125	8121573	NRL0510-02	12/11/08 12:29
Cadmium	ND	20.8		mg/kg dry	22.7	92%	75 - 125	8121573	NRL0510-02	12/11/08 12:29
Chromium	40.0	91.6		mg/kg dry	45.3	114%	75 - 125	8121573	NRL0510-02	12/11/08 12:29
Iron	25800	27400	MHA	mg/kg dry	227	690%	75 - 125	8121573	NRL0510-02	12/11/08 12:29
Lead	21.7	138		mg/kg dry	113	103%	75 - 125	8121573	NRL0510-02	12/11/08 12:29
Manganese	949	1160	MHA	mg/kg dry	113	190%	75 - 125	8121573	NRL0510-02	12/11/08 12:29
Nickel	6.81	119		mg/kg dry	113	99%	75 - 125	8121573	NRL0510-02	12/11/08 12:29
Selenium	ND	20.7		mg/kg dry	22.7	91%	75 - 125	8121573	NRL0510-02	12/11/08 12:29
Silver	0.600	11.7		mg/kg dry	11.3	98%	75 - 125	8121573	NRL0510-02	12/11/08 12:29
Mercury by EPA Methods 7470A/7471A										
8120735-MS1										
Mercury	ND	0.342		mg/kg dry	0.287	119%	60 - 149	8120735	NRL0332-05	12/04/08 15:12
TCLP Metals by 6000/7000 Series Methods										
8120910-MS1										
Mercury	ND	0.0207		mg/L	0.0200	104%	63 - 138	8120910	NRL0126-01	12/05/08 16:54
8120922-MS1										
Arsenic	ND	10.0		mg/L	10.0	100%	75 - 125	8120922	NRL0410-02	12/06/08 00:59
Barium	0.0350	50.5		mg/L	50.0	101%	75 - 125	8120922	NRL0410-02	12/06/08 00:59
Cadmium	ND	9.83		mg/L	10.0	98%	75 - 125	8120922	NRL0410-02	12/06/08 00:59
Chromium	ND	51.7		mg/L	50.0	103%	75 - 125	8120922	NRL0410-02	12/06/08 00:59
Lead	ND	50.5		mg/L	50.0	101%	75 - 125	8120922	NRL0410-02	12/06/08 00:59
Selenium	ND	10.2		mg/L	10.0	102%	75 - 125	8120922	NRL0410-02	12/06/08 00:59
Silver	ND	10.0		mg/L	10.0	100%	75 - 125	8120922	NRL0410-02	12/06/08 00:59

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Client	S&ME, Inc. (2420)	Work Order:	NRL0331
	620 Wando Park Blvd.	Project Name:	Macalloy Site
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

PROJECT QUALITY CONTROL DATA

Matrix Spike Dup

Analyte	Orig. Val.	Duplicate	Q	Units	Spike Conc	% Rec.	Target Range	RPD	Limit	Batch	Sample Duplicated	Analyzed Date/Time
General Chemistry Parameters												
8120897-MSD1												
Chromium (VI)	0.520	41.0		mg/kg wet	40.0	101%	75 - 125	0.1	20	8120897	NRL0191-01	12/08/08 12:07
Total Metals by EPA Method 6010B												
8121573-MSD1												
Antimony	ND	111		mg/kg dry	117	95%	75 - 125	4	20	8121573	NRL0510-02	12/11/08 12:33
Arsenic	14.5	37.9		mg/kg dry	23.4	100%	75 - 125	3	20	8121573	NRL0510-02	12/11/08 12:33
Barium	84.5	544		mg/kg dry	469	98%	75 - 125	5	20	8121573	NRL0510-02	12/11/08 12:33
Cadmium	ND	21.8		mg/kg dry	23.4	93%	75 - 125	4	20	8121573	NRL0510-02	12/11/08 12:33
Chromium	40.0	139	M1, R3	mg/kg dry	46.9	211%	75 - 125	41	20	8121573	NRL0510-02	12/11/08 12:33
Iron	25800	27100	MHA	mg/kg dry	234	548%	75 - 125	1	20	8121573	NRL0510-02	12/11/08 12:33
Lead	21.7	143		mg/kg dry	117	103%	75 - 125	3	20	8121573	NRL0510-02	12/11/08 12:33
Manganese	949	1030	MHA	mg/kg dry	117	73%	75 - 125	12	20	8121573	NRL0510-02	12/11/08 12:33
Nickel	6.81	124		mg/kg dry	117	100%	75 - 125	4	20	8121573	NRL0510-02	12/11/08 12:33
Selenium	ND	22.3		mg/kg dry	23.4	95%	75 - 125	7	20	8121573	NRL0510-02	12/11/08 12:33
Silver	0.600	12.0		mg/kg dry	11.7	98%	75 - 125	3	20	8121573	NRL0510-02	12/11/08 12:33
Mercury by EPA Methods 7470A/7471A												
8120735-MSD1												
Mercury	ND	0.373		mg/kg dry	0.299	125%	60 - 149	9	26	8120735	NRL0332-05	12/04/08 15:14
TCLP Metals by 6000/7000 Series Methods												
8120910-MSD1												
Mercury	ND	0.0203		mg/L	0.0200	102%	63 - 138	2	22	8120910	NRL0126-01	12/05/08 16:56
8120922-MSD1												
Arsenic	ND	10.1		mg/L	10.0	101%	75 - 125	0.6	20	8120922	NRL0410-02	12/06/08 01:03
Barium	0.0350	51.2		mg/L	50.0	102%	75 - 125	1	20	8120922	NRL0410-02	12/06/08 01:03
Cadmium	ND	9.92		mg/L	10.0	99%	75 - 125	0.9	20	8120922	NRL0410-02	12/06/08 01:03
Chromium	ND	52.3		mg/L	50.0	105%	75 - 125	1	20	8120922	NRL0410-02	12/06/08 01:03
Lead	ND	51.0		mg/L	50.0	102%	75 - 125	1	20	8120922	NRL0410-02	12/06/08 01:03
Selenium	ND	10.3		mg/L	10.0	103%	75 - 125	1	20	8120922	NRL0410-02	12/06/08 01:03
Silver	ND	10.2		mg/L	10.0	102%	75 - 125	2	20	8120922	NRL0410-02	12/06/08 01:03

Client	S&ME, Inc. (2420)	Work Order:	NRL0331
	620 Wando Park Blvd.	Project Name:	Macalloy Site
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

General Chemistry Parameters

8120897-PS1

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Client	S&ME, Inc. (2420)	Work Order:	NRL0331
	620 Wando Park Blvd.	Project Name:	Macalloy Site
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

CERTIFICATION SUMMARY

TestAmerica Nashville

Method	Matrix	AIHA	Nelac	South Carolina
SW846 1311/6010B	Soil	N/A	X	X
SW846 1311/7470A	Soil	N/A	X	X
SW846 1311	Soil	N/A	X	X
SW846 6010B	Soil	N/A	X	X
SW846 7196A	Soil		X	
SW846 7471A	Soil		X	X
SW-846	Soil			

Client	S&ME, Inc. (2420)	Work Order:	NRL0331
	620 Wando Park Blvd.	Project Name:	Macalloy Site
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

TCLP REGULATORY LIMITS

Analyte	Regulatory Limit
Arsenic	5
Barium	100
Cadmium	1
Chromium	5
Lead	5
Mercury	0.2
Selenium	1
Silver	5

2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

Client	S&ME, Inc. (2420)	Work Order:	NRL0331
	620 Wando Park Blvd.	Project Name:	Macalloy Site
	Mt. Pleasant, SC 29464	Project Number:	1131-08-554
Attn	Andrew Wertz	Received:	12/03/08 08:00

DATA QUALIFIERS AND DEFINITIONS

M1 The MS and/or MSD were above the acceptance limits due to sample matrix interference. See Blank Spike (LCS).

MHA Due to high levels of analyte in the sample, the MS/MSD calculation does not provide useful spike recovery information. See Blank Spike (LCS).

R3 The RPD exceeded the acceptance limit due to sample matrix effects.

ND Not detected at the reporting limit (or method detection limit if shown)

METHOD MODIFICATION NOTES

TestAmerica

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Nashville, TN

COOLER RECEIPT

NRL0331

Cooler Received/Opened On 12 / 03/ 08 @ 8:00

1. Tracking # 3167 (last 4 digits, FedEx)

Courier: FED-EX IR Gun ID 90942856

2. Temperature of rep. sample or temp blank when opened: 3.2 *Degrees Celsius*
3. If Item #2 temperature is 0°C or less, was the representative sample or temp blank frozen? YES NO...NA
4. Were custody seals on outside of cooler? YES...NO...NA

   If yes, how many and where: 2 front
5. Were the seals intact, signed, and dated correctly? YES...NO...NA
6. Were custody papers inside cooler? YES...NO...NA

I certify that I opened the cooler and answered questions 1-6 (intial)

7. Were custody seals on containers: YES NO and Intact YES...NO...NA

   Were these signed and dated correctly? YES...NO...NA
8. Packing mat'l used? Bubblewrap Plastic bag Peanuts Vermiculite Foam Insert Paper Other None
9. Cooling process: Ice Ice-pack Ice (direct contact) Dry ice Other None
10. Did all containers arrive in good condition (unbroken)? YES...NO...NA
11. Were all container labels complete (#, date, signed, pres., etc)? YES...NO...NA
12. Did all container labels and tags agree with custody papers? YES...NO...NA

only 2 jars received

13a. Were VOA vials received? YES...NO...NA

b. Was there any observable headspace present in any VOA vial? YES...NO...NA

14. Was there a Trip Blank in this cooler? YES...NO...NA If multiple coolers, sequence # NA

I certify that I unloaded the cooler and answered questions 7-14 (intial)

15a. On pres'd bottles, did pH test strips suggest preservation reached the correct pH level? YES..NO..NA

b. Did the bottle labels indicate that the correct preservatives were used YES...NO...NA

If preservation in-house was needed, record standard ID of preservative used here________

16. Was residual chlorine present? YES...NO...NA

I certify that I checked for chlorine and pH as per SOP and answered questions 15-16 (intial)

17. Were custody papers properly filled out (ink, signed, etc)? YES...NO...NA
18. Did you sign the custody papers in the appropriate place? YES...NO...NA
19. Were correct containers used for the analysis requested? YES...NO...NA
20. Was sufficient amount of sample sent in each container? YES...NO...NA

I certify that I entered this project into LIMS and answered questions 17-20 (intial)

I certify that I attached a label with the unique LIMS number to each container (intial)

21. Were there Non-Conformance issues at login? YES..NO Was a PIPE generated? YES..NO..#______

BIS = Broken in shipment

TestAmerica
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Nashville Division
2960 Foster Creighton
Nashville, TN 37204

Phone: 615-726-0177
Toll Free: 800-765-0980
Fax: 615-726-3404

To assist us in using the proper analytical methods, is this work being conducted for regulatory purposes?

Compliance Monitoring? Yes ____ No _
Enforcement Action? Yes ____ No _

Client Name/Account #: S&ME # 2420
Address: 620 Wando Park Road
City/State/Zip: Mt. Pleasant, SC 29464
Project Manager: Andrew Wertz email: awertz@smeinc.com
Telephone Number: 843.884.0005 **Fax No.:** 843.884-1696
Sampler Name: (Print) F. Slaughter
Sampler Signature: F. S

Site State: SC
PO#: 32106
TA Quote #:
Project ID: MACALLOY SITE
Project #: 1131-08-554

Std TAT

NRL0331
12/17/08 23:59

Sample ID / Description	Date Sampled	Time Sampled	No. of Containers Shipped	Grab	Composite	Field Filtered	Preservative: Ice	HNO_3 (Red Label)	HCl (Blue Label)	NaOH (Orange Label)	H_2SO_4 Plastic (Yellow Label)	H_2SO_4 Glass (Yellow Label)	None (Black Label)	Other (Specify)	Matrix: Groundwater	Wastewater	Drinking Water	Sludge	Soil	Other (specify):	Analyze For: TCLP METALS	TOTAL METALS -As, Sb	Ba, Cd, Cr, Fe, Pb, Mn	Ni, Se, Ag, Hg,	Hexavalent Chromium							RUSH TAT (Pre-Schedule)
MAC-MUD	12/2/08	1315	4		X		X						4					X			X	X	X	X	X							

Special Instructions:

Method of Shipment: FEDEX

Laboratory Comments:
Temperature Upon Receipt:
VOCs Free of Headspace? Y

Relinquished by:	Date	Time	Received by:	Date	Time
F. S	12/2/08	1400	J. Brunsford	12/2/08	1400
Relinquished by: J. Brunsford	12/2/08	1730	Received by TestAmerica:	12/3/08	0800

Fed ex to Test America - Nashville

Macalloy Site

NRL0331
12/17/08 23:59

Analyze 1 semi-solid (drilling mud) sample and 1 water sample for :

Total Metals by 6010B/7470A	TCLP Metals by 6010B/7470A
Arsenic	Arsenic
Antimony	Barium
Barium	Cadmium
Cadmium	Chromium
Chromium	Lead
Hexavalent Chromium	Selenium
Iron	Silver
Lead	Mercury
Manganese	
Nickel	
Selenium	
Silver	
Mercury	

Former Crosby's Gas Station

Analyze 1 semi-solid (drilling mud) sample ~~and 1 water sample for~~ :

TCLP VOCs by 8260B	TCLP SVOCs by 8270C	TCLP Metals by 6010B/7470A
1,1-dichloroethene	cresols	Arsenic
1,2-dichloroethane	1,4-dichlorobenzene	Barium
benzene	2,4-dinitrotoluene	Cadmium
chlorobenzene	hexachlorobenzene	Chromium
trichloroethene	hexachlorobutadiene	Lead
vinyl chloride	hexachloroethane	Selenium
2-butanone	nitrobenzene	Silver
carbon tetrachloride	pentachlorophenol	Mercury
chloroform	pyridine	
tetrachloroethene	2,4,5-trichlorophenol	
	2,4,6-trichlorophenol	