Exhibit X. Moseley North Site Preliminary Geotechnical Engineering Report

SOUTHERN EARTH SCIENCES, INC.

Geotechnical, Environmental & Construction Materials Testing
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Preliminary Geotechnical Engineering Study Report

Proposed +/- 305 Acre Moseley North Site
Pointe Coupee Parish, LA

Baton Rouge Area Chamber
SESI Project No: B15-047
March 18, 2015

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SOUTHERN EARTH SCIENCES, INC.

Geotechnical, Environmental & Construction Materials Testing

March 18, 2015

BATON ROUGE AREA CHAMBER
564 Laurel Street
Baton Rouge, Louisiana 70801

ATTENTION: Mr. Jim Cavanaugh

REFERENCE: Preliminary Geotechnical Engineering Study for
Proposed +/- 305 Acre Moseley North Site
Pointe Coupe Parish, Louisiana
SESI File No.: B15-047

Dear Mr. Cavanaugh:

Southern Earth Sciences, Inc (SESI) is pleased to submit our Preliminary Geotechnical Engineering Study Report for the above referenced project. The report includes the results of field and laboratory testing, preliminary discussions and recommendations for the foundation design, and general site conditions as related to soils.

We appreciate the given opportunity to perform this Preliminary Geotechnical Study and look forward to continue participating during the design and construction phases of this project. If you have any questions pertaining to this report, or if we may be of further service, please contact our office.

Sincerely,

SOUTHERN EARTH SCIENCES, INC.

Mike Juneau, P.E., MBA
Registered, Louisiana 37242

Joe Cobena, E.I.
Staff Engineer

STATE OF LOUISIANA
RAJA S. MADHYANNAPU
License No. 37040
PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING
3/18/15

Raja Madhyannapu, Ph.D. P.E.
Registered, Louisiana 37040

1.0 PROJECT INFORMATION

1.1 Project Authorization

Southern Earth Sciences, Inc. (SESI) has completed a subsurface exploration for the proposed preliminary site evaluation for marketing the project site in the Louisiana Economic Development Program (LEDP). Our geotechnical engineering services were performed in general accordance with our Geotechnical Proposal No: P15-031.01 dated January 25, 2015. Authorization to proceed with this investigation was received from Erin Monroe Wesley through *signed Work Authorization Sheet* dated February 5, 2015.

1.2 Project Description

It is our understanding that the project site will be marketed in the Louisiana Economic Development Program (LEDP) for future industrial development, which has not been defined at this time. Based on the provided information, the proposed Moseley NORTH site will encompass an area of size on the order of 305 acres. The proposed site is generally located north of Highway 10, and west of Highway 981 in Pointe Coupee Parish, Louisiana. Based on the provided information, the majority of the project site is a mixture of agricultural land, grass covered pastures, and some trees.

Furthermore, it is understood that in order to market the project site in the LEDP, preliminary evaluation of subsoil characteristics of the project site verifying the compatibility with industrial development is required. Generally, for this purpose, we understand LEDP requires at least one (1) soil boring to a depth of 100 feet for an area of 50 acres. However, the field exploration for this project was performed as directed by client. In addition, LEDP requirements state that once the type of development is determined and a site plan is developed, additional subsurface investigations should be performed in order to provide project specific, geotechnical engineering recommendations.

2.0 PURPOSE AND SCOPE

The purpose of this study was to explore the subsurface conditions at the site to provide preliminary evaluation of subsurface characteristics for future industrial development. As directed by client, two (2) soil borings to a depth of about 25 feet below existing grade and one (1) soil boring to a depth of about 75 feet were drilled and sampled.

The scope of services also included conducting laboratory tests on selected samples recovered from the soil borings. These tests included visual description and classification, moisture content, liquid limit, plastic limit, unconfined compressive strength, and undrained unconsolidated triaxial strength test. Both field and laboratory testing procedures are briefly discussed in this report.

This report includes a site description, discusses the conditions of the existing subsurface materials at the site and presents the following:

- Soil boring logs including identification and physical and engineering characteristics of subsurface materials encountered during the sampling and testing
- General discussion on subsurface conditions and their engineering characteristics
- Discussion on the suitability of existing subsurface soils for future industrial development including a "typical" 100,000 square foot warehouse building and associated roadways

The scope of geotechnical services did not include an environmental site assessment for determining the presence or absence of wetlands, hazardous or toxic materials in the soil, surface water, groundwater, or air on, below, or around the site. Any statement in this report or on the *Boring Log* sheets regarding odors, colors, and unusual or suspicious items or conditions is strictly for informational purposes.

In addition, SESI did not provide any service to investigate or detect the presence of moisture, mold, or other biological contaminates in or around any structure, or any service that was designed or intended to prevent or lower the risk of the occurrence or amplification of the same. The client acknowledges that mold is ubiquitous to the environment with mold amplification occurring when building materials are impacted by moisture. The client further acknowledges that site conditions are outside of SESI's control, and that mold amplification will likely occur, or continue to occur, in the presence of moisture. As such, SESI cannot and shall not be held responsible for the occurrence or recurrence of mold amplification.

3.0 FIELD EXPLORATION

The field exploration performed to evaluate the engineering characteristics of the subsurface materials, included a reconnaissance visit to the project site by a SESI representative, drilling the soil borings and recovering soil samples.

As previously mentioned, two (2) soil borings to a depth of about 25 feet and one (1) soil boring to a depth of about 75 feet within the proposed project footprint were drilled and sampled for this project. The depths and locations of the borings were as proposed by SESI and understood by client following the RFP. The *Boring Location Plan*, included in the Appendix, presents the approximate location of the borings. Descriptions of soil and groundwater conditions encountered in the borings are shown on their respective logs in Appendix.

4.0 DRILLING AND SAMPLING PROCEDURES

The borings were drilled with an ATV (all terrain vehicle) mounted drill rig using auger and rotary head wash drilling techniques to advance the borehole. Undisturbed samples were continuously obtained from the ground surface to a depth of ten (10) feet, then at five-foot intervals to the

depth of the boring. They were obtained using thin-walled tube sampling procedures in general accordance with ASTM D-1587 *Standard Practice for Thin-Walled Tube Sampling of Soils for Geotechnical Purposes*. These samples were extruded in the field with a hydraulic ram, and were identified according to project number, boring number and depth, wrapped in aluminum foil and placed in plastic bags to preserve the natural moisture condition; then, they were transported to the laboratory in containers to minimize disturbance.

5.0 LABORATORY TESTING PROGRAM

A supplemental laboratory testing program was conducted to determine additional pertinent engineering characteristics of the subsurface materials. This program included visual description and classification and determination of the moisture content (ASTM D2216 *Standard Test Method for Laboratory Determination of Water (Moisture*) Content of Soil and Rock by Mass) on all samples. Furthermore, selected samples were subjected to ASTM D4318 *Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils*, ASTM D1140 *Standard Test Method for Amount of Material in Soils Finer than the No. 200*, ASTM D2166 *Standard Test Method for Unconfined Compressive Strength of Cohesive Soils*, and ASTM D2850 *Standard Test Method for Unconsolidated Undrained Triaxial Compression Test on Cohesive Soils*. The results of these tests are found in the accompanying boring logs located in the Appendix. Please note that the samples obtained and not tested will be retained for a period of thirty (30) days; if further instructions are not received they will be disposed at that time.

6.0 GENERALIZED SUBSURFACE CONDITIONS

The subsurface conditions discussed below are based on our review of both the field observations and laboratory test results on select soil samples retrieved at boring locations B-1 through B-3. Borings B-1 and B-3 were explored to a depth of about 25 feet and boring B-2 was explored to a depth of about 75 feet.

The near surface materials encountered at the boring locations included soft to medium lean and fat clays from existing grade to a depth of about four (4) to six (6) feet. Below this, the overall subsurface materials across the project site primarily consisted of very loose to very dense sands with variable amounts of silt to a depth of about 75 feet. Intermediate, discontinuous layers of silt and lean clay, with variable amounts of sand, were observed at varying depths within the sand stratum.

Generally, the subsurface materials were sampled in gray and brown colors. Clay materials were sampled with variable amounts of silt, sand, and ferrous nodules; whereas, silty and sandy materials were sampled with clay pockets. All references to depth are made with respect to the existing ground surface at the time the borings were performed.

The above subsurface description is a generalized nature to highlight the major subsurface materials features and characteristics. The *Boring Log* sheets, included in the Appendix, present specific information at individual boring location including: soil description, stratification, ground water level, unconfined compressive strength, samples' location, and laboratory tests results. This information represents the actual conditions at the boring locations. Variations may occur and should be expected between boring locations. The stratification represents the approximate boundary between subsurface materials and the actual transition may be gradual.

7.0 GROUNDWATER

A summary of the encountered groundwater conditions is presented in the following table.

GROUND WATER TABLES	
Borehole	**Reading (feet)**
B-1	3.0
B-2	[1]7.0
B-3	11.0

[1]rose to 6.0 feet after 15 minutes

We caution that the clay soils present at this site will have a tendency to retain moisture and to create perched water conditions after periods of wet weather. Isolated perched water conditions shallower than those encountered during our investigations may be possible after periods of rainfall. Fluctuations in the groundwater table will occur due to variances in rainfall, elevation, drainage, types of soil encountered and other factors not evident at the time measurements were made. Groundwater levels should be verified prior to construction. Groundwater levels encountered at each test location at the time of our investigation are shown on the appropriate Soil Boring Logs attached in Appendix. Reference to depth has been made with respect to the existing ground surface.

8.0 GENERAL RECOMMENDATIONS

8.1 Site Discussion

Generally, the laboratory and field test results indicate that the encountered materials exhibit poor to fair strength parameters. Essentially near surface cohesive soils (clays) at all borings locations tend to be soft to medium in consistency; whereas, cohesionless soils (silts and sands) at all boring locations tend to be very loose to very dense in nature. Please refer to the boring logs attached to this report for strength, consistency, and density characteristics of soils with depth.

Based on our review of the existing subsoil conditions and analysis of laboratory and field test results, we consider the proposed project to be feasible from a geotechnical point of view for future commercial development. However, it is recommended that based on the proposed future commercial development and project requirements, the project site should be further explored to provide specific recommendations related to site preparation, foundation design, pavement design, and construction considerations. Please note that this report should be considered only for preliminary site evaluation and is not intended for design purposes.

We encourage contacting SESI to provide further geotechnical engineering and construction services, when the proposed commercial development is planned and ready to be implemented.

8.2 "Typical" Structure Recommendations

Considering the subsurface materials encountered, construction of a "typical" 100,000 square foot warehouse building with associated parking and driveways would be possible from a geotechnical standpoint. The foundation type to support a typical warehouse building depends on the anticipated structural loads and fill requirement to achieve the design grade.

Based on our general experience with the subsurface conditions encountered at the project site, a lightly loaded structure, not sensitive to total and/or differential settlements, may be supported on a shallow foundation system. However, if the structure(s) are sensitive to total and/or differential settlements and/or structural loads are beyond the capacity limits for shallow foundations, they may be entirely supported on deep foundations.

Recommendations on shallow and/or deep foundation systems will require further field exploration based on the site and project specific requirements.

9.0 REPORT LIMITATIONS

The explorations and analyses for this preliminary study, as well as the discussions and preliminary recommendations in this report, were selected and developed based on our understanding of the project as described in this report. Furthermore, they are based on the assumption that the exploratory borings are a representation of the subsoil conditions throughout the site. Please note that variations in the subsoil conditions may occur between and beyond borings. If pertinent details of the project differ from the description provided in this report, we should be authorized to review the discrepancies, and if necessary, modify our preliminary discussions and recommendations.

We understand that we will be contracted to complete the additional geotechnical field exploration, laboratory testing, and analyses for actual features and locations, when the proposed future development is planned and ready to be implemented. This is will give us the opportunity to verify and supplement the preliminary discussions and recommendations included in herein and prepare a final report.

SESI had prepared this report for the exclusive use to Baton Rouge Area Chamber. The observations and preliminary recommendations provided in this report may not be applicable at locations not explored by borings or in areas outside the project boundaries. This report should be made available for information only and not as a warranty of subsurface conditions.

APPENDIX

APPROXIMATE BORING LOCATION

N

PROPOSED MOSELEY NORTH SITE
POINTE COUPEE PARISH, LOUISIANA
SESI FILE NO.: B15-047

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FIGURE 1
BORING LOCATION PLAN

BORING LOG

BORING NO.: | **PROJECT NO.:**
PROJECT: | **DATE DRILLED:**
PROJECT LOCATION: | **DATE COMPLETED:**
BORING LOCATION: | **WATER LEVEL:**
BORING ELEVATION: | **WATER LEVEL DATE:**
GEOL/ENGR: | **LOGGED BY:**
METHOD: | **DRILLER:**

DEPTH (FEET)	SAMPLE	Standard Penetration (Blows/Ft.) or Penetrometer (TSF)	Unconfined Compressive Strength (TSF)	Moisture Content (%)	Dry Unit Weight (PCF)	LL	PI	Symbol	MATERIAL CLASSIFICATION

5
10
15
20
25
30
35
40

Description of strata as follows:
Strength (or Consistency), Color, Minor Constituent, Major Constituent, additional observations, etc.

Field evaluation of shear strength/relative density:
Standard Penetration Test (ASTM D-1586) in Blows/Ft.
Pocket penetrometer readings in Tons/Sq. Ft.

Groundwater second reading

Groundwater first encountered

Graphical presentation of material type:

Fat CLAY	SILT	SAND	FILL
Lean CLAY	CLAYEY SILT	CLAYEY SAND	GRAVEL
ORGANIC CLAY	SANDY SILT	SILTY SAND	GRAVELLY SAND
PEAT	ORGANIC SILT	SANDY CLAY	

Laboratory Information

As determined by Unconfined Compression (ASTM D-2166) or Unconsolidated Undrained Triaxial (ASTM D-2850), if noted.

Determined using applicable portions of ASTM D-2166 and ASTM D-2216.

Determined using ASTM D-2216 or D-4959.

Determined using ASTM D-4318. Provides data for application of Unified Classification System (UCS).

COMMENTS:

Shelby Tube Sample
Auger Sample
Split-spoon Sample
No Recovery

Sample recovery method.

SOUTHERN EARTH SCIENCES, inc.

GENERAL NOTES FROM LITERATURE

Unified Soil Classification System

Coarse-grained soils. More than 50% retained on US # 200 Sieve	***Gravels: More than 50% retained on US # 4 Sieve***	*Clean Gravel (little or no fines)*	*GW*	*Well graded gravels and gravel-sand mixtures with little or no fines*
			GP	*Poorly graded gravels and gravel-sand mixtures with little or no fines*
		Gravels with fines	*GM*	*Silty gravels, gravel-sand-silt mixtures*
			GC	*Clayey gravels, gravel-sand-clay mixtures*
	Gravels: More than 50% passing through US # 4 Sieve	*Clean sand (little or no fines)*	*SW*	*Well graded sands and gravelly sands, little or no fines*
			SP	*Poorly graded sands and gravelly sands, little or no fines*
		Sands with fines	*SM*	*Silty sands, sand-silt mixtures*
			SC	*Clayey sands, sand-clay mixtures*
Fine-grained soils. More than 50% passed through US Sieve # 200	***Silts and Clays with liquid limit (LL) less than 50***		*ML*	*Inorganic silts, very fine sands, rock flour, silty or clayey fine sands*
			CL	*Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays*
			OL	*Organic silts and organic silty clays of low plasticity*
	Silts and Clays with liquid limit (LL) greater than 50		*MH*	*Inorganic silts, micaceous diatomaceous fine sand or silty soil, elastic silts*
			CH	*Inorganic clays of high plasticity, fat clays*
			OH	*Organic clays of medium to high plasticity*
High organic soils			*PT*	*Peat, muck and other highly organic soils*

Classification of Granular Soils as per U.S. Standard Sieve Analysis

Description	*Boulders*	*Cobbles*	*Gravel*		*Sand*			*Silt or Clay*
			Coarse	*Fine*	*Coarse*	*Medium*	*Fine*	
Sieve Size	***>12 inches***	***3-12 inches***	***0.75 to 3inches***	***#4 to 0.75 iches***	***#10-#4***	***#40-#10***	***#200-#40***	***<#200***

Note:#4=5mm, #10=5mm, #40=0.4mm, #200=0.8mm

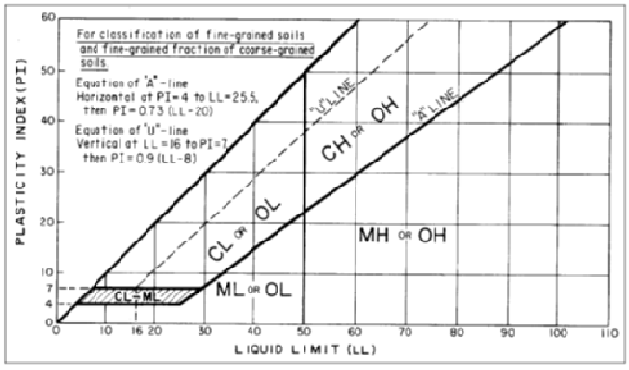
Consistency of Cohesive Soils

Consistency	Unconfined Compressive Strength, (tsf)	SPT* (N)
Very Soft	<0.25	<2
Soft	0.25 to 0.50	2 to 4
Medium Stiff	0.50 to 1.0	5 to 8
Stiff	1.0 to 2.0	9 to 15
Very Stiff	2.0 to 4.0	16 to 30
Hard	>4.0	>30

Relative Density of Granular Soils

Relative Density	SPT* (N)
Very Loose	0 to 4
Loose	5 to 10
Medium Dense	11 to 24
Dense	25 to 50
Very Dense	>50

**Standard Penetration test (SPT) value (N-value) is a number of blows required to advance a standard 2-inch O.D. split-spoon sampler (SS) the last 12 inches of the total 18 inches penetration with a 140-pound hammer falling from 30 in. height.*



Plasticity Characteristics

Plasticity	Plasticity Index (PI)
Non-Plastic	0
Slight	1 to 5
Low	5 to 10
Medium	11 to 20
High	21 to 40
Very high	> 40

FIELD BORING LOG

BORING NO.: B-1
PROJECT: MOSELEY NORTH SITE
PROJECT LOCATION: POINTE COUPEE PARISH
BORING LOCATION: SEE BORING LOCATION PLAN
BORING ELEVATION: EXISTING GRADE
GEOL/ENGR: RM
METHOD: AUGER/WET ROTARY

PROJECT NO.: B15-047
DATE DRILLED: 03/03/15
DATE COMPLETED: 03/03/15
WATER LEVEL: 3 ft
WATER LEVEL DATE: 03/03/15
LOGGED BY: WW
DRILLER: Triangle

DEPTH (feet)	SAMPLE	Standard Penetration (Blows/Ft.)	Unconfined Compressive Strength (tsf)	Moisture Content (%)	Dry Unit Weight (pcf)	LL	PI	Symbol	MATERIAL CLASSIFICATION
				29		57	35		Gray and Brown Fat CLAY (CH) -- with roots
			0.71	33	86				-- medium, with ferrous nodules
5				34		58	35		
			0.46 (1)	32	89				Loose, Brown Silty SAND (SM) -- with clay
	B			32					Brown Sandy SILT (ML)
10									
		6b/ft 4/3/3		30					Loose, Brown Silty SAND (SM)
15									
		12b/ft 6/7/5	(2)	28					-- medium
20									
		12b/ft 4/6/6		33					-- medium, gray
25									Bottom at 25 Feet
30									(1) UU Triaxial Test at 5.0 psi confining pressure (2) % Passing # 200 = 29.9%
35									
40									

COMMENTS:

SHELBY TUBE
B BAG
SPLIT SPOON

FIELD BORING LOG

BORING NO.: B-2
PROJECT: MOSELEY NORTH SITE
PROJECT LOCATION: POINTE COUPEE PARISH
BORING LOCATION: SEE BORING LOCATION PLAN
BORING ELEVATION: EXISTING GRADE
GEOL/ENGR: RM
METHOD: AUGER/WET ROTARY

PROJECT NO.: B15-047
DATE DRILLED: 03/03/15
DATE COMPLETED: 03/03/15
WATER LEVEL: 7 ft
WATER LEVEL DATE: 03/03/15
LOGGED BY: WW
DRILLER: Triangle

DEPTH (feet)	SAMPLE	Standard Penetration (Blows/Ft.)	Unconfined Compressive Strength (tsf)	Moisture Content (%)	Dry Unit Weight (pcf)	LL	PI	Symbol	MATERIAL CLASSIFICATION
				39					Gray and Brown Fat CLAY with roots (CH)
				43		89	62		-- with ferrous nodules
5			0.28 (1)	32	87				Loose, Gray and Brown SILT (ML) -- with clay and fine sand
				34					-- with trace clay and sand
				34		38	15		Gray and Brown Lean CLAY (CL) -- with sand
10									
				30					Brown Silty SAND (SM)
15									
				31					Gray and Brown Lean CLAY (CL) -- with sand
20									
	B		(2)	53					Gray and Brown Sandy Lean CLAY (CL)
25									
				35					Gray and Brown Lean CLAY (CL)
30									
		25b/ft 12/13/12		31					Dense, Gray Silty SAND (SM)
35									
		36b/ft 13/13/23		24					-- dense, with clay
40									

COMMENTS: WATER LEVEL AT 15 MINUTES = 6'

SHELBY TUBE B BAG SPLIT SPOON

FIELD BORING LOG

BORING NO.: B-2
PROJECT: MOSELEY NORTH SITE
PROJECT LOCATION: POINTE COUPEE PARISH
BORING LOCATION: SEE BORING LOCATION PLAN
BORING ELEVATION: EXISTING GRADE
GEOL/ENGR: RM
METHOD: AUGER/WET ROTARY

PROJECT NO.: B15-047
DATE DRILLED: 03/03/15
DATE COMPLETED: 03/03/15
WATER LEVEL: 7 ft
WATER LEVEL DATE: 03/03/15
LOGGED BY: WW
DRILLER: Triangle

DEPTH (feet)	SAMPLE	Standard Penetration (Blows/Ft.)	Unconfined Compressive Strength (tsf)	Moisture Content (%)	Dry Unit Weight (pcf)	LL	PI	Symbol	MATERIAL CLASSIFICATION
45	X	20b/ft 25/15/5	(3)	34					Very Stiff, Gray Lean CLAY (CL) -- with sand
50	B			26					Gray Fine SAND (SP) -- with trace silt
55	X	50+b/ft 23/25/25 in 3"		26					Very Dense, Gray Fine SAND (SM) -- with clay pockets
60	X	50+b/ft 25/25/25 in 3"	(4)	20					-- very dense, with silt
65	X	50+b/ft 33/50 in 5"		21					-- very dense, with clay pockets
70	X	50+b/ft 15/20/30 in 3"		23					-- very dense, with silt and clay
75	X	50+b/ft 33/40/10 in 2"		20					Very Dense, Gray Fine SAND (SP-SM) -- with silt
80									Bottom at 75 Feet (1) UU Triaxial Test at 3.0 psi confining pressure (2) % Passing # 200 = 60.2% (3) % Passing # 200 = 90.6% (4) % Passing # 200 = 13.2%

COMMENTS: WATER LEVEL AT 15 MINUTES = 6'

SHELBY TUBE B BAG
SPLIT SPOON

FIELD BORING LOG

BORING NO.: B-3
PROJECT: MOSELEY NORTH SITE
PROJECT LOCATION: POINTE COUPEE PARISH
BORING LOCATION: SEE BORING LOCATION PLAN
BORING ELEVATION: EXISTING GRADE
GEOL/ENGR: RM
METHOD: AUGER/WET ROTARY

PROJECT NO.: B15-047
DATE DRILLED: 03/03/15
DATE COMPLETED: 03/03/15
WATER LEVEL: 11 ft
WATER LEVEL DATE: 03/03/15
LOGGED BY: WW
DRILLER: Triangle

DEPTH (feet)	SAMPLE	Standard Penetration (Blows/Ft.)	Unconfined Compressive Strength (tsf)	Moisture Content (%)	Dry Unit Weight (pcf)	LL	PI	Symbol	MATERIAL CLASSIFICATION
				25		35	14		Light Gray and Brown Lean CLAY with sand (CL)
			0.35 (1)	30	93				-- soft
5				25					
				27		29	6		Brown Sandy SILT (ML) -- with clay
	B			31					Brown Silty SAND (SM)
10 ▽									
		0b/ft WOH/WOH/WOH		31					-- very loose
15									
		9b/ft 3/4/5	(2)	30					-- loose
20									
		8b/ft 3/4/4		29					-- loose
25									Bottom at 25 Feet
									(1) UU Triaxial Test at 1.2 psi confining pressure (2) % Passing # 200 = 38.8%
30									
35									
40									

COMMENTS:

SHELBY TUBE
B BAG
SPLIT SPOON

Environmental

Your Partner in Managing Ever-changing Environmental Requirements

With increasing federal, state and local scrutiny on environmental issues of all kinds, it is vital to have a partner who understands these pressures and remains on the leading edge of every issue. From Phase I Environmental Site Assessments to site analyses for large petroleum storage facilities and hazardous waste landfills, SESI has the necessary resources to solve client issues with modern efficiency.

Phase I Environmental Site Assessments

Phase I Environmental Site Assessments protect the purchaser and lender in commercial and industrial property transactions. New EPA requirements for All Appropriate Inquiry means contamination from off-site sources and vapor intrusion should be considered. SESI can also collect and analyze soil and groundwater samples, if required (Phase II).

Services

- Water quality evaluation
- Hydrogeological services
- Site inspections
- Stormwater / industrial discharge compliance
- Contamination assessments
- Remedial actions
- Risk assessments
- Phase I and II ESAs

Landfills and Solid Waste Management

SESI professionals are uniquely qualified to resolve landfill and hazardous waste issues. Our expertise in this area includes site selection and auditing, groundwater contamination testing, and closure services for landfills and energy-to-steam facilities. Our team has participated in the design of several – "Subtitle D" – solid waste landfills.

Our studies include the use of integrated computer graphics to create map displays, soil cross sections, boring logs and plume analysis. These technologies provide the most comprehensive evaluation and reporting of landfill conditions available.

Services

- Hydrogeological / geotechnical investigation
- Groundwater and gas monitoring / statistical analysis
- Technical support
- Design
- Leachate treatment
- Operations and management studies

Underground Storage Tanks

SESI is approved in Alabama (ADEM), Florida (FDEP) and Mississippi (MDEQ) as a qualified Underground Storage Tank Contractor. This gives our experts the ability to assist clients in every area including site assessment and site planning, permitting, remediation and corrective action plans, and compliance with regulatory requirements.

Services

- Regulatory compliance
- Permitting
- Remediation and corrective action planning
- Closure services
- Inspection and monitoring

Environmental Engineering and Consulting

Our engineers and geologist are capable of providing a variety of services to assist our clients in meeting project goals.

Services

- Wetlands Permitting
- On-site sewage systems
- Pond and lake design
- Small flow wastewater systems

Asbestos and Lead-Based Paint (LBP) Consulting

The SESI team of certified asbestos and lead professionals have considerable experience in this important discipline. Our laboratories have the capability to test air samples and provide monitoring and assessment information. All operations are supervised by a licensed asbestos consultant.

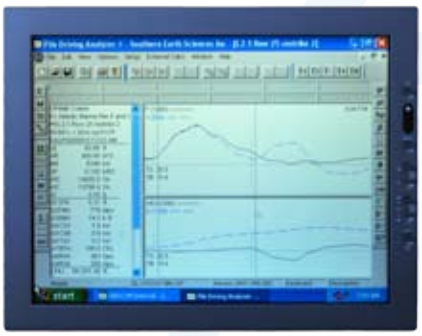
Services

- Risk assessments (LBP)
- Asbestos and LBP surveys
- Abatement plans and specs
- Abatement monitoring and inspections

Geotechnical

Comprehensive Geotechnical and Geological Services

The SESI multi-disciplined staff of professionals places the company in the unique position to combine efforts and give our clients the broad spectrum of geotechnical, environmental and construction consulting necessary to move a project forward quickly. We have drilling, cone penetration testing (CPT) and Geoprobe® equipment in-house to respond rapidly and efficiently to project schedules. Our team has assisted in thousands of projects ranging from single-story residential structures to multi-million dollar industrial facilities. SESI is truly your turn-key solution for site investigations.



Pile Driving Analyzer®

Engineering Analysis and Design

SESI registered professional engineers and geologists solve unusual foundation, engineering and environmental issues on a regular basis. We specialize in pinpointing the obstacles and presenting alternative design options. All foundation aspects are covered from pavement analysis, slope stability to deep and shallow foundation analysis.

Services

- Pile and drilled shaft systems
- Excavation bracing
- Geological mapping / soil profiles
- Soil stabilization studies
- Shallow foundation systems
- Retaining walls
- Slope stability

Field Drilling and Site Investigation

SESI Drilling, Cone Penetration Testing (CPT), and Geoprobe® crews have successfully completed the Hazardous Assessment and Resource Management Course (29 CFR 1910-120). Senior drillers are also required to maintain water well drilling licenses. Regardless of the area or terrain, our crews are prepared to go virtually anywhere to provide you with accurate and current data.

Services

- Groundwater monitor wells
- Sediment sampling
- SPT testing
- CPT testing

Laboratory Testing

In an effort to coordinate and expedite efforts across our geotechnical engineering, drilling and environmental projects, SESI maintains branch offices across the Southeast. These laboratories allow project engineers to receive results quickly and accurately. Routine tests are conducted at these facilities under the direction of responsible professionals.

Tests

- Compaction
- CBR and LBR
- Permeability
- Swell pressure measurements
- Triaxial strength testing
- ASTM testing of soils and rock
- Soil cement, classification, conductivity and resistivity
- Consolidation

Instrumentation

When land suitable for building is in short supply, it becomes necessary to evaluate innovative foundation solutions. Instrumentation of soil and rock plays a key role in overcoming building limitations. Over the years, SESI has developed an expertise in evaluating, identifying, planning and designing highly refined field instrumentation programs using pore pressure instrumentation, inclinometers, geophysical exploration equipment and vibration monitoring devices to limit engineering problems.

Equipment

- Inclinometers
- Piezometers
- Sondex units
- Settlement plates
- Strain gauges
- Pressure cells
- Vibration monitoring
- Pile integrity testing
- Pile dynamic analyzer (PDA)

Subsurface Investigations

Conventional Drilling
Cone Penetration Testing
Direct Push Technology

To support Southern Earth Sciences, Inc.'s geotechnical and environmental exploration objectives, SESI is staffed with experienced crews and equipped with a variety of Cone Penetration Testing, Drilling and Direct Push rigs. The equipment is mounted on a variety of carriers including two-wheel and four-wheel drive trucks and track vehicles. All crew members investigating contaminated sites have completed the 40-hour Hazardous Assessment and Response Management Course (29 CFR 1910-120), and senior drillers maintain required state water well contractors licenses.

Employing CPT technology, SESI, Inc. is able to provide high quality geotechnical and hydrogeological in-situ soil properties. Our in-house CPT equipment gives SESI a unique advantage to offer clients increased accuracy, speed of deployment and reduced costs.

CPT Technology

Cone Penetration Testing, commonly referred to as CPT, is an in-situ testing method used to determine the geotechnical engineering properties of soils and delineating soil stratigraphy. Today CPT is one of the most frequently used and accepted in-situ test methods for soil investigations worldwide although few CPT rigs are available in the Southeast area.

CPT works by pushing an instrumented cone into the ground at a controlled rate of 2 cm/sec. The data can be collected at any interval but is commonly collected every two-inches. Built-in load cells are used to continuously measure the cone tip and sleeve friction resistance. In addition to these values, a porous filter piezo-element, located behind the cone tip, is used to measure pore water pressure during penetration. All CPT field testing procedures are performed in accordance with ASTM D 5778-95 (2000).

Advantages Over Standard Penetration Testing

The CPT test offers an advantage over conventional sampling methods by providing a virtually continuous profile of subsurface stratigraphy. From the data collected, correlations can be made for the soil characteristics such as internal friction angle, undrained shear strength and estimated unit weight. In addition, pore water dissipation tests can be conducted in order to determine other properties, such as permeability of saturated soils. In an environmental application, soil/gas, soil and groundwater samples can be collected without producing cuttings that would require collection and disposal. Small wells (from 1 to 2 inches in diameter) can also be installed with this equipment.

Equipment Capabilities

- Climate controlled cabins
- 2.5, 5 and 10 ton cones
- Shear wave velocity measurement
- Video cone
- Instant feedback available through electronic logs

Equipment

- 20-ton track-mounted CPT rig
- 20-ton truck-mounted CPT rig
- Two (2) track-mounted GeoProbe 6625 equipped for CPT and MacroCore

Field Drilling

Southern Earth Sciences, Inc. has a variety of truck and track mounted drilling equipment to meet project objectives. SESI staff includes licensed well drillers in Louisiana, Mississippi and Florida.

Drilling methods include Flight Auger, Hollow Stem Auger, Rotary Wash and NQ Rock Coring. Specialty sampling equipment includes piston samplers up to 5," Dennison Samples, vane shear, etc.

Direct Push

SESI operates several direct push platforms including a dual purpose Geoprobe 6625 CPT. This equipment can utilize conventional macro core sampling and groundwater/vapor sampling tools or, by utilizing earth anchors, can be converted to a 20-ton Cone Penetration Testing Machine.

SOUTHERN EARTH SCIENCES, INC.

SOUTHERN EARTH SCIENCES, INC. (SESI) WAS FOUNDED IN 1976 AND PROVIDES GEOTECHNICAL ENGINEERING, CONSTRUCTION MATERIALS TESTING AND ENVIRONMENTAL SERVICES THROUGHOUT THE SOUTHEAST ON INDUSTRIAL, COMMERCIAL AND GOVERNMENT PROJECTS

EQUIPMENT LIST

BARGE-MOUNTED (35'X12') DIEDRICH D-50

SESI's 35 foot by 12 foot barge mounted drilling equipment is utilized for projects requiring subsurface investigations over the water. The Diedrich D-50 mounted on the barge is capable of borings in excess of 200 feet.

TRIPOD DRILLING

The tripod equipment is used in sensitive environmental areas to minimize the impact of drilling operations. The equipment is manually operated to depths generally less than 100 feet. Standard penetration tests, Shelby tube samples and vane shear test can be performed using the manual equipment.

CME-45 TRUCK-MOUNTED

The CME-45 is mounted on a four-wheel drive vehicle and is equipped with flight augers, hollow stem augers and mud rotary equipment.

Typical borehole depths are up to 120 feet.

BK-51 TRACK-MOUNTED VEHICLE

The BK-51 is a versatile drill platform with a very low contact pressure of approximately 3 psi. The rig can be configured with augers, mud rotary or NQ wireline.

JACK-UP BARGE

Our drilling and CPT equipment can be mounted on a Jack-Up barge for offshore projects where there is excessive wave action. Borings and CPT penetration have exceeded depths of 200 feet in areas where the water depths may be 50 feet.

20 TON CPT TRACK-MOUNTED

The 20 ton heavy-weight, track-mounted Penetrometer system is a self propelled hydraulic remote controlled CPT system designed for rough terrain or areas where low ground pressure is required for vehicle access. It has two double hydraulic cylinders coupled by a platen that pushes and pulls digital cones and other tools. It is powered by a 130 Hp diesel engine. The unit is equipped with hydraulic leveling jacks and a climate controlled operations center. The contact pressure is approximately 6 psi.

20 TON CPT TRUCK-MOUNTED

The 20 ton truck CPT rig is an ideal vehicle to provide quick, cost effective mobile platform for high production in geotechnical and environmental soils investigations. This system is equipped with 5 and 10 ton seismic piezo cones and vision cones. The operations center is climate controlled for maximum production, regardless of weather conditions or time of day.

SUPPORT EQUIPMENT CPT ON MARSH BUGGY

SESI's CPT system has the capability to be mounted on a marsh buggy for access in swampy conditions.

This setup has been extensively used in south Louisiana for exploration work associated with bridges, pipelines, levees, etc. We have performed CPTs from marsh buggies to depths over 100 feet.

BK-66 ON TWO-WHEEL DRIVE VEHICLE

The BK-66 is a high torque drill rig capable of turning 6.25" hollow stem augers to depths in excess of 100 feet. The rig is also equipped for mud rotary drilling with a Gardner Denver displacement pump.

DIEDRICH D-50 ON FOUR-WHEEL DRIVE VEHICLE

The CME-45 is mounted on a four-wheel drive vehicle and is equipped with flight augers, hollow stem augers and mud rotary equipment.

Typical borehole depths are up to 120 feet.

DIEDRICH D-50 TRACK-MOUNTED

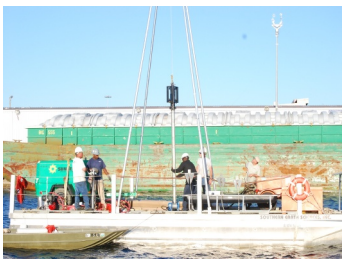
The Diedrich D-50 is a very versatile drilling rig and has a very low contact pressure of approximately 3 psi. This particular rig can be configured with augers, mud rotary or NQ wireline.

In addition, a Gardner Denver displacement pump is utilized for advancing large diameter boreholes to depths of 200 feet for 4" diameter by 4' long tube samples required for the Corps of Engineers (COE) levee projects.

DIEDRICH D-50 ON TWO-WHEEL DRIVE VEHICLE

This rig is mounted on a two-wheel drive vehicle and is equipped with flight augers, hollow stem augers, mud rotary equipment and NQ wireline.

Typical borehole depths are up to 120 feet.



VIBRACORE

SESI's 3-inch Vibracore is barge-mounted and consists of a submersible pneumatic vibrating motor attached to a four-inch steel casing with an internal clear acrylic sampling tube and is capable of sampling up to 20 feet.

GEOPROBE 6625 TRACK-MOUNTED CPT AND MACROCORE (SESI has two Geoprobes)

The Geoprobe 6625 CPT is a self-anchoring multi-purpose push platform. The system has 20 tons of push capacity when anchored even though the equipment weighs less than 5 tons. The system is capable of collecting CPT data or can be switched to conventional "Geoprobe" mode for Macro-Core soil and groundwater sampling.

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SOUTHERN EARTH SCIENCES, INC.

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QUALITY *Geotechnical* **VALUE** *Construction Materials Testing* **INNOVATIVE SOLUTIONS** *Environmental*

SOUTHERN EARTH SCIENCES, INC.

Southern Earth Sciences, Inc. is a member of the following organizations:

American Council of Engineering Companies (ACEC)

American Society of Civil Engineers (ASCE)

American Society for Testing of Materials (ASTM)

National Ground Water Association (NGWA)

American Concrete Institute (ACI)

American Association of State Highway and Traffic Officials (AASHTO)

ADEM Approved
Alabama Department of Environmental Management

FDEP Approved
Comprehensive Quality Assurance Plan

MDEQ Approved
Mississippi Department of Environmental Quality

OSHA Certified
Safety

NIOSH Certified
Asbestos

AASHTO and CMEC Accredited

US Army Corps of Engineers Validated

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