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SOUTHERN EARTH SCIENCES, INC.

Geotechnical, Environmental & Construction Materials Testing

November 25, 2008

STANDARD MATERIALS, LLC
62505 HIGHWAY 11
SLIDELL, LA 70452

Attention: Mr. Robert L. Scogin, Jr.

Re: Geotechnical Subsurface Exploration
New Concrete Plant
Abita Springs, Louisiana
SESI File No.: B08-064

Dear Mr. Scogin:

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

We appreciate the given opportunity to perform this 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.

Respectfully submitted,
SOUTHERN EARTH SCIENCES, INC.

STATE OF LOUISIANA
SERGIO AVILES
License No. 30371
PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING
11/25/08

Sergio Aviles, PE
Geotechnical Department Manager

Brenda Novoa, MSCE, PE
Project Engineer

PROJECT REPORT

SOUTHERN EARTH SCIENCES, INC.

GEOTECHNICAL ENGINEERING SERVICES REPORT

For

NEW CONCRETE PLANT
ABITA SPRINGS, LOUISIANA
SESI FILE NO: B08-064

Presented to

STANDARD MATERIALS, LLC
62505 HIGHWAY 11
SLIDELL, LOUISIANA 70452

Prepared by

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November 25, 2008

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November 25, 2008

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1.0 Project Information

1.1 Project Authorization

Southern Earth Sciences, Inc. (SESI) has completed a subsurface exploration for the proposed new concrete plant at North Lane, Abita Springs, Louisiana. Our geotechnical engineering services were performed in general accordance with our Geotechnical Proposal No. P08-109.08 dated August 8, 2008. Authorization to proceed with this investigation was received from Mr. Robert L. Scogin, Jr. on August 13, 2008 via fax.

1.2 Project Description

The proposed project consists of the design and construction of a foundation system for the new Concrete Plant. This plant will include a 2,400 square-foot warehouse, a 512 square-foot batch house, four (4) cement/aggregate bins, a mixer charging conveyor, and a truck scale area.

Based on the information submitted to us, column loads for the bins and conveyor are in the range of 2.1 to 234 kips. The warehouse and batch house will have floor loads in the order of 200- and 350-psf, respectively. No column or wall loads were submitted for these structures; however, SESI anticipates these loads to be on the order of ten (10) kips for the columns and three (3) kips per foot for the walls.[1]

A grading plan is not available at this time; however, no more than two (2) feet of fill are anticipated to achieve the design grade.

2.0 Purpose and Scope of Services

The purpose of this study was to explore the subsurface conditions at the site to enable an evaluation of acceptable foundation systems for the proposed new concrete plant. For this purpose, five (5) borings were drilled, two (2) to a depth of 20 feet and three (3) to a depth of ten (10) feet. In addition, a CPT sounding was pushed to a depth of 100 feet.

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 determination, determination of liquid limit, plastic limit and plasticity index, determination of the unconfined compressive strength, and sieve analysis. Both field and laboratory testing procedures are briefly discussed in this report.

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

[1] This assumed design data is based on our experience with similar projects. If the actual design data on the final plans and specifications is different from these assumptions, our firm should be contacted as revision to the foundation recommendations may be necessary.

- Site preparation;
- Foundation type, depth, and estimated settlement; and,
- Comments regarding factors that will impact construction and performance of the proposed project.

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 statements in this report or on the boring logs regarding odors, colors, and unusual or suspicious items or conditions are 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 Site Location and Description

The proposed new plant will be constructed off North Lane, Abita Springs, Louisiana. The site property is a relatively flat tract of land bordered to the South by the North Lane.

4.0 Field Exploration

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

As previously mentioned, two (2) borings (B-1 and B-2) were drilled to a depth of 20 feet and three (3) (B-3 thru B-5) to a depth of ten (10) feet. The CPT sounding was pushed to a depth of 100 feet. These depths are in reference to the existing ground surface at the time of the field exploration. The location and depth of the borings and CPT were determined by SESI. They were staked in the field by our firm using a tape to measure distances and estimating right angles with respect to existing site features. Their approximate locations are indicated on the Boring/CPT Location Plan included in the Appendix.

5.0 Drilling and Sampling Procedures

The borings were drilled with a track-mounted drill rig. Rotary head hollow stem auger drilling techniques were used to advance the borings. In borings B-1 and B-3 thru B-5, undisturbed samples were continuously obtained from the ground surface to a depth of eight (8) feet. In

Boring B-2, undisturbed samples were obtained continuously up to ten (10) feet. After these depths, disturbed samples were obtained at five (5) feet intervals to the end of the borings.

The undisturbed samples were obtained using thin-walled tube sampling procedures in general accordance with the 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, 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 special containers to prevent disturbance.

The disturbed samples were obtained in accordance to the procedures of ASTM D-1586, *Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils*. These disturbed samples were also identified according to project number, boring number and depth, and were placed in plastic bags to preserve the natural moisture condition.

The cone penetrometer sounding was advanced using a Geoprobe electronic CPT rig operated in general accordance with ASTM D-5778, *Standard Test Method for Electronic Friction Cone and Piezocone Penetration Testing of Soils*. The attached CPT log sheet graphically shows the cone tip resistance, friction resistance, equivalent N_{60} values, and interpreted soil type at the sounding location[2]. The soil types and stratigraphy are based upon material parameters measured and evaluated as the cone is advanced.

6.0 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 D-2216, *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 D-4318, *Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils*; ASTM D-2216, *Standard Test Method for Unconfined Compressive Strength of Cohesive Soils*; and, ASTM D-1140, *Standard Test Methods for Amount of Material in Soils Finer than the No. 200 (75-μm) Sieve*. The results of these tests are found in the accompanying boring logs located in the Appendix.

Please note that samples not altered by laboratory testing will be discarded after a period of thirty (30) days from the delivery date of this report.

[2] Soil classifications were interpreted from methods recommended by Robertson and Campanella. Correlations between cone resistance and Standard Penetration Test "N" values were performed according to the methods developed by Robertson, Campanella and Wightman.

7.0 Subsurface Conditions

7.1 Subsurface Materials

Generally, the exploratory borings revealed the presence of clay and sand mixtures from the ground surface to a depth of approximately eight (8) feet. These were sampled in yellowish brown and gray and with a medium stiff to stiff consistency. Below these mixtures, very loose to medium dense gray sand was found to at least 20 feet, the maximum depth of the borings.

In addition, a layer of dark brown silty sand to sandy silt was found from a depth of two (2) to four (4) feet in boring B-3. In boring B-5, this silty sand to sandy silt layer was found from the ground surface to a depth of four (4) feet. Below it in boring B-5, recovery of the samples up to a depth of eight (8) feet was compromised by what appears to be wood and organics, indicating the possibility that debris may exist in the subgrade and not only in this area, but in other areas as well. If encountered during construction, these materials shall be removed.

The CPT sounding confirmed the type of soils encountered at the borings. Below the 20 feet depth, it indicated the presence of mixtures of clay and silt, and sand and silt. At a depth of approximately 100 feet, it indicated the presence of a very dense gravelly sand to sand layer.

The above subsurface description is a generalized nature to highlight the major subsurface materials features and characteristics. The boring logs, included in the Appendix, present specific information at individual boring locations including: soil description, stratification, ground water level, unconfined compressive strength, samples' location, and laboratory tests results. The CPT log graphically shows the tip resistance, friction resistance, equivalent N_{60} values, and interpreted soil type at the sounding location. This information represents the actual conditions at the borings/CPT locations. Variations may occur and should be expected between these locations. The stratification represents the approximate boundary between subsurface materials and the actual transition may be gradual.

7.2 Groundwater

The groundwater level was detected at a depth of nine feet and seven inches (9'-7") and at eight feet (8') in borings B-1 and B-3, respectively. However, note that the groundwater conditions are likely to change due to topography, permeability, weather, and other soil and terrain properties. Therefore, we recommend that the Contractor determine the actual groundwater levels at the site at the time of the construction activities.

8.0 Discussion

Upon review of the existing subsoil conditions and laboratory tests results, we consider that the proposed project is feasible from a geotechnical point of view, if and when the included recommendations are correctly interpreted and applied.

Generally, the encountered subsoil materials provided with fair to good strength parameters; this based on the unconfined compressive strength results and SPT N-values. These materials are likely to deform once they are subjected to surface loads produced by permanent fills and/or structures. These deformations, in turn, may generate undesirable tilting, settling and/or cracking of structural elements.

This condition requires that site improvement methods be conducted during construction. Please review the following sections for further information on the corresponding site and foundation recommendations.

9.0 Recommendations

9.1 Removal and Substitution

As previously discussed, most of the site materials are likely to deform when subjected to surface loads. If a shallow foundation system will be used for the warehouse and batch house, we recommend the removal and substitution of the near surface materials. The removed materials shall be replaced with selected fill as per Section 9.2.4. This selected fill shall be placed in layers, compacted and tested according to specifications (see Section 9.2.5). Section 9.2.2 discusses the depth and lateral limits for this removal.

9.2 Site Development Recommendations

9.2.1 Site Preparation

Prior to the development of any structure or fill deposit, the complete earthwork area must be properly cleaned. The cleaning activities shall include the removal of all surface vegetation, debris and any foreign matter present on the site.

In addition, all top soil materials containing organic matter, all muck and all old man-made fill deposits shall be completely stripped. The actual removal depth shall be determined in the field by the Geotechnical Engineer or a representative. In order to investigate the extent of the organic materials discovered in boring B-5, and to verify their existence at other site areas, we recommend performing various test pits at all structural areas.

9.2.2 Over-Excavation Procedures

Once the site is cleaned and stripped, the over excavation activities shall commence. These activities depend on the actual stripping activities performed earlier and on the proposed grade elevation; therefore, some over-excavation may be required in the area

As mentioned before, a grading plan was not submitted to us; therefore, we cannot indicate a removal depth. Nevertheless, we recommend the removal of a minimum of two (2) feet below the foundation depth (the foundations shall be supported on a minimum of two (2) feet of structural fill). This removal shall include the structures' footprint area and at least five (5) feet outside the footprint on all sides.

The consistency of the existing subsoil materials suggests that standard earth moving equipment, like bulldozers and excavators, can perform the excavation activities.

These over-cut materials could be used as structural fill if they fulfill the requirements presented on Section 9.2.4. Structural fill

Water shall not be allowed to collect in the excavations; therefore, cut slopes shall be maintained at a 1.5 Horizontal : 1.0 Vertical steepness toward one corner of the excavation in order to facilitate the removal of any collected rainwater, groundwater, or surface runoff.

9.2.3 Proof Rolling

Upon completion of all stripping activities, the exposed areas shall be properly proof rolled in order to prepare the natural terrain to receive the design structural fill and traffic loads.

The proof roll consists of compacting the exposed surface with a 20- to 25-ton dump truck. Surface soils that are observed to rut or deflect excessively under the truck load should be undercut and replaced with the proper structural fill. These activities should be performed during a period of dry weather. They must be supervised by a Geotechnical Engineer or a representative.

9.2.4 Structural Fill Materials

For the structural fill, we recommend a material with the following properties:

a. Percent Passing U.S. Sieve #200: 50 percent minimum
b. Liquid Limit: 40 maximum
c. Plasticity Index: 15 maximum
d. Inert Material (Non-Expansive)
e. Free of Organics
f. Maximum Particle Size: 2-in

Structural fill

This material must be certified and approved by the Geotechnical Engineer prior to its use.

9.2.5 Structural Fill Deposit Construction

After all surface preparation and observation has been completed, the structural fill activities may begin. These activities must be performed in a sequential order where lower grounds must be worked before higher ones. The structural fill shall be deposited in lifts of eight (8) inches of loose material. Each lift shall be compacted and certified by the Geotechnical Engineer or a representative prior to placement other lifts. The passing criteria shall be a 95% of the maximum

8" layers 95%

dry density as determined by ASTM D-698, *Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3))*, and a moisture content between one (1) below and three (3) above percentages of the optimum moisture content. If water must be added, it should be uniformly applied and thoroughly mixed into the soil by disking or scarifying. As a guideline, it is recommended that field density tests be performed at a frequency of not less than one test per 2,500 square feet.

It is important to maintain the structural fill thickness as uniform as possible. Uneven fill thicknesses under a structure may cause differential soil responses to the applied loads which can produce cracking, settling, or tilting of the structure. Uniform fill areas shall consider the footprint of the structure plus a five (5) feet strip around its perimeter.

Fill slopes shall be maintained at a maximum 2 Horizontal : 1 Vertical steepness. The runoff of water across the faces of the slopes shall be avoided by appropriate drainage ways. In addition, appropriate drainage ways shall be maintained at all earthwork surface areas in order to not affect compaction.

9.3 Foundation Recommendations

9.3.1 Shallow Foundations

If shallow foundations are selected as the support mechanism of the proposed warehouse and batch house, they shall be embedded to a depth of two (2) feet below final grade elevation and supported on a minimum of two (2) feet of structural fill as mentioned before in Section 9.2.2. For continuous footings, a maximum allowable bearing capacity of 2,000 psf and a minimum width of one and a half (1.5) feet shall be used for their design. For the design of individual spread footings, a maximum allowable bearing capacity of 1,200 psf and a minimum width of three (3) feet shall be used. Please be aware that these are based on the assumed loads of ten (10) kips for the columns and three (3) kips per foot for the walls. If the actual loads are higher than these, we should be contacted in order to verify these recommendations.

1.5' wide Footing
10 Kips Columns
3 Kips/Ft Wall

The bottom of the excavation must be dry, clean, free of loose materials and construction debris. It should be observed by the Geotechnical Engineer or a representative prior to steel or concrete placement. Concrete shall be poured as quickly as possible to avoid exposure of the footing materials to moisture changes (wetting or drying). Water should be channeled away from the excavation and not be allowed to pond. If for any reason the excavation is required to be open for more than one day, it shall be protected to minimize moisture loss/gain.

For square footings, total and differential settlements are expected to be around 1 ¼-in and 1-in, respectively. For continuous footings, total and differential settlements are expected to be around 1-in and ¾-in, respectively.

9.3.2 Deep Foundations

As an alternative to the shallow foundation system for the warehouse and batch house, and for the bins and conveyor, a driven pile foundation system was evaluated. Allowable compression and tension capacities are provided in Tables 1 and 2 for 14-inch and 16-inch square concrete piles, respectively. The pile length referenced in the tables is from the existing ground surface at the time of our fieldwork. Pile capacities for pile types and/or lengths other than those listed below can be provided upon request.

Table 1. Compression and tension capacities for a 14-in square concrete pile at different lengths.

ESTIMATED SINGLE PILE LOAD CAPACITY IN TONS* COMPRESSION FACTOR OF SAFETY = 2.0 TENSION FACTOR OF SAFETY = 3.0		
PILE LENGTH (FEET)	14 INCH SQUARE CONCRETE PILE	
	COMPRESSION	TENSION
35	17	4
40	23	7
50	36	14
55	41	16
60	49	19

***These are soil-pile related capacities. The structural capacity of the piles to support design loads is beyond our scope of services and must be verified by others. Pile lengths are from existing ground surface. Additional pile length should be provided to accommodate any fill thickness.**

Table 2. Compression and tension capacities for a 16-in square concrete pile at different lengths.

ESTIMATED SINGLE PILE LOAD CAPACITY IN TONS* COMPRESSION FACTOR OF SAFETY = 2.0 TENSION FACTOR OF SAFETY = 3.0		
PILE LENGTH (FEET)	16 INCH SQUARE CONCRETE PILE	
	COMPRESSION	TENSION
35	20	5
40	29	8
50	42	16
55	48	18
60	56	22

***These are soil-pile related capacities. The structural capacity of the piles to support design loads is beyond our scope of services and must be verified by others. Pile lengths are from existing ground surface. Additional pile length should be provided to accommodate any fill thickness.**

The capacities given above are based on the assumption that less than two (2) feet of additional fill will be required to reach design grades. SESI should be retained to re-evaluate the above pile capacities if more than two feet of fill are needed.

9.3.2.1 Settlement

The estimated settlement of individual piles properly driven to the design depths and loaded to their allowable capacity will be less than one (1) inch. Once a pile load test is performed, SESI can evaluate the capacity and settlement for pile groups.

9.3.2.2 Group Effects

For piles in clusters of up to twelve (12) piles, following the configurations suggested on the *Concrete Reinforcing Steel Institute (CRSI) Design Manual, 2002* (9^{th} Edition) and with a minimum center to center spacing of three (3) pile diameters or side dimension, a reduction in capacity due to group effects should not be required. For larger clusters, group effects could reduce the pile capacities and should be evaluated accordingly when the actual pile length and layout are known.

9.3.2.3 Lateral Capacity

For deep foundations, the lateral loads are resisted by the soil as well as the rigidity of the pile. Analyses can be performed by methods ranging from chart solutions to finite difference methods. It is recommended that once the pile type, length and group dimensions are determined, our office be contacted to perform lateral load analysis for the proposed project.

9.3.2.4 Pile Installation

All pile driving operations shall be performed under experienced supervision and with efficiently operating mechanical equipment. The hammer selection is the responsibility of the contractor and shall be adequately large enough to reach proposed tip elevations and develop the required capacities.

The piles shall be jetted up to a depth of 16 feet in order to bypass the upper dense sand layer.

Piles in large groups should be driven from the center outward. Any piles which have heaved a quarter of an inch (¼") during driving of subsequent piles shall be re-driven to their original final resistance or their original embedment if originally driven to full penetration.

In no case shall the contractor be allowed to change pile driving equipment, pile types and or sizes without written approval from the Geotechnical Engineer. Piles should be allowed to set for a minimum of 14 days prior to loading.

9.3.2.5 Pile Driving Monitoring

Records of driving resistance versus depth, tip evaluation of piles, driving equipment, pile size and length, etc. shall be permanently kept.

Sometimes premature refusal occurs due to poor performance of the hammer rather than from soil resistance. Any changes in hammer blow counts shall be carefully examined before making any decisions about the pile penetration. We recommend that the pile driving be monitored by the Geotechnical Engineer or a representative.

The above situation may be observed at a depth of approximately 42 feet where a dense sand layer was registered with the CPT. In the case that hard driving conditions are encountered at this depth, we should be contacted in order to analyze the situation.

9.3.2.6 Pile Load Test

It is recommended that pile capacities be verified by field load tests. At least one test pile shall be driven in the proposed foundation area and tested in compression as outlined by ASTM D 1143, *Standard Test Method for Piles Under Static Axial Compression Load*. The pile load test(s) shall be performed under the guidance of the Geotechnical Engineer so that the data may be interpreted and the recommended pile capacity adjusted, if necessary, according to the load test results.

9.3.2.7 Pile Driving Resistance

To determine the driving characteristics and possibly adjust the depth of jetting, a few probe piles should be driven beneath the proposed structures, preferably in the vicinity of the borings. Probe piles will become working piles, and must be accurately located in accordance with the project's construction drawings. Exact driving resistance recommendations should be determined based on the actual pile driving equipment selected by the contractor and the driving results of the probe piles.

9.3.3 Floor Slab

The floor slab shall be supported on a minimum of four (4) feet of new compacted structural fill meeting the material and compaction requirements established in Sections 9.2.4 and 9.2.5, respectively.

In addition to the above required structural fill, SESI recommends a capillary water barrier placed directly below the buildings' slabs. This barrier shall consist of the usual vapor barrier membrane followed by a minimum thickness of four (4) inches of concrete sized aggregate, either crushed limestone or gravel, size No. 57 or 67 as per ASTM C-33, *Standard Specification for Concrete Aggregates*. Positive drainage shall be provided to prevent the continual saturation of the capillary water barrier.

At the warehouse, for the proposed load of 350 psf, total and differential settlements are expected to be around 2 ½ -in and 2-in, respectively. At the batch house, for the 200 psf floor load, total settlements are expected to be around 1 ½ -in, while differential settlements are expected to be around 1 ¼ -in. The structural engineer shall confirm if these magnitudes are within tolerable limits. If not, a deep foundation system shall be used as the support mechanism of these structures.

10.0 Construction Considerations

10.1 Observation and Testing

The preceding recommendations require a close supervision of the Geotechnical Engineer or representative; therefore, it is recommended that SESI be retained to provide observation and testing for the complete duration of all earthwork and foundation activities for this project. SESI cannot accept responsibility for any conditions deviated from those described in this report, nor for the performance of the foundation if not engaged to provide construction observation and testing.

10.2 Moisture Sensitive Soils/Weather Related Concerns

Most of the subsurface materials encountered at this site are expected to be sensitive to disturbances caused by changes in moisture content. During wet weather periods, the increment of the moisture content of the soil may cause a significant reduction of the soil strength and support capabilities. Furthermore, soils that become wet may be slow to dry, thus significantly retarding the progress of grading and compaction activities. For these reasons, it will be advantageous to perform earthwork and foundation construction activities during dry weather.

10.3 Excavations

In the Federal Register, Volume 54, No. 209 (October 1989), the United States Department of Labor, Occupational Safety and Health Administration (OSHA) amended its "Construction Standards for Excavations, 29 CFR, part 1926, Subpart P". This document was issued to better insure the safety of workmen entering trenches or excavations. It is mandated, by this federal regulation, that excavations, whether they be utility trenches, basement excavations or footing excavations, be constructed in accordance with the new OSHA guidelines.

The contractor is solely responsible for designing and constructing stable, temporary excavations and shall shore, slope, or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. The contractor's "responsible person", as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations.

We are providing this information solely as a service to our client. SESI does not assume responsibility for construction site safety or the contractor's or other parties' compliance with local, state, and federal safety or other regulations.

11.0 Report Limitations

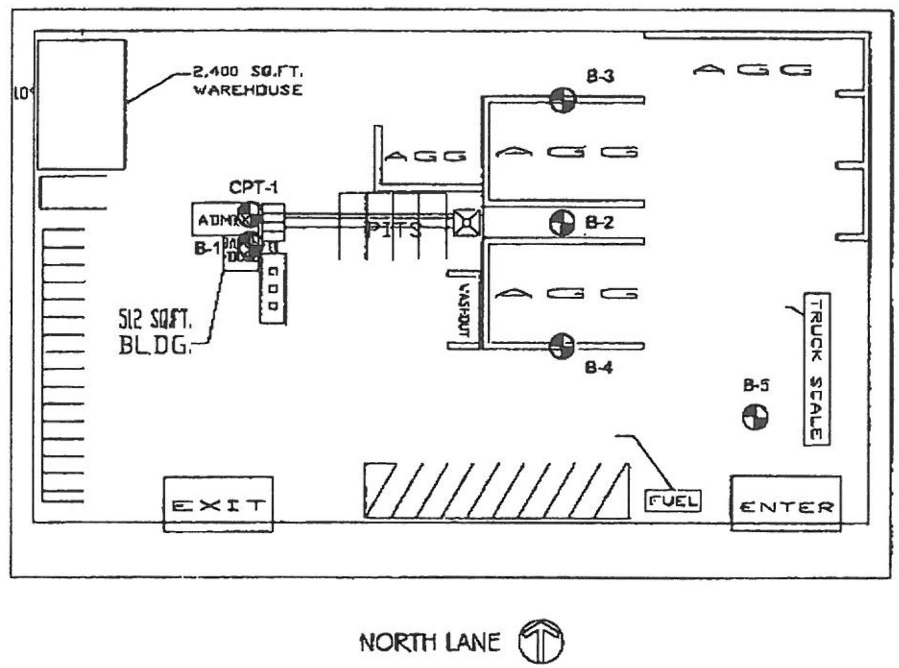
The analyses and recommendations presented in this report are based on the existing field conditions at the time of the investigation. Furthermore, they are based on the assumption that the exploratory borings are a representation of the subsoil conditions throughout the site. Please note that variations in the subsoil conditions may occur between and beyond borings. If variations in those conditions are encountered during construction, SESI shall be notified immediately in order to assess the situation, confirm the recommendations included in this report, or modify them according to their own judgment. If SESI is not notified of such variations, SESI will not be responsible for the impact of those variations on the project.

Furthermore, this report is based on the design considerations presently known to us. Project designers must be aware of this situation to check if any important design parameter has been overlook or requires additional clarification. If the nature of the project should change, the recommendations given in this report shall be re-evaluated. If SESI is not notified of such changes, SESI will not be responsible for the impact of those changes on the project.

SESI shall be retained for the review of final design drawings and specifications in order to ascertain whether their recommendations have been correctly interpreted and implemented and to confirm or modify them. SESI is not responsible for the adequacy of recommendations if they do not inspect the construction. The only warranty regarding our services is that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with the generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

This report has been prepared for the exclusive use of Standard Materials, LLC and their design/construction team associated to this specific project.

APPENDIX



NEW CONCRETE PLANT ABITA SPRINGS, LOUISIANA SESI PROJECT NO. B08-064	SOUTHERN EARTH SCIENCES, Inc. An Employee Owned Company www.soearth.com	FIGURE 1 BORING/CPT LOCATION PLAN

BORING LOG

SOUTHERN EARTH SCIENCES, inc.

BORING ____
JOB NO. ____
DATE ____
TECHNICIAN ____

Drill Method:
Initial Water Level:
DRILLER ____
RIG ____

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

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

Graphical presentation of material type:
Clay Silt Sand Gravel or Shell

LABORATORY INFORMATION

As determined by Unconfined Compression (ASTM D-2166 or 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
- Split-spoon Sample
- Auger Sample
- Sealed in Tube
- No Recovery

Sample recovery method.

SOUTHERN EARTH SCIENCES, inc.

BORING LOG

BORING NO.: B-1
PROJECT: NEW CONCRETE PLANT
PROJECT LOCATION: ABITA SPRINGS, LOUISIANA
BORING LOCATION: SEE LOCATION PLAN
BORING ELEVATION: EXISTING GROUND
GEOL/ENGR: BN
METHOD: AUGER FULL DEPTH

PROJECT NO.: B08-064
DATE DRILLED: 09/15/08
DATE COMPLETED: 09/15/08
WATER LEVEL: 9'-7"
WATER LEVEL DATE: 09/15/08
LOGGED BY: BN
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
	Shelby tube			19					Dark Brown becoming Yellowish Brown and Gray CLAYEY SAND (SC) —with trace gravel
	Shelby tube		1.28	22	105	25	12		Stiff, Yellowish Brown and Light Gray Lean CLAY (CL) —with sand pockets
5	Shelby tube		1.47	20	110	36	21		Stiff, Light Gray and Yellowish Brown SANDY CLAY (CL) —with ferrous nodules and silt pockets
	Shelby tube			18					—becoming light gray SAND with little clay
10	Split spoon	11 b/ft 7/4/7		22			(1)		Medium Dense, Gray medium-fine SAND (SP) —with clay pockets, wet
15	Split spoon	4 b/ft 3/2/2		21			(2)		—very loose, with little silt
20	Split spoon	8 b/ft 4/5/3		20					—loose
25									Bottom @ 20'
30									

Bottom @ 20'

(1) 30.1% Passing #200 sieve
(2) 10.6% Passing #200 sieve

COMMENTS:

SHELBY TUBE SPLIT SPOON

BORING LOG

BORING NO.: B-2
PROJECT: NEW CONCRETE PLANT
PROJECT LOCATION: ABITA SPRINGS, LOUISIANA
BORING LOCATION: SEE LOCATION PLAN
BORING ELEVATION: EXISTING GROUND
GEOL/ENGR: BN
METHOD: AUGER FULL DEPTH

PROJECT NO.: B08-064
DATE DRILLED: 09/15/08
DATE COMPLETED: 09/15/08
WATER LEVEL: NE
WATER LEVEL DATE: 09/15/08
LOGGED BY: BN
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
	Shelby tube		1.07	16	111	25	13		Stiff, Yellowish Brown and Light Gray SANDY CLAY (CL) —with ferrous nodules and trace organics
	Shelby tube		1.46	16	113	32	17		—with little silt, no organics
5	Shelby tube			19					
	Shelby tube		0.84	26	102	53	34		Medium Stiff, Gray and Yellowish Brown fat CLAY (CH) —becoming SAND with little clay
	Shelby tube			23					Light Gray medium-fine SAND (SP) —with trace silt and clay, ferrous nodules, wet
10									
15	Split spoon	19 b/ft 8/4/15		18					—medium dense, with trace silt
20	Split spoon	16 b/ft 7/6/10		19					
									Bottom @ 20'
25									
30									

COMMENTS: NE - NOT ENCOUNTERED

SHELBY TUBE   SPLIT SPOON

BORING LOG

BORING NO.: B-3
PROJECT: NEW CONCRETE PLANT
PROJECT LOCATION: ABITA SPRINGS, LOUISIANA
BORING LOCATION: SEE LOCATION PLAN
BORING ELEVATION: EXISTING GROUND
GEOL/ENGR: BN
METHOD: AUGER FULL DEPTH

PROJECT NO.: B08-064
DATE DRILLED: 09/15/08
DATE COMPLETED: 09/15/08
WATER LEVEL: 8'
WATER LEVEL DATE: 09/15/08
LOGGED BY: BN
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
	Shelby tube		0.96	16	110	24	13		Medium Stiff, Yellowish Brown and Dark Gray SANDY CLAY (CL) —with trace silt and organics
	Shelby tube		0.78	21	95	27	14		—becoming brown SANDY SILT with trace organics
5	Shelby tube		1.99	15	116	23	8		Stiff, Light Gray and Yellowish Brown SANDY CLAYEY SILT (CL-ML) —with ferrous nodules
	Shelby tube			16					Gray and Yellowish Brown CLAYEY SAND (SC) —with little silt
	Split spoon	12 b/ft 7/8/4		19			(1)		Medium Dense, Light Gray SAND (SP) —with yellowish brown streaks, little clay
10									Bottom @ 10'
									(1) 20.6% Passing #200 sieve
15									
20									
25									
30									

COMMENTS:

SHELBY TUBE   SPLIT SPOON

BORING LOG

BORING NO.: B-4
PROJECT: NEW CONCRETE PLANT
PROJECT LOCATION: ABITA SPRINGS, LOUISIANA
BORING LOCATION: SEE LOCATION PLAN
BORING ELEVATION: EXISTING GROUND
GEOL/ENGR: BN
METHOD: AUGER FULL DEPTH

PROJECT NO.: B08-064
DATE DRILLED: 09/15/08
DATE COMPLETED: 09/15/08
WATER LEVEL: NE
WATER LEVEL DATE: 09/15/08
LOGGED BY: BN
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
	Shelby tube		1.69	20	105	37	20		Stiff, Yellowish Brown and Gray SANDY CLAY (CL) —with silt pockets
	Shelby tube		1.28	19	107	22	7		Stiff, Yellowish Brown and Gray SANDY CLAYEY SILT (CL-ML)
5	Shelby tube		1.69	19	110	30	16		Stiff, Yellowish Brown and Light Gray SANDY CLAY (CL) —with sand and silt pockets, ferrous nodules
	Shelby tube			17					
	Split spoon	17 b/ft 4/5/12		21			(1)		Medium Dense, Light Gray medium-fine SAND (SP) —with trace clay
10									Bottom @ 10'
									(1) 7.7% Passing #200 sieve
15									
20									
25									
30									

COMMENTS: NE - NOT ENCOUNTERED

■ SHELBY TUBE ☒ SPLIT SPOON

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BORING LOG

BORING NO.: B-5
PROJECT: NEW CONCRETE PLANT
PROJECT LOCATION: ABITA SPRINGS, LOUISIANA
BORING LOCATION: SEE LOCATION PLAN
BORING ELEVATION: EXISTING GROUND
GEOL/ENGR: BN
METHOD: AUGER FULL DEPTH

PROJECT NO.: B08-064
DATE DRILLED: 09/15/08
DATE COMPLETED: 09/15/08
WATER LEVEL: NE
WATER LEVEL DATE: 09/15/08
LOGGED BY: BN
DRILLER:

DEPTH (FEET)	SAMPLE	Standard Penetration (Blows/Ft.) or Penetrometer (TSF)	Moisture Content (%)	Symbol	MATERIAL CLASSIFICATION
	Shelby tube		20		Dark Brown becoming Gray SILTY SAND (SM) ---with trace organics and ferrous nodules
	Shelby tube				Dark Brown and Brown SANDY SILT (ML) ---with trace organics
5	Shelby tube				No Recovery - sample stuck in tube No Recovery - wood fragments
10	Split spoon	9 b/ft 3/5/4	23 (1)		Loose, Light Gray medium-fine SAND (SP) ---with trace clay and organics
					Bottom @ 10' (1) 12.2% Passing #200 sieve
15					
20					
25					
30					

COMMENTS: NE - NOT ENCOUNTERED

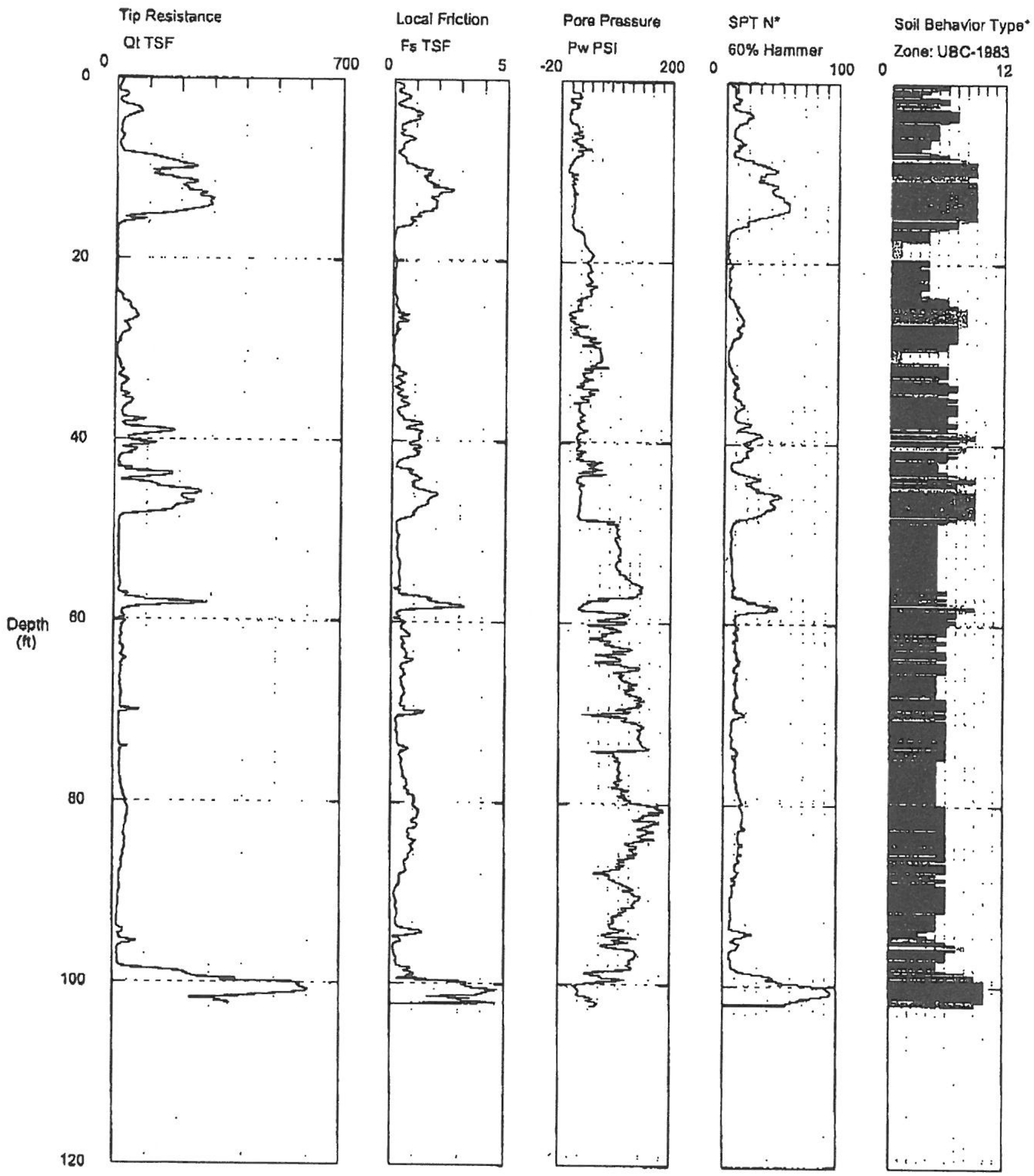
SHELBY TUBE   SPLIT SPOON

SOUTHERN EARTH SCIENCES, inc.

Southern Earth Sciences, Inc.

Operator: JAV
Sounding: CPT-1
Cone Used: DDG0899

CPT Date/Time: 10/22/2008 3:57:26 PM
Location: SLIDELL,LA
Job Number: BO8-064 CONCRETE PLANT



Maximum Depth = 102.36 feet

Depth Increment = 0.164 feet

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

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