Exhibit R. Baton Rouge Aviation Business Park Geotechnical Study Report

SOUTHERN EARTH SCIENCES, INC.

Geotechnical, Environmental & Construction Materials Testing

GEOTECHNICAL ENGINEERING SERVICES REPORT

For

BATON ROUGE METROPOLITAN AIRPORT PROPOSED INFIELD HANGERS
BATON ROUGE, LOUISIANA
SESI FILE NO: B10-061

Presented to

URS CORPORATION
9430 JACKIE COCHRAN BOULEVARD, SUITE 200
BATON ROUGE, LOUISIANA 70807
SESI File No: B10-061

Prepared by

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AUGUST 17, 2010

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Geotechnical, Environmental & Construction Materials Testing

August 17, 2010

URS Corporation
9430 Jackie Cochran Boulevard, Suite 200
Baton Rouge, Louisiana 70807

Attention: Mr. Joseph Levraea
Program Manager

Re: Geotechnical Subsurface Exploration for
Baton Rouge Metropolitan Airport
Proposed Infield Hangers
Baton Rouge, Louisiana
SESI File No.: B10-061

Dear Mr. Levraea:

Southern Earth Sciences, Inc. (SESI) is pleased to submit our Preliminary 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. 33571
PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING

8/17/10

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Geotechnical Project Engineer

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1.0 Executive Summary

Subsurface exploration and evaluation of the subsoil conditions have been completed for the proposed Infield Hangers at the Baton Rouge Metropolitan Airport in Baton Rouge, Louisiana. As requested SESI has drilled and tested six (6) borings to determine the types of foundation and constructability concerns.

Reference to the borings logs show predominately medium to stiff lean and fat clays were encountered at different depths in the borings to 60 feet, the maximum depth explored. In boring B-2, pockets of sandy silt and silt layers were noted from 13 to 15 feet and 53 to 60 feet, respectively. Groundwater was encountered upon completion of drilling at depths of 3 to 10 feet.

In general, the subsoils encountered at the site are good to develop upon. Due to unknown details on the type of loads of the proposed Hangers, this report presents various typical foundation designs including shallow strip/footing, Shallow Foundations on Rammed Aggregate Pier®, Driven Piles and Drilled Shafts. Details related to site preparation and development; foundation design and construction considerations are included in the subsequent sections of this report.

The owner/designer should not rely solely on this Executive Summary and must read and evaluate the entire contents of this report prior to utilizing our engineering recommendations in preparation of design/construction documents.

1.0 Project Information

1.1 Project Authorization

Southern Earth Sciences, Inc. (SESI) has completed a subsurface exploration for the proposed Infield hanger at the Metropolitan Baton Rouge Airport in Baton Rouge, Louisiana. Our geotechnical engineering services were performed in general accordance with our Geotechnical Proposal No. P10-102.07 dated July 22, 2010. Authorization to proceed with this investigation was received verbally from Mr. Mr. Joseph Levraea, on July 22, 2010.

1.2 Project Description

It is our understanding the proposed project will consist of the construction of airport hangers. No other structural loading information was available at the time of this report. Further, a grading plan is not available at this time; however, less than two (2) feet of fill is 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 an acceptable foundation for the proposed hangers. As directed, SESI drilled six (6) borings to a depth of 60 feet within the proposed construction footprint.

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, and unconfined compressive strength. 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:

- 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 statement 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

The proposed hangers will be constructed at the Baton Rouge Metropolitan Airport in Baton Rouge, Louisiana. At the time of field exploration, currently the site is a grassy undeveloped open field with abandoned runways and taxiways. We understand that these structural elements will be removed prior to proposed construction.

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.

As previously mentioned, six (6) borings to a depth of 60 feet were drilled as referenced to the existing ground surface at the time of the field exploration for this project. The depths and locations of the borings were as proposed by the client, and were staked in the field by others upon arrival of our drilling crews. The Boring Location Plan, included in the Appendix, presents the approximate location of the borings.

5.0 Drilling and Sampling Procedures

The borings were drilled with a track-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 special containers to prevent disturbance.

When undisturbed samples could not be recovered, 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 samples were also identified according to project number, boring number and depth, and were placed in plastic bags to preserve the natural moisture condition.

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 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, and ASTM D2166 *Standard Test Method for Unconfined Compressive Strength of Cohesive Soils*. The results of these tests are found in the accompanying boring logs located in the Appendix.

7.0 Subsurface Conditions

7.1 Subsurface Materials

Subsurface conditions encountered in the borings were similar. Generally, they revealed the presence of predominately medium to stiff lean and fat clays from ground surface to a depth of 60 feet, maximum depth explored. Pockets of sandy silt and silt layers were noted from 13 to 15 feet and 53 to 60 feet, respectively, in boring B-2. It is also noted that the clay layers at depths four (4) to six (6) feet and 28 and 30 feet in boring B-6 are jointed or slickensided and failed prematurely at strengths corresponding to soft consistency. The clay material was sampled in brown, tan and gray colors with variable amounts of silt, ferrous nodules, ferrous stains, and slickensided. All references to depth are made with respect to the existing ground surface at the time the borings were performed and all borings exhibited almost same property of soils.

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 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.

7.2 Groundwater

The groundwater level was detected as follows:

GROUND WATER TABLES		
Borehole	**Initial Reading**	**After 15 Minutes**
B-1	9.7 feet	9.5 feet
B-2	5.7 feet	NC
B-3	3.4 feet	NC
B-4	9.8 feet	9.5 feet
B-5	3.7 feet	NC
B-6	6.3 feet	NC

Note: No Change

It should be noted 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 test 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 fair to good strength parameters; this is based on the unconfined compressive strength results. Essentially clays at all boring locations tended to be predominately medium stiff to stiff consistency, except for pockets of clay layers in boring B-6 at depths four (4) to six (6) feet and 28 and 30 feet which are jointed and showed strengths corresponding to soft consistency due to premature failure. Due to unknown details on the type of loads of the proposed Hangers, this report presents various typical foundation designs including shallow strip/footing, Shallow Foundations on Rammed Aggregate Pier®, Driven Piles, and Drilled Shafts. Details related to site preparation and development; foundation design and construction considerations are included in the following sections of this report.

Please review the following sections for further information on the corresponding site and foundation recommendations.

9.0 Recommendations

9.1 Site Development Recommendations

9.1.1 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, SESI recommends that the existing runway and taxiway elements, topsoil, organics, and any soft or loose soils present shall be stripped from the site. At a minimum, 12 inches should be stripped / undercut from the site to remove the existing structural elements and disturbed soils from removal of these elements; however, the actual stripping / undercutting depth should be determined by a representative of the Geotechnical Engineer at the time of construction. Any material stripped from the site should be removed or wasted.

9.1.2 Proof Rolling

Upon completion of the 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 loaded 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 and should be supervised by a Geotechnical Engineer or a representative.

9.1.3 Structural Fill Materials

After subgrade preparation and observation has been completed, structural fill placement, if necessary, may begin. The first layer of structural fill should be placed in a relatively uniform horizontal lift and be adequately keyed into the properly prepared subgrade soils. The structural fill should consist of lean clays, sandy lean clays (CL) or clayey sands (SC) having the following recommended material properties:

a. Percent Passing U.S. Sieve #200: 50 percent minimum
b. Liquid Limit: 40 maximum
c. Plasticity Index: 10 to 20 maximum
d. Inert Material (Non-Expansive)
e. Free of Organics
f. Maximum Particle Size: 2-in

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

9.1.4 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 elevations 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 of other lifts. The passing criteria shall be a 95% of the maximum 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.

9.2 Foundation Recommendations

9.2.1 Shallow Foundation Parameters

Assuming the site is prepared in accordance with the “Site Preparation” section, the building may be supported on shallow footings. Based on the results of our analysis and provided design data, square spread footings and continuous wall footings bearing at least two (2) feet below finished grade on compacted structural fill or near the surface of very stiff lean clay may be designed for net allowable bearing capacities of 1,400 and 1,100 psf, respectively. Minimum dimensions of 24 inches for spread footings and 18 inches for continuous footings should be used in the foundation design to reduce the possibility of a local bearing failure.

Total settlements and differential settlements for spread footings up to four (4) feet in width and continuous footings up to 2.5 feet in width are expected to be less than one (1) inch. Settlements were estimated considering 70% of the above recommended net allowable bearing capacities plus two (2) feet of structural fill. The structural engineer shall confirm if these magnitudes are within tolerance limits.

The bottom of the excavation must be dry, clean and 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). Surface run-off 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.

9.2.2 Floor Slab

The floor slab shall be supported on the new compacted structural fill. In addition, we recommend a capillary water barrier placed directly below the building slab. This barrier shall consist of the usual membrane vapor barrier 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. In all cases, the moisture/vapor barrier should be design and constructed in accordance to the latest edition of the International Building Code.

9.2.3 Foundation Maintenance

Other preventive measures to minimize the damage potential of expansive soils are the following:

a) Surface Drainage – always drain away from the foundation; on vegetated ground, a minimum slope of 5% is required. Never allow water to accumulate close or around the foundation.
b) Landscaping
    - Avoid placing plants immediately adjacent to the foundation.
    - Avoid placing sprinkler system pipes near the foundation (they could leak).
    - Direct sprinkler heads away from the foundation.
    - Trees shall be planted at a minimum distance of half the anticipated canopy diameter or twenty (20) feet, whichever is larger, from the foundation edge. If existing trees are closer than this, they should be thoroughly soaked at least twice a week during dry periods and once a week during moderate rainfall periods.

9.2.4 Shallow Foundations on Rammed Aggregate Pier® Elements

The proposed structure can be supported by strip and spread footings resting on existing soil reinforced by Rammed Aggregate Pier® (RAP) elements. The piers are constructed by augering 24- to 30-inch diameter holes to depths of about 7 to 15 feet below the base of the footings and backfilling the holes with thin lifts of well-graded compacted aggregate to very stiff, high density aggregate piers. Compaction densifies the aggregate and forces it laterally increasing lateral stress in surrounding soil, thereby stiffening the stabilized composite soil matrix. As per SESI's request, Geopier performed preliminary analysis, based on the boring logs, and provided foundation design recommendations including allowable bearing pressure for spread, footings supported by RAP, of 5,000 psf and for load bearing walls, supported by RAP, of 30 kips/ft. Also, as per Geopier calculations, RAP elements control total and differential settlements to one (1) in. and ½ in., respectively. These recommendations are preliminary and a final design will be given by Geopier once final grading and structural loading information is provided. It should be noted that SESI does not assume any responsibility for the RAP foundation design calculations. The design recommendations for RAP foundation can be found in Appedix.

9.3 Driven Pile Foundation

Driven pile foundation systems were evaluated for the proposed hangars. Allowable compression capacities are provided in the Tables 1.0 and 2.0 for 14x73 steel "H" and 14-inch square precast-prestressed square concrete piles, respectively. Due to the possible construction disturbances, the top five (5) feet of soil was neglected in our calculations, therefore a pile cutoff of up to five (5) feet below the ground surface will have no effect on the estimated pile capacities. Pile capacities for pile types and/or lengths other than those listed below can be provided upon request.

The presented allowable compression capacity for piles are based on factor of safety (FS) of two (2) for compression and three (3) for tension, assuming a pile load test is conducted to verify the design (see Section 9.3.6). If a pile load test is not conducted, we would recommend a reduction in allowable capacity to provide for a FS in compression of at least 3.0.

Table 1.0 Estimated Capacities for Steel 14x73 H Section Pile.*

Pile Length (feet)	Compression Capacity (tons)		Tension Capacity (tons) (FS = 3.0)
	(FS = 2.0)	(FS = 3.0)	
40	37	25	24
50	48	32	30

Table 2.0 Estimated Capacities for 14-inch Square Concrete Pile.*

Pile Length (feet)	Compression Capacity (tons)		Tension Capacity (tons) (FS = 3.0)
	(FS = 2.0)	(FS = 3.0)	
40	44	29	27
50	57	38	34

Note: *These are soil-pile related capacities and consideration should be given to structural integrity of the pile member. Pile penetrations are from existing ground surface. Additional pile length should be provided to accommodate any fill thickness.

9.3.1 Settlement

The estimated settlement of individual piles properly driven to the design depths and loaded to the design capacities presented in section 9.3 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 Group Effects

Piles shall be installed at a minimum center-to-center spacing of four (4) pile diameters or side dimensions. For this spacing and with the pile cap in firm contact with the soil, a reduction in capacity due to group effects should not be required. If the pile cap will not be in firm contact with the soil, group effects could reduce the pile capacities and should be evaluated accordingly when the actual pile length and layout are known.

9.3.3 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.

9.3.4 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, but taking into account the potential vibrations resulting from pile driving operations.

Piles in large groups should be driven from the center outward. Any piles which have heaved a quarter of an inch (¼”) or more 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.

9.3.5 Pile Driving Monitoring

Records of pile size and length, driving equipment, driving resistance versus depth, tip evaluation of piles, 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.

Since testing and inspection services are within SESI's scope of work, we recommend that our firm be retained to assist you to monitor the driving of test piles, select the pile s to be tested, monitor the pile load test, evaluate the results of the load test, establish final pile lengths, and maintain vibration and driving records of all piles installed.

9.3.6 Pile Load Tests

It is recommended that pile capacities be verified by field load tests and/or pile dynamic analyses (PDA). At least one (1) test pile shall be driven in the proposed foundation area and tested in compression as outlined by ASTM D 1143, *Standard Test Method for Deep Foundations Under Static Axial Compression Load* or by dynamic pile analyses (PDA). The PDA tests or 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. Piles should be allowed to set for a minimum of 14 days prior to loading.

9.3.7 Pile Driving Resistance

To determine the driving characteristics, 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. In order to properly evaluate refusal, it is recommended to do a GRLWEAP analysis after deciding the type of hammer for pile driving.

9.4 Drilled Shaft Recommendations

As requested, analyses were made based on the borings and laboratory test data with regard to straight-sided drilled shaft foundation for support of the proposed Infield Hangers. These shafts will generally derive their support through skin resistance and some end bearing from medium to stiff clay subsoil. The estimated allowable axial compression and tension capacities for various sizes and depths, as measured from the existing ground surface at the time of exploration, of drilled shafts are presented in Table 3.0.

Table 3.0 Drilled Shaft Pile Capacities.
(Factor of Safety = 3.0 in Compression and Tension)

[2]Shaft Length (ft)	Shaft Diameter (in.)	[1]Allowable Compression Capacity (tons)	Allowable Tension Capacity (tons)
20	24	14	11
	30	19	14
	36	24	17
30	24	20	18
	30	26	22
	36	32	27

Notes: 1. Compressive capacities based on one (1) inch of vertical settlement.
2. Lengths in the above table are from the existing grade at the time of the boring were drilled. Additional shaft length must be added to accommodate any fill placement.

It is recommended to follow the manual titled Drilled Shafts: Construction Procedures and Design Methods (Pub. No. FHWA-IF-99-025, August 1999) for the structural design of drilled shafts. Detailed inspection of shaft construction should be made to verify that the shafts are vertical and founded in the proper bearing stratum and to verify that all loose and soft materials have been removed prior to concrete placement.

Where water inflow or caving soils are encountered, excavation of shafts and placement of concrete within a very short time frame will frequently aid in proper shaft construction. It is recommended that concrete be readily available on-site prior to beginning any shaft excavation.

We recommend that a geotechnical engineer or qualified technician observe the installation of the shafts to verify that, among other things, 1) subsurface conditions are as anticipated from the boring, 2) the shafts are constructed to the proper diameter, penetration and plumbness, 3) reinforcing is properly placed and centered in the open shaft, and 4) proper concrete placement. These critical items are fundamental to proper performance of shafts in accordance with design recommendations.

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 Regulations

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 Baton Rouge Metropolitan Airport and URS design/construction team associated to this specific project.

APPENDIX

RAP FOUNDATION DESIGN RECOMMENDATIONS

GEOPIER
FOUNDATION COMPANY

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August 16, 2010

Mr. Raja Madhyannapu Ph.D.
Southern Earth Science, Inc.
11638 Sun Belt Court
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Re: Geopier® System Foundation Recommendations
Baton Rouge Airport Hangars
Baton Rouge, Louisiana
GFC Project No.: P10-PLA-00042

Dear Mr. Madhyannapu:

Thank you for asking us to review the soil boring logs for the Baton Rouge Airport Hangars to be constructed in Baton Rouge, Louisiana. Our preliminary review of geotechnical conditions indicates that the Geopier® System can provide positive settlement control and increase the allowable bearing pressure for typical hangar structures. We have used the data that you provided to prepare a preliminary design for the project.

The following sections present the basis for our design and cost estimates and provide you with descriptions of the Geopier Technology, including design procedures, construction, and experience.

PROJECT DESCRIPTION

We have been provided with a copy of the boring logs prepared by Southern Earth Science, Inc., dated July 2010. Details of structure type and loading conditions were not available at the time of writing this letter. We assume that the structure will consist of long spans supported by isolated columns and load bearing walls, with potential for uplift forces due to wind loads. The finished floor elevation is expected to be near the existing site grade.

The subsurface conditions at the site consist of soft to very stiff lean clay and fat clay to the maximum explored depths of 60 feet. Groundwater was encountered at depths generally ranging from 3 to 9 feet at completion.

Continued…

TYPICAL GEOPIER DESIGN AND CONSTRUCTION PROCESS

The Geopier® System makes use of Rammed Aggregate Pier® (RAP) elements to reinforce site soils. RAP elements are installed by drilling 24 to 30-inch diameter holes and ramming thin lifts of well-graded aggregate within the holes to form very stiff, high-density aggregate piers. The drilled holes typically extend from 10 to 20 feet below grade and 7 to 15 feet below footing bottoms. The first lift of aggregate forms a bulb below the bottoms of the piers, thereby pre-stressing and pre-straining the soils to a depth equal to at least one pier diameter below drill depths. Subsequent lifts are typically about 12 to 24 inches in thickness. Ramming takes place with a high-energy beveled tamper that both densifies the aggregate and forces the aggregate laterally into the sidewalls of the hole. This action increases the lateral stress in surrounding soil; thereby further stiffening the stabilized composite soil mass. The result of the RAP element installation is a significant strengthening and stiffening of subsurface soils that then support high bearing capacity footings.

The design of the Geopier Systems are based on a two-layer settlement analysis as described by Lawton et al. (1994) and in our Geopier Reference Manual. Settlements within the “upper zone” (zone of soil that is reinforced with RAP elements) are computed using a weighted modulus method that accounts for the stiffness of the RAP elements, the stiffness of the matrix soil, and the area coverage of RAP elements below supported footings. Settlements within the “lower zone” (zone of soils beneath the upper zone which receives lower intensity footing stresses) are computed using conventional geotechnical settlement methods.

GEOPIER INTERMEDIATE FOUNDATION DESIGN CONSIDERATIONS

Based on the loading and subsurface conditions, Geopier Foundation Company, Inc. (GFC) recommends the following:

- Use Rammed Aggregate Pier® elements to support shallow spread footings loaded to an allowable bearing pressure of 5,000 psf. This bearing pressure can be increased one-third, in accordance with the local practice to resist transient loading conditions associated with seismic events or wind gusts.
- RAP elements at this site can support column and load-bearing walls with loads in excess of 1,000 kips and 30 kips/ft respectively. The structure is then supported by shallow spread footings and strip footings designed for the allowable bearing pressure stated above.
- RAP elements control total and differential settlements to 1 inch and ½ inch, respectively.
- RAP elements outfitted with a steel harness can resist uplift forces due to wind loads. Typical tension capacity of a RAP element ranges from 40 to 60 kips.

- A modulus test is performed on one RAP element as part of construction to confirm the site specific modulus of the production RAP elements. The tested RAP element will be constructed in a manner similar to production RAP elements. The modulus test should be witnessed by a representative of the project geotechnical engineer. An additional uplift test is performed where uplift resistance is a requirement.

The above recommendations should be considered preliminary. Once final grading and structural loading information is available, we can perform a detailed analysis to aid the design team in examining the feasibility of using the Geopier® System for support of the new structure. The structural information should include the conditions at all column and wall locations. Grading information should include amounts of cut and/or fill which will be required at the site.

Geopier Foundation Company, Inc. has performed foundation improvement work on over 3,000 projects across the country, including numerous project related to airports. We have attached a project summary for the Mississippi Air National Guard project that highlights the cost effective, time efficient solution using Rammed Aggregate Pier elements to support an airport hangar.

This appears to be an excellent site for the Geopier® System. If you have any questions concerning this report, or if we can be of further assistance, please contact me at (281) 913-5778.

Sincerely,
Geopier Foundation Company, Inc.

Gerry Kehler, P.E.
Regional Engineer

GIK/gik

Attachment: Geopier® System Brochure
Case Study, Mississippi Air National Guard Hangar

Rammed Aggregate Piers

Intermediate Foundation™ Solutions
The Geopier® System

The Geopier® Construction Process

The Geopier System uses replacement Rammed Aggregate Pier™ (RAP) elements to reinforce good to poor soils, including soft to stiff clay and silt, loose to dense sand, organic silt and peat and variable, uncontrolled fill.

The unique installation process utilizes pre-augering and vertical impact **ramming** energy to construct RAPs, which exhibit unsurpassed strength and stiffness. RAP solutions are designed to provide superior total and differential settlement control and increased bearing support to meet project requirements.

1. The process first involves drilling a cavity. Drill depths normally range from about 7 to 30 feet, depending on design requirements. Pre-drilling allows you to see the soil between the borings, ensuring that the piers are engineered to reinforce the right soils.
2. Layers of aggregate are then introduced into the drilled cavity in thin lifts of one-foot compacted thickness. A patented beveled tamper **rams** each layer of aggregate using vertical impact ramming energy, resulting in superior strength and stiffness. The tamper densifies aggregate vertically and forces aggregate laterally into cavity sidewalls. This results in excellent coupling with surrounding soils and reliable settlement control.
3. Following installation, RAPs reinforce slopes and embankments, support shallow foundations, floor slabs and tank pads. The footing stresses are attracted to the stiff RAPs, resulting in engineered settlement control.

GEOPIER
FOUNDATION COMPANY

800.371.7470
www.geopier.com

Intermediate Foundation™ Solutions

The Geopier® System

The Geopier® Intermediate Foundation™ System

Geopier Foundation Company developed the Geopier System in 1989 as an efficient and cost effective intermediate foundation solution for the support of settlement sensitive structures. The Geopier System has since become an effective replacement for massive overexcavation and replacement or deep foundations, including driven piles, drilled shafts or augered cast-in-place piles. Thousands of structures are currently supported by the Geopier System – proven experience that ensures high levels of performance and reliability compared to traditional systems.

International Place Tower III
Memphis, Tennesssee

Construction Advantages

- Better quality control through visual inspection of drill spoils and modulus tests with telltales
- Environmentally safe and sustainable offering LEED® point enhancement
- Clean and rapid installation process
- Accelerated schedules
- Versatile system allows for use in a wider range of structures
- Reliable and cost effective

Houston Fuel Oil Terminal Company
Houston, Texas

Design/Performance Advantages

- Stronger and stiffer elements
- Excellent settlement control
- Superior support capacity
- Increased bearing pressure up to 10,000 psf
- Designed for structural support of buildings
- Often results in 20% to 50% savings
- Engineered to meet specific soil conditions and loads
- Wind and seismic uplift resistance
- More than two decades of proven foundation support

The Home Depot
Provo, Utah

Applications

- Foundations
- Floor Slabs
- Biofuel Facilities
- Industrial Tanks
- Wind Turbines
- Transportation
- MSE Walls
- Embankments
- Railroad
- Liquefaction/Seismic
- Uplift and Lateral Load Resistance
- Slope Stabilization

I-10 and Picardy Avenue Interchange
Baton Rouge, Louisiana

GEOPIER
FOUNDATION COMPANY

A tensar® Company

150 Fairview Road, Suite 335 • Mooresville, NC 28117 • P: 704.799.3185 • 800.371.7470

Atlanta Boston Charlotte Chicago Des Moines Detroit Hawaii Houston Indianapolis Jacksonville Kansas City Los Angeles Memphis Mexico City Milwaukee Minneapolis Philadelphia Portland Raleigh Sacramento Salt Lake City San Francisco San Juan Seattle St. Louis Toronto Washington, DC

www.geopier.com

Mississippi Air National Guard Hangar
Meridian, Mississippi

Geopier® Rammed Aggregate Pier® System

Project Team

Owner: Mississippi Air National Guard

General Contractor: Tilly Constructors, Inc.

Geopier Installer: Intermediate Foundations, Inc.

Geopier Designer: GFC-Midsouth

Traditional foundation anchors presented difficulty in locating the anchor shafts within specified tolerances, difficulty in performance of full-scale load tests and the risk of cost overruns.

Project Overview

Description:
Construction of new hangar at Key Field and Air National Guard Field with design uplift forces, from wind loads, of 420 kips per footing.

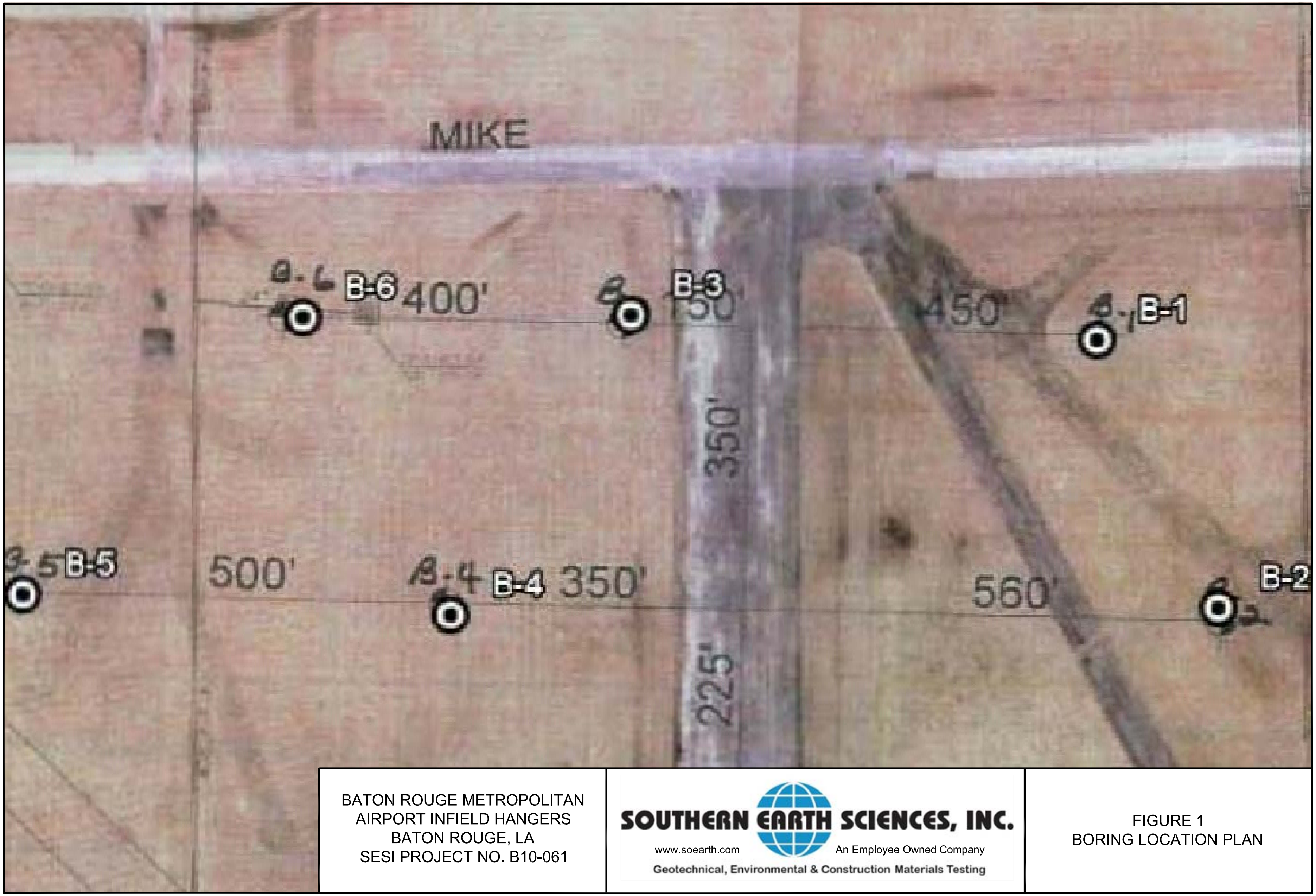
Subsurface Conditions:
Soil Conditions consist of 3 to 6 feet of well compacted, well graded sand fill overlying loose clayey sand.

Geopier Solution:
Traditional foundation anchors presented difficulty in locating the anchor shafts within specified tolerances, difficulty in performance of full-scale load tests and the risk of cost overruns. As a result, the Geopier® Rammed Aggregate Pier® System was selected for use on the project. Geopier Rammed Aggregate Piers (RAPs) with uplift anchors provided positive solutions to these problems. A total of 64 RAPs with uplift anchors were installed and the uplift test completed in less than one week.

GEOPIER FOUNDATION COMPANY

A tensar® Company

BORING LOCATION PLAN



BATON ROUGE METROPOLITAN
AIRPORT INFIELD HANGERS
BATON ROUGE, LA
SESI PROJECT NO. B10-061

SOUTHERN EARTH SCIENCES, INC.
www.soearth.com
An Employee Owned Company
Geotechnical, Environmental & Construction Materials Testing

FIGURE 1
BORING LOCATION PLAN

KEY TO TERMS AND SYMBOLS USED ON LOGS
&
BORING LOGS

BORING LOG

SOUTHERN EARTH SCIENCES, inc.

BORING ____________
JOB NO. ____________
DATE ____________
TECHNICIAN ____________

DEPTH (FEET)	SAMPLE	Standard Penetration (Blows/Ft.) or Penetrometer (TSF)	Drill Method: Initial Water Level:						DRILLER ______ RIG ______
			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.

BORING LOG

BORING NO.: B-1
PROJECT NO.: B10-061
PROJECT: BATON ROUGE AIRPORT
DATE DRILLED: 07/22/10
PROJECT LOCATION: BATON ROUGE, LA
DATE COMPLETED: 07/22/10
BORING LOCATION: N 30° 32' 16.1" W 91° 08' 55.0"
WATER LEVEL: 9.7'
BORING ELEVATION: EXISTING GROUND
WATER LEVEL DATE: 07/22/10
GEOL/ENGR: SA
LOGGED BY: KM
METHOD: AUGER/ROTARY WASH DRILLING
DRILLER: CM

DEPTH (FEET)	SAMPLE	Unconfined Compressive Strength (tsf)	Moisture Content (%)	Dry Unit Weight (PCF)	LL	PI	Symbol	MATERIAL CLASSIFICATION
			20		48	30		Light Gray Lean CLAY (CL)
		1.15	23	99	44	24		---stiff, tan, with gray silt and clay streaks and ferrous nodules
5			24					---tan and light gray
		1.90	21	107	37	22		---stiff, tan and light gray, with ferrous and calcium nodules
			20					---tan and light gray
10								
		1.11	31	92	68	44		Stiff, Tan and Light Gray fat CLAY (CH) ---with silt, jointed
15								
			26					Tan and Light Gray SILTY CLAY (CL)
20								
		0.90	32	92	65	38		Medium Stiff, Tan and Light Gray fat CLAY (CH)
25								
			27					---tan and light gray
30								
		1.41	22	105	38	22		Stiff, Tan and Light Gray Lean CLAY (CL) ---with large silty clay pockets
35								
			27					---tan and light gray, with ferrous nodules
40								

COMMENTS: WATER LEVEL ROSE TO 9.5' AFTER 15 MIN

SHELBY TUBE

SOUTHERN EARTH SCIENCES, inc.

BORING LOG

BORING NO.: B-1
PROJECT: BATON ROUGE AIRPORT
PROJECT LOCATION: BATON ROUGE, LA
BORING LOCATION: N 30° 32' 16.1" W 91° 08' 55.0"
BORING ELEVATION: EXISTING GROUND
GEOL/ENGR: SA
METHOD: AUGER/ROTARY WASH DRILLING

PROJECT NO.: B10-061
DATE DRILLED: 07/22/10
DATE COMPLETED: 07/22/10
WATER LEVEL: 9.7'
WATER LEVEL DATE: 07/22/10
LOGGED BY: KM
DRILLER: CM

DEPTH (FEET)	SAMPLE	Unconfined Compressive Strength (tsf)	Moisture Content (%)	Dry Unit Weight (PCF)	LL	PI	Symbol	MATERIAL CLASSIFICATION
43–45	Shelby tube	1.94	27	94	54	32	CH	Stiff, Dark Gray fat CLAY (CH) ---with silt pockets
48–50	Shelby tube		24				CL	Light Gray Lean CLAY (CL) ---with trace of organics
53–55	Shelby tube	1.21	26	98	40	21	CL	---stiff, tan and light gray, with ferrous nodules
58–60	Shelby tube	(1)	25				CL	---light gray, with silt and sand
60								Bottom @ 60'
								(1) 77.3% Passing #200 sieve

Depth scale: 45, 50, 55, 60, 65, 70, 75, 80

COMMENTS: WATER LEVEL ROSE TO 9.5' AFTER 15 MIN

■ SHELBY TUBE

BORING LOG

BORING NO.: B-2
PROJECT: BATON ROUGE AIRPORT
PROJECT LOCATION: BATON ROUGE, LA
BORING LOCATION: N 30° 32' 13" W 91° 08' 54"
BORING ELEVATION: EXISTING GROUND
GEOL/ENGR: SA
METHOD: AUGER/ROTARY WASH DRILLING

PROJECT NO.: B10-061
DATE DRILLED: 07/23/10
DATE COMPLETED: 07/23/10
WATER LEVEL: 5.7'
WATER LEVEL DATE: 07/23/10
LOGGED BY: KM
DRILLER: CM

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
			1.09	22	95	54	34		Stiff, Brown and Light Gray fat CLAY (CH) ---with roots and ferrous nodules and stains
				22					Light Gray and Tan Lean CLAY (CL) ---with ferrous nodules and stains
5			1.08	22	101	43	25		stiff, light gray, with ferrous nodules and staining
				25					---light gray and tan, with ferrous nodules
			1.16	24	101	43	28		---stiff, light gray and tan, with silt pockets
10									
15			(1)	21					Medium, Light Gray and Tan fine SANDY SILT (ML) ---with clay
20			1.48	26	97	58	39		Stiff, Light Gray and Tan fat CLAY (CH) ---with ferrous stains
25				29					---light gray and tan, with silt
30			1.01	33	88	68	41		---stiff, tan and light gray, with ferrous stains
35				33					---gray and tan, becoming light gray and tan lean clay
40			1.15	28	96	53	35		---stiff, light gray and tan, with ferrous nodules and stains

COMMENTS:

SHELBY TUBE SPLIT SPOON

BORING LOG

BORING NO.: B-2
PROJECT: BATON ROUGE AIRPORT
PROJECT LOCATION: BATON ROUGE, LA
BORING LOCATION: N 30° 32' 13" W 91° 08' 54"
BORING ELEVATION: EXISTING GROUND
GEOL/ENGR: SA
METHOD: AUGER/ROTARY WASH DRILLING

PROJECT NO.: B10-061
DATE DRILLED: 07/23/10
DATE COMPLETED: 07/23/10
WATER LEVEL: 5.7'
WATER LEVEL DATE: 07/23/10
LOGGED BY: KM
DRILLER: CM

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
43–45	Shelby Tube			29					Gray Lean CLAY (CL)
48–50	Shelby Tube		0.71	30	92	38	18		---medium, gray
53–55	Shelby Tube		(2)	32					Alternating layers of Gray SILTY CLAY and Gray SILT (ML)
58–60	Split Spoon	5 b/ft 3/2/3	(3)	32					Loose, Gray fine SILT (ML) ---with clay and sand
60									Bottom @ 60'

(1) 51.6% Passing #200 sieve
(2) 69.6% Passing #200 sieve
(3) 82.9% Passing #200 sieve

COMMENTS:

SHELBY TUBE SPLIT SPOON

BORING LOG

BORING NO.: B-3
PROJECT: BATON ROUGE AIRPORT
PROJECT LOCATION: BATON ROUGE, LA
BORING LOCATION: N 30° 32' 16.0" W 91° 09' 1.4"
BORING ELEVATION: EXISTING GROUND
GEOL/ENGR: SA
METHOD: AUGER/ROTARY WASH DRILLING

PROJECT NO.: B10-061
DATE DRILLED: 07/24/10
DATE COMPLETED: 07/24/10
WATER LEVEL: 3.4'
WATER LEVEL DATE: 07/24/10
LOGGED BY: KM
DRILLER: CM

DEPTH (FEET)	SAMPLE	Unconfined Compressive Strength (tsf)	Moisture Content (%)	Dry Unit Weight (PCF)	LL	PI	Symbol	MATERIAL CLASSIFICATION
			24		47	27		Tan, Brown and Light Gray Lean CLAY (CL) ---with ferrous nodules and grass roots
		0.60	24	98				---medium, gray, with ferrous nodules
5		0.56	27	92	56	33		Medium, Tan and Light Gray fat CLAY (CH) ---with silt and ferrous nodules
			15					---tan and light gray, with ferrous nodules
		2.34	21	107	46	27		---very stiff, tan and light gray, with ferrous nodules
10								
			24					Tan and Light Gray fat CLAY (CH) ---with silt and ferrous nodules
15								
			31					---light gray and tan, with ferrous nodules
20								
		1.25 (1)	26	98	50	28		---stiff, tan and light gray, with large sandy silt pockets
25								
		0.65	38	85	79	51		---stiff, light gray and tan, with calcium nodules, jointed
30								
			21					Light Gray and Tan Lean CLAY (CL)
35								
		1.38	26	99	54	34		Stiff, Light Gray and Tan fat CLAY (CH) ---with silt pockets
40								

COMMENTS:

■ SHELBY TUBE

BORING LOG

BORING NO.: B-3
PROJECT: BATON ROUGE AIRPORT
PROJECT LOCATION: BATON ROUGE, LA
BORING LOCATION: N 30° 32' 16.0" W 91° 09' 1.4"
BORING ELEVATION: EXISTING GROUND
GEOL/ENGR: SA
METHOD: AUGER/ROTARY WASH DRILLING

PROJECT NO.: B10-061
DATE DRILLED: 07/24/10
DATE COMPLETED: 07/24/10
WATER LEVEL: 3.4'
WATER LEVEL DATE: 07/24/10
LOGGED BY: KM
DRILLER: CM

DEPTH (FEET)	SAMPLE	Unconfined Compressive Strength (tsf)	Moisture Content (%)	Dry Unit Weight (PCF)	LL	PI	Symbol	MATERIAL CLASSIFICATION
45	Shelby tube		21					---tan and light gray, with silt pockets
50	Shelby tube	1.76	22	107	46	28		Stiff, Tan and Light Gray Lean CLAY (CL)
55	Shelby tube		22					---red, tan and light gray, with calcium nodules
60	Shelby tube	1.27	28	94	34	13		---stiff, tan and light gray, with clay layers
								Bottom @ 60'
								(1) UU Triaxial run at 15.7 psi confining pressure
65								
70								
75								
80								

COMMENTS:

■ SHELBY TUBE

BORING LOG

BORING NO.: B-4
PROJECT: BATON ROUGE AIRPORT
PROJECT LOCATION: BATON ROUGE, LA
BORING LOCATION: N 30° 32' 12.6" W 91° 09' 3.06"
BORING ELEVATION: EXISTING GROUND
GEOL/ENGR: SA
METHOD: AUGER/ROTARY WASH DRILLING

PROJECT NO.: B10-061
DATE DRILLED: 07/23/10
DATE COMPLETED: 07/23/10
WATER LEVEL: 9.8'
WATER LEVEL DATE: 07/23/10
LOGGED BY: KM
DRILLER: CM

DEPTH (FEET)	SAMPLE	Unconfined Compressive Strength (tsf)	Moisture Content (%)	Dry Unit Weight (PCF)	LL	PI	Symbol	MATERIAL CLASSIFICATION
			28		45	22		Brown, Gray and Tan Lean CLAY (CL) ---with ferrous nodules and roots
		1.18	23	100	32	9		---stiff, gray and tan, with ferrous nodules and stains and silt
5			24					---gray and tan, with silt
		1.40	24	101	41	19		---stiff, gray and tan, with ferrous nodules
			22					---light gray and tan, with trace of silt and ferrous nodules
10								
		1.33	24	100	67	44		Stiff, Tan and Light Gray fat CLAY (CH)
15								
			28					---light gray, with silt pockets and ferrous stains
20								
		1.13	25	99	57	32		---stiff, tan and gray, jointed
25								
			28					---gray, with calcium nodules, jointed
30								
		2.39	24	101	47	29		Very Stiff, Light Gray and Tan Lean CLAY (CL) ---with trace of silt
35								
			22					---light gray, with ferrous stains
40								

COMMENTS: WATER LEVEL ROSE TO 9.5' AFTER 15 MIN

■ SHELBY TUBE

BORING LOG

BORING NO.: B-4
PROJECT: BATON ROUGE AIRPORT
PROJECT LOCATION: BATON ROUGE, LA
BORING LOCATION: N 30° 32' 12.6" W 91° 09' 3.06"
BORING ELEVATION: EXISTING GROUND
GEOL/ENGR: SA
METHOD: AUGER/ROTARY WASH DRILLING

PROJECT NO.: B10-061
DATE DRILLED: 07/23/10
DATE COMPLETED: 07/23/10
WATER LEVEL: 9.8'
WATER LEVEL DATE: 07/23/10
LOGGED BY: KM
DRILLER: CM

DEPTH (FEET)	SAMPLE	Unconfined Compressive Strength (tsf)	Moisture Content (%)	Dry Unit Weight (PCF)	LL	PI	Symbol	MATERIAL CLASSIFICATION
44		2.69	23	104	60	40		Very Stiff, Tan and Light Gray fat CLAY (CH) ---with ferrous stains
45								
49			27					---light gray, with organic pockets and shell fragments
50								
54		2.84	26	98	52	31		---very stiff, tan and light gray, with silt pockets
55								
59			18					Tan and Light Gray Lean CLAY (CL) ---with ferrous stains
60								Bottom @ 60'
65								
70								
75								
80								

COMMENTS: WATER LEVEL ROSE TO 9.5' AFTER 15 MIN

■ SHELBY TUBE

BORING LOG

BORING NO.: B-5
PROJECT NO.: B10-061
PROJECT: BATON ROUGE AIRPORT
DATE DRILLED: 07/24/10
PROJECT LOCATION: BATON ROUGE, LA
DATE COMPLETED: 07/24/10
BORING LOCATION: N 30° 32' 12.3" W 91° 09' 9.0"
WATER LEVEL: 3.7'
BORING ELEVATION: EXISTING GROUND
WATER LEVEL DATE: 07/24/10
GEOL/ENGR: SA
LOGGED BY: KM
METHOD: AUGER/ROTARY WASH DRILLING
DRILLER: CM

DEPTH (FEET)	SAMPLE	Unconfined Compressive Strength (tsf)	Moisture Content (%)	Dry Unit Weight (PCF)	LL	PI	Symbol	MATERIAL CLASSIFICATION
		0.71	23	99	45	23		Medium Stiff, Tan and Light Gray Lean CLAY (CL) ---with roots, ferrous nodules and trace of organics
		0.52	28	93	41	21		---medium, gray and light brown, with ferrous nodules
5			24					Light Gray and Tan fat CLAY (CH)
		1.85	25	101	52	32		---stiff, light gray and tan, with ferrous nodules and silt
			22					Tan and Light Gray Lean CLAY (CL) ---with ferrous nodules
10								
		1.59	23	102	57	36		Stiff, Tan and Light Gray fat CLAY (CH) ---with silt and ferrous nodules
15								
			27					---tan and light gray, with silt and ferrous nodules
20								
		0.95	30	94	42	20		Medium Stiff, Tan and Light Gray Lean CLAY (CL) ---with trace of fine sand
25								
			27					---tan and light gray, with silt
30								
		0.70	27	96	45	26		---medium, light gray and tan, with silt
35								
			22					Red, Tan and Light Gray fat CLAY (CH) ---jointed
40								

COMMENTS:

SHELBY TUBE

BORING LOG

BORING NO.: B-5
PROJECT: BATON ROUGE AIRPORT
PROJECT LOCATION: BATON ROUGE, LA
BORING LOCATION: N 30° 32' 12.3" W 91° 09' 9.0"
BORING ELEVATION: EXISTING GROUND
GEOL/ENGR: SA
METHOD: AUGER/ROTARY WASH DRILLING

PROJECT NO.: B10-061
DATE DRILLED: 07/24/10
DATE COMPLETED: 07/24/10
WATER LEVEL: 3.7'
WATER LEVEL DATE: 07/24/10
LOGGED BY: KM
DRILLER: CM

DEPTH (FEET)	SAMPLE	Unconfined Compressive Strength (tsf)	Moisture Content (%)	Dry Unit Weight (PCF)	LL	PI	Symbol	MATERIAL CLASSIFICATION
45	Shelby Tube	0.94	20	107	52	35		---medium, tan and light gray, with silt and ferrous nodules, jointed
50	Shelby Tube		31					---red, tan and light gray, jointed
55	Shelby Tube	1.25	33	91	75	51		---stiff, tan and light gray, with large calcium nodules
60	Shelby Tube		23					---light gray, tan and greenish gray, with silt pockets becoming firm light gray sandy silt
								Bottom @ 60'
65								
70								
75								
80								

COMMENTS:

■ SHELBY TUBE

BORING LOG

BORING NO.: B-6
PROJECT: BATON ROUGE AIRPORT
PROJECT LOCATION: BATON ROUGE, LA
BORING LOCATION: N 30° 32' 16.06" W 91° 09' 5.25"
BORING ELEVATION: EXISTING GROUND
GEOL/ENGR: SA
METHOD: AUGER/ROTARY WASH DRILLING

PROJECT NO.: B10-061
DATE DRILLED: 07/23/10
DATE COMPLETED: 07/23/10
WATER LEVEL: 6.3'
WATER LEVEL DATE: 07/23/10
LOGGED BY: KM
DRILLER: CM

DEPTH (FEET)	SAMPLE	Unconfined Compressive Strength (tsf)	Moisture Content (%)	Dry Unit Weight (PCF)	LL	PI	Symbol	MATERIAL CLASSIFICATION
			17		39	18		Tan SILTY CLAY (CL) ---becoming dark brown, with ferrous nodules
			23					Tan and Light Brown Lean CLAY (CL) ---with ferrous nodules and organic pockets
5		0.43	26	99	34	11		---soft, tan and light gray, with ferrous stains, failure due to slickensides
			20					---light gray and tan, with ferrous nodules
		1.43	19	109	42	26		---stiff, tan and light gray, with silt and ferrous stains
10								
			22					---stiff, light gray and tan, with ferrous stains and silt
15								
		1.09	36	88	72	43		Stiff, Gray fat CLAY (CH) ---jointed and slickensided
20								
			24					Gray Lean CLAY (CL) ---with ferrous stains
25								
		0.37	39	84	68	36		Soft, Light Gray and Tan fat CLAY (CH) ---with ferrous nodules, jointed and slickensided
30								
			28					---light gray and tan, with trace of silt
35								
		1.17	23	102	42	25		Stiff, Light Gray and Tan Lean CLAY (CL) ---with ferrous stains
40								

COMMENTS:

SHELBY TUBE

BORING LOG

BORING NO.: B-6
PROJECT: BATON ROUGE AIRPORT
PROJECT LOCATION: BATON ROUGE, LA
BORING LOCATION: N 30° 32' 16.06" W 91° 09' 5.25"
BORING ELEVATION: EXISTING GROUND
GEOL/ENGR: SA
METHOD: AUGER/ROTARY WASH DRILLING

PROJECT NO.: B10-061
DATE DRILLED: 07/23/10
DATE COMPLETED: 07/23/10
WATER LEVEL: 6.3'
WATER LEVEL DATE: 07/23/10
LOGGED BY: KM
DRILLER: CM

DEPTH (FEET)	SAMPLE	Unconfined Compressive Strength (tsf)	Moisture Content (%)	Dry Unit Weight (PCF)	LL	PI	Symbol	MATERIAL CLASSIFICATION
44-45	Shelby tube		18					---tan and light gray, with silt pockets
48-50	Shelby tube	2.89	21	107	51	36		Very Stiff, Light Gray and Tan fat CLAY (CH) ---with calcium nodules
53-55	Shelby tube		25					---light gray, with ferrous stains
58-60	Shelby tube		23	98	46	27		Stiff, Light Gray and Tan Lean CLAY (CL) ---with silt pockets and calcium nodules
60								Bottom @ 60'

Depth scale: 45, 50, 55, 60, 65, 70, 75, 80

COMMENTS:

■ SHELBY TUBE

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SOUTHERN EARTH SCIENCES, INC.

Geotechnical, Environmental & Construction Materials Testing

GEOTECHNICAL ENGINEERING SERVICES REPORT

For

BATON ROUGE METROPOLITAN AIRPORT PROPOSED INFIELD HANGERS
BATON ROUGE, LOUISIANA
SESI FILE NO: B10-061

Presented to

URS CORPORATION
9430 JACKIE COCHRAN BOULEVARD, SUITE 200
BATON ROUGE, LOUISIANA 70807
SESI File No: B10-061

Prepared by

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AUGUST 17, 2010