Purchasing Office
P.O. Box 40197 • Lafayette, LA 70504-0197
Office: (337) 482-5396
Fax: (337) 482-5059

October 4, 2023

ADDENDUM NO. 6

PROPOSAL FOR FURNISHING ALL LABOR, MATERIALS, EQUIPMENT, TRANSPORTATION, SUPERVISION, PERMITS, ETC. NECESSARY FOR THE ULL CLECO ALTERNATIVE ENERGY RESEARCH CENTER MICROGRID PROJECT, LOCATED ON THE UL LAFAYETTE CAMPUS-CLECO, IN CROWLEY**, LOUISIANA.**

Due Tuesday, October 17, 2023 10:00 AM Solicitation No. 24203

The following is to be made part of the original specifications as though issued at the same time and shall be incorporated integrally therewith. This addendum shall be acknowledged on the BID FORM when submitted to the Purchasing Department prior to the bid due date/time.

Item No. 1

The bid due date was originally scheduled for Thursday, October 5, 2023 at 2:00PM.
The bid due date has been postponed to Tuesday, October 17, 2023 at 10:00AM.

The bid opening was originally scheduled for Thursday, October 5, 2023 at 3:00PM..
This meeting has been postponed and will now take place on Tuesday, October 17, 2023 at 11:00AM.

Item No. 2

Geotechnical Report added. See attached.

This is a public works bid. The addendum **MUST** be acknowledged with your bid on the BID FORM. For questions related to bidding these projects, please contact the UL Lafayette Purchasing Department at bids@louisiana.edu or 337.482.2955.

Marie C. Frank, MPA, CPPB
Assistant Vice President for Administration & Finance
University of Louisiana at Lafayette
Department of Purchasing

GeoConsultants, LLC of Louisiana
Geotechnical and Forensic Engineering Services

April 8, 2011

Mr. Steve Ayres
Petron, Inc.
P.O. Box 8718
Alexandria, Louisiana 71306

RE: Geotechnical Investigation
Alternative Energy Center for
Central Louisiana Electric Company
Crowley, Louisiana
Report No. 03-11-053

Dear Mr. Ayres:

GeoConsultants, LLC of Louisiana is pleased to submit this report of subsurface exploration for the above referenced project. Included in the report are the results of the exploration and recommendations concerning the design and construction of the foundations as well as general site development.

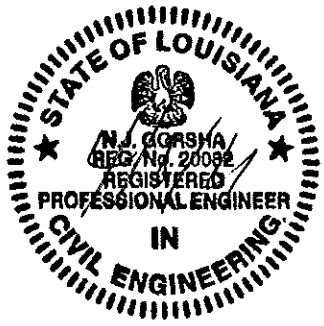
We appreciate the opportunity to have provided you with our geotechnical engineering services. If you have any questions concerning this report, or if we may be of further service, please contact our office.

Respectfully submitted,

GeoConsultants, LLC of Louisiana

N. J. Gorsha, P.E.

NJG/krg



Distribution: (2) Addressee
(1) Mr. Philippe E. Prouet, AIA, Poche Prouet Associates, Ltd.
(1) Mr. Rusty Bellard, P.E., Bellard & associates, Inc.

RECEIVED
APR 12 2011
POCHE PROUET ASSOCIATES

GEOTECHNICAL INVESTIGATION
FOR
ALTERNATIVE ENERGY CENTER FOR
CENTRAL LOUISIANA ELECTRIC COMPANY
CROWLEY, LOUISIANA
REPORT NO. 03-11-053

Prepared For:

Petron, Inc.
P.O. Box 8718
Alexandria, Louisiana 71306

Prepared By:

Geo*Consultants*, LLC of Louisiana
226 Parkwood Drive
Alexandria, Louisiana 71301

TABLE OF CONTENTS

APPENDIX

GEOTECHNICAL INVESTIGATION
FOR
ALTERNATIVE ENERGY CENTER FOR
CENTRAL LOUISIANA ELECTRIC COMPANY
CROWLEY, LOUISIANA
REPORT NO. 03-11-053

Introduction:

This report transmits the findings of a geotechnical investigation performed for the above-referenced project. The purpose of this investigation was to define and evaluate the general subsurface conditions in the immediate vicinity of a proposed new facility. Specifically, the study was planned to determine the following:

- Subsurface stratigraphy within the limits of our exploratory borings.
- Classification, strength, and compressibility characteristics of the foundation strata.
- Suitable foundation systems and allowable soil bearing pressures.
- Construction requirements for the placement of select earth fills.

The purpose of this report is to provide the structural engineer, architect, civil engineer, and other design team professionals with recommendations for the design and construction of the proposed project. This report should not be used by the contractor in lieu of project plans or specifications.

Project Authorization:

Formal authorization to perform the work was provided by Mr. Steve Ayres with Petron, Inc. (client), by accepting our March 31, 2011 written proposal. Verbal authorization to proceed was provided on the same day. Field procedures were conducted on March 31, 2011. To accomplish the intended purposes, a three-phase study program was conducted which included:

- a field investigation consisting of two exploratory test borings with samples obtained at selected intervals;
- a lab testing program designed to evaluate the expansive and strength characteristics of the subsurface soils; and,
- an engineering analysis of the field and laboratory test data for foundation design recommendations.

No additional analysis was requested. A brief description of the field and laboratory test procedures are provided in the Appendix.

Project Description:

We understand that the project will consist of a one story, slab on grade, wood-framed structure with approximately 6,224 square feet of area. Approximately 2,996 square feet will be utilized as office area, and the remaining 3,228 square feet will be shop area. Bobcat tractors will reportedly access the shop area.

For the purpose of this report, we have assumed that maximum column loads will not exceed approximately 25 kips, and that maximum continuous wall loads will be approximately one (1) to two (2) kips per linear foot. Maximum uniform and isolated concentrated floor loads are expected to be 125 psf and five (5) kips, respectively. Information provided to this office

indicates that the finished floor elevation will be established at Elev. 18 feet MSL. Based on the existing topography, it appears that the building pad area will receive a fill of approximately 2.5 feet to reach the design subgrade elevation. If larger grade changes are anticipated, these should be discussed with our geotechnical engineer prior to finalizing design.

If any of this information should change significantly or be in error, it should be brought to our attention so that we may review recommendations made in this report.

Site and Subsurface Conditions:

The project site is located generally northwest of the intersection of Maraist Road and Capitol Avenue in Acadia Parish, Crowley, Louisiana. The site was noted to be relatively level with estimated maximum elevation differences of no more than one (1) foot. The site was vegetated with weeds and grass at the time of drilling. The drilling rig experienced no difficulty moving about the site.

Subsurface Stratigraphy:

In accordance with your request, subsurface conditions at the proposed building site were explored by drilling a total of two (2) borings to a depth of approximately 30 feet. The borings were located in the field by the drilling crew by measuring approximate distances from existing features as shown on the Plan of Borings included in the Appendix of this report.

The stratification of the soils encountered during field drilling operations is presented on the boring logs in the Appendix. The stratification of the subsurface materials shown on the boring logs represents the subsurface conditions encountered at the actual boring locations and variations may occur across the site. The lines of demarcation represent the approximate boundary between the soil types, but the actual transition may be gradual. The following subsurface descriptions are of a generalized nature to highlight the major stratification features. The boring logs should be reviewed for more detailed information.

In order of increasing depth, the borings generally encountered the following soil strata beneath the surface: lean to fat clay (CL/CH), fat clay (CH), and silty lean clay (CL).

Groundwater Conditions:

Seepage was observed at a depth of 18 feet during advancement of the test borings. Groundwater was measured at depths of 13 to 14 feet below existing ground surface upon completion of the borings. The subsurface water regime is subject to change with variations in climatic conditions. Future construction activities may also alter the surface and/or subsurface drainage patterns of this site. Therefore, groundwater conditions should be explored at the start of construction by others. If there is a noticeable variance from the observations reported herein, then GeoConsultants should be notified immediately to review the effect, if any, such data may have on the design recommendations. It is not possible to predict future ground water conditions based upon short-term observations.

Foundation Recommendations:

Potential Vertical Rise (PVR) values were estimated to vary between approximately 2.75 and three (3) inches for this site. One (1) inch of PVR is generally accepted as the maximum allowable value for design and construction in the geographical area. The surficial soils encountered by the borings are considered to be highly expansive.

For site conditions such as these, we recommend placing the structure on a system of drilled, cast-in-place concrete shafts bearing between 15 and 25 feet below present grades. However, consideration may also be given to placing the structure on a foundation system consisting of shallow footings with a grade-supported floor slab. Recommendations for both foundation types are presented herein.

Positive drainage away from the structure should be provided at all times, including during construction. If positive drainage is not provided, water will pond around or below the building and excessive total and differential movements may occur. Proper surface drainage should be maintained, and landscape irrigation systems should be located and operated in a manner to minimize wetting of building foundations. After installation, the irrigation system should be pressure tested and any leaks repaired.

Foundation Subgrade Preparation:

To prepare for foundation construction, we recommend that all topsoil, vegetation, roots, and any soft soils in the building area be stripped from the site and either properly disposed or stockpiled for later use in landscaping. Utilities should be located and rerouted as necessary.

To remediate the variable soil conditions in the surficial zone and provide a consistent subgrade for equipment support, GeoConsultants recommends that a uniform layer of density-approved select fill be provided beneath the floor slab. The select fill pad should be a minimum of two (2) feet in thickness and should extend at least five (5) feet beyond the edge of the building. The estimated 2.5 feet of fill to raise the site should automatically satisfy this requirement.

The fill can be used to elevate the building pad so that positive drainage is provided away from the building. Where feasible, elevating the building pad with fill is generally desirable because this aids in providing positive drainage away from the floor slab and foundations and helps prevent water from collecting in the filled area.

After stripping and undercutting, as required by the grading plan, the building area should be proof-rolled with a heavy, loaded pneumatic-tired vehicle such as a 20 to 25 ton loaded dump truck. It is recommended that all areas beneath the floor slab be proof-rolled to identify loose or soft soils. All proof-rolling and undercutting activities should be witnessed by GeoConsultants or authorized representative and should be performed during a period of dry weather. Any weak areas which yield under the proof-roll, or any areas with a tendency to pump should be mitigated. Such mitigation may include over-excavation and backfilling, reprocessing to remove moisture, modification with lime or cement admixture, or using geotextiles. In the event such mitigation is required, the geotechnical engineer should be contacted to design an appropriate procedure.

After stripping, excavating where required, and proof-rolling but prior to placing fill, the exposed soils should be scarified and then processed to a moisture content between one (1) percentage point below and three (3) percentage points above the Standard Proctor optimum. The subgrade soils should be re-compacted to a dry density of at least 95 percent of the Standard Proctor (ASTM D-698) maximum dry density for a depth of at least eight (8) inches below the surface.

Select Fill:

After the subgrade has been prepared and inspected, fill placement may begin. Select fill material should be free of organic or other deleterious materials, homogeneous mixture, have a maximum particle size of three (3) inches, have a liquid limit less than 40 and plasticity index between 8 and 20, and consist of silty-clayey sands (SM-SC), low plasticity sandy clays (CL), or

clayey sands (SC) as defined by the Unified Soil Classification System. If a fine-grained material is used for fill, very close moisture content control will be required to achieve the recommended degree of compaction.

Fill should be placed in maximum lifts of eight (8) inches of loose materials and should be compacted within the range of one (1) percentage point below to three (3) percentage points above the optimum moisture content value and a minimum of 95% of the maximum density as determined by the Standard Proctor (ASTM D-698) test. If water must be added, it should be uniformly applied and thoroughly mixed into the soil by disking or scarifying.

Each lift of compacted soil should be tested and inspected by the soils engineer or his representative prior to placement of subsequent lifts. As a guideline, it is recommended that field density tests be taken at a frequency of not less than one (1) test per 2,500 square feet of surface area per lift or a minimum of four per lift for each tested area for the building area.

Drilled Shafts:

As previously discussed, loads for the structure should be supported on drilled piers with underreams. The underreamed piers should have a minimum bell diameter to shaft diameter ratio of 2.0 to resist uplift forces associated with shrinking and swelling of the site soils that may be created by soil-to-pier adhesion in the zone of expansive clays. A maximum bell diameter to shaft diameter ratio of 3.0 is also recommended.

Shafts should be founded at a depth of 15 feet and should not extend below a depth of 25 feet below the existing ground surface. Such shafts may be proportioned using a maximum allowable net end bearing pressure of 3,000 lbs/ft^2, plus an average unit allowable skin friction pressure of 200 lbs/ft^2 based on dead load plus live load considerations. Skin friction values for downward capacity should be ignored for the surficial five (5) feet and the bottom portion of the shaft equal to one-half the base diameter above the top of the underream.

The factor of safety for these calculations is 2.0. The above estimated values are based on field and empirical values. Therefore, we recommend that consideration be given to a shaft testing program to confirm the above estimated values. Groundwater will be encountered in the drilled shafts. Casing for installing drilled shafts is a possibility at this site. It is prudent for contract documents to include this option.

Drilled Shaft Considerations:

Due to the presence of a shallow groundwater table with a hydrostatic head, consideration should be given to installing the drilled shafts using a slurry method which maintains a constant slurry level equal to or slightly above the hydrostatic water level. If the shafts can be sealed from water intrusion using casing, the slurry option may be eliminated.

It is recommended that the design and construction of drilled piers should generally follow methods outlined in the manual titled Drilled Shafts: Construction Procedures and Design Methods (Publication No: FHWA-IF-99-025, August 1999).

We emphasize that close engineering supervision is essential during installation of the drilled pier foundations in order to assure that construction is performed in accordance with the plans and specifications. Also, to insure proper construction of the drilled piers at this site, close coordination between the drilling and concreting operations is considered to be of great importance. Detailed inspection of drilled 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 materials have been removed prior to concrete placement.

Floor Slab – Drilled Shafts:

It is recommended that the floor slabs utilized with the drilled pier foundation consist of a structurally suspended slab. Structurally supported slab and grade beams should be isolated from the subgrade soils by providing a minimum six (6) inch positive void beneath the slab and the grade beams. Using cardboard carton forms specially manufactured for this purpose can produce these voids. Care should be exercised so that the forms are not crushed, damaged, or saturated prior to placement of the concrete. In addition, barriers that will not rapidly decay should be placed or constructed along the sides of the cardboard carton forms to prevent soil intrusion into the void after the carton forms decay.

Shallow Foundation:

As previously discussed, the site is underlain by highly active fat clay with a swell potential estimated to be between 2.75 and three (3) inches. Consequently a portion of the fat clay subgrade should be removed prior to placing any fill to reach the design grades. Considering that 2.5 feet of fill will be required over the building pad, we estimate that an additional 4.5 feet of fat clay subgrade should be removed in order to limit the swell potential to a value of one (1) inch or less. The plans for a shallow foundation system should require a building pad containing a minimum thickness of seven (7) feet of density-approved select fill.

Fill areas will be required to provide a level building pad for the building. These fill areas should be composed of density controlled select fill (compacted to 95% Standard Proctor ASTM D-698). These constructed fills, even though placed in a density controlled and monitored manner, can be expected to settle between 1% and 2% throughout the fill thickness. This contribution to settlement can be significant on sites with constructed fill depths exceeding three (3) or four (4) feet, and should be accounted for in the design of the building.

Considering the fill thickness required, we feel it would be prudent to allow a resting period for self-consolidation once the fill is placed and prior to placement of footings and floor slabs. A resting period of at least two (2) weeks should be sufficient.

Foundation Subgrade Preparation:

To prepare for foundation and soil supported floor slab construction, we recommend that all topsoil, vegetation, roots, and any soft soils in the building area be stripped from the site and either properly disposed or stockpiled for later use in landscaping. Utilities should be located and rerouted as necessary.

To provide a consistent subgrade for slab support and reduce the potential for active soils to affect the foundation, GeoConsultants recommends that a uniform layer of density-approved select fill be provided beneath the floor slab. The select fill pad should be a minimum of seven (7) feet in thickness and should extend at least five (5) feet beyond the edge of the building. A portion of the fat clay subgrade should be stockpiled for use as a natural moisture barrier below landscaped areas and areas exposed to rainfall or runoff.

The select fill can be used to elevate the building pad so that positive drainage is provided away from the building. Where feasible, elevating the building pad with fill is generally desirable because this aids in providing positive drainage away from the floor slab and foundations and helps prevent water from collecting in the filled area.

The building pad should extend laterally a minimum of three (3) feet beyond the building perimeter prior to sloping. For maintenance purposes, the embankment should be placed at a slope rate of 3H:1V. All slopes should be over-constructed and cut back to the final slopes to ensure a

uniformly firm surface. The slopes should be covered with surface vegetation as soon as possible to inhibit erosion.

After stripping, excavating where required, but prior to placing fill, the exposed soils should be scarified and then processed to a moisture content between one (1) percentage point below and three (3) percentage points above the Standard Proctor optimum. The subgrade soils should be re-compacted to a dry density of at least 95 percent of the Standard Proctor (ASTM D-698) maximum dry density for a depth of at least eight (8) inches below the surface.

Select Fill:

After the subgrade has been prepared and inspected, fill placement may begin. Select fill material should be free of organic or other deleterious materials, homogeneous mixture, have a maximum particle size of three (3) inches, have a liquid limit less than 40 and plasticity index between 8 and 20, and consist of silty-clayey sands (SM-SC), low plasticity sandy clays (CL), or clayey sands (SC) as defined by the Unified Soil Classification System. If a fine-grained material is used for fill, very close moisture content control will be required to achieve the recommended degree of compaction.

Fill should be placed in maximum lifts of eight (8) inches of loose materials and should be compacted within the range of one (1) percentage point below to three (3) percentage points above the optimum moisture content value and a minimum of 95% of the maximum density as determined by the Standard Proctor (ASTM D-698) test. If water must be added, it should be uniformly applied and thoroughly mixed into the soil by disking or scarifying.

Each lift of compacted soil should be tested and inspected by the soils engineer or his representative prior to placement of subsequent lifts. As a guideline, it is recommended that field density tests be taken at a frequency of not less than one (1) test per 2,500 square feet of surface area per lift or a minimum of four per lift for each tested area for the building area.

Excessive movement should not occur if careful measures are taken to minimize moisture variations beneath the structure to preclude loss of shear strength of foundation soils. It is not uncommon to assume differential movement as half of the PVR. However, it should be noted that for extreme conditions (i.e. soils dry and shrink in one area with soils in another area being exposed to water and swelling) differential movement can be equal to or even double the PVR.

The plans should include a section illustrating the placement and compaction of at least 12 inches of fat clay below all landscaped areas and areas exposed to direct rainfall or runoff. The fat clay should act as a horizontal moisture barrier to inhibit moisture from infiltrating and saturating the select fill pad and thereby increasing the potential for swelling of the underlying fat clays. The fat clay layer should be placed and compacted to within six (6) inches of finished grade to allow the placement of a topsoil layer. The fat clay layer should extend at least five (5) feet beyond the perimeter of the structure.

If shrubs or bushes are placed next to the structure, an impervious membrane should be used to separate the slab from the shrubs to limit any infiltration of water under the slab. The minimum distance between a tree and the slab should be about one-half the expected mature height of the tree.

Shallow Footings:

Perimeter footings should bear at a minimum nominal depth of 24 inches below the planned finished floor elevation or 18 inches below exterior adjacent grade, whichever is deeper.

Spread footings for columns and strip footings for walls may be designed for a maximum net allowable soil bearing pressure of 2,500 psf and 2,000 psf, respectively, based on dead load plus design live load. Minimum foundation widths for column and strip footings should be 24 inches and 16 inches, respectively, even if the bearing pressures are less than the recommended values.

Total settlement is estimated to be on the order of one (1) inch or less for foundation units designed in accordance with recommendations provided herein. Differential settlements are estimated to be on the order of ½ inch or less. Approximately half of this settlement is expected to occur during construction. The remaining long-term settlement of ½ inch (¼ occurring differentially) should be tolerable.

All foundation excavations should be inspected by GeoConsultants or an authorized representative prior to steel and concrete placement to assess whether the foundation materials appear consistent with the boring logs. Soft or loose soil zones encountered at the bottom of the footing excavations should be removed and the cavity should be backfilled with compacted select fill, flowable grout fill, crushed stone flexible base, concrete, or other approved material and placement control.

Floor Slab and Grade Beams:

Construction of select fill as specified herein beneath the building should result in the development of a modulus of subgrade reaction (k_s) to range between 125 and 150 pounds per cubic inch based upon empirical equations that estimate the results of a plate load test. For shop area slabs exposed to Bobcat loads, the subgrade modulus may be increased to 250 pci by placing eight (8) inches of crushed limestone base or equal below the slab.

Grade beams utilized in conjunction with the floor system and *not designed in accordance with the above shallow footing recommendations* (i.e. depth, width, select fill provision, etc.) may exert a maximum net allowable soil bearing pressure no greater than 1,000 psf. Grade beams which are to support masonry walls or provide superstructure support should be designed as a continuous footing, as presented previously.

A permeable dry subgrade, with a smooth, low friction surface should be provided beneath the slab. The slab should not be constructed on a saturated subgrade or a subgrade with standing water. A few inches of sand may be useful as a level-up course under the slab to facilitate fine grading. If crushed stone is used as a subgrade material, the upper surface of the crushed stone should be choked off with sand or a smaller crushed stone material to provide a smooth surface that will allow the slab on grade to shrink with minimum restraint. The subgrade should be free of frost before concreting begins.

Utilities which project through the slab on grade should be designed with either some degree of flexibility or with sleeves. Such design features will help reduce damage to utility lines if vertical movements occur.

The floor slab may be placed monolithically with the grade beams, or designed and constructed as a floating slab where an isolation joint separates the floor slab from all grade beams and columns. In the former case, a crack or hinge joint may develop in the slab parallel to the exterior grade beams. The floor system type should be selected and designed by the structural engineer after considering the advantages and disadvantages of each.

Membrane Under Slab:

The decision as to whether a synthetic membrane (polyethylene or HDPE sheeting, etc.) is required below the slab should be made by the architect and structural engineer based on planned floor coverings, proximity of groundwater, planned site grading and drainage patterns, tolerance for curling, local custom, weather conditions at the time of construction, and other pertinent considerations.

Construction Considerations:

Excessive movement should not occur if customary measures are taken to minimize moisture variations beneath the structure to preclude loss of shear strength of foundation soils. Proper surface drainage should be maintained, and landscape irrigation systems should be located and operated in a manner to minimize wetting of building foundations. Positive drainage away from the building should be provided at all times, including during construction. If positive drainage is not provided, water will pond around or below the building and excessive total and differential movements may occur.

Secondary Design Considerations:

The following information has been assimilated after examination of numerous problems dealing with soil strata throughout Louisiana. It is presented here for implementation by others. If these features are not incorporated, then performance of the structure may be **"at-risk".**

1. Roof drainage should be **routed via pipe or a hard surface at least 5 feet from the structure.**
2. The **depth of frost penetration** in the vicinity of the project site is estimated to be approximately six inches.
3. Pavements, sidewalks, and the general ground surface should be sloped away from the structure on all sides. Water must not be allowed to pond within 5 feet of the building.
4. Backfill for utility lines should be compacted to at least 95 percent of the standard compaction test (ASTM D-698).
5. Surficial soils of the type encountered at this site are subject to erosion. Therefore, unpaved areas should be protected from erosion by the establishment of a good vegetation cover.
6. Clayey fill has been specified for select fill to reduce the potential migration of water beneath the proposed establishment. Drainage details must focus on routing water away from the structure. Excessive water intrusion can produce undesirable latent vertical movement.
7. Landscaping elements, including irrigation systems must not be allowed to introduce excess water to the structure subgrade. Monitor irrigation controls frequently and adjust to avoid over-watering of plants positioned in close proximity to the structure.

Safety Considerations:

Prior to the commencement of construction, the owner and the contractor should make themselves aware of and become familiar with applicable local, state, and federal safety regulations, including the current Occupational Safety and Health Association (OSHA) Excavation and Trench Safety Standards. Construction site safety generally is the sole responsibility of the contractor, who shall also be solely responsible for the means, methods, and sequencing of construction operations. We are providing this information solely as a

service to our client. Under no circumstances should the information provided herein be construed that GeoConsultants is assuming responsibility for construction site safety of the contractor's activities. Such responsibility is not being implied and should not be inferred.

Worker Safety - Excavations and Slopes:

After excavating, footings should be inspected and concrete placed as quickly as possible to avoid exposure of the footing bottoms to wetting and drying. If it is required that footing excavations be left open for more than one (1) day, they should be protected to reduce evaporation or entry of moisture. Adequate protection against sloughing of soil should be provided for workers and inspectors entering the footing excavations and undercut areas.

The contractor should be aware that slope height, slope inclination, or excavation depths (including utility trench excavations) should in no case exceed those specified in local, state, or federal safety regulations, e.g., OSHA Standards for Excavations, Title 29, Part 1926, successor regulations as well as other building code requirements. Such regulations are strictly enforced and, if not followed, the owner, contractor, and earthwork and utility subcontractors could be liable for substantial penalties.

If any excavations, including a utility trench, is extended to a depth of more than 20 feet, it will be required to have the side slopes designed by a professional engineer registered in the State of Louisiana.

Drainage:

Water should not be allowed to collect near the foundations, floor slab or pavement areas of the project either during or after construction. Undercut or excavated areas should be sloped toward a sump area to facilitate removal of any collected groundwater or surface runoff. Proper drainage should be provided by sloping the ground surface away from the structure.

Weather Considerations:

The soils encountered in the surficial zone at this site are expected to be relatively sensitive to disturbances caused by construction traffic when wet. The contractor should be aware of the importance of proper maintenance of surface drainage. Depending on weather-related ground conditions, contractor's maintenance of drainage during construction, and other factors, some difficulty may be encountered by the contractor in achieving compaction on initial lifts of fill placed on loose or soft subgrade. This will be exacerbated by wet weather, particularly if the contractor allows surface drainage to enter and pond in the excavations.

Fine-grained soils are expected to be relatively sensitive to disturbances caused by construction traffic and to changes in moisture content. During wet weather periods, increases in the moisture content of the soil can cause significant reduction in the soil strength and support characteristics. In addition, soil which becomes wet may be slow to dry and thus significantly retard the progress of grading and compaction activities. It will, therefore, be advantageous to perform earthwork and foundation construction activities during dry weather. Earthwork activities performed during cooler, wetter months may certainly offer more difficulties than if performed during warmer, drier periods.

If construction is performed during wet conditions, work platforms can be created for earthwork by mixing fly ash, hydrated lime, cement, or combinations of these additives. Quick lime may also be used in areas where dusting is of concern, if proper worker safety considerations are observed. Pumping subgrades are possible at the site and it is recommended that bid documents incorporate this possibility into the bid schedule.

The use of geotextiles and geogrids may be warranted in situations where the subgrade is very wet and highly unstable, if such use is necessary to maintain a mandatory construction schedule during wet weather.

Groundwater Control:

Due to potential variations in groundwater levels, difficulty during excavation and construction of the proposed foundation is possible. Shallow groundwater was encountered at this site, and it is reasonable to anticipate that groundwater conditions may vary as noted previously. It is suggested that contract documents address the need for maintaining controls to preclude water from draining into excavations. Some dewatering through shaping of work areas to shed water, and construction of temporary ditches with sumps and pumping may be necessary to remove the loose soils and allow placement of imported select fill in a dry manner. Excavated soils intended for re-use as select fill may require special methods in order to dry the soil to a suitable moisture content prior to re-placing the soil as select fill.

Protection of Work:

Subgrade areas, base courses, and lifts of fill that have been successfully moisture conditioned, processed, and compacted in lifts to the required density, successfully proof-rolled, and approved must be protected from changes in moisture and other influences. Satisfactorily completed areas may be adversely affected by prolonged exposure to dry weather, precipitation, equipment traffic, or by excavations and uncontrolled backfilling for utilities, and other disturbances rendering such areas unsatisfactory. Such areas should be reworked prior to continuing with subsequent construction.

Limitations:

The exploration and analysis of the conditions reported herein are considered sufficient in detail and scope to form a reasonable basis for the foundation design. The recommendations submitted are based on the available soil information and preliminary design details furnished for the proposed project. Any revision of the plans for the proposed facility from those enumerated in this report should be brought to our attention so that we may determine if changes in the foundation recommendations are required. If deviations from the noted subsurface conditions are encountered during construction, GeoConsultants should be retained to determine if changes in foundation recommendations are required. If GeoConsultants is not retained to perform these functions, we will not be responsible for the performance of the structure.

The findings, recommendations, specifications, or professional advice contained herein have been made after being prepared in accordance with generally accepted professional engineering practice in the fields of foundation engineering, soil mechanics, and engineering geology. No other warranties are implied or expressed.

The scope of services did not include any environmental assessment for the presence or absence of wetlands or hazardous or toxic materials in the soil, surface water, groundwater, or air, on or below or around this site. Any statements in this report or on the boring logs regarding odors, colors, or unusual or suspicious items or conditions are strictly for the information of the client. Prior to purchase or development of this site, an environmental assessment is advisable.

The scope of services did not include a geologic investigation to address any faults, large scale subsidence, or other macro geologic features not specifically addressed in this report or the agreement between GeoConsultants and the client.

After the plans and specifications are more complete, it is recommended that the soils and foundation engineer be provided the opportunity to review the final design and specifications in order that the earthwork and foundation recommendations may be properly interpreted and implemented. At that time, it may be necessary to submit supplementary recommendations.

This report has been prepared for the exclusive use of our client for the specific application to the referenced project. GeoConsultants cannot be responsible for interpretations, opinions, or recommendations made by others based on the data contained in this report.

This report was prepared for design purposes only and may not be sufficient for purposes of preparing an accurate bid for construction. Contractors reviewing this report are advised that the discussions and recommendations contained herein were provided exclusively to and for use by the project owner.

END OF REPORT TEXT

SEE FOLLOWING APPENDIX w/BORING LOGS & TEST RESULTS

APPENDIX

FIELD AND LABORATORY PROCEDURES
PLAN OF BORINGS
LOG OF BORINGS

FIELD AND LABORATORY PROCEDURES
FOR
ALTERNATIVE ENERGY CENTER FOR
CENTRAL LOUISIANA ELECTRIC COMPANY
CROWLEY, LOUISIANA
REPORT NUMBER 03-11-053

I. FIELD OPERATIONS:

Subsurface conditions were defined by two (2) intermittent soil borings drilled on March 31, 2011 within the project area. Boring locations were selected and staked in the field by representatives of GeoConsultants, LLC of Louisiana. An illustration of the approximate boring locations with respect to the area investigated is provided on the attached Plan of Borings. Descriptive terms and symbols used on the logs are in accordance with the Unified Soil Classification System. Surface elevations at the boreholes were not provided at the time of our investigation.

A truck-mounted rotary drill rig designed specifically for our purposes was used to make the test borings. Each boring was advanced using flight auger drilling techniques. Intermittent undisturbed samples were obtained in the following manner.

Standard penetration tests were performed in accordance with ASTM D-1586 procedures. This test is conducted by recording the number of blows required for a 140-pound hammer falling 30 inches to drive a split-spoon sampler eighteen inches into the substrata. The number of blows required to drive the sampler for each 6-inch increment were recorded. The penetration resistance is the number of blows required to drive the split-spoon sampler the final 12-inches of penetration. Information related to the penetration resistance is presented under the "Field Data" heading of the Log of Boring as the Standard Penetration (Blows/Foot). Depths at which split-spoon samples were taken are indicated by two crossed lines in the "Samples" column on the Log of Boring. These samples were visually examined, logged, and packaged for transport to our laboratory.

Cohesive strata were sampled in accordance with ASTM D-1587 procedures by means of pushing a thin walled Shelby tube a distance of two feet into the substrata. Consistency of the sample was measured in the field by means of a calibrated hand penetrometer. Such values, in tons per square foot, are provided under the "Field Data" heading on the Log of Boring. Depths at which these undisturbed samples were obtained are indicated by a shaded portion in the "Samples" column of the Log of Boring. All samples were prudently extruded in the field were sealed to maintain "in-situ" conditions, labeled, and packaged for transport to our laboratory.

The presence of ground water was monitored during drilling operations. Initial water seepage readings are provided under "Stratum Description" at the bottom of the Log of Borings. After boring completion, water levels were allowed to rise and stabilize for several minutes prior to final water readings. These readings are found at the bottom of the Log of Boring under "Water Observations, Feet". Soil sloughing from the walls of the boring are also recorded here as depth of cave-in.

II. LABORATORY STUDIES:

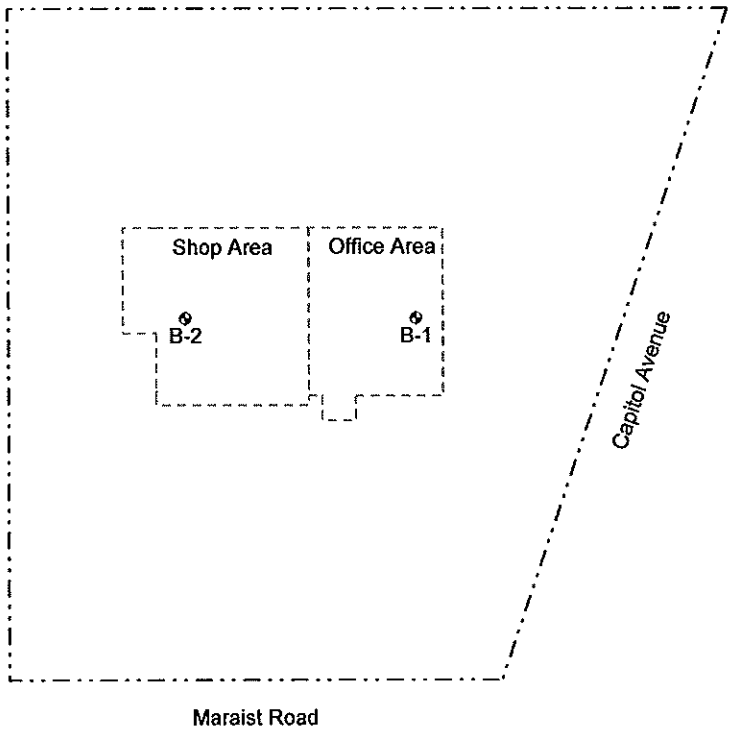
Upon return to the laboratory, all samples were visually examined and representative samples were selected for testing. Tests were performed on selected samples recovered from the test borings to verify classification and to determine pertinent engineering properties of the substrata. Individual test and ASTM designations are provided in the following table:

TABLE 1

Test	ASTM Designations
Atterberg Limits	D4318
Moisture Content	D2216
Partial Gradation	D1140
Unconfined Compression (Soil)	D2166
Hydrometer Analysis	D422

Results for soil classifications are tabulated on the Log of Boring in their respective columns under "Laboratory Data".

Samples obtained during our field studies and not consumed by laboratory testing procedures will be retained free of charge for a period of 30 days. Arrangements for storage beyond that period of time must be made in writing to ***GeoConsultants LLC of Louisiana.***



This is a generalized drawing intended to locate the borings relative to the general site plan

PLAN OF BORINGS

PROJECT

Alternative Energy Center For Central Louisiana Electric Company, Crowley, Louisiana

SCALE	DATE	FILENAME	
Not to Scale	4/7/2011	03-11-053	*GEOCONSULTANTS, LLC of Louisiana*

N

LOG OF BORING

PROJECT : Alternative Energy Center
LOCATION: Crowley, Louisiana
CLIENT : Petron, Inc.

BORING No. : B- 1
FILE No. : 03-11-053
DATE : 3/31/11

Split Spoon | Shelby Tube | No Recovery

DRILL METHOD: Rotary Drill

SURFACE ELEVATION: ND

Depth (Feet)	Samples	Hand Penetrometer (Tons/Sq. Ft.)	Standard Penetration (Blows/Foot)	Graphic Log	STRATUM DESCRIPTION	Moisture Content (%)	Unit Dry Weight (Lbs./Cu. Ft.)	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unconfined Compression (Lbs./Sq. Ft.)
			10		Stiff Brown & Gray LEAN TO FAT CLAY (CL/CH) 1.5'	28		54	22	32	97	
		2.25	Push		Stiff Tan & Gray FAT CLAY (CH)	30	96					3473
		3.75	Push		- very stiff @ 4.0 feet	24	99	75	27	48	99	5557
5		1.25	Push		- stiff, w/concretions @ 6.5 feet	34	86					2269
		1.50	Push			33	87	82	30	52	99	2084
10												
		1.50	Push		- firm, yellowish red, tan & gray @ 14.0 feet (SLS)	32	91					1574
15												
		1.25	Push		- w/limonite stains below 19.0 feet (SLS)	38	83	95	35	60	99	1806
20												
		1.75	Push		- stiff, yellowish red, tan & gray below 24.0 feet	35	87					2640
25												
		2.00	Push			35	88	73	28	45	99	2315
30					30.0'							
					Water Seepage Noted @ 18.0 Feet While Drilling							
35												

COMPLETION DEPTH, FEET:
30.0

WATER OBSERVATIONS, FEET:
14.0' @ 10 Minutes

NOTES:
See Plan of Borings for Location
ND = Not Determined
SLS = Slickensided Sample
Strata Boundaries May Not Be Exact

GEOTECHNICAL TESTING LABORATORY, INC.

LOG OF BORING

PROJECT : Alternative Energy Center
LOCATION: Crowley, Louisiana
CLIENT : Petron, Inc.

BORING No. : B- 2
FILE No. : 03-11-053
DATE : 3/31/11

Split Spoon | Shelby Tube | No Recovery

DRILL METHOD: Rotary Drill

SURFACE ELEVATION: ND

Depth (Feet)	Samples	Hand Penetrometer (Tons/Sq. Ft.)	Standard Penetration (Blows/Foot)	Graphic Log	STRATUM DESCRIPTION	Moisture Content (%)	Unit Dry Weight (Lbs./Cu. Ft.)	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unconfined Compression (Lbs./Sq. Ft.)
		2.00	Push		Stiff Tan & Gray FAT CLAY (CH)	21	99					3473
		2.50	Push			28	98	60	27	33	99	2732
5		4.00	Push		- very stiff @ 5.0 feet	22	96					5649
		1.75	Push		- stiff, w/concretions @ 7.0 feet	33	91	84	31	53	99	2732
		1.25	Push		- firm, w/silt (ML) seams @ 9.0 feet	35	89					1806
10												
		1.50	Push		- firm, yellowish red, tan & gray @ 14.0 feet (SLS)	31	92	71	30	41	99	1713
15												
		1.50	Push		- stiff, brownish red @ 19.0 feet	33	86					2593
20					22.0'							
					Firm Yellowish Red, Tan & Gray Silty LEAN CLAY (CL)							
		1.00	Push			28	95	39	20	19	97	1343
25												
					- w/silt (ML) layers @ 28.0 feet							
		1.50	Push			28	94					1713
30					30.0'							
					Water Seepage Noted @ 18.0 Feet While Drilling							
35												

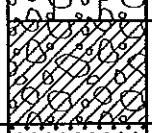
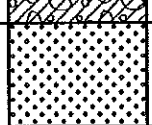
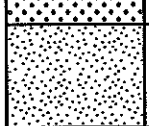
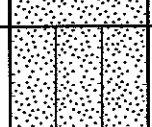
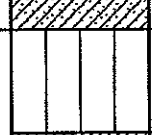
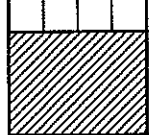
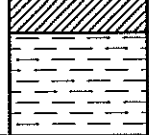
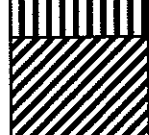
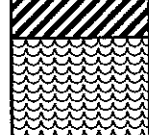
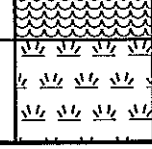
COMPLETION DEPTH, FEET:
30.0

WATER OBSERVATIONS, FEET:
13.0' @ 10 Minutes

NOTES:
See Plan of Borings for Location
ND = Not Determined
SLS = Slickensided Sample
Strata Boundaries May Not Be Exact

GEOTECHNICAL TESTING LABORATORY, INC.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS