



# Geotechnical Testing Laboratory, Inc.

Engineering and Construction Materials Testing Services

March 24, 2020

**Claiborne Parish Police Jury**  
P.O. Box 270  
Homer, Louisiana 71040

Attention: Mr. Dwayne Woodard

**RE: Geotechnical Investigation Services**  
**Claiborne Parish Library - Haynesville Branch**  
**1863 Main Street**  
**Haynesville, Claiborne Parish, Louisiana**  
**Report No. 03-20-040**

Dear Mr. Woodard:

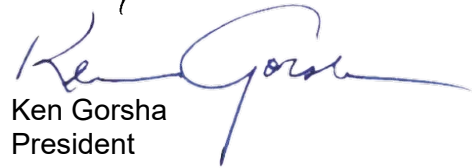
**Geotechnical Testing Laboratory, Inc.** is pleased to submit this report of subsurface exploration for the above referenced project. Included in the report are the results of the exploration and recommendations concerning the design and construction of the foundations as well as general site development.

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.

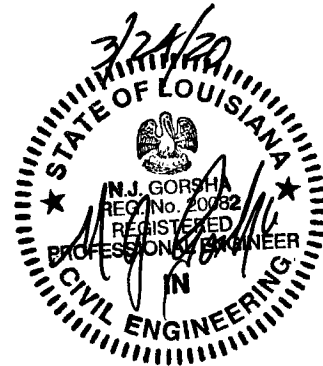
Respectfully submitted,  
**Geotechnical Testing Laboratory, Inc.**



N. J. Gorsha, P.E.  
Louisiana Registration No. 20082



Ken Gorsha  
President



Distribution: (3) Claiborne Parish Police Jury

NJG/krg

Geotechnical Investigation Services  
**Claiborne Parish Library - Haynesville Branch**  
1863 Main Street  
Haynesville, Claiborne Parish, Louisiana  
Report No. 03-20-040

Prepared For:

**Claiborne Parish Police Jury**  
P.O. Box 270  
Homer, Louisiana 71040

Prepared By:

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Geotechnical Investigation Services  
**Claiborne Parish Library - Haynesville Branch**  
1863 Main Street  
Haynesville, Claiborne Parish, Louisiana  
Report No. 03-20-040

**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 planned new public 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.
- Recommendations for rigid pavement sections for unspecified traffic.

The purpose of this report is to provide the structural engineer, 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. Dwayne R. Woodard, Secretary/Treasurer for the Claiborne Parish Police Jury (Client), by accepting our November 22, 2019 written proposal. Written authorization to proceed was provided on November 25, 2019. Field procedures were conducted on March 16, 2020. The site holds asbestos-containing soil. Consequently, the field procedures were delayed until an approved LDEQ plan was implemented for our field study. To accomplish the intended purposes, a three-phase study program was conducted which included:

- a field investigation consisting of four 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 the project will consist of a one-story, slab-on-grade, wood-frame library building containing approximately 4,500 square feet of area, with associated light and moderate-pavements. A common floor level is planned throughout. No below grade walls are anticipated.

For the purpose of this report, we have assumed that maximum column loads will not exceed approximately 20 kips (1 kip = 1,000 pounds), and that maximum continuous wall loads will be approximately one (1) to two (2) kips per linear foot. Information provided to this office indicates that the building pad area will receive a fill of approximately 12 inches to reach the design

grades. 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 Conditions:**

The project site is at physical address 1863 Main Street in Haynesville, Claiborne Parish, Louisiana. The site was noted to be relatively level with estimated maximum elevation differences of no more than one (1) foot, and was void of vegetation at the time of drilling. As previously mentioned, the site holds asbestos containing soil, consequently some areas were covered with reinforced poly to avoid exposure to our crew. The drilling rig experienced moderate difficulty moving about the site.

### **Subsurface Stratigraphy:**

The subsurface conditions at the proposed building site were explored by drilling a total of two (2) borings to a depth of approximately 20 feet. Additionally, the parking and drive areas were explored by drilling two (2) borings to a depth of approximately five (5) feet. The borings were located in the field by the drilling crew 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: fat clay (CH)s, (CH), slightly clayey silty sand (SC-SM) and lean to fat clay (CL-CH)s.

### **Groundwater Conditions:**

Seepage was observed at depths of seven (7) and eight (8) feet during advancement of the test borings. Groundwater was measured at a depth of eight (8) feet below existing ground surface upon completion of the borings. These levels are not expected to impact shallow excavations during construction, but the subsurface water regime is always subject to change with variations in climatic conditions and will likely coincide seasonal fluctuations. 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 due to short-term observations by our field crew.

Perched water may be briefly encountered in low quantities during earthwork and is typically due to storage of recent rainfall or by a barrier to capillary evaporation. Where perched water is encountered the contractor should expect to excavate gravity drainage ditches to divert it away from the construction area. The depth of the ditches should be at least two (2) to three (3) feet deeper than the lowest exterior footing elevation. Additionally, soft, wet and pumpable soils can be expected below perched water tables. In structural areas, these should be removed to firm ground and replaced with select fill soils compacted to project specifications as defined later in this report.

**Foundation Recommendations:**

Recent area rains are probably responsible for the presence the soft, saturated surface soils. If these wet conditions exist during construction, this can cause extreme difficulty in the preparation of the building pad areas. *We recommend that the construction take place during warmer and drier time of year.* It is recommended that the plans and bid documents include a cost item and procedure for removal of wet soils, should they exist at that time, and replacement with properly moisture conditioned select fill. Over-excavation required during wet episodes could extend to depths ranging from one (1) to two (2) feet.

If instability persists within the exposed subgrades, the recommendations presented in our Wet Weather and Soft Ground Considerations section of this report should be reviewed.

Detailed information on structural systems and planned grading was not available to us at the time this report was prepared. Based on the size and type of structure, as well as the findings from this investigation, a system of shallow footings with an on-grade floor slab, in conjunction with the recommended subgrade preparation is believed to be the most practical and economical means of support.

Potential Vertical Rise (PVR) values were estimated to vary between approximately 1.25 and 1.5 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 moderately expansive. In order to limit the PVR to a value of one (1) inch or less, this will require the removal of a minimum of two (2) feet of active fat clay beneath all areas of the floor slab and replacing it with density-approved select fill.

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 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, GTL recommends that a uniform layer of density-approved select fill be provided beneath the floor slab. After stripping the site and prior to placing fill to raise the elevation, the upper two (2) feet of fat clay subgrade should be removed and replaced with density-approved select fill. The slab cushion material should not be considered as a portion of the select fill thickness. The select fill building pad should extend at least five (5) feet beyond the edge of the building.

After stripping and undercutting, as required by the grading plan and the over-excavation as required herein, 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 GTL 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 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.

If instability persists within the exposed subgrade at the bottom of the building pad excavation, the area may require over-excavation of the wet material to provide a single over-sized bridge lift of drier material. Over-excavation for a bridge lift could extend to depths ranging from 1.5 to two (2) feet. The fill for this layer should consist of silty or sandy clay with a plasticity index between 25 and 35 and a moisture content no more than four (4) percent below optimum moisture content. To prevent moisture from migrating into the bridge lift from below, compaction levels for the bridge lift should be between 90 and 95 percent of Standard Proctor density.

#### **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. In addition to the above requirements, the material should have a minimum of 30 percent retained on the No. 200 sieve. 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 percent 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 (4) per lift for each tested area for the building.

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.

#### **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 2,000 psf and 1,500 psf, respectively, based on dead load plus design live load. Minimum foundation widths for column and strip footings should be 24 inches and 14 inches, respectively, even if the bearing pressures are less than the recommended values.

The factor of safety for the above bearing values is 3.0. 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 GTL 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.

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.

#### **Seismicity:**

Based on Section 1613 of the IBC-2012, a Site Class of D has been estimated for this site due to the lack of subsurface information to a depth of 100 feet. According to the USGS website for Seismic Hazard Design Parameters, the project site has a mapped 0.2 second spectral response acceleration ( $S_s$ ) of 0.156 g. The project also has a mapped 1.0 second spectral response acceleration ( $S_1$ ) of 0.084. The design spectral response accelerations,  $S_{DS}$  and  $S_{DI}$ , were determined to be 0.167 g and 0.134 g, respectively. Based on Tables 1613.3.5(1) and 1613.3.5(2), the site has an assigned Seismic Design Category of B for structures classified as Risk Categories I, II, and III. For structures classified as Risk Category IV, site has an assigned Seismic Design Category of C.

The presence of medium dense sands below the water table results in a moderate potential for liquefaction to occur.

#### **Pavement Recommendations:**

Information provided to this office indicates that the pavements will all be rigid Portland cement concrete. Our scope of services did not include extensive sampling and CBR testing of existing



subgrade or potential sources of imported base material for the specific purpose of a detailed pavement analysis. Instead, we have assumed pavement related design parameters that are considered to be typical for the area soil types. It has been assumed that the constructed pavement subgrade will consist of well compacted soils. Based on experience, it is anticipated that the compacted native subgrade will yield a California Bearing Ratio (CBR) of at least 5.

The satisfactory performance of pavements for parking and drive areas depends upon several factors including the characteristics of the supporting soil, the magnitude and frequency of wheel load applications, quality of construction materials, the contractor's placement and workmanship abilities, good drainage, and the desired period of design life.

The general pavement design information presented in this report is based on subsurface conditions inferred by the test borings, information published by the Portland Cement Association and past experience in the locale. The published information was utilized in conjunction with the available field and laboratory test data to develop general pavement designs based on the AASHTO structural numbering system.

#### **Traffic and Design Data:**

The commercial pavement sections presented herein are based upon minimum material thicknesses as recommended by the Portland Cement Association (PCA). For the purposes of this report, we have assumed average daily traffic should consist of 50 to 100 repetitions of lightly loaded automobile and pick-up trucks in the parking lots, and occasional delivery vans in the entrance and delivery areas. If traffic in excess of the aforementioned vehicles is anticipated (i.e. heavy trucks, medium duty loaded trucks, high automobile traffic, etc.), GTL should be contacted for additional recommendations.

**The information for the design of the pavement system(s) is presented below. All referenced sections are in accordance with the State of Louisiana, Department of Transportation and Development, Standard Specifications for Roads and Bridges, 2016 Edition.**

#### **Subgrade:**

It is paramount to the satisfactory performance of pavements that the subgrade be stable under loads and compacted prior to deployment of concrete. All pavement subgrade should be proof rolled prior to beginning placement of pavement section materials.

A bulk sample of the anticipated subgrade was subjected to standard laboratory tests to determine its usability beneath Portland cement concrete pavements. The results of those tests indicate that the material is not suitable beneath rigid pavements. A copy of the laboratory test results are included in the Appendix of this report.

#### **Usable Soils for Rigid Pavements:**

The site should be cut to an elevation which requires the placement of at least eight (8) inches of the aforementioned select fill or Usable Soils as determined by Section 203. By definition, Usable soils beneath rigid pavements should have a maximum PI of 25 and a maximum organic content of five (5) percent. Soils with a silt content of 50 percent or greater and also a PI of 10 or less will not be allowed.

An approved laboratory should test and classify the soil in accordance with DOTD TR423 from samples taken in the original locations or from designated sources. Soils which do not meet Liquid Limit or PI requirements should not be blended to reduce the Liquid Limit or PI. Instead, they may be treated with lime to reduce the PI in accordance with Subsection 203.06(e).

**Optional Subbase:**

Consideration could be given to using a base below the concrete to provide a consistently firm surface upon which to place the concrete and reduce instability. The table below presents the options to reduce the likelihood of a pumping subgrade below the pavements.

<b>REDUCED PUMPING SUBBASES</b>			
<b>Recommended Thickness</b>	<b>Type Material</b>	<b>LA SSFRB Designation</b>	<b>Maximum P.I.</b>
4.0"	Crushed Stone	Item 1003.03(b)	6
4.0"	Clean Sand	Item 1003.02(a)	N/P
6.0"	Sand-Clay-Gravel	Item 1003.04(b)	15

Granular base material should be compacted to 95 percent of the maximum density defined by the Modified Proctor DOTD TR 418 Method G (ASTM D-1557). Clean sand and sand-clay-gravel mixtures should be compacted to 95 percent of Standard Proctor density DOTD TR 418 Method A (ASTM D-698).

**Portland Cement Concrete for Rigid Pavements:**

Portland cement concrete for all entrances and drives should be a Type B or D Pavement in accordance with the general guidelines set forth in Table 901-3 of Section 901.11. The mixture should achieve a minimum compressive strength of 4,000 psi at 28 days, and be designed with an air content between two (2) and seven (7) percent. The design of steel reinforcement should be in accordance with local or accepted codes.

If desired, the design team may substitute a Class A mix in accordance with the 2006 DOTD SSFRB specifications. The mixture should be meet the previously mention air-entrainment requirements, and generate a minimum compressive strength of 3,500 psi in 28 days.

Proper finishing of concrete pavement requires appropriate construction joints to reduce the potential for cracking. Construction joints (weakened planes) should be designed in accordance with current Portland Cement Association guidelines. It is recommended that such weakened plane joints be spaced no more than 15' c-c, or as specified by the structural engineer. The depth of such joints should be 1/3 of the pavement thickness. The joints should be cut as soon as the concrete will support the machinery. Joints should be sealed to reduce the potential for water infiltration into pavement joints and subsequent infiltration into the supporting soils.

**Recommended Pavement Sections:**

The table below presents a summary of both rigid and flexible pavement sections for light and moderate-duty applications. It should be noted that the pavement sections as presented below are minimums. If it is desired to reduce potential cracking, greater thickness of select fill and/or greater pavement section thickness could be utilized. In addition, long term pavement performance requires good drainage and performance of periodic maintenance activities. Refer to the text for qualification of the designs and further discussion and limitations.

<b>MINIMUM PAVEMENT RECOMMENDATIONS *</b>		
<b>Pavement Type</b>	<b>Light Duty (Parking Stalls)</b>	<b>Heavy Duty (Entries &amp; Drives)</b>
Portland Cement Concrete	5.0" Portland Cement Concrete	6.0" Portland Cement Concrete
	8.0" Density Approved Usable Soil	8.0" Density Approved Usable Soil
*Materials should meet general requirements of the Louisiana DOTD Standard Specifications for Construction of Roads & Bridges, and specific requirements listed herein.		

Concrete thickness at trash receptacles should be a minimum of seven (7) inches. All paving recommendations are based on stable subgrade. Subgrade areas which are unstable should be over-excavated and replaced, or otherwise rendered stable prior to proceeding with base material placement.

### **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 GTL 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.

**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.

**Wet Weather and Soft Ground 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 cognizant 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, fine-grained soil that 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 may be necessary; these can be created for earthwork by mixing soil and hydrated lime, cement, or combinations of these additives. Quicklime may also be used in areas where dusting is of concern, if proper worker safety considerations are observed. *"Pumping" (unstable) subgrades are possible at this site and it is recommended that bid documents incorporate this possibility into the bid schedule.*

It is advisable to obtain unit prices in the bid schedule for remedial subgrade preparation options, should these become necessary. The following lists several subgrade preparation options; the best option will depend upon the specific soil and groundwater conditions encountered. All items should be bid "in-place, complete", on a pre-approved, as-needed basis only. Only the necessary quantity should be approved, usually as recommended (and later confirmed) by the geotechnical engineer's representative. Over-excavation presumes that the contractor must dispose of unsuitable (unusable) materials off-site. The contract documents should carefully and specifically state that such options will be allowed only when the work

cannot be successfully prosecuted using ordinary or normal construction skill, efforts and equipment. (descriptive wording only; not necessarily to be used for contract language).

Over-excavation and replacement with Select Fill (Cubic Yard)

Over-excavation and replacement with clay bridging layer (drier than optimum,  $18 < P.I. < 35$  (or as otherwise approved), attainable compaction as specified by geotechnical engineer's representative (Cubic Yard)

Provide and deploy geogrid (Tensar TriAx or approved equal), cover with minimum 6-inch thick (compacted with plate compactor) layer of minimum one (1) inch durable, crushed gravel (LDOTD Item 1003.03.b Base or approved alternate). (Square Yard)

Provide and deploy light-duty non-woven drainage geotextile (Square Yard)

Provide and install subsurface ("French") drain; drain media of washed, durable one (1) inch crushed stone, 36 inch wide by 18 to 48 inch high, with minimum four (4) inch diameter perforated PVC or HDPE pipe (contractor to submit pipe manufacturer's assurance of "non-crushing" under depth of planned cover), non-woven geotextile layer across top of gravel (Cubic Yard)

Lime-stabilize upper 12 inches (compacted thickness) with minimum 40 lbs hydrated lime per square yard (Square Yard)

Construction de-watering well, including periodic pumping as required (Each, or per vertical foot from surface to bottom)

The above are suggested options; the site civil engineer should adopt these or similar, standardized bid items as deemed appropriate.

### **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.

**Geotechnical Risk:**

The concept of risk is an important aspect of the geotechnical evaluation. The primary reason for this is that the analytical methods used to develop geotechnical recommendations do not comprise an exact science. The analytical tools which geotechnical engineers use are generally empirical and must be used in conjunction with engineering judgment and experience. Therefore, the solutions and recommendations presented in the geotechnical evaluation should not be considered risk-free and, more importantly, are not a guarantee that the interaction between the soils and the proposed structure will perform as planned. The engineering recommendations presented in the preceding sections constitutes GTL's professional estimate of those measures that are necessary for the proposed structure to perform according to the proposed design based on the information generated and referenced during this evaluation, and GTL's experience in working with these conditions.

**Limitations:**

The exploration and analysis of the conditions reported herein are considered sufficient in detail and scope to form a reasonable basis for the pavement and 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, GTL should be retained to determine if changes in foundation recommendations are required. If GTL 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 GTL 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. GTL 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**

## **APPENDIX A**

### FIELD AND LABORATORY PROCEDURES

Field and Laboratory Procedures  
**Claiborne Parish Library - Haynesville Branch**  
1863 Main Street  
Haynesville, Claiborne Parish, Louisiana  
Report Number 03-20-040

**I. Field Operations:**

Subsurface conditions were evaluated by advancing four (4) intermittent sample borings on March 16, 2020 within the project area. Boring locations were selected and staked in the field by representatives of the Client. An illustration of the approximate boring locations with respect to the area investigated is provided on the Plan of Borings in this report. Descriptive terms and symbols used on the logs are in accordance with the Unified Soil Classification System (USCS).

A truck-mounted rotary drill rig was used to make the test borings. Each boring was advanced in the dry 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. Depths at which split-spoon samples were taken are indicated by two crossed lines in the "Samples" column on the Log of Boring. 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). These samples were visually examined, logged, and packaged for transport to our laboratory.

The presence of ground water was monitored during drilling operations. Initial water seepage readings are provided under "Groundwater Information" in the right hand column of the Log of Boring. Upon boring completion, water levels were allowed to rise and stabilize for several minutes prior to final water readings. These readings are found under "Groundwater Information". 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 below:

Test	ASTM Designations
Atterberg Limits	ASTM D4318
Moisture Content	ASTM D2216
Percent Minus #200	ASTM D1140
Hydrometer Analysis	ASTM D422

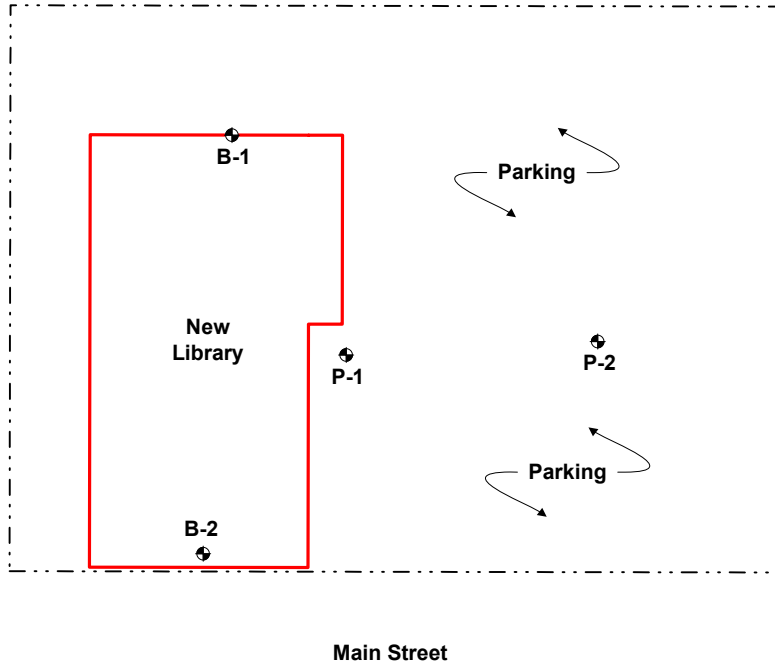


Results for soil classifications are located on the Log of Boring in their respective columns under "Laboratory Data."

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 ***Geotechnical Testing Laboratory, Inc.***

## **APPENDIX B**

### PLAN OF BORINGS



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

## PLAN OF BORINGS

PROJECT

Claiborne Parish Library - Haynesville Branch, 1863 Main Street, Haynesville, Louisiana

SCALE

Not to Scale

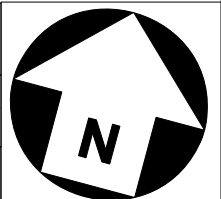
DATE

3/23/2020

FILENAME

03-20-040

***Claiborne Parish Police Jury***



## **APPENDIX C**

### **BORING LOGS AND SOIL CLASSIFICATION CHART**

## LOG OF BORING B-1

SHEET 1 of 1



Geotechnical Testing Laboratory, Inc.  
226 Parkwood Drive  
Alexandria, LA 71301  
Telephone: (318) 443-7429

CLIENT: Claiborne Parish Police Jury  
PROJECT: Clayborne Parish Library - Haynesville Branch  
LOCATION: Haynesville, Claiborne Parish, Louisiana  
FILE NO.: 03-20-040

DRILL DATE: 3/16/20

DRILLING METHOD(S):  
Diedrich D-50, 4.5" I.D. Hollow Stem Auger

DRILLER: R. Leggett CHECKED BY: K. Gorsha

GROUNDWATER INFORMATION:  
Water Seepage Noted @ 8.0 Feet While Drilling  
Water Level @ 8.0 Feet Upon Completion  
Boring Walls Collapsed @ 8.5 Feet

SURFACE ELEVATION: Not Determined

## DESCRIPTION OF STRATUM

Stiff Red & Gray FAT CLAY (CH)s w/sand

- stiff @ 2.5 feet

3.5'

Very Stiff Gray FAT CLAY (CH) w/sandy silt (ML)s laminations

- hard @ 5.5 feet

6.5'

Dense Gray, Slightly Clayey, Silty SAND (SC-SM) to Sandy SILT (CL-ML)

- medium dense @ 5.5 feet

12.0'

Hard Gray Sandy LEAN to FAT CLAY (CL-CH)s

20.0'

Boring Terminated @ 20.0 Feet

N - STANDARD PENETRATION TEST RESISTANCE  
P - POCKET PENETROMETER RESISTANCE

NOTES:  
See Plan of Borings for Location  
Stratification and Groundwater Depths Are Not Exact

GTL LOG - LOG A GNNL01.GDT - 3/21/20 07:50 - K:\GINT PROJECTS\2020\JOBS\03-20-040.GPJ

## LOG OF BORING B-2

SHEET 1 of 1



Geotechnical Testing Laboratory, Inc.  
226 Parkwood Drive  
Alexandria, LA 71301  
Telephone: (318) 443-7429

CLIENT: Claiborne Parish Police Jury  
PROJECT: Clayborne Parish Library - Haynesville Branch  
LOCATION: Haynesville, Claiborne Parish, Louisiana  
FILE NO.: 03-20-040

DRILL DATE: 3/16/20

DRILLING METHOD(S):  
Diedrich D-50, 4.5" I.D. Hollow Stem Auger

DRILLER: R. Leggett CHECKED BY: K. Gorsha

GROUNDWATER INFORMATION:  
Water Seepage Noted @ 7.0 Feet While Drilling  
Water Level @ 8.0 Feet Upon Completion  
Boring Walls Collapsed @ 9.5 Feet

SURFACE ELEVATION: Not Determined

## DESCRIPTION OF STRATUM

Firm Red & Gray FAT CLAY (CH)s w/sand

- stiff @ 2.5 feet

3.5'

Medium Dense Gray, Slightly Clayey, Silty SAND (SC-SM) to Sandy SILT (CL-ML)

- dense @ 5.5 feet

- medium dense @ 7.0 feet

8.0'

Very Stiff Gray FAT CLAY (CH) w/sandy silt (ML)s laminations

13.0'

Hard Gray Sandy LEAN to FAT CLAY (CL-CH)s

20.0'

Boring Terminated @ 20.0 Feet

N - STANDARD PENETRATION TEST RESISTANCE  
P - POCKET PENETROMETER RESISTANCE

NOTES:  
See Plan of Borings for Location  
Stratification and Groundwater Depths Are Not Exact

GTL LOG - LOG A GNLI01.GDT - 3/21/20 07:50 - K:\GINT PROJECTS\2020 JOBS\03-20-040.GPJ

SHEET 1 of 1

SHEET 1 of 1



**Geotechnical Testing Laboratory, Inc.**  
**226 Parkwood Drive**  
**Alexandria, LA 71301**  
**Telephone: (318) 443-7429**

CLIENT: **Claiborne Parish Police Jury**  
PROJECT: **Clayborne Parish Library - Haynesville Branch**  
LOCATION: **Haynesville, Claiborne Parish, Louisiana**  
FILE NO.: **03-20-040**

DRILL DATE: 3/16/20

DRILLING METHOD(S):  
**Diedrich D-50, 4.5" I.D. Hollow Stem Auger**

DRILLER: **R. Leggett** CHECKED BY: **K. Gorsha**

**GROUNDWATER INFORMATION:**  
**No Water Seepage Noted While Drilling**  
**No Water Observed Upon Completion**  
**Boring Walls Remained Open**

**SURFACE ELEVATION: Not Determined**

## DESCRIPTION OF STRATUM

Firm Red &amp; Gray FAT CLAY (CH)s w/sand

- stiff @ 2.5 feet

3.5'

Very Stiff Gray FAT CLAY (CH) w/silty SAND (SM) laminations

5.0'

Boring Terminated @ 5.0 Feet

NOTES:  
See Plan of Borings for Location  
Stratification and Groundwater Depths Are Not Exact

N - STANDARD PENETRATION TEST RESISTANCE  
P - POCKET PENETROMETER RESISTANCE

GTL LOG - LOG A GNNL01.GDT - 3/21/20 07:50 - K:\GINT PROJECTS\2020 JOBS\03-20-040.GPJ

## LOG OF BORING P-2






SHEET 1 of 1



Geotechnical Testing Laboratory, Inc.  
226 Parkwood Drive  
Alexandria, LA 71301  
Telephone: (318) 443-7429




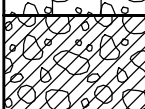

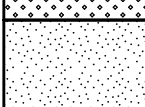
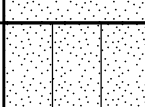
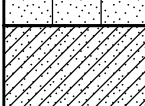
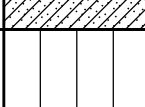
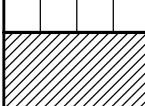
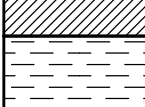
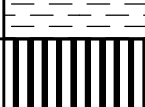

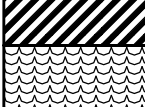
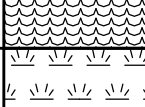
CLIENT: Claiborne Parish Police Jury  
PROJECT: Clayborne Parish Library - Haynesville Branch  
LOCATION: Haynesville, Claiborne Parish, Louisiana  
FILE NO.: 03-20-040

DRILL DATE: 3/16/20

	FIELD DATA			LABORATORY DATA							DRILLING METHOD(S): Diedrich D-50, 4.5" I.D. Hollow Stem Auger
SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT	MOISTURE CONTENT (%)	ATTERBERG LIMITS			MINUS NO. 200 SIEVE (%)	DRY DENSITY (Lbs./Cu.Ft.)	COMPRESSIVE STRENGTH (Lb./Sq. Ft.)	DRILLER: R. Leggett                      CHECKED BY: K. Gorsha
					LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX				GROUNDWATER INFORMATION: No Water Seepage Noted While Drilling No Water Observed Upon Completion Boring Walls Remained Open
											SURFACE ELEVATION: Not Determined
											DESCRIPTION OF STRATUM
	1		N = 14	29	56	23	33	80			Stiff Red & Gray FAT CLAY (CH)s w/sand
	2		N = 19	28							- very stiff @ 2.5 feet
	3										
	4		N = 33	28	54	23	31	56			Hard Gray FAT CLAY (CH) w/silty SAND (SM) laminations
	5										
											Boring Terminated @ 5.0 Feet
N - STANDARD PENETRATION TEST RESISTANCE P - POCKET PENETROMETER RESISTANCE											NOTES: See Plan of Borings for Location Stratification and Groundwater Depths Are Not Exact



# 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

## **APPENDIX D**

### LABORATORY ANALYSIS OF USABLE SOILS

## Laboratory Analysis of Usable Soils

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Report Date: 3/20/2020

Sample Date: 3/16/2020

Project No.: 03-20-040

Prepared **Claiborne Parish Police Jury**

For: P.O. Box 270  
Homer, Louisiana 71040  
Attention: Mr. Dwayne Woodard

**Project:** Claiborne Parish Library - Haynesville Branch, 1863 Main Street, Haynesville, Louisiana

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**Test Methods:** DOTD TR407, TR413, TR423, TR428

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### Laboratory Results:

Test	Pavement Subgrade @ Boring P-1	Usable Specifications for Portland Cement Concrete Paving	
Silt, %	17	< 50%	> 50%
Sand, %	34		
Clay, %	49		
Liquid Limit (LL)	52		
Plasticity Index (PI)	29	0 to 25	11 to 25
Organic Content, %	2.4	5% Max.	5% Max
Soil Group	A-7-6		
Soil Classification	Fat Clay		
Results	<b>Unusable</b>		

**GEOTECHNICAL TESTING LABORATORY, INC.**