



March 31, 2021

New Millennium Construction, LLC
3173 Terrace Avenue East
Slidell, Louisiana 70458
Phone: (985) 649-7381

Attn: Mr. Jimmy Crippin

Re: Geotechnical Investigation
Proposed Private Residence
34159 Lowry Lane
Slidell, Louisiana
SE Project No. G21-019

Dear Jimmy:

Stratum Engineering, LLC (SE) is pleased to submit our Geotechnical Engineering Report for the above referenced project. This report includes the results of the field exploration and laboratory testing, and recommendations for foundation design as well as general site development.

We appreciate the opportunity to perform this geotechnical study and look forward to continued participation during the design and construction phases of this project. If you have any questions pertaining to this report, or if we may be of further service, please contact our office.

Respectfully submitted,
STRATUM ENGINEERING, LLC

William "Dean" McInnis, P.E.
Project Manager

WDM/TYM:mpl

Tony Y. Maroun, P.E.
Principal

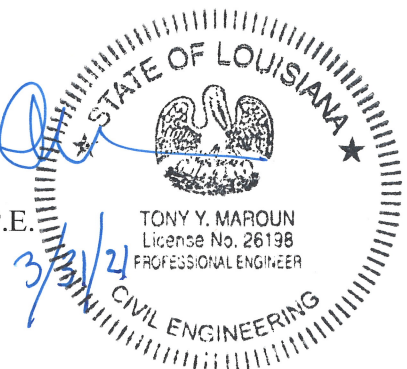


TABLE OF CONTENTS

| | |
|---|---|
| EXECUTIVE SUMMARY | 1 |
| PROJECT INFORMATION..... | 2 |
| Project Authorization | 2 |
| Project Description..... | 2 |
| Purpose and Scope of Services | 2 |
| SITE AND SUBSURFACE CONDITIONS | 3 |
| Site Location and Description..... | 3 |
| Drilling, Sampling, and Laboratory Testing Procedures | 3 |
| Subsurface Conditions | 4 |
| Groundwater Conditions..... | 5 |
| IBC Site Classification..... | 5 |
| EVALUATION AND RECOMMENDATIONS | 5 |
| General..... | 5 |
| Site Preparation..... | 5 |
| Shallow Footings | 6 |
| Settlement | 8 |
| Floor Slab..... | 8 |
| CONSTRUCTION CONSIDERATIONS | 8 |
| Moisture Sensitive Soils/Weather Related Concerns | 8 |
| Drainage and Groundwater Concerns..... | 8 |
| Excavations | 9 |
| REPORT LIMITATIONS | 9 |
| APPENDIX | |
| Boring Location Plan | |
| Boring Logs | |
| Key to Terms and Symbols Used on Logs | |

EXECUTIVE SUMMARY

An exploration and evaluation of the subsurface conditions has been completed for the proposed Private Residence to be constructed at 34159 Lowry Lane in Slidell, Louisiana.

The site encompasses approximately 7 acres of land located off Lowry Lane near Bayou Liberty in Slidell. The property is undeveloped with the exception of an access road extending into the site. The area is currently covered with short surface vegetation with some sparse trees. Detailed grading information was unavailable at the time the report was prepared. However, based on conversations with K.B. Kaufmann, we understand that about two (2) to 3 feet of fill will be needed to achieve the ground floor design grade.

The project includes the construction of a two-story elevated residence having a footprint of approximately 3,697 square feet with a ground floor slab to be used for parking. The building will be elevated above the existing grade using 16-inch square cast-in-place or concrete masonry unit (CMU) piers. Detailed structural loading information was not available at the time of the report; however, it was assumed that maximum column loads will be on the order of 25 kips.

A total of two (2) borings were drilled to depths of 20 and 40 feet below the existing ground surface. Based on the borings, the surface is generally covered with about 12 inches of sandy topsoil with organics. The topsoil was underlain by stiff to very stiff sandy silty clay or sandy lean clay to a depth of about 6 feet. The sandy clay was underlain by loose to medium dense clayey sand to a depth of about 12 feet followed by medium dense silty sand or stiff to very stiff sandy fat clay to a depth of 17 feet. The shallow boring was terminated in very stiff sandy lean clay at a depth of 20 feet while the deeper boring encountered alternating layers of firm to very stiff fat and sandy clays to a depth of approximately 40 feet, the maximum depth explored. Groundwater was measured in the borings at a depth of about 5 feet upon completion of the drilling operations.

Based on the borings, the subsurface soils at the site are fair in bearing quality and suitable for support of the proposed residence on a shallow foundation system with a ground floor slab on grade. Spread and continuous footings may be supported on the naturally occurring clay or on compacted structural fill bearing at least two (2) feet below the finished grade. The ground floor slab should bear on a minimum of 24 inches of low plasticity compacted structural fill.

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

PROJECT INFORMATION

Project Authorization

Stratum Engineering, LLC (SE) has completed a geotechnical exploration for the proposed Private Residence to be constructed at 34159 Lowry Lane in Slidell, Louisiana. The exploration was accomplished in general accordance with SE Proposal No. G21-032, dated February 22, 2021.

Project Description

The project includes the construction of a two-story elevated residence having a footprint of approximately 3,697 square feet. The building will be elevated above the existing grade using 16-inch square cast-in-place or concrete masonry unit (CMU) piers. The ground floor slab of the residence will be an enclosed area used for parking. The main living area will include two floors as well as a screened porch connecting to the kitchen and dining area. The structure will have a wood frame with elevated wood floor. Detailed structural loading information was not available at the time of the report; however, it was assumed that maximum column loads will be on the order of 25 kips.

The geotechnical recommendations presented in this report are based on the available project information, building location, and subsurface materials described in this report. If any of the noted information is incorrect, please inform SE in writing so that we may amend the recommendations presented in this report if appropriate and if desired by the client. SE will not be responsible for the implementation of its recommendations when it is not notified of changes in the project.

Purpose and Scope of Services

The purpose of this study was to explore the subsurface conditions at the site to enable an evaluation of cost effective foundation system for the proposed residence. A total of two (2) borings were drilled to depths of 20 to 40 feet below the existing ground surface. The borings were located in the field by a Stratum Engineering representative using normal taping from existing landmarks as indicated on the attached boring location plan.

Our scope of services included a reconnaissance to the project site, drilling the soil borings, select laboratory testing, and preparation of this geotechnical report. The report briefly outlines the testing procedures, presents available project information, describes the site and subsurface conditions, and provides recommendations regarding the following:

- Foundation type, allowable bearing capacities, and an estimate of settlement;
- Seismic site classification;
- Site preparation, including subgrade preparation and fill compaction requirements;
- Factors influencing construction and performance of the proposed facility.

The scope of geotechnical services did not include an environmental assessment for determining 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, and unusual or suspicious items or conditions are strictly for informational purposes. Prior to development of this site, an environmental site assessment is advisable.

SITE AND SUBSURFACE CONDITIONS

Site Location and Description

The site encompasses approximately 7 acres of land located off Lowry Lane near Bayou Liberty in Slidell. An access road with a small structure is situated on the west side of the property. The remaining undeveloped portion of the site is covered with short surface vegetation along with some sparse trees. The site is bound by Bayou Liberty to the east and south. Detailed grading information was unavailable at the time the report was prepared. However, based on conversations with K.B. Kaufmann, we understand that about two (2) to 3 feet of fill will be needed to achieve the ground floor design grade.

Drilling, Sampling, and Laboratory Testing Procedures

The borings were drilled an All-Terrain Vehicle (ATV) mounted drill rig. Auger and wet rotary drilling techniques were used to advance the borings. Samples were generally obtained continuously from the ground surface to a depth of ten feet and at maximum five foot intervals thereafter. Drilling and sampling techniques were accomplished in general accordance with ASTM Standards.

Undisturbed samples of cohesive soils were generally obtained using thin-wall tube sampling procedures in general accordance with the procedures for “Thin-Walled Tube Geotechnical Sampling of Soils” (ASTM D1587). These samples were extruded in the field with a hydraulic ram and were wrapped in aluminum foil prior to placement in a plastic wrapping to preserve moisture. The samples were transported to the laboratory in containers to prevent disturbance.

For cohesionless soils and semi-cohesive soils, Standard Penetration Tests (SPT) were performed to obtain standard penetration values of the soil. The standard penetration value (N) is defined as the number of blows of a 140 pound hammer, falling 30 inches, required to advance the split-barrel sampler one (1) foot into the soil. Samples of granular soils were obtained utilizing a two (2) inch O.D. split-barrel sampler in general accordance with procedures for “Penetration Test and Split-Barrel Sampling of Soils” (ASTM D1586). To perform the test and obtain a sample, the sampler is lowered to the bottom of the previously cleaned drill hole and advanced by blows from the hammer. The number of blows is recorded for each of three (3) successive increments of six (6) inches penetration. The “N” value is obtained by adding the second and third incremental numbers. The results of the standard penetration test indicate the relative density of cohesionless soils and thereby provide a basis for estimating the relative strength and compressibility of the soil profile components. The split spoon samples were identified according to the project number, boring number and depth, and were also placed in polyethylene plastic wrapping to protect against moisture loss.

The laboratory testing program included supplementary visual classification and water content tests on all of the soil samples. In addition, selected samples were subjected to percent passing the #200 sieve and Atterberg Limits determination. Additional estimates of unconfined compressive strength were made using a hand penetrometer. The laboratory testing was performed in general accordance with ASTM Standard Procedures.

Subsurface Conditions

Based on the borings, the surface is generally covered with about 12 inches of sandy topsoil with organics. The topsoil was underlain by stiff to very stiff sandy silty clay or sandy lean clay to a depth of about 6 feet. The sandy clay was underlain by loose to medium dense clayey sand to a depth of about 12 feet followed by medium dense silty sand or stiff to very stiff sandy fat clay to a depth of 17 feet. The shallow boring was terminated in very stiff sandy lean clay at a depth of 20 feet while the deeper boring encountered alternating layers of firm to very stiff fat and sandy clays to a depth of approximately 40 feet, the maximum depth explored.

The above subsurface description is of a generalized nature to highlight the major subsurface stratification features and material characteristics. The boring logs included in the Appendix should be reviewed for specific information at the boring locations. These records include soil descriptions, stratification, penetration resistances, and locations of the samples and laboratory test data. The stratification shown on the boring logs represent the conditions only at the actual boring locations. Variations may occur and should be expected between boring locations. The stratification represents the approximate boundary between subsurface materials and the actual transition may be gradual. Water level information obtained during field operations is also shown on the logs. The samples, which were not altered by laboratory testing, will be retained for 60 days from the date of this report and then will be discarded.

Groundwater Conditions

Groundwater was initially noted in the borings at a depth of about 8 to 9 feet below the existing ground surface during drilling and was later measured at an approximate depth of 5 feet upon completion of the drilling operations. However, it should be noted that groundwater levels will fluctuate with tidal changes in the nearby Bayou Liberty, seasonal variations in rainfall, extended periods of drought and surface runoff. Therefore, it is recommended that the actual groundwater levels at the site be determined by the contractor at the time of the construction activities.

IBC Site Classification

The International Building Code (IBC), 2012 edition, was reviewed to determine the site classification for seismic design. Based on the soils encountered in the borings and our experience in the general vicinity, the site can be classified as Site Class “D”, as outlined in Section 1613.3.2 of the Building Code.

EVALUATION AND RECOMMENDATIONS

General

The type and depth of foundation suitable for a given structure primarily depends on several factors including the subsurface conditions, the function of the structure, the loads it may carry, the cost of the foundation and the criteria set by the Design Engineer with respect to vertical and differential movement which the structure can withstand without damage.

The results of the exploration indicate that the soils at the site are fair in bearing quality and suitable for supporting the residence on a shallow foundation system provided the site is prepared as recommended in the report. Details related to site preparation and foundation recommendations, as well as construction considerations, are presented in subsequent sections of this report.

Site Preparation

Site preparation is expected to include, but not be limited to, clearing the site and stripping off all topsoil with organics and other deleterious materials. Based on the borings, about 12 inches of sandy topsoil with organics was encountered at this site. However, the actual stripping depth should be determined by a representative of the Geotechnical Engineer at the time of construction.

The exposed subgrade in the building area should be proofrolled with a rubber tired vehicle weighing about 20 tons. Soils, which are observed to rut or deflect excessively under the moving load, should be undercut and replaced with compacted structural fill. The proofrolling and undercutting activities should be witnessed by a representative of the Geotechnical Engineer and should be performed during a period of dry weather.

After the subgrade preparation and observation have been completed, the structural fill should be placed in a relatively uniform horizontal lift and should be adequately keyed into the stripped and scarified soils. The structural fill should consist of lean clays, sandy clays or clayey sands having a maximum liquid limit of 40 percent and a maximum plasticity index of 20 percent. The fill should be compacted to at least 95 percent of the fill's maximum dry density as determined by ASTM D698 (Standard Proctor).

The structural fill should be placed in maximum lifts of eight (8) inches of loose material and should be compacted within the range of one (1) percentage point below to three (3) percentage points above the optimum moisture content value. If water must be added, it should be uniformly applied and thoroughly mixed into the soil by disking or scarifying. Each lift of compacted structural fill should be tested by a representative of the Geotechnical Engineer prior to placement of subsequent lifts. In-place density measurements should be taken to assure that the above degree of compaction is achieved. The compacted structural fill should extend five (5) feet beyond the perimeter of the building prior to sloping. Adequate drainage should be provided prior to and during site work. The site should be graded to promote rapid runoff.

Crowning of the building pad during fill placement, particularly in wet periods, is highly recommended to minimize ponding of water and allow rapid runoff of surface water. Construction traffic should not be allowed on the building pad during wet weather, where practical.

Shallow Footings

Based on the field data and laboratory test results, the proposed residence may be supported on a shallow foundation system, provided the site is prepared as discussed in the Site Preparation section of this report. Spread footings and continuous footings bearing at least two (2) feet below the finished grade in the stiff naturally occurring clay or on compacted structural fill, could be designed for maximum allowable bearing pressures of 2,500 and 2,000 psf, respectively. Minimum dimensions of twenty-four (24) inches for column footings and eighteen (18) inches for continuous footings should be used in foundation design to minimize the possibility of a localized bearing failure. The above bearing capacities include a design factor of safety of three (3).

The uplift resistance of shallow spread footings formed in open excavations should be limited to the weight of the foundation concrete and the soil above it. For preliminary design purposes, the uplift resistance can be computed by using a total unit weight of 115 pcf for the structural fill placed and compacted above the footing and the unit weight of 150 pcf for the concrete. Concrete reinforcing steel should be properly sized to resist uplift forces. We recommend that a factor of safety of at least 1.5 be used when determining the allowable uplift resistance of spread footings.

Soil resistance to horizontal forces is developed by lateral earth pressures acting on the face of the footing and by friction or adhesion on the footing base. We recommend that the allowable passive pressure be computed for spread footings below grade using the following equations:

$$P_p = 2000 + 120H \text{ (Clay)}$$

where P_p is the lateral soil resistance in psf (pounds per square foot) and H is the depth in feet. For exterior footings, H is measured from one (1) foot below adjacent finished grade, provided that the adjacent finished grade extends level and at least beyond a point that makes a 45-degree angle from the bottom of the exterior footing to the finished ground surface.

The top foot of passive resistance at foundations should be neglected unless the ground surface around the footing is covered by concrete or pavement. The resistance to sliding of spread footings bearing in structural fill can be computed by multiplying the footing base contact area by a sliding friction factor of 0.38. Spread footings should also be sized to resist overturning due to moment forces.

The foundation excavations should be observed by a representative of SE prior to steel or concrete placement to assess that the foundation materials are capable of supporting the design loads and are consistent with the materials discussed in this report. Soft or loose soil zones encountered at the bottom of the footing excavations should be removed to the level of firm soils or adequately compacted fill as directed by the Geotechnical Engineer. Cavities formed as a result of excavation of soft or loose soil zones should be backfilled with compacted structural fill, as determined by the Geotechnical Engineer.

Footing excavations should be observed and concrete placed as quickly as possible to avoid exposure of the footing bottoms to wetting and drying. Surface run-off water should be drained away from the excavations and not be allowed to pond prior to or after concrete placement. The foundation concrete should be placed during the same day the excavation is made. If it is required that footing excavations be left open for more than one day, they should be protected to reduce evaporation or entry of moisture.

Settlement

Settlement of spread footings, designed for the recommended bearing pressure, is estimated to be less than one (1) inch. Differential settlement will be about 50 percent of the total settlement. While settlement of this magnitude is generally considered tolerable for structures of the type proposed, the design of masonry walls should include provisions for liberally spaced, vertical control joints to minimize the affects of cosmetic cracking.

Floor Slab

The soil supported ground floor slab used for parking under the proposed elevated structure should bear on a minimum of 24 inches of compacted structural fill. Placement of the new fill and preparation of the subgrade should be performed in accordance with the Site Preparation section of the report to identify any soft or unstable soils which should be removed from the floor slab area prior to additional fill placement and/or floor slab construction. The floor slab should have an adequate number of joints to reduce cracking resulting from any differential movement and shrinkage.

CONSTRUCTION CONSIDERATIONS

It is recommended that SE be retained to provide observation and testing of construction activities involved in the foundations and related activities of this project. SE cannot accept any responsibility for any conditions which deviate from those described in this report, nor for the performance of the foundations, if not engaged to also provide construction observation and testing for this project.

Moisture Sensitive Soils/Weather Related Concerns

The upper soils encountered at this site are extremely sensitive to disturbances caused by construction traffic and changes in moisture content. During wet weather periods, an increase in the moisture content of the soil can cause significant reduction in the soil strength and support capabilities. In addition, soils that become 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.

Drainage and Groundwater Concerns

Water should not be allowed to collect in the foundation excavations, floor slab area, or on the prepared subgrade in the construction area either during or after construction. Undercut or excavated areas should be sloped toward one corner to facilitate removal of any collected rainwater, groundwater, or surface runoff. Positive site surface drainage should be provided to reduce infiltration of surface water around the building.

Groundwater was measured at an approximate depth of 5 feet upon completion of the drilling operations. However, it is possible that tidal changes in the nearby Bayou Liberty along with seasonal variations will cause fluctuations of the water table. Additionally, perched water may be encountered in discontinuous zones within the overburden soils, particularly after extended periods of rain. Any water accumulation should be removed from the excavations by pumping. If excessive and uncontrolled amounts of seepage occur, the Geotechnical Engineer should be consulted.

Excavations

In Federal Register, Volume 54, No. 209 (October 1989), the United States Department of Labor, Occupational Safety and Health Administration (OSHA) amended its "Construction Standards for Excavations, 29 CFR, Part 1926, Subpart P". This document was issued to better ensure the safety of workmen entering trenches or excavations. It is mandated by this federal regulation that excavations, whether they be utility trenches, basement excavation or footing excavation, be constructed in accordance with the new OSHA guidelines. It is our understanding that these regulations are being strictly enforced and if they are not closely followed, the owner and the contractor could be liable for substantial penalties.

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

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

REPORT LIMITATIONS

The recommendations submitted in this report are based on the available subsurface information obtained by SE and design details furnished by K.B. Kaufmann & Co., Inc. If there are any revisions to the plans for this project, or if deviations from the subsurface conditions noted in this report are encountered during construction, SE should be notified immediately to determine if changes in the foundation recommendations are required. If SE is not notified of such changes, SE will not be responsible for the impact of those changes on the project.

The Geotechnical Engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

After the plans and specifications are more complete, the Geotechnical Engineer should be retained and provided the opportunity to review the final design plans and specifications to check that our engineering recommendations have been properly incorporated in to the design documents. At that time, it may be necessary to submit supplementary recommendations. If SE is not retained to perform these functions, SE will not be responsible for the impact of those conditions on the project. This report has been prepared for the exclusive use of New Millennium Construction, LLC for the specific application to the proposed Private Residence to be constructed at 34159 Lowry Lane in Slidell, Louisiana.

APPENDIX



BORING LOCATION PLAN
SE PROJECT NO. G21-019

GEOTECHNICAL ENGINEERING SERVICES
PROPOSED PRIVATE RESIDENCE
34159 LOWRY LANE
SLIDELL, LOUISIANA



LOG OF BORING B-1
PROPOSED PRIVATE RESIDENCE
34159 LOWRY LANE
SLIDELL, LOUISIANA

TYPE OF BORING: WET ROTARY

LOCATION: RESIDENCE AREA

PROJECT NO.: G21-019

| DEPTH, FT. | SOIL TYPE | SAMPLES | DESCRIPTION | N-BLOWS/FT. | UNCONFINED COMPRESSIVE STRENGTH tsf | HAND PENETROMETER tsf | TORVANE tsf | UNIT DRY WEIGHT pcf | MOISTURE CONTENT % | LIQUID LIMIT | PLASTICITY INDEX | % PASSING #200 SIEVE |
|------------|-----------------------------|---------|--|-------------|-------------------------------------|-----------------------|-------------|---------------------|--------------------|--------------|------------------|----------------------|
| 5 | Sandy Topsoil with organics | - | Firm tannish gray Sandy Lean Clay - becomes stiff to very stiff at 2' | | 1.17 | 0.75 | | | 20 | | | |
| | | | | | 2.00 | 2.00 | 113 | 17 | | | | |
| 10 | Clayey Sand | - | Medium to dense tannish gray Clayey Sand | | 1.70 | 4.50 | | | 15 | 31 | 13 | 33 |
| | | | | | 3.00 | 3.00 | 117 | 18 | | | | |
| 15 | Fat Clay | - | Stiff to very stiff gray Sandy Fat Clay | | 1.01 | 2.00 | | | 27 | | | |
| | | | | | 2.00 | 2.00 | | | | | | |
| 20 | Fat Clay | - | Stiff to very stiff gray Fat Clay | | | 2.00 | | | 31 | | | |
| | | | | | 1.50 | 1.50 | | | | | | |
| 25 | Fat Clay | - | Stiff to very stiff gray Fat Clay | | | 1.50 | | | 34 | | | |
| | | | | | 2.50 | 2.50 | | | | | | |
| 30 | Fat Clay | - | Stiff to very stiff gray Sandy Fat Clay | | 1.22 | 2.50 | | | 37 | | | |
| | | | | | 2.50 | 2.50 | | | | | | |
| 35 | Clayey Sand | - | Loose gray Clayey Sand | | 0.41 | 0.75 | | 95 | 29 | 40 | 23 | |
| | | | | | 0.75 | 0.75 | | | | | | |
| 40 | Fat Clay | - | Firm to stiff gray Fat Clay | | | 1.00 | | | 37 | | | |
| | | | | | 1.00 | 1.00 | | | | | | |
| 45 | - | - | Boring Terminated at 40 Feet | | | | | | | | | |
| | | | | | | | | | | | | |
| 50 | - | - | Boring Terminated at 40 Feet | | | | | | | | | |
| | | | | | | | | | | | | |

DEPTH OF BORING: 20 Feet
 DATE: 3/5/2021

GROUNDWATER: Measured at 5 Feet Upon Completion of Drilling



LOG OF BORING B-2
PROPOSED PRIVATE RESIDENCE
34159 LOWRY LANE
SLIDELL, LOUISIANA

TYPE OF BORING: WET ROTARY

LOCATION: RESIDENCE AREA

PROJECT NO.: G21-019

| DEPTH, FT. | SOIL TYPE | SAMPLES | DESCRIPTION | N-BLOWS/FT. | UNCONFINED COMPRESSIVE STRENGTH tsf | HAND PENETROMETER tsf | TORVANE tsf | UNIT DRY WEIGHT pcf | MOISTURE CONTENT % | LIQUID LIMIT | PLASTICITY INDEX | % PASSING #200 SIEVE |
|------------|-----------|---------|--|-------------|-------------------------------------|-----------------------|-------------|---------------------|--------------------|--------------|------------------|----------------------|
| | | | 12" Sandy Topsoil with organics | | | 2.00 | | | 33 | 33 | 6 | 60 |
| | | | Stiff to very stiff brown Sandy Silty Clay | | | | | | | | | |
| | | | Stiff to very stiff tannish gray Sandy Lean Clay | | 1.05 | 2.00 | | 115 | 17 | | | |
| 5 | | | | | | 2.00 | | | 19 | | | |
| | | | Loose to medium dense tannish gray Clayey Sand | | 0.85 | 1.75 | | 114 | 18 | | | |
| 10 | | | | | 1.06 | 2.00 | | 115 | 18 | 32 | 17 | |
| | | | Medium dense tannish gray Silty Sand | 20 | | | | | 21 | | | |
| 15 | | | | | | | | | | | | |
| | | | Very stiff tannish gray Sandy Lean Clay | 26 | | | | | 21 | | | 64 |
| 20 | | | Boring Terminated at 20 Feet | | | | | | | | | |
| 25 | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | |
| 35 | | | | | | | | | | | | |
| 40 | | | | | | | | | | | | |
| 45 | | | | | | | | | | | | |
| 50 | | | | | | | | | | | | |

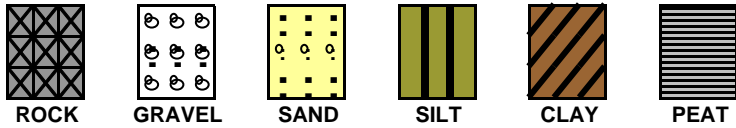
DEPTH OF BORING: 20 Feet
 DATE: 3/5/2021

GROUNDWATER: Measured at 5 Feet Upon Completion of Drilling

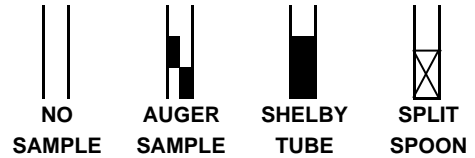


KEY TO TERMS AND SYMBOLS USED ON LOGS

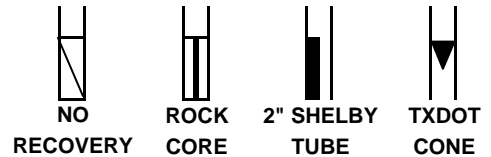
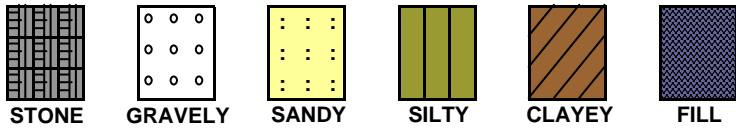
SOIL TYPE



SAMPLER TYPE



MODIFIERS



UNIFIED SOIL CLASSIFICATION SYSTEM - ASTM D 2487 (1980)

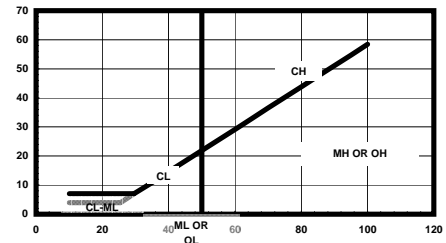
| MAJOR DIVISIONS | | | LETTER SYMBOL | TYPICAL DESCRIPTIONS | | |
|---|-----------------------------------|--|---|--|--|----------------------------------|
| COARSE GRAINED SOILS | GRAVEL & GRAVELLY SOILS | CLEAN GRAVEL (LITTLE OR NO FINES) | GW | WELL GRADED GRAVEL, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES | | |
| | | POORLY GRADED GRAVEL, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES | | GP | POORLY GRADED GRAVEL, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES | |
| | LESS THAN 50% PASSING NO. 4 SIEVE | W/ APPRECIABLE FINES | GM | | SILTY GRAVEL, GRAVEL-SAND-SILT MIXTURES | |
| | | CLEAN SANDS (LITTLE FINES) | | GC | CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES | |
| | 50% PASSING NO. 200 SIEVE | CLEAN SANDS (LITTLE FINES) | SW | | WELL GRADED SAND, GRAVELY SAND (LITTLE FINES) | |
| | | SANDS WITH APPRECIABLE FINES | | SP | POORLY GRADED SANDS, GRAVELY SAND (L-FINES) | |
| | FINE GRAINED SOILS | SILTS AND CLAYS | SANDS WITH APPRECIABLE FINES | | SM | SILTY SANDS, SAND-SILT MIXTURES |
| | | | CLAYEY SANDS, SAND-CLAY MIXTURES | SC | | CLAYEY SANDS, SAND-CLAY MIXTURES |
| | | | INORGANIC SILTS & VERY FINE SANDS, ROCK FLOUR | | | ML |
| | | SILTY OR CLAYEY FINE SANDS OR CLAYEY SILT W/ LOW PI | CL | SILTY OR CLAYEY FINE SANDS OR CLAYEY SILT W/ LOW PI | | |
| INORGANIC CLAY OF LOW TO MEDIUM PI LEAN CLAY | | OL | | INORGANIC CLAY OF LOW TO MEDIUM PI LEAN CLAY | | |
| GRAVELY CLAYS, SANDY CLAYS, SILTY CLAYS | | | MH | GRAVELY CLAYS, SANDY CLAYS, SILTY CLAYS | | |
| ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PI | CH | ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PI | | | | |
| INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS | | OH | INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS | | | |
| INORGANIC CLAYS OF HIGH PLASTICITY | PT | | INORGANIC CLAYS OF HIGH PLASTICITY | | | |
| FAT CLAYS | | | FAT CLAYS | | | |
| ORGANIC CLAYS OF MED TO HIGH PI, ORGANIC SILT | | ORGANIC CLAYS OF MED TO HIGH PI, ORGANIC SILT | | | | |
| HIGHLY ORGANIC SOIL | | PEAT AND OTHER HIGHLY ORGANIC SOILS | | | | |
| UNCLASSIFIED FILL MATERIALS | | ARTIFICIALLY DEPOSITED AND OTHER UNCLASSIFIED SOILS AND MAN-MADE SOIL MIXTURES | | | | |

CONSISTENCY OF COHESIVE SOILS

| CONSISTENCY | SHEAR STRENGTH IN TONS/FT ² |
|-------------|--|
| VERY SOFT | 0. TO 0.125 |
| SOFT | 0.125 TO 0.25 |
| FIRM | 0.25 TO 0.5 |
| STIFF | 0.5 TO 1.0 |
| VERY STIFF | 1.0 TO 2.0 |
| HARD | > 2.0 OR 2.0+ |

RELATIVE DENSITY - GRANULAR SOILS

| CONSISTENCY | N-VALUE (BLOWS/FOOT) |
|--------------|----------------------|
| VERY LOOSE | 0-4 |
| LOOSE | 4-9 |
| MEDIUM DENSE | 10-29 |
| DENSE | 30-49 |
| VERY DENSE | > 50 OR 50+ |



ABBREVIATIONS

- | | |
|------------------------|--|
| HP - HAND PENETROMETER | UC - UNCONFINED COMPRESSION TEST |
| TV - TORVANE | UU - UNCONSOLIDATED UNDRAINED TRIAXIAL |
| MV - MINIATURE VANE | CU - CONSOLIDATED UNDRAINED |

NOTE: PLOT INDICATES SHEAR STRENGTH AS OBTAINED BY ABOVE TESTS



CLASSIFICATION OF GRANULAR SOILS

U.S. STANDARD SIEVE SIZE(S)

| | | | | | | | | | |
|------------------|---------|--------|------|--------|--------|------|-------|------|-------|
| | 6" | 3" | 3/4" | 4 | 10 | 40 | 200 | | |
| BOUL- -DERS | COBBLES | GRAVEL | | SAND | | | SILT | CLAY | |
| | | COARSE | FINE | COARSE | MEDIUM | FINE | | | |
| | 152 | 76.2 | 19.1 | 4.76 | 2.0 | 0.42 | 0.075 | | 0.002 |
| GRAIN SIZE IN MM | | | | | | | | | |