UNIVERSAL ENGINEERING SCIENCES

SUBSURFACE EXPLORATION

Proposed Residence
4269 Turtle Mound Road
Melbourne, Brevard County, Florida
Universal Project No. 0330.2100104.0000

August 10, 2021

PREPARED BY:
Universal Engineering Sciences
820 Brevard Avenue
Melbourne, Florida 32940
(321) 638-0808

UNIVERSAL
ENGINEERING SCIENCES
Consultants In: Geotechnical Engineering • Environmental Sciences
Geophysical Services • Construction Materials Testing • Threshold Inspection
Building Inspection • Plan Review • Building Code Administration

LOCATIONS:
- Atlanta
- Daytona Beach
- Fort Myers
- Fort Pierce
- Gainesville
- Jacksonville
- Kissimmee
- Leesburg
- Miami
- Ocala
- Orlando (Headquarters)
- Palm Coast
- Panama City
- Pensacola
- Rockledge
- Sarasota
- Tampa
- West Palm Beach

August 10, 2021

Reference: **Subsurface Exploration**
Proposed Residence
4269 Turtle Mound Road
Melbourne, Brevard County, Florida
Universal Project No. 0330.2100104.0000

Universal Engineering Sciences, LLC (Universal) has completed a subsurface exploration at the above referenced site in Melbourne, Brevard County, Florida. Our exploration was authorized by the owner and was conducted as outlined in Universal's proposal No. 0330.0421.00009. This exploration was performed in accordance with generally accepted soil and foundation engineering practices. No other warranty, expressed or implied, is made.

The following report presents the results of our field exploration with a geotechnical engineering interpretation of those results with respect to the project characteristics as provided to us. We have included general engineering recommendations concerning site preparation procedures & foundation design parameters, and our estimates of the typical wet season high groundwater levels at the boring locations.

We appreciate the opportunity to have worked with you on this project and look forward to a continued association. Please do not hesitate to contact us if you should have any questions, or if we may further assist you as your plans proceed.

Sincerely yours,
UNIVERSAL ENGINEERING SCIENCES

Robert Smith, P.E.
Senior Project Manager
Florida Professional Engineer No. 78130

BRAD FAUCETT LICENSE NO. 33123 STATE OF FLORIDA PROFESSIONAL ENGINEER

Digitally signed by Brad Faucett Date: 2021.08.11 07:42:41 -04'00'

Brad Faucett, M.S. P.E.
Regional Engineer
Florida Professional Engineer No. 33123

UESDOCS# 1891272

TABLE OF CONTENTS

LIST OF TABLES

FIGURES

820 Brevard Avenue, Rockledge, Florida 32955 (321) 638-0808 Fax (321) 638-0978
www.UniversalEngineering.com

APPENDICES

EXHIBITS

820 Brevard Avenue, Rockledge, Florida 32955 (321) 638-0808 Fax (321) 638-0978
www.UniversalEngineering.com

1.0 INTRODUCTION

Universal Engineering Sciences, LLC (Universal) has completed a subsurface exploration for the proposed residence at 4269 Turtle Mound Road in Melbourne, Brevard County, Florida. Our exploration was authorized by owner and was conducted as outlined in Universal's proposal No. 0330.0421.00009. This exploration was performed in accordance with generally accepted soil and foundation engineering practices. No other warranty, expressed or implied, is made.

2.0 PROJECT DESCRIPTION

Based upon information provided by the Client, Universal understands that the proposed residence will be a one to two-story structure, situated in the approximate central/rear area of the parcel, as bounded by the soil boring locations, at 4269 Turtle Mound Road in Melbourne, Florida. We assume that the finished floor elevation will be roughly 2 to 3 feet above the existing grades.

We assume that the proposed residence will be constructed using a combination of reinforced concrete, masonry, and wood framing. Based on our experience will similar structures, we assume that maximum loading conditions will be on the order of 10 kips per column, 3 kips/foot for structural walls, and 100 pounds per square foot for on grade floor slabs.

If any of the above information is incorrect or changes prior to construction, please contact Universal immediately so that we may revise the recommendations contained in this report, as necessary. In order to verify that our recommendations are properly interpreted and implemented, Universal should be allowed to review the final design and specifications prior to the start of construction.

3.0 PURPOSE

The purposes of this exploration were:

- to explore and evaluate the subsurface conditions at the site with special attention to potential problems that may hinder the proposed development, and
- to provide our estimates of the typical wet season high groundwater levels at the boring locations, and
- to provide general engineering recommendations concerning site preparation procedures & foundation design parameters.

4.0 SITE DESCRIPTION

The subject site is located within Section 35, Township 26 South, Range 36 East in Brevard County, Florida. More specifically, the new residence will be located on the north side of Turtle Mound Road at 4269 Turtle Mound Road in Melbourne, Brevard County, Florida. At the time of drilling, the property had recently been cleared of trees and most vegetation. The surrounding area consists of developed residential lots.

820 Brevard Avenue, Rockledge, Florida 32955 (321) 638-0808 Fax (321) 638-0978
www.UniversalEngineering.com

4.1 SOIL SURVEY

The natural soils (pre-developmental) at the site are mapped as 36-Myakka Sand (Mk) according to the Brevard County Soil Survey (BCSS), dated 1974. Myakka sand (Mk) is described as nearly level, poorly drained sandy soil in broad areas in the flatwoods and in areas between sand ridges and sloughs and ponds. It should be noted that the far rear portion, assumed to be non-buildable area, of the lot consists of Tomoka muck and is indicated to consist of poorly drained muck soils in broad flat marshes, small depressions and swamps.

4.2 TOPOGRAPHY

According to information obtained from the United States Geological Survey (USGS) Eau Gallie, Florida 7.5 minute quadrangle map dated 1948 (Photorevised 1988); the ground surface (pre-developmental) across the building area is approximately +35 feet National Geodetic Vertical Datum (NGVD).

5.0 SCOPE OF SERVICES

The services conducted by Universal during our subsurface exploration program were as listed below:

- Drill four (4) Standard Penetration Test (SPT) borings within the proposed residence footprint to depths of 10 to 20 feet below existing land surface (bls).
- Secure samples of representative soils encountered in the soil borings for review, laboratory analysis and classification by a Geotechnical Engineer.
- Measure the existing site groundwater levels and provide an estimate of the typical wet season high groundwater levels at the boring locations.
- Complete soil gradation tests on selected soil samples obtained in the field to determine their engineering properties.
- Assess the existing soil conditions with respect to the proposed construction.
- Prepare a report that documents the results of our subsurface exploration and analysis with general geotechnical engineering recommendations.

6.0 LIMITATIONS

This report has been prepared in order to aid the client/contractor in the design and construction of the proposed residence at 4269 Turtle Mound Road in Melbourne, Brevard County, Florida. The scope is limited to the specific project and locations described herein. Our description of the project's design parameters represents our understanding of the significant aspects relevant to soil and foundation characteristics. In the event that any changes in the design or locations of the structures as outlined in this report are planned, we should be informed so the changes can be reviewed and the conclusions of this report modified, if required, and approved in writing by Universal.

820 Brevard Avenue, Rockledge, Florida 32955 (321) 638-0808 Fax (321) 638-0978
www.UniversalEngineering.com

The recommendations submitted in this report are based upon the data obtained from the soil borings performed at the locations indicated on the Boring Location Plan and from other information as referenced. This report does not reflect any variations that may occur between the boring locations, or within unexplored areas of the site. The nature and extent of such variations may not become evident until the course of construction. If variations become evident, it will then be necessary for a re-evaluation of the recommendations of this report after performing on-site observations during the construction period and noting the characteristics of the variations. Deleterious soils/debris were not encountered at any of the boring locations; however, we cannot completely preclude their presence between boring locations and within unexplored areas of the site. Therefore, this report should not be used for estimating such items as cut and fill quantities.

Borings for a typical geotechnical report are widely spaced and generally not sufficient for reliably detecting the presence of isolated, anomalous surface or subsurface conditions, or reliably estimating unsuitable or suitable material quantities. Accordingly, Universal does not recommend relying on our boring information to negate presence of anomalous materials or for estimation of material quantities unless our contracted services ***specifically*** include sufficient exploration for such purpose(s) and within the report we so state that the level of exploration provided should be sufficient to detect such anomalous conditions or estimate such quantities. Therefore, Universal will not be responsible for any extrapolation or use of our data by others beyond the purpose(s) for which it is applicable or intended.

All users of this report are cautioned that there was no requirement for Universal to attempt to locate any manmade buried objects or identify any other potentially hazardous conditions that may exist at the site during the course of this exploration. Therefore, no attempt was made by Universal to locate or identify such concerns. Universal cannot be responsible for any buried manmade objects or environmental hazards which may be subsequently encountered during construction that are not discussed within the text of this report. We can provide this service if requested.

For a further description of the scope and limitations of this report, please review the document attached within Exhibit 1, "Important Information about Your Geotechnical Engineering Report", prepared by GBA/The Geoprofessional Business Association.

7.0 FIELD METHODOLOGIES

7.1 STANDARD PENETRATION TEST BORINGS

The four (4) SPT borings, designated B1 through B4 on the attached Figure No. 1, were performed in general accordance with the procedures of ASTM D 1586 (Standard Method for Penetration Test and Split-Barrel Sampling of Soils). The SPT drilling technique involves driving a standard split-barrel sampler into the soil by a 140-pound hammer, free falling 30 inches. The number of blows required to drive the sampler 1 foot, after an initial seating of 6 inches, is designated the penetration resistance, or N-value, an index to soil strength and consistency. The soil samples recovered from the split-barrel sampler were visually inspected and classified in general accordance with the guidelines of ASTM D 2487 (Standard Classification of Soils for Engineering Purposes [Unified Soil Classification System]).

820 Brevard Avenue, Rockledge, Florida 32955 (321) 638-0808 Fax (321) 638-0978
www.UniversalEngineering.com

The SPT soil borings were performed using a CME 45 ATV-mounted drilling rig using either rotary mud techniques or continuous flight augers to termination depth. Universal located the test borings in the field by using a hand held GPS receiver. No survey control was provided on-site, and our boring locations should be considered only as accurate as implied by the methods used. The approximate boring locations are shown on the attached Figure No. 1.

8.0 LABORATORY METHODOLOGIES

8.1 PARTICLE SIZE ANALYSIS

We completed #200 sieve particle size analyses on two (2) representative soil samples. These samples were tested according to the procedures listed in ASTM D 1140 (Standard Test Method for Amount of Material in Soils Finer than the No. 200 Sieve). In part, ASTM D 1140 requires a thorough mixing the sample with water and flushing it through a No. 200 sieve until all of the particles smaller than the sieve size leave the sample. The percentage of the material finer than the No. 200 sieve helps determines the textural nature of the soil sample and aids in evaluating its engineering characteristics.

The percentage of soil particles passing the #200 sieve in each sample that was tested is shown on the appropriate attached boring logs.

9.0 SOIL STRATIGRAPHY

The results of our field exploration and laboratory analysis, together with pertinent information obtained from the SPT borings, such as soil profiles, penetration resistance and stabilized groundwater level are shown on the boring log included in Appendix A. The Key to Boring Logs, Soil Classification Chart is also included in Appendix A.

The soil profiles were prepared from the field logs after the recovered soil samples were examined by a Geotechnical Engineer. The stratification lines shown on the boring logs represent the approximate boundaries between soil types, and may not depict exact subsurface soil conditions. The actual soil boundaries may be more transitional than depicted.

820 Brevard Avenue, Rockledge, Florida 32955 (321) 638-0808 Fax (321) 638-0978
www.UniversalEngineering.com

A generalized profile of the soils encountered at our boring locations is presented in the following Table I. For more detailed soil profiles, please refer to the attached boring logs.

TABLE I
GENERALIZED SOIL PROFILE

Depth Encountered (feet, bls)	Approximate Thickness (feet)	Soil Description
Surface	~1 to ~2	Fine sand with silt and roots [SP-SM], topsoil. This thickness is given as an approximation of the topsoil at the site and some variation should be expected.
~1 to ~2	4 to 6	Fine sand [SP], loose to medium dense
6 to 7	3+ to 8+	Fine sands with varying quantities of silt [SP-SM] material was partially cemented with iron oxide and organic salts and is locally known as hardpan, medium dense to very dense.

NOTE: [ ] denotes Unified Soil Classification system designation.
+ indicates strata encountered at boring termination, total thickness undetermined.

10.0 GROUNDWATER CONDITIONS

10.1 EXISTING GROUNDWATER CONDITIONS

We measured the water level in the SPT boreholes on August 3, 2021 after the groundwater was allowed to stabilize. The groundwater levels are shown on the attached boring logs. The groundwater level depths ranged from 1.2 feet bls at boring locations B3 and B4 to 1.9 feet bls at boring location B1. Fluctuations in groundwater levels should be anticipated throughout the year, primarily due to seasonal variations in rainfall, surface runoff, and other factors that may vary from the time the borings were conducted.

10.2 TYPICAL WET SEASON HIGH GROUNDWATER LEVELS

The typical wet season high groundwater level is defined as the highest groundwater level sustained for a period of 2 to 4 weeks during the "wet" season of the year, for existing site conditions, in a year with average normal rainfall amounts. Based on historical data, the rainy season in Brevard County, Florida is between June and October of the year. In order to estimate the wet season water level at the boring locations, many factors are examined, including the following:

a. Measured groundwater level
b. Drainage characteristics of existing soil types
c. Season of the year (wet/dry season)
d. Current & historical rainfall data (recent and year-to-date)
e. Natural relief points (such as lakes, rivers, swamp areas, etc.)
f. Man-made drainage systems (ditches, canals, etc.)
g. Distances to relief points and man-made drainage systems
h. On-site types of vegetation
i. Area topography (ground surface elevations)

820 Brevard Avenue, Rockledge, Florida 32955 (321) 638-0808 Fax (321) 638-0978
www.UniversalEngineering.com

Groundwater level readings were taken on August 3, 2021. According to data from the Southeast Regional Climate Center and the National Weather Service, the total rainfall in the previous month of July in central Brevard County was approximately 5.1 inches, approximately 1.4 inches below the normal amount for the month of July. Year-to-date rainfall through August 3 was approximately 19½ inches, roughly 8 inches below the normal levels for this time period

Based on this information and the factors listed above, we estimate that the typical wet season high groundwater levels at the boring locations will be approximately 1 foot above the existing measured levels. Please note, however, that peak stage elevations immediately following various intense storm events, may be somewhat higher than the estimated typical wet season high levels.

11.0 LABORATORY RESULTS

11.1 PARTICLE SIZE ANALYSIS

The soil samples submitted for analysis were classified as fine sands [SP] and fine sands with silt [SP-SM]. The percentage of soil sizes passing the #200 sieve size are shown on the attached boring logs at the approximate depth sampled.

12.0 ANALYSIS AND RECOMMENDATIONS – PROPOSED RESIDENCE

We assume that the proposed residence will have first floor levels approximately 2 to 3 feet above existing grades. In general, the near surface soils within the proposed building footprint appear to be medium dense fine sands [SP].

Provided the suggested site preparation procedures are followed, we recommend designing conventional, shallow spread footings foundations for a maximum allowable soil-contact pressure of 2,000 pounds per square foot (psf). Even though computed soil-contact pressures may not warrant it, strip and square footings should have minimum widths of at least 18 and 24 inches, respectively to prevent "shear punch" deformations.

The base of all footings should be at least 18 inches below finished grade elevation, with the exception of a thickened-edge slab foundation system for which a minimum depth of 14 inches is acceptable.

Assuming existing soils and added structural fill soils are prepared and footings are designed according to our recommendations, we estimate maximum total vertical settlements of the proposed structure will be less than 1 inch and maximum differential settlements will be less than ½ inch. Almost all of the expected settlement will take place as soon as the structural loads have been applied to the densified existing sandy soil (and overlying sandy soil fill).

We recommend using a sheet vapor barrier, such as Visqueen, beneath the building slab-on-grades to help control moisture migration through the slab. Floor slabs can be supported upon the compacted fill and should be structurally isolated from other foundations elements or adequately reinforced to prevent distress due to differential movements. We recommend a minimum thickness of at least 5 inches be maintained for the concrete floor slabs where heavy

820 Brevard Avenue, Rockledge, Florida 32955 (321) 638-0808 Fax (321) 638-0978
www.UniversalEngineering.com

loads are anticipated. In lightly loaded pedestrian walk areas, we recommend a minimum thickness of at least 4 inches be maintained.

12.1 SITE PREPARATION PROCEDURES

Following is a list of our recommended site preparation procedures to prepare the site for the proposed construction.

1. Strip the footprint of the proposed residence, plus a minimum margin of at least five feet beyond foundation lines, of existing vegetation, roots, organic topsoils, foundations, slabs, debris, rubble, muck, etc. Any collapsible or leak prone utilities should be completely removed from within the locations of the proposed building. We recommend that the stripped surfaces be observed and probed by representatives of Universal to assure that all unsuitable material has been removed. Any deleterious matter remaining should be removed and replaced with select fine sand [SP] backfill.

2. Densify the exposed surficial soils, including the five feet margin, to at least 95 percent of the Modified Proctor test maximum dry density (ASTM D 1557, Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2,700 kN-m/m^3))) to a depth of at least 12 inches below the stripped surface.

3. If vibratory equipment is used to compact fill, then we recommend using vibratory rollers weighing less than 1 ton within 20 feet of existing structures, less than 2 tons within distances of 20 to 40 feet, and less than 6 tons beyond 40 feet. The use of heavier equipment may damage existing neighboring structures. Otherwise, static rollers weighing more than 5 tons should be used.

4. Proof-roll the exposed subsurface soils under the observation of Universal, to locate any unforeseen soft areas of unsuitable soils, and to increase the density of the shallow loose fine sand soils. Each pass should overlap the proceeding pass by roughly 30 percent to insure complete coverage. If deemed necessary by Universal, in areas that continue to "yield", remove any soft or deleterious materials and replace with a clean, compacted sand backfill [SP].

5. Depending upon weather conditions, or other factors, the addition or removal (dewatering) of water may be necessary to aid compactive efforts. Additional passes with compaction equipment or over excavation and replacement in compacted layers may be necessary if the minimum density requirements are not achieved by the recommended equipment.

6. Within all of the building areas, fill to floor slab/pavement grade as necessary with select structural fill, placed in maximum 10 inch loose lifts; we recommend using sandy soils with less than 10% passing the #200 sieve size [SP, SP-SM, or SP-SC]. Each lift of structural fill should be densified to at least 95 percent of the Modified Proctor test maximum dry density of the soil (ASTM D 1557) and tested for compaction and approved before the placement of subsequent lifts.

7. Footing and utility excavations and other construction activities frequently disturb compacted subsoils to various depths; therefore, compaction beneath all floor slabs and footings should be verified to a depth of 1 foot immediately prior to the placement of reinforcing steel and

820 Brevard Avenue, Rockledge, Florida 32955 (321) 638-0808 Fax (321) 638-0978
www.UniversalEngineering.com

concrete, and should meet at least 95 percent of the Modified Proctor test maximum dry density of the soil (ASTM D 1557).

8. Field density tests should be performed by Universal at appropriate times during earthwork operations in order to verify that the compaction requirements have been satisfied. These tests should be performed after compaction in the existing soils, after placement of each lift of structural fill, within all footing excavations, and beneath all concrete slab-on-grade locations. Compaction tests should be performed at a frequency of not less than four tests feet per each foot of compacted increment as specified herein. In addition, we recommend that at least every-other column footing be tested with at least one test per every 50 linear feet of wall footing.

13.0 EXCAVATIONS

Excavations should be sloped as necessary to prevent slope failure and to allow backfilling. As a minimum, temporary excavations below 4-foot depth should be sloped in accordance with OSHA regulations (29 CFR Par 1926) dated October 31, 1989. Where lateral confinement will not permit slopes to be laid back, the excavation should be shored in accordance with OSHA requirements. During excavation, excavated material should not be stockpiled at the top of the slope within a horizontal distance equal to the excavation depth. Provisions for maintaining worker safety within excavations is the sole responsibility of the contractor.

14.0 DEWATERING

Based on the water level conditions encountered, control of the groundwater will likely be required to achieve the necessary excavation, construction, backfilling and compaction requirements presented in the preceding sections. Regardless of the method(s) used, we suggest drawing down the water level at least 2 to 3 feet below the bottom of the excavations to preclude "pumping" and/or compaction-related problems with the subgrade soils. The actual method(s) of dewatering should be determined by the contractor.

Dewatering should be accomplished with the knowledge that the permeability of soils decreases with increasing silt [M] and/or clay [C] content. Therefore, a silty fine sand [SM] is less permeable than a fine sand [SP]. The fine sand [SP], fine sand with silt [SP-SM] and silty fine sand [SM] soil types can usually be dewatered by well pointing.

It should be noted that the typical wet season high groundwater levels previously listed may be temporarily exceeded during any given year in the future. Should impediments to surface water drainage exist on the site, or should rainfall intensity and duration, or total rainfall quantities exceed the normally anticipated rainfall quantities, groundwater levels may exceed our seasonal high estimates.

We recommend positive drainage be established and maintained on the site during construction. We further recommend permanent measures be constructed to maintain positive drainage from the site throughout the life of the project. We recommend that the contract documents provide for determining the depth to the groundwater table just prior to construction, and for any required remedial dewatering.

820 Brevard Avenue, Rockledge, Florida 32955 (321) 638-0808 Fax (321) 638-0978
www.UniversalEngineering.com

15.0 CLOSURE

The soil and groundwater conditions encountered during our subsurface exploration of the property and the results of the laboratory analysis identified no geotechnical issues that would significantly impact the proposed construction, as we currently understand it, using conventional construction practices.

The geotechnical engineering design does not end with the advertisement of the construction documents. The design is an on-going process throughout construction. Because of our familiarity with the site conditions and the intent of the engineering design, we are most qualified to address site problems or construction changes, which may arise during construction, in a timely and cost-effective manner.

We recommend the owner retain the Universal Rockledge office to provide inspection services during the site preparation procedures for confirmation of the adequacy of the earthwork operations. Field tests and observations include verification of foundation subgrades by monitoring proof-rolling operations and performing quality assurance tests of the placement of compacted structural fill courses.

* * * * * *

820 Brevard Avenue, Rockledge, Florida 32955 (321) 638-0808 Fax (321) 638-0978
www.UniversalEngineering.com

FIGURES

LEGEND:

⊕ *STANDARD PENETRATION TEST BORING*

UNIVERSAL
ENGINEERING SCIENCES

PROPOSED RESIDENCE
4269 TURTLE MOUND ROAD
MELBOURNE, BREVARD COUNTY, FLORIDA

BORING LOCATION PLAN

DRAWN BY:	RS	DATE:	AUGUST 9, 2021	CHECKED BY:	BF	DATE:	AUGUST 9, 2021
SCALE:	1" = 100'	PROJECT NO:	0730.2100104.0000			PAGE NO:	FIGURE 1

APPENDIX A

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	
REPORT NO.:	**0330.2100104.0000**
APPENDIX:	**A**

PROJECT: **PROPOSED RESIDENCE**
4269 TURTLE MOUND ROAD
MELBOURNE, FLORIDA

BORING DESIGNATION: **B1** SHEET: **1 of 1**
SECTION: TOWNSHIP: **SOUTH** RANGE: **EAST**

LOCATION: **SEE EXPLORATION LOCATION PLAN**
REMARKS:

G.S. ELEVATION (ft):
WATER TABLE (ft): **1.9**
DATE OF READING: **8/3/21**
EST. W.S.W.T. (ft):

DATE STARTED: **8/3/21**
DATE FINISHED: **8/3/21**
DRILLED BY: **PM, PG**
TYPE OF SAMPLING:

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N-VALUE	W.T.	SYMBOL	WELL DIAGRAM	DESCRIPTION	-200 (%)	MC (%)	K (IN./HR.)	ORG. CONT. (%)
0							**fine SAND with silt with roots**, dark brown, [SP-SM] (Topsoil)				
		1-1-3	4	▼			**fine SAND**, grey, [SP]				
		7-7-8	15					2.1	21.1		
5		6-5-6	11								
		5-5-9	14				**fine SAND with silt**, dark brown, (hardpan) [SP-SM]				
		16-16-10	26								
10		6-10-9	19								
15		5-12-13	25				**fine SAND with silt**, gray, [SP-SM]				
20		1-1-2	3				**fine SAND with silt and broken shell**, gray, [SP-SM]				
25		7-45-55	100				BORING TERMINATED AT 25'				

STANDLOG

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	
REPORT NO.:	**0330.2100104.0000**
APPENDIX:	**A**

PROJECT: **PROPOSED RESIDENCE**
4269 TURTLE MOUND ROAD
MELBOURNE, FLORIDA

BORING DESIGNATION: **B2** SHEET: **1 of 1**
SECTION: TOWNSHIP: **SOUTH** RANGE: **EAST**

LOCATION: **SEE EXPLORATION LOCATION PLAN**
REMARKS:

G.S. ELEVATION (ft):
WATER TABLE (ft): **1.8**
DATE OF READING: **8/3/21**
EST. W.S.W.T. (ft):

DATE STARTED: **8/3/21**
DATE FINISHED: **8/3/21**
DRILLED BY: **PM, PG**
TYPE OF SAMPLING:

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N-VALUE	W.T.	SYMBOL	WELL DIAGRAM	DESCRIPTION	-200 (%)	MC (%)	K (IN./HR.)	ORG. CONT. (%)
0							**fine SAND with silt and roots**, dark brown, [SP-SM] (Topsoil)				
							fine SAND, grey, [SP]				
		2-2-2	4								
		3-4-3	7								
5		3-3-5	8								
							fine SAND with silt, dark brown, (hardpan) [SP-SM]				
		5-7-8	15								
		13-19-20	39								
10		16-22-23	45				BORING TERMINATED AT 10'				
15											

STANDLOG

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	
REPORT NO.:	**0330.2100104.0000**
APPENDIX:	**A**

PROJECT: **PROPOSED RESIDENCE**
4269 TURTLE MOUND ROAD
MELBOURNE, FLORIDA

BORING DESIGNATION: **B3** SHEET: **1 of 1**
SECTION: TOWNSHIP: **SOUTH** RANGE: **EAST**

LOCATION: **SEE EXPLORATION LOCATION PLAN**
REMARKS:

G.S. ELEVATION (ft):
WATER TABLE (ft): **1.3**
DATE OF READING: **8/3/21**
EST. W.S.W.T. (ft):

DATE STARTED: **8/3/21**
DATE FINISHED: **8/3/21**
DRILLED BY: **PM, PG**
TYPE OF SAMPLING:

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N-VALUE	W.T.	SYMBOL	WELL DIAGRAM	DESCRIPTION	-200 (%)	MC (%)	K (IN./HR.)	ORG. CONT. (%)
0							**fine SAND with silt and roots**, dark brown, [SP-SM] (Topsoil)				
				▼			**fine SAND**, grey, [SP]				
		1-1-2	3								
		3-3-4	7								
5		3-4-4	8								
							fine SAND with silt, dark brown, (hardpan) [SP-SM]				
		3-6-10	16								
		10-15-20	35								
10		38-43-46	89				BORING TERMINATED AT 10'				
15											

STANDLOG

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	
REPORT NO.:	**0330.2100104.0000**
APPENDIX:	**A**

PROJECT: **PROPOSED RESIDENCE**
4269 TURTLE MOUND ROAD
MELBOURNE, FLORIDA

BORING DESIGNATION: **B4** SHEET: **1 of 1**
SECTION: TOWNSHIP: **SOUTH** RANGE: **EAST**

LOCATION: **SEE EXPLORATION LOCATION PLAN**
REMARKS:

G.S. ELEVATION (ft):
WATER TABLE (ft): **1.3**
DATE OF READING: **8/3/21**
EST. W.S.W.T. (ft):

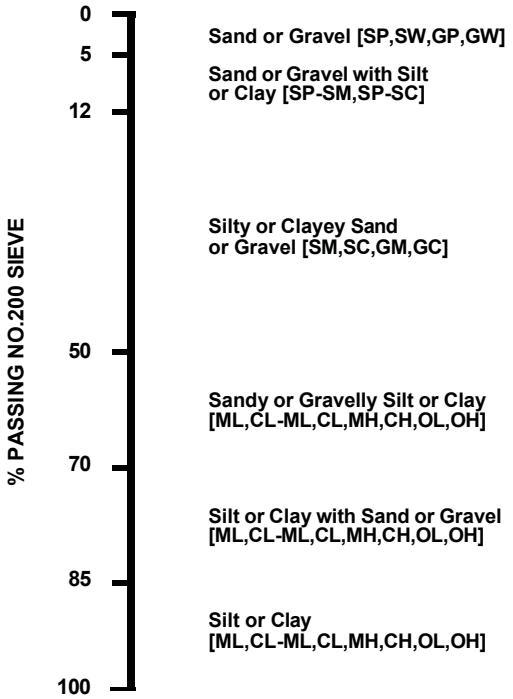
DATE STARTED: **8/3/21**
DATE FINISHED: **8/3/21**
DRILLED BY: **PM, PG**
TYPE OF SAMPLING:

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N-VALUE	W.T.	SYMBOL	WELL DIAGRAM	DESCRIPTION	-200 (%)	MC (%)	K (IN./HR.)	ORG. CONT. (%)
0							**fine SAND with silt and roots**, dark brown, [SP-SM] (Topsoil)				
				▼			**fine SAND**, grey, [SP]				
		1-3-2	5								
		3-3-4	7								
5		3-3-3	6								
		4-5-5	10				**fine SAND with silt**, dark brown, (hardpan) [SP-SM]				
		6-7-9	16					5.3	25.8		
10		5-10-11	21				BORING TERMINATED AT 10'				
15											

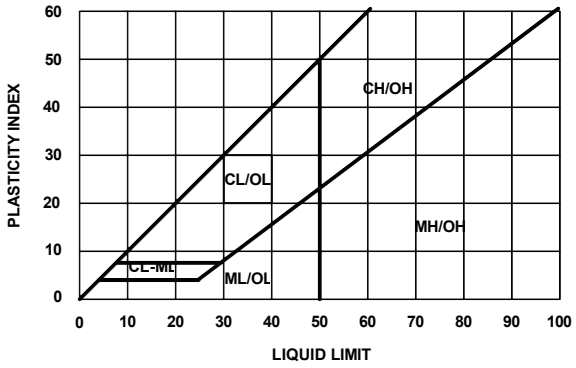
STANDLOG

KEY TO BORING LOGS

SOIL CLASSIFICATION CHART*



UNIVERSAL ENGINEERING SCIENCES, INC.



PLASTICITY CHART

GROUP NAME AND SYMBOL

COARSE GRAINED SOILS

- WELL-GRADED SANDS [SW]
- POORLY-GRADED SANDS [SP]
- POORLY-GRADED SANDS WITH SILT [SP-SM]
- POORLY-GRADED SANDS WITH CLAY [SP-SC]
- SILTY SANDS [SM]
- CLAYEY SANDS [SC]
- SILTY CLAYEY SANDS [SC-SM]
- WELL-GRADED GRAVELS [GW]
- POORLY-GRADED GRAVELS [GP]
- POORLY-GRADED GRAVELS WITH SILT [GP-GM]
- POORLY-GRADED GRAVELS WITH CLAY [GP-GC]
- SILTY GRAVELS [GM]
- CLAYEY GRAVELS [GC]

FINE GRAINED SOILS

- INORGANIC SILTS SLIGHT PLASTICITY [ML]
- INORGANIC SILTY CLAY LOW PLASTICITY [CL-ML]
- INORGANIC CLAYS LOW TO MEDIUM PLASTICITY [CL]
- INORGANIC SILTS HIGH PLASTICITY [MH]
- INORGANIC CLAYS HIGH PLASTICITY [CH]

HIGHLY ORGANIC SOILS

- ORGANIC SILTS/CLAYS LOW PLASTICITY [OL]**
- ORGANIC SILTS/CLAYS MEDIUM TO HIGH PLASTICITY [OH]**
- PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS [PT]**

RELATIVE DENSITY

(SAND AND GRAVEL)

VERY LOOSE - 0 to 4 Blows/ft.
LOOSE - 5 to 10 Blows/ft.
MEDIUM DENSE - 11 to 30 Blows/ft.
DENSE - 31 to 50 Blows/ft.
VERY DENSE - more than 50 Blows/ft.

IN ACCORDANCE WITH ASTM D 2487 - UNIFIED SOIL

* CLASSIFICATION SYSTEM.

** LOCALLY MAY BE KNOWN AS MUCK.

CONSISTENCY

(SILT AND CLAY)

VERY SOFT - 0 to 2 Blows/ft.
SOFT - 3 to 4 Blows/ft.
FIRM - 5 to 8 Blows/ft.
STIFF - 9 to 16 Blows/ft.
VERY STIFF - 17 to 30 Blows/ft.
HARD - more than 30 Blows/ft.

NOTES

- DENOTES DYNAMIC CONE PENETROMETER DCP VALUE
R - DENOTES REFUSAL TO PENETRATION
P - DENOTES PENETRATION WITH ONLY WEIGHT OF DRIVE HAMMER
N/E - DENOTES GROUNDWATER TABLE NOT ENCOUNTERED

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

EXHIBIT 1

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, clients can benefit from a lowered exposure to the subsurface problems that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed below, contact your GBA-member geotechnical engineer. Active involvement in the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Geotechnical-Engineering Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. *Those who rely on a geotechnical-engineering report prepared for a different client can be seriously misled*. No one except authorized client representatives should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one – not even you – should apply this report for any purpose or project except the one originally contemplated.*

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read it *in its entirety*. Do not rely on an executive summary. Do not read selected elements only. *Read this report in full*.

You Need to Inform Your Geotechnical Engineer about Change

Your geotechnical engineer considered unique, project-specific factors when designing the study behind this report and developing the confirmation-dependent recommendations the report conveys. A few typical factors include:

- the client's goals, objectives, budget, schedule, and risk-management preferences;
- the general nature of the structure involved, its size, configuration, and performance criteria;
- the structure's location and orientation on the site; and
- other planned or existing site improvements, such as retaining walls, access roads, parking lots, and underground utilities.

Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered*.

This Report May Not Be Reliable

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, that it could be unwise to rely on a geotechnical-engineering report whose reliability may have been affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If your geotechnical engineer has not indicated an "apply-by" date on the report, ask what it should be*, and, in general, *if you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying it. A minor amount of additional testing or analysis – if any is required at all – could prevent major problems.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface through various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing were performed*. The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgment to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team from project start to project finish, so the individual can provide informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, *they are not final*, because the geotechnical engineer who developed them relied heavily on judgment and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* revealed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation*.

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a full-time member of the design team, to:

- confer with other design-team members,
- help develop specifications,
- review pertinent elements of other design professionals' plans and specifications, and
- be on hand quickly whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction observation.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for informational purposes only*. To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report, but they may rely on the factual data relative to the specific times, locations, and depths/elevations referenced. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely*. Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures*. If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. As a general rule, *do not rely on an environmental report prepared for a different client, site, or project, or that is more than six months old.*

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, none of the engineer's services were designed, conducted, or intended to prevent uncontrolled migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration.*** Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION
Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org