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LIMITED GEOTECHNICAL EXPLORATION

MAITLAND CONCOURSE NORTH, LOT 6A-1 AND PARCEL C-2
511 WEST MAITLAND BOULEVARD (SR 414)
MAITLAND, ORANGE COUNTY, FLORIDA

UES PROJECT NO. 0130.1500104.0000
UES REPORT NO. 1223755

PREPARED FOR:

RELATED Development, LLC
315 South Biscayne Boulevard
Miami, Florida 33131

BPL Maitland Concourse North, LLC
221 South Knowles Avenue
Winter Park, Florida 32789

PREPARED BY:

Universal Engineering Sciences
3532 Maggie Boulevard
Orlando, Florida 32811
(407) 423-0504

April 30, 2015

UNIVERSAL ENGINEERING SCIENCES
Consultants In: Geotechnical Engineering • Environmental Sciences
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April 30, 2015

RELATED Development, LLC
315 South Biscayne Boulevard
Miami, Florida 33131

BPL Maitland Concourse North, LLC
221 South Knowles Avenue
Winter Park, Florida 32789

Attention: Mr. Max Cruz
mcruz@relatedgroup.com

Mr. W.P. Battaglia
bill@battagliagroup.com

Reference: **Limited Geotechnical Exploration**
Maitland Concourse North, Lot 6A-1 and Parcel C-2
511 West Maitland Boulevard (SR 414)
Maitland, Orange County, Florida
UES Project No. 0130.1500104.0000
UES Report No. 1223755

Dear Mr. Cruz and Mr. Battaglia:

Universal Engineering Sciences, Inc. (Universal) has completed a limited geotechnical exploration at the above referenced site in Orange County, Florida. The scope of our exploration was planned in conjunction with and authorized by you. This exploration was performed in accordance with generally accepted soil and foundation engineering practices. No other warranty, express 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 our estimates of the seasonal high groundwater level at the boring locations and general recommendations for utility trench construction.

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.

Respectfully Submitted,
UNIVERSAL ENGINEERING SCIENCES, INC.
Certificate of Authorization No. 549

Andrew S. Wilderotter, P.E.
Geotechnical Project Manager

GUY H. RABENS LICENSE No 60917 STATE OF FLORIDA PROFESSIONAL ENGINEER

Guy H. Rabens, M.S., P.E.
Geotechnical & Environmental Manager
Date: 4-30-2015
Florida Registration No. 60917

Mr. Max Cruz – mcruz@relatedgroup.com
Mr. Bill Battaglia - bill@battagliagroup.com
Mr. Jonathan Martin w/ Kimley-Horn – jonathan.martin@kimley-horn.com

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1.0 PROJECT DESCRIPTION

We understand that the proposed project will include the construction of a new mixed-use (residential and commercial) development in Maitland, FL. Based on information provided by Kimley-Horn & Associates, the project civil engineers, deep utility lines may be constructed off-site with Lot 6A-1 and Parcel C-2. A requested boring layout was provided to Universal prior to our exploration.

Should any of the above information or assumptions made by UES be inconsistent with the planned development and construction, we request that you contact us immediately to allow us the opportunity to review the new information in conjunction with our report and revise or modify our engineering recommendations accordingly, as needed.

No site or project facilities/improvements, other than those described herein, should be designed using the soil information presented in this report. Moreover, UES will not be responsible for the performance of any site improvement so designed and constructed.

2.0 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 impact the proposed development,
- to provide our estimates of the seasonal high groundwater level at the boring locations
- to provide general recommendations for utility trench construction.

This report presents an evaluation of site conditions on the basis of geotechnical procedures for site characterization. The recovered samples were not examined, either visually or analytically, for chemical composition or environmental hazards. We would be glad to provide you with a proposal for these services at your request.

Our exploration was not designed to specifically address the potential for surface expression of deep geological conditions, such as sinkhole development related to karst activity. This evaluation requires a more extensive range of field services than those performed in this study. We would be pleased to conduct an exploration to evaluate the probable effect of the regional geology upon the proposed construction, if you so desire.

3.0 SITE DESCRIPTION

The subject site is located within Section 25, Township 21 South, Range 29 East in Orange County, Florida. More specifically, the site is located on the north side of Maitland Boulevard (SR 414), between Interstate 4 and US Highway 17/92, as shown on the attached Figure A-1. At the time of drilling, the majority of the site was covered by citrus groves. Lake Hope borders the north side of the property, Lake Faith is located to the east, and Lake Charity to the west.

3.1 SOIL SURVEY

There are five (5) designated soil types mapped within the project boundaries according to the USDA NRCS Soil Survey of Orange County. A brief summary of the mapped surficial soil type(s) is presented in Table I.

TABLE I
SUMMARY OF PUBLISHED SOIL DATA

Soil Symbol	Soil Type	Hydrologic Group	Drainage Characteristics	Depth of Published Seasonal High GWT (feet)
3	***Basinger fine sand, depressional***	***A/D***	***Very poorly drained***	***0+***
28	Florahome fine sand, 0 to 5 percent slopes	A	Moderately well drained	4 to 6
46	Tavares fine sand, 0 to 5 percent slopes	A	Moderately well drained	3½ to 6
47	Tavares-Millhopper fine sand, 0 to 5 percent slopes	A	Moderately well drained	3½ to 6
48	Tavares-Urban land complex, 0 to 5 percent slopes	A	Moderately well drained	3½ to 6

Please note that soils mapped as Basinger fine sand, depressional were identified along the western boundary of Parcel 6A-1 (adjacent to Lake Charity). These depressional soils occasionally consist of up to 5+ feet of surficial organic soils. Based on the provided site plan, it appears that these depressional soils may be mapped outside of the proposed construction areas.

3.2 TOPOGRAPHY

According to information obtained from the United States Geologic Survey (USGS) Casselberry, FL quadrangle map, and partial topographic survey data provided by the project civil engineer, the ground surface elevation across the site area ranges from approximately +75 feet National Geodetic Vertical Datum (NGVD)within the northern portions of the site to +90 feet NGVD within Parcel C-2. A copy of a portion of the USGS Map is included in Appendix A.

Based on review of USGS maps and the Orange County Lake Index, normal high groundwater elevations for the Lake Hope, Lake Charity, Lake Faith chain ranges from about +67 to +69 feet NGVD.

4.0 SCOPE OF SERVICES

The scope of our geotechnical exploration, including locations and depths of the soil borings, was specifically requested by the project civil engineer. The services conducted by Universal during our exploration are as follows:

- Drill a total of four (4) Standard Penetration Test (SPT) borings to a depth of 15 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 seasonal high groundwater level at the boring locations.
- Conduct laboratory testing 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 which documents the results of our exploration and analysis with geotechnical engineering recommendations.

5.0 FIELD EXPLORATION

The SPT soil borings were performed using ATV and truck mounted drilling rigs. Horizontal and vertical survey control was not provided for the test locations prior to our field exploration program. Universal located the test borings by using the provided site plan, measuring from existing on-site landmarks shown on an aerial photograph, and by using handheld GPS devices. The indicated test locations should be considered accurate to the degree of the methodologies used. The approximate boring locations are shown in Appendix B.

The SPT borings, designated L-1 through L-4 on the attached Boring Location Plan in Appendix B, were performed in general accordance with the procedures of ASTM D 1586 "Standard Method for Penetration Test and Split-Barrel Sampling of Soils". SPT sampling was performed continuously to 10 feet to detect variations in the near surface soil profile and on approximate 5 feet centers thereafter.

6.0 LABORATORY TESTING

The soil samples recovered from the test borings were returned to our laboratory and visually classified in general accordance with ASTM D 2487 "Standard Classification of Soils for Engineering Purposes" (Unified Soil Classification System). We selected representative soil samples from the borings for laboratory testing to aid in classifying the soils and to help to evaluate the general engineering characteristics of the site soils. The results of these tests are shown on the boring logs in Appendix B. In addition, concrete compressive strength testing was performed on the floor slab cores. The results of these tests are shown in Table III. A summary of the tests performed is shown in Table I.

TABLE I
LABORATORY METHODOLOGIES

Test Performed	Number Performed	Reference
Grain Size Analysis (#200 wash only)	4	ASTM D 1140 "Amount of Material in Soils Finer than the No. 200 (75 - µm) sieve"
Moisture Content	4	ASTM D 2216 "Laboratory Determination of Water (Moisture) Content of Soil by Mass"

7.0 SUBSURFACE CONDITIONS

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 groundwater levels are shown on the boring logs included in Appendix B. The Key to Boring Logs, Soil Classification Chart is also included in Appendix B. The soil profiles were prepared from 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. A generalized profile of the soils encountered at our boring locations is presented in Table II. For detailed soil profiles, please refer to the attached boring logs.

TABLE III
GENERALIZED SOIL PROFILE

Typical Depth (feet, bls)		Soil Description	Range of SPT "N" Values (blows/ft)
From	To		
Surface	15*	Very loose to medium dense fine sands [SP]. These sands are underlain by clayey fine sands [SC] at borings L-2 and L-4	2 to 17

8.0 GROUNDWATER CONDITIONS

8.1 EXISTING GROUNDWATER LEVEL

We measured the water levels in the boreholes on April 10 through 13, 2015 at the time of our exploration. The encountered groundwater levels ranged from approximately 7 to 10 feet below existing grade. No groundwater was encountered within the drilled depths at boring L-4. The encountered groundwater level at each of the boring locations is shown on the attached boring logs. 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.

8.2 SEASONAL HIGH GROUNDWATER LEVEL

Based on historical data, the rainy season in Central Florida is between June and October of the year. In order to estimate the seasonal high water level at the boring locations, many factors are examined, including the following:

- Measured groundwater level
- Drainage characteristics of existing soil types
- Current & historical rainfall data
- Natural relief points (such as lakes, rivers, wetlands, etc.)
- Man-made drainage systems (ditches, canals, retention basins, etc.)
- On-site types of vegetation
- Review of available data (soil surveys, USGS maps, etc.)
- Redoximorphic features (mottling, stripping, etc.)

Based on the results of our field exploration and the factors listed above, we estimate that the seasonal high groundwater level at the boring locations may form roughly 4½ to 12 feet. The large variation in seasonal high groundwater levels can be attributed to topographic relief across the site and the presence/depth of hydraulically restrictive clayey soils.

Please note that the presence of hydraulically restrictive clayey sands may form a transient perched groundwater condition at boring L-4, especially after periods of heavy rainfall and/or irrigation. *Perched groundwater levels can generally be expected to occur about 6 inches to 2 feet above the top of hydraulically restrictive soils, where present, if the groundwater table is unable to drain and/or percolate into a more pervious layer. It should be noted that undercutting of the hydraulically restrictive materials will impact the depth of the perched water table. The potential for groundwater to perch will be directly related to rainfall and irrigation amounts, as well as site grading.* ***The potential for transient perched groundwater levels should be considered during the design of the site grades and during construction.***

The estimated seasonal high groundwater level at each of the boring locations is shown on the individual boring logs in Appendix B.

It should be noted that the estimated seasonal high water levels do not provide any assurance that groundwater levels will not exceed these estimated levels during any given year in the future. Should the impediments to surface water drainage be present, or should rainfall intensity and duration, or total rainfall quantities, exceed the normally anticipated rainfall quantities, groundwater levels might exceed our seasonal high estimates. Further, it should be understood that changes in the surface hydrology and subsurface drainage from on-site and/or off-site improvements could have significant effects on the normal and seasonal high groundwater levels.

9.0 UTILITY TRENCH RECOMMENDATIONS

The following are our recommendations for construction of the proposed utility lines.

1. Perform any necessary remedial dewatering prior to excavation operations. Dewatering should be performed to a depth of at least 2 feet below the bottom of trench excavation.

2. Excavate the trenches in accordance with design configuration and install utility lines. Any unsuitable soils encountered at trench bottom level should be removed and replaced within compacted approved sand backfill. If the bottom of excavation is unstable due to excessive fines and/or wet conditions, an option would be to over-excavate and replace the saturated soils with compacted graded aggregate (FDOT 57 stone) until a firm, non-yielding subgrade is achieved.

3. After constructing the utility lines, backfill with suitable sand fill placed in 6 to 12 inch thick loose lifts. Each lift of backfill should be compacted to at least 95 percent of the Modified Proctor test maximum dry density (ASTM D 1557). Beneath pavement areas, the top 12 inches of backfill should be compacted to at least 98 percent (see Section 10.2.2).

Backfill above and around thrust blocks should consist of clean fine sands [SP, SP-SM] compacted at least 98 percent of Modified Proctor maximum dry density (ASTM D 1557).

10.0 DEWATERING AND EXCAVATION CONSIDERATIONS

Based on the groundwater level conditions encountered, some dewatering may be required for the successful construction of this project. Where excavations will extend only a few feet below the groundwater table, a sump pump may be sufficient to control the groundwater table. Deeper excavations may require well points and/or sock drains to control the groundwater table. Regardless of the method(s) used, we recommend drawing down the water level at least 2 feet below the bottom of the excavation. The actual method(s) of dewatering should be determined by the contractor. The design and discharge of the dewatering system must be performed in accordance with applicable regulatory criteria (i.e. water management district, etc.) and compliance with such criteria is the sole responsibility of the contractor.

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. 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 workman safety within excavations is the sole responsibility of the contractor.

11.0 CONSTRUCTION RELATED SERVICES

We recommend the owner retain Universal 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 and pavement subgrades by monitoring earthwork operations and performing quality assurance tests of the placement of compacted structural fill courses.

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.

12.0 LIMITATIONS

This report has been prepared for the exclusive use of ***RELATED Development, LLC, BPL Maitland Concourse North, LLC***, and other designated members of their design/construction team associated with the proposed construction for the specific project discussed in this report. No other site or project facilities should be designed using the soil information contained in this report. As such, UES will not be responsible for the performance of any other site improvement designed using the data in this report.

This report should not be relied upon for final design recommendations or professional opinions by unauthorized third parties without the expressed written consent of Universal Engineering Sciences. Unauthorized third parties that rely upon the information contained herein without the expressed written consent of Universal Engineering Sciences, Inc. assume all risk and liability for such reliance.

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 which may occur between the boring locations. 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.

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, UES does not recommend relying on our boring information 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 anomalous conditions or estimate such quantities. Therefore, UES 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 man-made 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 man-made 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.

During the early stages of most construction projects, geotechnical issues not addressed in this report may arise. Because of the natural limitations inherent in working with the subsurface, it is not possible for a geotechnical engineer to predict and address all possible problems. An

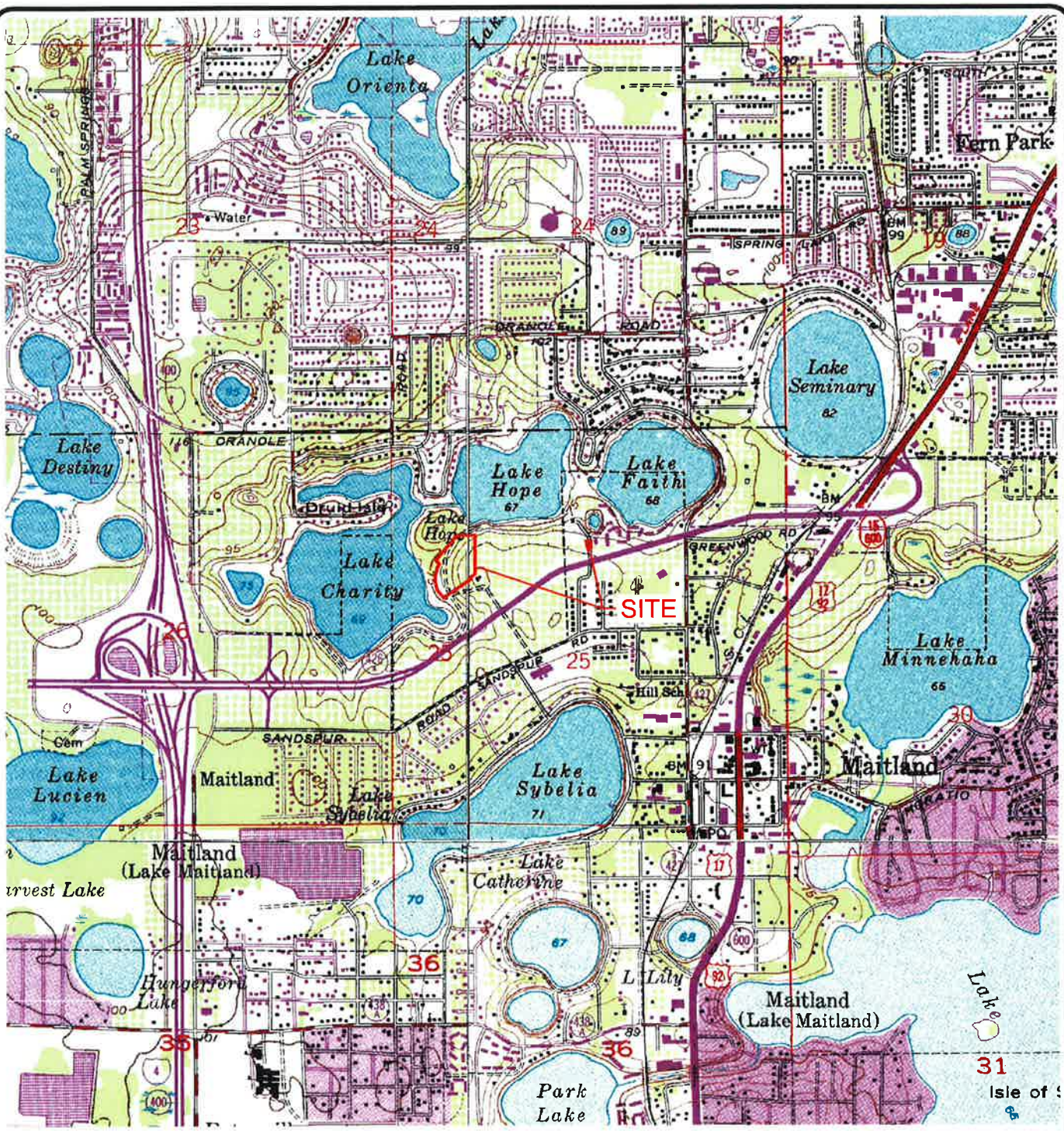
Association of Engineering Firms Practicing in the Geosciences (ASFE) publication, "Important Information About Your Geotechnical Engineering Report" appears in Appendix C, and will help explain the nature of geotechnical issues.

Further, we present documents in Appendix C: Constraints and Restrictions, to bring to your attention the potential concerns and the basic limitations of a typical geotechnical report.

* * * * * * * * * *

APPENDIX A

UNIVERSAL ENGINEERING SCIENCES



BASE MAPS: "CASSELBERRY, FLA." & "FOREST CITY, FLA." U.S.G.S. QUADRANGLE MAPS

15-0169-01

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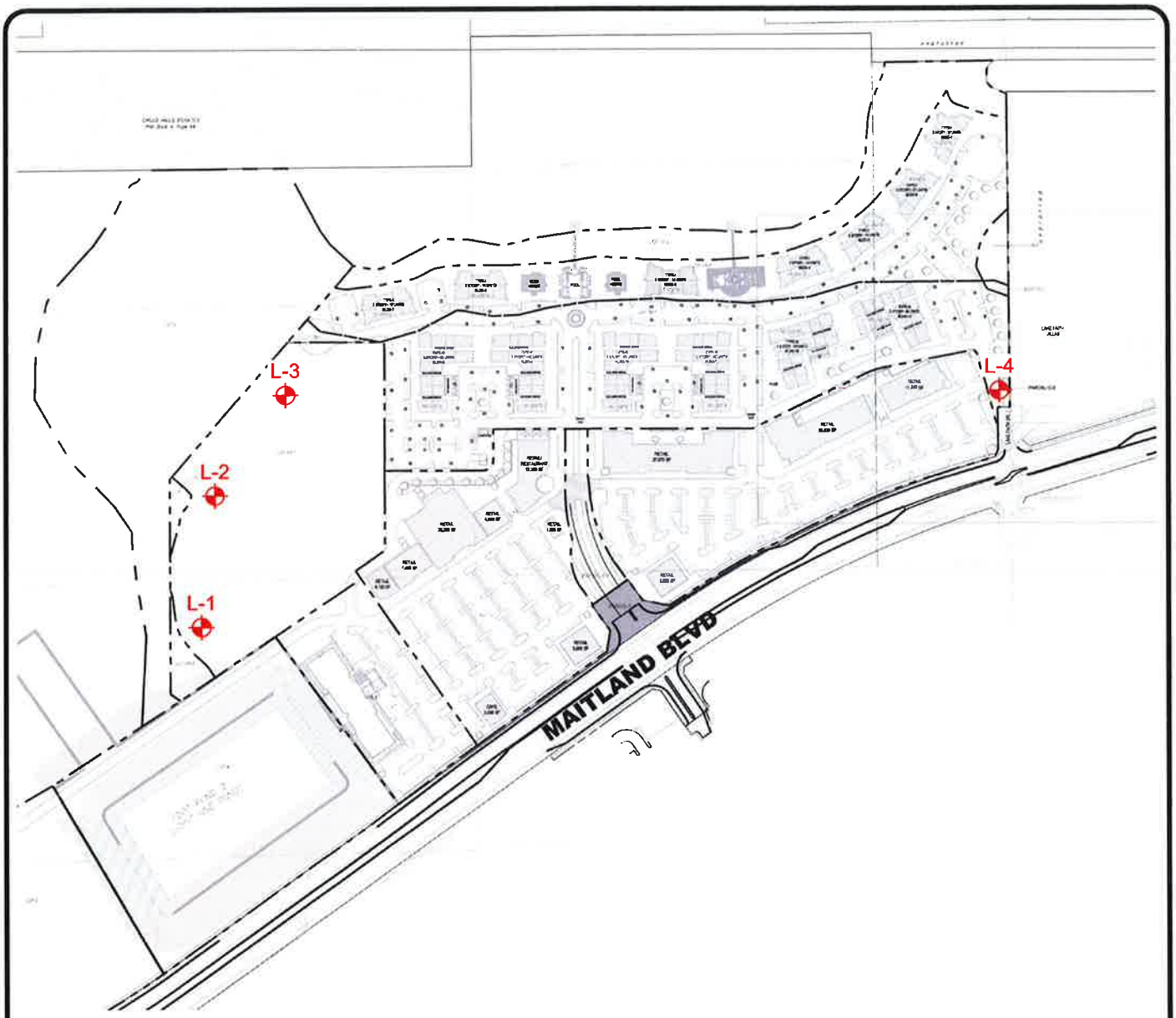
LIMITED GEOTECHNICAL EXPLORATION
MAITLAND CONCOURSE NORTH
LOT 6A-1 AND PARCEL C-2
ORANGE COUNTY, FLORIDA

U.S.G.S. SITE LOCATION MAP

DRAWN BY:	G.B.	DATE:	4/21/15	CHECKED BY:	A.S.W.	DATE:	4/28/15
SCALE:	AS SHOWN	PROJECT NO:	0130.1500104.0000	REPORT NO:	1223755	PAGE NO:	A-1

APPENDIX B

UNIVERSAL
ENGINEERING SCIENCES



LEGEND

APPROXIMATE STANDARD PENETRATION TEST BORING LOCATION

N

0 400

SCALE, FEET

BORINGS PERFORMED 4/10/15 & 4/13/15
THIS PLAN BASED ON DRAWING PROVIDED BY CLIENT

15-0169-01

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LIMITED GEOTECHNICAL EXPLORATION
MAITLAND CONCOURSE NORTH
LOT 6A-1 AND PARCEL C-2
ORANGE COUNTY, FLORIDA

BORING LOCATION PLAN

DRAWN BY:	G.B.	DATE:	4/21/15	CHECKED BY:	A.S.W.	DATE:	4/28/15
SCALE:	AS SHOWN	PROJECT NO:	0130.1500104.0000	REPORT NO:	1223755	PAGE NO:	B-1

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	0130.1500104.0000
REPORT NO.:	1223755
PAGE:	B-2.1

PROJECT: LIMITED GEOTECHNICAL EXPLORATION
MAITLAND CONCOURSE NORTH, LOT 6A-1 & PARCEL C-2
ORANGE COUNTY, FLORIDA

CLIENT: BPL MAITLAND CONCOURSE NORTH, LLC

LOCATION: SEE BORING LOCATION PLAN

REMARKS: SHGWT = SEASONAL HIGH GROUNDWATER TABLE, N.S. = NOT SURVEYED

BORING I.D.: **L-1** SHEET: **1 of 1**
SECTION: 25 TOWNSHIP: 21 RANGE: 29

G.S. ELEVATION (ft):	N.S.	DATE STARTED:	4/10/13
WATER TABLE (ft):	7	DATE FINISHED:	4/10/13
DATE OF READING:	4/10/2015	DRILLED BY:	ORL-JB/JB/JC
EST. SHGWT (ft):	4.5	TYPE OF SAMPLING:	ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N BLOWS / FT	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT/ DAY)	ORG. CONT. (%)
0												
		3-3-3	6			Loose dark brown fine SAND [SP]						
		3-3-3	6			-- gray brown						
5		3-4-5	9	▽		-- shade lighter						
		4-4-3	7	▼			3	11				
		3-3-3	6			-- gray						
10		3-4-4	8									
		4-5-8	13			-- medium dense, trace clay						
15						BORING TERMINATED AT 15.0 FEET						
20												
25												

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UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	0130.1500104.0000
REPORT NO.:	1223755
PAGE:	B-2.2

PROJECT: LIMITED GEOTECHNICAL EXPLORATION
MAITLAND CONCOURSE NORTH, LOT 6A-1 & PARCEL C-2
ORANGE COUNTY, FLORIDA

CLIENT: BPL MAITLAND CONCOURSE NORTH, LLC

LOCATION: SEE BORING LOCATION PLAN

REMARKS: SHGWT = SEASONAL HIGH GROUNDWATER TABLE, N.S. = NOT SURVEYED

BORING I.D.: **L-2** SHEET: **1 of 1**
SECTION: 25 TOWNSHIP: 21 RANGE: 29

G.S. ELEVATION (ft):	N.S.	DATE STARTED:	4/10/13
WATER TABLE (ft):	7.5	DATE FINISHED:	4/10/13
DATE OF READING:	4/10/2015	DRILLED BY:	ORL-JB/JB/JC
EST. SHGWT (ft):	5	TYPE OF SAMPLING:	ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N BLOWS / FT	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT/ DAY)	ORG. CONT. (%)
0						Very loose dark brown fine SAND with roots [SP]						
		2-1-2	3									
		3-2-3	5			-- loose						
5		2-2-2	4	▽		-- very loose, dark gray brown						
		3-2-2	4	▼		-- light brown						
		3-2-2	4									
10		2-1-1	2									
						Loose light gray brown clayey fine SAND [SC]	29	24				
15		2-3-3	6			BORING TERMINATED AT 15.0 FEET						
20												
25												

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UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	0130.1500104.0000
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PAGE:	B-2.3

PROJECT: LIMITED GEOTECHNICAL EXPLORATION
MAITLAND CONCOURSE NORTH, LOT 6A-1 & PARCEL C-2
ORANGE COUNTY, FLORIDA

CLIENT: BPL MAITLAND CONCOURSE NORTH, LLC

LOCATION: SEE BORING LOCATION PLAN

REMARKS: SHGWT = SEASONAL HIGH GROUNDWATER TABLE, N.S. = NOT SURVEYED

BORING I.D.: **L-3** SHEET: **1 of 1**
SECTION: 25 TOWNSHIP: 21 RANGE: 29

G.S. ELEVATION (ft): N.S. DATE STARTED: 4/10/13
WATER TABLE (ft): 10 DATE FINISHED: 4/10/13
DATE OF READING: 4/10/2015 DRILLED BY: ORL-JB/JB/JC
EST. SHGWT (ft): 7 TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N BLOWS / FT	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT/ DAY)	ORG. CONT. (%)
0						Loose dark brown fine SAND [SP]						
		3-2-3	5									
		2-3-3	6									
5						-- very loose, brown						
		2-1-2	3									
						-- light brown						
		2-2-2	4	▽								
		2-2-2	4				1	4				
10		2-2-2	4	▼		-- red brown						
						-- loose, dark brown						
15		3-3-3	6			BORING TERMINATED AT 15.0 FEET						
20												
25												

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UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	0130.1500104.0000
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PAGE:	B-2.4

PROJECT: LIMITED GEOTECHNICAL EXPLORATION
MAITLAND CONCOURSE NORTH, LOT 6A-1 & PARCEL C-2
ORANGE COUNTY, FLORIDA

CLIENT: BPL MAITLAND CONCOURSE NORTH, LLC

LOCATION: SEE BORING LOCATION PLAN

REMARKS: SHGWT = SEASONAL HIGH GROUNDWATER TABLE, N.S. = NOT SURVEYED

BORING I.D.: **L-4** SHEET: **1 of 1**
SECTION: 25 TOWNSHIP: 21 RANGE: 29

G.S. ELEVATION (ft): N.S. DATE STARTED: 4/13/15
WATER TABLE (ft): N.E. DATE FINISHED: 4/13/15
DATE OF READING: 4/13/15 DRILLED BY: ORL-JB/JB/SP
EST. SHGWT (ft): 12 TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N BLOWS / FT	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT/ DAY)	ORG. CONT. (%)
0						Loose light brown fine SAND [SP]						
		2-3-2	5									
						-- shade lighter						
		2-3-2	5									
5						-- very loose						
		2-2-1	3									
						-- very light brown						
		2-2-2	4									
						-- loose						
		2-3-2	5									
10		2-3-3	6									
				▽								
						Medium dense light brown clayey fine SAND [SC]	18	9				
15		8-8-9	17			BORING TERMINATED AT 15.0 FEET						
20												
25												

W-08667.GPJ

UNIVERSAL ENGINEERING SCIENCES

KEY TO BORING LOGS

SYMBOLS AND ABBREVIATIONS

SYMBOL	DESCRIPTION
N-Value	No. of Blows of a 140-lb. Weight Falling 30 Inches Required to Drive a Standard Spoon 1 Foot
WOR	Weight of Drill Rods
WOH	Weight of Drill Rods and Hammer
	Sample from Auger Cuttings
	Standard Penetration Test Sample
	Thin-wall Shelby Tube Sample (Undisturbed Sampler Used)
RQD	Rock Quality Designation
	Stabilized Groundwater Level
	Seasonal High Groundwater Level (also referred to as the W.S.W.T.)
NE	Not Encountered
GNE	Groundwater Not Encountered
BT	Boring Terminated
-200 (%)	Fines Content or % Passing No. 200 Sieve
MC (%)	Moisture Content
LL	Liquid Limit (Atterberg Limits Test)
PI	Plasticity Index (Atterberg Limits Test)
NP	Non-Plastic (Atterberg Limits Test)
K	Coefficient of Permeability
Org. Cont.	Organic Content
G.S. Elevation	Ground Surface Elevation

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COARSE GRAINED SOILS More than 50% retained on the No. 200 sieve*	GRAVELS 50% or more of coarse fraction retained on No. 4 sieve	CLEAN GRAVELS	GW	Well-graded gravels and gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines
		GRAVELS WITH FINES	GM	Silty gravels and gravel-sand-silt mixtures
			GC	Clayey gravels and gravel-sand-clay mixtures
	SANDS More than 50% of coarse fraction passes No. 4 sieve	CLEAN SANDS 5% or less passing No. 200 sieve	SW**	Well-graded sands and gravelly sands, little or no fines
			SP**	Poorly graded sands and gravelly sands, little or no fines
		SANDS with 12% or more passing No. 200 sieve	SM**	Silty sands, sand-silt mixtures
			SC**	Clayey sands, sand-clay mixtures
FINE-GRAINED SIOLS 50% or more passes the No. 200 sieve*	SILTS AND CLAYS Liquid limit 50% or less		ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy 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 diamicaceous fine sands or silts, elastic silts
			CH	Inorganic clays or clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity
			PT	Peat, muck and other highly organic soils

*Based on the material passing the 3-inch (75 mm) sieve
** Use dual symbol (such as SP-SM and SP-SC) for soils with more than 5% but less than 12% passing the No. 200 sieve

RELATIVE DENSITY
(Sands and Gravels)
Very loose – Less than 4 Blow/Foot
Loose – 4 to 10 Blows/Foot
Medium Dense – 11 to 30 Blows/Foot
Dense – 31 to 50 Blows/Foot
Very Dense – More than 50 Blows/Foot

CONSISTENCY
(Silts and Clays)
Very Soft – Less than 2 Blows/Foot
Soft – 2 to 4 Blows/Foot
Firm – 5 to 8 Blows/Foot
Stiff – 9 to 15 Blows/Foot
Very Stiff – 16 to 30 Blows/Foot
Hard – More than 30 Blows/Foot

RELATIVE HARDNESS
(Limestone)
Soft – 100 Blows for more than 2 Inches
Hard – 100 Blows for less than 2 Inches

MODIFIERS

These modifiers Provide Our Estimate of the Amount of Minor Constituents (Silt or Clay Size Particles) in the Soil Sample
Trace – 5% or less
With Silt or With Clay – 6% to 11%
Silty or Clayey – 12% to 30%
Very Silty or Very Clayey – 31% to 50%

These Modifiers Provide Our Estimate of the Amount of Organic Components in the Soil Sample
Trace – Less than 3%
Few – 3% to 4%
Some – 5% to 8%
Many – Greater than 8%

These Modifiers Provide Our Estimate of the Amount of Other Components (Shell, Gravel, Etc.) in the Soil Sample
Trace – 5% or less
Few – 6% to 12%
Some – 13% to 30%
Many – 31% to 50%

APPENDIX C

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Important Information about Your

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.

Geotechnical 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 civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- 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,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- 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. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of 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 equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely, on Your ASFE-Member Geotechncial Engineer for Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your ASFE-member geotechnical engineer for more information.

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CONSTRAINTS & RESTRICTIONS

The intent of this document is to bring to your attention the potential concerns and the basic limitations of a typical geotechnical report.

WARRANTY

Universal Engineering Sciences has prepared this report for our client for his exclusive use, in accordance with generally accepted soil and foundation engineering practices, and makes no other warranty either expressed or implied as to the professional advice provided in the report.

UNANTICIPATED SOIL CONDITIONS

The analysis and recommendations submitted in this report are based upon the data obtained from soil borings performed at the locations indicated on the Boring Location Plan. This report does not reflect any variations which may occur between these borings.

The nature and extent of variations between borings may not become known until excavation begins. If variations appear, we may have to re-evaluate our recommendations after performing on-site observations and noting the characteristics of any variations.

CHANGED CONDITIONS

We recommend that the specifications for the project require that the contractor immediately notify Universal Engineering Sciences, as well as the owner, when subsurface conditions are encountered that are different from those present in this report.

No claim by the contractor for any conditions differing from those anticipated in the plans, specifications, and those found in this report, should be allowed unless the contractor notifies the owner and Universal Engineering Sciences of such changed conditions. Further, we recommend that all foundation work and site improvements be observed by a representative of Universal Engineering Sciences to monitor field conditions and changes, to verify design assumptions and to evaluate and recommend any appropriate modifications to this report.

MISINTERPRETATION OF SOIL ENGINEERING REPORT

Universal Engineering Sciences is responsible for the conclusions and opinions contained within this report based upon the data relating only to the specific project and location discussed herein. If the conclusions or recommendations based upon the data presented are made by others, those conclusions or recommendations are not the responsibility of Universal Engineering Sciences.

CHANGED STRUCTURE OR LOCATION

This report was prepared in order to aid in the evaluation of this project and to assist the architect or engineer in the design of this project. If any changes in the design or location of the structure as outlined in this report are planned, or if any structures are included or added that are not discussed in the report, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions modified or approved by Universal Engineering Sciences.

USE OF REPORT BY BIDDERS

Bidders who are examining the report prior to submission of a bid are cautioned that this report was prepared as an aid to the designers of the project and it may affect actual construction operations.

Bidders are urged to make their own soil borings, test pits, test caissons or other investigations to determine those conditions that may affect construction operations. Universal Engineering Sciences cannot be responsible for any interpretations made from this report or the attached boring logs with regard to their adequacy in reflecting subsurface conditions which will affect construction operations.

STRATA CHANGES

Strata changes are indicated by a definite line on the boring logs which accompany this report. However, the actual change in the ground may be more gradual. Where changes occur between soil samples, the location of the change must necessarily be estimated using all available information and may not be shown at the exact depth.

OBSERVATIONS DURING DRILLING

Attempts are made to detect and/or identify occurrences during drilling and sampling, such as: water level, boulders, zones of lost circulation, relative ease or resistance to drilling progress, unusual sample recovery, variation of driving resistance, obstructions, etc.; however, lack of mention does not preclude their presence.

WATER LEVELS

Water level readings have been made in the drill holes during drilling and they indicate normally occurring conditions. Water levels may not have been stabilized at the last reading. This data has been reviewed and interpretations made in this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, tides, and other factors not evident at the time measurements were made and reported. Since the probability of such variations is anticipated, design drawings and specifications should accommodate such possibilities and construction planning should be based upon such assumptions of variations.

LOCATION OF BURIED OBJECTS

All users of this report are cautioned that there was no requirement for Universal Engineering Sciences to attempt to locate any man-made buried objects during the course of this exploration and that no attempt was made by Universal Engineering Sciences to locate any such buried objects. Universal Engineering Sciences cannot be responsible for any buried man-made objects which are subsequently encountered during construction that are not discussed within the text of this report.

TIME

This report reflects the soil conditions at the time of exploration. If the report is not used in a reasonable amount of time, significant changes to the site may occur and additional reviews may be required.

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