UNIVERSAL
ENGINEERING SCIENCES

REPORT OF GEOTECHNICAL EXPLORATION
ANCLOTE HARBOR APARTMENTS
US-19 AND ATLANTIC AVENUE
TARPON SPRINGS, PINELLAS COUNTY; FL

UES PROJECT NO.:1185.2000136.0000
UES REPORT NO.: G-MD-AHA-1

Prepared For:

Morgan Group Development
5606 South Rice Avenue
Houston, TX 77081

Prepared By:

Universal Engineering Sciences, Inc.
3018 22nd Avenue South
St. Petersburg, Florida 33712
(727) 209-1500

October 6, 2020

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
- Miami
- Ocala
- Orlando (Headquarters)
- Palm Coast
- Panama City
- Pensacola
- Rockledge
- Sarasota
- St. Petersburg
- Tampa
- Tifton
- West Palm Beach

October 6, 2020

Morgan Group Development
5606 South Rice Avenue
Houston, TX 77081

Attn: Mr. Kamil Salame

Reference: **REPORT OF GEOTECHNICAL EXPLORATION**
Anclote Harbor Apartments
US-19 and Atlantic Avenue
Tarpon Springs, Pinellas County; FL
UES Project No.:1185.2000136.0000
UES Report No.: G-MD-AHA-1

Dear Mr. Salame:

Universal Engineering Sciences, Inc. (UES) has completed the subsurface exploration for the above referenced project. The scope of our exploration was planned in conjunction with and authorized by you.

This report contains the results of our exploration, an engineering interpretation of these results with respect to the project characteristics described to us, and recommendations to aid in foundation, grade slab, and pavement design, and site preparation.

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 Number 549

SURENDRA V. SAGI LICENSE No. 74096 STATE OF FLORIDA PROFESSIONAL ENGINEER

Digitally signed by Surendra V Sagi
DN: c=US, st=Florida, l=Sarasota, o=Universal Engineering Sciences, LLC, cn=Surendra V Sagi, email=ssagi@universalengineering.com
Reason: This document has been digitally signed and sealed. Printed copies of this document are not considered signed and sealed, and the SHA authentication code must be verified on any electronic copies.
Location: Florida
Date: 2021.06.16 18:04:23 -04'00'

William (Trey) Pippin, E.I.
Staff Engineer

Surendra V. Sagi, P.E
Principal Engineer

TABLE OF CONTENTS

SECTION **PAGE**

LIST OF APPENDICES

1.0 INTRODUCTION

1.1 GENERAL

In this report, we present the results of the subsurface exploration for the proposed development. A general location plan of the project appears in Appendix A: Site Location Plan. We have divided this report into the following sections:

- SCOPE OF SERVICES - Defines what we did
- FINDINGS - Describes what we encountered
- RECOMMENDATIONS - Describes what we encourage you to do
- LIMITATIONS - Describes the restrictions inherent in this report
- APPENDICES - Presents support materials referenced in this report.

2.0 SCOPE OF SERVICES

2.1 PROJECT DESCRIPTION

The subject site is located northeast of the intersection of highway US 19 and Atlantic Avenue in Tarpon Springs, Pinellas County, Florida. Based on the latest site plan dated July 27, 2020 you provided, we understand that the proposed development is planned to consist of a five apartment buildings, a 4-story and a club house, a pool, garages with associated stormwater ponds, treatment ponds, and pavement areas. Structural loads were not available at the time of this report. We have assumed maximum column and wall loads of 100 kips and 15 kips per linear foot, respectively. Actual design building loads should be provided for our review when available.

The following drawings were provided and used for this report:

- *ALTA / NSPS Land Title Boundary and Topographic Survey* dated February 11, 2004 was used to estimate the ground surface elevations at the boring locations and define the wetland areas evaluated by muck probing (Wetland 2 and Wetland 6)
- *Anclote Harbor Conceptual Development Plan* dated July 27, 2020 was used to reference borings locations with respect to the proposed development. Our borings are shown on this drawing in Appendix A.

Our recommendations are based upon the above considerations. If any of this information is incorrect or if you anticipate any changes, inform Universal Engineering Sciences so that we may review our recommendations.

2.2 PURPOSE

The purpose of this exploration was:

- To explore the general subsurface conditions at the sites;
- To interpret and review the subsurface conditions with respect to the proposed construction; and
- To provide geotechnical engineering recommendations for foundation, grade slab, and pavement design, and site preparation.

Recommendations concerning other soil related considerations were beyond the scope of our exploration. This report presents an evaluation of site conditions on the basis of traditional geotechnical procedures for site characterization. The recovered samples were not examined, either visually or analytically, for chemical composition or environmental hazards. Universal Engineering Sciences would be pleased to perform these services, if you desire.

2.3 FIELD EXPLORATION

The subsurface conditions were explored by drilling and sampling eighty-six (86) borings and performing five (5) Double Ring Infiltrometer (DRI) tests and muck probing in two wetland impact areas. The borings depths ranged from 10 to 40 feet below the existing ground surface (bgs). The borings and DRI test locations were located in the field using a handled global positioning system (GPS) device. The approximate test locations are shown on the attached Boring Location Plan in Appendix A. Boring B-57 had to be offset approximately 100 feet north of the proposed location because the wetland impact area was not accessible to our drilling equipment. The two wetland impact area were evaluated (where accessible) for approximate muck depths by a UES Engineer with a 4-foot long probe rod.

We performed the Standard Penetration Test using our Diedrich D25 drill rig utilizing mud rotary procedures according to the procedures of ASTM D-1586, with continuous sampling performed above a depth of 10 feet, to detect slight variations in the soil profile at shallow depths, and then at five-foot intervals thereafter. The basic procedure for the Standard Penetration Test is as follows: A standard split-barrel sampler is driven into the soil by a 140-pound hammer falling 30 inches. The number of blows required to drive the sampler 1-foot, after seating 6 inches, is designated the penetration resistance, or N-value; this value is an index to soil strength and consistency.

3.0 FINDINGS

3.1 SITE CONDITIONS

The site currently consists of undeveloped land that is mostly wooded with relatively tall trees with some of the northern portion of the site being clear. Two wetland impact areas were noted at the site. The north wetland (Wetland 6) contained about 1 to 2 feet and ponded water. The south Wetland (Wetland 2) contained 1 to 3 feet of ponded water in most areas, but one isolated area contained 5 feet or more of water depth in the south-central area of the wetland. The central portion of Wetland 2 area was not observable due to very thick brush. The ground surface elevations at our boring locations ranged from approximately 3 to 22 feet according to the topographic drawing provided.

3.2 SOIL SURVEY-PUBLISHED INFORMATION

The “Soil Survey of Pinellas County, Florida”, published by the United States Department of Agriculture (USDA) - Soil Conservation Service (SCS), was reviewed for general near-surface soil information prior to development within the general project vicinity. The USDA, SCS primary soil mapping groups within the proposed project area, and some characteristics and properties are summarized below. The location of the group can be observed on the SCS Soil Survey Map provided in the Appendix A.

Astatula (soil Group No. 4): This soil group consists of fine sands from the surface to a depth of about 80 inches. The water table is at a depth of more than 80 inches.

Myakka (Soil Group No. 17): This soil group consists of fine sands from the surface to a depth of about 80 inches. The water table is at depths from 6 to 18 inches below grade.

Wulfert Muck (Soil Group No. 32): This soil group typically consists of muck from the surface to a depth of about 36 inches below grade, and fine sand from 36 to 80 inches. Based on the soil survey, the water table is at grade.

3.3 SUBSURFACE CONDITIONS

The approximate boring location and more detailed subsurface conditions are illustrated in Appendix A: Boring Location Plan and Soil Boring Profiles. The classifications and descriptions shown on the logs are generally based upon visual characterizations of the recovered soil samples and laboratory test performed. Laboratory tests included particle size anises, moisture content and organic content determination performed on select soil samples. Also, see Appendix A: Soils Classification Chart, for further explanation of the symbols and placement of data on the Boring Logs. The following tables summarize the typical soil conditions encountered in our limited subsurface exploration.

TABLE 1
General Soil Profile

Typical depth (ft)		Soil Descriptions
From	To	
0	12	Very loose to medium dense fine sand [SP]
12	17	Very loose to medium dense sand to fine sand with silt [SP, SP-SM]; very soft to medium stiff clay to silty clay [CL/CH/CL-ML]; very soft to medium stiff clayey silt [ML]
17	40*	Very loose to medium dense sand to fine sand with silt [SP, SP-SM]; very soft to medium stiff clay to silty clay [CL/CH/CL-ML]; very soft to medium stiff clayey silt [ML]; weathere limestone with calcareous clay

* Termination Depth of Deepest Boring
[ ] Bracketed Text Indicates: Unified Soil Classification

The above conditions are a general summary of typical conditions encountered in in most of the borings. However, the notable conditions below were also encountered in some of the borings.

Notable Conditions:

- **The presence of very loose soils with N-values of zero (WOH) to 1 blows per foot from depths ranging between 10 to 35 feet bgs in borings B-1, B-2, B-3, B-5, B-7, B-9, B-10, B-15, B-19, B-22, B-48, B-49, B-55, B-60, B-61, and B-62.**
- **The presence of significant amounts of organic material from depths ranging from 2 to 5 feet bgs in borings B-49, B-73, B-74, B-78, B-79, B-80, B-84, and B-86.**

Variations in the depth, thickness and consistency of the aforementioned soil strata occurred at the individual test boring locations. We encountered groundwater at depths of about 2 to 10 feet bgs in most of the borings at the time of our exploration. Some of the borings were terminated at a depth of 10 feet bgs and groundwater was not encountered. The table in Appendix A shows the apparent groundwater depths in the borings at the time of drilling and the estimated seasonal high groundwater table (SHGWT) at the boring locations.

3.3 DOUBLE RING INFILTROMETER TEST

UES performed five (5) DRI tests at a depth of approximately 2 feet below grade. The DRI tests were performed in general accordance with ASTM D 3385, "Standard Test Method for Infiltration Rate of Soils in Filed Using Double Ring Infiltrometer". The test locations are shown in Appendix A on the Boring Location Plan and the test results are also shown at the end of Apednix A.

The table below shows DRI test results and estimated soil design parameters. An appropriate factor of safety should be applied to stormwater drainage design.

TABLE 2: Recommendations for Soil Design Parameters

Design Parameter	Estimated Values				
Test Location	DRI-1	DRI-2	DRI-3	DRI-4	DRI-5
Test Depth (feet)	2	2	2	2	2
Estimated Depth of SHGW Level (feet)	3	3	3	2	5
Depth of Confining Layer (feet)	≥12	≥12	≥12	≥12	≥12
Fillable Porosity of Surficial in-situ sands (percent)	20	20	20	20	20
Estimated Vertical Unsaturated Infiltration Rate (feet/day)	11	15	16	5	16
Estimated Horizontal Hydraulic Conductivity (feet/day)	16	22	24	8	24

4.0 RECOMMENDATIONS

4.1 GENERAL

The organic materials encountered in eight of the borings (B-49, B-73, B-74, B-78, B-79, B-80, B-84, and B-86) are not suitable for the proposed construction and should be completely removed and replaced with structural fill.

Borings B-60 and B-62 performed in the proposed footprint of Building "3" and boring B-10 in the proposed pool area encountered very loose/soft zones on top of the upper weathered limestone layer and 100% loss of drilling fluid circulation during drilling. These conditions are common indicators of karst geology, but are also typical conditions found in portions of the Tampa Bay area. A review of Florida Geologic Survey (FGS) Sinkhole Database shows three reported "subsidences" within about 1 mile of the site. Although, the concern for sinkholes is relatively low for this site we still recommend

performing a targeted compaction grouting program in the footprint of Building "3" and the pool to reinforce the very loose/soft zones as indicated on the Grout Injection Plan provided in Appendix B. In addition, Compaction Grouting specifications and estimated quantities are provided in Appendix B.

The recommendations herein are made based upon a review of the attached soil test data, our understanding of the proposed construction, and experience with similar projects and subsurface conditions. If the assumed structural loadings, building locations, building sizes, or grading plans change or are different from those discussed previously, we request the opportunity to review and possibly amend our recommendations with respect to those changes.

Additionally, if subsurface conditions are encountered during construction which was not encountered in the borings, report those conditions immediately to us for observation and recommendations.

In this section of the report, we present our detailed recommendations for groundwater control, building foundations, and site preparation

4.2 GROUNDWATER CONSIDERATIONS

Groundwater was encountered at depths of about 2 to 10 feet bgs in most of the borings at the time of our exploration. Some of the borings were terminated at a depth of 10 feet bgs and groundwater was not encountered. The groundwater table will fluctuate seasonally depending upon local rainfall. The estimated seasonal high groundwater table elevations (SHGWT) at each boring location are shown in Appendix A.

It should be noted that the estimated SHGWT does not provide any assurance that groundwater levels will not exceed this level in the future. Should impediments to surface water drainage exist on the site, or should rainfall intensity and duration exceed the normally anticipated amounts, groundwater levels may exceed our seasonal high estimate. Also, future development around the site could alter surface runoff and drainage characteristics, and cause our seasonal high estimate to be exceeded. We therefore recommend positive drainage be established and maintained on the site during construction. Further, we recommend permanent measures be constructed to maintain positive drainage from the site throughout the life of the project. Finally, we recommend all foundation and pavement grades account for the seasonal high groundwater conditions.

Temporary dewatering may be required for excavations such as foundation elements, utility trenches, or undercutting, particularly if construction proceeds during the wetter season. Therefore, 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. Further, we recommend that the groundwater table be maintained at least 18 to 24 inches below all earthwork and compaction surfaces.

4.3 BUILDING FOUNDATIONS

The soil strata encountered at the SPT boring locations should be adaptable to support structures having loading conditions within our stated assumptions using conventional shallow foundations. However, if the actual building loads will exceed those we have previously stated, our foundation recommendations presented herein may not be applicable, and UES should be retained to review the updated information and revise our recommendations as needed.

The following parameters may be used for foundation design.

4.3.1 Bearing Pressure

The maximum allowable net soil bearing pressure for shallow foundations should not exceed 2,500 pounds per square foot (psf). Net bearing pressure is defined as the soil bearing pressure at the base of the foundation in excess of the natural overburden pressure. The foundations should be designed based upon the maximum load that could be imposed by all loading conditions.

4.3.2 Foundation Size

The minimum widths recommended for any isolated column footing and continuous wall footing is 24 inches and 18 inches, respectively. Even though the maximum allowable soil bearing pressure may not be achieved, this width recommendation should control the size of the foundations.

4.3.3 Bearing Depth

The exterior foundations should bear at a depth of at least 18 inches below the exterior final grades. We recommend stormwater and surface water be diverted away from the building exteriors, both during and after construction to reduce the possibility of erosion beneath the exterior footings.

4.3.4 Bearing Material

The foundations may bear on either the compacted suitable natural soils or compacted structural fill as recommended in the site preparation of this report. The bearing level soils, after compaction should have compaction to at least 95 percent of the maximum dry density of the bearing soils at least 2 feet below the bottom of the footings as determined by ASTM D-1557 (Modified Proctor). In addition to compaction the bearing soils must exhibit stability and be free of “pumping” conditions. If moisture sensitive soils are encountered and compaction is difficult to achieve, the footings can be treated with dry suitable material or acceptable crushed aggregate.

After opening, footing excavations should be observed and concrete placed as quickly as possible to avoid exposure of the footing bottoms to wetting and drying. Surface run-off water should be drained away from the excavations and not be allowed to pond. The foundation concrete should be placed promptly after the excavation is made.

4.3.5 Settlement Estimates

Post-construction settlement of the structure will be influenced by several interrelated factors,

such as (1) subsurface stratification and strength/compressibility characteristics of the bearing soils to a depth of approximately twice the width of the footing; (2) footing size, bearing level, applied loads, and resulting bearing pressures beneath the foundation; (3) site preparation and earthwork construction techniques used by the contractor, and (4) external factors, including but not limited to vibration from offsite sources and groundwater fluctuations beyond those normally anticipated for the naturally-occurring site and soil conditions which are present.

Our settlement estimates for the structure are based upon the use of successful adherence to the site preparation recommendations presented later in this report and the maximum loading conditions previously discussed. Any deviation from these recommendations could result in an increase in the estimated post-construction settlement of the structure.

Using the recommended maximum bearing pressure, the assumed maximum structural loads, and the field and laboratory test data which we have correlated into the strength and compressibility characteristics of the subsurface soils, we estimate the total settlements of the structure to be 1 inch or less.

Differential settlements result from differences in applied bearing pressures and the variations in the compressibility characteristics of the subsurface soils. For the foundations prepared as recommended, we anticipate post construction differential settlements of ½-inch or less.

4.3.6 Floor Slabs

The floor slab will be supported on compacted sand and should either be structurally isolated from the other foundation elements or monolithic floor slab adequately reinforced to prevent distress due to differential movements. For building design, we recommend using a subgrade reaction modulus of 150 pounds per cubic inch (pci) which can be achieved by compacting the subgrade soils as recommended in the site preparation procedure. We recommend the use of a sheet vapor barrier such as visqeen beneath the building slab on grade to help control moisture migration through the slab.

4.4 PAVEMENT

We anticipate that either rigid or flexible pavement section or a combination there of may be used on this project. Flexible pavement combines the strength and durability of several layer components to produce an appropriate and cost-effective combination of available construction materials. Concrete pavement has the advantage of the ability to “bridge” over isolated soft areas, it requires less lighting, and it typically has a longer service life than asphalt pavement.

4.4.1 Asphalt (Flexible) Pavements

We have recommended a flexible pavement section with a 20-year design life for use on this project. Because traffic loadings are commonly unavailable, we have generalized our pavement design into two groups. The group descriptions and the recommended component thicknesses are presented in Table 2: Pavement Component Recommendations. The structural numbers in Table 2 are based on a structural number analysis with the stated estimated daily traffic volume for a 20-year replacement design life.

TABLE 2 Summary of Pavement Component Recommendations				
Traffic Group	**Structural Number**	**Component Thickness (inches)**		
		Stabilized Subgrade	**Base Course**	**Surface Course**
Parking lots and driveways – standard duty	2.38	8	6	1.5
Parking lots and driveways – heavy duty	3.28	12	8	2.0

The Design Traffic Groups are defined below:

Automobile Parking lots and driveways -	**Standard Duty:**	1,000 cars and light panel and pickup trucks per day, (average gross weight of 4,000 pounds)
Parking lots and driveways -	**Heavy Duty:**	Standard duty loading plus; twenty 18-wheel tractor-trailer trucks per day (H-20 loading)

4.4.1.1 Stabilized Subgrade

We recommend that subgrade materials be compacted in place according to the requirements in the "Site Preparation" section of this report. Further, beneath the base course, stabilize the subgrade materials to a minimum Limerock Bearing Ratio (LBR) of 40, as specified by Florida Department of Transportation (FDOT) requirements for Type B Stabilized Subgrade. The subgrade material should be compacted to at least 98 percent of the Modified Proctor maximum dry density (ASTM D 1557, AASHTO T-180) value.

The stabilized subgrade can be a blend of existing soil or imported material and a stabilizing agent such as limerock or shell. The subgrade should be "free draining" and therefore, clay, marl or other impermeable stabilizing materials should not be used for mixing with the in-place or imported materials. If a blend is proposed, we recommend that the contractor perform a mix design to find the optimum mix proportions.

The primary function of stabilized subgrade beneath the base course is to provide a stable and firm subgrade so that the base can be properly and uniformly placed and compacted. Depending upon the soil type, the subgrade material may have sufficient stability to provide the needed support without additional stabilizing material. Generally, sands with rock or shell should have sufficient stability and may not require additional stabilizing material. Conversely, relatively "clean" sand will not typically provide sufficient stability to adequately construct the limerock base course. Universal Engineering Sciences should observe the soils exposed on the finish grades to evaluate whether or not additional stabilization will be required beneath the base course.

4.4.1.2 Base Course

We recommend the base course consist of approved crushed concrete, limerock or approved base material. The base course material should have a minimum Limerock Bearing Ratio (LBR) of 100 and should be compacted to 98 percent of the Modified Proctor maximum dry density (ASTM D 1557, AASHTO T-180) value.

4.4.1.3 Wearing Surface

The wearing surface should consist of Florida Department of Transportation (FDOT) Type S asphaltic concrete having a minimum Marshall Stability of 1,500 lbs. Specific requirements for Type S asphaltic concrete wearing surface are outlined in the Florida Department of Transportation, Standard Specifications for Road and Bridge Construction, 2000 Edition.

After placement and field compaction, the wearing surface should be cored to evaluate material thickness and to perform laboratory densities. Cores should be obtained at frequencies of at least one core per 10,000 square feet of placed pavement or a minimum of two cores per day's production.

4.4.1.4 Effects of Groundwater

One of the most critical factors influencing pavement performance in Florida is the relationship between the pavement subgrade and the seasonal high groundwater level.

Many roadways and parking areas have been destroyed as a result of deterioration of the base conditions and/or the base/surface course bond. We recommend a minimum separation of 18 inches should be maintained between the bottom of the pavement base material and the seasonal high groundwater level. If this separation cannot be established and maintained by grading and surface drainage improvements, it may be necessary to consider the use of underdrains in the pavement areas.

4.4.1.5 Curbing

We recommend that curbing around the landscaped sections adjacent to the parking areas and driveways be constructed with full-depth curb sections. For a concrete pavement subgrade, we recommend an LBR of 40 for the final 6 inches of sandy fill and using extruded curb sections which lie directly on top of the final asphalt level, or eliminating the curbing entirely, can allow migration of irrigation water from the landscape areas to the interface between the asphalt and the base. This migration often causes separation of the wearing surface from the base and subsequent rippling and pavement deterioration. Topsoil placed behind curbing in landscaped areas should be limited to 6 inches vertical thickness within five feet of flexible pavement.

4.4.2 Concrete (Rigid) Pavements

Concrete pavement is a rigid pavement that transfers much lighter wheel loads to the subgrade soils than a flexible asphalt pavement. For a concrete pavement subgrade, we recommend using the existing surficial sands or recommend clean fine sand fill (SP), densified to at least 98 percent of Modified Proctor test maximum dry density (ASTM D 1557), with the following stipulations:

1. Subgrade soils should be densified to at least 98 percent of Modified Proctor test maximum dry density (ASTM D 1557) to a depth of at least two feet prior to placement of

concrete.

2. The surface of the subgrade soils should be smooth, and any disturbances or wheel rutting corrected prior to placement of concrete.

3. The subgrade soils should be moistened prior to placement of concrete**.**

4. Concrete pavement thickness should be uniform throughout, with exception to thickened edges (curb or footing).

5. The bottom of the pavement should be separated from the estimated typical wet season groundwater level by at least 18 inches.

Our recommendations for slab thickness for standard duty and heavy duty concrete pavements are based on a) subgrade soils densified to 98 percent of the Modified Proctor maximum dry density (ASTM D 1557) b) modulus of subgrade reaction (k) equal to 200 pounds per cubic inch, c) a 20 year design life, and d) previously stated traffic conditions in Section 4.4.2. We recommend using the design shown in the follow Table 3 for standard duty concrete pavements.

TABLE 3 STANDARD DUTY CONCRETE PAVEMENT		
Minimum Pavement Thickness	**Maximum Control Joint Spacing**	**Minimum Sawcut Depth**
5 Inches	10 Feet X 10 Feet	1¼ Inches

Our recommended design for heavy duty concrete pavement is shown in Table 4 below.

TABLE 4 HEAVY DUTY CONCRETE PAVEMENT		
Minimum Pavement Thickness	**Maximum Control Joint Spacing**	**Minimum Sawcut Depth**
7 Inches	12 Feet X 12 Feet	1½ Inches

We recommend using concrete with a minimum 28-day flexural strength (modulus of rupture) of at least 650 pounds per square inch, based on 3rd point loading of concrete beam test samples. Layout of the saw cut control joints should form square panels, and the depth of saw cut joint should be at least ¼ of the concrete slab thickness. The joints should be sawed within six hours of concrete placement or as soon as the concrete has developed sufficient strength to support workers and equipment. We recommend allowing Universal to review and comment on the final concrete pavement design, including section and joint details (type of joints, joint spacing, etc.), prior to the start of construction.

For further details on concrete pavement construction, please reference the “Guide to Jointing on Non-Reinforced Concrete Pavements” published by the Florida Concrete and Products Associates, Inc., and “Building Quality Concrete Parking Areas”, published by the Portland Cement Association.

4.4.3 Construction Traffic

Light duty roadways and incomplete pavement sections will not perform satisfactorily under construction traffic loadings. We recommend that construction traffic (construction equipment, concrete trucks, sod trucks, garbage trucks, dump trucks, etc.) be re-routed away from these roadways or that the pavement section be designed for these loadings.

4.5 FILL SUITABILITY

The recovered soil samples were classified using visual and textural means, and limited laboratory testing. We offer below preliminary guidelines for the use of on-site soils, such as those excavated from the proposed stormwater ponds, as fill material for the project.

Soil materials excavated or imported and classified as fine sands to slightly silty fine sands (SP, SP-SM), with typically 12% fines or less (silt/clay fraction), may be considered suitable for use as utility trench backfill, as well as building pad and pavement subgrade structural fill, provided said materials are properly dried, placed, and compacted.

The soils typically encountered in the upper 12 to 17 feet of the borings performed at the site consisted of mostly fine sands with less than 5% fines, therefore, these on-site soils are suitable for re-use as structural fill provided no organics, topsoil, or rootmat are present.

4.6 MUCK PROBE SURVEY

Two wetland impact areas (Wetland 2 and Wetland 6) were evaluated (where accessible) for approximate muck depths by a UES Engineer. The ground surface was manually probed with a 4-foot long probe rod to estimate the depths of muck present in the wetland areas. The estimated muck depths are shown in the image titled “Muck Depths” attached in Appendix A. Little to no muck was apparent in Wetland 6. Please note the muck depths shown in Wetland 2 were estimated from the existing ground surface by manually probing and should be considering approximate. Ponded surface water was present in the wetlands typically ranging from 1 to 2 feet deep in Wetland 6 and 1 to 3 feet in Wetland 2 with one isolated area up to 5 feet deep or more in the south-central area of Wetland 2. The central portion of Wetland 2 was not accessible due to very thick brush.

In accordance with our Site Preparation recommendation in section 4.7, the muck will need to be completely removed from the site. After the muck is removed the exposed subgrade should be compacted per the recommendations in section 4.7 and replaced with structural fill in building or pavement footprints plus 5 feet beyond. The muck removal should be observed by a representative of UES. Extensive dewatering will be required. As mentioned, groundwater levels should be maintained at least 18 to 24 inches below all compaction surfaces. Once the obvious muck materials have been removed, proof-rolling will help locate any remaining zones of especially loose or soft soils that may also need to be removed or moisture conditioned for compaction. These zones should be evaluated and treated as recommended by UES.

4.7 SITE PREPARATION

We recommend only good practice, site preparation procedures in conjunction with the densification of the upper existing subgrade soils. These procedures include: stripping the site of all existing improvements, vegetation, roots and topsoil, or unsuitable materials and compacting and proof-rolling the exposed subgrade and filling to grade with engineered fill.

A more detailed synopsis of this work is as follows:

1. If required, perform remedial dewatering prior to any earthwork operations. We recommend temporary dewatering to reduce the likelihood of pumping of the shallow subgrade soils during normal construction operations. Maintain groundwater levels at least 18 to 24 inches below the lowest anticipated cut and/or all compaction surfaces.

2. Strip the proposed construction limits of vegetation, grass, roots, topsoil, organic soils, muck, and other unsuitable or deleterious materials within and 5 feet beyond the perimeter of the proposed building and in all paved areas. Expect clearing and grubbing to depths of 6 to 12 inches, on average, except for the Wetland 2 area where up to 4 feet or more of muck will need to be removed under the observation of a UES representative and the areas near borings B-49, B-73, B-74, B-78, B-79, B-80, B-84, and B-86 where the organic material will need to be removed up to 5 feet deep and replaced with structural fill. Deeper clearing and grubbing depths may also be required where major root systems are encountered. Resulting excavations should be replaced with compacted fill according to the recommendations provided in step #6 of this section.

3. After stripping the site as outlined above in Item #2, proof-roll the subgrade with a heavily loaded, rubber-tired vehicle under the observation of a Universal Engineering Sciences geotechnical engineer or his/her representative. Proof-rolling will help locate any zones of especially loose or soft soils not encountered in the soil test borings. Then undercut, or otherwise treat these zones as recommended by the engineer.

4. Prior to any filling of the site, compact the exposed subgrade from the surface using suitable compaction equipment, until you obtain a minimum density of 95% MPMDD per ASTM D1557 to a depth of 2 feet below stripped grade. In order to achieve the required degree of compaction, the soils may need to be moisture conditioned until the in-situ water content is within +/- 3% of the optimum moisture content (OMC).

5. Test the subgrade for compaction at a frequency of not less than one test per 2,500 square feet per foot of depth improvement in the building area.

6. Place fill and backfill material, as required. The fill should consist of "clean," fine sand with less than 5 percent soil fines. You may use fill materials with soil fines between 5 and 10 percent, but strict moisture control may be required. Place fill in uniform 12-inch compacted lifts and compact each lift to a minimum density of 95 percent of the Modified Proctor maximum dry density.

7. Perform in-place density tests within the fill at a frequency of not less than one test per 2,500 square feet per lift in the building areas.

8. Compact and test all footing subgrade to a depth of 2 feet. Additionally, we recommend that you test one out of every four column footings, and one test per every 50 lineal feet of wall footing to verify the required compaction is obtained.

Using vibratory compaction equipment at this site may disturb adjacent and other nearby structures and roadways. We recommend that you monitor adjacent and nearby structures before and during proof-compaction. If disturbance is noted, halt vibratory compaction and inform Universal Engineering Sciences immediately. We will review the compaction procedures

and evaluate if the compactive effort results in a satisfactory subgrade, complying with our original design assumptions

4.8 CONSTRUCTION RELATED SERVICES

We recommend the owner retain Universal Engineering Sciences to perform construction materials tests and observations on this project. Field tests and observations include verification of foundation and pavement subgrades by monitoring proof-rolling operations and performing quality assurance tests on the placement of compacted structural fill and pavement 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 problems that might arise during construction in a timely and cost-effective manner.

5.0 LIMITATIONS

This report has been prepared for the exclusive use of Morgan Group Development 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 UES. Unauthorized third parties that rely upon the information contained herein without the expressed written consent of UES assume all risk and liability for such reliance.

The recommendations submitted in this report are based upon the data obtained from the soil testing 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 test 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 and test locations 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 subsurface 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 UES 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 UES to locate or identify such concerns. UES 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. A Geoprofessional Business Association (GBA), "Important Information About Your Geotechnical Engineering Report" appears in Appendix B, and will help explain the nature of geotechnical issues.

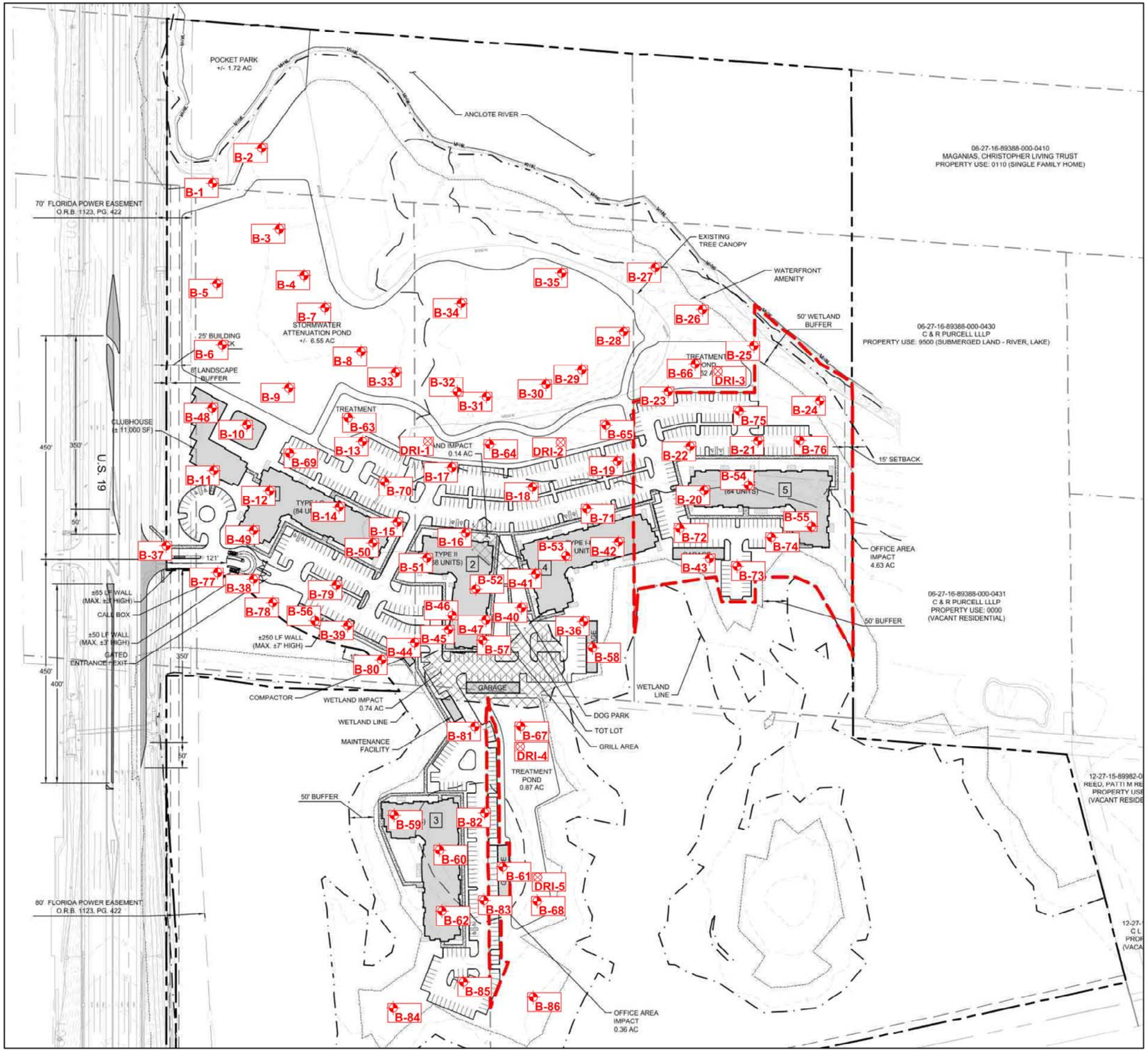
Further, we present documents in Appendix B: Constraints and Restrictions, to bring to your attention the potential concerns and the basic limitations of a typical geotechnical report.

APPENDIX A

UNIVERSAL
ENGINEERING SCIENCES

N

A-1	**SITE LOCATION PLAN** OBTAINED FROM YAHOO MAPS 2018	PROPOSED TARPON SPRINGS APARTMENT US 19 AND ATLANTIC AVENUE TARPON SPRINGS, FL PROJECT NO: 1185.2000136.0000 REPORT NO: G-MD-AHA-1	DRAWN FOR	MORGAN DEVELOPMENT	UNIVERSAL ENGINEERING SCIENCES 1748 INDEPENDENCE BLVD. SARASOTA, FL. 941-358-7410
			DRILLED BY	UES & R&M	
			DRAWN BY	R.L.D	
			DRAWING DATE	7/15/2019 8/26/2020	
			SCALE	NOT TO SCALE	



LEGEND

APPROXIMATE LOCATION	
⊕	SPT BORING
⊕	DRI

UNIVERSAL
ENGINEERING SCIENCES
1743 INDEPENDENCE BLVD.
SARASOTA, FL.
941-358-7410

DRAWN FOR	MORGAN DEVELOPMENT
DRILLED BY	UES & R&M
DRAWN BY	R.L.D
DRAWING DATE	7/15/2019 8/26/2020
SCALE	NOT TO SCALE

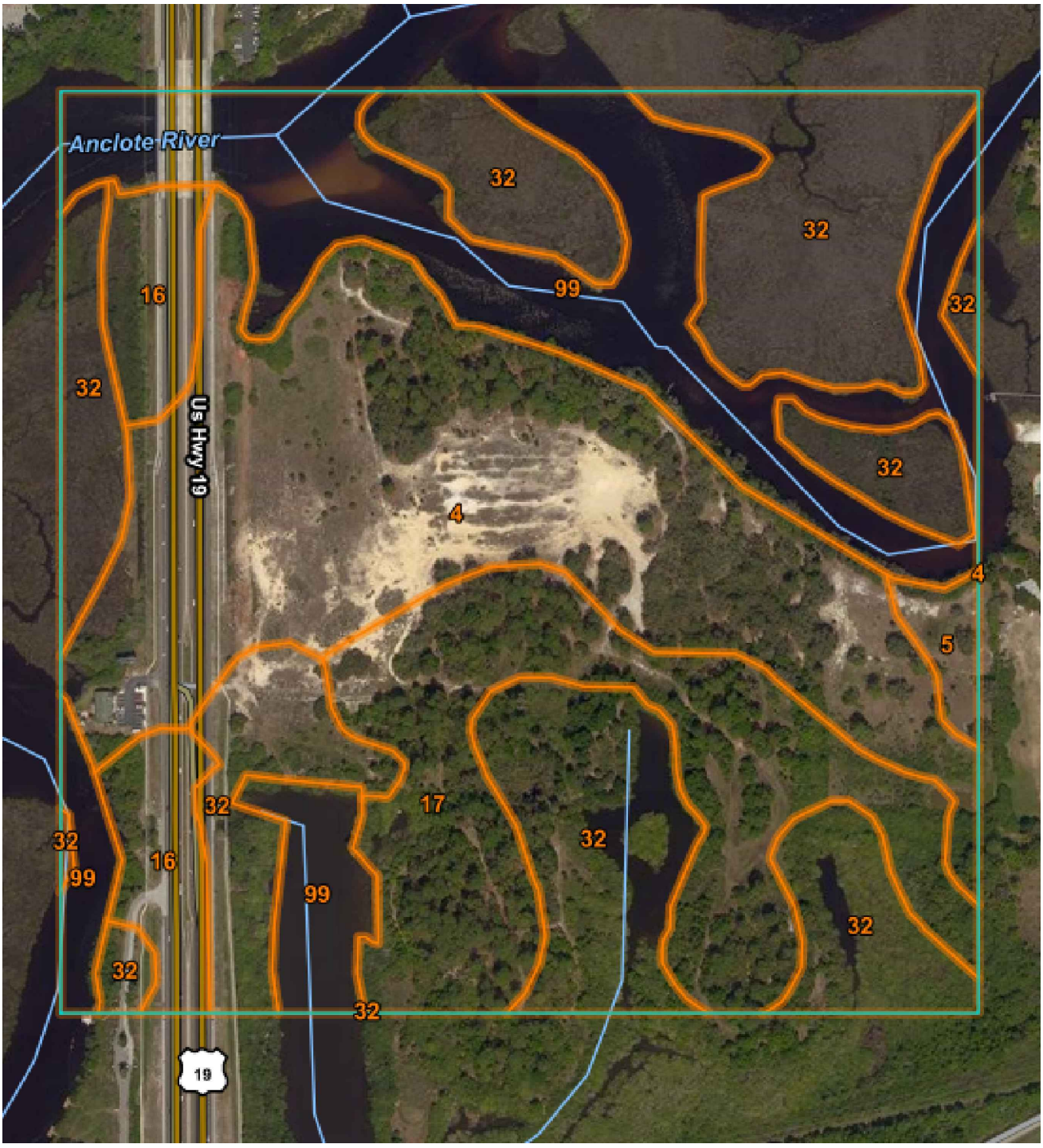
PROJECT NO: 1185.2000136.0000
REPORT NO: G-MD-AHA-1

PROPOSED TARPON SPRINGS
APARTMENT
US 19 AND ATLANTIC AVENUE
TARPON SPRINGS, FL

BORING LOCATION PLAN

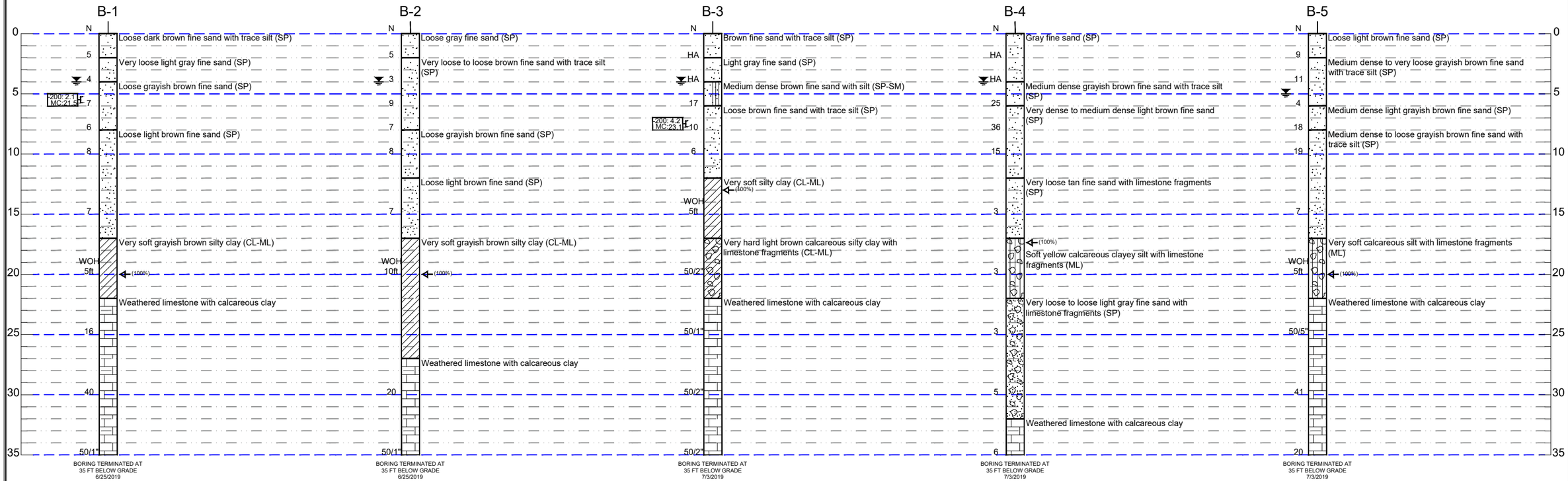
THIS MAP SHOWS APPROXIMATE LOCATION

A-2.0



N

A-3	**SCS SOIL SURVEY MAP** OBTAINED FROM WEB SOIL SURVEY 2018	PROPOSED TARPON SPRINGS APARTMENT US 19 AND ATLANTIC AVENUE TARPON SPRINGS, FL PROJECT NO: 1185.2000136.0000 REPORT NO: G-MD-AHA-1	DRAWN FOR	MORGAN DEVELOPMENT	UNIVERSAL ENGINEERING SCIENCES 1748 INDEPENDENCE BLVD. SARASOTA, FL. 941-358-7410
			DRILLED BY	UES & R&M	
			DRAWN BY	R.L.D	
			DRAWING DATE	7/15/2019 8/26/2020	
			SCALE	NOT TO SCALE	



LEGEND

[SP]	UNIFIED SOIL CLASSIFICATION SYSTEM GROUP SYMBOL (ASTM D2487) .BASED ON VISUAL OBSERVATION AND LABORATORY TEST.
N	STANDARD PENETRATION RESISTANCE (N-VALUE) IN BLOWS PER FOOT (ASTM D1586)
HA	HAND AUGER
	GROUND WATER LEVEL MEASURED ON DATE DRILLED
	SEASONAL HIGH WATER LEVEL
GNA	GROUNDWATER LEVEL NOT APPARENT
(%)	LOSS OF CIRCULATION (%)
-200	FINES PASSING NO. 200 U.S. STANDARD SIEVE (%)
WOH	WEIGHT OF HAMMER
50/1"	50 BLOWS FOR 1 INCH
OC	ORGANIC CONTENT (%)
MC	NATURAL MOISTURE CONTENT (%)
PL	PLASTICITY INDEX (%)
LL	LIQUID LIMIT (%)
NP	NON PLASTIC
UCS	UNCONFINED COMPRESSION STRENGTH

CORRELATION OF STANDARD PENETRATION RESISTANCE WITH RELATIVE DENSITY AND CONSISTENCY OF SOIL

COARSE-GRAINED SOILS-SANDS		FINES - CLAY AND SILT	
CONSISTENCY DESIGNATION	SPT N(BLOWS/FT)	CONSISTENCY DESIGNATION	SPT N(BLOWS/FT)
VERY LOOSE	0-4	VERY SOFT	0-1
LOOSE	5-10	SOFT	2-3
MEDIUM DENSE	11-30	MEDIUM STIFF	4-7
DENSE	31-50	STIFF	8-15
VERY DENSE	>50	VERY STIFF	16-31
		HARD	32-50
		VERY HARD	>50

UNIVERSAL ENGINEERING SCIENCES
1748 INDEPENDENCE BLVD.
SARASOTA, FL.
941-358-7410

DRAWN FOR: MORGAN DEVELOPMENT
DRILLED BY: UES & R&M
DRAWN BY: R.L.D
DRAWING DATE: 7/15/2019 8/26/2020
SCALE: NOT TO SCALE

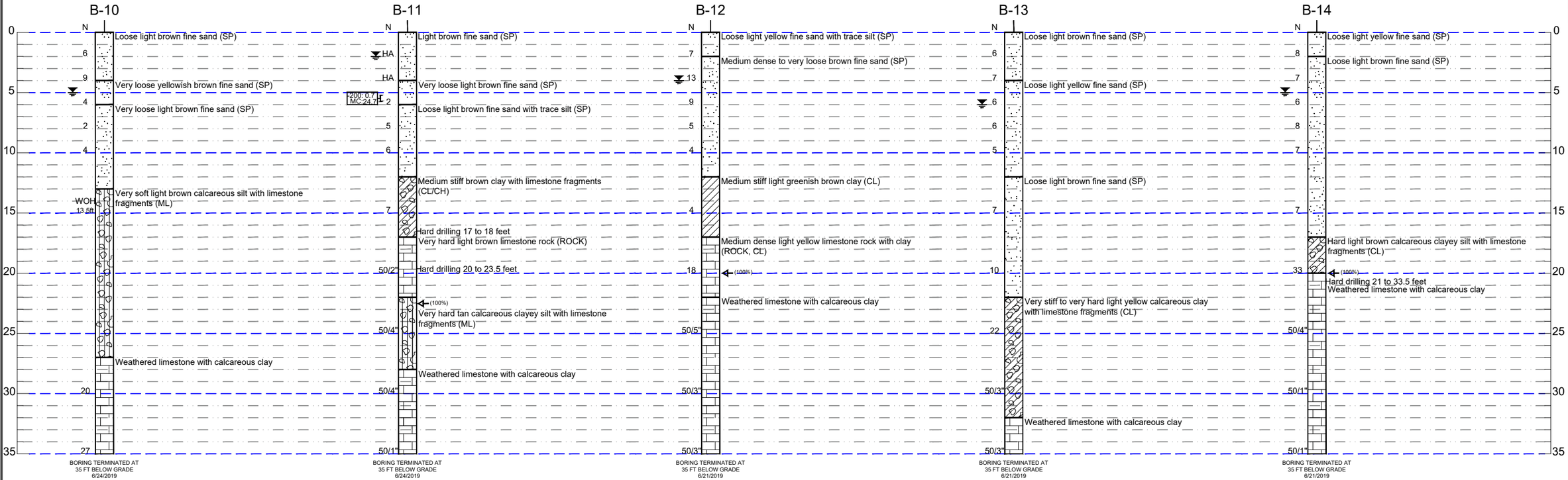
PROJECT NO: 1185.2000136.0000
REPORT NO: G-MD-AHA-1

PROPOSED TARPON SPRINGS APARTMENT
US 19 AND ATLANTIC AVENUE
TARPON SPRINGS, FL

SOIL BORING PROFILES

ALL SOIL BORING TEST ARE APPROXIMATE. SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED

A-4



UNIVERSAL ENGINEERING SCIENCES
1748 INDEPENDENCE BLVD.
SARASOTA, FL.
941-358-7410

DRAWN FOR: MORGAN DEVELOPMENT
DRILLED BY: UES & R&M
DRAWN BY: R.L.D
DRAWING DATE: 7/15/2019 8/26/2020
SCALE: NOT TO SCALE

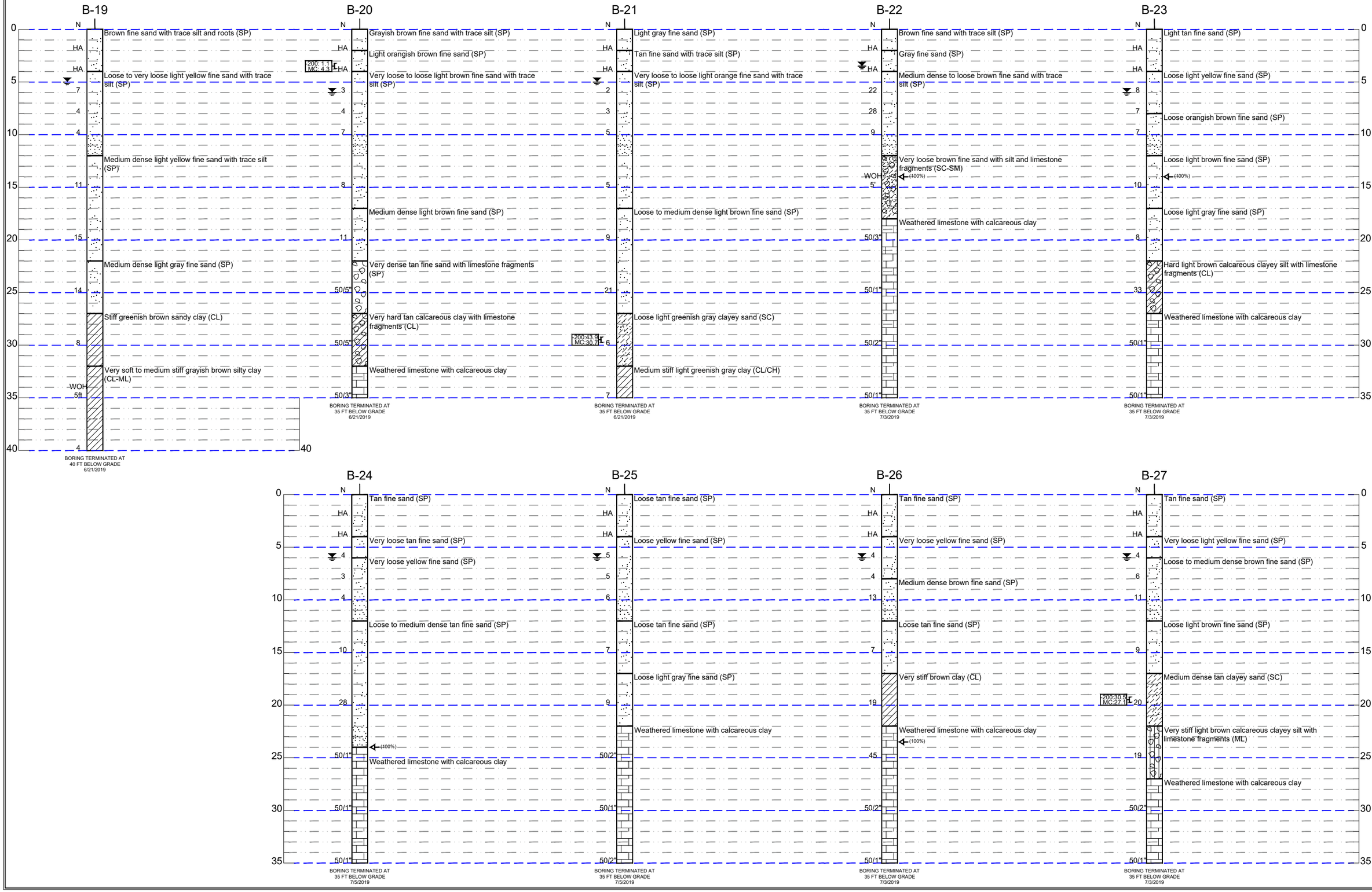
PROJECT NO: 1185.2000136.0000
REPORT NO: G-MD-AHA-1

PROPOSED TARPON SPRINGS APARTMENT
US 19 AND ATLANTIC AVENUE
TARPON SPRINGS, FL

SOIL BORING PROFILES

ALL SOIL BORING TEST ARE APPROXIMATE. SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED

A-4.1



UNIVERSAL ENGINEERING SCIENCES
1748 INDEPENDENCE BLVD.
SARASOTA, FL.
941-358-7410

DRAWN FOR	MORGAN DEVELOPMENT
DRILLED BY	UES & R&M
DRAWN BY	R.L.D
DRAWING DATE	7/15/2019 8/26/2020
SCALE	NOT TO SCALE

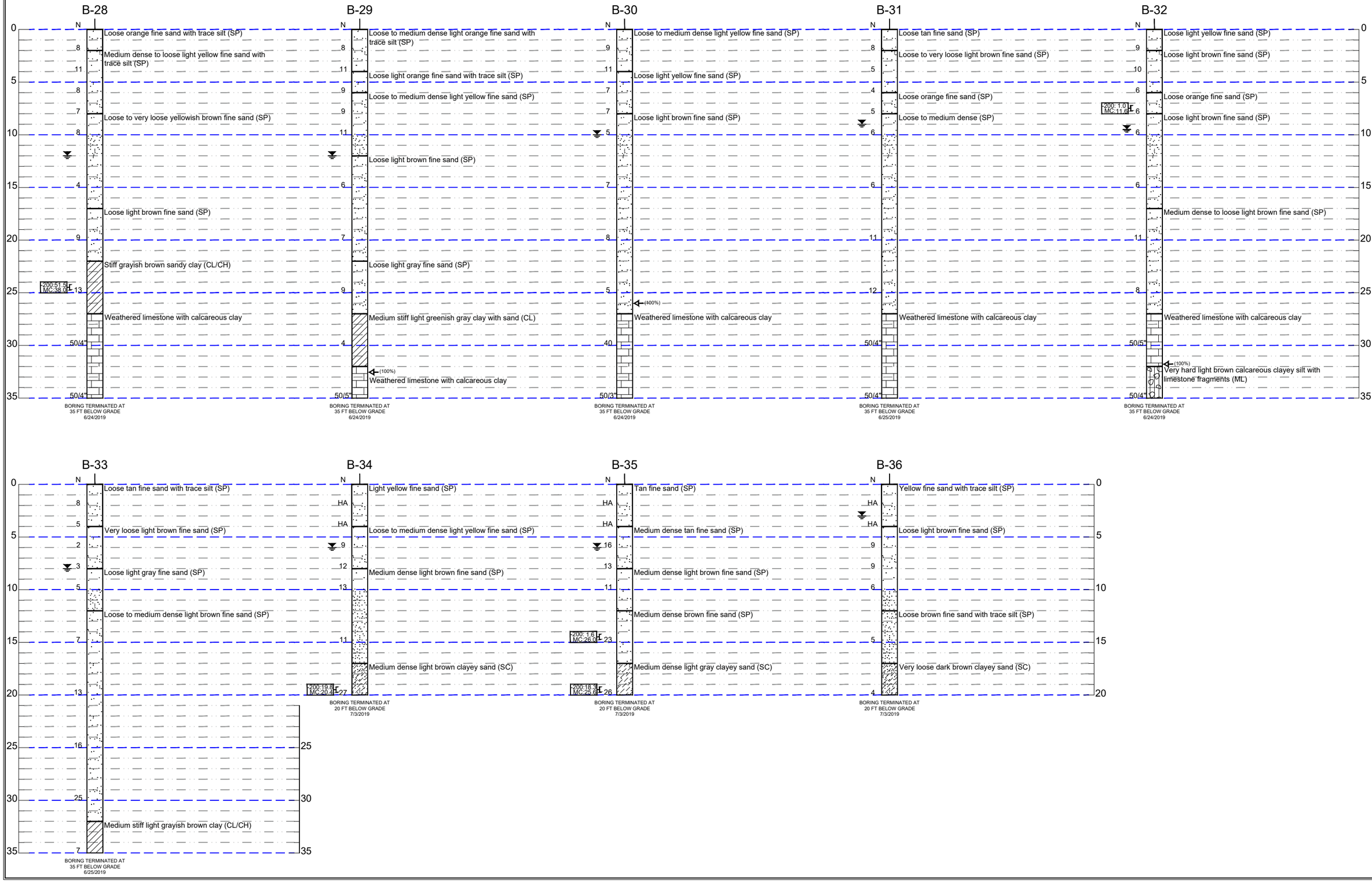
PROJECT NO: 11185.2000136.0000
REPORT NO: G-MD-AHA-1

PROPOSED TARPON SPRINGS APARTMENT
US 19 AND ATLANTIC AVENUE
TARPON SPRINGS, FL

SOIL BORING PROFILES

ALL SOIL BORING TEST ARE APPROXIMATE. SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED

A-4.2



UNIVERSAL ENGINEERING SCIENCES
1748 INDEPENDENCE BLVD.
SARASOTA, FL.
941-358-7410

DRAWN FOR: MORGAN DEVELOPMENT
DRILLED BY: UES & R&M
DRAWN BY: R.L.D
DRAWING DATE: 7/15/2019 8/26/2020
SCALE: NOT TO SCALE

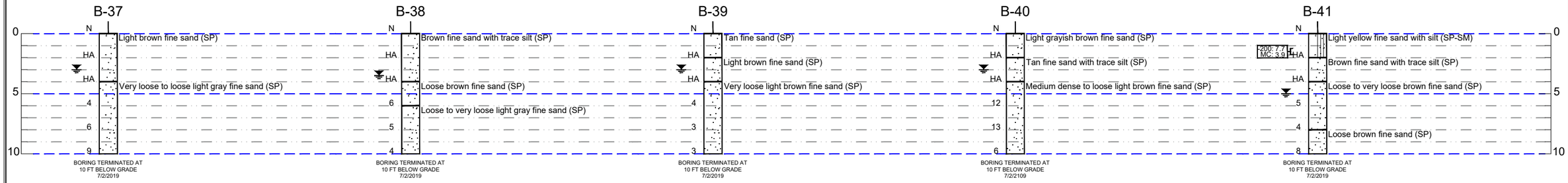
PROJECT NO: 1185.2000136.0000
REPORT NO: G-MD-AHA-1

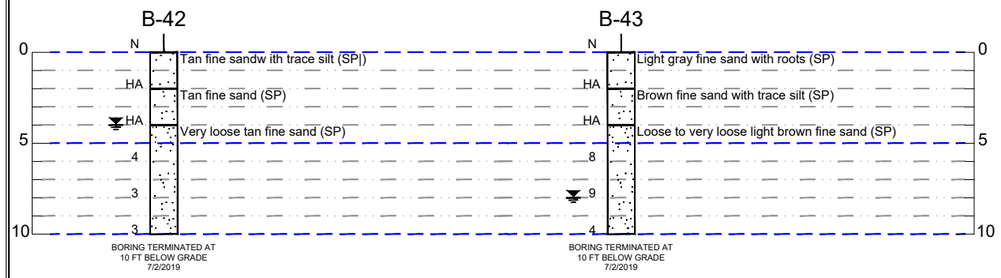
PROPOSED TARPON SPRINGS APARTMENT
US 19 AND ATLANTIC AVENUE
TARPON SPRINGS, FL

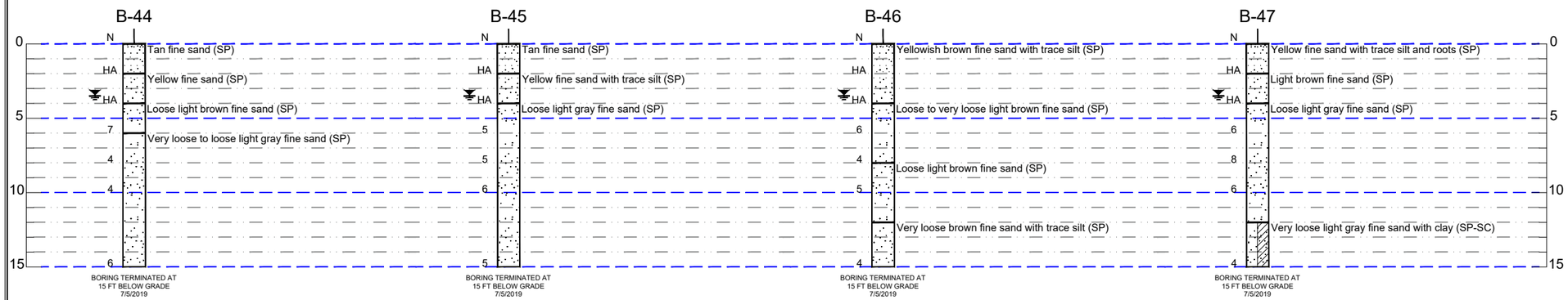
SOIL BORING PROFILES

ALL SOIL BORING TEST ARE APPROXIMATE. SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED

A-4.3







UNIVERSAL
ENGINEERING SCIENCES
1748 INDEPENDENCE BLVD.
SARASOTA, FL.
941-358-7410

DRAWN FOR	MORGAN DEVELOPMENT
DRILLED BY	UES & R&M
DRAWN BY	R.L.D
DRAWING DATE	7/15/2019 8/26/2020
SCALE	NOT TO SCALE

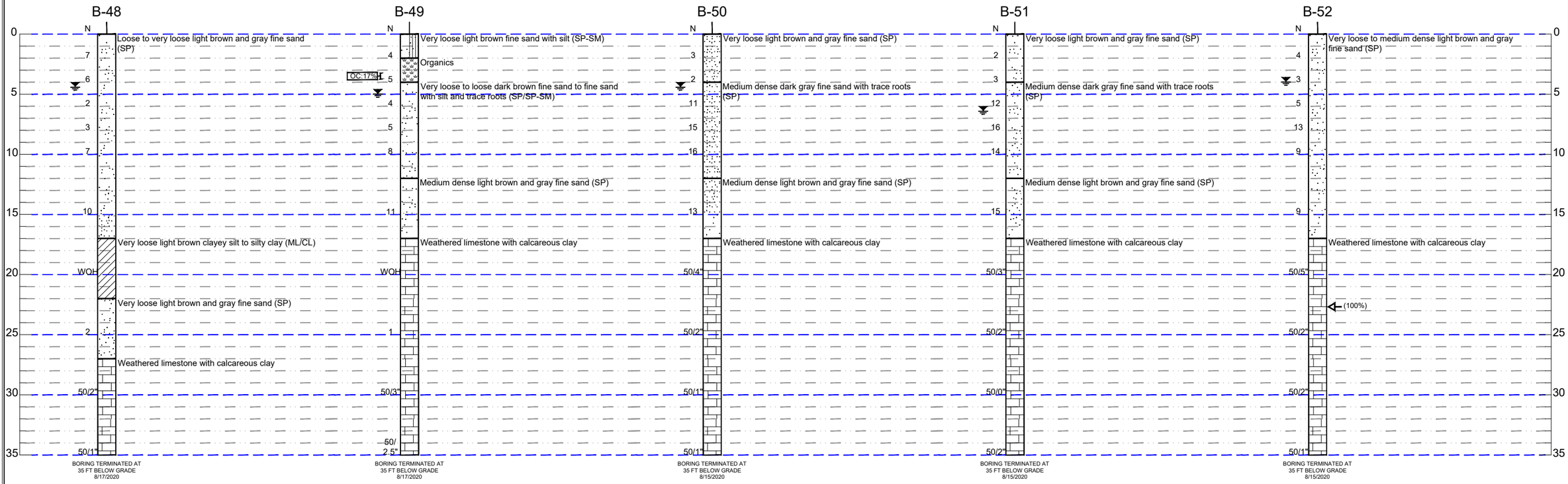
PROJECT NO: 1185.2000136.0000
REPORT NO: G-MD-AHA-1

PROPOSED TARPON SPRINGS APARTMENT
US 19 AND ATLANTIC AVENUE
TARPON SPRINGS, FL

SOIL BORING PROFILES

ALL SOIL BORING TEST ARE APPROXIMATE. SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED

A-4.4



UNIVERSAL
ENGINEERING SCIENCES
1748 INDEPENDENCE BLVD.
SARASOTA, FL.
941-358-7410

DRAWN FOR: MORGAN DEVELOPMENT
DRILLED BY: UES & R&M
DRAWN BY: R.L.D
DRAWING DATE: 7/15/2019 8/26/2020
SCALE: NOT TO SCALE

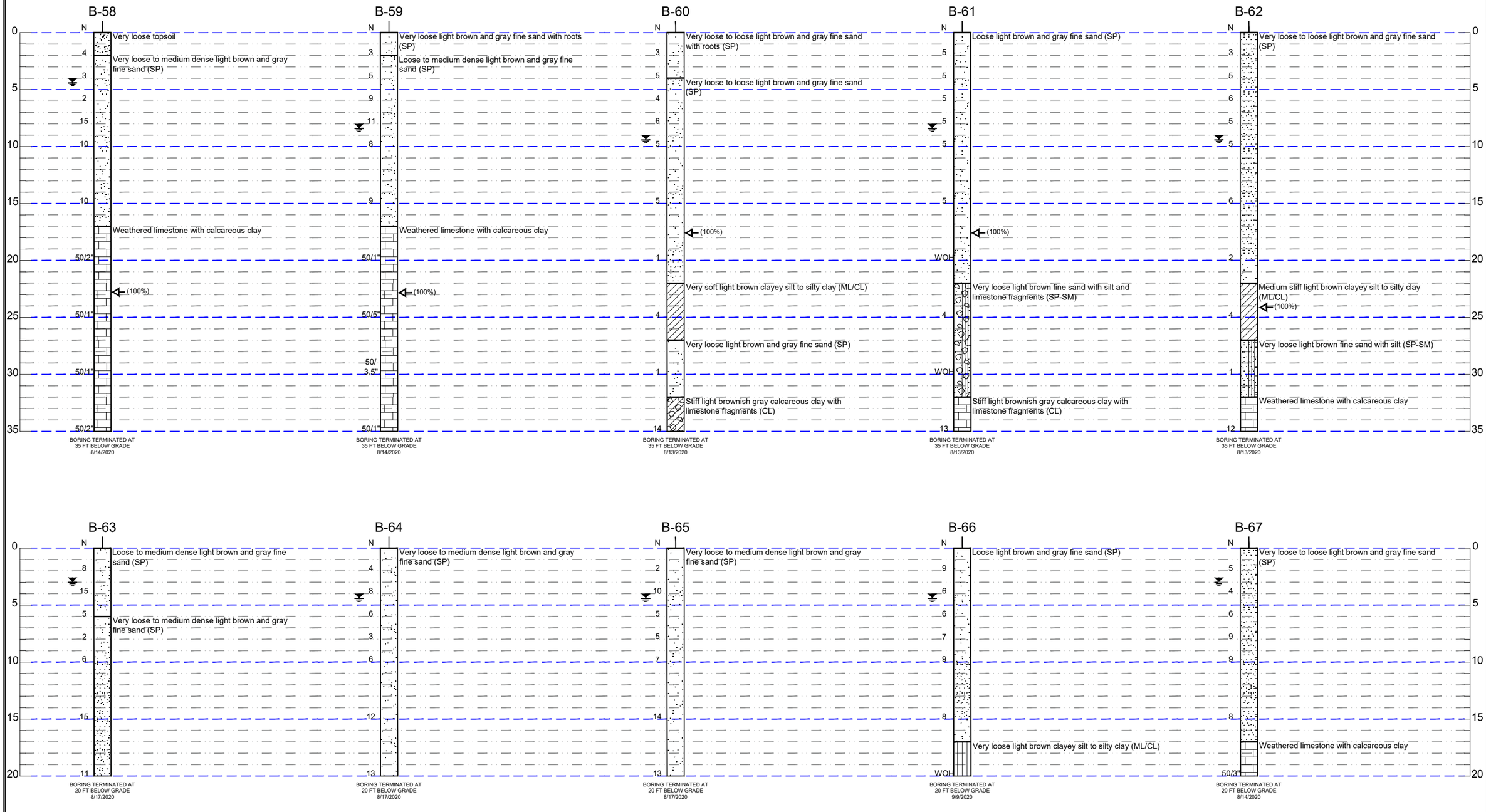
PROJECT NO: 1185.2000136.0000
REPORT NO: G-MD-AHA-1

PROPOSED TARPON SPRINGS APARTMENT
US 19 AND ATLANTIC AVENUE
TARPON SPRINGS, FL

SOIL BORING PROFILES

ALL SOIL BORING TEST ARE APPROXIMATE. SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED

A-4.5



UNIVERSAL
ENGINEERING SCIENCES
1748 INDEPENDENCE BLVD.
SARASOTA, FL.
941-358-7410

DRAWN FOR: MORGAN DEVELOPMENT
DRILLED BY: UES & R&M
DRAWN BY: R.L.D
DRAWING DATE: 7/15/2019 8/26/2020
SCALE: NOT TO SCALE

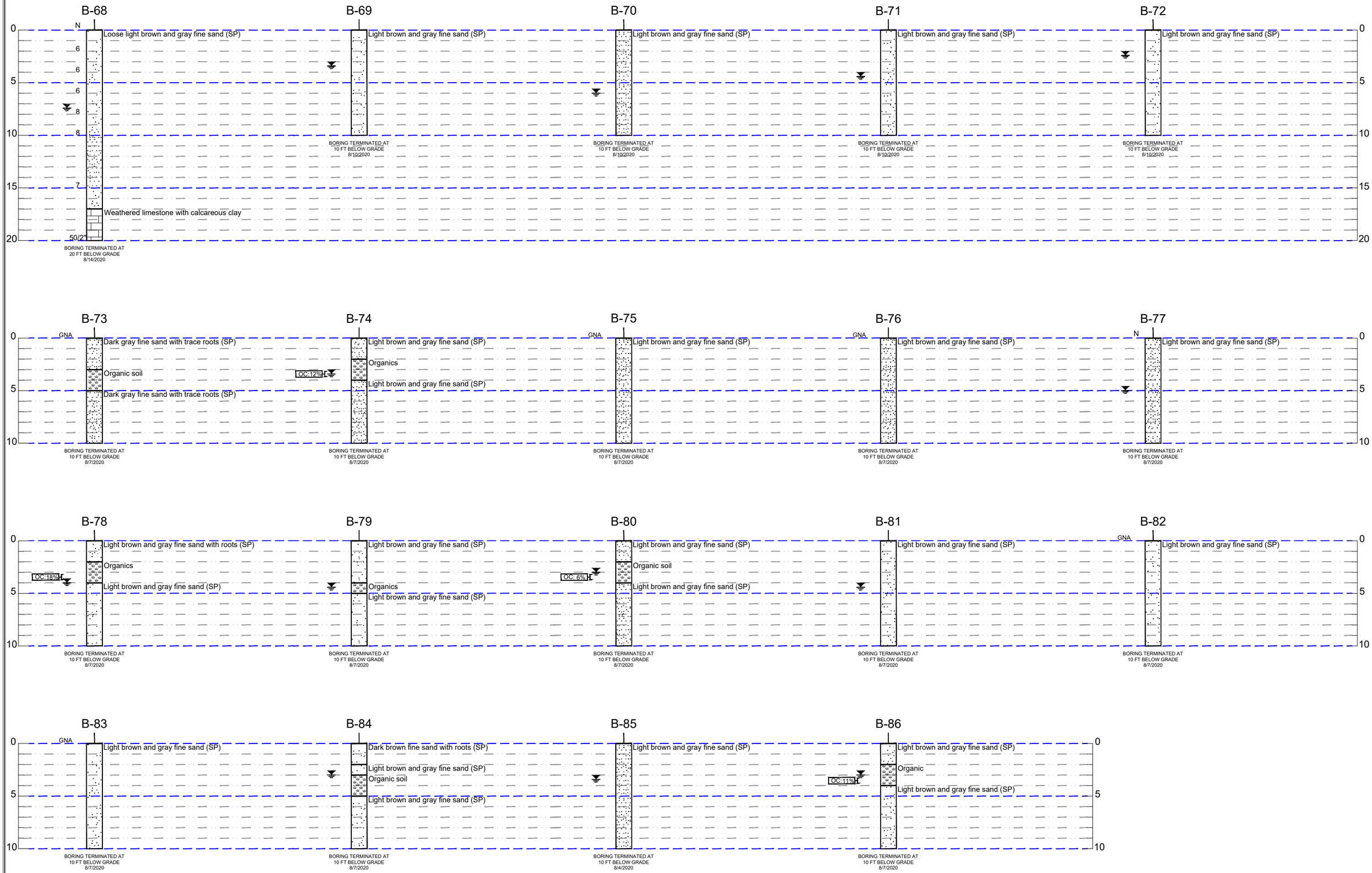
PROJECT NO: 1185.2000136.0000
REPORT NO: G-MD-AHA-1

PROPOSED TARPON SPRINGS APARTMENT
US 19 AND ATLANTIC AVENUE
TARPON SPRINGS, FL

SOIL BORING PROFILES

ALL SOIL BORING TEST ARE APPROXIMATE. SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED

A-4.6



UNIVERSAL
ENGINEERING SCIENCES
1748 INDEPENDENCE BLVD.
SARASOTA, FL.
941-358-7410

DRAWN FOR	MORGAN DEVELOPMENT
DRILLED BY	UES & R&M
DRAWN BY	R.L.D
DRAWING DATE	7/15/2019 8/26/2020
SCALE	NOT TO SCALE

PROJECT NO: 1185.2000136.0000
REPORT NO: G-MD-AHA-1

PROPOSED TARPON SPRINGS APARTMENT
US 19 AND ATLANTIC AVENUE
TARPON SPRINGS, FL

SOIL BORING PROFILES

ALL SOIL BORING TEST ARE APPROXIMATE. SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED

A-4.7

UNIVERSAL ENGINEERING SCIENCES
9802 Palm River Road
Tampa, Florida 33619

(813) 740-8506

SOIL CLASSIFICATION CHART

TERMS DESCRIBING CONSISTENCY OR CONDITION

COARSE-GRAINED SOILS (major portions retained on No. 200 sieve): includes (1) clean gravel and sands and (2) silty or clayey gravels and sands. Condition is rated according to relative density as determined by laboratory tests or standard penetration resistance tests.

Descriptive Terms	Relative Density	SPT Blow Count
Very loose	0 to 15 %	< 4
Loose	15 to 35 %	4 to 10
Medium dense	35 to 65 %	10 to 30
Dense	65 to 85 %	30 to 50
Very dense	85 to 100 %	> 50

FINE-GRAINED SOILS (major portions passing on No. 200 sieve): includes (1) inorganic and organic silts and clays, (2) gravelly, sandy, or silty clays, and (3) clayey silts. Consistency is rated according to shearing strength, as indicated by penetrometer readings, SPT blow count, or unconfined compression tests.

Descriptive Terms	Unconfined Compressive Strength kPa	SPT Blow Count
Very soft	< 25	< 2
Soft	25 to 50	2 to 4
Medium stiff	50 to 100	4 to 8
Stiff	100 to 200	8 to 15
Very stiff	200 to 400	15 to 30
Hard	> 400	> 30

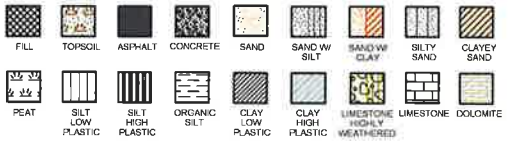
GENERAL NOTES

1. Classifications are based on the United Soil Classification System and include consistency, moisture, and color. Field descriptions have been modified to reflect results of laboratory tests where deemed appropriate.

2. Surface elevations are based on topographic maps and estimated locations.

3. Descriptions on these boring logs apply only at the specific boring locations and at the time the borings were made. They are not guaranteed to be representative of subsurface conditions at other locations or times.

SOIL SYMBOLS



OTHER SYMBOLS

▼ Measured Water Table Level

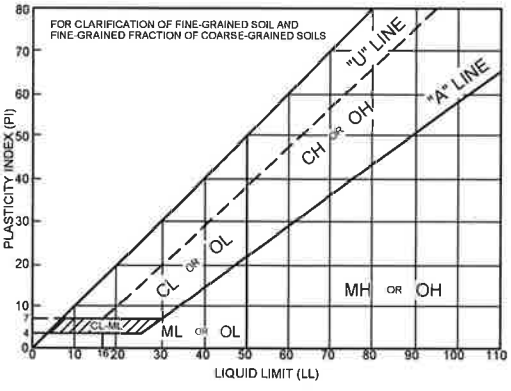
▽ Estimated Seasonal High Water Table

Major Divisions			Group Symbols	Typical Names	Laboratory Classification Criteria
Coarse-Grained soils (More than half the material is larger than No. 200 sieve size)	Gravels (More than half of coarse fraction is larger than No. 4 sieve size)	Clean gravel (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	$C_U = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3
			GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines	Not meeting all gradation requirements for GW
		Gravel with fines (Appreciable amount of fines)	GM	Silty gravels, gravel-sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4 / Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
			GC	Clayey gravels, gravel-sand-silt mixtures	Atterberg limits above "A" line or P.I. greater than 7
	Sands (More than half of coarse fraction is smaller than No. 4 sieve size)	Clean sands (Little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines	$C_U = \frac{D_{60}}{D_{10}}$ greater than 6; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3
			SP	Poorly-graded sands, gravelly sands, little or no fines	Not meeting all gradation requirements for SW
		Sands with fines (Appreciable amount of fines)	SM	Silty sands, sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4 / Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
			SC	Clayey sands, sand-clay mixtures	Atterberg limits above "A" line or P.I. greater than 7
Fine-Grained soils (More than half the material is smaller than No. 200 sieve size)	Silts and Clays (Liquid limit less than 50)		ML	Inorganic silts and very fine sands, rock floor, silty or clayey fine sands or clayey silts with slight plasticity	
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	
			OL	Organic silts and organic silty clays of low plasticity	
	Silts and Clays (Liquid limit greater than 50)		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, organic silts	
			CH	Inorganic clays of high plasticity, fat clays	
			OH	Organic clays of medium to high plasticity, organic silts	
	Highly Organic Soils		Pt	Peat and other highly organic soils	

Determine percentages of sand and gravel from grain size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve) coarse-grained soils are classified as follows:
Less than 5 percent..... GW, GP, SW, SP
More than 12 percent..... GM, GC, SM, SC
5 to 12 percent..... Borderline cases requiring dual symbols*

Particle Size	Sieve sizes	mm	Material
	< #200	< 0.074	Silt or clay
	#200 to #40	0.074 to 0.42	Sand
	#40 to #10	0.42 to 2.00	Fine
	#10 to #4	2.00 to 4.76	Medium

Particle Size	Sieve	mm	Material
	#4 to 3/4 in.	4.76 to 19.1	Gravel
	3/4 in. to 3 in.	19.1 to 76.2	Fine
	3 in. to 12 in.	76.2 to 304.8	Coarse
	12 in. to 36 in.	304.8 to 914.4	Cobble
			Boulders



Plasticity Chart

* When the percent passing a No. 200 sieve is between 5% and 12%, a dual symbol is used to denote the soil. For example; SP-SC, poorly-graded sand with clay content between 5% and 12%.

Estimated SHGWT Elevations

Anclote Harbor Apartments
October 6, 2020

Boring Location	Ground Surface Elevation*	Groundwater Depth*	Groundwater Elevation*	SHGWT Depth*	SHGWT Elevation*
B-1	6.5	4	2.5	2	4.5
B-2	5.5	4	1.5	2	3.5
B-3	5	4	1	2	3
B-4	5	4	1	2	3
B-5	6.5	5	1.5	3	3.5
B-6	6	6	0	3.5	2.5
B-7	6	4	2	2	4
B-8	5.5	4	1.5	2	3.5
B-9	5	5	0	3	2
B-10	6	5	1	3	3
B-11	6	2	4	1	5
B-12	5	4	1	2	3
B-13	6	6	0	3.5	2.5
B-14	6	5	1	3	3
B-15	7.5	5	2.5	3	4.5
B-16	3	5	-2	3	0
B-17	9.5	5	4.5	3	6.5
B-18	8	5	3	3	5
B-19	13	5	8	3	10
B-20	9	6	3	3.5	5.5
B-21	16	5	11	3.5	12.5
B-22	15.5	3.5	12	2	13.5
B-23	21	6	15	5	16
B-24	22	6	16	5	17
B-25	20.5	6	14.5	5	15.5
B-26	15	6	9	5	10
B-27	8	6	2	3.5	4.5
B-28	11.5	12	-0.5	5	6.5
B-29	10	12	-2	5	5
B-30	9	10	-1	5	4
B-31	9	9	0	5	4
B-32	9	9.5	-0.5	5	4
B-33	7	8	-1	5	2
B-34	9	6	3	3.5	5.5
B-35	9	6	3	3.5	5.5
B-36	4	3	1	1	3
B-37	7	3	4	1	6

***Estimated to the nearest 1/2 foot. Ground spot elevations were estimated from the topographic drawing provided to us and should be considered approximate.**

Estimated SHGWT Elevations

Anclote Harbor Apartments
October 6, 2020

Boring Location	Ground Surface Elevation*	Groundwater Depth*	Groundwater Elevation*	SHGWT Depth*	SHGWT Elevation*
B-38	6	3.5	2.5	1.5	4.5
B-39	4.5	3	1.5	1	3.5
B-40	3	3	0	1	2
B-41	3	5	-2	3	0
B-42	4.5	4	0.5	2	2.5
B-43	3.5	8	-4.5	5	-1.5
B-44	4.5	3.5	1	1.5	3
B-45	5	3.5	1.5	1.5	3.5
B-46	5	3.5	1.5	1.5	3.5
B-47	4	3.5	0.5	1.5	2.5
B-48	6	4.5	1.5	2.5	3.5
B-49	5	5	0	3	2
B-50	7	4.5	2.5	2.5	4.5
B-51	5	6.5	-1.5	4	1
B-52	4	4	0	2	2
B-53	4	3.5	0.5	1.5	2.5
B-54	9	3.5	5.5	1.5	7.5
B-55	6	4.5	1.5	2.5	3.5
B-56	4	4	0	2	2
B-57	4	2.5	1.5	1	3
B-58	4	4.5	-0.5	2.5	1.5
B-59	6	8.5	-2.5	5	1
B-60	10	9.5	0.5	5	5
B-61	10	8.5	1.5	5	5
B-62	7	9.5	-2.5	5	2
B-63	5	3	2	1	4
B-64	13	4.5	8.5	3	10
B-65	17	4.5	12.5	3	14
B-66	22	4.5	17.5	3	19
B-67	4.5	3	1.5	1	3.5
B-68	7	7.5	-0.5	5	2
B-69	5	3.5	1.5	1.5	3.5
B-70	7.5	6	1.5	3.5	4
B-71	6	4.5	1.5	2.5	3.5
B-72	4.5	2.5	2	1	3.5
B-73	4	GNA	GNA	5	-1

***Estimated to the nearest 1/2 foot. Ground spot elevations were estimated from the topographic drawing provided to us and should be considered approximate.**

Estimated SHGWT Elevations

Anclote Harbor Apartments
October 6, 2020

Boring Location	Ground Surface Elevation*	Groundwater Depth*	Groundwater Elevation*	SHGWT Depth*	SHGWT Elevation*
B-74	4	3.5	0.5	2.5	1.5
B-75	20	GNA	GNA	8	12
B-76	18	GNA	GNA	8	10
B-77	6	5	1	3	3
B-78	5	4.5	0.5	2.5	2.5
B-79	5.5	3	2.5	1	4.5
B-80	5	4.5	0.5	2.5	2.5
B-81	5.5	GNA	GNA	5	0.5
B-82	11	GNA	GNA	5	6
B-83	10	GNA	GNA	5	5
B-84	3.5	3	0.5	1	2.5
B-85	4.5	3.5	1	1.5	3
B-86	3.5	3	0.5	1	2.5

***Estimated to the nearest 1/2 foot. Ground spot elevations were estimated from the topographic drawing provided to us and should be considered approximate.**


Muck Depths
Legend
Approx Wetland Boundary
Boring
NB-70
NB-71
NB-50
NB-72
NB-51
NB-53
No Muck
NB-79
NB-52
NB-56
NB-57
NB-58
NB-80
0
4'
>4'
>4'
>4'
0.5'
1'
1'
0.5'
>4'
>4'
0.5'
0.5'
0.5'
1.5'
>4'
Water depth >5'
NB-81
NB-67
DRI-4
Google Earth
© 2020 Google
N
200 ft

UNIVERSAL
ENGINEERING SCIENCES
Consultants In: Geotechnical Engineering
Environmental Sciences • Construction Material Testing
1748 Independence Blvd., Suite B-1 • Sarasota, FL 34234 • (941) 358-7410

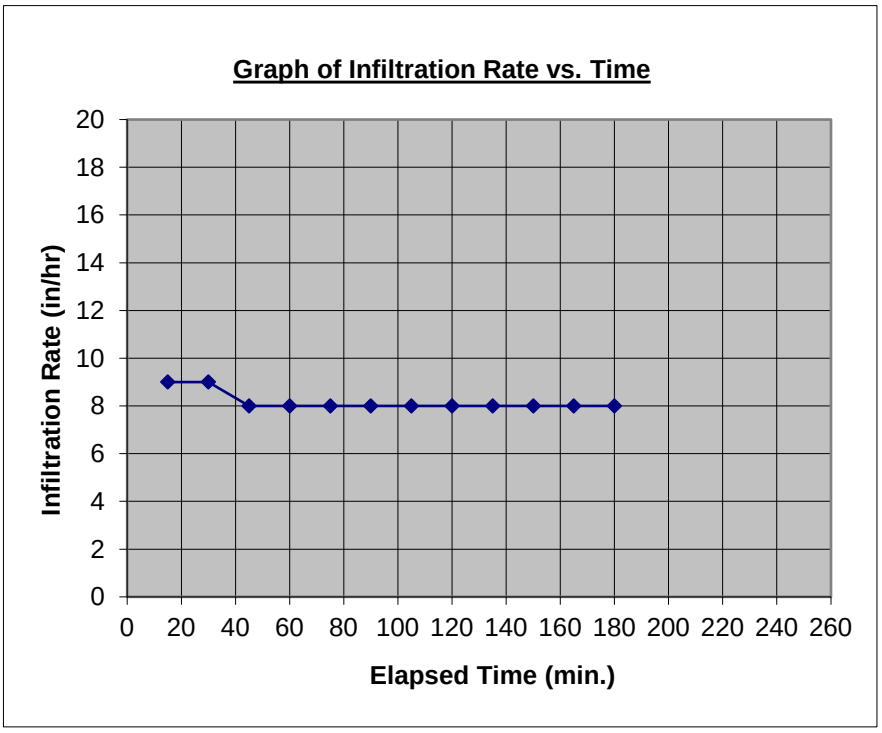
RESULTS OF DOUBLE-RING INFILTROMETER TEST

Project: Anclote Harbor Apartments
Location: US-19 & Atlantic Avenue,Tarpon Springs, FL
Test ID.: DRI-1

Project No.: 1185.2000136.0000
Date Tested: 8/4/2020

TEST DATA

Elapsed Time (min.)	Infiltration Rate (in/hr)
	Inner R.
15	9
30	9
45	8
60	8
75	8
90	8
105	8
120	8
135	8
150	8
165	8
180	8
195	
210	
225	
240	



UNIVERSAL
ENGINEERING SCIENCES
Consultants In: Geotechnical Engineering
Environmental Sciences • Construction Material Testing
1748 Independence Blvd., Suite B-1 • Sarasota, FL 34234 • (941) 358-7410

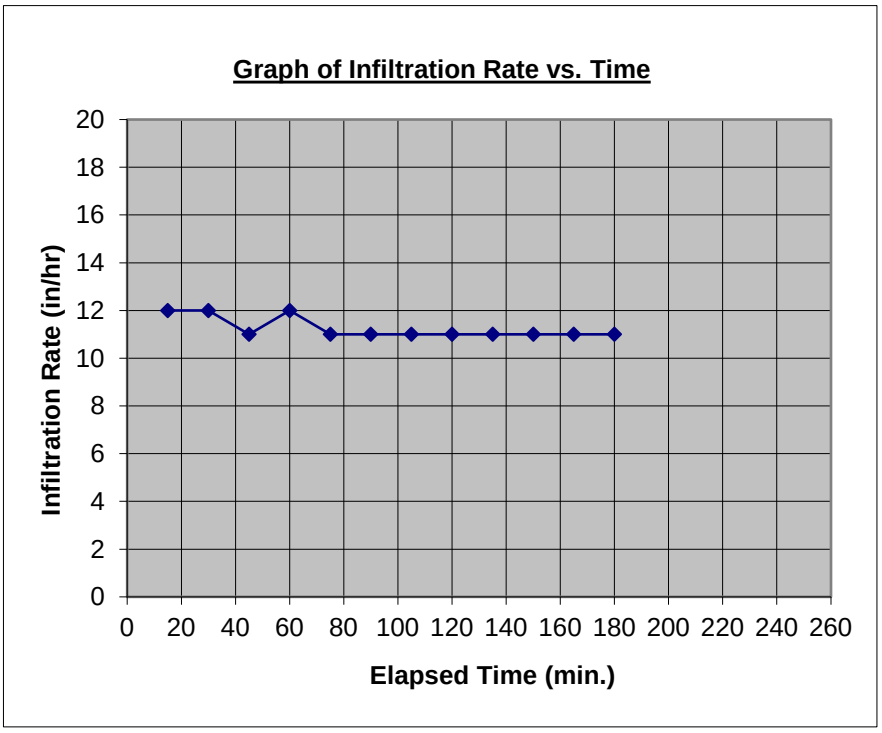
RESULTS OF DOUBLE-RING INFILTROMETER TEST

Project: Anclote Harbor Apartments
Location: US-19 & Atlantic Avenue,Tarpon Springs, FL
Test ID.: DRI-2

Project No.: 1185.2000136.0000
Date Tested: 8/5/2020

TEST DATA

Elapsed Time (min.)	Infiltration Rate (in/hr)
	Inner R.
15	12
30	12
45	11
60	12
75	11
90	11
105	11
120	11
135	11
150	11
165	11
180	11
195	
210	
225	
240	



UNIVERSAL
ENGINEERING SCIENCES
Consultants In: Geotechnical Engineering
Environmental Sciences • Construction Material Testing
1748 Independence Blvd., Suite B-1 • Sarasota, FL 34234 • (941) 358-7410

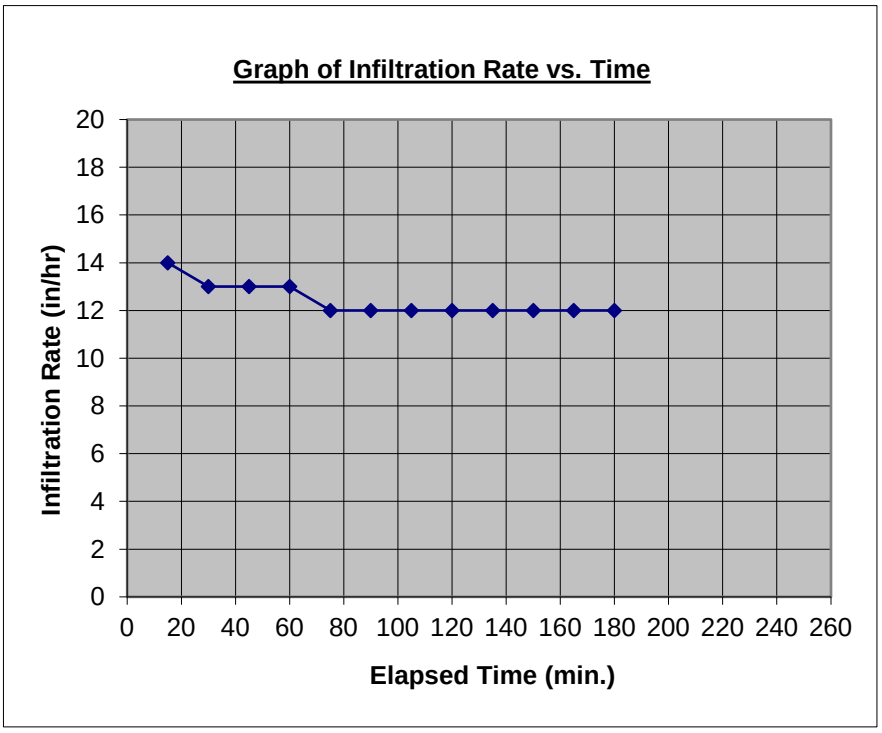
RESULTS OF DOUBLE-RING INFILTROMETER TEST

Project: Anclote Harbor Apartments
Location: US-19 & Atlantic Avenue,Tarpon Springs, FL
Test ID.: DRI-3

Project No.: 1185.2000136.0000
Date Tested: 8/5/2020

TEST DATA

Elapsed Time (min.)	Infiltration Rate (in/hr)
	Inner R.
15	14
30	13
45	13
60	13
75	12
90	12
105	12
120	12
135	12
150	12
165	12
180	12
195	
210	
225	
240	



UNIVERSAL
ENGINEERING SCIENCES
Consultants In: Geotechnical Engineering
Environmental Sciences • Construction Material Testing
1748 Independence Blvd., Suite B-1 • Sarasota, FL 34234 • (941) 358-7410

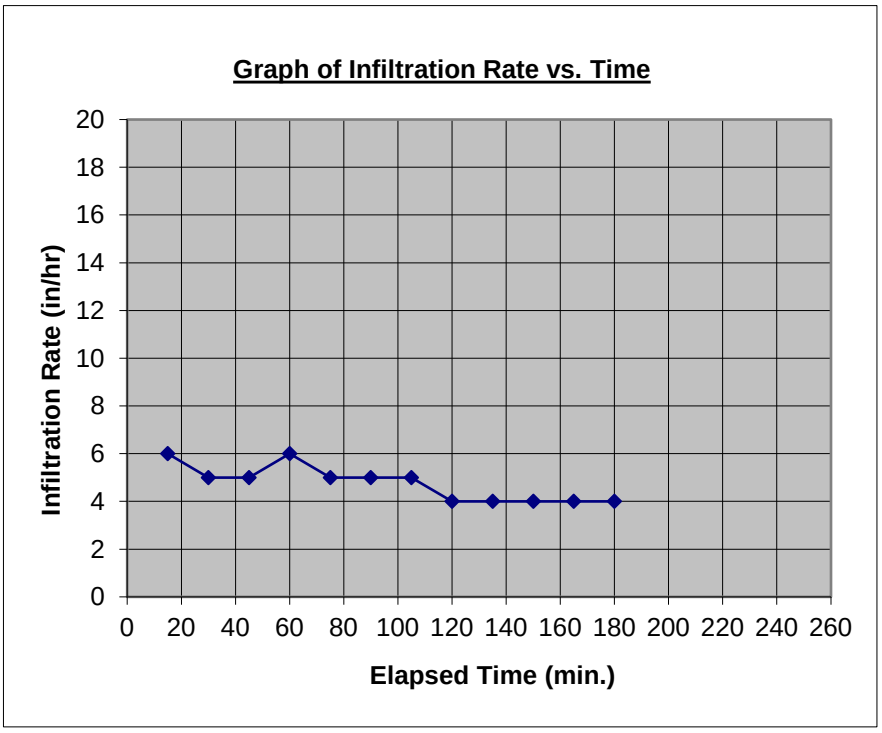
RESULTS OF DOUBLE-RING INFILTROMETER TEST

Project: Anclote Harbor Apartments
Location: US-19 & Atlantic Avenue,Tarpon Springs, FL
Test ID.: DRI-4

Project No.: 1185.2000136.0000
Date Tested: 8/6/2020

TEST DATA

Elapsed Time (min.)	Infiltration Rate (in/hr)
	Inner R.
15	6
30	5
45	5
60	6
75	5
90	5
105	5
120	4
135	4
150	4
165	4
180	4
195	
210	
225	
240	



UNIVERSAL
ENGINEERING SCIENCES
Consultants In: Geotechnical Engineering
Environmental Sciences • Construction Material Testing
1748 Independence Blvd., Suite B-1 • Sarasota, FL 34234 • (941) 358-7410

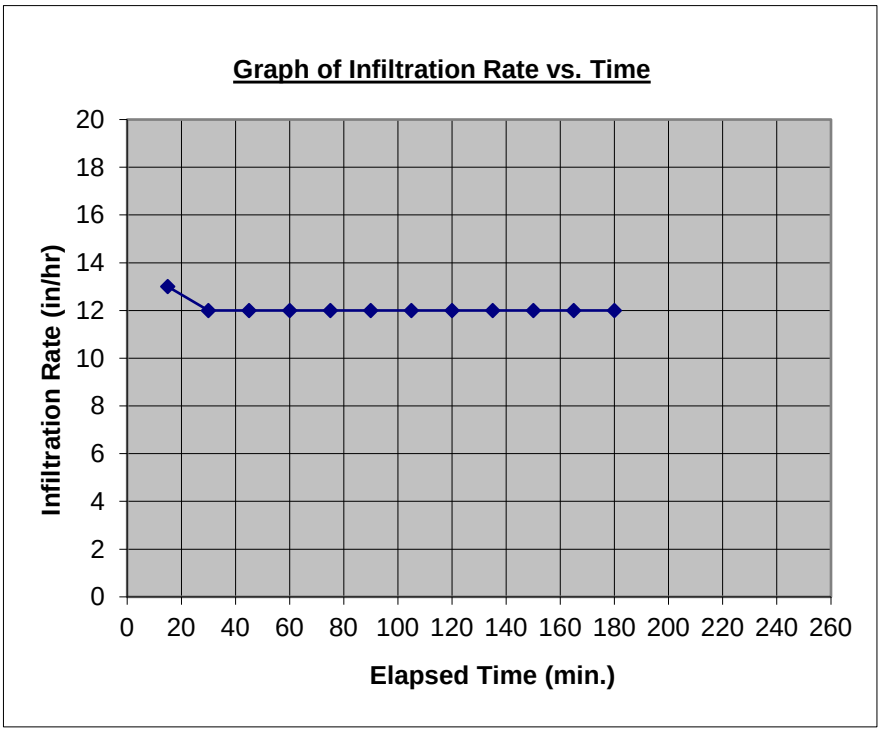
RESULTS OF DOUBLE-RING INFILTROMETER TEST

Project: Anclote Harbor Apartments
Location: US-19 & Atlantic Avenue,Tarpon Springs, FL
Test ID.: DRI-5

Project No.: 1185.2000136.0000
Date Tested: 8/6/2020

TEST DATA

Elapsed Time (min.)	Infiltration Rate (in/hr)
	Inner R.
15	13
30	12
45	12
60	12
75	12
90	12
105	12
120	12
135	12
150	12
165	12
180	12
195	
210	
225	
240	



APPENDIX B

UNIVERSAL
ENGINEERING SCIENCES

COMPACTION GROUTING PROGRAM RECOMMENDATIONS
ANCLOTE HARBOR APARTMENTS – BUILDING "3" AND POOL
TARPON SPRINGS, FLORIDA

1.1 Scope of Work

1.1.1 The work covered by this section consists of providing project control, supervision, all labor and equipment, and performing all operations in connection with improvement of the deep soils underlying the proposed Building "3" and the pool. Targeted grouting shall begin at each primary grouting location at depths as directed by the Geotechnical Engineer.

1.1.2 **In general, the goal of the proposed targeted grouting program shall be to compact, fill, and improve very loose/soft soils and/or fill void space <u>at and above</u> the soil/limestone interface.** The grout shall be a sand-cement mixture with appropriate additives and a 2-day compressive strength on the order of 150 pounds per square inch (psi).

1.1.3 The placement of low slump grout within the soil shall act to compress and densify the surrounding soil. Additionally, the grouting may plug openings that may exist in the top of the limestone layer. Grout with a maximum slump of 6 inches shall be used for the low slump grouting operations.

1.1.4 The grouting program includes the placement of grout injection pipes at the locations discussed in this report, or elsewhere as specifically approved by the Geotechnical Engineer. **Soil improvements shall primarily consist of injection of a low slump compaction grout under pressure at the injection points beginning just below the limestone/overburden interface.**

1.1.5 This recommendation is issued as an appendix to the Universal Engineering Sciences geotechnical exploration, UES Project No. 1185.2000136.0000. All findings and recommendations provided by the report and appended data are included by reference in this recommendation. All bidders are requested to submit the bid in a format and based on quantities presented in section 3.1.1.

1.2 EQUIPMENT

1.2.1 Only approved pumping equipment shall be used in the preparation or handling of compaction grout. All equipment shall be maintained in good working condition at all times.

1.2.2 Compaction grout pumps shall have an on-line pressure gauge with range of 50-500 psi.

1.2.3 The contractor shall provide vertical survey control in the vicinity of each injection point to determine when surface heave has occurred.

1.2.4 The contractor's equipment used for installation of the grout casing shall have the capability of installing injection pipes on angles, so as to extend grout piping beneath the building.

2.1 INJECTION POINT SPACING AND PLACEMENT

2.1.1 The method of installation of the grout injection pipes (GIP) shall be determined by the contractor, with the knowledge that the contractor assumes the risk of any subsidence damage that is deemed to result from the method used. The Primary GIPs should be advanced through the surface and underlying soils to an expected depth of approximately 35 feet below existing grade (bgs) for building 3 and 30 feet bgs for the pool, or approximately 2 feet into the limestone bedrock, at the locations indicated on the proposed Grout Injection Point Location Plan (**Appendix C**). Variation in depth shall be at the direction of the Geotechnical Engineer. **GIPs shall not be installed deeper than 35 feet unless under the direction of the Geotechnical Engineer.**

Grout injection points (casing) installed deeper than the above prescribed depth without the direction of the Geotechnical Engineer shall be re-drilled in an adjacent location under the direct supervision of the Geotechnical Engineer.

2.1.2 Dependent upon the installation depth and grout take for the initially planned injection points, additional secondary GIPs may be installed.

2.1.3 All changes in injection pipe spacing, grout delivery pressure, and allowable quantities of grout at a given depth and location shall be as directed by the Geotechnical Engineer.

2.1.4 The diameter of injection pipes shall be adequate to permit injection of compaction grout. The use of augers for the delivery of grout in lieu of injection pipes is unacceptable.

2.1.5 For all types of injection points, accurate installation records shall be kept by the contractor, including location and depth of injection points, method of installation, and other pertinent data such as difficulties encountered during drilling or pipe driving. UES should monitor the installation of the GIP to ensure that the goals of the grouting operations are met.

2.1.6 The Geotechnical Engineer should be notified immediately so that adequate protection measures can be implemented in order to protect integrity of the structure should a soil subsidence occur.

2.2 GROUT INJECTION PROCEDURES

2.2.1 The grouting shall proceed in alternating locations so that a minimum 6 hours curing time elapses prior to drilling and grouting adjacent holes.

2.2.2 The injection of grout shall begin at the bottom depth of the injection pipe and proceed upward in 5-foot intervals to within 20 feet of existing grade. No grout other than that required to fill the casing hole should be injected above the 20 feet depth.

2.2.3 A maximum grout line pressure of 150 psi over the static pressure is recommended.

2.2.4 Grouting procedure shall continue with the grout pipe withdrawn in a controlled manner and with sufficient pressure on the grout to assure that the drilled hole is filled with grout to prevent a breaching of any clay layer present. The Geotechnical Engineer may stop the withdrawal at pre-selected depth intervals for the grouting of extremely loose to near-void conditions.

2.2.5 In general, injection at each interval shall continue, except as specifically otherwise approved, until one of the following occurs:

A. A maximum grout pressure of 150 psi increase over the static line pressure, in which case the grout pipe should be withdrawn 5 feet and the grouting should continue at that depth.

B. A maximum grout pressure at the ground surface of 350 psi or as directed by the Geotechnical Engineer, the grouting pipe should be withdrawn 5 feet and the grouting of the particular grout injection point should continue.

C. If 2.5 cubic yards of grout per 5-foot interval is injected and the maximum grout pressures at the ground surface is 100 psi or higher, the grouting pipe should be withdrawn 5 feet and the grouting of the particular grout injection point should continue.

If 5 cubic yards of grout per 5-foot interval is injected and the maximum grout pressures at the ground surface is 100 psi or lower, the grouting pipe should be withdrawn 5 feet, the grouting pipe should be flushed and the grouting of the particular grout injection point should continue a minimum of 6 hours later.

D. Surface heave of more than 1/16 inch per interval.

E. Any observable heave of the structure, if applicable.

The above criteria may be altered by the Geotechnical Engineer during grouting dependent upon field conditions.

2.2.6 **No more than 10 cubic yards per day or 25 cubic yards total of grout shall be injected into any GIP without the direction of the Geotechnical Engineer.**

2.2.7 Ready mix tickets shall be saved and made part of the permanent project records.

2.3 CONTRACTOR'S SUPERVISION AND QUALITY CONTROL

2.3.1 A level control system shall be installed and operated by the contractor for use during grouting. The monitoring shall be carried out so as to detect any movement within 25 feet of the grouting operations whenever grouting is occurring.

2.3.2 Any grout injection performed by the contractor without representation of the geotechnical engineer present shall not be compensated and processes shall be repeated.

Grout injection performed by the contractor beyond the above referenced criteria (Sections 2.2.5 and 2.2.6) without the direction of the Geotechnical Engineer shall not be compensated.

2.3.3 Contractor drilling reports shall be required and shall contain at least the following information: Name of driller, type of drill, method being used, date started, date completed, location of hole, type and depth of materials encountered. Contractor grouting reports shall be required and shall contain at least the following information: Name of grout technician, constituents and proportions of grout, log of quantity injected per lineal foot of hole, date, rate of pumping, and pressure at the hole.

2.4 TESTING AND QUALITY

2.4.1 The testing and on-site observation of the operations shall be done at the owner's expense, by the Geotechnical Engineer. His activities shall include, but are not limited to, observing the drilling operations, observing the grouting activities, and monitoring grout volumes and depths.

2.4.2 In rare cases the Geotechnical Engineer reserves the option to perform Standard Penetration Test borings in improved areas during the grouting operations or after completion to evaluate the success of the grouting operation.

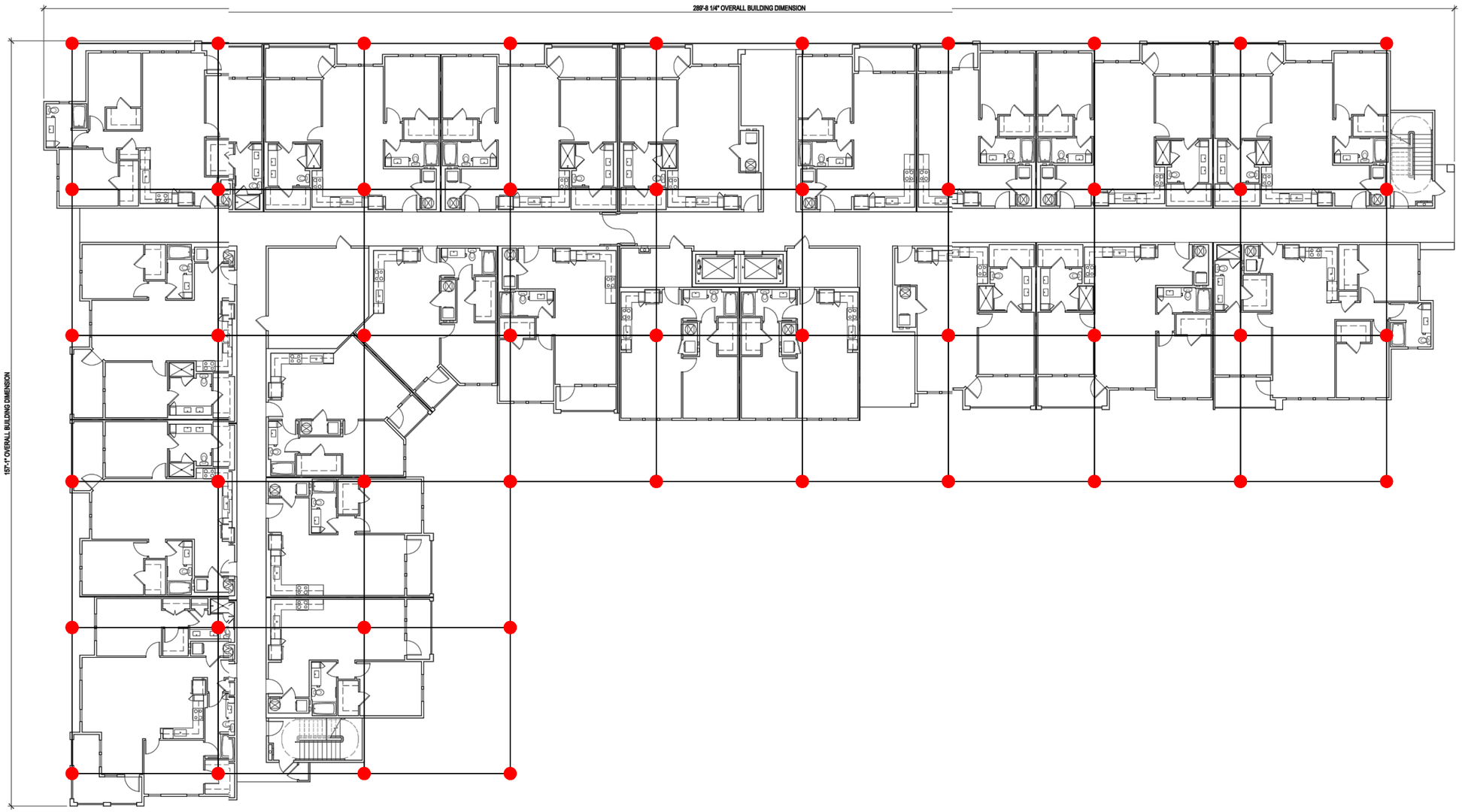
3.1 MEASUREMENT AND PAYMENT

3.1.1 The approved grouting contractor shall submit a bid based on the following quantities.

Item No.	Description	Estimated Quantity	Unit	Unit Price	Total
1	Mobilization / Demobilization	1	lump sum		
2	Grout injection point piping	2,130	lineal feet		
3	Cubic yards of compaction grout	593	cu.yds.		
4	UES Grout Monitoring Services	1	lump sum	$16,000	$16,000

3.1.2 Payment will be made solely at the bid prices, based on actual quantities performed. Additional payment for remobilization shall be made only where contractor was authorized by the Geotechnical Engineer to demobilize from the site and not as a result of variations in the scope or quantity of the grouting program or time of performance.

GROUT INJECTION POINT LOCATION PLAN: BUILDING "3"



1 Building Type I - First Floor Plan

3/32" = 1'-0"

821 = 1 Inches

FORUM
ARCHITECTURE &
INTERIOR DESIGN, INC.

237 S. Westmonte Drive, Suite 220
Altamonte Springs, FL 32714
407.830.1400
AA0002731

www.forumarchitecture.com

Anclote Harbor Apartments

Tarpon Springs, FL

08/13/2020
Andrew Scott Roark
AR97193

Preliminary - Not For Construction

SET DISTRIBUTIONS:

SHEET REVISIONS:

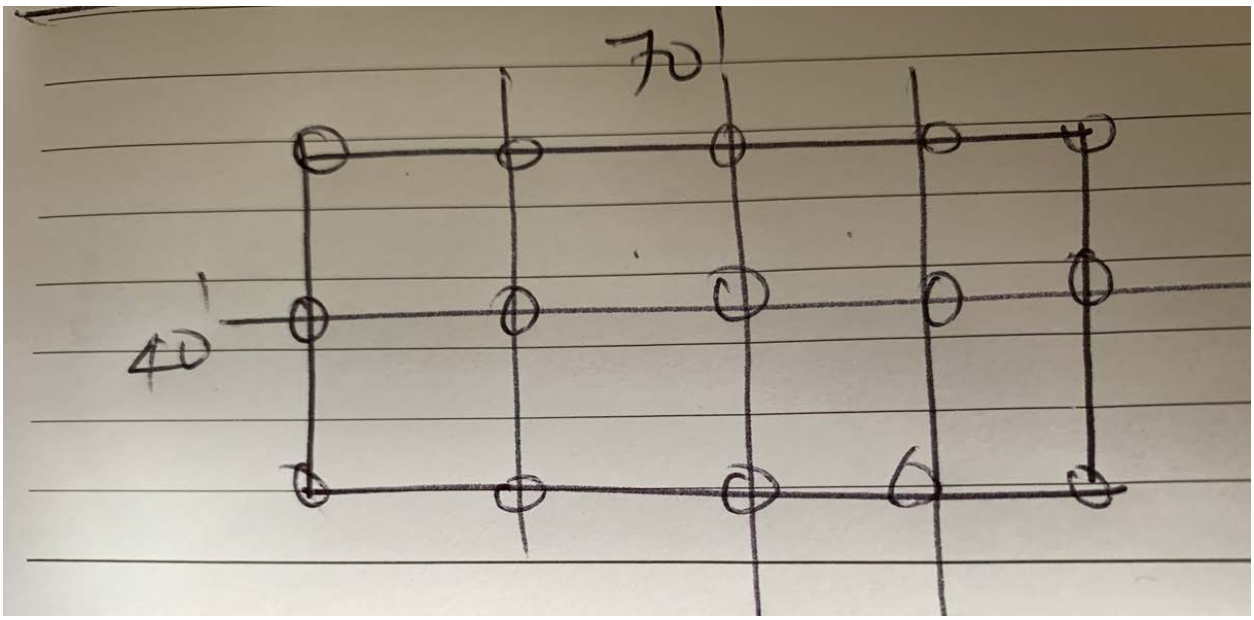
PROJECT NO. 3721

Building Type I

First Floor Plan

A5.11

GROUT INJECTION POINT PLAN: POOL



APPENDIX C

UNIVERSAL
ENGINEERING SCIENCES

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

CONSTRAINTS AND RESTRICTIONS

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 construction 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 explorations 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.

Universal Engineering Sciences, Inc.
GENERAL CONDITIONS

SECTION 1: RESPONSIBILITIES

1.1 *Universal Engineering Sciences, Inc.*, ("UES"), has the responsibility for providing the services described under the Scope of Services section. The work is to be performed according to accepted standards of care and is to be completed in a timely manner. The term "UES" as used herein includes all of *Universal Engineering Sciences, Inc's* agents, employees, professional staff, and subcontractors.

1.2 The Client or a duly authorized representative is responsible for providing UES with a clear understanding of the project nature and scope. The Client shall supply UES with sufficient and adequate information, including, but not limited to, maps, site plans, reports, surveys and designs, to allow UES to properly complete the specified services. The Client shall also communicate changes in the nature and scope of the project as soon as possible during performance of the work so that the changes can be incorporated into the work product.

1.3 The Client acknowledges that UES's responsibilities in providing the services described under the Scope of Services section is limited to those services described therein, and the Client hereby assumes any collateral or affiliated duties necessitated by or for those services. Such duties may include, but are not limited to, reporting requirements imposed by any third party such as federal, state, or local entities, the provision of any required notices to any third party, or the securing of necessary permits or permissions from any third parties required for UES's provision of the services so described, unless otherwise agreed upon by both parties.

1.4 Universal will not be responsible for scheduling our services and will not be responsible for tests or inspections that are not performed due to a failure to schedule our services on the project or any resulting damages.

1.5 **PURSUANT TO FLORIDA STATUTES §558.0035, ANY INDIVIDUAL EMPLOYEE OR AGENT OF UES MAY NOT BE HELD INDIVIDUALLY LIABLE FOR NEGLIGENCE.**

SECTION 2: STANDARD OF CARE

2.1 Services performed by UES under this Agreement will be conducted in a manner consistent with the level of care and skill ordinarily exercised by members of UES's profession practicing contemporaneously under similar conditions in the locality of the project. No other warranty, express or implied, is made.

2.2 The Client recognizes that subsurface conditions may vary from those observed at locations where borings, surveys, or other explorations are made, and that site conditions may change with time. Data, interpretations, and recommendations by UES will be based solely on information available to UES at the time of service. UES is responsible for those data, interpretations, and recommendations, but will not be responsible for other parties' interpretations or use of the information developed.

2.3 Execution of this document by UES is not a representation that UES has visited the site, become generally familiar with local conditions under which the services are to be performed, or correlated personal observations with the requirements of the Scope of Services. It is the Client's responsibility to provide UES with all information necessary for UES to provide the services described under the Scope of Services, and the Client assumes all liability for information not provided to UES that may affect the quality or sufficiency of the services so described.

2.4 Should UES be retained to provide threshold inspection services under Florida Statutes §553.79, Client acknowledges that UES's services thereunder do not constitute a guarantee that the construction in question has been properly designed or constructed, and UES's services do not replace any of the obligations or liabilities associated with any architect, contractor, or structural engineer. Therefore it is explicitly agreed that the Client will not hold UES responsible for the proper performance of service by any architect, contractor, structural engineer or any other entity associated with the project.

SECTION 3: SITE ACCESS AND SITE CONDITIONS

3.1 Client will grant or obtain free access to the site for all equipment and personnel necessary for UES to perform the work set forth in this Agreement. The Client will notify any and all possessors of the project site that Client has granted UES free access to the site. UES will take reasonable precautions to minimize damage to the site, but it is understood by Client that, in the normal course of work, some damage may occur, and the correction of such damage is not part of this Agreement unless so specified in the Proposal.

3.2 The Client is responsible for the accuracy of locations for all subterranean structures and utilities. UES will take reasonable precautions to avoid known subterranean structures, and the Client waives any claim against UES, and agrees to defend, indemnify, and hold UES harmless from any claim or liability for injury or loss, including costs of defense, arising from damage done to subterranean structures and utilities not identified or accurately located. In addition, Client agrees to compensate UES for any time spent or expenses incurred by UES in defense of any such claim with compensation to be based upon UES's prevailing fee schedule and expense reimbursement policy.

SECTION 4: SAMPLE OWNERSHIP AND DISPOSAL

4.1 Soil or water samples obtained from the project during performance of the work shall remain the property of the Client.

4.2 UES will dispose of or return to Client all remaining soils and rock samples 60 days after submission of report covering those samples. Further storage or transfer of samples can be made at Client's expense upon Client's prior written request.

4.3 Samples which are contaminated by petroleum products or other chemical waste will be returned to Client for treatment or disposal, consistent with all appropriate federal, state, or local regulations.

SECTION 5: BILLING AND PAYMENT

5.1 UES will submit invoices to Client monthly or upon completion of services. Invoices will show charges for different personnel and expense classifications.

5.2 Payment is due 30 days after presentation of invoice and is past due 31 days from invoice date. Client agrees to pay a finance charge of one and one-half percent (1 ½ %) per month, or the maximum rate allowed by law, on past due accounts.

5.3 If UES incurs any expenses to collect overdue billings on invoices, the sums paid by UES for reasonable attorneys' fees, court costs, UES's time, UES's expenses, and interest will be due and owing by the Client.

SECTION 6: OWNERSHIP AND USE OF DOCUMENTS

6.1 All reports, boring logs, field data, field notes, laboratory test data, calculations, estimates, and other documents prepared by UES, as instruments of service, shall remain the property of UES.

6.2 Client agrees that all reports and other work furnished to the Client or his agents, which are not paid for, will be returned upon demand and will not be used by the Client for any purpose.

6.3 UES will retain all pertinent records relating to the services performed for a period of five years following submission of the report, during which period the records will be made available to the Client at all reasonable times.

6.4 All reports, boring logs, field data, field notes, laboratory test data, calculations, estimates, and other documents prepared by UES, are prepared for the sole and exclusive use of Client, and may not be given to any other party or used or relied upon by any such party without the express written consent of UES.

SECTION 7: DISCOVERY OF UNANTICIPATED HAZARDOUS MATERIALS

7.1 Client warrants that a reasonable effort has been made to inform UES of known or suspected hazardous materials on or near the project site.

7.2 Under this agreement, the term hazardous materials include hazardous materials (40 CFR 172.01), hazardous wastes (40 CFR 261.2), hazardous substances (40 CFR 300.6), petroleum products, polychlorinated biphenyls, and asbestos.

7.3 Hazardous materials may exist at a site where there is no reason to believe they could or should be present. UES and Client agree that the discovery of unanticipated hazardous materials constitutes a changed condition mandating a renegotiation of the scope of work. UES and Client also agree that the discovery of unanticipated hazardous materials may make it necessary for UES to take immediate measures to protect health and safety. Client agrees to compensate UES for any equipment decontamination or other costs incident to the discovery of unanticipated hazardous waste.

7.4 UES agrees to notify Client when unanticipated hazardous materials or suspected hazardous materials are encountered. Client agrees to make any disclosures required by law to the appropriate governing agencies. Client also agrees to hold UES harmless for any and all consequences of disclosures made by UES which are required by governing law. In the event the project site is not owned by Client, Client recognizes that it is the Client's responsibility to inform the property owner of the discovery of unanticipated hazardous materials or suspected hazardous materials.

7.5 Notwithstanding any other provision of the Agreement, Client waives any claim against UES, and to the maximum extent permitted by law, agrees to defend, indemnify, and save UES harmless from any claim, liability, and/or defense costs for injury or loss arising from UES's discovery of unanticipated hazardous materials or suspected hazardous materials including any costs created by delay of the project and any cost associated with possible reduction of the property's value. Client will be responsible for ultimate disposal of any samples secured by UES which are found to be contaminated.

SECTION 8: RISK ALLOCATION

8.1 Client agrees that UES's liability for any damage on account of any breach of contract, error, omission or other professional negligence will be limited to a sum not to exceed $50,000 or UES's fee, whichever is greater. If Client prefers to have higher limits on contractual or professional liability, UES agrees to increase the limits up to a maximum of $1,000,000.00 upon Client's written request at the time of accepting our proposal provided that Client agrees to pay an additional consideration of four percent of the total fee, or $400.00, whichever is greater. The additional charge for the higher liability limits is because of the greater risk assumed and is not strictly a charge for additional professional liability insurance.

SECTION 9: INSURANCE

9.1 UES represents and warrants that it and its agents, staff and consultants employed by it, is and are protected by worker's compensation insurance and that UES has such coverage under public liability and property damage insurance policies which UES deems to be adequate. Certificates for all such policies of insurance shall be provided to Client upon request in writing. Within the limits and conditions of such insurance, UES agrees to indemnify and save Client harmless from and against loss, damage, or liability arising from negligent acts by UES, its agents, staff, and consultants employed by it. UES shall not be responsible for any loss, damage or liability beyond the amounts, limits, and conditions of such insurance or the limits described in Section 8, whichever is less. The Client agrees to defend, indemnify and save UES harmless for loss, damage or liability arising from acts by Client, Client's agent, staff, and other UESs employed by Client.

SECTION 10: DISPUTE RESOLUTION

10.1 All claims, disputes, and other matters in controversy between UES and Client arising out of or in any way related to this Agreement will be submitted to alternative dispute resolution (ADR) such as mediation or arbitration, before and as a condition precedent to other remedies provided by law, including the commencement of litigation.

10.2 If a dispute arises related to the services provided under this Agreement and that dispute requires litigation instead of ADR as provided above, then:

(a) the claim will be brought and tried in judicial jurisdiction of the court of the county where UES's principal place of business is located and Client waives the right to remove the action to any other county or judicial jurisdiction, and

(b) The prevailing party will be entitled to recovery of all reasonable costs incurred, including staff time, court costs, attorneys' fees, and other claim related expenses.

SECTION 11: TERMINATION

11.1 This agreement may be terminated by either party upon seven (7) days written notice in the event of substantial failure by the other party to perform in accordance with the terms hereof. Such termination shall not be effective if that substantial failure has been remedied before expiration of the period specified in the written notice. In the event of termination, UES shall be paid for services performed to the termination notice date plus reasonable termination expenses.

11.2 In the event of termination, or suspension for more than three (3) months, prior to completion of all reports contemplated by the Agreement, UES may complete such analyses and records as are necessary to complete its files and may also complete a report on the services performed to the date of notice of termination or suspension. The expense of termination or suspension shall include all direct costs of UES in completing such analyses, records and reports.

SECTION 12: ASSIGNS

12.1 Neither the Client nor UES may delegate, assign, sublet or transfer their duties or interest in this Agreement without the written consent of the other party.

SECTION 13. GOVERNING LAW AND SURVIVAL

13.1 The laws of the State of Florida will govern the validity of these Terms, their interpretation and performance.

13.2 If any of the provisions contained in this Agreement are held illegal, invalid, or unenforceable, the enforceability of the remaining provisions will not be impaired. Limitations of liability and indemnities will survive termination of this Agreement for any cause.

SECTION 14. INTEGRATION CLAUSE

14.1 This Agreement represents and contains the entire and only agreement and understanding among the parties with respect to the subject matter of this Agreement, and supersedes any and all prior and contemporaneous oral and written agreements, understandings, representations, inducements, promises, warranties, and conditions among the parties. No agreement, understanding, representation, inducement, promise, warranty, or condition of any kind with respect to the subject matter of this Agreement shall be relied upon by the parties unless expressly incorporated herein.

14.2 This Agreement may not be amended or modified except by an agreement in writing signed by the party against whom the enforcement of any modification or amendment is sought.