December 13, 2023

Patel, Greene, & Associates, LLC
7020 Professional Parkway E. Unit E.
Sarasota, FL 34240

Attn: Mr. Richard Uptegraff, P.E.

RE: Roadway Soil Survey Report
63rd Ave E from U.S. 301 to Tuttle Avenue
Manatee County, Florida
Manatee County Project No.: 6107860
Tierra Project No.: 6511-22-126

Mr. Uptegraff:

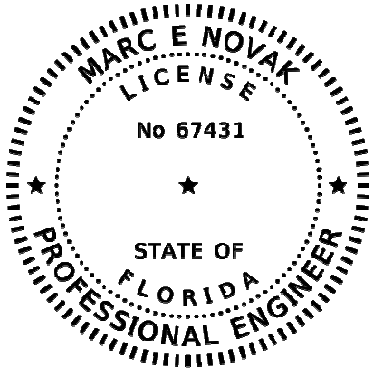
Tierra, Inc. (Tierra) has completed a Roadway Soil Survey Report for the above referenced project. This report is being provided to assist in preparation of the Roadway Plans for the 63rd Avenue Roadway Plans submittal. The results of our field exploration program and laboratory testing performed to date and subsequent geotechnical recommendations are presented herein.

Tierra, Inc. appreciates the opportunity to be of service to Patel, Greene, & Associates, LLC (PGA) on this project. If you have any questions or comments regarding this report, please contact our office at your earliest convenience.

Sincerely,

TIERRA, INC.

Kevin L. Hill, E.I.
Engineering Intern



This item has been digitally signed and sealed by Marc E. Novak on the date adjacent to the seal.

Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic documents.

Marc E. Novak, Ph.D., P.E.
Senior Geotechnical Engineer
Florida License No. 67431

Daniel Ruel, P.E.
Geotechnical Engineer
Florida License No. 82404

Table of Contents
Page 1 of 2

Table of Contents
Page 2 of 2

1.0 PROJECT INFORMATION

1.1 Project Authorization

Authorization to proceed with this project was issued by PGA in accordance with the Subconsultant Agreement for the referenced project.

1.2 Project Description

The project consists of preparing construction plans for the widening and improvements along the existing 63rd Avenue East from US 301 to Tuttle Avenue.

The purpose of this report is to provide geotechnical (i.e. soils and groundwater) input to the design team to assist in design of the proposed improvements. This report was generated to support the Roadway Plans submittal.

1.3 General Site Conditions

The existing roadway is generally a two-lane undivided roadway with side ditches/swales on either side. Land use adjacent to the roadway in the project area generally consists of residential, commercial developments and undeveloped land.

2.0 PURPOSE AND SCOPE OF SERVICES

This geotechnical study was performed to obtain information on the existing subsurface conditions along the limits of the proposed roadway and drainage improvements along the alignment to assist in design of the construction plans for the project. The following services were provided:

1. Reviewed published soil information obtained from the “Soil Survey of Manatee County, Florida” published by the United States Department of Agriculture (USDA) Natural Resources Conservation Services (NRCS). Reviewed topographic data obtained from the “Bradenton, Florida” Quadrangle Map and potentiometric information from the “Potentiometric Surface of the Upper Floridan Aquifer, West-Central Florida” Maps published by the United States Geological Survey (USGS).

2. Conducted a visual reconnaissance of the project site and coordinated utility clearances via Sunshine State One Call.

3. Performed a geotechnical field study to evaluate the existing subsurface conditions along the project alignment and stormwater areas consisting of borings, pavement cores, subsurface sampling and field-testing.

4. Collected bulk soil samples for Limerock Bearing Ratio (LBR) testing.

5. Obtained the necessary Manatee County permits and coordinate with maintenance of traffic support to obtain asphalt pavement cores within travel lanes.

6. Coordinated with the project surveyor to provide survey data (location and elevation) for the borings performed along the project alignment where the Seasonal High Groundwater Table (SHGWT) was estimated.

7. Visually classified and stratified recovered soil samples in the laboratory. Performed laboratory tests on selected representative samples to develop the soil legend for the project in accordance with the (AASHTO) soil classification system.

8. Prepared this Roadway Soil Survey Report for the project.

3.0 REVIEW OF PUBLISHED DATA

3.1 Regional Geology

The following paragraphs have been paraphrased from the Florida Geological Survey, Open-File Report 80, 2001 and other geologic references.

The near surface geologic deposits and formations from youngest to oldest in Manatee County include: Undifferentiated sediments (Qu, TQu), Shelly sediments (TQsu), the Hawthorn Group Peace River Formation (Thp), the Hawthorn Group Peace River Formation Bone Valley Member (Thpb), the Hawthorn Group Arcadia Formation (Tha), and the Hawthorn Group Arcadia Formation Tampa Member (That).

The Undifferentiated sediments and Beach and Ridge dunes are siliciclastics that are light gray, tan, brown to black, unconsolidated to poorly consolidated, clean to clayey silty, unfossiliferous, variably organic-bearing sands to blue green to olive green, poorly to moderately consolidated, sandy, silty clays. The Shelly sediments are variably calcareous and fossiliferous quartz sands to well indurated, sandy, fossiliferous limestones with clayey sands and sandy clays present.

The Peace River Formation is primarily found near the surface in northwestern Manatee County and is composed of interbedded sands, clays and carbonates. The sands are generally light gray to olive gray, poorly consolidated, clayey, variably dolomitic, very fine to medium grained and phosphatic. The clays are yellowish gray to olive gray, poorly to moderately consolidated sandy, silty, phosphatic and dolomitic. The carbonates are light gray to yellowish gray, poorly to well indurated, variably sandy and clayey, and phosphatic. The carbonates often include opaline chert. The Bone Valley Member is a clastic unit consisting of sand-sized and larger phosphate grains in a matrix of quartz sand, silt and clay. The lithology is highly variable ranging from sandy, silty, phosphatic clays and relatively pure clays to clayey, phosphatic sand to sandy, clayey phosphorites and is found within 50 feet of the surface in eastern Manatee County. The Peace River Formation is a semi-confining unit and forms an intermediate aquifer system in eastern Manatee County.

The Arcadia Formation is predominantly a carbonate unit with variable siliciclastic component. Arcadia Formation is composed of yellowish gray to light olive gray to light brown, micro to finely crystalline, variably sandy, clayey and phosphatic, fossiliferous limestones and dolostones. Thin beds of sand and clay are common. The sands are yellowish gray, very fine to medium grained, poorly to moderately indurated, clayey, dolomitic and phosphatic. The clays are

yellowish gray to light olive gray, poorly to moderately indurated, sandy, silty, phosphatic and dolomitic.

The Tampa member of the Arcadia Formation is white to yellowish gray, fossiliferous and variably sandy and clayey mudstones, wackestone and packstone with minor to no phosphate grains. In Manatee County the Tampa member is found about 300 feet bls and is approximately 100 to 150 feet thick and is part of the Floridan Aquifer System.

3.2 USDA Soil Survey

Based on a review of the Manatee County Soil Survey published by the USDA, it appears that there are nine (9) primary soil-mapping units noted along the project alignment. An illustration of the **USDA Soil Survey Map** and a summary of each soil unit is provided in **Appendix A**.

It should be noted that information contained in the USDA Soil Survey may not be reflective of actual soil and groundwater conditions, particularly if recent development in the project vicinity has modified soil conditions or surface/subsurface drainage.

3.3 USGS Quadrangle Maps

Based on a review of the USGS Quadrangle Map titled “Bradenton, Florida” it appears that the project site natural elevations range from approximately +10 feet to +20 feet, National Geodetic Vertical Datum of 1929 (NGVD 29) as illustrated on the **USGS Quadrangle Map** provided in **Appendix A**. This is reasonably consistent with survey elevations provided by the project surveyor for the borings performed.

3.4 Potentiometric Surface Elevation

Based on a review of the “Potentiometric Surface of the Upper Floridan Aquifer, West-Central Florida” map published by the USGS, the potentiometric surface elevation of the Upper Floridian Aquifer across the site is approximately +20 to +25 feet, NGVD 29. The natural ground elevation at the project site ranges from approximately +10 to +20 feet, NGVD 29. Artesian flow conditions were not encountered during the field exploration, however the contractor’s tools and construction methods should be able to handle artesian head up to +25 feet, at no additional cost to the owner.

4.0 SUBSURFACE EXPLORATION

Prior to commencing our subsurface explorations, a boring location plan for the proposed roadway alignment and pond locations was produced. The boring location plan was generated based on a review of the project design files provided by PGA, general guidance provided in the FDOT “Soils and Foundations Handbook” and our engineering judgment.

To evaluate the subsurface conditions and groundwater table levels along the project corridor and within off-site ponds, Tierra performed auger borings, SPT borings, mechanical test pits, and pavement cores. The results of the explorations are provided in **Appendix B**.

The hand auger borings were performed by manually twisting and advancing a bucket auger into the ground, typically in 6-inch increments. As each soil type was revealed, representative samples were collected and returned to our office for confirmation of the field classification by a geotechnical engineer. The hand auger borings advanced to depths of less than 5 feet were terminated due to either shallow groundwater levels resulting in cave-in of the borehole or hand auger refusal on hard materials.

The pavement cores were performed with the use of a 4-inch outside diameter core bit. The asphalt pavement was visually classified using standard FDOT nomenclature. Beneath the pavement and base layer, a hand auger was performed to evaluate the subgrade soil conditions.

The SPT borings were performed with the use of a drill rig using Bentonite Mud drilling procedures. The SPT borings were performed in general accordance with American Society for Testing and Materials (ASTM) Test Designation D-1586. For most of the SPT borings, the initial 4 to 6 feet of the borings were performed by manual hand auger methods to verify utility clearances. SPT resistance N-values were then taken continuously to a depth of 10 feet and at intervals of 5 feet thereafter. The soil samples were sealed in glass jars, labeled and transported to our laboratory for classification by a geotechnical engineer.

Test pits were performed within the FPC site. The test pits were performed through the use of a mechanical back-hoe and explored the subsurface conditions to depths of 8 to 10 feet below grade.

Feld permeability testing was also performed within Pond 2B. This information was utilized by the drainage designer to evaluate Pond 2B groundwater modeling. The results of the field permeability testing are Shown in the **Appendix C**.

In addition, to evaluate the subsurface conditions within the bottom of existing Pond 1 which will be improved, hand probes were performed to depths ranging from 0.5 to 2 feet below existing grade/mudline. Probing was performed by pushing a probe rod into the ground until a firm layer was encountered. Samples were retrieved through the use of a hand auger. The results of the probing are shown on the **Pond Soil Survey Sheet** in **Appendix B.**

Bulk soil samples were retrieved for LBR testing at four (4) locations along the roadway alignment. In addition, two (2) bulk samples were collected from each Pond site for LBR testing for an additional four (4) tests. In general, these samples were collected from depths of 1 to 2 feet below the existing ground surface. These samples were delivered to our Tampa laboratory for LBR testing. The results of these tests are provided in **Appendix C** of this report.

The locations and ground surface elevations of the auger borings where SHGWT estimates were made were determined by the project surveyor. The locations of the cores and remaining borings were estimated using the GPS coordinates obtained in the field by representatives of Tierra using hand-held, non-survey grade Garmin eTrex® Global Positioning System (GPS) devices with a manufacturer's reported accuracy of ±10 feet in conjunction with project design files and therefore should be considered approximate.

The locations of the borings/pavement cores performed for this study are shown on the **Boring Location Plan** sheets and **Pond Soil Survey** sheets in **Appendix B**. The station and offset of each boring/ pavement core are labeled on the **Roadway Soil Profiles** sheets and **Pond Soil Survey** sheets in **Appendix B**.

5.0 LABORATORY TESTING

5.1 General

Representative soil samples collected from the borings performed along the project alignment was classified and stratified in general accordance with the AASHTO soil classification system. Our classification was based on visual observations, using the results from the laboratory testing as confirmation. These tests included grain-size analyses, fines content, organic content, Atterberg limits and natural moisture content determination. In addition, environmental corrosion tests were performed on selected soil samples to evaluate the corrosive nature of the subsurface soils encountered.

5.2 Test Designation

The following list summarizes the laboratory tests performed by Tierra and the respective test methods utilized.

- Grain-Size Analyses/Fines Content - The grain-size analyses and fines content tests were conducted in general accordance with the AASHTO test designation T-088 (ASTM test designations D-6913 and D-1140).

- Atterberg Limits - The liquid limit and the plastic limit tests ("Atterberg Limits") were conducted in general accordance with the AASHTO test designations T-089 and T-090, respectively (ASTM test designation D-4318).

- Organic Content - The organic content tests were conducted in general accordance with the AASHTO test designation T-267.

- Natural Moisture Content - The moisture content tests were conducted in general accordance with the AASHTO test designation T-265 (ASTM test designation D-2216).

- Environmental Corrosion - The environmental corrosion tests were conducted in general accordance with the FDOT test designations FM 5-550, FM 5-551, FM 5-552 and FM 5-553.

- Limerock Bearing Ratio - The Limerock Bearing Ratio tests were conducted in accordance with the Florida State Test Method designation FM 5-515.

A summary of the laboratory test results for each soil stratum encountered along the project alignment is presented on the **Roadway Soil Survey** sheet in **Appendix B**. These sheets include ranges of laboratory test results for different stratum soil samples collected from borings performed along the project alignment. A detailed summary of the laboratory test results performed for this report is presented in **Appendix D**.

6.0 RESULTS OF SUBSURFACE EXPLORATION

6.1 General Soil Conditions

The soil types encountered during this exploration have been assigned a stratum number. The stratum number and soil types associated with the roadway and pond portion of this project are provided below:

Stratum Number	Typical Soil Description	AASHTO Classification
1	Gray To Brown Sand to Sand with Silt	A-3
2	Gray to Light Brown Silty Sand	A-2-4
3	Dark Gray to Dark Brown Sand to Sand with Silt to Silty Sand with Trace Organics	A-3/A-2-4
4	Dark Gray to Dark Brown Organic Sand to Sand with Silt to Silty Sand	A-8
5	Gray to Brown Clayey Sand	A-2-6
6	Gray to Brown to Green Clayey Sand	A-4/A-6/A-7-5
7	Debris: Soil Mixed with Variable Amounts of Concrete, Brick, Metal, Plastic, Asphalt, and/or wood	---
8	Gray to Brown Sand to Sand with Silt **(Disturbed)**	A-3
9	Gray to Light Brown Silty Sand **(Disturbed)**	A-2-4
10	Dark Gray to Dark Brown Organic Silty Sand **(Disturbed)**	A-8
11	Gray to Brown Clayey Sand **(Disturbed)**	A-2-6
12	Gray to Brown to Green Clay **(Disturbed)**	A-7-5/A-7-6
13	Gray to Brown to Green Clay	A-7-6
14	Weathered Limestone to Calcareous Clay	---

A geotechnical engineer bases soil stratification on a visual review of the recovered samples, laboratory testing and interpretation of the field boring logs. The boring stratification lines represent the approximate boundaries between soil types of significantly different engineering properties; however, the actual transition may be gradual. In some cases, small variations in properties within the same boring not considered pertinent to our engineering evaluation may have been abbreviated or omitted for clarity. The boring profiles represent the conditions at the particular boring location and variations do occur among the borings.

The results of the borings performed for this project are presented on the **Roadway Soil Profiles** sheets and **Pond Soil Survey** sheets in **Appendix B** of this report.

6.2 Groundwater

The groundwater table, when encountered, was recorded at each of the boring locations during our field exploration. The depths to the groundwater table along the project alignment ranged from above existing grade to a depth of 8 feet below the existing ground surface at the locations of the borings performed. The groundwater table measured at each of the boring locations is presented on the **Roadway Soil Profiles** sheets in **Appendix B** and **Summary of Roadway Seasonal High Groundwater Table Estimates** in **Appendix C**. The groundwater table measured at each of the boring locations in the pond is presented on the **Pond Soil Survey** sheet in **Appendix B** and **Summary of Pond Seasonal High Groundwater Table Estimates** in **Appendix C**

Where borings did not encounter the groundwater table within the boring depth, GNE (Groundwater Not Encountered) is indicated adjacent to the soil profiles. In addition, the groundwater table was not apparent prior to the introduction of drilling fluids (at a depth of 10 feet) within the SPT borings; therefore, GNA (Groundwater Not Apparent) is indicated on the soil profiles of these borings. Groundwater conditions will vary with environmental variations and seasonal conditions, such as the frequency and magnitude of rainfall patterns, as well as man-made influences (i.e., existing water management canals, swales, drainage ponds, underdrains, and areas of covered soils, such as paved parking lots and sidewalks).

6.3 Seasonal High Groundwater Estimates

Tierra performed hand auger borings at selected locations along the project alignment and within Pond locations to estimate the SHGWT. The SHGWT levels at these boring locations were estimated based on a review of the soil samples, natural indicators within the soils such as spodic horizons, stain lines/mottles, measured groundwater levels in the borings, and the USDA Manatee County Soil Survey information. A summary of the SHGWT estimates is presented in **Appendix C**.

6.4 Pavement Cores

Tierra performed seven (7) pavement cores along the existing 63rd Ave East and 33rd Street roadways. The locations of the pavement cores are presented on the **Boring Location Plan** in **Appendix B** and the results of the pavement coring operation are included on the **Pavement Data Table** in **Appendix C**.

7.0 ENGINEERING EVALUATIONS AND RECOMMENDATIONS

7.1 General

In general, the existing subsurface soils encountered in the borings performed along the project alignment are suitable for supporting the proposed improvements after proper subgrade preparation.

The removal and utilization of plastic soils, organic soils, top-soils and other surficial organic soils should be accomplished in accordance with the current FDOT Standard Plans Indices 120-001 and 120-002 and FDOT Specifications. Site preparation should consist of normal clearing

and grubbing followed by compaction of subgrade soils. Clearing and grubbing and compaction should be accomplished in accordance with FDOT Specifications.

All earthwork activities including the site preparation, clearing and grubbing, removal and utilization/placement of soils, compaction of subgrade soils and selection of backfill materials should be accomplished in accordance with the current FDOT Standards and Specifications.

7.2 Debris Materials Within FPC Site

Debris materials and disturbed soils (not in their *insitu* state) were encountered within the FPC Site.

The material from Stratum 7 is construction debris including sand to silty sand mixed with asphalt, concrete, brick, plastic and/or wood. The debris materials varied in depths and amounts. For instance, concrete pieces to entire concrete slabs were encountered. This material is deleterious and is not considered acceptable as roadway embankment fill nor general fill. Stratum 7 was encountered in a majority of the borings and test pits performed from depths ranging from 2 feet up to 15 feet. From an engineering perspective, Stratum 7 may remain in place within the FPC site if outside of the control line of any roadway embankment. If within the roadway embankment control line, Stratum 7 shall be treated as “muck” and removed per Index 120-002.

If excavated during FPC construction, Stratum 7 shall be removed and not used within the project limits and shall be disposed of offsite, in accordance with environmental guidelines.

The materials from Strata 8 through 12 consist of soils encountered in the disturbed FPC area that had been backfilled with debris and are not in their natural state. These materials are disturbed and are highly variable and may contain debris. Their ability for utilization as embankment fill shall be verified during construction. The utilization of these soils must be verified during construction for should be accomplished in accordance with the current FDOT Standard Plans Indices 120-001 and 120-002 and FDOT Specifications.

If the contractor can successfully sift or screen out the debris materials from the soil, the remaining soil may be used within the project provided it meets Project Engineering Specifications and is acceptable from a contamination/environmental perspective and approved by Manatee County.

The photographs of the encountered debris material are included on the **Photographs of Test Pits** in **Appendix C**

7.3 Organic Soils

Organic soils were encountered within two (2) general areas along the project alignment requirements removal per FDOT Index 120-002. Auger borings were performed to delineate the approximate horizontal and vertical limits of the organic soils. Recommended removal limits are presented on the roadway cross-sections and on the **Muck Delineation** sheet in **Appendix B**.

7.4 Embankment Settlement

Based on a review of the cross-sections, maximum proposed embankment heights are on the order of 6 feet. In general, most embankment heights are less than 4 feet.

Based on the current cross sections, soil encountered to date, assuming proper subgrade preparation, and adequate fill materials are utilized, it is anticipated that total settlements will be less than one (1) inch. These settlements are expected to occur predominately during construction.

7.5 Slope Stability

The cross sections in the project plans indicate the proposed embankment fill slopes are generally on the order of 3 Horizontal to 1 Vertical (3H:1V) to 4H:1V. Based on the soil conditions and if embankments are constructed in accordance with specifications, we do not anticipate conditions that would pose limitations to the construction of the proposed embankments. Based on soil conditions encountered throughout the site and based on our engineering judgement, slopes of 3H:1V or flatter will achieve factors of safety exceeding the minimum required safety factor of 1.3. As a result, Tierra does not anticipate limitations to the proposed roadway performance with embankments sloped at as currently shown provided that the embankments are constructed in accordance with FDOT and/or Manatee County Specifications.

7.6 Temporary Slopes and Trenches

Temporary side slopes and excavations should comply with the Occupational Safety and Health Administration's (OSHA) trench safety standards, 29 C.F.R., s. 1926.650, Subpart P, all subsequent revisions or updates of OSHA's referenced standard adopted by the Department of Labor and Employment Security and Florida's Trench Safety Act, Section 553.62, Florida Statutes. Excavated materials should not be stockpiled at the top of the slope within a horizontal distance equal to the excavation depth.

7.7 Groundwater Control

The groundwater levels presented in this report are the levels that were measured at the time of our field activities. Fluctuation should be anticipated. Tierra recommends that the Contractor determine the actual groundwater levels at the time of the construction to determine groundwater impacts on the planned construction procedure.

7.8 On-Site Soil Suitability

The general suitability and evaluations of the soils encountered during our geotechnical exploration is presented on the **Roadway Soil Survey** sheet in **Appendix B**. FDOT Standard Plans, Indices 120-001 and 120-002 of the FDOT Design Standards should be consulted to determine the specific use/suitability of the soil types present within the project limits.

7.9 General Roadway Construction

The overall site preparation and mechanical densification work for the construction of the proposed roadway should be in accordance with the Manatee County guidelines and FDOT Specifications.

7.10 Pavement Design Considerations

The design of the pavement section should be in accordance with Manatee County guidelines and FDOT Specifications.

As previously mentioned, bulk samples were collected and LBR tests were performed by Tierra on the soil samples obtained along the project alignment. The Design LBR value was obtained by applying the ±2% of Optimum Method and 90% Methods in accordance with the FDOT Soils and Foundations Handbook.

The design LBR value based on these methods for use in pavement design is 33 and is shown in **Appendix C**. Based on information provided in the FDOT Flexible Pavement Design Manual, Tierra converted the design LBR value to a design M_R value for the project. A design M_R value of 10,750 psi is converted for use per the flexible pavement design. A Summary Table of Design LBR is presented in **Appendix C**.

It should be noted that the design MR value is based on samples obtained of the in-situ soils at depths within 1 to 2 feet of the existing ground surface and may not be representative of borrow/import material which may support some of the proposed roadway.

Additionally, as requested, Tierra collected 4 bulk LBR Samples in the proposed ponds. The results of the LBR tests are included within **Appendix C.**

Grades for the roadway should be set to provide a minimum separation between the bottom of the base and the estimated seasonal high groundwater levels. Correspondingly, the base should remain equally above sustained water treatment levels in roadside ditches, making positive drainage of the ditches important. The choice of base material would depend upon the relationship of final roadway grades and the bottom of the base to the estimated seasonal high groundwater table levels. Depending on SHGWT to base separation, a reduction in MR Value may be warranted.

8.0 REPORT LIMITATIONS

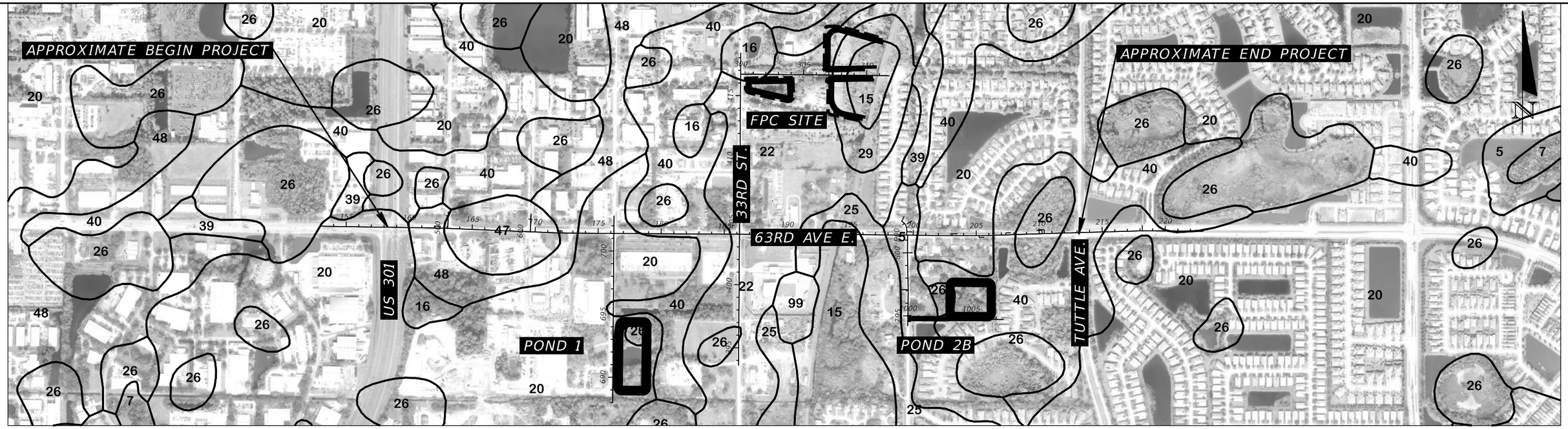
Our services have been performed, our findings obtained, and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices at the time of this report. Our geotechnical engineering evaluation of the site and subsurface conditions with respect to the planned roadway construction, and our recommendations are based upon the following: (1) site observations, (2) the field exploratory test data obtained during the geotechnical study, and (3) our understanding of the project information and anticipated grades as presented in this report. This company is not responsible for the conclusions, opinions or recommendations made by others based on these data.

The scope of the exploration was intended to evaluate soil conditions within the influence of the proposed Roadway Plan Set. The analyses and recommendations submitted in this report are based upon the anticipated location and type of construction and data obtained from the soil borings performed at the locations indicated and does not reflect any variations which did occur among these borings. If any variations become evident during the course of construction, a re-evaluation of the recommendations contained in this report will be necessary after we have had an opportunity to observe the characteristics of the conditions encountered.

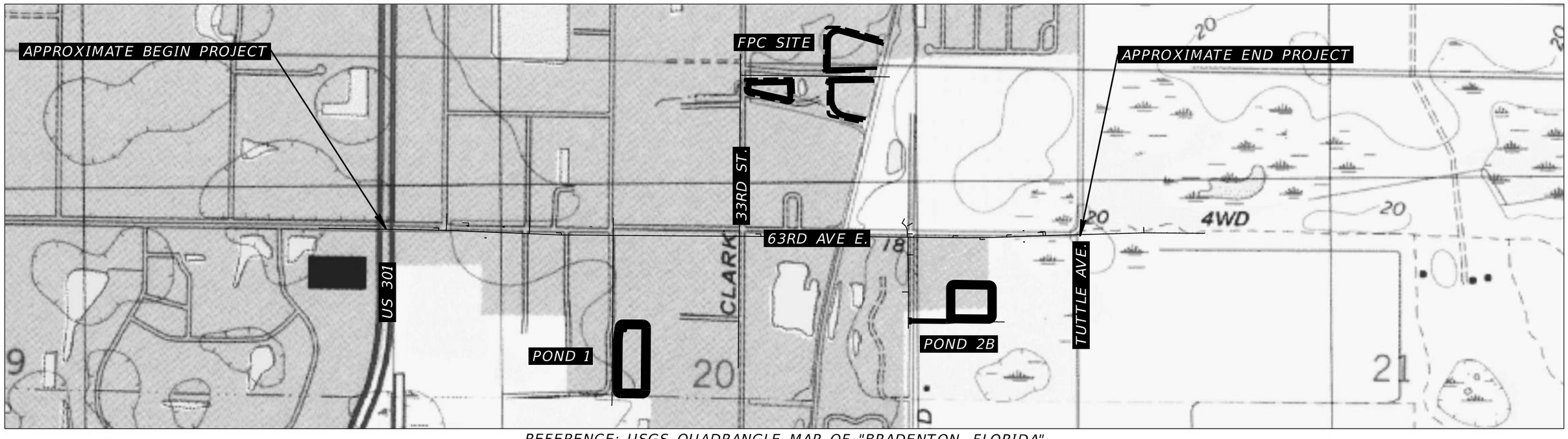
The scope of services, included herein, did not include any environmental assessment for the presence or absence of hazardous or toxic materials in the soil, surface water, groundwater, or air, on the site, below, and around the site. Any statements in this report or on the boring logs regarding odors, colors, unusual or suspicious items and conditions are strictly for the information of the PGA design team and Manatee County.

APPENDIX A

USDA Soil Survey & USGS Quadrangle Maps
Summary of USDA Soil Survey - Manatee County, Florida



REFERENCE: USDA SOIL SURVEY OF MANATEE COUNTY, FLORIDA



REFERENCE: USGS QUADRANGLE MAP OF "BRADENTON, FLORIDA"

TOWNSHIP: 35S
RANGE: 18E
SECTION: 20

0 200 800
Feet

NUMBER	DESCRIPTION	DATE

PROJECT #	6107860	SURVEYED	----	__/__/__
SURVEY #	----	DESIGNED	BJS	__/__/__
SEC./TWN./RGE	00/00/00	DRAWN	BJS	__/__/__
SCALE	AS NOTED	CHECKED	KH	__/__/__

MARC E. NOVAK, Ph.D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

Manatee County FLORIDA

PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
1022 26th Avenue East
Bradenton, FL 34208

USDA SOIL SURVEY & USGS QUADRANGLE MAPS

SHEET NO.

bsawaska 6/30/2023 4:23:00 PM J:\6511\2022 Files\6511-22-126 Manatee 63rd PGA\Microstation_ProjectWise\Geotech\USD

Summary of USDA Soil Survey
Manatee County, Florida

USDA Map Symbol and Soil Name	Soil Classification							pH	Seasonal High Water Table	
	Depth (in)	USCS	AASHTO	Permeability (in/hr)					Depth (feet)	Months
(5) Bradenton, Limestone substratum	0-6	SP-SM	A-2-4, A-3	6.0	-	20.0		5.6-7.3	0.0-1.0	June-Dec
	6-13	SP-SM, SM	A-2-4, A-3	6.0	-	20.0		5.6-7.3		
	13-47	SC-SM, SC, SM	A-2-4, A-2-6	0.6	-	2.0		6.6-7.8		
	47-51	Limestone								
(15) Delray	0-8	SC-SM, SP-SM, SM	A-2-4, A-3	6.0	-	20.0		5.6-7.3	+0.5-0.0	Jan-Mar, June-Dec
	8-51	SP-SM	A-2-4, A-3	6.0	-	20.0		5.6-7.3		
	51-80	SC-SM, SC, SM	A-2-4, A-2-6	0.6	-	6.0		6.6-7.8		
(20) Eaugallie, wet	0-6	SP-SM, SM	A-2-4, A-3	6.0	-	20.0		3.5-6.0	0.5-1.5	June-Nov
	6-23	SP-SM, SM	A-2-4, A-3	6.0	-	20.0		3.5-6.0		
	23-47	SP-SM, SM	A-2-4, A-3	6.0	-	20.0		3.5-7.3		
	47-55	SP-SM, SM	A-2-4, A-3	0.6	-	6.0		3.5-7.8		
	55-80	SC, SM	A-2-4, A-4, A-6	0.1	-	0.2		3.5-7.8		
	0-5	SP-SM, SM	A-2-4, A-3	6.0	-	20.0		3.5-6.0	0.3-1.5	July-Oct
	5-17	SP-SM, SM	A-2-4, A-3	6.0	-	20.0		3.5-6.0		
	17-26	SP-SM, SM	A-2-4, A-3	6.0	-	20.0		3.5-7.3		
	26-48	SP-SM, SM	A-2-4, A-3	0.6	-	2.0		3.5-7.8		
	48-72	SP-SM, SM	A-2-4, A-3	0.6	-	2.0		3.5-7.8		
	72-80	CL, SC-SM, SC	A-2-4, A-4, A-6	0.6	-	2.0		3.5-7.8		
(25) Floridana	0-15	SP-SM, SM	A-2-4	6.0	-	20.0		5.6-6.0	+2.0-0.0	June, July-Oct, Nov
	15-32	SP-SM, SM	A-2-4, A-3	6.0	-	20.0		6.1-6.5		
	32-65	SC-SM, SC	A-2-4, A-4, A-7-6	0.1	-	0.2		7.9-8.4		
	65-80	SP-SM, SM	A-2-4	6.0	-	20.0		7.9-8.4		
(26) Floridana, depressional, Immokalee, Okeelanta	0-19	SP-SM, SM	A-2-4, A-3	6.0	-	20.0		5.6-7.8	+2.0-0.0	Jan-Feb, June-Dec
	19-36	SP-SM, SP	A-3	6.0	-	20.0		5.6-7.8		
	36-63	SC-SM, SC	A-2-4, A-2-6	0.1	-	0.2		5.6-7.8		
	63-80	SP-SM, SM	A-2-4, A-3	6.0	-	20.0		5.6-7.8		
	0-10	SP-SM, SP	A-3	6.0	-	20.0		4.5-5.5	+2.0-0.0	Jan-Feb, June-Dec
	10-34	SP-SM, SP	A-3	6.0	-	20.0		4.5-5.5		
	34-43	SP-SM, SM	A-2-4, A-3	0.6	-	2.0		4.5-5.5		
	43-80	SP-SM, SP	A-3	6.0	-	20.0		4.5-5.5		
	0-20	PT	A-8	6.0	-	20.0		5.6-8.4	+1.0-0.0	June-Oct
	20-54	SP-SM, SM, SP	A-2-4, A-3	6.0	-	20.0		5.6-8.4		
(29) Manatee	0-13	SP-SM, SM	A-2-4, A-3	2.0	-	6.0		6.1-7.8	0.0-1.0	Jan-Feb, June-Dec
	13-34	SC-SM, SC	A-2-4	0.6	-	2.0		6.6-7.8		
	34-52	SC-SM, SC, SM	A-2-4	0.6	-	6.0		7.4-8.4		
	52-80	SC-SM, SC, SM	A-2-4	2.0	-	6.0		7.4-8.4		
	0-13	SP-SM, SM	A-2-4, A-3	2.0	-	6.0		6.1-7.8	+1.0-0.0	June-Sept
	13-34	SC-SM, SC	A-2-4	0.6	-	2.0		6.6-7.8		
	34-52	SC-SM, SC, SM	A-2-4	0.6	-	6.0		7.4-8.4		
	52-80	SC-SM, SC, SM	A-2-4	2.0	-	6.0		7.4-8.4		
(40) Pinellas, non-hydric, hydric	0-5	SP	A-3	6.0	-	20.0		5.6-7.8	0.5-1.5	June-Nov
	5-11	SP	A-3	6.0	-	20.0		5.6-7.8		
	11-33	SP-SM	A-2-4, A-3	6.0	-	20.0		6.6-9.0		
	33-45	SC-SM, SC	A-2-4, A-2-6	0.6	-	2.0		6.6-9.0		
	45-60	SP-SM, SP	A-2-4, A-3	6.0	-	20.0		7.9-9.0		
	0-5	SP	A-3	6.0	-	20.0		5.6-7.8	0.0-1.0	June-Nov
	5-11	SP	A-3	6.0	-	20.0		5.6-7.8		
	11-33	SP-SM	A-2-4, A-3	6.0	-	20.0		6.6-9.0		
	33-45	SC-SM, SC	A-2-4, A-2-6	0.6	-	2.0		6.6-9.0		
	45-60	SP-SM, SP	A-2-4, A-3	6.0	-	20.0		7.9-9.0		

Summary of USDA Soil Survey
Manatee County, Florida

USDA Map Symbol and Soil Name	Soil Classification						pH	Seasonal High Water Table	
	Depth (in)	USCS	AASHTO	Permeability (in/hr)				Depth (feet)	Months
(47) Tomoka	0-34	PT	A-8	6.0	-	20.0	3.5-4.4	+2.0-0.0	Jan, Feb, June, July-Oct, Nov-Dec
	34-39	SP-SM, SM	A-2-4, A-3	6.0	-	20.0	3.5-5.5		
	39-80	CL, SC-SM, SC	A-2-4, A-6	0.6	-	6.0	3.5-5.5		
(48) Wabasso, wet	0-7	SP-SM, SM	A-2-4, A-3	6.0	-	20.0	3.5-6.5	0.5-1.5	June-Nov
	7-24	SP-SM, SM	A-2-4, A-3	6.0	-	20.0	3.5-6.5		
	24-35	SP-SM, SM	A-2-4, A-3	0.6	-	2.0	3.5-5.9		
	35-39	SP-SM, SM	A-2-4, A-3	6.0	-	20.0	5.1-7.3		
	39-80	CL, SC-SM	A-2-4, A-6, A-7-6	0.6	-	2.0	5.1-8.4		
	0-7	SP-SM, SM	A-2-4, A-3	6.0	-	20.0	3.5-6.5	0.3-1.5	July-Oct
	7-24	SP-SM, SM	A-2-4, A-3	6.0	-	20.0	3.5-6.5		
	24-35	SP-SM, SM	A-2-4, A-3	0.6	-	2.0	3.5-5.9		
	35-39	SP-SM, SM	A-2-4, A-3	6.0	-	20.0	5.1-7.3		
	39-80	CL, SC-SM	A-2-4, A-6, A-7-6	0.6	-	2.0	5.1-8.4		

APPENDIX B

Roadway Soil Survey
Roadway Boring Location Plan
Roadway Soil Profiles
Pond Soil Survey sheets
Muck Delineation Sheets

DATE OF SURVEY: JULY 2022 TO JUNE 2023
SURVEY MADE BY: TIERRA, INC.
SUBMITTED BY: MARC E. NOVAK, Ph.D., P.E.

MANATEE COUNTY PUBLIC WORKS

CIP NO. : 6107860
PROJECT NAME: 63RD AVE. E. FROM U.S. 301 TO TUTTLE AVENUE

CROSS SECTION SOIL SURVEY FOR THE DESIGN OF ROADS

SURVEY BEGINS STA. : 161+30.00 SURVEY ENDS STA. : 210+40.00 REFERENCE: BASELINE SURVEY 63RD AVE.

	ORGANIC CONTENT		MOISTURE CONTENT		SIEVE ANALYSIS RESULTS PERCENT PASS (%)						ATTERBERG LIMITS (%)					CORROSION TEST RESULTS				
STRATUM NO.	NO. OF TESTS	% ORGANIC	NO. OF TESTS	MOISTURE CONTENT	NO. OF TESTS	10 MESH	40 MESH	60 MESH	100 MESH	200 MESH	NO. OF TESTS	LIQUID LIMIT	PLASTIC INDEX	AASHTO GROUP	DESCRIPTION	NO. OF TESTS	RESISTIVITY ohm-cm	CHLORIDE ppm	SULFATES ppm	pH
1	1	1	1	26	28	100	94-95	78-95	39-42	2-10	--	--	--	A-3	GRAY TO BROWN SAND TO SAND WITH SILT	5	3,300-29,000	15	<5-183	6.7-7.7
2	--	--	14	10-37	24	100	95	82	49	11-22	14	NP-23	NP-5	A-2-4	GRAY TO LIGHT BROWN SILTY SAND	--	--	--	--	--
3	5	2-4	5	21-36	5	--	--	--	--	3-15	--	--	--	A-3/A-2-4	DARK GRAY TO DARK BROWN SAND TO SAND WITH SILT TO SILTY SAND WITH TRACE ORGANICS	--	--	--	--	--
4	11	5-11	11	26-94	11	--	--	--	--	7-20	--	--	--	A-8	DARK GRAY TO DARK BROWN ORGANIC SAND TO SAND WITH SILT TO SILTY SAND	--	--	--	--	--
5	--	--	5	19-48	5	--	--	--	--	21-35	5	26-32	13-15	A-2-6	GRAY TO BROWN CLAYEY SAND	--	--	--	--	--
6	--	--	4	34-53	4	--	--	--	--	38-43	4	24-39	7-22	A-4/A-6/A-7-5	GRAY TO BROWN TO GREEN CLAY TO SILT	--	--	--	--	--
7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	DEBRIS: SOIL MIXED VARIABLE AMOUINTS OF CONCRETE, BRICK, METAL, PLASTIC, ASPHALT, AND/OR WOOD	--	--	--	--	--
8	--	--	--	--	1	--	--	--	--	10	--	--	--	A-3	GRAY TO BROWN SAND TO SAND WITH SILT (DISTURBED)	--	--	--	--	--
9	1	2	1	19	4	--	--	--	--	11-21	--	--	--	A-2-4	GRAY TO LIGHT BROWN SILTY SAND (DISTURBED)	--	--	--	--	--
10	1	6	1	32	1	--	--	--	--	20	--	--	--	A-8	DARK GRAY TO DARK BROWN ORGANIC SILTY SAND (DISTURBED)	--	--	--	--	--
11	--	--	1	23-25	2	--	--	--	--	26-31	2	32-39	11-25	A-2-6	GRAY TO BROWN CLAYEY SAND (DISTURBED)	--	--	--	--	--
12	--	--	1	54-60	2	--	--	--	--	55-80	2	50-84	41-54	A-7-5/A-7-6	GRAY TO BROWN TO GREEN CLAY (DISTURBED)	--	--	--	--	--
13	--	--	4	50-87	4	--	--	--	--	72-97	4	50-66	29-40	A-7-6	GRAY TO BROWN TO GREEN CLAY	--	--	--	--	--
14	--	--	--	--	--	--	--	--	--	--	--	--	--	--	WEATHERED LIMESTONE TO CALCAEOUS CLAY	--	--	--	--	--

NOTES:

1. STRATA 1 THROUGH 6 AND STRATUM 13 ARE SOILS IN THEIR NATURAL INSITU STATE. STRATA 8 THROUGH 12 ARE SOILS THAT WERE ENCOUNTERED IN THE FPC SITE AND APPEAR TO BE DISTURBED AS PART OF THE EXCAVATION OF THE BURYING OF DEBRIS AND ARE NOT IN THEIR NATURAL STATE. STRATA 8 THROUGH 12 CAN BE HIGHLY VARIABLE AND MIXED AND DIFFICULT TO SEPARATE. THEIR ABILITY FOR UTILIZATION FOR EMBANKMENT MATERIALS SHALL BE VERIFIED DURING CONSTRUCTION AND SUBJECT TO MANATEE COUNTY SPECIFICATIONS.
2. THE MATERIAL FROM STRATUM 1 (A-3) APPEARS SATISFACTORY FOR USE IN THE EMBANKMENT WHEN UTILIZED IN ACCORDANCE WITH STANDARD PLANS, INDEX 120-001.
3. THE MATERIAL FROM STRATUM 2 (A-2-4) APPEARS SATISFACTORY FOR USE IN THE EMBANKMENT WHEN UTILIZED IN ACCORDANCE WITH STANDARD PLANS, INDEX 120-001. HOWEVER, THIS MATERIAL IS LIKELY TO RETAIN EXCESS MOISTURE AND MAY BE DIFFICULT TO DRY AND COMPACT. IT SHOULD BE USED IN THE EMBANKMENT ABOVE THE WATER LEVEL EXISTING AT THE TIME OF CONSTRUCTION.
4. THE MATERIAL FROM STRATUM 3 (A-3/A-2-4) APPEARS SATISFACTORY FOR USE IN THE EMBANKMENT WHEN UTILIZED IN ACCORDANCE WITH STANDARD PLANS, INDEX 120-001. HOWEVER, THIS MATERIAL MAY NOT BE USED IN THE SUBGRADE PORTION OF THE ROADBED DUE TO ITS ORGANIC CONTENT.

EMBANKMENT AND SUBGRADE MATERIAL

STRATA BOUNDARIES ARE APPROXIMATE. MAKE FINAL CHECK AFTER GRADING.

▼ - WATER TABLE ENCOUNTERED

▽ - ESTIMATED SEASONAL HIGH GROUNDWATER TABLE

GNE - GROUNDWATER NOT ENCOUNTERED

NP - NON-PLASTIC

5. THE MATERIAL FROM STRATUM 4 (A-8) IS MUCK MATERIAL AND SHALL BE REMOVED IN ACCORDANCE WITH STANDARD PLANS, INDEX 120-002 AND UTILIZED IN ACCORDANCE WITH STANDARD PLANS, INDEX 120-001. THE REMOVAL LIMITS ARE DEPICTED ON THE ROADWAY CROSS-SECTIONS AND ON THE MUCK DELINEATION SHEETS.
6. THE MATERIAL FROM STRATA 5&6 (A-2-6/A-6/A-4) IS PLASTIC MATERIAL AND SHALL BE REMOVED IN ACCORDANCE WITH STANDARD PLANS, INDEX 120-002 AND UTILIZED IN ACCORDANCE WITH STANDARD PLANS, INDEX 120-001.
7. THE MATERIAL FROM STRATUM 13 (A-7-6) IS HIGH PLASTIC MATERIAL AND SHALL BE REMOVED IN ACCORDANCE WITH STANDARD PLANS, INDEX 120-002 AND UTILIZED IN ACCORDANCE WITH STANDARD PLANS, INDEX 120-001.
8. THE MATERIAL FROM STRATUM 7 IS CONSTRUCTION DEBRIS INCLUDING SOIL MIXED WITH VARIABLE AMOUNTS OF CONCRETE, BRICK, METAL, PLASTIC, ASPHALT, AND/OR WOOD. THIS MATERIAL WAS ENCOUNTERED WITHIN THE FPC SITE. IF ENCOUNTERED, THESE MATERIALS SHALL BE REMOVED AND DISPOSED OF OFFSITE AND NOT USED WITHIN THE PROJECT LIMITS.
9. THE MATERIAL FROM STRATUM 14 (LIMESTONE) IS ROCK. EXCAVATION INTO OR THROUGH THIS MATERIAL MAY BE DIFFICULT. THE CONTRACTOR SHOULD BE PREPARED TO USE SPECIALIZED EQUIPMENT TO EXCAVATE INTO OR THROUGH LIMESTONE. LIMESTONE IS ALSO POROUS AND WILL BE DIFFICULT DEWATERING.

NUMBER	DESCRIPTION	DATE

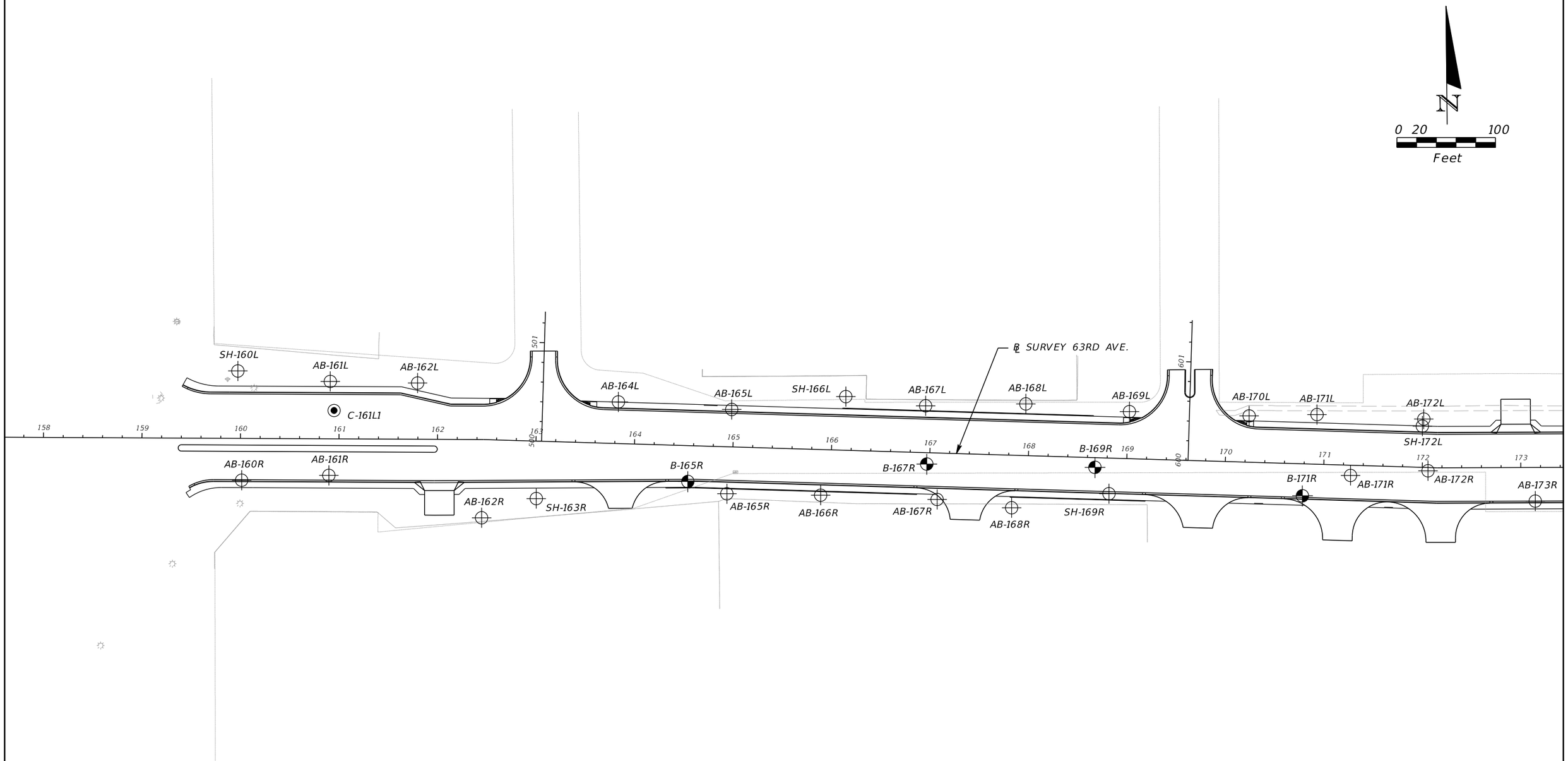
PROJECT #	6107860	SURVEYED	----	__/__/__
SURVEY #	----	DESIGNED	BJS	7/2023
SEC./TWN./RGE	00/00/00	DRAWN	BJS	7/2023
SCALE	AS NOTED	CHECKED	KH	7/2023

MARC E. NOVAK, Ph.D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

Manatee County FLORIDA
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
1022 26th Avenue East
Bradenton, FL 34208

ROADWAY SOIL SURVEY

SHEET NO. GR-1



LEGEND

- APPROXIMATE SPT BORING LOCATION
- APPROXIMATE AUGER BORING LOCATION
- APPROXIMATE PAVEMENT CORE LOCATION

NUMBER	DESCRIPTION	DATE

PROJECT #	6107860	SURVEYED	----	__/__/__
SURVEY #	----	DESIGNED	BJS	__/__/__
SEC./TWN./RGE	00/00/00	DRAWN	BJS	__/__/__
SCALE	AS NOTED	CHECKED	MEN	__/__/__

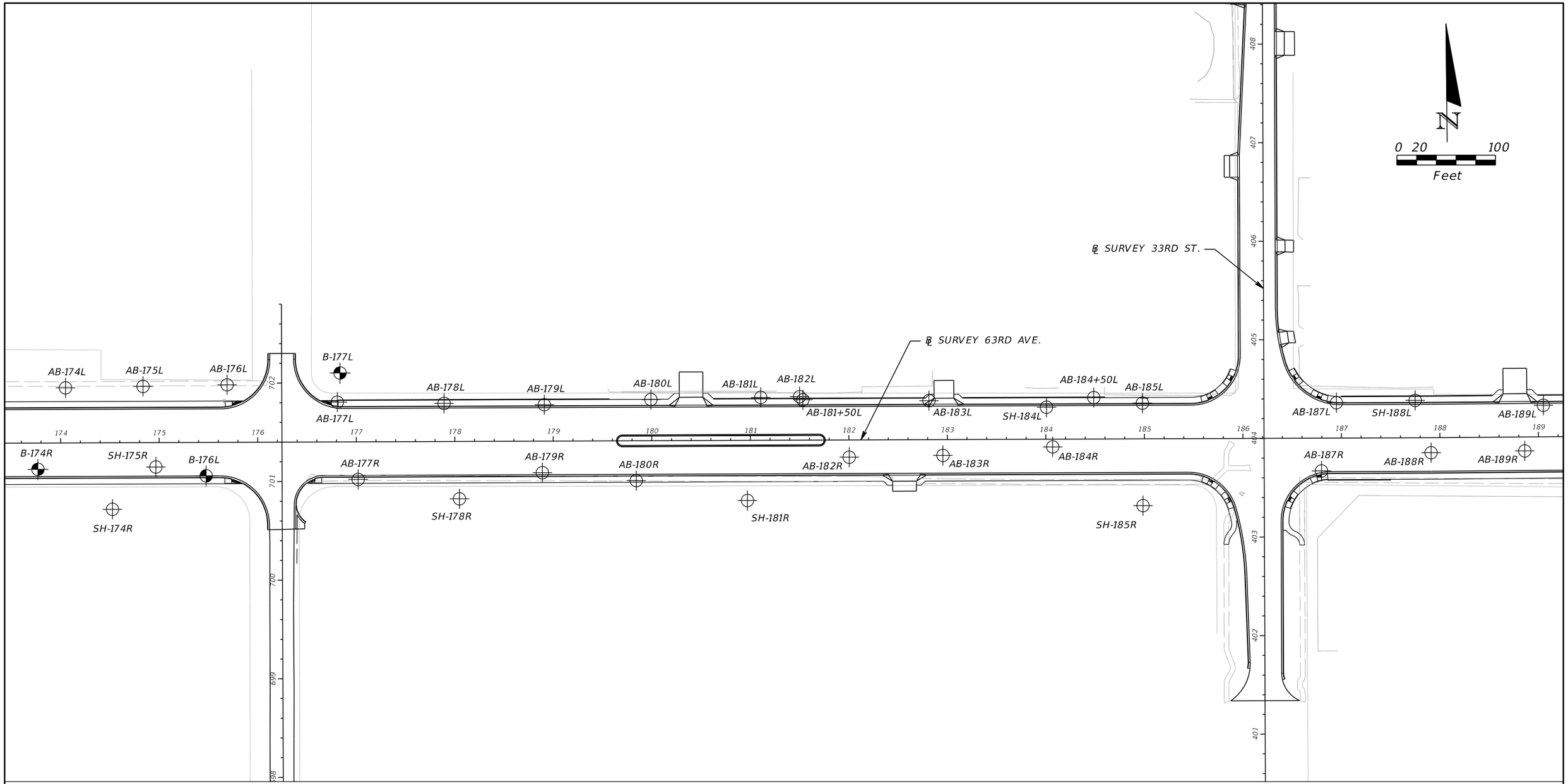
MARC E. NOVAK, Ph.D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

Manatee County FLORIDA

PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
1022 26th Avenue East
Bradenton, FL 34208

ROADWAY BORING LOCATION PLAN (1)

SHEET NO.



LEGEND

- APPROXIMATE SPT BORING LOCATION
- APPROXIMATE AUGER BORING LOCATION
- APPROXIMATE PAVEMENT CORE LOCATION

NUMBER	DESCRIPTION	DATE

PROJECT #	6107860	SURVEYED	----	__/__/__
SURVEY #	----	DESIGNED	BJS	__/__/__
SEC./TWN./RGE	00/00/00	DRAWN	BJS	__/__/__
SCALE	AS NOTED	CHECKED	MEN	__/__/__

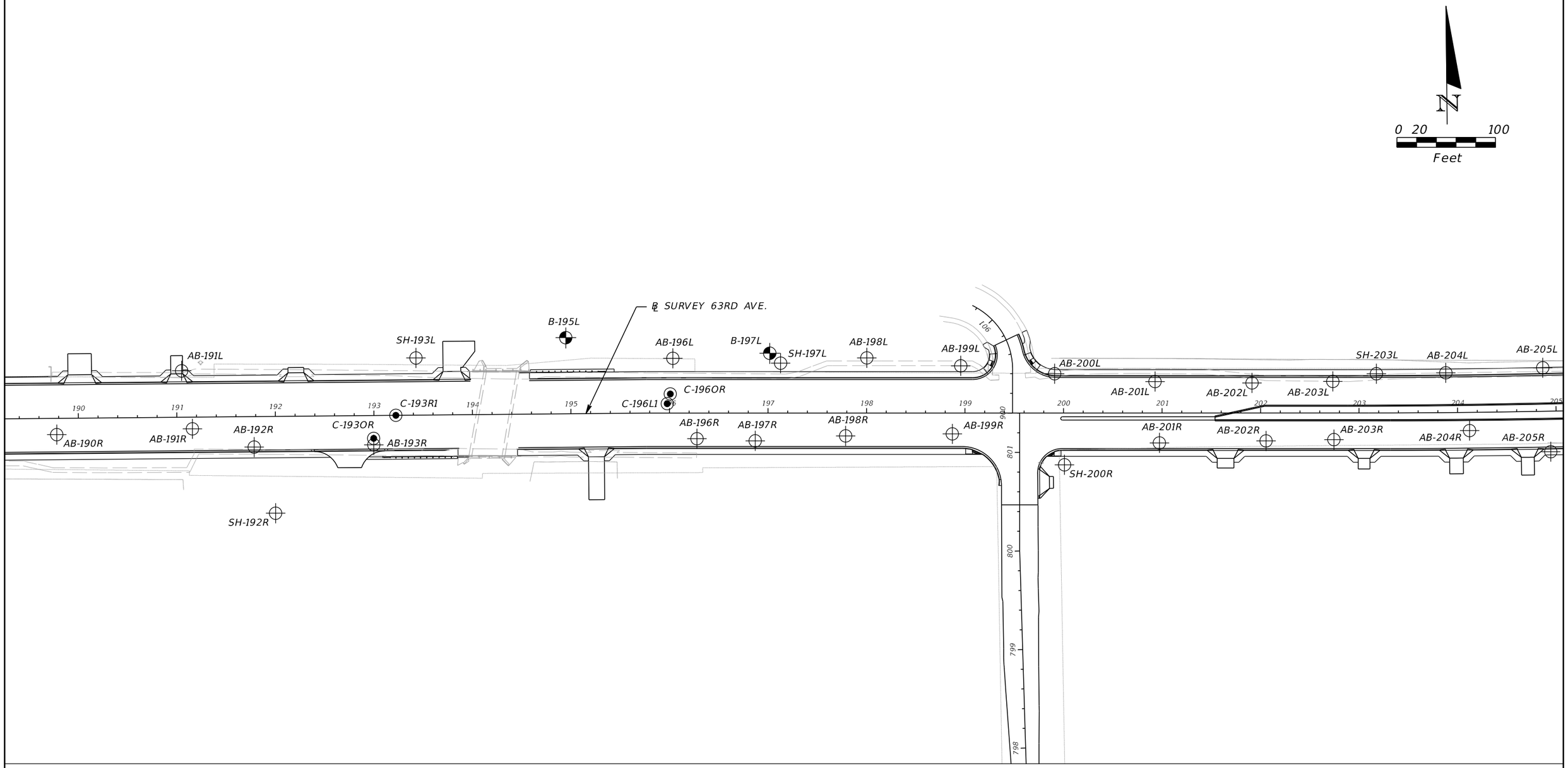
MARC E. NOVAK, Ph.D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

Manatee County FLORIDA

PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
1022 26th Avenue East
Bradenton, FL 34208

ROADWAY BORING LOCATION PLAN (2)

SHEET NO.



LEGEND

- APPROXIMATE SPT BORING LOCATION
- APPROXIMATE AUGER BORING LOCATION
- APPROXIMATE PAVEMENT CORE LOCATION

NUMBER	DESCRIPTION	DATE

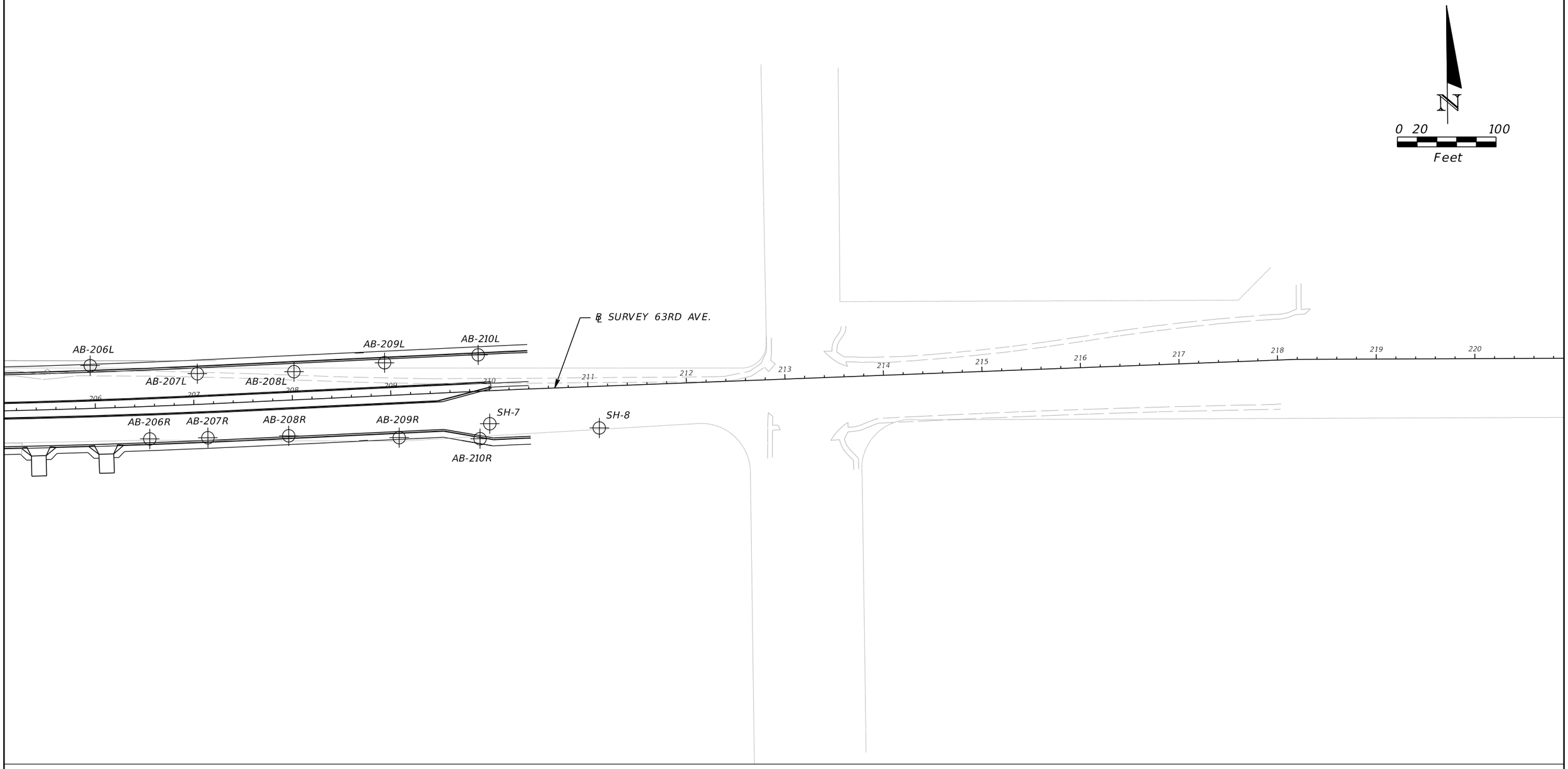
PROJECT #	6107860	SURVEYED	----	__/__/__
SURVEY #	----	DESIGNED	BJS	__/__/__
SEC./TWN./RGE	00/00/00	DRAWN	BJS	__/__/__
SCALE	AS NOTED	CHECKED	MEN	__/__/__

MARC E. NOVAK, Ph.D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

Manatee County FLORIDA
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
1022 26th Avenue East
Bradenton, FL 34208

ROADWAY BORING LOCATION PLAN (3)

SHEET NO.



LEGEND

- APPROXIMATE SPT BORING LOCATION
- APPROXIMATE AUGER BORING LOCATION
- APPROXIMATE PAVEMENT CORE LOCATION

NUMBER	DESCRIPTION	DATE

PROJECT #	6107860	SURVEYED	----	__/__/__
SURVEY #	----	DESIGNED	BJS	__/__/__
SEC./TWN./RGE	00/00/00	DRAWN	BJS	__/__/__
SCALE	AS NOTED	CHECKED	MEN	__/__/__

MARC E. NOVAK, Ph.D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

Manatee County FLORIDA

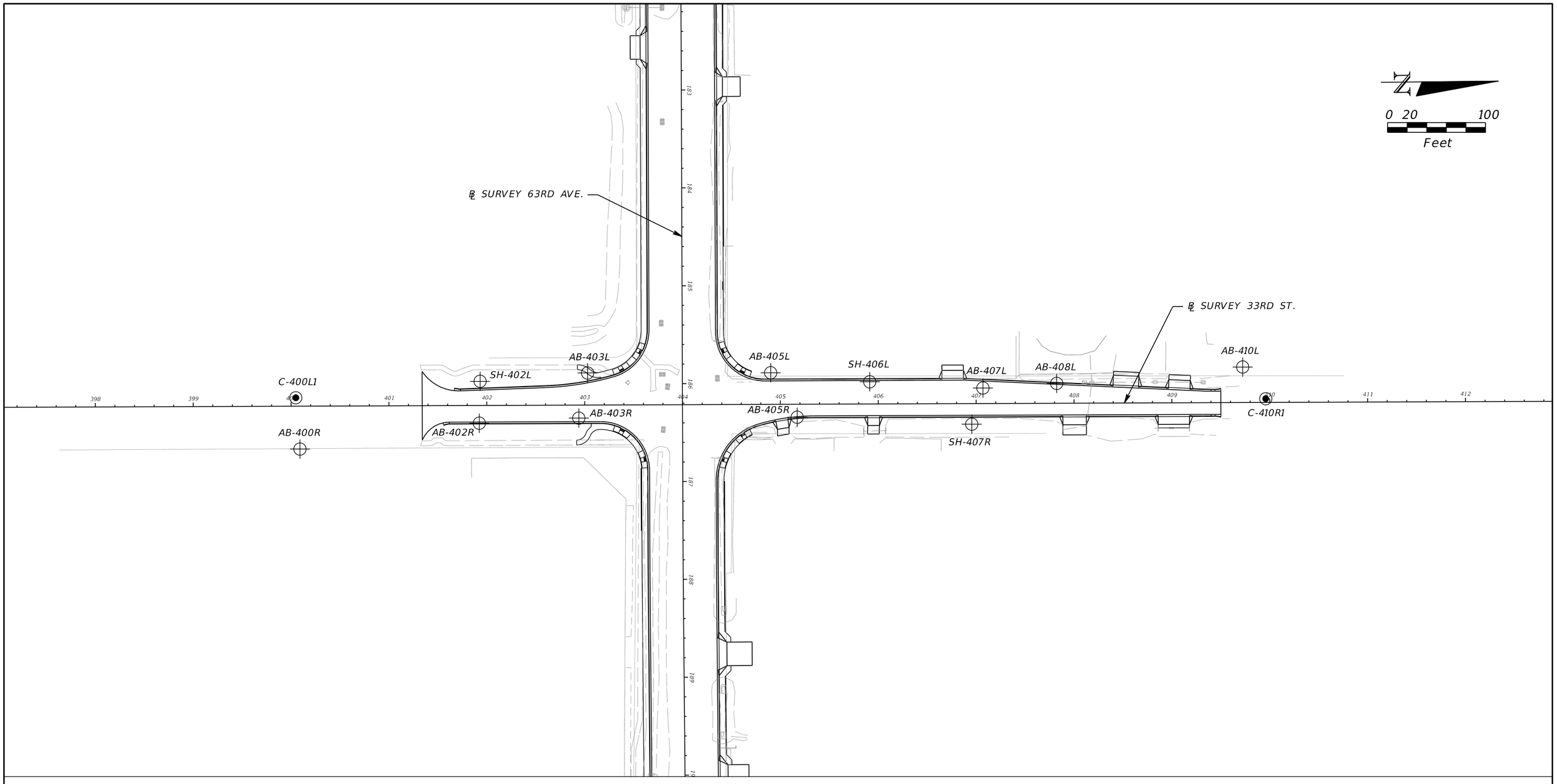
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
1022 26th Avenue East
Bradenton, FL 34208

ROADWAY BORING LOCATION PLAN (4)

SHEET NO.

THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.

bgarcia 6/27/2023 4:53:36 PM c:\pw_workdir\patelgreene-pw-01\pw_user\dms08404\ABORRD04.dgn



LEGEND

- APPROXIMATE SPT BORING LOCATION
- APPROXIMATE AUGER BORING LOCATION
- APPROXIMATE PAVEMENT CORE LOCATION

NUMBER	DESCRIPTION	DATE

PROJECT #	6107860	SURVEYED	----	__/__/__
SURVEY #	----	DESIGNED	BJS	__/__/__
SEC./TWN./RGE	00/00/00	DRAWN	BJS	__/__/__
SCALE	AS NOTED	CHECKED	MEN	__/__/__

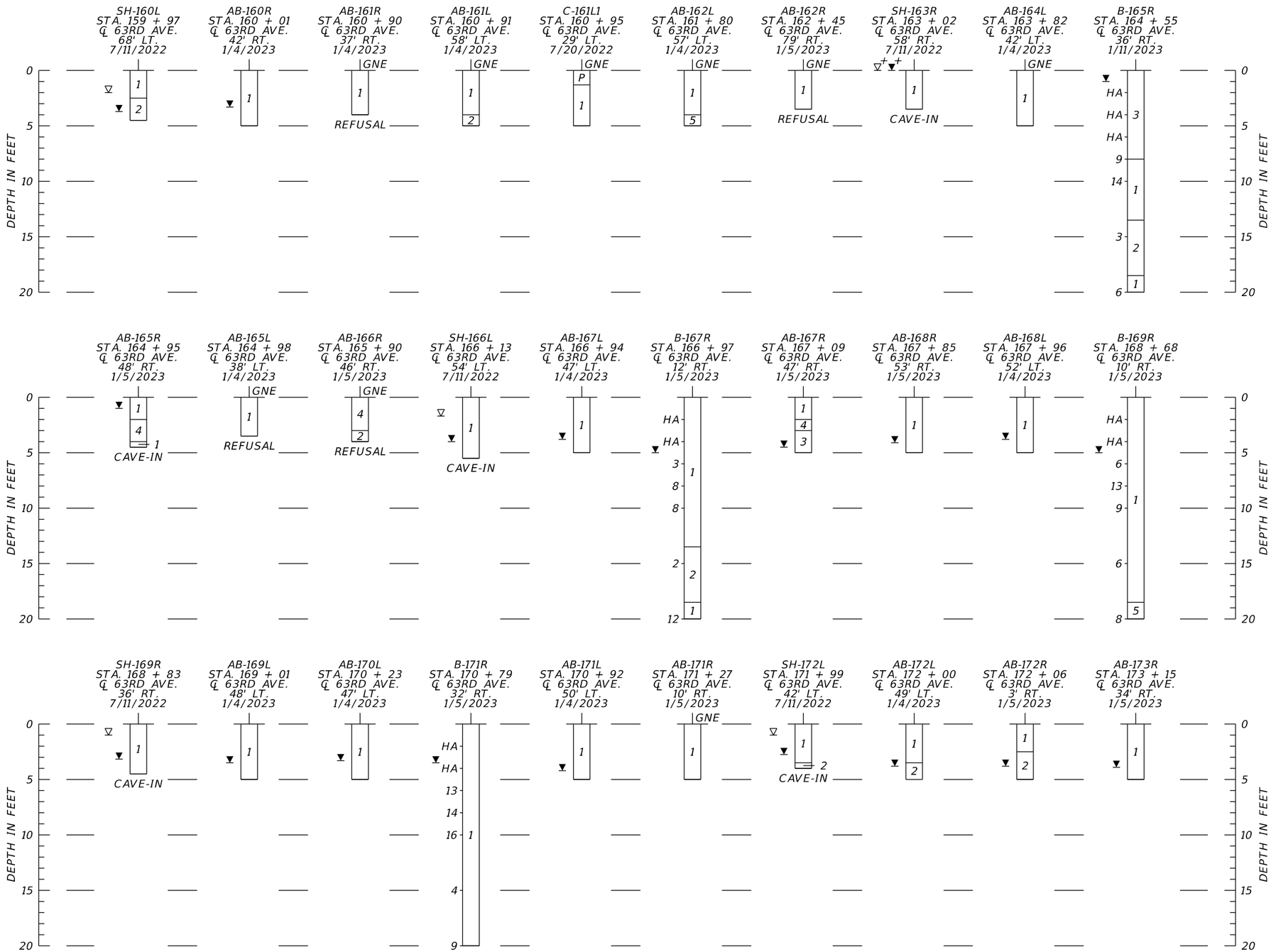
MARC E. NOVAK, Ph.D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

Manatee County FLORIDA
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
1022 26th Avenue East
Bradenton, FL 34208

ROADWAY BORING LOCATION PLAN (5)

SHEET NO.

bgarcia 6/27/2023 4:53:39 PM c:\pw_workdir\patelgreene-pw-01\pw_user\dms08404\AB0RRD05_33RD.dgn



LEGEND

1. GRAY TO BROWN SAND TO SAND WITH SILT (A-3)
2. GRAY TO LIGHT BROWN SILTY SAND (A-2-4)
3. DARK GRAY TO DARK BROWN SAND TO SAND WITH SILT WITH TRACE ORGANICS (A-3)
4. DARK GRAY TO DARK BROWN ORGANIC SAND TO SAND WITH SILT (A-8)
5. GRAY TO BROWN CLAYEY SAND (A-2-6)
6. GRAY TO BROWN TO GREEN CLAY TO SILT (A-4/A-6/A-7-5)
7. DEBRIS: SOIL MIXED WITH VARIABLE AMOUNTS OF CONCRETE, BRICK, METAL, PLASTIC, ASPHALT, AND/OR WOOD
8. GRAY TO BROWN SAND TO SAND WITH SILT (DISTURBED) (A-3)
9. GRAY TO LIGHT BROWN SILTY SAND (DISTURBED) (A-2-4)
10. DARK GRAY TO DARK BROWN ORGANIC SILTY SAND (DISTURBED) (A-8)
11. GRAY TO BROWN CLAYEY SAND (DISTURBED) (A-2-6)
12. GRAY TO BROWN TO GREEN CLAY (DISTURBED) (A-7-5/A-7-6)
13. GRAY TO BROWN TO GREEN CLAY (A-7-6)
14. WEATHERED LIMESTONE TO CALCAREOUS CLAY

P — PAVEMENT AND BASE SECTIONS

W — WATER

A-3 — AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.

GNE — GROUNDWATER NOT ENCOUNTERED

▽ — ESTIMATED SEASONAL HIGH GROUNDWATER TABLE

▽+ — ESTIMATED SEASONAL HIGH GROUNDWATER TABLE IS ABOVE GRADE

▼ — GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS

▼+ — GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS IS ABOVE GRADE

CAVE-IN — CAVE-IN DUE TO SHALLOW GROUNDWATER INTRUSION

REFUSAL — HAND AUGER REFUSAL DUE TO ROCK

℄ 63RD AVE. — CENTERLINE CONSTRUCTION OF 63RD AVENUE

℄ 33RD ST. E — CENTERLINE CONSTRUCTION OF 33RD STREET EAST

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	15 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

NUMBER	DESCRIPTION	DATE

SCALE	AS NOTED	DATE
DESIGNED BY	BJS	06/2023
DRAWN BY	BJS	PROJECT NO.
CHECKED BY	MEN	6107860

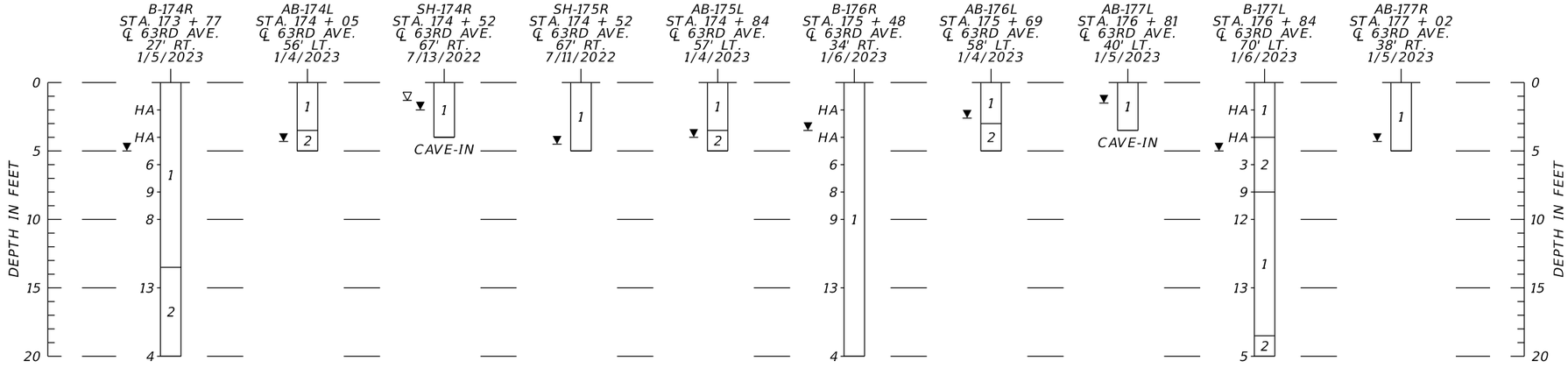
MARC E. NOVAK, Ph.D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

Manatee County FLORIDA

PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
1022 26th Avenue East
Bradenton, FL 34208

ROADWAY SOIL PROFILES (1)

SHEET NO.



LEGEND

1. GRAY TO BROWN SAND TO SAND WITH SILT (A-3)
2. GRAY TO LIGHT BROWN SILTY SAND (A-2-4)
3. DARK GRAY TO DARK BROWN SAND TO SAND WITH SILT WITH TRACE ORGANICS (A-3)
4. DARK GRAY TO DARK BROWN ORGANIC SAND TO SAND WITH SILT (A-8)
5. GRAY TO BROWN CLAYEY SAND (A-2-6)
6. GRAY TO BROWN TO GREEN CLAY TO SILT (A-4/A-6/A-7-5)
7. DEBRIS: SOIL MIXED WITH VARIABLE AMOUNTS OF CONCRETE, BRICK, METAL, PLASTIC, ASPHALT, AND/OR WOOD
8. GRAY TO BROWN SAND TO SAND WITH SILT (DISTURBED) (A-3)
9. GRAY TO LIGHT BROWN SILTY SAND (DISTURBED) (A-2-4)
10. DARK GRAY TO DARK BROWN ORGANIC SILTY SAND (DISTURBED) (A-8)
11. GRAY TO BROWN CLAYEY SAND (DISTURBED) (A-2-6)
12. GRAY TO BROWN TO GREEN CLAY (DISTURBED) (A-7-5/A-7-6)
13. GRAY TO BROWN TO GREEN CLAY (A-7-6)
14. WEATHERED LIMESTONE TO CALCAREOUS CLAY

P	PAVEMENT AND BASE SECTIONS
W	WATER
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
GNE	GROUNDWATER NOT ENCOUNTERED
▽	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
▽+	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE IS ABOVE GRADE
▼	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
▼+	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS IS ABOVE GRADE
CAVE-IN	CAVE-IN DUE TO SHALLOW GROUNDWATER INTRUSION
REFUSAL	HAND AUGER REFUSAL DUE TO ROCK
℄ 63RD AVE.	CENTERLINE CONSTRUCTION OF 63RD AVENUE
℄ 33RD ST. E	CENTERLINE CONSTRUCTION OF 33RD STREET EAST

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	15 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

NUMBER	DESCRIPTION	DATE

SCALE	AS NOTED	DATE
DESIGNED BY	BJS	06/2023
DRAWN BY	BJS	PROJECT NO.
CHECKED BY	MEN	6107860

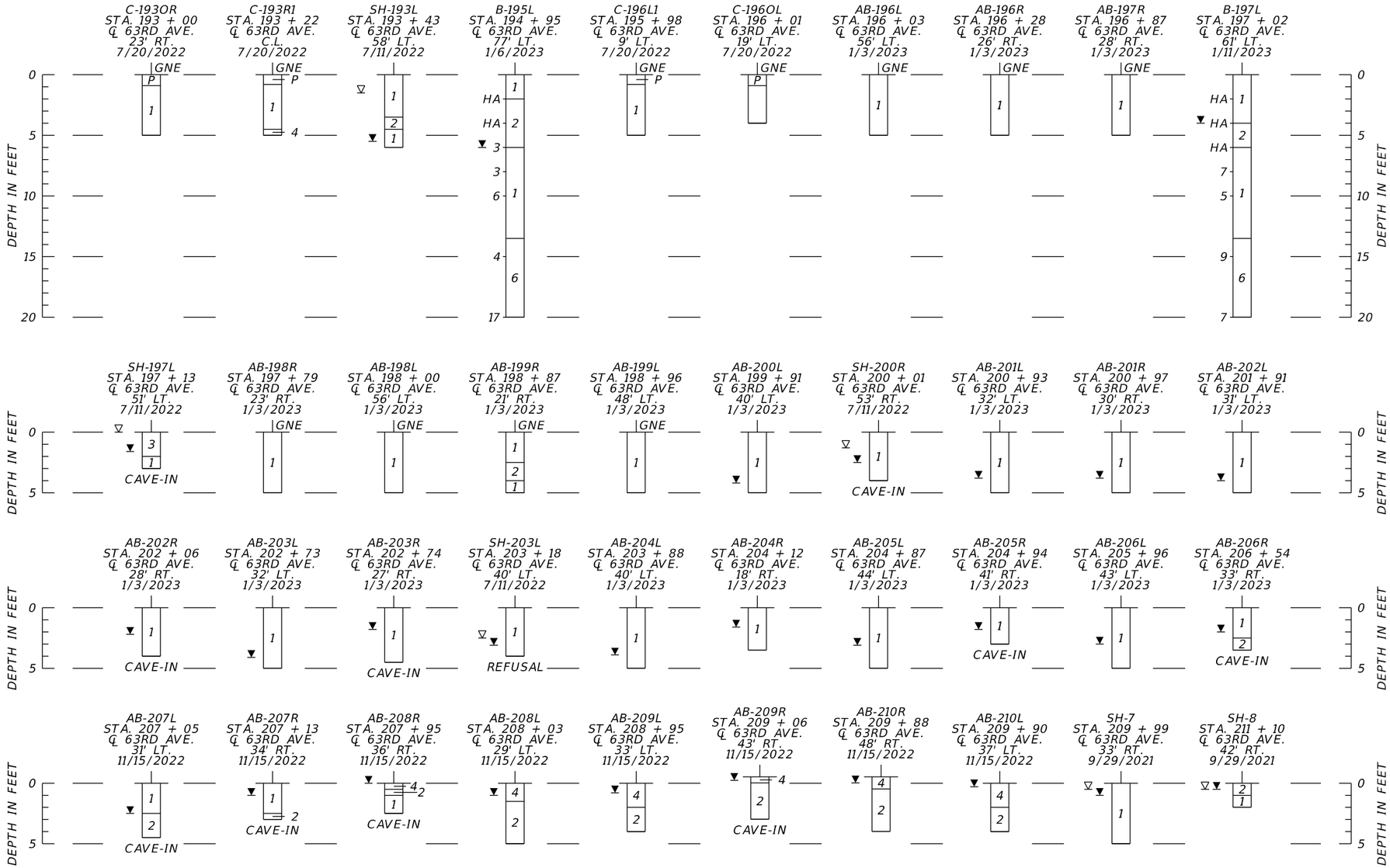
MARC E. NOVAK, Ph.D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

Manatee County FLORIDA

PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
1022 26th Avenue East
Bradenton, FL 34208

ROADWAY SOIL PROFILES (2)

SHEET NO.



LEGEND

1. GRAY TO BROWN SAND TO SAND WITH SILT (A-3)
2. GRAY TO LIGHT BROWN SILTY SAND (A-2-4)
3. DARK GRAY TO DARK BROWN SAND TO SAND WITH SILT WITH TRACE ORGANICS (A-3)
4. DARK GRAY TO DARK BROWN ORGANIC SAND TO SAND WITH SILT (A-8)
5. GRAY TO BROWN CLAYEY SAND (A-2-6)
6. GRAY TO BROWN TO GREEN CLAY TO SILT (A-4/A-6/A-7-5)
7. DEBRIS: SOIL MIXED WITH VARIABLE AMOUNTS OF CONCRETE, BRICK, METAL, PLASTIC, ASPHALT, AND/OR WOOD
8. GRAY TO BROWN SAND TO SAND WITH SILT (DISTURBED) (A-3)
9. GRAY TO LIGHT BROWN SILTY SAND (DISTURBED) (A-2-4)
10. DARK GRAY TO DARK BROWN ORGANIC SILTY SAND (DISTURBED) (A-8)
11. GRAY TO BROWN CLAYEY SAND (DISTURBED) (A-2-6)
12. GRAY TO BROWN TO GREEN CLAY (DISTURBED) (A-7-5/A-7-6)
13. GRAY TO BROWN TO GREEN CLAY (A-7-6)
14. WEATHERED LIMESTONE TO CALCAREOUS CLAY

P	PAVEMENT AND BASE SECTIONS
W	WATER
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
GNE	GROUNDWATER NOT ENCOUNTERED
▽	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
▽+	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE IS ABOVE GRADE
▼	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
▼+	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS IS ABOVE GRADE
CAVE-IN	CAVE-IN DUE TO SHALLOW GROUNDWATER INTRUSION
REFUSAL	HAND AUGER REFUSAL DUE TO ROCK
℄ 63RD AVE.	CENTERLINE CONSTRUCTION OF 63RD AVENUE
℄ 33RD ST. E	CENTERLINE CONSTRUCTION OF 33RD STREET EAST

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	15 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

NUMBER	DESCRIPTION	DATE

SCALE	AS NOTED	DATE
DESIGNED BY	BJS	06/2023
DRAWN BY	BJS	PROJECT NO.
CHECKED BY	MEN	6107860

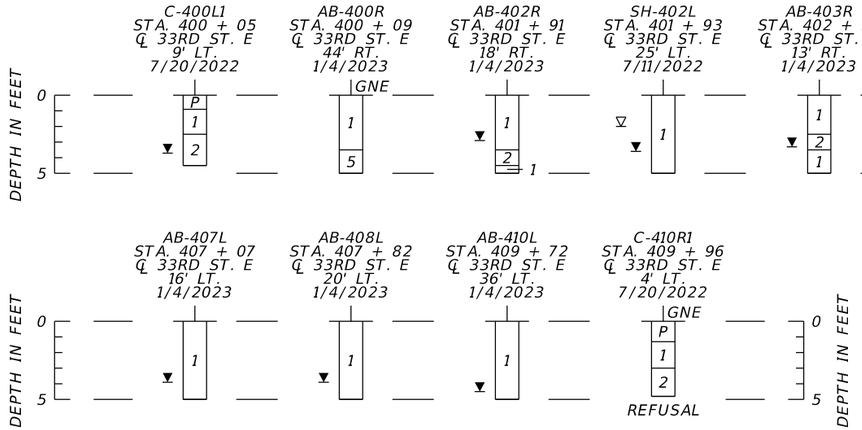
MARC E. NOVAK, Ph.D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

Manatee County FLORIDA

PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
1022 26th Avenue East
Bradenton, FL 34208

ROADWAY SOIL PROFILES (3)

SHEET NO.



LEGEND

1. GRAY TO BROWN SAND TO SAND WITH SILT (A-3)
2. GRAY TO LIGHT BROWN SILTY SAND (A-2-4)
3. DARK GRAY TO DARK BROWN SAND TO SAND WITH SILT WITH TRACE ORGANICS (A-3)
4. DARK GRAY TO DARK BROWN ORGANIC SAND TO SAND WITH SILT (A-8)
5. GRAY TO BROWN CLAYEY SAND (A-2-6)
6. GRAY TO BROWN TO GREEN CLAY TO SILT (A-4/A-6/A-7-5)
7. DEBRIS: SOIL MIXED WITH VARIABLE AMOUNTS OF CONCRETE, BRICK, METAL, PLASTIC, ASPHALT, AND/OR WOOD
8. GRAY TO BROWN SAND TO SAND WITH SILT (DISTURBED) (A-3)
9. GRAY TO LIGHT BROWN SILTY SAND (DISTURBED) (A-2-4)
10. DARK GRAY TO DARK BROWN ORGANIC SILTY SAND (DISTURBED) (A-8)
11. GRAY TO BROWN CLAYEY SAND (DISTURBED) (A-2-6)
12. GRAY TO BROWN TO GREEN CLAY (DISTURBED) (A-7-5/A-7-6)
13. GRAY TO BROWN TO GREEN CLAY (A-7-6)
14. WEATHERED LIMESTONE TO CALCAREOUS CLAY

P	PAVEMENT AND BASE SECTIONS
W	WATER
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
GNE	GROUNDWATER NOT ENCOUNTERED
▽	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
▽+	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE IS ABOVE GRADE
▼	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
▼+	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS IS ABOVE GRADE
CAVE-IN	CAVE-IN DUE TO SHALLOW GROUNDWATER INTRUSION
REFUSAL	HAND AUGER REFUSAL DUE TO ROCK
℄ 63RD AVE.	CENTERLINE CONSTRUCTION OF 63RD AVENUE
℄ 33RD ST. E	CENTERLINE CONSTRUCTION OF 33RD STREET EAST

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	15 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

NUMBER	DESCRIPTION	DATE

SCALE	AS NOTED	DATE
DESIGNED BY	BJS	06/2023
DRAWN BY	BJS	PROJECT NO.
CHECKED BY	MEN	6107860

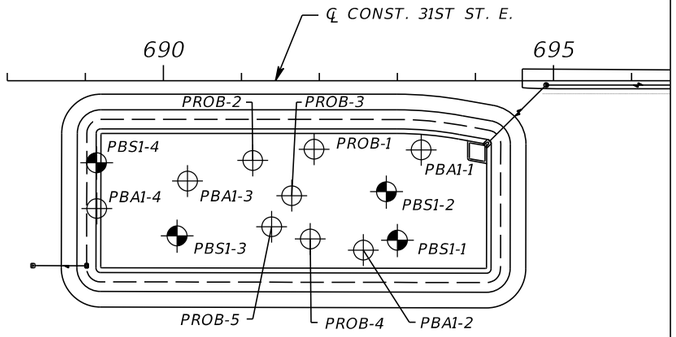
MARC E. NOVAK, Ph.D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

Manatee County FLORIDA

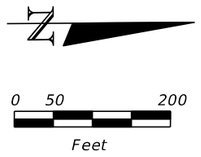
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
1022 26th Avenue East
Bradenton, FL 34208

ROADWAY SOIL PROFILES (4)

SHEET NO.



POND 1



BORING LOCATION PLAN

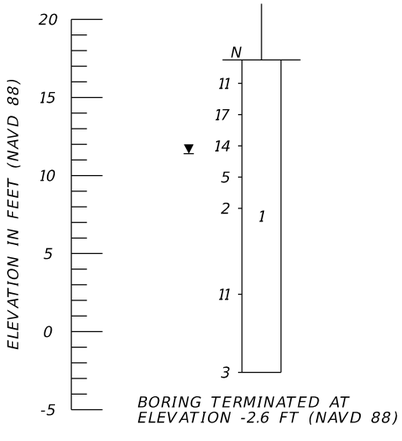
LEGEND

1. GRAY TO BROWN SAND TO SAND WITH SILT (A-3)
2. GRAY TO LIGHT BROWN SILTY SAND (A-2-4)
3. DARK GRAY TO DARK BROWN SAND TO SAND WITH SILT WITH TRACE ORGANICS (A-3)
4. DARK GRAY TO DARK BROWN ORGANIC SAND TO SAND WITH SILT (A-8)
5. GRAY TO BROWN CLAYEY SAND (A-2-6)
6. GRAY TO BROWN TO GREEN CLAY TO SILT (A-4/A-6/A-7-5)
7. DEBRIS: SOIL MIXED WITH VARIABLE AMOUNTS OF CONCRETE, BRICK, METAL, PLASTIC, ASPHALT, AND/OR WOOD
8. GRAY TO BROWN SAND TO SAND WITH SILT (DISTURBED) (A-3)
9. GRAY TO LIGHT BROWN SILTY SAND (DISTURBED) (A-2-4)
10. DARK GRAY TO DARK BROWN ORGANIC SILTY SAND (DISTURBED) (A-8)
11. GRAY TO BROWN CLAYEY SAND (DISTURBED) (A-2-6)
12. GRAY TO BROWN TO GREEN CLAY (DISTURBED) (A-7-5/A-7-6)
13. GRAY TO BROWN TO GREEN CLAY (A-7-6)
14. WEATHERED LIMESTONE TO CALCAREOUS CLAY

A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD AND HAMMER
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
OC	ORGANIC CONTENT (%)
NP	NON-PLASTIC
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988
⊕	APPROXIMATE AUGER BORING LOCATION
⊕	APPROXIMATE SPT BORING LOCATION
▪	APPROXIMATE TEST PIT LOCATION
▽	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
▼	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
GNA	GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID AT A DEPTH OF 10 FEET.
GNE	GROUNDWATER NOT ENCOUNTERED
R	HAND AUGER OR MECHANICAL BACK-HOE REFUSAL ON DEBRIS MATERIALS PREVENTING DEEPER EXPLORATION
↓	TEST PIT TERMINATED IN DEBRIS MATERIAL; DEBRIS CONTINUES DEEPER
◁ 100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
‖	CASING

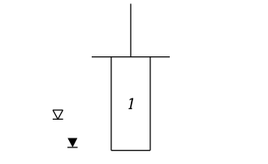
NOTES:
1. THE LOCATIONS OF THE BORINGS WERE RECORDED IN THE FIELD BY TIERRA, INC. USING GARMIN ETREX HANDHELD GPS EQUIPMENT WITH A REPORTED ACCURACY OF ± 10 FEET. THE GPS COORDINATES RECORDED BY TIERRA WERE UTILIZED IN CONJUNCTION WITH DESIGN FILES TO OBTAIN STATION AND OFFSET. THEREFORE, THE BORING LOCATIONS SHOULD BE CONSIDERED APPROXIMATE. BORINGS DENOTED BY AN ASTERISK (*) WERE LOCATED BY THE PROJECT SURVEYOR.
2. STRATA 8 THROUGH 11 THROUGHOUT THE FPC AREA ARE NOT IN THEIR NATURAL STATE AND LIKELY WERE DEPOSITED WHEN THE DEBRIS MATERIALS WERE BURIED.

BOR # PBS1-4
STA. 689+14
REF. ℄ CONST. 31ST AVE
OFF. 105' RT.
ELEV. 17.4
DATE 2/7/2023
DRILLER J. SHAW
HAMMER AUTOMATIC
RIG D-25



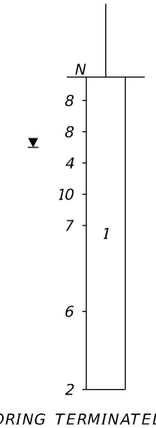
BORING TERMINATED AT ELEVATION -2.6 FT (NAVD 88)

BOR # PBA1-4*
STA. 689+15
REF. ℄ CONST. 31ST AVE
OFF. 164' RT.
ELEV. 17.6
DATE 1/24/2023



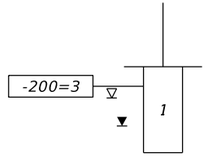
BORING TERMINATED AT ELEVATION 11.6 FT (NAVD 88)

BOR # PBS1-3
STA. 690+18
REF. ℄ CONST. 31ST AVE
OFF. 199' RT.
ELEV. 16.3
DATE 2/7/2023
DRILLER J. SHAW
HAMMER AUTOMATIC
RIG D-25

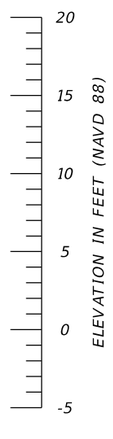


BORING TERMINATED AT ELEVATION -3.7 FT (NAVD 88)

BOR # PBA1-3*
STA. 690+31
REF. ℄ CONST. 31ST AVE
OFF. 128' RT.
ELEV. 16.9
DATE 1/24/2023



BORING TERMINATED AT ELEVATION 11.4 FT (NAVD 88)



	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	15 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

POND 1

NUMBER	DESCRIPTION	DATE

SCALE	AS NOTED	DATE
DESIGNED BY	BMG	06/2023
DRAWN BY	BMG	PROJECT NO.
CHECKED BY	MEN	6107860

MARC E. NOVAK, Ph.D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

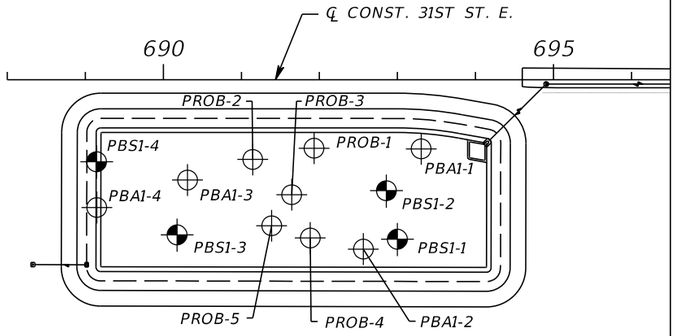
Manatee County FLORIDA

PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
1022 26th Avenue East
Bradenton, FL 34208

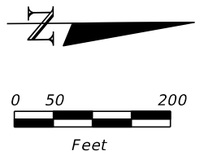
POND SOIL SURVEY (1)

SHEET NO.
GR-2

bsawaska 7/11/2023 3:12:11 PM c:\pw_workdir\patelgreene-pw-01\pw_user\dms08404\PB0RRD01.dgn



POND 1



BORING LOCATION PLAN

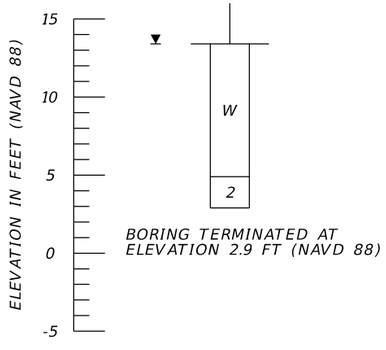
LEGEND

1. GRAY TO BROWN SAND TO SAND WITH SILT (A-3)
2. GRAY TO LIGHT BROWN SILTY SAND (A-2-4)
3. DARK GRAY TO DARK BROWN SAND TO SAND WITH SILT WITH TRACE ORGANICS (A-3)
4. DARK GRAY TO DARK BROWN ORGANIC SAND TO SAND WITH SILT (A-8)
5. GRAY TO BROWN CLAYEY SAND (A-2-6)
6. GRAY TO BROWN TO GREEN CLAY TO SILT (A-4/A-6/A-7-5)
7. DEBRIS: SOIL MIXED WITH VARIABLE AMOUNTS OF CONCRETE, BRICK, METAL, PLASTIC, ASPHALT, AND/OR WOOD
8. GRAY TO BROWN SAND TO SAND WITH SILT (DISTURBED) (A-3)
9. GRAY TO LIGHT BROWN SILTY SAND (DISTURBED) (A-2-4)
10. DARK GRAY TO DARK BROWN ORGANIC SILTY SAND (DISTURBED) (A-8)
11. GRAY TO BROWN CLAYEY SAND (DISTURBED) (A-2-6)
12. GRAY TO BROWN TO GREEN CLAY (DISTURBED) (A-7-5/A-7-6)
13. GRAY TO BROWN TO GREEN CLAY (A-7-6)
14. WEATHERED LIMESTONE TO CALCAREOUS CLAY

A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD AND HAMMER
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
OC	ORGANIC CONTENT (%)
NP	NON-PLASTIC
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988
⊕	APPROXIMATE AUGER BORING LOCATION
⊕	APPROXIMATE SPT BORING LOCATION
▞	APPROXIMATE TEST PIT LOCATION
▽	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
▼	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
GNA	GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID AT A DEPTH OF 10 FEET.
GNE	GROUNDWATER NOT ENCOUNTERED
R	HAND AUGER OR MECHANICAL BACK-HOE REFUSAL ON DEBRIS MATERIALS PREVENTING DEEPER EXPLORATION
↓	TEST PIT TERMINATED IN DEBRIS MATERIAL; DEBRIS CONTINUES DEEPER
◁ 100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
‖	CASING

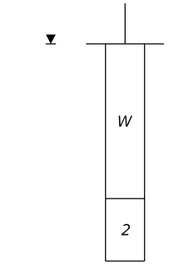
NOTES:
1. THE LOCATIONS OF THE BORINGS WERE RECORDED IN THE FIELD BY TIERRA, INC. USING GARMIN ETREX HANDHELD GPS EQUIPMENT WITH A REPORTED ACCURACY OF ± 10 FEET. THE GPS COORDINATES RECORDED BY TIERRA WERE UTILIZED IN CONJUNCTION WITH DESIGN FILES TO OBTAIN STATION AND OFFSET. THEREFORE, THE BORING LOCATIONS SHOULD BE CONSIDERED APPROXIMATE. BORINGS DENOTED BY AN ASTERISK (*) WERE LOCATED BY THE PROJECT SURVEYOR.
2. STRATA 8 THROUGH 11 THROUGHOUT THE FPC AREA ARE NOT IN THEIR NATURAL STATE AND LIKELY WERE DEPOSITED WHEN THE DEBRIS MATERIALS WERE BURIED.

BOR # PROBE-2
STA. 691+15
REF. ℄ CONST. 31ST AVE
OFF. 102' RT.
ELEV. 13.4
DATE 1/24/2023



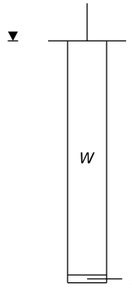
BORING TERMINATED AT ELEVATION 2.9 FT (NAVD 88)

BOR # PROBE-5
STA. 691+39
REF. ℄ CONST. 31ST AVE
OFF. 187' RT.
ELEV. 13.4
DATE 1/24/2023



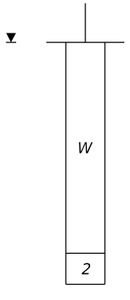
BORING TERMINATED AT ELEVATION -0.5 FT (NAVD 88)

BOR # PROBE-3
STA. 691+64
REF. ℄ CONST. 31ST AVE
OFF. 147' RT.
ELEV. 13.6
DATE 1/24/2023



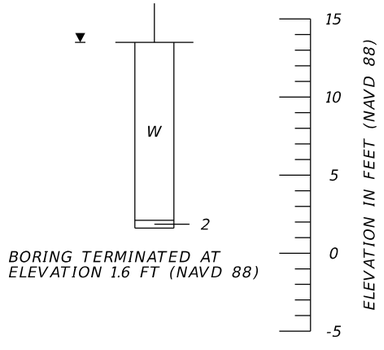
BORING TERMINATED AT ELEVATION -1.9 FT (NAVD 88)

BOR # PROBE-4
STA. 691+88
REF. ℄ CONST. 31ST AVE
OFF. 203' RT.
ELEV. 13.5
DATE 1/24/2023



BORING TERMINATED AT ELEVATION -1.9 FT (NAVD 88)

BOR # PROBE-1
STA. 691+93
REF. ℄ CONST. 31ST AVE
OFF. 88' RT.
ELEV. 13.5
DATE 1/24/2023



BORING TERMINATED AT ELEVATION 1.6 FT (NAVD 88)

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	15 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

POND 1

NUMBER	DESCRIPTION	DATE

SCALE	AS NOTED	DATE
DESIGNED BY	BMG	06/2023
DRAWN BY	BMG	PROJECT NO.
CHECKED BY	MEN	6107860

MARC E. NOVAK, Ph.D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

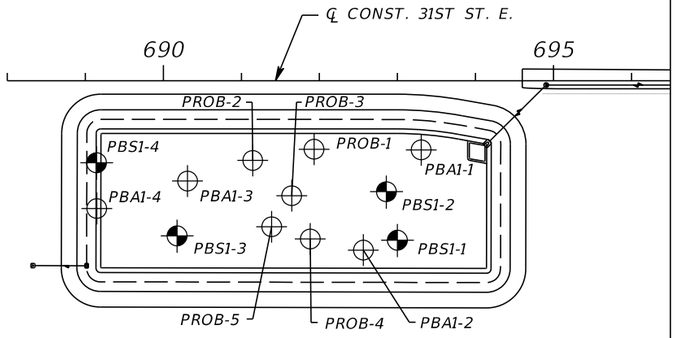
Manatee County FLORIDA

PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
1022 26th Avenue East
Bradenton, FL 34208

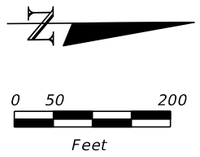
POND SOIL SURVEY (2)

SHEET NO.
GR-3

bsawaska 7/11/2023 3:12:14 PM c:\pw_workdir\patelgreene-pw-01\pw_user\dms08404\PB0RRD02.dgn



POND 1



BORING LOCATION PLAN

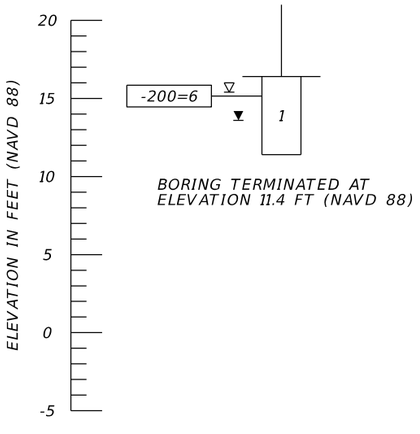
LEGEND

1. GRAY TO BROWN SAND TO SAND WITH SILT (A-3)
2. GRAY TO LIGHT BROWN SILTY SAND (A-2-4)
3. DARK GRAY TO DARK BROWN SAND TO SAND WITH SILT WITH TRACE ORGANICS (A-3)
4. DARK GRAY TO DARK BROWN ORGANIC SAND TO SAND WITH SILT (A-8)
5. GRAY TO BROWN CLAYEY SAND (A-2-6)
6. GRAY TO BROWN TO GREEN CLAY TO SILT (A-4/A-6/A-7-5)
7. DEBRIS: SOIL MIXED WITH VARIABLE AMOUNTS OF CONCRETE, BRICK, METAL, PLASTIC, ASPHALT, AND/OR WOOD
8. GRAY TO BROWN SAND TO SAND WITH SILT (DISTURBED) (A-3)
9. GRAY TO LIGHT BROWN SILTY SAND (DISTURBED) (A-2-4)
10. DARK GRAY TO DARK BROWN ORGANIC SILTY SAND (DISTURBED) (A-8)
11. GRAY TO BROWN CLAYEY SAND (DISTURBED) (A-2-6)
12. GRAY TO BROWN TO GREEN CLAY (DISTURBED) (A-7-5/A-7-6)
13. GRAY TO BROWN TO GREEN CLAY (A-7-6)
14. WEATHERED LIMESTONE TO CALCAREOUS CLAY

A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD AND HAMMER
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
OC	ORGANIC CONTENT (%)
NP	NON-PLASTIC
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988
⊕	APPROXIMATE AUGER BORING LOCATION
⊕	APPROXIMATE SPT BORING LOCATION
◪	APPROXIMATE TEST PIT LOCATION
▽	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
▼	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
GNA	GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID AT A DEPTH OF 10 FEET.
GNE	GROUNDWATER NOT ENCOUNTERED
R	HAND AUGER OR MECHANICAL BACK-HOE REFUSAL ON DEBRIS MATERIALS PREVENTING DEEPER EXPLORATION
▼	TEST PIT TERMINATED IN DEBRIS MATERIAL; DEBRIS CONTINUES DEEPER
◁ 100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
‖	CASING

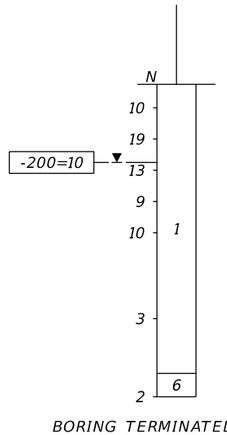
NOTES:
1. THE LOCATIONS OF THE BORINGS WERE RECORDED IN THE FIELD BY TIERRA, INC. USING GARMIN ETREX HANDHELD GPS EQUIPMENT WITH A REPORTED ACCURACY OF ± 10 FEET. THE GPS COORDINATES RECORDED BY TIERRA WERE UTILIZED IN CONJUNCTION WITH DESIGN FILES TO OBTAIN STATION AND OFFSET. THEREFORE, THE BORING LOCATIONS SHOULD BE CONSIDERED APPROXIMATE. BORINGS DENOTED BY AN ASTERISK (*) WERE LOCATED BY THE PROJECT SURVEYOR.
2. STRATA 8 THROUGH 11 THROUGHOUT THE FPC AREA ARE NOT IN THEIR NATURAL STATE AND LIKELY WERE DEPOSITED WHEN THE DEBRIS MATERIALS WERE BURIED.

BOR # PBA1-2*
STA. 692+56
REF. ℄ CONST. 31ST AVE
OFF. 217' RT.
ELEV. 16.4
DATE 1/24/2023



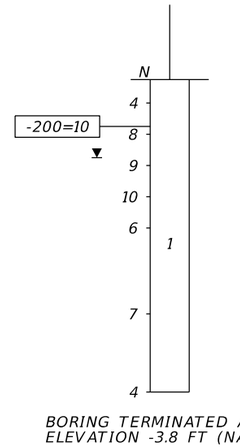
BORING TERMINATED AT ELEVATION 11.4 FT (NAVD 88)

BOR # PBS1-2
STA. 692+86
REF. ℄ CONST. 31ST AVE
OFF. 142' RT.
ELEV. 15.9
DATE 2/7/2023
DRILLER J. SHAW
HAMMER AUTOMATIC
RIG D-25



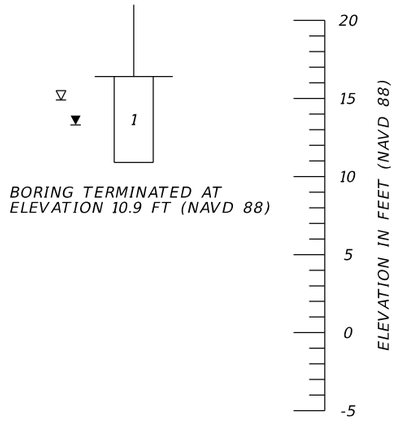
BORING TERMINATED AT ELEVATION -4.1 FT (NAVD 88)

BOR # PBS1-1
STA. 693+00
REF. ℄ CONST. 31ST AVE
OFF. 204' RT.
ELEV. 16.2
DATE 2/7/2023
DRILLER J. SHAW
HAMMER AUTOMATIC
RIG D-25



BORING TERMINATED AT ELEVATION -3.8 FT (NAVD 88)

BOR # PBA1-1*
STA. 693+30
REF. ℄ CONST. 31ST AVE
OFF. 88' RT.
ELEV. 16.4
DATE 1/24/2023



BORING TERMINATED AT ELEVATION 10.9 FT (NAVD 88)

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	15 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

POND 1

NUMBER	DESCRIPTION	DATE

SCALE	AS NOTED	DATE
DESIGNED BY	BMG	06/2023
DRAWN BY	BMG	PROJECT NO.
CHECKED BY	MEN	6107860

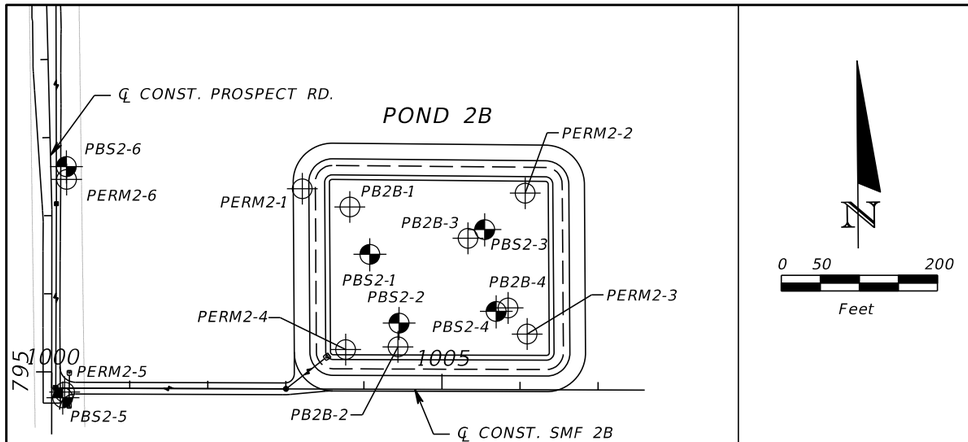
MARC E. NOVAK, Ph.D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

Manatee County FLORIDA
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
1022 26th Avenue East
Bradenton, FL 34208

POND SOIL SURVEY (3)

SHEET NO. GR-4

bsawaska 7/11/2023 3:12:19 PM c:\pw_workdir\patelgreene-pw-01\pw_user\dms08404\PB0RRD03.dgn



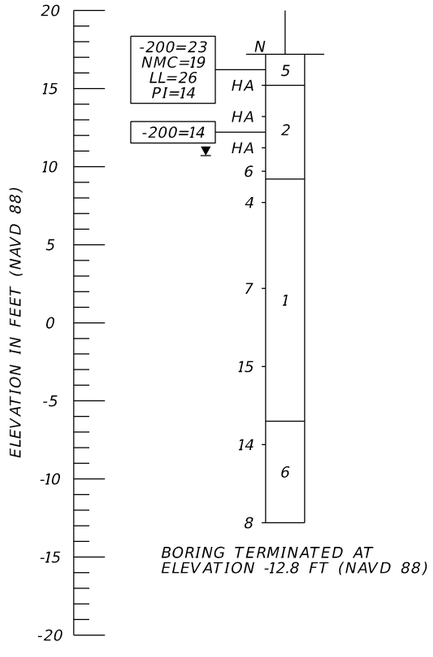
BORING LOCATION PLAN

LEGEND

1. GRAY TO BROWN SAND TO SAND WITH SILT (A-3)
2. GRAY TO LIGHT BROWN SILTY SAND (A-2-4)
3. DARK GRAY TO DARK BROWN SAND TO SAND WITH SILT WITH TRACE ORGANICS (A-3)
4. DARK GRAY TO DARK BROWN ORGANIC SAND TO SAND WITH SILT (A-8)
5. GRAY TO BROWN CLAYEY SAND (A-2-6)
6. GRAY TO BROWN TO GREEN CLAY TO SILT (A-4/A-6/A-7-5)
7. DEBRIS: SOIL MIXED WITH VARIABLE AMOUNTS OF CONCRETE, BRICK, METAL, PLASTIC, ASPHALT, AND/OR WOOD
8. GRAY TO BROWN SAND TO SAND WITH SILT (DISTURBED) (A-3)
9. GRAY TO LIGHT BROWN SILTY SAND (DISTURBED) (A-2-4)
10. DARK GRAY TO DARK BROWN ORGANIC SILTY SAND (DISTURBED) (A-8)
11. GRAY TO BROWN CLAYEY SAND (DISTURBED) (A-2-6)
12. GRAY TO BROWN TO GREEN CLAY (DISTURBED) (A-7-5/A-7-6)
13. GRAY TO BROWN TO GREEN CLAY (A-7-6)
14. WEATHERED LIMESTONE TO CALCAREOUS CLAY

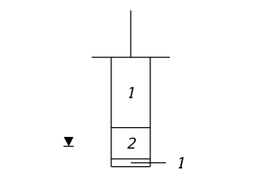
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD AND HAMMER
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
OC	ORGANIC CONTENT (%)
NP	NON-PLASTIC
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988
⊕	APPROXIMATE AUGER BORING LOCATION
⊕	APPROXIMATE SPT BORING LOCATION
▪	APPROXIMATE TEST PIT LOCATION
▽	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
▼	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
GNA	GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID AT A DEPTH OF 10 FEET.
GNE	GROUNDWATER NOT ENCOUNTERED
R	HAND AUGER OR MECHANICAL BACK-HOE REFUSAL ON DEBRIS MATERIALS PREVENTING DEEPER EXPLORATION
▼	TEST PIT TERMINATED IN DEBRIS MATERIAL; DEBRIS CONTINUES DEEPER
100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
‖	CASING

BOR # PBS2-5
STA. 1000+14
REF. ℄ CONST. SMF 2B
OFF. 12' RT.
ELEV. 17.2
DATE 5/1/2023
DRILLER C. VIRGEN
HAMMER AUTOMATIC
RIG D-25



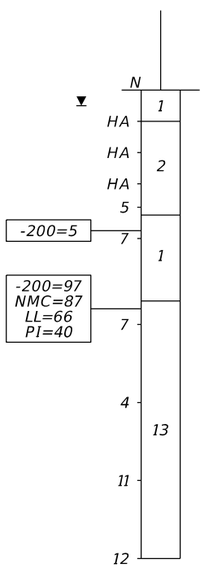
BORING TERMINATED AT ELEVATION -12.8 FT (NAVD 88)

BOR # PERM2-5
STA. 1000+16
REF. ℄ CONST. SMF 2B
OFF. 5' RT.
ELEV. 17.0
DATE 3/21/2023



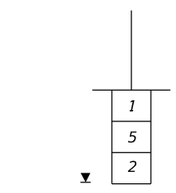
BORING TERMINATED AT ELEVATION 10.0 FT (NAVD 88)

BOR # PBS2-6
STA. 1000+18
REF. ℄ CONST. SMF 2B
OFF. 284' LT.
ELEV. 14.9
DATE 5/1/2023
DRILLER C. VIRGEN
HAMMER AUTOMATIC
RIG D-25



BORING TERMINATED AT ELEVATION -15.1 FT (NAVD 88)

BOR # PERM2-6
STA. 1000+18
REF. ℄ CONST. SMF 2B
OFF. 267' LT.
ELEV. 14.9
DATE 3/21/2023



BORING TERMINATED AT ELEVATION 8.9 FT (NAVD 88)

NOTES:
1. THE LOCATIONS OF THE BORINGS WERE RECORDED IN THE FIELD BY TIERRA, INC. USING GARMIN ETREX HANDHELD GPS EQUIPMENT WITH A REPORTED ACCURACY OF ± 10 FEET. THE GPS COORDINATES RECORDED BY TIERRA WERE UTILIZED IN CONJUNCTION WITH DESIGN FILES TO OBTAIN STATION AND OFFSET. THEREFORE, THE BORING LOCATIONS SHOULD BE CONSIDERED APPROXIMATE. BORINGS DENOTED BY AN ASTERISK (*) WERE LOCATED BY THE PROJECT SURVEYOR.
2. STRATA 8 THROUGH 11 THROUGHOUT THE FPC AREA ARE NOT IN THEIR NATURAL STATE AND LIKELY WERE DEPOSITED WHEN THE DEBRIS MATERIALS WERE BURIED.

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	15 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

POND 2B

NUMBER	DESCRIPTION	DATE

SCALE	AS NOTED	DATE
DESIGNED BY	BMG	06/2023
DRAWN BY	BMG	PROJECT NO.
CHECKED BY	MEN	6107860

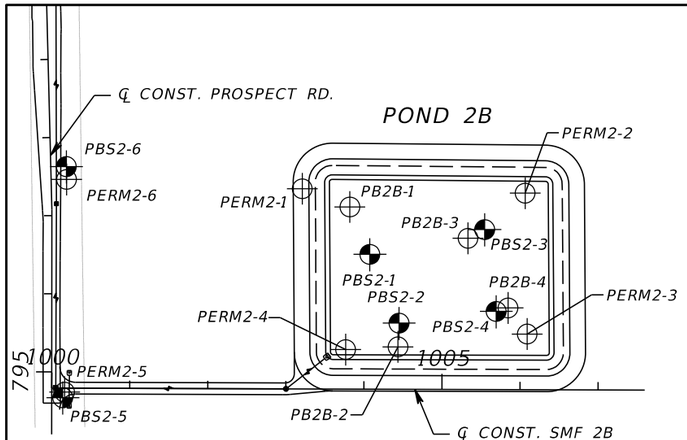
MARC E. NOVAK, Ph.D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

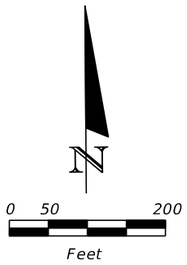
Manatee County FLORIDA
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
1022 26th Avenue East
Bradenton, FL 34208

POND SOIL SURVEY (4)

SHEET NO. GR-5

bsawaska 7/11/2023 3:12:22 PM c:\pw_workdir\patelgreene-pw-01\pw_user\dms08404\PB0RRD04_2B.dgn





BORING LOCATION PLAN

LEGEND

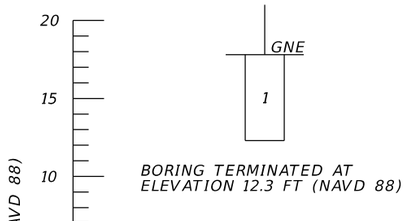
1. GRAY TO BROWN SAND TO SAND WITH SILT (A-3)
2. GRAY TO LIGHT BROWN SILTY SAND (A-2-4)
3. DARK GRAY TO DARK BROWN SAND TO SAND WITH SILT WITH TRACE ORGANICS (A-3)
4. DARK GRAY TO DARK BROWN ORGANIC SAND TO SAND WITH SILT (A-8)
5. GRAY TO BROWN CLAYEY SAND (A-2-6)
6. GRAY TO BROWN TO GREEN CLAY TO SILT (A-4/A-6/A-7-5)
7. DEBRIS: SOIL MIXED WITH VARIABLE AMOUNTS OF CONCRETE, BRICK, METAL, PLASTIC, ASPHALT, AND/OR WOOD
8. GRAY TO BROWN SAND TO SAND WITH SILT (DISTURBED) (A-3)
9. GRAY TO LIGHT BROWN SILTY SAND (DISTURBED) (A-2-4)
10. DARK GRAY TO DARK BROWN ORGANIC SILTY SAND (DISTURBED) (A-8)
11. GRAY TO BROWN CLAYEY SAND (DISTURBED) (A-2-6)
12. GRAY TO BROWN TO GREEN CLAY (DISTURBED) (A-7-5/A-7-6)
13. GRAY TO BROWN TO GREEN CLAY (A-7-6)
14. WEATHERED LIMESTONE TO CALCAREOUS CLAY

A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD AND HAMMER
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
OC	ORGANIC CONTENT (%)
NP	NON-PLASTIC
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988
⊕	APPROXIMATE AUGER BORING LOCATION
⊕	APPROXIMATE SPT BORING LOCATION
▩	APPROXIMATE TEST PIT LOCATION
▽	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
▼	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
GNA	GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID AT A DEPTH OF 10 FEET.
GNE	GROUNDWATER NOT ENCOUNTERED
R	HAND AUGER OR MECHANICAL BACK-HOE REFUSAL ON DEBRIS MATERIALS PREVENTING DEEPER EXPLORATION
▼	TEST PIT TERMINATED IN DEBRIS MATERIAL; DEBRIS CONTINUES DEEPER
◁ 100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
‖	CASING

NOTES:
1. THE LOCATIONS OF THE BORINGS WERE RECORDED IN THE FIELD BY TIERRA, INC. USING GARMIN ETREX HANDHELD GPS EQUIPMENT WITH A REPORTED ACCURACY OF ± 10 FEET. THE GPS COORDINATES RECORDED BY TIERRA WERE UTILIZED IN CONJUNCTION WITH DESIGN FILES TO OBTAIN STATION AND OFFSET. THEREFORE, THE BORING LOCATIONS SHOULD BE CONSIDERED APPROXIMATE. BORINGS DENOTED BY AN ASTERISK (*) WERE LOCATED BY THE PROJECT SURVEYOR.
2. STRATA 8 THROUGH 11 THROUGHOUT THE FPC AREA ARE NOT IN THEIR NATURAL STATE AND LIKELY WERE DEPOSITED WHEN THE DEBRIS MATERIALS WERE BURIED.

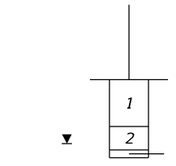
	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	15 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

BOR # PERM2-1
STA. 1003+20
REF. ℄ CONST. SMF 2B
OFF. 256' LT.
ELEV. 17.8
DATE 3/20/2023



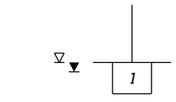
BORING TERMINATED AT ELEVATION 12.3 FT (NAVD 88)

BOR # PERM2-4
STA. 1003+76
REF. ℄ CONST. SMF 2B
OFF. 51' LT.
ELEV. 16.2
DATE 3/20/2023



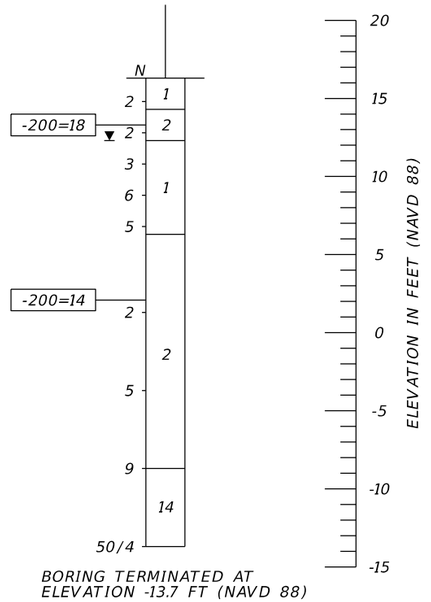
BORING TERMINATED AT ELEVATION 11.2 FT (NAVD 88)

BOR # PB2B-1*
STA. 1003+81
REF. ℄ CONST. SMF 2B
OFF. 233' LT.
ELEV. 17.3
DATE 9/22/2022



BORING TERMINATED AT ELEVATION 15.3 FT (NAVD 88)

BOR # PBS2-1
STA. 1004+07
REF. ℄ CONST. SMF 2B
OFF. 173' LT.
ELEV. 16.3
DATE 3/10/2023
DRILLER M. ATKINSON
HAMMER AUTOMATIC
RIG D-25



BORING TERMINATED AT ELEVATION -13.7 FT (NAVD 88)

POND 2B

NUMBER	DESCRIPTION	DATE

SCALE	AS NOTED	DATE
DESIGNED BY	BMG	06/2023
DRAWN BY	BMG	PROJECT NO.
CHECKED BY	MEN	6107860

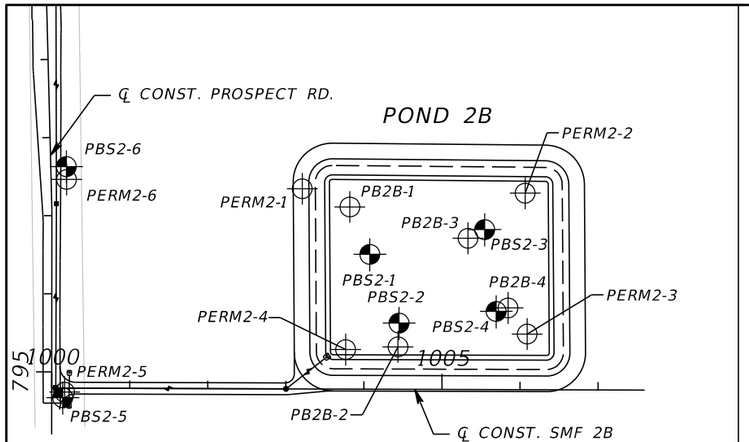
MARC E. NOVAK, Ph.D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

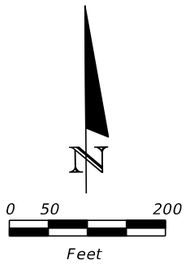
Manatee County FLORIDA

PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
1022 26th Avenue East
Bradenton, FL 34208

POND SOIL SURVEY (5)

SHEET NO.
GR-6





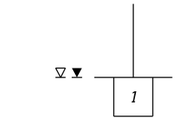
BORING LOCATION PLAN

LEGEND

1. GRAY TO BROWN SAND TO SAND WITH SILT (A-3)
2. GRAY TO LIGHT BROWN SILTY SAND (A-2-4)
3. DARK GRAY TO DARK BROWN SAND TO SAND WITH SILT WITH TRACE ORGANICS (A-3)
4. DARK GRAY TO DARK BROWN ORGANIC SAND TO SAND WITH SILT (A-8)
5. GRAY TO BROWN CLAYEY SAND (A-2-6)
6. GRAY TO BROWN TO GREEN CLAY TO SILT (A-4/A-6/A-7-5)
7. DEBRIS: SOIL MIXED WITH VARIABLE AMOUNTS OF CONCRETE, BRICK, METAL, PLASTIC, ASPHALT, AND/OR WOOD
8. GRAY TO BROWN SAND TO SAND WITH SILT (DISTURBED) (A-3)
9. GRAY TO LIGHT BROWN SILTY SAND (DISTURBED) (A-2-4)
10. DARK GRAY TO DARK BROWN ORGANIC SILTY SAND (DISTURBED) (A-8)
11. GRAY TO BROWN CLAYEY SAND (DISTURBED) (A-2-6)
12. GRAY TO BROWN TO GREEN CLAY (DISTURBED) (A-7-5/A-7-6)
13. GRAY TO BROWN TO GREEN CLAY (A-7-6)
14. WEATHERED LIMESTONE TO CALCAREOUS CLAY

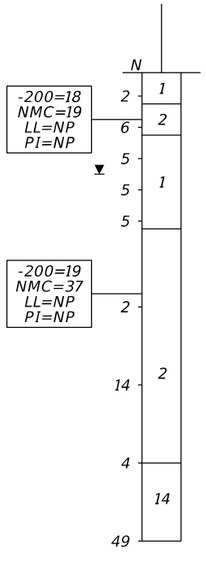
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD AND HAMMER
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
OC	ORGANIC CONTENT (%)
NP	NON-PLASTIC
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988
⊕	APPROXIMATE AUGER BORING LOCATION
⊕	APPROXIMATE SPT BORING LOCATION
▞	APPROXIMATE TEST PIT LOCATION
▽	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
▼	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
GNA	GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID AT A DEPTH OF 10 FEET.
GNE	GROUNDWATER NOT ENCOUNTERED
R	HAND AUGER OR MECHANICAL BACK-HOE REFUSAL ON DEBRIS MATERIALS PREVENTING DEEPER EXPLORATION
▼	TEST PIT TERMINATED IN DEBRIS MATERIAL; DEBRIS CONTINUES DEEPER
◁ 100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
‖	CASING

BOR # PB2B-2*
STA. 1004+44
REF. ℄ CONST. SMF 2B
OFF. 54' LT.
ELEV. 16.3
DATE 9/22/2022



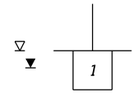
BORING TERMINATED AT ELEVATION 13.8 FT (NAVD 88)

BOR # PBS2-2
STA. 1004+45
REF. ℄ CONST. SMF 2B
OFF. 85' LT.
ELEV. 16.6
DATE 3/10/2023
DRILLER M. ATKINSON
HAMMER AUTOMATIC
RIG D-25



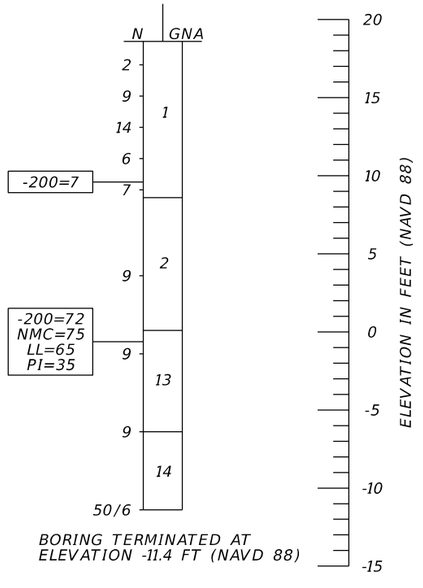
BORING TERMINATED AT ELEVATION -13.4 FT (NAVD 88)

BOR # PB2B-3*
STA. 1005+33
REF. ℄ CONST. SMF 2B
OFF. 194' LT.
ELEV. 18.0
DATE 9/22/2022



BORING TERMINATED AT ELEVATION 15.5 FT (NAVD 88)

BOR # PBS2-3
STA. 1005+54
REF. ℄ CONST. SMF 2B
OFF. 205' LT.
ELEV. 18.6
DATE 3/10/2023
DRILLER M. ATKINSON
HAMMER AUTOMATIC
RIG D-25



BORING TERMINATED AT ELEVATION -11.4 FT (NAVD 88)

NOTES:
1. THE LOCATIONS OF THE BORINGS WERE RECORDED IN THE FIELD BY TIERRA, INC. USING GARMIN ETREX HANDHELD GPS EQUIPMENT WITH A REPORTED ACCURACY OF ± 10 FEET. THE GPS COORDINATES RECORDED BY TIERRA WERE UTILIZED IN CONJUNCTION WITH DESIGN FILES TO OBTAIN STATION AND OFFSET. THEREFORE, THE BORING LOCATIONS SHOULD BE CONSIDERED APPROXIMATE. BORINGS DENOTED BY AN ASTERISK (*) WERE LOCATED BY THE PROJECT SURVEYOR.
2. STRATA 8 THROUGH 11 THROUGHOUT THE FPC AREA ARE NOT IN THEIR NATURAL STATE AND LIKELY WERE DEPOSITED WHEN THE DEBRIS MATERIALS WERE BURIED.

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	15 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

POND 2B

NUMBER	DESCRIPTION	DATE

SCALE	AS NOTED	DATE
DESIGNED BY	BMG	06/2023
DRAWN BY	BMG	PROJECT NO.
CHECKED BY	MEN	6107860

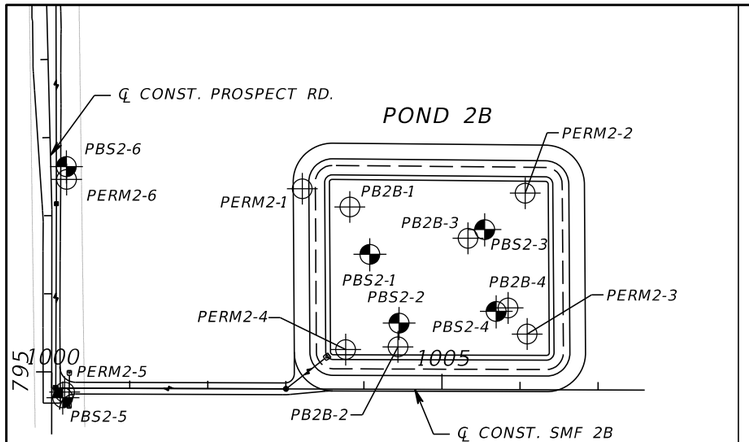
MARC E. NOVAK, Ph.D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

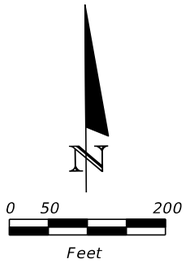
Manatee County FLORIDA

PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
1022 26th Avenue East
Bradenton, FL 34208

POND SOIL SURVEY (6)

SHEET NO. GR-7





BORING LOCATION PLAN

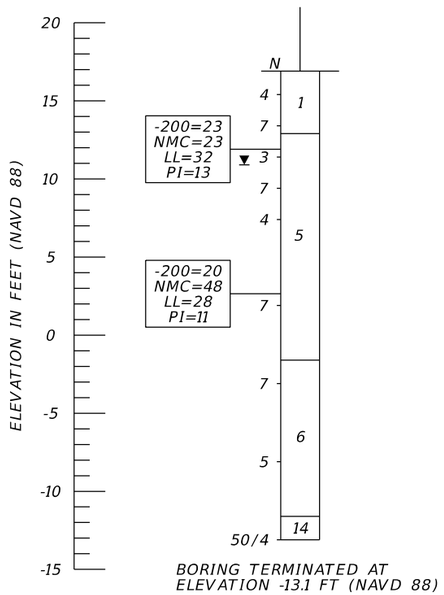
LEGEND

1. GRAY TO BROWN SAND TO SAND WITH SILT (A-3)
2. GRAY TO LIGHT BROWN SILTY SAND (A-2-4)
3. DARK GRAY TO DARK BROWN SAND TO SAND WITH SILT WITH TRACE ORGANICS (A-3)
4. DARK GRAY TO DARK BROWN ORGANIC SAND TO SAND WITH SILT (A-8)
5. GRAY TO BROWN CLAYEY SAND (A-2-6)
6. GRAY TO BROWN TO GREEN CLAY TO SILT (A-4/A-6/A-7-5)
7. DEBRIS: SOIL MIXED WITH VARIABLE AMOUNTS OF CONCRETE, BRICK, METAL, PLASTIC, ASPHALT, AND/OR WOOD
8. GRAY TO BROWN SAND TO SAND WITH SILT (DISTURBED) (A-3)
9. GRAY TO LIGHT BROWN SILTY SAND (DISTURBED) (A-2-4)
10. DARK GRAY TO DARK BROWN ORGANIC SILTY SAND (DISTURBED) (A-8)
11. GRAY TO BROWN CLAYEY SAND (DISTURBED) (A-2-6)
12. GRAY TO BROWN TO GREEN CLAY (DISTURBED) (A-7-5/A-7-6)
13. GRAY TO BROWN TO GREEN CLAY (A-7-6)
14. WEATHERED LIMESTONE TO CALCAREOUS CLAY

A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD AND HAMMER
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
OC	ORGANIC CONTENT (%)
NP	NON-PLASTIC
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988
⊕	APPROXIMATE AUGER BORING LOCATION
⊕	APPROXIMATE SPT BORING LOCATION
▪	APPROXIMATE TEST PIT LOCATION
▽	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
▼	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
GNA	GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID AT A DEPTH OF 10 FEET.
GNE	GROUNDWATER NOT ENCOUNTERED
R	HAND AUGER OR MECHANICAL BACK-HOE REFUSAL ON DEBRIS MATERIALS PREVENTING DEEPER EXPLORATION
▼	TEST PIT TERMINATED IN DEBRIS MATERIAL; DEBRIS CONTINUES DEEPER
◁ 100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
‖	CASING

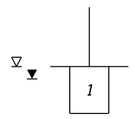
NOTES:
1. THE LOCATIONS OF THE BORINGS WERE RECORDED IN THE FIELD BY TIERRA, INC. USING GARMIN ETREX HANDHELD GPS EQUIPMENT WITH A REPORTED ACCURACY OF ± 10 FEET. THE GPS COORDINATES RECORDED BY TIERRA WERE UTILIZED IN CONJUNCTION WITH DESIGN FILES TO OBTAIN STATION AND OFFSET. THEREFORE, THE BORING LOCATIONS SHOULD BE CONSIDERED APPROXIMATE. BORINGS DENOTED BY AN ASTERISK (*) WERE LOCATED BY THE PROJECT SURVEYOR.
2. STRATA 8 THROUGH 11 THROUGHOUT THE FPC AREA ARE NOT IN THEIR NATURAL STATE AND LIKELY WERE DEPOSITED WHEN THE DEBRIS MATERIALS WERE BURIED.

BOR # PBS2-4
STA. 1005+69
REF. ℄ CONST. SMF 2B
OFF. 100' LT.
ELEV. 16.9
DATE 3/10/2023
DRILLER M. ATKINSON
HAMMER AUTOMATIC
RIG D-25



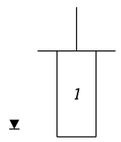
BORING TERMINATED AT ELEVATION -13.1 FT (NAVD 88)

BOR # PB2B-4*
STA. 1005+84
REF. ℄ CONST. SMF 2B
OFF. 104' LT.
ELEV. 17.2
DATE 9/22/2022



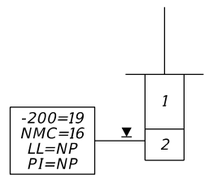
BORING TERMINATED AT ELEVATION 14.2 FT (NAVD 88)

BOR # PERM2-2
STA. 1006+06
REF. ℄ CONST. SMF 2B
OFF. 252' LT.
ELEV. 18.2
DATE 3/20/2023



BORING TERMINATED AT ELEVATION 12.7 FT (NAVD 88)

BOR # PERM2-3
STA. 1006+09
REF. ℄ CONST. SMF 2B
OFF. 71' LT.
ELEV. 16.7
DATE 3/20/2023



BORING TERMINATED AT ELEVATION 11.2 FT (NAVD 88)

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	15 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

POND 2B

NUMBER	DESCRIPTION	DATE

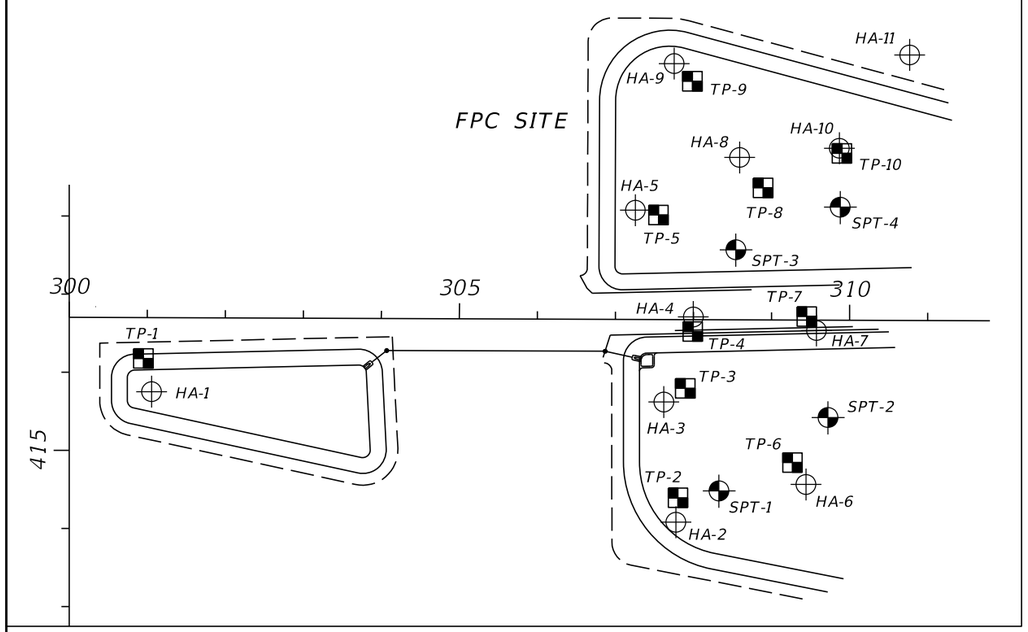
SCALE	AS NOTED	DATE
DESIGNED BY	BMG	06/2023
DRAWN BY	BMG	PROJECT NO.
CHECKED BY	MEN	6107860

MARC E. NOVAK, Ph.D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

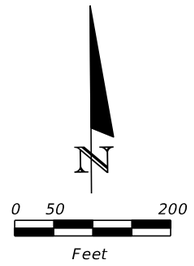
Manatee County FLORIDA
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
1022 26th Avenue East
Bradenton, FL 34208

POND SOIL SURVEY (7)

SHEET NO. GR-8



BORING LOCATION PLAN

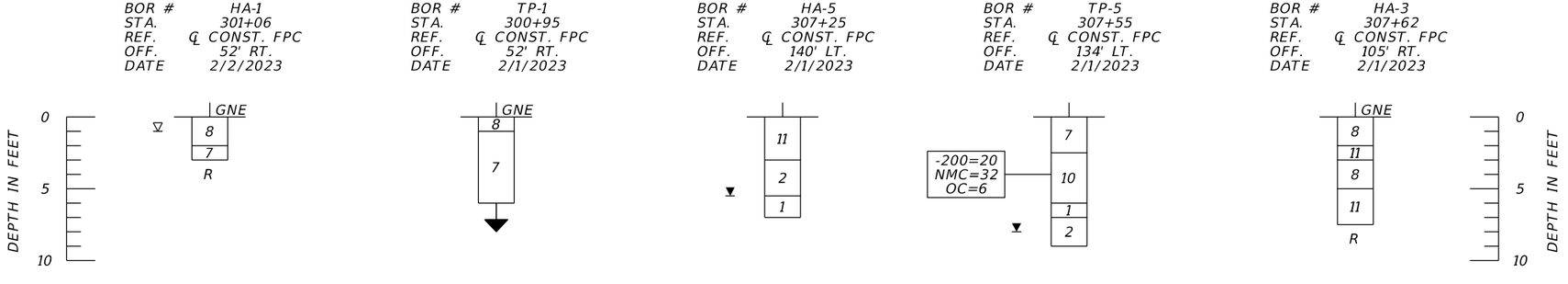


LEGEND

1. GRAY TO BROWN SAND TO SAND WITH SILT (A-3)
2. GRAY TO LIGHT BROWN SILTY SAND (A-2-4)
3. DARK GRAY TO DARK BROWN SAND TO SAND WITH SILT WITH TRACE ORGANICS (A-3)
4. DARK GRAY TO DARK BROWN ORGANIC SAND TO SAND WITH SILT (A-8)
5. GRAY TO BROWN CLAYEY SAND (A-2-6)
6. GRAY TO BROWN TO GREEN CLAY TO SILT (A-4/A-6/A-7-5)
7. DEBRIS: SOIL MIXED WITH VARIABLE AMOUNTS OF CONCRETE, BRICK, METAL, PLASTIC, ASPHALT, AND/OR WOOD
8. GRAY TO BROWN SAND TO SAND WITH SILT (DISTURBED) (A-3)
9. GRAY TO LIGHT BROWN SILTY SAND (DISTURBED) (A-2-4)
10. DARK GRAY TO DARK BROWN ORGANIC SILTY SAND (DISTURBED) (A-8)
11. GRAY TO BROWN CLAYEY SAND (DISTURBED) (A-2-6)
12. GRAY TO BROWN TO GREEN CLAY (DISTURBED) (A-7-5/A-7-6)
13. GRAY TO BROWN TO GREEN CLAY (A-7-6)
14. WEATHERED LIMESTONE TO CALCAREOUS CLAY

A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD AND HAMMER
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
OC	ORGANIC CONTENT (%)
NP	NON-PLASTIC
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988
⊕	APPROXIMATE AUGER BORING LOCATION
⊕	APPROXIMATE SPT BORING LOCATION
■	APPROXIMATE TEST PIT LOCATION
▽	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
▼	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
GNA	GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID AT A DEPTH OF 10 FEET.
GNE	GROUNDWATER NOT ENCOUNTERED
R	HAND AUGER OR MECHANICAL BACK-HOE REFUSAL ON DEBRIS MATERIALS PREVENTING DEEPER EXPLORATION
↓	TEST PIT TERMINATED IN DEBRIS MATERIAL; DEBRIS CONTINUES DEEPER
◁ 100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
‖	CASING

NOTES:
1. THE LOCATIONS OF THE BORINGS WERE RECORDED IN THE FIELD BY TIERRA, INC. USING GARMIN ETREX HANDHELD GPS EQUIPMENT WITH A REPORTED ACCURACY OF ± 10 FEET. THE GPS COORDINATES RECORDED BY TIERRA WERE UTILIZED IN CONJUNCTION WITH DESIGN FILES TO OBTAIN STATION AND OFFSET. THEREFORE, THE BORING LOCATIONS SHOULD BE CONSIDERED APPROXIMATE. BORINGS DENOTED BY AN ASTERISK (*) WERE LOCATED BY THE PROJECT SURVEYOR.
2. STRATA 8 THROUGH 11 THROUGHOUT THE FPC AREA ARE NOT IN THEIR NATURAL STATE AND LIKELY WERE DEPOSITED WHEN THE DEBRIS MATERIALS WERE BURIED.



SAFETY HAMMER		AUTOMATIC HAMMER	
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)		SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4		LESS THAN 3
LOOSE	4 to 10		3 to 8
MEDIUM DENSE	10 to 30		8 to 24
DENSE	30 to 50		24 to 40
VERY DENSE	GREATER THAN 50		GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)		SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2		LESS THAN 1
SOFT	2 to 4		1 to 3
FIRM	4 to 8		3 to 6
STIFF	8 to 15		6 to 12
VERY STIFF	15 to 30		12 to 24
HARD	GREATER THAN 30		GREATER THAN 24

FPC SITE

NUMBER	DESCRIPTION	DATE

SCALE	AS NOTED	DATE
DESIGNED BY	BMG	06/2023
DRAWN BY	BMG	PROJECT NO.
CHECKED BY	MEN	6107860

MARC E. NOVAK, Ph.D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

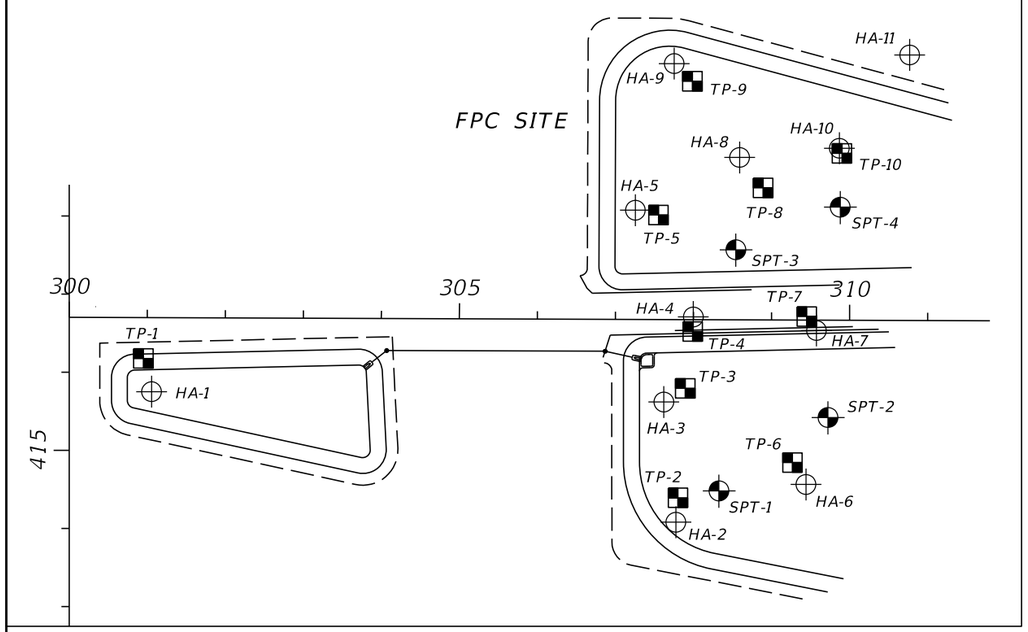
Manatee County FLORIDA

PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
1022 26th Avenue East
Bradenton, FL 34208

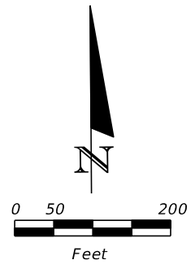
POND SOIL SURVEY (8)

SHEET NO. GR-9

bsawaska 7/11/2023 3:12:34 PM c:\pw_workdir\patelgreene-pw-01\pw_user\dms08404\PB0RRD08_FPC.dgn



BORING LOCATION PLAN



LEGEND

1. GRAY TO BROWN SAND TO SAND WITH SILT (A-3)
2. GRAY TO LIGHT BROWN SILTY SAND (A-2-4)
3. DARK GRAY TO DARK BROWN SAND TO SAND WITH SILT WITH TRACE ORGANICS (A-3)
4. DARK GRAY TO DARK BROWN ORGANIC SAND TO SAND WITH SILT (A-8)
5. GRAY TO BROWN CLAYEY SAND (A-2-6)
6. GRAY TO BROWN TO GREEN CLAY TO SILT (A-4/A-6/A-7-5)
7. DEBRIS: SOIL MIXED WITH VARIABLE AMOUNTS OF CONCRETE, BRICK, METAL, PLASTIC, ASPHALT, AND/OR WOOD
8. GRAY TO BROWN SAND TO SAND WITH SILT (DISTURBED) (A-3)
9. GRAY TO LIGHT BROWN SILTY SAND (DISTURBED) (A-2-4)
10. DARK GRAY TO DARK BROWN ORGANIC SILTY SAND (DISTURBED) (A-8)
11. GRAY TO BROWN CLAYEY SAND (DISTURBED) (A-2-6)
12. GRAY TO BROWN TO GREEN CLAY (DISTURBED) (A-7-5/A-7-6)
13. GRAY TO BROWN TO GREEN CLAY (A-7-6)
14. WEATHERED LIMESTONE TO CALCAREOUS CLAY

A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD AND HAMMER
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
OC	ORGANIC CONTENT (%)
NP	NON-PLASTIC
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988
⊕	APPROXIMATE AUGER BORING LOCATION
⊕	APPROXIMATE SPT BORING LOCATION
■	APPROXIMATE TEST PIT LOCATION
▽	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
▼	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
GNA	GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID AT A DEPTH OF 10 FEET.
GNE	GROUNDWATER NOT ENCOUNTERED
R	HAND AUGER OR MECHANICAL BACK-HOE REFUSAL ON DEBRIS MATERIALS PREVENTING DEEPER EXPLORATION
↓	TEST PIT TERMINATED IN DEBRIS MATERIAL; DEBRIS CONTINUES DEEPER
◁ 100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
‖	CASING

NOTES:
1. THE LOCATIONS OF THE BORINGS WERE RECORDED IN THE FIELD BY TIERRA, INC. USING GARMIN ETREX HANDHELD GPS EQUIPMENT WITH A REPORTED ACCURACY OF ± 10 FEET. THE GPS COORDINATES RECORDED BY TIERRA WERE UTILIZED IN CONJUNCTION WITH DESIGN FILES TO OBTAIN STATION AND OFFSET. THEREFORE, THE BORING LOCATIONS SHOULD BE CONSIDERED APPROXIMATE. BORINGS DENOTED BY AN ASTERISK (*) WERE LOCATED BY THE PROJECT SURVEYOR.
2. STRATA 8 THROUGH 11 THROUGHOUT THE FPC AREA ARE NOT IN THEIR NATURAL STATE AND LIKELY WERE DEPOSITED WHEN THE DEBRIS MATERIALS WERE BURIED.

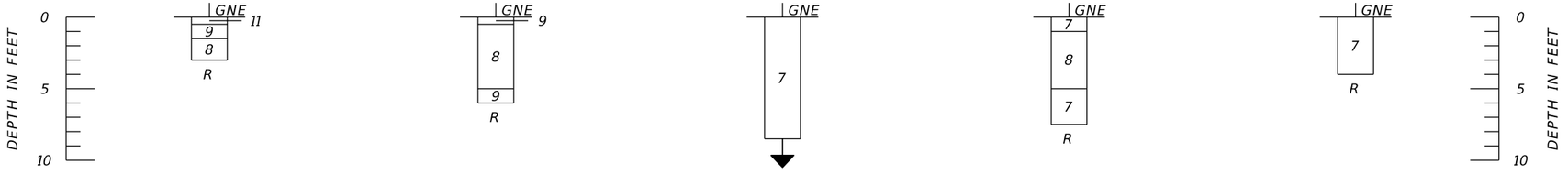
BOR # HA-9
STA. 307+74
REF. ℄ CONST. FPC
OFF. 328' LT.
DATE 2/1/2023

BOR # HA-2
STA. 307+79
REF. ℄ CONST. FPC
OFF. 260' RT.
DATE 2/2/2023

BOR # TP-2
STA. 307+81
REF. ℄ CONST. FPC
OFF. 228' RT.
DATE 2/1/2023

BOR # TP-3
STA. 307+90
REF. ℄ CONST. FPC
OFF. 88' RT.
DATE 2/1/2023

BOR # TP-9
STA. 307+97
REF. ℄ CONST. FPC
OFF. 305' LT.
DATE 2/2/2023



	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	15 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

FPC SITE

NUMBER	DESCRIPTION	DATE

SCALE	AS NOTED	DATE
DESIGNED BY	BMG	06/2023
DRAWN BY	BMG	PROJECT NO.
CHECKED BY	MEN	6107860

MARC E. NOVAK, Ph.D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

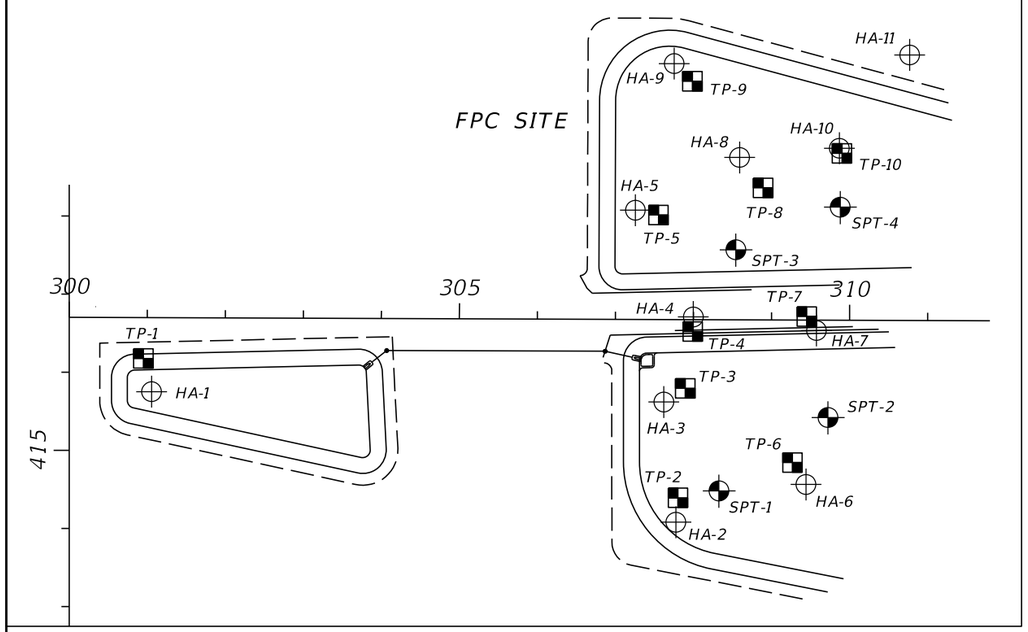
Manatee County FLORIDA

PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
1022 26th Avenue East
Bradenton, FL 34208

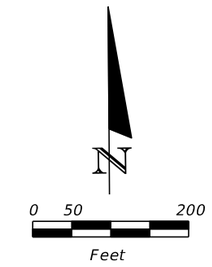
POND SOIL SURVEY (9)

SHEET NO.
GR-10

bsawaska 7/11/2023 3:12:37 PM c:\pw_workdir\patelgreene-pw-01\pw_user\dms08404\PB0RRD09_FPC.dgn



BORING LOCATION PLAN

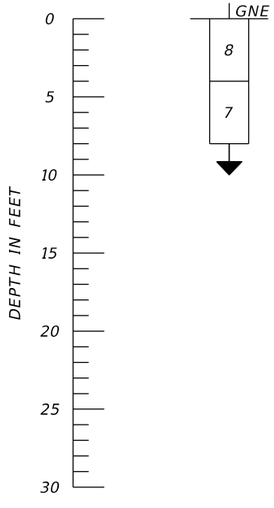


LEGEND

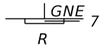
1. GRAY TO BROWN SAND TO SAND WITH SILT (A-3)
2. GRAY TO LIGHT BROWN SILTY SAND (A-2-4)
3. DARK GRAY TO DARK BROWN SAND TO SAND WITH SILT WITH TRACE ORGANICS (A-3)
4. DARK GRAY TO DARK BROWN ORGANIC SAND TO SAND WITH SILT (A-8)
5. GRAY TO BROWN CLAYEY SAND (A-2-6)
6. GRAY TO BROWN TO GREEN CLAY TO SILT (A-4/A-6/A-7-5)
7. DEBRIS: SOIL MIXED WITH VARIABLE AMOUNTS OF CONCRETE, BRICK, METAL, PLASTIC, ASPHALT, AND/OR WOOD
8. GRAY TO BROWN SAND TO SAND WITH SILT (DISTURBED) (A-3)
9. GRAY TO LIGHT BROWN SILTY SAND (DISTURBED) (A-2-4)
10. DARK GRAY TO DARK BROWN ORGANIC SILTY SAND (DISTURBED) (A-8)
11. GRAY TO BROWN CLAYEY SAND (DISTURBED) (A-2-6)
12. GRAY TO BROWN TO GREEN CLAY (DISTURBED) (A-7-5/A-7-6)
13. GRAY TO BROWN TO GREEN CLAY (A-7-6)
14. WEATHERED LIMESTONE TO CALCAREOUS CLAY

A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD AND HAMMER
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
OC	ORGANIC CONTENT (%)
NP	NON-PLASTIC
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988
⊕	APPROXIMATE AUGER BORING LOCATION
⊕	APPROXIMATE SPT BORING LOCATION
■	APPROXIMATE TEST PIT LOCATION
▽	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
▼	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
GNA	GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID AT A DEPTH OF 10 FEET.
GNE	GROUNDWATER NOT ENCOUNTERED
R	HAND AUGER OR MECHANICAL BACK-HOE REFUSAL ON DEBRIS MATERIALS PREVENTING DEEPER EXPLORATION
▼	TEST PIT TERMINATED IN DEBRIS MATERIAL; DEBRIS CONTINUES DEEPER
◁ 100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
‖	CASING

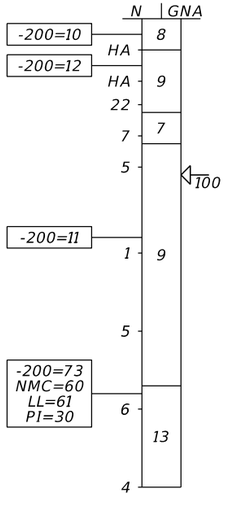
BOR # TP-4
STA. 307+99
REF. ℄ CONST. FPC
OFF. 15' RT.
DATE 2/2/2023



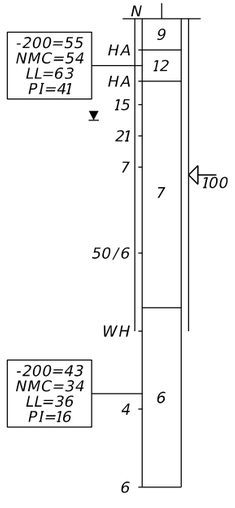
BOR # HA-4
STA. 308+00
REF. ℄ CONST. FPC
OFF. 4' LT.
DATE 3/9/2023



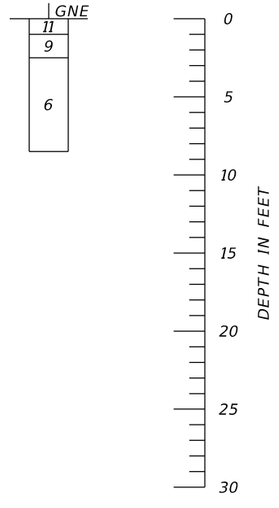
BOR # SPT-1
STA. 308+34
REF. ℄ CONST. FPC
OFF. 219' RT.
DATE 3/9/2023
DRILLER M. ATKINSON
HAMMER AUTOMATIC
RIG D-25



BOR # SPT-3
STA. 308+54
REF. ℄ CONST. FPC
OFF. 90' LT.
DATE 3/9/2023
DRILLER M. ATKINSON
HAMMER AUTOMATIC
RIG D-25



BOR # HA-8
STA. 308+58
REF. ℄ CONST. FPC
OFF. 208' LT.
DATE 3/9/2023



NOTES:
1. THE LOCATIONS OF THE BORINGS WERE RECORDED IN THE FIELD BY TIERRA, INC. USING GARMIN ETREX HANDHELD GPS EQUIPMENT WITH A REPORTED ACCURACY OF ± 10 FEET. THE GPS COORDINATES RECORDED BY TIERRA WERE UTILIZED IN CONJUNCTION WITH DESIGN FILES TO OBTAIN STATION AND OFFSET. THEREFORE, THE BORING LOCATIONS SHOULD BE CONSIDERED APPROXIMATE. BORINGS DENOTED BY AN ASTERISK (*) WERE LOCATED BY THE PROJECT SURVEYOR.
2. STRATA 8 THROUGH 11 THROUGHOUT THE FPC AREA ARE NOT IN THEIR NATURAL STATE AND LIKELY WERE DEPOSITED WHEN THE DEBRIS MATERIALS WERE BURIED.

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	15 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

FPC SITE

NUMBER	DESCRIPTION	DATE

SCALE	AS NOTED	DATE
DESIGNED BY	BMG	06/2023
DRAWN BY	BMG	PROJECT NO.
CHECKED BY	MEN	6107860

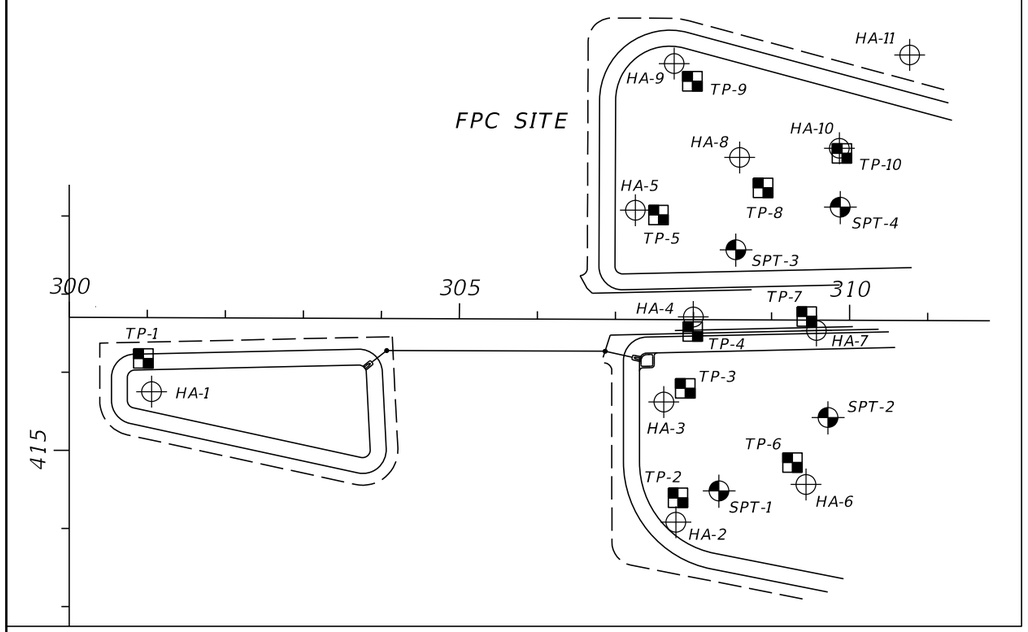
MARC E. NOVAK, Ph.D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

Manatee County FLORIDA

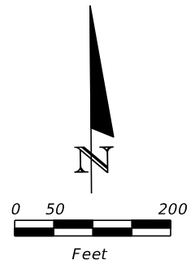
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
1022 26th Avenue East
Bradenton, FL 34208

POND SOIL SURVEY (10)

SHEET NO. GR-11



BORING LOCATION PLAN



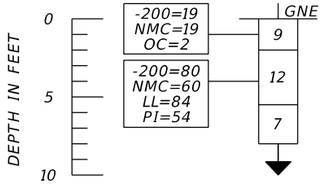
LEGEND

1. GRAY TO BROWN SAND TO SAND WITH SILT (A-3)
2. GRAY TO LIGHT BROWN SILTY SAND (A-2-4)
3. DARK GRAY TO DARK BROWN SAND TO SAND WITH SILT WITH TRACE ORGANICS (A-3)
4. DARK GRAY TO DARK BROWN ORGANIC SAND TO SAND WITH SILT (A-8)
5. GRAY TO BROWN CLAYEY SAND (A-2-6)
6. GRAY TO BROWN TO GREEN CLAY TO SILT (A-4/A-6/A-7-5)
7. DEBRIS: SOIL MIXED WITH VARIABLE AMOUNTS OF CONCRETE, BRICK, METAL, PLASTIC, ASPHALT, AND/OR WOOD
8. GRAY TO BROWN SAND TO SAND WITH SILT (DISTURBED) (A-3)
9. GRAY TO LIGHT BROWN SILTY SAND (DISTURBED) (A-2-4)
10. DARK GRAY TO DARK BROWN ORGANIC SILTY SAND (DISTURBED) (A-8)
11. GRAY TO BROWN CLAYEY SAND (DISTURBED) (A-2-6)
12. GRAY TO BROWN TO GREEN CLAY (DISTURBED) (A-7-5/A-7-6)
13. GRAY TO BROWN TO GREEN CLAY (A-7-6)
14. WEATHERED LIMESTONE TO CALCAREOUS CLAY

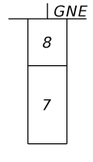
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD AND HAMMER
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
OC	ORGANIC CONTENT (%)
NP	NON-PLASTIC
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988
⊕	APPROXIMATE AUGER BORING LOCATION
⊕	APPROXIMATE SPT BORING LOCATION
■	APPROXIMATE TEST PIT LOCATION
▽	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
▼	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
GNA	GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID AT A DEPTH OF 10 FEET.
GNE	GROUNDWATER NOT ENCOUNTERED
R	HAND AUGER OR MECHANICAL BACK-HOE REFUSAL ON DEBRIS MATERIALS PREVENTING DEEPER EXPLORATION
↓	TEST PIT TERMINATED IN DEBRIS MATERIAL; DEBRIS CONTINUES DEEPER
◁ 100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
‖	CASING

NOTES:
1. THE LOCATIONS OF THE BORINGS WERE RECORDED IN THE FIELD BY TIERRA, INC. USING GARMIN ETREX HANDHELD GPS EQUIPMENT WITH A REPORTED ACCURACY OF ± 10 FEET. THE GPS COORDINATES RECORDED BY TIERRA WERE UTILIZED IN CONJUNCTION WITH DESIGN FILES TO OBTAIN STATION AND OFFSET. THEREFORE, THE BORING LOCATIONS SHOULD BE CONSIDERED APPROXIMATE. BORINGS DENOTED BY AN ASTERISK (*) WERE LOCATED BY THE PROJECT SURVEYOR.
2. STRATA 8 THROUGH 11 THROUGHOUT THE FPC AREA ARE NOT IN THEIR NATURAL STATE AND LIKELY WERE DEPOSITED WHEN THE DEBRIS MATERIALS WERE BURIED.

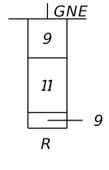
BOR # TP-8
STA. 308+89
REF. ℄ CONST. FPC
OFF. 169' LT.
DATE 3/15/2023



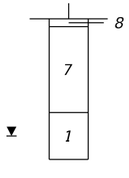
BOR # TP-6
STA. 309+28
REF. ℄ CONST. FPC
OFF. 182' RT.
DATE 3/3/2023



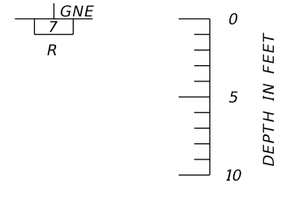
BOR # HA-6
STA. 309+45
REF. ℄ CONST. FPC
OFF. 210' RT.
DATE 3/3/2023



BOR # TP-7
STA. 309+45
REF. ℄ CONST. FPC
OFF. 5' LT.
DATE 3/3/2023



BOR # HA-7
STA. 309+58
REF. ℄ CONST. FPC
OFF. 13' RT.
DATE 3/15/2023



	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	15 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

FPC SITE

NUMBER	DESCRIPTION	DATE

SCALE	AS NOTED	DATE
DESIGNED BY	BMG	06/2023
DRAWN BY	BMG	PROJECT NO.
CHECKED BY	MEN	6107860

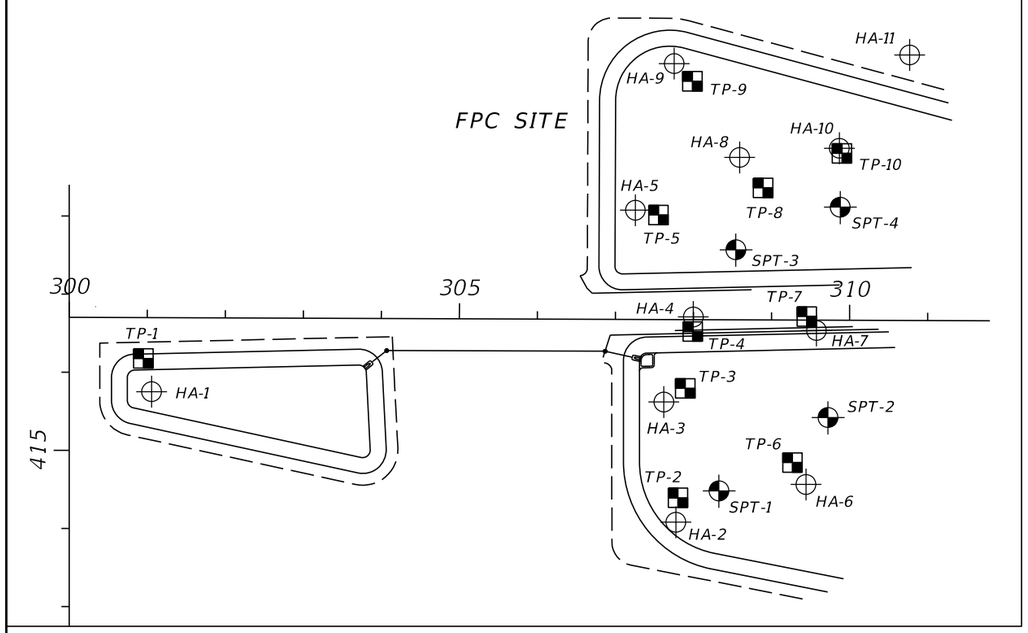
MARC E. NOVAK, Ph.D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

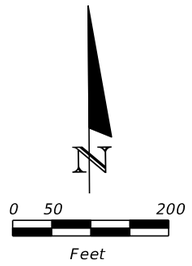
Manatee County FLORIDA
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
1022 26th Avenue East
Bradenton, FL 34208

POND SOIL SURVEY (11)

SHEET NO. GR-12

bsawaska 7/11/2023 3:12:42 PM c:\pw_workdir\patelgreene-pw-01\pw_user\dms08404\PB0RRD11_FPC.dgn





BORING LOCATION PLAN

LEGEND

1. GRAY TO BROWN SAND TO SAND WITH SILT (A-3)
2. GRAY TO LIGHT BROWN SILTY SAND (A-2-4)
3. DARK GRAY TO DARK BROWN SAND TO SAND WITH SILT WITH TRACE ORGANICS (A-3)
4. DARK GRAY TO DARK BROWN ORGANIC SAND TO SAND WITH SILT (A-8)
5. GRAY TO BROWN CLAYEY SAND (A-2-6)
6. GRAY TO BROWN TO GREEN CLAY TO SILT (A-4/A-6/A-7-5)
7. DEBRIS: SOIL MIXED WITH VARIABLE AMOUNTS OF CONCRETE, BRICK, METAL, PLASTIC, ASPHALT, AND/OR WOOD
8. GRAY TO BROWN SAND TO SAND WITH SILT (DISTURBED) (A-3)
9. GRAY TO LIGHT BROWN SILTY SAND (DISTURBED) (A-2-4)
10. DARK GRAY TO DARK BROWN ORGANIC SILTY SAND (DISTURBED) (A-8)
11. GRAY TO BROWN CLAYEY SAND (DISTURBED) (A-2-6)
12. GRAY TO BROWN TO GREEN CLAY (DISTURBED) (A-7-5/A-7-6)
13. GRAY TO BROWN TO GREEN CLAY (A-7-6)
14. WEATHERED LIMESTONE TO CALCAREOUS CLAY

A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD AND HAMMER
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
OC	ORGANIC CONTENT (%)
NP	NON-PLASTIC
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988
⊕	APPROXIMATE AUGER BORING LOCATION
⊕	APPROXIMATE SPT BORING LOCATION
■	APPROXIMATE TEST PIT LOCATION
▽	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
▼	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
GNA	GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID AT A DEPTH OF 10 FEET.
GNE	GROUNDWATER NOT ENCOUNTERED
R	HAND AUGER OR MECHANICAL BACK-HOE REFUSAL ON DEBRIS MATERIALS PREVENTING DEEPER EXPLORATION
▼	TEST PIT TERMINATED IN DEBRIS MATERIAL; DEBRIS CONTINUES DEEPER
◁100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
‖ ‖	CASING

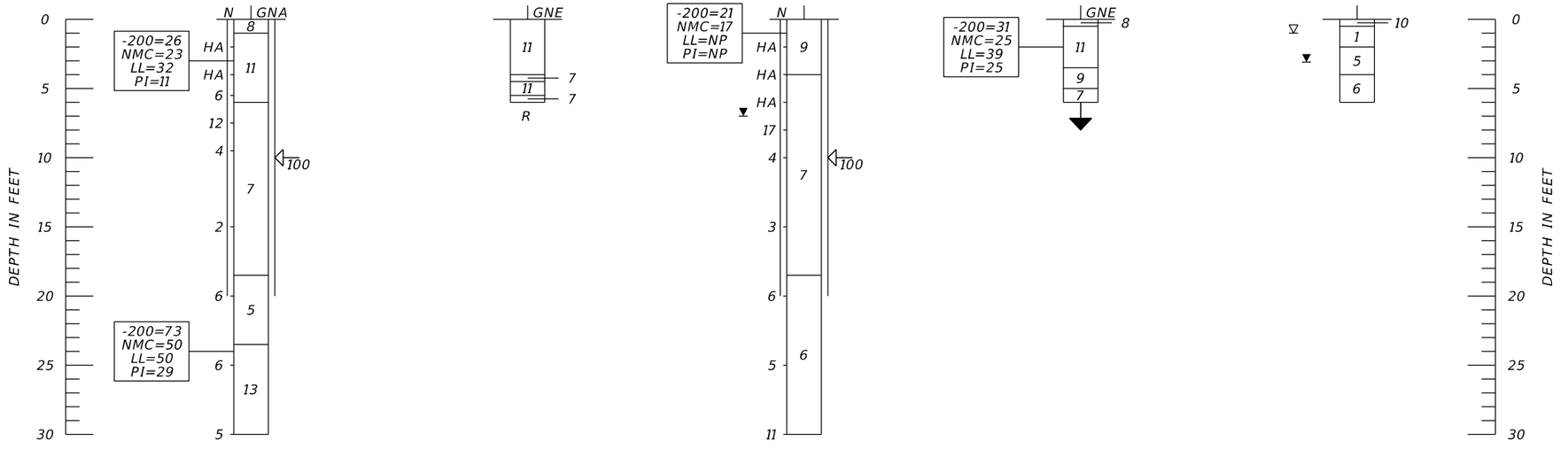
BOR # SPT-2
STA. 309+73
REF. ℄ CONST. FPC
OFF. 125' RT.
DATE 3/3/2023
DRILLER M. ATKINSON
HAMMER AUTOMATIC
RIG D-25

BOR # HA-10
STA. 309+86
REF. ℄ CONST. FPC
OFF. 220' LT.
DATE 3/3/2023

BOR # SPT-4
STA. 309+87
REF. ℄ CONST. FPC
OFF. 145' LT.
DATE 3/15/2023
DRILLER M. ATKINSON
HAMMER AUTOMATIC
RIG D-25

BOR # TP-10
STA. 309+89
REF. ℄ CONST. FPC
OFF. 214' LT.
DATE 3/15/2023

BOR # HA-11
STA. 310+76
REF. ℄ CONST. FPC
OFF. 340' LT.
DATE 3/15/2023



NOTES:
1. THE LOCATIONS OF THE BORINGS WERE RECORDED IN THE FIELD BY TIERRA, INC. USING GARMIN ETREX HANDHELD GPS EQUIPMENT WITH A REPORTED ACCURACY OF ± 10 FEET. THE GPS COORDINATES RECORDED BY TIERRA WERE UTILIZED IN CONJUNCTION WITH DESIGN FILES TO OBTAIN STATION AND OFFSET. THEREFORE, THE BORING LOCATIONS SHOULD BE CONSIDERED APPROXIMATE. BORINGS DENOTED BY AN ASTERISK (*) WERE LOCATED BY THE PROJECT SURVEYOR.
2. STRATA 8 THROUGH 11 THROUGHOUT THE FPC AREA ARE NOT IN THEIR NATURAL STATE AND LIKELY WERE DEPOSITED WHEN THE DEBRIS MATERIALS WERE BURIED.

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	15 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

FPC SITE

NUMBER	DESCRIPTION	DATE

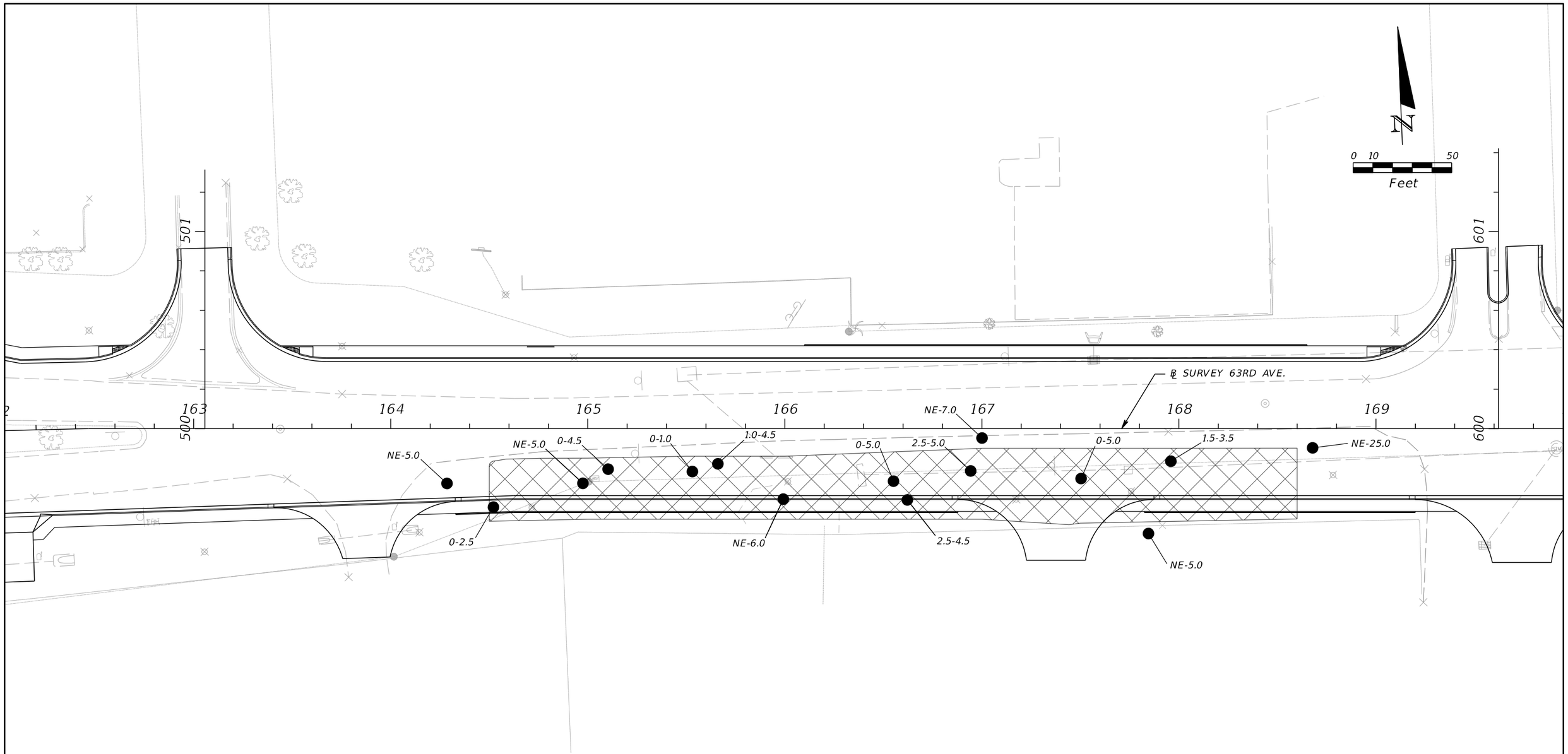
SCALE	AS NOTED	DATE
DESIGNED BY	BMG	06/2023
DRAWN BY	BMG	PROJECT NO.
CHECKED BY	MEN	6107860

MARC E. NOVAK, Ph.D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

Manatee County FLORIDA
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
1022 26th Avenue East
Bradenton, FL 34208

POND SOIL SURVEY (12)

SHEET NO. GR-13



LEGEND

1.0-4.5 / NE-2.5 — ORGANICS ENCOUNTERED 1.0 TO 4.5 FEET BELOW EXISTING GRADE

ORGANICS NOT ENCOUNTERED TO 2.5 FEET BELOW EXISTING GRADE

APPROXIMATE AREA OF MUCK REMOVAL

NUMBER	DESCRIPTION	DATE

SCALE	AS NOTED	DATE
DESIGNED BY	BJS	07/2023
DRAWN BY	BJS	PROJECT NO.
CHECKED BY	MEN	6107860

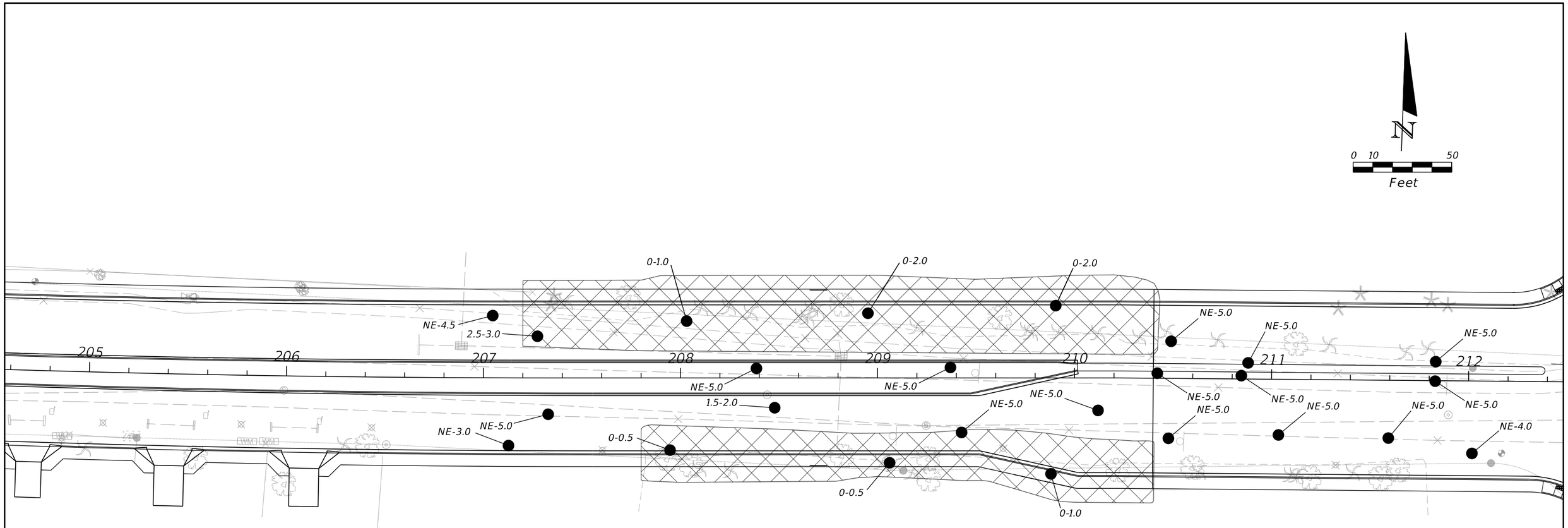
MARC E. NOVAK, Ph.D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

Manatee County FLORIDA

PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
1022 26th Avenue East
Bradenton, FL 34208

MUCK DELINEATION SHEET (1)

SHEET NO. GR-14



LEGEND

1.0-4.5 / NE-2.5 — ORGANICS ENCOUNTERED 1.0 TO 4.5 FEET BELOW EXISTING GRADE

ORGANICS NOT ENCOUNTERED TO 2.5 FEET BELOW EXISTING GRADE

APPROXIMATE AREA OF MUCK REMOVAL

NUMBER	DESCRIPTION	DATE

SCALE	AS NOTED	DATE
DESIGNED BY	BJS	07/2023
DRAWN BY	BJS	PROJECT NO.
CHECKED BY	MEN	6107860

MARC E. NOVAK, Ph.D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

Manatee County FLORIDA

PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
1022 26th Avenue East
Bradenton, FL 34208

MUCK DELINEATION SHEET (2)

SHEET NO.
GR-15

APPENDIX C

Summary of Roadway Seasonal High Groundwater Table Estimates
Summary of Pond Seasonal High Groundwater Table Estimates
Summary of Permeability Test Results in Pond 2B
Design LBR Calculations
Results of Limerock Bearing Ratio Test within Ponds
Pavement Data Table
Photographs of Test Pits

Summary of Roadway Seasonal High Groundwater Table Estimates
63rd Ave E from U.S. 301 to Tuttle Avenue
Manatee County, Florida
CIP Project No. 6107860
Tierra Project No. 6511-22-126

Boring Name	Boring Location[1]					Surveyed Ground Elevation[1] (feet, NAVD 88)	Boring Depth[2] (feet)	Measured Groundwater Table			USDA Soil Survey		Estimated SHGWT[4]	
	FL State Plane West		Station (feet)	Offset (feet)	Reference			Date Recorded	Depth[2] (feet)	Elevation (feet, NAVD 88)	Map Symbol	Estimated SHGWT[3] Depth (feet)	Depth (feet)	Elevation (feet, NAVD 88)
	Northing	Easting												
63rd Ave E														
SH-160L	1125605	484258	159 + 97	68' LT	B/L Surv. 63rd Ave	19.1	4.5	7/11/2022	3.7	15.4	20/40/48	0.3-1.5/0.0-1.5/0.3-1.5	2.0	17.1
SH-163R	1125473	484560	163 + 02	58' RT	B/L Surv. 63rd Ave	15.9	3.5	7/11/2022	ABG[6]	>15.9	47/48	+2.0-0.0/0.3-1.5	ABG[6]	>15.9
SH-166L	1125573	484875	166 + 13	54' LT	B/L Surv. 63rd Ave	18.0	5.5	7/11/2022	4.0	14.0	47	+2.0-0.0	1.7	16.3
SH-169R	1125471	485141	168 + 83	36' RT	B/L Surv. 63rd Ave	17.3	4.5	7/11/2022	3.2	14.1	47	+2.0-0.0	1.0	16.3
SH-172L	1125536	485460	171 + 99	42' LT	B/L Surv. 63rd Ave	17.6	4.0	7/11/2022	2.8	14.9	47/48	+2.0-0.0/0.3-1.5	1.0	16.6
SH-174R	1125425	485711	174 + 52	67' RT	B/L Surv. 63rd Ave	17.7	4.0	7/13/2022	2.0	15.7	20	0.3-1.5	1.3	16.4
SH-178R	1125432	486063	178 + 05	58' RT	B/L Surv. 63rd Ave	15.0	4.0	7/11/2022	ABG[6]	>15.0	20	0.3-1.5	ABG[6]	>15.0
SH-181R	1125427	486356	180 + 97	61' RT	B/L Surv. 63rd Ave	15.1	4.0	7/11/2022	ABG[6]	>15.1	20	0.3-1.5	ABG[6]	>15.1
SH-184L	1125518	486660	184 + 01	32' LT	B/L Surv. 63rd Ave	14.0	4.5	7/11/2022	2.3	11.7	40	0.0-1.5	0.5	13.5
SH-185R	1125417	486757	184 + 98	68' RT	B/L Surv. 63rd Ave	15.8	4.0	7/11/2022	2.6	13.2	40	0.0-1.5	1.5	14.3
SH-188L	1125521	487035	187 + 75	38' LT	B/L Surv. 63rd Ave	11.0	2.0	7/11/2022	0.5	10.5	22	0.3-1.5	ABG[6]	>11.0
SH-192R	1125384	487458	191 + 99	98' RT	B/L Surv. 63rd Ave	16.3	4.5	7/11/2022	GNE[5]	<11.8	25	+2.0-0.0	3.0	13.3
SH-193L	1125540	487603	193 + 43	58' LT	B/L Surv. 63rd Ave	13.6	6.0	7/11/2022	5.5	8.1	15 / 25	+0.5-0.0/+2.0-0.0	1.5	12.1
SH-197L	1125531	487973	197 + 13	51' LT	B/L Surv. 63rd Ave	13.9	3.0	7/11/2022	1.6	12.3	25	+2.0-0.0	0.0	13.9
SH-200R	1125424	488260	200 + 01	53' RT	B/L Surv. 63rd Ave	16.1	4.0	7/11/2022	2.5	13.6	5	0.0-1.5	1.3	14.8
SH-203L	1125513	488577	203 + 18	40' LT	B/L Surv. 63rd Ave	18.0	4.0	7/11/2022	3.1	14.9	20	0.3-1.5	2.5	15.5
SH-7	1125455	489259	209 + 99	33' RT	B/L Surv. 63rd Ave	16.1	3.0	9/29/2021	1.0	15.1	26	+2.0-0.0	0.5	15.6
SH-8	1125450	489370	211 + 10	42' RT	B/L Surv. 63rd Ave	16.0	2.0	9/29/2021	0.5	16.0	26	+2.0-0.0	0.5	15.5
33rd Street E														
SH-402L	1125278	486855	401 93	25' LT	B/L Surv. 33rd St.	15.6	5.0	7/11/2022	3.6	12.0	22	0.3-1.5	2.0	13.6
SH-185R	1125417	486757	403 + 32	123' LT	B/L Surv. 33rd St.	15.8	4.0	7/11/2022	2.6	13.2	40	0.0-1.5	1.3	14.5
SH-188L	1125521	487035	404 + 38	153' RT	B/L Surv. 33rd St.	11.0	2.0	7/11/2022	0.5	10.5	22	0.3-1.5	ABG[6]	>11.0
SH-406L	1125676	486859	405 + 23	23' LT	B/L Surv. 33rd St.	15.3	4.5	7/11/2022	2.1	13.2	22	0.3-1.5	1.0	14.3
SH-407R	1125779	486904	406 + 95	21' RT	B/L Surv. 33rd St.	14.6	4.0	7/11/2022	2.3	12.3	22	0.3-1.5	1.0	13.6

[1] Boring locations and elevation were provided by the Project Surveyor. State Plane Coordinates provided by surveyor and converted by Tierra to station and offset using project design files provided by PGA.

[2] Depth below existing grades at time of augering.

[3] Seasonal high groundwater table depth estimated based on the Manatee County, Florida USDA Soil Survey information.

[4] Seasonal high groundwater table depth estimated based on soil stratigraphy, measured groundwater levels from the borings, the Manatee County, Florida USDA Soil Survey information and past experience with similar soil conditions.

[5] GNE: Groundwater Not Encountered

[6] ABG: Measured groundwater table or estimated seasonal high groundwater table is above existing grade.

Summary of Pond Seasonal High Groundwater Table Estimates
63rd Ave E from U.S. 301 to Tuttle Avenue
Manatee County, Florida
CIP Project No. 6107860
Tierra Project No. 6511-22-126

Boring Name	Boring Location[1]					Surveyed Ground Elevation[1] (feet, NAVD 88)	Boring Depth[2] (feet)	Measured Groundwater Table			USDA Soil Survey		Estimated SHGWT[4]	
	FL State Plane West		Station (feet)	Offset (feet)	Reference			Date Recorded	Depth[2] (feet)	Elevation (feet, NAVD 88)	Map Symbol	Estimated SHGWT[3] Depth (feet)	Depth (feet)	Elevation (feet, NAVD 88)
	Northing	Easting												
Pond 1A														
PB1A-1	1124681	485967	693 30	88' RT.	C/L CONST. 31ST AVE	16.4	5.5	1/24/2023	3.1	13.3	20/26	0.3-1.5/+2.0-0.0	1.5	14.9
PB1A-2	1124606	486095	692 56	217' RT.	C/L CONST. 31ST AVE	16.4	5.0	1/24/2023	2.8	13.6	20/26	0.3-1.5/+2.0-0.0	1.0	15.4
PB1A-3	1124381	486004	690 31	128' RT.	C/L CONST. 31ST AVE	16.9	5.5	1/24/2023	3.8	13.1	20	0.3-1.5	2.0	14.9
PB1A-4	1124265	486039	689 + 15	164' RT.	C/L CONST. 31ST AVE	17.6	6.0	1/24/2023	5.8	11.8	20	0.3-1.5	4.0	13.6
Pond 2B														
PB2B-1	1125046	488601	1003 81	233' LT.	C/L CONST. SMF 2B	17.3	2.0	9/22/2022	0.6	16.7	40/26	0.0-1.5	0.0	17.3
PB2B-2	1124866	488661	1004 + 44	54' LT.	C/L CONST. SMF 2B	16.3	2.5	9/22/2022	0.0	16.3	40	0.0-1.5	0.0	16.3
PB2B-3	1125005	488752	1005 + 33	194' LT.	C/L CONST. SMF 2B	18.0	2.5	9/22/2022	1.1	16.9	40	0.0-1.5	0.5	17.5
PB2B-4	1124915	488802	1005 + 84	104' LT.	C/L CONST. SMF 2B	17.2	3.0	9/22/2022	0.8	16.4	40	0.0-1.5	0.0	17.2

[1] Boring locations and elevation were provided by the Project Surveyor. State Plane Coordinates provided by surveyor and converted by Tierra to station and offset using project design files provided by PGA.

[2] Depth below existing grades at time of augering.

[3] Seasonal high groundwater table depth estimated based on the Manatee County, Florida USDA Soil Survey information.

[4] Seasonal high groundwater table depth estimated based on soil stratigraphy, measured groundwater levels from the borings, the Manatee County, Florida USDA Soil Survey information and past experience with similar soil conditions.

Summary of Permeability Test Results in Pond 2B
63rd Ave E from U.S. 301 to Tuttle Avenue
Manatee County, Florida
CIP Project No. 6107860
Tierra Project No. 6511-22-126

Boring	Test Type [1]	Test/Sample Depth Below Ground Surface (feet)	Stratum Tested	Vertical Unsaturated Hydraulic Conductivity, k (feet/day)[2]
PERM2-1	Field	4	1	23
PERM2-1	Laboratory	3-5	1	8
PERM2-2	Field	3.5	1	17
PBS2-2	Laboratory	10-20	2	2
PERM2-3	Field	3	1	38
PERM2-4	Field	2.5	1	22
	Field	4	2	4
PERM2-5	Field	4	1	13
PERM2-6	Field	1.5	1	34

[1] Field permeability tests were performed and the results evaluated in general accordance with the methodology presented in the FDOT Soils and Foundations Handbook for “Case C”. Laboratory falling head permeability tests were conducted in accordance with the FDOT test designation FM 5-513.

[2] The hydraulic conductivity values presented are for the soil stratum indicated in the table and are **not** factored. The design engineer should apply an appropriate factor of safety.

Design LBR Calculation
63rd street from US 301 to Tuttle Road
Manatee County, Florida
Tierra Project No.: 6511-22-126
2% of Optimum Method

Test No.	Bulk Sample Location	Maximum LBR	LBR at Moisture Contents (of Optimum LBR):	
			- 2%	+ 2%
LBR #1	LBR-SH-163R	43	37	30
LBR #2	LBR-SH-175R	37	32	32
LBR #3	LBR-SH-185R	67	~~58~~ 40	~~43~~ 40
LBR #4	LBR-SH-200R	32	29	23
Mean LBR Value		44	35	31

Design LBR = 33

Design M_R (Resilent Modulus)[(1)] = 10,750 psi

(1) Based on 2022 FDOT Flexible Pavement Manual Table 5.1 for relationship of LBR to MR.

Design LBR Calculation
63rd street from US 301 to Tuttle Road
Manatee County, Florida
Tierra Project No.: 6511-22-126
90% Method

Test No.	Bulk Sample Location	Maximum LBR	Rank	Percent of Samples with equal or greater value
LBR #4	LBR-SH-200R	32	1	100
LBR #2	LBR-SH-175R	37	2	75
LBR #1	LBR-SH-163R	43	3	50
LBR #3	LBR-SH-185R	67	4	25

Design LBR = 34

Design M_R (Resilent Modulus) [(1)] = 11,000 psi

[(1)] Based on 2022 FDOT Flexible Pavement Manual Table 5.1 for relationship of LBR to M_R.

TIERRA

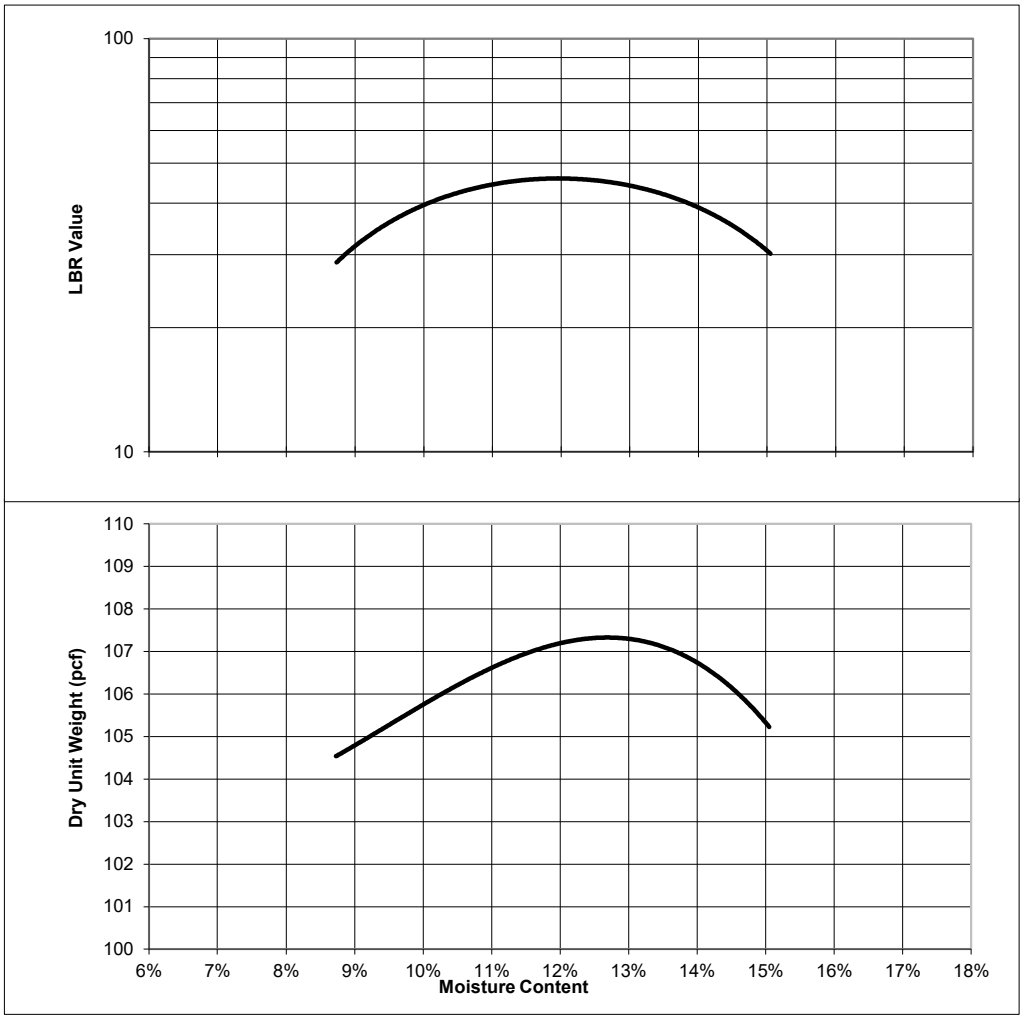
RESULTS OF LIMEROCK BEARING RATIO TEST

Tested For: PGA

Project: 63rd Ave. US 301 to Tuttle

Project No. 6511-22-126
Report No. LBR-P1 (Pond 1)

LBR & MOISTURE-DENSITY RELATIONSHIP



LBR Value	45
Maximum Density	107.3 pcf
Optimum Moisture	12.7 %
Test Method:	FSTM FM 5-515
Tested By:	J. Shuey

Description: Brown Sand to Sand with Silt (SP/SP-SM)

Sample Depth: 0' - 2'

cc:

Respectfully Submitted,
TIERRA INC.

7351 Temple Terrace • Tampa, FL 33637
Florida Certificate No. 6486

TIERRA

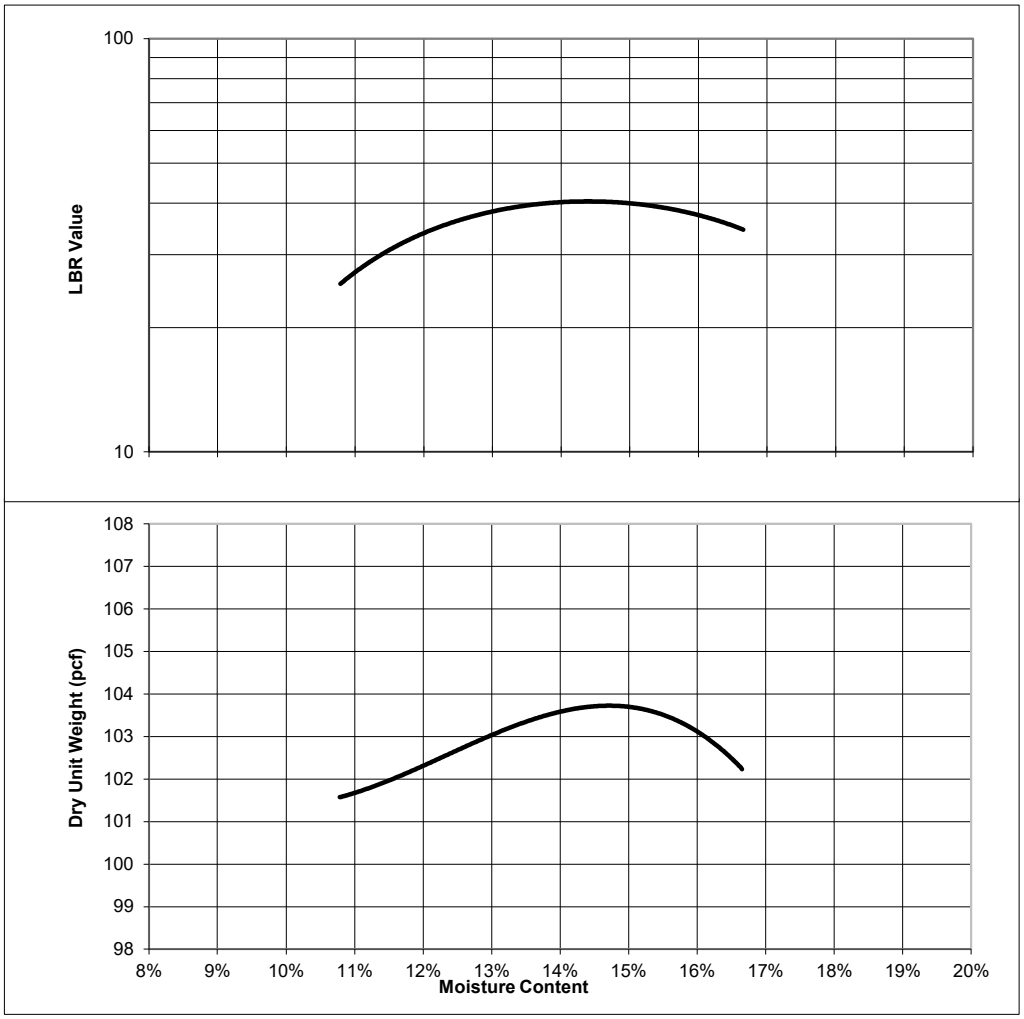
RESULTS OF LIMEROCK BEARING RATIO TEST

Tested For: PGA

Project: 63rd Ave. US 301 to Tuttle

Project No. 6511-22-126
Report No. LBR-P2 (Pond 1)

LBR & MOISTURE-DENSITY RELATIONSHIP



LBR Value	40
Maximum Density	103.7 pcf
Optimum Moisture	14.8 %
Test Method:	FSTM FM 5-515
Tested By:	J. Shuey

Description: Gray Fine Sand to Silty Sand (SP/SP-SM)

Sample Depth: 0' - 2'

cc:

Respectfully Submitted,
TIERRA INC.

7351 Temple Terrace • Tampa, FL 33637
Florida Certificate No. 6486

TIERRA

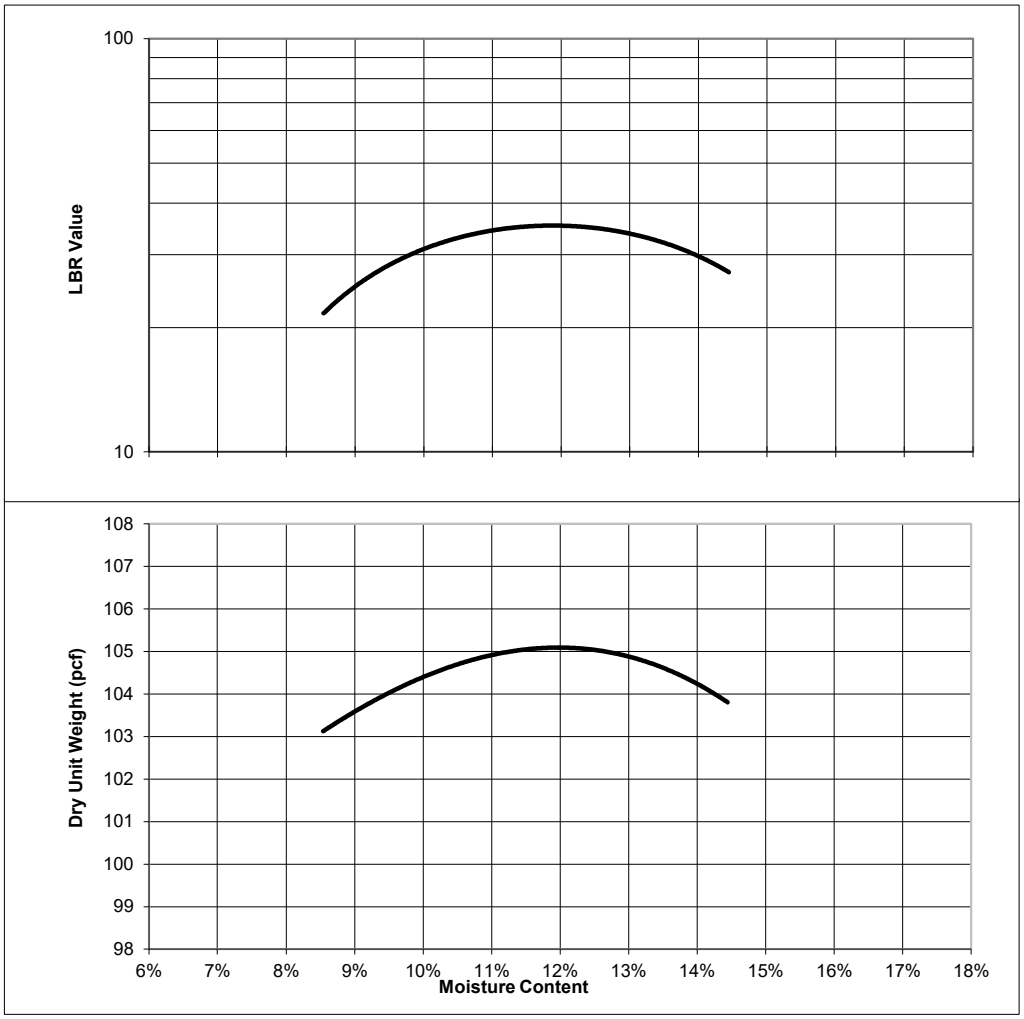
RESULTS OF LIMEROCK BEARING RATIO TEST

Tested For: PGA

Project: 63rd Ave. US 301 to Tuttle

Project No. 6511-22-126
Report No. LBR-P3 (Pond 2B)

LBR & MOISTURE-DENSITY RELATIONSHIP



LBR Value	36
Maximum Density	105.1 pcf
Optimum Moisture	12.0 %
Test Method:	FSTM FM 5-515
Tested By:	J. Shuey

Description: Gray to Brown Sand to Sand with Silt (SP/SP-SM)

Sample Depth: 0' - 2'

cc:

Respectfully Submitted,
TIERRA INC.

7351 Temple Terrace • Tampa, FL 33637
Florida Certificate No. 6486

TIERRA

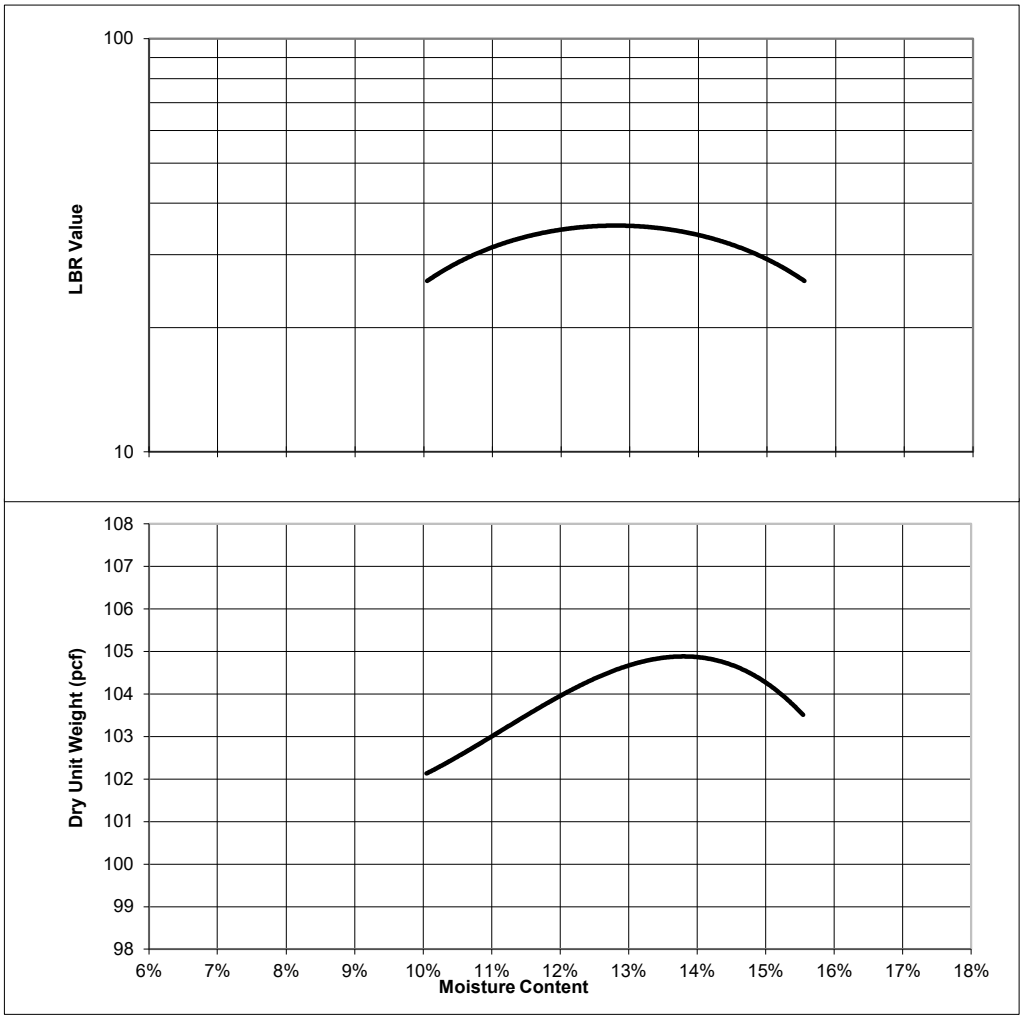
RESULTS OF LIMEROCK BEARING RATIO TEST

Tested For: PGA

Project: 63rd Ave. US 301 to Tuttle

Project No. 6511-22-126
Report No. LBR-P4 (Pond 2B)

LBR & MOISTURE-DENSITY RELATIONSHIP



LBR Value	35		
		Description:	Dark Brown Fine Sand To Sand with Silt (SP/SP-SM)
Maximum Density	104.9 pcf		
Optimum Moisture	13.8 %		
Test Method:	FSTM FM 5-515		
Tested By:	J. Shuey	Sample Depth:	0' - 2'

cc:

Respectfully Submitted,
TIERRA INC.

7351 Temple Terrace • Tampa, FL 33637
Florida Certificate No. 6486

PAVEMENT DATA TABLE

63rd Ave E from U.S. 301 to Tuttle Avenue

Manatee County, Florida

CIP Project No. 6107860

Tierra Project No.: 6511-22-126

Core No.	Approximate Core Location[1] (Station Along Roadway of core)	Roadway Alignment	Lane Designation	Wheel Path	Asphalt Pavement[2]		Base for Paved Roadway		Subgrade		Crack Depth (inches)	Pavement Condition[4]	Groundwater Depth[3] (feet)	Comments
					Type S/SP	Total Asphalt Core Length (inches)	Type	Thickness (inches)	Type	Depth[3] (feet)				
C-161L1	160+95	CL 63rd Ave E	L1	RWP	4.5	4.5	Bank Run Shell	11.5	A-3	0.0 to 3.7	---[5]	Fair	>3.7	
C-193R1	193+22	CL 63rd Ave E	R1	RWP	1.8	1.8	Crush Concrete	7.1	A-3	0.0 to 4.3	---[5]	Fair	>4.3	
C-193OR	193+00	CL 63rd Ave E	OR	RWP	2.3	2.3	Crush Concrete	8.3	A-3	0.0 to 4.1	---[5]	Fair	>4.1	
C-196L1	195+98	CL 63rd Ave E	L1	RWP	1.4	1.4	Crush Concrete	8.1	A-3/ A-2-4	0.0 to 2.7	1.4[6]	Fair	>4.2	Asphalt Core taken within Crack; Full Depth Crack Within Core.
									A-3	2.7 to 4.2				
C-196OL	196+01	CL 63rd Ave E	OL	RWP	1.6	1.6	Crush Concrete	8.6	A-2-4	0.0 to 3.1	---[5]	Fair	>3.1	
C-400L1	400+05	CL. 33 Street E	L1	RWP	3.3	3.3	Bank Run Shell	7.8	A-2-4	0.0 to 3.6	3.3[6]	Fair to Poor	3.7	Asphalt Core taken within Crack; Full Depth Crack Within Core.
									A-3 with shell	3.6 to 4.1				
C-410R1	409+96	CL. 33 Street E	R1	RWP	3.0	3.0	Bank Run Shell	12.0	A-3	0.0 to 3.5	3.0[6]	Fair	>3.5	Asphalt Core taken within Crack; Full Depth Crack Within Core.

Notes:

[1] Pavement core locations were obtained by Tierra, Inc. in the field using hand-held, non-survey grade GPS equipment with a manufacturer's reported accuracy of ± 10 feet should be considered approximate.

[2] Pavement layer identification based on visual review using FDOT Mixture nomenclature. Actual pavement may be a local mix.

[3] Depth measured from bottom of base material.

[4] Pavement condition based on visual observatoin only: Good, Fair or Poor.

[5] No cracks were observed within the pavement cores at these locations.

[6] Full depth cracking observed within the pavement core at these locations.

63rd Ave
Parcel 1870010079 33rd Street East – FPC Site
Test Pit Photographs

Photograph 1. Test Pit TP-1.

63rd Ave
Parcel 1870010079 33rd Street East – FPC Site
Test Pit Photographs

Photograph 2. Test Pit TP-2

63rd Ave
Parcel 1870010079 33rd Street East – FPC Site
Test Pit Photographs

Photograph 3. Test Pit TP-2

63rd Ave
Parcel 1870010079 33rd Street East – FPC Site
Test Pit Photographs

Photograph 4. Test Pit TP-2.

63rd Ave
Parcel 1870010079 33rd Street East – FPC Site
Test Pit Photographs

Photograph 5. Test Pit TP-4

63rd Ave
Parcel 1870010079 33rd Street East – FPC Site
Test Pit Photographs

Photograph 6. Test Pit TP-4.

63rd Ave
Parcel 1870010079 33rd Street East – FPC Site
Test Pit Photographs

Photograph 7. Test Pit TP-6 metal pipe encountered.

63rd Ave
Parcel 1870010079 33rd Street East – FPC Site
Test Pit Photographs

Photograph 8. Test Pit TP-7.

63rd Ave
Parcel 1870010079 33rd Street East – FPC Site
Test Pit Photographs

Photograph 9. Test Pit TP-8.

63rd Ave
Parcel 1870010079 33rd Street East – FPC Site
Test Pit Photographs

Photograph 10. Test Pit TP-9.

APPENDIX D

Summary of Laboratory Test Results for soil classification
Summary of Corrosion Test Results for Environmental Classification

Summary of Laboratory Test Results for Soil Classification
63rd Ave E from U.S. 301 to Tuttle Avenue
Manatee County, Florida
CIP Project No. 6107860
Tierra Project No.: 6511-22-126

Boring Number	Sample Depth (ft)	Stratum Number	AASHTO Symbol	Sieve Analysis					Atterberg Limits			Organic Content (%)	Natural Moisture Content (%)
				#10	#40	#60	#100	#200	Liquid Limit	Plastic Limit	Plasticity Index		
AB-187R	0 - 3	1	A-3					2	-	-	-	-	-
SH-193L	1.0 - 2.5	1	A-3	---	---	---	---	2	---	---	---	---	---
AB-175L	0 - 3.5	1	A-3					3	-	-	-	-	-
SH-185R	0.5 - 3.5	1	A-3	---	---	---	---	3	---	---	---	---	---
PBA1-3	1 - 1.5	1	A-3					3	-	-	-	-	-
AB-201L	0 - 5	1	A-3					3	-	-	-	-	-
B-174R	2 - 4	1	A-3					3	-	-	-	-	-
SH-406L	1.5 - 2.5	1	A-3	100	94	78	40	3	---	---	---	---	---
AB-405R	0 - 2.5	1	A-3					4	-	-	-	-	-
SH-203L	1.5 - 2.5	1	A-3	---	---	---	---	4	---	---	---	---	---
SH-407R	2.0 - 3.5	1	A-3	---	---	---	---	4	---	---	---	---	---
B-167R	6 - 8	1	A-3					4	-	-	-	-	-
LabPerm2-1	3 - 5	1	A-3	100	94	80	42	4	-	-	-	-	-
SH-166L	1.5 - 4.5	1	A-3	---	---	---	---	4	---	---	---	---	---
SH-175R	1.5 - 4.0	1	A-3	---	---	---	---	5	---	---	---	---	---
PBS2-6	8 - 10	1	A-3					5	-	-	-	-	-
LAB PERM 1	0 - 10	1	A-3	100	95	80	39	5	-	-	-	-	-
PBA1-2	1 - 1.5	1	A-3					6	-	-	-	-	-
PBS2-3	13.5 - 15	1	A-3					7	-	-	-	-	-
B-177L	2 - 4	1	A-3					7	-	-	-	-	-
SH-200R	1.5 - 3.5	1	A-3	---	---	---	---	7	---	---	---	---	---
HA-11	0.5 - 1	1	A-3					8	-	-	-	-	-
HA-9	1.5 - 3	1	A-3					9	-	-	-	-	-
B-176L	18.5 - 20	1	A-3					10	-	-	-	-	-
PBS-1	2 - 4	1	A-3					10	-	-	-	-	-
B-197L	6 - 8	1	A-3					10	-	-	-	-	-
B-167R	4 - 6	1	A-3					10	-	-	-	1	26
PBS-2	4 - 6	1	A-3					10	-	-	-	-	-
AB-187R	3 - 5	2	A-2-4					11	-	-	-	-	-
B-174R	13.5 - 15	2	A-2-4					12	-	-	-	-	-
AB-162L	4 - 4.5	2	A-2-4					12	-	-	-	-	-
AB-172L	3.5 - 5	2	A-2-4					13	NP	NP	NP	-	23
B-195L	4 - 6	2	A-2-4					13	-	-	-	-	-
PBS2-1	13.5 - 15	2	A-2-4					14	-	-	-	-	-
AB-172R	2.5 - 3	2	A-2-4					14	NP	NP	NP	-	21
PBS2-5	4 - 6	2	A-2-4					14	-	-	-	-	-
HA-6	0 - 2.5	2	A-2-4					14	-	-	-	-	-
B-177L	4 - 6	2	A-2-4					15	NP	NP	NP	-	26
AB-187L	3 - 5	2	A-2-4					16	NP	NP	NP	-	21
SH-172L	3.5 - 4.0	2	A-2-4	---	---	---	---	16	NP	NP	NP	---	23
AB-206R	2.5 - 3.5	2	A-2-4					16	NP	NP	NP	-	21
AB-207L	2.5 - 3.0	2	A-2-4	---	---	---	---	17	23	18	5	---	20
HA-5	0 - 2	2	A-2-4					17	NP	NP	NP	-	17
C-400L1	2.5 - 4.5	2	A-2-4	---	---	---	---	17	NP	NP	NP	---	35
LabPerm2-2	4 - 5	2	A-2-4	100	95	82	49	17	-	-	-	-	-
PBS2-1	2 - 4	2	A-2-4					18	-	-	-	-	-
PBS2-2	2 - 4	2	A-2-4					18	NP	NP	NP	-	19
Perm2-3	3.5 - 5	2	A-2-4					19	NP	NP	NP	-	16
PBS2-2	13.5 - 15	2	A-2-4					19	NP	NP	NP	-	37
SH-193L	4.0 - 4.5	2	A-2-4	---	---	---	---	19	NP	NP	NP	---	10
C-410R1	3.0 - 4.8	2	A-2-4	---	---	---	---	20	---	---	---	---	---
HA-11	2 - 2.5	2	A-2-4					22	NP	NP	NP	-	18
SH-178R	0.0 - 2.0	3	A-3	---	---	---	---	3	---	---	---	3	36
SH-197L	0.5 - 2.0	3	A-3	---	---	---	---	5	---	---	---	3	25
AB-167R	3 - 5	3	A-3					9	-	-	-	3	27
B-165R	2 - 4	3	A-2-4					11	-	-	-	2	28
HA-5	3 - 5.5	3	A-2-4					15	-	-	-	4	21
AB-164+50R	0 - 2.5	4	A-8					7	-	-	-	5	65
AB-167+50R	2.5 - 6	4	A-8					8	-	-	-	5	29
AB-166+50R	2.5 - 5	4	A-8					10	-	-	-	5	32

Summary of Laboratory Test Results for Soil Classification
63rd Ave E from U.S. 301 to Tuttle Avenue
Manatee County, Florida
CIP Project No. 6107860
Tierra Project No.: 6511-22-126

Boring Number	Sample Depth (ft)	Stratum Number	AASHTO Symbol	Sieve Analysis					Atterberg Limits			Organic Content (%)	Natural Moisture Content (%)
				#10	#40	#60	#100	#200	Liquid Limit	Plastic Limit	Plasticity Index		
AB-167R	2 - 3	4	A-8					8	-	-	-	8	43
C-193R1	4.5 - 5.0	4	A-8	---	---	---	---	9	---	---	---	11	35
AB-166R	0 - 3	4	A-8					11	-	-	-	7	45
AB-165R	2 - 4	4	A-8					11	-	-	-	8	41
AB-209L	1.0 - 2.0	4	A-8	---	---	---	---	12	---	---	---	5	42
AB-208L	1.0 - 1.5	4	A-8	---	---	---	---	14	---	---	---	5	26
AB-210L	0.0 - 2.0	4	A-8	---	---	---	---	16	---	---	---	11	59
AB-165+50R	0 - 4.5	4	A-8					20	-	-	-	11	94
PBS2-4	13.5 - 15	5	A-2-6					19	28	17	11	-	48
AB-162L	4.5 - 5	5	A-2-6					21	31	19	11	-	23
PBS2-5	0 - 2	5	A-2-6					23	26	12	14	-	19
PBS2-4	4 - 6	5	A-2-6					23	32	19	13	-	23
HA-10	0 - 4	5	A-2-6					35	31	16	15	-	26
HA-6	2.5 - 4	6	A-6					38	39	17	22	-	39
HA-10	4.5 - 5.5	6	A-6					40	38	18	20	-	37
B-195L	13.5 - 15	6	A-4					56	24	17	7	-	53
SPT-3	23.5 - 25	6	A-6					43	36	20	16	-	34
SPT-1	0 - 2	8	A-3					10	-	-	-	-	-
SPT-1	13.5 - 15	9	A-2-4					11	-	-	-	-	-
SPT-1	2 - 4	9	A-2-4					12	-	-	-	-	-
TP-8	0 - 2	9	A-2-4					19	-	-	-	2	19
SPT-4	0 - 2	9	A-2-4					21	NP	NP	NP	-	17
TP-5	2.5 - 6	10	A-8					20	-	-	-	6	32
SPT-2	2 - 4	11	A-2-6					26	32	21	11	-	23
TP-10	0.5 - 3.5	11	A-2-6					31	39	14	25	-	25
SPT-3	2 - 4	12	A-7-6					55	63	22	41	-	54
TP-8	2.5 - 5.5	12	A-7-5					80	84	30	54	-	60
PBS2-3	18.5 - 20	13	A-7-5					72	65	30	35	-	75
SPT-1	23.5 - 25	13	A-7-5					73	61	31	30	-	60
SPT-2	23.5 - 25	13	A-7-6					73	50	20	29	-	50
PBS2-6	13.5 - 15	13	A-7-6					97	66	26	40	-	87

Summary of Laboratory Test Results for Environmental Classification
63rd Ave E from U.S. 301 to Tuttle Avenue
Manatee County, Florida
CIP Project No. 6107860
Tierra Project No.: 6511-22-126

Boring Number	Depth (feet)	Stratum Number	pH (FM 5-550)	Resistivity (ohm-cm) (FM 5-551)	Chlorides (ppm) (FM 5-552)	Sulfates (ppm) (FM 5-553)	Environmental Classification[1]	
							Steel	Concrete
SH-166L	1.5 - 4.5	1	6.7	3,300	15	183	Moderately Aggressive	Slightly Aggressive
SH-175R	1.5 - 4.0	1	6.9	7,800	15	66	Moderately Aggressive	Slightly Aggressive
SH-185R	0.5 - 3.5	1	7.0	28,000	15	<5	Moderately Aggressive	Slightly Aggressive
SH-200R	1.5 - 3.5	1	7.0	29,000	15	<5	Moderately Aggressive	Slightly Aggressive
SH-407R	2.0 - 3.5	1	7.7	7,100	15	<5	Slightly Aggressive	Slightly Aggressive

[1] As per FDOT Structures Design Guidelines