June 6, 2022

Kisinger Campo & Associates, Corp.
201 N. Franklin Street, Suite 400
Tampa, Florida 33602

Attn: Mr. Alejandro Mendez, P.E.

RE: Roadway Soil Survey Report
60th Avenue Extension
Manatee County Project No.: 6083160
Manatee County, Florida
Tierra Project No.: 6511-21-054

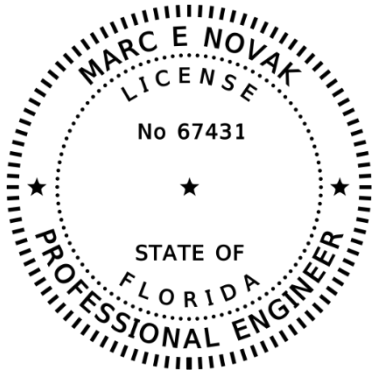
Mr. Mendez:

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 90% Roadway Plans for the 60th Avenue Roadway 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 Kisinger Campo & Associates, Corp. (KCA) on this project. If you have any questions or comments regarding this report, please contact our office at your earliest convenience.

Sincerely,

TIERRA, INC.



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.

Tyler R. Jean, E.I.
Geotechnical Engineer Intern

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

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

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1.0 PROJECT INFORMATION

1.1 Project Authorization

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

1.2 Project Description

The project, as we understand it, consists of preparing constructions plan for improvements along the existing 60th Avenue East from US 301 to 26th Street East (and resurfacing of 60th Avenue to Mendoza Road (Segment 1); for the design the new 60th Avenue East extension north of Mendoza Road to the existing Buffalo Road (Segment 2); and for improvements to the intersection and signalization of Buffalo Road at 69th Street East (Segment 3). Drainage improvements are also proposed within each Segment.

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 roadway and drainage improvements. This Roadway Soil Survey report is to support the 90% submittal for all three segments. As the project progresses this report will be updated.

Reports addressing the signal poles associated with the project will be submitted under separate covers.

1.3 General Site Conditions

Segment 1 is an existing roadway. Land use adjacent to Segment 1 consists of residential and commercial developments and some undeveloped areas. Segment 2 will be a new roadway and traverses undeveloped areas. Segment 3 land use consists mostly of residential developments surrounding the existing roadways.

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 pond improvements along the alignments 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 “Palmetto, Florida” Quadrangle Map.

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 alignments consisting of borings, pavement cores, subsurface sampling and field-testing.

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

5. Coordinated with property owners to obtain access along Segment 2.

6. Obtained the necessary Manatee County permits to obtain asphalt pavement cores within travel lanes.

7. Performed Maintenance of Traffic (MOT) operations during collection of asphalt pavement cores.

8. 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.

9. 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 American Association of State Highway and Transportation Officials (AASHTO) soil classification system.

10. 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 twelve (12) primary soil-mapping units noted along the project alignment. An illustration of the **USDA Soil Survey Map** is provided in **Appendix A** and a summary of each soil unit is provided in **Appendix C**.

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 “Palmetto, Florida” it appears that the project site natural elevations range from approximately +10 feet to +30 feet National Geodetic Vertical Datum of 1929 (NGVD 29) as illustrated on the **USGS Quadrangle Map** provided in **Appendix A**. The project elevation begins near elevation +10 feet, NGVD 29 closer to US 301 and then rises steadily as the project alignment moves north.

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 ranges from approximately +20 to +30 feet, NGVD. The natural ground elevation at the project site ranges from approximately +10 to +30 feet, NGVD 29. The SPT borings performed across the site did not encounter artesian flow conditions during the field exploration.

4.0 SUBSURFACE EXPLORATION

Prior to commencing our subsurface explorations, boring location plans for the proposed roadway alignments were produced. The boring location plans were generated based on a review of the project design files provided by KCA, general guidance provided in the FDOT "Soils and Foundations Handbook" and our engineering judgment.

To evaluate the subsurface conditions and groundwater table levels, Tierra performed hand auger borings, SPT borings, 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 Limestone or rock fill.

The SPT borings were performed using mechanical drilling equipment utilizing bentonite mud drilling procedures. The soil sampling was performed in general accordance with the American Society for Testing and Materials (ASTM) test designation D-1586. SPT resistance N-values were taken at intervals of 2 feet from the ground surface and to depths of 10 feet and 5 feet thereafter the boring termination depths. Occasionally, the initial few feet were manually augered. Representative portions of the soil samples were sealed in glass jars, labeled and transferred to our laboratory for classification and testing.

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 base layer an hand auger was performed to evaluate the subgrade soil conditions.

Bulk soil samples were retrieved for LBR testing at 3 locations along the Segment 1 project alignment and 5 locations along the Segment 2 project alignment. In general, these samples were collected from depths of up to ½ 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 borings performed for evaluation of the SHGWT were determined by the project surveyor. The locations and ground elevations of the remainder of the 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 performed for this study are shown on the **Boring Location Plan** sheets in **Appendix B**. The station and offset of each boring are labeled on the **Roadway Soil Profiles** sheets in **Appendix B**.

5.0 LABORATORY TESTING

5.1 General

Representative soil samples collected from the borings performed along the project alignments were 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 designation D-422).

- 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 alignments 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 alignments for Segments 1, 2, and 3. 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 to date are provided below:

Stratum Number	Typical Soil Description	AASHTO Classification
1	Light Gray to Brown Fine Sand	A-3/A-2-4
2	Light Gray to Brown Silty Sand	A-2-4
3	Light Gray to Gray Silty Sand to Clayey Sand	A-2-4/A-2-6
4	Light Gray Silt to Sandy Clay	A-4/A-6/A-7-6
5	Dark Gray Organic Sand to Muck	A-8
6	Calcareous Clay to Weathered Limestone	---(1)
7	Light Gray Clay	A-7-6
(1) AASHTO does not include nomenclature for Limestone		

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 along with the boring location plans are presented in **Appendix B** of this report.

6.2 Groundwater

The groundwater table was recorded when encountered at each of the boring locations during our field exploration. The depths to the groundwater table along the project alignments were found to range from at or above grade to depths of 6 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 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. 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 alignments 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 are presented in **Appendix C**.

6.4 Pavement Cores

Results of the pavement coring operation are included on the **Pavement Data Table** sheets in **Appendix B**.

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 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 provided cross sections, assuming proper subgrade preparation, adequate fill materials are utilized, and all proposed side slopes be constructed on 2 horizontal to 1 vertical (2H:1V) or flatter, it is anticipated that total settlements will be less than one (1) inch. These settlements are expected to occur predominately during construction.

7.3 Slope Stability

The cross sections in the project plans indicate the proposed embankment cut and fill slopes are generally on the order of 5 Horizontal to 1 Vertical (5H:1V) to 2H: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 2H: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 5H:1V to 2H:1V provided that the embankments are constructed in accordance with FDOT Specifications.

7.4 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.

7.5 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.

7.6 On-Site Soil Suitability

The general suitability and preliminary 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.

7.7 General Roadway Construction

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

7.8 Pavement Design Considerations

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

As previously mentioned, bulk samples were collected and LBR tests were performed by Tierra on the soil samples obtained along the Segment 1 and Segment 2 project alignments. 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 40 for Segment 1 and 34 for Segment 2 and are shown in **Appendix B**. 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 12,000 psi is converted for use per the flexible pavement design for Segment 1 and 11,000 psi for Segment 2. 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.

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.

8.0 BOX CULVERTS

8.1 Environmental Classification

Environmental corrosion tests were performed on selected soil and water samples recovered in the vicinity of the box culvert extensions. Environmental corrosion tests measure parameters including pH, resistivity, sulfate content and chloride content. The results of these tests are presented on the attached **Report of Core Borings** sheets. Based on the results of the testing, the environmental classification of the substructure for the box culverts and wing walls is moderately aggressive for concrete and steel.

8.2 Evaluations and Recommendations

The overall site preparation and mechanical densification work for the proposed box culvert extensions and wing wall construction should be in accordance with FDOT Specifications.

Recommended Soil Parameters

Based on the results of the borings, our analyses and experience with similar projects, the subsurface conditions encountered at the box culvert extension locations are suitable for support of the proposed box culvert extensions and wing wall foundations using shallow foundations after proper site preparation. The overall site preparation and mechanical densification work for the proposed box culvert extension construction should be in accordance with FDOT Specifications.

It is our understanding that the box culvert extensions and associated wing walls will be designed utilizing the approved FDOT software *LRFD Box Culvert Program.* Tierra has created the following table of recommended geotechnical parameters to be used in the structural analysis and design using the above mentioned program. The recommended values are based on our experience, our knowledge of the FDOT program, the results from our borings and that construction of the box culvert extensions and wing walls will be in accordance with the FDOT Specifications.

Recommended Soil Parameters for Use in Culverts and Wing Wall Design						
Culvert Extension Name	**Soil Unit Weight (pcf)**	**Internal Angle of Friction Ø (Degrees)**	**Wing Wall Nominal Soil Bearing Resistance q_{nom} (psf)**	**Soil Modulus of Subgrade Reaction Kg (pcf)**	**Precast Box Culvert Option Link Slab Values (Standard Plan Index 400-291)**	
					ΔY, Maximum Long-Term Differential Settlement (feet)	**L, Effective Length for Single Curvature Deflection (feet)**
CD-A	120	30	4,500	52,000	.05	75
CD-B	120	30	4,500	52,000	.05	55
CD-C	120	30	4,500	52,000	.05	65

Settlement

The settlements of the proposed box culvert extensions and associated wing walls supported on compacted backfill and in-situ subsurface materials after proper site preparation should occur rapidly after loading. Thus, the expected settlement should occur during construction as dead loads are imposed. Provided the site preparation operations are performed in accordance with the FDOT Specifications, the total settlement of the box culvert extensions should not exceed approximately ¾ inch. The maximum differential settlement for each of the box culvert extensions is estimated to be on the order of ½ inch over the length of the box culvert extension. The Structural Engineer should compare the anticipated settlements to the allowable settlement of the structure to ensure that the settlements presented herein are acceptable.

9.0 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 and pond 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 and pond construction. 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 may 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 KCA design team and Manatee County.

APPENDIX A

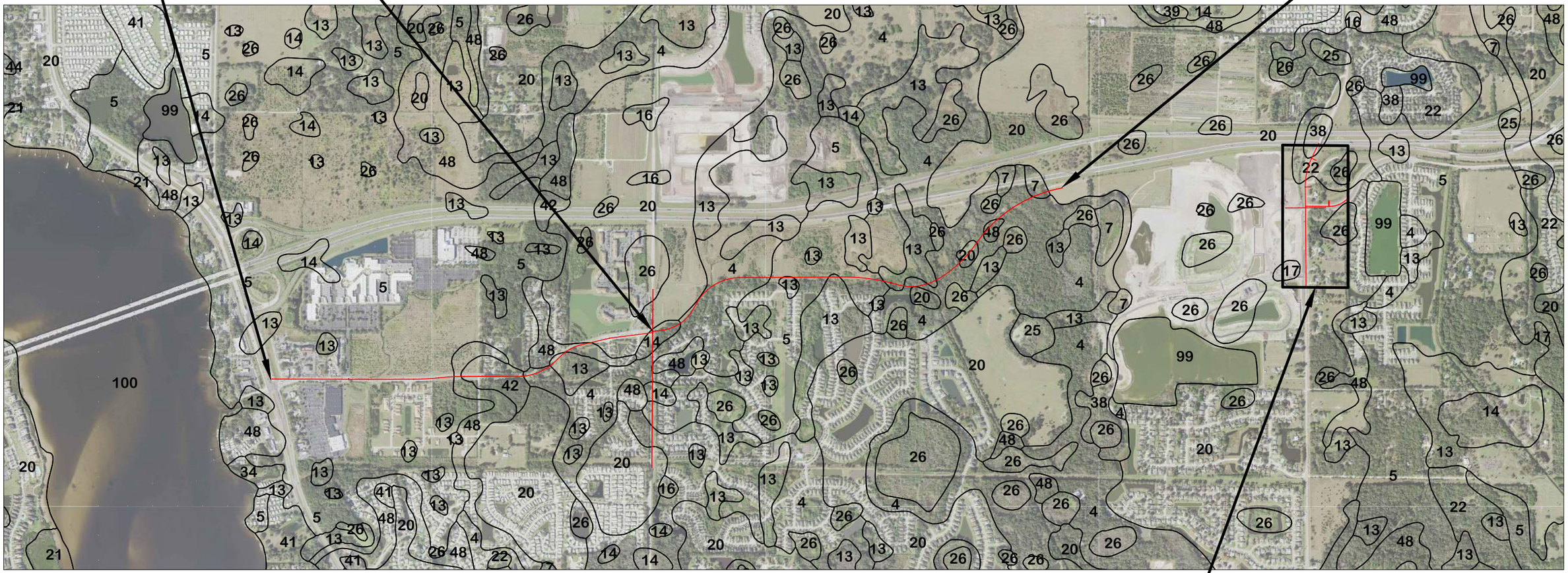
USDA Soil Survey Map
USGS Topographic Map
Summary of USDA Soil Survey - Manatee County, Florida

USDA SOIL SURVEY MAP

APPROXIMATE BEGIN SEGMENT 1

APPROXIMATE END SECTION 1 AND BEGIN SEGMENT 2

APPROXIMATE END SEGMENT 2



APPROXIMATE BOUNDARY OF SEGMENT 3

REFERENCE: USDA SOIL SURVEY OF MANATEE COUNTY, FLORIDA

0 1500'

PLAN SCALE

TIERRA
7351 Temple Terrace Highway
Tampa, Florida 33637
Phone: 813-989-1354 Fax: 813-989-1355

NUMBER	DESCRIPTION	DATE

PROJECT #	6083160	SURVEYED	----	__/__/__
SURVEY #	----	DESIGNED	SW	06/2021
SEC./TWN./RGE	00/00/00	DRAWN	SW	06/2021
SCALE	NOTED	CHECKED	MEN	06/2021

MARC E. NOVAK, P.E.
FLORIDA P.E. # 67431

Signature & Date

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

60TH AVENUE EXTENSION

SHEET NO. 1

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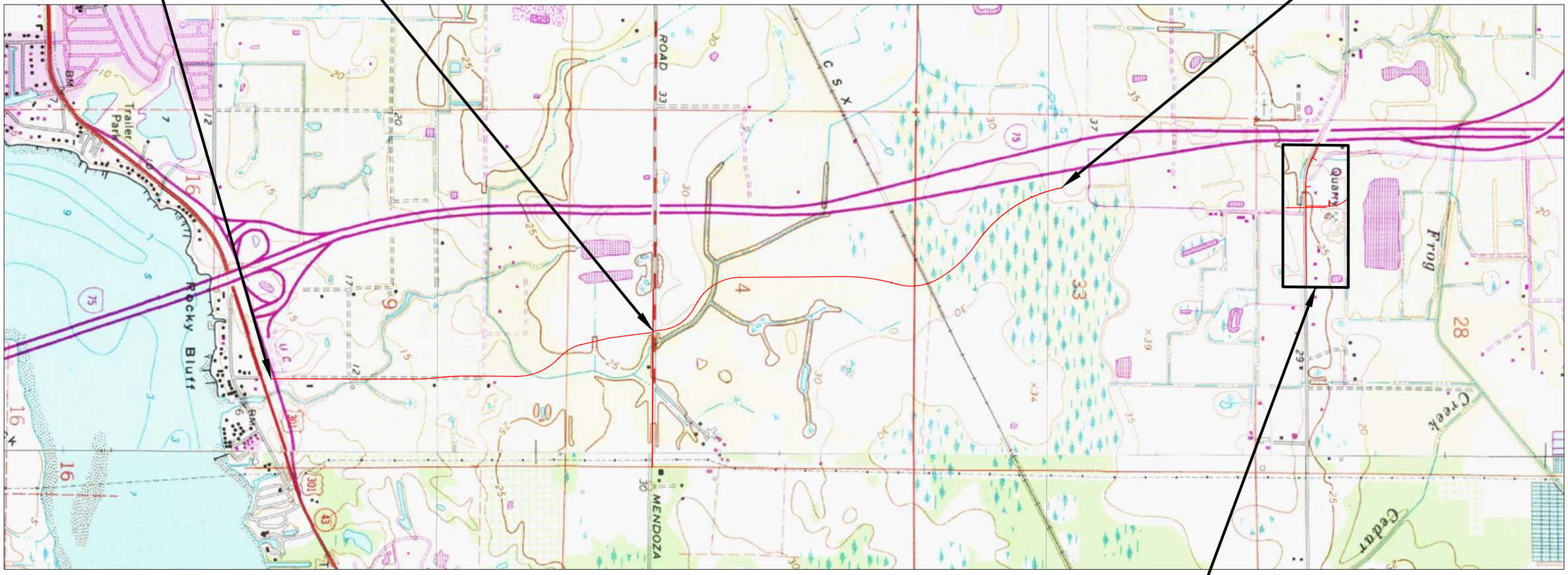
USGS TOPOGRAPHIC MAP

APPROXIMATE BEGIN SEGMENT 1

APPROXIMATE END SECTION 1 AND BEGIN SEGMENT 2

APPROXIMATE END SEGMENT 2



APPROXIMATE BOUNDARY OF SEGMENT 3

REFERENCE: "PALMETTO, FLORIDA" USGS QUADRANGLE MAP

0 1500'

PLAN SCALE

TIERRA
7351 Temple Terrace Highway
Tampa, Florida 33637
Phone: 813-989-1354 Fax: 813-989-1355

NUMBER	DESCRIPTION	DATE

PROJECT #	6083160	SURVEYED	----	__/__/__
SURVEY #	----	DESIGNED	SW	06/2021
SEC./TWN./RGE	00/00/00	DRAWN	SW	06/2021
SCALE	NOTED	CHECKED	MEN	06/2021

MARC E. NOVAK, P.E.
FLORIDA P.E. # 67431

Signature & Date

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

60TH AVENUE EXTENSION

SHEET NO. 2

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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
(4) Bradenton	0-4	SM, SP-SM	A-2-4, A-3	6.0	-	20.0		5.0-7.0	0.3-1.5	Jul-Oct
	4-10	SP-SM, SM	A-2-4, A-3	6.0	-	20.0		5.0-7.0		
	10-19	SC, CL, SC-SM	A-2-4, A-4, A-6	0.6	-	2.0		5.0-8.0		
	19-26	SC, SC-SM	A-2-4, A-6	0.6	-	2.0		6.0-8.0		
	26-80	SC-SM, SC	A-2-4, A-6	0.6	-	2.0		6.0-8.0		
(5) Bradenton	0-6	SP-SM	A-2-4, A-3	6.0	-	20.0		5.6-7.3	0.0-1.0	Jun-Dec
	6-13	SM, SP-SM	A-2-4, A-3	6.0	-	20.0		5.6-7.3		
	13-47	SC, SC-SM, SM	A-2-4, A-2-6	0.6	-	2.0		6.6-7.8		
	>47-51	Limestone[1]		2.0	-	20.0		—		
(7) Canova, Anclote and Okeelanta soils	0-8	PT	A-8	6.0	-	20.0		3.5-6.0	+2.0-0.0	Jan-Dec
	8-24	SP, SP-SM	A-3	6.0	-	20.0		6.1-8.4		
	24-68	SC, SC-SM, SM	A-2-4, A-3	0.6	-	6.0		7.4-8.4		
	0-16	SM, SP-SM	A-2-4, A-3	6.0	-	20.0		5.6-8.4	+1.0-0.0	Jun-Dec
	16-80	SM, SP, SP-SM	A-2-4, A-3	6.0	-	20.0		5.6-8.4		
	0-20	PT	A-8	6.0	-	20.0		4.5-6.5	+1.0-0.0	Jan, Jun-Dec
	20-54	SM, SP, SP-SM	A-2-4, A-3	6.0	-	20.0		5.1-7.8		
(13) Chobee loamy fine sand	0-8	SM	A-4, A-2-4	2.0	-	6.0		6.1-8.4	+2.0-0.0	Jan-Feb, Jun-Dec
	8-51	SC, CL, SC-SM	A-4, A-6, A-7-6	0.1	-	0.6		6.1-8.4		
	51-80	SM, SC	A-6, A-2-4	0.2	-	6.0		6.1-8.4		
(14) Chobee variant sandy clay loam	0-20	SC	A-6, A-7	0.1	-	0.2		5.6-7.3	+2.0-0.0	Jul-Dec
	20-35	CH, CL, SC	A-6, A-7	0.1	-	0.2		7.4-8.4		
	35-40	CH, CL, SC, SC-SM	A-2-4, A-3	0.1	-	0.6		7.4-8.4		
	40-80	SM, SC-SM	A-2-4, A-3	6.0	-	20.0		7.4-8.4		
(17) Delray-EauGallie complex	0-15	SC-SM, SM, SP-SM	A-3, A-2-4	6.0	-	20.0		5.6-7.3	0.0-0.5	Jan-Mar, Jun-Dec
	15-55	SP-SM	A-3, A-2-4	6.0	-	20.0		5.6-7.3		
	55-80	SC, SC-SM, SM	A-2-6, A-2-4	0.6	-	6.0		6.6-7.8		
	0-4	SP, SP-SM	A-3	6.0	-	20.0		4.5-5.5	0.5-1.5	Jun-Oct
	4-9	SP, SP-SM	A-3	6.0	-	20.0		4.5-5.5		
	9-35	SM, SP-SM	A-3, A-2-4	0.6	-	6.0		4.5-6.5		
	35-40	SP, SP-SM	A-3, A-2-4	6.0	-	20.0		5.6-7.8		
	40-76	SC, SC-SM, SM	A-2-6, A-2-4	0.6	-	6.0		5.6-7.8		
(20) EauGallie-EauGallie wet	0-6	SM, SP-SM	A-3, A-2-4	6.0	-	20.0		3.5-6.0	0.5-1.5	Jun-Nov
	6-23	AM, SP-SM	A-2-4, A-3	6.0	-	20.0		3.5-6.0		
	23-47	SM, SP-SM	A-3, A-2-4	6.0	-	20.0		3.5-7.3		
	47-55	SM, SP-SM	A-2-4, A-3	0.6	-	6.0		3.5-7.8		
	55-80	SM, SC	A-2-4, A-6, A-4	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	Jul-Oct
	5-17	SP-SM, SM	A-3, A-2-4	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-2-3, A-3	0.6	-	2.0		3.5-7.8		
	48-72	SP-SM, SM	A-3, A-2-4	0.6	-	2.0		3.5-7.8		
	72-80	SC, CL, SC-SM	A-4, A-6, A-2-4	0.6	-	2.0		3.5-7.8		
(22) Felda fine sand	0-4	SP-SM, SM	A-3, A-2-4	6.0	-	20.0		5.1-7.8	0.3-1.5	Jul-Oct
	4-35	SM, SP-SM	A-3, A-2-4	6.0	-	20.0		5.1-7.8		
	35-43	SC, CL	A-7-6, A-6, A-2-4	0.6	-	6.0		6.1-7.8		
	43-80	SM, SP-SM	A-2-4, A-3	6.0	-	20.0		6.1-8.4		
(26) Floridana-Immokalee-Okeelanta	0-19	SP-SM, SM	A-3, A-2-4	6.0	-	20.0		5.6-7.8	+2.0-0.0	Jan-Feb, Jun-Dec
	19-36	SP-SM, SP	A-3	6.0	-	20.0		5.6-7.8		
	36-63	SC-SM, SC	A-2-6, A-2-4	0.1	-	2.0		5.6-7.8		
	63-80	SP-SM, SM	A-3, A-2-4	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, Jun-Dec
	10-34	SP-SM, SP	A-3	6.0	-	20.0		4.5-5.5		
	34-43	SP-SM, SM	A-3, A-2-4	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	Jun-Oct
	20-54	SP-SM, SP, SM	A-3, A-2-4	6.0	-	20.0		5.6-8.4		
(38) Palmetto	0-8	SP, SP-SM	A-2-4, A-3	6.0	-	20.0		3.5-5.5	0.0	Jun-Nov
	8-25	SP, SP-SM	A-2-4, A-3	6.0	-	20.0		3.5-5.5		
	25-45	SP-SM	A-2-4, A-3	6.0	-	20.0		3.5-5.5		
	45-64	SC, SC-SM, SM	A-2-4, A-2-6	0.2	-	0.6		4.5-5.5		
	64-68	SM, SP-SM	A-2-4, A-3	2.0	-	6.0		4.5-5.5		
(42) Pomello	0-4	SM, SP-SM	A-2-4, A-3	0.0	-	20.0		4.5-6.0	1.5-3.5	Jun-Nov
	4-42	SP-SM, SM	A-3, A-2-4	0.0	-	20.0		4.5-6.0		
	42-54	SP-SM, SM	A-3, A-2-4	2.0	-	6.0		4.5-6.0		
	54-80	SP-SM, SM	A-3, A-2-4	6.0	-	20.0		4.5-6.0		
(48) Wabasso-Wabasso wet	0-7	SP-SM, SM	A-2-4, A-3	6.0	-	20.0		3.5-6.5	0.5-1.5	Jun-Nov
	7-24	SP-SM, SM	A-3, A-2-4	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-6, A-7-6, A-2-4	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	Jul-Oct
	7-24	SP-SM, SM	A-3, A-2-4	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-6, A-7-6, A-2-4	0.6	-	2.0		5.1-8.4		

(1) AASHTO and USCS do not provide classification for Limestone

APPENDIX B

Roadway Soil Survey
Roadway Boring Location Plan Sheets
Roadway Soil Profiles Sheets
Pond Boring Location and Soil Profile Sheets
Box Culvert Report of Core Borings Sheets

MANATEE COUNTY

PROJECT NAME: 60TH AVENUE EAST FROM US 301 TO MENDOZA ROAD

MANATEE COUNTY PROJECT NO. 15-0909JE

DATE OF SURVEY: JANUARY 2022
SURVEY MADE BY: TIERRA, INC.
SUBMITTED BY: MARC E. NOVAK, P.E.

COUNTY: MANATEE

CROSS SECTION SOIL SURVEY FOR THE DESIGN OF ROADS

SURVEY BEGINS STA. : 11+30.61 SURVEY ENDS STA. : 30+60.35 REFERENCE: B/L SURVEY 60TH AVE. E

	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 ohms cm	CHLORIDE ppm	SULFATES ppm	pH
1	1	3	1	26	32	---	---	---	--	1-14	---	---	---	A-3/A-2-4	LIGHT GRAY TO BROWN FINE SAND TO SILTY SAND	11	2900-28000	15-120	<4.8-45	4.6-8.2
2	1	3	8	12-23	24	---	---	--	--	15-34	7	NP	NP	A-2-4	LIGHT GRAY TO BROWN SILTY SAND	10	760-2400	15-45	<4.8-231	5.4-8.3
3	---	--	31	16-36	32	---	---	---	---	13-34	31	33-37	6-21	A-2-4/A-2-6	LIGHT GRAY TO GRAY SILTY SAND TO CLAYEY SAND	---	---	---	---	---
4	---	---	10	15-28	10	---	---	---	---	36-85	10	31-44	5-20	A-4/A-6/A-7-6	LIGHT GRAY SILT TO CLAY WITH SAND	1	8100	15	96	5.4
5	2	5-22	2	21-137	2	---	---	---	---	8-18	---	---	---	A-8	DARK GRAY ORGANIC SAND TO MUCK	---	---	---	---	---
6	---	---	---	---	---	---	---	---	---	---	---	---	---	WLS	CALCAREOUS CLAY TO WEATHERED LIMESTONE	---	---	---	---	---
7	---	---	1	67	1	---	---	---	---	72	1	132	64	A-7-6	LIGHT GRAY CLAY	---	---	---	---	---

EMBANKMENT AND SUBGRADE MATERIAL

STRATA BOUNDARIES ARE APPROXIMATE. MAKE FINAL CHECK AFTER GRADING.

▽ - ESTIMATED SEASONAL HIGH GROUNDWATER TABLE

▼ - GROUNDWATER TABLE ENCOUNTERED DURING INVESTIGATION

GNE - GROUNDWATER NOT ENCOUNTERED.

A - WITH LIMESTONE FRAGMENTS

NP - NON PLASTIC

NOTES:

1. THE MATERIAL FROM STRATUM 1 (A-3/A-2-4) APPEARS SATISFACTORY FOR USE IN THE EMBANKMENT WHEN UTILIZED IN ACCORDANCE WITH STANDARD PLANS, INDEX 120-001.
2. 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.
3. THE MATERIAL FROM STRATA 3 AND 4 (A-2-4/A-2-6/A-6/A-7-6/A-4) ARE PLASTIC MATERIALS 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 ON THE ROADWAY CROSS-SECTIONS.
4. THE MATERIAL FROM STRATUM 7 (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. THE REMOVAL LIMITS ARE DEPICTED ON THE ROADWAY CROSS-SECTIONS AT THE NEXT SUBMITTAL.
5. THE MATERIAL FROM STRATUM 5 (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.
6. THE MATERIAL FROM STRATUM NUMBER 6 IS A NATURAL LIMESTONE FORMATION. SPECIAL TOOLS AND EQUIPMENT WILL BE REQUIRED TO EXCAVATE AND/OR DEWATER THIS MATERIAL. WEATHERED LIMESTONE/CAPROCK WAS ENCOUNTERED WITHIN THE BORINGS. THIS MATERIAL IS ROCK AND IS LOCATED AT SHALLOW DEPTHS. EXCAVATIONS INTO AND/OR THROUGH LIMESTONE/CAPROCK WILL BE DIFFICULT AND WILL REQUIRE NON CONVENTIONAL CONSTRUCTION TECHNIQUES AND SPECIALIZED EQUIPMENT. LIMESTONE/CAPROCK IS POROUS AND WILL BE DIFFICULT TO DEWATER.

TIERRA
7351 Temple Terrace Highway
Tampa, Florida 33637
Phone: 813-989-1354 Fax: 813-989-1355

ROADWAY SOIL SURVEY - SEG. 1

NUMBER	DESCRIPTION	DATE

PROJECT #	6083160	SURVEYED	----	__/__/__
SURVEY #	----	DESIGNED	SW	10/2021
SEC./TWN./RGE	00/00/00	DRAWN	SW	10/2021
SCALE	NOTED	CHECKED	MEN	10/2021

MARC E. NOVAK, P.E.
FLORIDA P.E. # 67431
Signature & Date

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

60TH AVENUE EXTENSION

SHEET NO.
SEG1-1

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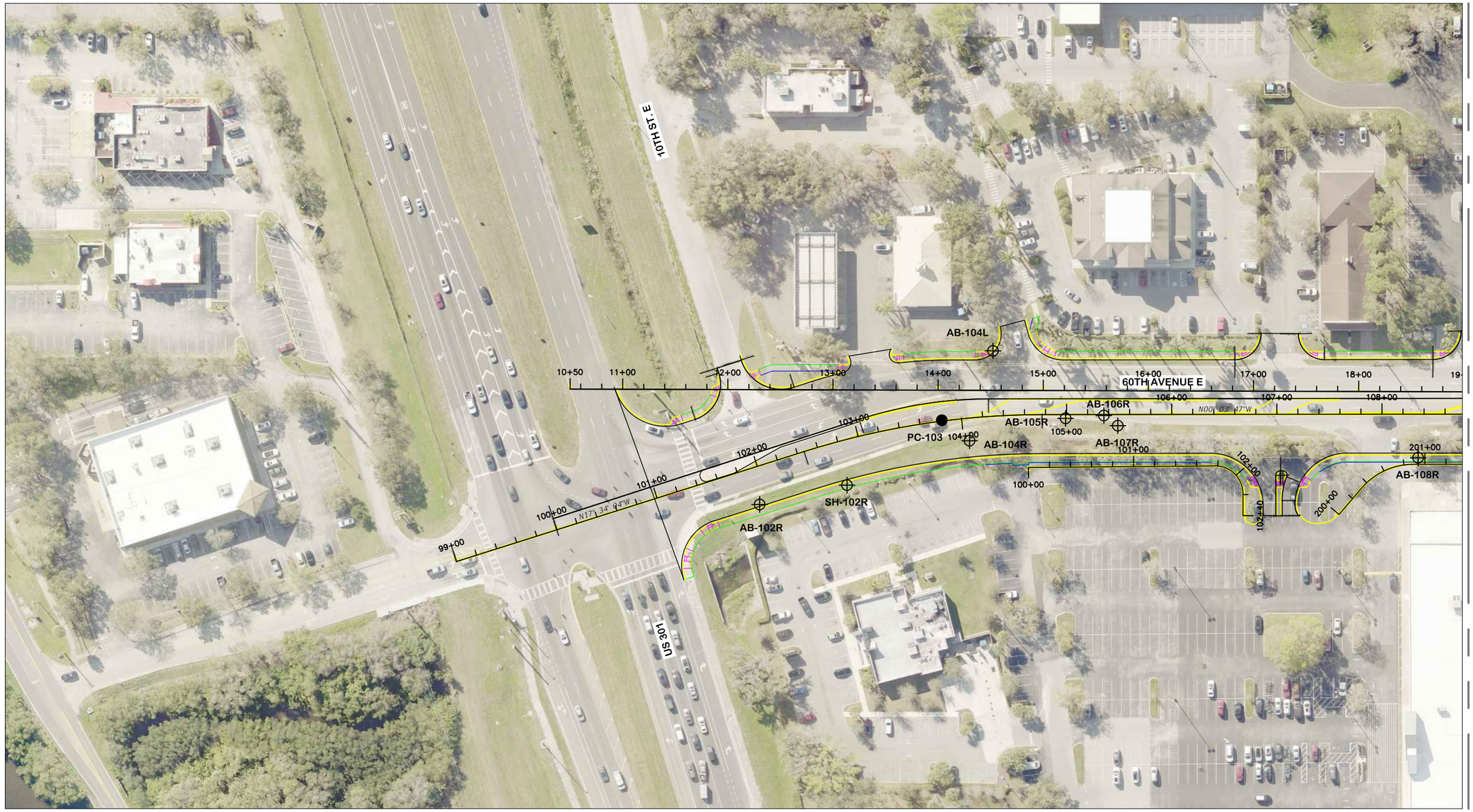

MATCH LINE SHEET SEG1–3

NOTE: BASE MAP PROVIDED BY KISINGER CAMPO & ASSOCIATES, CORP.

BORING LOCATION PLAN

0 100'

PLAN SCALE

LEGEND

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

TIERRA
7351 Temple Terrace Highway
Tampa, Florida 33637
Phone: 813-989-1354 Fax: 813-989-1355

NUMBER	DESCRIPTION	DATE

PROJECT #	6083160	SURVEYED	----	__/__/__
SURVEY #	----	DESIGNED	SW	10/2021
SEC./TWN./RGE	00/00/00	DRAWN	SW	10/2021
SCALE	NOTED	CHECKED	MEN	10/2021

MARC E. NOVAK, P.E.
FLORIDA P.E. # 67431

Signature & Date

Manatee County FLORIDA

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

60TH AVENUE EXTENSION

SHEET NO.
SEG-2

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MATCH LINE SHEET SEG1–2

MATCH LINE SHEET SEG1–4

NOTE: BASE MAP PROVIDED BY KISINGER CAMPO & ASSOCIATES, CORP.

BORING LOCATION PLAN

0 100'

PLAN SCALE

LEGEND

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

TIERRA
7351 Temple Terrace Highway
Tampa, Florida 33637
Phone: 813-989-1354 Fax: 813-989-1355

NUMBER	DESCRIPTION	DATE

PROJECT #	6083160	SURVEYED	----	__/__/__
SURVEY #	----	DESIGNED	SW	10/2021
SEC./TWN./RGE	00/00/00	DRAWN	SW	10/2021
SCALE	NOTED	CHECKED	MEN	10/2021

MARC E. NOVAK, P.E.
FLORIDA P.E. # 67431

Signature & Date

Manatee County FLORIDA
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60TH AVENUE EXTENSION

SHEET NO.
SEG1-3

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NOTE: BASE MAP PROVIDED BY KISINGER CAMPO & ASSOCIATES, CORP.

BORING LOCATION PLAN

0 100'

PLAN SCALE

LEGEND

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

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NUMBER	DESCRIPTION	DATE

PROJECT #	6083160	SURVEYED	----	__/__/__
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SEC./TWN./RGE	00/00/00	DRAWN	SW	10/2021
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60TH AVENUE EXTENSION

SHEET NO.
SEG1-4

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NOTE: BASE MAP PROVIDED BY KISINGER CAMPO & ASSOCIATES, CORP.

BORING LOCATION PLAN

0 100'

PLAN SCALE

LEGEND

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

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NUMBER	DESCRIPTION	DATE

PROJECT #	6083160	SURVEYED	----	__/__/__
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SEC./TWN./RGE	00/00/00	DRAWN	SW	10/2021
SCALE	NOTED	CHECKED	MEN	10/2021

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Signature & Date

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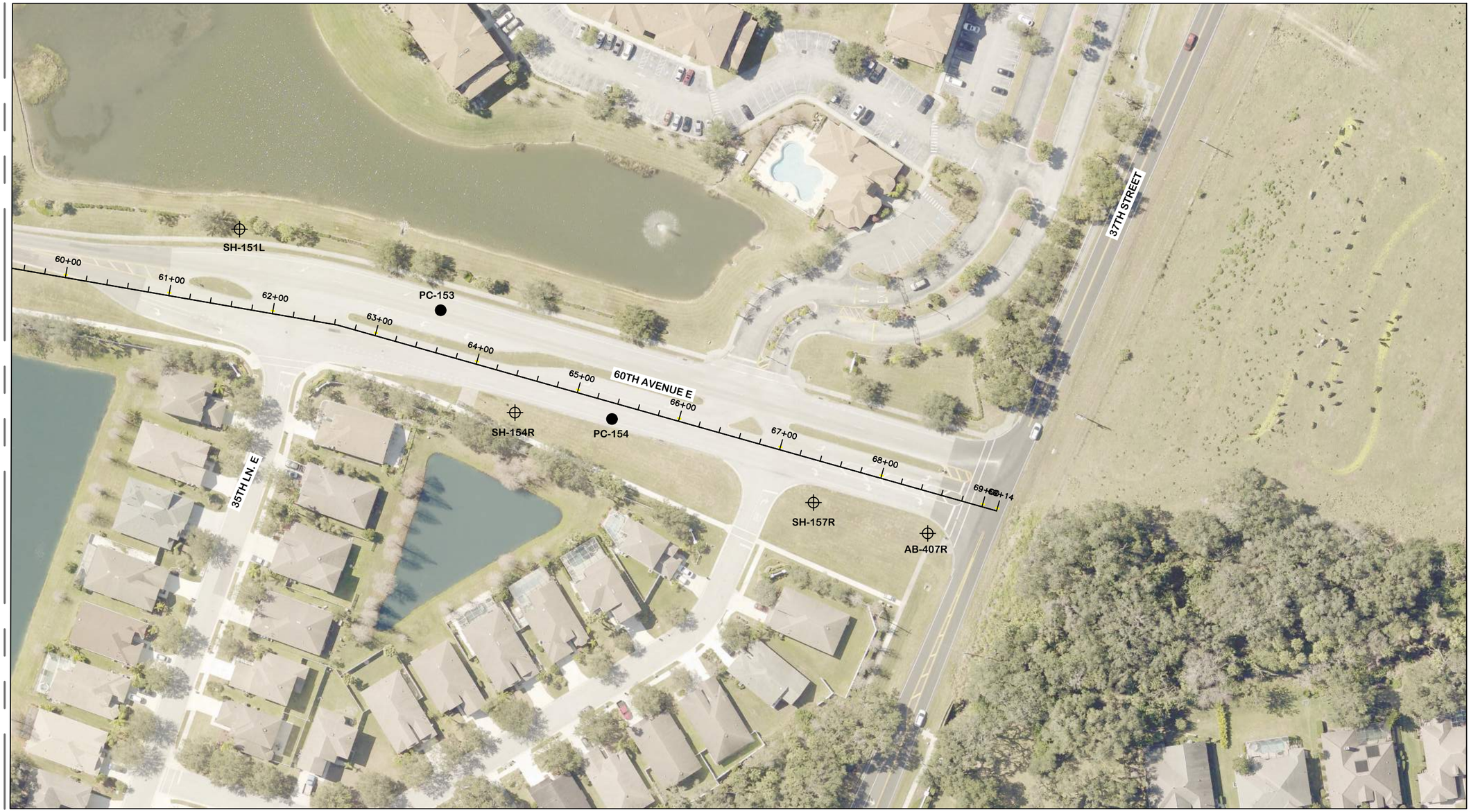
ENGINEERING SERVICES
1022 26th Avenue East, Bradenton, FL 34208

60TH AVENUE EXTENSION

SHEET NO.
SEG1-5

MATCH LINE SHEET SEG1–5



NOTE: BASE MAP PROVIDED BY KISINGER CAMPO & ASSOCIATES, CORP.

BORING LOCATION PLAN

0 100'

PLAN SCALE

LEGEND

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

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NUMBER	DESCRIPTION	DATE

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SEC./TWN./RGE	00/00/00	DRAWN	SW	10/2021
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MARC E. NOVAK, P.E.
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Signature & Date

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60TH AVENUE EXTENSION

SHEET NO.
SEG1-6

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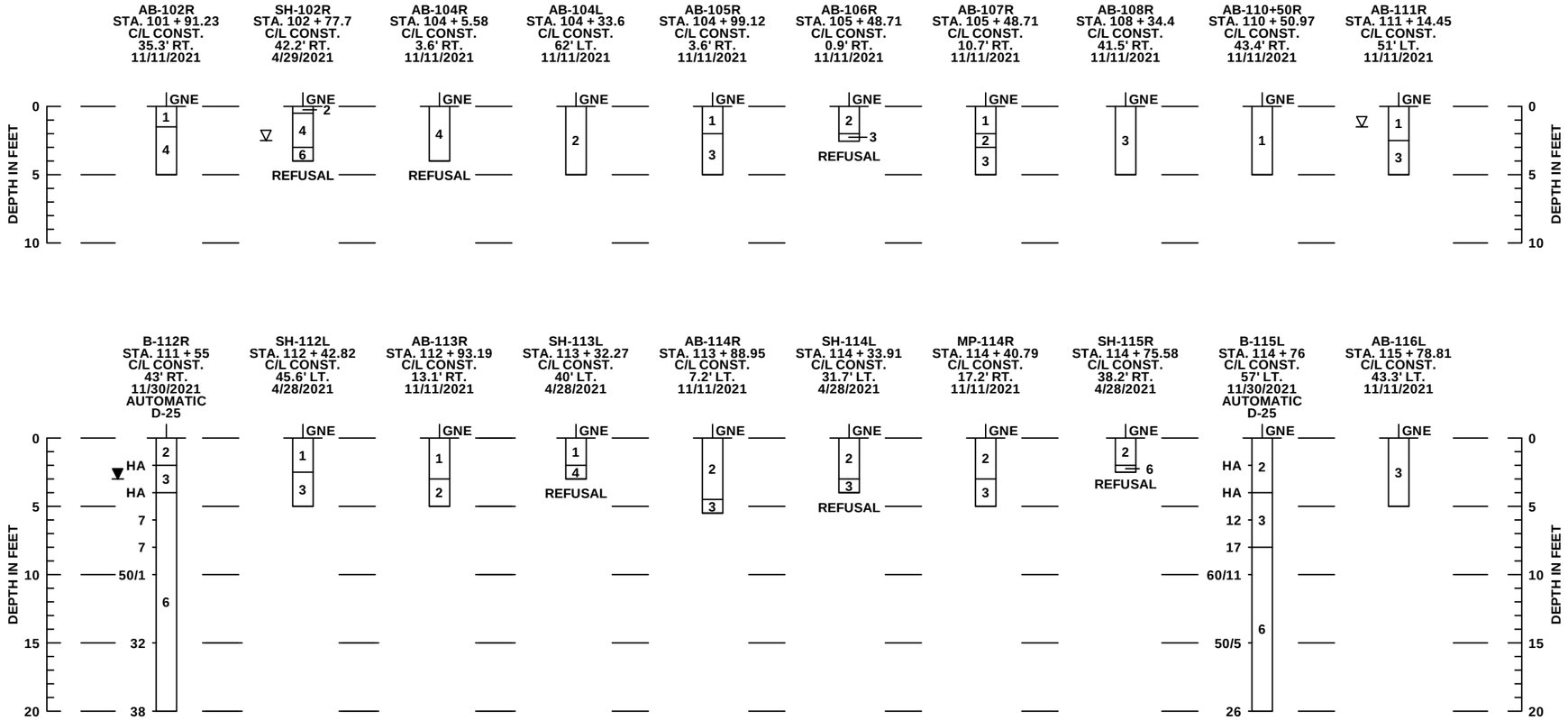
SOIL PROFILES



LEGEND

1	LIGHT GRAY TO BROWN FINE SAND (A-3/A-2-4)
2	LIGHT GRAY TO BROWN SILTY SAND (A-2-4)
3	LIGHT GRAY TO GRAY SILTY SAND TO CLAYEY SAND (A-2-4/A-2-6)
4	LIGHT GRAY SILT TO SANDY CLAY (A-4/A-6/A-7-6)
5	DARK GRAY ORGANIC SAND TO MUCK (A-8)
6	CALCAREOUS CLAY TO WEATHERED LIMESTONE
7	LIGHT GRAY CLAY (A-7-6)
▼	GROUNDWATER LEVEL ENCOUNTERED DURING INVESTIGATION
▽	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
∇^{+}	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE IS ABOVE GRADE
N	SPT N-VALUE IN BLOWS/FOOT FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED)
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW
GNE	GROUNDWATER TABLE NOT ENCOUNTERED
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCES
REFUSAL	BORING TERMINATED DUE TO AUGER REFUSAL ON ROCK MATERIAL
B/L SURVEY	BASELINE SURVEY OF 60TH AVENUE
C/L CONST.	CENTERLINE CONSTRUCTION OF 60TH AVENUE
*	BORING LOCATED BY SURVEYOR

NOTE: BORING LOCATIONS WERE DETERMINED USING GPS COORDINATES OBTAINED BY TIERRA, INC. IN THE FIELD BY A TIERRA REPRESENTATIVE USING A GPS DEVICE WITH A REPORTED ACCURACY OF APPROXIMATELY +/- 10 FEET UNLESS OTHERWISE NOTED BY AN ASTERISK (*).

AUTOMATIC HAMMER	
GRANULAR MATERIALS-RELATIVE DENSITY	SPT (BLOWS/FT.)
VERY LOOSE	LESS THAN 3
LOOSE	3 TO 8
MEDIUM	8 TO 24
DENSE	24 TO 40
VERY DENSE	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT (BLOWS/FT.)
VERY SOFT	LESS THAN 2
SOFT	1 TO 3
FIRM	3 TO 6
STIFF	6 TO 12
VERY STIFF	12 TO 24
HARD	GREATER THAN 24

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Signature & Date

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60TH AVENUE EXTENSION

SHEET NO.
SEG1-7

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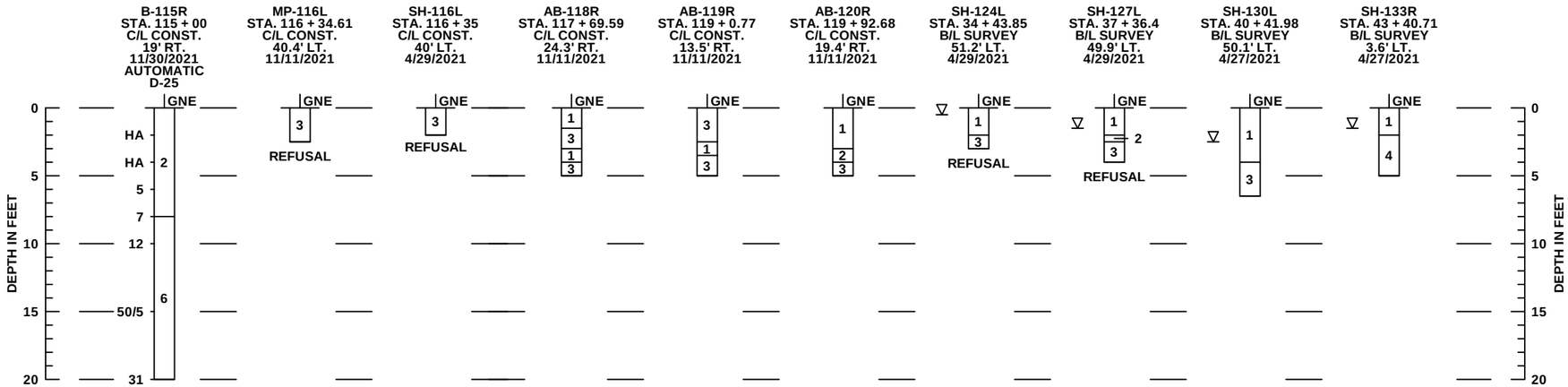
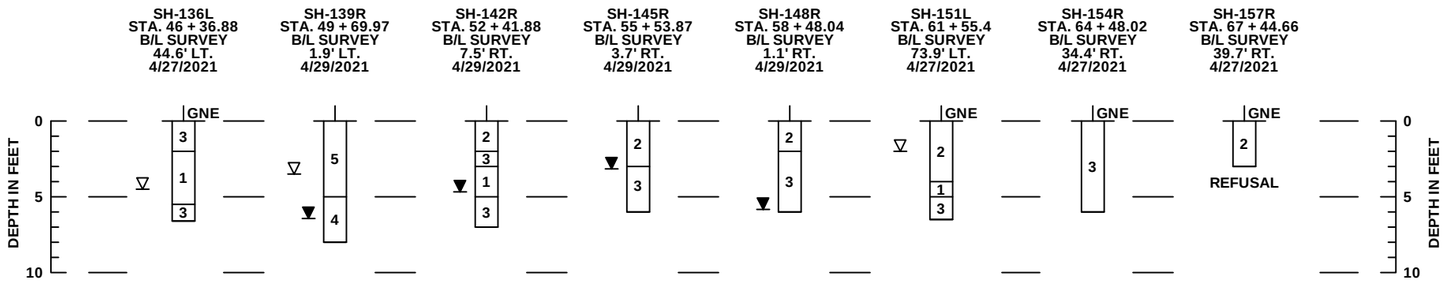
SOIL PROFILES





LEGEND

1	LIGHT GRAY TO BROWN FINE SAND (A-3/A-2-4)
2	LIGHT GRAY TO BROWN SILTY SAND (A-2-4)
3	LIGHT GRAY TO GRAY SILTY SAND TO CLAYEY SAND (A-2-4/A-2-6)
4	LIGHT GRAY SILT TO SANDY CLAY (A-4/A-6/A-7-6)
5	DARK GRAY ORGANIC SAND TO MUCK (A-8)
6	CALCAREOUS CLAY TO WEATHERED LIMESTONE
7	LIGHT GRAY CLAY (A-7-6)
▼	GROUNDWATER LEVEL ENCOUNTERED DURING INVESTIGATION
▽	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
∇^{+}	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE IS ABOVE GRADE
N	SPT N-VALUE IN BLOWS/FOOT FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED)
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW
GNE	GROUNDWATER TABLE NOT ENCOUNTERED
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCES
REFUSAL	BORING TERMINATED DUE TO AUGER REFUSAL ON ROCK MATERIAL
B/L SURVEY	BASELINE SURVEY OF 60TH AVENUE
C/L CONST.	CENTERLINE CONSTRUCTION OF 60TH AVENUE
*	BORING LOCATED BY SURVEYOR

NOTE: BORING LOCATIONS WERE DETERMINED USING GPS COORDINATES OBTAINED BY TIERRA, INC. IN THE FIELD BY A TIERRA REPRESENTATIVE USING A GPS DEVICE WITH A REPORTED ACCURACY OF APPROXIMATELY +/- 10 FEET UNLESS OTHERWISE NOTED BY AN ASTERISK (*).

AUTOMATIC HAMMER	
GRANULAR MATERIALS-RELATIVE DENSITY	SPT (BLOWS/FT.)
VERY LOOSE	LESS THAN 3
LOOSE	3 TO 8
MEDIUM	8 TO 24
DENSE	24 TO 40
VERY DENSE	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT (BLOWS/FT.)
VERY SOFT	LESS THAN 2
SOFT	1 TO 3
FIRM	3 TO 6
STIFF	6 TO 12
VERY STIFF	12 TO 24
HARD	GREATER THAN 24

TIERRA
7351 Temple Terrace Highway
Tampa, Florida 33637
Phone: 813-989-1354 Fax: 813-989-1355

NUMBER	DESCRIPTION	DATE

PROJECT #	6083160	SURVEYED	----	__/__/__
SURVEY #	----	DESIGNED	SW	10/2021
SEC./TWN./RGE	00/00/00	DRAWN	SW	10/2021
SCALE	NOTED	CHECKED	MEN	10/2021

MARC E. NOVAK, P.E.
FLORIDA P.E. # 67431
Signature & Date

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

60TH AVENUE EXTENSION

SHEET NO.
SEG1-8

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MANATEE COUNTY

PROJECT NAME: BUFFALO ROAD FROM MENDOZA ROAD TO THE EXISTING TERMINUS SOUTH OF 69TH STREET EAST

MANATEE COUNTY PROJECT NO. 6083160

DATE OF SURVEY: JANUARY 2022
SURVEY MADE BY: TIERRA, INC.
SUBMITTED BY: MARC E. NOVAK, P.E.

COUNTY: MANATEE

CROSS SECTION SOIL SURVEY FOR THE DESIGN OF ROADS

SURVEY BEGINS STA. : 200+00 SURVEY ENDS STA. : 262+60 REFERENCE: C/L CONSTRUCTION BUFFALO ROAD (60TH AVENUE E.)

	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 ohms cm	CHLORIDE ppm	SULFATES ppm	pH
1	1	3	1	26	32	---	---	---	--	1-14	---	---	---	A-3/A-2-4	LIGHT GRAY TO BROWN FINE SAND TO SILTY SAND	11	2900-28000	15-120	<4.8-45	4.6-8.2
2	1	3	8	12-23	24	---	---	--	--	15-34	7	NP	NP	A-2-4	LIGHT GRAY TO BROWN SILTY SAND	10	760-2400	15-45	<4.8-231	5.4-8.3
3	---	--	31	16-36	32	---	---	---	---	13-34	31	33-37	6-21	A-2-4/A-2-6	LIGHT GRAY TO GRAY SILTY SAND TO CLAYEY SAND	---	---	---	---	---
4	---	---	10	15-28	10	---	---	---	---	36-85	10	31-44	5-20	A-4/A-6/A-7-6	LIGHT GRAY SILT TO CLAY WITH SAND	1	8100	15	96	5.4
5	2	5-22	2	21-137	2	---	---	---	---	8-18	---	---	---	A-8	DARK GRAY ORGANIC SAND TO MUCK	---	---	---	---	---
6	---	---	---	---	---	---	---	---	---	---	---	---	---	WLS	CALCAREOUS CLAY TO WEATHERED LIMESTONE	---	---	---	---	---
7	---	---	1	67	1	---	---	---	---	72	1	132	64	A-7-6	LIGHT GRAY CLAY	---	---	---	---	---

EMBANKMENT AND SUBGRADE MATERIAL

STRATA BOUNDARIES ARE APPROXIMATE. MAKE FINAL CHECK AFTER GRADING.

▽ - ESTIMATED SEASONAL HIGH GROUNDWATER TABLE

▼ - GROUNDWATER TABLE ENCOUNTERED DURING INVESTIGATION

GNE - GROUNDWATER NOT ENCOUNTERED.

A - WITH LIMESTONE FRAGMENTS

NP - NON PLASTIC

NOTES:

1. THE MATERIAL FROM STRATUM 1 (A-3/A-2-4) APPEARS SATISFACTORY FOR USE IN THE EMBANKMENT WHEN UTILIZED IN ACCORDANCE WITH STANDARD PLANS, INDEX 120-001.
2. 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.
3. THE MATERIAL FROM STRATA 3 AND 4 (A-2-4/A-2-6/A-6/A-7-6/A-4) ARE PLASTIC MATERIALS 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.
4. THE MATERIAL FROM STRATUM 7 (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. THE REMOVAL LIMITS ARE DEPICTED ON THE ROADWAY CROSS-SECTIONS.
5. THE MATERIAL FROM STRATUM 5 (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.
6. THE MATERIAL FROM STRATUM NUMBER 6 IS A NATURAL LIMESTONE FORMATION. SPECIAL TOOLS AND EQUIPMENT WILL BE REQUIRED TO EXCAVATE AND/OR DEWATER THIS MATERIAL. WEATHERED LIMESTONE/CAPROCK WAS ENCOUNTERED WITHIN THE BORINGS. THIS MATERIAL IS ROCK AND IS LOCATED AT SHALLOW DEPTHS. EXCAVATIONS INTO AND/OR THROUGH LIMESTONE/CAPROCK WILL BE DIFFICULT AND WILL REQUIRE NON CONVENTIONAL CONSTRUCTION TECHNIQUES AND SPECIALIZED EQUIPMENT. LIMESTONE/CAPROCK IS POROUS AND WILL BE DIFFICULT TO DEWATER.

TIERRA
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ROADWAY SOIL SURVEY - SEG. 2

NUMBER	DESCRIPTION	DATE

PROJECT #	6083160	SURVEYED	----	__/__/__
SURVEY #	----	DESIGNED	SW	06/2021
SEC./TWN./RGE	00/00/00	DRAWN	SW	06/2021
SCALE	NOTED	CHECKED	MEN	06/2021

MARC E. NOVAK, P.E.
FLORIDA P.E. # 67431
Signature & Date

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

60TH AVENUE EXTENSION

SHEET NO.
SEG2-1

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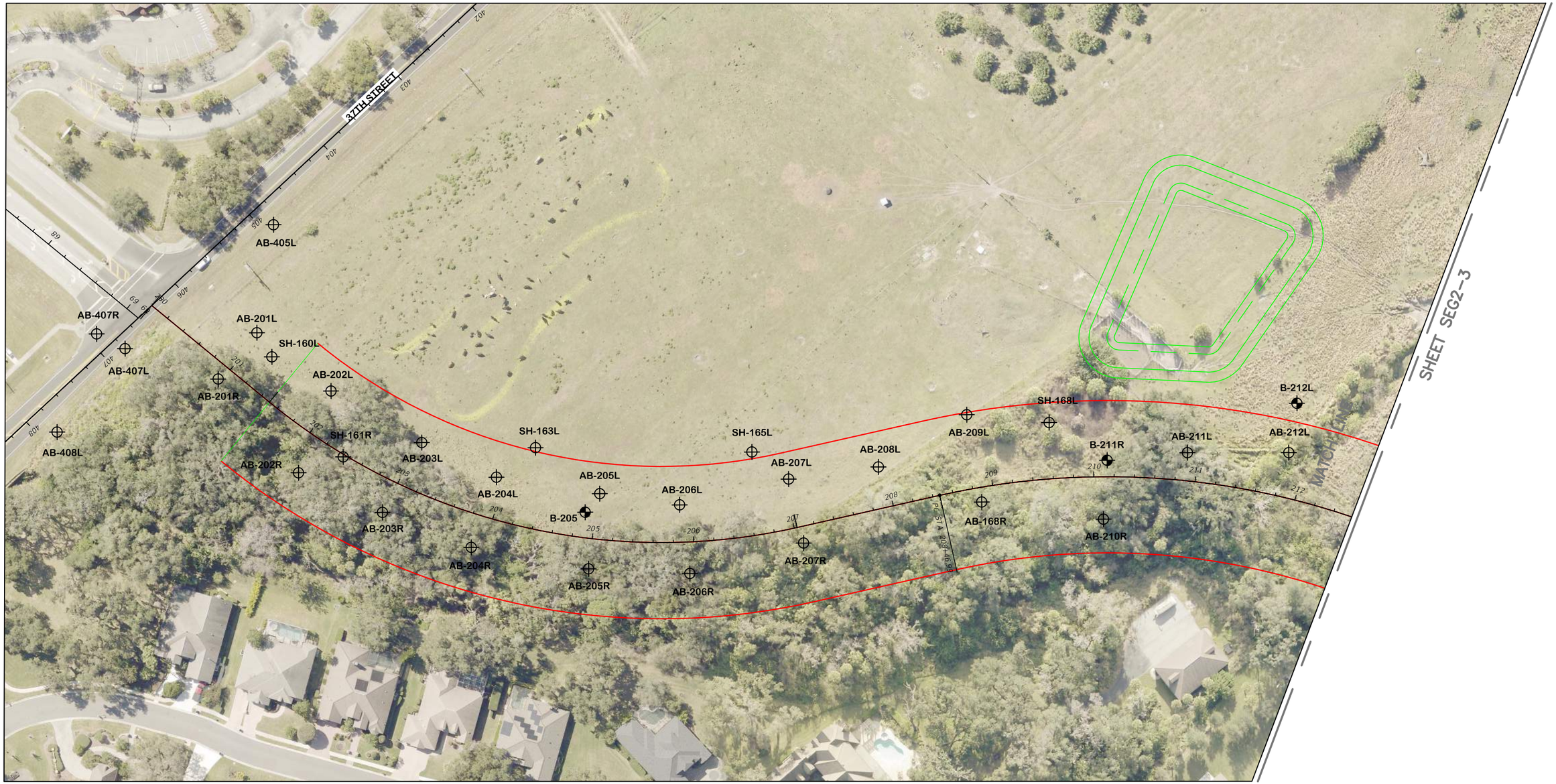

NOTE: BASE MAP PROVIDED BY KISINGER CAMPO & ASSOCIATES, CORP.

BORING LOCATION PLAN

0 100'

PLAN SCALE

LEGEND

- APPROXIMATE LOCATION OF AUGER BORING
- APPROXIMATE LOCATION OF SPT BORING

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NUMBER	DESCRIPTION	DATE

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MARC E. NOVAK, P.E.
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Signature & Date

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60TH AVENUE EXTENSION

SHEET NO.
SEG2-2

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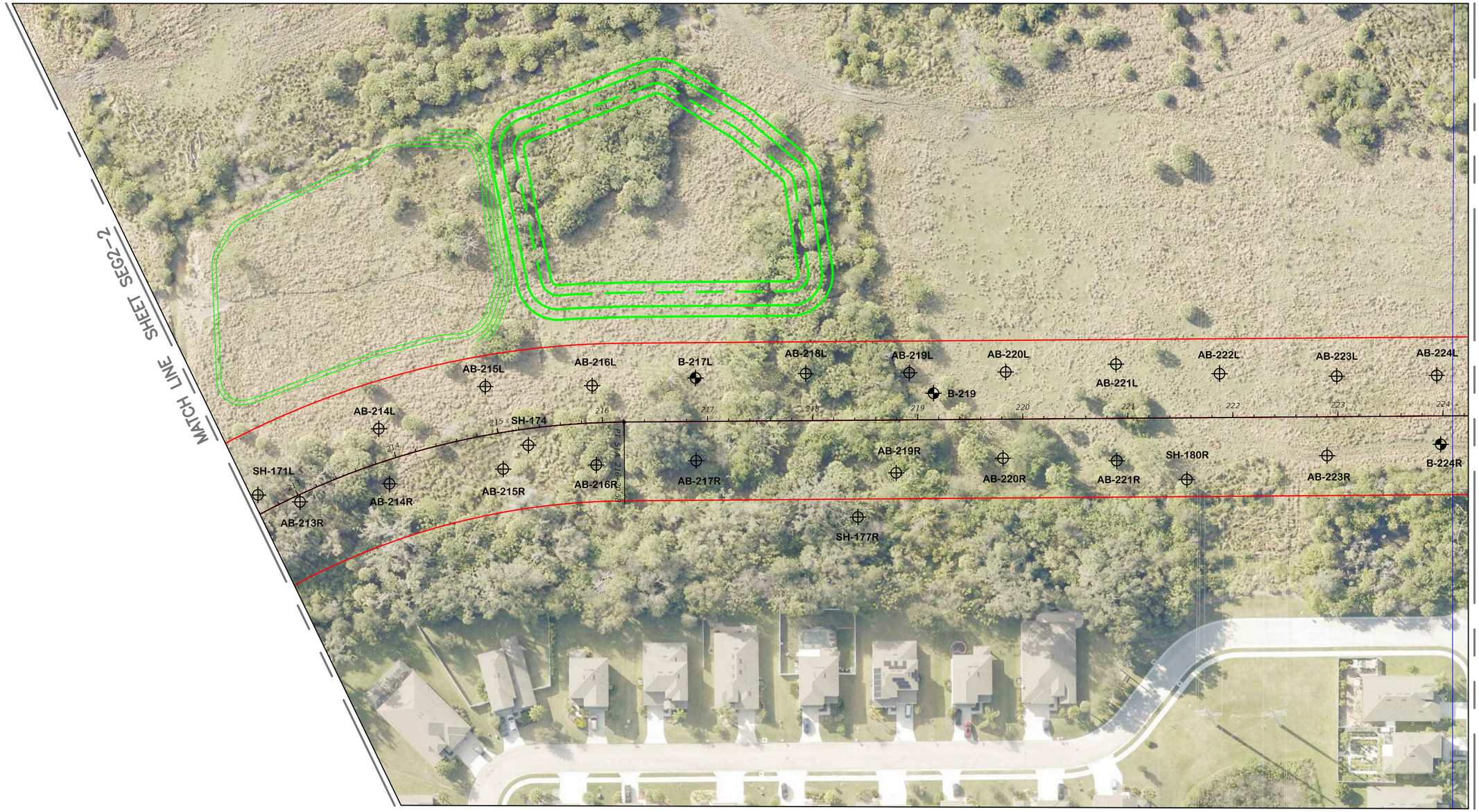

NOTE: BASE MAP PROVIDED BY KISINGER CAMPO & ASSOCIATES, CORP.

BORING LOCATION PLAN

0 100'

PLAN SCALE

LEGEND

- APPROXIMATE LOCATION OF AUGER BORING
- APPROXIMATE LOCATION OF SPT BORING

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60TH AVENUE EXTENSION

SHEET NO.
SG2-3

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MATCH LINE SHEET SEG2-3

MATCH LINE SHEET SEG2-5

NOTE: BASE MAP PROVIDED BY KISINGER CAMPO & ASSOCIATES, CORP.

BORING LOCATION PLAN

0 100'

PLAN SCALE

LEGEND

- APPROXIMATE LOCATION OF AUGER BORING
- APPROXIMATE LOCATION OF SPT BORING

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NUMBER	DESCRIPTION	DATE

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60TH AVENUE EXTENSION

SHEET NO.
SEG2-4

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NOTE: BASE MAP PROVIDED BY KISINGER CAMPO & ASSOCIATES, CORP.

BORING LOCATION PLAN

0 100'

PLAN SCALE

LEGEND

- APPROXIMATE LOCATION OF AUGER BORING
- APPROXIMATE LOCATION OF SPT BORING

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NUMBER	DESCRIPTION	DATE

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60TH AVENUE EXTENSION

SHEET NO.
SEG2-5

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NOTE: BASE MAP PROVIDED BY KISINGER CAMPO & ASSOCIATES, CORP.

BORING LOCATION PLAN

0 100'

PLAN SCALE

LEGEND

- APPROXIMATE LOCATION OF AUGER BORING
- APPROXIMATE LOCATION OF SPT BORING

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60TH AVENUE EXTENSION

SHEET NO.
SEG2-6

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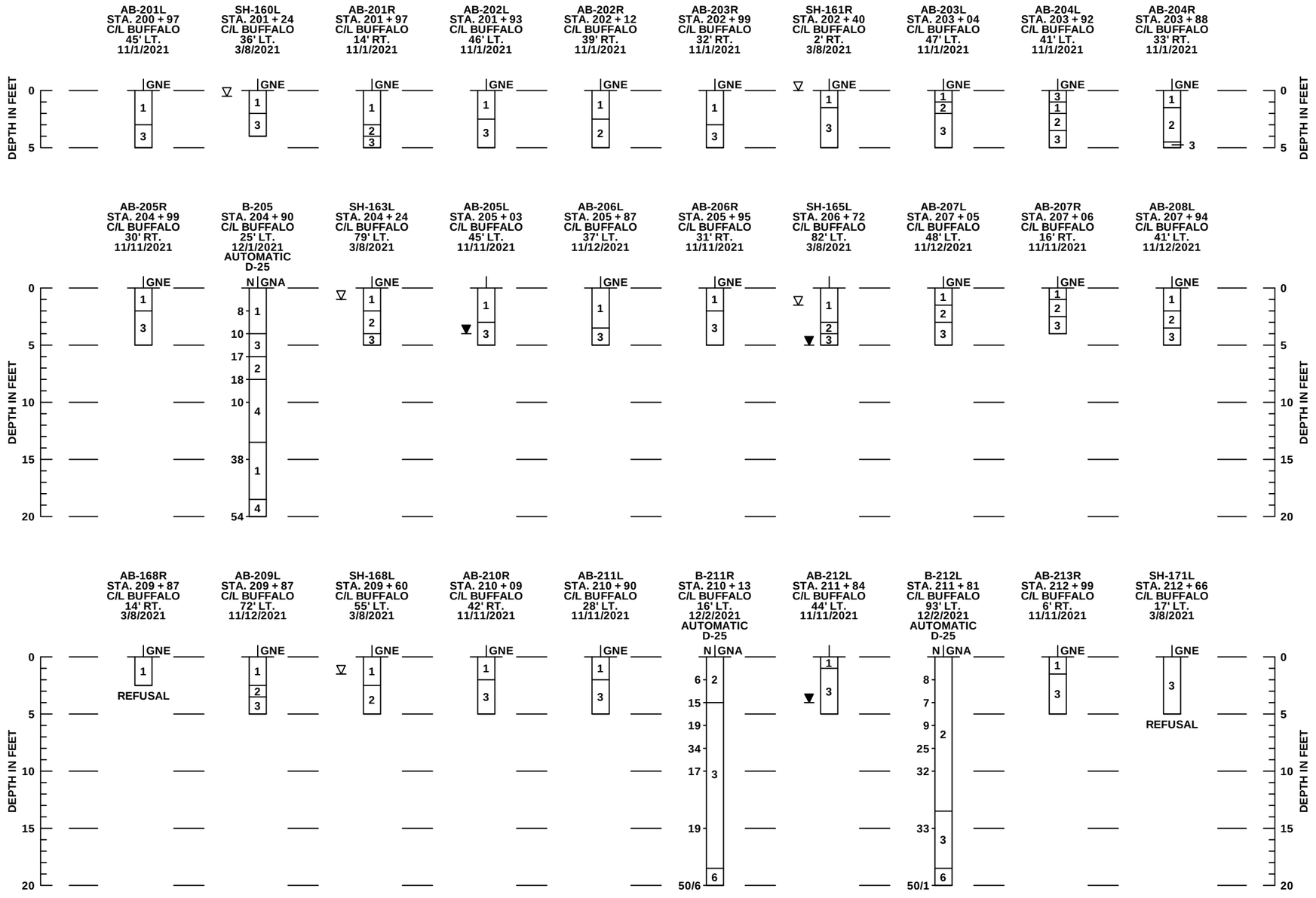
SOIL PROFILES



LEGEND

1	LIGHT GRAY TO BROWN FINE SAND (A-3/A-2-4)
2	LIGHT GRAY TO BROWN SILTY SAND (A-2-4)
3	LIGHT GRAY TO GRAY SILTY SAND TO CLAYEY SAND (A-2-4/A-2-6)
4	LIGHT GRAY SILT TO SANDY CLAY (A-4/A-6/A-7-6)
5	DARK GRAY ORGANIC SAND TO MUCK (A-8)
6	CALCAREOUS CLAY TO WEATHERED LIMESTONE
7	LIGHT GRAY CLAY (A-7-6)
▼+	GROUNDWATER LEVEL ABOVE GRADE
▼	GROUNDWATER LEVEL ENCOUNTERED DURING INVESTIGATION
▽	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
N	SPT N-VALUE IN BLOWS/FOOT FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED)
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW
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REFUSAL	BORING TERMINATED DUE TO AUGER REFUSAL ON ROCK MATERIAL
CAVE-IN	BOREHOLE COLLAPSE DUE TO GROUNDWATER INTRUSION
C/L CONST.	CENTERLINE CONSTRUCTION BUFFALO ROAD (60TH AVENUE E.)
C/L BUFFALO	BASELINE CONSTRUCTION BUFFALO ROAD (60TH AVENUE E.)
*	BORING LOCATED BY SURVEYOR

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AUTOMATIC HAMMER	
GRANULAR MATERIALS- RELATIVE DENSITY	SPT (BLOWS/FT.)
VERY LOOSE	LESS THAN 3
LOOSE	3 TO 8
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60TH AVENUE EXTENSION

SHEET NO.
SEG2-7

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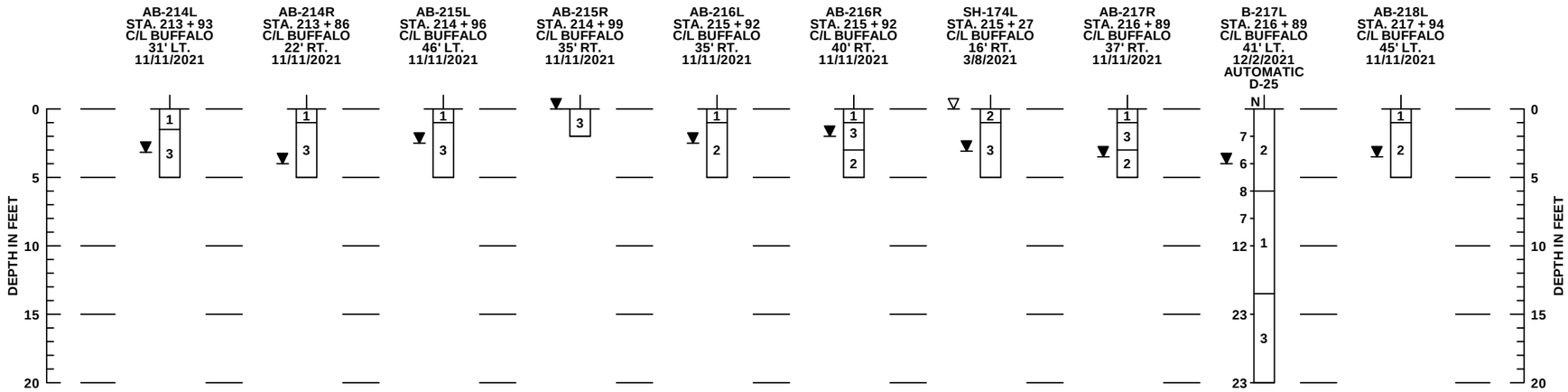
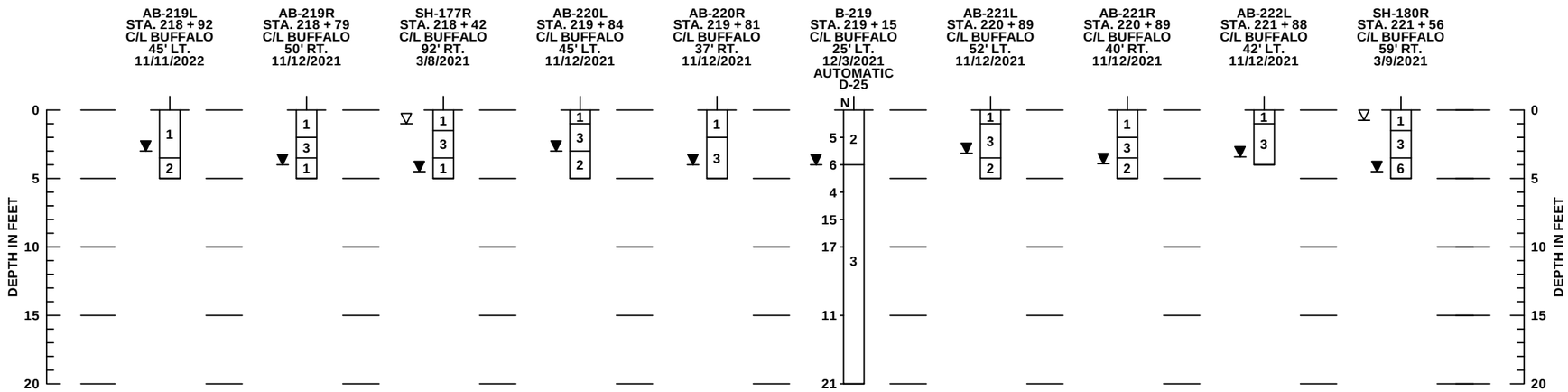
SOIL PROFILES





LEGEND

1	LIGHT GRAY TO BROWN FINE SAND (A-3/A-2-4)
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C/L CONST.	CENTERLINE CONSTRUCTION BUFFALO ROAD (60TH AVENUE E.)
C/L BUFFALO	BASELINE CONSTRUCTION BUFFALO ROAD (60TH AVENUE E.)
*	BORING LOCATED BY SURVEYOR

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AUTOMATIC HAMMER	
GRANULAR MATERIALS-RELATIVE DENSITY	SPT (BLOWS/FT.)
VERY LOOSE	LESS THAN 3
LOOSE	3 TO 8
MEDIUM	8 TO 24
DENSE	24 TO 40
VERY DENSE	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT (BLOWS/FT.)
VERY SOFT	LESS THAN 2
SOFT	1 TO 3
FIRM	3 TO 6
STIFF	6 TO 12
VERY STIFF	12 TO 24
HARD	GREATER THAN 24

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NUMBER	DESCRIPTION	DATE

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SEC./TWN./RGE	00/00/00	DRAWN	SW	06/2021
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Signature & Date

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PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
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60TH AVENUE EXTENSION

SHEET NO.
SEG2-8

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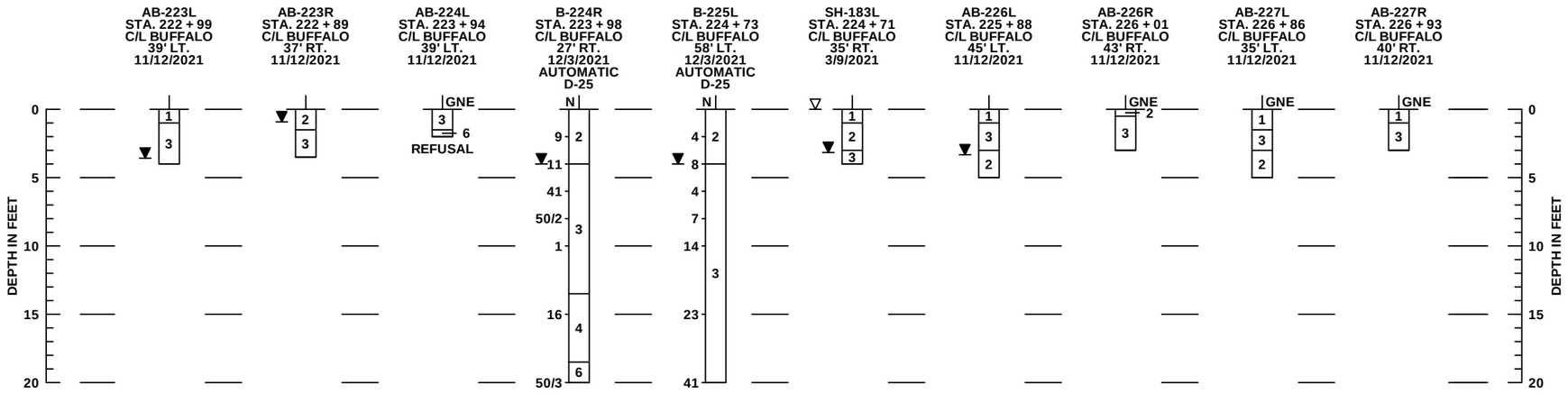
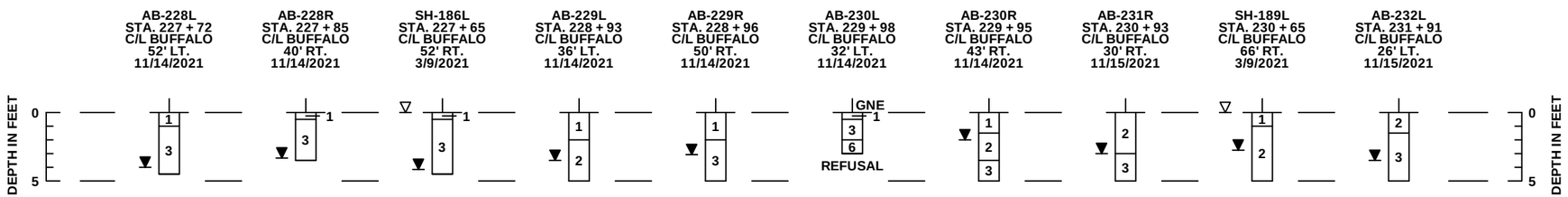
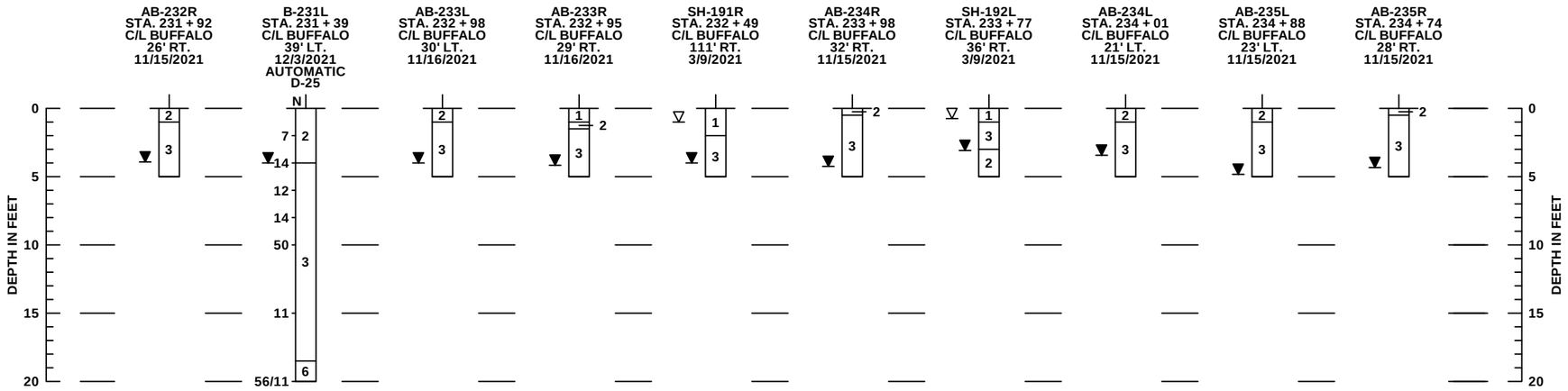
SOIL PROFILES







LEGEND

1	LIGHT GRAY TO BROWN FINE SAND (A-3/A-2-4)
2	LIGHT GRAY TO BROWN SILTY SAND (A-2-4)
3	LIGHT GRAY TO GRAY SILTY SAND TO CLAYEY SAND (A-2-4/A-2-6)
4	LIGHT GRAY SILT TO SANDY CLAY (A-4/A-6/A-7-6)
5	DARK GRAY ORGANIC SAND TO MUCK (A-8)
6	CALCAREOUS CLAY TO WEATHERED LIMESTONE
7	LIGHT GRAY CLAY (A-7-6)
▼+	GROUNDWATER LEVEL ABOVE GRADE
▼	GROUNDWATER LEVEL ENCOUNTERED DURING INVESTIGATION
▽	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
N	SPT N-VALUE IN BLOWS/FOOT FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED)
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GNE	GROUNDWATER TABLE NOT ENCOUNTERED
REFUSAL	BORING TERMINATED DUE TO AUGER REFUSAL ON ROCK MATERIAL
CAVE-IN	BOREHOLE COLLAPSE DUE TO GROUNDWATER INTRUSION
C/L CONST.	CENTERLINE CONSTRUCTION BUFFALO ROAD (60TH AVENUE E.)
C/L BUFFALO	BASELINE CONSTRUCTION BUFFALO ROAD (60TH AVENUE E.)
*	BORING LOCATED BY SURVEYOR

NOTE: BORING LOCATIONS WERE DETERMINED USING GPS COORDINATES OBTAINED BY TIERRA, INC. IN THE FIELD BY A TIERRA REPRESENTATIVE USING A GPS DEVICE WITH A REPORTED ACCURACY OF APPROXIMATELY +/- 10 FEET UNLESS OTHERWISE NOTED BY AN ASTERISK (*).

AUTOMATIC HAMMER	
GRANULAR MATERIALS-RELATIVE DENSITY	SPT (BLOWS/FT.)
VERY LOOSE	LESS THAN 3
LOOSE	3 TO 8
MEDIUM	8 TO 24
DENSE	24 TO 40
VERY DENSE	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT (BLOWS/FT.)
VERY SOFT	LESS THAN 2
SOFT	1 TO 3
FIRM	3 TO 6
STIFF	6 TO 12
VERY STIFF	12 TO 24
HARD	GREATER THAN 24

TIERRA
7351 Temple Terrace Highway
Tampa, Florida 33637
Phone: 813-989-1354 Fax: 813-989-1355

NUMBER	DESCRIPTION	DATE

PROJECT #	6083160	SURVEYED	----	__/__/__
SURVEY #	----	DESIGNED	SW	06/2021
SEC./TWN./RGE	00/00/00	DRAWN	SW	06/2021
SCALE	NOTED	CHECKED	MEN	06/2021

MARC E. NOVAK, P.E.
FLORIDA P.E. # 67431

Signature & Date

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

60TH AVENUE EXTENSION

SHEET NO.
SEG2-9

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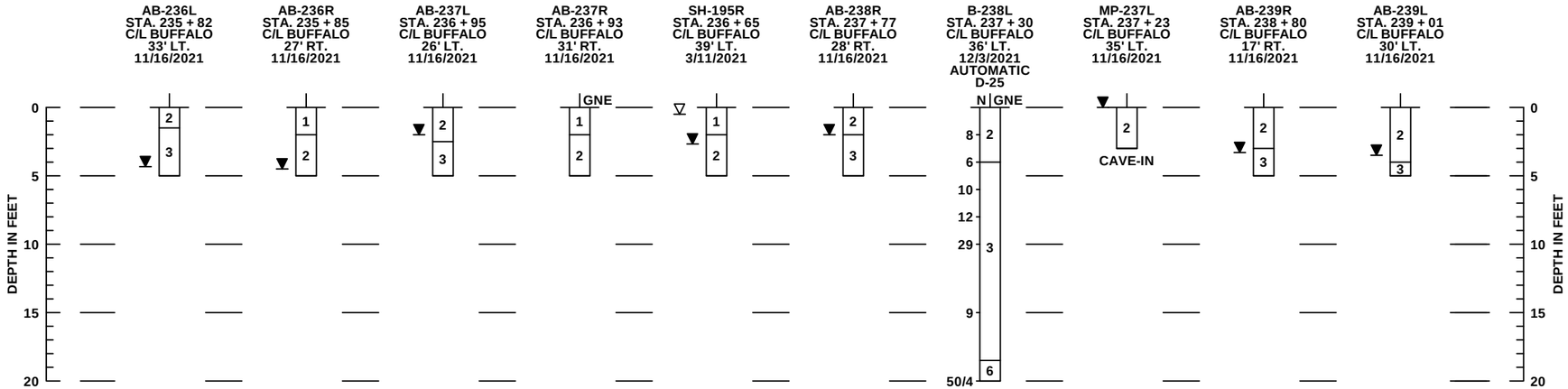
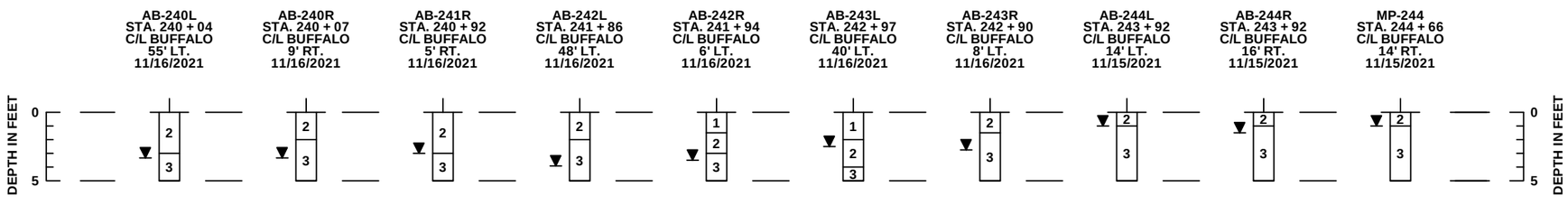
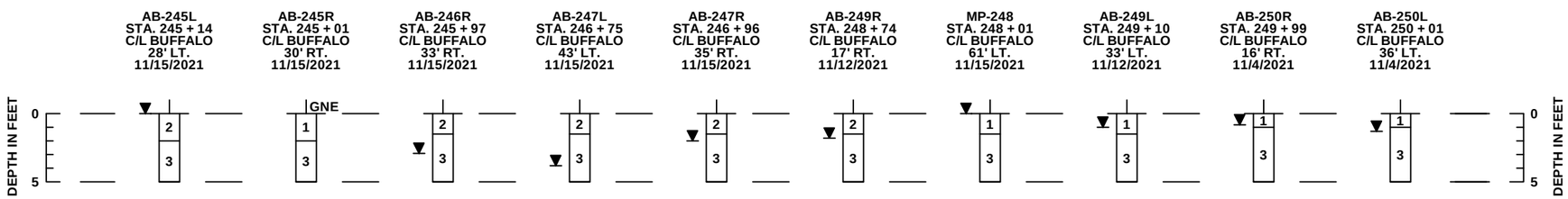
SOIL PROFILES







LEGEND

1	LIGHT GRAY TO BROWN FINE SAND (A-3/A-2-4)
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4	LIGHT GRAY SILT TO SANDY CLAY (A-4/A-6/A-7-6)
5	DARK GRAY ORGANIC SAND TO MUCK (A-8)
6	CALCAREOUS CLAY TO WEATHERED LIMESTONE
7	LIGHT GRAY CLAY (A-7-6)
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C/L CONST.	CENTERLINE CONSTRUCTION BUFFALO ROAD (60TH AVENUE E.)
C/L BUFFALO	BASELINE CONSTRUCTION BUFFALO ROAD (60TH AVENUE E.)
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MARC E. NOVAK, P.E.
FLORIDA P.E. # 67431
Signature & Date

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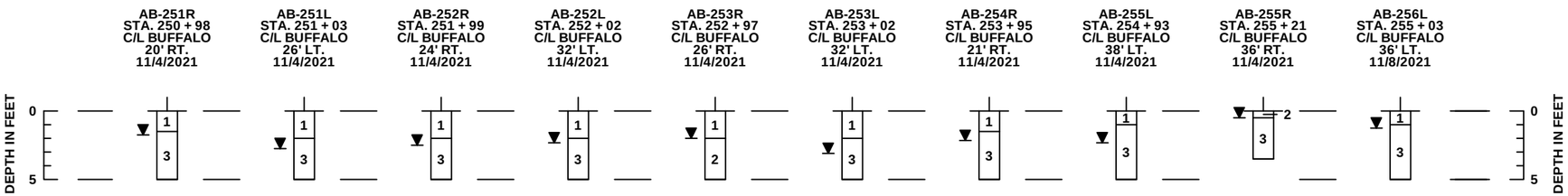
1022 26th Avenue East, Bradenton, FL 34208

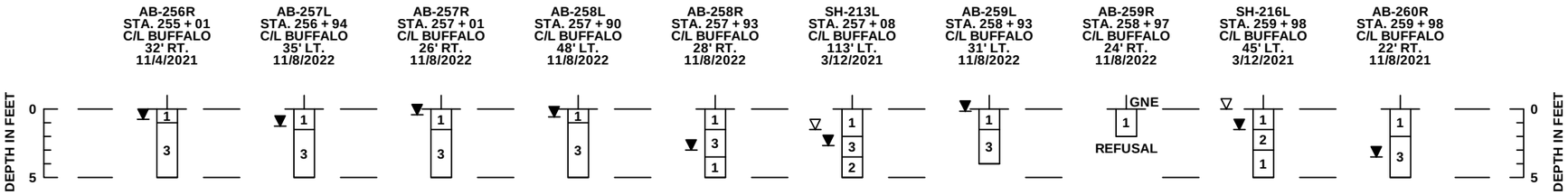
60TH AVENUE EXTENSION

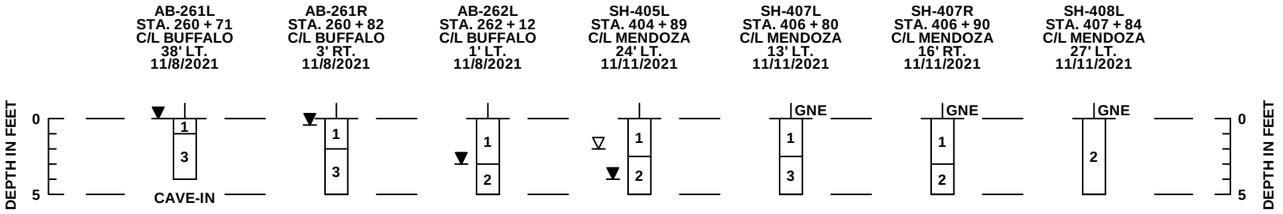
SHEET NO.
SEG2-10

J:\6511\2021 Files\6511-21-054 60th Ave Extension\CAD\6511-21-054_SEG_2.dwg [2/23/2022 2:49 PM]

SOIL PROFILES







LEGEND

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MARC E. NOVAK, P.E.
FLORIDA P.E. # 67431
Signature & Date

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60TH AVENUE EXTENSION

SHEET NO.
SEG2-11

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MANATEE COUNTY

PROJECT NAME: 69TH STREET EAST INTERSECTION IMPROVEMENTS

MANATEE COUNTY PROJECT NO. 6083160

DATE OF SURVEY: JANUARY 2022
SURVEY MADE BY: TIERRA, INC.
SUBMITTED BY: MARC E. NOVAK, P.E.

COUNTY: MANATEE

CROSS SECTION SOIL SURVEY FOR THE DESIGN OF ROADS

SURVEY BEGINS STA. : 196+77 SURVEY ENDS STA. : 506+50 REFERENCE: B/L SURVEY BUFFALO ROAD

	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 ohms cm	CHLORIDE ppm	SULFATES ppm	pH
1	1	3	1	26	32	---	---	---	--	1-14	---	---	---	A-3/A-2-4	LIGHT GRAY TO BROWN FINE SAND TO SILTY SAND	11	2900-28000	15-120	<4.8-45	4.6-8.2
2	1	3	8	12-23	24	---	---	--	--	15-34	7	NP	NP	A-2-4	LIGHT GRAY TO BROWN SILTY SAND	10	760-2400	15-45	<4.8-231	5.4-8.3
3	---	--	31	16-36	32	---	---	---	---	13-34	31	33-37	6-21	A-2-4/A-2-6	LIGHT GRAY TO GRAY SILTY SAND TO CLAYEY SAND	---	---	---	---	---
4	---	---	10	15-28	10	---	---	---	---	36-85	10	31-44	5-20	A-4/A-6/A-7-6	LIGHT GRAY SILT TO CLAY WITH SAND	1	8100	15	96	5.4
5	2	5-22	2	21-137	2	---	---	---	---	8-18	---	---	---	A-8	DARK GRAY ORGANIC SAND TO MUCK	---	---	---	---	---
6	---	---	---	---	---	---	---	---	---	---	---	---	---	WLS	CALCAREOUS CLAY TO WEATHERED LIMESTONE	---	---	---	---	---
7	---	---	1	67	1	---	---	---	---	72	1	132	64	A-7-6	LIGHT GRAY CLAY	---	---	---	---	---

EMBANKMENT AND SUBGRADE MATERIAL

STRATA BOUNDARIES ARE APPROXIMATE. MAKE FINAL CHECK AFTER GRADING.

▽ - ESTIMATED SEASONAL HIGH GROUNDWATER TABLE

▼ - GROUNDWATER TABLE ENCOUNTERED DURING INVESTIGATION

GNE - GROUNDWATER NOT ENCOUNTERED.

A - WITH LIMESTONE FRAGMENTS

NP - NON PLASTIC

NOTES:

1. THE MATERIAL FROM STRATUM 1 (A-3/A-2-4) APPEARS SATISFACTORY FOR USE IN THE EMBANKMENT WHEN UTILIZED IN ACCORDANCE WITH STANDARD PLANS, INDEX 120-001.
2. 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.
3. THE MATERIAL FROM STRATA 3 AND 4 (A-2-4/A-2-6/A-6/A-7-6/A-4) ARE PLASTIC MATERIALS 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, IF REQUIRED, WILL BE DEPICTED ON THE ROADWAY CROSS-SECTIONS AT THE NEXT SUBMITTAL.
4. THE MATERIAL FROM STRATUM 7 (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. THE REMOVAL LIMITS, IF REQUIRED, WILL BE DEPICTED ON THE ROADWAY CROSS-SECTIONS AT THE NEXT SUBMITTAL.
5. THE MATERIAL FROM STRATUM 5 (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 WILL BE DEPICTED ON THE ROADWAY CROSS-SECTIONS AT NEXT SUBMITTAL AND ON THE MUCK DELINEATION SHEETS.
6. THE MATERIAL FROM STRATUM NUMBER 6 IS A NATURAL LIMESTONE FORMATION. SPECIAL TOOLS AND EQUIPMENT WILL BE REQUIRED TO EXCAVATE AND/OR DEWATER THIS MATERIAL. WEATHERED LIMESTONE/CAPROCK WAS ENCOUNTERED WITHIN THE BORINGS. THIS MATERIAL IS ROCK AND IS LOCATED AT SHALLOW DEPTHS. EXCAVATIONS INTO AND/OR THROUGH LIMESTONE/CAPROCK WILL BE DIFFICULT AND WILL REQUIRE NON CONVENTIONAL CONSTRUCTION TECHNIQUES AND SPECIALIZED EQUIPMENT. LIMESTONE/CAPROCK IS POROUS AND WILL BE DIFFICULT TO DEWATER.

TIERRA
7351 Temple Terrace Highway
Tampa, Florida 33637
Phone: 813-989-1354 Fax: 813-989-1355

ROADWAY SOIL SURVEY - SEG. 3

NUMBER	DESCRIPTION	DATE

PROJECT #	6083160	SURVEYED	----	__/__/__
SURVEY #	----	DESIGNED	SW	06/2021
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MARC E. NOVAK, P.E.
FLORIDA P.E. # 67431
Signature & Date

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1022 26th Avenue East, Bradenton, FL 34208

60TH AVENUE EXTENSION

SHEET NO.
SEG3-1

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MATCH LINE SHEET SEG3-4

MATCH LINE SHEET SEG3-3

NOTE: BASE MAP PROVIDED BY KISINGER CAMPO & ASSOCIATES, CORP.

BORING LOCATION PLAN

0 100'

PLAN SCALE

LEGEND

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

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60TH AVENUE EXTENSION

SHEET NO.
SEG3-2

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MATCH LINE SHEET SEG3–2

NOTE: BASE MAP PROVIDED BY KISINGER CAMPO & ASSOCIATES, CORP.

BORING LOCATION PLAN

0 100'

PLAN SCALE

LEGEND

- APPROXIMATE LOCATION OF AUGER BORING
- APPROXIMATE LOCATION OF SPT BORING
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60TH AVENUE EXTENSION

SHEET NO.
SEG3-3

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MATCH LINE SHEET SEG3–2

NOTE: BASE MAP PROVIDED BY KISINGER CAMPO & ASSOCIATES, CORP.

BORING LOCATION PLAN

0 100'

PLAN SCALE

LEGEND

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- APPROXIMATE LOCATION OF SPT BORING
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60TH AVENUE EXTENSION

SHEET NO.
SEG3-4

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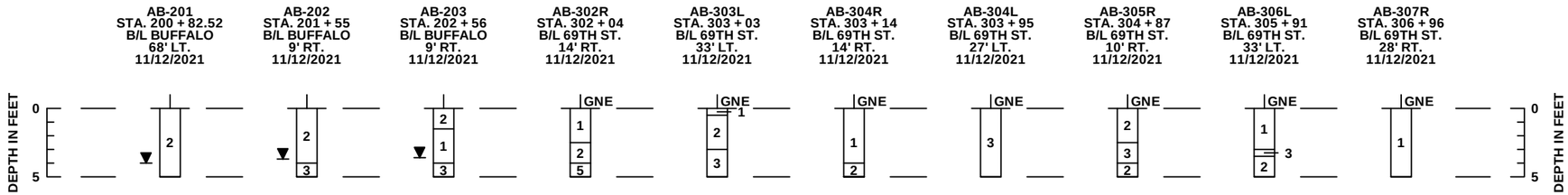
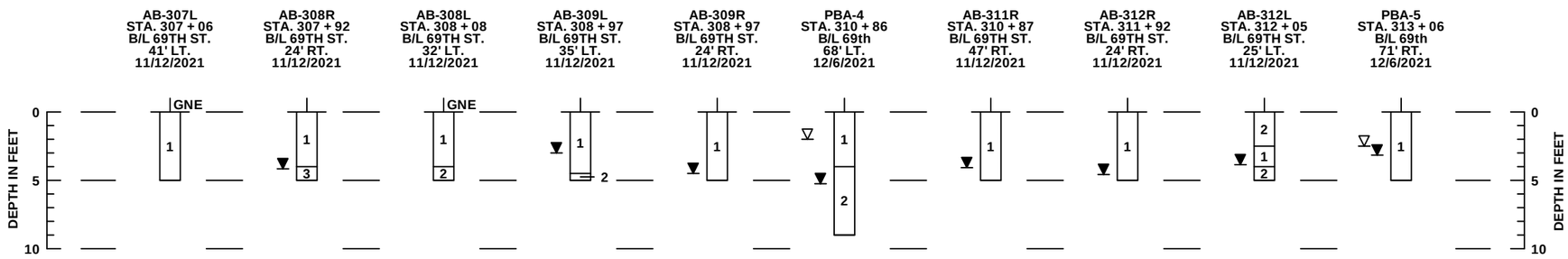
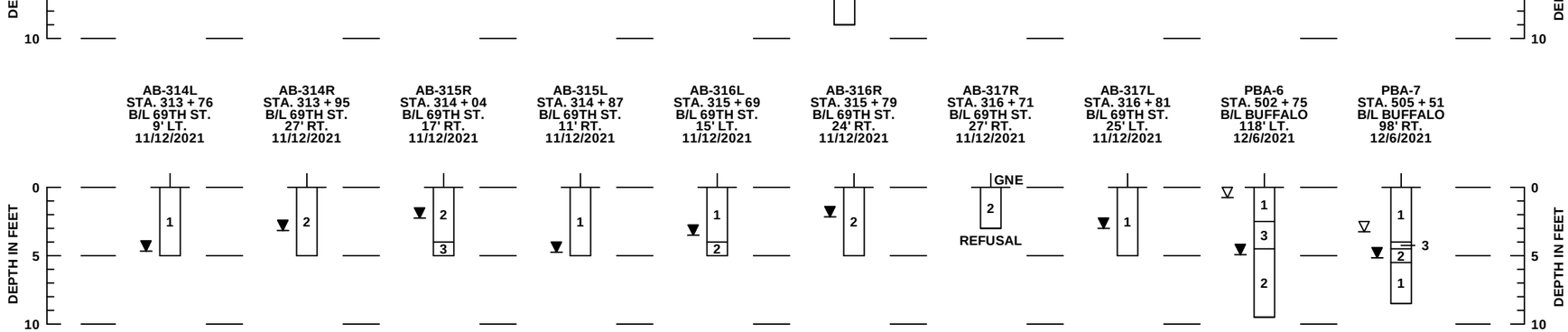
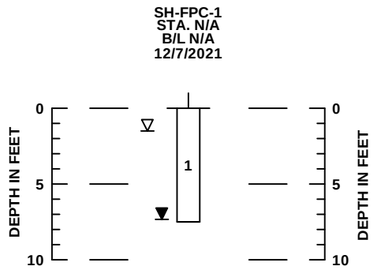
SOIL PROFILES









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B/L 69TH ST.	BASELINE 69TH STREET
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SEC./TWN./RGE	00/00/00	DRAWN	SW	06/2021
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MARC E. NOVAK, P.E.
FLORIDA P.E. # 67431
Signature & Date

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

60TH AVENUE EXTENSION

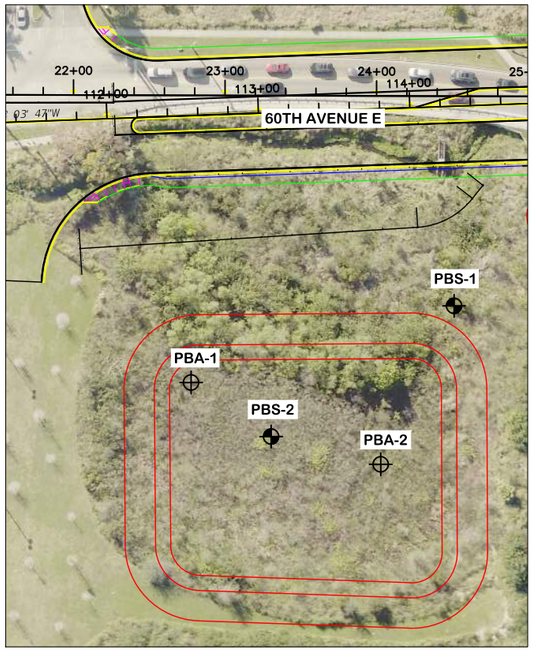
SHEET NO.
SEG3-5

J:\65111\2021 Files\6511-21-054 60th Ave Extension\CAD\6511-21-054_SEG_3.dwg [2/23/2022 2:48 PM]

BORING LOCATION PLAN

0 100'

PLAN SCALE



NOTE: BASE MAP PROVIDED BY KISINGER CAMPO & ASSOCIATES, CORP.

LEGEND

1 LIGHT GRAY TO BROWN FINE SAND (A-3/A-2-4)

2 LIGHT GRAY TO BROWN SILTY SAND (A-2-4)

3 LIGHT GRAY TO GRAY SILTY SAND TO CLAYEY SAND (A-2-4/A-2-6)

4 LIGHT GRAY SILT TO SANDY CLAY (A-4/A-6/A-7-6)

5 DARK GRAY ORGANIC SAND TO MUCK (A-8)

6 CALCAREOUS CLAY TO WEATHERED LIMESTONE

7 LIGHT GRAY CLAY (A-7-6)

A - WITH LIMEROCK FRAGMENTS

APPROXIMATE LOCATION OF AUGER BORING

APPROXIMATE LOCATION OF SPT BORING

GROUNDWATER LEVEL ENCOUNTERED DURING INVESTIGATION

ESTIMATED SEASONAL HIGH GROUNDWATER TABLE

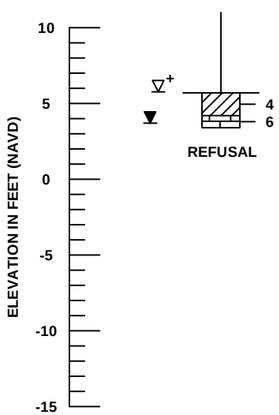
ESTIMATED SEASONAL HIGH GROUNDWATER TABLE IS ABOVE GRADE

N	SPT N-VALUE IN BLOWS/FOOT FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED)
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW
GNE	GROUNDWATER TABLE NOT ENCOUNTERED
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCES
REFUSAL	BORING TERMINATED DUE TO AUGER REFUSAL ON ROCK MATERIAL
C/L SURVEY	CENTERLINE SURVEY 60TH AVENUE EAST
NAVD	NORTH AMERICAN VERTICAL DATUM OF 1988
*	BORING LOCATED BY SURVEYOR
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
OC	ORGANIC CONTENT (%)
NP	NON PLASTIC

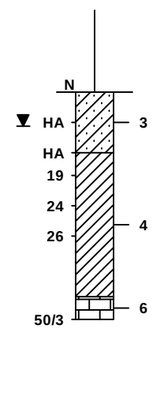
NOTE: BORING LOCATIONS WERE DETERMINED USING GPS COORDINATES OBTAINED BY TIERRA, INC. IN THE FIELD BY A TIERRA REPRESENTATIVE USING A GPS DEVICE WITH A REPORTED ACCURACY OF APPROXIMATELY +/- 10 FEET UNLESS OTHERWISE NOTED BY AN ASTERISK (*).

AUTOMATIC HAMMER	
GRANULAR MATERIALS-RELATIVE DENSITY	SPT (BLOWS/FT.)
VERY LOOSE	LESS THAN 3
LOOSE	3 TO 8
MEDIUM	8 TO 24
DENSE	24 TO 40
VERY DENSE	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT (BLOWS/FT.)
VERY SOFT	LESS THAN 2
SOFT	1 TO 3
FIRM	3 TO 6
STIFF	6 TO 12
VERY STIFF	12 TO 24
HARD	GREATER THAN 24

BOR # PBA-1*
STA. 22+78
REF. C/L SURVEY
OFF. 189' RT.
ELEV. 5.7
DATE 5/21/2021

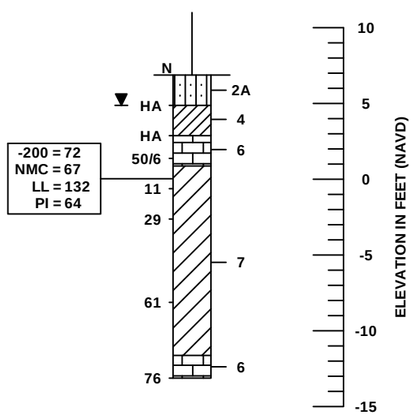


BOR # PBS-2*
STA. 23+31
REF. C/L SURVEY
OFF. 225' RT.
ELEV. 5.6
DATE 5/20/2021
DRILLER M. ATKINSON
HAMMER AUTOMATIC
RIG D-25



BOR # PBA-2*
STA. 24+03
REF. C/L SURVEY
OFF. 243' RT.
ELEV. 5.8
DATE 5/21/2021

BOR # PBS-1*
STA. 24+52
REF. C/L SURVEY
OFF. 138' RT.
ELEV. 6.9
DATE 5/20/2021
DRILLER M. ATKINSON
HAMMER AUTOMATIC
RIG D-25



TIERRA
7351 Temple Terrace Highway
Tampa, Florida 33637
Phone: 813-989-1354 Fax: 813-989-1355

NUMBER	DESCRIPTION	DATE

PROJECT #	6083160	SURVEYED	----	__/__/__
SURVEY #	----	DESIGNED	SW	10/2021
SEC./TWN./RGE	00/00/00	DRAWN	SW	10/2021
SCALE	NOTED	CHECKED	MEN	10/2021

MARC E. NOVAK, P.E.
FLORIDA P.E. # 67431

Signature & Date

Manatee County FLORIDA

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

60TH AVENUE EXTENSION

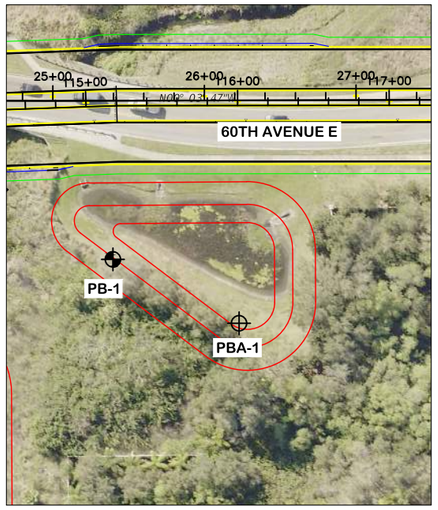
SHEET NO.
SEG1-P1

J:\6511\2021 Files\6511-21-054 60th Ave Extension\CAD\6511-21-054_SEG_1_POND.dwg [2/23/2022 2:45 PM]

BORING LOCATION PLAN

0 100'

PLAN SCALE



NOTE: BASE MAP PROVIDED BY KISINGER CAMPO & ASSOCIATES, CORP.

LEGEND

1 LIGHT GRAY TO BROWN FINE SAND (A-3/A-2-4)

2 LIGHT GRAY TO BROWN SILTY SAND (A-2-4)

3 LIGHT GRAY TO GRAY SILTY SAND TO CLAYEY SAND (A-2-4/A-2-6)

4 LIGHT GRAY SILT TO SANDY CLAY (A-4/A-6/A-7-6)

5 DARK GRAY ORGANIC SAND TO MUCK (A-8)

6 CALCAREOUS CLAY TO WEATHERED LIMESTONE

7 LIGHT GRAY CLAY (A-7-6)

A - WITH LIMEROCK FRAGMENTS

APPROXIMATE LOCATION OF AUGER BORING

APPROXIMATE LOCATION OF SPT BORING

GROUNDWATER LEVEL ENCOUNTERED DURING INVESTIGATION

ESTIMATED SEASONAL HIGH GROUNDWATER TABLE

ESTIMATED SEASONAL HIGH GROUNDWATER TABLE IS ABOVE GRADE

N	SPT N-VALUE IN BLOWS/FOOT FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED)
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW
GNE	GROUNDWATER TABLE NOT ENCOUNTERED
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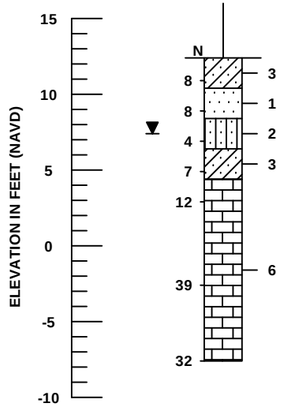
C/L SURVEY	CENTERLINE SURVEY 60TH AVENUE EAST
NAVD	NORTH AMERICAN VERTICAL DATUM OF 1988
*	BORING LOCATED BY SURVEYOR
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
OC	ORGANIC CONTENT (%)
NP	NON PLASTIC

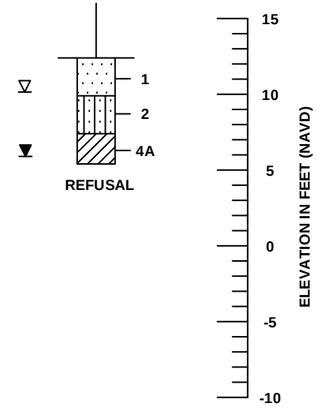
NOTE: BORING LOCATIONS WERE DETERMINED USING GPS COORDINATES OBTAINED BY TIERRA, INC. IN THE FIELD BY A TIERRA REPRESENTATIVE USING A GPS DEVICE WITH A REPORTED ACCURACY OF APPROXIMATELY +/- 10 FEET UNLESS OTHERWISE NOTED BY AN ASTERISK (*).

AUTOMATIC HAMMER	
GRANULAR MATERIALS-RELATIVE DENSITY	SPT (BLOWS/FT.)
VERY LOOSE	LESS THAN 3
LOOSE	3 TO 8
MEDIUM	8 TO 24
DENSE	24 TO 40
VERY DENSE	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT (BLOWS/FT.)
VERY SOFT	LESS THAN 2
SOFT	1 TO 3
FIRM	3 TO 6
STIFF	6 TO 12
VERY STIFF	12 TO 24
HARD	GREATER THAN 24

BOR # PB-1
STA. 114+95
REF. C/L BASELINE
ELEV. 12.4
DATE 11/30/2021
DRILLER B. CRAIG
HAMMER AUTOMATIC
RIG D-25



BOR # PBA-1*
STA. 116+01
REF. C/L BASELINE
ELEV. 12.4
DATE 1/18/2022



TIERRA
7351 Temple Terrace Highway
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NUMBER	DESCRIPTION	DATE

PROJECT #	6083160	SURVEYED	----	__/__/__
SURVEY #	----	DESIGNED	SW	10/2021
SEC./TWN./RGE	00/00/00	DRAWN	SW	10/2021
SCALE	NOTED	CHECKED	MEN	10/2021

MARC E. NOVAK, P.E.
FLORIDA P.E. # 67431

Signature & Date

Manatee County FLORIDA

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

60TH AVENUE EXTENSION

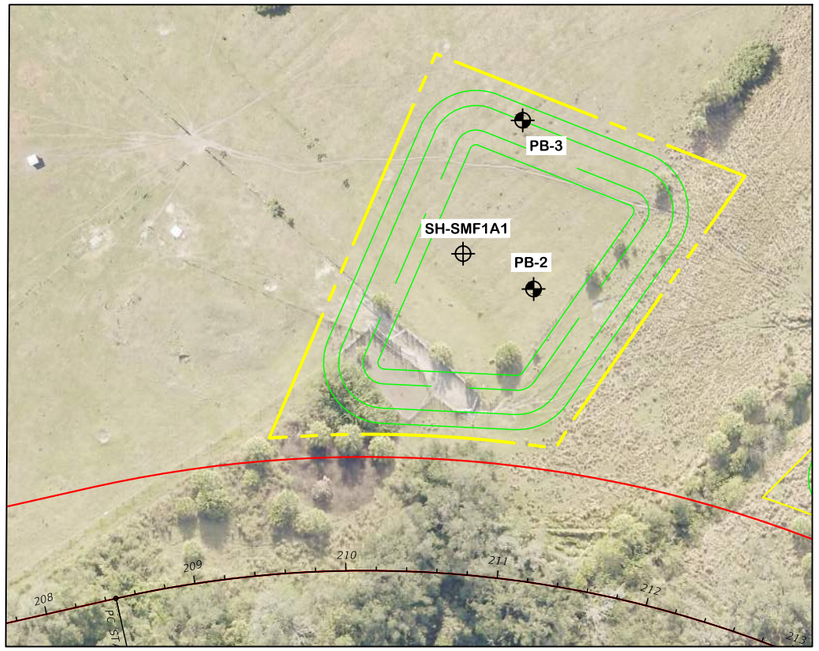
SHEET NO.
SEG1-P2

J:\6511\2021 Files\6511-21-054 60th Ave Extension\CAD\6511-21-054_SEG_1_POND.dwg [2/23/2022 2:45 PM]

BORING LOCATION PLAN

0 100'

PLAN SCALE



NOTE: BASE MAP PROVIDED BY KISINGER CAMPO & ASSOCIATES, CORP.

LEGEND

1 LIGHT GRAY TO BROWN FINE SAND (A-3/A-2-4)

2 LIGHT GRAY TO BROWN SILTY SAND (A-2-4)

3 LIGHT GRAY TO GRAY SILTY SAND TO CLAYEY SAND (A-2-4/A-2-6)

4 LIGHT GRAY SILT TO SANDY CLAY (A-4/A-6/A-7-6)

5 DARK GRAY ORGANIC SAND TO MUCK (A-8)

6 CALCAREOUS CLAY TO WEATHERED LIMESTONE

7 LIGHT GRAY CLAY (A-7-6)

A - WITH LIMEROCK FRAGMENTS

APPROXIMATE LOCATION OF AUGER BORING

APPROXIMATE LOCATION OF SPT BORING

GROUNDWATER LEVEL ENCOUNTERED DURING INVESTIGATION

ESTIMATED SEASONAL HIGH GROUNDWATER TABLE

ESTIMATED SEASONAL HIGH GROUNDWATER TABLE IS ABOVE GRADE

N	SPT N-VALUE IN BLOWS/FOOT FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED)
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NAVD	NORTH AMERICAN VERTICAL DATUM OF 1988
*	BORING LOCATED BY SURVEYOR
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
OC	ORGANIC CONTENT (%)
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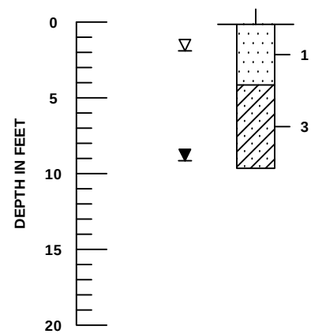
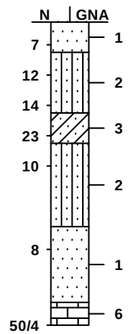
AUTOMATIC HAMMER	
GRANULAR MATERIALS-RELATIVE DENSITY	SPT (BLOWS/FT.)
VERY LOOSE	LESS THAN 3
LOOSE	3 TO 8
MEDIUM	8 TO 24
DENSE	24 TO 40
VERY DENSE	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT (BLOWS/FT.)
VERY SOFT	LESS THAN 2
SOFT	1 TO 3
FIRM	3 TO 6
STIFF	6 TO 12
VERY STIFF	12 TO 24
HARD	GREATER THAN 24

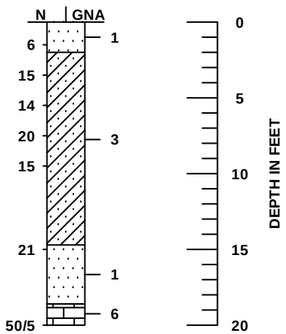
BOR #	SH-SMF1A1*
STA.	210+62
REF.	CL/CONST
OFF.	209' LT.
ELEV.	30.1
DATE	7/30/2021



BOR #	PB-3
STA.	210+87
REF.	CL/CONST
OFF.	302' LT.
ELEV.	30.5
DATE	12/1/2021
DRILLER	B. CRAIG
HAMMER	AUTOMATIC
RIG	D-25



BOR #	PB-2
STA.	211+02
REF.	CL/CONST
OFF.	192' LT.
ELEV.	30.1
DATE	12/1/2021
DRILLER	B. CRAIG
HAMMER	AUTOMATIC
RIG	D-25



TIERRA
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J:\6511\2021 Files\6511-21-054 60th Ave Extension\CAD\6511-21-054_SEG_2_POND.dwg [2/23/2022 4:31 PM]

NUMBER	DESCRIPTION	DATE

PROJECT #	6083160	SURVEYED	----	__/__/__
SURVEY #	----	DESIGNED	SW	06/2021
SEC./TWN./RGE	00/00/00	DRAWN	SW	06/2021
SCALE	NOTED	CHECKED	MEN	06/2021

MARC E. NOVAK, P.E.
FLORIDA P.E. # 67431

Signature & Date

Manatee County FLORIDA

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

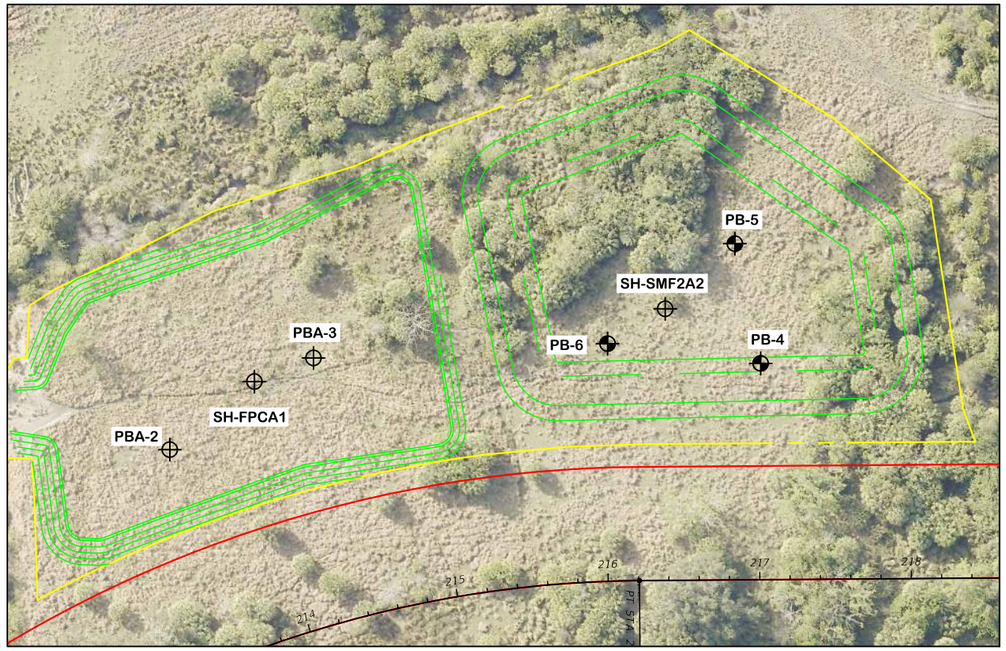
60TH AVENUE EXTENSION

SHEET NO.
SEG2-P1

BORING LOCATION PLAN

0 100'

PLAN SCALE



NOTE: BASE MAP PROVIDED BY KISINGER CAMPO & ASSOCIATES, CORP.

LEGEND

1 LIGHT GRAY TO BROWN FINE SAND (A-3/A-2-4)

2 LIGHT GRAY TO BROWN SILTY SAND (A-2-4)

3 LIGHT GRAY TO GRAY SILTY SAND TO CLAYEY SAND (A-2-4/A-2-6)

4 LIGHT GRAY SILT TO SANDY CLAY (A-4/A-6/A-7-6)

5 DARK GRAY ORGANIC SAND TO MUCK (A-8)

6 CALCAREOUS CLAY TO WEATHERED LIMESTONE

7 LIGHT GRAY CLAY (A-7-6)

A - WITH LIMEROCK FRAGMENTS

APPROXIMATE LOCATION OF AUGER BORING

APPROXIMATE LOCATION OF SPT BORING

GROUNDWATER LEVEL ENCOUNTERED DURING INVESTIGATION

ESTIMATED SEASONAL HIGH GROUNDWATER TABLE

ESTIMATED SEASONAL HIGH GROUNDWATER TABLE IS ABOVE GRADE

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C/L SURVEY	CENTERLINE SURVEY 60TH AVENUE EAST
NAVD	NORTH AMERICAN VERTICAL DATUM OF 1988
*	BORING LOCATED BY SURVEYOR
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
OC	ORGANIC CONTENT (%)
NP	NON PLASTIC

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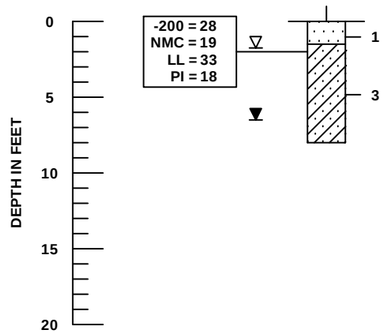
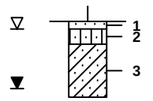
AUTOMATIC HAMMER	
GRANULAR MATERIALS-RELATIVE DENSITY	SPT (BLOWS/FT.)
VERY LOOSE	LESS THAN 3
LOOSE	3 TO 8
MEDIUM	8 TO 24
DENSE	24 TO 40
VERY DENSE	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT (BLOWS/FT.)
VERY SOFT	LESS THAN 2
SOFT	1 TO 3
FIRM	3 TO 6
STIFF	6 TO 12
VERY STIFF	12 TO 24
HARD	GREATER THAN 24

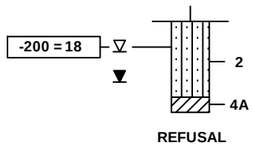
BOR # PBA-2* | STA. 213+56 | REF. CL/CONST | OFF. 144' LT. | ELEV. 27.8 | DATE 1/18/2022



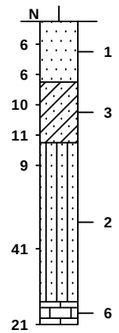
BOR # SH-FPCA1* | STA. 214+11 | REF. CL/CONST | OFF. 169' LT. | ELEV. 27.6 | DATE 7/30/2021



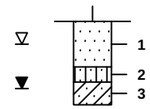
BOR # PBA-3* | STA. 214+45 | REF. CL/CONST | OFF. 174' LT. | ELEV. 27.7 | DATE 1/18/2022



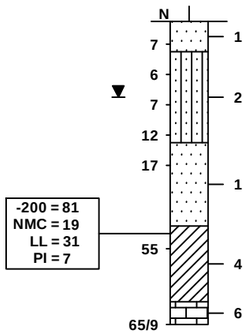
BOR # PB-6 | STA. 216+04 | REF. CL/CONST | OFF. 157' LT | ELEV. 27.2 | DATE 12/2/2021 | DRILLER B. CRAIG | HAMMER AUTOMATIC | RIG D-25



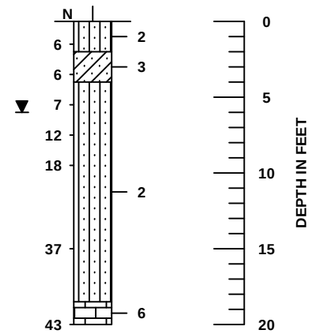
BOR # SH-SMF2A2* | STA. 216+40 | REF. C/L CONST | OFF. 183' LT. | ELEV. 27.3 | DATE 7/30/2021



BOR # PB-5 | STA. 216+85 | REF. CL/CONST | OFF. 222' LT. | ELEV. 26.9 | DATE 12/2/2021 | DRILLER B. CRAIG | HAMMER AUTOMATIC | RIG D-25



BOR # PB-4 | STA. 217+02 | REF. CL/CONST | OFF. 143' LT. | ELEV. 27.2 | DATE 12/2/2021 | DRILLER B. CRAIG | HAMMER AUTOMATIC | RIG D-25



TIERRA
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NUMBER	DESCRIPTION	DATE

PROJECT #	6083160	SURVEYED	----	__/__/__
SURVEY #	----	DESIGNED	SW	06/2021
SEC./TWN./RGE	00/00/00	DRAWN	SW	06/2021
SCALE	NOTED	CHECKED	MEN	06/2021

MARC E. NOVAK, P.E.
FLORIDA P.E. # 67431

Signature & Date

Manatee County FLORIDA

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

60TH AVENUE EXTENSION

SHEET NO.
SEG2-P2

J:\6511\2021 Files\6511-21-054 60th Ave Extension\CAD\6511-21-054_SEG_2_POND.dwg [2/23/2022 4:31 PM]

BORING LOCATION PLAN

0 200'

PLAN SCALE

NOTE: BASE MAP PROVIDED BY KISINGER CAMPO & ASSOCIATES, CORP.

LEGEND

1 LIGHT GRAY TO BROWN FINE SAND (A-3/A-2-4)

2 LIGHT GRAY TO BROWN SILTY SAND (A-2-4)

3 LIGHT GRAY TO GRAY SILTY SAND TO CLAYEY SAND (A-2-4/A-2-6)

4 LIGHT GRAY SILT TO SANDY CLAY (A-4/A-6/A-7-6)

5 DARK GRAY ORGANIC SAND TO MUCK (A-8)

6 CALCAREOUS CLAY TO WEATHERED LIMESTONE

7 LIGHT GRAY CLAY (A-7-6)

A - WITH LIMEROCK FRAGMENTS

APPROXIMATE LOCATION OF AUGER BORING

APPROXIMATE LOCATION OF SPT BORING

GROUNDWATER LEVEL ENCOUNTERED DURING INVESTIGATION

ESTIMATED SEASONAL HIGH GROUNDWATER TABLE

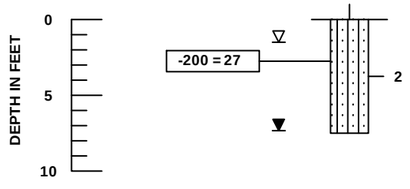
ESTIMATED SEASONAL HIGH GROUNDWATER TABLE IS ABOVE GRADE

N	SPT N-VALUE IN BLOWS/FOOT FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED)
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW
GNE	GROUNDWATER TABLE NOT ENCOUNTERED
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCES
REFUSAL	BORING TERMINATED DUE TO AUGER REFUSAL ON ROCK MATERIAL
C/L SURVEY	CENTERLINE SURVEY 60TH AVENUE EAST
NAVD	NORTH AMERICAN VERTICAL DATUM OF 1988
*	BORING LOCATED BY SURVEYOR
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
OC	ORGANIC CONTENT (%)
NP	NON PLASTIC

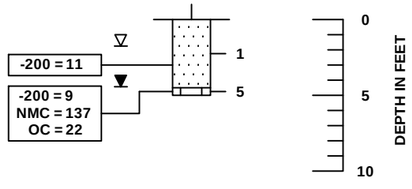
NOTE: BORING LOCATIONS WERE DETERMINED USING GPS COORDINATES OBTAINED BY TIERRA, INC. IN THE FIELD BY A TIERRA REPRESENTATIVE USING A GPS DEVICE WITH A REPORTED ACCURACY OF APPROXIMATELY +/- 10 FEET UNLESS OTHERWISE NOTED BY AN ASTERISK (*).

AUTOMATIC HAMMER	
GRANULAR MATERIALS-RELATIVE DENSITY	SPT (BLOWS/FT.)
VERY LOOSE	LESS THAN 3
LOOSE	3 TO 8
MEDIUM	8 TO 24
DENSE	24 TO 40
VERY DENSE	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT (BLOWS/FT.)
VERY SOFT	LESS THAN 2
SOFT	1 TO 3
FIRM	3 TO 6
STIFF	6 TO 12
VERY STIFF	12 TO 24
HARD	GREATER THAN 24

BOR #	SH-FPC-1*
STA.	N/A
REF.	C/L CONST
OFF.	N/A
ELEV.	22.3
DATE	12/7/2021



BOR #	SH-FPC-2*
STA.	303+78
REF.	C/L CONST
OFF.	116' LT.
ELEV.	18.6
DATE	12/7/2021



TIERRA
7351 Temple Terrace Highway
Tampa, Florida 33637
Phone: 813-989-1354 Fax: 813-989-1355

NUMBER	DESCRIPTION	DATE

PROJECT #	6083160	SURVEYED	----	__/__/__
SURVEY #	----	DESIGNED	SW	06/2021
SEC./TWN./RGE	00/00/00	DRAWN	SW	06/2021
SCALE	NOTED	CHECKED	MEN	06/2021

MARC E. NOVAK, P.E.
FLORIDA P.E. # 67431

Signature & Date

Manatee County FLORIDA

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

60TH AVENUE EXTENSION

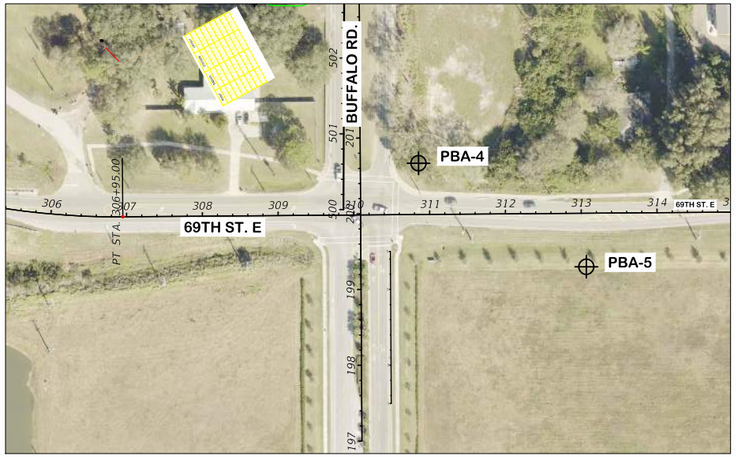
SHEET NO.
SEG3-P1

J:\6511\2021 Files\6511-21-054 60th Ave Extension\CAD\6511-21-054_SEG_3_POND.dwg [2/23/2022 2:43 PM]

BORING LOCATION PLAN

0 200'

PLAN SCALE



NOTE: BASE MAP PROVIDED BY KISINGER CAMPO & ASSOCIATES, CORP.

LEGEND

1 LIGHT GRAY TO BROWN FINE SAND (A-3/A-2-4)

2 LIGHT GRAY TO BROWN SILTY SAND (A-2-4)

3 LIGHT GRAY TO GRAY SILTY SAND TO CLAYEY SAND (A-2-4/A-2-6)

4 LIGHT GRAY SILT TO SANDY CLAY (A-4/A-6/A-7-6)

5 DARK GRAY ORGANIC SAND TO MUCK (A-8)

6 CALCAREOUS CLAY TO WEATHERED LIMESTONE

7 LIGHT GRAY CLAY (A-7-6)

A - WITH LIMEROCK FRAGMENTS

APPROXIMATE LOCATION OF AUGER BORING

APPROXIMATE LOCATION OF SPT BORING

GROUNDWATER LEVEL ENCOUNTERED DURING INVESTIGATION

ESTIMATED SEASONAL HIGH GROUNDWATER TABLE

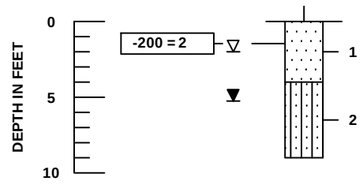
ESTIMATED SEASONAL HIGH GROUNDWATER TABLE IS ABOVE GRADE

N	SPT N-VALUE IN BLOWS/FOOT FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED)
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW
GNE	GROUNDWATER TABLE NOT ENCOUNTERED
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCES
REFUSAL	BORING TERMINATED DUE TO AUGER REFUSAL ON ROCK MATERIAL
C/L SURVEY	CENTERLINE SURVEY 60TH AVENUE EAST
NAVD	NORTH AMERICAN VERTICAL DATUM OF 1988
*	BORING LOCATED BY SURVEYOR
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
OC	ORGANIC CONTENT (%)
NP	NON PLASTIC

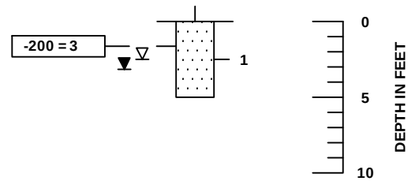
NOTE: BORING LOCATIONS WERE DETERMINED USING GPS COORDINATES OBTAINED BY TIERRA, INC. IN THE FIELD BY A TIERRA REPRESENTATIVE USING A GPS DEVICE WITH A REPORTED ACCURACY OF APPROXIMATELY +/- 10 FEET UNLESS OTHERWISE NOTED BY AN ASTERISK (*).

AUTOMATIC HAMMER	
GRANULAR MATERIALS-RELATIVE DENSITY	SPT (BLOWS/FT.)
VERY LOOSE	LESS THAN 3
LOOSE	3 TO 8
MEDIUM	8 TO 24
DENSE	24 TO 40
VERY DENSE	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT (BLOWS/FT.)
VERY SOFT	LESS THAN 2
SOFT	1 TO 3
FIRM	3 TO 6
STIFF	6 TO 12
VERY STIFF	12 TO 24
HARD	GREATER THAN 24

BOR #	PBA-4*
STA.	310+86
REF.	C/L CONST
OFF.	68' LT.
ELEV.	24.3
DATE	12/6/2021



BOR #	PBA-5*
STA.	313+06
REF.	C/L CONST
OFF.	71' RT.
ELEV.	26.3
DATE	12/6/2021



TIERRA
7351 Temple Terrace Highway
Tampa, Florida 33637
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NUMBER	DESCRIPTION	DATE

PROJECT #	6083160	SURVEYED	----	__/__/__
SURVEY #	----	DESIGNED	SW	06/2021
SEC./TWN./RGE	00/00/00	DRAWN	SW	06/2021
SCALE	NOTED	CHECKED	MEN	06/2021

MARC E. NOVAK, P.E.
FLORIDA P.E. # 67431

Signature & Date

Manatee County FLORIDA

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

60TH AVENUE EXTENSION

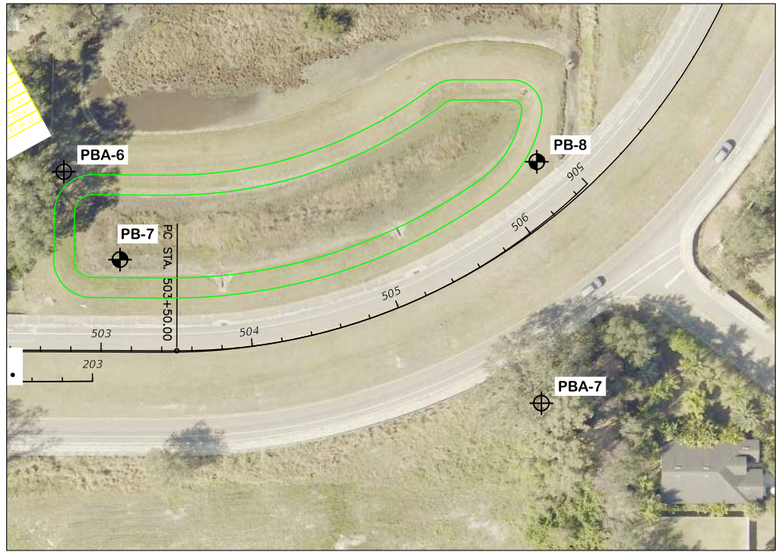
SHEET NO.
SEG3-P2

J:\6511\2021 Files\6511-21-054 60th Ave Extension\CAD\6511-21-054_SEG_3_POND.dwg [2/23/2022 2:43 PM]

BORING LOCATION PLAN

0 100'

PLAN SCALE



NOTE: BASE MAP PROVIDED BY KISINGER CAMPO & ASSOCIATES, CORP.

LEGEND

1 LIGHT GRAY TO BROWN FINE SAND (A-3/A-2-4)

2 LIGHT GRAY TO BROWN SILTY SAND (A-2-4)

3 LIGHT GRAY TO GRAY SILTY SAND TO CLAYEY SAND (A-2-4/A-2-6)

4 LIGHT GRAY SILT TO SANDY CLAY (A-4/A-6/A-7-6)

5 DARK GRAY ORGANIC SAND TO MUCK (A-8)

6 CALCAREOUS CLAY TO WEATHERED LIMESTONE

7 LIGHT GRAY CLAY (A-7-6)

A - WITH LIMEROCK FRAGMENTS

APPROXIMATE LOCATION OF AUGER BORING

APPROXIMATE LOCATION OF SPT BORING

GROUNDWATER LEVEL ENCOUNTERED DURING INVESTIGATION

ESTIMATED SEASONAL HIGH GROUNDWATER TABLE

ESTIMATED SEASONAL HIGH GROUNDWATER TABLE IS ABOVE GRADE

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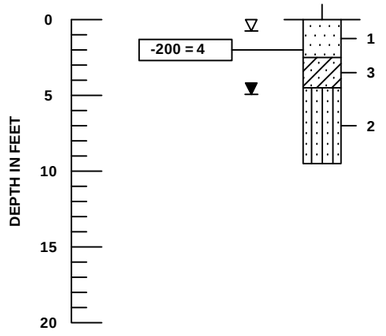
GNE	GROUNDWATER TABLE NOT ENCOUNTERED
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCES
REFUSAL	BORING TERMINATED DUE TO AUGER REFUSAL ON ROCK MATERIAL
C/L SURVEY	CENTERLINE SURVEY 60TH AVENUE EAST
NAVD	NORTH AMERICAN VERTICAL DATUM OF 1988
*	BORING LOCATED BY SURVEYOR
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
OC	ORGANIC CONTENT (%)
NP	NON PLASTIC

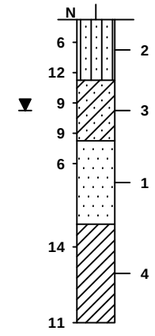
NOTE: BORING LOCATIONS WERE DETERMINED USING GPS COORDINATES OBTAINED BY TIERRA, INC. IN THE FIELD BY A TIERRA REPRESENTATIVE USING A GPS DEVICE WITH A REPORTED ACCURACY OF APPROXIMATELY +/- 10 FEET UNLESS OTHERWISE NOTED BY AN ASTERISK (*).

AUTOMATIC HAMMER	
GRANULAR MATERIALS-RELATIVE DENSITY	SPT (BLOWS/FT.)
VERY LOOSE	LESS THAN 3
LOOSE	3 TO 8
MEDIUM	8 TO 24
DENSE	24 TO 40
VERY DENSE	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT (BLOWS/FT.)
VERY SOFT	LESS THAN 2
SOFT	1 TO 3
FIRM	3 TO 6
STIFF	6 TO 12
VERY STIFF	12 TO 24
HARD	GREATER THAN 24

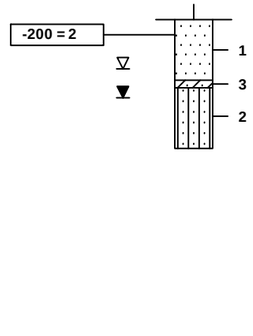
BOR # PBA-6*
STA. 502+75
REF. C/L CONST
OFF. 118' LT.
ELEV. 22.2
DATE 12/6/2021



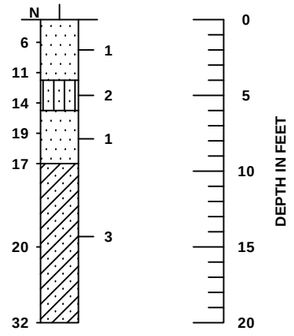
BOR # PB-7
STA. 503+12
REF. C/L CONST
OFF. 60' LT.
ELEV. N/A
DATE 1/11/2022
DRILLER R. SCRUGGS
HAMMER AUTOMATIC
RIG D-25



BOR # PBA-7*
STA. 505+51
REF. C/L CONST
OFF. 98' RT.
ELEV. 22.1
DATE 12/6/2021



BOR # PB-8
STA. 506+35
REF. C/L CONST
OFF. 33' LT.
ELEV. N/A
DATE 1/11/2022
DRILLER R. SCRUGGS
HAMMER AUTOMATIC
RIG D-25



TIERRA
7351 Temple Terrace Highway
Tampa, Florida 33637
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NUMBER	DESCRIPTION	DATE

PROJECT #	6083160	SURVEYED	----	__/__/__
SURVEY #	----	DESIGNED	SW	06/2021
SEC./TWN./RGE	00/00/00	DRAWN	SW	06/2021
SCALE	NOTED	CHECKED	MEN	06/2021

MARC E. NOVAK, P.E.
FLORIDA P.E. # 67431

Signature & Date

Manatee County FLORIDA

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

60TH AVENUE EXTENSION

SHEET NO.
SEG3-P3

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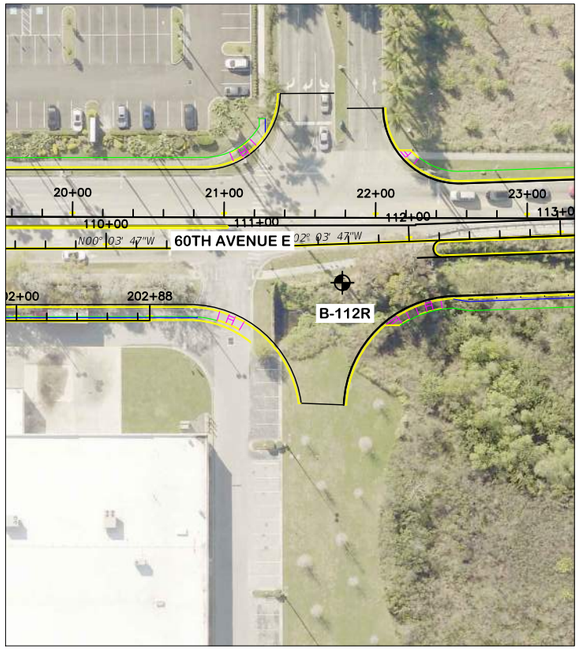
BORING LOCATION PLAN

0 100'

PLAN SCALE



NOTE: BASE MAP PROVIDED BY KISINGER CAMPO & ASSOCIATES, CORP.

LEGEND

1	LIGHT GRAY TO BROWN FINE SAND TO SILTY SAND (A-3/A-2-4)
2	LIGHT GRAY TO BROWN SILTY SAND (A-2-4)
3	LIGHT GRAY TO GRAY SILTY SAND TO CLAYEY SAND (A-2-4/A-2-6)
4	LIGHT GRAY SILT TO CLAY WITH SAND (A-4/A-6/A-7-6)
5	DARK GRAY ORGANIC SAND TO MUCK (A-8)
6	CALCAREOUS CLAY TO WEATHERED LIMESTONE
7	LIGHT GRAY CLAY (A-7-6)

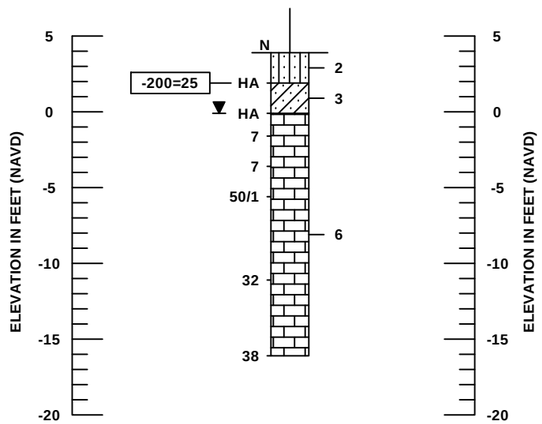
N	SPT N-VALUE IN BLOWS/FOOT FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED)
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCES
▼	GROUNDWATER LEVEL ENCOUNTERED DURING INVESTIGATION
C/L CONST.	CENTERLINE CONSTRUCTION 60TH AVENUE EAST
NAVD	NORTH AMERICAN VERTICAL DATUM OF 1988
*	BORING LOCATED BY SURVEYOR
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
⊕	APPROXIMATE LOCATION OF SPT BORING

RECOMMENDED ENVIRONMENTAL CLASSIFICATION:
SUBSTRUCTURE CONCRETE: MODERATELY AGGRESSIVE (RESISTIVITY= 3000 OHM-CM)
SUBSTRUCTURE STEEL: MODERATELY AGGRESSIVE (RESISTIVITY= 3000 OHM-CM)

SOIL TEST RESULTS:

RESISTIVITY: 3,000 OHM-CM
CHLORIDES: 15 PPM
SULFATES: <5
pH: 7.4

BOR #	B-112R
STA.	111+55
REF.	C/L CONST.
OFF.	43' RT.
ELEV.	3.9
DATE	11/30/2021
DRILLER	B. CRAIG
HAMMER	AUTOMATIC
RIG	D-25



NOTES:

1. THE BORINGS WERE LOCATED IN THE FIELD BY A REPRESENTATIVE OF TIERRA USING HAND-HELD, NON-SURVEY GRADE GPS EQUIPMENT WITH A MANUFACTURE'S REPORTED ACCURACY OF ± 10 FEET. STATION, OFFSET AND GROUND ELEVATIONS AT THE BORING LOCATIONS WERE DETERMINED BASED ON THE ESTIMATED GPS COORDINATES IN CONJUNCTION WITH PROJECT DESIGN FILES PROVIDED BY AIM ENGINEERING & SURVEYING, INC. THE BORING LOCATIONS AND ELEVATIONS SHOULD BE CONSIDERED APPROXIMATE. FOR BORING DENOTED WITH AN ASTERISKS (*), THE STATION, OFFSET AND ELEVATION WERE LOCATED BY THE PROJECT SURVEYOR.
2. BASED ON REVIEW OF THE "POTENTIOMETRIC SURFACE OF THE UPPER FLORIDAN AQUIFER, WEST CENTRAL FLORIDA" MAPS PUBLISHED BY THE USGS, THE POTENTIOMETRIC SURFACE ELEVATION IN THE VICINITY OF THE CULVERT RANGES UP TO APPROXIMATELY +25 FEET, NGVD 29. ARTESIAN CONDITIONS WERE NOT ENCOUNTERED DURING THE FIELD EXPLORATION; HOWEVER, THE CONTRACTOR SHOULD BE PREPARED TO ADDRESS ARTESIAN LEVELS UP TO A HEAD OF +25 FEET, NGVD 29 AT NO ADDITIONAL COST TO THE COUNTY.
3. VERY HARD CLAY TO WEATHERED LIMESTONE WAS ENCOUNTERED WITHIN THE BORINGS. SPECIAL TOOLS OR EQUIPMENT MAY BE REQUIRED TO EXCAVATE INTO AND/OR THROUGH SUCH MATERIALS. LIMESTONE IS POROUS AND WILL BE DIFFICULT TO DEWATER.

AUTOMATIC HAMMER	
GRANULAR MATERIALS- RELATIVE DENSITY	SPT (BLOWS/FT.)
VERY LOOSE	LESS THAN 3
LOOSE	3 TO 8
MEDIUM	8 TO 24
DENSE	24 TO 40
VERY DENSE	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT (BLOWS/FT.)
VERY SOFT	LESS THAN 2
SOFT	1 TO 3
FIRM	3 TO 6
STIFF	6 TO 12
VERY STIFF	12 TO 24
HARD	GREATER THAN 24

TIERRA
7351 Temple Terrace Highway
Tampa, Florida 33637
Phone: 813-989-1354 Fax: 813-989-1355

BOX CULVERT CD-A

NUMBER	DESCRIPTION	DATE

PROJECT #	6083160	SURVEYED	----	__/__/__
SURVEY #	----	DESIGNED	SW	06/2022
SEC./TWN./RGE	----	DRAWN	SW	06/2022
SCALE	NOTED	CHECKED	MEN	06/2022

MARC E. NOVAK, P.E.
FLORIDA P.E. # 67431

Signature & Date

Manatee County FLORIDA

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

60TH AVENUE EXTENSION

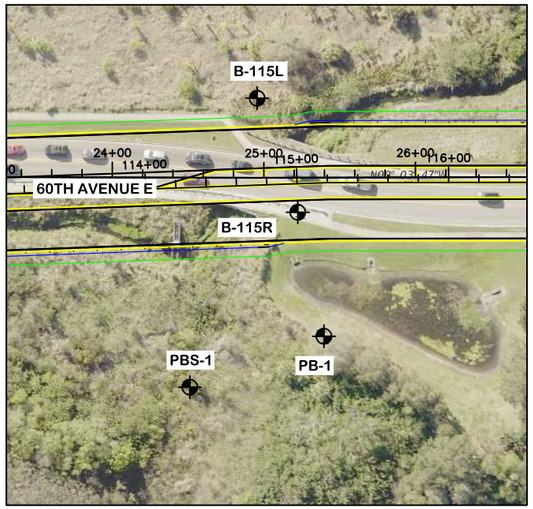
SHEET NO.
SEG1-

J:\6511\2021 Files\6511-21-054 60th Ave Extension\CAD\6511-21-054_SEG_1_BOX CULVERT.dwg [6/6/2022 4:13 PM]

BORING LOCATION PLAN

0 100'

PLAN SCALE



NOTE: BASE MAP PROVIDED BY KISINGER CAMPO & ASSOCIATES, CORP.

LEGEND

1. LIGHT GRAY TO BROWN FINE SAND TO SILTY SAND (A-3/A-2-4)
2. LIGHT GRAY TO BROWN SILTY SAND (A-2-4)
3. LIGHT GRAY TO GRAY SILTY SAND TO CLAYEY SAND (A-2-4/A-2-6)
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C/L CONST.	CENTERLINE CONSTRUCTION 60TH AVENUE EAST
NAVD	NORTH AMERICAN VERTICAL DATUM OF 1988
*	BORING LOCATED BY SURVEYOR
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
⊕	APPROXIMATE LOCATION OF SPT BORING

RECOMMENDED ENVIRONMENTAL CLASSIFICATION:
SUBSTRUCTURE CONCRETE: MODERATELY AGGRESSIVE (RESISTIVITY= 2100 OHM-CM)
SUBSTRUCTURE STEEL: MODERATELY AGGRESSIVE (RESISTIVITY= 2100 OHM-CM)

SOIL TEST RESULTS:

RESISTIVITY: 2,100 OHM-CM
CHLORIDES: 80 PPM
SULFATES: 130 PPM
pH: 7.5

WATER TEST RESULTS:

RESISTIVITY: 5,500 OHM-CM
CHLORIDES: 15 PPM
SULFATES: 21 PPM
pH: 8.1

NOTES:

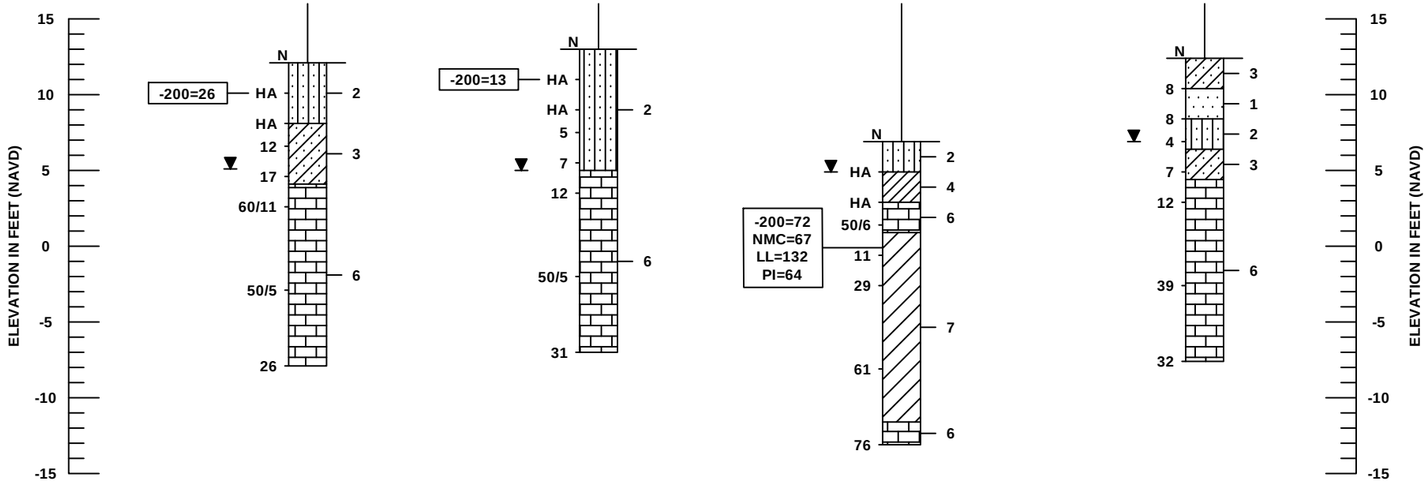
1. THE BORINGS WERE LOCATED IN THE FIELD BY A REPRESENTATIVE OF TIERRA USING HAND-HELD, NON-SURVEY GRADE GPS EQUIPMENT WITH A MANUFACTURE'S REPORTED ACCURACY OF ± 10 FEET. STATION, OFFSET AND GROUND ELEVATIONS AT THE BORING LOCATIONS WERE DETERMINED BASED ON THE ESTIMATED GPS COORDINATES IN CONJUNCTION WITH PROJECT DESIGN FILES PROVIDED BY AIM ENGINEERING & SURVEYING, INC. THE BORING LOCATIONS AND ELEVATIONS SHOULD BE CONSIDERED APPROXIMATE. FOR BORING DENOTED WITH AN ASTERISKS (*), THE STATION, OFFSET AND ELEVATION WERE LOCATED BY THE PROJECT SURVEYOR.
2. BASED ON REVIEW OF THE "POTENTIOMETRIC SURFACE OF THE UPPER FLORIDAN AQUIFER, WEST CENTRAL FLORIDA" MAPS PUBLISHED BY THE USGS, THE POTENTIOMETRIC SURFACE ELEVATION IN THE VICINITY OF THE CULVERT RANGES UP TO APPROXIMATELY +25 FEET, NGVD 29. ARTESIAN CONDITIONS WERE NOT ENCOUNTERED DURING THE FIELD EXPLORATION; HOWEVER, THE CONTRACTOR SHOULD BE PREPARED TO ADDRESS ARTESIAN LEVELS UP TO A HEAD OF +25 FEET, NGVD 29 AT NO ADDITIONAL COST TO THE COUNTY.
3. VERY HARD CLAY TO WEATHERED LIMESTONE WAS ENCOUNTERED WITHIN THE BORINGS. SPECIAL TOOLS OR EQUIPMENT MAY BE REQUIRED TO EXCAVATE INTO AND/OR THROUGH SUCH MATERIALS. LIMESTONE IS POROUS AND WILL BE DIFFICULT TO DEWATER.

BOR #	B-115L
STA.	114+76
REF.	C/L CONST.
OFF.	57' LT.
ELEV.	12.1
DATE	11/30/2021
DRILLER	B. CRAIG
HAMMER	AUTOMATIC
RIG	D-25

BOR #	B-115R
STA.	115+00
REF.	C/L CONST.
OFF.	19' RT.
ELEV.	13.0
DATE	11/30/2022
DRILLER	B. CRAIG
HAMMER	AUTOMATIC
RIG	D-25

BOR #	PBS-1
STA.	114+32
REF.	C/L CONST.
OFF.	139' RT.
ELEV.	6.9
DATE	5/20/2021
DRILLER	M. ATKINSON
HAMMER	AUTOMATIC
RIG	D-25

BOR #	PB-1*
STA.	114+95
REF.	C/L CONST.
OFF.	100' RT.
ELEV.	12.4
DATE	11/30/2022
DRILLER	B. CRAIG
HAMMER	AUTOMATIC
RIG	D-25



AUTOMATIC HAMMER	
GRANULAR MATERIALS- RELATIVE DENSITY	SPT (BLOWS/FT.)
VERY LOOSE	LESS THAN 3
LOOSE	3 TO 8
MEDIUM	8 TO 24
DENSE	24 TO 40
VERY DENSE	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT (BLOWS/FT.)
VERY SOFT	LESS THAN 2
SOFT	1 TO 3
FIRM	3 TO 6
STIFF	6 TO 12
VERY STIFF	12 TO 24
HARD	GREATER THAN 24

TIERRA
7351 Temple Terrace Highway
Tampa, Florida 33637
Phone: 813-989-1354 Fax: 813-989-1355

BOX CULVERT CD-B & CD-C

NUMBER	DESCRIPTION	DATE

PROJECT #	6083160	SURVEYED	----	__/__/__
SURVEY #	----	DESIGNED	SW	06/2022
SEC./TWN./RGE	----	DRAWN	SW	06/2022
SCALE	NOTED	CHECKED	MEN	06/2022

MARC E. NOVAK, P.E.
FLORIDA P.E. # 67431
Signature & Date

Manatee County FLORIDA

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

60TH AVENUE EXTENSION

SHEET NO.
SEG1-

J:\6511\2021 Files\6511-21-054 60th Ave Extension\CAD\6511-21-054_SEG_1_BOX CULVERT.dwg [6/6/2022 4:13 PM]

APPENDIX C

Summary of Seasonal High Groundwater Table Estimates
LBR Data Tables
Pavement Data Table Sheets

Summary of Seasonal High Groundwater Table Estimates

60th Avenue Extension - Segment 01 - US 301 to Mendoza

Manatee County, Florida

Tierra Project No. 6511-21-054

Boring Name	Boring Location[1] FL West NAD 83		Boring Location[1] (B/L Survey 60th Ave)		Survey Ground Elevation[1] (feet, NAVD 88)	Boring Depth[2] (feet)	Measured Groundwater Table			USDA Soil Survey		Estimated SHGWT[4]	
	Easting	Northing	Station (feet)	Offset (feet)			Date Recorded	Depth[2] (feet)	Elevation (feet, NAVD 88)	Map Symbol	Estimated SHGWT[3] Depth (feet)	Depth (feet)	Elevation (feet, NAVD 88)
SH - 102R	493186	1162866	13 + 14	91 RT	8.4	4.0	04/29/21	GNE[5]	<4.4	5	0.0 - 1.0	2.0	6.4
SH - 112L	493066	1163816	22 + 63	32 LT	11.3	5.0	04/29/21	GNE[5]	<6.3	5	0.0 - 1.0	2.5	8.8
SH - 115R	493162	1164036	24 + 83	64 RT	9.5	2.5	04/29/21	GNE[5]	<7.0	5	0.0 - 1.0	0.0	9.5
SH - 116L	493071	1164251	26 + 99	27 LT	12.5	2.0	04/29/21	GNE[5]	<10.5	5	0.0 - 1.0	2.0	10.5
SH - 121L	493032	1164700	31 + 48	65 LT	13.7	5.0	04/29/21	GNE[5]	<8.7	5	0.0 - 1.0	1.5	12.2
SH - 124L	493033	1164991	34 + 43	53 LT	16.3	3.0	04/29/21	GNE[5]	<13.3	5	0.0 - 1.0	0.5	15.8
SH - 127L	493007	1165258	37 + 11	54 LT	18.3	4.0	04/29/21	GNE[5]	<14.3	5/48	0.0 - 1.0/0.3 - 1.5	1.5	16.8
SH - 130L	492992	1165589	40 + 38	60 LT	17.9	6.5	04/27/21	GNE[5]	<11.4	42/48	1.5 - 3.5/0.3 - 1.5	1.5	16.4
SH - 133R	493104	1165888	43 + 38	50 LT	18.2	5.0	04/27/21	GNE[5]	<13.2	42/48	1.5 - 3.5/0.3 - 1.5	1.5	16.7
SH - 136L	493004	1166180	46 + 29	53 LT	20.9	6.5	04/27/21	GNE[5]	<14.4	42	1.5 - 3.5	4.0	16.9
SH - 139R	493117	1166497	49 + 27	86 RT	21.7	8.0	04/27/21	6.4	13.7	4	0.3 - 1.5	2.5	19.2
SH - 142R	492920	1166771	52 + 40	20 RT	24.3	7.0	04/27/21	4.7	17.3	4/13/48	0.3 - 1.5	2.0	22.3
SH - 145R	492712	1166993	55 + 44	11 RT	22.1	6.0	04/27/21	3.2	16.1	13/48	+2.0 - 0.0/0.0 - 1.0	0.5	21.6
SH - 148R	492581	1167261	58 + 49	6 RT	25.3	6.0	04/27/21	5.8	19.3	20/48	0.3 - 1.5	2.0	23.3
SH - 151L	492431	1167532	61 + 47	78 LT	27.0	6.5	04/27/21	GNE[5]	<20.5	20	0.3 - 1.5	3.0	24.0
SH - 160L	492328	1168428	101 + 33	34 LT	28.8	4.0	03/09/21	GNE[5]	<24.8	4/14	0.3 - 1.5/ +2.0 - 0.0	1.0	27.8

(1) Boring coordinates, station, offset and elevation were provided by the project surveyor.

(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, and review of the Manatee County, Florida USDA Soil Survey and USGS Quadrangle Map of Palmetto, Florida

(5) GNE: Groundwater Not Encountered within the depth of the boring.

Summary of Seasonal High Groundwater Table Estimates

60th Avenue Extension - Segment 02 - North of Mendoza

Manatee County, Florida

Tierra Project No. 6511-21-054

Boring Name	Boring Location[1] FL West NAD 83		Boring Location[1] (B/L Survey 60th Ave)		Survey Ground Elevation[1] (feet, NAVD 88)	Boring Depth[2] (feet)	Measured Groundwater Table			USDA Soil Survey		Estimated SHGWT[4]	
	Easting	Northing	Station (feet)	Offset (feet)			Date Recorded	Depth[2] (feet)	Elevation (feet, NAVD 88)	Map Symbol	Estimated SHGWT[3] Depth (feet)	Depth (feet)	Elevation (feet, NAVD 88)
SH - 160L	492328	1168428	101 + 33	34 LT	28.8	4.0	03/09/21	GNE[5]	<24.8	4/14	0.3 - 1.5/ +2.0 - 0.0	1.0	27.8
SH - 161R	492344	1168547	102 + 44	12 RT	25.5	5.0	03/09/21	GNE[5]	<20.5	4/14	0.3 - 1.5/ +2.0 - 0.0	ABG[6]	>25.5
SH - 163L	492199	1168670	104 + 35	39 LT	28.5	5.0	03/09/21	GNE[5]	<23.5	4/14	0.3 - 1.5/ +2.0 - 0.0	1.0	27.5
SH - 165L	492047	1168819	106 + 50	14 RT	29.8	5.0	03/09/21	5.0	24.8	4/20	0.3 - 1.5	1.5	28.3
SH - 168L	491814	1168999	109 + 60	47 RT	29.7	5.0	03/09/21	GNE[5]	<24.7	4/20	0.3 - 1.5	1.5	28.2
SH - 171L	491642	1169270	112 + 88	33 LT	27.2	5.0	03/09/21	GNE[5]	<22.2	4	0.3 - 1.5	0.0	27.2
SH - 174L	491594	1169527	115 + 46	79 LT	25.4	5.0	03/09/21	3.1	22.3	4	0.3 - 1.5	ABG[6]	>25.4
SH - 177R	491663	1169841	118 + 59	8 LT	27.8	5.0	03/09/21	4.5	23.3	4	0.3 - 1.5	0.5	27.3
SH - 180R	491627	1170154	121 + 72	41 LT	28.4	5.0	03/09/21	4.5	23.9	5	0.0 - 1.0	0.8	27.6
SH - 183L	491601	1170469	124 + 87	65 LT	26.9	4.0	03/09/21	3.2	23.7	5/13	0.0 - 1.0 / +2.0 to 0.0	0.0	26.9
SH - 186L	491616	1170762	127 + 81	47 LT	28.0	4.5	03/09/21	4.2	23.8	5	0.0 - 1.0	0.0	28.0
SH - 189L	491628	1171063	130 + 81	34 LT	26.9	5.0	03/09/21	2.8	24.2	13	+2.0 - 0.0	ABG[6]	>26.9
SH - 192L	491604	1171371	133 + 90	55 LT	28.0	7.0	03/11/21	3.1	25.0	5	0.0 - 1.0	0.5	27.5
SH - 195R	491565	1171666	136 + 85	92 LT	27.5	3.5	03/11/21	2.7	24.9	5	0.0 - 1.0	0.0	27.5
SH - 198R	491424	1171951	139 + 70	231 LT	27.3	4.0	03/11/21	2.1	25.2	4	0.3 - 1.5	ABG[6]	>27.3
SH - 201R	491306	1172221	142 + 41	346 RT	28.5	4.0	03/11/21	2.8	25.7	5/13	0.0 -1.0 / +2.0 - 0.0	0.0	28.5
AB - 202L	491142	1172267	142 + 89	510 LT	29.4	5.0	03/11/21	3.8	25.7	13	+2.0 - 0.0	0.5	28.9
SH - 204R	491165	1172458	147 + 57	432 LT	29.6	4.0	03/11/21	3.6	26.0	13	+2.0 - 0.0	0.5	29.1
AB - 206R	491144	1172642	149 + 60	335 LT	28.4	3.0	03/11/21	2.0	26.4	4/26	0.3 - 1.5/ +2.0 - 0.0	ABG[6]	>28.4
SH - 207R	491055	1172749	151 + 31	325 LT	27.4	3.0	03/11/21	2.5	24.9	13	+2.0 - 0.0	ABG[6]	>27.4
SH - 210R	490909	1172988	154 + 33	226 LT	28.6	4.0	03/11/21	3.3	25.4	4	0.3 - 1.5	0.0	28.6
SH - 213L	490751	1173262	157 + 6	113 LT	29.5	5.0	03/11/21	2.7	26.9	4	0.3 - 1.5	0.0	29.5
SH - 216L	490596	1173529	159 + 95	46 LT	29.9	5.0	03/11/21	1.5	28.4	4	0.3 - 1.5	ABG[6]	>29.9

[1] Boring coordinates, station, offset and elevation were provided by the project surveyor.

[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, and review of the Manatee County, Florida USDA Soil Survey and USGS Quadrangle Map of Palmetto, Florida

[5] GNE: Groundwater Not Encountered within the depth of the boring.

[6] ABG: Seasonal High Groundwater estimated to be above grade

Summary of Seasonal High Groundwater Table Estimates

60th Avenue Extension - Ponds - US 301 to Mendoza

Manatee County, Florida

Tierra Project No. 6511-21-054

Boring Name	Reference	Boring Location[1] FL West NAD 83		Boring Location[1]		Survey Ground Elevation[1] (feet, NAVD 88)	Boring Depth[2] (feet)	Measured Groundwater Table			USDA Soil Survey		Estimated SHGWT[4]	
		Easting	Northing	Station (feet)	Offset (feet)			Date Recorded	Depth[2] (feet)	Elevation (feet, NAVD 88)	Map Symbol	Estimated SHGWT[3] Depth (feet)	Depth (feet)	Elevation (feet, NAVD 88)
Segment 1														
PBA-1	B/L Survey	493287	1163830	22 + 78	189 RT	5.7	2.3	05/21/21	2.0	3.7	5	0.0 - 1.0	ABG[6]	>5.7
PBA-2	B/L Survey	493339	1163955	24 + 03	243 RT	5.8	1.3	05/21/21	GNE[5]	<4.5	5	0.0 - 1.0	ABG[6]	>5.8
PBA-1	B/L Const.	493245	1164175	116 + 01	144 RT	12.4	7.0	01/18/22	6.4	6.0	5	0.0 - 1.0	2.3	10.2
Segment 2														
SH-SMF1A1	C/L Const. Buffalo Rd	491621	1168968	210 + 62	209 LT	30.1	9.5	07/30/21	9.0	21.1	20	0.3 - 1.5	1.8	28.4
SH-FPC-A1	C/L Const. Buffalo Rd	491441	1169364	211 + 46	348 LT	27.0	5.0	07/30/21	4.4	22.6	20	0.3 - 1.5	0.5	26.5
PBA-2	C/L Const. Buffalo Rd	491486	1169308	213 + 56	144 LT	27.8	9.5	01/18/22	6.3	21.5	4	0.3 - 1.5	1.8	26.1
PBA-3	C/L Const. Buffalo Rd	491425	1169403	214 + 45	174 LT	27.7	6.0	01/18/22	5.8	21.9	4	0.3 - 1.5	1.5	26.2
SH-SMF2A2	C/L Const. Buffalo Rd	491393	1169635	216 + 40	183 LT	27.3	5.5	07/30/21	4.4	22.9	4	0.3 - 1.5	0.8	26.5
Segment 3														
PBA-6	B/L Const. Buffalo Rd	490385	1178378	502 + 75	118 LT	22.2	9.5	12/06/21	4.9	17.3	20	0.3 - 1.5	0.8	21.5
PBA-7	B/L Const. Buffalo Rd	490537	1178693	505 + 51	98 RT	22.1	8.5	12/06/21	5.3	16.8	26	+2.0 - 0.0	3.3	18.9
SH-FPC-1	B/L Const. Buffalo Rd	489647	1178616	N/A		22.3	5.0	12/07/21	7.3	15.0	22	0.3 - 1.5	1.5	20.8
SH-FPC-2	B/L Const. Buffalo Rd	489934	1178252	303 + 78	116 LT	18.6	9.5	12/07/21	4.4	14.2	22	0.3 - 1.5	1.8	16.9

(1) Boring coordinates, station, offset and elevation were provided by the project surveyor.

(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, and review of the Manatee County, Florida USDA Soil Survey and USGS Quadrangle Map of Palmetto, Florida

(5) GNE: Groundwater Not Encountered within the depth of the boring.

(6) ABG: Seasonal High Groundwater estimated to be above grade

LBR ±2% Method Summary Sheet
60th Avenue Extension - Segment 1
Manatee County, Florida
Tierra Project No.: 6511-21-054

Test Location	Test Number	LBR Value[1]	LBR at Moisture Contents (of Optimum LBR)	
			-2%	2%
LBR-SH-114L	1	52	45	46
LBR-SH-121L	2	40	34	35
LBR-SH-133R	3	69	58	58
Mean LBR Value:		53.7	46	46
Average= 46			±2% Method LBR[2]= 40	

[1] Value obtained from laboratory test results

[2] Design LBR value determined by applying the ±2% of Optimum Method identified in the FDOT Soils and Foundations Handbook. Design LBR should be set to no greater than 40 per FDOT Flexible Pavement Design Manual.

LBR 90% Method Summary Sheet
60th Avenue Extension - Segment 1
Manatee County, Florida
Tierra Project No.: 6511-21-054

Test Location	Test Number	LBR Value[1]	Test Rank	Percent Higher
LBR-SH-160L	3	69	1	33%
LBR-SH-201R	1	52	2	66%
LBR-SH-213L	2	40	3	100%
			90% Method LBR[2]= 40	

[1] Value obtained from laboratory test results

[2] Design LBR value determined by applying the 90% Method identified in the FDOT Soils and Foundations Handbook. Design LBR should be set to no greater than 40 per FDOT Flexible Pavement Design Manual.

LBR ±2% Method Summary Sheet
60th Avenue Extension - Segment 2
Manatee County, Florida
Tierra Project No.: 6511-21-054

Test Location	Test Number	LBR Value[(1)]	LBR at Moisture Contents (of Optimum LBR)	
			-2%	2%
LBR-SH-160L	1	47	43	43
LBR-SH-174L	2	26	22	22
LBR-SH-192L	3	42	38	41
LBR-SH-201R	4	74	62	61
LBR-SH-213L	5	75	55	57
Mean LBR Value:		52.8	44	45
Average= 44			±2% Method LBR[(2)]= 40	

(1) Value obtained from laboratory test results

(2) Design LBR value determined by applying the ±2% of Optimum Method identified in the FDOT Soils and Foundations Handbook. Design LBR should be set to 40 per FDOT Flexible Pavement Design Manual.

LBR 90% Method Summary Sheet
60th Avenue Extension - Segment 2
Manatee County, Florida
Tierra Project No.: 6511-21-054

Test Location	Test Number	LBR Value[(1)]	Test Rank	Percent Higher
LBR-SH-174L	2	26	1	100%
LBR-SH-192L	3	42	2	80%
LBR-SH-160L	1	47	3	60%
LBR-SH-201R	4	74	4	40%
LBR-SH-213L	5	75	5	20%
			90% Method LBR[(2)]= 34	

(1) Value obtained from laboratory test results

(2) Design LBR value determined by applying the 90% Method identified in the FDOT Soils and Foundations

Pavement Data Table
60th Avenue Extension
Manatee County, Florida
Tierra Project Number: 6511-21-054

Core No.	Location			Asphalt Layer					Base for Paved Roadway		Subgrade		Crack Depth (inches)	Pavement Condition[5]	Comments
	Roadway Alignment	Lane Designation (B/L Survey 60th Ave)	Station	Thickness (inches)		Type[2]		Total Asphalt Thickness (inches)	Type	Thickness (inches)	Type	Depth (feet) [3]			
				Top Layer	Bottom Layer	Top Layer	Bottom Layer								
PC-103	60th Avenue	R3	14+06	2.0	2.0	SP-9.5	S-3	4.0	Crushed Concrete	6.0	A-2-4	0.0 to 2.0	N/A[4]	Good	Recent overlay or rehabilitated pavement in core area (US 301 to approximate Station 14+30)
											A-6	2.0 to 4.0			
PC-109	60th Avenue	L3	19+54	4.0	---	S-3	---	4.0	Crushed Concrete	8.0	A-2-4	0.0 to 2.0	4.0	Fair to Poor	Core obtained in longitudinal crack; full depth crack
											A-2-6	2.0 to 3.0			
PC-120	60th Avenue	R1	30+42	1.3	---	S-3	---	1.3	Crushed Concrete	7.8	A-3	0.0 to 2.2	1.3	Fair to Poor	Core obtained in longitudinal crack; full depth crack
											A-2-6	2.2 to 4.2			
PC-121	60th Avenue	L1	31+83	1.5	0.8	SP-9.5	S-3	2.3	Crushed Concrete	9.8	A-2-4 with Shell	0.0 to 0.7	N/A[4]	Fair	Auger encountered refusal material at 0.7 feet below base.
PC-130	60th Avenue	R1	41+05	1.0	1.5	SP-9.5	S-3	2.5	Crushed Concrete	8.0	A-3 with Limerock	0.0 to 2.2	2.0	Fair	Core obtained in longitudinal crack.
											A-2-4	2.2 to 4.2			
PC-147	60th Avenue	L1	57+42	2.0	---	S-3	---	2.0	Crushed Concrete	8.5	A-3 with Limerock and Clay Nodules	0.0 to 4.2	2.0	Poor	Core obtained in alligator cracks; full depth crack. Alligator cracking prevalent in area.
PC-153	60th Avenue	L3	63+54	1.9	---	S-3	---	1.9	Crushed Concrete	12.1	A-3 with Limerock and Clay Nodules	0.0 to 3.9	1.9	Fair	Core obtained in transverse crack; full depth crack
PC-154	60th Avenue	R3	65+39	2.0	---	S-3	---	2.0	Crushed Concrete	8.0	A-2-6	0.0 to 2.7	2.0	Fair to Poor	Core obtained in alligator cracks; full depth crack. Alligator cracking in area.
											A-6	2.7 to 4.2			

Notes:
[1] Pavement core locations were estimated in the field by a representative of Tierra using a non-survey grade GPS unit with a reported accuracy of ±10 feet. The pavement core locations should therefore be considered approximate.
[2] Pavement layer indentifcation based on visual review using FDOT Mixture nomenclature. Actual pavement may be a local mix. Pavement layer is classified in descending order from the top of the core sample to the bottom.
[3] Depth is measured from bottom of base.
[4] No cracks were observed within the pavement cores at these locations.
[5] Pavement condition based on visual observation only: Good, Fair or Poor.
GNE -- Groundwater Not Encountered
N/A -- Not Applicable

Pavement Data Table
60th Avenue Extension - Segment 3
Manatee County, Florida
Tierra Project Number: 6511-21-054

Core No.	Location			Asphalt Layer					Base		Subgrade		Crack Depth (inches)	Pavement Condition[4]	Comments
	Roadway Alignment	Lane Designation	Station	Thickness (inches)		Type[1]		Total Asphalt Thickness (inches)	Type	Thickness (inches)	Type	Depth (feet) [2]			
				Top Layer	Bottom Layer	Top Layer	Bottom Layer								
PC-1	69th Street	R1/TL	307+36	1.3	1.7	SP	S	3.0	Limerock	5.5	A-3/A-2-4 with Limerock and Clay Nodules	0.0 to 4.0	N/A[3]	Fair	
PC-4	69th Street	L1/TL	312+87	1.0	1.6	SP	S	2.6	N/A	N/A	Stablizied A-3 with Limerock	0.0 to 1.0	N/A[3]	Fair	1. At the time of coring operations, the Eastbound lanes of 69th from Buffalo Road east had recently been re-paved (new overlay present). 2. A distinct base layer was not observed. Below the asphalt was 12 inches of stabilized subgrade.
											A-3/A-2-4	1.0 to 4.0			
PC-2	Buffalo Road	L1	202+31	3.3	---	SP	---	3.3	Limerock	7.3	N/A	N/A	N/A[3]	Fair	Refusal in auger. PC-2A taken as alternative for base/subgrade check.
PC-2A	Buffalo Road	L1	202+13	3.5	---	SP	---	3.5	Limerock	9.5	A-3 with Clay Nodules	0.0 to 4.0	N/A[3]	Fair	
PC-3	Buffalo Road	R1	202+43	3.5	---	SP	---	3.5	Limerock	10	A-3	0.0 to 3.5	N/A[3]	Fair	
											A-2-6	3.5 to 4.0			
PC-5	Buffalo Road	R2	197+64	3.0	---	SP	---	3.0	Limerock	12.0	A-3	0.0 to 4.0	N/A[3]	Fair	
PC-6	Buffalo Road	L1	197+81	3.3	---	SP	---	3.3	Shell Rock	12.8	A-3	0.0 to 4.0	N/A[3]	Fair	

Notes:
[1] Pavement layer indentifcation based on visual review using FDOT Mixture nomenclature. Actual pavement may be a local mix. Pavement layer is classified in descending order from the top of the core sample to the bottom.
[2] Depth is measured from bottom of base.
[3] No cracks were observed within the pavement cores at these locations.
[4] Pavement condition based on visual observation only: Good, Fair or Poor.
GNE -- Groundwater Not Encountered
N/A -- Not Applicable

APPENDIX D

Summary of Laboratory Test Results
Summary of Corrosion Test Results

Summary of Laboratory Test Results for Soil Classification
60th Avenue Extension
Manatee County, Florida
Tierra Project No. 6511-21-054

Boring Number	Sample Depth (ft)	Stratum Number	AASHTO Symbol	Sieve Analysis -	Atterberg Limits			Organic Content (%)	Natural Moisture Content (%)
				#200	Liquid Limit	Plastic Limit	Plasticity Index		
SH-206R	1.0 - 1.5	1	A-3	1	-			2	26
PBA-7	0.5 - 1.5	1	A-3	2	-	-	-	-	-
PBA-4	1.0 - 2.0	1	A-3	2	-	-	-	-	-
PBA-5	1.5 - 2.0	1	A-3	3	-	-	-	-	-
AB-202	1.0 - 1.5	1	A-3	3	-	-	-	-	-
SH-130L	0.5 - 1.0	1	A-3	3	-	-	-	-	-
AB-317L	1.5 - 2.0	1	A-3	3	-	-	-	-	-
SH-133R	0.5 - 1.0	1	A-3	3	-	-	-	-	-
SH-127L	0.5 - 1.0	1	A-3	4	-	-	-	-	-
PBA-6	1.5 - 2.5	1	A-3	4	-	-	-	-	-
AB-307R	2.5 - 3.0	1	A-3	5	-	-	-	-	-
SH-160L	0.0 - 2.0	1	A-3	5	-	-	-	-	-
SH-121L	1.0 - 1.5	1	A-3	5	-	-	-	-	-
SH-133L	0.0 - 2.0	1	A-3	6	-	-	-	-	-
SH-192L	0.5 - 1.0	1	A-3	6	-	-	-	-	-
AB-114L	0.0 - 2.0	1	A-3	6	-	-	-	-	-
AB-309R	1.5 - 2.0	1	A-3	6	-	-	-	-	-
SH-204R	1.0 - 1.5	1	A-3	7	-	-	-	-	-
SH-121L	0.0 - 2.0	1	A-3	7	-	-	-	-	-
SH-201R	0.0 - 2.0	1	A-3	7	-	-	-	-	-
SH-168L	2.0 - 2.5	1	A-3	8	-	-	-	-	-
SH-174L	0.0 - 2.0	1	A-3	8	-	-	-	-	-
SH-213L	0.0 - 2.0	1	A-3	9	-	-	-	-	-
B-205	0.0 - 4.0	1	A-3	10	-	-	-	-	-
AB-304R	4.0 - 4.5	1	A-2-4	11	-	-	-	-	-
SH-FPC-2	2.5 - 3.0	1	A-2-4	11	-	-	-	-	-
B-115R	0.0 - 4.0	1	A-2-4	13	-	-	-	-	-
SH-195R	2.5 - 3.0	1	A-2-4	13	-	-	-	-	-
SH-207R	1.0 - 1.5	1	A-2-4	14	-	-	-	-	-
SH-183L	1.0 - 1.5	1	A-2-4	14	-	-	-	-	-

Summary of Laboratory Test Results for Soil Classification
60th Avenue Extension
Manatee County, Florida
Tierra Project No. 6511-21-054

Boring Number	Sample Depth (ft)	Stratum Number	AASHTO Symbol	Sieve Analysis -	Atterberg Limits			Organic Content (%)	Natural Moisture Content (%)
				#200	Liquid Limit	Plastic Limit	Plasticity Index		
B-211R	0.0 - 4.0	1	A-2-4	14	-	-	-	-	-
B-217L	0.0 - 4.0	1	A-2-4	14	-	-	-	-	-
B-238L	0.0 - 4.0	2	A-2-4	15	-	-	-	-	-
AB-407R	1.5 - 2.0	2	A-2-4	15	-	-	-	-	-
AB-262L	4.0 - 5.0	2	A-2-4	16	NP	NP	NP	-	18
SH-192L	3.5 - 4.0	2	A-2-4	17	NP	-	-	-	20
AB-113R	3.0 - 3.5	2	A-2-4	17	NP	NP	NP	-	23
PBA-4	5.0 - 6.0	2	A-2-4	17	-	-	-	-	-
PBA-3	1.5 - 2.0	2	A-2-4	18	-	-	-	-	-
SH-189L	1.0 - 1.5	2	A-2-4	18	-	-	-	-	-
SH-148R	0.5 - 1.0	2	A-2-4	18	-	-	-	-	-
AB-233R	1.0 - 1.5	2	A-2-4	18	NP	NP	NP	-	20
SH-216L	1.5 - 2.0	2	A-2-4	18	NP	-	-	-	17
PBA-7	4.0 - 4.5	2	A-2-4	19	NP	NP	NP	-	18
B-212L	0.0 - 4.0	2	A-2-4	21	-	-	-	-	-
B-219	0.0 - 4.0	2	A-2-4	23	-	-	-	-	-
SH-174L	1.0 - 1.5	2	A-2-4	23	NP	-	-	-	18
SH-192L	0.0 - 2.0	2	A-2-4	24	-	-	-	-	-
B-231L	0.0 - 4.0	2	A-2-4	24	-	-	-	-	-
SH-151L	0.0 - 0.5	2	A-2-4	25	-	-	-	3	12
B-112R	0.0 - 4.0	2	A-2-4	25	-	-	-	-	-
B-115L	0.0 - 4.0	2	A-2-4	26	-	-	-	-	-
SH-FPC-1	2.5 - 3.5	2	A-2-4	27	-	-	-	-	-
SH-163L	2.5 - 3.0	2	A-2-4	29	-	-	-	-	-
B-224R	0.0 - 4.0	2	A-2-4	32	-	-	-	-	-
B-225L	0.0 - 4.0	2	A-2-4	34	-	-	-	-	-
AB-223L	1.0 - 3.0	3	A-2-4	13	26	17	9	-	20
AB-229R	2.5 - 4.0	3	A-2-4	19	26	17	9	-	18
AB-238R	2.0 - 3.0	3	A-2-4	20	25	16	9	-	18
AB-249L	2.0 - 2.5	3	A-2-6	21	27	16	11	-	20

Summary of Laboratory Test Results for Soil Classification
60th Avenue Extension
Manatee County, Florida
Tierra Project No. 6511-21-054

Boring Number	Sample Depth (ft)	Stratum Number	AASHTO Symbol	Sieve Analysis -	Atterberg Limits			Organic Content (%)	Natural Moisture Content (%)
				#200	Liquid Limit	Plastic Limit	Plasticity Index		
SH-206R	1.0 - 1.5	3	A-2-6	21	26	17	19	-	27
PBA-6	2.5 - 4.0	3	A-2-4	21	23	17	6	-	20
AB-114R	4.5 - 5.0	3	A-2-4	22	26	18	8	-	22
AB-258R	2.0 - 3.5	3	A-2-4	22	24	17	7	-	17
SH-213L	2.0 - 2.5	3	A-2-6	22	27	16	11	-	18
MP-248R	1.5 - 3.0	3	A-2-4	22	29	19	10	-	26
SH-124L	1.0 - 1.5	3	A-2-6	23	29	15	14	-	16
AB-219R	2.0 - 3.5	3	A-2-4	23	24	16	8	-	18
AB-118R	1.5 - 2.0	3	A-2-4	23	27	19	8	-	20
AB-227R	1.0 - 2.0	3	A-2-6	24	30	15	15	-	17
AB-407L	2.5 - 3.0	3	A-2-4	25	26	17	9	-	17
AB-245R	2.0 - 4.0	3	A-2-6	25	32	15	17	-	23
SH-145R	2.5 - 3.0	3	A-2-6	25	32	17	15	-	22
SH-180R	1.5 - 2.0	3	A-2-6	26	33	15	18	-	20
SH-202L	1.5 - 2.0	3	A-2-6	27	35	16	19	-	18
AB-201L	3.0 - 5.0	3	A-2-4	28	26	17	9	-	18
SH-186L	1.0 - 1.5	3	A-2-6	28	31	14	17	-	19
AB-212L	1.0 - 5.0	3	A-2-6	28	31	15	16	-	19
AB-111R	3.0 - 3.5	3	A-2-6	28	32	18	14	-	18
AB-222L	1.0 - 3.5	3	A-2-6	28	26	15	11	-	17
AB-119R	1.0 - 1.5	3	A-2-6	28	33	18	15	-	25
PBA-2	2.0 - 2.5	3	A-2-6	28	33	15	18	-	19
AB-109R	4.0 - 4.5	3	A-2-6	28	31	16	15	-	24
SH-136L	0.0 - 0.5	3	A-2-6	32	33	18	15	-	20
SH-207L	3.5 - 5.0	3	A-2-6	32	31	18	13	-	19
AB-255L	2.5 - 5.0	3	A-2-6	34	37	16	21	-	24
SH-102R	2.0 - 2.5	3	A-2-4	35	32	22	10	-	36
AB-240R	2.0 - 4.0	4	A-6	37	39	17	22	-	25
AB-104R	1.0 - 1.5	4	A-6	36	36	18	18	-	17
AB-102R	3.0 - 3.5	4	A-6	38	40	20	19	-	28

Summary of Laboratory Test Results for Soil Classification
60th Avenue Extension
Manatee County, Florida
Tierra Project No. 6511-21-054

Boring Number	Sample Depth (ft)	Stratum Number	AASHTO Symbol	Sieve Analysis -	Atterberg Limits			Organic Content (%)	Natural Moisture Content (%)
				#200	Liquid Limit	Plastic Limit	Plasticity Index		
SH-133R	3.5 - 4.0	4	A-6	39	39	15	24	-	15
SH-210R	2.5 - 3.0	4	A-4	39	38	12	26	-	25
AB-113L	2.0 - 3.0	4	A-6	41	34	20	14	-	21
SH-139R	6.0 - 6.5	4	A-7-6	47	45	18	27	-	22
PBS-2	4.0 - 6.0	4	A-7-6	65	28	23	5	-	21
PB-5	13.5 - 15.0	4	A-4	81	31	24	7	-	19
B-205	18.0 - 20.0	4	A-7-6	84	44	27	17	-	28
SH-FPC-2	4.5 - 5.0	5	A-8	9	-	-	-	22	137
SH-139R	1.0 - 1.5	5	A-8	18	-	-	-	5	21
PBS-1	6.0 - 8.0	7	A-7-6	72	132	68	64	-	67

Summary of Laboratory Test Results for Environmental Classification
60th Avenue Extension
Manatee County, Florida
Tierra Project No. 6511-21-054

Boring Number	Stratum Number	Depth (ft)			pH (FM 5-550)	Resistivity (ohm-cm) (FM 5-551)	Chlorides (ppm) (FM 5-552)	Sulfates (ppm) (FM 5-553)	Environmental Classification* (Soil)	
									Steel	Concrete
AB-114L	1	0.0	-	2.0	6.7	16,000	15	<5	Moderately Aggressive	Slightly Aggressive
SH-121L	1	0.0	-	2.0	6.2	21,000	15	<5	Moderately Aggressive	Slightly Aggressive
SH-133L	1	0.0	-	2.0	6.9	18,000	15	<5	Moderately Aggressive	Slightly Aggressive
SH-160L	1	0.0	-	2.0	5.6	4,700	120	18	Extremely Aggressive	Moderately Aggressive
SH-174L	1	0.0	-	2.0	4.9	2,900	30	12	Extremely Aggressive	Extremely Aggressive
SH-201R	1	0.0	-	2.0	5.9	14,000	30	<5	Extremely Aggressive	Moderately Aggressive
SH-213L	1	0.0	-	2.0	5.8	8,900	15	<5	Extremely Aggressive	Moderately Aggressive
B-115R	1	0.0	-	4.0	8.2	5,400	15	18	Slightly Aggressive	Slightly Aggressive
B-211R	1	0.0	-	4.0	4.6	22,000	15	45	Extremely Aggressive	Extremely Aggressive
B-217L	1	0.0	-	4.0	7.0	5,700	15	36	Slightly Aggressive	Slightly Aggressive
PBA-6	1	1.5	-	2.5	6.6	28,000	15	<5	Moderately Aggressive	Slightly Aggressive
SH-192L	2	0.0	-	2.0	5.4	4,800	30	<5	Extremely Aggressive	Moderately Aggressive
B-112R	2	0.0	-	4.0	7.4	3,000	15	<5	Moderately Aggressive	Moderately Aggressive
B-115L	2	0.0	-	4.0	8.1	5,500	15	21	Slightly Aggressive	Slightly Aggressive
B-212L	2	0.0	-	4.0	6.1	8,400	15	99	Moderately Aggressive	Slightly Aggressive
B-219	2	0.0	-	4.0	7.1	2,000	15	48	Moderately Aggressive	Moderately Aggressive
B-224R	2	0.0	-	4.0	7.9	4,300	45	177	Moderately Aggressive	Slightly Aggressive
B-225L	2	0.0	-	4.0	8.2	5,200	15	<5	Slightly Aggressive	Slightly Aggressive
B-231L	2	0.0	-	4.0	8.3	4,900	15	<5	Moderately Aggressive	Slightly Aggressive
B-238L	2	0.0	-	4.0	7.9	6,200	15	<5	Slightly Aggressive	Slightly Aggressive
PBA-4	2	5.0	-	6.0	5.8	760	15	231	Extremely Aggressive	Moderately Aggressive
B-205	4	0.0	-	4.0	5.4	8,100	15	96	Extremely Aggressive	Moderately Aggressive
AB-114R	WATER	--			7.6	1,700	80	60	Moderately Aggressive	Moderately Aggressive
B-115L	WATER	--			7.5	2,100	80	130	Moderately Aggressive	Moderately Aggressive
AB-212L	WATER	--			7.5	1,600	80	76	Moderately Aggressive	Moderately Aggressive
AB-212R	WATER	--			7.5	1,800	80	76	Moderately Aggressive	Moderately Aggressive
B-213R	WATER	--			7.6	1,600	80	76	Moderately Aggressive	Moderately Aggressive

* As per FDOT Structures Manual