FINAL

CENTRAL POLK PARKWAY (SR 570B)

From Polk Parkway (SR 570) to US 17 (SR 35)

Polk County, Florida
MP 0.000 to MP 6.232

FPID: 440897-2-52-01
CONTRACT NO: C9Y59

BALD EAGLE NEST EVALUATION DESIGN MEMORANDUM

PREPARED FOR:

FLORIDA'S TURNPIKE ENTERPRISE
MILE POST 263
BUILDING 5315
OCOEE, FLORIDA 34761

PREPARED BY:

KISINGER CAMPO & ASSOCIATES, CORP.
201 NORTH FRANKLIN STREET
SUITE 400
TAMPA, FLORIDA 33602

September 11, 2020

APPROVED BY:

TODD M. GARDINA
LICENSE
No 66373
STATE OF FLORIDA
PROFESSIONAL ENGINEER

THIS ITEM HAS BEEN DIGITALLY SIGNED AND SEALED BY

Todd M Gardina
2020.09.11 13:33:45 -04'00'

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 COPIES.

Kisinger Campo & Associates Corp.
201 N. Franklin Street, Suite 400
Tampa, Florida 33602
Engineer of Record: Todd M. Gardina, P.E.
P.E. No.: 66373

THE ABOVE NAMED PROFESSIONAL ENGINEER SHALL BE RESPONSIBLE FOR THE FOLLOWING SHEETS IN ACCORDANCE WITH RULE 61G15-23.004, F.A.C.

TABLE OF CONTENTS

LIST OF FIGURES

APPENDICES

Appendix A: Alternative Alignment Roll Plots
Appendix B: Preliminary Roadway Soil Survey Report
Appendix C: Proposed DRI Boundary Map
Appendix D: Land Use Map
Appendix E: Wetland Impact Map
Appendix F: Protected Species Map
Appendix G: Cultural Resources Map
Appendix H: Cultural Resource Research Design and Survey Methodology
Appendix I: Contamination Technical Memorandum
Appendix J: Floodplain Impact Map
Appendix K: USFWS Bald Eagle Technical Assistance Meeting Minutes

EXECUTIVE SUMMARY

The Florida Department of Transportation (FDOT), Florida's Turnpike Enterprise (FTE), is planning for a new, four-lane divided, limited access expressway in Polk County, Florida. This new expressway, known as the Central Polk Parkway (CPP/SR 570B), will be a component of a larger regional east/west network and a vital key to support the regional, north/south connectivity, enhance freight mobility and economic competitiveness, improve emergency evacuation times and accommodate future population growth and land use changes. The project is located between the city of Lakeland to the north and the city of Bartow to the west. The CPP will be a tolled facility to connect with the Polk Parkway (SR 570) and extend nearly 6.5 miles to the south through nearly 520 acres of mixed land use of agricultural and residential property to connect with US 17 (SR 35).

Majority of the project area provides suitable habitat for multiple federal and state listed species, including the bald eagle (*Haliaeetus leucocephalus*). The bald eagle is protected under State and Federal law by the Florida Fish and Wildlife Conservation Commission (FWC) under the Bald Eagle Rule (68A-16.002, F.A.C.), the United States Fish and Wildlife Service (USFWS) under the Bald and Golden Eagle Protection Act (BGEPA; 16 U.S.C. 668-668c), and the Migratory Bird Treaty Act (MBTA; 16 U.S.C. 703-712). Several bald eagle nests have been identified within the project planning area which are currently documented through the USFWS or have recently been identified though field reviews conducted along the project corridor. The proposed project may require an incidental nest take permit to the federally listed bald eagle species and/or remove habitat that may lead to harming the species by altering essential behaviors, such as breeding, feeding or sheltering. This design memorandum documents the potential impacts to the bald eagle nests with the current project alignment and evaluates several alternative alignments for the design of the CPP to minimize and avoid impacts to the nests within the project area. The intent is to support the permitting requirements for this project in order to provide the best opportunity to preserve the bald eagle nests while considering the necessary engineering factors to support a safe, reliable, and sustainable transportation solution for this new expressway.

1.0 INTRODUCTION

1.1 Overview

The project design area, or permit area, includes a minimum 310-foot proposed right-of-way (ROW) corridor to accommodate the proposed roadway improvements. The project location map is shown in Figure 1 which identifies the current project alignment beginning with the connection to the Polk Parkway (SR 570) and terminating at US 17 (SR 35). The alignment traverses along the eastern boundary of the SWFWMD property around Lake Hancock in Polk County. The project planning area currently inhabits several Federal and State listed protected species. The protected species and their impacts are described in detail within Section 4 *Environmental/Biological Assessment.*

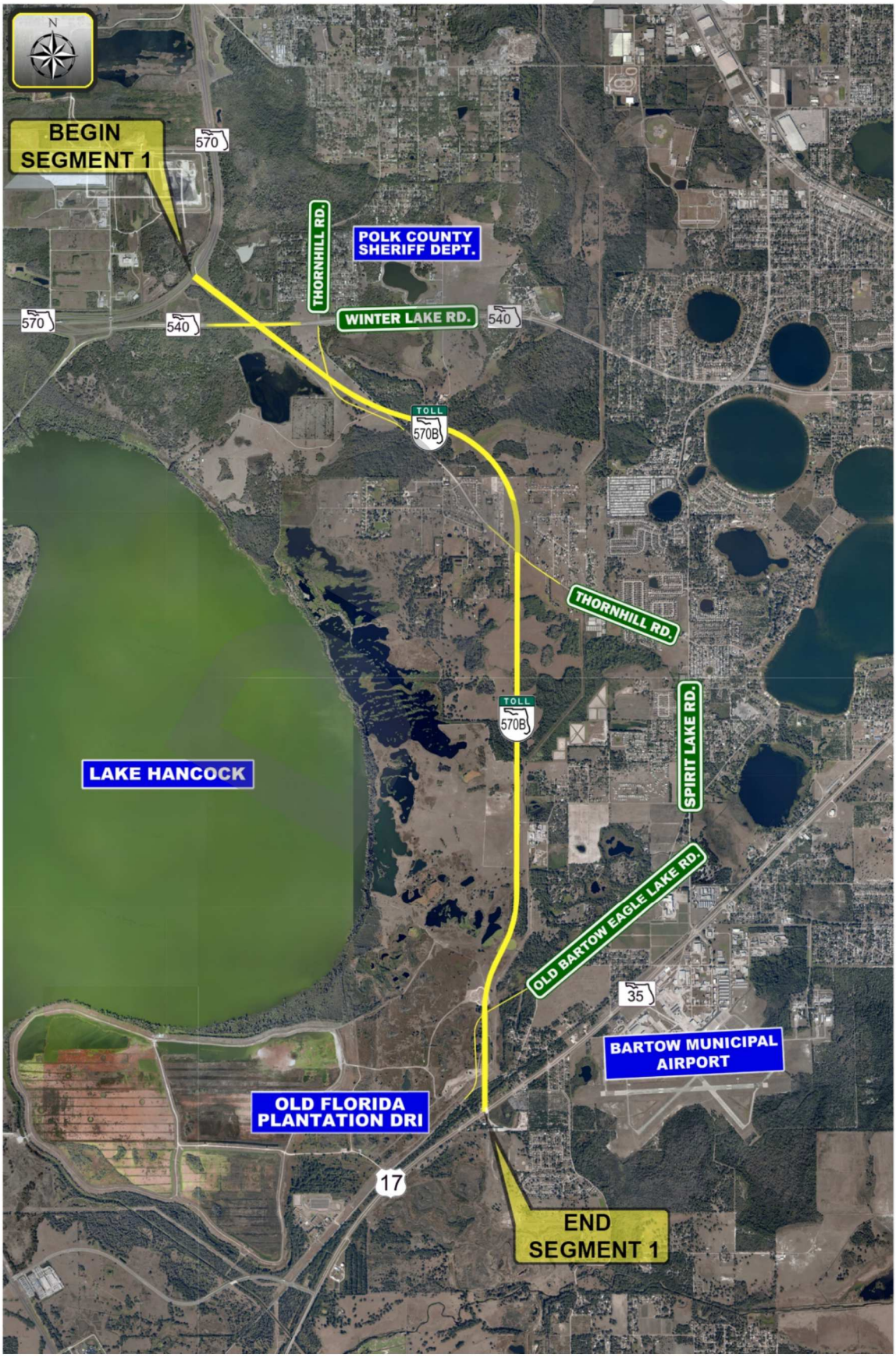


Figure 1: Project Location Map

1.2 Background

The limits of this project are within the boundaries of the PD&E study, FPID No. 423601-1-22-01 CPP from SR 60 to SR 570 and from SR 60 to Interstate 4. The 423601-1-22-01 State and Environmental Impact Report (SEIR) was signed in March 2011. The design for the CPP, FPID No. 431641-1-52-01, from the Polk Parkway to south of US 17 began in February of 2013 and was partially completed to Phase I by FDOT District One. The District One project was then placed on hold in April 2016 stopping any future work on the project noting insufficient funding and traffic volume support. The FTE took ownership of the project in 2017 by justifying the traffic volume support for the design of the CPP from SR 570 to US 17. The project was under contract for design in March 2018 which began with the development of the Alternatives Evaluation Report to focus on optimizing the previous District One design. The report included several design alternatives to address right-of-way need, residential and business impacts, roadway geometrics as it relates to safety and traffic volumes, stormwater management facilities, preliminary structural design, environmental, geotechnical, and utility concerns. The primary purpose of the report was to refine the original design, balance the projected project funding, and support the construction financial feasibility for the project. The Final report was completed in August 2018 and used as the basis for the design of the CPP. A public information meeting was held in June 2019 which displayed the design in an attempt to receive public input for the project. Following the public information meeting, the design was completed to Phase II in November 2019. Part of the scope requirements for this project required coordinating with the regulatory agencies to acquire the necessary permits for construction, including the coordination for impacts to the protected species in the area.

1.3 Endangered Species Act

Listed species are afforded special protective status by federal and state agencies. This special protection is federally administered by the United States Department of the Interior, United States Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration – National Marine Fisheries Services (NOAA-NMFS) pursuant to the Endangered Species Act of 1973 (as amended). The USFWS administers the federal list of animal species and plant species (50 CFR 17).

Section 9 of the Endangered Species Act (Act) and federal regulation pursuant to section 4(a) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. A take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by USFWS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the USFWS as intentional or negligent actions that create the likelihood of injury to listed species by annoying them to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take, that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity.

Pursuant to section 11(a) and (b) of the Act, any person who knowingly violates this section 9 of the Act or any permit, certificate, or regulation related to section 9, may be subject to civil penalties of up to $25,000 for each violation or criminal penalties up to $50,000 and/or imprisonment of up to one year.

Administered by the Florida Fish and Wildlife Conservation Commission (FWC), the State of Florida affords special protection to animal species designated as State-designated Threatened or State Species of Special Concern, pursuant to Chapter 68A-27, F.A.C. The State of Florida also protects and regulates plant species designated as endangered, threatened or commercially exploited as identified on the Regulated Plant Index (5B-40.0055, F.A.C.), which is administered by the Florida Department of Agriculture and Consumer Services (FDACS), Division of Plant Industry, pursuant to Chapter 5B-40, F.A.C.

1.4 Permitting and Regulatory Requirements

Wetlands protect and improve water quality, provide habitat for fish and wildlife, reduce damage caused by storm surges and flooding, and recharge underground sources of drinking water. Given the important role wetlands play in the

environment, strict regulations are in place to ensure their protection. Any person or business proposing to impact existing wetlands must first make every attempt to avoid and minimize the impact. For the unavoidable impacts to wetlands, the replacement of any loss of wetland, stream, and/or aquatic resource is required through compensatory wetlands mitigation overseen by the U.S. Army Corps of Engineers. Furthermore, unavoidable impacts to wetlands will also need to be mitigated pursuant to Florida state mitigation requirements, Section 373.4137, F.S., to satisfy all mitigation requirements of Part IV of Chapter 373, F.S., and 33 CFR §325 and 332.

The bald eagle, both birds and their nests, are protected under state and federal law. The bald eagle is protected by FWC under the Bald Eagle Rule (68A-16.002, F.A.C.) and USFWS under the Bald and Golden Eagle Protection Act (BGEPA; 16 U.S.C. 668-668c) and the Migratory Bird Treaty Act (MBTA; 16 U.S.C. 703-712). Bald eagle nests are protected within their 330-foot primary buffer zone and 660-foot secondary buffer zone. No construction activities may occur within the 330-foot primary buffer zone of any active bald eagle nest during nesting season (October 1 – May 15). Work conducted during the nesting season (October 1 – May 15) from the 330-primary buffer zone to the 660-foot secondary buffer zone requires monitoring by a qualified biologist and adherence to the USFWS Bald Eagle Monitoring Guidelines (revised 2007). Construction activities more than 660 feet from a bald eagle nest may be conducted at any time of the year with no coordination required with the USFWS. Work conducted within 660 feet of a bald eagle nest generally requires technical assistance and an Incidental Take Permit from the USFWS.

2.0 PROJECT DESCRIPTION

The Central Polk Parkway (CPP/SR 570B) will be a new four-lane divided limited access expressway in Polk County, Florida. Through coordination with Florida's Turnpike Enterprise it has been determined that this new corridor will be classified as a Strategic Intermodal System highway. This roadway network is a planned new alignment toll facility that will connect the Polk Parkway (SR 570) with US 17 (SR 35) to the south. The project is located between the city of Lakeland to the north and the city of Bartow to the west. The project will be completed under the Financial Project Identification (FPID) No. 440897-2-52-01.

The existing roadway configuration includes a directional, two-level interchange connecting Polk Parkway (SR 570) to Winter Lake Road (SR 540). Since this is a new alignment, there is no existing roadway that provides a connection to US 17 (SR 35) beyond SR 540 located within the project limits. The existing Polk Parkway typical section is comprised of a four-lane, divided, limited access facility with a 64-foot median, 12-foot travel lanes, 8-foot inside shoulders (4-foot paved), and 12-foot outside shoulders (10-foot paved). Additionally, the existing SR 540 typical section is defined by a four-lane, divided, minor arterial facility with a 28-foot median, 12-foot travel lanes, Type F curb and gutter with no inside shoulders, and 10-foot outside shoulders (4-foot paved). At the south end of Segment 1, the existing US 17 typical section includes a four-lane, divided, principal arterial facility with a 40-foot median, 12-foot travel lanes, 8-foot inside shoulders (unpaved), and 10-foot outside shoulders (5-foot paved).

The proposed typical section for the CPP mainline includes two 12-foot travel lanes in each direction with 12-foot outside shoulders (10-foot paved), 8-foot inside shoulders (4-foot paved), a 74-foot median, and 94-feet of border width all within a 310-foot limited access right-of-way corridor. The typical section accommodates future widening to the median if traffic volumes warrant additional capacity. This allows for all future widening to be maintained within the proposed right-of-way corridor without impacting the 94-foot border width requirements.

The project includes approximately 6.5 miles of roadway length from MP 0.000 to MP 6.232 under county and section number 16-471 of Polk County. The scope of work for this segment includes two new interchanges, one three-level interchange at the Polk Parkway (SR 570) and another two-level interchange at Winter Lake Road (SR 540). Access to this new alignment from the south at US 17 (SR 35) will be by way of an at-grade intersection, and the facility will feature All-Electronic Tolling (AET). The scope of work for this project also includes widening improvements and milling and resurfacing along portions of the Polk Parkway (SR 570), Winter Lake Road (SR 540), and US 17 (SR 35).

3.0 ENGINEERING ANALYSIS

3.1 Project Alignment

The CPP roadway alignment, as submitted with the Phase II design, was established based on the Alternatives Evaluation Report which focused on optimizing the previous District One design. The report included several design alternatives to address right-of-way need, residential and business impacts, roadway geometrics as it relates to safety and traffic volumes, stormwater management facilities, preliminary structural design, environmental, geotechnical, utility concerns, and project construction costs. During the evaluation it was interpreted the District One alignment was established to minimize impacts to SWFWMD property, the primary property owner throughout the project limits, by following the eastern boundary of the property to avoid bisecting the parcels to preserve access to the existing property which is currently separated by water features from the north and south. Previous studies identified large portions of land within the project area to have been heavily mined for phosphate over the years which carry forward unsuitable soil conditions for roadway development. One known area was near the southern limits of the project where the District One alignment shifted the US 17 (SR 35) interchange nearly 2,200-feet to the north from what was originally proposed within the approved 2011 SEIR. This was another deciding factor used in establishing the current alignment to follow the eastern boundary of the SWFWMD property to reduce the risk for encountering unsuitable soils to the west into the previously mined lands where necessary geotechnical investigation had not been conducted. The current alignment was established to reduce the risk for encountering unsuitable soil conditions while remaining outside of the existing TECO utility easement which carries 230kV overhead transmission lines.

3.2 Alignment Alternatives

Bald eagles and their nests were documented within and adjacent to the proposed right-of-way (ROW). Site reviews were conducted in 2017, 2018, 2019, and 2020 by the project design team's environmental biologists to confirm the presence of protected species within the project limits. There are thirteen known bald eagle nests, nine of which have previously been identified by the FWC and Audubon EagleWatch, and designated accordingly by these agencies. The remaining nests which were documented during field reviews (undocumented by FWC) have been identified with unofficial nest numbers for the purposes of this evaluation. After reviewing the previous SEIR and District one documents there were known bald eagle nests within the project area which will be impacted by the design of the new CPP expressway. The nests (undocumented by FWC) which the design team's environmental biologists observed during field reviews do not appear to have been specifically referenced within the previous SEIR and District One documents. Current KCA environmental staff first observed Nest 1 on September 27, 2019 during wetland delineation surveys. Nest 2 was first observed on February 5, 2019 during a pond siting field review. Nest 3 was first observed on November 20, 2019 during a field review with Turnpike staff. Nest 4 was first documented on March 6, 2020 during a field review to confirm bald eagle activity in the vicinity of the project area. There are three bald eagle nests which are directly impacted by the project alignment. The project alignment impacts the 330-foot primary buffer zone for Nest 1 requiring an Eagle Nest Take Permit. Nest 2 will need to be removed or relocated requiring an Eagle Nest Take Permit. The 660-foot secondary buffer zone for Nest PO037a, a nest previously identified by FWC, will be impacted and require an Eagle Nest Incidental Take Permit. The secondary buffer zone for Nest PO037a is impacted by the proposed limited access ROW which establishes the boundary for the proposed regional pond to support the drainage improvements for this project. However, the pond construction is anticipated to be completed outside of the 660-foot secondary buffer zone for this nest; therefore, an Eagle Nest Incidental Take Permit may not be warranted. If construction activities are to occur within the buffer zone of this nest, then these activities will be completed outside of nesting season. The project planning area and the bald eagle nests are shown in Figure 2.

- Nest 1 - the 330-foot primary buffer zone overlaps the proposed ROW
- Nest 2 - the tree supporting Nest 2 is located within the proposed ROW
- Nest PO037a - the 660-foot secondary buffer zone overlaps the proposed ROW

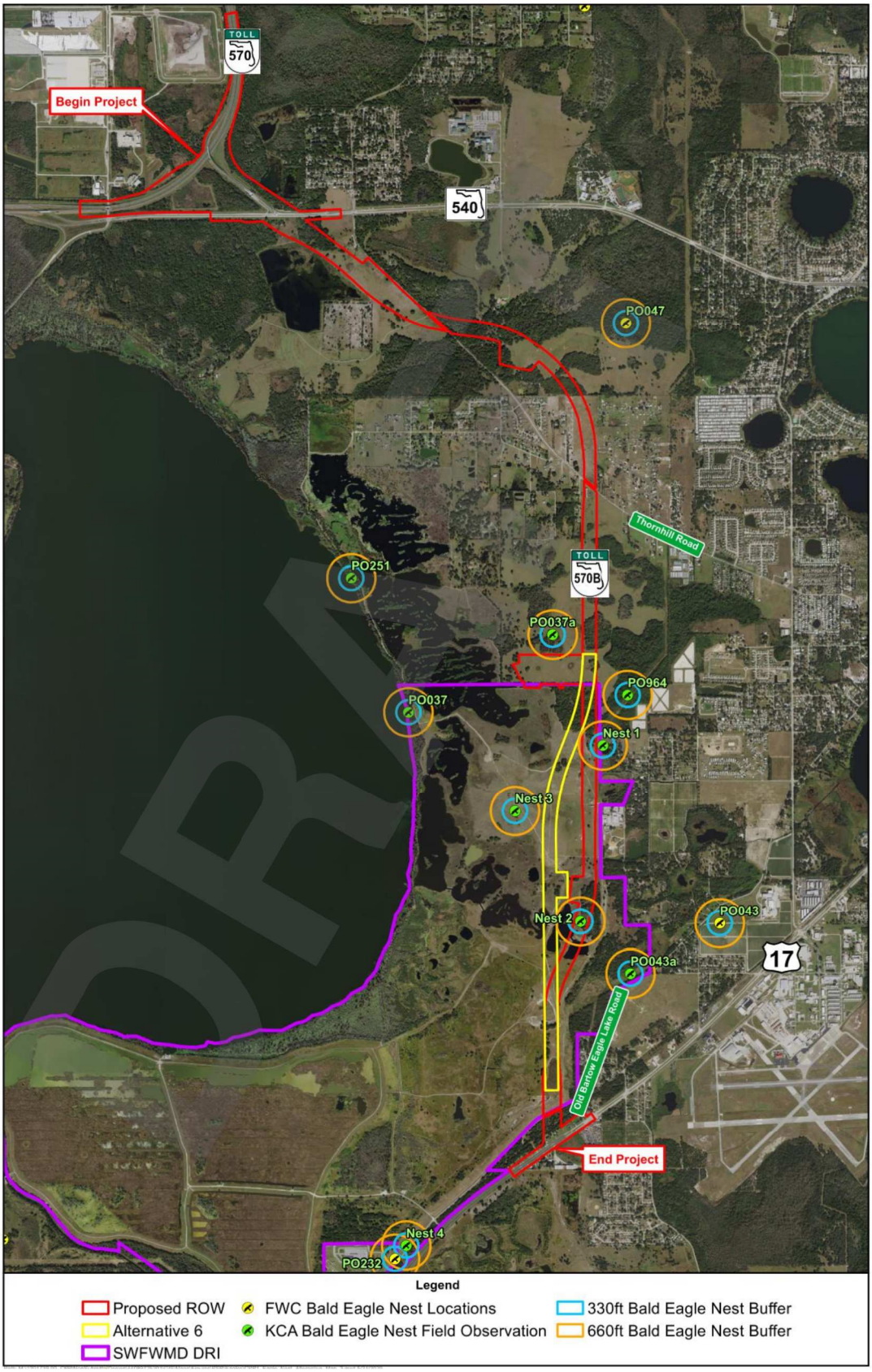


Figure 2: Bald Eagle Nest Location Map

This evaluation will focus on a two-mile segment of the project where the three nests are located. Considering the slight encroachment into the 660-foot secondary buffer zone for Eagle Nest PO037a and construction activities have the opportunity to remain outside of this buffer zone, this nest is excluded from this evaluation. This segment is primarily within the SWFWMD property along the southern limits of the project north of the Old Bartow Eagle Lake Road crossing. Six alternative alignments have been evaluated both east and west of the current alignment. These alternatives were developed to minimize and avoid impacts to the bald eagle nests while considering the necessary engineering factors to support a sustainable transportation solution for the project. These engineering factors include safety for the traveling public, roadway, drainage, geotechnical, structural, and utilities investigation, ROW need, accessibility and maintenance, and construction cost. The alignment alternatives utilize the 330-foot primary and 660-foot secondary buffer zones as the basis for defining the level of minimization and avoidance to the bald eagle nests. These protective zones, and their significance as it relates to the planning and construction of the CPP are described in more detail within Section 4 *Environmental/Biological Assessment*. The alignment alternative roll plots can be referenced in Appendix A which separates each alternative with the respective primary and secondary buffer zones for the bald eagle nests within the evaluation segment.

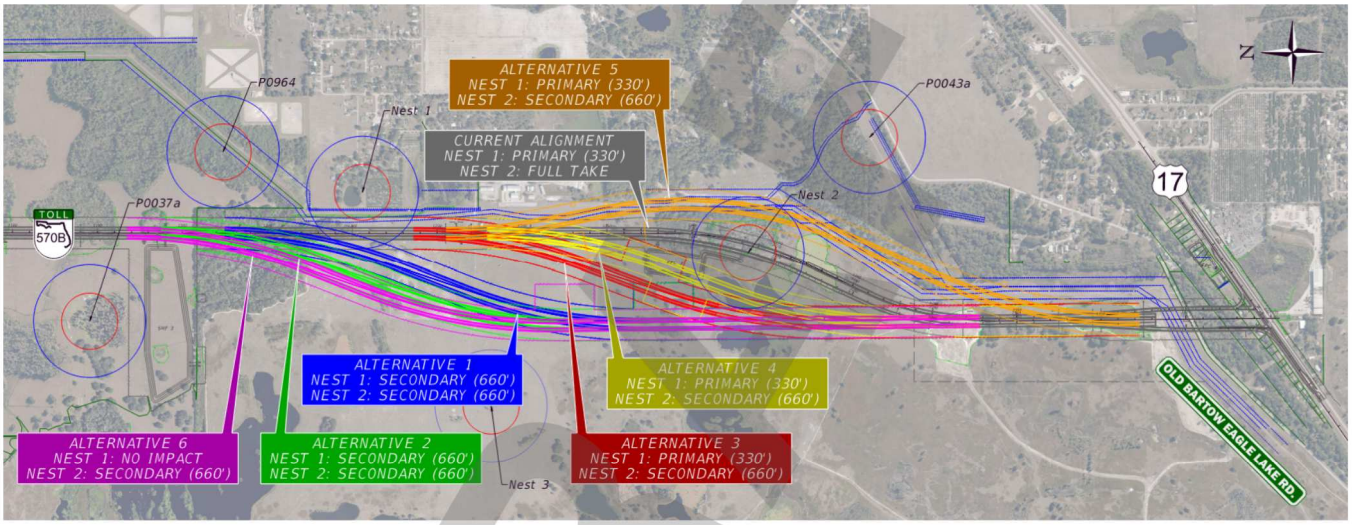


Figure 3: Alternative Alignments

The evaluation matrix for all six alignment alternatives is shown in Figure 4 which was presented to FTE staff along with the advantages and disadvantages for each alternative in November 2019. Several design parameters were considered to compare the various degrees of minimization and avoidance to the bald eagle nests. A risk level for low, medium, and high was allocated for the geotechnical investigation of the alternative alignments based on the latest USDA soil survey maps within the project area and the likelihood to encounter unsuitable soils the further west the alignment traverses through the previously mined lands. Alternatives 2 and 4 were immediately eliminated from further discussion due to similarities with Alternatives 1 and 3 without an added benefit for avoiding impacts to the nests. Alternative 5 was eliminated due to significant impacts to the TECO 230kV overhead transmission poles and right-of-way impacts to several local residential properties and the Polk County property. In comparing Alternatives 1, 3, and 6, Alternative 6 provides the greatest level of bald eagle nest impact avoidance by eliminating impacts to Nest 1 with no encroachment into the 660-foot secondary buffer zone while slightly encroaching into the secondary buffer zone for Nest 2. This nest could not be completely avoided due to the location of the interchange connection at US 17 (SR 35). This interchange location was established to provide enough distance for the CPP mainline to tie down to existing grade with an acceptable vertical profile given the vertical clearance requirements to bridge over Old Bartow Eagle Lake Road. The design team and FTE recommended Alternative 6 to be further evaluated and compared with the current project alignment. The evaluation will include geotechnical investigation along the Alternative 6 alignment in order to elaborate on each engineering factor to ultimately provide a recommendation for final design and permitting.

Description	Current Alignment	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6
Bridge Length (ft.) – Each Side	780	1300	1300	1300	1500	0	1300
Min. Curve Radius (ft.)	3000	5730	5730	5730	5730	4700	5730
Max. Curve Superelevation	6.70%	3.70%	3.70%	3.70%	3.70%	4.50%	3.70%
Curve HSO (ft.)*	22	9	9	9	9	12	9
Eagle Nest 1 Impacts	Primary (330')	Secondary (660')	Secondary (660')	Primary (330')	Primary (330')	Primary (330')	None
Eagle Nest 2 Impacts	Full Take	Secondary (660')	Secondary (660')	Secondary (660')	Secondary (660')	Secondary (660')	Secondary (660')
Geotechnical Risk	High	High	High	High	High	Low	High
Estimated ROW (AC)	106.45	104.08	104.06	104.05	105.69	104.93	104.06
Floodplain Impact (AC)	9.0	13.8	12.7	8.7	8.9	15.2	9.2
Wetland and Surface Water Impacts (AC)	23.83	21.27	21.04	21.27	24.97	16.22	20.42
Roadway Cost	$16,342,901	$16,714,752	$16,717,531	$16,719,266	$16,460,206	$16,579,350	$16,716,920
Drainage Cost	$1,362,282	$1,393,278	$1,393,510	$1,393,654	$1,372,060	$1,381,991	$1,393,459
Structures Cost	$6,552,000	$12,202,667	$12,202,667	$12,014,933	$14,150,400	$0	$12,202,667
Total Construction Cost	**$24,257,183**	**$30,310,697**	**$30,313,708**	**$30,127,853**	**$31,982,666**	**$17,961,341**	**$30,313,046**
Estimated ROW Cost**	$834,625	$816,057	$815,921	$815,837	$828,677	$822,722	$815,951
Wetland Mitigation Cost***	$1,612,000	$1,295,800	$1,284,640	$1,292,080	$1,310,680	$1,275,960	$1,212,720
Utility Mitigation Cost	$0	$0	$0	$0	$0	$14,500,000	$0
Alternative Total Cost	**$26,703,808**	**$32,422,554**	**$32,414,269**	**$32,235,770**	**$34,122,023**	**$34,560,023**	**$32,341,717**
Cost Increase (from Current Alignment)		**$5,718,746**	**$5,710,461**	**$5,531,962**	**$7,418,215**	**$7,856,215**	**$5,637,909**

*Horizontal Sight Offset as measured from controlling inside lane EOP to offset required to be clear of obstructions.
**The ROW cost estimates (SWFWMD lands: $7,841/acre) have a confidence level C; indicating Below-Average confidence.
***Wetland Mitigation Cost only includes wetland impacts at $124,000/function loss (FL) unit.

Note: Ground improvement costs required for soil remediation have been excluded from Figure 4. Figure 4 was developed to compare all of the alternative alignments to support the recommendation for the selected Alternative 6 to be further evaluated with the current alignment, including ground improvement costs.

Figure 4: Alignment Alternatives Evaluation Matrix

3.3 Selected Alternative

3.3.1 Roadway

The Alternative 6 alignment utilizes a series of horizontal curves at the beginning of the evaluation limits in order to shift the alignment further to the west to avoid bald eagle nests 1 and 2. The horizontal curves utilize a centerline radius of 5,730-feet (Degree of Curvature = 1°) and requires superelevation of 3.7 percent with a design speed of 70 mph. The flatter curvature with Alternative 6 accommodates the stopping sight distance requirements of 820-feet with utilizing the standard shoulder width for the CPP mainline. The current alignment utilizes a series of horizontal curves towards the end of the evaluation limits over the mine pit area. Curve 1 of the current alignment includes a horizontal curve radius of nearly 5,000-feet requiring superelevation of 4.3 percent with a horizontal sight offset of 12-feet for stopping sight distance. This increases the bridge width over the mine pit area. Curve 2 includes a minimum horizontal curve radius of 3,000-feet requiring superelevation of 6.7 percent. This curve requires a horizontal sight offset of nearly 22-feet to accommodate stopping sight distance which controls the location of the median barrier to ensure sight obstructions are not proposed within the 22-foot offset. Widened shoulders for the current alignment requires bifurcating the median within the limits of the horizontal curves to ensure the stopping sight distance can be accommodated in the future if additional lanes are added to the median. The wider median requires more right-of-way acquisition from the SWFWMD property within these limits. Large portions of the SWFWMD property become inundated with surface water during peak season throughout the year which sets the seasonal high ground water elevation to be at or slightly above existing

grade. For the purposes of this evaluation, the vertical profile control follows a minimum elevation of 5-feet above existing grade to ensure adequate base clearance requirements of 3-feet are met. This approach does not differ between the current alignment or Alternative 6. The profile is raised within the mine pit area where several bridge structures are proposed and described in Section 3.3.4 *Structures.* The 2-foot drift clearance above the mean high water elevation for this area controls the vertical profile across these open water features. The current alignment requires independent profiles throughout these limits in order to control the vertical differential between the two bridge structures. Alternative 6 does not require independent profiles as the two bridge structures are located within a tangent. The current alignment meets the minimum 0.5 percent profile grade (0.2 percent along the edge of pavement) within the superelevation transition across the mine pit bridges. This area requires raising the profile further above the minimum 2-foot drift clearance control to maintain the minimum profile grade where the cross slope is less than or equal to 1.5 percent to eliminate ponding water on the bridges.

3.3.2 Drainage

Water quality treatment for both the current and Alternative 6 alignments are being provided within the regional pond (SMF 3) as shown in Appendix A: Alternative Alignment Roll Plots. The water quantity attenuation is being provided in the roadside ditches for the current alignment and will also be provided using the roadside ditches for the Alternative 6 alignment. A bridge drainage system will be needed for the current alignment for the westbound bridge over the mine pit lake. The westbound bridge for the current alignment has a superelevation transition that passes through a zero cross slope. For the Alternative 6 alignment, the bridges over the mine pit lake are in a tangent section and should not require a bridge drainage system. The floodplain encroachment locations and the Floodplain Compensation (FPC) site locations will be different for the current and Alternative 6 alignments. However, the right-of-way required for the FPC site is approximately the same for both alternatives and the drainage evaluation will not favor one alternative over the other. See Appendix J for the Floodplain Impact Map.

3.3.3 Geotechnical

Prior to the geotechnical investigation of soils within the SWFWMD property west of the current alignment, little information was known about the quality of soils and to what magnitude a soil remediation plan would be required. Because of the variability and potential deleterious nature of reclaimed mine lands, FTE authorized a preliminary geotechnical study along the Alternative 6 alignment to provide an assessment on how the soil conditions compare to the current alignment. The *Preliminary Roadway Soil Survey Report* is included within Appendix B. The investigation is considered preliminary in nature and was performed at a test boring frequency much less than required for design level geotechnical exploration within reclaimed mine lands. 12 hand auger borings were performed within the natural portion of the alignment, 53 SPT borings within the reclaim mined areas, and over 70 hand probes within the open water feature, or mine pit, towards the southern end of the evaluation limits. Due to the presence of subsurface organics and previously mined soils with variable consistency, the likely remediation measure for this area will include a combination of the use of surcharge embankment in conjunction with settlement plates, and geogrid mesh material to be placed prior to the roadway construction for a duration range of 30 to 120 days, similar to the current alignment. As a result, approximately 7,300-feet, or 540,000 cubic yards (CY), of surcharge embankment would be required along the Alternative 6 alignment. However, the surcharge embankment requirements for Alternative 6 results in nearly a 4 percent decrease when compared to the requirements of the current alignment (560,000 CY). Subsurface organic depths within the reclaim mined land, and water depths with subsurface soft soils (slime) at the bottom of the mine pit were similar to the current alignment as shown in Figure 5. The probing operations conducted within the mine pit area revealed water depths ranging from 1-foot around the perimeter and dropping to depths of 30-feet. Soft soils were discovered at the bottom of the mine pit where the hand probe depths ranged between 2-feet and 20-feet. The conditions within the mine pit will require consideration for bridge structures which is described in more detail in Section 3.3.4 *Structures.* The geotechnical investigation concluded the soils to be slightly better with Alternative 6 when compared to the current alignment resulting in soil remediation cost savings of nearly $352,000.

Description	Current Alignment	Alternative 6
Subsurface Organics (Muck) Depths within Reclaim Mined lands (range; ft.- ft.)	0-20	2-28
Water Depths within Mine Pit Area (ft.)	6-20	1-30
Subsurface Soft Soil (Slime) Depths at Mine Pit Bottom (ft.)	5-15	2-20
Surcharge Embankment Requirements (CY)	560,000	540,000

Figure 5: Subsurface Conditions

3.3.4 Structures

For the current alignment, paired westbound and eastbound bridges, each spanning a total length of 780-feet over the mine pit region, are proposed. A preliminary Bridge Development Report (BDR) was prepared to investigate structure types suitable at this location. Per the preliminary BDR, the preferred alternative at the current alignment consists of ten equal length spans with Florida-I 36 beam superstructures and pile bent substructures founded on battered 24-inch piles. The BDR analysis resulted in an average cost estimate of approximately $90 per square foot of bridge.

Along the current alignment, the mine pit depths at the westbound bridge controlled the design. A maximum water depth of approximately 20-feet was observed, and generally poor soils were found in the pit, with the top 5-feet of soil consisting of very soft sediment that provides negligible resistance. In combination with the preliminary profile, an unsupported pile length of 40-feet was considered in the preliminary bent analyses.

For Alternative 6, total bridge lengths of 1,300-feet are estimated. For approximately 738-feet, the westbound bridge spans over relatively higher ground and the use of pile bents along this length would be logical. However, at the mine pit, preliminary probing estimates showed a maximum combined water and soft sediment depth of 44-feet, which is 19-feet deeper than measured at the current alignment. Given that the unsupported pile length would be in excess of 40-feet (without any consideration given to the profile) if pile bents were employed in the region, it is assumed that pier supports would be required along the remaining 562-feet of the bridge. As a result, the conceptual span arrangement developed for Alternative 6 is divided into two sections: (1) nine spans at 82’-0” and (2) four spans at 140’-6”. The first section would employ Florida-I 36 beams on pile bent supports, while the second section would employ Florida-I 63 beams on pier supports. Figure 6 illustrates the conceptual bridge layouts for both Alternative 6 and the current alignment.

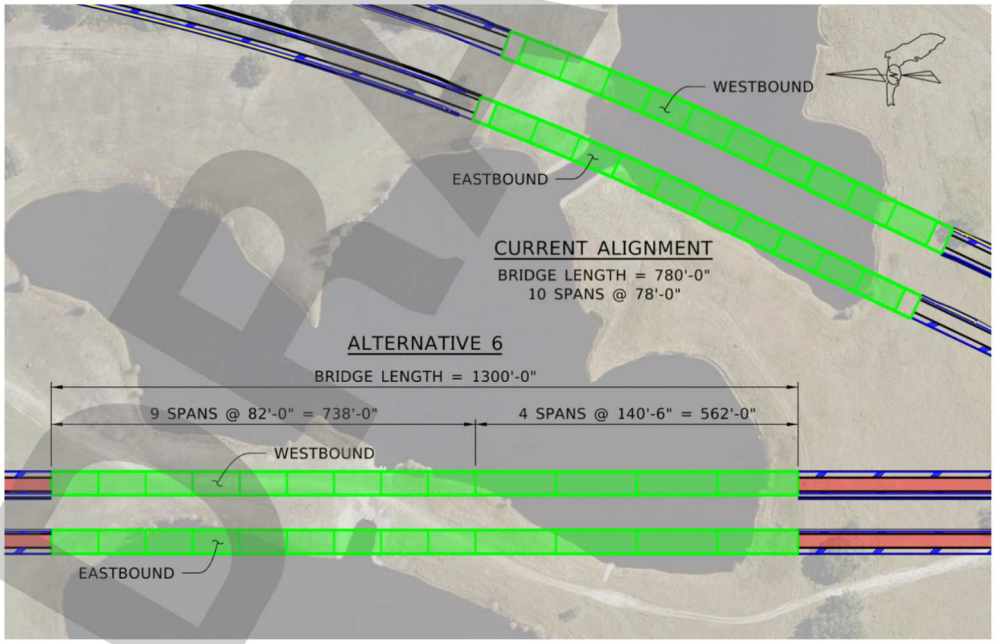


Figure 6: Bridge Analysis

A span arrangement matching the westbound bridge is assumed for the eastbound bridge under Alternative 6. The mine pit region traversed closer to the eastbound begin bridge is anticipated to have water and soft sediment depths similar to the current alignment. Given that the bridges may be widened to their inside in the future and that the preliminary

probing was limited, the substantial pit depths at the westbound end spans are also accounted for at the eastbound bridge with the assumed implementation of pier supports. It is noted that the preliminary bridge limits were established to be aligned with each other and set back from the water's edge, as observed by aerial view. As a result, the estimated westbound bridge length may be conservative, and the first few spans centered along the isthmus could potentially be eliminated after further geotechnical analysis is completed and a roadway profile is generated. The use of earth plugs at the pits may also be investigated as a means of reducing cost during the design phase.

The preliminary BDR prepared for the current alignment investigated an alternative with multi-column pier supports under 130-foot spans in addition to the preferred pile bent alternative. The BDR analysis resulted in an average cost estimate of approximately $100 per square foot of bridge. To compensate for the nature of the preliminary geotechnical discovery and conceptual analysis employed at this stage, the estimated bridge cost is increased to $110 per square foot for Alternative 6.

3.3.5 Utilities

TECO maintains 230kV overhead transmission lines within an existing easement which parallels the alternative alignments to the east. Neither the current alignment nor Alternative 6 impacts this easement within the evaluation limits. The proposed TECO transmission line realignment near US 17 is not affected by either the current alignment or Alternative 6, and the proposed TECO easement is not significantly impacted.

3.3.6 Safety

High speed facilities with sharp horizontal curvature requiring higher superelevation rates tend to result in a significant increase of run-off-road crashes, rollover crashes, and rear end crashes if operations deteriorate (Level of Service drops). A decrease in free flow speeds due to the sharp horizontal curvature could also result in a reduction in capacity.

Crash modification factors for various types of crashes were calculated from the Highway Safety Manual for freeway segments to compare safety impacts between the sharper and flatter curved alignment alternatives. The analysis shows that introducing a sharp curve within an alignment such as the 3000-foot radius used in the current alignment could potentially increase the risk of multiple vehicle crashes (rear end type) by a rate of nearly 6.18% (K = 0.1%, A = 0.3%, B = 2.1%, C = 3.7%, PDO = 12.2%) and single vehicle crashes (run-off-road and overturn types) by a rate of nearly 25.85% (K = 0.5%, A = 1.3%, B = 8.7%, C = 15.4%, PDO = 22.5%). Introducing a flatter curve within an alignment such as the 5730-foot radius used in Alternative 6 yields a decrease in the risk for potential multiple vehicle crashes (rear end type) by a rate of nearly 1.72% (K = 0.03%, A = 0.1%, B = 0.6%, C = 1.0%, PDO = 3.4%) and single vehicle crashes (run-off-road and overturn types) by a rate of nearly 7.19% (K = 0.1%, A = 0.4%, B = 2.4%, C = 4.3%, PDO = 6.3%). Shown below in Figure 7 are the summarized results from our risk predictive analysis which shows that by utilizing the flatter curve in Alternative 6 would theoretically result in a reduction in all types of crashes. The percentages in Figure 7 were calculated using Eq. 18-24 of the Highway Safety Manual to compare expected crash rate increases by type and severity.

Crash Severity	Crash Type					
	Multiple Vehicle (Rear-End Type)			Single Vehicle (Rollover, Run-Off-Road Types)		
	Current (R = 3000')	Alt 6 (R = 5730')	Crash Reduction (Alt 6 vs. Current)	Current (R = 3000')	Alt 6 (R = 5730')	Crash Reduction (Alt 6 vs. Current)
Fatal (K)	0.12%	0.03%	0.09%	0.52%	0.14%	0.37%
Severe Injury (A)	0.31%	0.09%	0.22%	1.29%	0.36%	0.93%
Moderate Injury (B)	2.08%	0.58%	1.50%	8.69%	2.42%	6.27%
Minor Injury (C)	3.67%	1.02%	2.65%	15.35%	4.27%	11.08%
Total Fatal/Injury	6.18%	1.72%	4.46%	25.85%	7.19%	18.65%
Property Damage Only (PDO)	12.22%	3.40%	8.82%	22.51%	6.26%	16.25%

Figure 7: Safety Risk Analysis for Potential Percent (%) Decrease in Crashes

Alternative 6 utilizes flatter horizontal geometry and less superelevation than the current alignment, which yields a safety advantage over the current alignment. Using the Highway Safety Manual crash modification formulas for horizontal

curvature on freeway segments, the flatter curvature and superelevation rate of 3.7% used along Alternative 6 decreases the expected crash rates to approximately a third of that of the sharper curvature and superelevation rate of 6.7% used with the current alignment.

3.3.7 Right of Way

The Alternative 6 alignment shifts farther to the west to maximize the opportunity for minimization and avoidance to the bald eagle nests in the area. The alignment remains within the SWFWMD property which includes a right-of-way (ROW) need of approximately 104.06 AC, a potential 2.4 AC reduction from the current alignment. Alternative 6 does not impact any additional parcels or incur any residential/business relocations. Through coordination with the SWFWMD there is a large development of regional impact (DRI) area which is planned within the evaluation limits and the surrounding area. Even though Alternative 6 results in a 2.2 acre reduction to the DRI boundary when compared to the current alignment, the Alternative 6 creates more of a bifurcation and disruption to the DRI. Coordination with the SWFWMD is ongoing for the status of the DRI. The ROW impacts are summarized in Section 3.4 *Evaluation Comparison* which includes the ROW differences and DRI impacts for each alignment. See Appendix C for the Proposed DRI Boundary Map.

3.3.8 Accessibility/Maintenance

The current alignment was established to follow the eastern boundary of the SWFWMD property to avoid bisecting the parcel and preserve the primary means of access from the north and south sections of the property that are currently separated by open water features. The SWFWMD utilizes several access locations throughout the property which can be seen through aerial view. These stabilized maintenance features have been discussed with the agency to be imperative for the maintenance and accessibility to the property from the north and the south. This is largely due to the majority of the property becoming inundated with standing water during peak storm seasons throughout the year. Even though the Alternative 6 alignment appears to directly impact the SWFWMD primary means of access through the mined pit area, both alignments would require alternatives to maintain access east and west of the alignment which will not largely favor one alternative over the other. Coordination with the SWFWMD is ongoing and a detailed alternative analysis to address the accessibility and maintenance to the property has been excluded from this evaluation. Polk County operates several trail networks within the project area, including the Panther Point Trail that follows the eastern boundary of Lake Hancock. Neither of the alignments directly impact the existing trail network or any proposed trail currently included within Polk County's 2040 Long Range Transportation Plan (LRTP). Coordination with Polk County is ongoing for this project.

3.3.9 Construction Cost

Construction cost estimates were generated on a cost per linear foot basis for roadway, drainage, and earthwork quantities for each alignment alternative. Structure costs were generated on a cost per square foot basis for the total bridge area required for each alternative, varying based on the type of bridge and whether multi-column piers or pile bents were used. Estimated costs for construction are included within Figure 8 which indicates an additional cost of nearly $5.3 million for Alternative 6 over the current alignment.

3.4 Evaluation Comparison

The evaluation matrix comparing Alternative 6 to the current alignment is given in Figure 8. Alternative 6 completely avoids Nest 1 and slightly encroaches within the 660-foot secondary protective zone for Nest 2. The safety analysis utilized the Highway Safety Manual's Predictive Crash Method which concluded a theoretical reduction in run-off-road crashes, rollover crashes, and rear end crashes for Alternative 6. This reduction is due to the alignment having flatter curved geometry used to avoid Nests 1 and 2. There were no drainage design factors which largely favored one alternative over the other. The geotechnical investigation concluded the soils to be slightly better with Alternative 6 when compared to the current alignment requiring less surcharge embankment material and an overall soil remediation reduction cost of nearly $352,000. The open water features were closely evaluated within the mine pit area towards the southern end of the evaluation limits. It was determined longer bridge structures with deeper structural foundations will

be required for Alternative 6. Accessibility and maintenance were considered as Alternative 6 appears to directly impact the primary access to the SWFWMD property from the south. However, coordination is ongoing with the SWFWMD for this project and this consideration currently does not play a key role in favoring either alternative considered for this evaluation. The estimated right-of-way impact for Alternative 6 results in a 2.2 acre reduction when compared to the current alignment. The planned development of regional impact (DRI) was considered as the DRI boundary covers a large portion of the SWFWMD property within the evaluation limits and the surrounding area. Even though Alternative 6 results in a 2.2 acre reduction to the DRI boundary when compared to the current alignment, the Alternative 6 creates more of a bifurcation and disruption to the DRI. Coordination with the SWFWMD is ongoing for the status of the DRI. Alternative 6 will result in 9.2 acres of floodplain impacts, while the current alignment will result in 9.0 acres of floodplain impacts. The estimated construction cost for all engineering factors resulted in nearly a $5.3 million increase to the total project cost for Alternative 6 over the current alignment. The bridge structures over the mine pit became the key factor responsible for the cost increase for Alternative 6 over the current alignment.

Description	Current Alignment	Alternative 6
Bridge Length (ft.) – Each Side	780	1300
Min. Curve Radius (ft.)	3000	5730
Max. Curve Superelevation	6.70%	3.70%
Curve HSO (ft.)*	22	9
Eagle Nest 1 Impacts	Primary (330')	None
Eagle Nest 2 Impacts	Full Take	Secondary (660')
Total Estimated ROW (AC)	106.45	104.06
Total Estimated DRI Impact (AC)	99.42	97.26
Wetland and Surface Water Impacts (AC)	23.83	20.42
Floodplain Impact (AC)	9.0	9.2
Roadway Cost	$16,342,901	$16,716,920
Drainage Cost	$1,362,282	$1,393,459
Structures Cost	$6,552,000	$12,202,667
Ground Improvement Cost	$7,428,032	$7,076,341
Total Construction Cost	$31,685,215	$37,389,387
Estimated ROW Cost**	$834,625	$815,951
Wetland Mitigation Cost***	$1,612,000	$1,212,720
Utility Mitigation Cost	$0	$0
Alternative Total Cost	$34,131,840	$39,418,058
Cost Increase (from Current Alignment)		$5,286,218

*Horizontal Sight Offset as measured from controlling inside lane EOP to offset required to be clear of obstructions.
**The ROW cost estimates (SWFWMD lands: $7,841/acre) have a confidence level C; indicating Below-Average confidence.
***Wetland Mitigation Cost only includes wetland impacts at $124,000/function loss (FL) unit
Note: Please reference Section 4.1.2 for the wetland and surface water evaluation.

Figure 8: Alignment Alternative Matrix

4.0 ENVIRONMENTAL/BIOLOGICAL ASSESSMENT

4.1 Existing Conditions

4.1.1 Land Use and Vegetative Cover

Existing land uses and habitat types within the evaluated alternatives (Alternative 6 and current alignment) were classified using the Florida Land Use, Cover and Forms Classification System (FLUCFCS) (FDOT 1999) and verified during field reviews. Habitat classifications, their FLUCFCS codes, and acreage within each alternative are presented in Figure 9. Appendix D provides a map of existing land use within these alternatives.

FLUCFCS Classification[1]	Acreage within Alternative 6	Acreage within Current Alignment
510: Streams and Waterways	0.11	0.31
530: Reservoirs	5.42	4.02
Total Surface Waters	**5.53**	**4.33**
615: Stream and Lake Swamps	2.41	2.92
617: Mixed Wetland Hardwoods	3.26	3.63
624: Cypress - Pine - Cabbage Palm	-	3.76
641: Freshwater Marshes	9.22	9.19
Total Wetlands	**14.89**	**19.5**
165: Reclaimed Land	71.54	66.4
210: Cropland and Pastureland	5.08	5.19
427: Live Oak	-	3.46
438: Mixed Hardwoods	7.03	7.56
Total Uplands	**83.65**	**82.61**
Total Wetlands and Surface Waters	**20.42**	**23.83**
Total	**104.07**	**106.44**

[1]FDOT 1999

Figure 9: Land Use by Alternative

4.1.2 Wetland and Surface Water Evaluation

Impacts to wetlands and surface waters associated with the evaluated alternatives (Alternative 6 and current alignment) are summarized in Figure 10, as well as approximate Uniform Mitigation Assessment Methodology (UMAM) scores for each type of these systems and functional loss based on preliminary reviews. The jurisdictional boundaries of these systems and UMAM scores have not been reviewed by regulatory agencies and are subject to change during the permitting process. Appendix E provides a map depicting wetland impacts within these alternatives.

FLUCFCS Classification[1]	UMAM Delta	Alternative 6 Impact Acreage	Alternative 6 Functional Loss	Current Alignment Impact Acreage	Current Alignment Functional Loss
510: Streams and Waterways	-	0.11	-	0.31	-
530: Reservoirs	-	5.42	-	4.02	-
Total Surface Water Impacts		**5.53**	**0.00**	**4.33**	**0.00**
615: Stream and Lake Swamps	0.70	2.41	1.69	2.92	2.04
617: Mixed Wetland Hardwoods	0.70	3.26	2.28	3.63	2.54
624: Cypress - Pine - Cabbage Palm	0.70	-	-	3.76	2.63
641: Freshwater Marshes	0.63	9.22	5.81	9.19	5.79
Total Wetland Impacts		**14.89**	**9.78**	**19.50**	**13.00**
Total Wetland and Surface Water Impacts		**20.42**	**9.78**	**23.83**	**13.00**

[1]FDOT 1999
Mitigation is not proposed for surface waters (FLUCFCS 510 and FLUCFCS 530).
UMAM scores presented in this table were approximated by FLUCFCS classification for the purposes of this report and a UMAM assessment was not conducted for each individual system. Additionally, these scores have not been reviewed by regulatory agencies and are subject to change during project permitting.

Figure 10: Approximate UMAM$_1$ Functional Loss by Alternative

4.2 Protected Species

The project area was assessed for the potential for occurrence of protected species through a desktop review and field reviews conducted throughout 2017, 2018, 2019 and 2020. Figure 11 provides the protected species with potential to occur within the alternatives, their federal or state designated status, effect determination, habitat preference, and additional notes. Due to current conditions in the project corridor (previous mining, land use conversion, etc.), the habitat present for plant species meets little to none of the habitat requirements for these species. As a result, these species are addressed collectively in Figure 11. Additionally, due to the close proximity of the individual alternatives, the effect determinations presented apply to all alternatives. See Appendix F for the Protected Species Map.

Species	Designated Status		Habitat Preference	Effect Determination	Notes
	Fed	State			
Flora					
Federal Protected Flora	T/E	-	Varies by species.	MANLAA	
State Protected Flora	-	T/E	Varies by species.	NAEA	
Reptiles					
American Alligator (Alligator mississippiensis)	SAT	-	Freshwater and brackish marshes, ponds, lakes, rivers, swamps, bayous, and canals.	MANLAA	Observed during field reviews.
Eastern Indigo Snake (Drymarchon corais couperi)	T	-	Mesic and upland pine forests, swamps, wet prairies, and scrub habitats.	MANLAA	
Gopher Tortoise (Gopherus polyphemus)	-	T	Dry upland habitats and disturbed habitats (pastures, old fields, etc.).	NAEA	Potentially occupied burrows observed during field reviews.
Short-tailed Snake (Lampropeltis extenuata)	-	T	Dry upland habitats, principally sandhill, xeric hammock, and sand pine scrub.	NAEA	
Florida Pine Snake (Pituophis melanoleucus mugitus)	-	T	Dry sandy soils with open canopies. Sandhill, sand pine scrub, and scrubby flatwoods.	NAEA	
Blue-tailed Mole Skink (Plestiodon egregius lividus)	T	-	Ridge scrub habitats with loose sand, open sand/min. canopy and edges of disturbed habitats with remnant scrub.	May Affect	0.09 acres of suitable skink habitat present in Alternative 5.
Sand Skink (Plestiodon reynoldsi)	T	-			
Avian					
Florida Grasshopper Sparrow (Ammodramus savannarum floridanus)	E	-	Areas of frequently burned dry prairie habitat with patchy open areas for foraging.	No Effect	
Florida Sandhill Crane (Antigone canadensis pratensis)	-	T	Shallow freshwater areas including pastures, prairies, marshes, and open woods habitats.	NAEA	Unoccupied nests observed during field reviews. Adults observed when migratory sandhill cranes are present, unable to differentiate between species.
Florida Scrub-jay (Aphelocoma coerulescens)	T	-	Early successional stages of fire-dominated xeric oak communities on well-drained, sandy soils.	MANLAA	
Florida Burrowing Owl (Athene cunicularia floridana)	-	T	Areas of short, herbaceous groundcover, including prairies, sandhills, and farmland.	NAEA	
Crested Caracara (Caracara cheriway)	T	-	Dry prairie/pasture with scattered cabbage palm, cabbage palm/oak hammocks, shallow ponds and sloughs.	MANLAA	
Little Blue Heron (Egretta caerulea)	-	T	Freshwater marshes, beaches, mangroves, forested wetlands, and wet prairies.	NAEA	Observed during field reviews.
Tricolored Heron (Egretta tricolor)	-	T	Freshwater marshes, beaches, mangroves, forested wetlands, and wet prairies.	NAEA	

Species	Designated Status		Habitat Preference	Effect Determination	Notes
	Fed	State			
Southeastern American Kestrel (Falco sparverius paulus)	-	T	Pine scrub, dry prairies, mixed pine hardwood forests, and pine flatwoods.	NAEA	Adult observed when migratory American kestrels are present, unable to differentiate between species.
Bald Eagle (Haliaeetus leucocephalus)	NL[1]	NL[2]	Large open water bodies, marshes, dry prairies, pine and hardwood forests, wet prairies, and sandhills.	PAE	Nests and individuals observed during field reviews.
Wood Stork (Mycteria americana)	T	-	Fresh and saltwater marshes, tidal flats, wet prairies, cypress swamps, and agricultural environments.	MANLAA	Observed during field reviews. All alternatives are within the Core Foraging Area (CFA) of 5 active wood stork nesting colonies.
Osprey (Pandion haliaetus)	NL[3]	-	Near still or slow flowing open water, such as lakes, rivers, wooded swamps, and shorelines.	NAEA	Nests and individuals observed during field reviews. One nest is located within Alt 6 ROW.
Roseate Spoonbill (Platalea ajaja)	-	T	Freshwater marshes, beaches, mangroves, forested wetlands, and wet prairies.	NAEA	Observed during field reviews.
Everglade Snail Kite (Rostrhamus sociabilis plumbeus)	E	-	Large, open freshwater marshes and lakes or open water areas without emergent vegetation.	MANLAA	
Mammals					
Florida Panther (Puma concolor coryi)	E	-	Large areas of forested communities and wetlands that are generally inaccessible to humans for diurnal refuge.	No Effect	

Designated Status:
E = endangered, T = threatened, SAT = Federal Threatened due to similarity of appearance, NL = not listed
[1]While not listed under the ESA, the Bald Eagle is federally protected under the Bald and Golden Eagle Protection Act.
[2]While not listed under Chapter 68A-27 FAC, the Bald Eagle is state protected under the FWC Species Action Plan for the Bald Eagle (2017).
[3]The Osprey is federally protected by the U.S. Migratory Bird Treaty Act (16 USC 703-702).

Project Effect Determination:
MANLAA = "May affect, but is not likely to adversely affect", PAE = "Potential for adverse effect", NAEA = "No adverse effect anticipated"

Figure 11: Protected Species Effect Determinations

4.2.1 Bald Eagle

To support the purposes of this memorandum in documenting bald eagle nest avoidance and minimization, an in-depth analysis of the project area was performed to determine bald eagle nest involvement associated with the evaluated alternatives. This analysis included a desktop review of existing bald eagle nesting data, including Audubon EagleWatch data and the FWC Bald Eagle Nest Locator database. Additionally, field reviews of the alternatives and their 660-foot buffer were conducted during the 2019-2020 nesting season to identify undocumented bald eagle nests and confirm the location and status of documented bald eagle nests. The design team and FTE conducted a meeting with the USFWS on December 2, 2019 to discuss the impacts to the bald eagle nests and permitting requirements for the project. See Appendix K for the USFWS Bald Eagle Technical Assistance Meeting Minutes. According to the USFWS Bald Eagle Biologist, Nest 2 would require a full Nest Take Permit with the current alignment and this would not be problematic as long as the alignment is justified.

According to 50 CFR Section 22, an action is justifiable so long as avoidance and minimization measures are considered to the furthest extent practicable. Practicable means "available and capable of being done after taking into consideration existing technology, logistics, and cost in light of a mitigation measure's beneficial value to eagles and the activity's overall purpose, scope, and scale." The avoidance and minimization memorandum discusses available technology, logistics, and costs associated with the Current Alignment and Alternative 6.

Bald eagle nest locations identified during this analysis are provided on Figure 12. Nest 1 and 2 were previously undocumented bald eagle nest locations that were identified during field reviews. Figure 12 summarizes the bald eagle

nest involvement associated with the evaluated alternatives (Alternative 6 and Current Alignment) and their 2019-2020 nesting season status determined during field reviews. Due to its location, available resources, and nesting habitat, the proposed project area and surrounding areas appear to maintain a high bald eagle population of all age classes, including nesting pairs. As a result, there is greater potential for additional nests, from either new nesting pairs or alternative nests from existing nesting pairs, to be built within proximity to the selected alternative prior to project construction. Appendix F provides a map depicting protected species information, including bald eagle nest locations.

Bald Eagle Nest ID	2019-2020 Nesting Season Status	Current Alignment Bald Eagle Nest Involvement	Alternative 6 Bald Eagle Nest Involvement
Nest 1	Active	330-foot buffer encroachment	None
Nest 2	Active	Full take	660-foot buffer encroachment

Figure 12: Bald Eagle Nest Involvement by Alternative

4.3 Cultural Resources

Previously recorded archaeological sites and historic resources within the Area of Potential Effect (APE) were assessed via a desktop analysis to determine potential impacts. At this preliminary stage, the archaeological APE was defined as the footprint of the proposed pond site and the area contained within the proposed right-of-way (ROW) within the evaluated alternatives (Alternative 6 and current alignment). The historic APE includes the archaeological APE and the immediately adjacent viewshed within 250-feet. Figure 13 includes the previously recorded archaeological sites located within one half mile of the APE. Based on the data compiled, it appears that cultural resources will not be a critical issue for this proposed undertaking, especially since much of the APE has been strip mined and no natural soils stratigraphy or context remains. Only the northern portion of the APE remains relatively undisturbed. There are no historic resources (building, roads, cemeteries, etc.) located within the APE of the evaluated alternatives (Alternative 6 and current alignment). Thus, historic resources will not be an issue. A Cultural Resource Assessment Survey (CRAS) was conducted for the PD&E in 2010 and SHPO concurred with those findings on December 30, 2010. A CRAS will be conducted for the chosen alignment and will be reviewed by SHPO for concurrence. See Appendix G for the Cultural Resources Location Maps for each alternative. See Appendix H for the Cultural Resource Research Design and Survey Methodology prepared for Alternative 6.

Site #	Site Name	Site Type	SHPO Evaluated for NRHP	Located in Alternative 6	Located in Existing Alignment
8PO04128	Bald Eagle Nest	Campsite; artifact scatter	Ineligible	Yes	Yes
8PO04129	Parking lot	Campsite; artifact scatter; raw material procurement; habitation	Ineligible	Yes	Yes
8PO04762	Sheffield Road	Artifact scatter	Not Evaluated	Yes	Yes
8PO06845	Stuart Ranch 2	Campsite; lithic scatter	Ineligible	Yes	Yes
8PO06846	Stuart Ranch 3	Campsite; lithic scatter	Ineligible	Yes	Yes
8PO04763	Vaughn Road Extension	Artifact scatter	Not Evaluated	No	Yes
Total Archaeological Sites located within APE				5	6

Figure 13: Previously Recorded Archaeological Sites within APE by Alternative

4.4 Contamination

A Contamination Technical Memorandum screening evaluation "Addendum to the Mainline CSER" dated August 2020 was completed for Alternative 6. Contamination sites related to Alternative 6 were assigned rankings. Figure 14 includes the contamination sites related to Alternative 6. Based on this contamination screening Level II testing is recommended for Site 11. Final disposition of the April 10, 2020 design phase CSER for the mainline will be contingent on the selected alternative because of this evaluation. See Appendix I for the August 2020 Contamination Technical Memorandum "Addendum to the Mainline CSER" prepared for Alternative 6.

Site Number	Site Name & Address	Contaminants of Concern	Risk Rating	Approximate Distance from Alt 6 ROW	Approximate Distance from Current Alignment ROW
11	Former Old Florida Plantation Property (AKA Clear Springs Mine) North of Old Bartow Eagle Lake Road, Bartow	Polycyclic Aromatic Hydrocarbons (PAHs), Volatile Organic Compounds (VOCs), Total Petroleum Hydrocarbons (TPH), Radium 226, and pH	Medium	Within proposed ROW	Within proposed ROW

Figure 14: Potential Contamination Sites

4.5 Bald Eagle Nest Avoidance and Minimization

If work is required within the 330 to 660-foot secondary buffer zone (Nest 2 in Alternative 6) of an eagle nest during the nesting season (October 1 through May 15), monitoring will be conducted by a qualified biologist in accordance with the USFWS Bald Eagle Monitoring Guidelines (2007). Monitoring will be implemented during the nesting season, October 1 through May 15, or until fledging, and appropriate reporting conducted. Construction will be halted or modified immediately if nesting bald eagles exhibit signs of distress (flushing and/or distress calls) or other changes in behavior are observed (i.e., reduction in feeding rate) as a result of the activity.

Work within the 0 to 330-foot buffer zone (Nest 1 in Current Alignment) of an eagle nest during the nesting season (October 1 through May 15) is not recommended by the USFWS, even when a buffer zone of less than 330 feet is established in accordance with the National Bald Eagle Management Guidelines (2007). Additionally, if a bald eagle nest is present within the selected alignment, a full take will be required. To avoid further impacts, full take nest locations (Nest 2 in Current Alignment) will be removed outside of the nesting season and all potential nesting substrates within the project limits in the vicinity of removed nest locations will be removed to ensure the associated nesting pair does not attempt to build a new nest within the project limits.

If the selected alignment requires involvement with bald eagle nests, including full nest take (Nest 2 in Current Alignment) or work to occur within the 330-foot primary buffer zone (Nest 1 in Current Alignment) during nesting season of a bald eagle nest, avoidance and minimization measures will be used to minimize potential disturbance to eagles. In 2017, the FWC completed the Species Action Plan for the Bald Eagle, replacing the FWC Bald Eagle Management Plan (2008); however, the FWC Bald Eagle Management Plan (2008) provided implementation measures that remain effective for the purposes of avoidance and minimization. The following measures will be considered for implementation during the construction of the proposed project and potentially be required for permitting based on the selected alignment and bald eagle nest involvement.

Avoidance and Minimization Measures

- Implementation of the 2007 USFWS Bald Eagle Monitoring Guidelines for all site work construction activities including; 1) avoidance of activities within 330 feet of a nesting bald eagle during the nesting season (October 1 through May 15, or when eagles are nesting prior to October 1 or after May 15); and 2) monitoring of the nest, in accordance with monitoring guidelines, for construction activities between 330 and 660 feet of the nest.
- Avoiding construction activity (except those related to emergencies) within 100 feet of the eagle nest during any time of the year, or when similar scope may allow construction activities to occur closer than 100 feet.
- Avoid the use or placement of heavy equipment within 50 feet of a nest tree at any time to avoid potential impacts to tree roots. This minimization does not apply to existing roads, trails or other linear facilities. In such cases, the placement of heavy equipment will be no closer than the existing roads, trails or other linear facilities.
- Shielding new exterior lighting and construction lighting so that lights do not shine directly onto the nest.
- Create, enhance, or expand the visual vegetative buffer between construction activities and the nest by planting appropriate native pines or hardwoods.
- If a full nest take is required (Nest 2 in Current Alignment) surrounding potential nest trees within the project limits should be removed concurrently with the nest tree to prevent re-nesting within the project area.

- Site stormwater ponds no closer than 100 feet from the eagle nest and construct them outside the nesting season. Consider planting native pines or hardwoods around the pond to create, enhance, or expand the visual buffer.
    - Fencing for potential pond site locations within 660 feet of bald eagle nest locations should be scheduled to be constructed outside of nesting season.
- All construction activities, including staging/storing areas, turning points, parking areas, laydown areas, stockpile areas, etc. will be limited to areas outside of eagle nest buffer zones.
- Whenever practicable, work activities closest to the eagle nest structure will be conducted outside the nesting season and proceed to work away from the nest structure; if construction occurs during nesting season, construction activities should be scheduled so that construction further from the nest occurs before construction closer to the nest.
- Due to the high population of bald eagles in the area, bald eagle surveys of the project area may be warranted during the nesting season prior to construction commencement to ensure no undocumented nests have been built within 660 feet of the project area.
- The Alternative 6 ROW footprint overlaps the 660-foot secondary zone of Nest 2 by 16-feet; however, the full overlap is within a surface water feature adjacent to the alignment of the bridge structure. There are opportunities to avoid construction activities within the 660-foot secondary zone of Nest 2; these opportunities will be further explored when nest locations are surveyed, outside of nesting season, and exact locations and buffers are determined. Opportunities include, but are not limited to:
    - Construction activities remaining outside the 660-foot secondary zone of Nest 2 during nesting season to include staging areas, barges, drainage outfalls, etc.
    - Reducing the size of ROW within that area to avoid the 660-foot secondary zone of Nest 2 altogether.

The current project alignment was established to minimize impacts to SWFWMD property by following the eastern boundary of the property to avoid bisecting the parcels to preserve access which is currently separated by water features from the north and south. The eastern boundary of the property also remains further outside of the previously mined land which reduces the risk for encountering unsuitable soil conditions. The existing TECO utility easement was used as the eastern boundary control in order to eliminate impacts to the 230kV overhead transmission lines to avoid extensive relocation costs. Despite these roadway design constraints, the design team selected the proposed alignment to avoid impacts to the surrounding habitat to the greatest extent possible. Florida's Turnpike Enterprise approved the geotechnical investigation for Alternative 6 as part of this evaluation which concluded soil conditions to be slightly better along the alignment alternative. This alignment provides the best opportunity for minimization and avoidance to the bald eagle nests within the area and lessens the impacts to the wetlands and surface waters, and the previously recorded archaeological resources. However, the Alternative 6 alignment does not completely avoid impacts to all bald eagle nests in the vicinity of the project area, with a slight encroachment into the 660-foot secondary buffer zone for bald eagle Nest 2. The encroachment is located within an open water feature along the east side of the alignment and construction activities are expected to remain outside of the secondary buffer zone for this nest. The alignment within this area could not be shifted further to the west to completely avoid the secondary buffer zone due to the location of the interchange connection at US 17 (SR 35). This interchange location was established to provide enough distance for the CPP mainline to tie down to existing grade with an acceptable vertical profile given the vertical clearance requirements to bridge over Old Bartow Eagle Lake Road. However, if Alternative 6 is selected, there are other opportunities to completely avoid Nest 2 which will be further explored during the design phase such as reducing the right-of-way within this area which results in a reduction in border width.

5.0 EVALUATION SUMMARY/RECOMMENDATION

The evaluation between the current project alignment, as submitted with the Phase II plans, and the Alternative 6 alignment focuses on the avoidance and minimization of impacts to the bald eagle nests. The intent is to support the permitting requirements for this project in order to provide the best opportunity to preserve the bald eagle nests while considering the necessary engineering factors to support a safe, reliable, and sustainable transportation solution for this new expressway. The evaluation is summarized in Figure 15. The evaluation utilizes the 330-foot primary and 660-foot secondary protective zones as the basis for defining the level of minimization and avoidance to the bald eagle nests. The Alternative 6 alignment was established to provide the greatest level of eagle nest impact avoidance by eliminating impacts to Nest 1 with no encroachment into the 660-foot secondary protective zone while slightly encroaching into the secondary protective zone for Nest 2, requiring only monitoring during construction.

The engineering factors considered for this evaluation include safety for the traveling public, roadway, drainage, geotechnical, structural, and utilities investigation, right-of-way (ROW) need, accessibility and maintenance, and construction cost. The safety analysis utilized the Highway Safety Manual's Predictive Crash Method which concluded a theoretical reduction in run-off-road crashes, rollover crashes, and rear end crashes for Alternative 6. This reduction is due to alignment having flatter curved geometry used in avoiding Nests 1 and 2. There were no drainage design factors which largely favored one alternative over the other. The geotechnical investigation concluded the soils to be slightly better with Alternative 6 when compared to the current alignment requiring less surcharge embankment material and an overall soil remediation cost reduction of nearly $352,000. The open water features were closely evaluated within the mine pit area towards the southern end of the evaluation limits. It was determined longer bridge structures with deeper structural foundations will be required for Alternative 6. Accessibility and maintenance were considered as Alternative 6 appears to directly impact the primary access to the SWFWMD property from the south. Although additional cost may be incurred when an access point is established, the coordination between SWFWMD and FTE for this access point was not considered for this evaluation. The estimate right-of-way impact for Alternative 6 results in a 2.2-acre reduction when compared to the current alignment. The planned development of regional impact (DRI) was considered as the DRI boundary covers a large portion of the SWFWMD property within the evaluation limits and the surrounding area. Even though Alternative 6 results in a 2.2 acre reduction to the DRI boundary when compared to the current alignment, the Alternative 6 creates more of a bifurcation and disruption to the DRI. Coordination with the SWFWMD is ongoing for the status of the DRI. The estimated construction cost for all engineering factors resulted in nearly a $5.3 million increase to the total project cost for Alternative 6 over the current alignment. The bridge structures over the mine pit are the key factor for the cost increase for Alternative 6 over the current alignment.

While the Alternative 6 alignment has the greatest avoidance to bald eagle nests feasible, all other federal and state protected species will result with the same determination of effect between the two evaluated alternatives. Other environmental factors considered for this evaluation include impacts to wetlands and floodplain, cultural/archaeological features, and contamination. Alternative 6 will have 20.42 acres of wetland and surface water impacts (a loss of approximately 13.00 FL units) compared to 23.83 acres (a loss of approximately 9.78 FL units) for the current alignment. Alternative 6 will result in 9.2 acres of floodplain impacts, while the current alignment will result in 9.0 acres of floodplain impacts. Additionally, Alternative 6 has only five previously recorded archaeological sites, while the current alignment has six. Both evaluated alternatives have one potential contamination site located within proposed right-of-way which will not favor one alternative over the other.

Alternative 6 provides the best opportunity for minimization and avoidance of impacts to the bald eagle nests at this time. This alignment avoids the full Nest Take Permit required with the current alignment and requires an Incidental Nest Take Permit for the slight encroachment into the 660-foot secondary buffer zone for Nest 2. The encroachment is located within an open water feature along the east side of the alignment and construction activities are expected to remain outside of the secondary buffer zone for this nest. Opportunities for complete avoidance of Nest 2 will be further explored during the design phase such as reducing the right-of-way within this area which results in a reduction in border width. However, there is potential for additional nests, from either new nesting pairs or alternative nests from existing nesting pairs, to be established within proximity to the Alternative 6 alignment prior to project construction. The

evaluation concluded a net improvement when considering the engineering factors to support a safe and reliable transportation network to connect SR 570 (Polk Parkway) to US 17 (SR 35). The additional construction cost required for Alternative 6 does not appear to outweigh the benefit for the environmental improvements associated with impacts to the bald eagle nests, wetlands and surface waters, and the previously recorded archaeological resources. The design team recommends utilizing the Alternative 6 alignment to proceed towards final design and permitting.

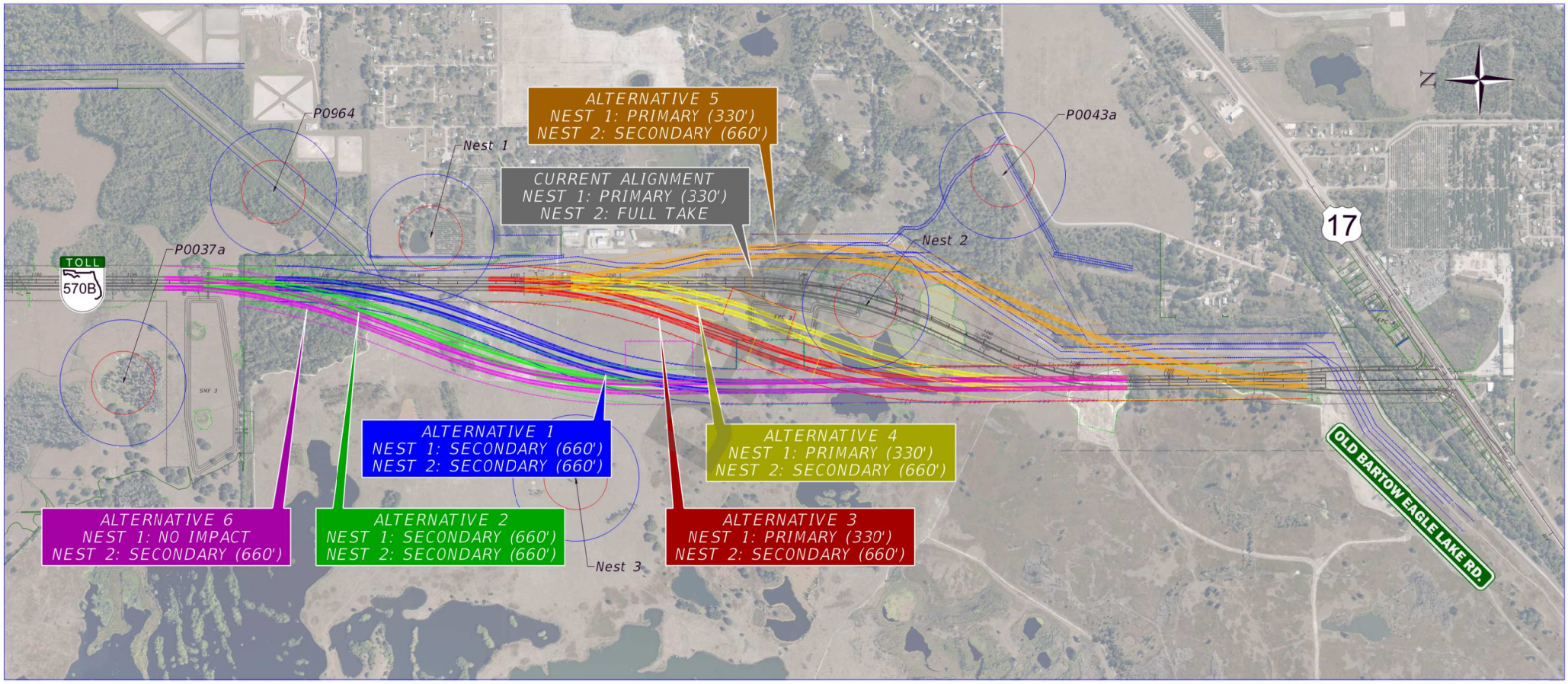
Description	Current Alignment	Alternative 6
Bridge Length (ft.) – Each Side	780	1300
Min. Curve Radius (ft.)	3000	5730
Max. Curve Superelevation	6.70%	3.70%
Curve HSO (ft.)*	22	9
Eagle Nest 1 Impacts	Primary (330')	None
Eagle Nest 2 Impacts	Full Take	Secondary (660')
Total Estimated ROW (AC)	106.45	104.06
Total Estimated DRI Impact (AC)	99.42	97.26
Floodplain Impact (AC)	9.0	9.2
Wetland and Surface Water Impacts (AC)	23.83	20.42
Archaeological Site Impacts	6	5
Contamination Sites	1	1
Roadway Cost	$16,342,901	$16,716,920
Drainage Cost	$1,362,282	$1,393,459
Structures Cost	$6,552,000	$12,202,667
Ground Improvement Cost	$7,428,032	$7,076,341
Total Construction Cost	$31,685,215	$37,389,387
Estimated ROW Cost**	$834,625	$815,951
Wetland Mitigation Cost***	$1,612,000	$1,212,720
Utility Mitigation Cost	$0	$0
Alternative Total Cost	$34,131,840	$39,418,058
Cost Increase (from Current Alignment)		$5,286,218

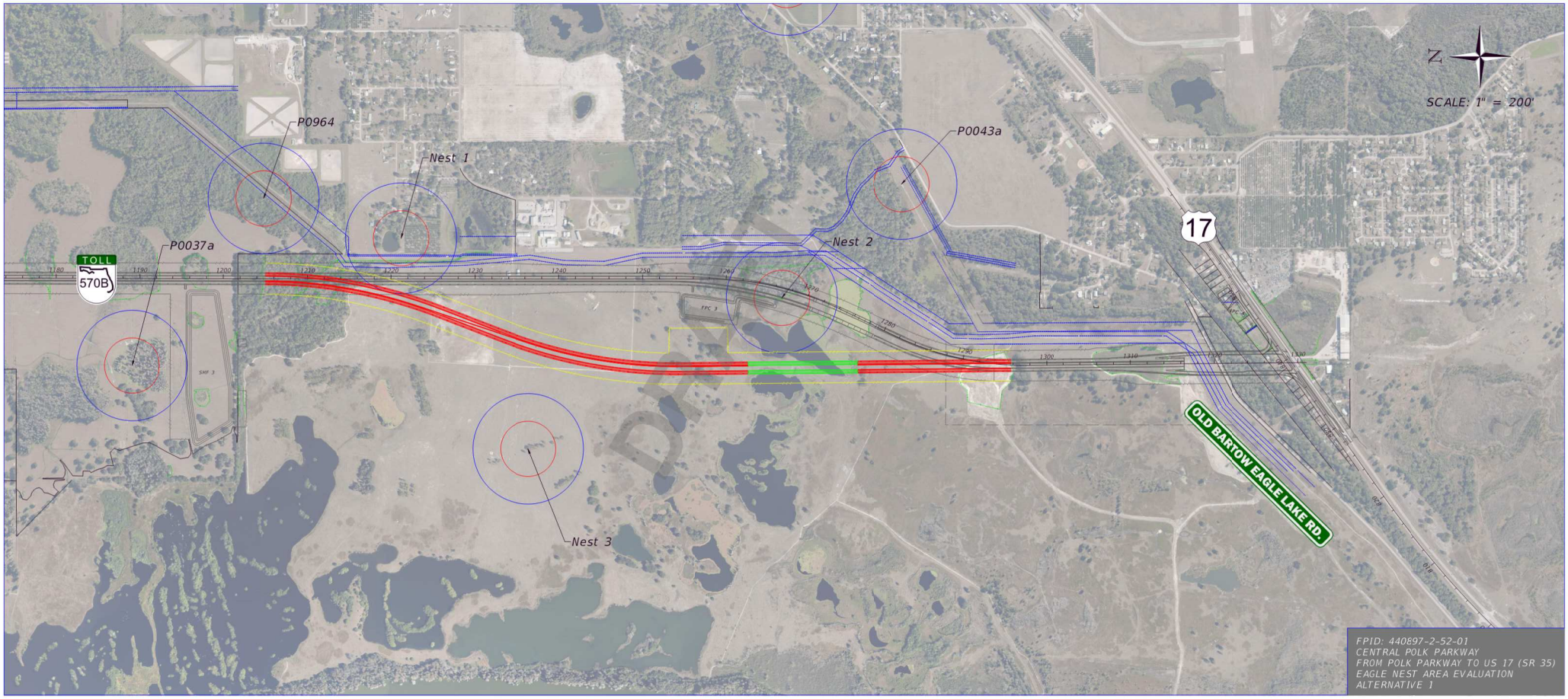
*Horizontal Sight Offset as measured from controlling inside lane EOP to offset required to be clear of obstructions.
**The ROW cost estimates (SWFWMD lands: $7,841/acre) have a confidence level C; indicating Below-Average confidence.
***Wetland Mitigation Cost only includes wetland impacts at $124,000/function loss (FL) unit.

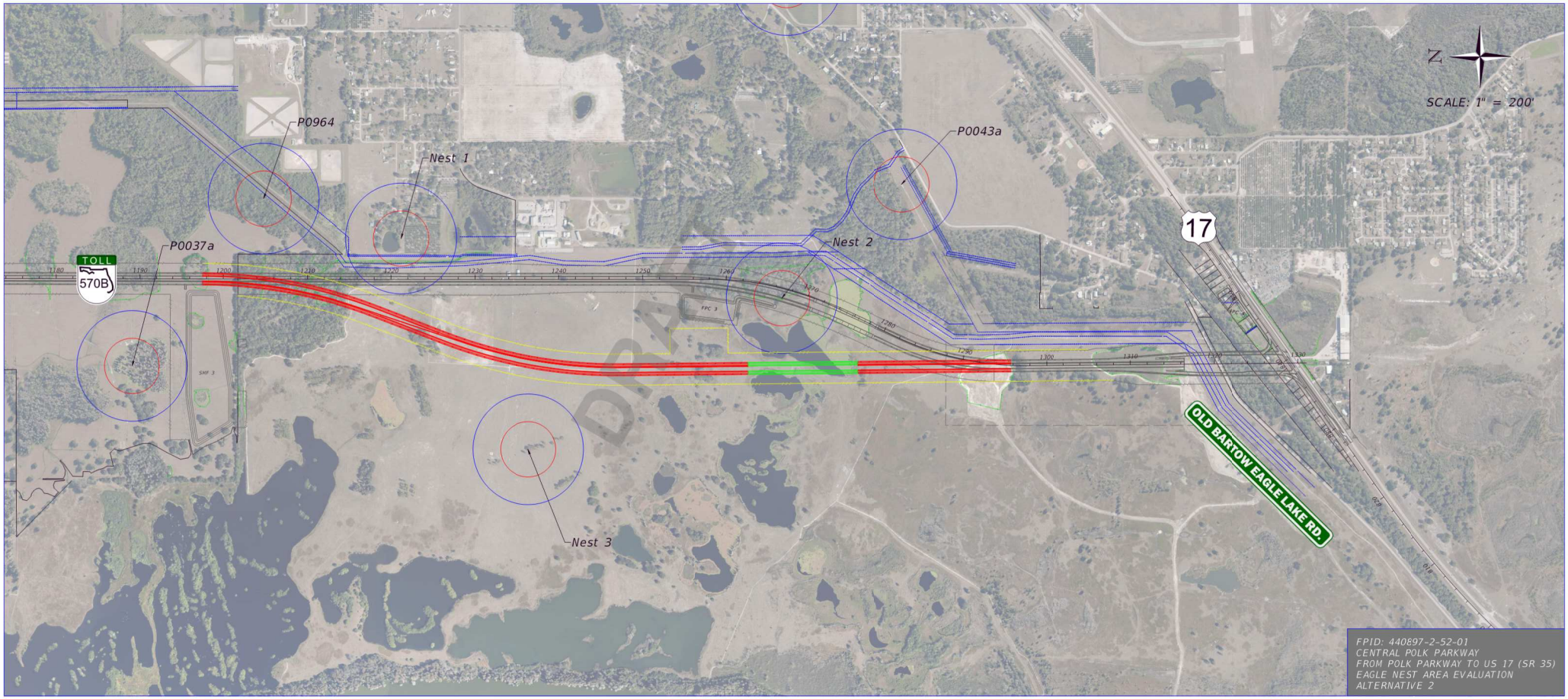
Figure 15: Evaluation Comparison Matrix

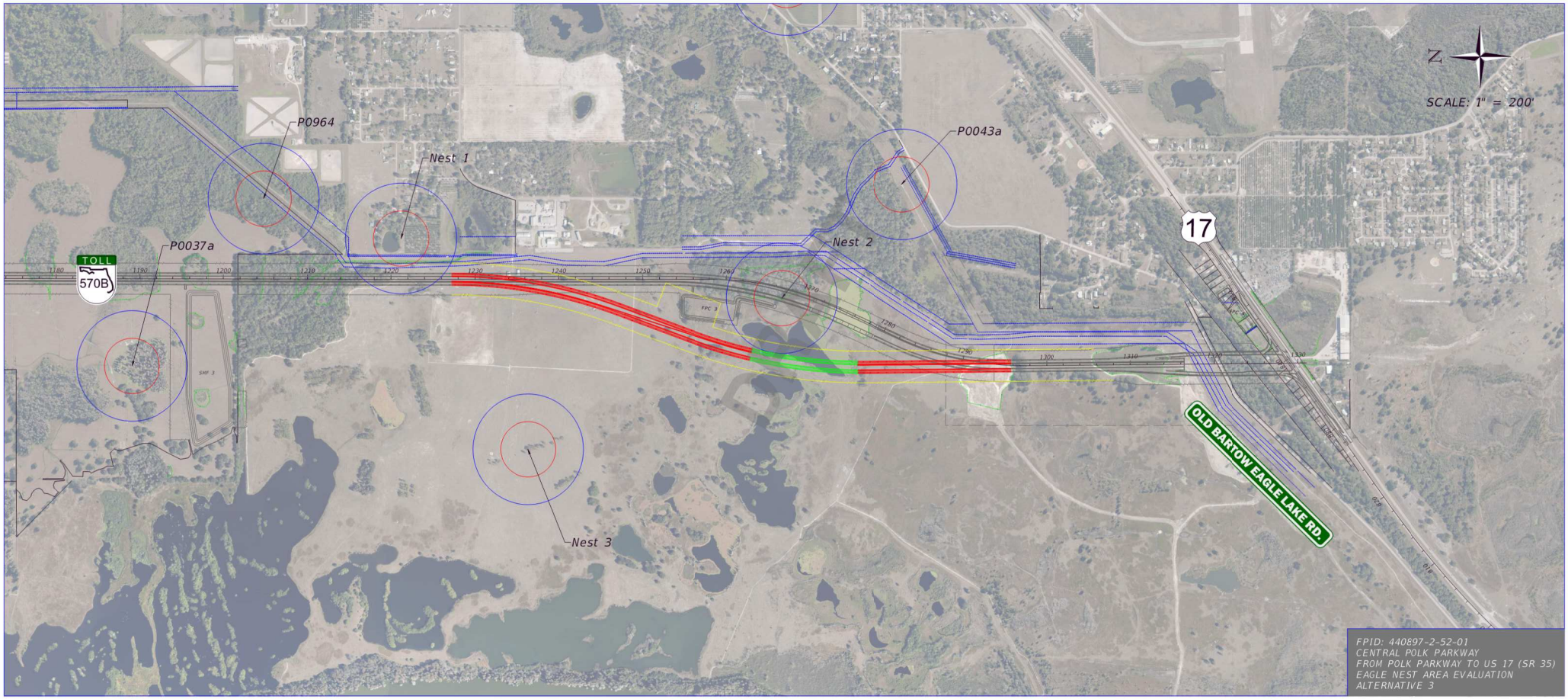
APPENDIX A:

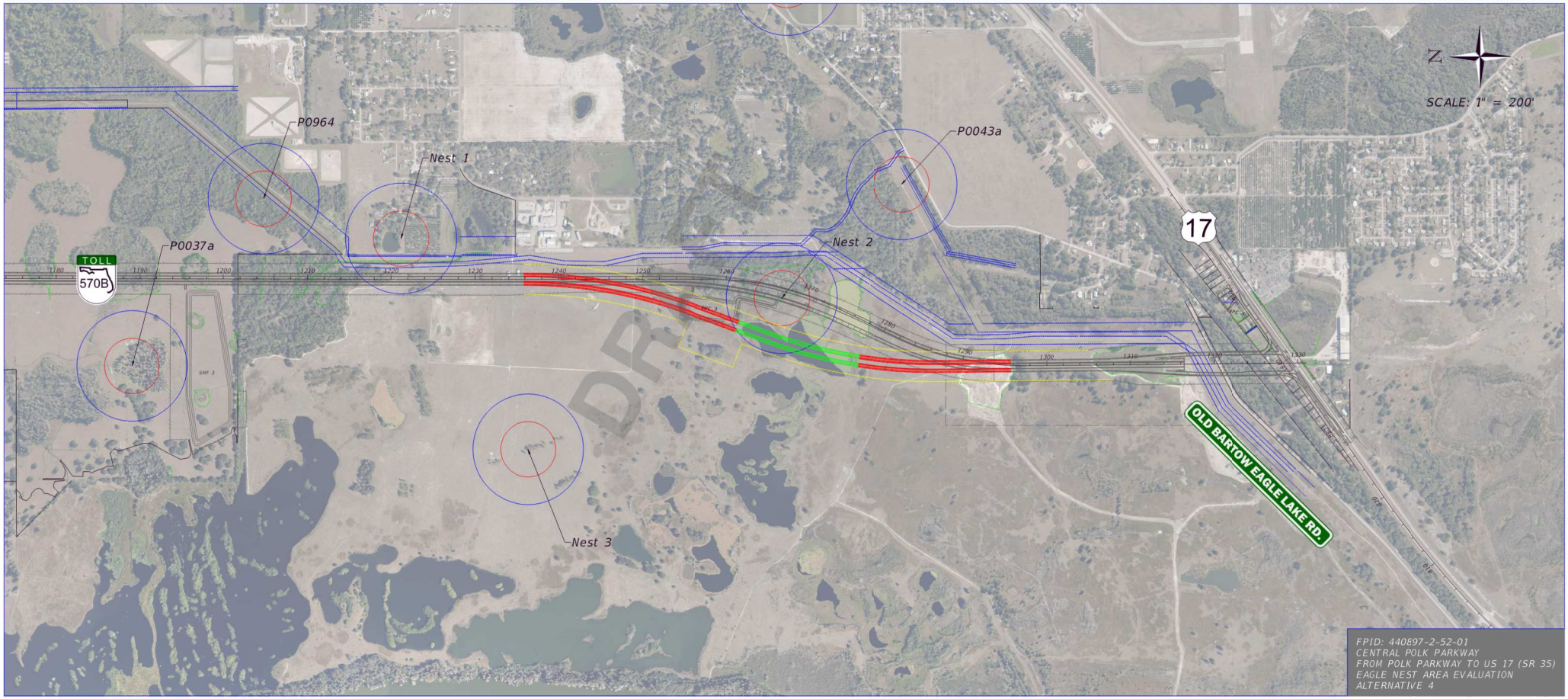
ALTERNATIVE ALIGNMENT ROLL PLOTS

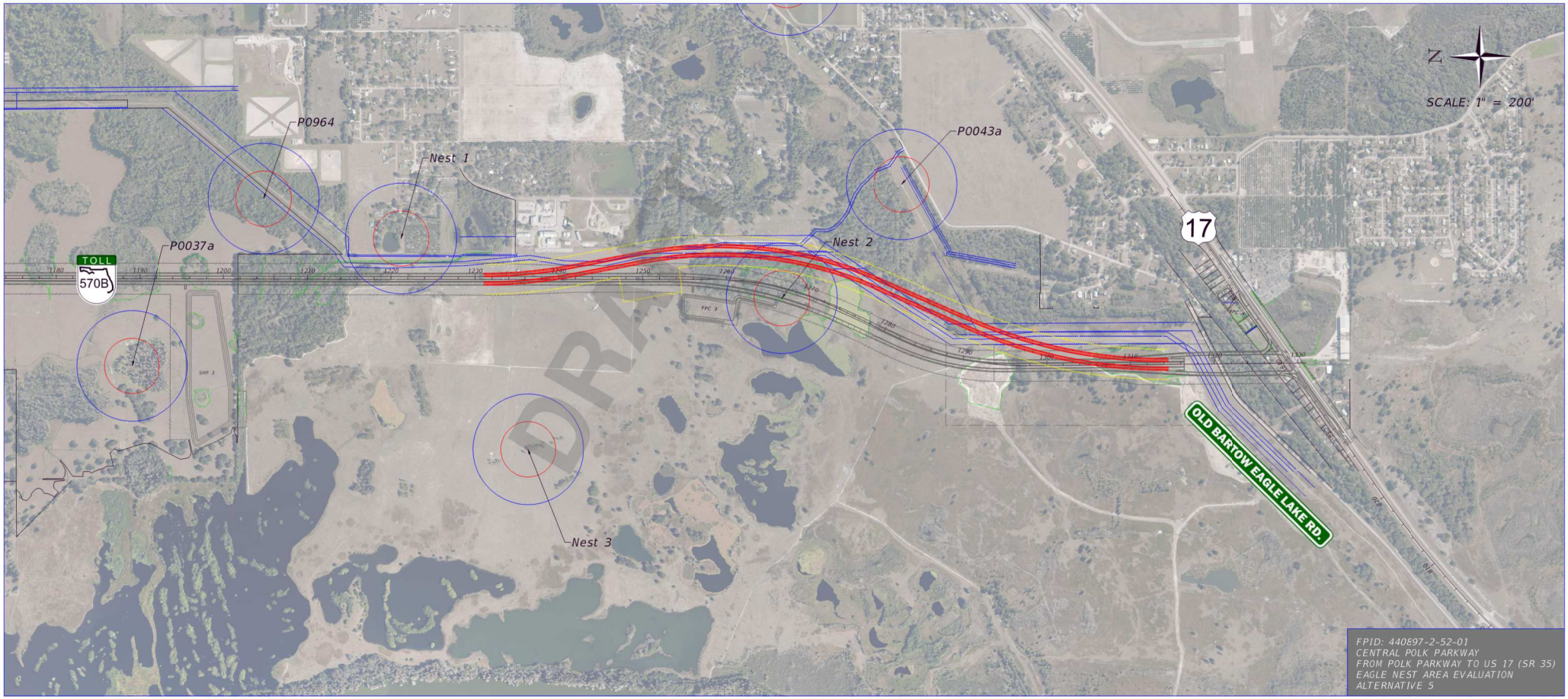

ALTERNATIVE 5
NEST 1: PRIMARY (330')
NEST 2: SECONDARY (660')
CURRENT ALIGNMENT
NEST 1: PRIMARY (330')
NEST 2: FULL TAKE
ALTERNATIVE 1
NEST 1: SECONDARY (660')
NEST 2: SECONDARY (660')
ALTERNATIVE 2
NEST 1: SECONDARY (660')
NEST 2: SECONDARY (660')
ALTERNATIVE 3
NEST 1: PRIMARY (330')
NEST 2: SECONDARY (660')
ALTERNATIVE 4
NEST 1: PRIMARY (330')
NEST 2: SECONDARY (660')
ALTERNATIVE 6
NEST 1: NO IMPACT
NEST 2: SECONDARY (660')
P0964
P0037a
P0043a
Nest 1
Nest 2
Nest 3
TOLL
570B
17
OLD BARTOW EAGLE LAKE RD.
N

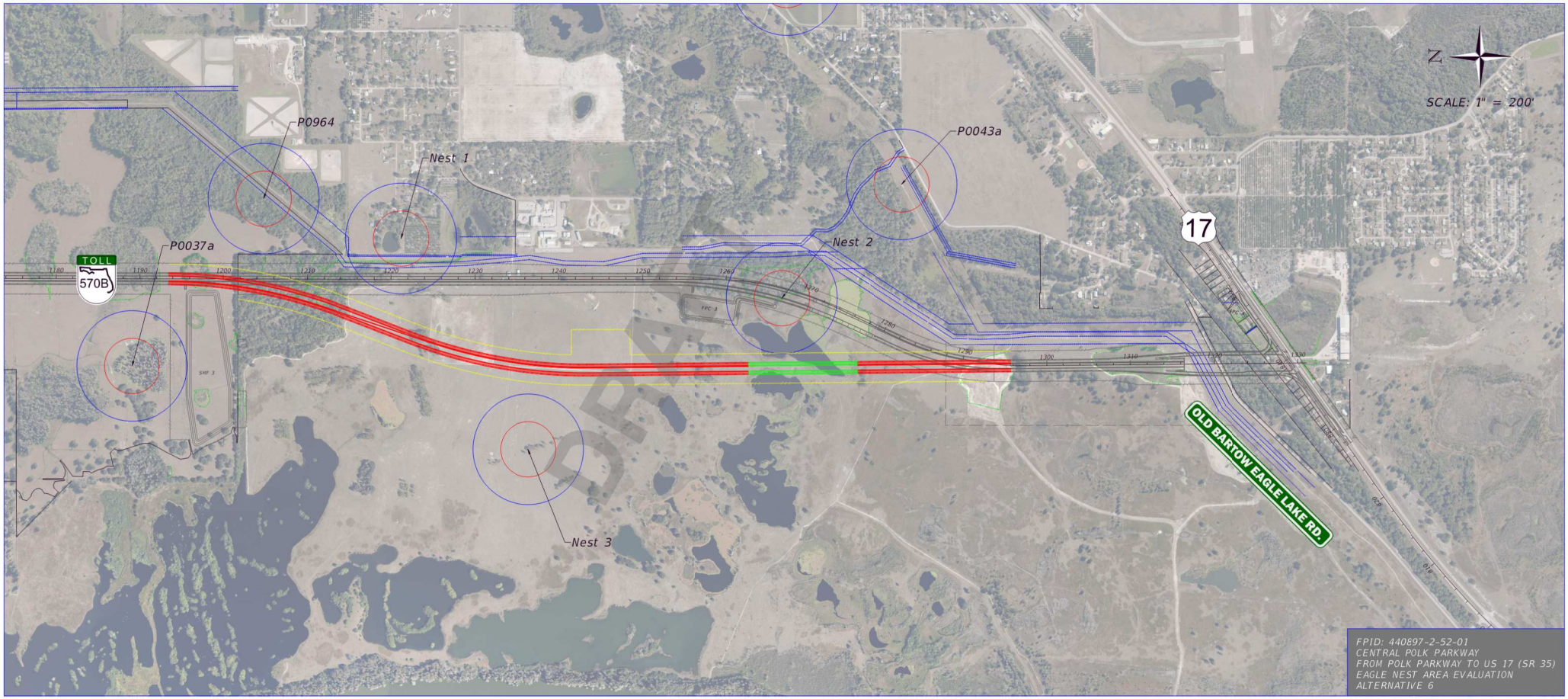

P0964
Nest 1
P0043a
P0037a
Nest 2
Nest 3
TOLL
570B
17
OLD BARTOW EAGLE LAKE RD.
SCALE: 1" = 200'
FPID: 440897-2-52-01
CENTRAL POLK PARKWAY
FROM POLK PARKWAY TO US 17 (SR 35)
EAGLE NEST AREA EVALUATION
ALTERNATIVE 1


P0964
Nest 1
P0043a
P0037a
Nest 2
Nest 3
TOLL
570B
17
OLD BARTOW EAGLE LAKE RD.
SCALE: 1" = 200'
DRAFT
FPID: 440897-2-52-01
CENTRAL POLK PARKWAY
FROM POLK PARKWAY TO US 17 (SR 35)
EAGLE NEST AREA EVALUATION
ALTERNATIVE 2


P0964
Nest 1
P0043a
Nest 2
P0037a
TOLL
570B
17
SCALE: 1" = 200'
OLD BARTOW EAGLE LAKE RD.
Nest 3
FPID: 440697-2-52-01
CENTRAL POLK PARKWAY
FROM POLK PARKWAY TO US 17 (SR 35)
EAGLE NEST AREA EVALUATION
ALTERNATIVE 3


P0964
Nest 1
P0043a
P0037a
Nest 2
Nest 3
TOLL
570B
17
OLD BARTOW EAGLE LAKE RD.
SCALE: 1" = 200'
DRAFT
FPID: 440697-2-52-01
CENTRAL POLK PARKWAY
FROM POLK PARKWAY TO US 17 (SR 35)
EAGLE NEST AREA EVALUATION
ALTERNATIVE 4


P0964
Nest 1
P0037a
P0043a
Nest 2
Nest 3
TOLL
570B
17
OLD BARTOW EAGLE LAKE RD.
SCALE: 1" = 200'
DRAFT
FPID: 440897-2-52-01
CENTRAL POLK PARKWAY
FROM POLK PARKWAY TO US 17 (SR 35)
EAGLE NEST AREA EVALUATION
ALTERNATIVE 5


P0964
Nest 1
P0043a
P0037a
Nest 2
Nest 3
TOLL
570B
17
OLD BARTOW EAGLE LAKE RD.
SCALE: 1" = 200'
DRAFT
FPID: 440897-2-52-01
CENTRAL POLK PARKWAY
FROM POLK PARKWAY TO US 17 (SR 35)
EAGLE NEST AREA EVALUATION
ALTERNATIVE 6

APPENDIX B:

PRELIMINARY ROADWAY SOIL SURVEY REPORT

July 9, 2020

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

Attn: Thomas J. Presby II

RE: Roadway Soil Survey Report
Alignment Alternative 6 Evaluation
SR 570B (Central Polk Parkway)
From SR 570 (Polk Parkway) to SR 35 (US 17)
Polk County, Florida
FPN: 440897-2-52-01
Tierra Project No.: 6511-17-181-001.01

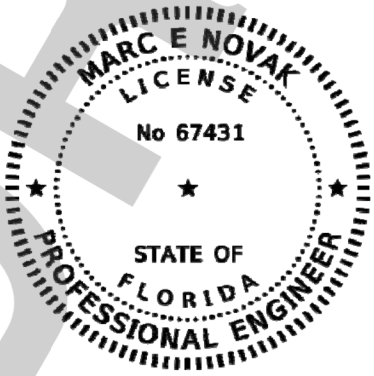
Mr. Presby:

Tierra, Inc. (Tierra) has completed a preliminary Roadway Soil Survey Report for the above referenced project. This report is being provided to assist in the evaluation of an alignment shift for a portion of the current Central Polk Parkway (CPP). The results of our field exploration program, laboratory testing performed to date and subsequent preliminary geotechnical evaluations 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.

Respectfully Submitted,

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.

Kaitlyn C. Waterman, E.I.
Geotechnical Engineering Intern

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

Lawrence P. Moore, P.E.
Principal Geotechnical Engineer
Florida License No. 47673

Table of Contents

Table of Contents
Page 2 of 2

1.0 PROJECT INFORMATION

1.1 Project Authorization

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

1.2 Project Description and Background

The project consists of the design of approximately 6½ miles of new alignment of the Central Polk Parkway (CPP) from the existing Polk Parkway (SR 570) to US 17 (SR 35) in Polk County, Florida.

The current CPP project alignment begins at Baseline Survey of Central Polk Parkway (B/L CPP) Station 1000+53.07 at the existing Polk Parkway and extends south to Station 1329+03.43 at US 17. Following the Phase II Roadway Plans submittal, the Florida's Turnpike Enterprise (FTE) requested KCA evaluate an alternative roadway alignment for a portion of the current CPP alignment. This alignment alternative (known as Alternative 6) begins at approximate B/L Station 1194+00 and shifts the roadway further to the west. The Alternative 6 roadway then merges back with the current CPP alignment near B/L Station 1296+00. Alignment Alternative 6 is approximately the same length as the current CPP alignment within the limits of the proposed shift. Similar to the current alignment, Alignment Alternative 6 traverses open water body features referred to as a "Mine Pits". Bridges are proposed over the existing Mine Pits along both the current alignment and Alignment Alternative 6.

Both the current CPP alignment and Alignment Alternative 6 traverse reclaimed mine lands where past phosphate mining operations occurred. These soils are not "natural" and have been disturbed, mixed, and modified from past mining operations. Reclaimed mine areas present unique challenges to roadway design. The lands have been transformed and reshaped and unknown/variable materials were utilized during the reclamation process. Further description and discussion on the challenges of reclaimed mine soils can be found in Tierra's *Phase II Roadway Soils Survey Report* for this project.

Because of the variability and potential deleterious nature of reclaimed mine lands, FTE authorized a preliminary geotechnical study along Alignment Alternative 6 to provide an assessment on how the soil conditions along Alignment Alternative 6 compare to the current alignment. The geotechnical soil exploration program presented herein is preliminary in nature and was performed at a test boring frequency much less than required for design level geotechnical exploration in reclaimed mine lands. Within the "Mine Pits", only hand probes were performed for this preliminary study.

This report presents the results of the preliminary geotechnical exploration performed along Alignment Alternative 6 and our preliminary assessment of how the soil conditions compare to the current alignment. Should Alternative 6 be selected for design, additional geotechnical explorations will be required. Due to the inherent variability of soils in areas of past mining activity, a higher frequency of borings and testing above the minimum guidelines presented in

the Soils and Foundation Handbook will be required to develop recommendations for roadway construction through mined lands.

1.3 General Site Conditions

Approximately the first 2,000 feet of Alternative Alignment 6 (Station 1194+00 to 1214+00, B/L ALT 6) traverses open and wooded natural areas. The remainder of the alignment (Station 1214+00 to 1296+00, B/L ALT 6) traverses reclaimed mine lands where past phosphate mining operations occurred. The reclaimed mined lands have been modified from their natural conditions. They are characterized by open fields, low-lying areas, open water bodies and mounds/hills.

2.0 PURPOSE AND SCOPE OF SERVICES

This preliminary study was performed to obtain information on the existing subsurface conditions along the limits of the proposed alignment shift to assist in the evaluation of Alignment Alternative 6. The following services were provided:

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

2. Reviewed historical aerials along the project corridor obtained from databases from the University of Florida (UF), USGS Earth Resources Observation and Science (EROS) Center, and FDOT Survey & Mapping.

3. Prepared a boring location plan for borings and hand probes to be performed along Alignment Alternative 6.

4. Conducted a visual reconnaissance of the project site and located and coordinated utility clearance via Sunshine State One Call.

5. Performed a preliminary geotechnical field study consisting of hand augers, hand probes, and Standard Penetration Test (SPT) borings to evaluate the existing subsurface conditions along Alignment Alternative 6.

6. Identified groundwater levels at the boring locations.

7. Visually classified and stratified recovered soil samples in the laboratory in accordance with the American Association of State Highway and Transportation Officials (AASHTO) soil classification system. Performed laboratory tests on selected representative soil samples.

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

3.0 REVIEW OF PUBLISHED DATA

3.1 Project Area Background (Past Phosphate Mining Activities) and Historical Aerials

A review of published data from the USDA Soil Survey of Polk County, historical aerials, and USGS topographic maps indicates that the northern approximate 2,000 feet of Alignment Alternative 6 (Station 1194+00 to 1214+00, B/L ALT 6) traverses natural soils. The remainder of the existing soils along Alignment Alternative 6 (Station 1214+00 to Station 1296+00, B/L ALT 6) are not "natural" and have been disturbed, mixed, and modified from past phosphate mining operations. Mining operations appear to have occurred approximately during the 1960s and 1970s in this area and reclaiming activities occurred into the 1980s.

Historical aerial photographs were reviewed to identify the areas where past mining activities occurred. Historical aerial photographs were reviewed for years 1941, 1959, 1968, 1971, 1980, and 1993. Tierra searched aerial photographs databases from the University of Florida (UF), USGS Earth Resources Observation and Science (EROS) Center, and FDOT Survey & Mapping. Copies of select aerial photographs are presented in **Appendix A**.

3.2 USDA Soil Survey

Based on a review of the "Soil Survey of Polk County, Florida" published by the USDA, it appears that there are 8 primary soil-mapping units noted along Alignment Alternative 6. A reproduction of the **USDA Soil Survey Map** is illustrated in **Appendix A** and the soil mapping units are summarized in **Appendix A**.

A review of published data from the USDA Soil Survey of Polk County, historical aerials, and USGS topographic maps indicates that the northern approximate 2,000 feet of Alignment Alternative 6 (Station 1194+00 to 1214+00, B/L ALT 6) traverses natural soils. The remainder of Alignment Alternative 6 is not "natural" and has been disturbed, mixed, and modified from past phosphate mining operations. The soil units associated with past mining along Alternative 6 include Arents-Water Complex (Unit 11), Neilhurst Sand (Unit 12), Arents (Unit 68) and water (Unit 99). These units result from the past phosphate mining and reclamation process and are not natural soils or indicate areas that had been modified/re-shaped from their natural condition.

Soil Unit 13 (Samsula Muck) is a natural soil unit that is noted for organic/muck soils in the top 2 to 3 feet. This soil unit along with several other natural sandy soil units are reported by the USDA at the beginning of Alignment Alternative 6.

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

3.3 USGS Quadrangle Map

Based on a review of the "Bartow, Florida" Quadrangle Map, it appears that the ground surface elevation along Alignment Alternative 6 ranges from approximately +100 to +110 feet National Geodetic Vertical Datum of 1929 (NGVD 29) as illustrated on the **USGS Quadrangle Map** in **Appendix A**.

The USGS maps are in agreement with the USDA maps indicating that the southern portion of the Alignment Alternative 6 right of way are hatched and designated as Reclaimed Strip Mine and modified lands from mining operations. The Strip Mines and modified lands areas are shown on the **USGS Quadrangle Map** in **Appendix A**.

3.4 Potentiometric Surface Elevation

Based on a review of the "Potentiometric Surface of the Upper Floridan Aquifer, West-Central Florida" Maps published by the USGS, the potentiometric surface elevation of the Upper Floridan Aquifer in the project vicinity could potentially range from approximately +90 to +110 feet, NGVD 29. As indicated in **Section 3.3**, the natural ground surface elevation along Alignment Alternative 6 ranges from approximately +100 to +110 feet, NGVD 29. Artesian flow conditions were not encountered during the field exploration.

4.0 SUBSURFACE EXPLORATION

4.1 Boring Location Plan and Utility Clearance

Prior to commencing our subsurface explorations, a boring location plan for Alignment Alternative 6 was produced. The boring location plan was generated based on a review of the project design files provided by KCA, a review of the USDA Soil Survey information, USGS topographic maps, current aerials and historical aerials for potential features and areas of interest and our engineering judgment. This boring location plan was submitted the FTE's Geotechnical Engineer for review and approval.

The boring locations were staked in the field by representatives of Tierra using hand-held, non-survey grade Garmin eTrex® Global Positioning System (GPS) equipment with a manufacturer's reported accuracy of ± 10 feet. Utility clearances were coordinated by Tierra via Sunshine State One-Call and updated as required prior to performing the soil borings in order to reduce the potential for damage to underground utilities during the soil boring process.

4.2 Soil Borings and Hand Probes

To evaluate the subsurface conditions and groundwater table levels along Alignment Alternative 6, Tierra performed 12 hand auger borings within the natural portion of the alignment, 53 SPT borings within the reclaimed mine areas and over 70 hand probes within the existing Mine Pits.

The hand auger borings were advanced to depths ranging from approximately 5 to 5½ feet below the existing ground surface. 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 laboratory for classification and testing.

The SPT borings were performed to depths ranging from approximately 30 to 45 feet below existing grade. The SPT borings were performed using truck-mounted and track-mounted drilling equipment utilizing bentonite mud drilling procedures. The soil sampling was performed in general accordance with American Society for Testing and Materials (ASTM) test designation D-1586. SPT resistance N-values were generally taken at intervals of 2 feet for the initial 10 feet of the borings and at intervals of 5 feet thereafter to the boring termination depths. Representative portions of the soil samples were sealed in glass jars, labeled and transferred to our laboratory for classification and analysis.

More than 70 hand probes were performed to evaluate the water depths and subsurface conditions within the existing Mine Pits along Alignment Alternative 6. Probing was performed by pushing a probe rod into the ground until a firm layer was encountered.

The boring and hand probe locations were estimated using the GPS coordinates obtained in the field and should be considered approximate. Station and offset of the boring locations were determined using the GPS coordinates obtained in the field in conjunction with project design files provided by KCA. The boring locations are presented on the **Boring Location Plan** sheets in **Appendix B**. The station and offset of the boring locations are provided on the **Roadway Soil Profiles** sheets in **Appendix B**. The approximate hand probe locations are presented on the **Mine Pit Lakes Probing Plan** in **Appendix B**.

5.0 LABORATORY TESTING

5.1 General

Representative soil samples collected from the borings performed along Alignment Alternative 6 were classified and stratified in general accordance with the American Association of State Highway and Transportation Officials (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.

5.2 Test Designation

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

- Fines Content - The 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).

A summary of the laboratory test results for borings performed along Alignment Alternative 6 is provided in the **Summary of Laboratory Test Results for Soil Classification** in **Appendix E**. It is important to note that the laboratory test results have not been added to the **Roadway Soil Survey** sheets provided in this report. The laboratory test results will be added to the **Roadway Soil Survey** sheets if Alignment Alternative 6 is selected for the project.

6.0 RESULTS OF SUBSURFACE EXPLORATION

6.1 General Soil Conditions

The majority of the soils encountered within the borings performed were in areas of historic phosphate mining. These soils are not "natural" and have been disturbed, mixed, and modified from past mining and reclamation operations. Tierra utilized the same soil stratification legend to classify the soils encountered along Alignment Alternative 6 as was used for the current CPP alignment. The **Roadway Soil Survey** sheets from the Phase II roadway plans submittal is presented in **Appendix C**. It is important to note that the laboratory test results have not been added to the **Roadway Soil Survey** sheets provided in this report. The laboratory test results will be added to the **Roadway Soil Survey** sheets if Alignment Alternative 6 is selected for the project. The stratum numbers and soil types associated with Alignment Alternative 6 are provided in the table below.

Stratum Number	Typical Soil Description	AASHTO Classification
1	Light Gray to Gray to Pale Brown to Dark Brown SAND to SAND with Silt	A-3/A-2-4
2	Light Gray to Gray to Brown Silty SAND	A-2-4
3	Gray to Brown Silty-Clayey SAND to Clayey SAND	A-2-6/A-2-7
4	Light Gray to Gray to Brown Clayey SAND to Sandy CLAY to SILT to CLAY	A-4/A-6/ A-7-5/A-7-6
5	Light Gray to Gray to Brown Clayey SAND to Sandy CLAY to SILT to CLAY	A-7-5/A-7-6/A-2-7
6	Dark Gray to Dark Grayish Brown Organic Soils to MUCK	A-8
7	Dark Reddish Brown to Brown Cemented SAND to Silty SAND **(Hardpan)**	A-3/A-2-4
8	Limestone	---(1)

Stratum Number	Typical Soil Description	AASHTO Classification
9	Light Gray to Pale Brown SAND to SAND with Silt, Trace Phosphate **(Sand and Tailing Sand)**	A-3
10	Light Gray To Dark Brown SAND with Silt to Silty SAND **(Disturbed)**	A-2-4
11	Gray to Brown Silty-Clayey SAND to Clayey SAND to SILT to CLAY **(Disturbed)**	A-2-6/A-4/A-6/ A-7-5/A-7-6/A-2-7
12	Sandy CLAY including Waste Phosphatic CLAY **(Slime)**	A-7-5/A-7-6
13	Dark Brown to Black Organic Soils to Muck/Peat **(Disturbed)**	A-8
14	Light Gray to Dark Brown Silty SAND to Silty-Clayey SAND **(Disturbed)**	A-2-4
(1) USCS does not have a classification 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 each particular boring location and variations did occur among the borings.

The results of the borings performed for this evaluation are presented on the **Roadway Soil Profiles** sheets in **Appendix B**.

6.2 Groundwater

If encountered within the auger boring depth or within the top 10 feet of the SPT boring, the groundwater table was recorded during our field exploration. With the exception of the open water Mine Pit features, the depths to the groundwater table along Alignment Alternative 6 were found to range from approximately 2 feet below the existing ground surface to depths of greater than 10 feet below the existing ground surface at the locations of the borings performed. The depths to the groundwater table, when encountered, are presented on the **Roadway Soil Profiles** sheets in **Appendix B**.

Where auger borings did not encounter the groundwater table within the boring depth, GNE (Groundwater Not Encountered) is indicated adjacent to the soil profiles. Where SPT borings did not encounter the groundwater table before the introduction of drilling fluid (at a depth of approximately 10 feet), GNA (Groundwater Not Apparent) 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 Mine Pits (Open Water Features)

The hand probes performed within the open water features along Alignment Alternative 6 encountered water depths ranging from approximately 1 to 30 feet underlain by soft sediment of thicknesses ranging from 0 (not encountered) to 21 feet beneath the mudline. The results of the hand probing exploration are provided on the **Mine Pit Lakes Probing Plan** in **Appendix B**.

The reported water depths should be considered approximate and reflect the water levels during field activities performed in March 2020. The thicknesses of the soft sediment layer beneath the mudline should be considered qualitative. If Alignment Alternative 6 is selected for design, SPT borings will be required to provide a quantitative measure of the depth and consistency of the soft sediment materials.

7.0 PRELIMINARY ENGINEERING EVALUATIONS

7.1 General

In general, the soil conditions encountered in both the natural and reclaimed mine lands along Alignment Alternative 6 can be considered similar and comparable to those along the current alignment in the area of the proposed shift.

The results of the roadway exploration program for the current alignment from Station 1194+00 to 1296+00 are included in **Appendix D**. These include the **Boring Location Plan** sheets and **Roadway Soil Profiles** sheets from Tierra's *Phase II Roadway Soils Survey Report.*

It is important to note that the boring frequency for this preliminary study for Alignment Alternative 6 is below design level boring frequency and approximately one-sixth of the number of borings performed for the current design. Therefore, the evaluation and comparison between the two alignments presented below needs to consider the preliminary nature of the study.

7.2 Alignment Soil Comparison Discussion

7.2.1 Natural Soil Area

Both alignments traverse approximately 2,000 feet of natural soils prior to entering the reclaimed mine land. Organic soils were encountered within several of the auger borings performed along Alignment Alternative 6. These soils were encountered within areas identified as USDA Soil Unit 13 (Samsula Muck). The organic soils were generally encountered in the top 1 foot at the boring locations. Soil removal will be required in these areas in accordance with FDOT Standard Plans Index 120-002. Delineation of the organic soils to approximate their horizontal and vertical limits along Alignment Alternative 6 was not performed but will need to be completed if Alignment Alternative 6 is selected. Similar organic soil conditions were encountered along the current CPP alignment in this area (Soil Unit 13) and organic material removal has been recommended.

7.2.2 Reclaimed Mine Area

As mentioned previously, the soil conditions along Alignment Alternative 6 are similar to those along the current alignment. As discussed in detail in the *Phase II Roadway Soils Survey Report*, different types of reclaimed soil conditions were encountered resulting in different degrees of recommended soil remediation measures. Tierra developed the following recommended remediation measures for the soil conditions encountered along the current alignment*:*

Reclaimed Soil Condition Requiring Remediation	**Recommended Remediation Approach**
Reclaimed Mine Soils of Variable Consistency; Neither Surficial nor Buried Slime/Organics Encountered	Approximate 5 foot temporary surcharge of limited duration.
Reclaimed Mine Soils of Variable Consistency; AND Buried Slime/Organics Encountered	More significant Temporary Surcharge (height based on degree of buried slime/organics); surcharge duration longer and determined by settlement plate monitoring; geo-synthetic layers also added to mitigate against future settlement distress
Reclaimed Mine Soils of Variable Consistency; Surficial and Buried Slime/Organics Encountered	Removal of surficial deleterious materials plus same approach as when Buried Slime/Organics Encountered
Reclaimed Mine Soils of Variable Consistency; Surficial Slime/Organics Encountered	Removal of surficial deleterious materials plus same approach as when no Buried organics/slimes encountered
Open Water Features	Bridging

In Tierra's *Phase II Roadway Soils Survey Report* a table was presented that provided the approximate station limits for each of these recommended remediation approaches. For comparison purposes, Tierra has created a similar table for the Alternative 6 alignment based on the results of the limited soil exploration program. This table is presented to assist the KCA team in the evaluation/comparison of the current alignment and Alternative 6. It must be noted that the degree of soil exploration was far less on Alignment Alternative 6 than along the current alignment and the station limits and type of remediation recommended is based only on this preliminary field exploration program. If Alignment Alternative 6 is chosen for design, additional borings will be performed along the alignment and the approximate limits provided in the table below could be modified depending on the conditions encountered subsequent to performing the design-level test borings.

Alignment Alternative 6 Reclaimed Mine Land Recommended Remediation Measures		
Approximate Station Ranges (B/L ALT 6)	**Primary Condition Requiring Remediation**	**Remediation Approach**
1214+00 to 1216+00	Spoil Row/Mound Not Explored; Assume similar remediation as on current alignment for comparison purposes	Geo-synthetics under pavement base; Spoil Mound has acted like a surcharge already
1216+00 to 1231+00	Mined Soils of Variable Consistency; Subsurface Organics (Stratum 13) **not** encountered	Temporary Surcharge without Settlement Plates for a Fixed Time Period of 30 days
1231+00 to 1235+00	Buried Subsurface Organics (Stratum 13) and Soft Clays (Stratum 12)	Temporary Surcharge with Settlement Plates and Geo-Synthetics
1235+00 to 1243+00	Mined Soils of Variable Consistency; Subsurface Organics (Stratum 13) **not** encountered	Temporary Surcharge without Settlement Plates for a Fixed Time Period of 30 days
1243+00 to 1254+00	Buried Subsurface Organics (Stratum 13) and Soft Clays (Stratum 12)	Temporary Surcharge with Settlement Plates and Geo-Synthetics
1254+00 to 1263+00	Mined Soils of Variable Consistency; Subsurface Organics (Stratum 13) **not** encountered	Temporary Surcharge without Settlement Plates for a Fixed Time Period of 30 days
1263+00 to ~1264+00 (Begin Bridges)	Buried Subsurface Organics (Stratum 13)	Temporary Surcharge with Settlement Plates and Geo-Synthetics
Mine Pit Bridges (~1264+00 to ~1277+00)	Deep Water and Soft Soils	Bridge Structures
~1277+00 (End Bridges) to 1291+00	Buried Subsurface Organics (Stratum 13)	Temporary Surcharge with Settlement Plates and Geo-Synthetics
1291+00 to 1296+00	Mined Soils of Variable Consistency; Subsurface Organics (Stratum 13) **not** encountered	Temporary Surcharge without Settlement Plates for a Fixed Time Period of 30 days

8.0 REPORT LIMITATIONS

Our services have been performed, our findings obtained and our preliminary evaluations prepared in accordance with generally accepted geotechnical engineering principles and practices at the time of this report. Tierra is not responsible for the conclusions, opinions or recommendations made by others based on this data.

The scope of the geotechnical portion of the current study is to provide preliminary information on the existing subsurface conditions along Alignment Alternative 6 and our preliminary evaluation regarding the soil conditions along Alignment Alternative 6 compared to the current CPP alignment. Should Alignment Alternative 6 be selected for design, additional geotechnical explorations will be required. Due to the inherent variability of soils in areas of past mining activity, a higher frequency of borings and testing above the minimum guidelines presented in the Soils and Foundation Handbook will be required to develop recommendations for roadway construction through mined lands.

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 team and Florida's Turnpike Enterprise.

APPENDIX A

Historical Aerials

USDA Soil Survey Map

USGS Quadrangle Map

Summary of USDA Soil Survey of Polk County, Florida

SOURCE: UNIVERSITY OF FLORIDA

1941 HISTORICAL AERIAL PHOTOGRAPH

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

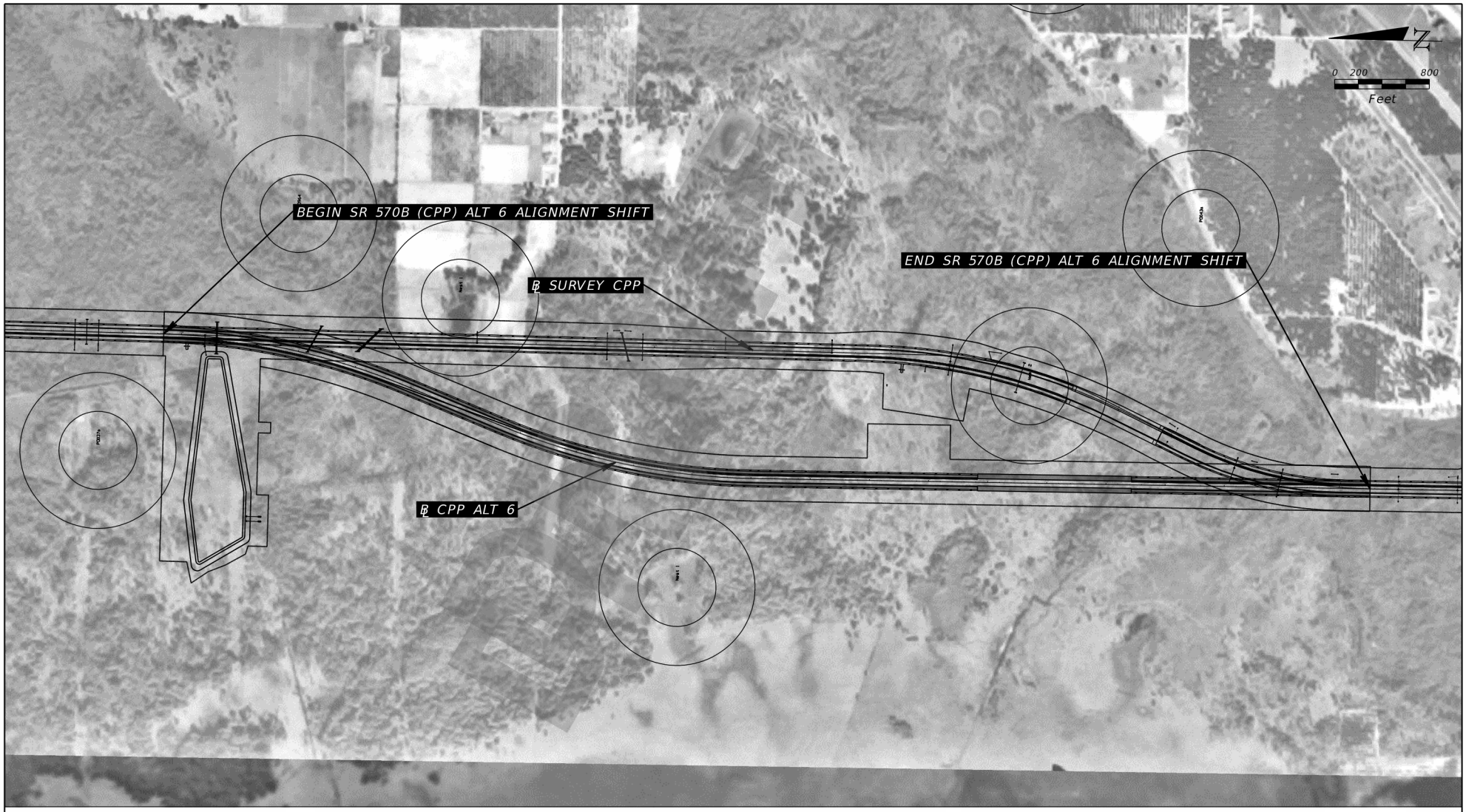
MARC E. NOVAK, Ph.D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

HISTORICAL AERIAL PHOTOGRAPHS

SHEET NO.



SOURCE: USGS EARTH RESOURCES OBSERVATION AND SCIENCE (EROS) CENTER

1959 HISTORICAL AERIAL PHOTOGRAPH

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

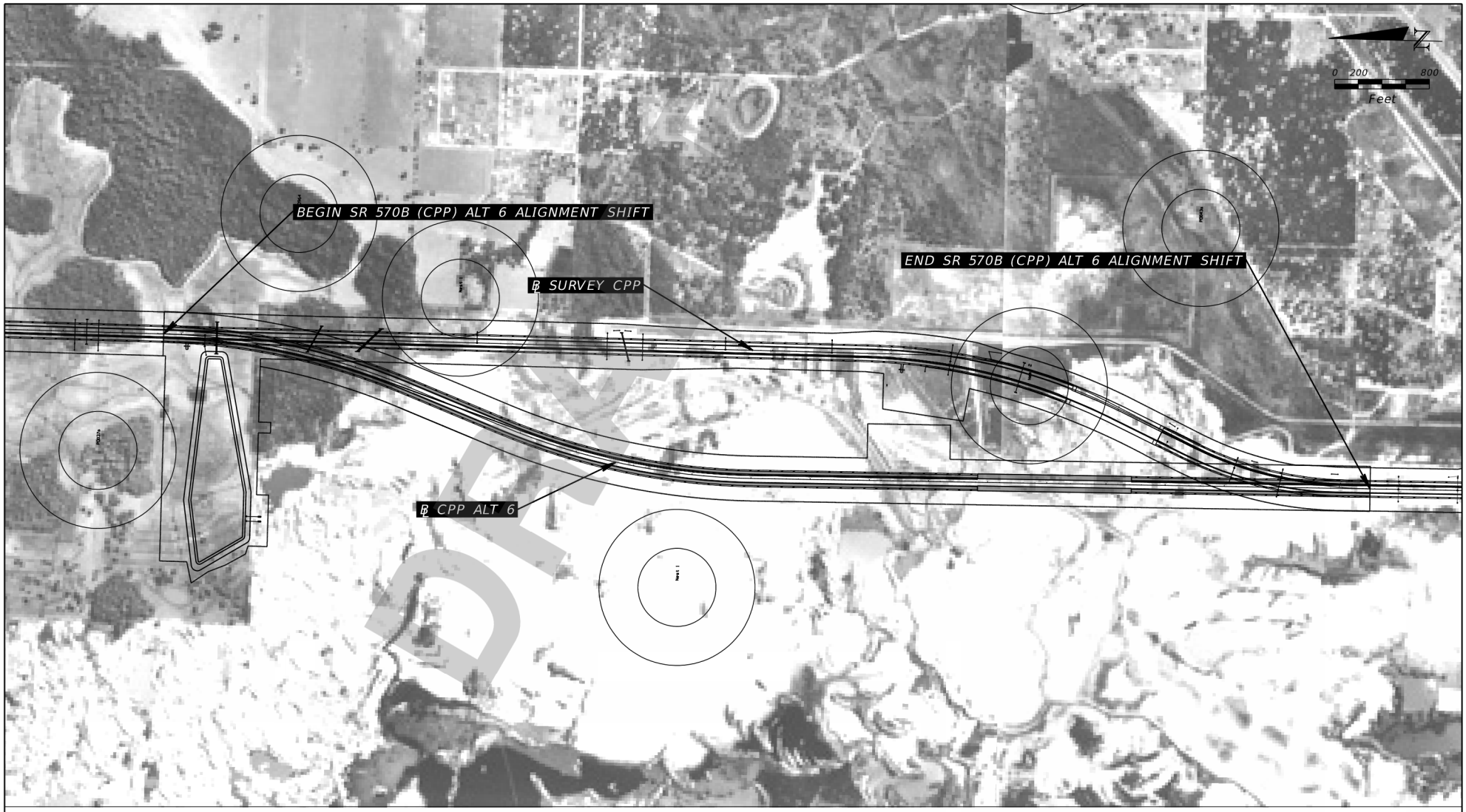
MARC E. NOVAK, Ph.D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

HISTORICAL AERIAL PHOTOGRAPHS

SHEET NO.



SOURCE: UNIVERSITY OF FLORIDA

1968 HISTORICAL AERIAL PHOTOGRAPH

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

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

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

HISTORICAL AERIAL PHOTOGRAPHS

SHEET NO.

SOURCE: FDOT SURVEY AND MAPPING DATED

1971 HISTORICAL AERIAL PHOTOGRAPH

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

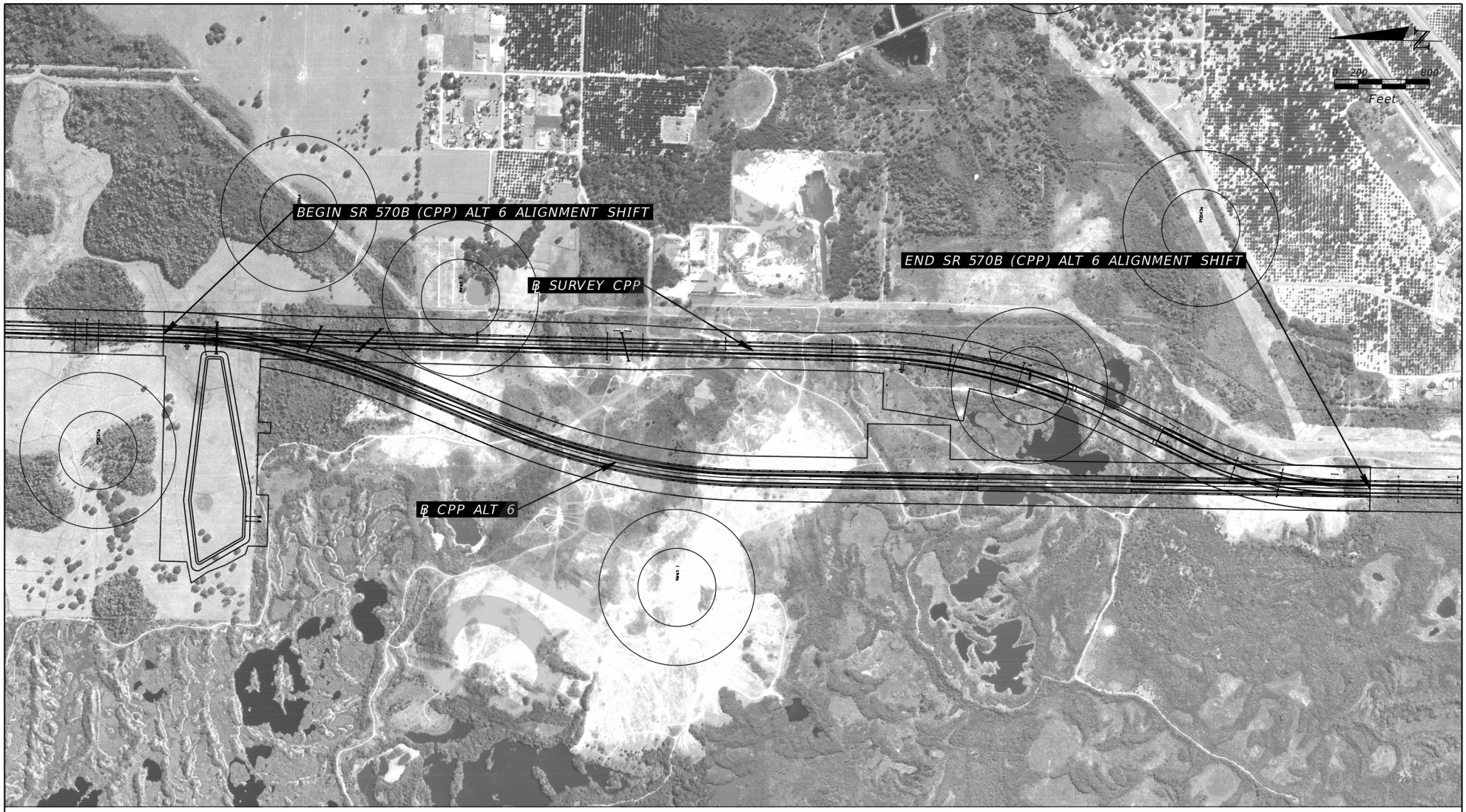
MARC E. NOVAK, Ph.D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

HISTORICAL AERIAL PHOTOGRAPHS

SHEET NO.



SOURCE: FDOT SURVEY AND MAPPING DATED

1980 HISTORICAL AERIAL PHOTOGRAPH

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

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

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

HISTORICAL AERIAL PHOTOGRAPHS

SHEET NO.

SOURCE: FDOT SURVEY AND MAPPING DATED

1993 HISTORICAL AERIAL PHOTOGRAPH

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

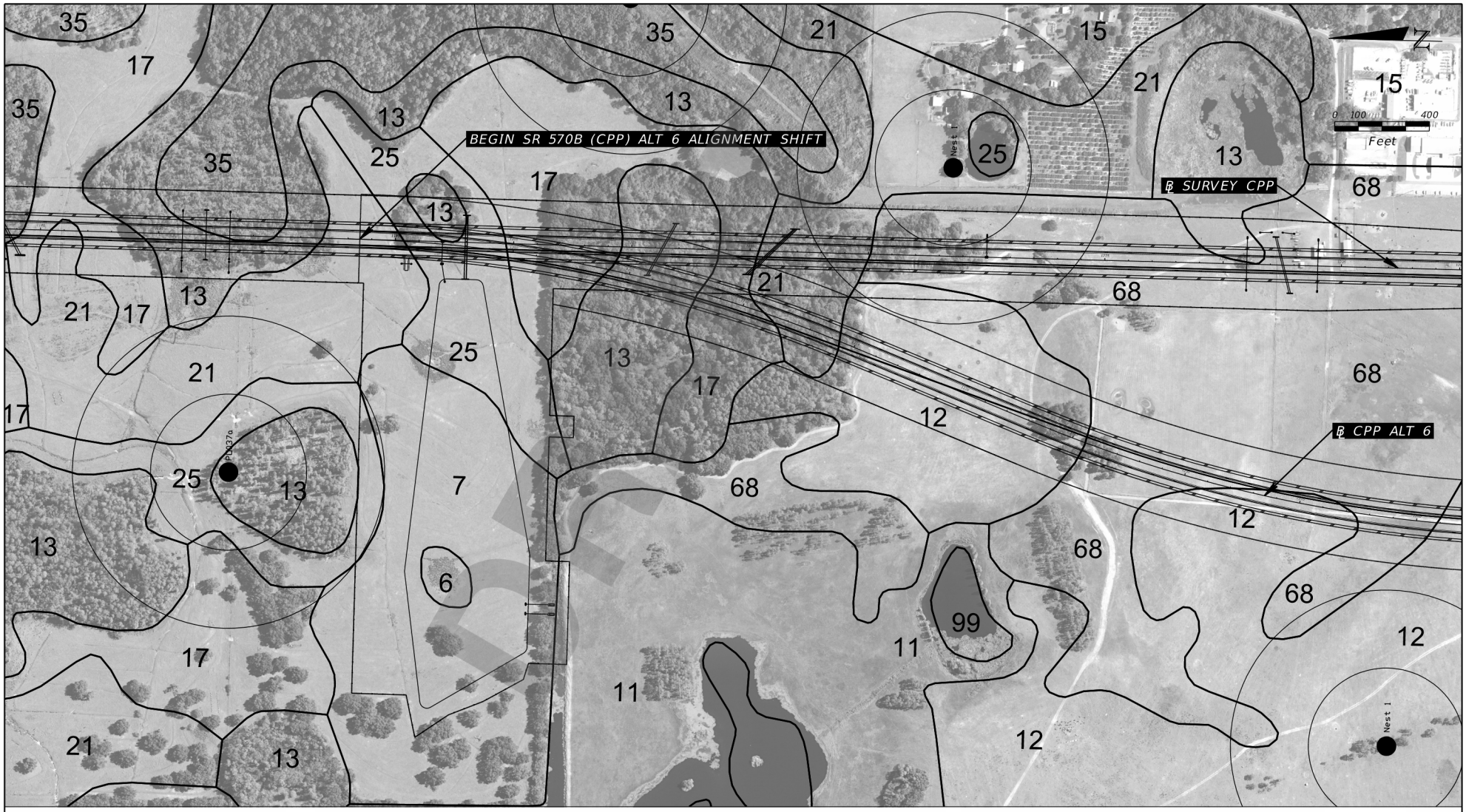
MARC E. NOVAK, Ph.D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

HISTORICAL AERIAL PHOTOGRAPHS

SHEET NO.



REFERENCE: USDA SOIL SURVEY OF POLK COUNTY, FLORIDA

TOWNSHIP: 29S
RANGE: 25E
SECTION: 10, 15, 22

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

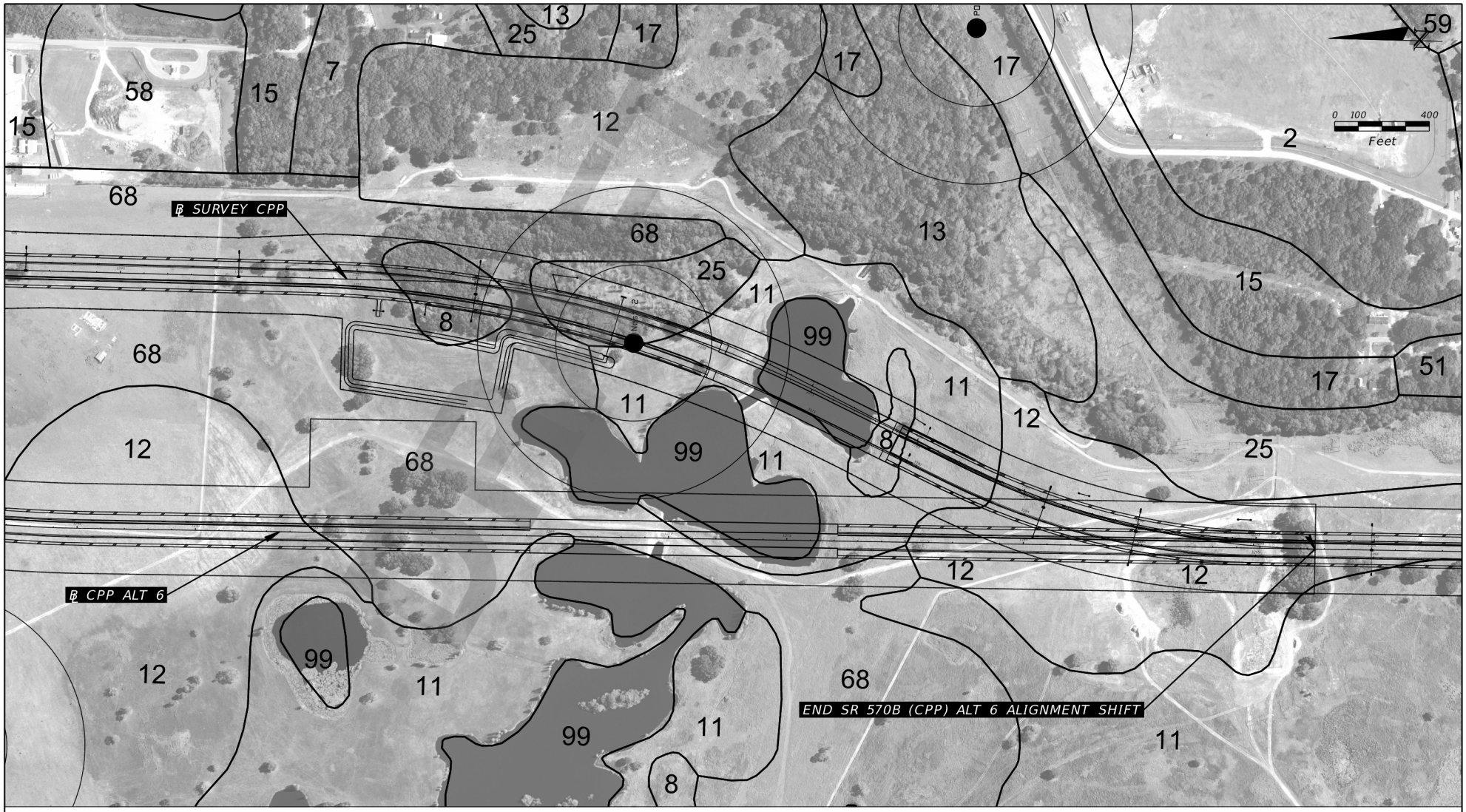
MARC E. NOVAK, Ph.D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

USDA SOIL SURVEY (1)

SHEET NO.



REFERENCE: USDA SOIL SURVEY OF POLK COUNTY, FLORIDA

TOWNSHIP: 29S
RANGE: 25E
SECTION: 10, 15, 22

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

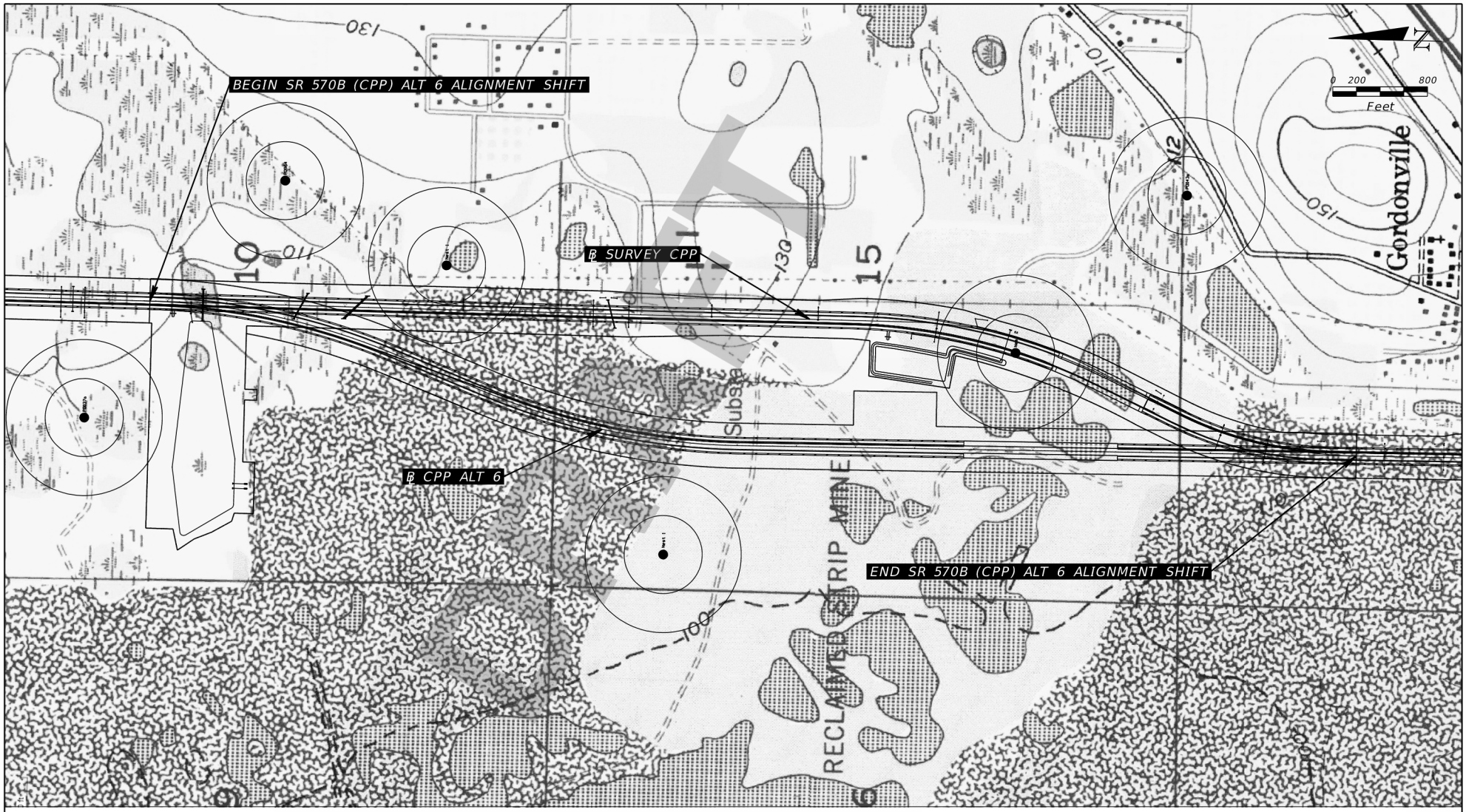
MARC E. NOVAK, Ph.D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

USDA SOIL SURVEY (2)

SHEET NO.



REFERENCE: USGS QUADRANGLE MAP OF "BARTOW, FLORIDA"

TOWNSHIP: 29S
RANGE: 25E
SECTION: 10, 15, 22

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

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

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

USGS QUADRANGLE MAP

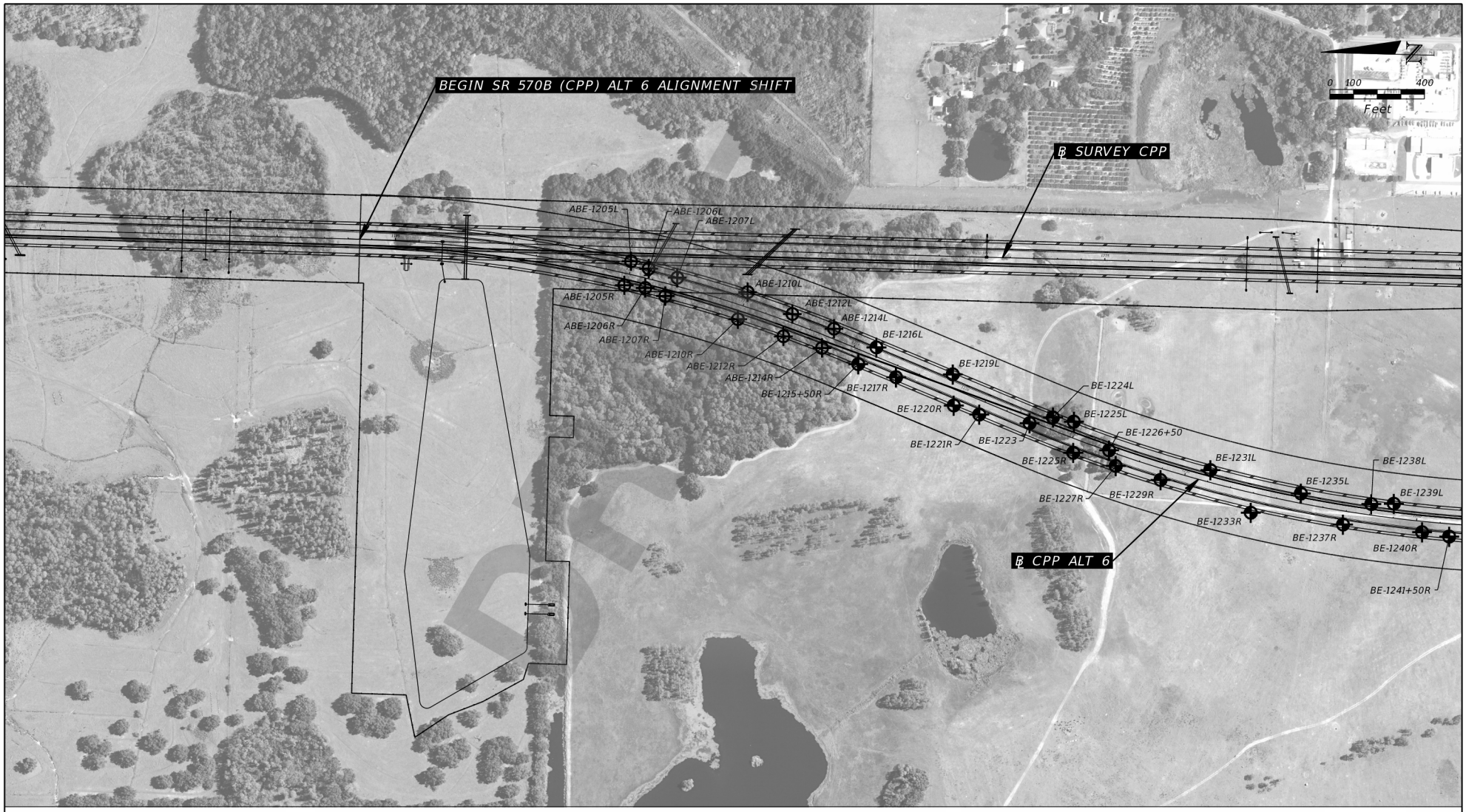
SHEET NO.

APPENDIX B

Boring Location Plan – Alignment Alternative 6

Roadway Soil Profiles – Alignment Alternative 6

Mine Pit Lakes Probing Plan – Alignment Alternative 6



LEGEND

- APPROXIMATE SPT BORING LOCATION
- APPROXIMATE AUGER BORING LOCATION
- REFER TO MINE PIT LAKES PROBING PLAN

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

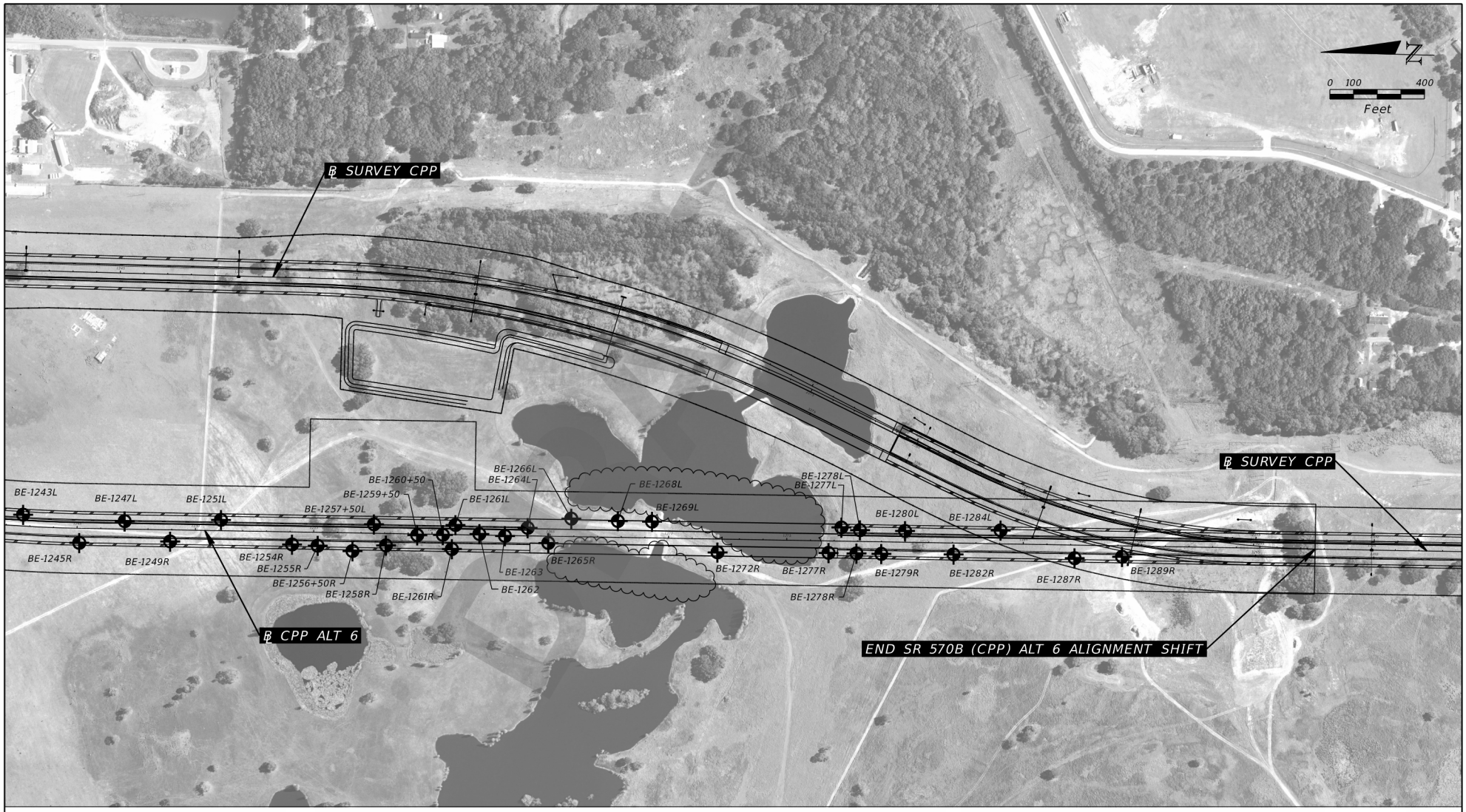
MARC E. NOVAK, Ph.D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

BORING LOCATION PLAN (1)

SHEET NO.



LEGEND

- APPROXIMATE SPT BORING LOCATION
- APPROXIMATE AUGER BORING LOCATION
- REFER TO MINE PIT LAKES PROBING PLAN

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

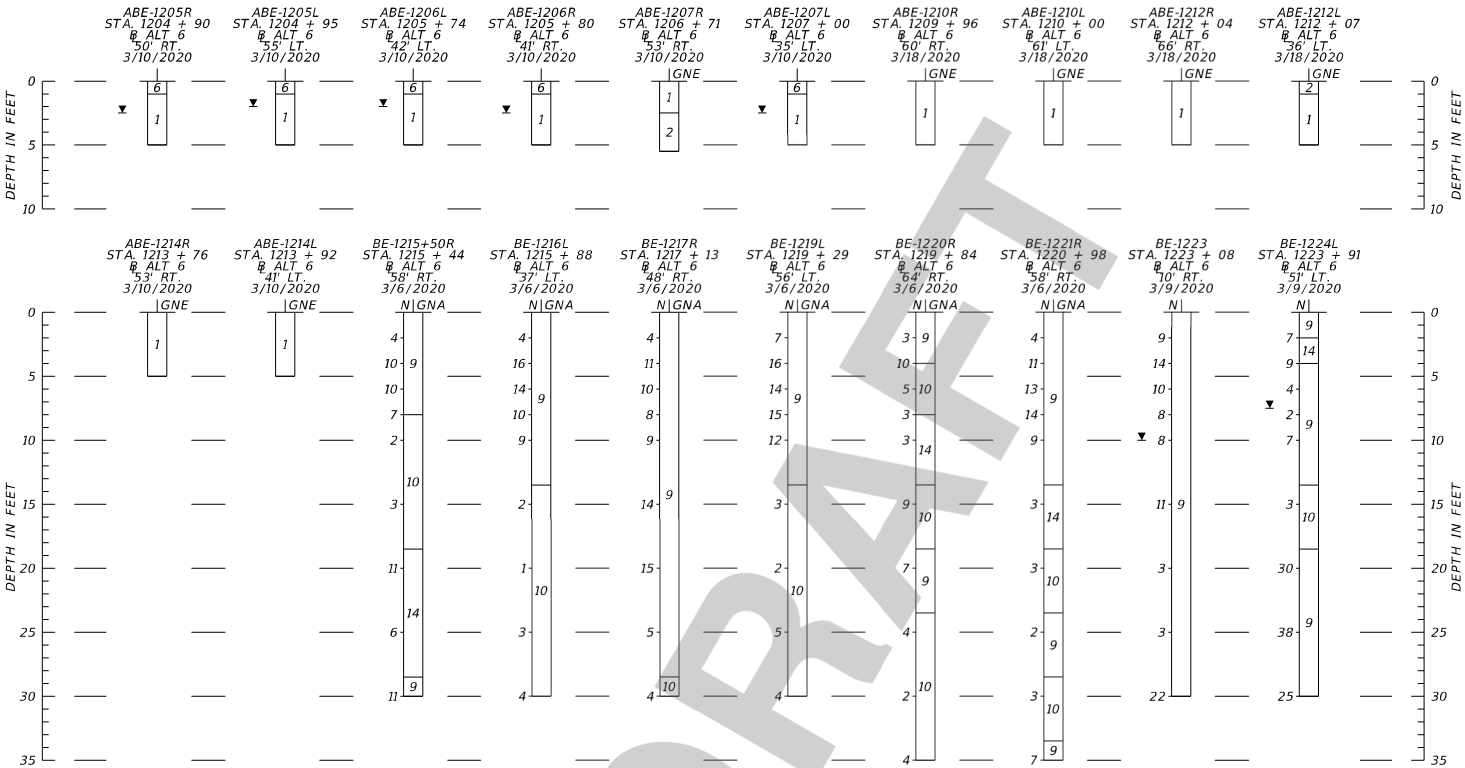
MARC E. NOVAK, Ph.D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

BORING LOCATION PLAN (2)

SHEET NO.



LEGEND

1. LIGHT GRAY TO GRAY TO PALE BROWN TO DARK BROWN SAND TO SAND WITH SILT (A-3/A-2-4)
2. LIGHT GRAY TO GRAY TO BROWN SILTY SAND (A-2-4)
3. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND (A-2-6/A-2-7)
4. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-4/A-6/A-7-5/A-7-6)
5. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-7-5/A-7-6/A-2-7)
6. DARK GRAY TO DARK GRAYISH BROWN ORGANIC SOILS TO MUCK (A-8)
7. DARK REDDISH BROWN TO BROWN CEMENTED SAND TO SILTY SAND (HARDPAN) (A-3/A-2-4)
8. LIMESTONE
9. LIGHT GRAY TO PALE BROWN SAND TO SAND WITH SILT, TRACE PHOSPHATE (SAND AND TAILING SAND) (A-3)
10. LIGHT GRAY TO DARK BROWN SAND WITH SILT TO SILTY SAND (DISTURBED) (A-2-4)
11. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND TO SILT TO CLAY (DISTURBED) (A-2-6/A-4/A-6/A-7-5/A-7-6/A-2-7)
12. SANDY CLAY INCLUDING WASTE PHOSPHATIC CLAY (SLIME) (A-7-5/A-7-6)
13. DARK BROWN TO BLACK ORGANIC SOILS TO MUCK/PEAT (DISTURBED) (A-8)
14. LIGHT GRAY TO DARK BROWN SILTY SAND TO SILTY-CLAYEY SAND (DISTURBED) (A-2-4)

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

N NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).

50/4 NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION

WH FELL UNDER WEIGHT OF ROD AND HAMMER

▼ GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS

GNE GROUNDWATER NOT ENCOUNTERED

GNA GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID.

℄ ALT 6 BASELINE SURVEY OF CPP ALTERNATIVE 6

NOTE: THE BORINGS WERE PERFORMED UTILIZING AN AUTOMATIC HAMMER

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS - RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	16 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

ALTERNATIVE 6

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

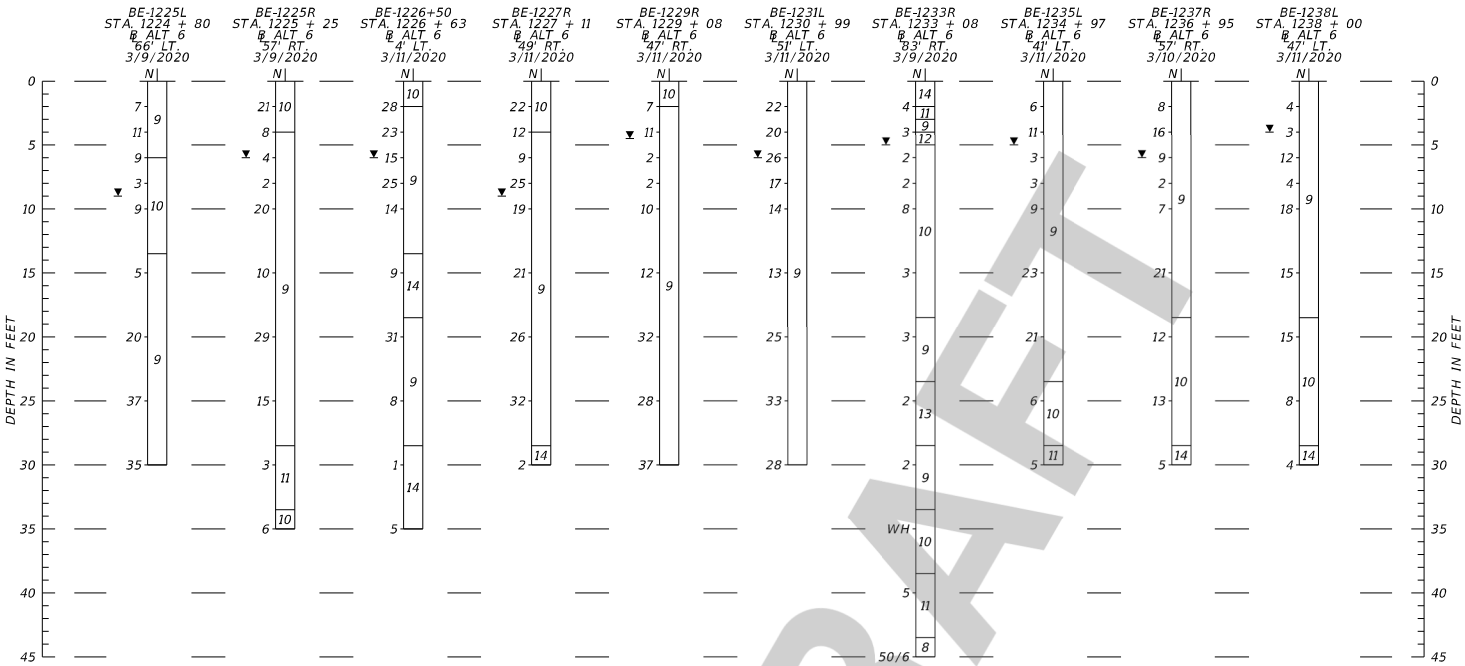
MARC E. NOVAK, Ph.D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

ROADWAY PROFILES (1)

SHEET NO.



LEGEND

1. LIGHT GRAY TO GRAY TO PALE BROWN TO DARK BROWN SAND TO SAND WITH SILT (A-3/A-2-4)
2. LIGHT GRAY TO GRAY TO BROWN SILTY SAND (A-2-4)
3. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND (A-2-6/A-2-7)
4. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-4/A-6/A-7-5/A-7-6)
5. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-7-5/A-7-6/A-2-7)
6. DARK GRAY TO DARK GRAYISH BROWN ORGANIC SOILS TO MUCK (A-8)
7. DARK REDDISH BROWN TO BROWN CEMENTED SAND TO SILTY SAND (HARDPAN) (A-3/A-2-4)
8. LIMESTONE
9. LIGHT GRAY TO PALE BROWN SAND TO SAND WITH SILT, TRACE PHOSPHATE (SAND AND TAILING SAND) (A-3)
10. LIGHT GRAY TO DARK BROWN SAND WITH SILT TO SILTY SAND (DISTURBED) (A-2-4)
11. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND TO SILT TO CLAY (DISTURBED) (A-2-6/A-4/A-6/A-7-5/A-7-6/A-2-7)
12. SANDY CLAY INCLUDING WASTE PHOSPHATIC CLAY (SLIME) (A-7-5/A-7-6)
13. DARK BROWN TO BLACK ORGANIC SOILS TO MUCK/PEAT (DISTURBED) (A-8)
14. LIGHT GRAY TO DARK BROWN SILTY SAND TO SILTY-CLAYEY SAND (DISTURBED) (A-2-4)

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

N NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).

50/4 NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION

WH FELL UNDER WEIGHT OF ROD AND HAMMER

▼ GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS

GNE GROUNDWATER NOT ENCOUNTERED

GNA GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID.

℄ ALT 6 BASELINE SURVEY OF CPP ALTERNATIVE 6

NOTE: THE BORINGS WERE PERFORMED UTILIZING AN AUTOMATIC HAMMER

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	16 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

ALTERNATIVE 6

REVISIONS

DATE	DESCRIPTION	DATE	DESCRIPTION

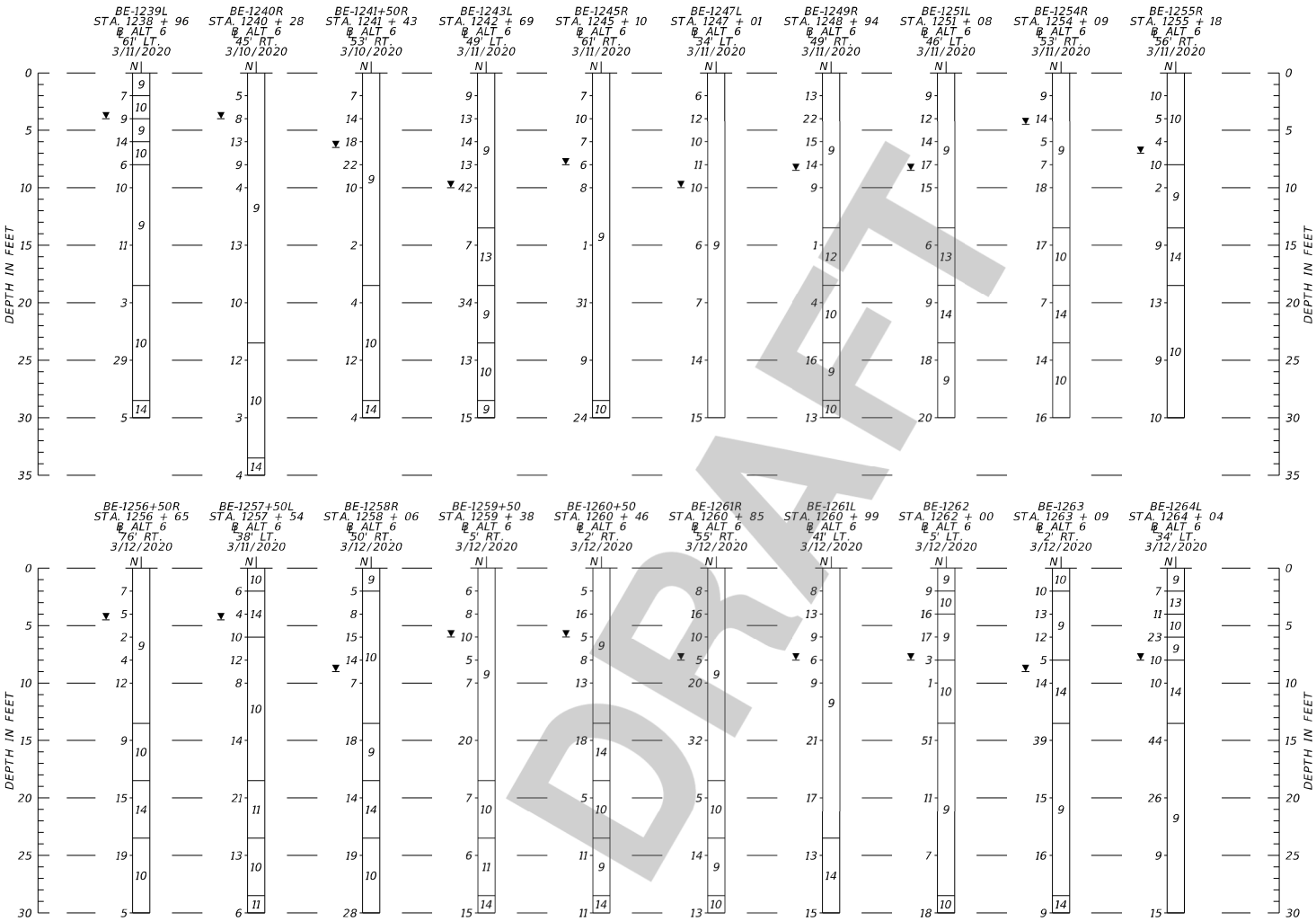
MARC E. NOVAK, Ph.D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

ROADWAY PROFILES (2)

SHEET NO.



LEGEND

1. LIGHT GRAY TO GRAY TO PALE BROWN TO DARK BROWN SAND TO SAND WITH SILT (A-3/A-2-4)
2. LIGHT GRAY TO GRAY TO BROWN SILTY SAND (A-2-4)
3. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND (A-2-6/A-2-7)
4. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-4/A-6/A-7-5/A-7-6)
5. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-7-5/A-7-6/A-2-7)
6. DARK GRAY TO DARK GRAYISH BROWN ORGANIC SOILS TO MUCK (A-8)
7. DARK REDDISH BROWN TO BROWN CEMENTED SAND TO SILTY SAND (HARDPAN) (A-3/A-2-4)
8. LIMESTONE
9. LIGHT GRAY TO PALE BROWN SAND TO SAND WITH SILT, TRACE PHOSPHATE (SAND AND TAILING SAND) (A-3)
10. LIGHT GRAY TO DARK BROWN SAND WITH SILT TO SILTY SAND (DISTURBED) (A-2-4)
11. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND TO SILT TO CLAY (DISTURBED) (A-2-6/A-4/A-6/A-7-5/A-7-6/A-2-7)
12. SANDY CLAY INCLUDING WASTE PHOSPHATIC CLAY (SLIME) (A-7-5/A-7-6)
13. DARK BROWN TO BLACK ORGANIC SOILS TO MUCK/PEAT (DISTURBED) (A-8)
14. LIGHT GRAY TO DARK BROWN SILTY SAND TO SILTY-CLAYEY SAND (DISTURBED) (A-2-4)

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

N NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).

50/4 NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION

WH FELL UNDER WEIGHT OF ROD AND HAMMER

▼ GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS

GNE GROUNDWATER NOT ENCOUNTERED

GNA GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID.

℄ ALT 6 BASELINE SURVEY OF CPP ALTERNATIVE 6

NOTE: THE BORINGS WERE PERFORMED UTILIZING AN AUTOMATIC HAMMER

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	16 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

ALTERNATIVE 6

REVISIONS

DATE	DESCRIPTION	DATE	DESCRIPTION

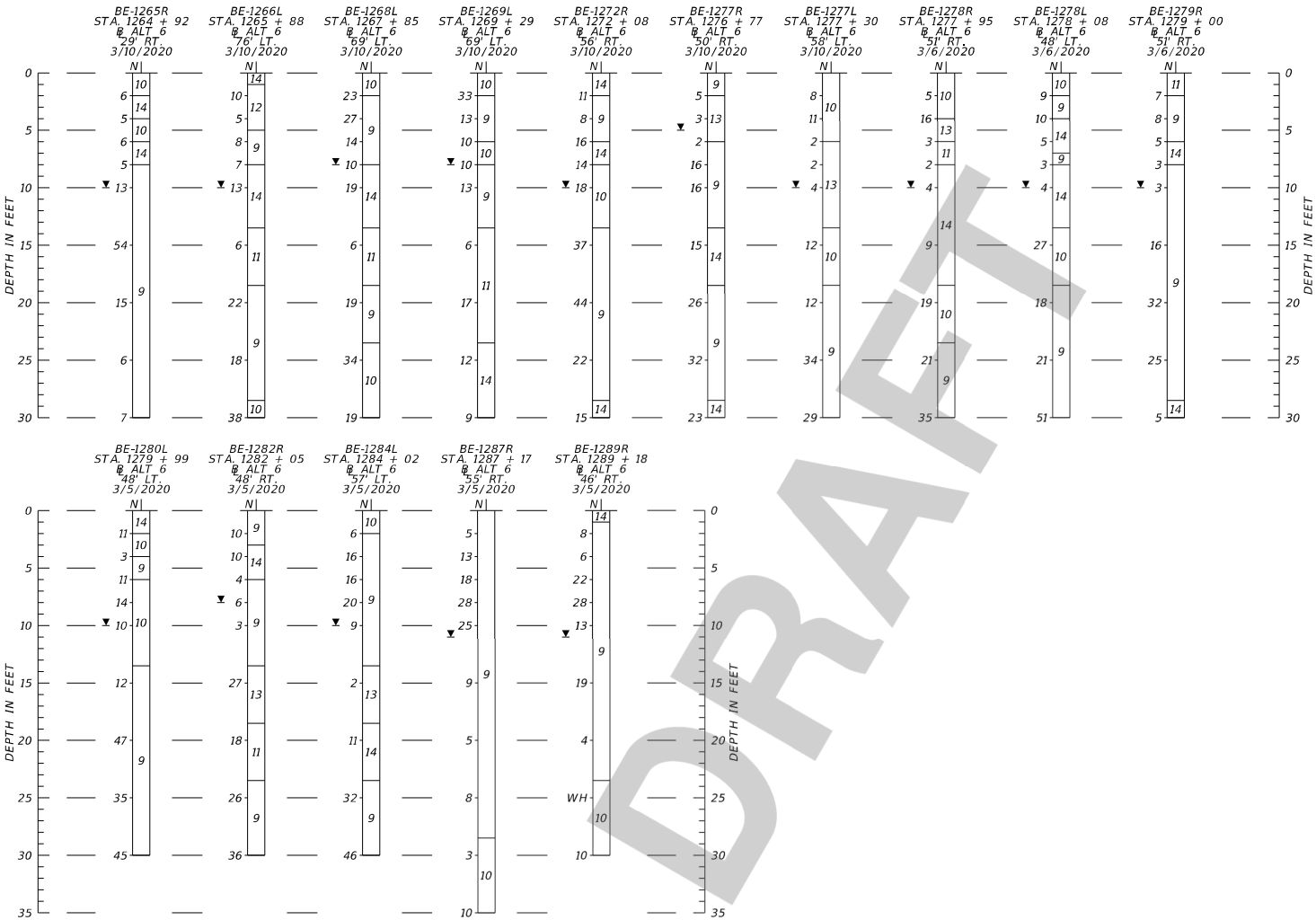
MARC E. NOVAK, Ph.D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

ROADWAY PROFILES (3)

SHEET NO.



LEGEND

1. LIGHT GRAY TO GRAY TO PALE BROWN TO DARK BROWN SAND TO SAND WITH SILT (A-3/A-2-4)
2. LIGHT GRAY TO GRAY TO BROWN SILTY SAND (A-2-4)
3. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND (A-2-6/A-2-7)
4. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-4/A-6/A-7-5/A-7-6)
5. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-7-5/A-7-6/A-2-7)
6. DARK GRAY TO DARK GRAYISH BROWN ORGANIC SOILS TO MUCK (A-8)
7. DARK REDDISH BROWN TO BROWN CEMENTED SAND TO SILTY SAND (HARDPAN) (A-3/A-2-4)
8. LIMESTONE
9. LIGHT GRAY TO PALE BROWN SAND TO SAND WITH SILT, TRACE PHOSPHATE (SAND AND TAILING SAND) (A-3)
10. LIGHT GRAY TO DARK BROWN SAND WITH SILT TO SILTY SAND (DISTURBED) (A-2-4)
11. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND TO SILT TO CLAY (DISTURBED) (A-2-6/A-4/A-6/A-7-5/A-7-6/A-2-7)
12. SANDY CLAY INCLUDING WASTE PHOSPHATIC CLAY (SLIME) (A-7-5/A-7-6)
13. DARK BROWN TO BLACK ORGANIC SOILS TO MUCK/PEAT (DISTURBED) (A-8)
14. LIGHT GRAY TO DARK BROWN SILTY SAND TO SILTY-CLAYEY SAND (DISTURBED) (A-2-4)

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

N NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).

50/4 NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION

WH FELL UNDER WEIGHT OF ROD AND HAMMER

▼ GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS

GNE GROUNDWATER NOT ENCOUNTERED

GNA GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID.

℄ ALT 6 BASELINE SURVEY OF CPP ALTERNATIVE 6

NOTE: THE BORINGS WERE PERFORMED UTILIZING AN AUTOMATIC HAMMER

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	16 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

ALTERNATIVE 6

REVISIONS

DATE	DESCRIPTION	DATE	DESCRIPTION

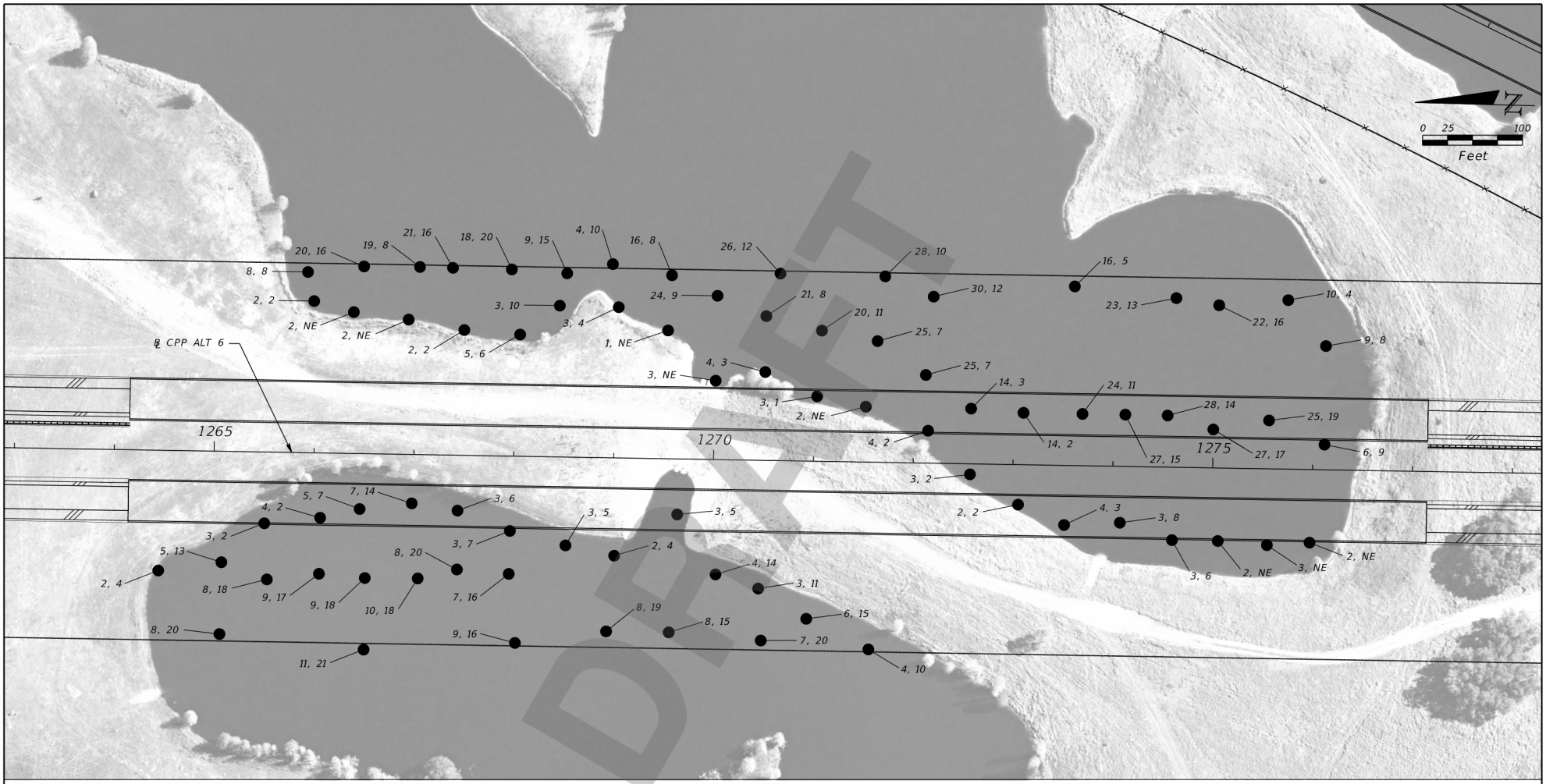
MARC E. NOVAK, Ph.D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

ROADWAY PROFILES (4)

SHEET NO.



NOTE:

PROBE LOCATIONS SHOULD BE CONSIDERED APPROXIMATE AND WERE BASED ON HAND-HELD GPS DEVICES WITH A MANUFACTURER'S REPORTED ACCURACY OF ± 10 FEET. WATER DEPTHS SHOULD BE CONSIDERED APPROXIMATE AND REFLECT THE WATER LEVELS DURING FIELD ACTIVITIES IN MARCH 2020. PROBING WAS PERFORMED BY MANUALLY PUSHING A PROBE ROD BELOW THE MUDLINE THROUGH THE SOFT SEDIMENT LAYER UNTIL A FIRM LAYER WAS ENCOUNTERED. THE THICKNESS OF THE SOFT SEDIMENT LAYER SHOULD BE CONSIDERED QUALITATIVE. SPT BORINGS DURING THE DESIGN PHASE, IF THE ALIGNMENT IS SELECTED, WILL BE REQUIRED TO PROVIDE A QUANTITATIVE MEASURE OF THE DEPTH AND CONSISTENCY OF THESE MATERIALS.

LEGEND

APPROXIMATE PROBE LOCATION

3, 7 — MEASURED WATER DEPTH OF 3 FEET, 7 FEET OF SOFT SEDIMENT BELOW MUDLINE

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

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

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

MINE PIT LAKES PROBING PLAN

SHEET NO.

APPENDIX C

Roadway Soil Survey Sheets

DATE OF SURVEY: APRIL 2013 TO NOVEMBER 2019
SURVEY MADE BY: TIERRA, INC.
SUBMITTED BY: MARC E. NOVAK, Ph. D., P.E.

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

DISTRICT: TURNPIKE
ROAD NO.: SR 570B
COUNTY: POLK

FINANCIAL PROJECT ID : 440897-2-52-01

PROJECT NAME: SR 570B (CENTRAL POLK PARKWAY) FROM SR 570 (POLK PARKWAY) TO SR 35 (US 17)

CROSS SECTION SOIL SURVEY FOR THE DESIGN OF ROADS

CENTRAL POLK PARKWAY MAINLINE SURVEY BEGINS STA. : 1000+53.07 SURVEY ENDS STA. : 1329+03.43 REFERENCE : ℄ SURVEY CENTRAL POLK PARKWAY

	ORGANIC CONTENT		MOISTURE CONTENT		SIEVE ANALYSIS RESULTS PERCENT PASS (%)						ATTERBERG LIMITS (%)					CORROSION TEST RESULTS				
STRATUM NO.	NO. OF TESTS	% ORGANIC	NO. OF TESTS	MOISTURE CONTENT	NO. OF TESTS	10 MESH	40 MESH	60 MESH	100 MESH	200 MESH	NO. OF TESTS	LIQUID LIMIT	PLASTIC INDEX	AASHTO GROUP	DESCRIPTION	NO. OF TESTS	RESISTIVITY ohm-cm	CHLORIDE ppm	SULFATES ppm	pH
1	2	3	10	6-42	73	100	88-95	11-64	9-33	3-15	2	NP	NP	A-3/A-2-4	LIGHT GRAY TO GRAY TO PALE BROWN TO DARK BROWN SAND TO SAND WITH SILT	26	4,700-120,000	15-45	<5-24	3.9-7.8
2	2	2-3	58	3-39	87	100	92-95	52-67	24-38	16-33	28	NP-34	NP-10	A-2-4	LIGHT GRAY TO GRAY TO BROWN SILTY SAND	12	3,200-37,000	15-45	<5-45	4.2-8.0
3	--	--	43	7-54	43	--	--	--	--	21-35	43	23-49	11-28	A-2-6/A-2-7	GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND	2	2,500-22,000	30-45	<5-36	6.4-8.2
4	2	3-4	26	13-51	32	--	--	--	--	36-80	25	22-49	7-29	A-4/A-6/ A-7-5/A-7-6	LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY	1	19,000	30	60	4.2
5	--	--	51	16-110	51	--	--	--	--	22-86	51	52-172	15-99	A-7-5/A-7-6/ A-2-7	LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY	--	--	--	--	--
6	57	7-65	57	15-312	63	--	--	--	--	4-55	1	NP	NP	A-8	DARK GRAY TO DARK GRAYISH BROWN ORGANIC SOILS TO MUCK	--	--	--	--	--
7	--	--	3	16-20	5	100	90	58	27	8-19	--	--	--	A-3/A-2-4	DARK REDDISH BROWN TO BROWN CEMENTED SAND TO SILTY SAND (HARDPAN)	1	22,000	30	<5	4.0
8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	LIMESTONE	--	--	--	--	--

NOTES:

THE ROADWAY SOIL SURVEY IS PRESENTED ON TWO (2) SHEETS. STRATA 1 THROUGH 8 ARE SOILS THAT ARE IN THEIR NATURAL INSITU STATE. STRATA 9 THROUGH 14 ARE SOILS THAT WERE ENCOUNTERED IN THE PORTION OF THE ALIGNMENT WHERE PHOSPHATE MINING ACTIVITY OCCURRED AND APPEAR TO HAVE BEEN DISTURBED AS A RESULT OF PAST MINING ACTIVITY AND ARE NOT IN THEIR NATURAL STATE. THESE SOILS ARE HIGHLY VARIABLE.

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-2-6/A-4/A-6/A-7-6/A-7-5/A-2-7) IS PLASTIC MATERIAL AND SHALL BE REMOVED IN ACCORDANCE WITH STANDARD PLANS, INDEX 120-002 AND UTILIZED IN ACCORDANCE WITH STANDARD PLANS, INDEX 120-001.
4. THE MATERIAL FROM STRATUM 5 (A-7-5/A-7-6/A-2-7) 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.

EMBANKMENT AND SUBGRADE MATERIAL

STRATA BOUNDARIES ARE APPROXIMATE. MAKE FINAL CHECK AFTER GRADING.

▼ - WATER TABLE ENCOUNTERED

▼+ - GROUNDWATER LEVEL ENCOUNTERED ABOVE EXISTING GRADE

GNE - GROUNDWATER NOT ENCOUNTERED

▽ - ESTIMATED SEASONAL HIGH GROUNDWATER TABLE

▽+ - ESTIMATED SEASONAL HIGH GROUNDWATER TABLE ABOVE EXISTING GROUND SURFACE

NP - NON-PLASTIC

GNA - GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID

5. THE MATERIAL FROM STRATUM 6 (A-8) IS ORGANIC MATERIAL TO MUCK. THIS MATERIAL SHALL BE REMOVED IN ACCORDANCE WITH STANDARD PLANS, INDEX 120-002. THIS MATERIAL SHALL NOT BE USED WITHIN THE SUBGRADE OR EMBANKMENT PORTION OF THE ROADBED. REMOVAL LIMITS ARE SHOWN ON THE ROADWAY CROSS-SECTIONS.
6. THE MATERIAL FROM STRATUM 7 (HARDPAN) IS CEMENTED AND IS LOCATED IN SOME AREAS ALONG THE PROPOSED ROADWAY ALIGNMENTS. EXCAVATIONS INTO AND THROUGH THIS MATERIAL MAY BE DIFFICULT AND MAY REQUIRE SPECIALIZED EQUIPMENT. VARIATIONS IN THE DEPTH AND RELATIVE DENSITY OF THIS MATERIAL SHALL BE ANTICIPATED. THE MATERIAL FROM STRATUM 7 (A-3/A-2-4) APPEARS SATISFACTORY FOR USE IN THE EMBANKMENT WHEN UTILIZED IN ACCORDANCE WITH STANDARD PLANS, INDEX 120-001.
7. THE MATERIAL FROM STRATUM 8 (WEATHERED LIMESTONE) IS ROCK AND WAS ENCOUNTERED AT DEPTHS GREATER THAN 30 FEET BELOW GRADE. EXCAVATION INTO AND THROUGH THIS MATERIAL MAY BE DIFFICULT. THE CONTRACTOR SHOULD BE PREPARED TO USE SPECIALIZED EQUIPMENT TO EXCAVATE INTO AND THROUGH LIMESTONE. LIMESTONE IS ALSO POROUS AND WILL BE DIFFICULT TO DEWATER.
8. THE MATERIALS FROM STRATA 9 THROUGH 14 CONSIST OF SOILS RELATED TO PAST MINING ACTIVITY AND ARE NOT IN A NATURAL STATE. THEY ARE DISTURBED AND CAN BE HIGHLY VARIABLE AND DIFFICULT TO SEPARATE. THEIR ABILITY FOR UTILIZATION FOR EMBANKMENT MATERIAL SHOULD BE VERIFIED DURING CONSTRUCTION. THE UTILIZATION OF THESE MATERIALS INDICATED IN NOTES 9, 10, 11, AND 14 SHOULD BE CONSIDERED AS A GUIDELINE ONLY AND ARE SUBJECT TO THE REQUIREMENTS OF THE STANDARD PLANS, INDEX 120-001.

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

ROADWAY SOIL SURVEY (1)

SHEET NO.

bgarcia 11/21/2019 4:58:46 PM J:\6511\2017 Files\6511-17-181 CPP-1\-001_Design\Microstation\SSUVRD01.dgn

DATE OF SURVEY: APRIL 2013 TO NOVEMBER 2019
SURVEY MADE BY: TIERRA, INC.
SUBMITTED BY: MARC E. NOVAK, Ph. D., P.E.

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

DISTRICT: TURNPIKE
ROAD NO.: SR 570B
COUNTY: POLK

FINANCIAL PROJECT ID : 440897-2-52-01

PROJECT NAME: SR 570B (CENTRAL POLK PARKWAY) FROM SR 570 (POLK PARKWAY) TO SR 35 (US 17)

CROSS SECTION SOIL SURVEY FOR THE DESIGN OF ROADS

CENTRAL POLK PARKWAY MAINLINE SURVEY BEGINS STA. : 1000+53.07 SURVEY ENDS STA. : 1329+03.43 REFERENCE : ℄ SURVEY CENTRAL POLK PARKWAY

	ORGANIC CONTENT		MOISTURE CONTENT		SIEVE ANALYSIS RESULTS PERCENT PASS (%)						ATTERBERG LIMITS (%)					CORROSION TEST RESULTS				
STRATUM NO.	NO. OF TESTS	% ORGANIC	NO. OF TESTS	MOISTURE CONTENT	NO. OF TESTS	10 MESH	40 MESH	60 MESH	100 MESH	200 MESH	NO. OF TESTS	LIQUID LIMIT	PLASTIC INDEX	AASHTO GROUP	DESCRIPTION	NO. OF TESTS	RESISTIVITY ohm-cm	CHLORIDE ppm	SULFATES ppm	pH
9	2	1	7	4-55	48	100	83-97	28-90	4-60	1-9	1	NP	NP	A-3	LIGHT GRAY TO PALE BROWN SAND TO SAND WITH SILT, TRACE PHOSPHATE (SAND AND TAILING SAND)	11	2,600-45,000	15-45	<5-15	4.7-8.1
10	6	2-4	33	16-98	44	100	91-96	47-87	16-61	11-34	24	NP	NP	A-2-4	LIGHT GRAY TO DARK BROWN SAND WITH SILT TO SILTY SAND (DISTURBED)	3	6,200-41,000	30-60	<5-72	5.4-7.2
11	--	--	37	9-104	37	100	94	73	57	19-69	37	23-49	11-29	A-2-6/A-4/ A-6/A-7-5/ A-7-6/A-2-7	GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND TO CLAY (DISTURBED)	--	--	--	--	--
12	--	--	19	27-111	23	--	--	--	--	54-98	18	54-151	28-99	A-7-5/A-7-6	SANDY CLAY INCLUDING WASTE PHOSPHATIC CLAY (SLIME)	--	--	--	--	--
13	44	6-96	44	7-612	34	--	--	--	--	6-93	7	NP-86	NP-38	A-8	DARK BROWN TO BLACK ORGANIC SOILS TO MUCK/PEAT (DISTURBED)	--	--	--	--	--
14	--	--	43	9-58	43	100	86-97	57-87	29-63	17-38	43	16-40	2-10	A-2-4	LIGHT GRAY TO DARK BROWN SILTY SAND TO SILTY-CLAYEY SAND (DISTURBED)	--	--	--	--	--

NOTES:

EMBANKMENT AND SUBGRADE MATERIAL

STRATA BOUNDARIES ARE APPROXIMATE. MAKE FINAL CHECK AFTER GRADING.

▼ - WATER TABLE ENCOUNTERED

▼+ - GROUNDWATER LEVEL ENCOUNTERED ABOVE EXISTING GRADE

GNE - GROUNDWATER NOT ENCOUNTERED

▽ - ESTIMATED SEASONAL HIGH GROUNDWATER TABLE

▽+ - ESTIMATED SEASONAL HIGH GROUNDWATER TABLE ABOVE EXISTING GROUND SURFACE

NP - NON-PLASTIC

GNA - GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID

9. THE MATERIAL FROM STRATUM 9 (A-3) APPEARS SATISFACTORY FOR USE IN THE EMBANKMENT WHEN UTILIZED IN ACCORDANCE WITH STANDARD PLANS, INDEX 120-001. THIS STRATUM IS INTER-MIXED WITH OTHER STRATA AND IS HIGHLY VARIABLE AND DIFFICULT TO SEPARATE.

10. THE MATERIAL FROM STRATUM 10 (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. THIS STRATUM IS INTER-MIXED WITH OTHER STRATA AND IS HIGHLY VARIABLE AND DIFFICULT TO SEPARATE.

11. THE MATERIAL FROM STRATUM 11 IS MIXED/DISTURBED AND VARIABLE DUE TO PAST MINING ACTIVITY IN THE PROJECT AREA. THIS MATERIAL IS PLASTIC MATERIAL AND SHALL BE REMOVED IN ACCORDANCE WITH STANDARD PLANS, INDEX 120-002 AND UTILIZED IN ACCORDANCE WITH STANDARD PLANS, INDEX 120-001. THIS STRATUM IS INTER-MIXED WITH OTHER STRATA AND IS HIGHLY VARIABLE AND DIFFICULT TO SEPARATE.

12. THE MATERIAL FROM STRATUM 12 (A-7-5/A-7-6) IS SANDY CLAY INCLUDING WASTE PHOSPHATIC CLAY (SLIME) AND IS HIGH PLASTIC MATERIAL AND SHALL BE REMOVED IN ACCORDANCE WITH STANDARD PLANS, INDEX 120-002. REMOVAL LIMITS ARE SHOWN ON THE PROJECT ROADWAY CROSS-SECTIONS. THIS MATERIAL IS HIGHLY PLASTIC AND MOISTURE SENSITIVE AND MAY PRESENT DIFFICULTY IN HANDLING. THIS MATERIAL, WHEN REMOVED, SHALL NOT BE USED WITHIN THE PROJECT LIMITS. STRATUM 12 MAY REMAIN IN PLACE IN OTHER PORTIONS OF THE PROJECT PROVIDED THAT THE REMEDIATION PLAN SHOWN IN THE PLANS IS IMPLEMENTED. LIMITS AND DETAILS OF THE REMEDIATION PLAN ARE SHOWN IN THE PHASE II PLANS. THIS STRATUM IS INTER-MIXED WITH OTHER STRATA AND IS HIGHLY VARIABLE AND DIFFICULT TO SEPARATE.

13. THE MATERIAL FROM STRATUM 13 (A-8) IS ORGANIC MATERIAL TO MUCK/PEAT. THIS MATERIAL SHALL BE REMOVED AS MUCK IN ACCORDANCE WITH STANDARD PLANS, INDEX 120-002. THIS MATERIAL, WHEN REMOVED, SHALL NOT BE USED WITHIN THE PROJECT LIMITS. REMOVAL LIMITS ARE SHOWN ON THE PROJECT ROADWAY CROSS-SECTIONS. IN OTHER AREAS, DUE TO ITS DEPTH, THIS MATERIAL MAY REMAIN PLACE PROVIDED THAT THE REMEDIATION PLAN SHOWN IN THE PLANS IS IMPLEMENTED. LIMITS AND DETAILS OF THE REMEDIATION PLAN ARE SHOWN IN THE PHASE II PLANS.

14. THE MATERIAL FROM STRATUM 14 IS PLASTIC A-2-4 SOIL. DUE TO ITS VARIABLE NATURE, ASSOCIATION WITH PAST MINING ACTIVITY AND OFTEN INTER-MINGLED WITH STRATUM 11, STRATUM 14 SHOULD BE CONSIDERED AS PLASTIC (P) MATERIAL IN ACCORDANCE WITH STANDARD PLANS, INDEX 120-001. IT MAY BE UTILIZED IN THE EMBANKMENT IN ACCORDANCE WITH STANDARD PLANS, INDEX 120-001. THIS STRATUM IS INTER-MIXED WITH OTHER STRATA AND IS HIGHLY VARIABLE AND DIFFICULT TO SEPARATE.

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

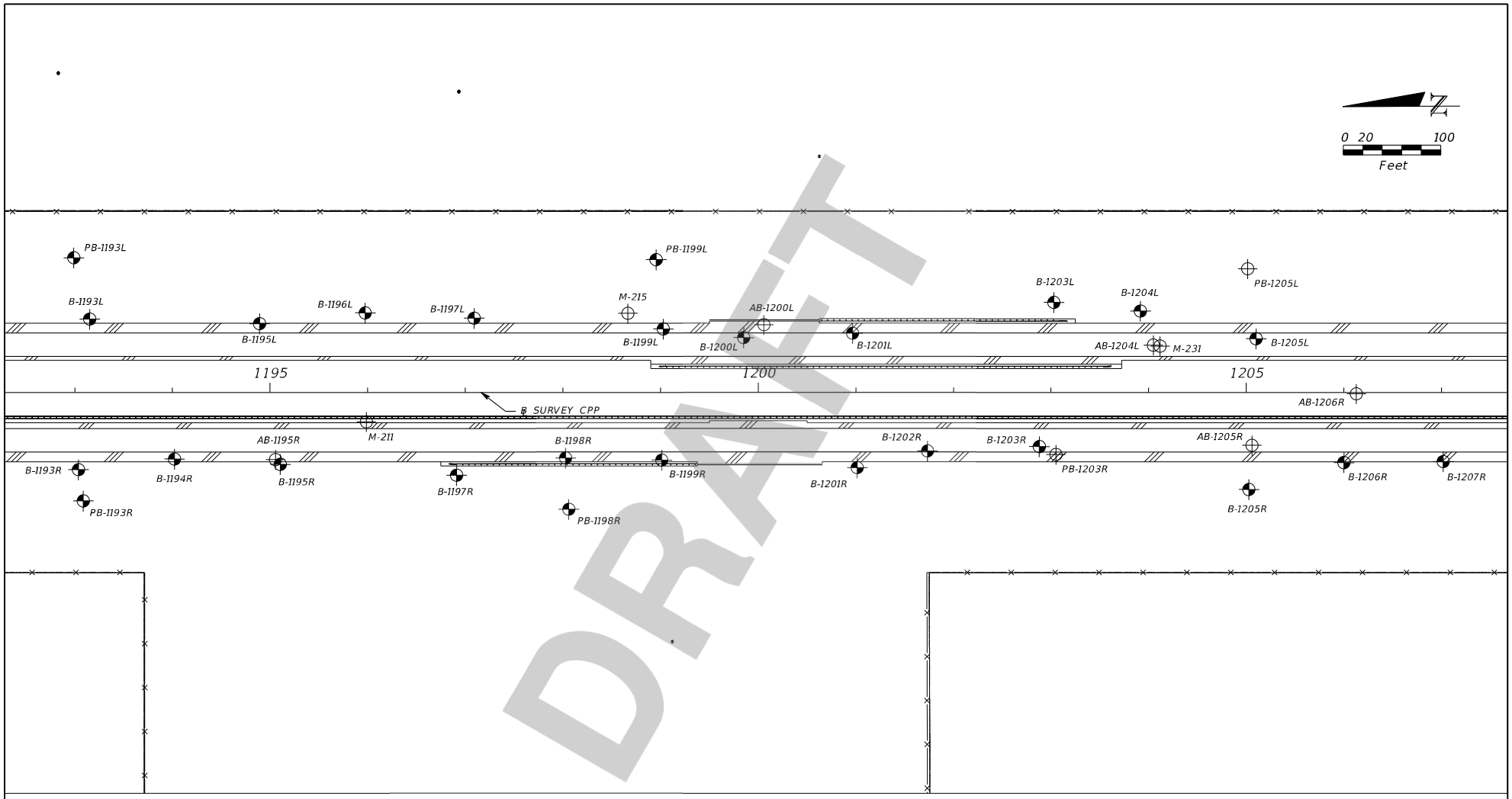
ROADWAY SOIL SURVEY (2)

SHEET NO.

APPENDIX D

Boring Location Plan – Current CPP Alignment

Roadway Soil Profiles – Current CPP Alignment



LEGEND

- APPROXIMATE SPT BORING LOCATION
- APPROXIMATE AUGER BORING LOCATION
- APPROXIMATE PIEZOMETER LOCATION

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

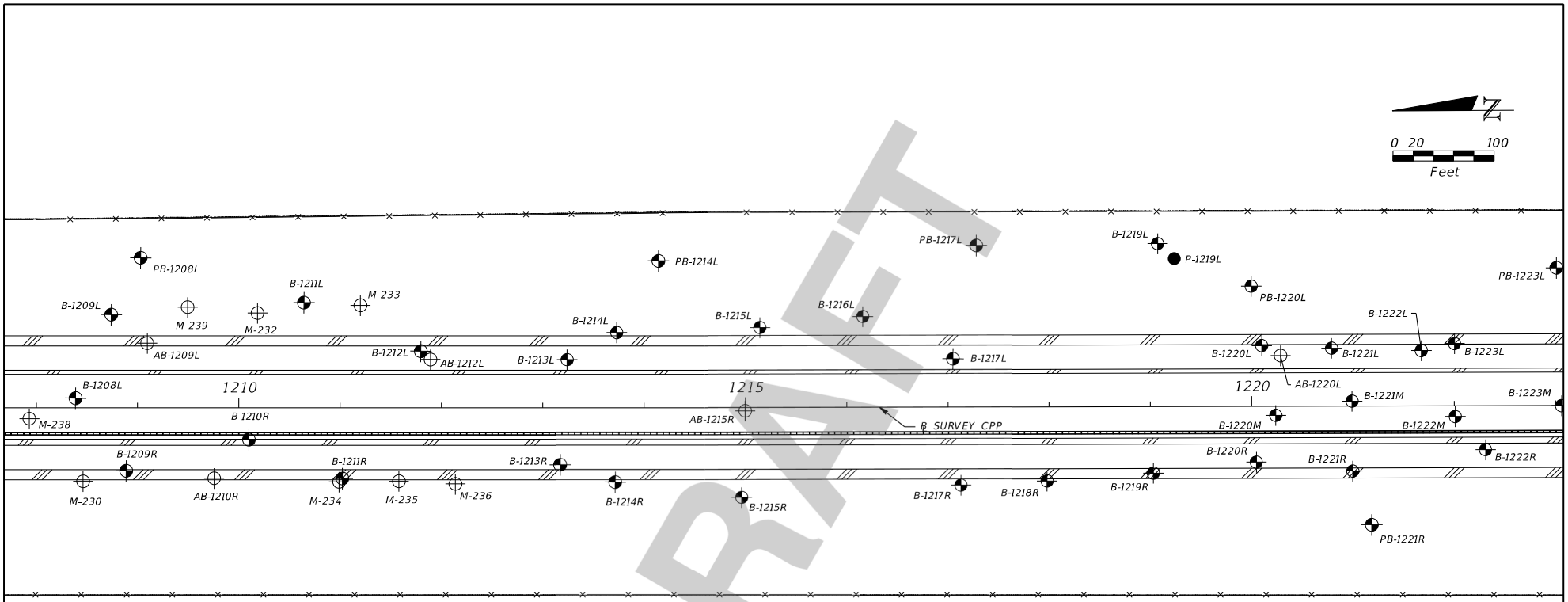
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

BORING LOCATION PLAN (14)

SHEET NO.

bgarcia 11/21/2019 6:56:36 PM J:\6511\2017 Files\6511-17-181 CPP-1\-001_Design\Microstation\rdgeo14.dgn



LEGEND

- APPROXIMATE SPT BORING LOCATION
- APPROXIMATE AUGER BORING LOCATION
- APPROXIMATE PIEZOMETER LOCATION

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

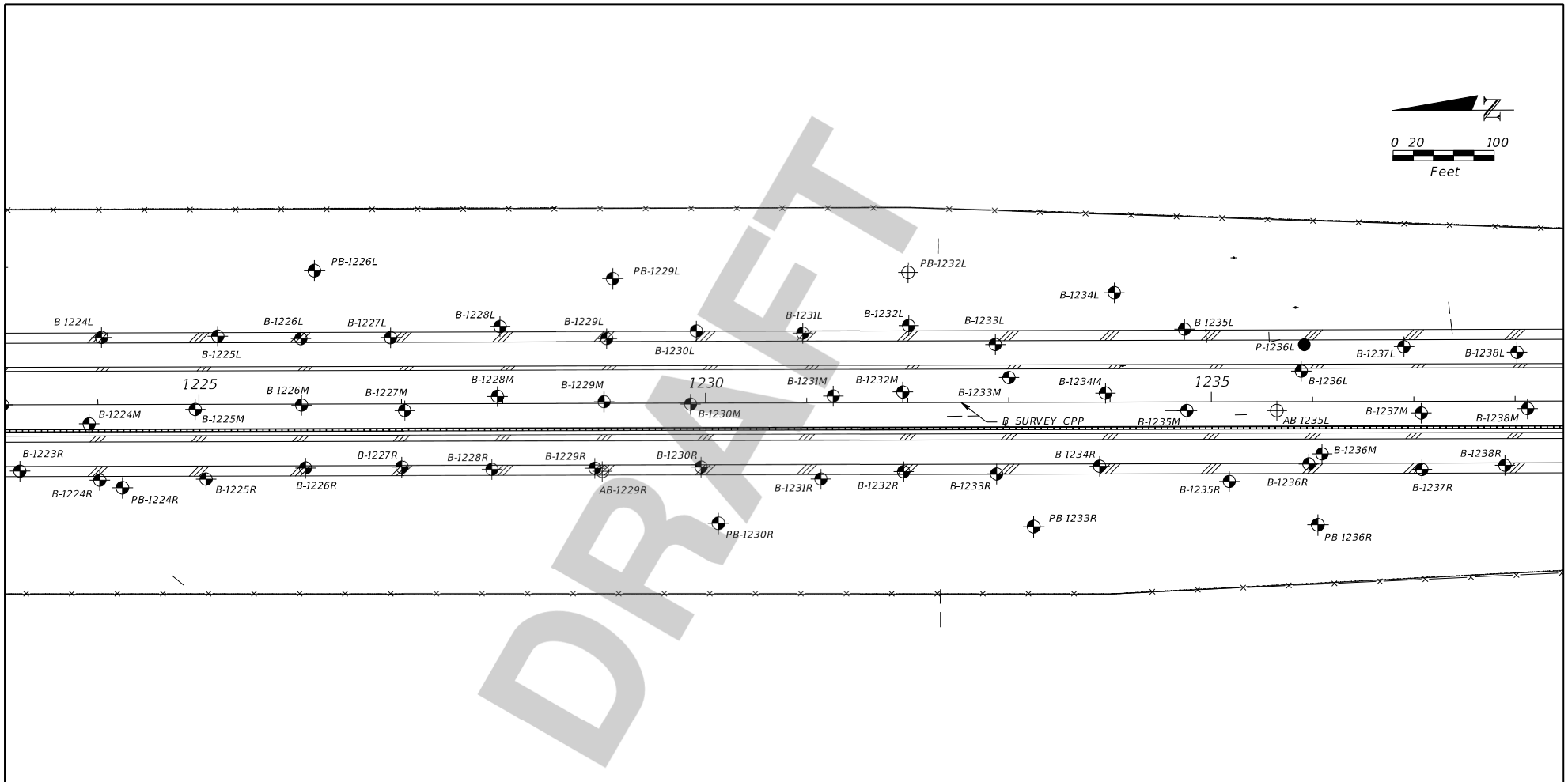
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

BORING LOCATION PLAN (15)

SHEET NO.

bgarcia 11/21/2019 6:56:37 PM J:\6511\2017 Files\6511-17-181 CPP-1\-001_Design\Microstation\rdgeo15.dgn



LEGEND

- APPROXIMATE SPT BORING LOCATION
- APPROXIMATE AUGER BORING LOCATION
- APPROXIMATE PIEZOMETER LOCATION

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

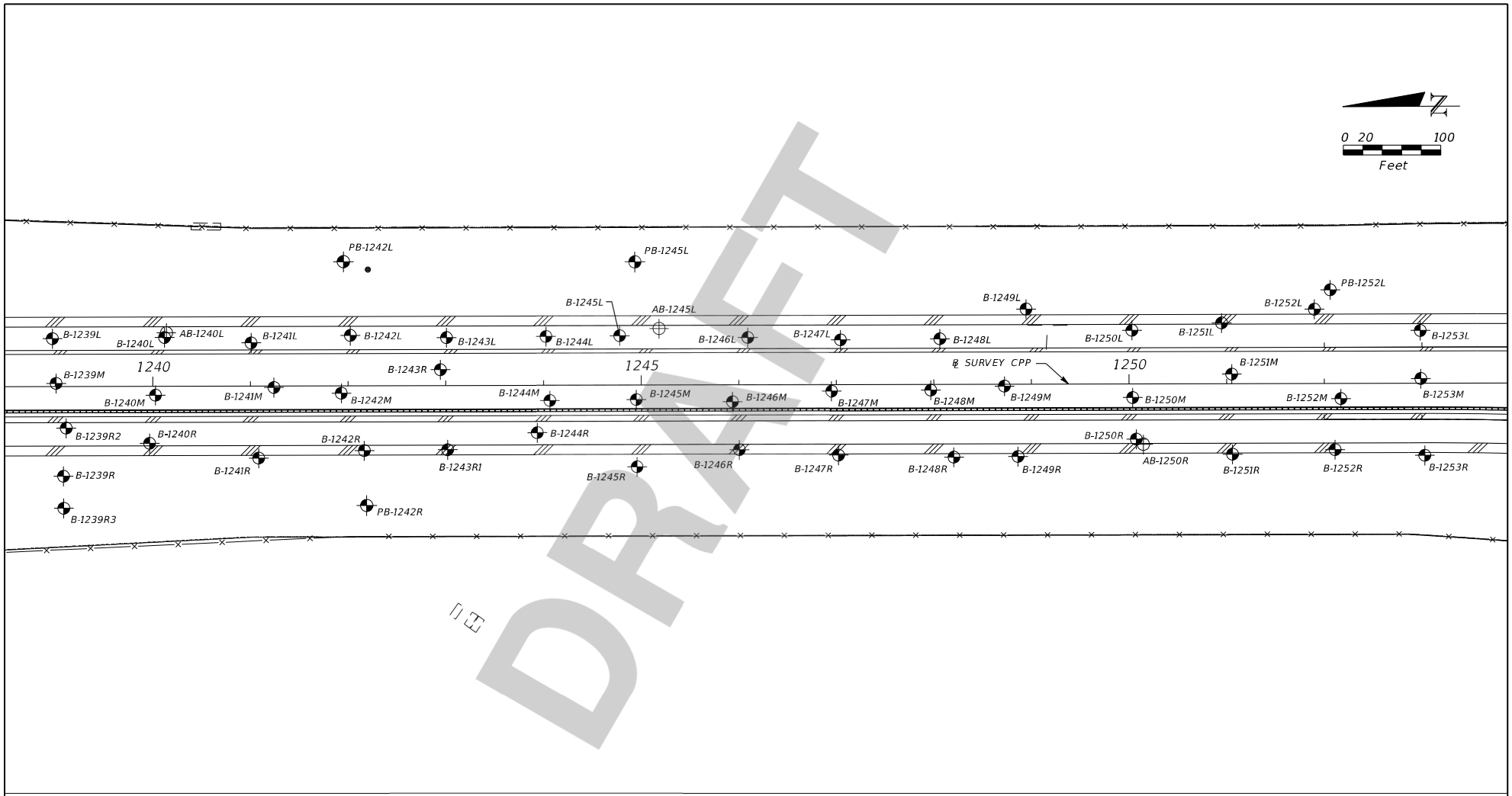
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

BORING LOCATION PLAN (16)

SHEET NO.

bgarcia 11/21/2019 6:56:39 PM J:\6511\2017 Files\6511-17-181 CPP-1\-001_Design\Microstation\rdgeo16.dgn



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

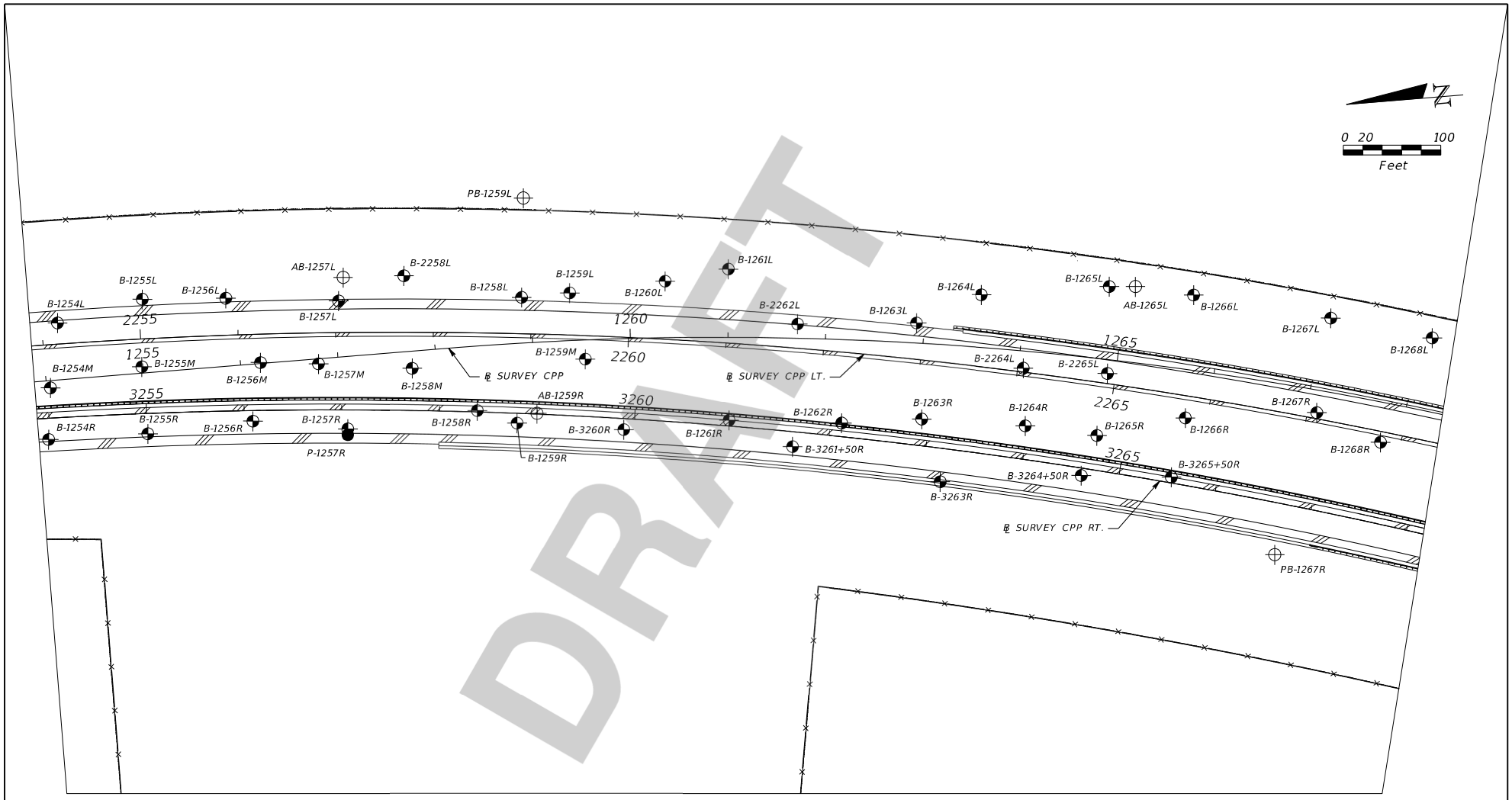
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

BORING LOCATION PLAN (17)

SHEET NO.

bgarcia 11/21/2019 6:56:52 PM J:\6511\2017 Files\6511-17-181 CPP-I\-001_Design\Microstation\rdgeo17.dgn



LEGEND

- APPROXIMATE SPT BORING LOCATION
- APPROXIMATE AUGER BORING LOCATION
- APPROXIMATE PIEZOMETER LOCATION

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

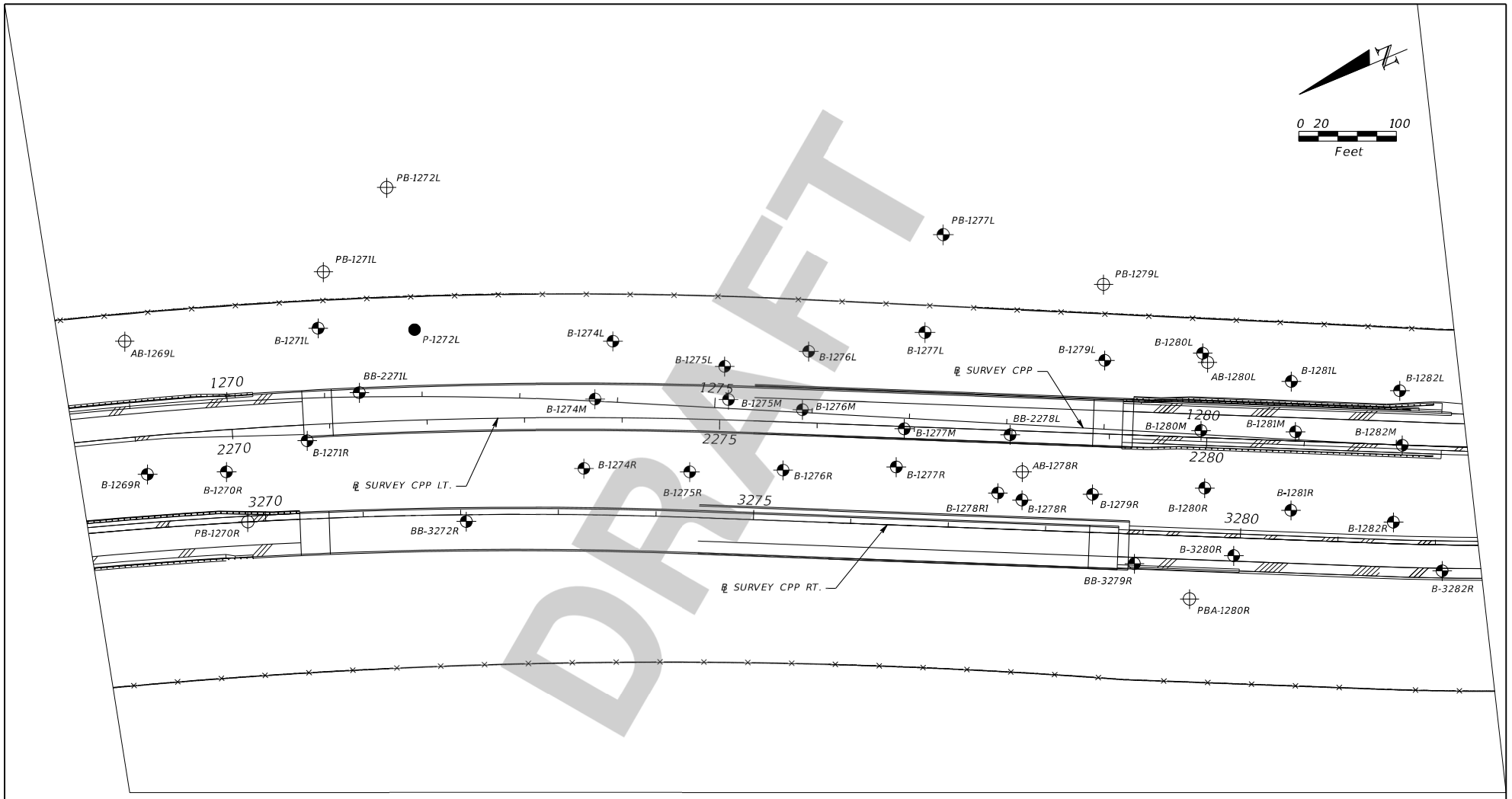
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

BORING LOCATION PLAN (18)

SHEET NO.

bgarcia 11/21/2019 6:56:53 PM J:\6511\2017 Files\6511-17-181 CPP-I\-001_Design\Microstation\rdgeo18.dgn



DRAFT

LEGEND

- APPROXIMATE SPT BORING LOCATION
- APPROXIMATE AUGER BORING LOCATION
- APPROXIMATE PIEZOMETER LOCATION

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

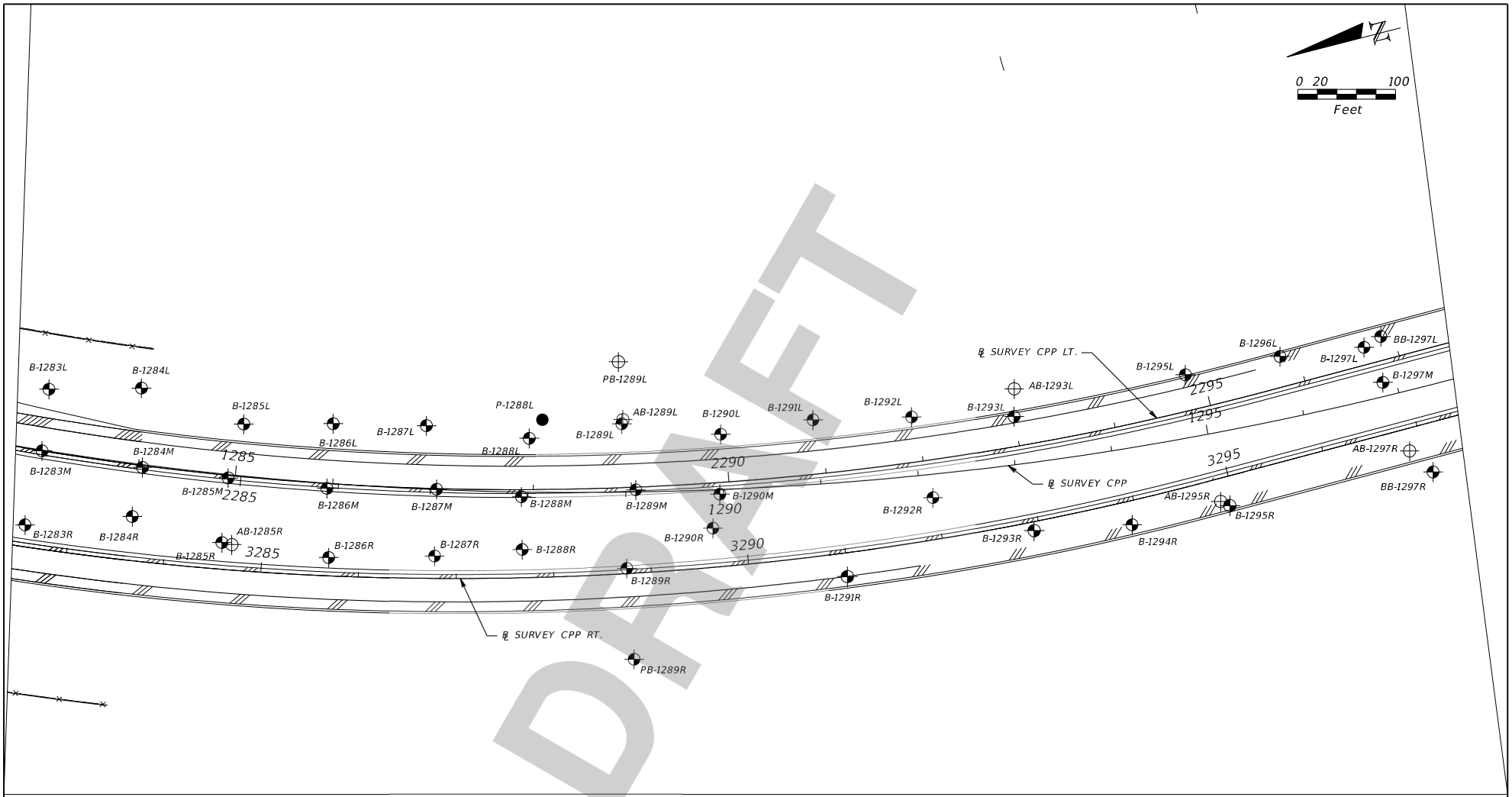
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

BORING LOCATION PLAN (19)

SHEET NO.

bgarcia 11/21/2019 6:56:55 PM J:\6511\2017 Files\6511-17-181 CPP-I\-001_Design\Microstation\rdgeo19.dgn



LEGEND

- APPROXIMATE SPT BORING LOCATION
- APPROXIMATE AUGER BORING LOCATION
- APPROXIMATE PIEZOMETER LOCATION

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

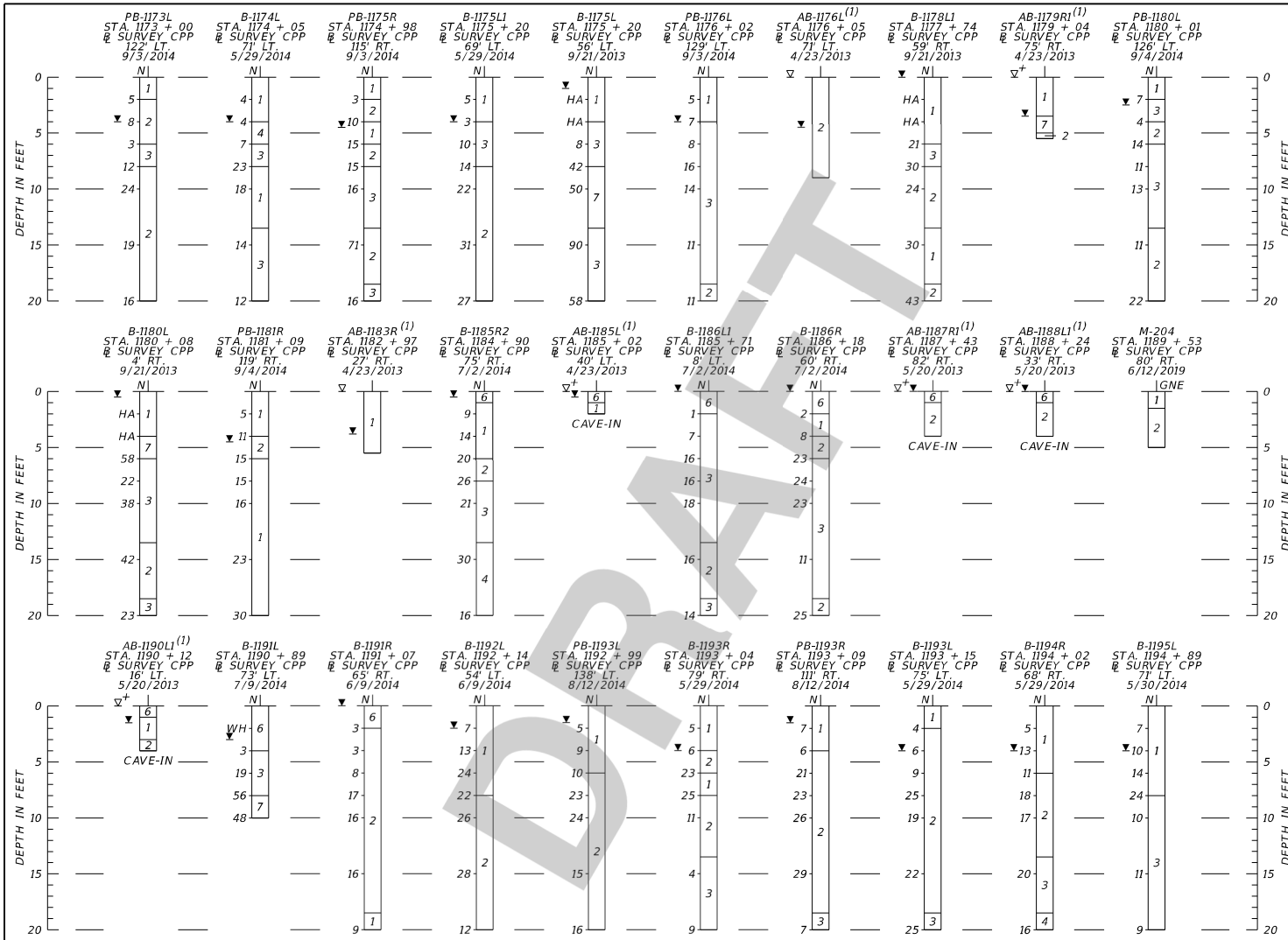
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

BORING LOCATION PLAN (20)

SHEET NO.

bgarcia 11/21/2019 6:56:56 PM J:\6511\2017 Files\6511-17-181 CPP-1\-001_Design\Microstation\rdgeo20.dgn



LEGEND

1. LIGHT GRAY TO GRAY TO PALE BROWN TO DARK BROWN SAND TO SAND WITH SILT (A-3/A-2-4)
2. LIGHT GRAY TO GRAY TO BROWN SILTY SAND (A-2-4)
3. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND (A-2-6/A-2-7)
4. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-4/A-6/A-7-5/A-7-6)
5. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-7-5/A-7-6/A-2-7)
6. DARK GRAY TO DARK GRAYISH BROWN ORGANIC SOILS TO MUCK (A-8)
7. DARK REDDISH BROWN TO BROWN CEMENTED SAND TO SILTY SAND (HARDPAN) (A-3/A-2-4)
8. LIMESTONE
9. LIGHT GRAY TO PALE BROWN SAND TO SAND WITH SILT, TRACE PHOSPHATE (SAND AND TAILING SAND) (A-3)
10. LIGHT GRAY TO DARK BROWN SAND WITH SILT TO SILTY SAND (DISTURBED) (A-2-4)
11. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND TO SILT TO CLAY (DISTURBED) (A-2-6/A-4/A-6/A-7-5/A-7-6/A-2-7)
12. SANDY CLAY INCLUDING WASTE PHOSPHATIC CLAY (SLIME) (A-7-5/A-7-6)
13. DARK BROWN TO BLACK ORGANIC SOILS TO MUCK/PEAT (DISTURBED) ORGANIC SOILS (A-8)
14. LIGHT GRAY TO DARK BROWN SILTY SAND TO SILTY-CLAYEY SAND (DISTURBED) (A-2-4)

W	WATER
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	FELL UNDER WEIGHT OF ROD AND HAMMER
WR	FELL UNDER WEIGHT OF ROD
▼	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
▽	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
▽+	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE AT OR ABOVE GROUND SURFACE
GNE	GROUNDWATER NOT ENCOUNTERED
GNA	GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID.
100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
| |	CASING
T	BORING TRUNCATED FOR ROADWAY SOIL PROFILE SHEETS
CAVE-IN	BORING TERMINATED DUE TO GROUNDWATER TABLE
REFUSAL	BORING TERMINATED DUE TO REFUSAL
NOTE:	THE BORINGS DENOTED WITH A "(1)" WERE PROVIDED BY THE PROJECT SURVEYOR
℄ SURVEY CPP	BASELINE SURVEY OF CENTRAL POLK PARKWAY

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	16 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

MAINLINE

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

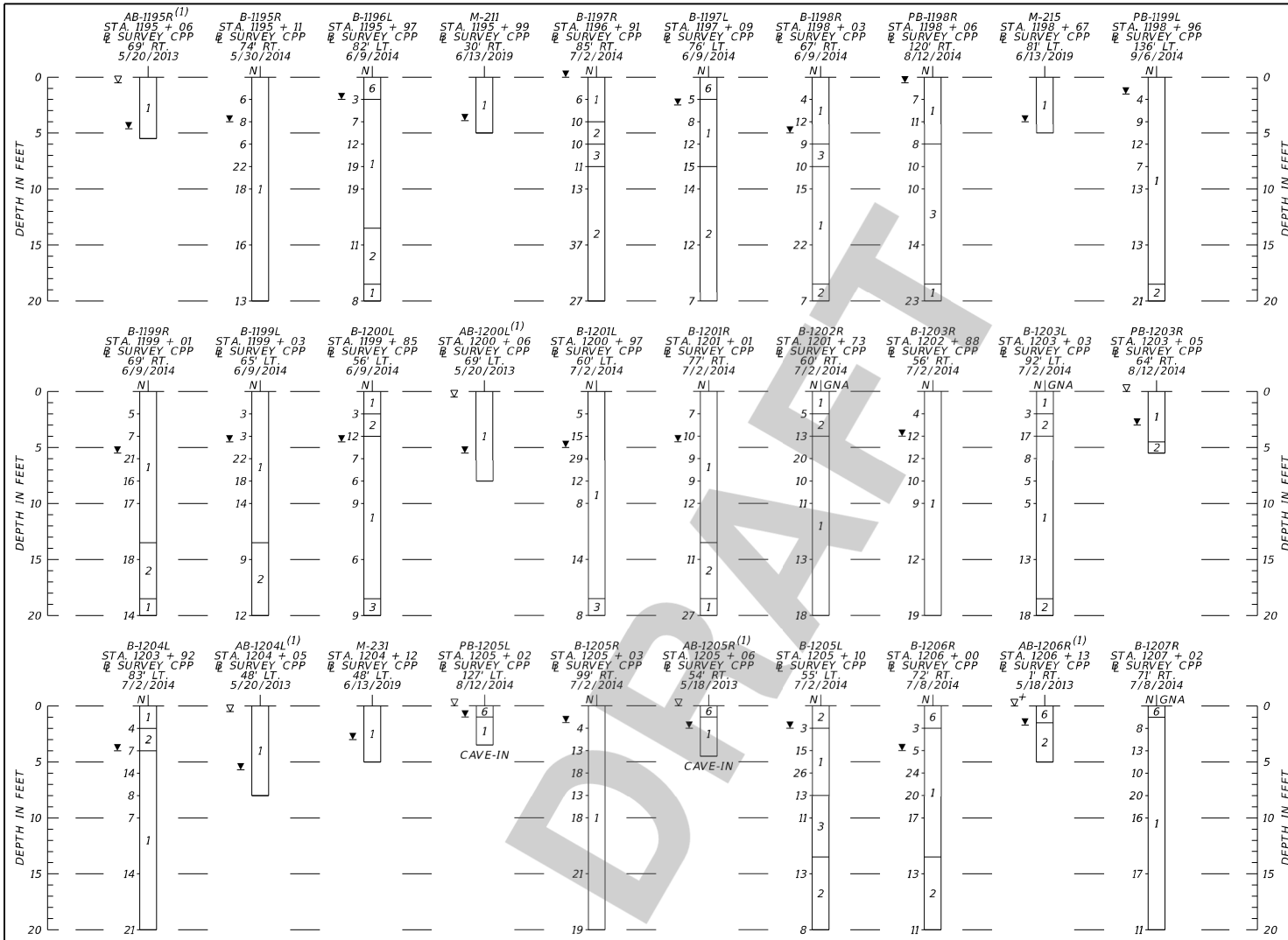
MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

ROADWAY SOIL PROFILES (33)

SHEET NO.



LEGEND

1. LIGHT GRAY TO GRAY TO PALE BROWN TO DARK BROWN SAND TO SAND WITH SILT (A-3/A-2-4)
2. LIGHT GRAY TO GRAY TO BROWN SILTY SAND (A-2-4)
3. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND (A-2-6/A-2-7)
4. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-4/A-6/A-7-5/A-7-6)
5. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-7-5/A-7-6/A-2-7)
6. DARK GRAY TO DARK GRAYISH BROWN ORGANIC SOILS TO MUCK (A-8)
7. DARK REDDISH BROWN TO BROWN CEMENTED SAND TO SILTY SAND (HARDPAN) (A-3/A-2-4)
8. LIMESTONE
9. LIGHT GRAY TO PALE BROWN SAND TO SAND WITH SILT, TRACE PHOSPHATE (SAND AND TAILING SAND) (A-3)
10. LIGHT GRAY TO DARK BROWN SAND WITH SILT TO SILTY SAND (DISTURBED) (A-2-4)
11. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND TO SILT TO CLAY (DISTURBED) (A-2-6/A-4/A-6/A-7-5/A-7-6/A-2-7)
12. SANDY CLAY INCLUDING WASTE PHOSPHATIC CLAY (SLIME) (A-7-5/A-7-6)
13. DARK BROWN TO BLACK ORGANIC SOILS TO MUCK/PEAT (DISTURBED) ORGANIC SOILS (A-8)
14. LIGHT GRAY TO DARK BROWN SILTY SAND TO SILTY-CLAYEY SAND (DISTURBED) (A-2-4)

W	WATER
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	FELL UNDER WEIGHT OF ROD AND HAMMER
WR	FELL UNDER WEIGHT OF ROD
▼	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
▽	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
▽+	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE AT OR ABOVE GROUND SURFACE
GNE	GROUNDWATER NOT ENCOUNTERED
GNA	GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID.
◁ 100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
| |	CASING
T	BORING TRUNCATED FOR ROADWAY SOIL PROFILE SHEETS
CAVE-IN	BORING TERMINATED DUE TO GROUNDWATER TABLE
REFUSAL	BORING TERMINATED DUE TO REFUSAL
NOTE:	THE BORINGS DENOTED WITH A "(1)" WERE PROVIDED BY THE PROJECT SURVEYOR
℄ SURVEY CPP	BASELINE SURVEY OF CENTRAL POLK PARKWAY

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	16 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

MAINLINE

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

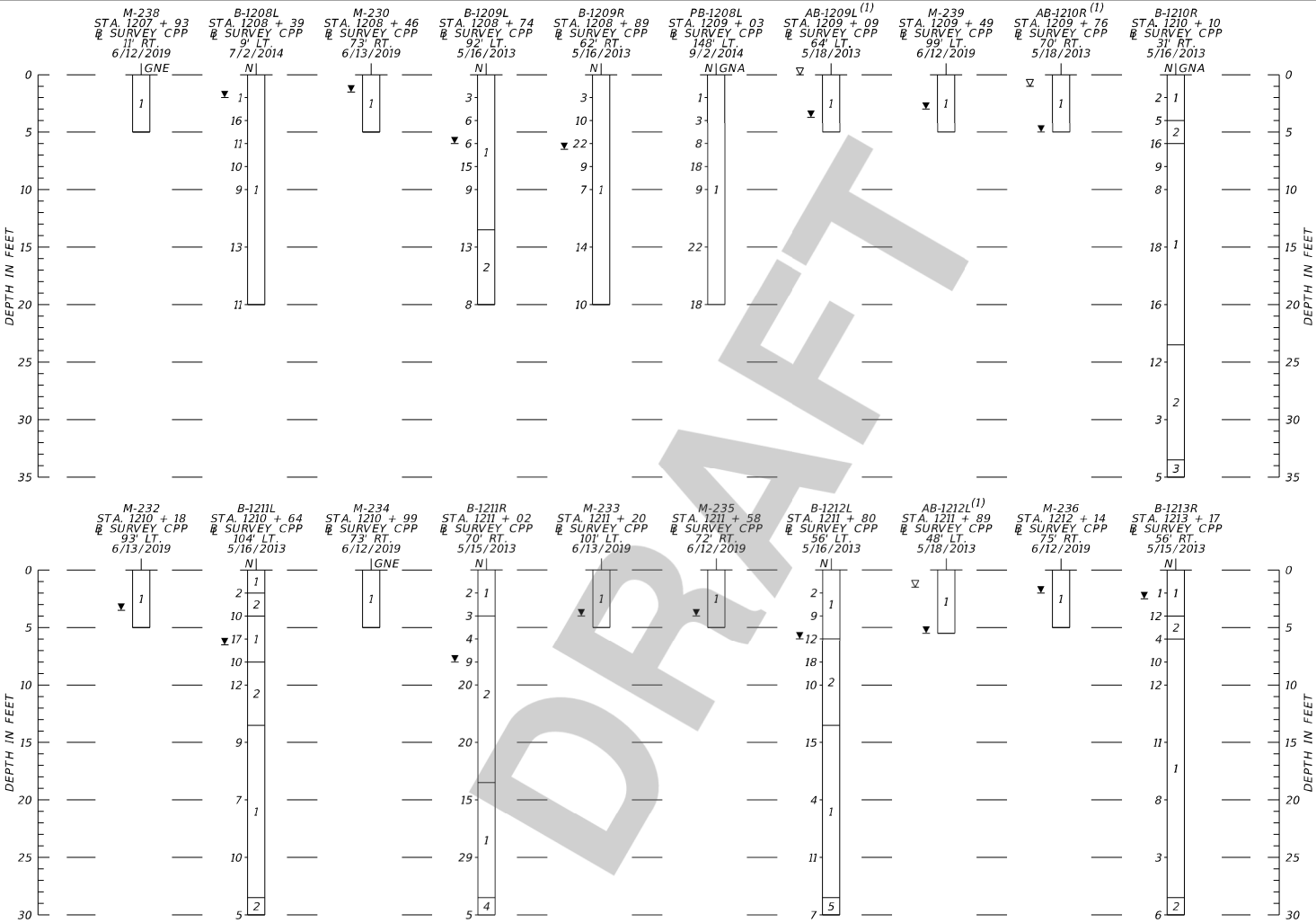
MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

ROADWAY SOIL PROFILES (34)

SHEET NO.



LEGEND

1. LIGHT GRAY TO GRAY TO PALE BROWN TO DARK BROWN SAND TO SAND WITH SILT (A-3/A-2-4)
2. LIGHT GRAY TO GRAY TO BROWN SILTY SAND (A-2-4)
3. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND (A-2-6/A-2-7)
4. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-4/A-6/A-7-5/A-7-6)
5. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-7-5/A-7-6/A-2-7)
6. DARK GRAY TO DARK GRAYISH BROWN ORGANIC SOILS TO MUCK (A-8)
7. DARK REDDISH BROWN TO BROWN CEMENTED SAND TO SILTY SAND (HARDPAN) (A-3/A-2-4)
8. LIMESTONE
9. LIGHT GRAY TO PALE BROWN SAND TO SAND WITH SILT, TRACE PHOSPHATE (SAND AND TAILING SAND) (A-3)
10. LIGHT GRAY TO DARK BROWN SAND WITH SILT TO SILTY SAND (DISTURBED) (A-2-4)
11. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND TO SILT TO CLAY (DISTURBED) (A-2-6/A-4/A-6/A-7-5/A-7-6/A-2-7)
12. SANDY CLAY INCLUDING WASTE PHOSPHATIC CLAY (SLIME) (A-7-5/A-7-6)
13. DARK BROWN TO BLACK ORGANIC SOILS TO MUCK/PEAT (DISTURBED) ORGANIC SOILS (A-8)
14. LIGHT GRAY TO DARK BROWN SILTY SAND TO SILTY-CLAYEY SAND (DISTURBED) (A-2-4)

W WATER

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

N NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).

50/4 NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION

HA HAND AUGERED TO VERIFY UTILITY CLEARANCE

WH FELL UNDER WEIGHT OF ROD AND HAMMER

WR FELL UNDER WEIGHT OF ROD

▼ GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS

▽ ESTIMATED SEASONAL HIGH GROUNDWATER TABLE

▽+ ESTIMATED SEASONAL HIGH GROUNDWATER TABLE AT OR ABOVE GROUND SURFACE

GNE GROUNDWATER NOT ENCOUNTERED

GNA GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID.

100 LOSS OF CIRCULATION OF DRILLING FLUID (%)

CASING

T BORING TRUNCATED FOR ROADWAY SOIL PROFILE SHEETS

CAVE-IN BORING TERMINATED DUE TO GROUNDWATER TABLE

REFUSAL BORING TERMINATED DUE TO REFUSAL

NOTE: THE BORINGS DENOTED WITH A "(1)" WERE PROVIDED BY THE PROJECT SURVEYOR

℄ SURVEY CPP BASELINE SURVEY OF CENTRAL POLK PARKWAY

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	16 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

MAINLINE

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

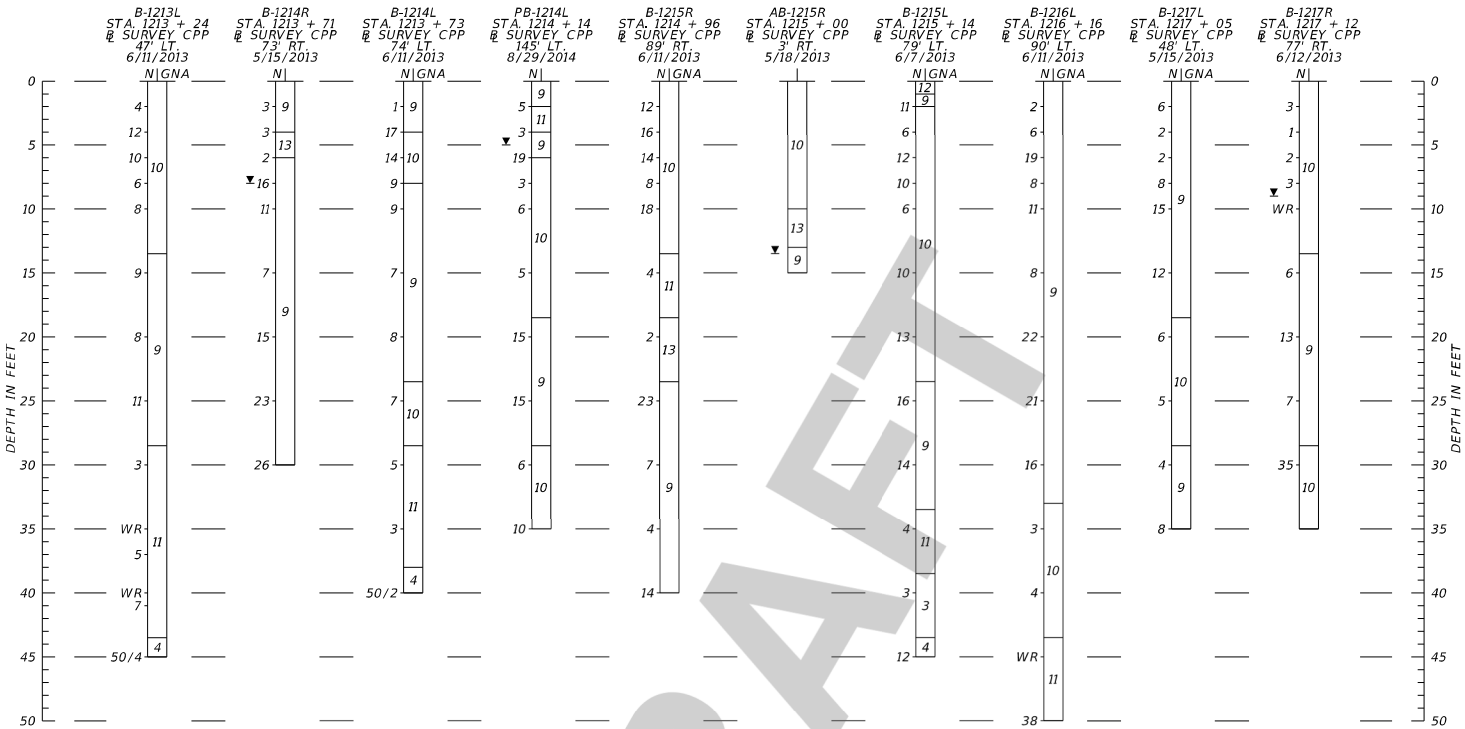
MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

ROADWAY SOIL PROFILES (35)

SHEET NO.



LEGEND

1. LIGHT GRAY TO GRAY TO PALE BROWN TO DARK BROWN SAND TO SAND WITH SILT (A-3/A-2-4)
2. LIGHT GRAY TO GRAY TO BROWN SILTY SAND (A-2-4)
3. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND (A-2-6/A-2-7)
4. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-4/A-6/A-7-5/A-7-6)
5. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-7-5/A-7-6/A-2-7)
6. DARK GRAY TO DARK GRAYISH BROWN ORGANIC SOILS TO MUCK (A-8)
7. DARK REDDISH BROWN TO BROWN CEMENTED SAND TO SILTY SAND (HARDPAN) (A-3/A-2-4)
8. LIMESTONE
9. LIGHT GRAY TO PALE BROWN SAND TO SAND WITH SILT, TRACE PHOSPHATE (SAND AND TAILING SAND) (A-3)
10. LIGHT GRAY TO DARK BROWN SAND WITH SILT TO SILTY SAND (DISTURBED) (A-2-4)
11. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND TO SILT TO CLAY (DISTURBED) (A-2-6/A-4/A-6/A-7-5/A-7-6/A-2-7)
12. SANDY CLAY INCLUDING WASTE PHOSPHATIC CLAY (SLIME) (A-7-5/A-7-6)
13. DARK BROWN TO BLACK ORGANIC SOILS TO MUCK/PEAT (DISTURBED) ORGANIC SOILS (A-8)
14. LIGHT GRAY TO DARK BROWN SILTY SAND TO SILTY-CLAYEY SAND (DISTURBED) (A-2-4)

W	WATER
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	FELL UNDER WEIGHT OF ROD AND HAMMER
WR	FELL UNDER WEIGHT OF ROD
▼	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
▽	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
$▽^{+}$	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE AT OR ABOVE GROUND SURFACE
GNE	GROUNDWATER NOT ENCOUNTERED
GNA	GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID.
100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
| |	CASING
T	BORING TRUNCATED FOR ROADWAY SOIL PROFILE SHEETS
CAVE-IN	BORING TERMINATED DUE TO GROUNDWATER TABLE
REFUSAL	BORING TERMINATED DUE TO REFUSAL
NOTE:	THE BORINGS DENOTED WITH A "(1)" WERE PROVIDED BY THE PROJECT SURVEYOR
℄ SURVEY CPP	BASELINE SURVEY OF CENTRAL POLK PARKWAY

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	16 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

MAINLINE

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

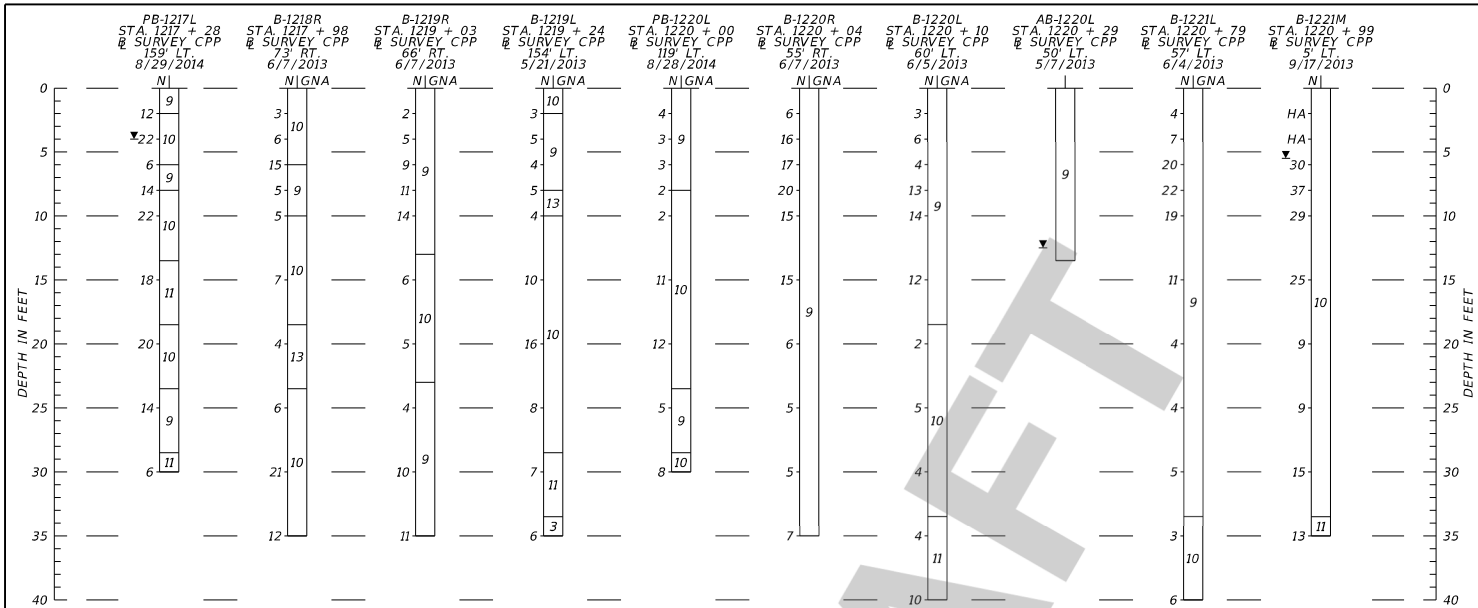
MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

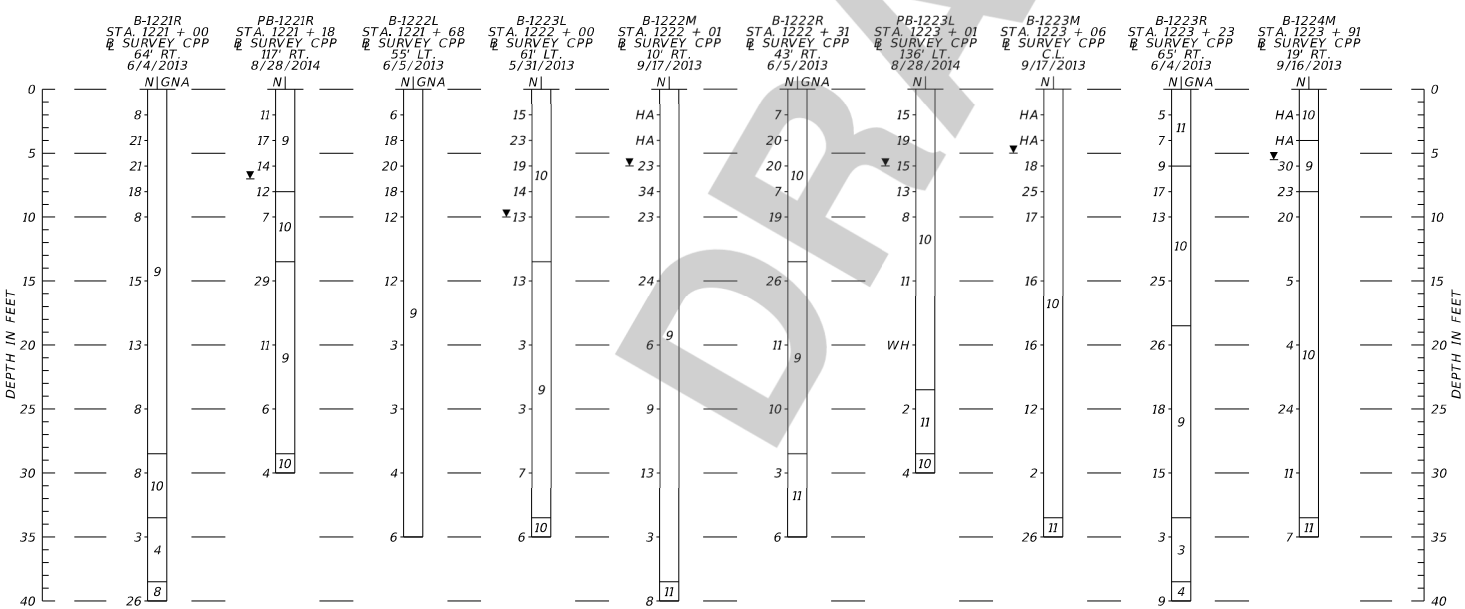
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

ROADWAY SOIL PROFILES (36)

SHEET NO.





LEGEND

1. LIGHT GRAY TO GRAY TO PALE BROWN TO DARK BROWN SAND TO SAND WITH SILT (A-3/A-2-4)
2. LIGHT GRAY TO GRAY TO BROWN SILTY SAND (A-2-4)
3. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND (A-2-6/A-2-7)
4. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-4/A-6/A-7-5/A-7-6)
5. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-7-5/A-7-6/A-2-7)
6. DARK GRAY TO DARK GRAYISH BROWN ORGANIC SOILS TO MUCK (A-8)
7. DARK REDDISH BROWN TO BROWN CEMENTED SAND TO SILTY SAND (HARDPAN) (A-3/A-2-4)
8. LIMESTONE
9. LIGHT GRAY TO PALE BROWN SAND TO SAND WITH SILT, TRACE PHOSPHATE (SAND AND TAILING SAND) (A-3)
10. LIGHT GRAY TO DARK BROWN SAND WITH SILT TO SILTY SAND (DISTURBED) (A-2-4)
11. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND TO SILT TO CLAY (DISTURBED) (A-2-6/A-4/A-6/A-7-5/A-7-6/A-2-7)
12. SANDY CLAY INCLUDING WASTE PHOSPHATIC CLAY (SLIME) (A-7-5/A-7-6)
13. DARK BROWN TO BLACK ORGANIC SOILS TO MUCK/PEAT (DISTURBED) ORGANIC SOILS (A-8)
14. LIGHT GRAY TO DARK BROWN SILTY SAND TO SILTY-CLAYEY SAND (DISTURBED) (A-2-4)

W WATER

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

N NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).

50/4 NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION

HA HAND AUGERED TO VERIFY UTILITY CLEARANCE

WH FELL UNDER WEIGHT OF ROD AND HAMMER

WR FELL UNDER WEIGHT OF ROD

▼ GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS

▽ ESTIMATED SEASONAL HIGH GROUNDWATER TABLE

▽+ ESTIMATED SEASONAL HIGH GROUNDWATER TABLE AT OR ABOVE GROUND SURFACE

GNE GROUNDWATER NOT ENCOUNTERED

GNA GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID.

100 LOSS OF CIRCULATION OF DRILLING FLUID (%)

| | CASING

T BORING TRUNCATED FOR ROADWAY SOIL PROFILE SHEETS

CAVE-IN BORING TERMINATED DUE TO GROUNDWATER TABLE

REFUSAL BORING TERMINATED DUE TO REFUSAL

NOTE: THE BORINGS DENOTED WITH A "(1)" WERE PROVIDED BY THE PROJECT SURVEYOR

℄ SURVEY CPP BASELINE SURVEY OF CENTRAL POLK PARKWAY

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	16 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

MAINLINE

REVISIONS

DATE	DESCRIPTION	DATE	DESCRIPTION

MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

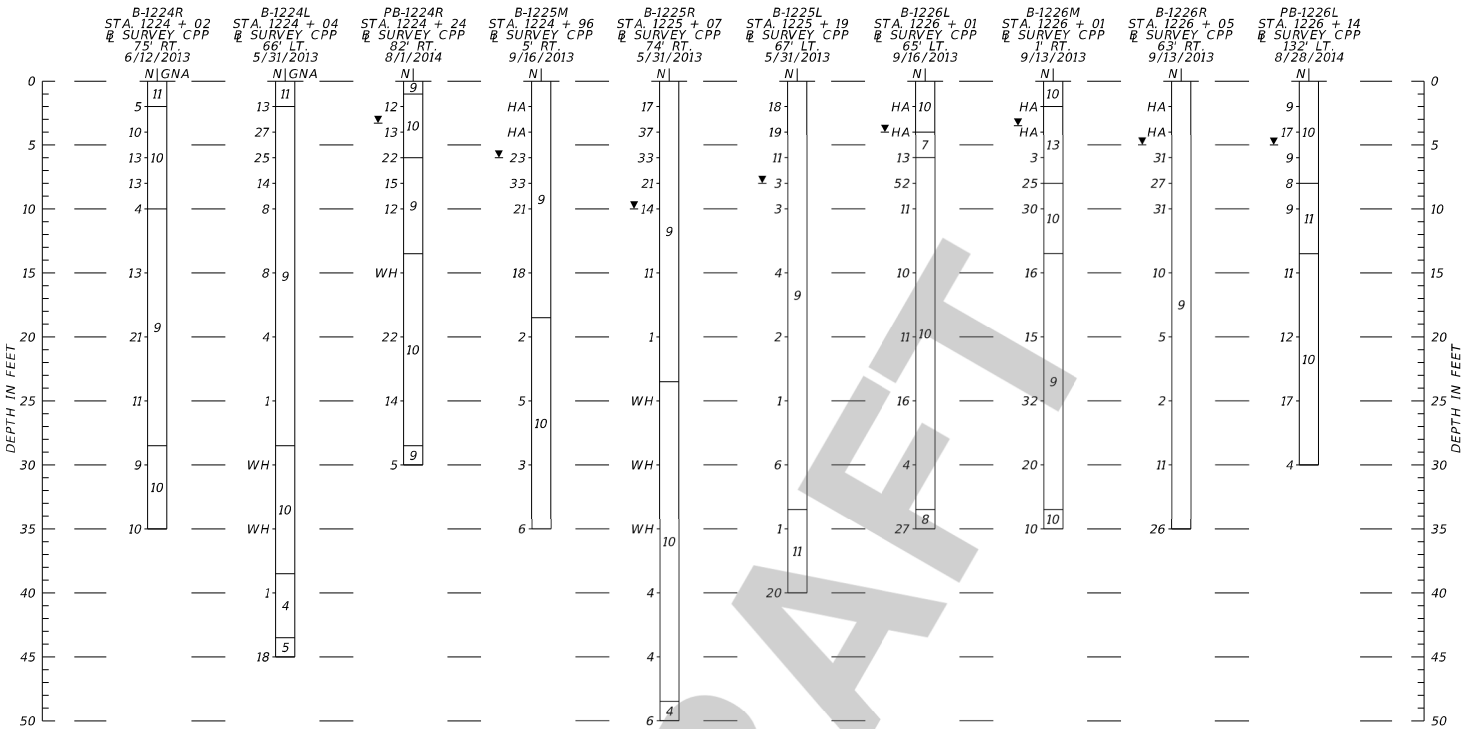
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

ROADWAY SOIL PROFILES (37)

SHEET NO.

bgarcia 11/21/2019 5:48:45 PM J:\6511\2017 Files\6511-17-181 CPP-I\-001_Design\Microstation\AB0RRDProf01.dgn



LEGEND

1. LIGHT GRAY TO GRAY TO PALE BROWN TO DARK BROWN SAND TO SAND WITH SILT (A-3/A-2-4)
2. LIGHT GRAY TO GRAY TO BROWN SILTY SAND (A-2-4)
3. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND (A-2-6/A-2-7)
4. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-4/A-6/A-7-5/A-7-6)
5. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-7-5/A-7-6/A-2-7)
6. DARK GRAY TO DARK GRAYISH BROWN ORGANIC SOILS TO MUCK (A-8)
7. DARK REDDISH BROWN TO BROWN CEMENTED SAND TO SILTY SAND (HARDPAN) (A-3/A-2-4)
8. LIMESTONE
9. LIGHT GRAY TO PALE BROWN SAND TO SAND WITH SILT, TRACE PHOSPHATE (SAND AND TAILING SAND) (A-3)
10. LIGHT GRAY TO DARK BROWN SAND WITH SILT TO SILTY SAND (DISTURBED) (A-2-4)
11. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND TO SILT TO CLAY (DISTURBED) (A-2-6/A-4/A-6/A-7-5/A-7-6/A-2-7)
12. SANDY CLAY INCLUDING WASTE PHOSPHATIC CLAY (SLIME) (A-7-5/A-7-6)
13. DARK BROWN TO BLACK ORGANIC SOILS TO MUCK/PEAT (DISTURBED) ORGANIC SOILS (A-8)
14. LIGHT GRAY TO DARK BROWN SILTY SAND TO SILTY-CLAYEY SAND (DISTURBED) (A-2-4)

W	WATER
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	FELL UNDER WEIGHT OF ROD AND HAMMER
WR	FELL UNDER WEIGHT OF ROD
▼	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
▽	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
▽+	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE AT OR ABOVE GROUND SURFACE
GNE	GROUNDWATER NOT ENCOUNTERED
GNA	GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID.
100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
| |	CASING
T	BORING TRUNCATED FOR ROADWAY SOIL PROFILE SHEETS
CAVE-IN	BORING TERMINATED DUE TO GROUNDWATER TABLE
REFUSAL	BORING TERMINATED DUE TO REFUSAL
NOTE:	THE BORINGS DENOTED WITH A "(1)" WERE PROVIDED BY THE PROJECT SURVEYOR
℄ SURVEY CPP	BASELINE SURVEY OF CENTRAL POLK PARKWAY

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	16 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

MAINLINE

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

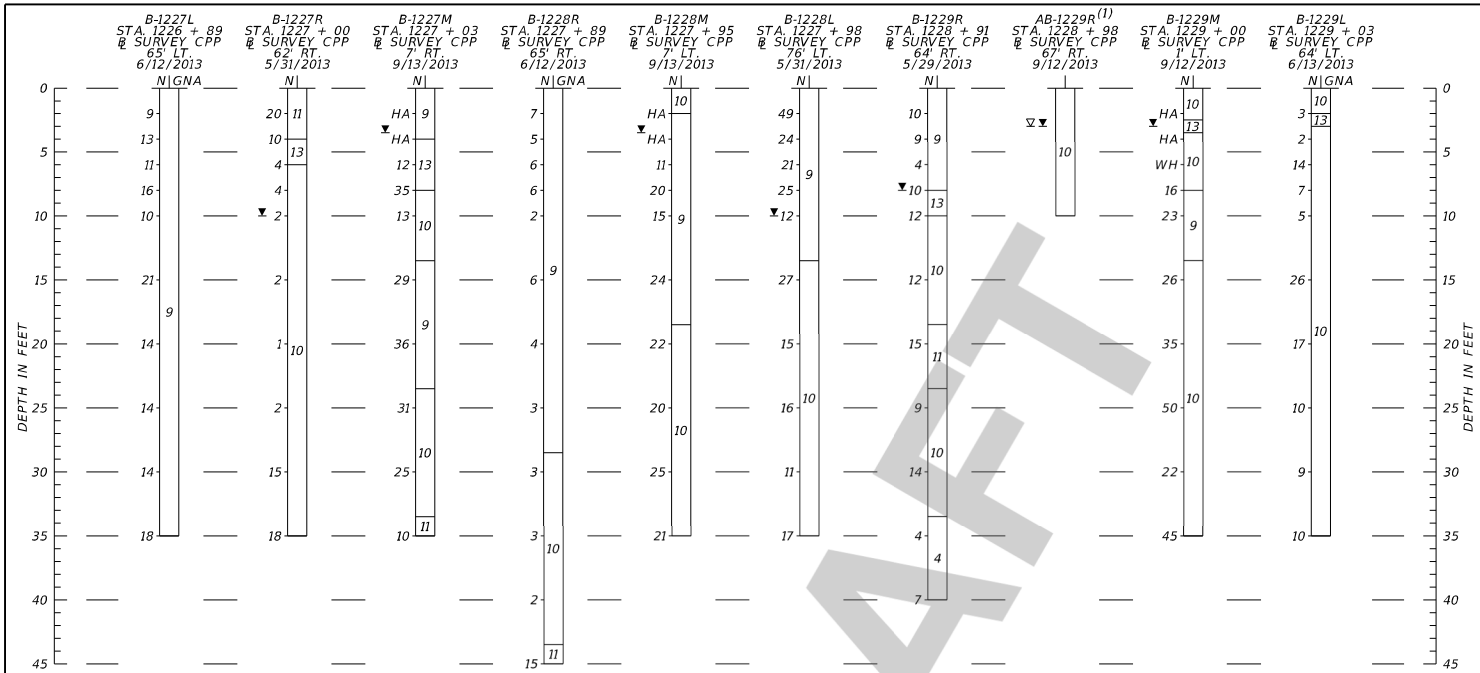
MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

ROADWAY SOIL PROFILES (38)

SHEET NO.



LEGEND

1. LIGHT GRAY TO GRAY TO PALE BROWN TO DARK BROWN SAND TO SAND WITH SILT (A-3/A-2-4)
2. LIGHT GRAY TO GRAY TO BROWN SILTY SAND (A-2-4)
3. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND (A-2-6/A-2-7)
4. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-4/A-6/A-7-5/A-7-6)
5. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-7-5/A-7-6/A-2-7)
6. DARK GRAY TO DARK GRAYISH BROWN ORGANIC SOILS TO MUCK (A-8)
7. DARK REDDISH BROWN TO BROWN CEMENTED SAND TO SILTY SAND (HARDPAN) (A-3/A-2-4)
8. LIMESTONE
9. LIGHT GRAY TO PALE BROWN SAND TO SAND WITH SILT, TRACE PHOSPHATE (SAND AND TAILING SAND) (A-3)
10. LIGHT GRAY TO DARK BROWN SAND WITH SILT TO SILTY SAND (DISTURBED) (A-2-4)
11. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND TO SILT TO CLAY (DISTURBED) (A-2-6/A-4/A-6/A-7-5/A-7-6/A-2-7)
12. SANDY CLAY INCLUDING WASTE PHOSPHATIC CLAY (SLIME) (A-7-5/A-7-6)
13. DARK BROWN TO BLACK ORGANIC SOILS TO MUCK/PEAT (DISTURBED) ORGANIC SOILS (A-8)
14. LIGHT GRAY TO DARK BROWN SILTY SAND TO SILTY-CLAYEY SAND (DISTURBED) (A-2-4)

W WATER

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

N NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).

50/4 NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION

HA HAND AUGERED TO VERIFY UTILITY CLEARANCE

WH FELL UNDER WEIGHT OF ROD AND HAMMER

WR FELL UNDER WEIGHT OF ROD

▼ GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS

▽ ESTIMATED SEASONAL HIGH GROUNDWATER TABLE

▽+ ESTIMATED SEASONAL HIGH GROUNDWATER TABLE AT OR ABOVE GROUND SURFACE

GNE GROUNDWATER NOT ENCOUNTERED

GNA GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID.

100 LOSS OF CIRCULATION OF DRILLING FLUID (%)

| | CASING

T BORING TRUNCATED FOR ROADWAY SOIL PROFILE SHEETS

CAVE-IN BORING TERMINATED DUE TO GROUNDWATER TABLE

REFUSAL BORING TERMINATED DUE TO REFUSAL

NOTE: THE BORINGS DENOTED WITH A "(1)" WERE PROVIDED BY THE PROJECT SURVEYOR

℄ SURVEY CPP BASELINE SURVEY OF CENTRAL POLK PARKWAY

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	16 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

MAINLINE

REVISIONS

DATE	DESCRIPTION	DATE	DESCRIPTION

MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

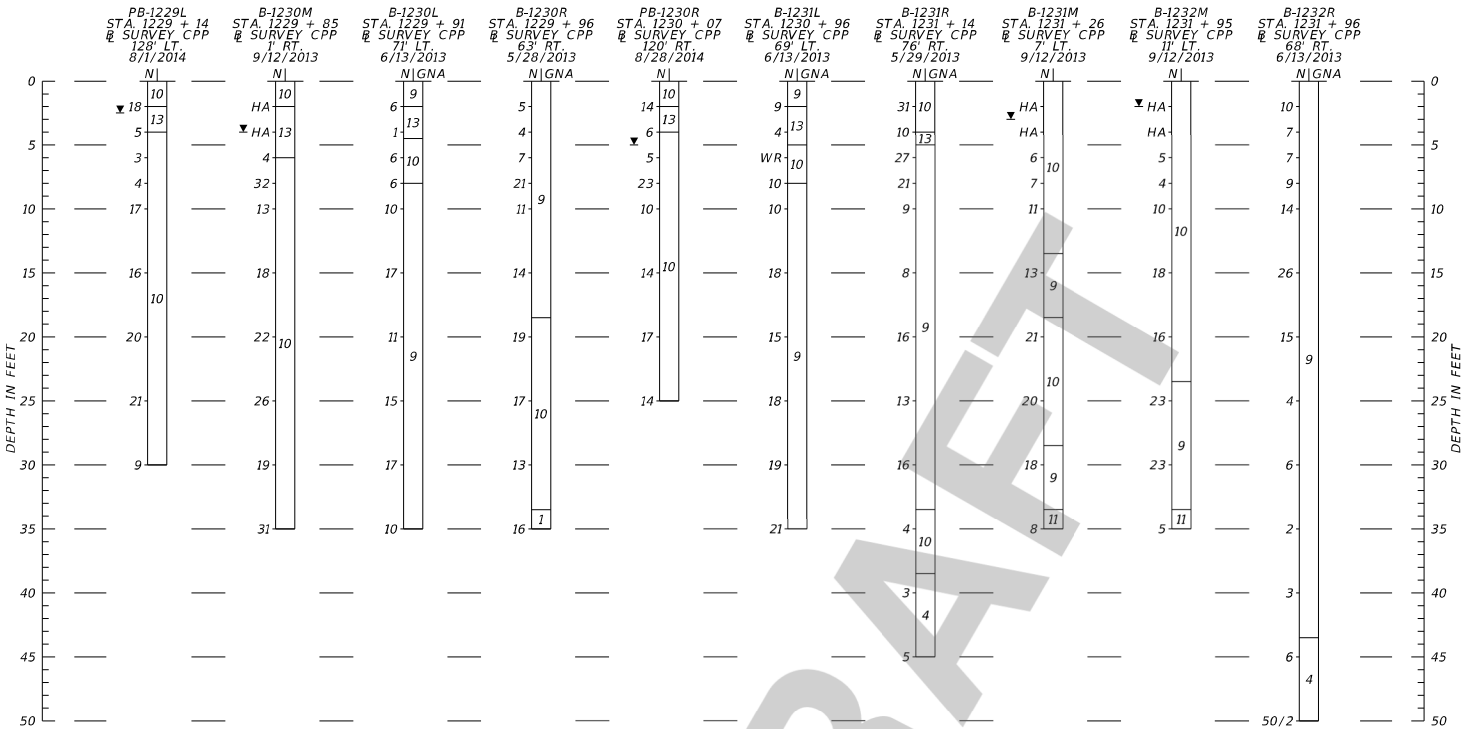
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

ROADWAY SOIL PROFILES (39)

SHEET NO.

bgarcia 11/21/2019 5:48:46 PM J:\6511\2017 Files\6511-17-181 CPP-1\-001_Design\Microstation\AB0RRDProf01.dgn



LEGEND

1. LIGHT GRAY TO GRAY TO PALE BROWN TO DARK BROWN SAND TO SAND WITH SILT (A-3/A-2-4)
2. LIGHT GRAY TO GRAY TO BROWN SILTY SAND (A-2-4)
3. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND (A-2-6/A-2-7)
4. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-4/A-6/A-7-5/A-7-6)
5. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-7-5/A-7-6/A-2-7)
6. DARK GRAY TO DARK GRAYISH BROWN ORGANIC SOILS TO MUCK (A-8)
7. DARK REDDISH BROWN TO BROWN CEMENTED SAND TO SILTY SAND (HARDPAN) (A-3/A-2-4)
8. LIMESTONE
9. LIGHT GRAY TO PALE BROWN SAND TO SAND WITH SILT, TRACE PHOSPHATE (SAND AND TAILING SAND) (A-3)
10. LIGHT GRAY TO DARK BROWN SAND WITH SILT TO SILTY SAND (DISTURBED) (A-2-4)
11. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND TO SILT TO CLAY (DISTURBED) (A-2-6/A-4/A-6/A-7-5/A-7-6/A-2-7)
12. SANDY CLAY INCLUDING WASTE PHOSPHATIC CLAY (SLIME) (A-7-5/A-7-6)
13. DARK BROWN TO BLACK ORGANIC SOILS TO MUCK/PEAT (DISTURBED) ORGANIC SOILS (A-8)
14. LIGHT GRAY TO DARK BROWN SILTY SAND TO SILTY-CLAYEY SAND (DISTURBED) (A-2-4)

W WATER

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

N NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).

50/4 NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION

HA HAND AUGERED TO VERIFY UTILITY CLEARANCE

WH FELL UNDER WEIGHT OF ROD AND HAMMER

WR FELL UNDER WEIGHT OF ROD

▼ GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS

▽ ESTIMATED SEASONAL HIGH GROUNDWATER TABLE

▽+ ESTIMATED SEASONAL HIGH GROUNDWATER TABLE AT OR ABOVE GROUND SURFACE

GNE GROUNDWATER NOT ENCOUNTERED

GNA GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID.

100 LOSS OF CIRCULATION OF DRILLING FLUID (%)

| | CASING

T BORING TRUNCATED FOR ROADWAY SOIL PROFILE SHEETS

CAVE-IN BORING TERMINATED DUE TO GROUNDWATER TABLE

REFUSAL BORING TERMINATED DUE TO REFUSAL

NOTE: THE BORINGS DENOTED WITH A "(1)" WERE PROVIDED BY THE PROJECT SURVEYOR

℄ SURVEY CPP BASELINE SURVEY OF CENTRAL POLK PARKWAY

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	16 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

MAINLINE

REVISIONS

DATE	DESCRIPTION	DATE	DESCRIPTION

MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

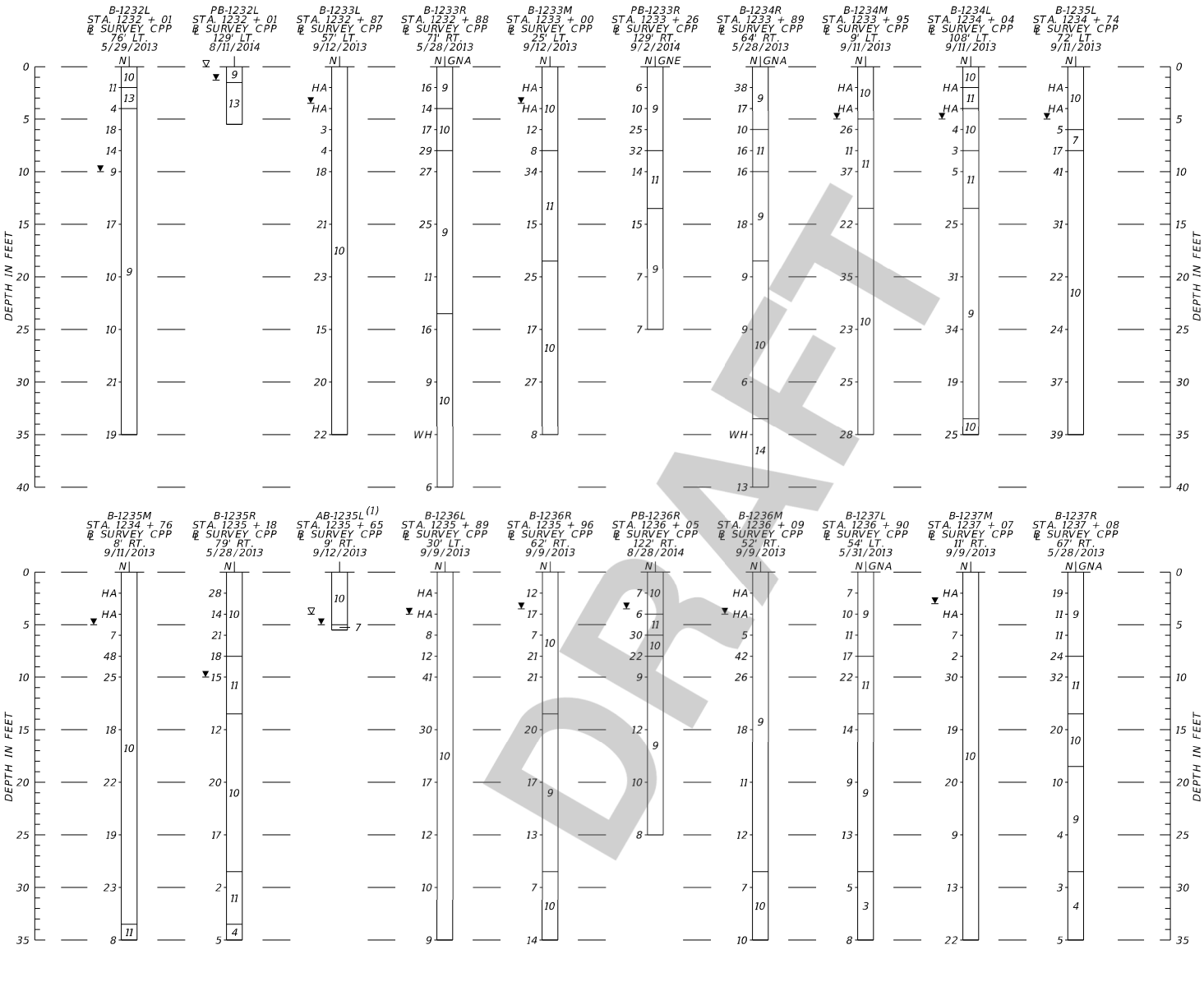
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

ROADWAY SOIL PROFILES (40)

SHEET NO.

bgarcia 11/21/2019 5:48:46 PM J:\6511\2017 Files\6511-17-181 CPP-1\-001_Design\Microstation\AB0RRDProf01.dgn



LEGEND

1. LIGHT GRAY TO GRAY TO PALE BROWN TO DARK BROWN SAND TO SAND WITH SILT (A-3/A-2-4)
2. LIGHT GRAY TO GRAY TO BROWN SILTY SAND (A-2-4)
3. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND (A-2-6/A-2-7)
4. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-4/A-6/A-7-5/A-7-6)
5. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-7-5/A-7-6/A-2-7)
6. DARK GRAY TO DARK GRAYISH BROWN ORGANIC SOILS TO MUCK (A-8)
7. DARK REDDISH BROWN TO BROWN CEMENTED SAND TO SILTY SAND (HARDPAN) (A-3/A-2-4)
8. LIMESTONE
9. LIGHT GRAY TO PALE BROWN SAND TO SAND WITH SILT, TRACE PHOSPHATE (SAND AND TAILING SAND) (A-3)
10. LIGHT GRAY TO DARK BROWN SAND WITH SILT TO SILTY SAND (DISTURBED) (A-2-4)
11. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND TO SILT TO CLAY (DISTURBED) (A-2-6/A-4/A-6/A-7-5/A-7-6/A-2-7)
12. SANDY CLAY INCLUDING WASTE PHOSPHATIC CLAY (SLIME) (A-7-5/A-7-6)
13. DARK BROWN TO BLACK ORGANIC SOILS TO MUCK/PEAT (DISTURBED) ORGANIC SOILS (A-8)
14. LIGHT GRAY TO DARK BROWN SILTY SAND TO SILTY-CLAYEY SAND (DISTURBED) (A-2-4)

W WATER

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

N NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).

50/4 NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION

HA HAND AUGERED TO VERIFY UTILITY CLEARANCE

WH FELL UNDER WEIGHT OF ROD AND HAMMER

WR FELL UNDER WEIGHT OF ROD

▼ GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS

▽ ESTIMATED SEASONAL HIGH GROUNDWATER TABLE

▽+ ESTIMATED SEASONAL HIGH GROUNDWATER TABLE AT OR ABOVE GROUND SURFACE

GNE GROUNDWATER NOT ENCOUNTERED

GNA GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID.

100 LOSS OF CIRCULATION OF DRILLING FLUID (%)

| | CASING

T BORING TRUNCATED FOR ROADWAY SOIL PROFILE SHEETS

CAVE-IN BORING TERMINATED DUE TO GROUNDWATER TABLE

REFUSAL BORING TERMINATED DUE TO REFUSAL

NOTE: THE BORINGS DENOTED WITH A "(1)" WERE PROVIDED BY THE PROJECT SURVEYOR

℄ SURVEY CPP BASELINE SURVEY OF CENTRAL POLK PARKWAY

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	16 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

MAINLINE

REVISIONS

DATE	DESCRIPTION	DATE	DESCRIPTION

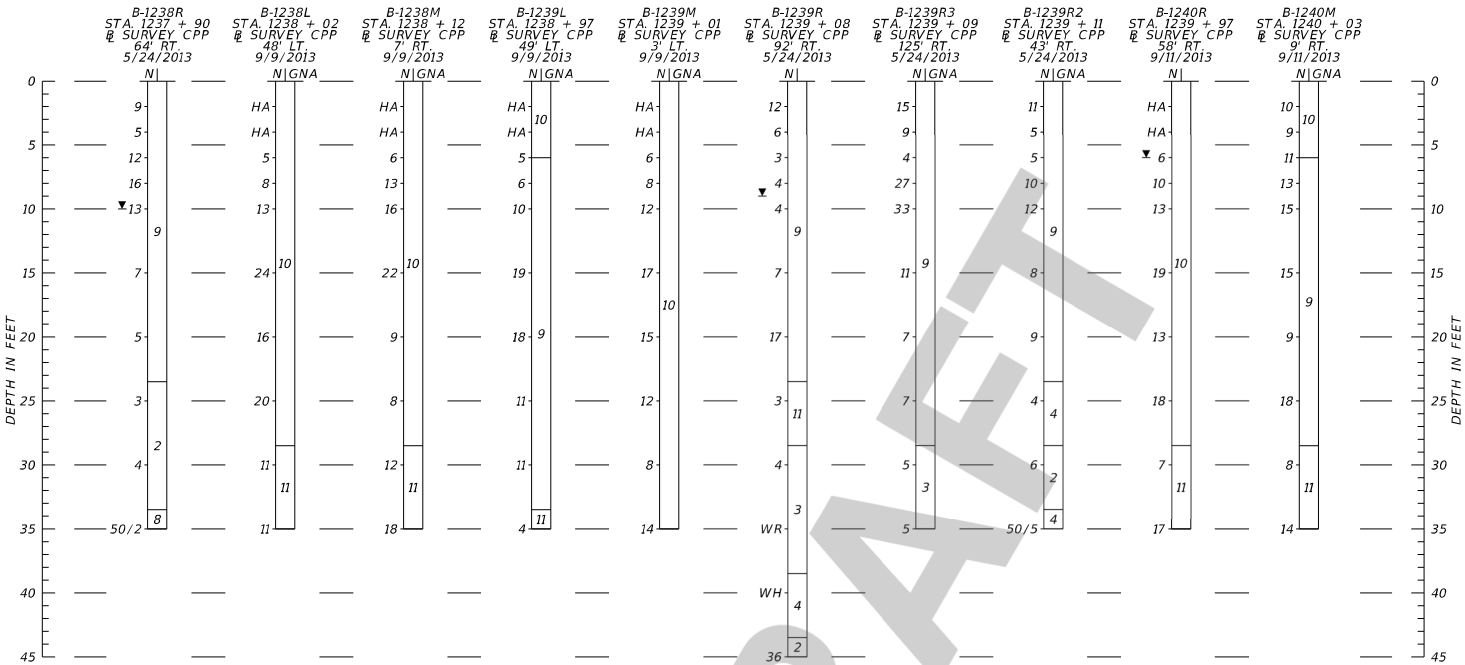
MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

ROADWAY SOIL PROFILES (41)

SHEET NO.



LEGEND

1. LIGHT GRAY TO GRAY TO PALE BROWN TO DARK BROWN SAND TO SAND WITH SILT (A-3/A-2-4)
2. LIGHT GRAY TO GRAY TO BROWN SILTY SAND (A-2-4)
3. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND (A-2-6/A-2-7)
4. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-4/A-6/A-7-5/A-7-6)
5. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-7-5/A-7-6/A-2-7)
6. DARK GRAY TO DARK GRAYISH BROWN ORGANIC SOILS TO MUCK (A-8)
7. DARK REDDISH BROWN TO BROWN CEMENTED SAND TO SILTY SAND (HARDPAN) (A-3/A-2-4)
8. LIMESTONE
9. LIGHT GRAY TO PALE BROWN SAND TO SAND WITH SILT, TRACE PHOSPHATE (SAND AND TAILING SAND) (A-3)
10. LIGHT GRAY TO DARK BROWN SAND WITH SILT TO SILTY SAND (DISTURBED) (A-2-4)
11. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND TO SILT TO CLAY (DISTURBED) (A-2-6/A-4/A-6/A-7-5/A-7-6/A-2-7)
12. SANDY CLAY INCLUDING WASTE PHOSPHATIC CLAY (SLIME) (A-7-5/A-7-6)
13. DARK BROWN TO BLACK ORGANIC SOILS TO MUCK/PEAT (DISTURBED) ORGANIC SOILS (A-8)
14. LIGHT GRAY TO DARK BROWN SILTY SAND TO SILTY-CLAYEY SAND (DISTURBED) (A-2-4)

W WATER

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

N NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).

50/4 NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION

HA HAND AUGERED TO VERIFY UTILITY CLEARANCE

WH FELL UNDER WEIGHT OF ROD AND HAMMER

WR FELL UNDER WEIGHT OF ROD

▼ GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS

▽ ESTIMATED SEASONAL HIGH GROUNDWATER TABLE

▽+ ESTIMATED SEASONAL HIGH GROUNDWATER TABLE AT OR ABOVE GROUND SURFACE

GNE GROUNDWATER NOT ENCOUNTERED

GNA GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID.

100 LOSS OF CIRCULATION OF DRILLING FLUID (%)

| | CASING

T BORING TRUNCATED FOR ROADWAY SOIL PROFILE SHEETS

CAVE-IN BORING TERMINATED DUE TO GROUNDWATER TABLE

REFUSAL BORING TERMINATED DUE TO REFUSAL

NOTE: THE BORINGS DENOTED WITH A "(1)" WERE PROVIDED BY THE PROJECT SURVEYOR

℄ SURVEY CPP BASELINE SURVEY OF CENTRAL POLK PARKWAY

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	16 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

MAINLINE

REVISIONS

DATE	DESCRIPTION	DATE	DESCRIPTION

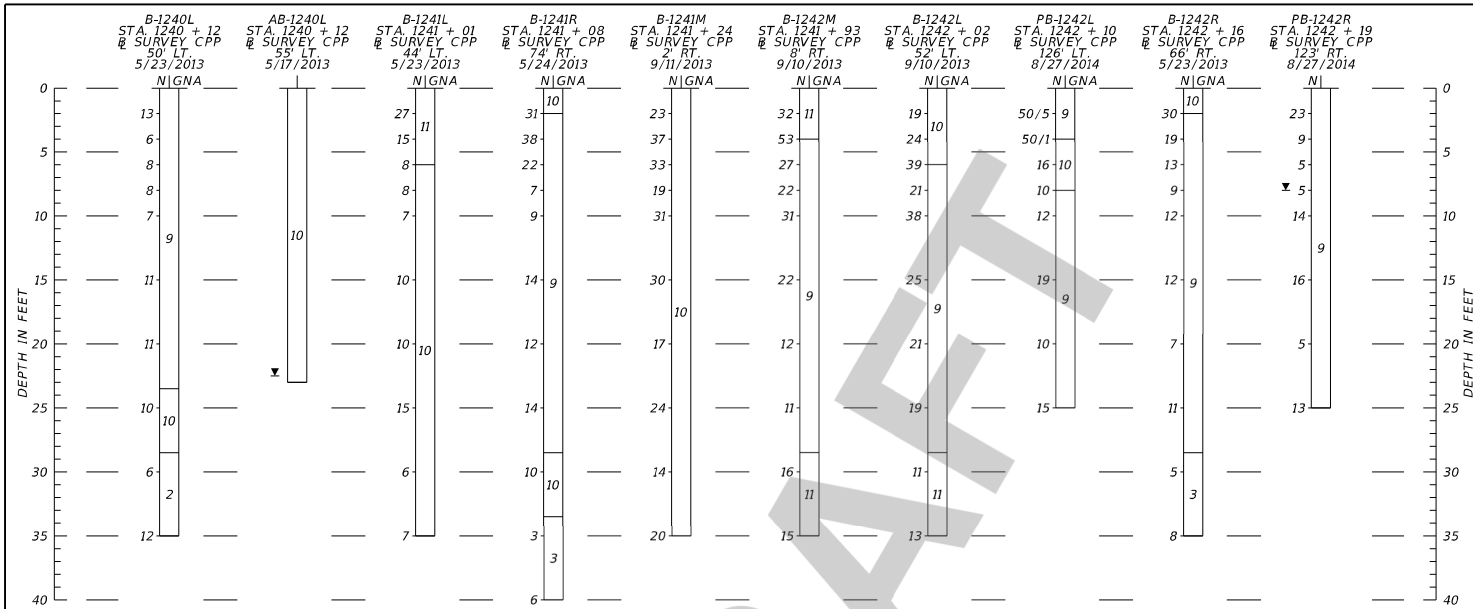
MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

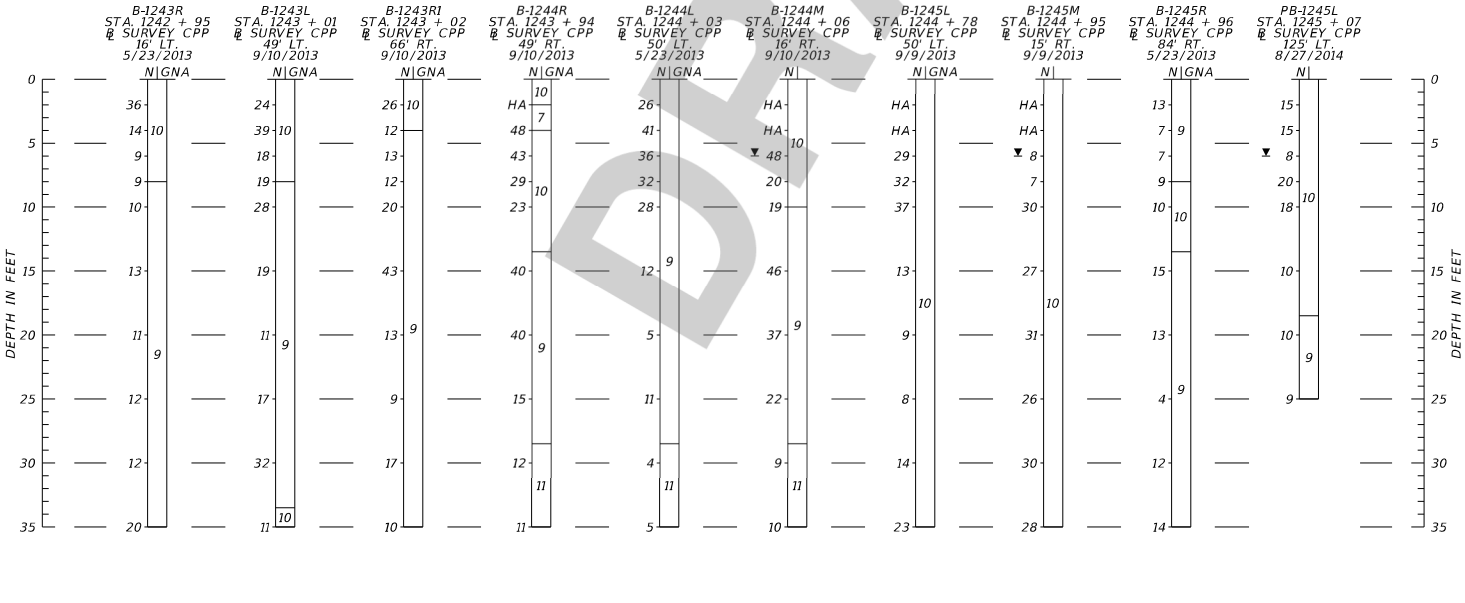
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

ROADWAY SOIL PROFILES (42)

SHEET NO.





LEGEND

1. LIGHT GRAY TO GRAY TO PALE BROWN TO DARK BROWN SAND TO SAND WITH SILT (A-3/A-2-4)
2. LIGHT GRAY TO GRAY TO BROWN SILTY SAND (A-2-4)
3. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND (A-2-6/A-2-7)
4. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-4/A-6/A-7-5/A-7-6)
5. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-7-5/A-7-6/A-2-7)
6. DARK GRAY TO DARK GRAYISH BROWN ORGANIC SOILS TO MUCK (A-8)
7. DARK REDDISH BROWN TO BROWN CEMENTED SAND TO SILTY SAND (HARDPAN) (A-3/A-2-4)
8. LIMESTONE
9. LIGHT GRAY TO PALE BROWN SAND TO SAND WITH SILT, TRACE PHOSPHATE (SAND AND TAILING SAND) (A-3)
10. LIGHT GRAY TO DARK BROWN SAND WITH SILT TO SILTY SAND (DISTURBED) (A-2-4)
11. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND TO SILT TO CLAY (DISTURBED) (A-2-6/A-4/A-6/A-7-5/A-7-6/A-2-7)
12. SANDY CLAY INCLUDING WASTE PHOSPHATIC CLAY (SLIME) (A-7-5/A-7-6)
13. DARK BROWN TO BLACK ORGANIC SOILS TO MUCK/PEAT (DISTURBED) ORGANIC SOILS (A-8)
14. LIGHT GRAY TO DARK BROWN SILTY SAND TO SILTY-CLAYEY SAND (DISTURBED) (A-2-4)

W WATER

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

N NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).

50/4 NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION

HA HAND AUGERED TO VERIFY UTILITY CLEARANCE

WH FELL UNDER WEIGHT OF ROD AND HAMMER

WR FELL UNDER WEIGHT OF ROD

▼ GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS

▽ ESTIMATED SEASONAL HIGH GROUNDWATER TABLE

▽+ ESTIMATED SEASONAL HIGH GROUNDWATER TABLE AT OR ABOVE GROUND SURFACE

GNE GROUNDWATER NOT ENCOUNTERED

GNA GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID.

100 LOSS OF CIRCULATION OF DRILLING FLUID (%)

| | CASING

T BORING TRUNCATED FOR ROADWAY SOIL PROFILE SHEETS

CAVE-IN BORING TERMINATED DUE TO GROUNDWATER TABLE

REFUSAL BORING TERMINATED DUE TO REFUSAL

NOTE: THE BORINGS DENOTED WITH A "(1)" WERE PROVIDED BY THE PROJECT SURVEYOR

℄ SURVEY CPP BASELINE SURVEY OF CENTRAL POLK PARKWAY

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	16 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

MAINLINE

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

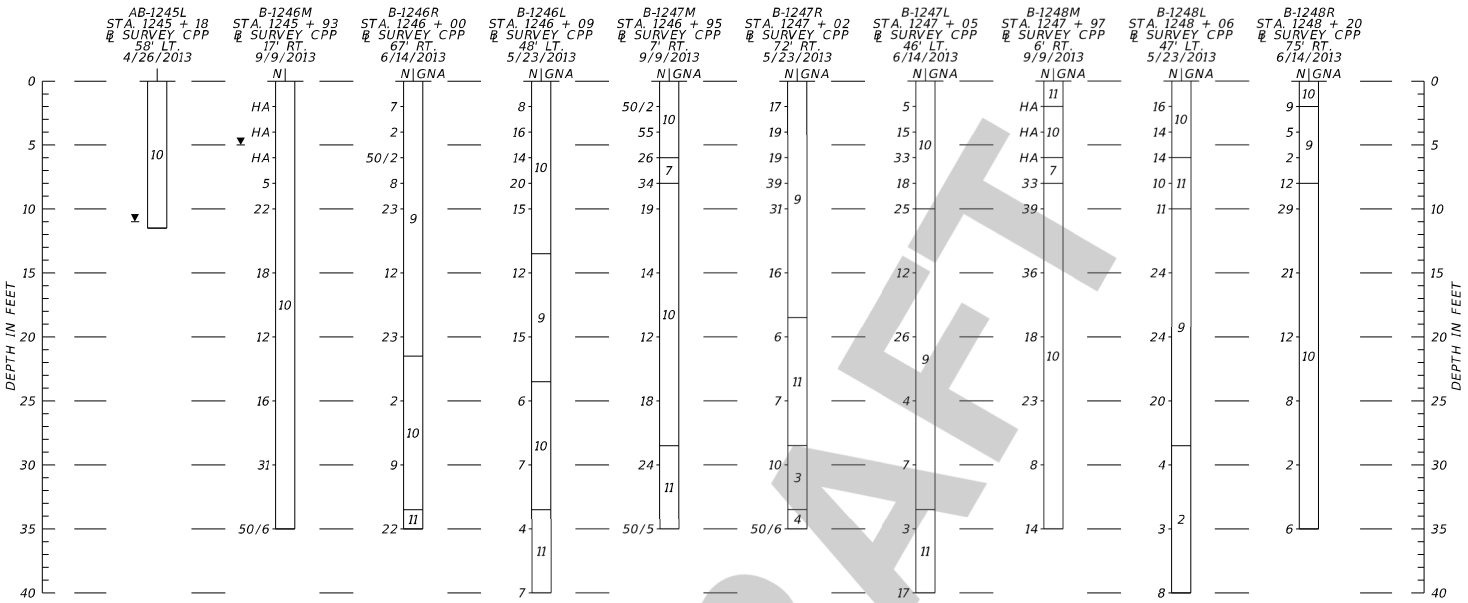
MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

ROADWAY SOIL PROFILES (43)

SHEET NO.



LEGEND

1. LIGHT GRAY TO GRAY TO PALE BROWN TO DARK BROWN SAND TO SAND WITH SILT (A-3/A-2-4)
2. LIGHT GRAY TO GRAY TO BROWN SILTY SAND (A-2-4)
3. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND (A-2-6/A-2-7)
4. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-4/A-6/A-7-5/A-7-6)
5. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-7-5/A-7-6/A-2-7)
6. DARK GRAY TO DARK GRAYISH BROWN ORGANIC SOILS TO MUCK (A-8)
7. DARK REDDISH BROWN TO BROWN CEMENTED SAND TO SILTY SAND (HARDPAN) (A-3/A-2-4)
8. LIMESTONE
9. LIGHT GRAY TO PALE BROWN SAND TO SAND WITH SILT, TRACE PHOSPHATE (SAND AND TAILING SAND) (A-3)
10. LIGHT GRAY TO DARK BROWN SAND WITH SILT TO SILTY SAND (DISTURBED) (A-2-4)
11. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND TO SILT TO CLAY (DISTURBED) (A-2-6/A-4/A-6/A-7-5/A-7-6/A-2-7)
12. SANDY CLAY INCLUDING WASTE PHOSPHATIC CLAY (SLIME) (A-7-5/A-7-6)
13. DARK BROWN TO BLACK ORGANIC SOILS TO MUCK/PEAT (DISTURBED) ORGANIC SOILS (A-8)
14. LIGHT GRAY TO DARK BROWN SILTY SAND TO SILTY-CLAYEY SAND (DISTURBED) (A-2-4)

W	WATER
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	FELL UNDER WEIGHT OF ROD AND HAMMER
WR	FELL UNDER WEIGHT OF ROD
▼	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
▽	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
▽+	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE AT OR ABOVE GROUND SURFACE
GNE	GROUNDWATER NOT ENCOUNTERED
GNA	GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID.
100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
| |	CASING
T	BORING TRUNCATED FOR ROADWAY SOIL PROFILE SHEETS
CAVE-IN	BORING TERMINATED DUE TO GROUNDWATER TABLE
REFUSAL	BORING TERMINATED DUE TO REFUSAL
NOTE:	THE BORINGS DENOTED WITH A "(1)" WERE PROVIDED BY THE PROJECT SURVEYOR
℄ SURVEY CPP	BASELINE SURVEY OF CENTRAL POLK PARKWAY

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	16 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

MAINLINE

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

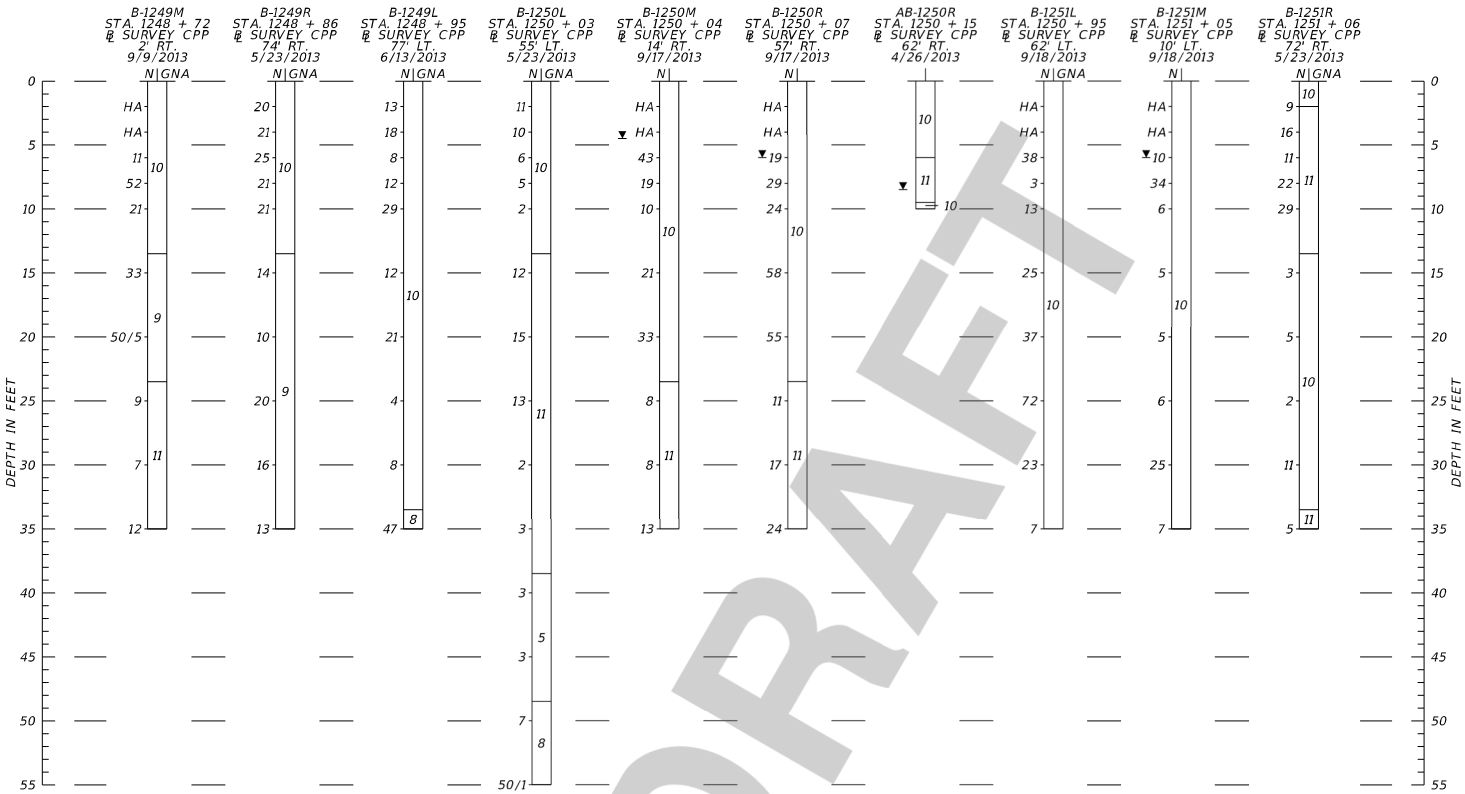
MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

ROADWAY SOIL PROFILES (44)

SHEET NO.



LEGEND

1. LIGHT GRAY TO GRAY TO PALE BROWN TO DARK BROWN SAND TO SAND WITH SILT (A-3/A-2-4)
2. LIGHT GRAY TO GRAY TO BROWN SILTY SAND (A-2-4)
3. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND (A-2-6/A-2-7)
4. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-4/A-6/A-7-5/A-7-6)
5. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-7-5/A-7-6/A-2-7)
6. DARK GRAY TO DARK GRAYISH BROWN ORGANIC SOILS TO MUCK (A-8)
7. DARK REDDISH BROWN TO BROWN CEMENTED SAND TO SILTY SAND (HARDPAN) (A-3/A-2-4)
8. LIMESTONE
9. LIGHT GRAY TO PALE BROWN SAND TO SAND WITH SILT, TRACE PHOSPHATE (SAND AND TAILING SAND) (A-3)
10. LIGHT GRAY TO DARK BROWN SAND WITH SILT TO SILTY SAND (DISTURBED) (A-2-4)
11. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND TO SILT TO CLAY (DISTURBED) (A-2-6/A-4/A-6/A-7-5/A-7-6/A-2-7)
12. SANDY CLAY INCLUDING WASTE PHOSPHATIC CLAY (SLIME) (A-7-5/A-7-6)
13. DARK BROWN TO BLACK ORGANIC SOILS TO MUCK/PEAT (DISTURBED) ORGANIC SOILS (A-8)
14. LIGHT GRAY TO DARK BROWN SILTY SAND TO SILTY-CLAYEY SAND (DISTURBED) (A-2-4)

W	WATER
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	FELL UNDER WEIGHT OF ROD AND HAMMER
WR	FELL UNDER WEIGHT OF ROD
▼	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
▽	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
▽+	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE AT OR ABOVE GROUND SURFACE
GNE	GROUNDWATER NOT ENCOUNTERED
GNA	GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID.
100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
| |	CASING
T	BORING TRUNCATED FOR ROADWAY SOIL PROFILE SHEETS
CAVE-IN	BORING TERMINATED DUE TO GROUNDWATER TABLE
REFUSAL	BORING TERMINATED DUE TO REFUSAL
NOTE:	THE BORINGS DENOTED WITH A "(1)" WERE PROVIDED BY THE PROJECT SURVEYOR
℄ SURVEY CPP	BASELINE SURVEY OF CENTRAL POLK PARKWAY

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	16 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

MAINLINE

REVISIONS

DATE	DESCRIPTION	DATE	DESCRIPTION

MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

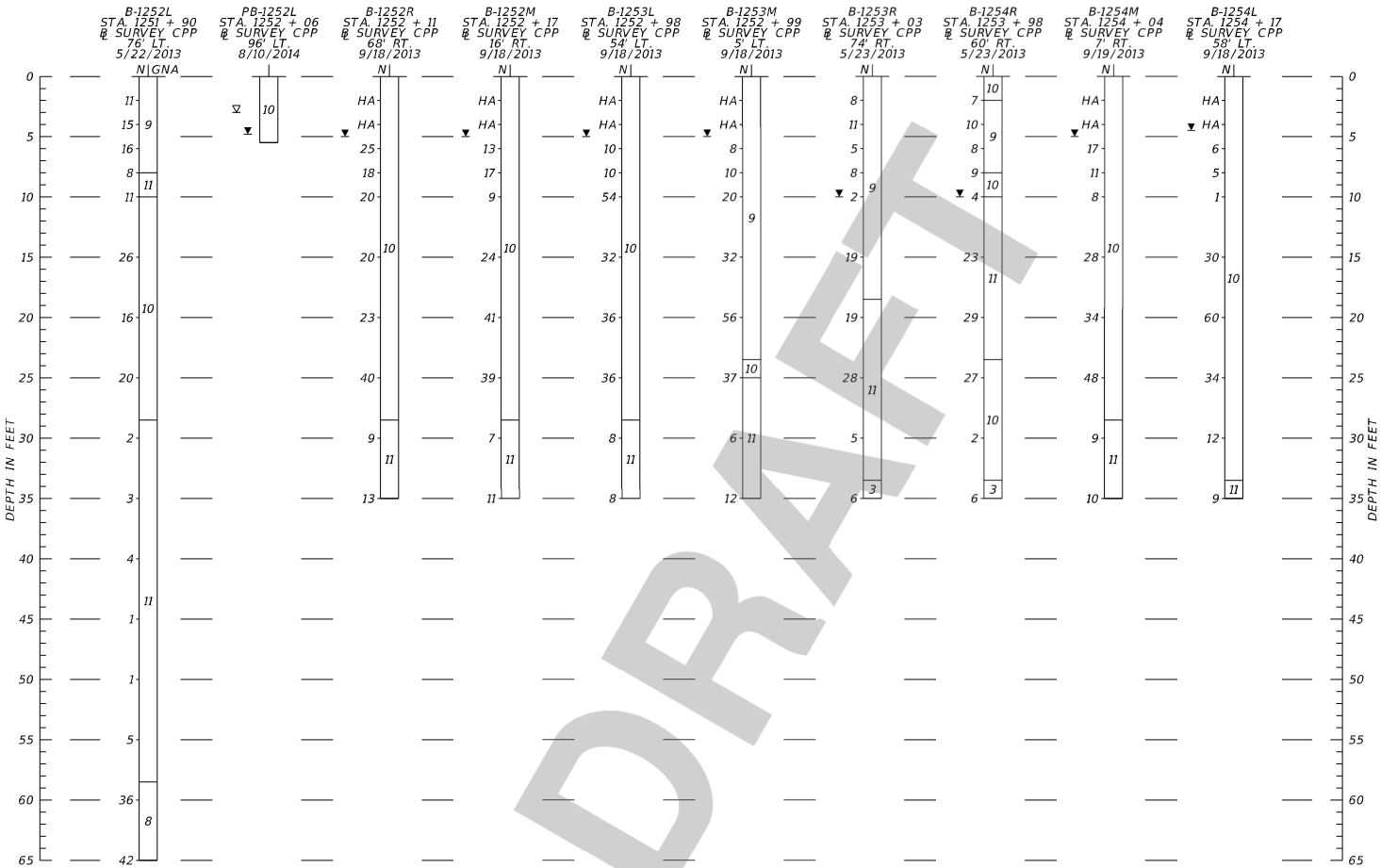
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

ROADWAY SOIL PROFILES (45)

SHEET NO.

bgarcia 11/21/2019 5:48:48 PM J:\6511\2017 Files\6511-17-181 CPP-1\-001_Design\Microstation\AB0RRDProf01.dgn



LEGEND

1. LIGHT GRAY TO GRAY TO PALE BROWN TO DARK BROWN SAND TO SAND WITH SILT (A-3/A-2-4)
2. LIGHT GRAY TO GRAY TO BROWN SILTY SAND (A-2-4)
3. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND (A-2-6/A-2-7)
4. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-4/A-6/A-7-5/A-7-6)
5. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-7-5/A-7-6/A-2-7)
6. DARK GRAY TO DARK GRAYISH BROWN ORGANIC SOILS TO MUCK (A-8)
7. DARK REDDISH BROWN TO BROWN CEMENTED SAND TO SILTY SAND (HARDPAN) (A-3/A-2-4)
8. LIMESTONE
9. LIGHT GRAY TO PALE BROWN SAND TO SAND WITH SILT, TRACE PHOSPHATE (SAND AND TAILING SAND) (A-3)
10. LIGHT GRAY TO DARK BROWN SAND WITH SILT TO SILTY SAND (DISTURBED) (A-2-4)
11. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND TO SILT TO CLAY (DISTURBED) (A-2-6/A-4/A-6/A-7-5/A-7-6/A-2-7)
12. SANDY CLAY INCLUDING WASTE PHOSPHATIC CLAY (SLIME) (A-7-5/A-7-6)
13. DARK BROWN TO BLACK ORGANIC SOILS TO MUCK/PEAT (DISTURBED) ORGANIC SOILS (A-8)
14. LIGHT GRAY TO DARK BROWN SILTY SAND TO SILTY-CLAYEY SAND (DISTURBED) (A-2-4)

W	WATER
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	FELL UNDER WEIGHT OF ROD AND HAMMER
WR	FELL UNDER WEIGHT OF ROD
▼	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
▽	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
▽+	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE AT OR ABOVE GROUND SURFACE
GNE	GROUNDWATER NOT ENCOUNTERED
GNA	GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID.
100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
| |	CASING
T	BORING TRUNCATED FOR ROADWAY SOIL PROFILE SHEETS
CAVE-IN	BORING TERMINATED DUE TO GROUNDWATER TABLE
REFUSAL	BORING TERMINATED DUE TO REFUSAL
NOTE:	THE BORINGS DENOTED WITH A "(1)" WERE PROVIDED BY THE PROJECT SURVEYOR
℄ SURVEY CPP	BASELINE SURVEY OF CENTRAL POLK PARKWAY

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	16 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

MAINLINE

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

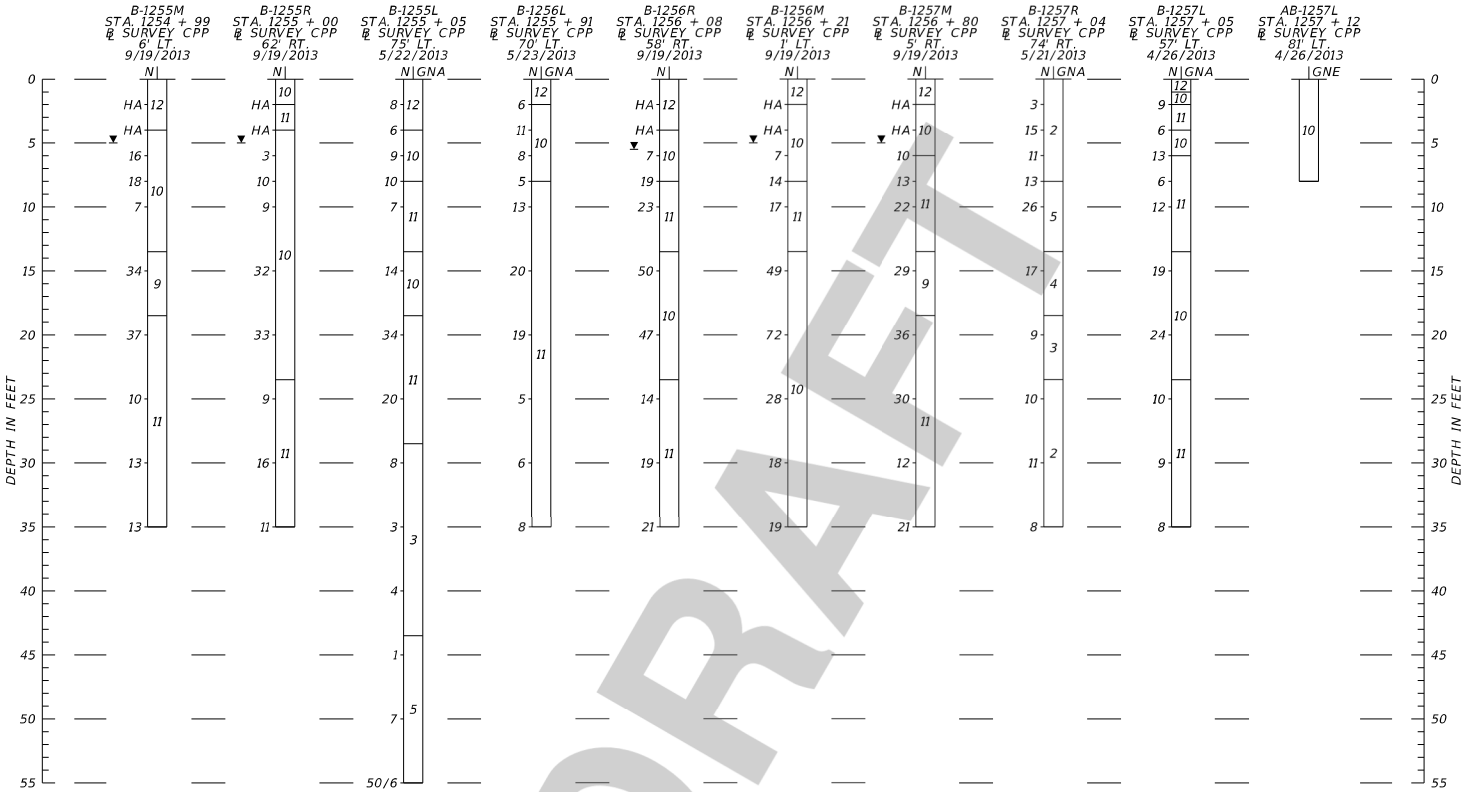
MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

ROADWAY SOIL PROFILES (46)

SHEET NO.



LEGEND

1. LIGHT GRAY TO GRAY TO PALE BROWN TO DARK BROWN SAND TO SAND WITH SILT (A-3/A-2-4)
2. LIGHT GRAY TO GRAY TO BROWN SILTY SAND (A-2-4)
3. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND (A-2-6/A-2-7)
4. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-4/A-6/A-7-5/A-7-6)
5. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-7-5/A-7-6/A-2-7)
6. DARK GRAY TO DARK GRAYISH BROWN ORGANIC SOILS TO MUCK (A-8)
7. DARK REDDISH BROWN TO BROWN CEMENTED SAND TO SILTY SAND (HARDPAN) (A-3/A-2-4)
8. LIMESTONE
9. LIGHT GRAY TO PALE BROWN SAND TO SAND WITH SILT, TRACE PHOSPHATE (SAND AND TAILING SAND) (A-3)
10. LIGHT GRAY TO DARK BROWN SAND WITH SILT TO SILTY SAND (DISTURBED) (A-2-4)
11. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND TO SILT TO CLAY (DISTURBED) (A-2-6/A-4/A-6/A-7-5/A-7-6/A-2-7)
12. SANDY CLAY INCLUDING WASTE PHOSPHATIC CLAY (SLIME) (A-7-5/A-7-6)
13. DARK BROWN TO BLACK ORGANIC SOILS TO MUCK/PEAT (DISTURBED) ORGANIC SOILS (A-8)
14. LIGHT GRAY TO DARK BROWN SILTY SAND TO SILTY-CLAYEY SAND (DISTURBED) (A-2-4)

W	WATER
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	FELL UNDER WEIGHT OF ROD AND HAMMER
WR	FELL UNDER WEIGHT OF ROD
▼	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
▽	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
▽+	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE AT OR ABOVE GROUND SURFACE
GNE	GROUNDWATER NOT ENCOUNTERED
GNA	GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID.
100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
| |	CASING
T	BORING TRUNCATED FOR ROADWAY SOIL PROFILE SHEETS
CAVE-IN	BORING TERMINATED DUE TO GROUNDWATER TABLE
REFUSAL	BORING TERMINATED DUE TO REFUSAL
NOTE:	THE BORINGS DENOTED WITH A "(1)" WERE PROVIDED BY THE PROJECT SURVEYOR
℄ SURVEY CPP	BASELINE SURVEY OF CENTRAL POLK PARKWAY

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	16 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

MAINLINE

REVISIONS

DATE	DESCRIPTION	DATE	DESCRIPTION

MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

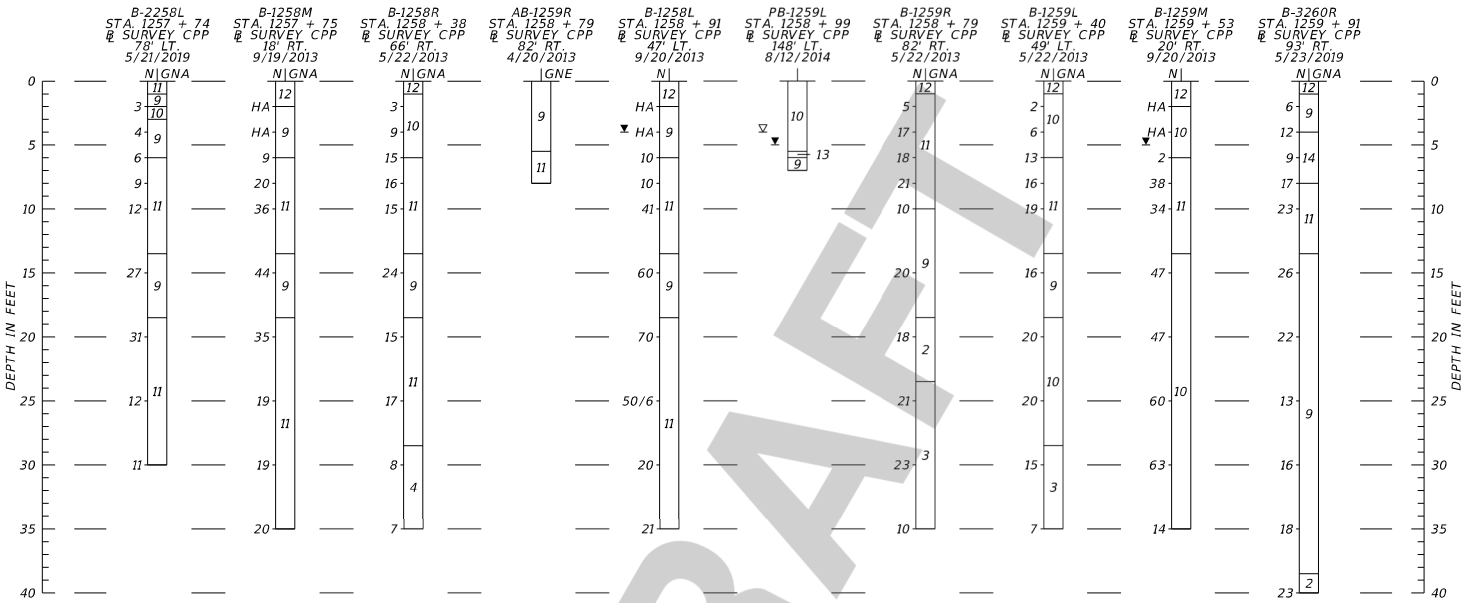
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

ROADWAY SOIL PROFILES (47)

SHEET NO.

bgarcia 11/21/2019 5:48:49 PM J:\6511\2017 Files\6511-17-181 CPP-1\-001_Design\Microstation\AB0RRDProf01.dgn



LEGEND

1. LIGHT GRAY TO GRAY TO PALE BROWN TO DARK BROWN SAND TO SAND WITH SILT (A-3/A-2-4)
2. LIGHT GRAY TO GRAY TO BROWN SILTY SAND (A-2-4)
3. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND (A-2-6/A-2-7)
4. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-4/A-6/A-7-5/A-7-6)
5. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-7-5/A-7-6/A-2-7)
6. DARK GRAY TO DARK GRAYISH BROWN ORGANIC SOILS TO MUCK (A-8)
7. DARK REDDISH BROWN TO BROWN CEMENTED SAND TO SILTY SAND (HARDPAN) (A-3/A-2-4)
8. LIMESTONE
9. LIGHT GRAY TO PALE BROWN SAND TO SAND WITH SILT, TRACE PHOSPHATE (SAND AND TAILING SAND) (A-3)
10. LIGHT GRAY TO DARK BROWN SAND WITH SILT TO SILTY SAND (DISTURBED) (A-2-4)
11. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND TO SILT TO CLAY (DISTURBED) (A-2-6/A-4/A-6/A-7-5/A-7-6/A-2-7)
12. SANDY CLAY INCLUDING WASTE PHOSPHATIC CLAY (SLIME) (A-7-5/A-7-6)
13. DARK BROWN TO BLACK ORGANIC SOILS TO MUCK/PEAT (DISTURBED) ORGANIC SOILS (A-8)
14. LIGHT GRAY TO DARK BROWN SILTY SAND TO SILTY-CLAYEY SAND (DISTURBED) (A-2-4)

W	WATER
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	FELL UNDER WEIGHT OF ROD AND HAMMER
WR	FELL UNDER WEIGHT OF ROD
▼	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
▽	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
▽+	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE AT OR ABOVE GROUND SURFACE
GNE	GROUNDWATER NOT ENCOUNTERED
GNA	GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID.
100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
| |	CASING
T	BORING TRUNCATED FOR ROADWAY SOIL PROFILE SHEETS
CAVE-IN	BORING TERMINATED DUE TO GROUNDWATER TABLE
REFUSAL	BORING TERMINATED DUE TO REFUSAL
NOTE:	THE BORINGS DENOTED WITH A "(1)" WERE PROVIDED BY THE PROJECT SURVEYOR
℄ SURVEY CPP	BASELINE SURVEY OF CENTRAL POLK PARKWAY

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	16 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

MAINLINE

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

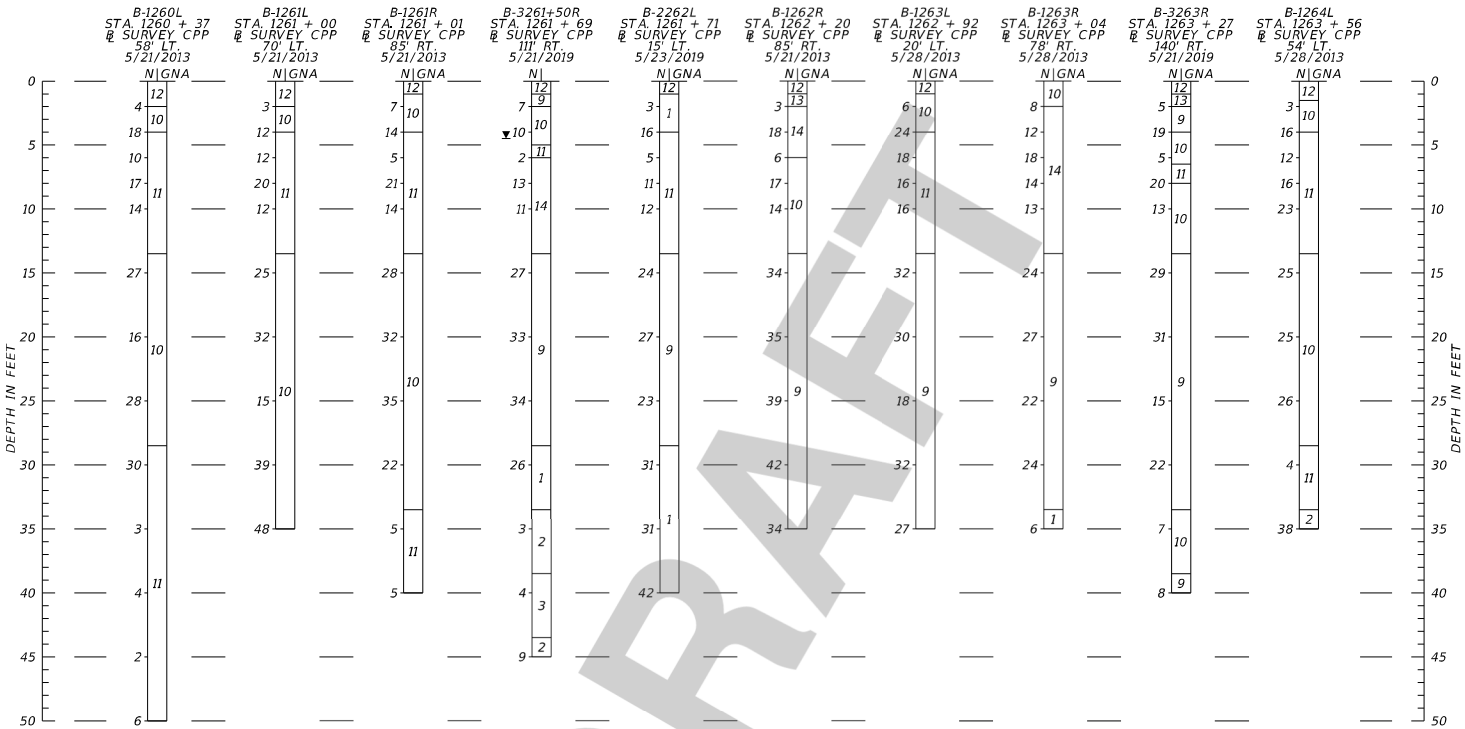
MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

ROADWAY SOIL PROFILES (48)

SHEET NO.



LEGEND

1. LIGHT GRAY TO GRAY TO PALE BROWN TO DARK BROWN SAND TO SAND WITH SILT (A-3/A-2-4)
2. LIGHT GRAY TO GRAY TO BROWN SILTY SAND (A-2-4)
3. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND (A-2-6/A-2-7)
4. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-4/A-6/A-7-5/A-7-6)
5. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-7-5/A-7-6/A-2-7)
6. DARK GRAY TO DARK GRAYISH BROWN ORGANIC SOILS TO MUCK (A-8)
7. DARK REDDISH BROWN TO BROWN CEMENTED SAND TO SILTY SAND (HARDPAN) (A-3/A-2-4)
8. LIMESTONE
9. LIGHT GRAY TO PALE BROWN SAND TO SAND WITH SILT, TRACE PHOSPHATE (SAND AND TAILING SAND) (A-3)
10. LIGHT GRAY TO DARK BROWN SAND WITH SILT TO SILTY SAND (DISTURBED) (A-2-4)
11. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND TO SILT TO CLAY (DISTURBED) (A-2-6/A-4/A-6/A-7-5/A-7-6/A-2-7)
12. SANDY CLAY INCLUDING WASTE PHOSPHATIC CLAY (SLIME) (A-7-5/A-7-6)
13. DARK BROWN TO BLACK ORGANIC SOILS TO MUCK/PEAT (DISTURBED) ORGANIC SOILS (A-8)
14. LIGHT GRAY TO DARK BROWN SILTY SAND TO SILTY-CLAYEY SAND (DISTURBED) (A-2-4)

W WATER

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

N NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).

50/4 NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION

HA HAND AUGERED TO VERIFY UTILITY CLEARANCE

WH FELL UNDER WEIGHT OF ROD AND HAMMER

WR FELL UNDER WEIGHT OF ROD

▼ GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS

▽ ESTIMATED SEASONAL HIGH GROUNDWATER TABLE

▽+ ESTIMATED SEASONAL HIGH GROUNDWATER TABLE AT OR ABOVE GROUND SURFACE

GNE GROUNDWATER NOT ENCOUNTERED

GNA GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID.

100 LOSS OF CIRCULATION OF DRILLING FLUID (%)

| | CASING

T BORING TRUNCATED FOR ROADWAY SOIL PROFILE SHEETS

CAVE-IN BORING TERMINATED DUE TO GROUNDWATER TABLE

REFUSAL BORING TERMINATED DUE TO REFUSAL

NOTE: THE BORINGS DENOTED WITH A "(1)" WERE PROVIDED BY THE PROJECT SURVEYOR

℄ SURVEY CPP BASELINE SURVEY OF CENTRAL POLK PARKWAY

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	16 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

MAINLINE

REVISIONS

DATE	DESCRIPTION	DATE	DESCRIPTION

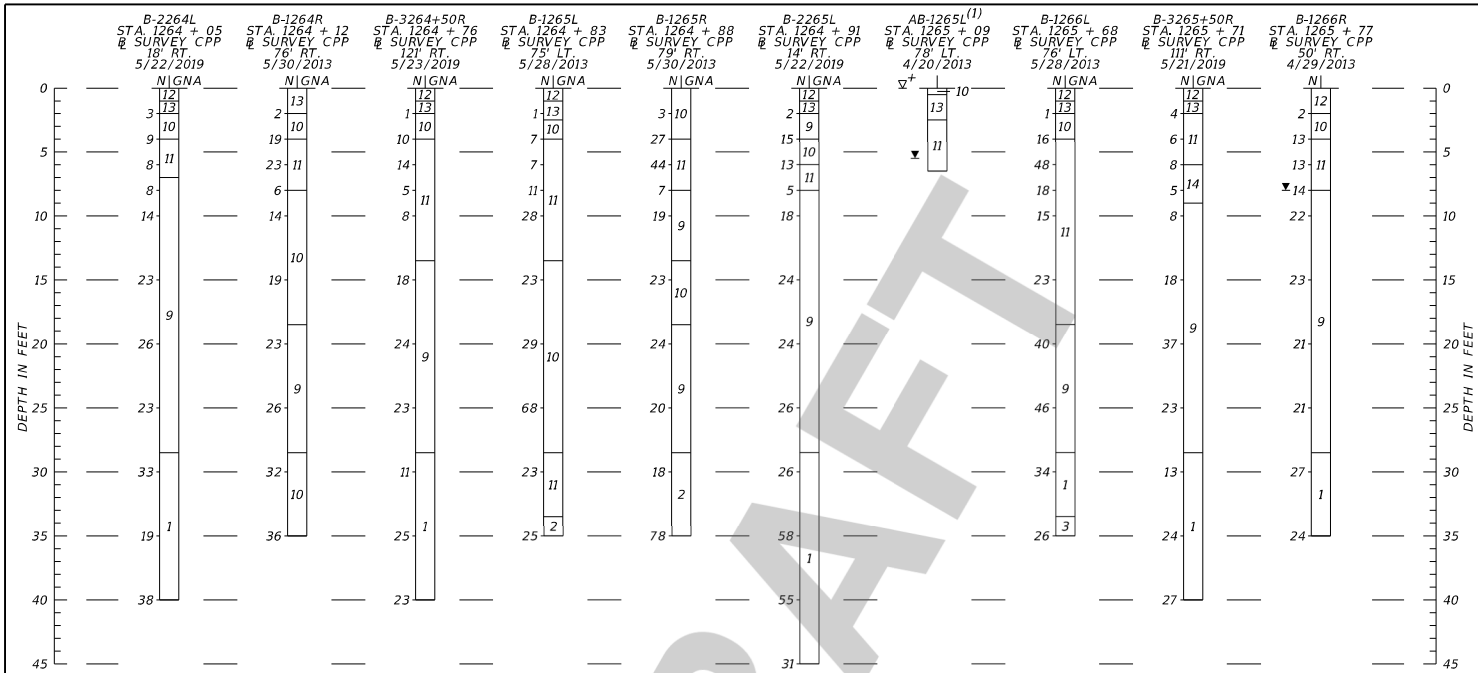
MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

ROADWAY SOIL PROFILES (49)

SHEET NO.



LEGEND

1. LIGHT GRAY TO GRAY TO PALE BROWN TO DARK BROWN SAND TO SAND WITH SILT (A-3/A-2-4)
2. LIGHT GRAY TO GRAY TO BROWN SILTY SAND (A-2-4)
3. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND (A-2-6/A-2-7)
4. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-4/A-6/A-7-5/A-7-6)
5. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-7-5/A-7-6/A-2-7)
6. DARK GRAY TO DARK GRAYISH BROWN ORGANIC SOILS TO MUCK (A-8)
7. DARK REDDISH BROWN TO BROWN CEMENTED SAND TO SILTY SAND (HARDPAN) (A-3/A-2-4)
8. LIMESTONE
9. LIGHT GRAY TO PALE BROWN SAND TO SAND WITH SILT, TRACE PHOSPHATE (SAND AND TAILING SAND) (A-3)
10. LIGHT GRAY TO DARK BROWN SAND WITH SILT TO SILTY SAND (DISTURBED) (A-2-4)
11. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND TO SILT TO CLAY (DISTURBED) (A-2-6/A-4/A-6/A-7-5/A-7-6/A-2-7)
12. SANDY CLAY INCLUDING WASTE PHOSPHATIC CLAY (SLIME) (A-7-5/A-7-6)
13. DARK BROWN TO BLACK ORGANIC SOILS TO MUCK/PEAT (DISTURBED) ORGANIC SOILS (A-8)
14. LIGHT GRAY TO DARK BROWN SILTY SAND TO SILTY-CLAYEY SAND (DISTURBED) (A-2-4)

W WATER

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

N NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).

50/4 NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION

HA HAND AUGERED TO VERIFY UTILITY CLEARANCE

WH FELL UNDER WEIGHT OF ROD AND HAMMER

WR FELL UNDER WEIGHT OF ROD

▼ GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS

▽ ESTIMATED SEASONAL HIGH GROUNDWATER TABLE

▽+ ESTIMATED SEASONAL HIGH GROUNDWATER TABLE AT OR ABOVE GROUND SURFACE

GNE GROUNDWATER NOT ENCOUNTERED

GNA GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID.

100 LOSS OF CIRCULATION OF DRILLING FLUID (%)

| | CASING

T BORING TRUNCATED FOR ROADWAY SOIL PROFILE SHEETS

CAVE-IN BORING TERMINATED DUE TO GROUNDWATER TABLE

REFUSAL BORING TERMINATED DUE TO REFUSAL

NOTE: THE BORINGS DENOTED WITH A "(1)" WERE PROVIDED BY THE PROJECT SURVEYOR

℄ SURVEY CPP BASELINE SURVEY OF CENTRAL POLK PARKWAY

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	16 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

MAINLINE

REVISIONS

DATE	DESCRIPTION	DATE	DESCRIPTION

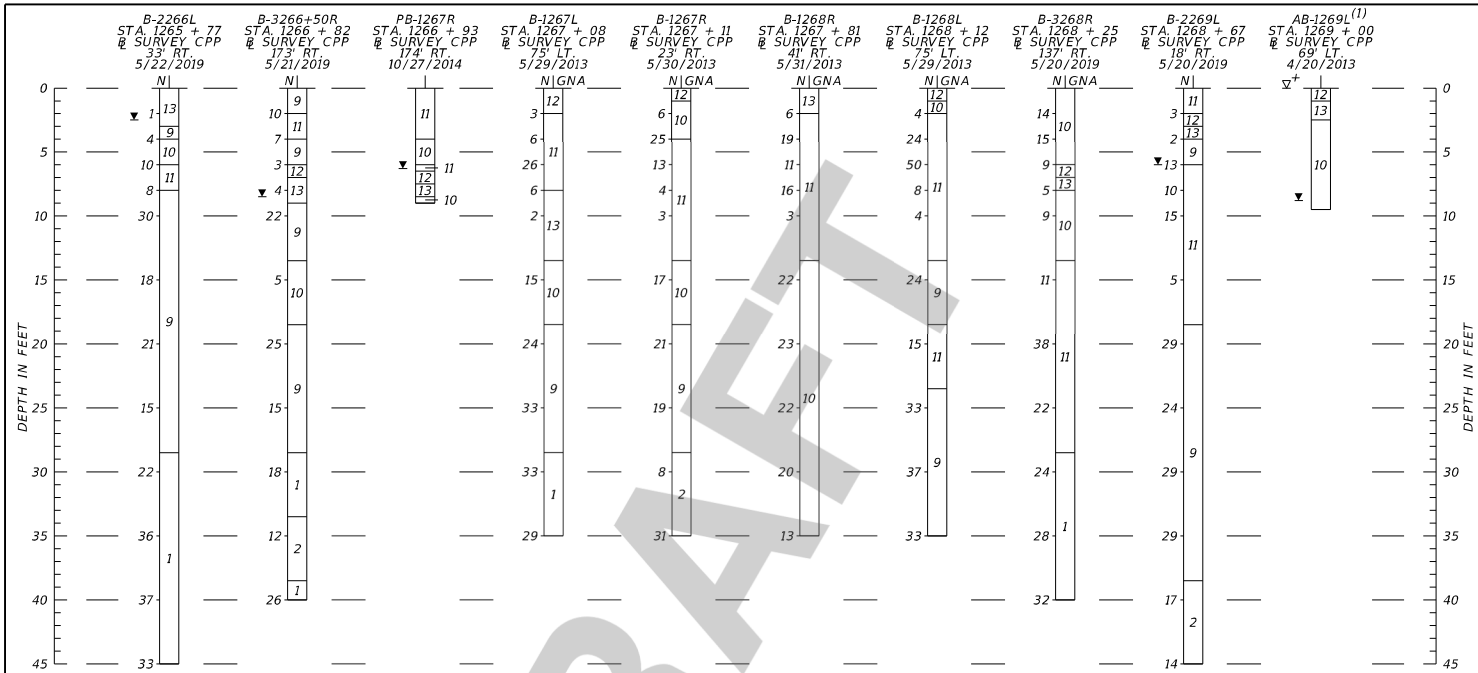
MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

ROADWAY SOIL PROFILES (50)

SHEET NO.



LEGEND

1. LIGHT GRAY TO GRAY TO PALE BROWN TO DARK BROWN SAND TO SAND WITH SILT (A-3/A-2-4)
2. LIGHT GRAY TO GRAY TO BROWN SILTY SAND (A-2-4)
3. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND (A-2-6/A-2-7)
4. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-4/A-6/A-7-5/A-7-6)
5. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-7-5/A-7-6/A-2-7)
6. DARK GRAY TO DARK GRAYISH BROWN ORGANIC SOILS TO MUCK (A-8)
7. DARK REDDISH BROWN TO BROWN CEMENTED SAND TO SILTY SAND (HARDPAN) (A-3/A-2-4)
8. LIMESTONE
9. LIGHT GRAY TO PALE BROWN SAND TO SAND WITH SILT, TRACE PHOSPHATE (SAND AND TAILING SAND) (A-3)
10. LIGHT GRAY TO DARK BROWN SAND WITH SILT TO SILTY SAND (DISTURBED) (A-2-4)
11. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND TO SILT TO CLAY (DISTURBED) (A-2-6/A-4/A-6/A-7-5/A-7-6/A-2-7)
12. SANDY CLAY INCLUDING WASTE PHOSPHATIC CLAY (SLIME) (A-7-5/A-7-6)
13. DARK BROWN TO BLACK ORGANIC SOILS TO MUCK/PEAT (DISTURBED) ORGANIC SOILS (A-8)
14. LIGHT GRAY TO DARK BROWN SILTY SAND TO SILTY-CLAYEY SAND (DISTURBED) (A-2-4)

W	WATER
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	FELL UNDER WEIGHT OF ROD AND HAMMER
WR	FELL UNDER WEIGHT OF ROD
▼	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
▽	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
▽+	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE AT OR ABOVE GROUND SURFACE
GNE	GROUNDWATER NOT ENCOUNTERED
GNA	GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID.
◁ 100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
| |	CASING
T	BORING TRUNCATED FOR ROADWAY SOIL PROFILE SHEETS
CAVE-IN	BORING TERMINATED DUE TO GROUNDWATER TABLE
REFUSAL	BORING TERMINATED DUE TO REFUSAL
NOTE:	THE BORINGS DENOTED WITH A "(1)" WERE PROVIDED BY THE PROJECT SURVEYOR
℄ SURVEY CPP	BASELINE SURVEY OF CENTRAL POLK PARKWAY

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	16 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

MAINLINE

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

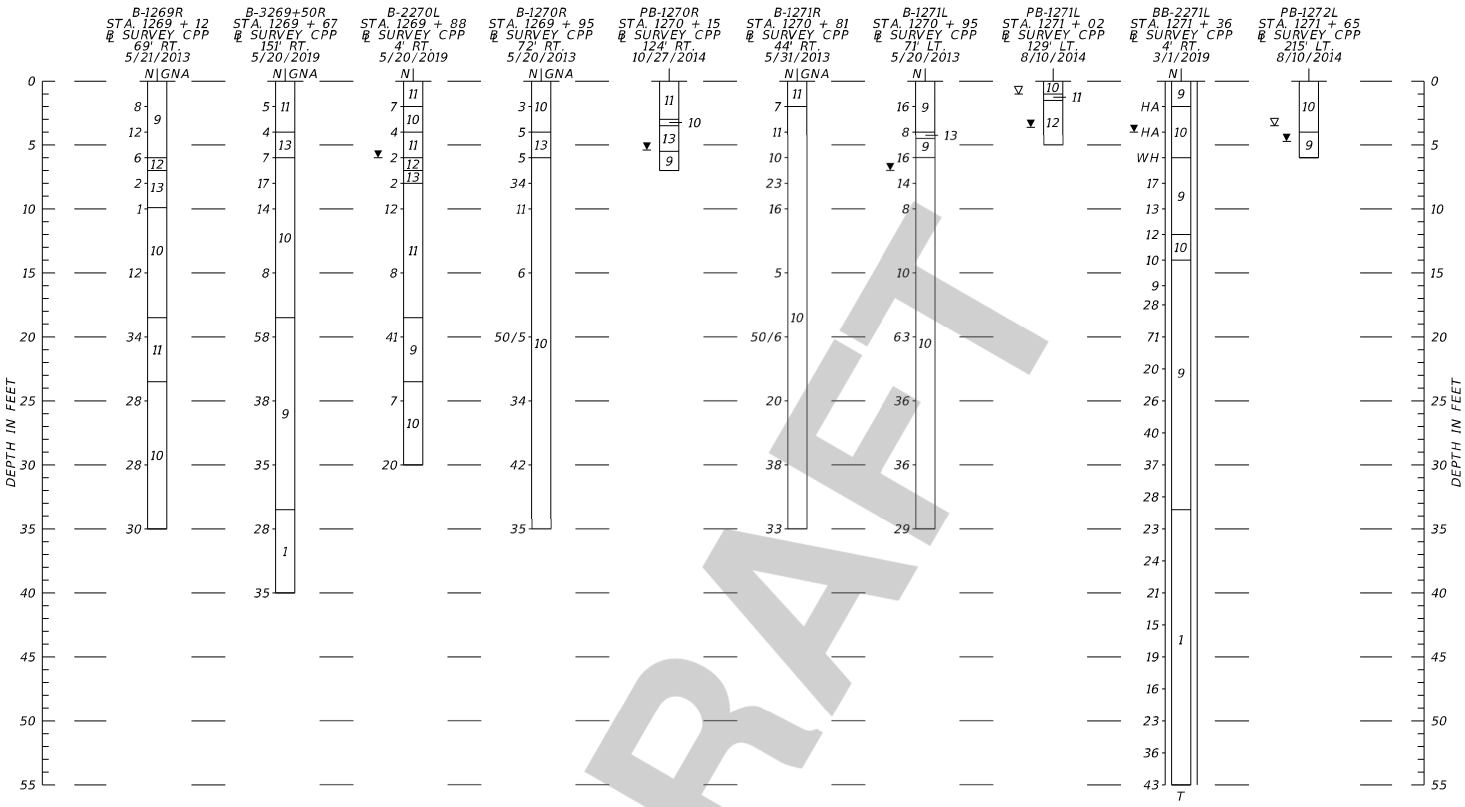
MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

ROADWAY SOIL PROFILES (51)

SHEET NO.



LEGEND

1. LIGHT GRAY TO GRAY TO PALE BROWN TO DARK BROWN SAND TO SAND WITH SILT (A-3/A-2-4)
2. LIGHT GRAY TO GRAY TO BROWN SILTY SAND (A-2-4)
3. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND (A-2-6/A-2-7)
4. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-4/A-6/A-7-5/A-7-6)
5. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-7-5/A-7-6/A-2-7)
6. DARK GRAY TO DARK GRAYISH BROWN ORGANIC SOILS TO MUCK (A-8)
7. DARK REDDISH BROWN TO BROWN CEMENTED SAND TO SILTY SAND (HARDPAN) (A-3/A-2-4)
8. LIMESTONE
9. LIGHT GRAY TO PALE BROWN SAND TO SAND WITH SILT, TRACE PHOSPHATE (SAND AND TAILING SAND) (A-3)
10. LIGHT GRAY TO DARK BROWN SAND WITH SILT TO SILTY SAND (DISTURBED) (A-2-4)
11. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND TO SILT TO CLAY (DISTURBED) (A-2-6/A-4/A-6/A-7-5/A-7-6/A-2-7)
12. SANDY CLAY INCLUDING WASTE PHOSPHATIC CLAY (SLIME) (A-7-5/A-7-6)
13. DARK BROWN TO BLACK ORGANIC SOILS TO MUCK/PEAT (DISTURBED) ORGANIC SOILS (A-8)
14. LIGHT GRAY TO DARK BROWN SILTY SAND TO SILTY-CLAYEY SAND (DISTURBED) (A-2-4)

W	WATER
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	FELL UNDER WEIGHT OF ROD AND HAMMER
WR	FELL UNDER WEIGHT OF ROD
▼	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
▽	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
▽+	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE AT OR ABOVE GROUND SURFACE
GNE	GROUNDWATER NOT ENCOUNTERED
GNA	GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID.
100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
| |	CASING
T	BORING TRUNCATED FOR ROADWAY SOIL PROFILE SHEETS
CAVE-IN	BORING TERMINATED DUE TO GROUNDWATER TABLE
REFUSAL	BORING TERMINATED DUE TO REFUSAL
NOTE:	THE BORINGS DENOTED WITH A "(1)" WERE PROVIDED BY THE PROJECT SURVEYOR
℄ SURVEY CPP	BASELINE SURVEY OF CENTRAL POLK PARKWAY

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	16 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

MAINLINE

REVISIONS

DATE	DESCRIPTION	DATE	DESCRIPTION

MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

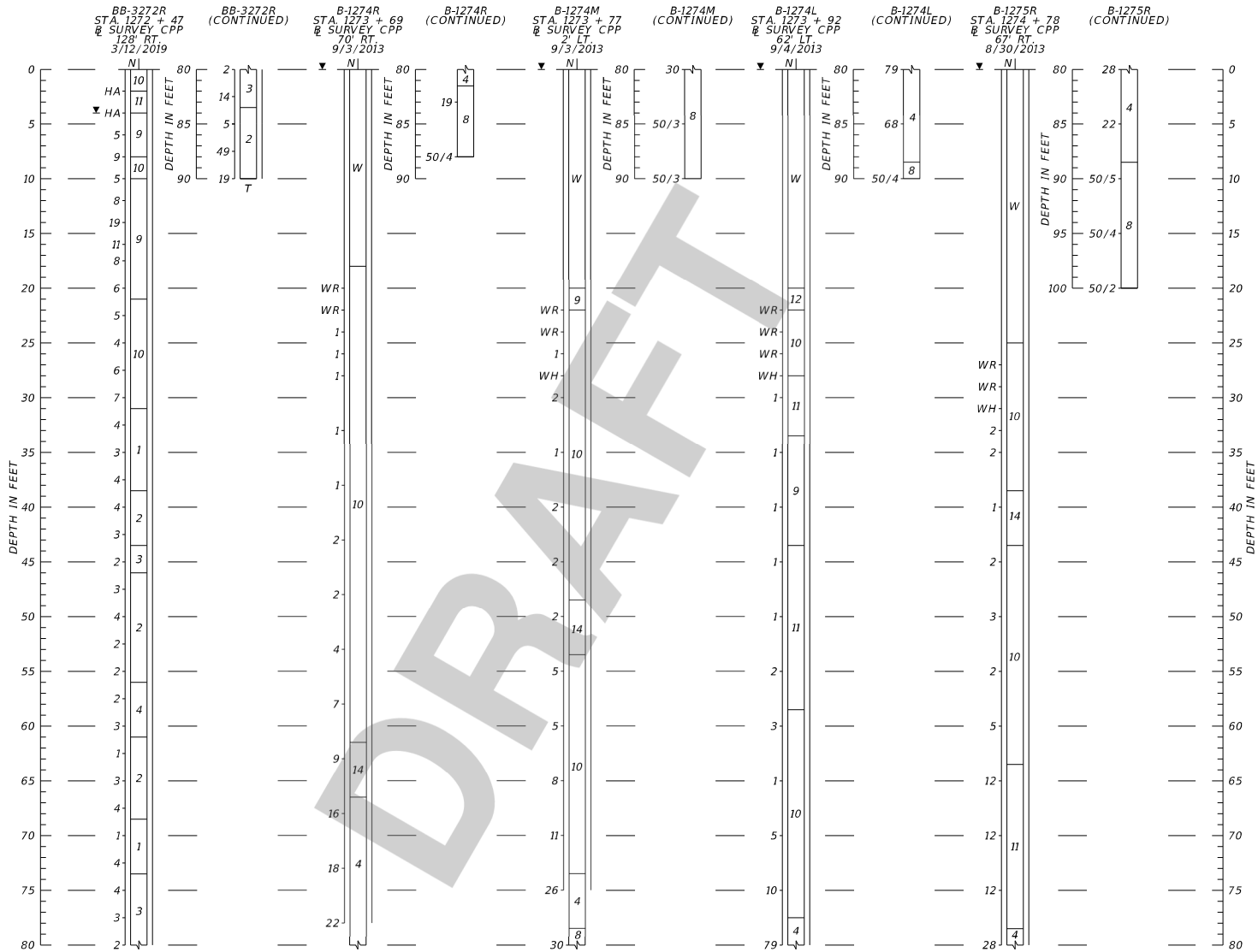
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

ROADWAY SOIL PROFILES (52)

SHEET NO.

bgarcia 11/21/2019 5:48:51 PM J:\6511\2017 Files\6511-17-181 CPP-1\-001_Design\Microstation\AB0RRDProf01.dgn



LEGEND

1. LIGHT GRAY TO GRAY TO PALE BROWN TO DARK BROWN SAND TO SAND WITH SILT (A-3/A-2-4)
2. LIGHT GRAY TO GRAY TO BROWN SILTY SAND (A-2-4)
3. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND (A-2-6/A-2-7)
4. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-4/A-6/A-7-5/A-7-6)
5. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-7-5/A-7-6/A-2-7)
6. DARK GRAY TO DARK GRAYISH BROWN ORGANIC SOILS TO MUCK (A-8)
7. DARK REDDISH BROWN TO BROWN CEMENTED SAND TO SILTY SAND (HARDPAN) (A-3/A-2-4)
8. LIMESTONE
9. LIGHT GRAY TO PALE BROWN SAND TO SAND WITH SILT, TRACE PHOSPHATE (SAND AND TAILING SAND) (A-3)
10. LIGHT GRAY TO DARK BROWN SAND WITH SILT TO SILTY SAND (DISTURBED) (A-2-4)
11. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND TO SILT TO CLAY (DISTURBED) (A-2-6/A-4/A-6/A-7-5/A-7-6/A-2-7)
12. SANDY CLAY INCLUDING WASTE PHOSPHATIC CLAY (SLIME) (A-7-5/A-7-6)
13. DARK BROWN TO BLACK ORGANIC SOILS TO MUCK/PEAT (DISTURBED) ORGANIC SOILS (A-8)
14. LIGHT GRAY TO DARK BROWN SILTY SAND TO SILTY-CLAYEY SAND (DISTURBED) (A-2-4)

W	WATER
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	FELL UNDER WEIGHT OF ROD AND HAMMER
WR	FELL UNDER WEIGHT OF ROD
▼	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
▽	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
▽+	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE AT OR ABOVE GROUND SURFACE
GNE	GROUNDWATER NOT ENCOUNTERED
GNA	GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID.
100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
| |	CASING
T	BORING TRUNCATED FOR ROADWAY SOIL PROFILE SHEETS
CAVE-IN	BORING TERMINATED DUE TO GROUNDWATER TABLE
REFUSAL	BORING TERMINATED DUE TO REFUSAL
NOTE:	THE BORINGS DENOTED WITH A "(1)" WERE PROVIDED BY THE PROJECT SURVEYOR

℄ SURVEY CPP BASELINE SURVEY OF CENTRAL POLK PARKWAY

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	16 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

MAINLINE

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

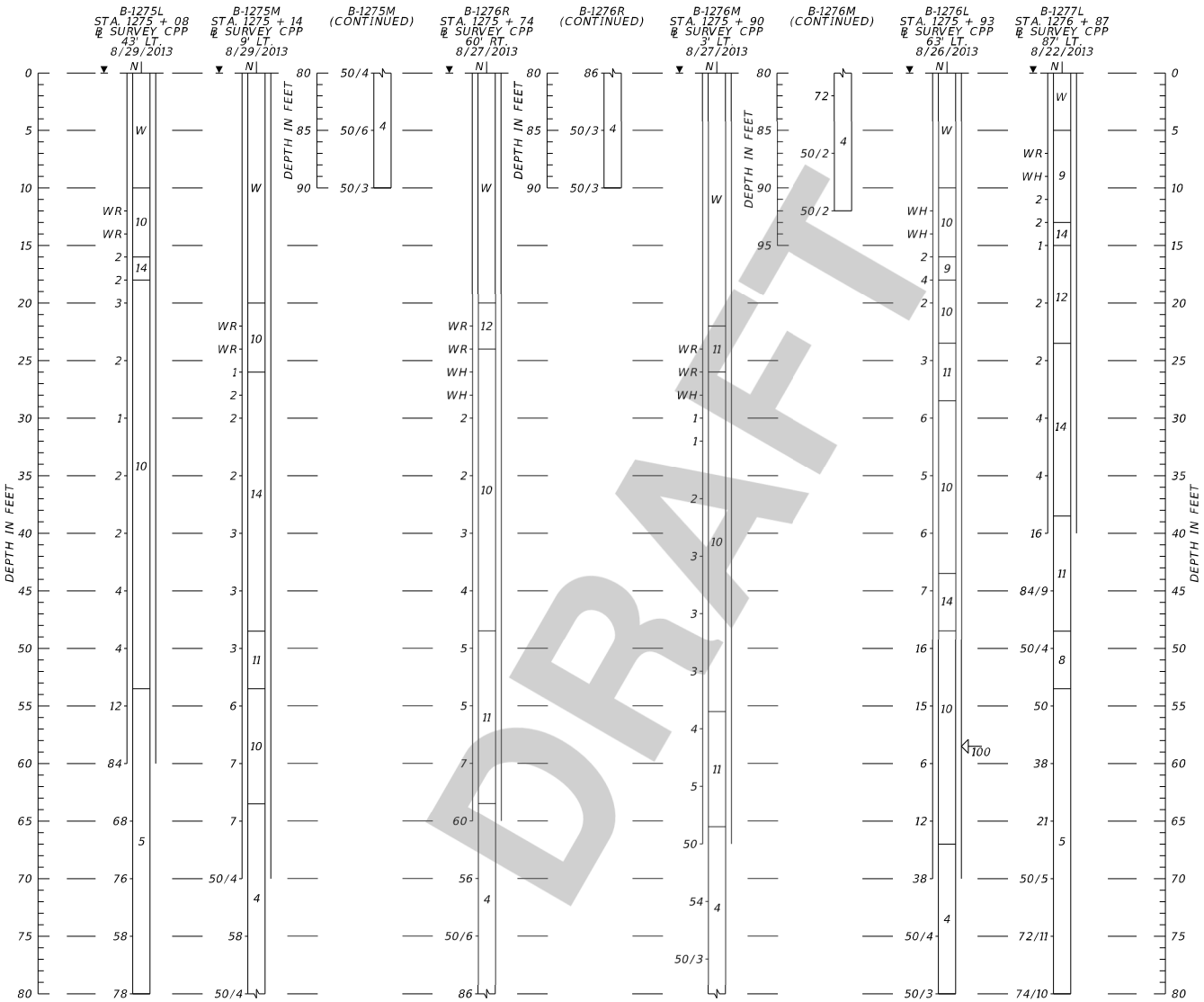
MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

ROADWAY SOIL PROFILES (53)

SHEET NO.



LEGEND

1. LIGHT GRAY TO GRAY TO PALE BROWN TO DARK BROWN SAND TO SAND WITH SILT (A-3/A-2-4)
2. LIGHT GRAY TO GRAY TO BROWN SILTY SAND (A-2-4)
3. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND (A-2-6/A-2-7)
4. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-4/A-6/A-7-5/A-7-6)
5. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-7-5/A-7-6/A-2-7)
6. DARK GRAY TO DARK GRAYISH BROWN ORGANIC SOILS TO MUCK (A-8)
7. DARK REDDISH BROWN TO BROWN CEMENTED SAND TO SILTY SAND (HARDPAN) (A-3/A-2-4)
8. LIMESTONE
9. LIGHT GRAY TO PALE BROWN SAND TO SAND WITH SILT, TRACE PHOSPHATE (SAND AND TAILING SAND) (A-3)
10. LIGHT GRAY TO DARK BROWN SAND WITH SILT TO SILTY SAND (DISTURBED) (A-2-4)
11. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND TO SILT TO CLAY (DISTURBED) (A-2-6/A-4/A-6/A-7-5/A-7-6/A-2-7)
12. SANDY CLAY INCLUDING WASTE PHOSPHATIC CLAY (SLIME) (A-7-5/A-7-6)
13. DARK BROWN TO BLACK ORGANIC SOILS TO MUCK/PEAT (DISTURBED) ORGANIC SOILS (A-8)
14. LIGHT GRAY TO DARK BROWN SILTY SAND TO SILTY-CLAYEY SAND (DISTURBED) (A-2-4)

W WATER

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

N NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).

50/4 NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION

HA HAND AUGERED TO VERIFY UTILITY CLEARANCE

WH FELL UNDER WEIGHT OF ROD AND HAMMER

WR FELL UNDER WEIGHT OF ROD

▼ GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS

▽ ESTIMATED SEASONAL HIGH GROUNDWATER TABLE

$▽^{+}$ ESTIMATED SEASONAL HIGH GROUNDWATER TABLE AT OR ABOVE GROUND SURFACE

GNE GROUNDWATER NOT ENCOUNTERED

GNA GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID.

T00 LOSS OF CIRCULATION OF DRILLING FLUID (%)

| | CASING

T BORING TRUNCATED FOR ROADWAY SOIL PROFILE SHEETS

CAVE-IN BORING TERMINATED DUE TO GROUNDWATER TABLE

REFUSAL BORING TERMINATED DUE TO REFUSAL

NOTE: THE BORINGS DENOTED WITH A "(1)" WERE PROVIDED BY THE PROJECT SURVEYOR

℄ SURVEY CPP BASELINE SURVEY OF CENTRAL POLK PARKWAY

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	16 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

MAINLINE

REVISIONS

DATE	DESCRIPTION	DATE	DESCRIPTION

MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

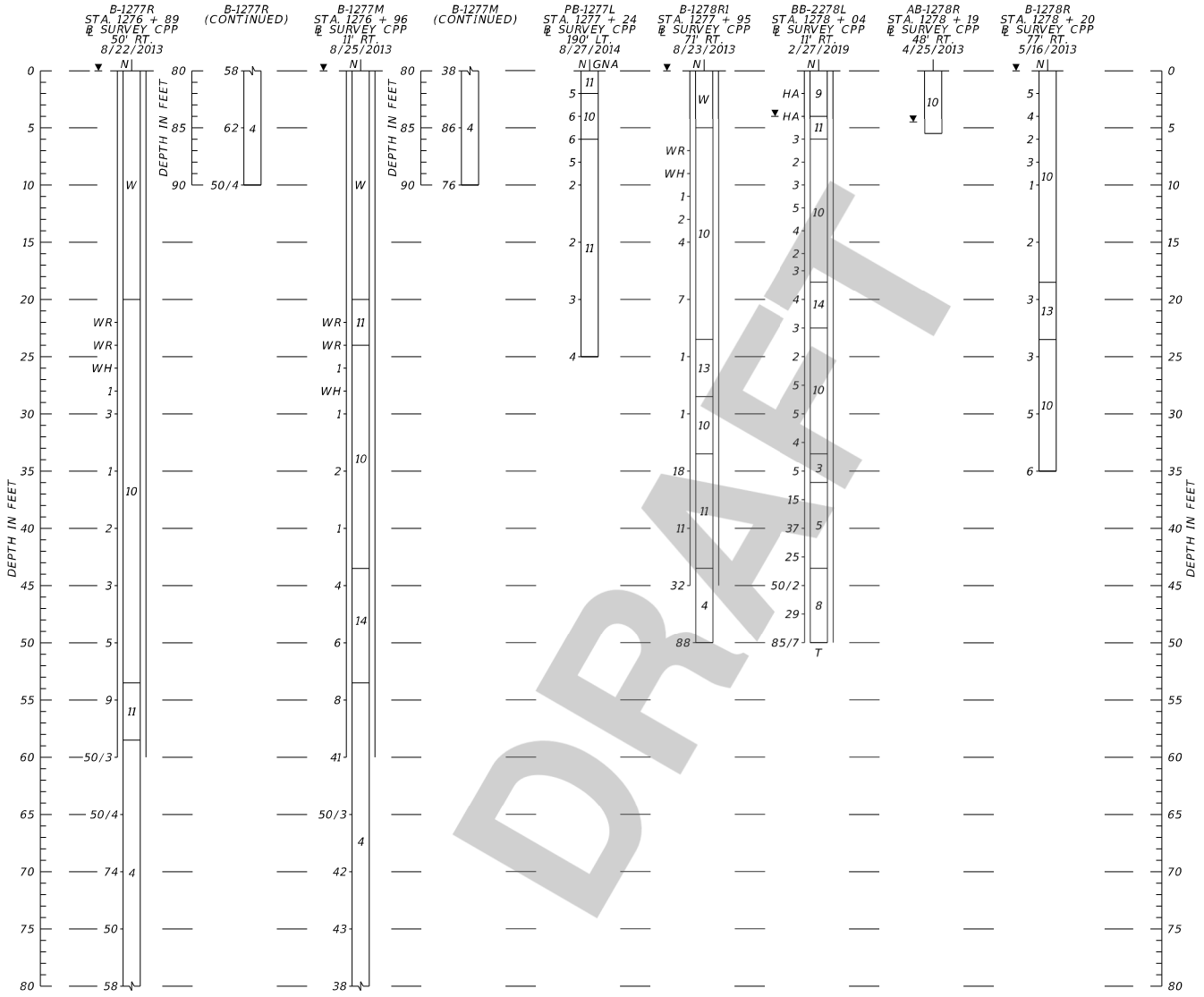
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

ROADWAY SOIL PROFILES (54)

SHEET NO.

bgarcia 11/21/2019 5:48:52 PM J:\6511\2017 Files\6511-17-181 CPP-1\-001_Design\Microstation\AB0RRDProf01.dgn



LEGEND

1. LIGHT GRAY TO GRAY TO PALE BROWN TO DARK BROWN SAND TO SAND WITH SILT (A-3/A-2-4)
2. LIGHT GRAY TO GRAY TO BROWN SILTY SAND (A-2-4)
3. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND (A-2-6/A-2-7)
4. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-4/A-6/A-7-5/A-7-6)
5. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-7-5/A-7-6/A-2-7)
6. DARK GRAY TO DARK GRAYISH BROWN ORGANIC SOILS TO MUCK (A-8)
7. DARK REDDISH BROWN TO BROWN CEMENTED SAND TO SILTY SAND (HARDPAN) (A-3/A-2-4)
8. LIMESTONE
9. LIGHT GRAY TO PALE BROWN SAND TO SAND WITH SILT, TRACE PHOSPHATE (SAND AND TAILING SAND) (A-3)
10. LIGHT GRAY TO DARK BROWN SAND WITH SILT TO SILTY SAND (DISTURBED) (A-2-4)
11. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND TO SILT TO CLAY (DISTURBED) (A-2-6/A-4/A-6/A-7-5/A-7-6/A-2-7)
12. SANDY CLAY INCLUDING WASTE PHOSPHATIC CLAY (SLIME) (A-7-5/A-7-6)
13. DARK BROWN TO BLACK ORGANIC SOILS TO MUCK/PEAT (DISTURBED) ORGANIC SOILS (A-8)
14. LIGHT GRAY TO DARK BROWN SILTY SAND TO SILTY-CLAYEY SAND (DISTURBED) (A-2-4)

W	WATER
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	FELL UNDER WEIGHT OF ROD AND HAMMER
WR	FELL UNDER WEIGHT OF ROD
▼	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
▽	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
▽+	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE AT OR ABOVE GROUND SURFACE
GNE	GROUNDWATER NOT ENCOUNTERED
GNA	GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID.
100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
| |	CASING
T	BORING TRUNCATED FOR ROADWAY SOIL PROFILE SHEETS
CAVE-IN	BORING TERMINATED DUE TO GROUNDWATER TABLE
REFUSAL	BORING TERMINATED DUE TO REFUSAL
NOTE:	THE BORINGS DENOTED WITH A "(1)" WERE PROVIDED BY THE PROJECT SURVEYOR
℄ SURVEY CPP	BASELINE SURVEY OF CENTRAL POLK PARKWAY

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	16 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

MAINLINE

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

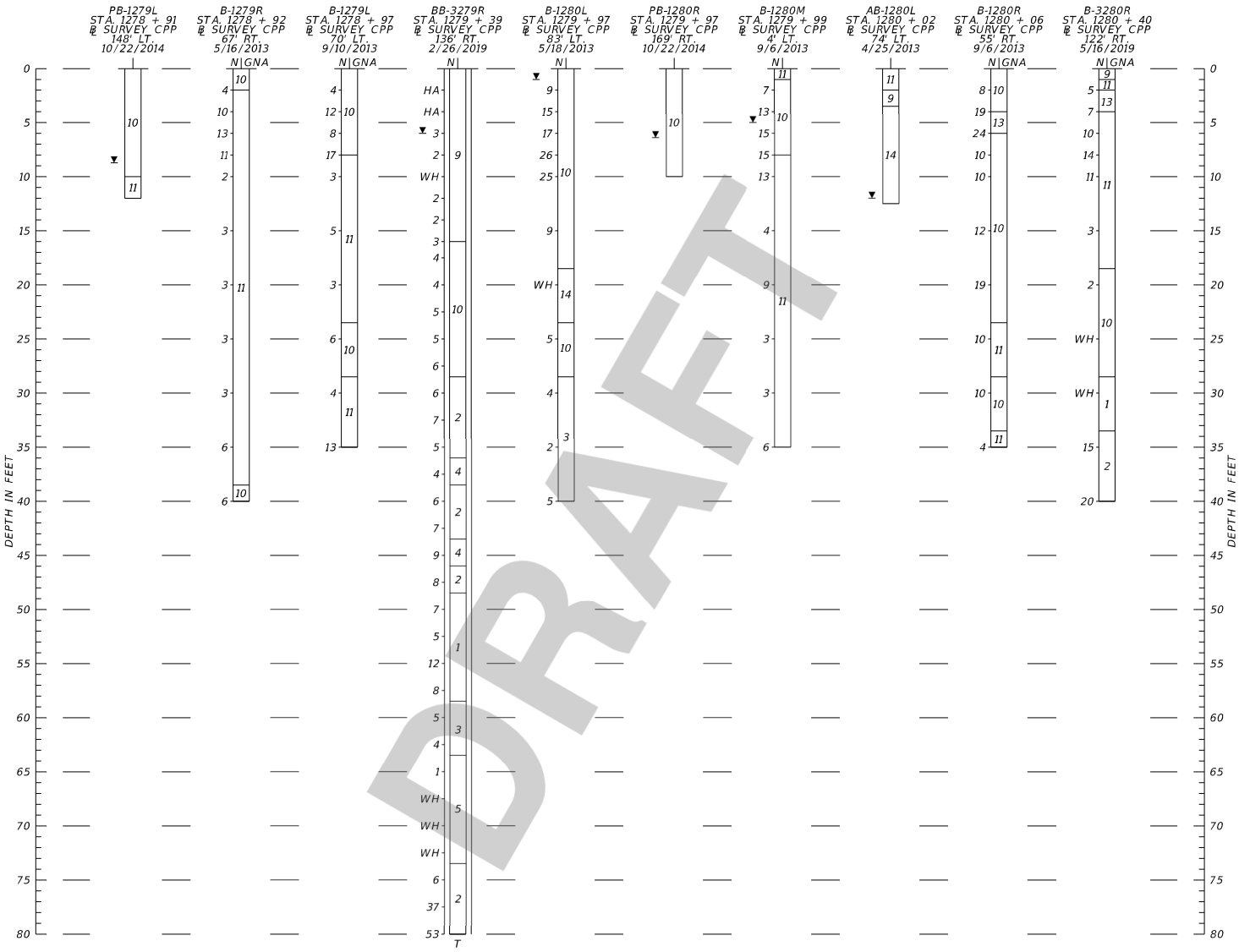
MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

ROADWAY SOIL PROFILES (55)

SHEET NO.



LEGEND

1. LIGHT GRAY TO GRAY TO PALE BROWN TO DARK BROWN SAND TO SAND WITH SILT (A-3/A-2-4)
2. LIGHT GRAY TO GRAY TO BROWN SILTY SAND (A-2-4)
3. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND (A-2-6/A-2-7)
4. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-4/A-6/A-7-5/A-7-6)
5. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-7-5/A-7-6/A-2-7)
6. DARK GRAY TO DARK GRAYISH BROWN ORGANIC SOILS TO MUCK (A-8)
7. DARK REDDISH BROWN TO BROWN CEMENTED SAND TO SILTY SAND (HARDPAN) (A-3/A-2-4)
8. LIMESTONE
9. LIGHT GRAY TO PALE BROWN SAND TO SAND WITH SILT, TRACE PHOSPHATE (SAND AND TAILING SAND) (A-3)
10. LIGHT GRAY TO DARK BROWN SAND WITH SILT TO SILTY SAND (DISTURBED) (A-2-4)
11. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND TO SILT TO CLAY (DISTURBED) (A-2-6/A-4/A-6/A-7-5/A-7-6/A-2-7)
12. SANDY CLAY INCLUDING WASTE PHOSPHATIC CLAY (SLIME) (A-7-5/A-7-6)
13. DARK BROWN TO BLACK ORGANIC SOILS TO MUCK/PEAT (DISTURBED) ORGANIC SOILS (A-8)
14. LIGHT GRAY TO DARK BROWN SILTY SAND TO SILTY-CLAYEY SAND (DISTURBED) (A-2-4)

W WATER

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

N NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).

50/4 NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION

HA HAND AUGERED TO VERIFY UTILITY CLEARANCE

WH FELL UNDER WEIGHT OF ROD AND HAMMER

WR FELL UNDER WEIGHT OF ROD

▼ GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS

▽ ESTIMATED SEASONAL HIGH GROUNDWATER TABLE

▽+ ESTIMATED SEASONAL HIGH GROUNDWATER TABLE AT OR ABOVE GROUND SURFACE

GNE GROUNDWATER NOT ENCOUNTERED

GNA GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID.

100 LOSS OF CIRCULATION OF DRILLING FLUID (%)

| | CASING

T BORING TRUNCATED FOR ROADWAY SOIL PROFILE SHEETS

CAVE-IN BORING TERMINATED DUE TO GROUNDWATER TABLE

REFUSAL BORING TERMINATED DUE TO REFUSAL

NOTE: THE BORINGS DENOTED WITH A "(1)" WERE PROVIDED BY THE PROJECT SURVEYOR

℄ SURVEY CPP BASELINE SURVEY OF CENTRAL POLK PARKWAY

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	16 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

MAINLINE

REVISIONS

DATE	DESCRIPTION	DATE	DESCRIPTION

MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

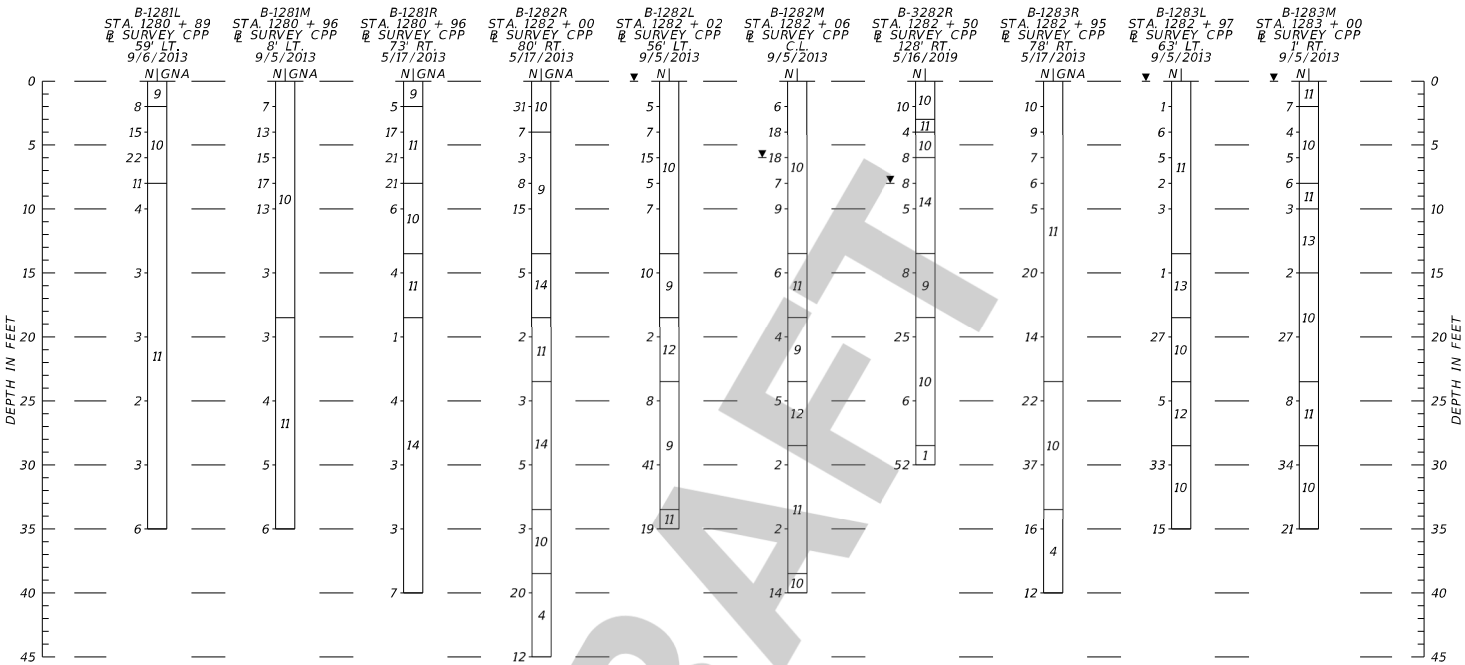
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

ROADWAY SOIL PROFILES (56)

SHEET NO.

bgarcia 11/21/2019 5:48:53 PM J:\6511\2017 Files\6511-17-181 CPP-1\-001_Design\Microstation\AB0RRDProf01.dgn



LEGEND

1. LIGHT GRAY TO GRAY TO PALE BROWN TO DARK BROWN SAND TO SAND WITH SILT (A-3/A-2-4)
2. LIGHT GRAY TO GRAY TO BROWN SILTY SAND (A-2-4)
3. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND (A-2-6/A-2-7)
4. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-4/A-6/A-7-5/A-7-6)
5. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-7-5/A-7-6/A-2-7)
6. DARK GRAY TO DARK GRAYISH BROWN ORGANIC SOILS TO MUCK (A-8)
7. DARK REDDISH BROWN TO BROWN CEMENTED SAND TO SILTY SAND (HARDPAN) (A-3/A-2-4)
8. LIMESTONE
9. LIGHT GRAY TO PALE BROWN SAND TO SAND WITH SILT, TRACE PHOSPHATE (SAND AND TAILING SAND) (A-3)
10. LIGHT GRAY TO DARK BROWN SAND WITH SILT TO SILTY SAND (DISTURBED) (A-2-4)
11. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND TO SILT TO CLAY (DISTURBED) (A-2-6/A-4/A-6/A-7-5/A-7-6/A-2-7)
12. SANDY CLAY INCLUDING WASTE PHOSPHATIC CLAY (SLIME) (A-7-5/A-7-6)
13. DARK BROWN TO BLACK ORGANIC SOILS TO MUCK/PEAT (DISTURBED) ORGANIC SOILS (A-8)
14. LIGHT GRAY TO DARK BROWN SILTY SAND TO SILTY-CLAYEY SAND (DISTURBED) (A-2-4)

W WATER

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

N NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).

50/4 NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION

HA HAND AUGERED TO VERIFY UTILITY CLEARANCE

WH FELL UNDER WEIGHT OF ROD AND HAMMER

WR FELL UNDER WEIGHT OF ROD

▼ GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS

▽ ESTIMATED SEASONAL HIGH GROUNDWATER TABLE

▽+ ESTIMATED SEASONAL HIGH GROUNDWATER TABLE AT OR ABOVE GROUND SURFACE

GNE GROUNDWATER NOT ENCOUNTERED

GNA GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID.

100 LOSS OF CIRCULATION OF DRILLING FLUID (%)

| | CASING

T BORING TRUNCATED FOR ROADWAY SOIL PROFILE SHEETS

CAVE-IN BORING TERMINATED DUE TO GROUNDWATER TABLE

REFUSAL BORING TERMINATED DUE TO REFUSAL

NOTE: THE BORINGS DENOTED WITH A "(1)" WERE PROVIDED BY THE PROJECT SURVEYOR

℄ SURVEY CPP BASELINE SURVEY OF CENTRAL POLK PARKWAY

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	16 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

MAINLINE

REVISIONS

DATE	DESCRIPTION	DATE	DESCRIPTION

MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

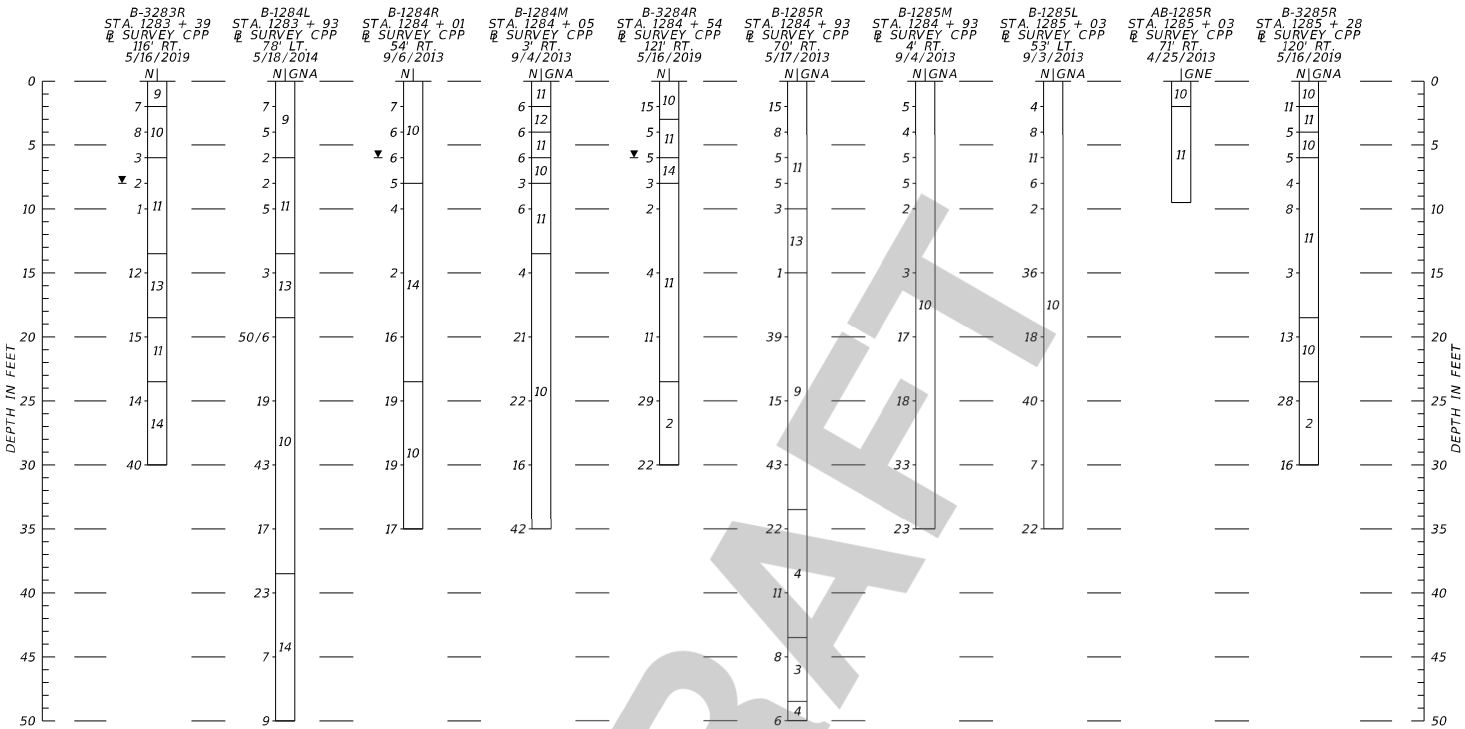
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

ROADWAY SOIL PROFILES (57)

SHEET NO.

bgarcia 11/21/2019 5:48:53 PM J:\6511\2017 Files\6511-17-181 CPP-1\-001_Design\Microstation\AB0RRDProf01.dgn



LEGEND

1. LIGHT GRAY TO GRAY TO PALE BROWN TO DARK BROWN SAND TO SAND WITH SILT (A-3/A-2-4)
2. LIGHT GRAY TO GRAY TO BROWN SILTY SAND (A-2-4)
3. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND (A-2-6/A-2-7)
4. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-4/A-6/A-7-5/A-7-6)
5. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-7-5/A-7-6/A-2-7)
6. DARK GRAY TO DARK GRAYISH BROWN ORGANIC SOILS TO MUCK (A-8)
7. DARK REDDISH BROWN TO BROWN CEMENTED SAND TO SILTY SAND (HARDPAN) (A-3/A-2-4)
8. LIMESTONE
9. LIGHT GRAY TO PALE BROWN SAND TO SAND WITH SILT, TRACE PHOSPHATE (SAND AND TAILING SAND) (A-3)
10. LIGHT GRAY TO DARK BROWN SAND WITH SILT TO SILTY SAND (DISTURBED) (A-2-4)
11. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND TO SILT TO CLAY (DISTURBED) (A-2-6/A-4/A-6/A-7-5/A-7-6/A-2-7)
12. SANDY CLAY INCLUDING WASTE PHOSPHATIC CLAY (SLIME) (A-7-5/A-7-6)
13. DARK BROWN TO BLACK ORGANIC SOILS TO MUCK/PEAT (DISTURBED) ORGANIC SOILS (A-8)
14. LIGHT GRAY TO DARK BROWN SILTY SAND TO SILTY-CLAYEY SAND (DISTURBED) (A-2-4)

W	WATER
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	FELL UNDER WEIGHT OF ROD AND HAMMER
WR	FELL UNDER WEIGHT OF ROD
▼	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
▽	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
▽+	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE AT OR ABOVE GROUND SURFACE
GNE	GROUNDWATER NOT ENCOUNTERED
GNA	GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID.
◁ 100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
| |	CASING
T	BORING TRUNCATED FOR ROADWAY SOIL PROFILE SHEETS
CAVE-IN	BORING TERMINATED DUE TO GROUNDWATER TABLE
REFUSAL	BORING TERMINATED DUE TO REFUSAL
NOTE:	THE BORINGS DENOTED WITH A "(1)" WERE PROVIDED BY THE PROJECT SURVEYOR
℄ SURVEY CPP	BASELINE SURVEY OF CENTRAL POLK PARKWAY

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	16 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

MAINLINE

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

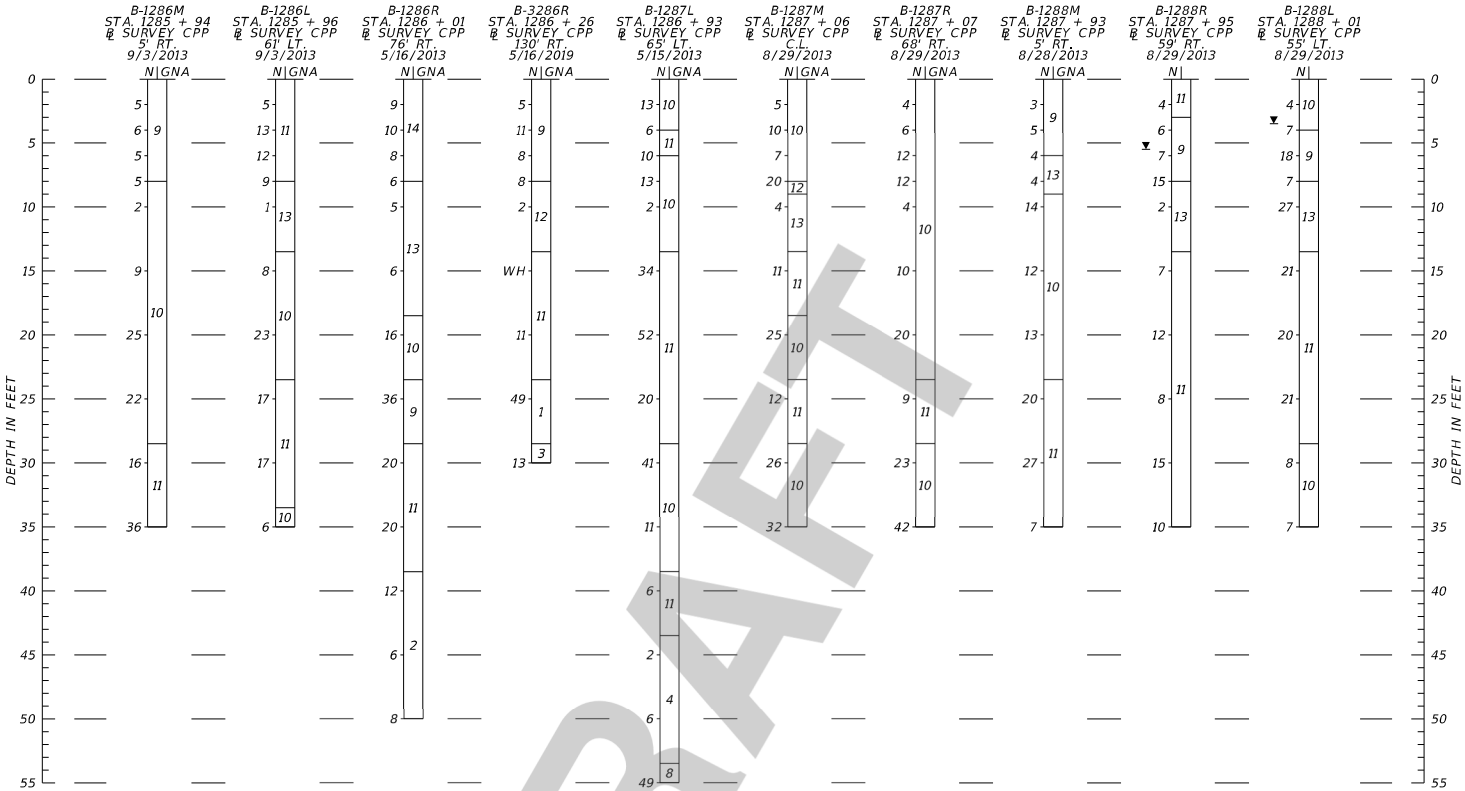
MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

ROADWAY SOIL PROFILES (58)

SHEET NO.



LEGEND

1. LIGHT GRAY TO GRAY TO PALE BROWN TO DARK BROWN SAND TO SAND WITH SILT (A-3/A-2-4)
2. LIGHT GRAY TO GRAY TO BROWN SILTY SAND (A-2-4)
3. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND (A-2-6/A-2-7)
4. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-4/A-6/A-7-5/A-7-6)
5. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-7-5/A-7-6/A-2-7)
6. DARK GRAY TO DARK GRAYISH BROWN ORGANIC SOILS TO MUCK (A-8)
7. DARK REDDISH BROWN TO BROWN CEMENTED SAND TO SILTY SAND (HARDPAN) (A-3/A-2-4)
8. LIMESTONE
9. LIGHT GRAY TO PALE BROWN SAND TO SAND WITH SILT, TRACE PHOSPHATE (SAND AND TAILING SAND) (A-3)
10. LIGHT GRAY TO DARK BROWN SAND WITH SILT TO SILTY SAND (DISTURBED) (A-2-4)
11. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND TO SILT TO CLAY (DISTURBED) (A-2-6/A-4/A-6/A-7-5/A-7-6/A-2-7)
12. SANDY CLAY INCLUDING WASTE PHOSPHATIC CLAY (SLIME) (A-7-5/A-7-6)
13. DARK BROWN TO BLACK ORGANIC SOILS TO MUCK/PEAT (DISTURBED) ORGANIC SOILS (A-8)
14. LIGHT GRAY TO DARK BROWN SILTY SAND TO SILTY-CLAYEY SAND (DISTURBED) (A-2-4)

W	WATER
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	FELL UNDER WEIGHT OF ROD AND HAMMER
WR	FELL UNDER WEIGHT OF ROD
▼	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
▽	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
▽+	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE AT OR ABOVE GROUND SURFACE
GNE	GROUNDWATER NOT ENCOUNTERED
GNA	GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID.
100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
| |	CASING
T	BORING TRUNCATED FOR ROADWAY SOIL PROFILE SHEETS
CAVE-IN	BORING TERMINATED DUE TO GROUNDWATER TABLE
REFUSAL	BORING TERMINATED DUE TO REFUSAL
NOTE:	THE BORINGS DENOTED WITH A "(1)" WERE PROVIDED BY THE PROJECT SURVEYOR
℄ SURVEY CPP	BASELINE SURVEY OF CENTRAL POLK PARKWAY

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	16 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

MAINLINE

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

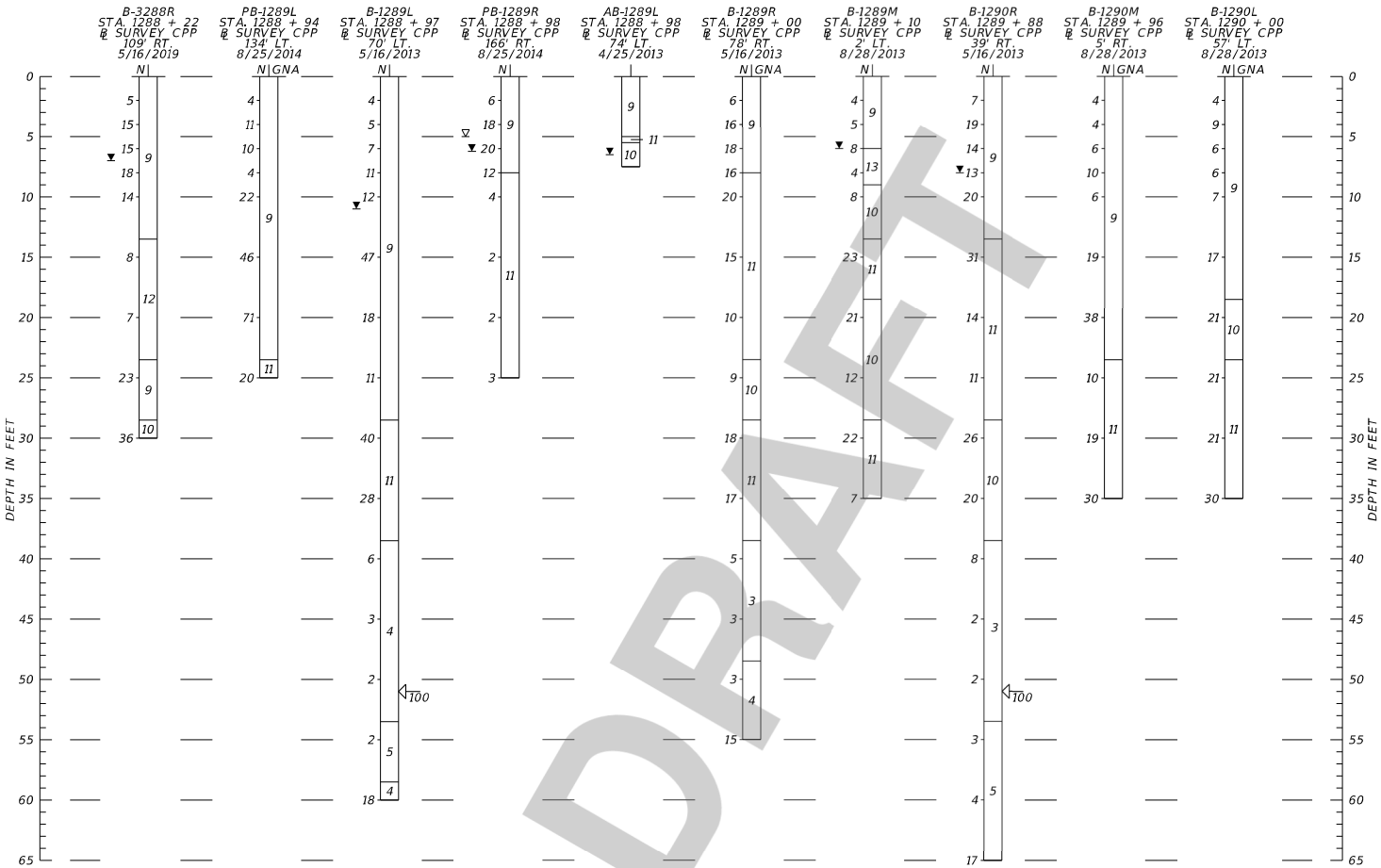
MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

ROADWAY SOIL PROFILES (59)

SHEET NO.



LEGEND

1. LIGHT GRAY TO GRAY TO PALE BROWN TO DARK BROWN SAND TO SAND WITH SILT (A-3/A-2-4)
2. LIGHT GRAY TO GRAY TO BROWN SILTY SAND (A-2-4)
3. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND (A-2-6/A-2-7)
4. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-4/A-6/A-7-5/A-7-6)
5. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-7-5/A-7-6/A-2-7)
6. DARK GRAY TO DARK GRAYISH BROWN ORGANIC SOILS TO MUCK (A-8)
7. DARK REDDISH BROWN TO BROWN CEMENTED SAND TO SILTY SAND (HARDPAN) (A-3/A-2-4)
8. LIMESTONE
9. LIGHT GRAY TO PALE BROWN SAND TO SAND WITH SILT, TRACE PHOSPHATE (SAND AND TAILING SAND) (A-3)
10. LIGHT GRAY TO DARK BROWN SAND WITH SILT TO SILTY SAND (DISTURBED) (A-2-4)
11. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND TO SILT TO CLAY (DISTURBED) (A-2-6/A-4/A-6/A-7-5/A-7-6/A-2-7)
12. SANDY CLAY INCLUDING WASTE PHOSPHATIC CLAY (SLIME) (A-7-5/A-7-6)
13. DARK BROWN TO BLACK ORGANIC SOILS TO MUCK/PEAT (DISTURBED) ORGANIC SOILS (A-8)
14. LIGHT GRAY TO DARK BROWN SILTY SAND TO SILTY-CLAYEY SAND (DISTURBED) (A-2-4)

W	WATER
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	FELL UNDER WEIGHT OF ROD AND HAMMER
WR	FELL UNDER WEIGHT OF ROD
▼	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
▽	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
▽+	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE AT OR ABOVE GROUND SURFACE
GNE	GROUNDWATER NOT ENCOUNTERED
GNA	GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID.
100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
| |	CASING
T	BORING TRUNCATED FOR ROADWAY SOIL PROFILE SHEETS
CAVE-IN	BORING TERMINATED DUE TO GROUNDWATER TABLE
REFUSAL	BORING TERMINATED DUE TO REFUSAL
NOTE:	THE BORINGS DENOTED WITH A "(1)" WERE PROVIDED BY THE PROJECT SURVEYOR
℄ SURVEY CPP	BASELINE SURVEY OF CENTRAL POLK PARKWAY

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	16 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

MAINLINE

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

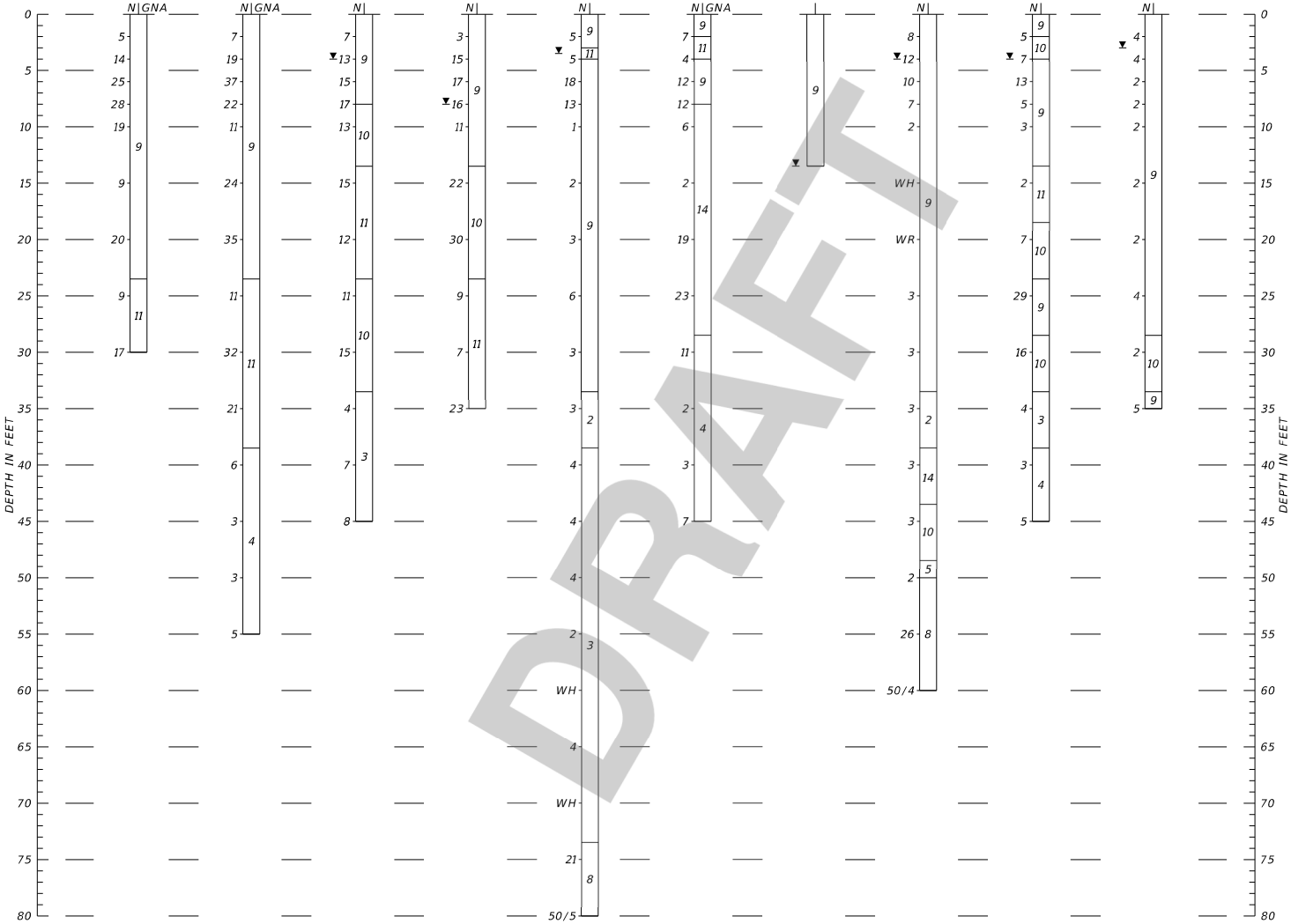
MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

ROADWAY SOIL PROFILES (60)

SHEET NO.



LEGEND

1. LIGHT GRAY TO GRAY TO PALE BROWN TO DARK BROWN SAND TO SAND WITH SILT (A-3/A-2-4)
2. LIGHT GRAY TO GRAY TO BROWN SILTY SAND (A-2-4)
3. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND (A-2-6/A-2-7)
4. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-4/A-6/A-7-5/A-7-6)
5. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-7-5/A-7-6/A-2-7)
6. DARK GRAY TO DARK GRAYISH BROWN ORGANIC SOILS TO MUCK (A-8)
7. DARK REDDISH BROWN TO BROWN CEMENTED SAND TO SILTY SAND (HARDPAN) (A-3/A-2-4)
8. LIMESTONE
9. LIGHT GRAY TO PALE BROWN SAND TO SAND WITH SILT, TRACE PHOSPHATE (SAND AND TAILING SAND) (A-3)
10. LIGHT GRAY TO DARK BROWN SAND WITH SILT TO SILTY SAND (DISTURBED) (A-2-4)
11. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND TO SILT TO CLAY (DISTURBED) (A-2-6/A-4/A-6/A-7-5/A-7-6/A-2-7)
12. SANDY CLAY INCLUDING WASTE PHOSPHATIC CLAY (SLIME) (A-7-5/A-7-6)
13. DARK BROWN TO BLACK ORGANIC SOILS TO MUCK/PEAT (DISTURBED) ORGANIC SOILS (A-8)
14. LIGHT GRAY TO DARK BROWN SILTY SAND TO SILTY-CLAYEY SAND (DISTURBED) (A-2-4)

W	WATER
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	FELL UNDER WEIGHT OF ROD AND HAMMER
WR	FELL UNDER WEIGHT OF ROD
▼	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
▽	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
▽+	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE AT OR ABOVE GROUND SURFACE
GNE	GROUNDWATER NOT ENCOUNTERED
GNA	GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID.
100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
| |	CASING
T	BORING TRUNCATED FOR ROADWAY SOIL PROFILE SHEETS
CAVE-IN	BORING TERMINATED DUE TO GROUNDWATER TABLE
REFUSAL	BORING TERMINATED DUE TO REFUSAL
NOTE:	THE BORINGS DENOTED WITH A "(1)" WERE PROVIDED BY THE PROJECT SURVEYOR
℄ SURVEY CPP	BASELINE SURVEY OF CENTRAL POLK PARKWAY

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	16 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

MAINLINE

REVISIONS

DATE	DESCRIPTION	DATE	DESCRIPTION

MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

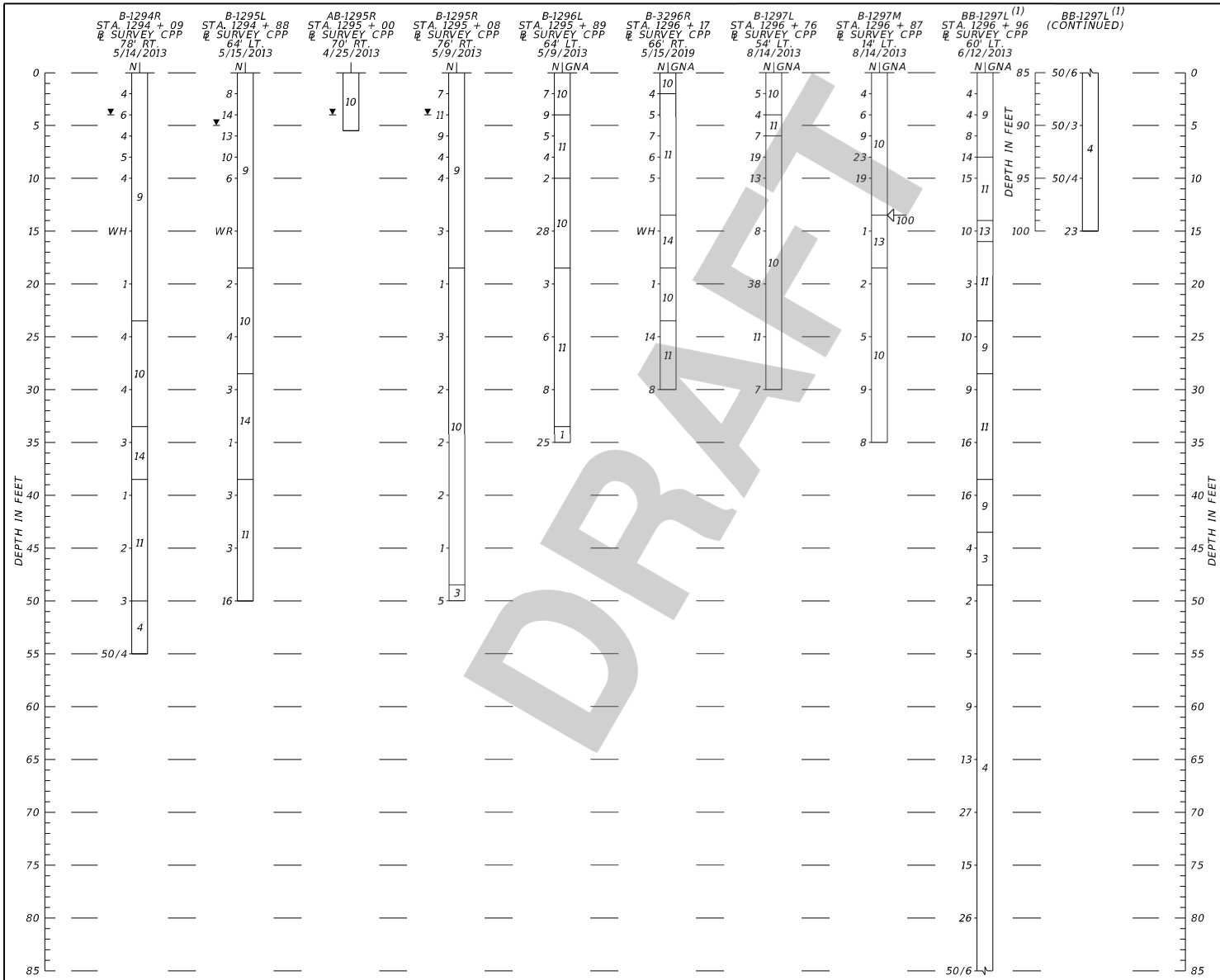
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

ROADWAY SOIL PROFILES (61)

SHEET NO.

bgarcia 11/21/2019 5:48:55 PM J:\6511\2017 Files\6511-17-181 CPP-1\-001_Design\Microstation\AB0RRDProf01.dgn



LEGEND

1. LIGHT GRAY TO GRAY TO PALE BROWN TO DARK BROWN SAND TO SAND WITH SILT (A-3/A-2-4)
2. LIGHT GRAY TO GRAY TO BROWN SILTY SAND (A-2-4)
3. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND (A-2-6/A-2-7)
4. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-4/A-6/A-7-5/A-7-6)
5. LIGHT GRAY TO GRAY TO BROWN CLAYEY SAND TO SANDY CLAY TO SILT TO CLAY (A-7-5/A-7-6/A-2-7)
6. DARK GRAY TO DARK GRAYISH BROWN ORGANIC SOILS TO MUCK (A-8)
7. DARK REDDISH BROWN TO BROWN CEMENTED SAND TO SILTY SAND (HARDPAN) (A-3/A-2-4)
8. LIMESTONE
9. LIGHT GRAY TO PALE BROWN SAND TO SAND WITH SILT, TRACE PHOSPHATE (SAND AND TAILING SAND) (A-3)
10. LIGHT GRAY TO DARK BROWN SAND WITH SILT TO SILTY SAND (DISTURBED) (A-2-4)
11. GRAY TO BROWN SILTY-CLAYEY SAND TO CLAYEY SAND TO SILT TO CLAY (DISTURBED) (A-2-6/A-4/A-6/A-7-5/A-7-6/A-2-7)
12. SANDY CLAY INCLUDING WASTE PHOSPHATIC CLAY (SLIME) (A-7-5/A-7-6)
13. DARK BROWN TO BLACK ORGANIC SOILS TO MUCK/PEAT (DISTURBED) ORGANIC SOILS (A-8)
14. LIGHT GRAY TO DARK BROWN SILTY SAND TO SILTY-CLAYEY SAND (DISTURBED) (A-2-4)

W	WATER
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	FELL UNDER WEIGHT OF ROD AND HAMMER
WR	FELL UNDER WEIGHT OF ROD
▼	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
▽	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
▽+	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE AT OR ABOVE GROUND SURFACE
GNE	GROUNDWATER NOT ENCOUNTERED
GNA	GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID.
100	LOSS OF CIRCULATION OF DRILLING FLUID (%)
| |	CASING
T	BORING TRUNCATED FOR ROADWAY SOIL PROFILE SHEETS
CAVE-IN	BORING TERMINATED DUE TO GROUNDWATER TABLE
REFUSAL	BORING TERMINATED DUE TO REFUSAL
NOTE:	THE BORINGS DENOTED WITH A "(1)" WERE PROVIDED BY THE PROJECT SURVEYOR
℄ SURVEY CPP	BASELINE SURVEY OF CENTRAL POLK PARKWAY

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	16 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

MAINLINE

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

MARC E. NOVAK, Ph. D., P.E.
P.E. LICENSE NUMBER 67431
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 570B	POLK	440897-2-52-01

ROADWAY SOIL PROFILES (62)

SHEET NO.

bgarcia 11/21/2019 5:48:55 PM J:\6511\2017 Files\6511-17-181 CPP-1\-001_Design\Microstation\AB0RRDProf01.dgn

APPENDIX E

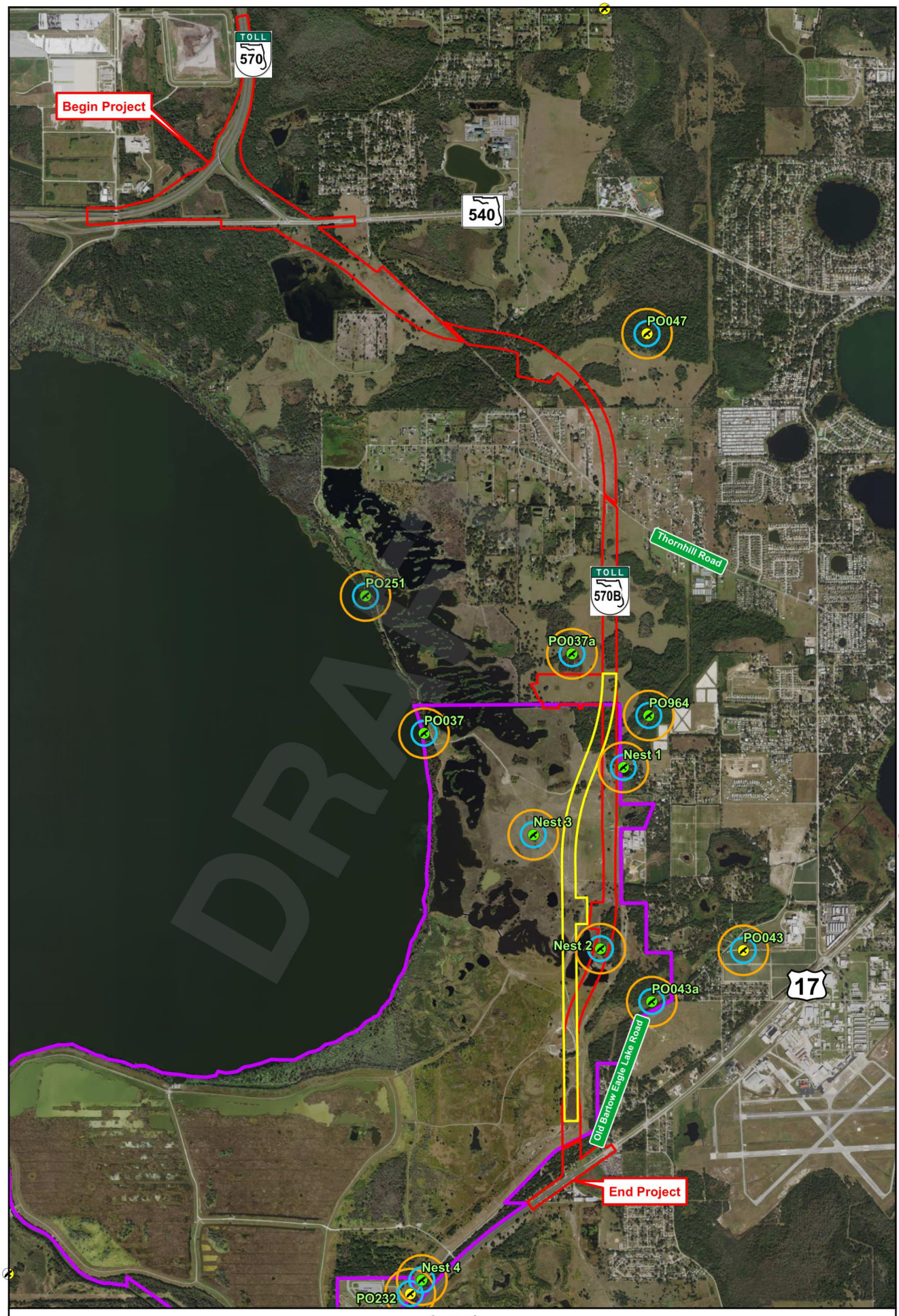
Summary of Laboratory Test Results for Soil Classification – Alignment Alternative 6

Summary of Laboratory Test Results for Soil Classification
Alignment Alternative 6 Evaluation
SR 570B (Central Polk Parkway) from SR 570 (Polk Parkway) to SR 35 (US 17)
Polk County, Florida
FPN: 440897-2-52-01
Tierra Project No.: 6511-17-181-001.01

Boring Name	Sample Depth (feet)	Stratum Number	AASHTO	% Finer	Atterberg Limits			Organic Content	Moisture Content
				#200	LL	PL	PI		
ABE-1205L	0.0 - 1.0	6	A-8	11	--	--	--	17	73
ABE-1205R	0.0 - 1.0	6	A-8	7	--	--	--	13	55
ABE-1206L	0.0 - 1.0	6	A-8	5	--	--	--	14	57
ABE-1207L	0.0 - 1.0	6	A-8	6	--	--	--	10	78
BE-1224L	6.0 - 8.0	9	A-3	9	--	--	--	--	--
BE-1233R	18.5 - 20.0	9	A-3	6	--	--	--	--	--
BE-1241+50R	13.5 - 15.0	9	A-3	7	--	--	--	--	--
BE-1245R	13.5 - 15.0	9	A-3	3	--	--	--	--	--
BE-1255R	8.0 - 10.0	9	A-3	5	--	--	--	--	--
BE-1216L	13.5 - 15.0	10	A-2-4	21	NP	NP	NP	--	21
BE-1216L	18.5 - 20.0	10	A-2-4	12	NP	NP	NP	--	19
BE-1219L	18.5 - 20.0	10	A-2-4	20	NP	NP	NP	--	47
BE-1220R	6.0 - 8.0	10	A-2-4	17	NP	NP	NP	--	17
BE-1233R	5.0 - 6.0	10	A-2-4	20	--	--	--	--	--
BE-1233R	33.5 - 35.0	10	A-2-4	17	--	--	--	--	--
BE-1239L	2.0 - 4.0	10	A-2-4	15	NP	NP	NP	--	38
BE-1249R	18.5 - 20.0	10	A-2-4	23	--	--	--	3	21
BE-1255R	0.0 - 2.0	10	A-2-4	21	NP	NP	NP	--	9
BE-1262	8.0 - 10.0	10	A-2-4	11	--	--	--	--	--
BE-1289R	23.5 - 25.0	10	A-2-4	16	NP	NP	NP	--	54
BE-1225R	28.5 - 30.0	11	A-6	48	27	13	14	--	28
BE-1269L	13.5 - 15.0	11	A-4	38	NP	NP	NP	--	29
BE-1278R	6.0 - 8.0	11	A-6	41	28	16	12	--	20
BE-1279R	0.0 - 1.0	11	A-6	45	33	17	16	3	26
BE-1233R	4.0 - 5.0	12	A-7-6	79	79	25	54	--	44
BE-1249R	13.5 - 15.0	12	A-7-5	71	72	35	37	--	119
BE-1266L	2.0 - 4.0	12	A-7-5	83	76	37	39	--	66
BE-1233R	23.5 - 25.0	13	A-8	9	--	--	--	10	45
BE-1243L	13.5 - 15.0	13	A-8	56	--	--	--	9	48
BE-1251L	13.5 - 15.0	13	A-8	4	--	--	--	28	88
BE-1264L	2.0 - 4.0	13	A-8	9	--	--	--	8	22
BE-1277L	6.0 - 8.0	13	A-8	17	--	--	--	8	39
BE-1277L	8.0 - 10.0	13	A-8	17	--	--	--	8	39
BE-1277R	2.0 - 4.0	13	A-8	42	40	23	17	16	60
BE-1277R	4.0 - 6.0	13	A-8	9	--	--	--	11	54
BE-1278R	4.0 - 6.0	13	A-8	24	--	--	--	34	60
BE-1282R	13.5 - 15.0	13	A-8	12	--	--	--	9	22
BE-1284L	13.5 - 15.0	13	A-8	11	--	--	--	20	118
BE-1226+50	28.5 - 30.0	14	A-2-4	30	18	12	6	--	21
BE-1227R	28.5 - 30.0	14	A-2-4	15	16	14	2	--	19
BE-1279R	28.5 - 30.0	14	A-2-4	25	24	14	10	--	21

APPENDIX C:

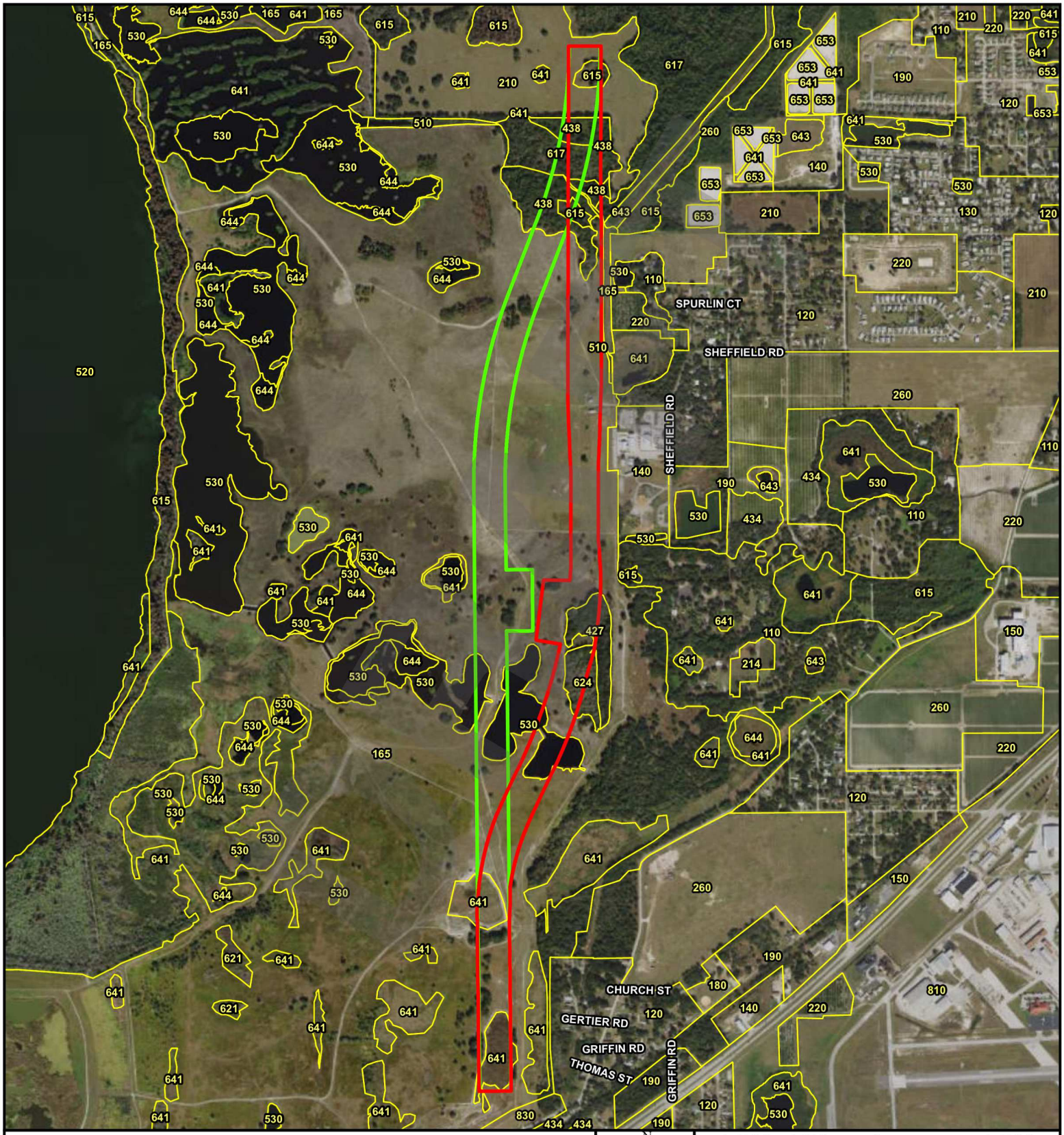
PROPOSED DRI BOUNDARY MAP



Path: M:\12017\39.00_CPP\NonSubmittal\Design\440897\2020\GIS\Maps\Figures\PSR\Eagles\CPP1_Eagle_Nest_Alternative_Map_3.mxd 5/27/2020

APPENDIX D:

LAND USE MAP



Legend

- Current Alignment
- Alternative 6

120: RESIDENTIAL MED DENSITY 2->5 DWELLING UNIT
140: COMMERCIAL AND SERVICES
165: RECLAIMED LAND
190: OPEN LAND
210: CROPLAND AND PASTURELAND
230: FEEDING OPERATIONS
320: SHRUB AND BRUSHLAND
411: PINE FLATWOODS
427: LIVE OAK
434: HARDWOOD CONIFER MIXED
438: MIXED HARDWOODS
510: STREAMS AND WATERWAYS
530: RESERVOIRS
615: STREAM AND LAKE SWAMPS (BOTTOMLAND)
617: MIXED WETLAND HARDWOODS
624: CYPRESS - PINE - CABBAGE PALM
630: WETLAND FORESTED MIXED
631: WETLAND SCRUB
641: FRESHWATER MARSHES
653: INTERMITTENT PONDS
810: TRANSPORTATION
830: UTILITIES

N
W E
S

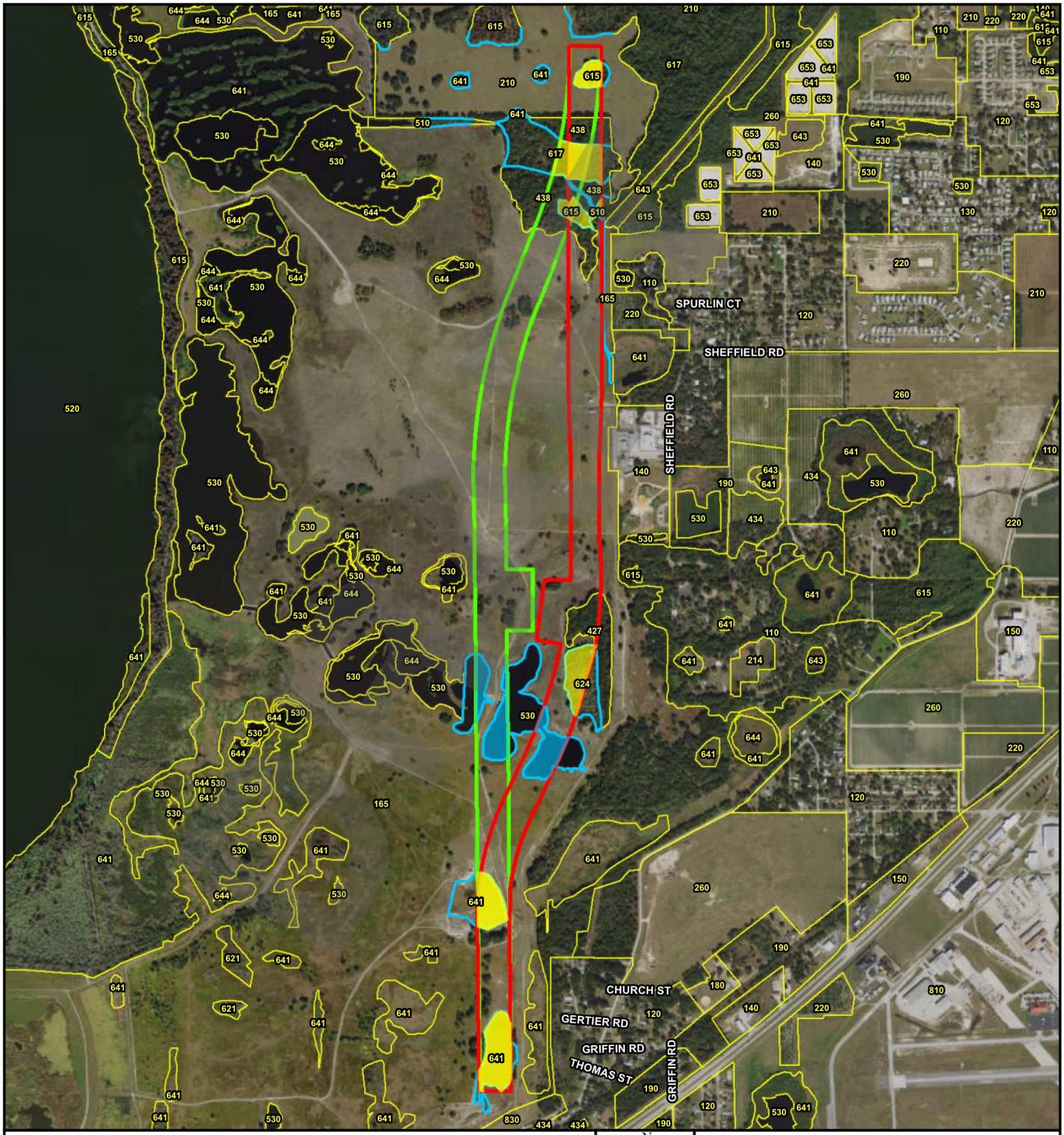
1,500 750 0 1,500
Feet

Land Use Map
Central Polk Parkway from Polk Parkway (SR 570) to US 17 (SR 35)
Polk County, Florida
FPID Number: 440897-1-52-01

Kisinger Campo & Associates, Corp.
201 N. Franklin Street, Suite 400
Tampa, FL 33602
Phone: 813/871-5331

APPENDIX E:

WETLAND IMPACT MAP



Legend

- Current Alignment
- Alternative 6
- Wetland/Surface Water Line
- Surface Water Impact
- Wetland Impact

120: RESIDENTIAL MED DENSITY 2->5 DWELLING UNIT
140: COMMERCIAL AND SERVICES
165: RECLAIMED LAND
190: OPEN LAND
210: CROPLAND AND PASTURELAND
230: FEEDING OPERATIONS
320: SHRUB AND BRUSHLAND
411: PINE FLATWOODS
427: LIVE OAK
434: HARDWOOD CONIFER MIXED
438: MIXED HARDWOODS
510: STREAMS AND WATERWAYS
530: RESERVOIRS
615: STREAM AND LAKE SWAMPS (BOTTOMLAND)
617: MIXED WETLAND HARDWOODS
624: CYPRESS - PINE - CABBAGE PALM
630: WETLAND FORESTED MIXED
631: WETLAND SCRUB
641: FRESHWATER MARSHES
653: INTERMITTENT PONDS
810: TRANSPORTATION
830: UTILITIES

N W E S

1,500 750 0 1,500

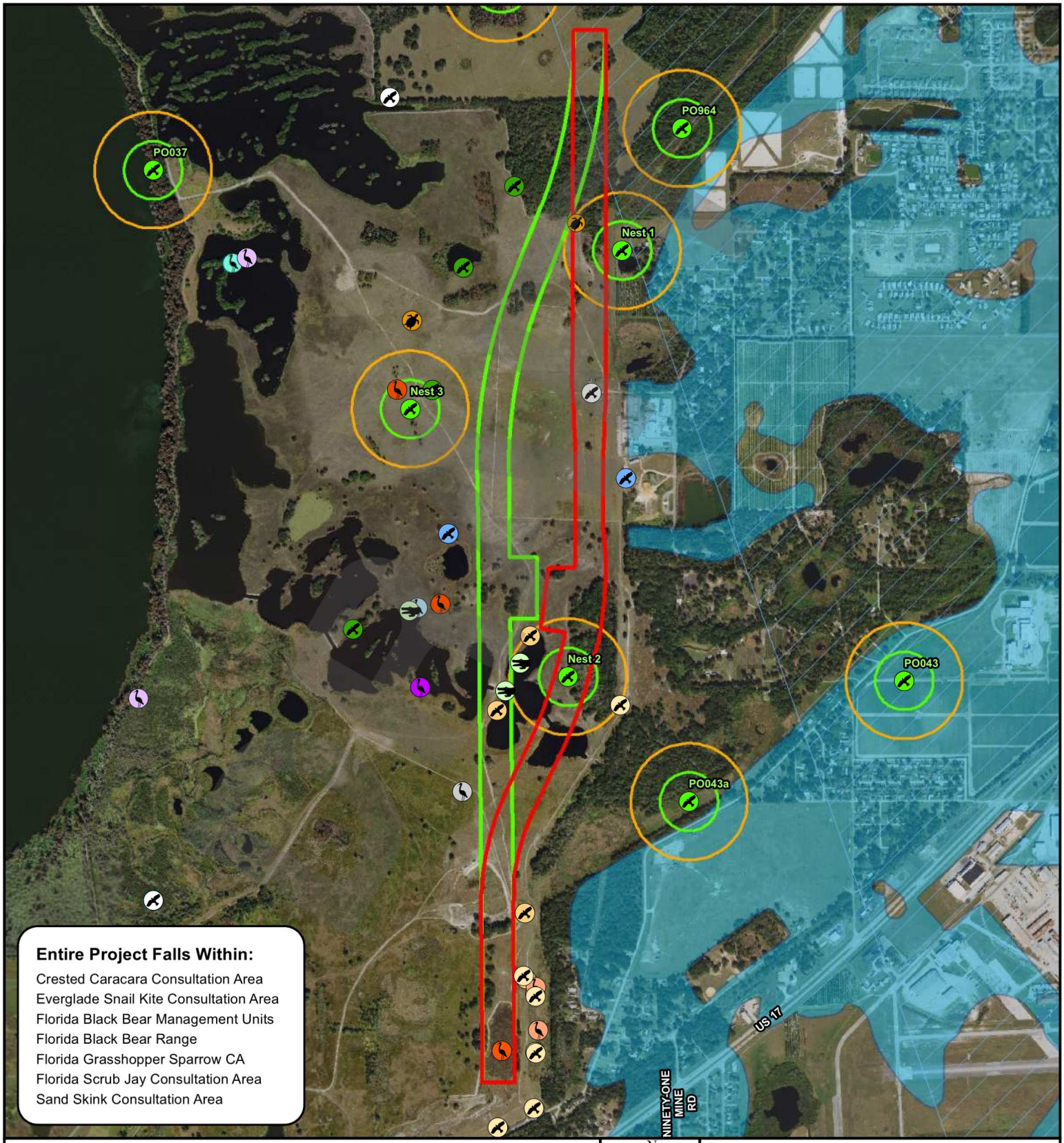
Feet

Wetland and Surface Water Impact Map
Central Polk Parkway from Polk Parkway (SR 570) to US 17 (SR 35)
Polk County, Florida
FPID Number: 440897-1-52-01

Kisinger Campo & Associates, Corp.
201 N. Franklin Street, Suite 400
Tampa, FL 33602
Phone: 813/871-5331

APPENDIX F:

PROTECTED SPECIES MAP



Entire Project Falls Within:

Crested Caracara Consultation Area
Everglade Snail Kite Consultation Area
Florida Black Bear Management Units
Florida Black Bear Range
Florida Grasshopper Sparrow CA
Florida Scrub Jay Consultation Area
Sand Skink Consultation Area

- Current Alignment
- Alternative 6
- Florida Scrub Jay Service Area
- Sand Skink Potential Habitat
- 330ft Eagle Nest Buffer
- 660ft Eagle Nest Buffer
- Osprey (Documented)
- Wood Stork (Documented)
- FWC Bald Eagle Nest Location
- Wading Bird Rookery

KCA Observed:

- Osprey (In Flight)
- Osprey nest
- Sandhill Crane
- American Kestrel
- Bald Eagle Nest
- American Alligator
- Bald Eagle Flyover
- Florida Sandhill Crane Nest
- Gopher Tortoise Burrow
- Little Blue Heron
- Roseate Spoonbill
- Wood Stork

N W E S

1,500 750 0 1,500

Feet

Listed Species Map
Central Polk Parkway from Polk Parkway (SR 570) to US 17 (SR 35)
Polk County, Florida
FPID Number: 440897-2-52-01

Kisinger Campo & Associates, Corp.
201 N. Franklin Street, Suite 400
Tampa, FL 33602
Phone: 813/871-5331

Path: M:\1201739.00_CPP\NonSubmittalDesign\440897252011\GIS\Maps\Figures\Protected Species Memo\CPP1_Species_Map.mxd 4/13/2020

APPENDIX I:

CONTAMINATION TECHNICAL MEMORANDUM

CONTAMINATION TECHNICAL MEMORANDUM

(Addendum to the Mainline CSER)

ALTERNATIVE 6 - BALD EAGLE REALIGNMENT

Florida Turnpike Enterprise

SR 570B (Central Polk Parkway) Segment 1
From SR 570 (Polk Parkway) to SR 35 (US 17)

Polk County, Florida

Financial Management Number: 440897-2-32-01

August 5, 2020

Introduction

The purpose of this Contamination Technical Memorandum (Tech Memo) is to present the findings of a contamination screening for a new alignment option known as Alternative 6 (Alt 6). This document is an addendum to the mainline CSER. FTE comments (DCN 11695, DCN 11805, and DCN 11925) have been incorporated into this document. Alt 6 is being considered as a possible realignment of a portion of the preferred alignment (Alt 4) for the SR 570B (Central Polk Parkway) Segment 1 from SR 570 (Polk Parkway) to SR 35 (US 17) roadway project. The realignment is intended to avoid and/or minimize bald eagle nest impacts. Alt 4 is approximately seven miles in length. Alt 6 is approximately two miles in length and is located approximately 1,000 feet west of the Alt 4 alignment. See attached **Sheet No. A-1**.

Methodology

The methodology (based on negotiated scope) for this contamination evaluation includes:

- Desktop review of the Level I Contamination Screening Evaluation Report (mainline) dated April 10, 2020,
- Assign risk ratings for contamination sites related to Alt 6, and
- Provide a written Contamination Tech Memo for Alt 6.

Documentation reviewed for this Contamination Tech Memo, including historic aerial photographs, the USGS topographic map, regulatory database report, and other resources are included in the Level I Contamination Screening Evaluation Report (mainline) dated April 10, 2020.

Findings

Previously, the Alt 4 alignment was evaluated in the Level I Contamination Screening Evaluation Report (mainline) dated April 10, 2020. Of the eighteen potential contamination sites evaluated in the April 2020 Level I Contamination Screening Evaluation Report, one site is located within the PD&E Manual Chapter 20 recommended search distances for Alt 6:

- Site 11 - Former Old Florida Plantation Property (currently Southwest Florida Water Management District (SWFWMD) property) - this site was assigned a risk rating of Medium for historic use as phosphate mined land. Alt 6 is located within the limits of Site 11, except for the northern-most 2,200 feet (0.4 miles).

A detailed discussion of Site 11 as it relates to Alt 6 is provided in **Table 1** and Site 11 is depicted on **Sheet No. A-1**.

Table 1 – Potential Contamination Site						
Site Number	**Site Name & Address**	**Facility ID**	**Approximate Distance From Alt 6 ROW**	**Contaminants of Concern**	**Risk Rating**	**Comments**
11	**Former Old Florida Plantation Property (currently Southwest Florida Water Management District (SWFWMD) property)** North of Old Bartow Eagle Lake Road, Bartow	NA	Within proposed Alt 6 ROW	Polycyclic Aromatic Hydrocarbons (PAHs), Volatile Organic Compounds (VOCs), Total Petroleum Hydrocarbons (TPH), Radium 226, and pH	**Medium**	This facility (PD&E Site W203-6) was identified as a former phosphate mine located within the right-of-way (ROW) in the original PD&E Contamination Screening Evaluation Report dated December 2010 (Revised March 2011), and assigned a risk rating of Medium. PD&E recommendations included soil and groundwater sampling for pH, Radium 226, and polynuclear aromatic hydrocarbons (PAHs). During the site reconnaissance during the original PD&E, this site was observed as open pasture and ponds. During the review of historical aerial photography and topographic maps during the original PD&E, mining activities spanning approximately 2 miles of the southern portion of the project corridor were evident within and adjacent to proposed ROW at least since the 1960s. One 2-inch diameter piezometer (presumably) within steel protective casing was observed approximately 20 feet east of the Alt 4 ROW (approximately 1,000 feet east of the Alt 6 ROW). This piezometer does not appear to be related to any known contamination issues. This site is illustrated on the attachment, **Sheet A-1**. Contamination related regulatory files were not identified for this facility. According to the FDEP's "Phosphate" website, large draglines are used to conduct the mining. It scoops up the top 15 to 30 feet of earth, known as overburden, and dumps it in spoil piles to the side of the mine pit. The dragline then digs out the ore-bearing layer (known as the matrix), which consists of about equal parts phosphate rock, clay, and sand. Matrix material is then dumped in a pit where high-pressure water guns create a slurry that can then be pumped to the beneficiation plant, which can be several miles away. At the beneficiation plant, the phosphate is separated from the sand and clay. The phosphate is sent by rail to a separate chemical processing plant where it is processed for use in fertilizer and other products. The chemical processing is done at separate facilities that are not regulated by the FDEP Mining and Mitigation Program. After going through beneficiation, the clay is pumped through pipelines into large impoundment areas, known as clay settling areas, where they remain. The sand is pumped through pipelines back to the mined area and is used in reclamation. According to the Selected Study Area Existing Conditions Analysis Polk County Florida report dated May 2012 (by Florida Institute for Phosphate Research (FIPR)), waste disposal, radioactivity, air and water pollution are considered "special regulatory concerns" with regards to "impact to health." Since, based on review of historic aerial photographs, no phosphate plant is located within or adjacent to the ROW, plant emissions are not considered a contamination concern. Based on the 1941 aerial photograph, the processing plant was located approximately 0.7 miles south of US 17 and the project limits. Phosphogypsum stacks or process water ponds were not identified within or adjacent to the ROW. Currently, Florida Administrative Code requires radiation monitoring (soil radium) at phosphate mining areas both pre- and post-mining, and after reclamation. The FDEP was contacted on March 26, 2019 for contamination assessment/testing related files for this study area. A response provided on March 27, 2019 by Mrs. Marisa Rhian, FDEP Environmental Administrator, Bartow/Homeland Regional Field Office stated areas adjacent to the ROW "were mined for phosphate prior to June 1, 1975 and are considered nonmandatory. Reclamation standards for phosphate mines were established for lands mined after June 1, 1975 per Chapter 378, Florida Statutes." She further stated inquiries regarding radium/radon testing should be sent to the Florida Department of Health's (FDOH) Bureau of Radiation Control at 407-297-2096, RadiationControl@FLHealth.gov. In an email response (dated April 3, 2019) from the FDOH, Bureau of Radiation Control, Brenda Andrews stated "according to our Environmental Radiation Section, we have no data points for the mine referenced as it was closed long before pre and post mining began." See email in the Level I Contamination Screening Evaluation Report dated April 10, 2020. Based on Tierra's Preliminary Roadway Soil Survey Report dated October 23, 2018, a total of 7 piezometers were installed along the project limits in 2013. Depth to groundwater ranged from 4.5 feet below land surface (bls) to 12.5 feet bls in 2013. Mined soils, including Clay Settling Areas (CSAs) also known as waste phosphatic clay or waste slime, were identified from Station 1213 to Station 1333, located in the south and central areas of this project at depths ranging from 15 to 80 feet bls. Based on the USEPA Fact Sheet (no date), "phosphate rocks, which can contain relatively high levels of radium and uranium, are a potential source of exposure." Radium exposure can be from inhalation and ingestion. It can accumulate in bones and will remain there for a person's lifetime. In the environment the greatest risk associated with radium is actually posed by its direct decay product radon. No information was reviewed that would warrant a change to the risk rating assigned during the PD&E. Therefore, this area retains a risk rating of Medium.

Conclusions and Recommendations

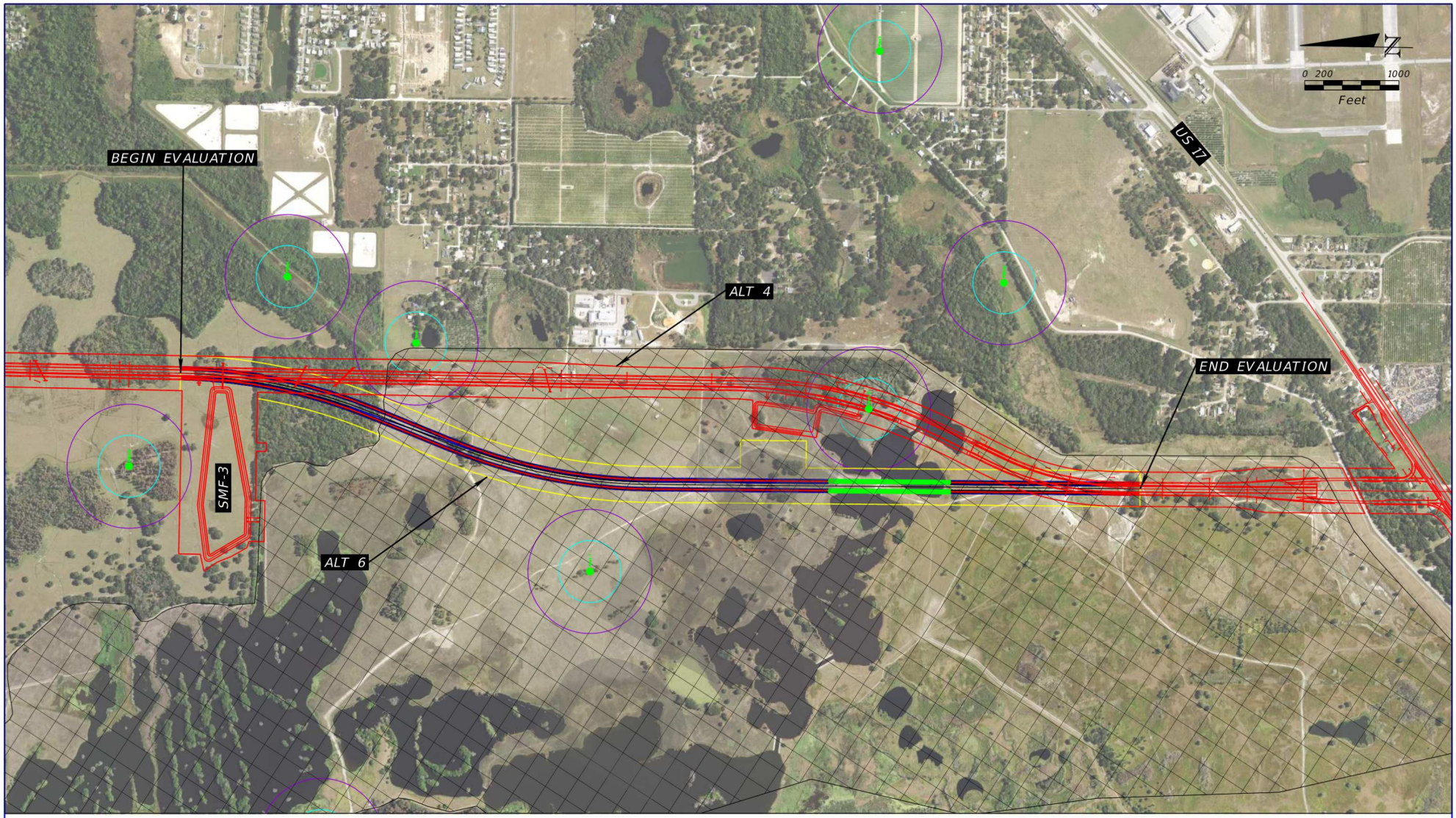
Based on this contamination screening, one potential contamination site was identified within the limits of Alt 6. The following table presents a summary of the risk ratings assigned for each potential contamination site/facility:

Risk rating	No. of Sites	Site Number – Site Name
No	0	
Low	0	
Medium	1	Site 11 – Former Old Florida Plantation (currently Southwest Florida Water Management District (SWFWMD) property)
High	0	

Based on the conclusions of the study and the risk ratings noted above, the following recommendations are made for this project:

- Additional information may become available or site-specific conditions may change from the time this report was prepared and should be considered prior to acquiring ROW and/or proceeding with roadway construction.

- Level II testing is recommended for Site 11 – Former Old Florida Plantation (currently Southwest Florida Water Management District (SWFWMD) property) which was assigned a risk rating of Medium for historical use as phosphate mined land. It has been determined that this site may have potential contaminants that could impact the proposed project. A soil and groundwater sampling plan should be developed. The sampling plan should provide sufficient detail as to the number of soil and groundwater samples to be obtained and the specific analytical tests to be performed. Laboratory analytical tests may include Radium 226 by EPA Method 903.1, Polycyclic Aromatic Hydrocarbons (PAHs) by EPA Method 8270, Total Petroleum Hydrocarbons (TPH) by FL PRO Method, Volatile Organic Compounds (VOCs) by EPA Method 8260, and pH. A site location sketch showing all proposed boring locations and groundwater monitoring wells should be prepared. The FTE District Contamination Impact Coordinator (DCIC) should be consulted regarding the site-specific Level II field screening scope of work.



SITE 11- MEDIUM RISK RATING

EAGLES NEST

SOURCE: FDOT SURVEY AND MAPPING DATED 2017

POTENTIAL CONTAMINATION SITES

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION
			TIERRA PROJECT NO.: 6511-17-181-001E

TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
N/A	POLK	440897-2-32-01

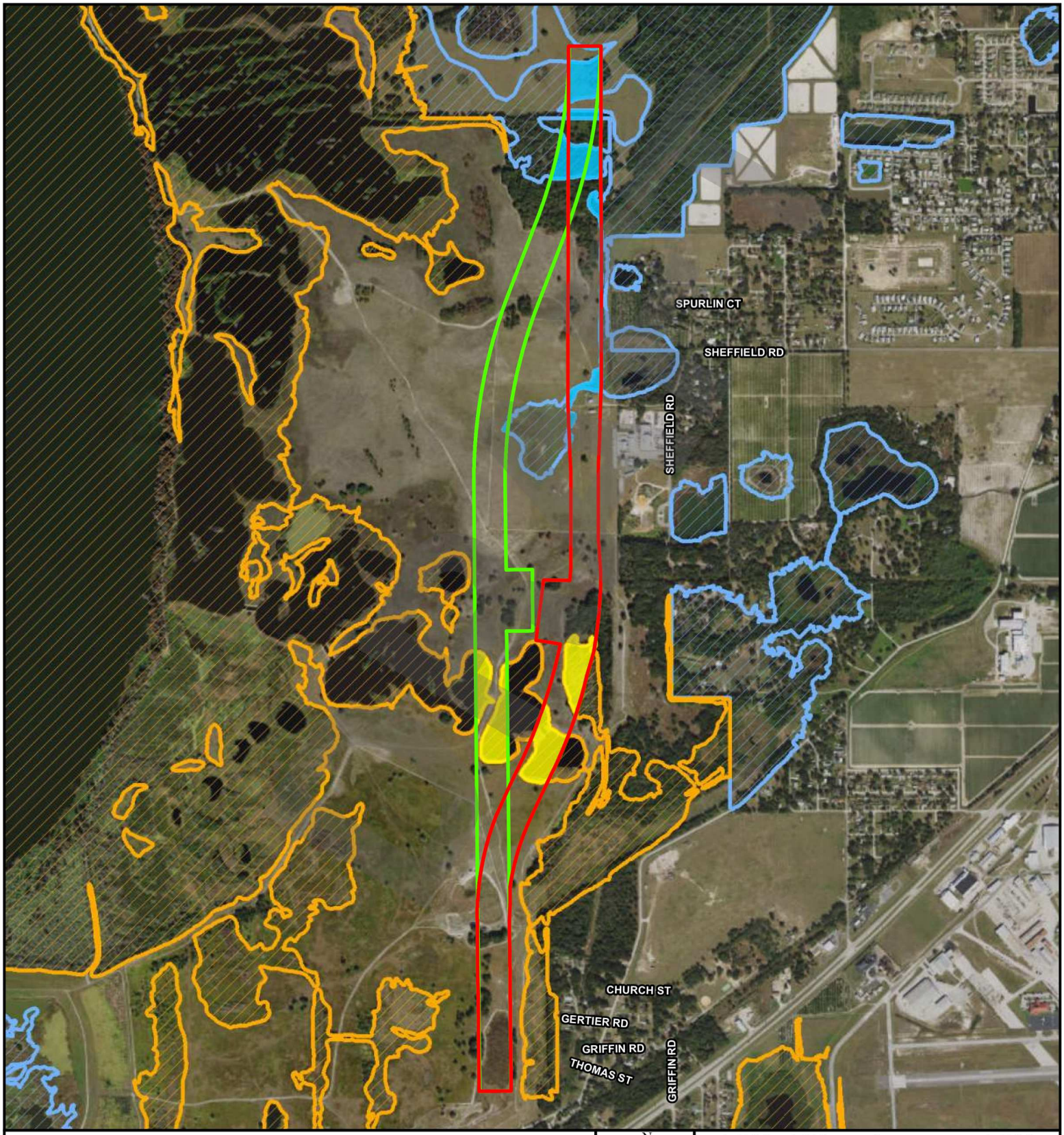
CENTRAL POLK PARKWAY - SEGMENT 1
ALTERNATIVE 6 - POLK COUNTY, FLORIDA

SHEET NO.
A-1

bgarcia 5/27/2020 3:13:36 PM J:\6511\2017 Files\6511-17-181 CPP-1\-001_Design\Microstation\Bald Eagle\rdgeoEnvBE

APPENDIX J:

FLOODPLAIN IMPACT MAP



Legend

- Current Alignment
- Alternative 6

FEMA Flood Zone

- A
- AE

Flood Zone Impact

- A
- AE

N W E S

1,500 750 0 1,500

Feet

FEMA Flood Zone Impact Map
Central Polk Parkway from Polk Parkway (SR 570) to US 17 (SR 35)
Polk County, Florida
FPID Number: 440897-1-52-01

Kisinger Campo & Associates, Corp.
201 N. Franklin Street, Suite 400
Tampa, FL 33602
Phone: 813/871-5331

APPENDIX K:

USFWS EAGLE TECHNICAL ASSISTANCE MEETING MINUTES

Florida Department of Transportation

RON DESANTIS
GOVERNOR

Florida's Turnpike Enterprise
P.O. Box 613069, Ocoee, FL 34761
407-532-3999

KEVIN J. THIBAULT, P.E.
SECRETARY

FDOT, Florida's Turnpike Enterprise/USFWS Bald Eagle Nest Technical Assistance Meeting Notes
FPID 440897-2 SR 570B (Central Polk Parkway)
Segment 1 from SR 570 (Polk Parkway) to SR 35 (US 17)
Polk County

Date: 12/02/2019
Time: 3:00 PM – 4:30 PM
Venue: Go-To Meeting

Note: The italicized text below in the meeting agenda are the topic points and notes that were discussed throughout the meeting.

1. **Introductions**
   - **Turnpike Environmental Permits Coordinator – Annemarie Hammond** Annemarie Hammond
   - **Turnpike Project Manager – Pam Nagot (HNTB)**
   - **Turnpike Permits Coordinator – Fred Gaines (Atkins)**
   - **Turnpike Permits Coordinator – Tiffany Crosby (Atkins)**
   - **USFWS Bald Eagle Biologist – Ulgonda Kirkpatrick**
   - **KCA Senior Environmental Scientist – Catie Neal**
   - **KCA Chief Environmental Scientist – Robert Whitman**
   - **KCA Senior Environmental Scientist – Ashley Abdel-Hadi**
   - **KCA Senior Roadway Project Engineer – Todd Gardina**
   - **KCA Senior Environmental Scientist – Nicole Selly**
   - **KCA Structures Department Manager – Guillermo Madriz**

2. **Project Overview (map provided)**
   - Project Timeline

   A project overview was provided and a timeline of the PD&E effort by FDOT D1, FTE and the approval of the final SEIR in 2011. The SEIR documented one nest within 660' of the proposed project (assumed to be PO043a). FDOT D1 started design but put on shelf in 2016 with a slightly different alignment than approved SEIR. FTE conducted nest pedestrian/vehicle surveys in 2017 through 2019 documenting potential project involvement with three eagle nests.

- Project area with high bald eagle presence associated with Lake Hancock
  A description of the site conditions was provided with its associated constraints:

  - *Identified bald eagle nests within the vicinity of the project. FFWCC Eagle Nest Locator data, Audubon and field data observations/surveys/locations used for graphics. USFWS indicated that FWC would no longer be in charge of the eagle database and Audubon EagleWatch was taking over. She requested that FWC be notified of the eagle's nests found while doing surveys.*
  - *The proposed project Stormwater Management Pond ROW is located within the 660' secondary buffer of PO037a but construction should be located outside of the secondary buffer; minimal (fencing and minor grading) to no impacts are proposed to the nest after construction.*
  - *The project area is located within the 330' primary zone of "Nest 1" identified. KCA clarified the proposed ROW is 180 feet from the nest and pavement will be approximately 275 feet from the nest.*
  - *Nest 2 will be a full take as it is located within the current alignment's proposed limits of construction and the tree will need to be removed.*
  - *Access via Sheffield Road and canal crossing, DRI plans, utility transmission poles, future plans, etc.*

- Current Alignment (map provided)

  A description of the current alignment and its development from the PD&E was provided.

- Optimization

  2011 SEIR preferred alternative with assumed nest PO043a disturbance (within 660') was reevaluated to avoid Polk Co. Public Works and major high-powered utility transmission lines. This resulted in the 2016 FDOT D1 "optimized" alignment, which continued potential involvement with nest PO043a. FTE started design in 2017 with a review of D1 optimized alignment. 2 "new" eagle nests (Nest 1 within 660' and Nest 2 within 330' and nest tree removal) were identified during design field reviews.

- Avoidance and Minimization
  - Four (4) other Alternatives evaluated (maps provided)
  - Impact Table Provided (all alternatives include work within PO037a for ROW fence)

Description	Current Alignment	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Bridge Length (ft.)	1560	1750	1750	0	1750
Eagle Nest 1 Impacts	Primary (330')	Secondary (660')	Primary (330')	Primary (330')	None
Eagle Nest 2 Impacts	Full Take	None	Secondary (660')	Secondary (660')	Secondary (660')
Toll Facility Impact	No	Yes	No	No	Yes
Geotechnical Risk	Low	High	High	Low	High

Description	Current Alignment	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Utility Impacts	Low	Low	Low	High	Low
SWFWMD Impacts	Low	High	Medium	Low	High
Total Estimated R/W (AC)	519.67	517.30	517.27	518.15	517.28
Floodplain Impact (AC)	124.11	121.35	121.72	126.92	119.46
Wetland Impact (AC)	89.84	87.35	87.36	82.31	86.47

The four alternatives and the constraints associated with each were discussed. It was clarified that the alternative alignments have not be vetted and are still under review to confirm if they are feasible.

- *Alternative 1 moves out of the primary zone for Nest 1 and Nest 2 but bisects the SWFWMD DRI property to a larger degree than the current alignment.*
- *Alternative 2 maintains the current toll site but remains within the primary zone of Nest 1 and moves out of the primary zone for Nest 2, bisecting SWFWMD DRI property to a larger degree than the current alignment.*
- *Alternative 3 moves to the east, staying within the primary zone of Nest 1 and Nest 2; however, this alternative creates large impacts to major high-powered utility transmission poles and impacts County facilities.*
- *Alternative 4 avoids both nests and minimizes impacts to the fullest degree by remaining completely outside primary and secondary buffer zones for Nest 1 and barely within the secondary zone of Nest 2.*

3. Bald Eagle Nests Involvement within Project Area (Map Provided)

- Three (3) nests with potential involvement

Bald Eagle Nest	Status	Notes
PO37a	PI	2019 surveys indicated this bald eagle nest is not currently in use; FWC/Audubon data suggest this pair is currently utilizing another nest (PO037) to the west on Lake Hancock west shore
Nest 1	A	Bald eagles were observed nest building during 2019 surveys
Nest 2	A	Bald eagles were observed nest building during 2019 surveys

A: Active
PI: Potentially Inactive

USFWS asked if the current alignment was the preferred alignment? Turnpike indicated that the project currently in designed is based on 2016 FDOT D1 alignment (current alignment). Since the two new bald eagle nests have been recently identified, the alternative alignments discussed in the meeting are being investigated.

4. Permitting Options

- Bald Eagle Nest Take Permit (discussion for each involved nest – Full take and Incidental Take – 330 & 660 buffer impacts)

USFWS reminded attendees that if there is no nest then no nest permit is required. If an incidental take or disturbance permit is required, it includes construction of roads, trails, canals, power lines and other linear utilities, agriculture, building construction, mining activities, drilling activities, timber operations, off-road vehicle use, watercraft use, human entry, and loud noises.

USFWS indicated that for PO037a, since minor activities within the secondary (330-660') zone, FTE could either 1) continue to try to avoid impacts entirely; 2) worse case implement monitoring guidelines; or 3) include it in with the other nest take permit applications. USFWS recommended since FTE is already permitting nest impacts, it would not be an issue to include it with the other two nest take permit applications.

USFWS indicated that it appeared Nest 1 would be an incidental take.

USFWS indicated Nest 2 would be a full take with the current alignment. If the current alignment is justified, then the removal of Nest 2 would need to take place outside of nesting season or when no adults are present for 10 consecutive days. USFWS advised that construction be coordinated for the removal of the nest and clearing of the ROW to discourage the eagles from re-0nesting close by and within the same project area. USFWS advised all permits should be in place so other clearing and grubbing operations can occur concurrently.

USFWS explained that all three nests could be combined and issued under one permit, but each proposed nest impact will require a separate application. The nest take permit would be valid for 5 years from date of issuance.

Turnpike requested clarification of qualifications for a Full Nest Take permit. USFWS indicated that the take permit applications should demonstrate the purposed actions provide a protected interest and have a net benefit to eagles in order to qualify under the last criteria for nest take permit issuance.

Turnpike requested examples on how to show a net benefit for eagles. USFWS indicated there are several options and no real guidelines but they must pass reasonable scrutiny (straight face test). The nest take permit application needs to prove there is an overall net benefit criteria met for the species. USFWS clarified that the local area where the overall net benefit can occur is based on an 86-mile radius from the nest being taken. USFWS provided several examples but noted FDOT is not limited to only these options.

- *Land management funding for prescribed burning*
- *Set aside existing eagle habitat for conservation via conservation easement*
- *Work with utility companies to make sure that existing or new powerlines are suitable for eagles based on Avian Power Line Interaction Committee – APLIC guidelines*
- *Donate to eagle rehab center*

Turnpike request clarification on the public notice process of the application and permit issuance. USFWS indicated that the nest take permit applications do not have a public notice process, but they do go through concurrent intra-agency Section 7 consultation. Federal actions on the project will need to be reviewed concurrently (including US Army Corps of Engineers – COE S404 Permit Application Review). USFWS was not sure if the COE S404 Public Notice would include the Bald eagle nest take permit with the Section 7 consultation information. USFWS recommended coordinating with John Wrublik for clarification of the COE/USFWS Section 7 consultation process relative to Bald Eagle Nest Take Permit Applications and to finalize any other protected species issues beforehand. Tribal and cultural consultation are also required so it is also recommended to submit SHPO concurrence with application.

- Additional data needed

Clarification was requested regarding additional data that might be needed for the permit applications.

USFWS indicated that Turnpike needs to be able to address all the questions on the application. If not possible to answer, reach out to USFWS to discuss an approach prior to leaving questions blank. The local area population analysis will be conducted by USFWS. The information present on maps and current data collected should be sufficient for the application. USFWS indicated that FTE needs to show the following: "What you want to do", "Where you want to do it", and "How you want to do it." Provide information on how you are going to avoid and minimize impacts to the greatest extent practicable and what kind of net benefit to eagles will be provided to the nest removal. USFWS confirmed that the original PD&E related documents are acceptable for the NEPA related aspects associated with the nest take permit applications.

- Monitoring requirements

Turnpike inquired if there will be any further monitoring required for the nest take permit applications based on the information presented in the meeting. USFWS indicated that no further monitoring should be required for the nest take application, but monitoring will likely be required after the permits are issued. For Nest 1, it will likely be required to monitor for any impacts during construction if work is conducted during the nesting season in the 330-660' protection zone and post-construction for 1 year. For example, a 5-year (nesting season) duration construction project will require nesting season monitoring all 5 years if construction occurs within the protection zones and then 1 year afterwards. For Nest 2, monitoring will be required until adults have not returned for 10-consecutive days prior to nest tree removal. If the eagles come back, relocate outside of the project area protection zone distance and produce young right away then monitoring will only be required for 1 nesting season. If the birds do not return, then a minimum of 2 years is likely required. If the birds happen to come back and build a nest within 660 feet of the project area, then a permit amendment for the new location may be required.

Turnpike inquired about the amendment process; difficulty, level of involvement, similarity to the initial application process? USFWS indicated that amendments are generally not difficult to process and timely and can be done via email and coordination with her directly.

5. Mitigation Options

- Compensatory Mitigation – conservation of existing bald eagle nest or habitat
- Artificial Nest Structures
- Monitoring
- Cooperative project – FTE, SWFWMD, Audubon Eagle Watch Program

USFWS indicated that the mitigation options vary widely. Local area for a nest is 86 miles, so FDOT can be liberal in location of conservation measures.

6. Timeline

USFWS indicated that a nest take permit processing timeline is approximately 80 – 180 days. Turnpike inquired if that is the same timeline for multiple nests, USFWS indicated that, yes, 80 – 180 days is the goal for USFWS, but certain things can delay the process. USFWS does not currently see any red flags. Getting the concurrent Section 7 coordination would be critical to avoid delays in permitting.

USFWS indicated that a year out for the permit process will be sufficient for application submittal. It should line up with the ACOE permit application review and other USFWS coordination in order to prevent any potential delays (due to the intra-agency Section 7 coordination). USFWS explained that the eagle populations in central Florida (Polk County included) are so high and dynamic. For example, a storm or hurricane could easily blow a nest out of the tree and the nest could "disappear." USFWS verified that if a known nest is removed and is no longer existing, there is nothing to permit. It is recommended to wait until a year before construction is due to start to apply for any Bald Eagle permits. Nests could be removed (due to natural reasons) or there could be additional nests that are found in the area (newly built nests).

7. Roundtable/Questions/Comments

Turnpike requested clarification on what type of documentation is needed to demonstrate avoidance and minimization? USFWS indicated that to avoid doing work within 330 feet is a valid minimization measure. If that is not possible, then temporary work barriers to avoid heavy equipment would also be considered. Additionally, making sure construction crews are aware of the location of the nest(s) and work quickly and quietly within the 330-foot zones is also a valid measure. Additional measures can include: modifying project lighting so it does not shine on the nest, minimizing the need for back up alarms, removing carcasses from the roadway to avoid potential vehicular associated mortality, etc.

Turnpike inquired if the known communal roost area needs to be addressed in the permitting process. KCA clarified the known areas location (NW of the project area at the landfill). USFWS indicated that because it was not within the project area, it does not need to be addressed as an impact in the permit application.

USFWS reiterated that they are available to provide any technical assistance or discuss questions that may come up during the permitting or application process, including Reese Collins (USFWS Regional Eagle Coordinator) is available as needed (timelines, application fee, or permitting questions). Any administrative questions should be directed toward Cathy Watkins.