Florida Department of Transportation

SR 524 PD&E Study

Friday Road to Industry Road in Brevard County, FL

Preliminary Geotechnical Report

FDOT Office
District Five

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Financial Management No. 437983-1-22-01
ETDM No. 14321

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by the Florida Department of Transportation (FDOT) pursuant to 23 U.S.C §327 and a Memorandum of Understanding dated December 14, 2016 and executed by the Federal Highway Administration and FDOT.

S.R. 524 from Friday Road to Industry Road
S.R. 524 PD&E Study
Brevard County, Florida
Financial Management No. 437983-1-22-01
ETDM No. 14321
PSI Project No. 07572016

Project Number: 07572016
Updated October 13, 2021

Professional Service Industries, Inc.
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Mr. Bill Umlauf, P.E.
Project Manager
CONSOR
1511 East SR 434
Suite 1001
Winter Springs, Florida 32708

RE: **S.R. 524 from Friday Road to Industry Road**
S.R. 524 PD&E Study
Brevard County, Florida
Financial Management No. 437983-1-22-01
ETDM No. 14321

Dear Mr. Umlauf:

Professional Service Industries, Inc. (PSI) an **Intertek Company** has performed a preliminary subsurface exploration for the proposed roadway improvements. This preliminary Project Development and Environmental (PD&E) geotechnical report summarizes the field and laboratory services performed to date and includes PSI's preliminary geotechnical recommendations to assist with preliminary design of the proposed roadway and ponds. Our geotechnical services were performed in accordance with the existing subconsultant contract between Infrastructures Engineers and PSI dated October 31, 2018. This report has been updated to include the results of the supplemental field exploration program completed for the project.

PSI appreciates the opportunity to provide our services to you on this project. If you have any questions regarding the information provided in this report, or if we may be of further service, please contact the undersigned.

Respectfully submitted,

PROFESSIONAL SERVICE INDUSTRIES, INC.
Certificate of Authorization No. 3684

Venkata Prashanth Muppana, M.S., P.E.
Project Engineer
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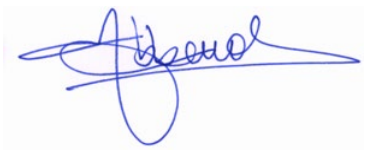

Mustapha A. Abboud, M.S., P.E.
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PROJECT INFORMATION

Improvements are planned for the State Road 524 corridor from approximately 150 feet south of Friday Road to Industry Road. Currently, S.R. 524 is a two-lane urban roadway with four-foot paved shoulders with limited bicycle and pedestrian features. With the exception of the residential developments (Cocoa Pines and Cocoa Villas) located on the north side of S.R. 525, northeast of Cox Road, a majority of the corridor is undeveloped. Based on the S.R 524 Corridor Planning Study, several large scale commercial and industrial developments are proposed for this corridor.

Planned improvements to the corridor to accommodate future growth include widening S.R. 524 from 2 to 4 lanes, a multi-use path along the north side of the corridor, sidewalks, buffered bike lanes, new traffic signals and improved lighting. Intersection improvements may also include the construction of one or more round-a-bouts.

Stormwater for the proposed roadway improvements will be conveyed to new stormwater ponds via roadside swales and drainage structures. There are 13 potential pond locations being considered along the alignment. Depending on the pond location, wet bottom or dry bottom ponds may be feasible.

The project is currently at the Project Development and Environmental Study (PD&E) phase and multiple alignments and roadway/trail configurations are being reviewed. However, PSI anticipates all proposed alignments and configurations will remain in the existing FDOT right of way. The preliminary geotechnical information provided in this report will be utilized to assess the site characteristics and to assist line and grade design of the roadway as well as preliminary suitability of the proposed pond sites. As noted, this report has been updated to include pond borings for stormwater ponds 2D, 2E and 2F.

The noted information/assumptions have been used for the purpose of preparing this report. If any of the stated information/assumptions are incorrect or have been changed, PSI should be notified so appropriate changes to our recommendations can be incorporated in this report.

REVIEW OF PUBLISHED DATA

USGS Topographic Map

The topographic survey map published by the USGS entitled “Lake Poinsett, Florida” and “Sharpes, Florida” were reviewed for ground surface elevations within the project limits. Based on this review, the natural ground surface elevation is approximately between +20 to +25 feet NGVD from the beginning of the roadway alignment (175+00) to Coventry Court (328+00). The ground surface elevation begins to increase near Station 328+00 from +25 feet to approximately +45 feet NGVD at the project terminus, Industry Road. Ground surface elevations at two potential pond sites located southwest of Mud Lake range from +15 to +20 feet NGVD.

Figure 1 of **Appendix B** contains an excerpt of the USGS map for the site including the proposed trail alignment.

USDA SCS Soil Survey

The "Soil Survey of Brevard County, Florida," published by the USDA SCS, was reviewed for general near-surface soil information within the general project vicinity. This information indicates that there are fifteen soil groups within the vicinity of the proposed project. The general information provided by the SCS for the mapped soil units are summarized in the following table.

Soil Series	Depth (inches)	Unified Classification	USDA Seasonal High Groundwater Table
			Depth (feet)
2 – Anclote Sand, frequently ponded, 0 to 1 percent slopes	0 to 80	A-3	0 to 1
28 – Immokalee sand, 0 to 2 percent slopes	0 to 80	A-3, A-2-4	0.5 to 1.5
7 – Basinger fine sand	0 to 80	A-3	0 to 1.5
30 – Malabar sand, 0 to 2 percent slopes	0 to 80	A-3	0 to 1
36 – Myakka sand, 0 to 2 percent slopes	0 to 80	A-3, A-2-4	0 to 1.5
38 – Myakka sand, depressional	0 to 80	A-3, A-2-4	0 to 1.5
43 - Paola fine sand, 0 to 8 percent slopes	0 to 80	A-3	> 6
49 – Pomello sand, 0 to 5 percent slopes	0 to 80	A-3, A-2-4	1.5 to 4
54 – St. Johns sand, 0 to 2 percent slopes	0 to 80	A-3	0 to 1.5
55 – St. Johns sand, depressional	0 to 80	A-3	0 to 1
56 - St. Lucie fine sand, 0 to 5 percent slopes	0 to 80	A-3	> 6
57 - St. Lucie fine sand, 5 to 12 percent slopes	0 to 80	A-3	> 6
64 – Terra Ceia muck, frequently flooded	0 to 80	A-8	0 to +2
67 – Tomoka muck, frequently flooded, 0 to 1 percent slopes	0 to 80	A-8	0 to +2
91 – Anclote sand	0 to 80	A-3	0 to 1

Figures 2 and 3 of **Appendix B** contains an excerpt of the USDA SCS Soils map for the site including the proposed roadway alignment.

Potentiometric Surface Map

Potentiometric surface map of the Upper Floridan Aquifer in the St. Johns River Water Management District and Vicinity, prepared by the USGS and dated June 2010, was reviewed. The potentiometric surface elevation in the project vicinity ranges approximately between +20 and +30 feet NAVD. The existing ground surface elevations range approximately between +20 to +45 feet NGVD.

Comparing the potentiometric surface elevation to the existing ground surface elevation, there is potential for artesian conditions to occur during pond excavation or where confining layers are breached. The contractor should be prepared to handle artesian conditions up to elevation +30 feet NAVD during construction. Refer to **Figure 4** in **Appendix B** for a reproduction of the potentiometric map.

FIELD EXPLORATION

General

To assist with preliminary design of possible alignment alternatives and pond sites, PSI performed twenty (20) manual auger borings within the existing FDOT right of way for the length of the project and thirteen (13) manual auger borings at potential pond sites evaluate subsurface conditions. The auger borings were extended to depths of 5 to 10 feet below the existing grade, and samples were collected from each of the soil stratum. Upon completion of the field exploration, the boreholes were backfilled with soil cuttings. The approximate boring locations are presented on the boring location plan, **Sheet 2** of **Appendix B**. The boring locations are also shown by station and offset from the SR 524 centerline of construction on **Sheets 3, 4** and **5** of **Appendix B**.

The samples recovered from the borings were returned to our Orlando laboratory for stratification and testing. The soil samples were visually stratified following the guidelines contained in the AASHTO Classification System. A limited laboratory testing program was conducted to confirm soil classification and pertinent engineering properties. The results of laboratory testing are summarized on the **Roadway Soil Survey Sheet** (**Sheet 1** of **Appendix B**) and on **Table 1** of **Appendix A**.

The stratification presented is based on visual observation of the recovered soil samples, laboratory testing and interpretation of field logs by a geotechnical engineer. It should be noted that variations in the subsurface conditions are expected and may be encountered between and away from PSI's borings. Also, whereas the individual boring logs indicate distinct strata breaks, the actual transition between the soil layers may be more gradual than shown on the soil profiles.

Soil Conditions

The soil types encountered at the specific boring locations are presented in the form of soil profiles on the attached **Sheets 3, 4** and **5** in **Appendix B**. The following soil types were encountered in the preliminary borings performed.

Stratum	Soil Description	AASHTO Soil Classification	Standard Plan 120-001 Classification
1	Light gray, orange-brown and brown fine sand, occasional trace shell or limerock, occasional trace organic	A-3	Select (S)
2	Orange brown, brown, gray and dark gray silty fine sand, occasional trace shell and trace organics	A-2-4	Select (S)
3	Dark gray organic fine sand with silt	A-8	Muck (M)

Groundwater Conditions

At the time of our fieldwork (September 2019), groundwater was encounterted in the borings to depths of approximately 0.6 to 4.7 feet below the existing grade. Three borings did not encounter groundwater (GNE) to a depth of 5 feet below the existing grade. The borings performed within the proposed stormwater ponds 2D, 2E and 2F (August 10, 2021) as part of the supplemental services, encountered standing water at the time of drilling. The groundwater levels encountered at the time the borings were performed are shown adjacent to the soil boring profiles on **Sheets 3, 4** and **5** of **Appendix B**.

The estimated normal seasonal high groundwater levels presented herein are based on the observed soil stratigraphy, conditions observed in the borings, USDA Soil Survey information, review of past permits and plans along the project corridor, wetland and waterbody hydrological indicators and our past experience in the project vicinity.

In general, the estimated normal seasonal high groundwater level is not intended to define a limit or ensure that future seasonal fluctuations in groundwater levels will not exceed the estimated levels. Groundwater conditions will vary with environmental changes and seasonal conditions, such as the frequency and magnitude of rainfall patterns, as well as man-made influences, such as swales, ponds, drainage systems, underdrains and areas of covered soil.

In this regard, the estimated normal seasonal high groundwater levels for the preliminary roadway and pond soil borings are presented in **Table 2** of **Appendix A** (Roadway and Pond Groundwater Summary).

LABORATORY TESTING

Representative soil samples were retained from the soil strata observed in each boring and returned to PSI's laboratory for visual classification and stratification. Sieve analysis and moisture content were performed on selected samples for verification of the visual classification. The results of the laboratory testing are presented in **Table 1** on **Appendix A** and summarized on the Roadway Soil Survey Sheet (**Sheet 1** of **Appendix B**). The types of tests performed with the associated test designation are presented in the following table.

Test Type	ASTM	FDOT
Sieve Analysis	D-422	FM 1-T 088
Moisture Content	D-2216	FM 1-T 265
Organic Content	D-2974	FM 1-T 267

PRELIMINARY GEOTECHNICAL RECOMMENDATIONS

General

Based on the results of the preliminary borings, site preparation and roadway embankment construction can proceed in accordance with the latest version of the FDOT Standard Specifications for Road and Bridge Construction. Strata 1 and 2 (A-3 and A-2-4 materials) encountered in the borings are considered Select (S) material per FDOT Standard Plan 120-001 and can be utilized as embankment soils. However, Stratum 2 is likely to retain excess moisture and may be difficult to dry and compact. Stratum 3 (A-8 material) should be considered as Muck (M) and should be removed in accordance with FDOT Standard Plans Index 120-002 unless otherwise noted on the plans.

Pavement Design Considerations

Flexible or rigid pavement design should be performed in accordance with the FDOT Flexible Pavement Design Manual and FDOT Rigid Pavement Design Manual. Roadway plans and cross-sections are not available at this time. As a minimum, PSI recommends at least 24 inches of separation between the estimated normal seasonal high groundwater level and the bottom of the flexible pavement base or bottom of the rigid pavement section.

If roadway grades provide less than the recommended minimum separation above the estimated normal seasonal high groundwater level, underdrains or asphaltic base may be required. Once plans and cross-sections are available, PSI should be given the opportunity to review the plans and verify the minimum separation between the roadway base/pavement section and estimated normal seasonal high groundwater level.

Resilient Modulus (M_R) testing has not been performed at this time. PSI is waiting for the preferred alignment to be determined before obtaining the bulk samples and initiating the testing. Once the Resilient Modulus testing is complete, PSI will provide a recommended design resilient modulus (Mr) value.

Stormwater Retention

Thirteen possible stormwater sites were explored as part of this preliminary geotechnical exploration. PSI performed one manual auger boring at each potential pond location to provide preliminary soil and groundwater information to assist with determining which sites should be further evaluated.

The results of the pond auger borings are presented on **Sheets 4** and **5** of **Appendix B**. The encountered groundwater level and normal estimated seasonal high groundwater level for each of the proposed pond sites are summarized in **Table 2** of **Appendix A**.

LIMITATIONS

Our professional services have been performed, our findings obtained, and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. This company is not responsible for the conclusions, opinions or recommendations made by others based on these data.

The scope of our exploration for the preliminary PD&E Study was intended to evaluate soil conditions within the influence of the proposed roadway and ponds and does not include an evaluation of potential deep soil problems such as sinkholes. The analysis and recommendations submitted in this report are based on the data obtained from the soil borings performed at the locations indicated. Project plans were not available at the time this report was developed. Once roadway plans are available, PSI should be given the opportunity to review the plans and revise our geotechnical recommendations. If any subsoil variations become evident during the course of this project, a re-evaluation of the recommendations contained in this report will be necessary after we have had an opportunity to observe the characteristics of the conditions encountered. The applicability of the report should also be reviewed in the event significant changes occur in the design, nature or location of the proposed roadway and ponds.

The scope of our geotechnical services does not include any environmental assessment or investigation for the presence or absence of hazardous or toxic materials in the soil, groundwater, or surface water within or beyond the site studied. Any statements in this report regarding odors, staining of soils, or other unusual conditions observed are strictly for the information of our client.

APPENDIX A

TABLES

TABLE 1
RESULTS OF LABORATORY CLASSIFICATION TESTING FOR ROADWAY AND POND BORINGS
S.R. 524 PD&E from South of Friday Road to Industry Road
FPN: 437983-1-22-01
FDOT Contract No. CA155
PSI PROJECT NO. 7572016

Boring No.	Sample Depth (feet)	Stratum No.	Approx. Station (feet)	Approx. Offset (feet)	Centerline of Construction	AASHTO Class.	W%	OC%	Sieve Analysis (% Finer)					Atterberg Limits	
									#10	#40	#60	#100	#200	LL	PI
ROADWAY															
HA-1	0 to 3	1	181+10	35 RT	SR 524	A-3	---	---	95	81	56	24	9	---	---
HA-12	1 to 2	1	220+20	-28 LT	SR 524	A-3	---	---	---	---	---	---	4	---	---
HA-19	1 to 3	1	248+70	45 RT	SR 524	A-3	---	---	100	87	62	15	2	---	---
AB-7	0 to 3	1	261+10	45 RT	SR 524	A-3	---	---	97	86	64	25	7	---	---
AB-7	4 to 5	1	261+10	45 RT	SR 524	A-3	---	---	---	---	---	---	6	---	---
HA-29	0 to 2	1	287+60	30 RT	SR 524	A-3	---	---	99	84	58	14	3	---	---
HA-32	4 to 5	1	297+30	-40 LT	SR 524	A-3	16	4	100	86	52	16	6	---	---
HA-34	1 to 3.5	1	307+50	30 RT	SR 524	A-3	---	---	100	88	58	14	1	---	---
HA-40	3 to 5	1	327+60	30 RT	SR 524	A-3	---	---	---	---	---	---	3	---	---
HA-43	2 to 3	1	338+30	-45 LT	SR 524	A-3	---	---	100	80	47	11	1	---	---
HA-6	2 to 3	2	200+10	-25 LT	SR 524	A-2-4	---	---	100	87	63	30	11	---	---
HA-15	2 to 3	2	230+20	15 RT	SR 524	A-2-4	---	---	96	82	59	28	14	---	---
HA-21	0 to 3	2	261+10	-20 LT	SR 524	A-2-4	---	---	---	---	---	---	14	---	---
HA-12	4 to 5	2	220+20	-28 LT	SR 524	A-2-4	25	4	---	---	---	---	---	---	---
HA-19	2.5 to 4	2	248+70	45 RT	SR 524	A-2-4	13	2	---	---	---	---	---	---	---
HA-18	4 to 5	3	240+15	-35 LT	SR 524	A-8	29	6	---	---	---	---	---	---	---
HA-24	4.5 to 5	3	270+80	30 RT	SR 524	A-8	32	6	100	92	67	22	9		
PONDS															
PB-2	2 to 5	1	199+90	-400 LT	SR 524	A-3	---	---	---	---	---	---	4	---	---
PB-3	0 to 2	1	208+60	-145 LT	SR 524	A-3	---	---	---	---	---	---	3	---	---
PB-5	0 to 2.5	1	218+40	-175 LT	SR 524	A-3	---	---	---	---	---	---	4	---	---
PB-9	3 to 5	1	342+50	-125 LT	SR 524	A-3	---	---	---	---	---	---	4	---	---
PB-1	0 to 1	3	195+00	-495 LT	SR 524	A-8	168	11	---	---	---	---	---	---	---

TABLE 1
RESULTS OF LABORATORY CLASSIFICATION TESTING FOR ROADWAY AND POND BORINGS
S.R. 524 PD&E from South of Friday Road to Industry Road
FPN: 437983-1-22-01
FDOT Contract No. CA155
PSI PROJECT NO. 7572016

Boring No.	Sample Depth (feet)	Stratum No.	Approx. Station (feet)	Approx. Offset (feet)	Centerline of Construction	AASHTO Class.	W%	OC%	Sieve Analysis (% Finer)					Atterberg Limits	
									#10	#40	#60	#100	#200	LL	PI
PB-11	4 to 5	1	448+20	-500 LT	SR 524	A-3	---	---	---	---	---	---	4	---	---
PB-12	2 to 3	1	448+67	304 RT	SR 524	A-3	---	4	---	---	---	---	3	---	---
PB-13	0 to 1	3	441+82	202 RT	SR 524	A-8	---	---	---	---	---	---	4	---	---

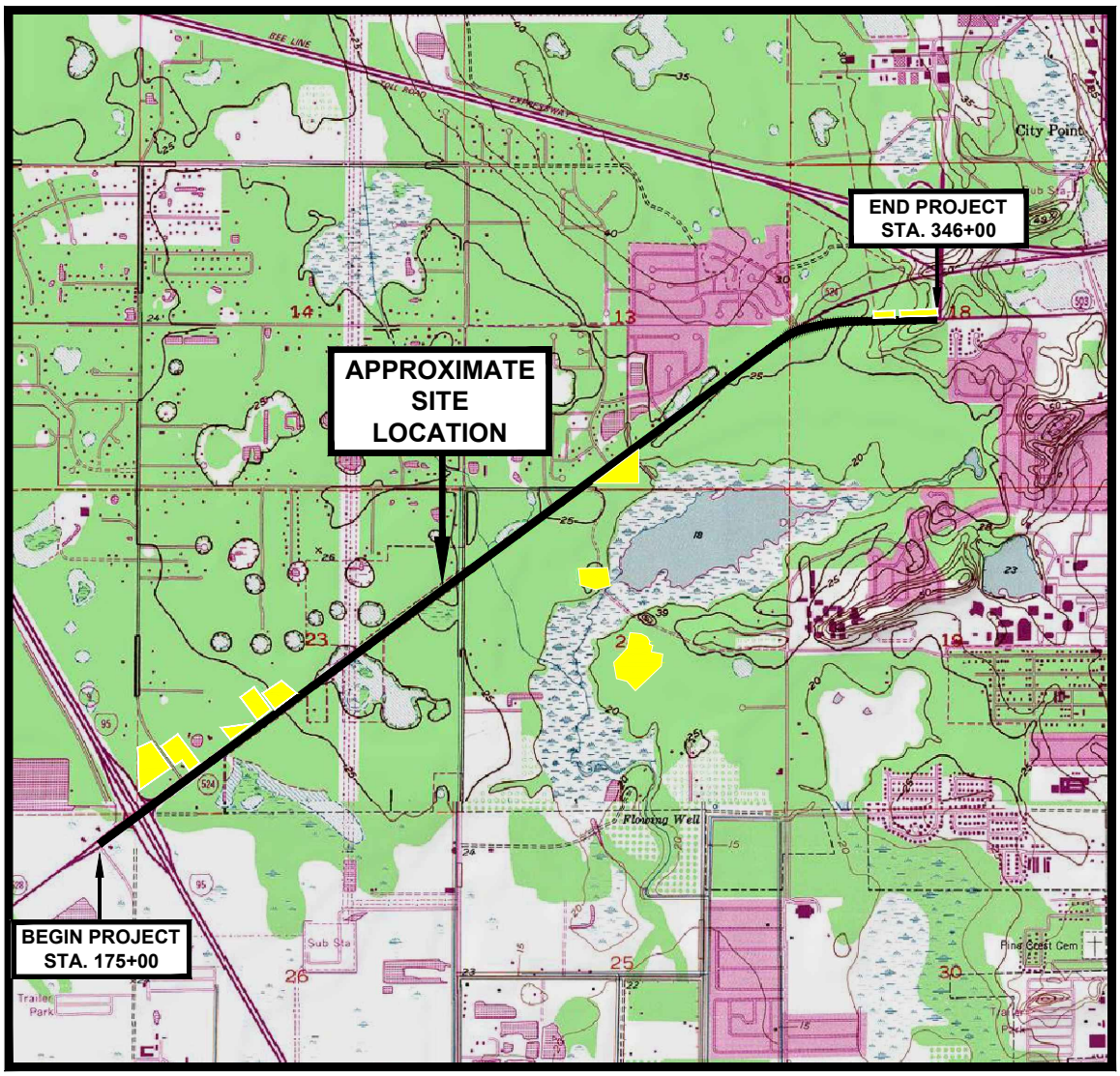
TABLE 2
Roadway and Pond Groundwater Summary
SR 524 PD&E
Brevard County, Florida
PSI Project No. 07572016

Boring No.	Station/Offset	Ground Surface Elevation (ft NAVD)	Encountered Groundwater Depth (ft)	Encountered Groundwater Elevation (ft NAVD)	Estimated Normal Seasonal High Groundwater Elevation (ft NAVD)	NOTES
Roadway						
HA-1	181+10, 35	+27.7	GNE@5	GNE@22.7	+23.00	
HA-4	190+50, -30	+27.2	4.5	+22.70	+23.00	Adj north Wetland ESHGWL +22.5NAVD, south wetland at +23.5 NAVD
HA-6	200+10, -25	+26.0	4.6	+21.40	+23.00	
HA-9	210+10, 38	+24.7	3.5	+21.20	+23.50	-
HA-12	220+20, -28	+25.2	3.6	+21.60	+23.50	-
HA-15	230+20, 15	+25.7	3	+22.70	+23.50	Wetland, north side ESHGWL +23.5 NAVD
HA-18	240+15, -35	+24.9	2.5	+22.40	+23.50	Wetland, north side ESHGWL +23.5 NAVD
HA-19	248+70, 45	+24.8	0.6	+24.20	+23.50	Wetland, north side ESHGWL +23.5 NAVD
AB-6	248+55, -30	+24.6	2.8	+21.80	+23.50	Wetland, north side ESHGWL +23.5 NAVD
HA-21	261+10' -20	+24.3	3.5	+20.80	+22.50	-
AB-7	261+10, 45	+23.8	GNE@5	GNE@18.8	+22.50	-
HA-24	270+80, 30	+23.9	3	+20.90	+22.50	-
HA-27	282+10, -38	+24.4	3.5	+20.90	+22.50	Cocoa North ponds +21 to +22 NAVD NWL
HA-29	287+60, 30	+25.0	3.8	+21.20	+22.50	Cocoa North ponds +21 to +22 NAVD NWL
HA-32	297+30, -40	+25.7	GNE@5	GNE@20.7	+22.50	Cocoa North ponds +21 to +22 NAVD NWL
HA-34	307+50, 30	+25.5	4.7	+20.80	+23.00	Cocoa North ponds +21 to +22 NAVD NWL
HA-37	316+90, -38	+26.5	4.2	+22.30	+23.50	+23 to +23.5 NAVD by road, +22 away from road UES Geo
HA-40	327+60, 30	+24.3	3	+21.30	+23.50	Permit shows +22 NAVD ESHGWL
HA-43	338+30, -45	+30.9	4.5	+26.40	+26.00	Publix, south side pond NWL +25NGVD (+24 NAVD)
HA-46	343+00, 35	+30.1	4.3	+25.80	+26.50	Publix, south side pond NWL +25NGVD (+24 NAVD)
PONDS						
PB-1*	POND 1A	+21.0	0.8	+20.20	+21.00	HA-4/HA-6
PB-2	POND 1B	+22.4	2.2	+20.20	+22.00	HA-6
PB-3	POND 1C	+25.0	2.1	+22.90	+23.50	TP-1 to TP-6 Biological Survey Average +24.3 NGVD (+23.5 NAVD), +25 GSE based on average of GSE of TP-1 through TP-6 (Permit 16533-1)
PB-4	POND 1D	+23.9	2.8	+21.10	+23.50	HA-9/HA-12
PB-5	POND 1E	+23.5	2.8	+20.70	+23.00	HA-12
PB-6*	POND 2B	+26.4	3.1	+23.30	+24.00	-
PB-7	POND 2C	+24.0	3.2	+20.80	+22.50	HA-27
PB-8	POND 3A	+30.1	3.3	+26.80	+26.00	HA-43
PB-9	POND 3B	+30.3	2.7	+27.60	+26.50	HA-43/HA-46
PB-10*	POND 2A	+17.6	2.9	+14.70	AGS	-
PB-11	POND 2D	-	+0.5	-	AGS	-
PB-12	POND 2F	-	+1	-	AGS	-
PB-13	POND 2E	-	+0.5	-	AGS	-

* Recommend biological indicators be identified and surveyed at these locations.

APPENDIX B

FIGURES AND SHEETS



REFERENCE: U.S.G.S. "LAKE POINSETT & SHARPES, FLORIDA" QUAD. MAPS

SECTIONS: 27,22,23,24,13,18
TOWNSHIP: 24 SOUTH
RANGE: 35 & 36 EAST

ISSUED: 1989
PHOTOREVISED: 1992
SCALE: 1"=3000'

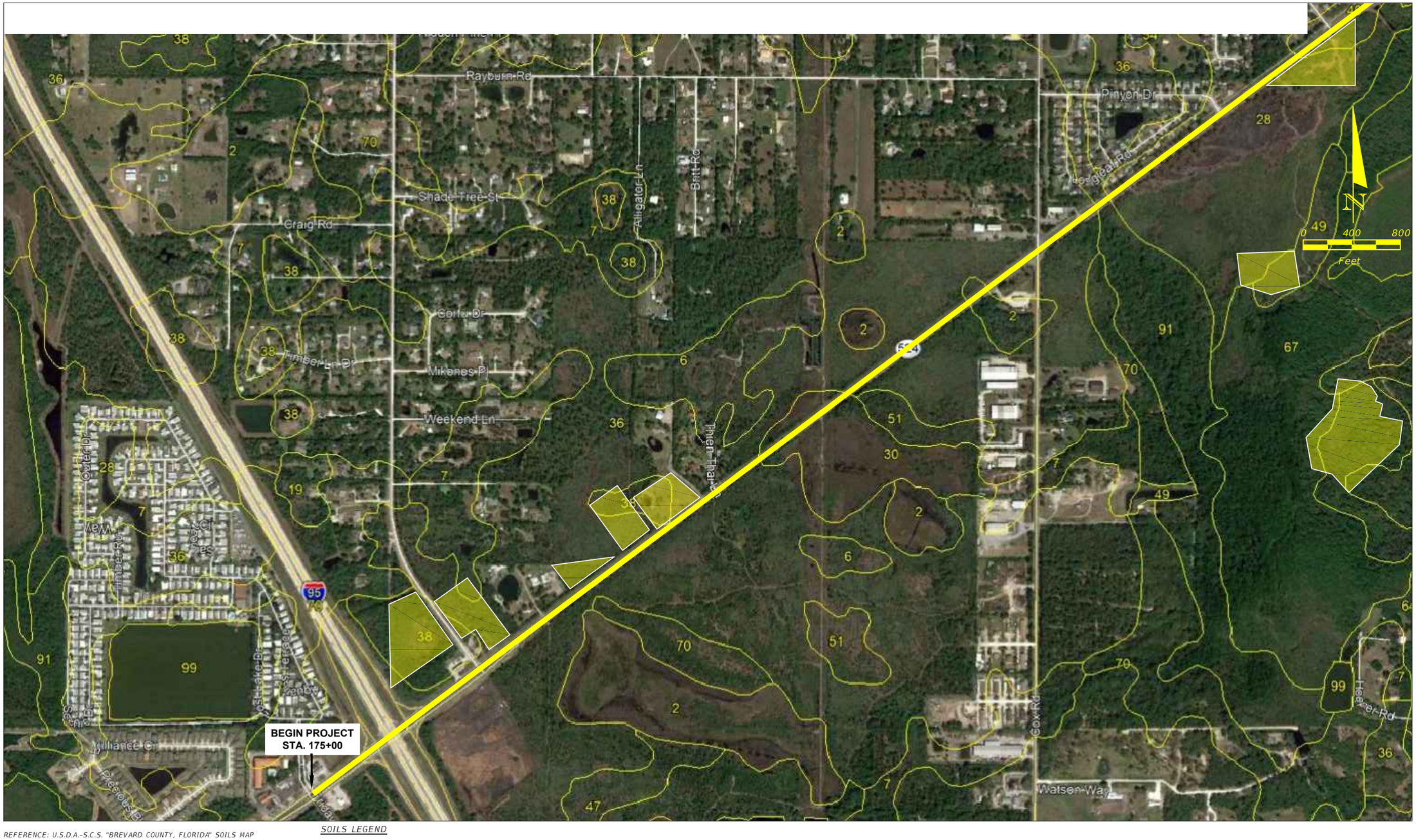
USGS QUADRANGLE MAP

SR 524 PD&E
SOUTH OF FRIDAY ROAD TO INDUSTRY ROAD

BREVARD COUNTY, FLORIDA

intertek psi

DRAWN:	DJW	SCALE:	NOTED	PROJ. NO:	07572016
CHKD:	MAA	DATE:	1-23-20	FIGURE:	1



REFERENCE: U.S.D.A.-S.C.S. "BREVARD COUNTY, FLORIDA" SOILS MAP

SECTIONS: 27,22,23,24,13,18
TOWNSHIP: 24 SOUTH
RANGE: 35 & 36 EAST

ISSUED: N/A
SCALE: 1"=3000'

SOILS LEGEND

2	ANCLOTE SAND, FREQUENTLY PONDED, 0 TO 1 PERCENT SLOPES	43	PAOLA FINE SAND, 0 TO 8 PERCENT SLOPES	57	ST. LUCIE FINE SAND, 5 TO 12 PERCENT SLOPES
7	BASINGER FINE SAND	49	POMELLO SAND, 0 TO 5 PERCENT SLOPES	64	TERR CEIA MUCK, FREQUENTLY FLOODED
28	IMMOKALEE SAND, 0 TO 2 PERCENT SLOPES	54	ST. JOHNS SAND, 0 TO 2 PERCENT SLOPES	67	TOMOKA MUCK, FREQUENTLY FLOODED, 0 TO 1 PERCENT SLOPES
30	MALABAR SAND, 0 TO 2 PERCENT SLOPES	55	ST. JOHNS SAND, DEPRESSIONAL	91	ANCLOTE SAND
36	MYAKKA SAND, 0 TO 2 PERCENT SLOPES	56	ST. LUCIE FINE SAND, 0 TO 5 PECENT SLOPES		
38	MYAKKA SAND, DEPRESSIONAL				

REVISIONS

Date	By	Description	Date	By	Description

MUSTAPHA A. ABBOUD, P.E.
P.E. NO.: 56112
PROFESSIONAL SERVICE IND., INC.
1748 33RD STREET
ORLANDO, FL. 32839
CERTIFICATE OF AUTHORIZATION No. 00003684

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
524	BREVARD	437983-1

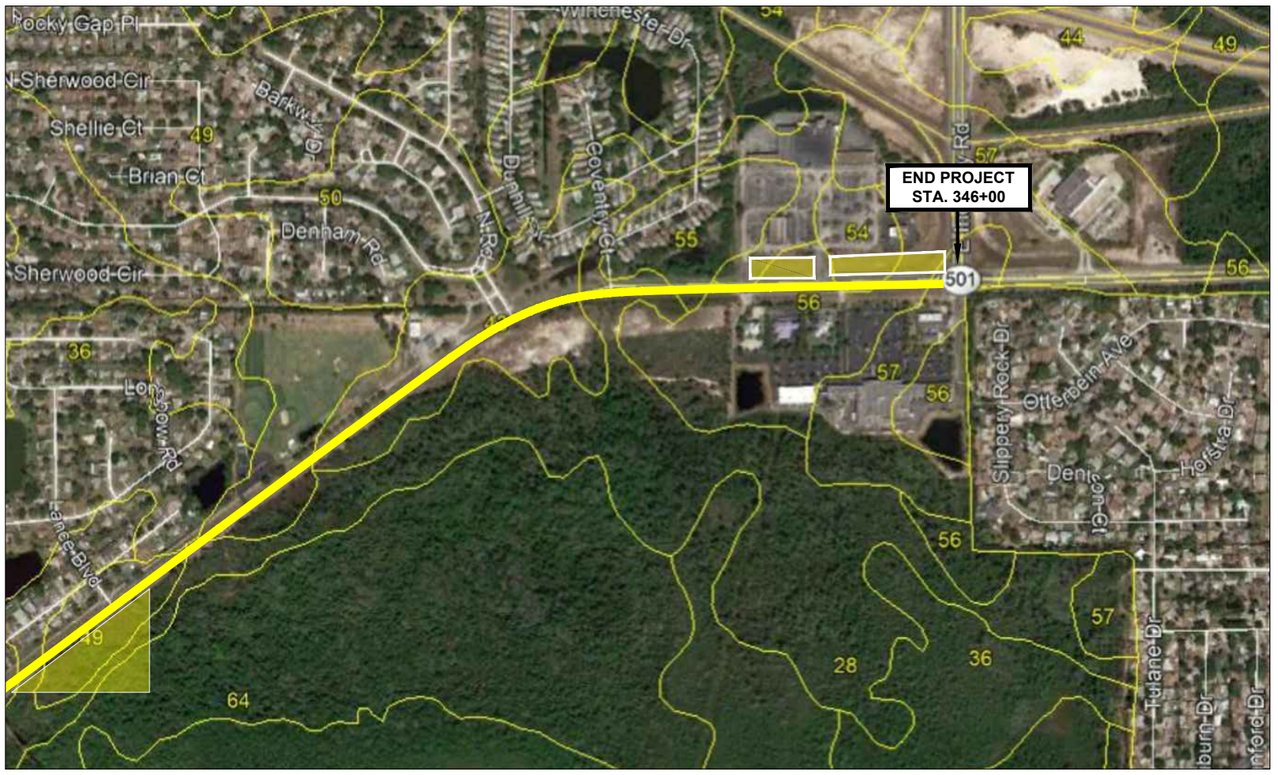
USDA SOILS MAP

SR 524 PD&E
SOUTH OF FRIDAY ROAD TO INDUSTRY ROAD

BREVARD COUNTY, FLORIDA

SHEET NO.

PSI PROJECT No. 07572016
FIGURE: 2



REFERENCE: U.S.D.A.-S.C.S. "BREVARD COUNTY, FLORIDA" SOILS MAP

SECTIONS: 27,22,23,24,13,18
TOWNSHIP: 24 SOUTH
RANGE: 35 & 36 EAST

ISSUED: N/A
SCALE: 1"=3000'

SOILS LEGEND

2 ANCLOTE SAND, FREQUENTLY PONDED, 0 TO 1 PERCENT SLOPES
7 BASINGER FINE SAND
28 IMMOKALEE SAND, 0 TO 2 PERCENT SLOPES
30 MALABAR SAND, 0 TO 2 PERCENT SLOPES
36 MYAKKA SAND, 0 TO 2 PERCENT SLOPES
38 MYAKKA SAND, DEPRESSIONAL
43 PAOLA FINE SAND, 0 TO 8 PERCENT SLOPES
49 POMELLO SAND, 0 TO 5 PERCENT SLOPES
54 ST. JOHNS SAND, 0 TO 2 PERCENT SLOPES
55 ST. JOHNS SAND, DEPRESSIONAL
56 ST. LUCIE FINE SAND, 0 TO 5 PECENT SLOPES
57 ST. LUCIE FINE SAND, 5 TO 12 PERCENT SLOPES
64 TERR CEIA MUCK, FREQUENTLY FLOODED
67 TOMOKA MUCK, FREQUENTLY FLOODED, 0 TO 1 PERCENT SLOPES
91 ANCLOTE SAND

REVISIONS

Date	By	Description	Date	By	Description

MUSTAPHA A. ABBOUD, P.E.
P.E. NO.: 56112
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ORLANDO, FL. 32839
CERTIFICATE OF AUTHORIZATION No. 00003684

intertek psi

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
524	BREVARD	437983-1

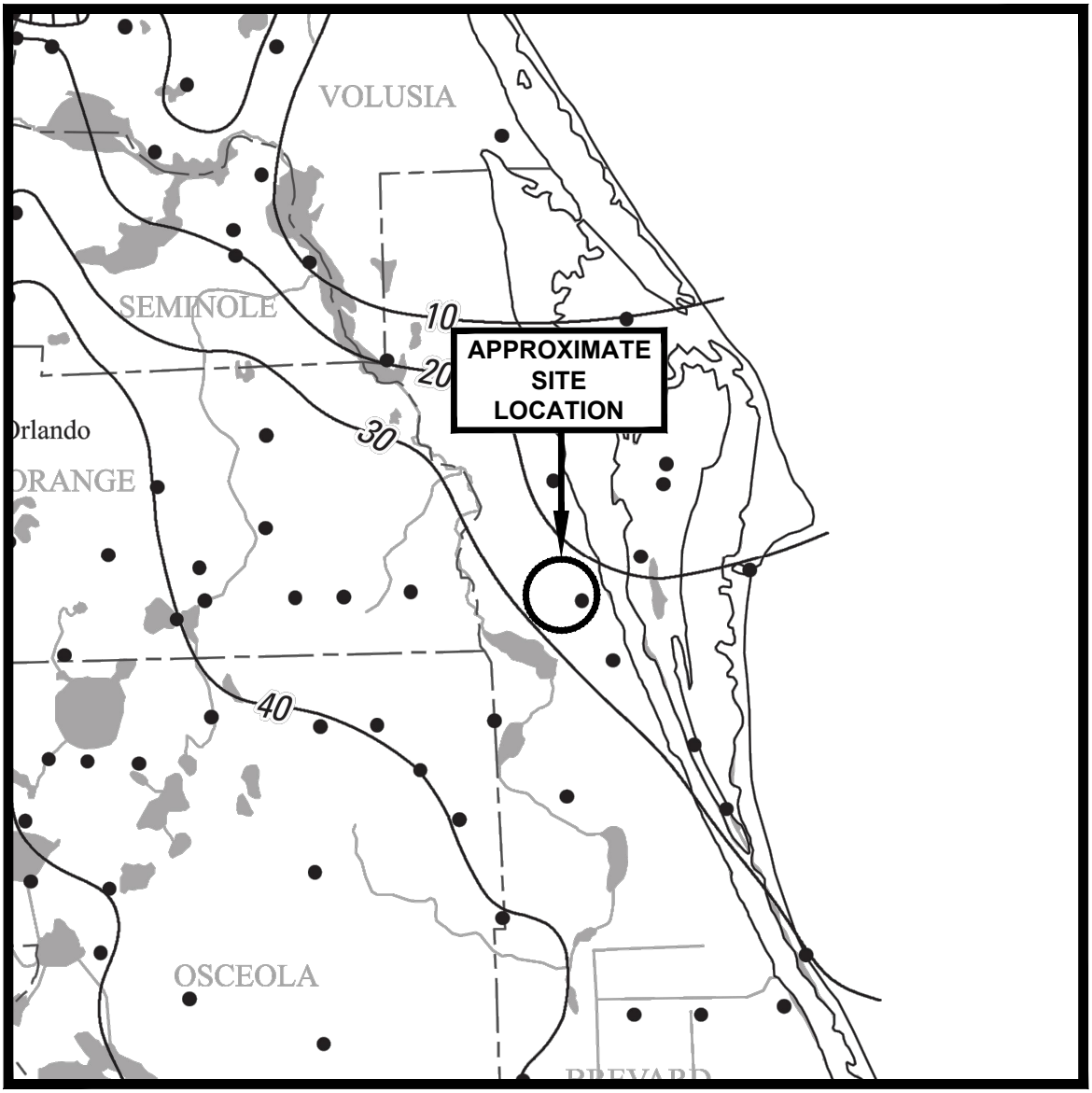
USDA SOILS MAP

SR 524 PD&E
SOUTH OF FRIDAY ROAD TO INDUSTRY ROAD

BREVARD COUNTY, FLORIDA

SHEET NO.

PSI PROJECT No. 07572016
FIGURE: 3



REFERENCE: POTENTIOMETRIC SURFACE OF THE UPPER FLORIDAN AQUIFER IN THE ST. JOHNS RIVER WATER MANAGEMENT DISTRICT AND VICINITY, FLORIDA, JUNE 2010

SECTIONS: 27,22,23,24,13,18
TOWNSHIP: 24 SOUTH
RANGE: 35 & 36 EAST

LEGEND

—60— POTENTIOMETRIC CONTOUR—— Shows altitude at which water level would have stood in tightly cased wells. Contour intervals is 10 feet. Datum is sea level.

POTENTIOMETRIC SURFACE MAP

SR 524 PD&E
SOUTH OF FRIDAY ROAD TO INDUSTRY ROAD

BREVARD COUNTY, FLORIDA

intertek psi

DRAWN:	DJW	SCALE:	NOTED	PROJ. NO:	07572016
CHKD:	MAA	DATE:	1-23-20	FIGURE:	4

Note: Elevations Shown on Map are in feet, NGVD

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

DATE OF SURVEY : 10/21
SURVEY MADE BY : PSI
SUBMITTED BY : MUSTAPHA A. ABBOUD, P.E.

SECTION : 24,27,22,23,24,13,18
TOWNSHIP : 24 SOUTH
RANGE : 35 & 36 EAST

DISTRICT : 5
ROAD NO. : SR 524
COUNTY : BREVARD

FINANCIAL PROJECT ID : 437983-1-22-01

CROSS SECTION SOIL SURVEY FOR THE DESIGN OF ROADS

SURVEY BEGINS STA. : 175+00 SURVEY ENDS STA. : 346+00

SR 524 PD&E STUDY FROM SOUTH OF FRIDAY ROAD TO INDUSTRY ROAD

	ORGANIC CONTENT		MOISTURE CONTENT		SIEVE ANALYSIS RESULTS % PASS						ATTERBERG LIMITS					CORROSION TEST RESULTS					SUBSTRUCTURE ENVIRONMENTAL CLASSIFICATION	
STRATUM NO.	No. OF TESTS	% ORGANIC	No. OF TESTS	MOISTURE CONTENT	No. OF TESTS	% PASSING 10 MESH	% PASSING 40 MESH	% PASSING 60 MESH	% PASSING 100 MESH	% PASSING 200 MESH	NO. OF TESTS	LIQUID LIMIT	PLASTIC INDEX	AASHTO GROUP	DESCRIPTION	NO. OF TESTS	RESISTIVITY OHM-CM	CHLORIDES PPM	SULFATE PPM	pH	CONCRETE	STEEL
1	2	4	1	16	8(-200) 7(FULL)	95-100	80-88	52-64	11-25	1-9	-	-	-	A-3	Light gray, orange-brown and brown fine SAND, occasional trace shell, occasional trace limerock, occasional trace organics	-	-	-	-	-	-	-
2	2	2-4	2	13-25	1(-200) 2(FULL)	96-100	82-87	59-63	28-30	11-14	-	-	-	A-2-4	Orange-brown, brown, gray and dark gray silty fine SAND, occasional trace shell and trace organics	-	-	-	-	-	-	-
3	3	6-11	3	29-168	1(-200) 1(FULL)	100	92	67	22	3-9	-	-	-	A-8	Dark gray organic fine SAND with silt	-	-	-	-	-	-	-

EMBANKMENT AND SUBGRADE MATERIAL

STRATA BOUNDARIES ARE APPROXIMATE, MAKE FINAL CHECK AFTER GRADING

▼ WATER TABLE ENCOUNTERED AT TIME OF SURVEY

▽ ESTIMATED NORMAL SEASONAL HIGH WATER LEVEL AT TIME OF SURVEY.

GNE GROUNDWATER LEVEL NOT ENCOUNTERED AT TIME OF SURVEY.

NOTES:

(1) STRATA BOUNDARIES ARE APPROXIMATE AND REPRESENT SOIL STRATA AT EACH TEST HOLE LOCATION ONLY. ANY STRATUM CONNECTING LINES SHOWN ARE FOR ESTIMATING EARTHWORK ONLY AND DO NOT INDICATE ACTUAL STRATUM LIMITS. SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED AS INDICATED IN SECTION 2-4. FOR FURTHER DETAILS SEE SECTION 120-3.

(2) IF THE SYMBOL "-" IS PRESENT, IT REPRESENTS UNMEASURED SOIL PARAMETERS.

(3) SOIL ANALYSIS INCLUDES DATA FROM ROADWAY AND POND AUGER BORINGS.

(4) THE MATERIAL FROM STRATA NOS. 1 AND 2 IS SELECT (S) MATERIAL AND APPEARS SATISFACTORY FOR USE IN THE EMBANKMENT WHEN UTILIZED IN ACCORDANCE WITH INDEX NO. 120-001. HOWEVER, STRATUM NO. 2 MATERIAL IS LIKELY RETAIN EXCESS MOISTURE AND BE DIFFICULT TO DRY AND COMPACT.

(5) THE MATERIAL FROM STRATUM NO. 3 SHOULD BE TREATED AS MUCK (M) MATERIAL AND SHOULD BE REMOVED IN ACCORDANCE WITH FDOT STANDARD PLAN INDEX 120-002.

(6) THE CONTRACTOR SHOULD BE PREPARED TO HANDLE ARTESIAN CONDITIONS UP TO ELEVATION +30 FEET NAVD DURING CONSTRUCTION.

REVISIONS

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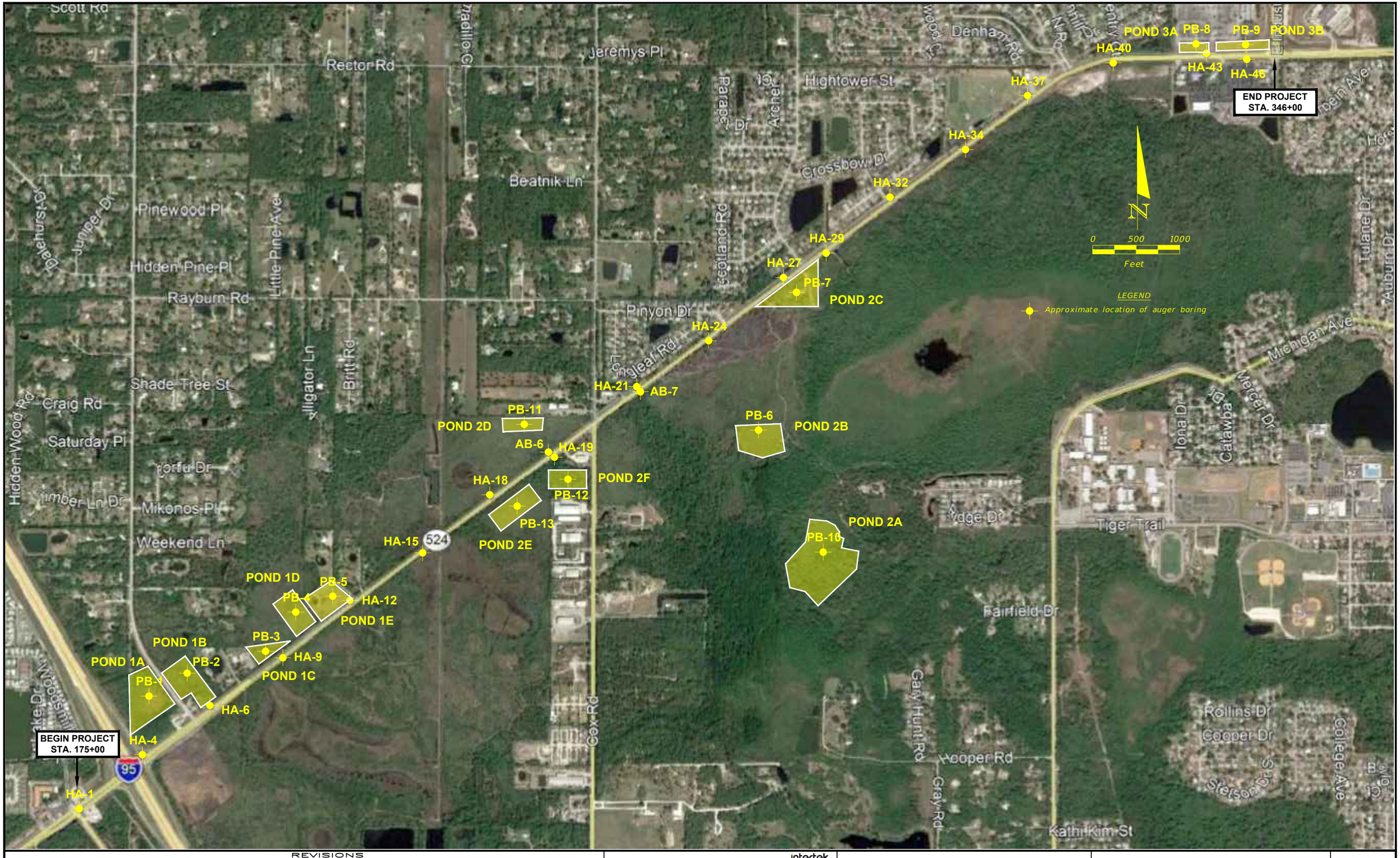
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
524	BREVARD	437983-1

ROADWAY SOIL SURVEY
SR 524 PD&E
SOUTH OF FRIDAY ROAD TO INDUSTRY ROAD
BREVARD COUNTY, FLORIDA

SHEET NO.

PSI PROJECT No. 0757.2016
SHEET: 1



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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
524	BREVARD	437983-1

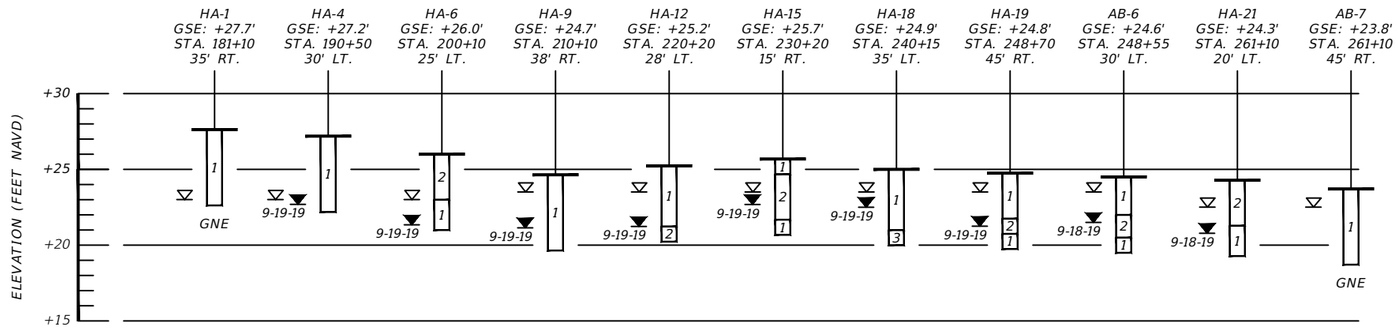
BORING LOCATION PLAN

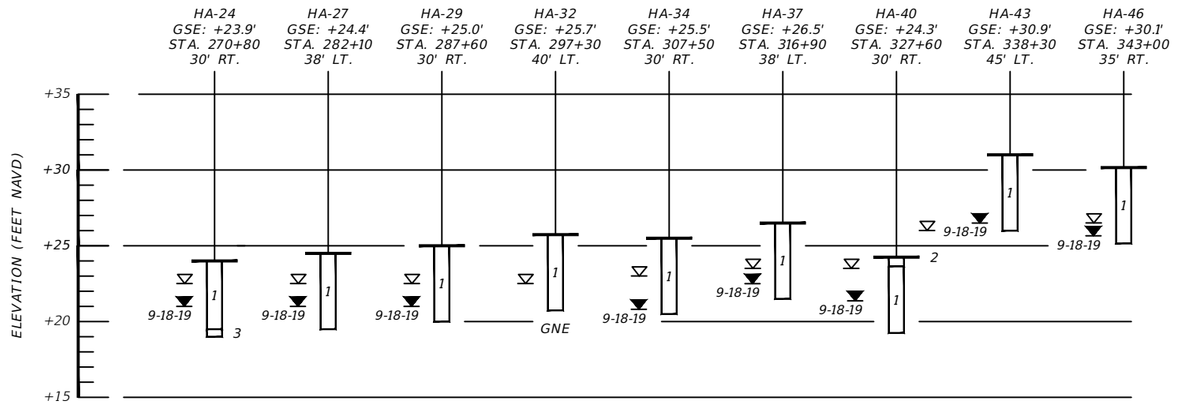
SR 524 PD&E
SOUTH OF FRIDAY ROAD TO INDUSTRY ROAD

BREVARD COUNTY, FLORIDA

SHEET NO.

PSI PROJECT No. 0757.2016
SHEET: 2





LEGEND

1	Light gray, orange-brown and brown fine SAND, occasional trace limerock, occasional trace organics, (A-3)
2	Orange-brown, brown, gray and dark gray silty fine SAND, occasional trace shell and trace organics
3	Dark gray organic fine SAND with silt, (A-8)
(SP)	Unified soils classification group symbol
9-26-19	Depth to groundwater level with date of reading
	Estimated normal seasonal high groundwater level

Notes:
1.) Ground Surface Elevation (GSE) references the NAV88 vertial datum and were provided by the design team surveyor.
2.) Boring station and offset refer to the project centerline (CL) of construction.
3.) Boring station and offset estimated from the project plans.

REVISIONS

Date	By	Description	Date	By	Description

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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
524	BREVARD	437983-1

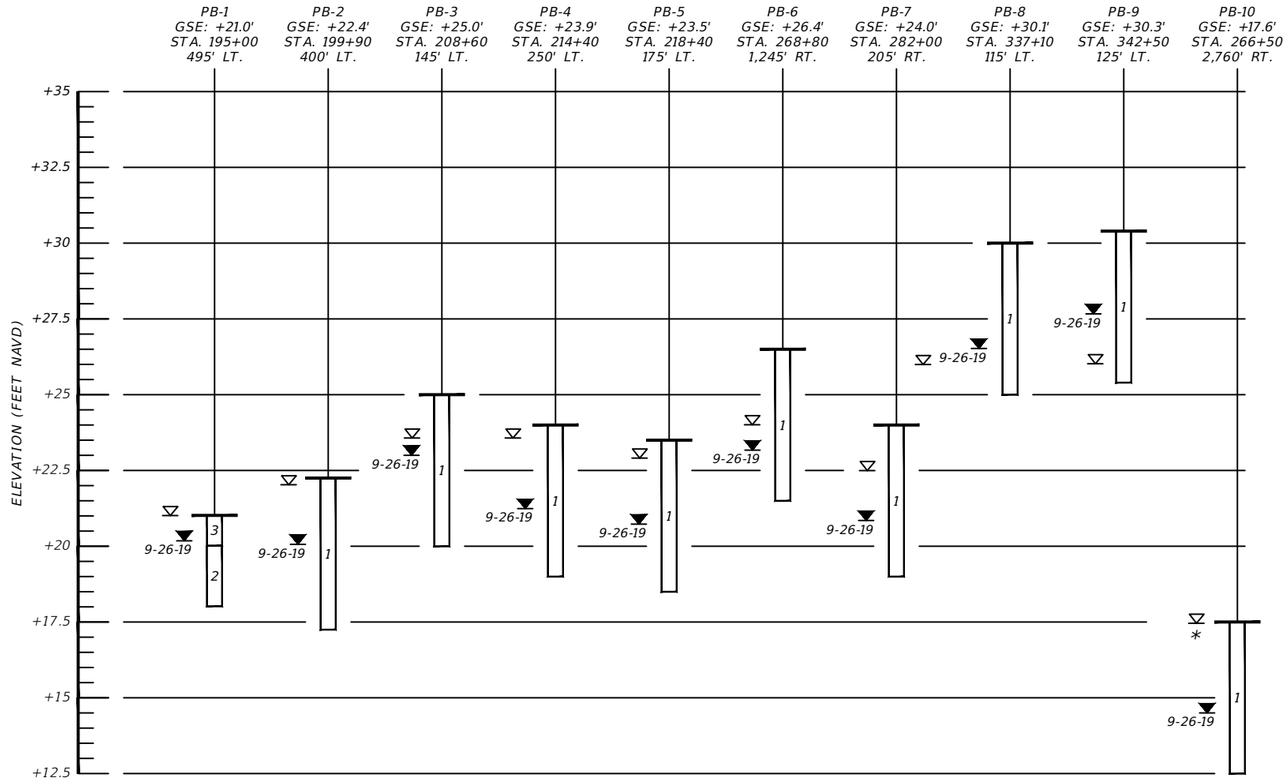
ROADWAY AUGER BORING PROFILES

SR 524 PD&E
SOUTH OF FRIDAY ROAD TO INDUSTRY ROAD

BREVARD COUNTY, FLORIDA

SHEET NO.

PSI PROJECT No. 0752016
SHEET: 3



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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
524	BREVARD	437983-1

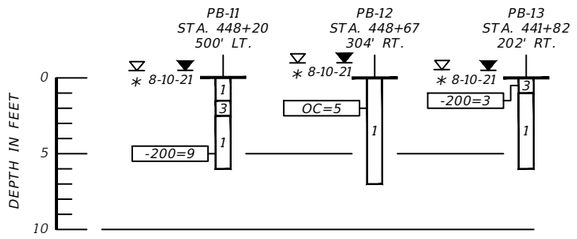
POND AUGER BORING PROFILES

SR 524 PD&E
SOUTH OF FRIDAY ROAD TO INDUSTRY ROAD

BREVARD COUNTY, FLORIDA

SHEET NO.

PSI PROJECT No. 0757.2016
SHEET: 4



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POND AUGER BORING PROFILES

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SOUTH OF FRIDAY ROAD TO INDUSTRY ROAD

BREVARD COUNTY, FLORIDA

SHEET NO.

PSI PROJECT No. 0757.2016
SHEET: 5