September 17, 2021

Mr. Maurice Rudolph
HYDRY Company, LLC
4314 Pablo Oaks Court
Jacksonville, Florida 32224

ECS Project No. 35:29020-A1
Client ID: 3524

Reference: Preliminary Report of Geotechnical Exploration
River Landing Lot 21
Nocatee, St. Johns County, Florida

Dear Mr. Rudolph:

ECS Florida, LLC (ECS) has completed the requested preliminary geotechnical exploration in general accordance with our Proposal No. 35:17711-GPR dated April 5, 2021. The exploration was performed to explore the general subsurface conditions within the proposed lot area and to provide preliminary recommendations for foundation support.

Additional field testing should be performed to formulate detailed foundation design and site preparation and earthwork construction recommendations prior to final design. Once more detailed information regarding the proposed structure is developed, we should be given the opportunity to review and develop a supplemental design-phase scope of services.

PROJECT INFORMATION

The general site location is shown on the Site Location Diagram (Figure 1). At the time of our exploration, the site was undeveloped, with ground surface cover consisting of brush and trees. Surface water was not observed near the planned building area at the time of our exploration.

You provided a copy of a site plan for the subject site. This plan indicates the boundary limits for the property and the existing roadways adjacent to the site. However, we note the location of the proposed structure(s) was not available to our office at the time of this report preparation.

The following information explains our assumptions of the planned development.

SUBJECT	DESIGN INFORMATION / ASSUMPTIONS
# of Stories	3 stories above grade
Usage	Residential
Column Loads(1)	50 kips
Wall Loads(1)	3 kips per linear foot (klf) maximum
Floor Loads(1)	150 pounds per square foot (psf) maximum
Fill and Cut Heights	Assumed a maximum of 3 feet of fill and only minor cuts, from existing site grades

(1) If actual structural loads differ from these assumed loads ECS must be contacted immediately in order to revise building foundation recommendations and settlement calculations, as needed.

FIELD EXPLORATION

We performed a field exploration on August 20, 2021 and September 7, 2021. The approximate boring locations are indicated on the attached Field Exploration Diagram (Figure 2). Our personnel determined the boring locations using a handheld Global Positioning System (GPS) unit. The boring locations on the referenced Field Exploration Diagram should be considered accurate only to the degree implied by the method of measurement used.

We located and performed two Standard Penetration Test (SPT) borings, drilled to depths of approximately 15 feet below the existing ground surface, in general accordance with the methodology outlined in ASTM D 1586 and two auger borings, drilled to depths of approximately 10 feet below the existing ground surface in general accordance with the methodology outlined in ASTM D 1452 to explore the subsurface conditions within the lot area. Soil samples recovered during performance of the borings were visually classified in the field and representative portions of the samples were transported to our laboratory for further evaluation. Our exploration procedures are explained in greater detail in Appendix B including the insert titled Subsurface Exploration Procedures.

VISUAL CLASSIFICATION

Each sample was visually classified on the basis of texture and plasticity in accordance with ASTM D2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedures) and including USCS classification symbols, and ASTM D2487 Standard Practice for Classification for Engineering Purposes (Unified Soil Classification System (USCS)). After classification, the samples were grouped in the major zones noted on the boring logs in Appendix B. The group symbols for each soil type are indicated in parentheses along with the soil descriptions. The stratification lines between strata on the logs are approximate; in situ, the transitions may be gradual.

GENERAL SUBSURFACE CONDITIONS

A graphical presentation of the generalized subsurface conditions is presented on Figure 3. It should be understood that the soil conditions will vary between the boring locations and in areas of the site not explored during our visit. The following table summarizes the soil conditions encountered.

Typical Depth (ft)		Stratum	Description
From	To		
Existing Ground Surface	0.5 – 1	N/A	Topsoil
0.5 – 1	3 – 4	I	Very Loose to Loose FINE SAND (SP), No to Trace Shell Fragments, Moist to Wet
3 – 4	4 – 6	II	Loose FINE SAND (SP) and SILTY FINE SAND, With Organic Fines (OL), Wet
4 – 6	12	III	Loose to Medium Dense FINE SAND (SP), SAND WITH CLAY (SP-SC), CLAYEY SAND (SC), and Very Soft to Soft SILTY CLAY (CH), Wet
12	15	IV	Loose to Medium Dense FINE SAND (SP), Wet

A graphical presentation of the subsurface conditions is shown on the Generalized Subsurface Soil Profiles in Appendix A.

Groundwater was encountered at each boring location and recorded at the time of drilling at depths varying from 2.3 feet to 2.8 feet below the existing ground surface. We note that groundwater levels will fluctuate due to seasonal climatic variations, surface water runoff patterns, construction operations, and other interrelated factors. The groundwater depth at each boring location is noted on the Generalized Subsurface Profiles and on the Log of Boring records.

PRELIMINARY DESIGN RECOMMENDATIONS

Our geotechnical engineering evaluation of the site and subsurface conditions at the property, with respect to the planned construction and our recommendations for earthwork and foundation support, are based on (1) our site observations, (2) the field and laboratory test data obtained, (3) our understanding of the project information and structural conditions as presented in this report, and (4) our experience with similar soil and loading conditions.

Additional field testing should be performed to formulate detailed foundation design and site preparation and earthwork construction recommendations prior to final design. Also, the discovery of any site or subsurface conditions during construction that deviate from the data obtained during this geotechnical exploration should also be reported to us for our evaluation.

Based on the above preliminary evaluation of the site and subsurface conditions at the borings with respect to the anticipated construction, it appears the proposed structure can be constructed on a conventional shallow foundation system provided the organic-containing soils are removed from below the structure.

Conventional Shallow Foundation Support – (Option 1)

The planned residential structure can be supported by a conventional shallow foundation system ("spread footings") provided the site is properly prepared. As described previously, the borings encountered organic containing material at depths varying between 3 feet to 6 below the existing ground surface. While the overlying sands with shell fragments appear suitable for structural fill, we do not recommend that this organic-containing material be left in-place below the planned structure. We therefore recommend that this material be removed from within and 5-feet beyond planned structural areas. The overlying sands with shell fragments can be replaced in the resulting excavation and compacted in lifts. We recommend

additional test pits be performed prior to or concurrent with over-excavation to better delineate the horizontal extents of materials requiring removal. Subsequent to these site preparation activities, we expect that shallow spread foundations can be designed for an allowable bearing capacity of 2,500 psf.

Deep Foundation Support – (Option 2)

The organic-containing soils can be left in-place if the proposed structure (including the floor slabs) is supported by deep foundations. There are several types of deep foundations; however, based on our experience with similar projects and soil conditions, Auger Cast In-Place (ACIP) piles are applicable. ACIP piles are constructed by drilling into the subsurface material with a continuous flight auger which is pulled upward (after achieving the required length) while cement grout is pumped under pressure through the auger. Based on our experience with similar soil conditions, we expect that a 14-inch ACIP bearing 15-feet below the existing grades may develop an axial capacity on the order of 6 tons.

REPORT LIMITATIONS

Our geotechnical exploration has been performed, our findings obtained, and our recommendations prepared, in accordance with generally accepted geotechnical engineering principles and practices. ECS is not responsible for any independent conclusions, interpretation, opinions, or recommendations made by others based on the data contained in this report. Additional field testing should be performed to formulate detailed foundation design and site preparation and earthwork construction recommendations prior to final design.

Respectfully Submitted
ECS FLORIDA, LLC

Christopher M. Egan, State of Florida Professional Engineer, License No. 79645
This item has been digitally signed and sealed by Christopher Egan on the date indicated here.
Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.
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Joey Broussard, P.E.
Principal Engineer
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APPENDICES

Appendix A – Drawings & Reports

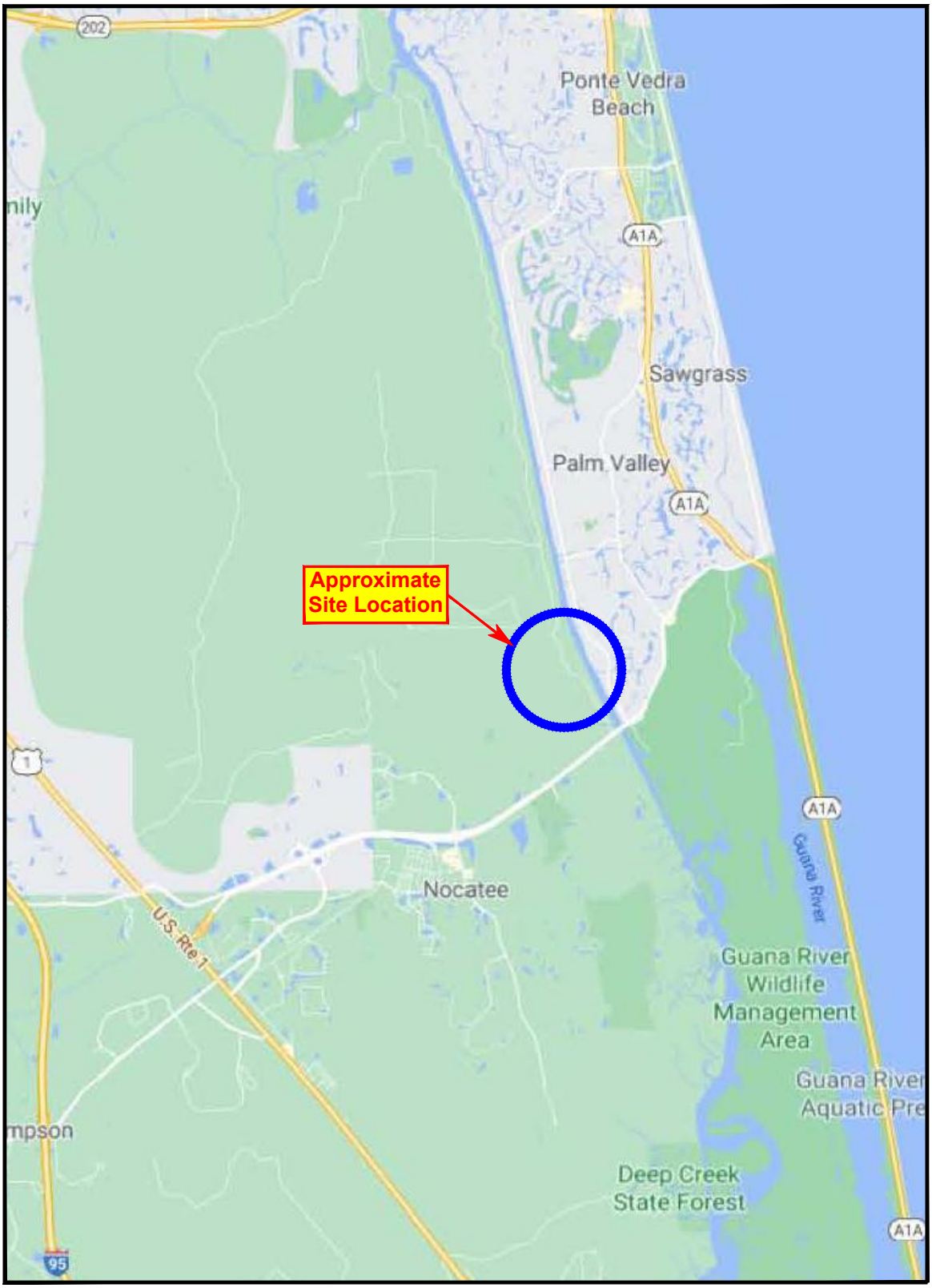
- Figure 1 - Site Location Diagram
- Figure 2 - Field Exploration Diagram
- Figure 3 – Generalized Subsurface Profiles

Appendix B – Field Operations

- Reference Notes for Boring Logs
- Subsurface Exploration Procedure: Standard Penetration Testing (SPT)
- Boring Logs

Appendix A – Drawings & Reports

Figure 1 - Site Location Diagram
Figure 2 - Field Exploration Diagram
Figures 3 - Generalized Subsurface Profile



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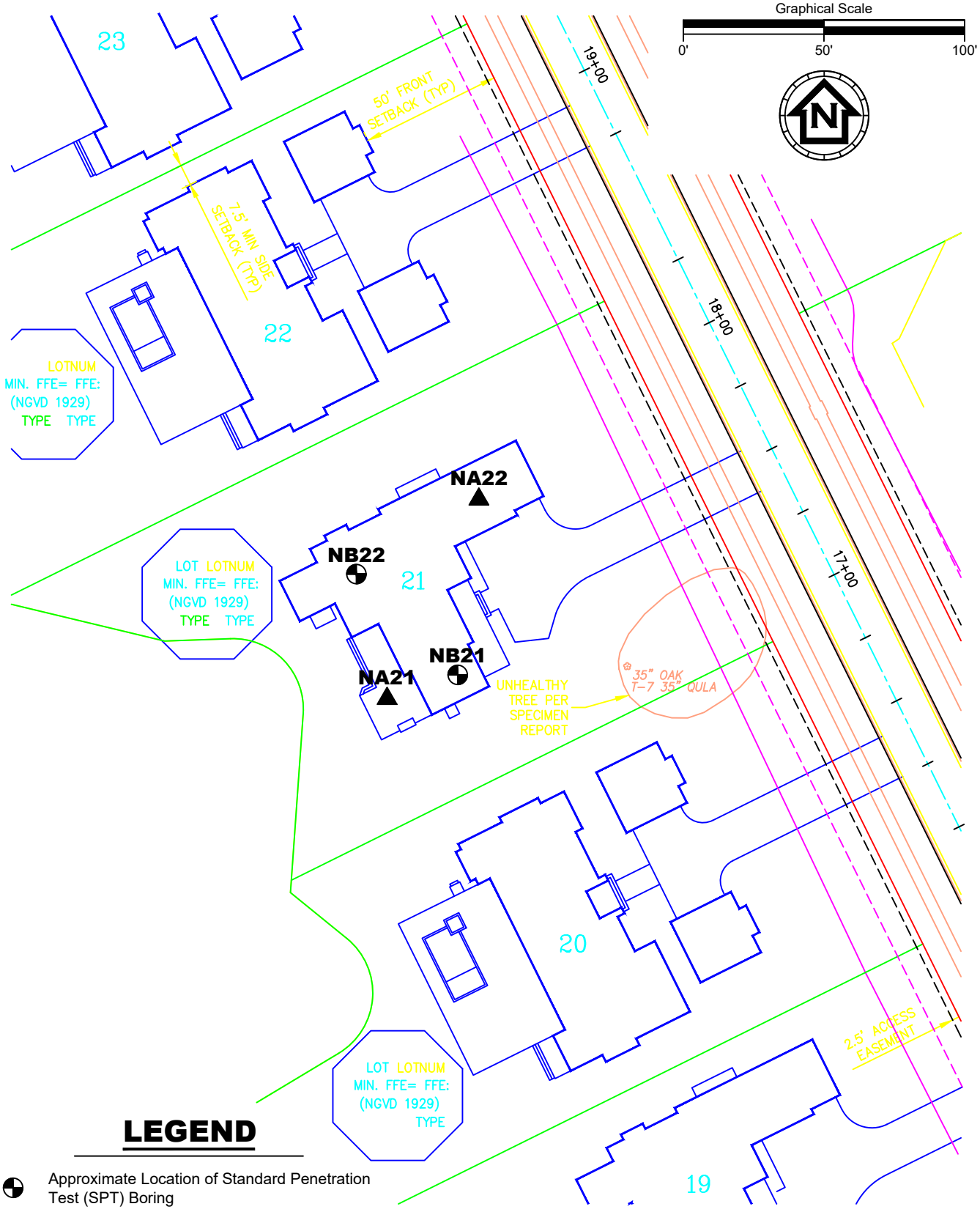
Site Location Diagram

River Landing Natural Lots - Lot 21

St. Johns County, Florida

Date: 09/15/21	Project No.: 35-29020-A1	Figure 1

JAS - 35-29020-A1



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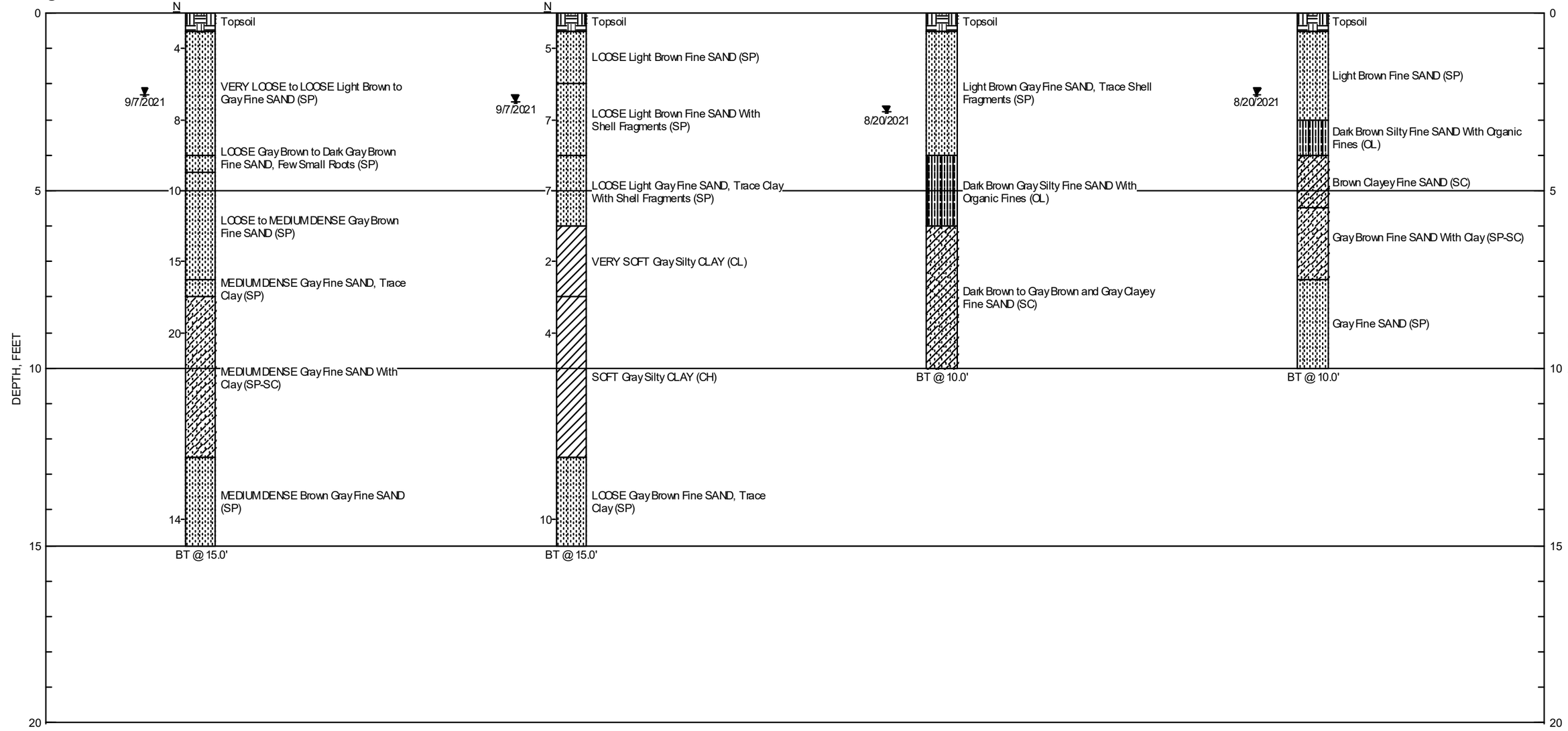
Field Exploration Diagram

River Landing Natural Lots - Lot 21

St. Johns County, Florida

Date: 09/15/21	Project No.: 35-29020-A1	Figure 2

JAS - 35-29020-A1



LEGEND

- Topsoil
- Fine SAND With Clay (SP-SC)
- Clayey Fine SAND (SC)
- Fine SAND (SP)
- CLAY (CH)
- Silty Fine SAND With Organic Fines (OL)

N — Standard Penetration Resistance, Blows/Foot

SP — Unified Soil Classification System

Groundwater Level at Time of Drilling

1/12" — One Blow to Drive Split Spoon Sample Twelve Inches

BT — Boring Terminated at Depth Below Grade

Generalized Subsurface Profiles

River Landing Natural Lots - Lot 21

St. Johns County, Florida

ECS

DATE: 9/15/21	PROJ. NO.: 35-29020-A1	Figure 3

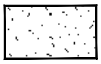
Appendix B – Field Operations

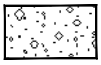
Reference Notes for Boring Logs
Subsurface Exploration Procedure: Standard Penetration Testing (SPT)
Boring Logs

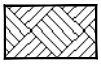
REFERENCE NOTES FOR BORING LOGS

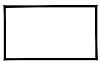
MATERIAL[1,2]

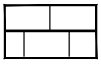

ASPHALT


CONCRETE


GRAVEL

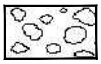

TOPSOIL

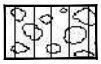

VOID


BRICK

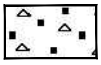

AGGREGATE BASE COURSE

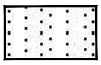

GW **WELL-GRADED GRAVEL**
gravel-sand mixtures, little or no fines

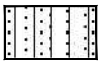

GP **POORLY-GRADED GRAVEL**
gravel-sand mixtures, little or no fines


GM **SILTY GRAVEL**
gravel-sand-silt mixtures

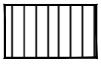

GC **CLAYEY GRAVEL**
gravel-sand-clay mixtures

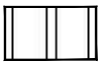

SW **WELL-GRADED SAND**
gravelly sand, little or no fines

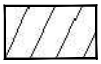

SP **POORLY-GRADED SAND**
gravelly sand, little or no fines


SM **SILTY SAND**
sand-silt mixtures

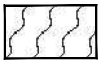

SC **CLAYEY SAND**
sand-clay mixtures

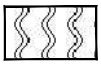

ML **SILT**
non-plastic to medium plasticity

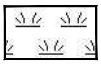

MH **ELASTIC SILT**
high plasticity


CL **LEAN CLAY**
low to medium plasticity


CH **FAT CLAY**
high plasticity


OL **ORGANIC SILT or CLAY**
non-plastic to low plasticity


OH **ORGANIC SILT or CLAY**
high plasticity


PT **PEAT**
highly organic soils

DRILLING SAMPLING SYMBOLS & ABBREVIATIONS

SS	Split Spoon Sampler	PM	Pressuremeter Test
ST	Shelby Tube Sampler	RD	Rock Bit Drilling
WS	Wash Sample	RC	Rock Core, NX, BX, AX
BS	Bulk Sample of Cuttings	REC	Rock Sample Recovery %
PA	Power Auger (no sample)	RQD	Rock Quality Designation %
HSA	Hollow Stem Auger		

PARTICLE SIZE IDENTIFICATION

DESIGNATION		PARTICLE SIZES
Boulders		12 inches (300 mm) or larger
Cobbles		3 inches to 12 inches (75 mm to 300 mm)
Gravel:	Coarse	¾ inch to 3 inches (19 mm to 75 mm)
	Fine	4.75 mm to 19 mm (No. 4 sieve to ¾ inch)
Sand:	Coarse	2.00 mm to 4.75 mm (No. 10 to No. 4 sieve)
	Medium	0.425 mm to 2.00 mm (No. 40 to No. 10 sieve)
	Fine	0.074 mm to 0.425 mm (No. 200 to No. 40 sieve)
Silt & Clay ("Fines")		<0.074 mm (smaller than a No. 200 sieve)

COHESIVE SILTS & CLAYS

UNCONFINED COMPRESSIVE STRENGTH, Q_P[4]	SPT[5] (BPF)	CONSISTENCY[7] (COHESIVE)
<0.25	<2	Very Soft
0.25 - <0.50	2 - 4	Soft
0.50 - <1.00	5 - 8	Firm
1.00 - <2.00	9 - 15	Stiff
2.00 - <4.00	16 - 30	Very Stiff
4.00 - 8.00	31 - 50	Hard
>8.00	>50	Very Hard

GRAVELS, SANDS & NON-COHESIVE SILTS

SPT[5]	DENSITY
<5	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
>50	Very Dense

RELATIVE AMOUNT[7]	COARSE GRAINED (%)[8]	FINE GRAINED (%)[8]
Trace	≤5	≤5
With	10 - 20	10 - 25
Adjective *(ex: "Silty")*	25 - 45	30 - 45

WATER LEVELS[6]

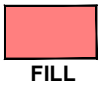

WL (First Encountered)


WL (Completion)


WL (Seasonal High Water)


WL (Stabilized)

FILL AND ROCK


FILL


POSSIBLE FILL


PROBABLE FILL


ROCK

[1]Classifications and symbols per ASTM D 2488-17 (Visual-Manual Procedure) unless noted otherwise.

[2]To be consistent with general practice, "POORLY GRADED" has been removed from GP, GP-GM, GP-GC, SP, SP-SM, SP-SC soil types on the boring logs.

[3]Non-ASTM designations are included in soil descriptions and symbols along with ASTM symbol [Ex: (SM-FILL)].

[4]Typically estimated via pocket penetrometer or Torvane shear test and expressed in tons per square foot (tsf).

[5]Standard Penetration Test (SPT) refers to the number of hammer blows (blow count) of a 140 lb. hammer falling 30 inches on a 2 inch OD split spoon sampler required to drive the sampler 12 inches (ASTM D 1586). "N-value" is another term for "blow count" and is expressed in blows per foot (bpf). SPT correlations per 7.4.2 Method B and need to be corrected if using an auto hammer.

[6]The water levels are those levels actually measured in the borehole at the times indicated by the symbol. The measurements are relatively reliable when augering, without adding fluids, in granular soils. In clay and cohesive silts, the determination of water levels may require several days for the water level to stabilize. In such cases, additional methods of measurement are generally employed.

[7]Minor deviation from ASTM D 2488-17 Note 14.

[8]Percentages are estimated to the nearest 5% per ASTM D 2488-17.

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SUBSURFACE EXPLORATION PROCEDURE: STANDARD PENETRATION TESTING (SPT) ASTM D 1586 Split-Barrel Sampling

Standard Penetration Testing, or **SPT**, is the most frequently used subsurface exploration test performed worldwide. This test provides samples for identification purposes, as well as a measure of penetration resistance, or N-value. The N-Value, or blow counts, when corrected and correlated, can approximate engineering properties of soils used for geotechnical design and engineering purposes.

SPT Procedure:

- Involves driving a hollow tube (split-spoon) into the ground by dropping a 140-lb hammer a height of 30-inches at desired depth
- Recording the number of hammer blows required to drive split-spoon a distance of 12 inches (in 3 or 4 Increments of 6 inches each)

- Auger is advanced* and an additional SPT is performed
- One SPT test is typically performed for every two to five feet

- Obtain two-inch diameter soil sample

**Drilling Methods May Vary—* The predominant drilling methods used for SPT are open hole fluid rotary drilling and hollow-stem auger drilling.

Project No.: 35-29020-A1
Boring No.: NB21
Sheet 1 of 1

LOG OF BORING

Project: River Landing Natural Lots - Lot 21
Client: HyDry Company, LLC
Drill Rig: 104A
Driller: C. Morgan
Boring Location: See Field Exploration Plan
Drill Rod: AWJ
Drill Mud: Super Gel-X
Casing Size:
Length of Casing:
Groundwater Depth: 2.3 ft Time: Drilling Date: 9/7/21
Boring Begun: 9/7/21
Boring Completed: 9/7/21

SAMPLE NO.	DEPTH, FEET	SAMPLE TYPE	DESCRIPTION	BLOWS PER 6 IN.	N Value
	0		Topsoil	2	
1			VERY LOOSE Light Brown Fine SAND (SP)	2	
				2	4
				2	
				2	
2			LOOSE Gray Fine SAND (SP)	3	
				5	8
				3	
			LOOSE Gray Brown to Dark Gray Brown Fine SAND, Few Small Roots (SP)	2	
3	5			4	
			LOOSE to MEDIUM DENSE Gray Brown Fine SAND (SP)	6	10
				7	
				6	
4				6	
				9	15
			MEDIUM DENSE Gray Fine SAND, Trace Clay (SP)	10	
				6	
5			MEDIUM DENSE Gray Fine SAND With Clay (SP-SC)	8	
				12	20
	10			13	
			MEDIUM DENSE Brown Gray Fine SAND (SP)		
				4	
6				7	
	15			7	14
			Boring Terminated @ 15 ft.		
	20				
	25				

PERCENT ORGANIC MATERIAL
PERCENT PASSING NO. 200 SIEVE
○PLASTIC LIMIT MOISTURE CONTENT + ◇LIQUID LIMIT
(%) 0 10 20 30 40

SHEAR STRENGTH (ksf)
⊙ Pocket Penetrometer Undisturbed Sample
◕ Pocket Penetrometer Disturbed Sample
▼ Torvane
● Unconfined Compression
⊠ Triaxial Compression
0 1 2

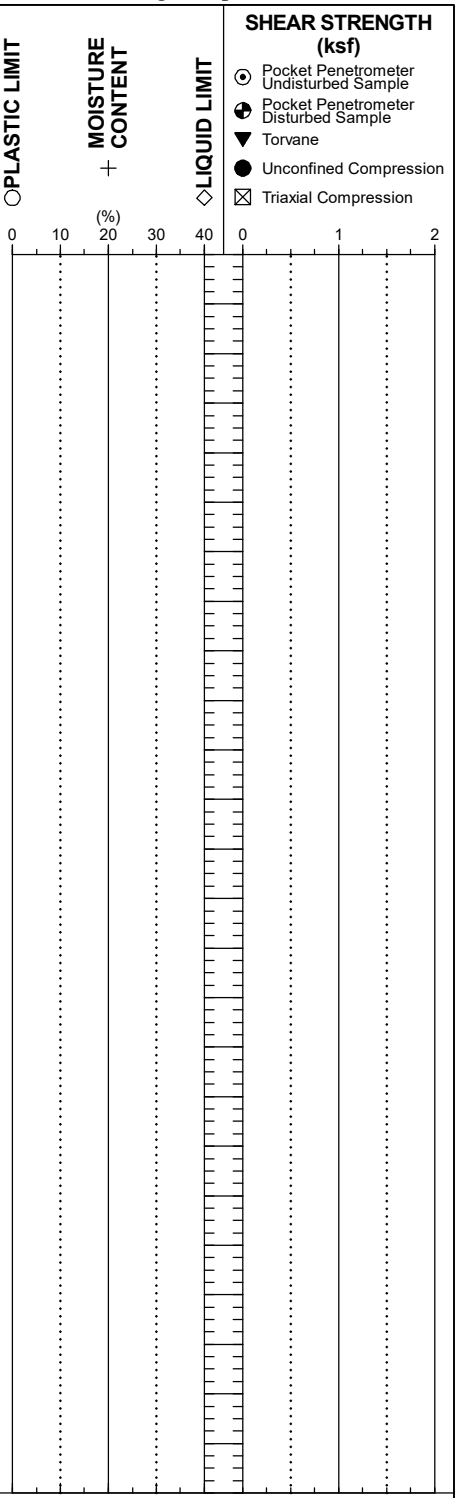
Remarks

Project No.: 35-29020-A1
Boring No.: NB22
Sheet 1 of 1

LOG OF BORING

Project: River Landing Natural Lots - Lot 21
Client: HyDry Company, LLC
Drill Rig: 104A
Driller: C. Morgan
Boring Location: See Field Exploration Plan
Drill Rod: AWJ
Drill Mud: Super Gel-X
Casing Size:
Length of Casing:
Groundwater Depth: 2.5 ft Time: Drilling Date: 9/7/21
Boring Begun: 9/7/21
Boring Completed: 9/7/21

SAMPLE NO.	DEPTH, FEET	SAMPLE TYPE	DESCRIPTION	BLOWS PER 6 IN.	N Value	PERCENT ORGANIC MATERIAL	PERCENT PASSING NO. 200 SIEVE
	0		Topsoil	2			
1			LOOSE Light Brown Fine SAND (SP)	2 3 4	5		
			LOOSE Light Brown Fine SAND With Shell Fragments (SP)	2 3 4	7		
2				6			
			LOOSE Light Gray Fine SAND, Trace Clay With Shell Fragments (SP)	4 4 3	7		
3	5			2			
			VERY SOFT Gray Silty CLAY (CL)	1 1 1	2		
4				2			
			SOFT Gray Silty CLAY (CH)	2 2 2	4		
5				2			
	10						
			LOOSE Gray Brown Fine SAND, Trace Clay (SP)	3 4	10		
6				6			
	15		Boring Terminated @ 15 ft.				
	20						
	25						



Remarks

Project No.: 35-29020-A1
Boring No.: NA21
Sheet 1 of 1

LOG OF BORING

Project: River Landing Natural Lots - Lot 21
Client: HyDry Company, LLC
Drill Rig: 104A
Driller: C. Morgan
Boring Location: See Field Exploration Plan
Drill Rod: Flight Auger
Drill Mud:
Casing Size:
Length of Casing:
Groundwater Depth: 2.8 ft Time: Drilling Date: 8/20/21
Boring Begun: 8/20/21
Boring Completed: 8/20/21

SAMPLE NO.	DEPTH, FEET	SAMPLE TYPE	DESCRIPTION
	0		Topsoil
1			Light Brown Gray Fine SAND, Trace Shell Fragments (SP)
2	5		Dark Brown Gray Silty Fine SAND With Organic Fines (OL)
3			Dark Brown Clayey Fine SAND (SC)
4			Gray Brown Clayey Fine SAND (SC)
5	10		Gray Clayey Fine SAND (SC)
			Boring Terminated @ 10 ft.
	15		
	20		
	25		

BLOWS PER 6 IN.
N Value
PERCENT ORGANIC MATERIAL
PERCENT PASSING NO. 200 SIEVE
○PLASTIC LIMIT
MOISTURE CONTENT +
◇LIQUID LIMIT
(%)
0 10 20 30 40

SHEAR STRENGTH (ksf)
⊙ Pocket Penetrometer Undisturbed Sample
◕ Pocket Penetrometer Disturbed Sample
▼ Torvane
● Unconfined Compression
⊠ Triaxial Compression
0 1 2

Remarks

Project No.: 35-29020-A1
Boring No.: NA22
Sheet 1 of 1

LOG OF BORING

Project: River Landing Natural Lots - Lot 21
Client: HyDry Company, LLC
Drill Rig: 104A
Driller: C. Morgan
Boring Location: See Field Exploration Plan
Drill Rod: Flight Auger
Drill Mud:
Casing Size:
Length of Casing:
Groundwater Depth: 2.3 ft Time: Drilling Date: 8/20/21
Boring Begun: 8/20/21
Boring Completed: 8/20/21

SAMPLE NO.	DEPTH, FEET	SAMPLE TYPE	DESCRIPTION
	0		Topsoil
1			Light Brown Fine SAND (SP)
2			Dark Brown Silty Fine SAND With Organic Fines (OL)
			Brown Clayey Fine SAND (SC)
3	5		Gray Brown Fine SAND With Clay (SP-SC)
4			Gray Fine SAND (SP)
5			
	10		Boring Terminated @ 10 ft.
	15		
	20		
	25		

BLOWS PER 6 IN.
N Value
PERCENT ORGANIC MATERIAL
PERCENT PASSING NO. 200 SIEVE
○PLASTIC LIMIT
MOISTURE CONTENT +
◇LIQUID LIMIT
(%) 0 10 20 30 40

SHEAR STRENGTH (ksf)
⊙ Pocket Penetrometer Undisturbed Sample
◒ Pocket Penetrometer Disturbed Sample
▼ Torvane
● Unconfined Compression
⊠ Triaxial Compression
0 1 2

Remarks