July 28, 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 35
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 July 19, 2021 and July 20, 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 25 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	4 – 5.5	I	Very Loose to Medium Dense SAND (SP), Some Shell Fragments, Moist
4 – 5.5	8 – 12	II	Loose to Medium Dense SAND WITH CLAY (SP-SC) and CLAYEY SAND (SC), Moist to Wet
8 – 12	25	III	Very Loose to Medium Dense SAND (SP), SAND WITH SILT (SP-SM), and SILTY SAND (SM), Wet

As an exception, Boring NA44 encountered a layer of sand with roots at depths between approximately 4 feet and 6 feet below existing grades. We do not consider this layer suitable to remain in place below proposed structures.

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 6 feet to 8.5 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.

Over-Excavation and Shallow Foundations

As encountered in Boring NA44, sand with roots is present at depths between approximately 4 feet and 6 feet below existing grades. We recommend this layer containing roots will be completely over-excavated within and to a distance of at least 5 feet beyond the building areas, pool areas and horizontal limits of the proposed hardscape areas. We recommend test pits be performed prior to or concurrent with the over-excavation to better delineate the horizontal extents of the organic material. The replacement soils should

be placed and compacted in lifts to finished grade. We note that the soils encountered above the organic-containing layer are suitable for reuse as structural fill, and can be placed and compacted in lifts within the excavation after organic-soil removal.

Subsequent to performing the over-excavation and replacement of the organic soil, the structure may be supported on conventional shallow foundations. It appears maximum allowable soil bearing pressures for shallow foundations supporting the proposed structure will be on the order of 2,500 psf. We emphasize the necessary site preparation and earthwork construction procedures will be primarily dependent on the maximum anticipated structural loads applied to the foundations.

Auger Cast-In-Place (ACIP) Piles

The organic-containing soils can be left in-place if the proposed structure (including floor slabs) is supported by deep foundations. Based on the results of our subsurface exploration and experience with similar projects, ACIP piles are considered a feasible option for support of the residence. ACIP piles are constructed by drilling into the subsurface material with a continuous flight, hollow-stem auger which is pulled upward (after achieving the required length) while cement grout is pumped under pressure through the auger. The continuous auger flight provides adequate support to the open pile annulus during grouting.

Based on our experience with similar projects, it is our opinion that 14-inch ACIP piles are a feasible foundation option for support of the structure. We estimate 14-inch ACIP piles bearing 20 feet below existing grades may have an axial capacity on the order of 15 tons. Additional recommendations can be provided when additional information about the proposed construction is available.

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 M. 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.

2021-07-28 17:09:27

Chris M. Egan, P.E.
Geotechnical Department Manager
Registered, Florida No. 79645
CEgan@ecslimited.com

Joey Broussard, P.E.
Principal Engineer
Registered Florida No. 58233
JBroussard@ecslimited.com

APPENDICES

Appendix A – Drawings & Reports

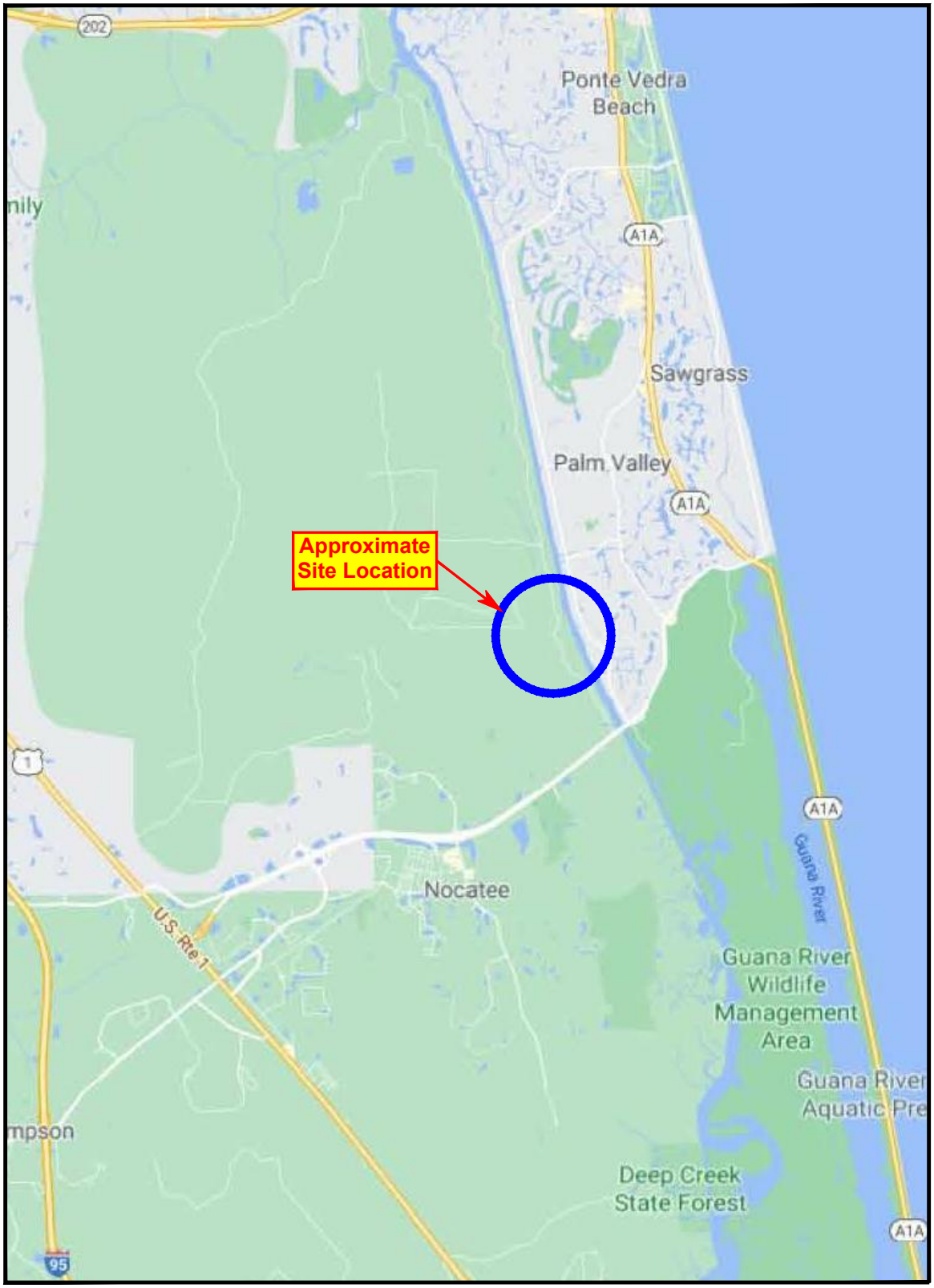
- Figure 1 - Site Location Diagram
- Figure 2 - Field Exploration Diagram
- Figure 3 – Generalized Subsurface Profiles

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
Figure 3 - Generalized Subsurface Profiles



ECS Florida, LLC
Geotechnical ■ Construction Materials ■ Environmental ■ Facilities
11554 Davis Creek Court, Jacksonville, FL 32256
T: (904) 880-0960 ● F: (904) 880-0970
www.ecslimited.com

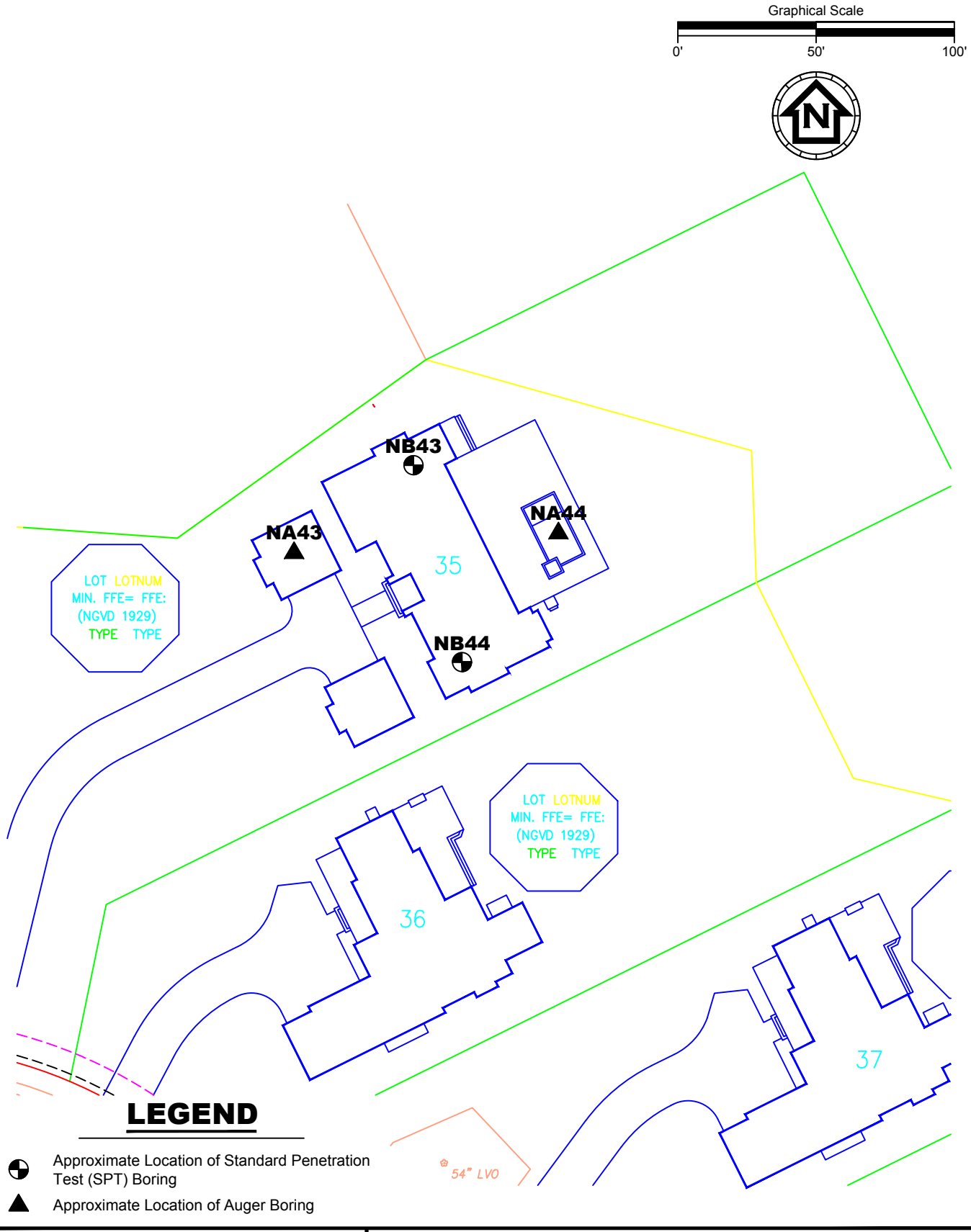
Site Location Diagram

River Landing Natural Lots - Lot 35

St. Johns County, Florida

Date: 07/28/21	Project No.: 35-29020-A1	Figure 1

JAS - 35-29020-A1



ECS Florida, LLC
Geotechnical ■ Construction Materials ■ Environmental ■ Facilities
11554 Davis Creek Court, Jacksonville, FL 32256
T: (904) 880-0960 ● F: (904) 880-0970
www.ecslimited.com

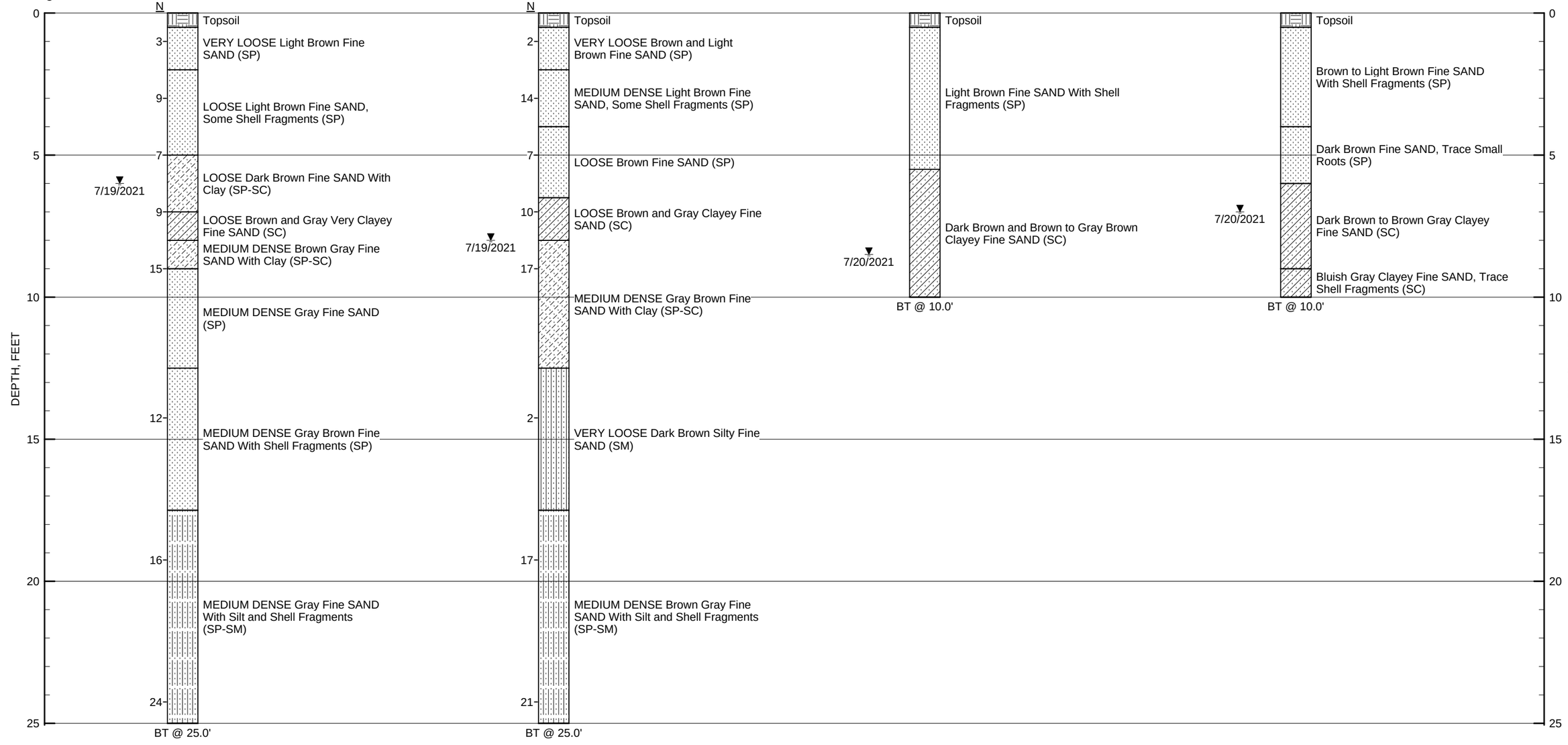
Field Exploration Diagram

River Landing Natural Lots - Lot 35

St. Johns County, Florida

Date: 07/28/21	Project No.: 35-29020-A1	Figure 2

JAS - 35-29020-A1



LEGEND

- Topsoil
- Fine SAND (SP)
- Fine SAND With Silt (SP-SM)
- Fine SAND With Clay (SP-SC)
- Silty Fine SAND (SM)
- Clayey Fine SAND (SC)

N — Standard Penetration Resistance, Blows/Foot

SP — Unified Soil Classification System

▼ — Groundwater Level at Time of Drilling

BT — Boring Terminated at Depth Below Grade

Generalized Subsurface Profiles

River Landing Natural Lots - Lot 35

St. Johns County, Florida

ECS

DATE: 7/28/21 | PROJ. NO.: 35-29020-A1 | Figure 3

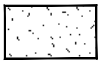
Appendix B – Field Operations

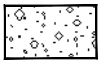
Reference Notes for Boring Logs
Subsurface Exploration Procedure: Standard Penetration Testing (SPT)
Boring Logs

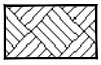
REFERENCE NOTES FOR BORING LOGS

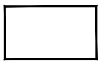
MATERIAL[1,2]

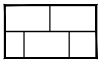

ASPHALT


CONCRETE


GRAVEL

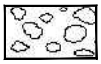

TOPSOIL

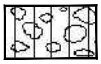

VOID


BRICK

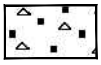

AGGREGATE BASE COURSE

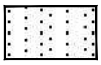

GW **WELL-GRADED GRAVEL**
gravel-sand mixtures, little or no fines

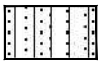

GP **POORLY-GRADED GRAVEL**
gravel-sand mixtures, little or no fines


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

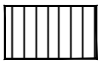

GC **CLAYEY GRAVEL**
gravel-sand-clay mixtures

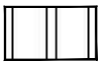

SW **WELL-GRADED SAND**
gravelly sand, little or no fines

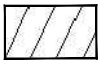

SP **POORLY-GRADED SAND**
gravelly sand, little or no fines


SM **SILTY SAND**
sand-silt mixtures

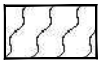

SC **CLAYEY SAND**
sand-clay mixtures

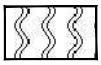

ML **SILT**
non-plastic to medium plasticity

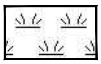

MH **ELASTIC SILT**
high plasticity


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	3 - 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]

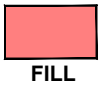

WL (First Encountered)


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.

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.: NB43
Sheet 1 of 1

LOG OF BORING

Project: River Landing Natural Lots - Lot 35
Client: HyDry Company, LLC
Drill Rig: 104A
Driller: M. Letchworth
Boring Location: See Field Exploration Plan
Drill Rod: AWJ
Drill Mud: Super Gel-X
Casing Size:
Length of Casing:
Groundwater Depth: 6 ft Time: Drilling Date: 7/19/21
Boring Begun: 7/19/21
Boring Completed: 7/19/21

SAMPLE NO.	DEPTH, FEET	SAMPLE TYPE	DESCRIPTION	BLOWS PER 6 IN.	N Value	PERCENT ORGANIC MATERIAL	PERCENT PASSING NO. 200 SIEVE
	0		Topsoil	1			
1			VERY LOOSE Light Brown Fine SAND (SP)	1 2 3	3		
2			LOOSE Light Brown Fine SAND, Some Shell Fragments (SP)	5 5 4 3	9		
3	5		LOOSE Dark Brown Fine SAND With Clay (SP-SC)	2 3 4 3	7		
4			LOOSE Brown and Gray Very Clayey Fine SAND (SC)	3 4 5 5	9		
5			MEDIUM DENSE Brown Gray Fine SAND With Clay (SP-SC)	7 7			
	10		MEDIUM DENSE Gray Fine SAND (SP)	8 12	15		
6			MEDIUM DENSE Gray Brown Fine SAND With Shell Fragments (SP)	6 6 6	12		
7	15		MEDIUM DENSE Gray Fine SAND With Silt and Shell Fragments (SP-SM)	8 7 9	16		
8	20			12 12 12	24		
	25		Boring Terminated @ 25 ft.				

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.: NB44
Sheet 1 of 1

LOG OF BORING

Project: River Landing Natural Lots - Lot 35
Client: HyDry Company, LLC
Drill Rig: 104A
Driller: M. Letchworth
Boring Location: See Field Exploration Plan
Drill Rod: AWJ
Drill Mud: Super Gel-X
Casing Size:
Length of Casing:
Groundwater Depth: 8 ft Time: Drilling Date: 7/19/21
Boring Begun: 7/19/21
Boring Completed: 7/19/21

SAMPLE NO.	DEPTH, FEET	SAMPLE TYPE	DESCRIPTION	BLOWS PER 6 IN.	N Value
	0		Topsoil	1	
1			VERY LOOSE Brown and Light Brown Fine SAND (SP)	1 1 4	2
2			MEDIUM DENSE Light Brown Fine SAND, Some Shell Fragments (SP)	4 5 9 7	14
3	5		LOOSE Brown Fine SAND (SP)	4 3 4 7 6	7
4			LOOSE Brown and Gray Clayey Fine SAND (SC)	4 6 10	10
5			MEDIUM DENSE Gray Brown Fine SAND With Clay (SP-SC)	4 6 11 13	17
	10				
6			VERY LOOSE Dark Brown Silty Fine SAND (SM)	1 1 1	2
	15				
7			MEDIUM DENSE Brown Gray Fine SAND With Silt and Shell Fragments (SP-SM)	4 7 10	17
	20				
8				8 9 12	21
	25		Boring Terminated @ 25 ft.		

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.: NA43
Sheet 1 of 1

LOG OF BORING

Project: River Landing Natural Lots - Lot 35
Client: HyDry Company, LLC
Drill Rig: 104A
Driller: M. Letchworth
Boring Location: See Field Exploration Plan
Drill Rod: AWJ
Drill Mud: Super Gel-X
Casing Size:
Length of Casing:
Groundwater Depth: 8.5 ft Time: Drilling Date: 7/20/21
Boring Begun: 7/19/21
Boring Completed: 7/19/21

SAMPLE NO.	DEPTH, FEET	SAMPLE TYPE	DESCRIPTION	BLOWS PER 6 IN.	N Value	PERCENT ORGANIC MATERIAL	PERCENT PASSING NO. 200 SIEVE	PLASTIC LIMIT ○ / MOISTURE CONTENT + / LIQUID LIMIT ◇ (%)	SHEAR STRENGTH (ksf)
	0		Topsoil						
1			Light Brown Fine SAND With Shell Fragments (SP)						
	5								
2			Dark Brown Clayey Fine SAND (SC)						
3			Brown Clayey Fine SAND (SC)						
4			Gray Brown Clayey Fine SAND (SC)						
	10		Boring Terminated @ 10 ft.						
	15								
	20								
	25								

SHEAR STRENGTH (ksf)
- Pocket Penetrometer Undisturbed Sample
- Pocket Penetrometer Disturbed Sample
- Torvane
- Unconfined Compression
- Triaxial Compression

MOISTURE CONTENT (%): 0 10 20 30 40
SHEAR STRENGTH (ksf): 0 1 2

Remarks

Project No.: 35-29020-A1
Boring No.: NA44
Sheet 1 of 1

LOG OF BORING

Project: River Landing Natural Lots - Lot 35
Client: HyDry Company, LLC
Drill Rig: 104A
Driller: M. Letchworth
Boring Location: See Field Exploration Plan
Drill Rod: AWJ
Drill Mud: Super Gel-X
Casing Size:
Length of Casing:
Groundwater Depth: 7 ft Time: Drilling Date: 7/20/21
Boring Begun: 7/19/21
Boring Completed: 7/19/21

SAMPLE NO.	DEPTH, FEET	SAMPLE TYPE	DESCRIPTION
	0		Topsoil
1			Brown Fine SAND With Shell Fragments (SP)
2			Light Brown Fine SAND With Shell Fragments (SP)
3	5		Dark Brown Fine SAND, Trace Small Roots (SP)
4			Dark Brown Clayey Fine SAND (SC)
5			Brown Gray Clayey Fine SAND (SC)
6	10		Bluish Gray Clayey Fine SAND, Trace Shell Fragments (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 + (%) 0 10 20 30 40 | LIQUID LIMIT ◇

SHEAR STRENGTH (ksf)
- Pocket Penetrometer Undisturbed Sample
- Pocket Penetrometer Disturbed Sample
- Torvane
- Unconfined Compression
- Triaxial Compression

0 1 2

Remarks