November 29, 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 89**
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 September 9, 2021. The approximate boring location is indicated on the attached Field Exploration Diagram (Figure 2). Our personnel determined the boring location using a handheld Global Positioning System (GPS) unit. The boring location 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 one Standard Penetration Test (SPT) boring, drilled to a depth of approximately 15 feet below the existing ground surface, in general accordance with the methodology outlined in ASTM D 1586 to explore the subsurface conditions within the lot area. Soil samples recovered during performance of the boring 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**

It should be understood that the soil conditions will vary adjacent to the boring location 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 | 6 | I | Medium Dense to Loose Fine SAND (SP) With Shell Fragments, Moist to Wet |
| 6 | 15 | II | Very Loose Clayey SAND (SC) and Soft CLAY (CH), Wet |

Groundwater was encountered at the boring location and recorded at the time of drilling at a depth of approximately 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.

**Conventional Shallow Foundation Support**

The planned residential structure can be supported by a conventional shallow foundation system ("spread footings") provided the site is properly prepared. Subsequent to typical site preparation activities, we expect that shallow spread foundations can be designed for an allowable bearing capacity of 2,500 psf.

**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.

2021.11.29 11:49:58-05'00'

*Chris M. Egan, P.E.*
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*Registered, Florida No. 79645*
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*Joey Broussard, P.E.*
***Principal Engineer***
*Registered Florida No. 58233*
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**APPENDICES**

**Appendix A – Drawings & Reports**

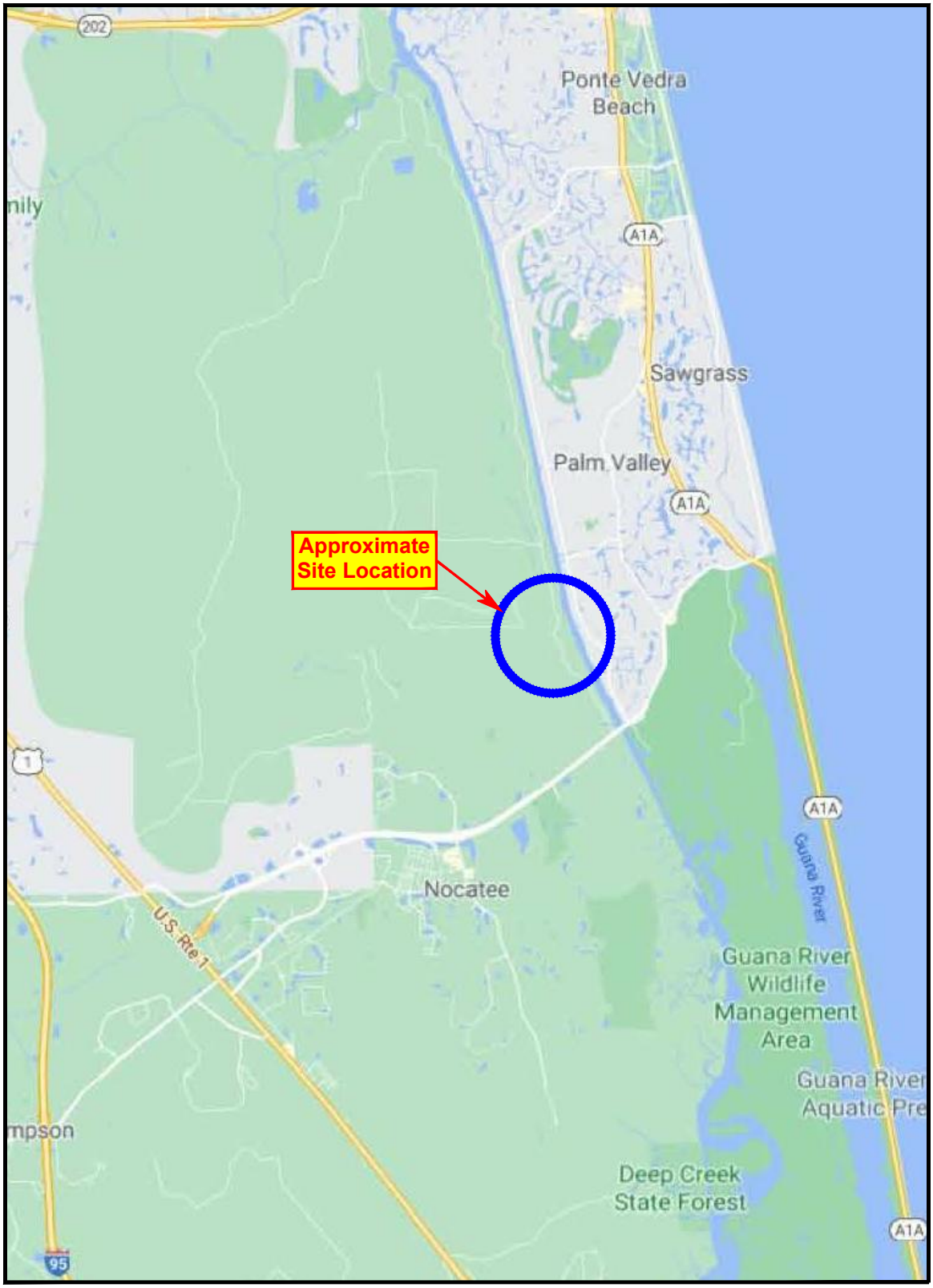
- Figure 1 - Site Location Diagram
- Figure 2 - Field Exploration Diagram

**Appendix B – Field Operations**

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

## APPENDIX A – Drawings & Reports

Figure 1 - Site Location Diagram
Figure 2 - Field Exploration Diagram

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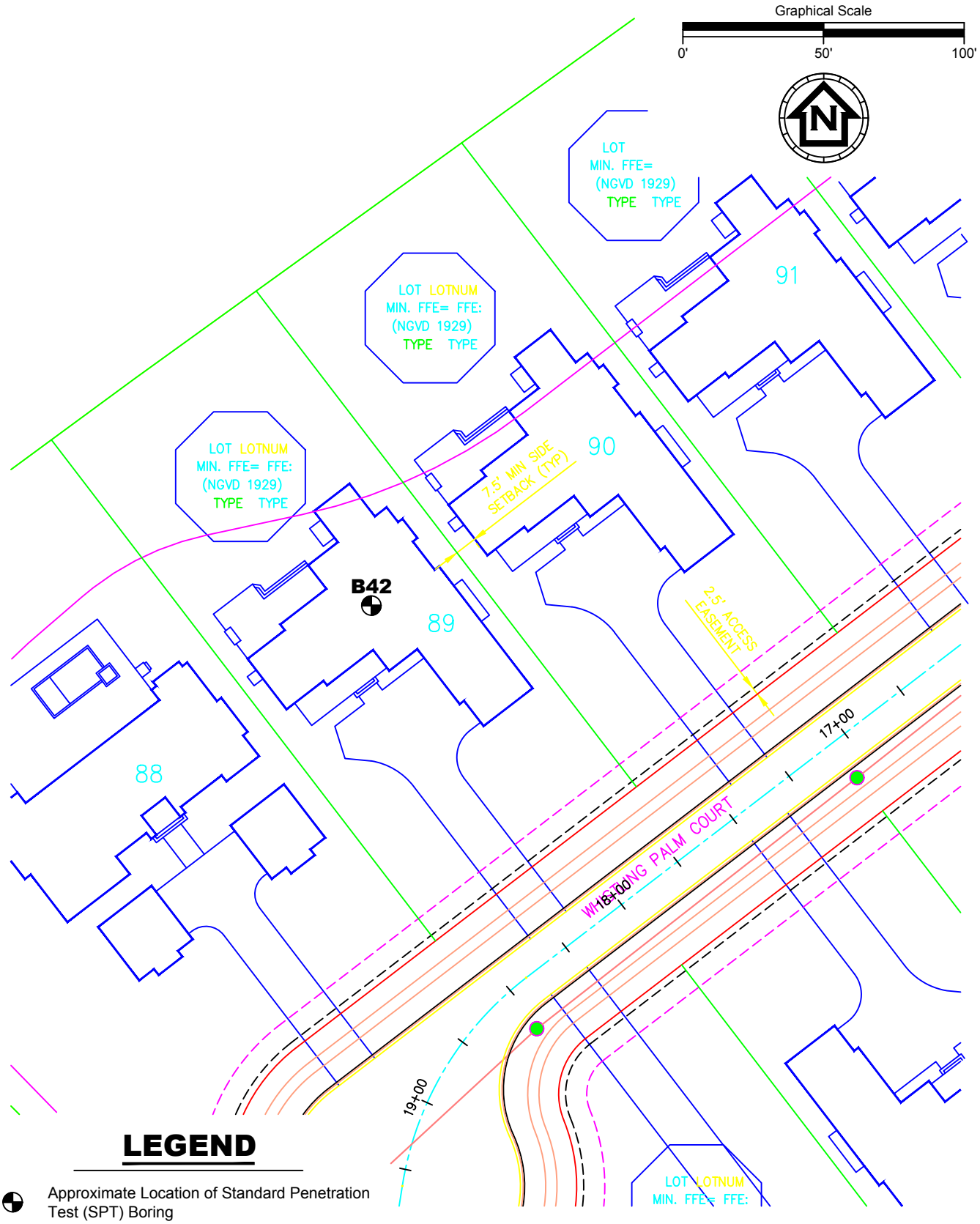
Site Location Diagram

**River Landing Natural Lots - Lot 89**

St. Johns County, Florida

| Date: 11/20/21 | Project No.: 35-29020-A1 | Figure 1 |
|---|---|---|

JAS - 35-29020-A1




## LEGEND

Approximate Location of Standard Penetration Test (SPT) Boring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Field Exploration Diagram

**River Landing Natural Lots - Lot 89**

St. Johns County, Florida

| Date: 11/20/21 | Project No.: 35-29020-A1 | Figure 2 |
|---|---|---|

JAS - 35-29020-A1

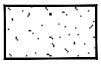
## APPENDIX B – Field Operations

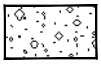
Reference Notes for Boring Logs
Subsurface Exploration Procedure:  Standard Penetration Testing (SPT)
Boring Logs

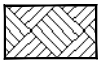
# REFERENCE NOTES FOR BORING LOGS

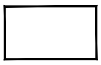
## MATERIAL[1,2]

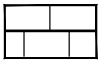

**ASPHALT**


**CONCRETE**


**GRAVEL**

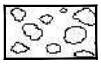

**TOPSOIL**

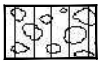

**VOID**


**BRICK**

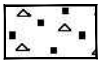

**AGGREGATE BASE COURSE**

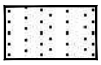

**GW** **WELL-GRADED GRAVEL**
**gravel-sand mixtures, little or no fines**

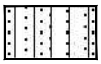

**GP** **POORLY-GRADED GRAVEL**
**gravel-sand mixtures, little or no fines**


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

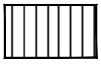

**GC** **CLAYEY GRAVEL**
**gravel-sand-clay mixtures**

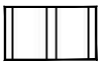

**SW** **WELL-GRADED SAND**
**gravelly sand, little or no fines**

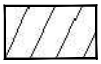

**SP** **POORLY-GRADED SAND**
**gravelly sand, little or no fines**


**SM** **SILTY SAND**
**sand-silt mixtures**

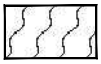

**SC** **CLAYEY SAND**
**sand-clay mixtures**

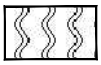

**ML** **SILT**
**non-plastic to medium plasticity**

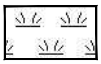

**MH** **ELASTIC SILT**
**high plasticity**


**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]

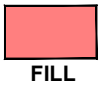

WL (First Encountered)


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.

# 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.: B42
Sheet 1 of 1

# LOG OF BORING

Project: River Landing Natural Lots - Lot 89
Client: HyDry Company, LLC
Drill Rig: 101A
Driller: M. Foster
Boring Location: See Field Exploration Plan
Drill Rod: AWJ
Drill Mud: Super Gel-X
Casing Size:
Length of Casing:
Groundwater Depth: 5 ft Time: Drilling Date: 9/9/21
Boring Begun: 9/9/21
Boring Completed: 9/9/21

| 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 | 2 | | | | | |
| 1 | | | MEDIUM DENSE to LOOSE Gray Brown Fine SAND With Shell Fragments (SP) | 4<br>7<br>7<br>7 | 11 | | | | |
| 2 | | | | 8<br>10<br>9<br>7 | 18 | | | | |
| 3 | 5 | | | 3<br>2<br>2 | 5 | | | | |
| | | | VERY LOOSE Gray Clayey Fine SAND (SC) | 1<br>2 | | | | | |
| 4 | | | | 1<br>2<br>2 | 3 | | | | |
| 5 | | | | 2<br>2<br>2 | 4 | | | | |
| | 10 | | | | | | | | |
| | | | SOFT Gray CLAY (CH) | | | | | | |
| 6 | | | | 1<br>1<br>2 | 3 | | | | |
| | 15 | | Boring Terminated @ 15 ft. | | | | | | |
| | 20 | | | | | | | | |
| | 25 | | | | | | | | |

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

0 10 20 30 40 (%)
0 1 2

**Remarks**