



Geotechnical Engineering Report

Structure 157 Rehabilitation
Sebastian, Brevard County, Florida

August 2, 2022

Terracon Project No. H1225128

Prepared for:

St. John's River Water Management District
Palm Bay, Florida

Prepared by:

Terracon Consultants, Inc.
Winter Park, Florida



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August 2, 2022

St. John's River Water Management District
525 Community College Parkway
Palm Bay, Florida 32909

Attn: Mr. Robert Day
P: (386) 329 4151
E: rday@sjrwmd.com

Re: Geotechnical Engineering Report
Structure 157 Rehabilitation
Buffer Reserve Road
Sebastian, Brevard County, Florida
Terracon Project No. H1225128

Dear Mr. Day:

We have completed the Geotechnical Engineering services for the above referenced project. This study was performed in general accordance with Terracon Proposal No. PH1225128.1 dated April 29, 2022. This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning earthwork and the design and construction of temporary support systems related to the rehabilitation of Structure 157.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,

[Terracon Consultants, Inc.](#)

Certificate of Authorization No. 8330

Bruce H. Woloshin, P.E.
Principal
Florida PE #36734

Jay W. Casper, P.E.
Senior Principal

This item has been digitally signed and sealed by Bruce H. Woloshin, P.E. on the date adjacent to the seal.
Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

Explore with us

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Note: This report was originally delivered in a web-based format. **Orange Bold** text in the report indicates a referenced section heading. The PDF version also includes hyperlinks which direct the reader to that section and clicking on the [GeoReport](#) logo will bring you back to this page. For more interactive features, please view your project online at client.terracon.com.

ATTACHMENTS

- EXPLORATION AND TESTING PROCEDURES
- PHOTOGRAPHY LOG
- SITE LOCATION AND EXPLORATION PLANS
- EXPLORATION RESULTS
- SUPPORTING INFORMATION

Note: Refer to each individual Attachment for a listing of contents.

Geotechnical Engineering Report

Structure 157 Rehabilitation

Buffer Reserve Road

Sebastian, Brevard County, Florida

Terracon Project No. H1225128
August 2, 2022

INTRODUCTION

This report presents the results of our subsurface exploration and geotechnical engineering services performed for the proposed Structure 157 Rehabilitation Project located at Buffer Reserve Road in Sebastian, Brevard County, Florida. The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil conditions
- Groundwater conditions
- Site preparation and earthwork
- Excavation considerations
- Dewatering considerations
- Foundation design and construction
- Geotechnical parameters for sheet pile design

The geotechnical engineering Scope of Services for this project included the advancement of four test borings to depths of 75 feet below existing site grades along with four groundwater observation wells with well screens positioned between depths of 15 to 70 feet.

Maps showing the site and boring locations are shown in the [Site Location](#) and [Exploration Plan](#) sections, respectively. The results of the laboratory testing performed on soil samples obtained from the site during the field exploration are included on the boring logs in the [Exploration Results](#) section.

SITE CONDITIONS

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available geologic and topographic maps.

Item	Description
Parcel Information	The project is located at Buffer Reserve Road in Sebastian, Brevard County, Florida. Latitude/Longitude (approximate) 27.8305484, -80.5396426 See Site Location

Item	Description
Existing Improvements	<p>A major maintenance program is planned for the existing water control structure which will include installing temporary sheet pile on both the upstream (west) and downstream (east) sides of the structure. Flow from the C-54 Canal will be diverted away from Structure 157.</p> <p>Two “water boils” have been reported, one about 120’ downstream of the structure near the existing boat barrier and another several hundred feet further downstream. The boils have been surveyed by divers and appear to be potential artesian flow likely coming from soft or loose layers above dense layers.</p>
Current Ground Cover	Grass
Existing Topography (from aerial photos)	<p>Top of the berm at the travel level is approximately elevation +22, water level on the upstream side is approximately elevation +15, mud level on the upstream side is approximately elevation -2, water level on the downstream side is approximately elevation +4, mud level on downstream side is approximately elevation -12, and the mudline of the boil near the boat barrier is reported at elevation -19.</p>
Surface Water	<p>The USGS topographic quadrangle map “Fellsmere, Florida” depicts the site as being situated located within a manmade canal constructed to manage the Upper St. Johns River Marsh and out falling in the St. Sebastian River.</p>

Geology

Florida Geological Survey (FGS) Bulletin 64, Geologic Framework of the Lower Floridan Aquifer System, Brevard County, Florida (Joel G. Duncan, William L. Evans III, and Koren L. Taylor) states that Cretaceous to Holocene strata in Brevard County consist of a thick sequence of interbedded limestone and dolostone overlain by a veneer of siliciclastic sediment. The Floridan aquifer system is characterized by Paleocene to Upper Eocene limestones and dolostones. The top of the Floridan aquifer is below elevation -300 feet in the project vicinity.

General Potential for Sinkhole Development

Sinkhole development occurs in Florida and varies geographically from areas with almost no potential or a very low potential to areas with a high potential where sinkholes occur frequently. The subject property is located in Area II as mapped by the Florida Geological Survey (FGS) web site. The cover (over limestone bedrock) in Area II is between 30 to 200 feet thick and is predominantly sandy. Sinkholes are few, shallow, of small diameter and develop gradually in Area II. The risk of sinkhole occurrence at most sites is small even in areas known to have a higher than average risk of sinkhole occurrence. Based on our prior experience in this area, the potential for sinkhole activity throughout Brevard County is considered to be very low.

A review of Florida Geologic Survey’s on-line Subsidence Incident Reports (SIRs) database reveals the closest reported alleged sinkhole is about 8½ miles southwest of the subject site. It should be noted

that the number of sinkholes is based on information reported to the FGS and does not necessarily reflect the number of sinkholes confirmed by public or private industry.

During our limited evaluation, we did not encounter traditional signs associated with potential sinkhole development such as loss of circulation of drilling fluid, obvious raveled zones, surface depressions, etc. However, this evaluation was not planned to specifically address sinkhole potential.

Soil Survey

The Soil Survey of Brevard County, Florida as prepared by the United States Department of Agriculture (USDA), Soil Conservation Service (SCS; later renamed the Natural Resource Conservation Service - NRCS), identifies the predevelopment soil types at the subject site as Udorthents, steep (59). A Soils Map is included with this [GeoReport](#), depicting the applicable Soil Survey map portion for the subject site.

59 – Udorthents, steep. This soil type consists of steep marine terraces consisted of sand and gravelly sand. Areas of Udorthents (locally spoils from the canal construction) are generally between 5 and 40 feet deep, surrounded by sidewalls of variable steepness.

PROJECT DESCRIPTION

Our initial understanding of the project was provided in our proposal and was discussed during project planning. A period of collaboration has transpired since the project was initiated, and our final understanding of the project conditions is as follows:

Item	Description ¹
Information Provided	We were provided with proposed 60% and 90% plans for the downstream grading (C4), downstream canal sections and downstream grading section (C5), and a site plan (C2). We were also provided with the partially legible C-54, Structure 157 plans from 1968 and various survey and diving records for the reported boils. In reviewing the original boring logs, most logs have layers of shell which could be the source of the flowing water.
Project Description	Evaluate the subsurface conditions related to the installation and removal of the temporary sheetpile system on both the upstream and downstream sides of the Structure 157. Provide professional options to support the design and construction of the temporary cofferdam/sheet pile system, address the potential risks for artesian conditions affecting the existing structure and provide remedial solution alternatives, as appropriate.
Upstream Water	Maximum water elevation +20.0'; Design water level +15.5'
Downstream Water	Maximum water elevation +5.0'; Design water level +3.9'
Estimated Start of Construction	2023

1. Assumptions have been highlighted in yellow.

GEOTECHNICAL CHARACTERIZATION

We have developed a general characterization of the subsurface conditions based upon our review of the subsurface exploration, laboratory data, geologic setting and our understanding of the project. This characterization, termed GeoModel, forms the basis of our geotechnical calculations and evaluation of site preparation and foundation options. Conditions encountered at each exploration point are indicated on the individual logs. The individual logs can be found in the [Exploration Results](#) section and the GeoModel can be found in the [Figures](#) section of this report.

As part of our analyses, we identified the following model layers within the subsurface profile. For a more detailed view of the model layer depths at each boring location, refer to the GeoModel.

Model Layer	Layer Name	General Description
1	Surface Sands	Surface sand, loose to medium dense (SP, SP-SM, SM)
2	Weak Silty Sand	Silty sand to fat clay, very loose or very soft (SM, CH)
3	Dense Sands	Dense sand, hydraulically restrictive, dense to very dense, (SP-SM, SP, SM, many with shell)
4	Limestone	Limestone

In general, the borings encountered the three top layers in all of the borings. Of special note is the interface between Model Layers 2 and 3, which we believe this is the likely source of upward pressure seen in the water boils on the downstream side of the Structure 157.

Groundwater Conditions

During drilling, groundwater levels were not encountered in the upper 10 feet of drilling prior to adding drilling fluids to maintain borehole stability and to continue drilling deeper. Artesian pressures above the ground surface were not encountered in the 75-foot investigations.

Four observation wells were installed to get better indications of the groundwater conditions. Each observation well was installed with 10-foot well screens at various depths within the profile. Each well screen was part of a prepacked sand/screen assembly and placed in the borehole at the assigned depth. The screen was then isolated within a bentonite and cement grout seal so that the water level within the standpipe was with water pressure head only at the screen interval. The following table is a summary of the well screen placement.

Continuous monitoring transducers were installed in each observation well and will record the variations in the groundwater levels. We will periodically download the data and provide updates of the groundwater levels in each well. Current groundwater readings appear to mimic the variation of the upstream and downstream water levels in the canal. Seasonal high variations are expected however, we believe the seasonal effects to be minor compared to the variations due to changes to the control structure holding or releasing water.

Boring Number	Upstream or Downstream	Well Screen Depths (Ft)	Well Screen Elevations (ft)	Maximum Canal Level/Design Canal Level (ft) ¹
B-1	Upstream	20-30	+6.4 to -3.6	+20.0/+15.5
B-3	Upstream	15-25	+11.4 to +1.4	
B-2	Downstream	60-70	-33.3 to -43.3	+5.0/+3.9
B-4	Downstream	35-45	-7.9 to -17.9	

1. Reference Upper St. Johns River Basin Structure 157 Rehabilitation Drawing C5 60% Submittal

Groundwater data was collected from the groundwater level data acquisition transducers starting on 7/20/2022 and manually captured on 7/29/2022. A graphic image of the groundwater variations is attached to this report. In general, the groundwater (total pressure head) was measured in the upstream monitoring wells at approximate elevation +16.75 in boring B-1 and +15.8 in boring B-3. The groundwater was measured in the downstream monitoring wells at approximate elevation +9.5 in boring B-2 and elevation +6.8 in boring B-4. We believe these water conditions mimic the groundwater elevations of the upstream and downstream canal water levels.

GEOTECHNICAL OVERVIEW

Borings encountered native sand to sand with silt to silty sand and clayey sand and fat clay.

Plans call for the installation of cofferdams both upstream and downstream to allow for the structure rehabilitation in dry conditions. Sheet piles are planned to be installed perpendicular to the structure on the order of 100-120 feet from the outside edges of the structure.

The [General Comments](#) section provides an understanding of the report limitations.

GROUNDWATER BOIL

It is our professional opinion that the groundwater boils identified on the downstream side of Structure 157 are a direct relationship to the grade differential between the upstream pressure head and the downstream stream pressure head. Placement of the observation wells at various depths has shown the groundwater levels are not under artesian pressure from deeper sources. Further the soils strength variation in the soil profile was very pronounced and we believe significant to further allow the horizontal flow from the upstream side of the structure to the downstream side. As shown on the attached GeoModel, Layer 2 is shown as a very weak sand or very soft clay material with N-values generally less than 5 blows per foot. Further, Layer 3 is shown as a very dense (strong, often cemented) sand. We know that groundwater will flow in the direction of its path of least resistance. The variation in density at the interface between the Layer 2 and Layer 3 is the likely condition for groundwater to move laterally with even the slightest of grade pressure.

SHEETPILE DESIGN CONSIDERATIONS

We understand that sheet piles will be used to support the canal water and the excavation on both the west and east sides of Structure 157 in order that the structure rehabilitation can be performed in dry conditions. On the upstream side, rip rap is planned to be placed in the canal area from about 66 feet from the west edge of the structure to the structure at to create a new “canal bottom” at elevation -2.2 feet.

The temporary sheet pile cofferdam will need to support the canal water with the current water level at +20. Further, our boring data has shown that GeoModel Layer 2 is very soft with N-values less than 4 blows per foot. The material as recovered in our SPT samples was very loose or very soft and the horizontal forces should be considered maximum in the sheet pile design from the existing canal bottom (elevation +2) to -18 on the upstream sheet piles.

Similarly, on the downstream side, rip rap is planned to be placed in the canal area from about 100 feet from the east edge of the structure to create a new “canal bottom” at elevation -11 feet. The canal bottom on the downstream side where the sheet piles are planned is at approximate elevation -16. Based upon our boring data the bottom of GeoModel Layer 2 should be at approximate elevation -10 and therefore should not adversely affect the design of the downstream sheet piles.

To account for the high lateral stresses on the sheet piles, the upstream water should be lowered as much as possible.

Sheetpile Placement Constraints

We recommend that the sheet piles be installed no closer than 50 feet from the existing structure to minimize the affects of vibrating the sheets in and out of the existing soil. As noted in the boring logs, the contractor should anticipate “easy driving” of the sheet through the GeoModel Layer 2 soils which terminated at approximate elevations -6 to -17 on the downstream side and about elevation -2 to -8 on the upstream side. Once the sheet piles reach GeoModel Layer 3, the driving should require significantly more energy to reach the desired penetration depths. If tieback designs are contemplated to withstand lateral pressures, anchors will need to be drilled into GeoModel Layer 3 to achieve any realistic pull out (tension) capacity.

LATERAL EARTH PRESSURES

Design Parameters

Structures with unbalanced backfill levels on opposite sides should be designed for earth pressures coefficients at least equal to values indicated in the following table. Earth pressures will be influenced by structural design of the walls, conditions of wall restraint, methods of construction and the strength of the materials being restrained. Two wall restraint conditions are shown in the diagram below. Active earth pressure is commonly used for design of free-standing cantilever retaining walls and assumes wall movement. The “at-rest” condition assumes no wall movement and is commonly used for basement walls, loading dock walls, or other walls restrained at the top, which is not typically used on sheet piles applications of this type. The recommended design lateral earth pressures do not include a factor of

safety. Hydrostatic pressure on the walls need to be applied based on the control water level on each side of the sheet pile.

Boring Number	Upstream or Downstream	GeoModel Layer 2		GeoModel Layer 3	
		Coefficient	Elevations	Coefficient	Elevations
B-1	Upstream	Ka=1.0	+0 ¹ to -17	Ka=0.3	-17 to -48 ²
B-3		Kp=1.0	+0 ¹ to -8	Kp=3.0	-8 to -48 ²
B-2	Downstream	Proposed bottom of excavation is below GeoModel Layer 2		Ka=0.3	-14 to -48 ²
B-4				Kp=3.0	-14 to -48 ²

1 Assume bottom of excavation is elevation +0 upstream and -14 downstream

2 Assume bottom of sheet pile is elevation -48 upstream and downstream

Boring Number	GeoModel Layer 2			GeoModel Layer 3		
	Elevations	Friction Angle (°)	Saturated Unit Weight (pcf)	Elevations	Friction Angle (°)	Saturated Unit Weight (pcf)
B-1	+0 ¹ to -17	25	90	-17 to -48 ²	35	115
B-3	+0 ¹ to -8	25	90	-8 to -48 ²	35	115
B-2	Proposed bottom of excavation is below GeoModel Layer 2			-14 to -48 ²	34	115
B-4				-14 to -48 ²	34	115

GENERAL COMMENTS

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Natural variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence or collaboration through this system are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for

information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly impact excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety, and cost estimating including, excavation support, and dewatering requirements/design are the responsibility of others. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

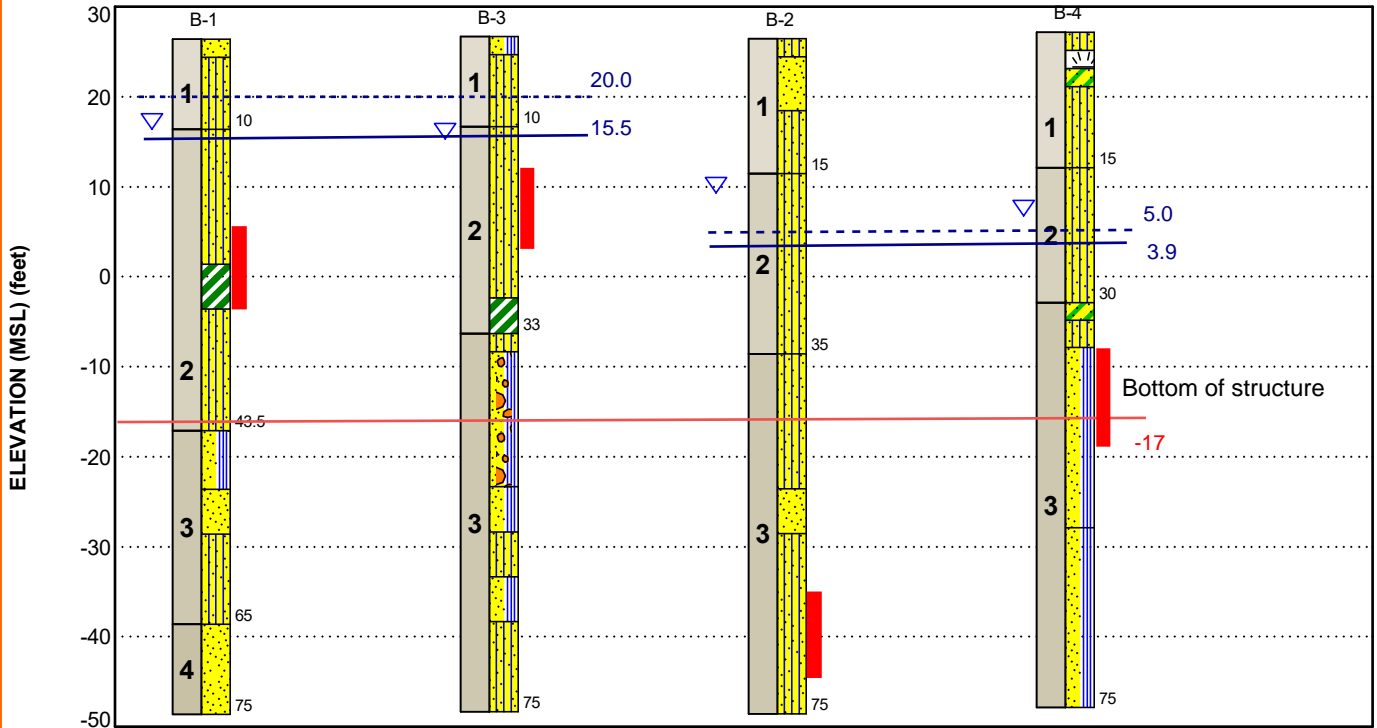
FIGURES

Contents:

GeoModel

GEOMODEL

S-157 Refurbishment ■ Sebastian, FL
Terracon Project No. H1225128



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description
1	Surface Sands	Surface sands, loose to medium dense (SP, SP-SM, SM)
2	Weak Silty Sand	Silty sand to fat clay, very loose or very soft, (SM, CH)
3	Dense Sands	Dense Sand, Hydraulically Restrictive, dense to very dense, (SP-SM, SP, SM, many with shell)
4	Limestone	Limestone

LEGEND

- Poorly-graded Sand
- Silty Sand
- Fat Clay
- Poorly-graded Sand with Silt
- Poorly-graded Sand with Silt and Gravel
- Peat
- Clayey Sand
- Well Screen Location
- Max Canal Water Level
- Design Canal Water Level

▽ Monitoring Well Water
Elevation 7-20-22

NOTES:

Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project. Numbers adjacent to soil column indicate depth below ground surface.

Groundwater levels are temporal. The levels shown are representative of the date and time of our exploration. Significant changes are possible over time. Water levels shown are as measured during and/or after drilling. In some cases, boring advancement methods mask the presence/absence of groundwater. See individual logs for details.

ATTACHMENTS

EXPLORATION AND TESTING PROCEDURES

Field Exploration

Number of Borings	Boring Depth (feet) ¹	Location
4	75	Planned Structure Rehabilitation area

1. Below ground surface.

Boring Layout and Elevations: We used handheld GPS equipment to locate borings with an estimated horizontal accuracy of +/-20 feet. Field measurements from existing site features were used.

Subsurface Exploration Procedures: We advanced soil borings with a truck-mounted drill rig using rotary wash techniques as necessary depending on soil conditions. Five samples were obtained in the upper 10 feet of each boring and at intervals of 5 feet thereafter. We obtained representative samples primarily by the split-barrel sampling procedure. In the split-barrel sampling procedure, a standard, 2-inch O.D., split-barrel sampling spoon is driven into the boring with a 140-pound automatic SPT (Standard Penetration Test) hammer falling 30 inches. We recorded the number of blows required to advance the sampling spoon the last 12 inches of an 18-inch sampling interval as the standard penetration resistance value, N.

The samples were placed in appropriate containers, taken to our soil laboratory for testing, and classified by a Geotechnical Engineer. In addition, we observed and record groundwater levels during drilling and sampling.

The sampling depths, penetration distances, and other sampling information was recorded on the field boring logs. The samples were placed in appropriate containers and taken to our soil laboratory for testing and classification by a Geotechnical Engineer. Our exploration team prepared field boring logs as part of the drilling operations. These field logs included visual classifications of the materials encountered during drilling and our interpretation of the subsurface conditions between samples. Final boring logs were prepared from the field logs. The final boring logs represent the Geotechnical Engineer's interpretation of the field logs and include modifications based on observations and tests of the samples in our laboratory.

Observation Wells: Groundwater observation wells were installed at each of the four boring locations. Each well was constructed with a 2-inch diameter PVC with a 10-foot 0.01-inch slotted screen. Screen depths were as follows:

- Well 188328-1; location Northeast quadrant; well screen from 60-70 feet; Boring B-2
- Well 188329-1; location Northwest quadrant; well screen from 20-30 feet; Boring B-1
- Well 188330-1; location Southwest quadrant; well screen from 15-25 feet; Boring B-3
- Well 188331-1; location Southeast quadrant; well screen from 35-45 feet; Boring B-4

All wells were constructed with hollow stem augers advanced to the bottom of the screen depth. Prepacked screens wrapped in stainless steel mesh filled with sand were used. On top of the prepack unit, bentonite pellets were placed to separate the well screen from the grout that was place to the top of the drill hole. Upon completing the pvc stick up pipe was placed inside a steel housing and a small footing was placed to secure the steel housing.

Geotechnical Engineering Report

Structure 157 Rehabilitation ■ Sebastian, Brevard County, Florida

August 5, 2022 ■ Terracon Project No. H1225128



To monitor the groundwater level, we inserted an In-situ Troll 100 transducer devised in each casing to measure the amount of water above the transducer level. Groundwater levels are then converted to actual elevation.

Laboratory Testing

The project engineer reviewed the field data and assigned laboratory tests to understand the engineering properties of the various soil strata, as necessary, for this project. Procedural standards noted below are for reference to methodology in general. In some cases, variations to methods were applied because of local practice or professional judgment. Standards noted below include reference to other, related standards. Such references are not necessarily applicable to describe the specific test performed.

- ASTM D2216 Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil by Mass
- ASTM D4318 Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
- ASTM D1140 Standard Test Method for Amount of Material in Soils Finer than No. 200 (75- μ m) Sieve

The laboratory testing program often included examination of soil samples by an engineer. Based on the material's texture and plasticity, we described and classified the soil samples in accordance with the Unified Soil Classification System.

PHOTOGRAPHY LOG



Typical Well Cover



Downstream View of S-157



Downstream View of S-157

SITE LOCATION AND EXPLORATION PLANS

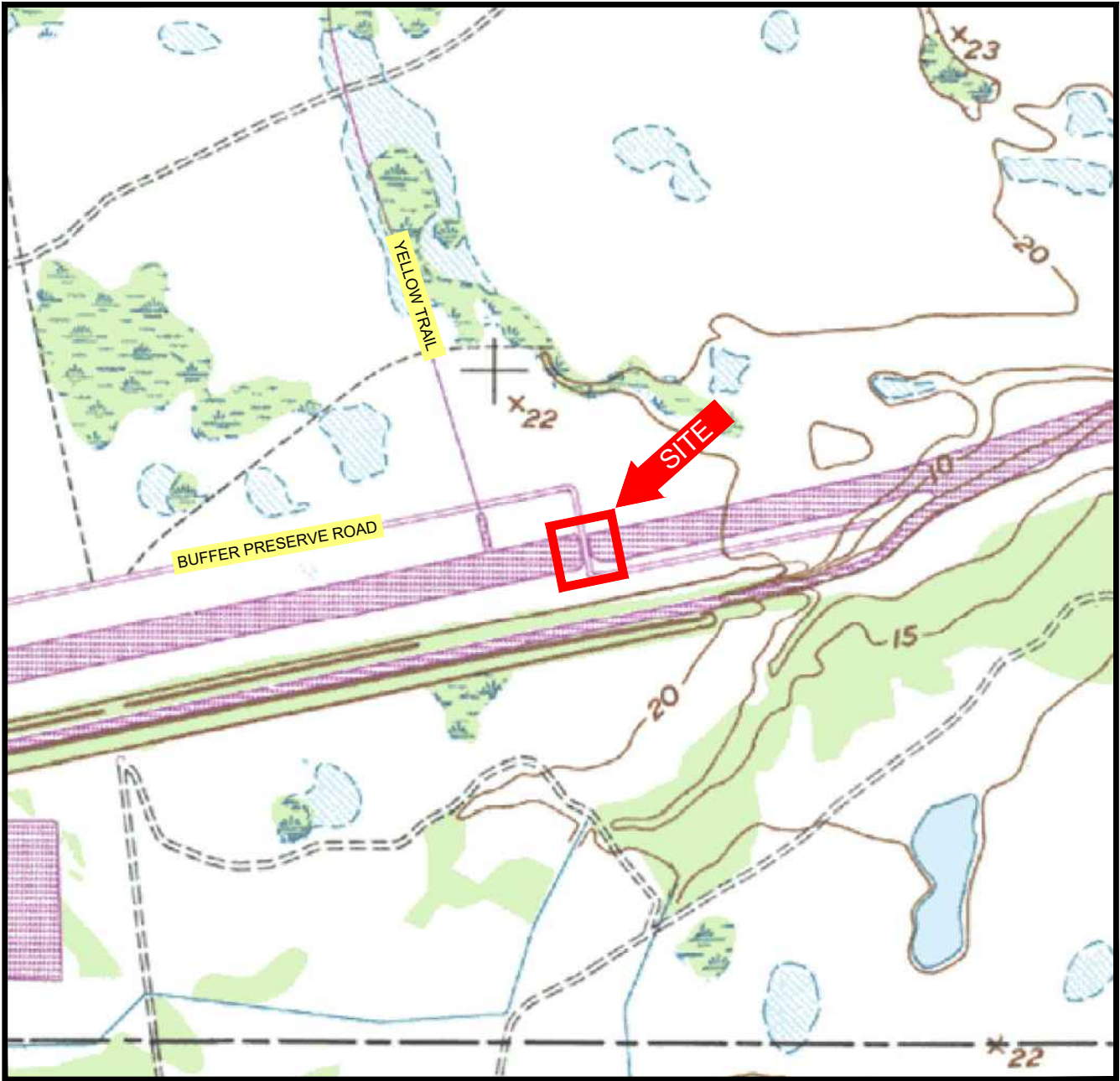
Contents:

Topographic Vicinity Map

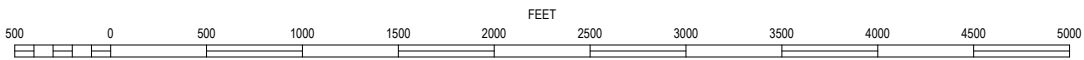
Soils Map

Location Plan

Note: All attachments are one page unless noted above.



SCALE 1"=1000'



FELLSMERE, FLORIDA
 ISSUED: 1992
 7.5 MINUTE SERIES (QUADRANGLE)



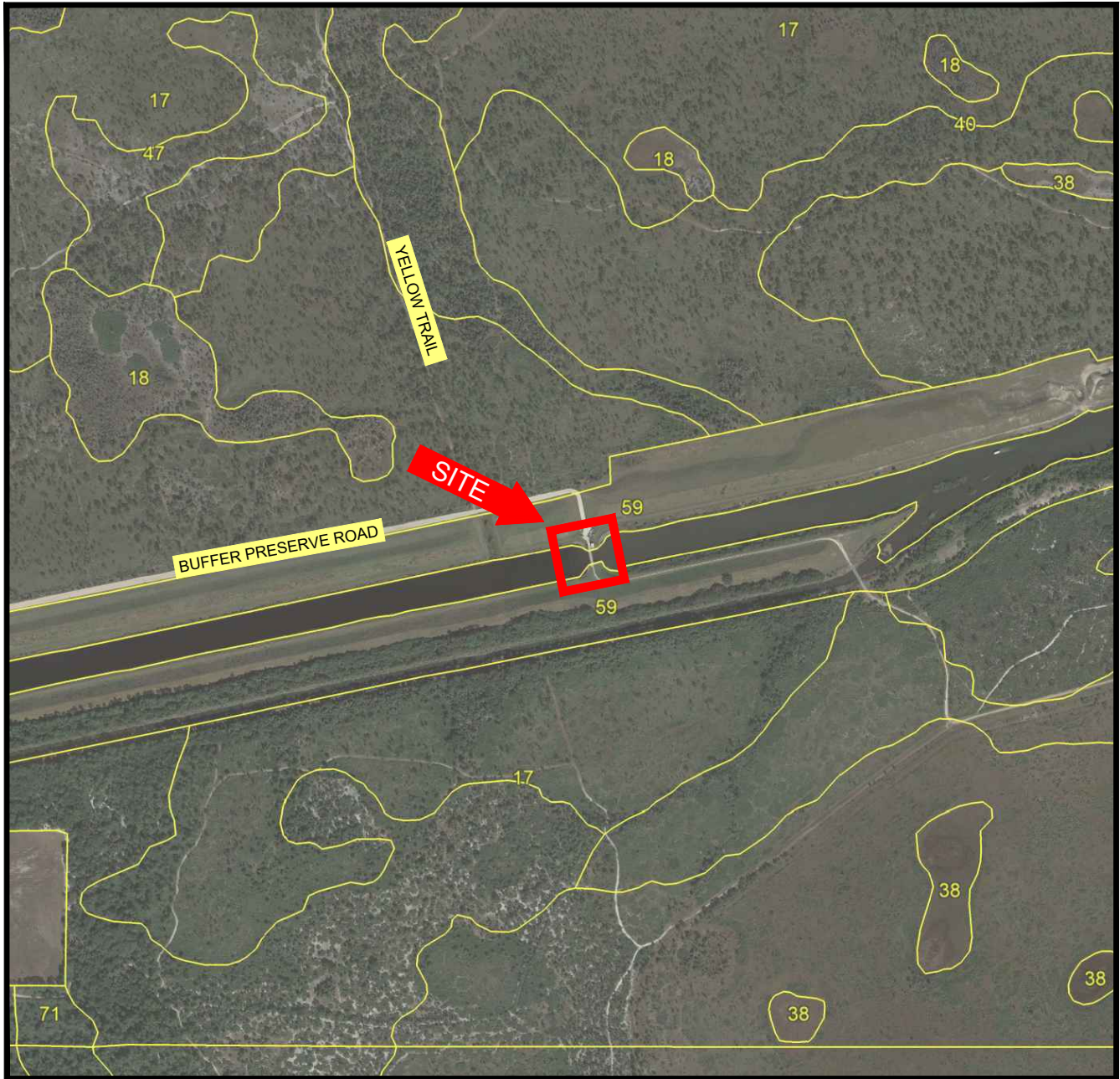
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Project Mngr:	BHW	Project No.	H1225128
Drawn By:	AS	Scale:	AS SHOWN
Checked By:	BHW	File No.	H1225128
Approved By:	JWC	Date:	5-18-22


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TOPOGRAPHIC VICINITY MAP
 GEOTECHNICAL ENGINEERING REPORT
 S-157 REHABILITATION
 ST. SEBASTIAN RIVER PRESERVE STATE PARK
 SEBASTIAN, BREVARD COUNTY, FLORIDA

EXHIBIT



SCALE 1"=1000'



U.S.D.A. SOIL SURVEY FOR BREVARD COUNTY, FLORIDA

SOIL LEGEND

59 UDORTHENTS, STEEP



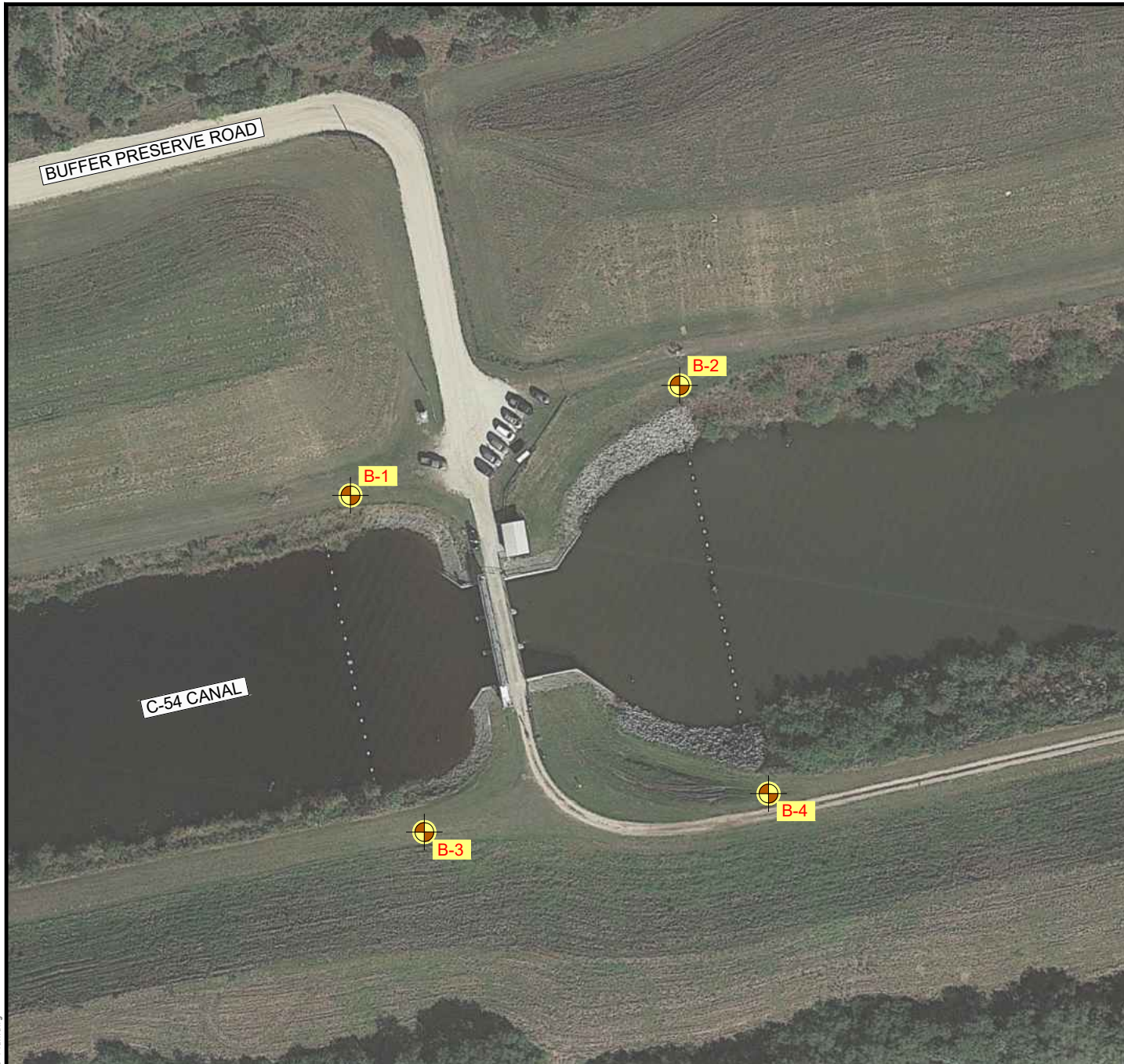
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Project Mngr:	BHW	Project No.	H1225128
Drawn By:	AS	Scale:	AS SHOWN
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Approved By:	JWC	Date:	5-18-22


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SOILS MAP
GEOTECHNICAL ENGINEERING REPORT
S-157 REHABILITATION
 ST. SEBASTIAN RIVER PRESERVE STATE PARK
 SEBASTIAN, BREVARD COUNTY, FLORIDA

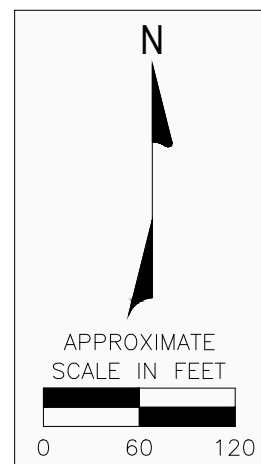
EXHIBIT



LEGEND



APPROXIMATE LOCATION OF STANDARD PENETRATION TEST BORING



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Project Mngr:	BHW
Drawn By:	AS
Checked By:	BHW
Approved By:	JWC

Project No.	H1225128
Scale:	AS SHOWN
File No.	H1225128
Date:	5-18-22



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LOCATION PLAN
GEOTECHNICAL ENGINEERING REPORT
S-157 REHABILITATION
 ST. SEBASTIAN RIVER PRESERVE STATE PARK
 SEBASTIAN, BREVARD COUNTY, FLORIDA

EXHIBIT

EXPLORATION RESULTS

Contents:

Boring Logs (B-1 through B-4)

Well Completion Reports (188328 through 188331)

Groundwater Level Data 7-20-22 to 7-29-22

Note: All attachments are one page unless noted above.

BORING LOG NO. B-1

PROJECT: S-157 Refurbishment

**CLIENT: St. Johns River Water Management District
Palatka, FL**

**SITE: Buffer Preserve Road
Sebastian, FL**

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_H1225128 S-157 REFURBISHME.GPJ TERRACON_DATATEMPLATE.GDT 7/26/22

MODEL LAYER	GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 27.8309° Longitude: -80.5401° Surface Elev.: 26.389 (Ft.) ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS	
								LL-PL-PI	PERCENT FINES
		DEPTH							
3		dense POORLY GRADED SAND (SP) , with shell (10%), fine grained, gray, dense (<i>continued</i>)	55.0	-28.6	55	X	10-11-19 N=30		
		SILTY SAND (SM) , gray, medium dense to dense							
		with shell (10%)			60	X	9-6-5 N=11	20.1	
4		with shell (5%)	65.0	-38.6	65	X	8-16-17 N=33		
		POORLY GRADED SAND (SP) , fine grained, gray, very dense							
		with shell (5%)	75.0	-48.6	75	X	20-31-50/6" N>50 bpf		
Boring Terminated at 75 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Washed Rotary

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See [Supporting Information](#) for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater Not Encountered In Upper 10'



Boring Started: 06-07-2022

Boring Completed: 06-08-2022

Drill Rig: CME-45

Driller: Travis

Project No.: H1225128

BORING LOG NO. B-2

PROJECT: S-157 Refurbishment

**CLIENT: St. Johns River Water Management District
Palatka, FL**

**SITE: Buffer Preserve Road
Sebastian, FL**

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_H1225128 S-157 REFURBISHME.GPJ TERRACON_DATATEMPLATE.GDT 7/26/22

MODEL LAYER	GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 27.8311° Longitude: -80.5393° Surface Elev.: 26.441 (Ft.) ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS	
								LL-PL-PI	PERCENT FINES
1		DEPTH 2.0	24.4		X	4-5-6-6 N=11	18.6		3
		POORLY GRADED SAND (SP) , fine grained, gray to orange brown, medium dense			X	5-8-11-14 N=19			
		DEPTH 8.0	18.4		X	10-9-8-12 N=17 6-6-10-10 N=16			
2		SILTY SAND (SM) , fine grained, brown, loose to medium dense			X	4-5-5-7 N=10	39.5		17
		DEPTH 15.0	11.4		X	3-4-3 N=7			
		SILTY SAND (SM) , fine grained, gray, very loose			X	1-1-1 N=2			
					X	WH-WH-1-1 N=2 bpf			
					X	1-1-1-1 N=2			
3					X	1-1-1-1 N=2	36.5		40
		DEPTH 35.0	-8.6		X	2-2-1-3 N=3			
		SILTY SAND (SM) , with shell 50%, fine grained, gray, medium dense to dense			X	WH-2-2 N=4 bpf			
					X	2-3-8 N=11			
					X	11-13-12 N=25	27.3		15
DEPTH 50.0	-23.6		X	21-16-9 N=25					
		POORLY GRADED SAND (SP) , fine grained, gray, dense							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Washed Rotary

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS
Groundwater Not Encountered In Upper 10'



Boring Started: 06-08-2022	Boring Completed: 06-08-2022
Drill Rig: CME-45	Driller: Travis
Project No.: H1225128	

BORING LOG NO. B-2

PROJECT: S-157 Refurbishment

**CLIENT: St. Johns River Water Management District
Palatka, FL**

**SITE: Buffer Preserve Road
Sebastian, FL**

MODEL LAYER	GRAPHIC LOG	LOCATION See Exploration Plan	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS	PERCENT FINES
		Latitude: 27.8311° Longitude: -80.5393° Surface Elev.: 26.441 (Ft.)						LL-PL-PI	
		DEPTH	ELEVATION (Ft.)						
		POORLY GRADED SAND (SP) , fine grained, gray, dense <i>(continued)</i>	55.0	-28.6	X	10-15-17 N=32			
		SILTY SAND (SM) , with shell 50-80%, fine grained, gray, medium dense			X	8-8-10 N=18			
					X	7-8-13 N=21			
					X	5-5-5 N=10			
			75.0	-48.6	X	9-4-4 N=8	19.9		23
		Boring Terminated at 75 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Washed Rotary

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See [Supporting Information](#) for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater Not Encountered In Upper 10'



Boring Started: 06-08-2022

Boring Completed: 06-08-2022

Drill Rig: CME-45

Driller: Travis

Project No.: H1225128

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_H1225128 S-157 REFURBISHME.GPJ TERRACON_DATATEMPLATE.GDT 7/26/22

BORING LOG NO. B-3

PROJECT: S-157 Refurbishment

**CLIENT: St. Johns River Water Management District
Palatka, FL**

**SITE: Buffer Preserve Road
Sebastian, FL**

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_H1225128 S-157 REFURBISHME.GPJ TERRACON_DATATEMPLATE.GDT 7/26/22

MODEL LAYER	GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 27.8301° Longitude: -80.5399° Surface Elev.: 26.653 (Ft.) ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS		PERCENT FINES
								LL-PL-PI		
1		POORLY GRADED SAND WITH SILT (SP-SM), brown, medium dense	2.0			4-7-7-8 N=14				
		SILTY SAND (SM), gray brown to orange, loose to medium dense with organics				10-12-11-7 N=23				
						4-6-6-7 N=12				
						5-4-4-4 N=8				
						4-4-5-5 N=9				
2		SILTY SAND (SM), gray, very loose to loose	10.0							
						2-3-3 N=6				
						1-1-1 N=2				
		trace shells				1-2-1 N=3	43.1			27
						1-1-1-1 N=2				
3		FAT CLAY (CH), gray, loose	29.0			2-1-1-2 N=2				
						3-2-3-2 N=5	99.6	143-51-92	96	
						2-2-2-2 N=4				
						5-7-8-9 N=15				
						16-22-25 N=47				
3		SILTY SAND (SM), trace organics, brown, medium dense	33.0							
		POORLY GRADED SAND WITH SILT (SP-SM), gray, very dense	35.0							
		10% shells				19-20-20 N=40	14.2			9
		20% shells	50.0							
		POORLY GRADED SAND WITH SILT (SP-SM), 10% shells, gray, very				12-20-22 N=42				

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Washed Rotary

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater Not Encountered In Upper 10'



Boring Started: 06-06-2022	Boring Completed: 06-06-2022
Drill Rig: CME-45	Driller: Travis
Project No.: H1225128	

BORING LOG NO. B-3

PROJECT: S-157 Refurbishment

**CLIENT: St. Johns River Water Management District
Palatka, FL**

**SITE: Buffer Preserve Road
Sebastian, FL**

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_H1225128 S-157 REFURBISHME.GPJ TERRACON_DATATEMPLATE.GDT 7/26/22

MODEL LAYER	GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 27.8301° Longitude: -80.5399° Surface Elev.: 26.653 (Ft.) ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS	
								LL-PL-PI	PERCENT FINES
3		dense POORLY GRADED SAND WITH SILT (SP-SM) , 10% shells, gray, very dense (continued)	55.0	-28.3	X	15-21-24 N=45			
		SILTY SAND (SM) , 5% shells, gray, medium dense							
		60.0	-33.3	X	9-11-8 N=19	28.3		25	
		POORLY GRADED SAND WITH SILT (SP-SM) , 10% shells, gray, dense							
		65.0	-38.3	X	8-12-15 N=27				
		SILTY SAND (SM) , 5% shells, gray, loose to medium dense							
		70	-48.3	X	4-3-3 N=6	28.6		18	
		75.0	-48.3	X	3-3-7 N=10				
Boring Terminated at 75 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Washed Rotary

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

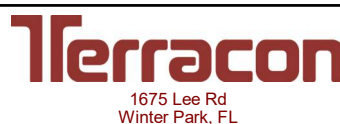
Notes:

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See [Supporting Information](#) for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater Not Encountered In Upper 10'



Boring Started: 06-06-2022

Boring Completed: 06-06-2022

Drill Rig: CME-45

Driller: Travis

Project No.: H1225128

BORING LOG NO. B-4

PROJECT: S-157 Refurbishment

**CLIENT: St. Johns River Water Management District
Palatka, FL**

**SITE: Buffer Preserve Road
Sebastian, FL**

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_H1225128 S-157 REFURBISHME.GPJ TERRACON_DATATEMPLATE.GDT 7/26/22

MODEL LAYER	GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 27.8302° Longitude: -80.5390° Surface Elev.: 27.131 (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS		PERCENT FINES
								LL-PL-PI		
		DEPTH	ELEVATION (Ft.)							
1		2.0	25.1		X	2-3-3-3 N=6				
		4.0	23.1		X	3-8-7-12 N=15	21.5			
		6.0	21.1		X	9-7-6-7 N=13	17.8			21
					X	5-5-6-7 N=11				
					X	5-4-3-3 N=7				
					X	3-3-4 N=7				
					X	WH/18" N<1 bpf	38.8			14
					X	WH-1-1-1 N=2 bpf				
					X	WH-1-1-1 N=2 bpf	31.8			13
					X	1-1-1-1 N=2				
2		30.0	-2.9		X	WH/24" N<1 bpf	36.8			16
		32.0	-4.9		X	WH/18"-1 N<1 bpf	26.3			24
		35.0	-7.9		X	2-2-3-3 N=5				
					X	3-4-3 N=7				
					X	3-3-2 N=5	24.6			11
			X	4-3-5 N=8						
			X	15-20-25 N=45						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Washed Rotary

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS
Groundwater Not Encountered In Upper 10'



Boring Started: 06-07-2022	Boring Completed: 06-07-2022
Drill Rig: CME-45	Driller: Travis
Project No.: H1225128	

BORING LOG NO. B-4

PROJECT: S-157 Refurbishment

**CLIENT: St. Johns River Water Management District
Palatka, FL**

**SITE: Buffer Preserve Road
Sebastian, FL**

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_H1225128 S-157 REFURBISHME.GPJ TERRACON_DATATEMPLATE.GDT 7/26/22

MODEL LAYER	GRAPHIC LOG	LOCATION See Exploration Plan	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS		
		Latitude: 27.8302° Longitude: -80.5390°						LL-PL-PI	PERCENT FINES	
		Surface Elev.: 27.131 (Ft.)								
		DEPTH	ELEVATION (Ft.)							
3		POORLY GRADED SAND WITH SILT (SP-SM) , shell 20%, fine grained, gray, loose to very dense <i>(continued)</i>	55.0	-27.9	X	10-12-15 N=27				
		POORLY GRADED SAND WITH SILT (SP-SM) , fine grained, gray, loose to very dense			X	13-20-22 N=42	21.9		7	
		shell 50%			X	4-13-21 N=34				
		shell 5%			X	5-3-2 N=5	19.3		10	
		shell 10%		75.0	-47.9	X	2-3-6 N=9			
		Boring Terminated at 75 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Washed Rotary

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

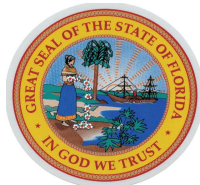
Notes:

WATER LEVEL OBSERVATIONS

Groundwater Not Encountered In Upper 10'



Boring Started: 06-07-2022	Boring Completed: 06-07-2022
Drill Rig: CME-45	Driller: Travis
Project No.: H1225128	



STATE OF FLORIDA WELL COMPLETION REPORT

Southwest
 Northwest
 St. Johns River
 South Florida
 Suwannee River
 DEP
 Delegated Authority (If Applicable) **Brevard DOH**

PLEASE, FILL OUT ALL APPLICABLE FIELDS
 (*Denotes Required Fields Where Applicable)

Date Stamp
 Confirmation# 770530
 Date:07/27/2022
 Official Use Only

1. *Permit Number MW-188329-1 *CUP/WUP Number _____ *DID Number 528925 62-524 Delineation No. _____
 2. *Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned 3
 3. *Owner's Name St Johns River Water Managemen 4.*Completion Date 07/08/2022 5. Florida Unique ID _____
 6. 1909 Unknown, sebastian , FL 32948
 *Well Location – Address, Road Name or Number, City, ZIP
 7. *County Brevard *Section 6 Land Grant _____ *Township 30S *Range 38E
 8. Latitude 274951.0704 Longitude 803223.7744
 9. Data Obtained From: _____ GPS Map _____ Survey Datum: _____ NAD 27 NAD 83 _____ WGS 84

10. *Type of Work: Construction _____ Repair _____ Modification _____ Abandonment Reason: _____
 11. *Specify Intended Use(s) of Well(s):
 _____ Domestic _____ Landscape Irrigation _____ Agricultural Irrigation _____ Site Investigation
 _____ Bottled Water Supply _____ Recreation Area Irrigation _____ Livestock Monitoring
 _____ Public Water Supply (Limited Use/DOH) _____ Nursery Irrigation _____ Test
 _____ Public Water Supply (Community or Non-Community/DEP) _____ Commercial/Industrial _____ Earth-Coupled Geothermal
 _____ Class I Injection _____ Golf Course Irrigation _____ HVAC Supply
 _____ HVAC Return
 Class V Injection: _____ Recharge _____ Commercial/Industrial Disposal _____ Aquifer Storage and Recovery _____ Drainage
 Remediation: _____ Recovery _____ Air Sparge _____ Other (Describe) _____
 _____ Other (Describe) _____

12. *Drill Method: Auger _____ Cable Tool _____ Rotary _____ Combination (Two or More Methods) _____ Jetted _____ Sonic
 _____ Horizontal Drilling _____ Hydraulic Point (Direct Push) _____ Other _____
 13. *Measured Static Water Level 7 ft. Measured Pumping Water Level _____ ft. After _____ Hours at _____ GPM
 14. *Measuring Point (Describe) top of casing Which is _____ ft. _____ Above _____ Below Land Surface *Flowing: _____ Yes No
 15. *Casing Material: _____ Black Steel _____ Galvanized PVC _____ Stainless Steel _____ Not Cased _____ Other _____
 16. *Total Well Depth 30 ft. Cased Depth 20 ft. *Open Hole: From _____ To _____ ft. *Screen: From 20 To 30 ft. Slot Size .01

17. *Abandonment: _____
 Other(Explain _____)
 From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
 From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
 From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
 From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
 From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____

18. *Surface Casing Diameter and Depth:
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____

19. *Primary Casing Diameter and Depth:
 Dia 2 in. From 0 ft. To 20 ft. No. of Bags 4 Seal Material (Check One): Neat Cement _____ Bentonite _____ Other _____
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____

20. *Liner Casing Diameter and Depth:
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____

21. *Telescope Casing Diameter and Depth:
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____

22. Pump Type (If known): _____ Centrifugal _____ Jet _____ Submersible _____ Turbine 23. Chemical Analysis (When Required):
 Iron _____ ppm Sulfate _____ ppm Chloride _____ ppm
 Horsepower _____ Pump Capacity (GPM) _____
 Pump Depth _____ ft. Intake Depth _____ ft. _____ Laboratory Test _____ Field Test Kit

24. Water Well Contractor:
 *Contractor Name James P Smith *License Number 7352 E-mail jpsmith@terracon.com
 Address _____

*Contractor's Signature James P Smith *Driller's Name (Print or Type) Travis Brundidge
 (I certify that the information provided in this report is accurate and true.)

*Detailed Site Map of Well Location





STATE OF FLORIDA WELL COMPLETION REPORT

Southwest
 Northwest
 St. Johns River
 South Florida
 Suwannee River
 DEP
 Delegated Authority (If Applicable) **Brevard DOH**

Date Stamp
 Confirmation# 770537
 Date: 07/27/2022
 Official Use Only

PLEASE, FILL OUT ALL APPLICABLE FIELDS
 (*Denotes Required Fields Where Applicable)

1. *Permit Number MW-188328-1 *CUP/WUP Number _____ *DID Number 528924 62-524 Delineation No. _____
 2. *Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned 0
 3. *Owner's Name St Johns River Water Managemen 4.*Completion Date 07/08/2022 5. Florida Unique ID _____
 6. 1909 Unknown, SEBASTIAN , FL 32948
 *Well Location – Address, Road Name or Number, City, ZIP
 7. *County Brevard *Section 6 Land Grant _____ *Township 30S *Range 38E
 8. Latitude 274951.9615 Longitude 803221.3808
 9. Data Obtained From: _____ GPS Map _____ Survey Datum: _____ NAD 27 NAD 83 _____ WGS 84

10. *Type of Work: Construction _____ Repair _____ Modification _____ Abandonment Reason: _____
 11. *Specify Intended Use(s) of Well(s):
 _____ Domestic _____ Landscape Irrigation _____ Agricultural Irrigation _____ Site Investigation
 _____ Bottled Water Supply _____ Recreation Area Irrigation _____ Livestock Monitoring
 _____ Public Water Supply (Limited Use/DOH) _____ Nursery Irrigation _____ Test
 _____ Public Water Supply (Community or Non-Community/DEP) _____ Commercial/Industrial _____ Earth-Coupled Geothermal
 _____ Class I Injection _____ Golf Course Irrigation _____ HVAC Supply
 _____ HVAC Return
 Class V Injection: _____ Recharge _____ Commercial/Industrial Disposal _____ Aquifer Storage and Recovery _____ Drainage
 Remediation: _____ Recovery _____ Air Sparge _____ Other (Describe) _____
 _____ Other (Describe) _____

12. *Drill Method: _____ Auger _____ Cable Tool Rotary _____ Combination (Two or More Methods) _____ Jetted _____ Sonic
 _____ Horizontal Drilling _____ Hydraulic Point (Direct Push) _____ Other _____
 13. *Measured Static Water Level 7 ft. Measured Pumping Water Level _____ ft. After _____ Hours at _____ GPM
 14. *Measuring Point (Describe) TOP OF CASING Which is _____ ft. Above _____ Below Land Surface *Flowing: _____ Yes No
 15. *Casing Material: _____ Black Steel _____ Galvanized PVC _____ Stainless Steel _____ Not Cased _____ Other _____
 16. *Total Well Depth 70 ft. Cased Depth 60 ft. *Open Hole: From _____ To _____ ft. *Screen: From 60 To 70 ft. Slot Size _____

17. *Abandonment: _____
 Other(Explain _____)
 From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
 From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
 From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
 From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
 From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____

18. *Surface Casing Diameter and Depth:
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____

19. *Primary Casing Diameter and Depth:
 Dia 2 in. From 0 ft. To 60 ft. No. of Bags 8 Seal Material (Check One): Neat Cement _____ Bentonite _____ Other _____
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____

20. *Liner Casing Diameter and Depth:
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____

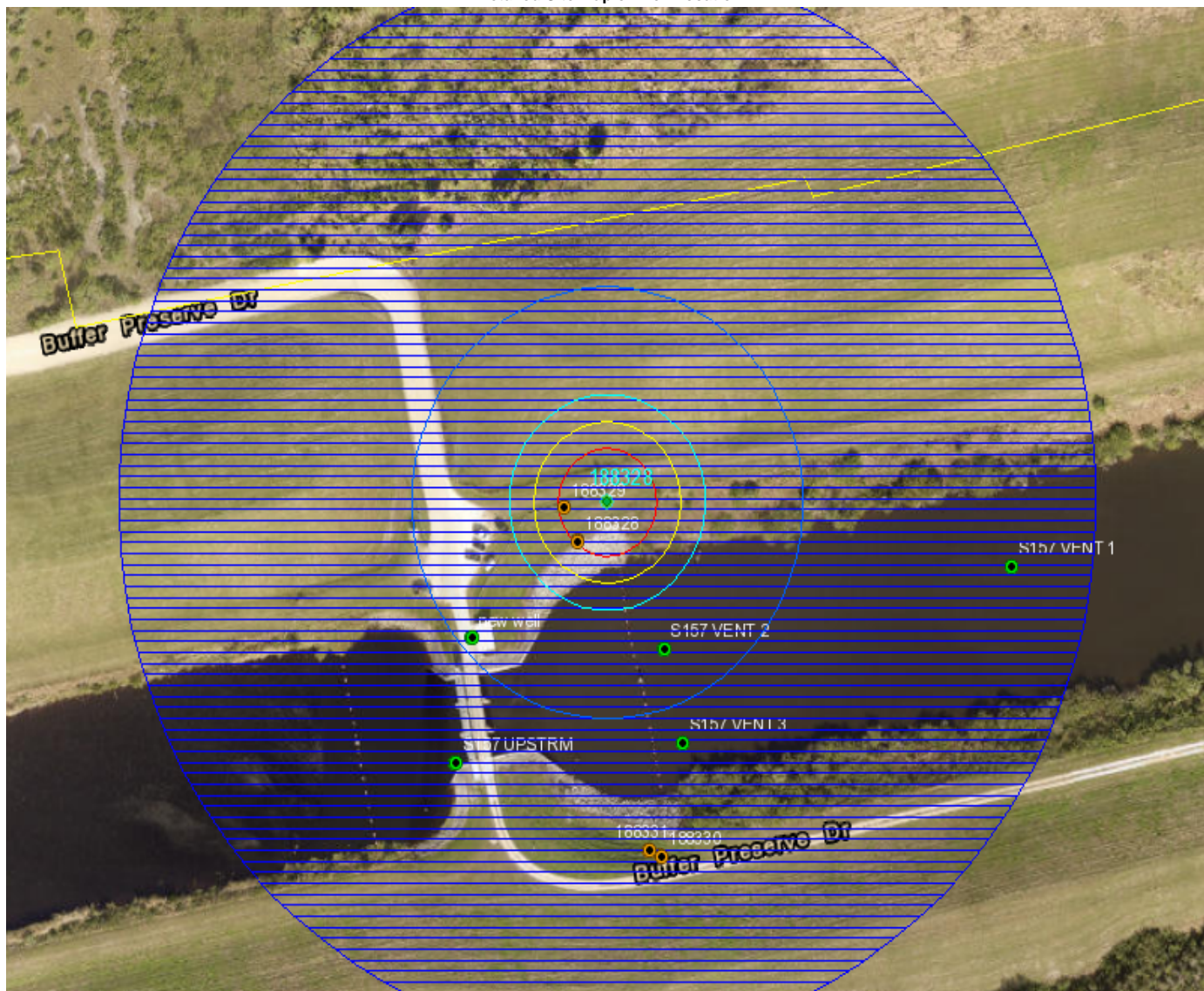
21. *Telescope Casing Diameter and Depth:
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____

22. Pump Type (If known): _____ Centrifugal _____ Jet _____ Submersible _____ Turbine 23. Chemical Analysis (When Required):
 Iron _____ ppm Sulfate _____ ppm Chloride _____ ppm
 Horsepower _____ Pump Capacity (GPM) _____
 Pump Depth _____ ft. Intake Depth _____ ft. _____ Laboratory Test _____ Field Test Kit

24. Water Well Contractor:
 *Contractor Name James P Smith *License Number 7352 E-mail jpsmith@terracon.com
 Address _____

*Contractor's Signature James P Smith *Driller's Name (Print or Type) Travis Brundidge
 (I certify that the information provided in this report is accurate and true.)

*Detailed Site Map of Well Location





STATE OF FLORIDA WELL COMPLETION REPORT

Southwest
 Northwest
 St. Johns River
 South Florida
 Suwannee River
 DEP
 Delegated Authority (If Applicable) **Brevard DOH**

Date Stamp
 Confirmation# 770549
 Date: 07/27/2022
 Official Use Only

PLEASE, FILL OUT ALL APPLICABLE FIELDS
 (*Denotes Required Fields Where Applicable)

1. *Permit Number MW-188330-1 *CUP/WUP Number _____ *DID Number 528926 62-524 Delineation No. _____
 2. *Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned 0
 3. *Owner's Name St Johns River Water Managemen 4.*Completion Date 07/08/2022 5. Florida Unique ID _____
 6. 1909 Unknown, sebastian , FL 32948
 *Well Location – Address, Road Name or Number, City, ZIP
 7. *County Brevard *Section 6 Land Grant _____ *Township 30S *Range 38E
 8. Latitude 274948.4215 Longitude 803223.594
 9. Data Obtained From: _____ GPS Map _____ Survey Datum: _____ NAD 27 NAD 83 _____ WGS 84

10. *Type of Work: Construction _____ Repair _____ Modification _____ Abandonment Reason: _____
 11. *Specify Intended Use(s) of Well(s):
 _____ Domestic _____ Landscape Irrigation _____ Agricultural Irrigation _____ Site Investigation
 _____ Bottled Water Supply _____ Recreation Area Irrigation _____ Livestock Monitoring
 _____ Public Water Supply (Limited Use/DOH) _____ Nursery Irrigation _____ Test
 _____ Public Water Supply (Community or Non-Community/DEP) _____ Commercial/Industrial _____ Earth-Coupled Geothermal
 _____ Class I Injection _____ Golf Course Irrigation _____ HVAC Supply
 _____ HVAC Return
 Class V Injection: _____ Recharge _____ Commercial/Industrial Disposal _____ Aquifer Storage and Recovery _____ Drainage
 Remediation: _____ Recovery _____ Air Sparge _____ Other (Describe) _____
 _____ Other (Describe) _____

12. *Drill Method: Auger _____ Cable Tool _____ Rotary _____ Combination (Two or More Methods) _____ Jetted _____ Sonic
 _____ Horizontal Drilling _____ Hydraulic Point (Direct Push) _____ Other _____
 13. *Measured Static Water Level 7 ft. Measured Pumping Water Level _____ ft. After _____ Hours at _____ GPM
 14. *Measuring Point (Describe) top of casing Which is _____ ft. Above _____ Below Land Surface *Flowing: _____ Yes No
 15. *Casing Material: _____ Black Steel _____ Galvanized PVC _____ Stainless Steel _____ Not Cased _____ Other _____
 16. *Total Well Depth 25 ft. Cased Depth _____ ft. *Open Hole: From _____ To _____ ft. *Screen: From 15 To 25 ft. Slot Size .01

17. *Abandonment: _____
 Other(Explain _____)
 From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
 From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
 From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
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 From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____

18. *Surface Casing Diameter and Depth:
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____

19. *Primary Casing Diameter and Depth:
 Dia 2 in. From 0 ft. To 14 ft. No. of Bags 4 Seal Material (Check One): Neat Cement _____ Bentonite _____ Other _____
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____

20. *Liner Casing Diameter and Depth:
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____

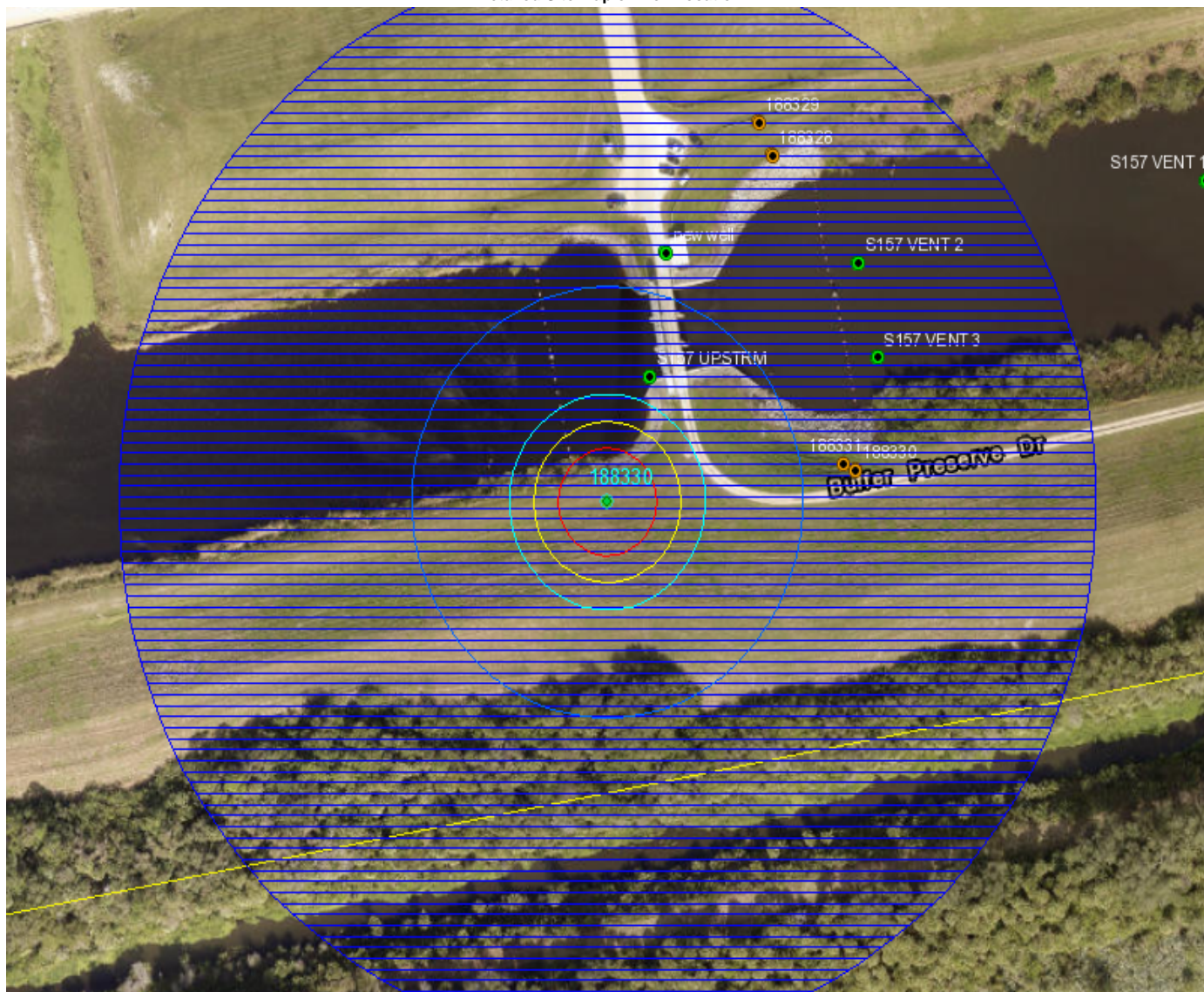
21. *Telescope Casing Diameter and Depth:
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____

22. Pump Type (If known): _____ Centrifugal _____ Jet _____ Submersible _____ Turbine
 Horsepower _____ Pump Capacity (GPM) _____
 Pump Depth _____ ft. Intake Depth _____ ft. _____ Laboratory Test _____ Field Test Kit

23. Chemical Analysis (When Required):
 Iron _____ ppm Sulfate _____ ppm Chloride _____ ppm
 24. Water Well Contractor:
 *Contractor Name James P Smith *License Number 7352 E-mail jpsmith@terracon.com
 Address _____

*Contractor's Signature James P Smith *Driller's Name (Print or Type) Travis Brundidge
 (I certify that the information provided in this report is accurate and true.)

*Detailed Site Map of Well Location





STATE OF FLORIDA WELL COMPLETION REPORT

Southwest
 Northwest
 St. Johns River
 South Florida
 Suwannee River
 DEP
 Delegated Authority (If Applicable) **Brevard DOH**

PLEASE, FILL OUT ALL APPLICABLE FIELDS
 (*Denotes Required Fields Where Applicable)

Date Stamp
 Confirmation# 770562
 Date: 07/27/2022
 Official Use Only

1. *Permit Number MW-188331-1 *CUP/WUP Number _____ *DID Number 528927 62-524 Delineation No. _____

2. *Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned 0

3. *Owner's Name St Johns River Water Managemen 4.*Completion Date 07/08/2022 5. Florida Unique ID _____

6. 1909 Unknown, sebastian , FL 32948
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7. *County Brevard *Section 6 Land Grant _____ *Township 30S *Range 38E

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 _____ Public Water Supply (Limited Use/DOH) _____ Nursery Irrigation _____ Test
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13. *Measured Static Water Level 7 ft. Measured Pumping Water Level _____ ft. After _____ Hours at _____ GPM

14. *Measuring Point (Describe) top of casing Which is _____ ft. _____ Above _____ Below Land Surface *Flowing: _____ Yes No

15. *Casing Material: _____ Black Steel _____ Galvanized PVC _____ Stainless Steel _____ Not Cased _____ Other _____

16. *Total Well Depth 45 ft. Cased Depth 35 ft. *Open Hole: From _____ To _____ ft. *Screen: From 35 To 45 ft. Slot Size .01

17. *Abandonment: _____
 Other(Explain _____)
 From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
 From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
 From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
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 From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____

18. *Surface Casing Diameter and Depth:
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____

19. *Primary Casing Diameter and Depth:
 Dia 2 in. From 0 ft. To 34 ft. No. of Bags 4 Seal Material (Check One): Neat Cement _____ Bentonite _____ Other _____
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
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 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____

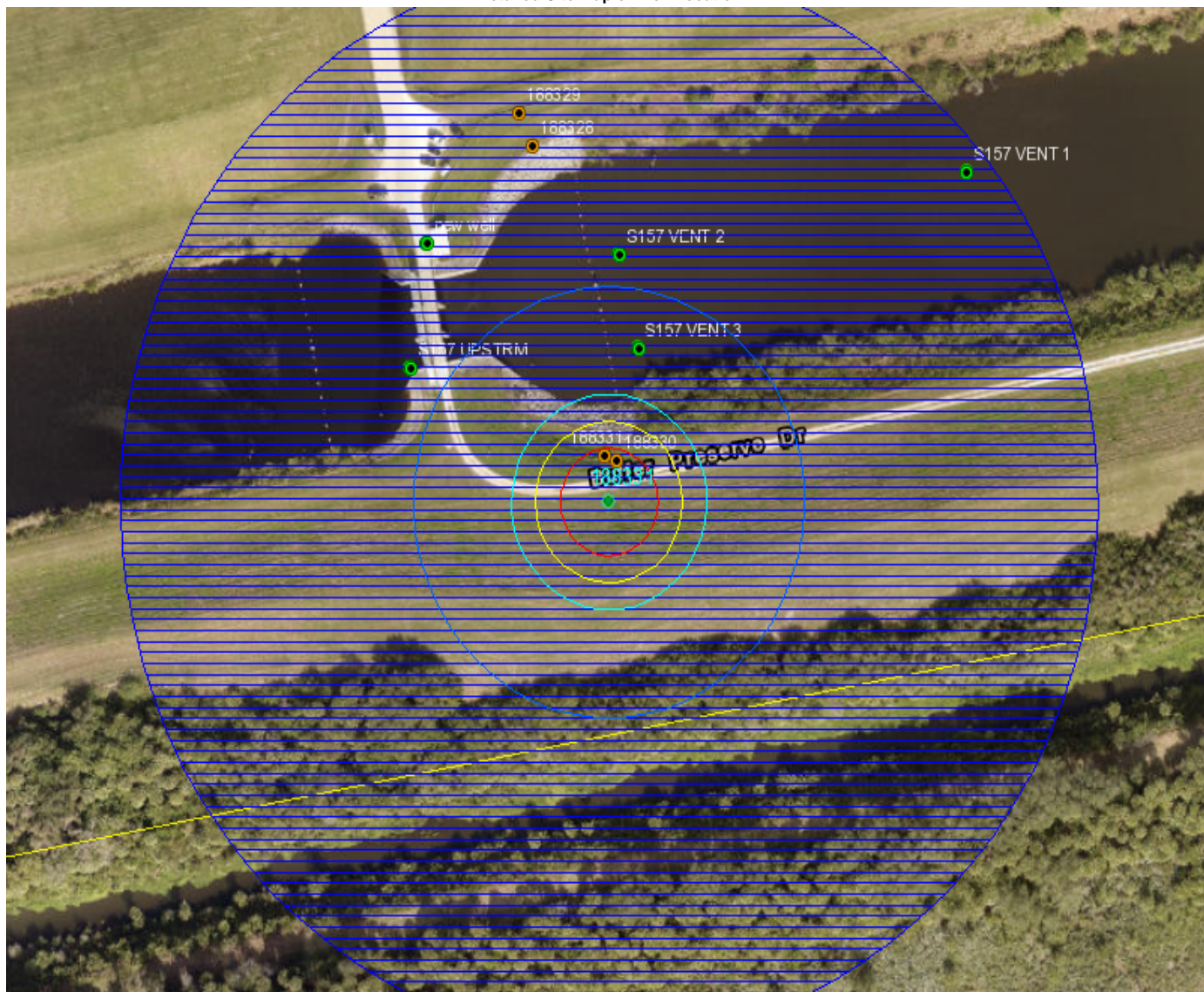
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 Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): _____ Neat Cement _____ Bentonite _____ Other _____
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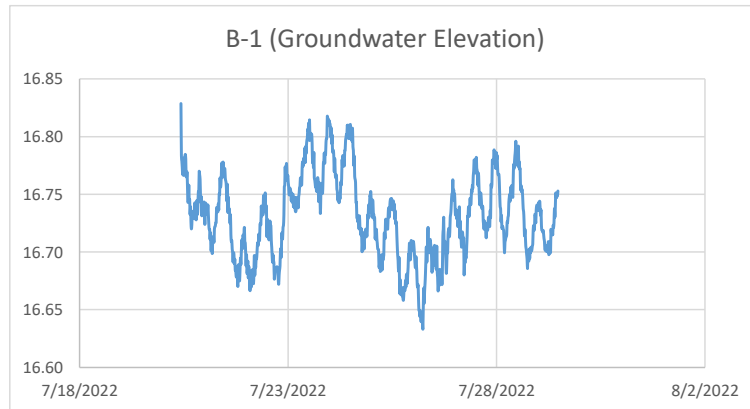
24. Water Well Contractor:
 *Contractor Name James P Smith *License Number 7352 E-mail jpsmith@terracon.com
 Address _____
 *Contractor's Signature James P Smith *Driller's Name (Print or Type) Travis Brundidge
 (I certify that the information provided in this report is accurate and true.)

*Detailed Site Map of Well Location

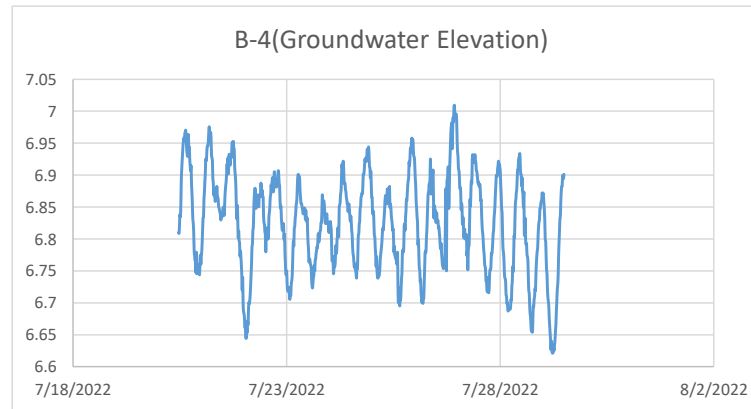
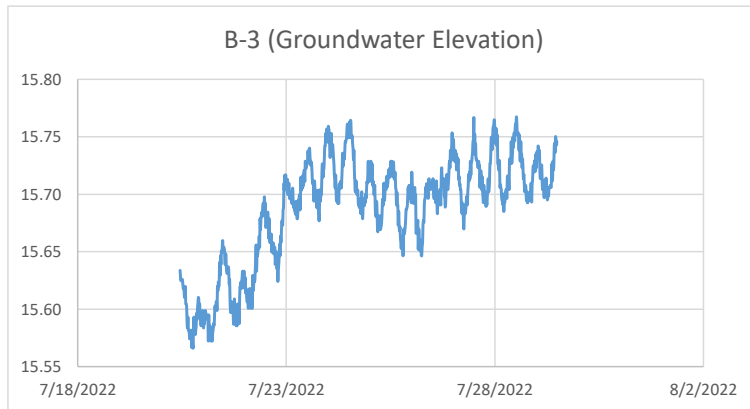
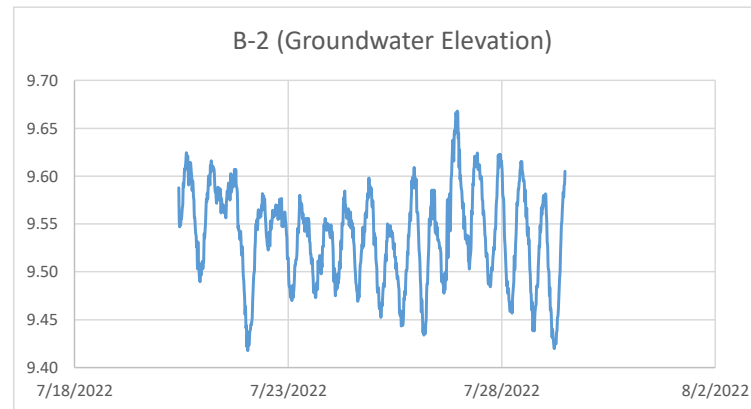


Boring #	Well Depth (Ft)	Pole length between concrete pad and top of casing	Piezo wire length below top of casing (Ft)	Depth of Piezo below water level at the time of piezo installation (7/20/2022)	Piezo Elevation	Water Depth from top of casing (use water meter) (Feet)	
						7/20/2022	7/29/2022
B-1	35	54.5 inches	25	10.92 ft	5.931	14.2	14.4
B-2	75.5	50.2 inches	34	12.98 ft	-3.376	21.05	21.1
B-3	30	54.75 inches	25	9.42 ft	6.216	15.8	15.6
B-4	50.5	51.5 inches	34	9.38 ft	-2.577	25.05	24.9

Downstream



Upstream



SUPPORTING INFORMATION










Contents:

General Notes
Unified Soil Classification System

Note: All attachments are one page unless noted above.

GENERAL NOTES

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

SAMPLING	 Auger Cuttings  Grab Sample  Shelby Tube	 Rock Core  No Recovery  Standard Penetration Test	WATER LEVEL	 Water Initially Encountered  Water Level After a Specified Period of Time  Water Level After a Specified Period of Time Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.	FIELD TESTS	(HP) Hand Penetrometer (T) Torvane (DCP) Dynamic Cone Penetrometer (PID) Photo-Ionization Detector (OVA) Organic Vapor Analyzer
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DESCRIPTIVE SOIL CLASSIFICATION

Soil classification is based on the Unified Soil Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

LOCATION AND ELEVATION NOTES

Unless otherwise noted, Latitude and Longitude are approximately determined using a hand-held GPS device. The accuracy of such devices is variable. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS	RELATIVE DENSITY OF COARSE-GRAINED SOILS <small>(More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance</small>		CONSISTENCY OF FINE-GRAINED SOILS <small>(50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance</small>		
	Descriptive Term (Density)	Automatic Hammer SPT N-Value (Blows/Ft.)	Descriptive Term (Consistency)	Unconfined Compressive Strength Qu, (psf)	Automatic Hammer SPT N-Value (Blows/Ft.)
	Very Loose	< 3	Very Soft	less than 500	< 1
	Loose	3 - 8	Soft	500 to 1,000	1 - 3
	Medium Dense	8 - 24	Medium Stiff	1,000 to 2,000	3 - 6
	Dense	24 - 40	Stiff	2,000 to 4,000	6 - 12
	Very Dense	> 40	Very Stiff	4,000 to 8,000	12 - 24
			Hard	> 8,000	> 24

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 15
With	15 - 29
Modifier	> 30

GRAIN SIZE TERMINOLOGY

Major Component of Sample	Particle Size
Boulders	Over 12 in. (300 mm)
Cobbles	12 in. to 3 in. (300mm to 75mm)
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)
Sand	#4 to #200 sieve (4.75mm to 0.075mm)
Silt or Clay	Passing #200 sieve (0.075mm)

RELATIVE PROPORTIONS OF FINES

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 5
With	5 - 12
Modifier	> 12

PLASTICITY DESCRIPTION

Term	Plasticity Index
Non-plastic	0
Low	1 - 10
Medium	11 - 30
High	> 30

UNIFIED SOIL CLASSIFICATION SYSTEM



Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests ^A				Soil Classification		
				Group Symbol	Group Name ^B	
Coarse-Grained Soils: More than 50% retained on No. 200 sieve	Gravels: More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels: Less than 5% fines ^C	$Cu \geq 4$ and $1 \leq Cc \leq 3$ ^E	GW	Well-graded gravel ^F	
			$Cu < 4$ and/or [$Cc < 1$ or $Cc > 3.0$] ^E	GP	Poorly graded gravel ^F	
		Gravels with Fines: More than 12%	Fines classify as ML or MH	GM	Silty gravel ^{F, G, H}	
			Fines classify as CL or CH	GC	Clayey gravel ^{F, G, H}	
	Sands: 50% or more of coarse fraction passes No. 4 sieve	Clean Sands: Less than 5% fines ^D	$Cu \geq 6$ and $1 \leq Cc \leq 3$ ^E	SW	Well-graded sand ^I	
			$Cu < 6$ and/or [$Cc < 1$ or $Cc > 3.0$] ^E	SP	Poorly graded sand ^I	
		Sands with Fines: More than 12% fines ^D	Fines classify as ML or MH	SM	Silty sand ^{G, H, I}	
			Fines classify as CL or CH	SC	Clayey sand ^{G, H, I}	
Fine-Grained Soils: 50% or more passes the No. 200 sieve	Silts and Clays: Liquid limit less than 50	Inorganic:	$PI > 7$ and plots on or above	CL	Lean clay ^{K, L, M}	
			$PI < 4$ or plots below "A" line ^J	ML	Silt ^{K, L, M}	
		Organic:	Liquid limit - oven dried	< 0.75	OL	Organic clay ^{K, L, M, N}
			Liquid limit - not dried			Organic silt ^{K, L, M, O}
	Silts and Clays: Liquid limit 50 or more	Inorganic:	PI plots on or above "A" line	CH	Fat clay ^{K, L, M}	
			PI plots below "A" line	MH	Elastic Silt ^{K, L, M}	
		Organic:	Liquid limit - oven dried	< 0.75	OH	Organic clay ^{K, L, M, P}
			Liquid limit - not dried			Organic silt ^{K, L, M, O}
Highly organic	Primarily organic matter, dark in color, and organic odor			PT	Peat	

^A Based on the material passing the 3-inch (75-mm) sieve.

^B If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

^C Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

^D Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.

^E $Cu = D_{60}/D_{10}$ $Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$

^F If soil contains $\geq 15\%$ sand, add "with sand" to group name.

^G If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

^H If fines are organic, add "with organic fines" to group name.

^I If soil contains $\geq 15\%$ gravel, add "with gravel" to group name.

^J If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

^K If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

^L If soil contains $\geq 30\%$ plus No. 200 predominantly sand, add "sandy" to group name.

^M If soil contains $\geq 30\%$ plus No. 200, predominantly gravel, add "gravelly" to group name.

^N $PI \geq 4$ and plots on or above "A" line.

^O $PI < 4$ or plots below "A" line.

^P PI plots on or above "A" line.

^O PI plots below "A" line.

