

Invitation for Bid 37744

Exhibit 1

GEOTECHNICAL DATA REPORT

**Black Creek Water Resource
Development Project
Intake, Pump Station, and Aquifer
Recharge System**

St. Johns River Water
Management District

May 2022



St. John's River Water Management District Black Creek Water Resource Development Project Intake, Pump Station, and Aquifer Recharge System Geotechnical Data Report

May 2022

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Section 1

Introduction

1.1 Project Description

The CDM Smith project team has been retained by the St. Johns River Water Management District to provide design services associated with the Black Creek Water Resource Development Project (Black Creek) Intake, Pump Station, and Aquifer Recharge System in Clay County, Florida. As part of these services, CDM Smith performed a geotechnical investigation and prepared this report summarizing our investigation and engineering recommendations for design and construction. The proposed improvements will consist of:

- An Intake Structure in Black Creek;
- 850 feet of raw water gravity intake line to be installed by open-cut and microtunneling
- An Intake Pump Station;
- An Electrical Building; and
- A trenchless crossing of a gas easement at the Recharge site;

1.2 Purpose and Scope

This GDR presents data compiled from the investigation program. The geotechnical scope of services included:

- Review available subsurface information;
- Drill geotechnical test borings for the proposed improvements for the purpose of gathering information on the subsurface conditions and obtaining soil samples for laboratory testing;
- Conduct laboratory testing to assist with classification and estimating engineering properties of the soils encountered; and
- Preparing this GDR presenting the data collected as part of the field investigation program.

Twelve (12) test borings have been drilled for the intake area and two (2) test borings were drilled for the easement crossing.

1.3 Elevation Datum

All elevations noted herein are reported in feet and referenced to the North American Vertical Datum of 1988 (NAVD 88).

1.4 Report Limitations

This report has been prepared for the exclusive use of proposed Downtown Storm Sewer Infrastructure Improvements project in New Haven, Connecticut as understood at this time and described in this report. The data presented in this report are based on subsurface conditions

encountered at the time of CDM Smith's study and on experience and engineering judgement. While the data provided in this report is based on investigations and test data, they should not be interpreted as a guarantee or warranty that the conditions encountered during construction will be completely as described. Furthermore, CDM Smith cannot be held responsible for the interpretation by others of the data contained herein.

Within the limitations of scope, schedule, and budget, CDM Smith's services have been performed in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions in the area. No other warranty, expressed or implied, is made.

Section 2

Site and Subsurface Conditions

2.1 Site Conditions

2.1.1 General

The Black Creek Water Resource Development Project (Black Creek) is located in Clay County, Florida. The intake site is located north of State Road 16, between the entrance to Seamark Ranch and Black Creek. The surrounding area is primarily rural. The ground surface at the intake site has existing grades ranging from El. 47 to El. 8. The gas easement is located near Treat Road and Alligator Creek. The ground surface at the gas easement crossing has existing grades ranging from El. 146 to 148.

2.1.2 Regional Geology

According to USGS geologic maps, Pliocene Age Cypresshead Formation sediments are to be expected within the majority of the intake site. These sediments consist of unconsolidated to poorly consolidated, fine- to coarse-grained, variably clayey to clean quartz sand. In soil samples, the soils are often characterized by fine-grained sand with thin layers of clay dispersed throughout. The portion of the site near Black Creek will encounter Miocene Age Coosawhatchie Formation sediments of the Hawthorne Group. These sediments typically consist of fine to medium-grained sandy dolostone with interbedded quartz sands and clays, becoming more sandy and clayey with depth.

2.2 Subsurface Exploration Program

2.2.1 Test Borings

A total of fourteen (14) test borings (B-3, B-4, B-9, B-10, B-100 through B-107, B-114 and B-115) were drilled to investigate subsurface conditions within the site. The borings were drilled by Independent Drilling, Inc. of Leesburg, Florida between September 25th and 26th, 2017, May 7th and May 17th, 2018, and August 28, 2018. The approximate locations of test borings are shown on the Contract Drawings.

All the intake test borings were observed and logged by a CDM Smith geotechnical engineer. Test boring logs prepared by CDM Smith are included in **Appendix A**. CSI Geo observed and logged test borings B-114 and B-115. Test boring logs prepared by CSI Geo are included in **Appendix B**.

The test borings were drilled using a track drill rig and amphibious drill rig, depending upon the access conditions at the test boring location. Test borings were typically advanced using mud rotary to the specified depths, which ranged from 20 to 60 feet below the existing ground surface. Split-spoon sampling was generally conducted continuously from ground surface to 10 feet below ground surface, and at 5-foot intervals thereafter to the depth of boring.

Split-spoon samples were collected in accordance with ASTM D1586 (2-inch-diameter sampler driven 24 inches by blows from a 140-pound hammer falling freely for a 30-inch drop). The number of blows required to drive the sampler each 6-inch increment was recorded. The Standard Penetration Resistance (N-value) was calculated as the sum of the blows over the second and third 6-inch increments of penetration. A CDM Smith geotechnical engineer or a CSI Geo representative visually classified the soil samples recovered in the field in general accordance with the ASTM D2488 and

noted the Unified Soil Classification System (USCS) designation. Representative soil samples from each split spoon were collected and stored in jars for subsequent review and laboratory testing.

Groundwater levels at the test boring locations were estimated from the condition of samples obtained and by observed water levels within a borehole at the time of drilling.

All test borings were backfilled with soil cuttings.

2.3 Geotechnical Laboratory Testing

Geotechnical laboratory testing was conducted on selected soil samples as follows:

- Thirteen (13) grain size analyses in accordance with ASTM D422;
- Three (3) hydrometer analyses in accordance with ASTM D422;
- Nine (9) Atterberg limits tests in accordance with ASTM D4318;
- Twelve (12) moisture content determination analyses in accordance with ASTM D2216;
- One (1) one dimensional consolidation analysis in accordance with ASTM D2435; and
- Two (2) percent passing #200 test in accordance with ASTM D1140.

A summary of the geotechnical laboratory test results is included in **Table 2-1** and test results are included in **Appendix B**.

**St. Johns River Water Management District
Black Creek Water Resource Development Project
Clay County, FL**

**Table 2-1
Summary of Geotechnical Laboratory Test Results - Index Testing**

Test Boring Number	Sample No.	Sample Depth (ft.)	USCS Classification	Moisture Content ¹ (%)	Atterberg Limits ²			Sieve Analysis ³			
					Liquid Limit	Plastic Limit	Plasticity Index	% Gravel	% Sand	% Fines	
Intake											
B-3	UD	40.0	41.0	SM	54.10	77	54	23	-	-	48
B-4	S-4	6.0	8.0	SP	21.19	-	-	-	0	99	1
B-4	S-7	18.5	20.0	-	20.95	-	-	-	-	-	16
B-4	S-8	23.5	25.0	-	-	38	28	10	-	-	-
B-4	S-12	43.5	45.0	SM	43.06	-	-	-	0	72	28
B-10	S-4	6.0	8.0	SP-SM	20.50	-	-	-	0	96	4
B-10	S-7	18.5	20.0	-	-	58	41	17	-	-	-
B-100	S-6	13.5	15.0	CH	66.00	67	27	40	-	-	-
B-101	S-7	18.5	20.0	ML	41.00	49	30	19	-	-	-
B-101	S-8	23.5	25.0	-	-	-	-	-	4	68.0	28.0
B-101	S-12	43.5	45.0	-	-	-	-	-	0	64.0	36.0
B-102	S-4	6.0	8.0	-	-	-	-	-	0	88.0	12.0
B-102	S-7	18.5	20.0	-	-	-	-	-	-	-	29.0
B-102	S-10	33.5	35.0	-	-	-	-	-	0	59.0	41.0
B-102	S-12	43.5	45.0	-	-	-	-	-	5	72.0	23.0
B-103	S-9	23.5	25.0	-	-	-	-	-	2.0	61.0	37.0
B-104	S-9	23.5	25.0	-	28.00	-	-	-	0	44.0	56.0
B-105	S-8	18.5	20.0	ML	27.00	40	28	12	-	-	-
B-106	S-2	2.0	4.0	-	-	-	-	-	0	80.0	20.0
B-106	S-7	13.5	15.0	-	-	-	-	-	0	42.0	58.0
B-107	S-3	4.0	6.0	-	-	-	-	-	0	98.0	2.0
B-107	S-9	28.5	30.0	CL	29.00	36	21	15	-	-	-
B-107	S-11	38.5	40.0	CH	43.00	109	40	69	-	-	-
B-107	S-12	43.5	45.0	CH	78.00	119	37	82	-	-	-

Notes:

- Moisture content tests were performed in accordance with ASTM D2216.
- Atterberg Limit tests were performed in accordance with ASTM D4318.
- Sieve analyses performed in accordance with ASTM D422.
- Consolidation test performed in accordance with ASTM D2435

Abbreviations:

- | | | | |
|----|---------------------|-------|----------------|
| - | Test Not Performed | SP-SM | Sand with Silt |
| ML | Low Plasticity Silt | CH | Fat Clay |
| SP | Poorly Graded Sand | CL | Lean Clay |
| SM | Silty Sand | | |

St. Johns River Water Management District
 Black Creek Water Resource Development Project
 Clay County, FL

Table 2-2
Summary of Subsurface Explorations

Test Boring Number	Approximate Ground Surface EL. ^(1, 2)	Total Drilling Depth (ft)	Strata Thickness (ft)			Approximate Depth to Groundwater	Approximate Groundwater Elevation
			Sand	Silty/Clayey Sand	Sandy Clay/Silt		
Intake							
B-3	16.3	50.0	12.0	3.0	35.0	3.0	13.3
B-4	24.0	50.0	27.0	13.0	10.0	6.0	18.0
B-9	27.8	25.0	18.0	-	7.0	6.5	21.3
B-10	29.6	25.0	17.0	3.0	5.0	3.0	26.6
B-100	40.0	20.0	13.0	5.0	2.0	5.5	34.5
B-101	36.0	60.0	50.0	-	10.0	2.1	33.9
B-102	35.0	50.0	13.5	35.0	1.5	2.0	33.0
B-103	28.0	35.0	8.0	27.0	-	2.0	26.0
B-104	24.0	30.0	13.5	5.0	11.5	1.4	22.6
B-105	23.0	30.0	12.0	9.5	8.5	1.5	21.5
B-106	18.0	25.0	2.0	23.0	-	1.5	16.5
B-107	26.0	50.0	18.5	5.0	26.5	4.0	22.0
B-114	148.0	25.0	6.0	17.0	2.0	13.0	135.0
B-115	146.0	25.0	5.0	16.0	4.0	9.0	137.0

Notes:

1. Elevations based on the National American Vertical Datum (NAVD) of 1988 and are reported in feet. - Indicates strata/groundwater not encountered
2. Ground surface and groundwater elevations are approximate and are estimated based upon the Contract Drawings contours.

Appendix A
CDM Smith Boring Logs



BOREHOLE LOG

B-3

Client: Clay County, Florida
Project Location: Clay County, Florida

Project Name: Black Creek Water Resource Development
Project Number: 9247-221208

Drilling Contractor: Independent Drilling Inc.
Drilling Method/Rig: Mud Rotary/MST-800
Drillers: Bobby
Drilling Date: Start: 9-25-17 **End:** 9-25-17
Borehole Coordinates:
 See Boring Location Plan

Surface Elevation (ft.): 16.3
Total Depth (ft.): 50
Depth to Initial Water Level (ft-bgs): 3'
Abandonment Method: Grout.
Field Screening Instrument: N/A
Logged By: KNA

Sample Type	Sample Number	Sample Adv/Rec (inches)	Elev. Depth (ft.)	N-Value	Blows per 6-in	Graphic Log	USCS Designation	Material Description
			16.3					
			0		1			
SPT	S-1	24/0		3	1			No Sample
					2			
					1			
SPT	S-2	24/15		11	2			Light Gray Fine SAND, Poorly Graded, Medium Dense, Wet (SP)
					6			
					5			
SPT	S-3	24/10	11.3	12	5			Tan Medium SAND, Poorly Graded, Medium Dense, Wet (SP)
			5		7			
					7			
SPT	S-4	24/11		7	5			Tan Medium SAND, Trace Wood, Poorly Graded, Loose, Wet (SP)
					3			
					4			
					3			
SPT	S-5	24/16		6	2			Brown and Light Gray Medium SAND, Poorly Graded, Loose, Wet (SP)
					2			
					4			
					5			
			6.3					
			10					
					6		CH	
SPT	S-6	18/18		25	11			Light Gray and Black Speckled CLAY, Little Sand, High Plasticity, Hard, Moist (CH)
					14			
			1.3					

BOREHOLE BLACK CREEK FORMATTING - BIG LOGS.GPJ_CDM_CORP.GDT 7/3/18

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
 HSA - Hollow Stem Auger
 SSA - Solid Stem Auger
 HA - Hand Auger
 AR - Air Rotary
 DTR - Dual Tube Rotary
 FR - Foam Rotary
 MR - Mud Rotary
 RC - Reverse Circulation
 CT - Cable Tool
 JET - Jetting
 D - Driving
 DTC - Drill Through Casing

SAMPLING TYPES:
 AS - Auger/Grab Sample
 CS - California Sampler
 BX - 1.5" Rock Core
 NX - 2.1" Rock Core
 GP - Geoprobe
 HP - Hydro Punch
 SS - Split Spoon
 ST - Shelby Tube
 WS - Wash Sample
OTHER:
 AGS - Above Ground Surface

REMARKS

Hammer weight = 140 lbs, Hammer drop height = 30 in., Spoon Size = 2 in. OD and 24 in. length. Surface elevations noted are approximate based upon survey contours.

Reviewed by: JAC

Date: 10-13-17



BOREHOLE LOG B-3

Client: Clay County, Florida

Project Name: Black Creek Water Resource Development

Project Location: Clay County, Florida

Project Number: 9247-221208

BOREHOLE BLACK CREEK FORMATTING - BJG LOGS.GPJ_CDM_CORP.GDT 7/3/18

Sample Type	Sample Number	Sample Adv/Rec (inches)	Elev. Depth (ft.)	N-Value	Blows per 6-in	Graphic Log	USCS Designation	Material Description
			1.3 15					
SPT	S-7	18/18		46	22 26 20			Light Gray and Black Speckled CLAY, Trace Sand, High Plasticity, Hard, Moist (CH)
			-3.7 20					
SPT	S-8	18/18		30	10 16 14			Light Gray and Black Speckled CLAY, Trace Sand, High Plasticity, Hard, Moist (CH)
			-8.7 25					CH
SPT	S-9	18/18		14	5 6 8			Light Gray and Black Speckled CLAY, Trace Sand, High Plasticity, Very Stiff, Moist (CH)
			-13.7 30					
SPT	S-10	18/18		9	2 4 5			Light Gray and Black Speckled CLAY, Trace Sand, High Plasticity, Stiff, Moist (CH)
			-18.7 35					
					3			



BOREHOLE LOG B-3

Client: Clay County, Florida

Project Name: Black Creek Water Resource Development

Project Location: Clay County, Florida

Project Number: 9247-221208

Sample Type	Sample Number	Sample Adv/Rec (inches)	Elev. Depth (ft.)	N-Value	Blows per 6-in	Graphic Log	USCS Designation	Material Description
SPT	S-11	18/18	-23.7	11	5		CH	Light Gray and Black Speckled CLAY, Little Sand, High Plasticity, Stiff, Moist (CH) Shelby tube sample collected
ST	ST-1	12/12	40		6			
SPT	S-12	18/18	-28.7	9	3		ML	Olive Green SILT, Little Sand, Stiff, Moist
			45		4			
					5		SM	Olive Green Silty SAND, Medium Dense, Moist (SM)
SPT	S-13	18/18	-33.7	16	6			
			50		10			Boring Terminated at 50 Feet Below Ground Surface
			-38.7					
			55					
			-43.7					
			60					



BOREHOLE LOG

B-4

Client: Clay County, Florida
Project Location: Clay County, Florida

Project Name: Black Creek Water Resource Development
Project Number: 9247-221208

Drilling Contractor: Independent Drilling Inc.
Drilling Method/Rig: Mud Rotary/MST-800
Drillers: Bobby
Drilling Date: Start: 9-26-17 **End:** 9-26-17
Borehole Coordinates:
 See Boring Location Plan

Surface Elevation (ft.): 24
Total Depth (ft.): 50
Depth to Initial Water Level (ft-bgs): 6'
Abandonment Method: Grout.
Field Screening Instrument: PP
Logged By: KNA

Sample Type	Sample Number	Sample Adv/Rec (inches)	Elev. Depth (ft.)	N-Value	Blows per 6-in	Graphic Log	USCS Designation	Material Description	
			24.0						
			0		1				
SPT	S-1	24/16		4	2		SP	Tan Fine SAND, Poorly Graded, Loose, Moist (SP)	
					2				
SPT	S-2	24/10		12	6				Brown Fine SAND, Trace Wood, Poorly Graded, Medium Dense, Moist (SP)
					6				
SPT	S-3	24/16	19.0	5	2				Tan Fine SAND, Trace Wood, Poorly Graded, Loose, Moist to Wet (SP)
			5		2				
SPT	S-4	24/12		7	3				Tan and Gray Fine SAND, Poorly Graded, Loose, Wet (SP)
					4				
SPT	S-5	24/12		7	2				Tan and Dark Brown Fine SAND, Poorly Graded, Loose, Wet (SP)
					2				
			14.0		5				
			10		8				
SPT	S-6	18/10		15	4			Gray Fine SAND, Trace Wood, Poorly Graded, Medium Dense, Wet (SP)	
			9.0		6				
					9				

BOREHOLE BLACK CREEK FORMATTING - BIG LOGS.GPJ_CDM_CORP.GDT 7/3/18

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
 HSA - Hollow Stem Auger
 SSA - Solid Stem Auger
 HA - Hand Auger
 AR - Air Rotary
 DTR - Dual Tube Rotary
 FR - Foam Rotary
 MR - Mud Rotary
 RC - Reverse Circulation
 CT - Cable Tool
 JET - Jetting
 D - Driving
 DTC - Drill Through Casing

SAMPLING TYPES:
 AS - Auger/Grab Sample
 CS - California Sampler
 BX - 1.5" Rock Core
 NX - 2.1" Rock Core
 GP - Geoprobe
 HP - Hydro Punch
 SS - Split Spoon
 ST - Shelby Tube
 WS - Wash Sample
OTHER:
 AGS - Above Ground Surface

REMARKS

Hammer weight = 140 lbs, Hammer drop height = 30 in., Spoon Size = 2 in. OD and 24 in. length. Surface elevations noted are approximate based upon survey contours.
 PP = Pocket Pen

Reviewed by: JAC

Date: 10-13-17



BOREHOLE LOG

B-4

Client: Clay County, Florida

Project Name: Black Creek Water Resource Development

Project Location: Clay County, Florida

Project Number: 9247-221208

BOREHOLE BLACK CREEK FORMATTING - BJG LOGS.GPJ_CDM_CORP.GDT 7/3/18

Sample Type	Sample Number	Sample Adv/Rec (inches)	Elev. Depth (ft.)	N-Value	Blows per 6-in	Graphic Log	USCS Designation	Material Description
			9.0					
			15				SP	
SPT	S-7	18/10		15	6 10 5		SW	Gray and Dark Brown Fine to Coarse SAND, Well Graded, Medium Dense, Wet (SW)
			4.0					
			20					
SPT	S-8	18/18		48	16 27 21		CH	Gray and Black Speckled Sandy CLAY, High Plasticity, Hard, Moist (CL) PP = 3.5 tsf
			-1.0					
			25					
SPT	S-9	18/18		20	8 8 12		CH	Gray and Black Speckled Sandy CLAY, High Plasticity, Very Stiff, Moist (CL) PP = 2.25 tsf
			-6.0					
			30					
SPT	S-10	18/18		28	9 10 18		SC	Gray and Black Speckled Clayey SAND, Poorly Graded, Dense, Moist (SC)
			-11.0					
			35					
					5			



BOREHOLE LOG B-4

Client: Clay County, Florida

Project Name: Black Creek Water Resource Development

Project Location: Clay County, Florida

Project Number: 9247-221208

Sample Type	Sample Number	Sample Adv/Rec (inches)	Elev. Depth (ft.)	N-Value	Blows per 6-in	Graphic Log	USCS Designation	Material Description
SPT	S-11	18/18	-16.0 40	11	5 6		SC	Gray and Black Speckled Clayey SAND, Poorly Graded, Medium Dense, Moist (SC)
SPT	S-12	18/18	-21.0 45	14	3 6 8		SM	Dark Gray Fine to Medium Silty SAND, Well Graded, Medium Dense, Wet (SM)
SPT	S-13	18/18	-26.0 50	11	3 4 7			Olive Green Silty SAND, Medium Dense, Moist (SM)
			-31.0 55					Boring Terminated at 50 Feet Below Ground Surface
			-36.0 60					



BOREHOLE LOG

B-9

Client: Clay County, Florida
Project Location: Clay County, Florida

Project Name: Black Creek Water Resource Development
Project Number: 9247-221208

Drilling Contractor: Independent Drilling Inc.
Drilling Method/Rig: Mud Rotary/BR-2500
Drillers: Shannon
Drilling Date: Start: 9-26-17 **End:** 9-26-17

Surface Elevation (ft.): 27.8
Total Depth (ft.): 25
Depth to Initial Water Level (ft-bgs): 6.5'
Abandonment Method: Grout.

Borehole Coordinates:
 See Boring Location Plan

Field Screening Instrument: N/A
Logged By: KNA

Sample Type	Sample Number	Sample Adv/Rec (inches)	Elev. Depth (ft.)	N-Value	Blows per 6-in	Graphic Log	USCS Designation	Material Description		
			27.8							
			0		2					
SPT	S-1	24/20		10	2	[Dotted Pattern]	SP	Brown Fine SAND, Poorly Graded, Medium Dense, Dry (SP)		
					8					
					8					
SPT	S-2	24/14		23	7					Tan Fine SAND, Poorly Graded, Medium Dense, Moist (SP)
					11					
					12					
					15					
SPT	S-3	24/24	22.8	16	6					Brown Fine SAND, Poorly Graded, Medium Dense, Moist (SP)
			5		8					
					8					
SPT	S-4	24/24		10	5			Gray Fine SAND, Poorly Graded, Medium Dense, Wet (SP)		
					6					
					4					
					4					
SPT	S-5	24/24		7	5	[Diagonal Hatching]	CL	Dark Gray Sandy CLAY, Stiff, Wet (CL)		
					4					
					3					
			17.8		11					
			10							
SPT	S-6	18/16		11	9	[Dotted Pattern]	SP	Brown Fine SAND, Poorly Graded, Medium Dense, Wet (SP)		
					7					
			12.8		4					

BOREHOLE BLACK CREEK FORMATTING - BIG LOGS.GPJ_CDM_CORP.GDT 7/3/18

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
 HSA - Hollow Stem Auger
 SSA - Solid Stem Auger
 HA - Hand Auger
 AR - Air Rotary
 DTR - Dual Tube Rotary
 FR - Foam Rotary
 MR - Mud Rotary
 RC - Reverse Circulation
 CT - Cable Tool
 JET - Jetting
 D - Driving
 DTC - Drill Through Casing

SAMPLING TYPES:
 AS - Auger/Grab Sample
 CS - California Sampler
 BX - 1.5" Rock Core
 NX - 2.1" Rock Core
 GP - Geoprobe
 HP - Hydro Punch
 SS - Split Spoon
 ST - Shelby Tube
 WS - Wash Sample
OTHER:
 AGS - Above Ground Surface

REMARKS

Hammer weight = 140 lbs, Hammer drop height = 30 in., Spoon Size = 2 in. OD and 24 in. length. Surface elevations noted are approximate based upon survey contours.

Reviewed by: JAC

Date: 10-13-17



BOREHOLE LOG

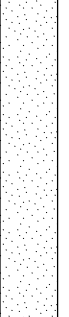
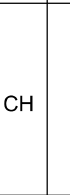
B-9

Client: Clay County, Florida

Project Name: Black Creek Water Resource Development

Project Location: Clay County, Florida

Project Number: 9247-221208

Sample Type	Sample Number	Sample Adv/Rec (inches)	Elev. Depth (ft.)	N-Value	Blows per 6-in	Graphic Log	USCS Designation	Material Description
			12.8 15					
SPT	S-7	18/12		20	11 12 8		SP	Brown Fine SAND, Poorly Graded, Medium Dense, Wet (SP)
			7.8 20					
SPT	S-8	18/18		12	5 6 6		CH	Gray and Black Speckled CLAY, Little Sand, High Plasticity, Stiff to Very Stiff, Moist (CH)
			2.8 25					Boring Terminated at 25 Feet Below Ground Surface
			-2.2 30					
			-7.2 35					



BOREHOLE LOG

B-10

Client: Clay County, Florida
Project Location: Clay County, Florida

Project Name: Black Creek Water Resource Development
Project Number: 9247-221208

Drilling Contractor: Independent Drilling Inc.
Drilling Method/Rig: Mud Rotary/BR-2500
Drillers: Shannon
Drilling Date: Start: 9-26-17 **End:** 9-26-17

Surface Elevation (ft.): 29.6
Total Depth (ft.): 25
Depth to Initial Water Level (ft-bgs): 3'

Borehole Coordinates:
 See Boring Location Plan

Abandonment Method: Grout.
Field Screening Instrument: PP
Logged By: KNA

Sample Type	Sample Number	Sample Adv/Rec (inches)	Elev. Depth (ft.)	N-Value	Blows per 6-in	Graphic Log	USCS Designation	Material Description	
			29.6						
			0		2				
SPT	S-1	24/24		10	4		SP	Brown Fine SAND, Poorly Graded, Medium Dense, Moist (SP)	
					6				
					7				
SPT	S-2	24/24		5	4				Brown Fine SAND, Poorly Graded, Loose, Moist (SP)
					3				
					2				
					2				
SPT	S-3	24/24	24.6 5	3	1				Brown Fine SAND, Poorly Graded, Loose, Wet (SP)
					1				
					2				
					5				
SPT	S-4	24/24		5	4				Brown and Dark Brown Fine SAND, Poorly Graded, Loose, Wet (SP)
					2				
					3				
					3				
SPT	S-5	24/16		34	5		Brown Fine SAND, Poorly Graded, Dense, Wet (SP)		
					14				
					20				
					21				
			19.6						
			10						
SPT	S-6	18/12		12	6		Brown Fine SAND, Poorly Graded, Medium Dense, Wet (SP)		
					8				
					4				
			14.6						

BOREHOLE BLACK CREEK FORMATTING - B/J LOGS.GPJ_CDM_CORP.GDT 7/3/18

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
 HSA - Hollow Stem Auger
 SSA - Solid Stem Auger
 HA - Hand Auger
 AR - Air Rotary
 DTR - Dual Tube Rotary
 FR - Foam Rotary
 MR - Mud Rotary
 RC - Reverse Circulation
 CT - Cable Tool
 JET - Jetting
 D - Driving
 DTC - Drill Through Casing

SAMPLING TYPES:
 AS - Auger/Grab Sample
 CS - California Sampler
 BX - 1.5" Rock Core
 NX - 2.1" Rock Core
 GP - Geoprobe
 HP - Hydro Punch
 SS - Split Spoon
 ST - Shelby Tube
 WS - Wash Sample
OTHER:
 AGS - Above Ground Surface

REMARKS

Hammer weight = 140 lbs, Hammer drop height = 30 in., Spoon Size = 2 in. OD and 24 in. length. Surface elevations noted are approximate based upon survey contours. PP = Pocket Pen

Reviewed by: JAC

Date: 10-13-17



BOREHOLE LOG

B-10

Client: Clay County, Florida

Project Name: Black Creek Water Resource Development

Project Location: Clay County, Florida

Project Number: 9247-221208

Sample Type	Sample Number	Sample Adv/Rec (inches)	Elev. Depth (ft.)	N-Value	Blows per 6-in	Graphic Log	USCS Designation	Material Description
			14.6					
			15				SP	
SPT	S-7	18/18		26	10 12 14		MH	Gray and Black Speckled Sandy SILT, High Plasticity, Hard, Moist (MH) PP = 2.25 tsf
			9.6					
			20					
SPT	S-8	18/18		19	6 8 11		SM	Olive Green Silty SAND, Medium Dense, Moist (SM)
			4.6					
			25					Boring Terminated at 25 Feet Below Ground Surface
			-0.4					
			30					
			-5.4					
			35					



BOREHOLE LOG

B-100

Client: St. Johns River Water Mgmt District
Project Location: Clay County, Florida

Project Name: Black Creek Water Resource Dev. Project
Project Number: 9247-221208

Drilling Contractor: Independent Drilling Inc.
Drilling Method/Rig: Mud Rotary/CME Gotrack
Drillers: Shannon
Drilling Date: Start: 5-11-18 **End:** 5-11-18

Surface Elevation (ft.): 40
Total Depth (ft.): 20
Depth to Initial Water Level (ft-bgs): 5.5'
Abandonment Method: Grout.
Field Screening Instrument: PP
Logged By: KNA

Borehole Coordinates:
 See Boring Location Plan

Sample Type	Sample Number	Sample Adv/Rec (inches)	Elev. Depth (ft.)	N-Value	Blows per 6-in	Graphic Log	USCS Designation	Material Description
			40.0					
			0		1			
SPT	S-1	24/8		5	2			Brown Fine SAND, Trace Roots, Poorly Graded, Loose, Dry (SP)
					3			
					3			
SPT	S-2	24/12		7	2			Brown Fine SAND, Poorly Graded, Loose, Dry (SP)
					3			
					4			
					4			
SPT	S-3	24/10	35.0	8	2			Tan and Orange Fine SAND, Poorly Graded, Loose, Moist to Wet (SP)
			5		4			
					4			
					6			
SPT	S-4	24/12		13	3			Tan and Orange Fine SAND, Poorly Graded, Medium Dense, Wet (SP)
					6			
					7			
					5			
SPT	S-5	24/14		7	2		Tan Fine SAND, Poorly Graded, Loose, Wet (SP)	
					4			
					3			
					2			
			30.0					
			10					
SPT	S-6	18/18		4	WOH			
					WOH			
			25.0		4			Gray CLAY, Little Sand, High Plasticity, Firm, Wet (CH)

BOREHOLE BLACK CREEK PHASE 2 WITH LAB.GPJ CDM_CORP.GDT 7/2/18

EXPLANATION OF ABBREVIATIONS

- | | |
|--|---|
| <p>DRILLING METHODS:
 HSA - Hollow Stem Auger
 SSA - Solid Stem Auger
 HA - Hand Auger
 AR - Air Rotary
 DTR - Dual Tube Rotary
 FR - Foam Rotary
 MR - Mud Rotary
 RC - Reverse Circulation
 CT - Cable Tool
 JET - Jetting
 D - Driving
 DTC - Drill Through Casing</p> | <p>SAMPLING TYPES:
 AS - Auger/Grab Sample
 CS - California Sampler
 BX - 1.5" Rock Core
 NX - 2.1" Rock Core
 GP - Geoprobe
 HP - Hydro Punch
 SS - Split Spoon
 ST - Shelby Tube
 WS - Wash Sample
 OTHER:
 AGS - Above Ground Surface</p> |
|--|---|

REMARKS

Hammer weight = 140 lbs, Hammer drop height = 30 in., Spoon Size = 2 in. OD and 24 in. length. Surface elevations noted are approximate based upon survey contours. PP = Pocket Pen

Reviewed by: JAC **Date:** 5-21-18



BOREHOLE LOG

B-100

Client: St. Johns River Water Mgmt District

Project Name: Black Creek Water Resource Dev. Project

Project Location: Clay County, Florida

Project Number: 9247-221208

Sample Type	Sample Number	Sample Adv/Rec (inches)	Elev. Depth (ft.)	N-Value	Blows per 6-in	Graphic Log	USCS Designation	Material Description
			25.0 15					
SPT	S-7	18/18		47	11 16 31		SC	Gray and Black Speckled Fine to Medium Clayey SAND, Well Graded, Dense, Moist (SC)
			20.0 20					Boring Terminated at 20 Feet Below Ground Surface.
			15.0 25					
			10.0 30					
			5.0 35					



BOREHOLE LOG

B-101

Client: St. Johns River Water Mgmt District
Project Location: Clay County, Florida

Project Name: Black Creek Water Resource Dev. Project
Project Number: 9247-221208

Drilling Contractor: Independent Drilling Inc.
Drilling Method/Rig: Mud Rotary/CME Gotrack
Drillers: Shannon
Drilling Date: Start: 5-11-18 **End:** 5-11-18
Borehole Coordinates:
 See Boring Location Plan

Surface Elevation (ft.): 35.5
Total Depth (ft.): 60
Depth to Initial Water Level (ft-bgs): 2.1'
Abandonment Method: Grout.
Field Screening Instrument: PP
Logged By: KNA

Sample Type	Sample Number	Sample Adv/Rec (inches)	Elev. Depth (ft.)	N-Value	Blows per 6-in	Graphic Log	USCS Designation	Material Description
			35.5					
			0					
SPT	S-1	24/4		1	WOH WOH 1 WOH		SC	Gray Medium Clayey SAND, Some Woody Debris, Poorly Graded, Very Loose, Dry (SC)
SPT	S-2	24/18		20	8 10 10 10		SM	Gray Medium Silty SAND, Poorly Graded, Medium Dense, Wet (SM)
SPT	S-3	24/18	30.5 5	1	2 WOH 1 1		SC	Gray Clayey SAND, Well Graded, Very Loose, Wet (SC)
SPT	S-4	24/24		3	1 1 2 4		SC	Mottled Orange and Gray Fine to Medium Clayey SAND, Well Graded, Very Loose, Wet (SC)
SPT	S-5	15/15		>50	4 35 50/3"		SC	Mottled Orange and Gray Fine to Medium Clayey SAND, Well Graded, Very Dense, Moist (SC)
			25.5 10				SC	
SPT	S-6	18/18		20	13 9 11		SC	Dark Gray, Orange and Black Fine to Coarse Clayey SAND, Trace Gravel, Well Graded, Medium Dense, Wet (SC)
			20.5					

BOREHOLE BLACK CREEK PHASE 2 WITH LAB.GPJ CDM_CORP.GDT 7/2/18

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
 HSA - Hollow Stem Auger
 SSA - Solid Stem Auger
 HA - Hand Auger
 AR - Air Rotary
 DTR - Dual Tube Rotary
 FR - Foam Rotary
 MR - Mud Rotary
 RC - Reverse Circulation
 CT - Cable Tool
 JET - Jetting
 D - Driving
 DTC - Drill Through Casing

SAMPLING TYPES:
 AS - Auger/Grab Sample
 CS - California Sampler
 BX - 1.5" Rock Core
 NX - 2.1" Rock Core
 GP - Geoprobe
 HP - Hydro Punch
 SS - Split Spoon
 ST - Shelby Tube
 WS - Wash Sample
OTHER:
 AGS - Above Ground Surface

REMARKS

Hammer weight = 140 lbs, Hammer drop height = 30 in., Spoon Size = 2 in. OD and 24 in. length. Surface elevations noted are approximate based upon survey contours. PP = Pocket Pen

Reviewed by: JAC

Date: 5-21-18



BOREHOLE LOG

B-101

Client: St. Johns River Water Mgmt District
Project Location: Clay County, Florida

Project Name: Black Creek Water Resource Dev. Project
Project Number: 9247-221208

Sample Type	Sample Number	Sample Adv/Rec (inches)	Elev. Depth (ft.)	N-Value	Blows per 6-in	Graphic Log	USCS Designation	Material Description
			20.5					
			15				SC	
SPT	S-7	18/18	15.5	24	10 10 14		ML	Gray SILT, Little Fine Sand, Low Plasticity, Very Stiff, Wet (ML)
			20					
SPT	S-8	18/18	10.5	17	7 7 10		SM	Green and Black Speckled Fine to Medium Silty SAND, Trace Gravel, Well Graded, Medium Dense, Wet (SM)
			25					
SPT	S-9	18/18	5.5	31	27 18 13		SM	Gray and Black Speckled Fine to Medium Silty SAND, Trace Gravel, Well Graded, Dense, Moist (SM)
			30					
SPT	S-10	18/18	0.5	54	7 25 29		SC	Mottled Green and Gray Fine to Medium Clayey SAND, Well Graded, Very Dense, Moist (SC)
			35					
					12		SM	Grayish Green Fine Silty SAND, Well Graded, Very Dense, Moist

BOREHOLE BLACK CREEK PHASE 2 WITH LAB.GPJ_CDM_CORP.GDT 7/2/18



BOREHOLE LOG

B-101

Client: St. Johns River Water Mgmt District
Project Location: Clay County, Florida

Project Name: Black Creek Water Resource Dev. Project
Project Number: 9247-221208

BOREHOLE BLACK CREEK PHASE 2 WITH LAB.GPJ_CDM_CORP.GDT 7/2/18

Sample Type	Sample Number	Sample Adv/Rec (inches)	Elev. Depth (ft.)	N-Value	Blows per 6-in	Graphic Log	USCS Designation	Material Description
SPT	S-11	18/18	-4.5 40	48	22 26		SM	(SM) Green and Black Speckled Fine to Coarse Silty SAND, Trace Gravel, Well Graded, Dense, Wet (SM)
SPT	S-12	18/18	-9.5 45	25	7 12 13			
SPT	S-13	18/18	-14.5 50	10	4 4 6		SC	Green Fine to Medium Clayey SAND, Well Graded, Medium Dense, Wet (SC)
SPT	S-14	18/18	-19.5 55	15	5 6 9			
SPT	S-15	18/18	-24.5 60	16	4 8 8		ML	Green SILT, Trace Sand, Low Plasticity, Very Stiff, Wet (ML) Green and Gray Sandy SILT, Low Plasticity, Very Stiff, Wet (ML)



BOREHOLE LOG

B-102

Client: St. Johns River Water Mgmt District
Project Location: Clay County, Florida

Project Name: Black Creek Water Resource Dev. Project
Project Number: 9247-221208

Drilling Contractor: Independent Drilling Inc.
Drilling Method/Rig: Mud Rotary/CME Gotrack
Drillers: Shannon
Drilling Date: Start: 5-9-18 **End:** 5-10-18
Borehole Coordinates:
 See Boring Location Plan

Surface Elevation (ft.): 34.5
Total Depth (ft.): 50
Depth to Initial Water Level (ft-bgs): Caved, assumed 2'
Abandonment Method: Grout.
Field Screening Instrument: N/A
Logged By: KNA

Sample Type	Sample Number	Sample Adv/Rec (inches)	Elev. Depth (ft.)	N-Value	Blows per 6-in	Graphic Log	USCS Designation	Material Description		
			34.5							
			0							
SPT	S-1	24/12		1	1	[Stippled Pattern]	SP	Black and Gray Fine SAND, Poorly Graded, Very Loose, Wet (SP)		
					2					
					4					
SPT	S-2	24/18		9	5					Light Brown Fine SAND, Poorly Graded, Medium Dense, Wet (SP)
					4					
					5					No Sample.
SPT	S-3	24/0	29.5 5	4	1	[Vertical Lines]	SP-SM	Dark Brown Fine SAND, Little Silt, Poorly Graded, Loose, Wet (SP-SM)		
					1					
					3					
SPT	S-4	24/20		7	6			Dark Brown, Green and Light Gray Fine SAND, Poorly Graded, Very Loose, Wet (SP)		
					6					
SPT	S-5	24/24		3	1	[Stippled Pattern]	SP	Dark Brown, Green and Light Gray Fine SAND, Poorly Graded, Very Loose, Wet (SP)		
					2					
					1					
			24.5 10		12					
SPT	S-6	18/18		61	9	[Diagonal Lines]	SC	Green and Black Speckled Fine Clayey SAND, Poorly Graded, Very Dense, Wet (SC)		
					11					
			19.5		50					

BOREHOLE BLACK CREEK PHASE 2 WITH LAB.GPJ CDM_CORP.GDT 7/2/18

EXPLANATION OF ABBREVIATIONS

- | | |
|--|---|
| <p>DRILLING METHODS:
 HSA - Hollow Stem Auger
 SSA - Solid Stem Auger
 HA - Hand Auger
 AR - Air Rotary
 DTR - Dual Tube Rotary
 FR - Foam Rotary
 MR - Mud Rotary
 RC - Reverse Circulation
 CT - Cable Tool
 JET - Jetting
 D - Driving
 DTC - Drill Through Casing</p> | <p>SAMPLING TYPES:
 AS - Auger/Grab Sample
 CS - California Sampler
 BX - 1.5" Rock Core
 NX - 2.1" Rock Core
 GP - Geoprobe
 HP - Hydro Punch
 SS - Split Spoon
 ST - Shelby Tube
 WS - Wash Sample
 OTHER:
 AGS - Above Ground Surface</p> |
|--|---|

REMARKS

Hammer weight = 140 lbs, Hammer drop height = 30 in., Spoon Size = 2 in. OD and 24 in. length. Surface elevations noted are approximate based upon survey contours.
 PP = Pocket Pen

Reviewed by: JAC

Date: 5-21-18



BOREHOLE LOG

B-102

Client: St. Johns River Water Mgmt District
Project Location: Clay County, Florida

Project Name: Black Creek Water Resource Dev. Project
Project Number: 9247-221208

Sample Type	Sample Number	Sample Adv/Rec (inches)	Elev. Depth (ft.)	N-Value	Blows per 6-in	Graphic Log	USCS Designation	Material Description
			19.5					
			15					
SPT	S-7	18/18		16	4 6 10		SC	Green Clayey SAND, Trace Gravel, Well Graded, Medium Dense, Wet (SC)
			14.5					
			20					
SPT	S-8	15/15		>50	7 23 50/3"			Light Gray Silty SAND, Very Dense, Moist (SM)
			9.5					
			25					
SPT	S-9	15.5/15.5		>50	18 11 50/3.5"		SM	Green Fine Silty SAND, Well Graded, Very Dense, Wet (SM)
			4.5					
			30					
SPT	S-10	18/18		27	5 7 20			Tannish Green Fine Silty SAND, Poorly Graded, Dense, Wet (SM)
			-0.5					
			35					
					6		SC	Green Fine to Medium Clayey SAND, Well Graded, Dense, Wet

BOREHOLE BLACK CREEK PHASE 2 WITH LAB.GPJ_CDM_CORP.GDT 7/2/18



BOREHOLE LOG

B-102

Client: St. Johns River Water Mgmt District
Project Location: Clay County, Florida

Project Name: Black Creek Water Resource Dev. Project
Project Number: 9247-221208

Sample Type	Sample Number	Sample Adv/Rec (inches)	Elev. Depth (ft.)	N-Value	Blows per 6-in	Graphic Log	USCS Designation	Material Description
SPT	S-11	18/18	-5.5 40	28	9 19		SC	(SC)
SPT	S-12	18/18	-10.5 45	16	4 6 10			Green Fine to Medium Clayey SAND, Well Graded, Medium Dense, Wet (SC)
SPT	S-13	18/18	-15.5 50	16	4 7 9		ML	Green, Sandy SILT, Low Plasticity, Very Stiff, Wet (ML)
			-20.5 55					Boring Terminated at 50 Feet Below Ground Surface.
			-25.5 60					

BOREHOLE BLACK CREEK PHASE 2 WITH LAB.GPJ CDM_CORP.GDT 7/2/18



BOREHOLE LOG

B-103

Client: St. Johns River Water Mgmt District
Project Location: Clay County, Florida

Project Name: Black Creek Water Resource Dev. Project
Project Number: 9247-221208

Drilling Contractor: Independent Drilling Inc.
Drilling Method/Rig: Mud Rotary/CME Gotrack
Drillers: Shannon
Drilling Date: Start: 5-9-18 **End:** 5-9-18
Borehole Coordinates:
 See Boring Location Plan

Surface Elevation (ft.): 28
Total Depth (ft.): 35
Depth to Initial Water Level (ft-bgs): 2.0'
Abandonment Method: Grout.
Field Screening Instrument: N/A
Logged By: KNA

Sample Type	Sample Number	Sample Adv/Rec (inches)	Elev. Depth (ft.)	N-Value	Blows per 6-in	Graphic Log	USCS Designation	Material Description	
			28.0						
			0						
SPT	S-1	24/20		0	WOH WOH WOH WOH	[Dotted pattern]	SP	Gray Fine SAND, Poorly Graded, Very Loose, Wet (SP)	
SPT	S-2	24/16		9	1 1 8 13			Dark Gray Fine SAND, Poorly Graded, Medium Dense, Wet (SP)	
SPT	S-3	24/18	23.0 5	17	4 9 8 12			Light Brown Fine SAND, Trace Roots, Poorly Graded, Medium Dense, Wet (SP)	
SPT	S-4	24/18		22	5 11 11 11			Tan Fine SAND, Poorly Graded, Medium Dense, Wet (SP)	
SPT	S-5	24/24		17	1 6 11 12			SM	Gray and Black Speckled Fine to Medium Silty SAND, Well Graded, Medium Dense, Moist (SM)
			18.0 10						
SPT	S-6	18/18		46	24 19 27	Gray and Black Speckled Fine to Medium Silty SAND, Trace Gravel, Well Graded, Very Dense, Moist (SM)			
			13.0						

BOREHOLE BLACK CREEK PHASE 2 WITH LAB.GPJ CDM CORP.GDT 7/2/18

EXPLANATION OF ABBREVIATIONS

- | | |
|--|---|
| <p>DRILLING METHODS:
 HSA - Hollow Stem Auger
 SSA - Solid Stem Auger
 HA - Hand Auger
 AR - Air Rotary
 DTR - Dual Tube Rotary
 FR - Foam Rotary
 MR - Mud Rotary
 RC - Reverse Circulation
 CT - Cable Tool
 JET - Jetting
 D - Driving
 DTC - Drill Through Casing</p> | <p>SAMPLING TYPES:
 AS - Auger/Grab Sample
 CS - California Sampler
 BX - 1.5" Rock Core
 NX - 2.1" Rock Core
 GP - Geoprobe
 HP - Hydro Punch
 SS - Split Spoon
 ST - Shelby Tube
 WS - Wash Sample
 OTHER:
 AGS - Above Ground Surface</p> |
|--|---|

REMARKS

Hammer weight = 140 lbs, Hammer drop height = 30 in., Spoon Size = 2 in. OD and 24 in. length. Surface elevations noted are approximate based upon survey contours.
 PP = Pocket Pen

Reviewed by: JAC

Date: 5-21-18



BOREHOLE LOG

B-103

Client: St. Johns River Water Mgmt District
Project Location: Clay County, Florida

Project Name: Black Creek Water Resource Dev. Project
Project Number: 9247-221208

Sample Type	Sample Number	Sample Adv/Rec (inches)	Elev. Depth (ft.)	N-Value	Blows per 6-in	Graphic Log	USCS Designation	Material Description
			13.0					
			15					
SPT	S-7	18/18		15	5 6 9		SM	Green and Black Speckled Fine to Medium Silty SAND, Trace Gravel, Well Graded, Medium Dense, Wet (SM)
			8.0					
			20					
SPT	S-8	18/18		64	5 14 50			Gray Silty SAND, Very Dense, Moist (SM)
SPT	S-9	18/18		45	26 23 22			Gray Fine to Medium Clayey SAND, Trace Gravel, Very Dense, Moist (SC)
			3.0					
			25					
SPT	S-10	10/10		>50	19 50/4"		SC	Gray and Green Mottled Fine to Medium Clayey SAND, Trace Gravel, Well Graded, Very Dense, Moist to Wet (SC)
			-2.0					
			30					
SPT	S-11	18/18		51	9 15 36			Greenish Gray Fine Clayey SAND, Poorly Graded, Very Dense, Wet (SC)
			-7.0					
			35					Boring Terminated at 35 Feet Below Ground Surface.

BOREHOLE BLACK CREEK PHASE 2 WITH LAB.GPJ_CDM_CORP.GDT 7/2/18



BOREHOLE LOG

B-104

Client: St. Johns River Water Mgmt District
Project Location: Clay County, Florida

Project Name: Black Creek Water Resource Dev. Project
Project Number: 9247-221208

Drilling Contractor: Independent Drilling Inc.
Drilling Method/Rig: Mud Rotary/CME Gotrack
Drillers: Shannon
Drilling Date: Start: 5-8-18 **End:** 5-8-18
Borehole Coordinates:
 See Boring Location Plan

Surface Elevation (ft.): 24
Total Depth (ft.): 30
Depth to Initial Water Level (ft-bgs): 1.4'
Abandonment Method: Grout.
Field Screening Instrument: PP
Logged By: KNA

Sample Type	Sample Number	Sample Adv/Rec (inches)	Elev. Depth (ft.)	N-Value	Blows per 6-in	Graphic Log	USCS Designation	Material Description	
			24.0						
			0						
SPT	S-1	24/20		2	1 1 WOH		SP	Light Gray Fine SAND, Poorly Graded, Very Loose, Wet (SP)	
SPT	S-2	24/24		8	1 2 6 6			Black Fine SAND, Poorly Graded, Loose, Wet (SP)	
SPT	S-3	24/6	19.0	9	1 8 11			Dark Gray Fine SAND, Poorly Graded, Medium Dense, Wet (SP)	
SPT	S-4	24/0	5	22	8 11 11 9			No Sample.	
SPT	S-5	24/10		15	4 7 8 5			Dark Gray Fine SAND, Poorly Graded, Medium Dense, Wet (SP)	
			14.0						
			10						
SPT	S-6	18/18		6	WOH 3 3	ML	Green Sandy SILT, Low Plasticity, Firm to Stiff, Wet (ML)		
			9.0						

BOREHOLE BLACK CREEK PHASE 2 WITH LAB.GPJ CDM CORP.GDT 7/2/18

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
 HSA - Hollow Stem Auger
 SSA - Solid Stem Auger
 HA - Hand Auger
 AR - Air Rotary
 DTR - Dual Tube Rotary
 FR - Foam Rotary
 MR - Mud Rotary
 RC - Reverse Circulation
 CT - Cable Tool
 JET - Jetting
 D - Driving
 DTC - Drill Through Casing

SAMPLING TYPES:
 AS - Auger/Grab Sample
 CS - California Sampler
 BX - 1.5" Rock Core
 NX - 2.1" Rock Core
 GP - Geoprobe
 HP - Hydro Punch
 SS - Split Spoon
 ST - Shelby Tube
 WS - Wash Sample
OTHER:
 AGS - Above Ground Surface

REMARKS

Hammer weight = 140 lbs, Hammer drop height = 30 in.,
 Spoon Size = 2 in. OD and 24 in. length.
 Surface elevations noted are approximate based upon survey contours.
 PP = Pocket Pen

Reviewed by: JAC

Date: 5-21-18



BOREHOLE LOG

B-104

Client: St. Johns River Water Mgmt District

Project Name: Black Creek Water Resource Dev. Project

Project Location: Clay County, Florida

Project Number: 9247-221208

Sample Type	Sample Number	Sample Adv/Rec (inches)	Elev. Depth (ft.)	N-Value	Blows per 6-in	Graphic Log	USCS Designation	Material Description
			9.0 15				ML	
SPT	S-7	18/18		27	6 7 20		SM	Gray Silty SAND, Dense, Moist (SM)
SPT	S-8	18/18	4.0 20	62	23 34 28		SM	Gray Fine to Medium Silty SAND, Trace Gravel, Well Graded, Very Dense, Moist (SM)
SPT	S-9	18/18		25	9 15 10		ML	Greenish Gray Fine to Medium Sandy SILT, Low Plasticity, Very Stiff, Moist (ML)
			-1.0 25				ML	
SPT	S-10	18/18		19	5 8 11		ML	Greenish Gray Fine to Medium Sandy SILT, Low Plasticity, Very Stiff, Moist (ML)
			-6.0 30					Boring Terminated at 30 Feet Below Ground Surface.
			-11.0 35					

BOREHOLE BLACK CREEK PHASE 2 WITH LAB.GPJ_CDM_CORP.GDT 7/2/18



BOREHOLE LOG

B-105

Client: St. Johns River Water Mgmt District

Project Name: Black Creek Water Resource Dev. Project

Project Location: Clay County, Florida

Project Number: 9247-221208

Sample Type	Sample Number	Sample Adv/Rec (inches)	Elev. Depth (ft.)	N-Value	Blows per 6-in	Graphic Log	USCS Designation	Material Description
			8.5 15				ML	
SPT	S-7	18/18		49	9 21 28		SC	Gray and Black Speckled Clayey SAND, Very Dense, Moist (SC)
SPT	S-8	18/18		47	12 21 26		ML	Gray and Black Speckled SILT, Some Sand, Trace Gravel, Low Plasticity, Hard, Moist (ML)
			3.5 20				ML	
SPT	S-9	18/18		15	4 5 10		SM	Greenish Gray Silty SAND, Medium Dense, Moist (SM)
			-1.5 25				SM	
SPT	S-10	18/18		14	5 5 9		SM	Greenish Gray Fine SAND, Little Silt, Poorly Graded, Medium Dense, Wet (SM)
			-6.5 30					Boring Terminated at 30 Feet Below Ground Surface.
			-11.5 35					

BOREHOLE BLACK CREEK PHASE 2 WITH LAB.GPJ_CDM_CORP.GDT 7/2/18



BOREHOLE LOG

B-106

Client: St. Johns River Water Mgmt District
Project Location: Clay County, Florida

Project Name: Black Creek Water Resource Dev. Project
Project Number: 9247-221208

Drilling Contractor: Independent Drilling Inc.
Drilling Method/Rig: Mud Rotary/CME Gotrack
Drillers: Shannon
Drilling Date: Start: 5-7-18 **End:** 5-8-18

Surface Elevation (ft.): 18.5
Total Depth (ft.): 25
Depth to Initial Water Level (ft-bgs): Caved, assumed 1.5'
Abandonment Method: Grout.

Borehole Coordinates:
 See Boring Location Plan

Field Screening Instrument: N/A
Logged By: KNA

Sample Type	Sample Number	Sample Adv/Rec (inches)	Elev. Depth (ft.)	N-Value	Blows per 6-in	Graphic Log	USCS Designation	Material Description
			18.5					
			0					
SPT	S-1	24/18		2	WOH 1 1 WOH	[Hatched Pattern]	SC	Light Brown Fine Clayey SAND, Poorly Graded, Very Loose, Wet (SC)
SPT	S-2	24/6		2	5 1 1 1			Light Brown Fine Clayey SAND, Trace Woody Debris, Poorly Graded, Very Loose, Wet (SC)
SPT	S-3	24/10	13.5 5	10	2 5 5 4	[Dotted Pattern]	SP	White and Gray Fine SAND, Trace Woody Debris, Poorly Graded, Medium Dense, Wet (SP)
SPT	S-4	24/24		9	1 4 5 8	[Hatched Pattern]	SC	Dark Gray Clayey SAND, Medium Dense, Wet (SC)
SPT	S-5	24/24		15	3 6 9 9			Greenish Gray Fine Clayey SAND, Poorly Graded, Medium Dense, Wet (SC)
			8.5 10					Gray Fine to Medium Clayey SAND, Well Graded, Dense, Wet (SC)
SPT	S-6	18/18		38	4 9 29	[Hatched Pattern]	SC	Gray Fine to Medium Clayey SAND, Well Graded, Dense, Wet (SC)
SPT	S-7	18/18		29	3 15 14	[Hatched Pattern]	CL	Gray CLAY, Some Sand, Low Plasticity, Hard, Wet (CL)
			3.5					

BOREHOLE BLACK CREEK PHASE 2 WITH LAB.GPJ CDM CORP.GDT 7/2/18

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
 HSA - Hollow Stem Auger
 SSA - Solid Stem Auger
 HA - Hand Auger
 AR - Air Rotary
 DTR - Dual Tube Rotary
 FR - Foam Rotary
 MR - Mud Rotary
 RC - Reverse Circulation
 CT - Cable Tool
 JET - Jetting
 D - Driving
 DTC - Drill Through Casing

SAMPLING TYPES:
 AS - Auger/Grab Sample
 CS - California Sampler
 BX - 1.5" Rock Core
 NX - 2.1" Rock Core
 GP - Geoprobe
 HP - Hydro Punch
 SS - Split Spoon
 ST - Shelby Tube
 WS - Wash Sample
OTHER:
 AGS - Above Ground Surface

REMARKS

Hammer weight = 140 lbs, Hammer drop height = 30 in., Spoon Size = 2 in. OD and 24 in. length. Surface elevations noted are approximate based upon survey contours.
 PP = Pocket Pen

Reviewed by: JAC

Date: 5-21-18



BOREHOLE LOG

B-106

Client: St. Johns River Water Mgmt District

Project Name: Black Creek Water Resource Dev. Project

Project Location: Clay County, Florida

Project Number: 9247-221208

Sample Type	Sample Number	Sample Adv/Rec (inches)	Elev. Depth (ft.)	N-Value	Blows per 6-in	Graphic Log	USCS Designation	Material Description
			3.5 15					
							CL	
SPT	S-8	4/4		>50	50/4"			Gray Fine to Medium Clayey SAND, Well Graded, Very Dense, Wet (SC)
			-1.5 20				SC	
SPT	S-9	18/18		45	17 22 23			Gray Fine to Medium Clayey SAND, Well Graded, Very Dense, Wet (SC)
			-6.5 25					Boring Terminated at 25 Feet Below Ground Surface.
			-11.5 30					
			-16.5 35					

BOREHOLE BLACK CREEK PHASE 2 WITH LAB.GPJ CDM_CORP.GDT 7/2/18



BOREHOLE LOG

B-107

Client: St. Johns River Water Mgmt District
Project Location: Clay County, Florida

Project Name: Black Creek Water Resource Dev. Project
Project Number: 9247-221208

Drilling Contractor: Independent Drilling Inc.
Drilling Method/Rig: Mud Rotary/BR 2500 (Buck Rogers)
Drillers: Shannon
Drilling Date: Start: 5-17-18 **End:** 5-17-18
Borehole Coordinates:
 See Boring Location Plan

Surface Elevation (ft.): 26
Total Depth (ft.): 50
Depth to Initial Water Level (ft-bgs): 4'
Abandonment Method: Grout.
Field Screening Instrument: PP
Logged By: KNA

Sample Type	Sample Number	Sample Adv/Rec (inches)	Elev. Depth (ft.)	N-Value	Blows per 6-in	Graphic Log	USCS Designation	Material Description		
			26.0							
			0							
SPT	S-1	24/24		2	1		SP	Gray Fine SAND, Poorly Graded, Very Loose, Moist (SP)		
					1					
					1					
					2					Light Brown Fine SAND, Poorly Graded, Very Loose, Moist (SP)
SPT	S-2	24/20		3	2					
					1					
					2					
SPT	S-3	24/24	21.0	5	2					Light Brown Fine SAND, Trace Roots, Poorly Graded, Loose, Wet (SP)
			5		2					
					3					
					3					
SPT	S-4	24/18		9	5					Tan and Light Brown Fine SAND, Poorly Graded, Medium Dense, Wet (SP)
					4					
					5					
					4					
SPT	S-5	24/12		6	3			Brown Fine SAND, Poorly Graded, Loose, Wet (SP)		
					3					
					3					
			16.0		3					
			10							
SPT	S-6	18/18		11	4		SW	Brown Fine to Medium SAND, Well Graded, Medium Dense, Wet (SW)		
					7					
					4					
			11.0		4					

BOREHOLE BLACK CREEK PHASE 2 WITH LAB.GPJ CDM CORP.GDT 7/2/18

EXPLANATION OF ABBREVIATIONS

- | | |
|--|---|
| <p>DRILLING METHODS:
 HSA - Hollow Stem Auger
 SSA - Solid Stem Auger
 HA - Hand Auger
 AR - Air Rotary
 DTR - Dual Tube Rotary
 FR - Foam Rotary
 MR - Mud Rotary
 RC - Reverse Circulation
 CT - Cable Tool
 JET - Jetting
 D - Driving
 DTC - Drill Through Casing</p> | <p>SAMPLING TYPES:
 AS - Auger/Grab Sample
 CS - California Sampler
 BX - 1.5" Rock Core
 NX - 2.1" Rock Core
 GP - Geoprobe
 HP - Hydro Punch
 SS - Split Spoon
 ST - Shelby Tube
 WS - Wash Sample
 OTHER:
 AGS - Above Ground Surface</p> |
|--|---|

REMARKS

Hammer weight = 140 lbs, Hammer drop height = 30 in., Spoon Size = 2 in. OD and 24 in. length. Surface elevations noted are approximate based upon survey contours. PP = Pocket Pen

Reviewed by: JAC

Date: 5-21-18



BOREHOLE LOG

B-107

Client: St. Johns River Water Mgmt District
Project Location: Clay County, Florida

Project Name: Black Creek Water Resource Dev. Project
Project Number: 9247-221208

Sample Type	Sample Number	Sample Adv/Rec (inches)	Elev. Depth (ft.)	N-Value	Blows per 6-in	Graphic Log	USCS Designation	Material Description
			11.0 15				SW	
SPT	S-7	18/18	6.0 20	27	7 14 13		CH	Gray and Black Speckled CLAY, High Plasticity, Hard, Moist (CH)
SPT	S-8	2/2	1.0 25	>50	50/2"		SC	Gray and Black Speckled Fine to Coarse Clayey SAND, Well Graded, Very Dense, Moist (SC)
SPT	S-9	18/18	-4.0 30	32	12 10 22		CL	Greenish Gray CLAY, Trace Sand, Low Plasticity, Hard, Moist (CL)
SPT	S-10	18/18	-9.0 35	16	5 7 9		CL	Greenish Gray CLAY, Trace Sand, Low Plasticity, Very Stiff, Moist (CL)
				2			CH	Greenish Gray CLAY, Little Sand, High Plasticity, Stiff, Moist to

BOREHOLE BLACK CREEK PHASE 2 WITH LAB.GPJ_CDM_CORP.GDT 7/2/18



BOREHOLE LOG

B-107

Client: St. Johns River Water Mgmt District
Project Location: Clay County, Florida

Project Name: Black Creek Water Resource Dev. Project
Project Number: 9247-221208

Sample Type	Sample Number	Sample Adv/Rec (inches)	Elev. Depth (ft.)	N-Value	Blows per 6-in	Graphic Log	USCS Designation	Material Description
SPT	S-11	18/18	-14.0 40	8	3 5		CH	Wet (CH)
SPT	S-12	18/18	-19.0 45	15	4 7 8			Green CLAY, High Plasticity, Very Stiff, Moist (CH)
SPT	S-13	18/18	-24.0 50	17	6 7 10		CL	Green CLAY, Trace Sand, Low Plasticity, Very Stiff, Moist (CL)
			-29.0 55					Boring Terminated at 50 Feet Below Ground Surface.
			-34.0 60					

BOREHOLE BLACK CREEK PHASE 2 WITH LAB.GPJ CDM CORP.GDT 7/2/18

Appendix C

Geotechnical Laboratory Testing Results

SUMMARY OF LABORATORY TEST RESULTS

Black Creek Water Resource Development Project
Lab Request Form 7

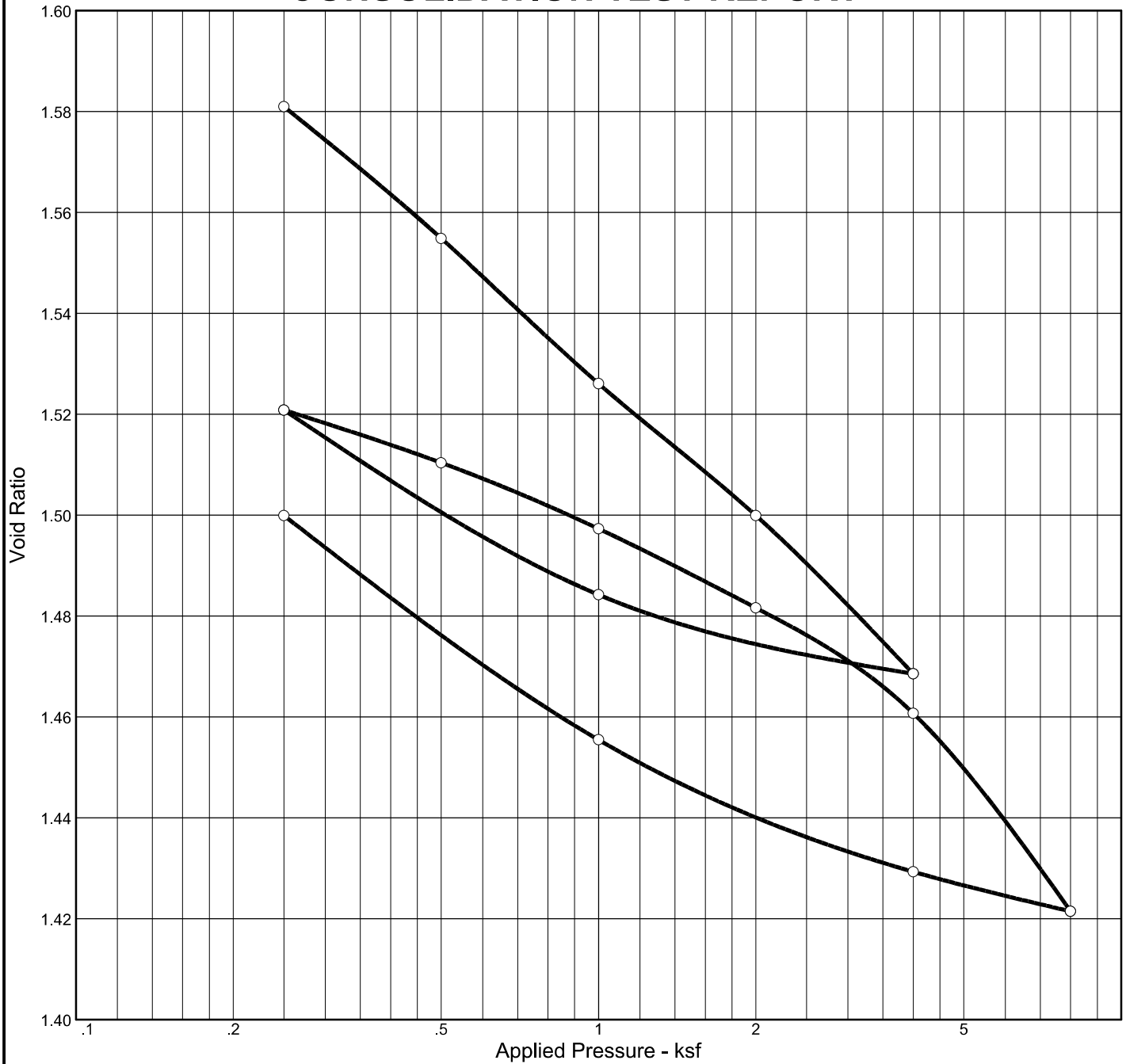
Boring No.	Sample No.	Approximate Depth (ft)	Natural Moisture Content (%)	Organic Content (%)	Percent Passing Sieve Size (%)							Atterberg Limits	
					#4	#10	#40	#60	#100	#200	LL	PI	
B-100	S-6	13.5 - 15.0	66									67	40
B-101	S-7	18.5 - 20.0	41									49	19
B-101	S-8	23.5 - 25.0			96	91	73	52	33	28			
B-101	S-12	43.5 - 45.0			100	98	82	65	44	36			
B-102	S-4	6.0 - 8.0			100	100	98	86	27	12			
B-102	S-7	18.5 - 20.0								29			
B-102	S-10	33.5 - 35.0			100	100	89	74	47	41			
B-102	S-12	43.5 - 45.0			95	92	72	42	27	23			
B-103	S-9	23.5 - 25.0			98	84	67	55	40	37			
B-104	S-9	23.5 - 25.0	28		100	99	92	80	62	56			
B-105	S-8	16.5 - 20.0	27								40	12	
B-106	S-2	2.0 - 4.0			100	99	97	90	41	20			
B-106	S-7	13.5 - 15.0			100	97	88	75	61	58			
B-107	S-3	4.0 - 6.0			100	100	99	88	19	2			
B-107	S-9	28.5 - 30.0	29								36	15	
B-107	S-11	38.5 - 40.0	43								109	69	
B-107	S-12	43.5 - 45.0	78								119	82	

SUMMARY OF LABORATORY TEST RESULTS

**Black Creek Water Resource Development Project
Clay County, Florida**

Boring No.	Sample No.	Approximate Depth (ft)	Natural Moisture Content (%)	Organic Content (%)	Percent Passing Sieve Size (%)							Atterberg Limits		Soil Classification Symbol	
					#4	#10	#40	#60	#100	#200	LL	PI			
B-3	UD	See PDF													
B-4	4	6.0 - 8.0	21		100	100	100	88	18	1					SP
B-4	7	18.5 - 20.0	21												
B-4	8	23.5 - 25.0										38	10		
B-4	12	43.5 - 45.0	43		100	100	81	40	30	28					SM
B-10	4	6.0 - 8.0	21		100	100	99	89	22	4					SP-SM
B-10	7	18.5 - 20.0										58	17		

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_r	Initial Void Ratio
Saturation	Moisture									
88.8 %	54.1 %	63.3	77	23	2.65		4.19	0.16	0.05	1.615

MATERIAL DESCRIPTION								USCS	AASHTO
Gray Silty Fine SAND								SM	

Project No. 711712701 Project: Black Creek Water Resource Development Project Source:	Client: CDM Smith, Inc. Sample No.: B-3 Elev./Depth: 40-41	Remarks: Percent Passing -200 Sieve : 48%
CSI GEO, Inc. Jacksonville, Florida		Figure

GRAIN SIZE DISTRIBUTION GRAPH

US STANDARD SIEVE SIZES

