43.00'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR2-5-01

Contract: 25-113-01

Boring Location: Sta. 273+25.21, 109' Rt. C.L.

Boring Surface Elev.: + 41.55 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: 2 IN. Type of: Split-Barrel O.D. IN. IN. O.D. U-Sampler: 3 Ball Sampler Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of:

Hollow Stem Auger: From Depth of: 0.00'

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 1/23/2008 6 2.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corperation **Driller:** Dave Burt

Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	2.0'	1 1 1	Saturated soft brown clayey silt w/some fine sand, trace of coarse sand. 15" RECOVERY	A-4(7)	
2.5		2	2.0'	1 3 4 5	Saturated loose brown fine to coarse sand w/ some silt and gravel.	A-2-4(0)	IG
5		3	4.0' 4.0' 6.0'	1 5 7 9	8" RECOVERY Saturated medium dense brown fine to coarse sand w/some silt and gravel. 12" RECOVERY	A-2-4(0)	
7.5		4	6.0'	9 16 28 20	Saturated dense brown fine to coarse sand and gravel w/some silt. 14" RECOVERY	A-2-4(0)	
10		5	8.0'	6 9 14 15	Saturated medium dense brown fine to coarse sand w/trace of silt and gravel.	A-3	
		6	10.0'	17 18 24 25	Saturated dense brown fine to coarse sand w/ some silt, trace of gravel. 24" RECOVERY	A-2-4(0)	
12.5		7	12.0'	4 7 14 16	Saturated medium dense brown fine to coarse sand w/trace of silt and gravel.	A-3	

Remarks: Mud Rotary @ 43 ft.

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth	Daily		Sample	51		0 15	01 (5.	
(ft.)	Progress	No.	Depth	Blows/6"	<u> </u>	Sample Description	Class./G.I.	Remarks
		8	14.0' / 14.0'	4 8 13 15		\18" RECOVERY \/ Saturated medium dense brown fine to coarse	A-3	
15				15		sand w/trace of gravel and silt.		
			16.0'	40		14" RECOVERY		
		9	16.0'	12 12 18 25		Saturated medium dense brown fine to coarse	A-2-4(0)	
				25		sand w/some silt, trace of gravel.		
17.5								
		10	18.0' 18.0'	19		18" RECOVERY	A 2 4/0\	
		10	16.0	19 28 34 29		Saturated very dense brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
				29		saila wisolile sitt, trace of graver.		
20			20.0'			18" RECOVERY		
22.5						DRAFT		
22.5								
		11	24.0'	3 7 9 10		Saturated medium dense brown fine to coarse	A-3	11/2
25	l '	V		9 10		sand w/trace of silt.	JII'	U
	_			_				
			26.0			13" RECOVERY	4 —	
						3 S 20	15	
						JUSI ZU		
27.5							-	
		12	29.0'	5		Cotamoto dans diseas dans a la constitución de la c	A 2 4(0)	
		14	23.0	5 4 8 8		Saturated medium dense brown fine sand w/ some silt and coarse sand.	A-2-4(0)	
30				8		Some one and course band.		
						15" 5500 1551		
			31.0'			17" RECOVERY		
20.5								
32.5								
		13	34.0'	3 3 8 7		Saturated medium dense brown fine sand w/	A-2-4(0)	
35				8 7		some coarse sand and silt.		
			36.0'			14" RECOVERY		
37.5								

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	-							
	-	14	39.0'	6 8		Saturated medium dense brown fine sand w/	A-2-4(0)	
40]			6 8 10 11		some silt and coarse sand.		
	-		41.0'			17" RECOVERY		
	-							
42.5	-							
]							
		15	44.0'	6		Saturated medium dense dark green fine sand	A-3	Glauconite
45	-			6 6 8 9		w/some coarse sand, trace of gravel.		
v]							
			46.0'			18" RECOVERY		
47.5	_		-					
77.5								
		V				OK BIDI	JII'	VU
	-	16	49.0'	9		Saturated medium dense dark green fine sand	A-3	Glauconite
50				9 13 14 13		w/trace of silt and coarse sand.	A-3	Giauconite
]					3USI /U		
			51.0'	1		17" RECOVERY		
F0.5								
52.5	1							
]							
		17	54.0'	7		Su vialandi da	A 2 4/0	Clarace's
		''	34.0	7 10 14 14		Saturated medium dense dark green fine sand w/some silt, trace of coarse sand.	A-2-4(0)	Glauconite
55	1			'-				
]		56.0'			21" RECOVERY		
	-							
57.5	}							
	1							
		18	59.0'	9 15 20 30		Saturated dense dark green fine sand w/some coarse sand and silt, trace of gravel and	A-2-4(0)	Glauconite
60	-			30		organic matter.		
			61.0'			22" RECOVERY		
	1				t::::::			l

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
62.5								
65		19	64.0'	19 28 44 50		Saturated very dense dark green fine to coarse sand w/some silt, trace of organic matter. 19" RECOVERY	A-2-4(0)	Glauconite
67.5								
70		20	69.0'	17 18 31 47		Saturated dense dark green silty fine to coarse sand w/trace of gravel and organic matter.	A-2-4(0)	Glauconite - Quartz Seam @ 69.0'.
72.5	l		71.0'	Τ		ORBIDI		IG
		21	73.0	19 29 29 29 29		Saturated very dense dark green clayey fine sand w/some coarse sand and organic matter, trace of gravel.	A-2-4(0)	Glauconite
75			75.0'		.:::::::	24" RECOVERY Boring Terminated at 75 feet.		
77.5								
80								
82.5								
02.0								

KEY TO SYMBOLS

Symbol Description

Strata symbols

Silt

Sand

Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- Exploratory borings were drilled on 1/23/2008 using a
 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55
- No free water was encountered at the time of drilling or when re-checked the following day.
- 3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

24.00'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR2-5-02

Contract: 25-113-01

Boring Location: Sta. 273+78.60, 29' Rt. C.L.

Boring Surface Elev.: + 38.84 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: 2 IN. Type of: Split-Barrel O.D. IN. IN. O.D. U-Sampler: 3 Ball Sampler

Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.00'

Water Level Readings

Time **Depth of Hole Depth of Casing Depth of Water** Elev. of Water Date 1/23/2008 6.2' 6'

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corperation **Driller:** Gary Truver Sr.

Helpers: Jeff Hillerbrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks	
		1	0.0'	W/H W/H 1 6	No Sieve Analysis - Indication of saturated brown organic sandy silt.	
			2.0'		8" RECOVERY	
2.5		2	2.0'	3 5 7 5	Saturated medium dense reddish brown fine to coarse sand w/some silt. A-2-4(0)	
			4.0'		10" RECOVERY	
5		3	4.0'	3 6 7 5	Saturated medium dense reddish brown fine to coarse sand w/some silt, trace of gravel. A-2-4(0)	
			6.0'		15" RECOVERY	
		4	6.0'	3 8 14 22	Saturated medium dense reddish brown fine to coarse sand w/some silt, trace of gravel. A-2-4(0)	
7.5			8.0'		4" RECOVERY	
		5	8.0'	12 12 14 18	Saturated medium dense reddish brown fine to coarse sand w/some silt. A-2-4(0)	
10			10.0'		16" RECOVERY	
		6	10.0'	7 10 14 17	Saturated medium dense reddish brown fine to coarse sand w/some silt, trace of gravel. 24" RECOVERY	
12.5		7	12.0'	3 9 13 18	Saturated medium dense brownish green fine to coarse sand w/trace of silt. A-3	

Remarks: Mud Rotary @ 24.0

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
		8	14.0' /	3		24" RECOVERY	A-3	
			14.0'	3 7 15 20		Saturated medium dense brownish green fine	11 3	
15]			20		to coarse sand w/trace of silt and gravel.		
						č		
			40.01			All DECOVERY		
		9	16.0' 16.0'	13		24" RECOVERY	1 2 4(0)	CI.
]	9	16.0	13 18 25 35		Saturated dense brownish green fine to coarse	A-2-4(0)	Glauconite
				25 35		sand w/some silt.		
	1							
17.5	ł							
			18.0'			24" RECOVERY		
		10	18.0'	9 10 16 23		Saturated medium dense greenish brown fine	A-2-4(0)	
	1			16 23		to coarse sand w/some silt.		
	1							
20			20.0'			18" RECOVERY		
	1							
			01.5		 			
		U-1	21.0'			Saturated greenish brown fine to coarse sand	A-3	Press Sample - Shelby Tube
						w/ trace of silt		
22.5						IJRAFI		
			23.0'			19" RECOVERY		
	_	_	_					_
		11	24.0'	8				
		11	24.0	8 17 23 24		Saturated dense greenish brown fine to coarse	A-3	
25		V 1		23		sand w/trace of silt.		
20	1 -			_				
	-							
			26.0			24" RECOVERY		
			/		47	24"RECOVERY	1 6	
	1							
				1		7001 20		
27.5								
	1							
		12	29.0'	6			1.0.1(0)	
		12	29.0	6 10 11 14		Saturated medium dense greenish brown fine	A-2-4(0)	Glauconite
30				14		sand w/some silt and coarse sand.		
	1							
			31.0'			18" RECOVERY		
32.5								
	1							
		13	34.0'	9		Cotamotad madiana di manana 111 C	A 2	Clausania
		١٥	34.0	9 12 13 17		Saturated medium dense greenish brown fine	A-3	Glauconite
35				17		sand w/some coarse sand, trace of silt.		
]							
			36.0'			19" RECOVERY		
37.5								

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

•		-					
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		14	39.0'	7	Saturated medium dense dark gray fine sand	A-3	Glauconite
40				7 7 16 14	w/trace of coarse sand and silt.	113	Olucomic
40							
			41.0'		24" RECOVERY		
42.5							
		15	44.0'	12 19 23 34	Saturated dense dark gray fine sand w/some	A-2-4(0)	
45				23 34	silt, trace of coarse sand and organic matter.		
			46.0'		20" RECOVERY		
47.5		_					_
47.5						$\supset IV$	
		V			·OR BIDI		
	•						
		16	49.0'	12 17 19 48	Saturated dense dark gray fine sand w/some silt, trace of coarse sand and organic matter.	A-2-4(0)	
50				48	sait, trace of coarse saint and organic matter.	15	
			51.0'	1	24" RECOVERY		
			31.0		24 RECOVER I		
52.5							
		17	54.0'	11	Saturated dense dark gray fine sand w/some	A-2-4(0)	
55				11 16 23 28	silt and coarse sand, trace of gravel and	(-)	
					organic matter.		
			56.0'		24" RECOVERY		
57.5							
		18	59.0' \ 59.3' /	50/4"	Saturated very dense dark gray fine to coarse	A-2-4(0)	
60					sand w/some silt, trace of organic matter and gravel.		
					4" RECOVERY		

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
			·					
62.5								
		19	64.0'	20 27 47 50/4"		Saturated very dense dark gray silty fine to	A-2-4(0)	
65				50/4"		coarse sand w/trace of organic matter and gravel.		
			65.8'			22" RECOVERY		
67.5								
		20	69.0'	24 34 50/5"		Saturated hard dark gray clayey silt w/some	A-4(7)	
70				50/5"		coarse sand and organic matter, trace of fine		
			70.4'			sand and gravel. 15" RECOVERY		
70.5		V '				OR BIDI		
72.5								
			Λ			DI IOT OO	15	
				20		3113171	15	
		21	74.0'	20 42 50/3"		Saturated very dense dark gray clayey fine sand w/some coarse sand, trace of gravel and	A-2-6(0)	
75			75.3'			organic matter.		
						15" RECOVERY		
						Boring Terminated at 75.3 feet.		
77.5								
80								
82.5								
-								
	Ī	I	1	1	I		İ	i

KEY TO SYMBOLS

Symbol Description

Strata symbols

Sand

Silty sand

Silt

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- Exploratory borings were drilled on 1/23/2008 using a
 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 75
- 2. No free water was encountered at the time of drilling or when re-checked the following day.
- 3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

16.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR2-5-03

Contract: 25-113-01

Boring Location: Sta. 275+23.63, 83' Rt. C.L.

Boring Surface Elev.: + 43.07 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: 2 Type of: Split-Barrel O.D. IN. IN. O.D. U-Sampler: 3 Ball Sampler

Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 1/22/2008 4.0' 4.0' 2.0'

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Dia. U-Sample Boring: U-Samples: Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corperation **Driller:** Dan Taylor

Helpers: Dan Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks
		1	0.0'	1 W/H W/H 6	No Sieve Analysis - Indication of brown silty sand.
			2.0'		3" RECOVERY
2.5		2	2.0'	5 7 6 6	Wet medium dense light brown coarse to fine A-1-b sand w/some gravel and silt.
			4.0'		12" RECOVERY
5		3	4.0'	2 4 4 6	Saturated loose brown fine to coarse sand w/ A-2-4(0) some silt, trace of gravel.
			6.0'		13" RECOVERY
		4	6.0'	3 6 8 9	Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel. A-2-4(0)
7.5			8.0'		18" RECOVERY
		5	8.0'	5 9 14 20	Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel. A-2-4(0)
10			10.0'	_	15" RECOVERY
		6	10.0'	5 9 10 12	Saturated medium dense brown fine to coarse sand w/trace of gravel. 17" RECOVERY
12.5		7	12.0'	6 8 8 12	Saturated medium dense brown fine to coarse sand w/trace of silt and gravel. A-3

Remarks: Mud Rotay @ 16 ft.

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
15		8	14.0'	4 9 9 13		Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
47.5		9	16.0' 16.0'	6 9 11 13		19" RECOVERY Saturated medium dense brown fine to coarse sand w/trace of silt and gravel.	A-3	
17.5			18.0'			18" RECOVERY		
		10	18.0'	4 8 10 11		Saturated medium dense brown fine to coarse sand w/trace of silt and gravel.	A-3	
20			20.0'			18" RECOVERY		
22.5						DRAFT		
25	N	11	24.0'	3 8 11 12		Saturated medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	IG
27.5			26.0'	l		3UST 20" RECOVERY 20	15	
30		12	29.0'	6 7 9 9		Saturated medium dense brown fine sand w/some silt and coarse sand.	A-2-4(0)	
32.5			31.0'			18" RECOVERY		
35		13	34.0'	6 6 7 10		Saturated medium dense brown fine sand w/some silt and coarse sand.	A-2-4(0)	
37.5			36.0'		-	19" RECOVERY		

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
		14	39.0'	5 8 8 10		Saturated medium dense dark brown fine sand	A-3	
40				10		w/some coarse sand, trace of silt.		
			41.0'			17" RECOVERY		
		14A	41.0'	9 11		17 RECOVER1		GTA - pH sample
				13 16				
42.5			40.01			ANI DEGOVERN		
			43.0'			22" RECOVERY		
		15	44.0'	4 8 8 12		Saturated medium dense dark green fine sand w/trace of silt and coarse sand.	A-3	Glauconite
45				12				
			46.0'			14" RECOVERY		
		15A	46.0'	5 11 16 17				GTA - pH sample
47.5				17				
47.5			48.0'			16" RECOVERY		
		V				OR DIDI	ノ ロ`	
		16	49.0'	7 10		Saturated medium dense dark green fine sand	A-2-4(0)	Glauconite
50			Λ	11 11 14		w/some silt, trace of coarse sand.	15	
						JUS 1 ZU		
			51.0'	1		22" RECOVERY		
52.5								
		17	54.0'	7 9 13 17		Saturated medium dense dark green fine sand	A-2-4(0)	Glauconite
55				17		w/some silt, trace of coarse sand, gravel and organic matter.		
			56.0'			22" RECOVERY		
			30.0			22 RECOVERT		
57.5								
		18	59.0'	11 23 36 57		Saturated very dense dark green fine to coarse sand w/some silt, trace of gravel and organic	A-2-4(0)	Glauconite
60				57		matter.		
			61.0'			22" RECOVERY		
	ı		1		t:::::::		1	İ

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

					 	Ī	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
00.5							
62.5	1						
	-						
		19	64.0'	12 12 13 13	Saturated medium dense dark green silty fine to coarse sand w/trace of organic matter.	A-2-4(0)	Glauconite
65				13	to coarse said w/trace or organic matter.		
	-		66.0'		10" PECOVERY		
			00.0		19" RECOVERY		
67.5							
	1						
		20	69.0'	14	Saturated dense dark green fine to coarse sand	A-2-4(0)	Glauconite
70	-			14 19 21 21	w/some silt, trace of organic matter and	, ,	
					gravel.		
			71.0'		22" RECOVERY		
					ORBIDI		
72.5		A .					
12.5	1						
		21	73.0' 73.6'	49 50/1"	Saturated very dense dark green silty fine to	A-2-5(0)	Glauconite
					coarse sand w/some gravel, trace of organic matter.		
					6" RECOVERY		
75					Boring Terminated at 73.6 feet.		
					2 orang remanated at 7000 reest		
	-						
77.5							
	-						
]						
80							
82.5	-						
02.0]						
]						

KEY TO SYMBOLS

Symbol Description

Strata symbols

Sand

Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- Exploratory borings were drilled on 1/22/2008 using a
 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 55
- No free water was encountered at the time of drilling or when re-checked the following day.
- 3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR2-5-04

Contract: 25-113-01

Boring Location: Sta. 272+60.80. 28' Rt. C.L.

Reference: **Boring Surface Elev.:** 44.04

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: 2 IN. Type of: Split-Barrel O.D. IN. IN. O.D. U-Sampler: 3 Ball Sampler Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of:

Hollow Stem Auger: From Depth of: 0.0' 34.0'

Water Level Readings

Elev. of Water Time **Depth of Casing Depth of Water** Depth of Hole Date 39.4 44.0 1/26/2008 6 4.6

 $\begin{array}{c} 44.0 \\ 44.0 \end{array}$

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Dia. U-Sample Boring: U-Samples: Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corperation Driller: Bill Holden

Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks
		1	2.0'	4 2 2 3	Wet very loose brown silty fine to coarse sand w/trace of gravel. 10" RECOVERY
2.5		2	4.0'	2 5 5 7	Wet loose brown fine to coarse sand w/some A-2-4(0) silt, trace of gravel. 16" RECOVERY
5		3	4.0'	6 12 12 12	Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel. 16" RECOVERY
7.5		4	6.0'	9 15 15 15	Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel. 16" RECOVERY
10		5	8.0'	8 11 13 12	Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel. 18" RECOVERY
		6	10.0'	7 11 15 14	Saturated medium dense brown fine to coarse sand w/some silt. 16" RECOVERY
12.5		7	12.0'	3 8 11 12	Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel. A-2-4(0)

Remarks: Mud Rotary @ 34 ft.

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth	Daily		Sample	Die 'o"		October Description	01- /0 :	5 .
(ft.)	Progress	No.	Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
		8	\14.0'/ 14.0'	3 7 9 11		Saturated medium dense brown fine to coarse	A-2-4(0)	
15				11		sand w/some silt.		
			16.0'			16" RECOVERY		
		9	16.0'	7 11 15 20		Saturated medium dense brown fine to coarse	A-2-4(0)	
				15 20		sand w/some silt.		
17.5								
			18.0'			14" RECOVERY		
		10	18.0'	6 9 15 12		Saturated medium dense brown silty fine sand	A-2-4(0)	
				15 12		w/some coarse sand, trace of gravel.		
20			20.0'			14" RECOVERY		
		U-1	20.0'			Saturated medium dense brown silty fine to	A-2-4(0)	Press Sample - Shellby Tube
						coarse sand.		
			22.0'			23" RECOVERY		
22.5						$\square \bowtie \Delta \vdash \square$		
		11	24.0'	6 8		Saturated medium dense brown silty fine sand	A-2-4(0)	
25		V		6 8 13 14		w/some coarse sand.		
25	•							
			26.0			15" RECOVERY		
			20.0			15" RECOVERY	1 [
						GUST 20		
27.5				1				
27.5								
		12	29.0'	4 6		Saturated medium dense brown fine sand w/	A-2-4(0)	
				10 11		some silt and coarse sand.	112 1(0)	
30								
			04.01			10" PEGOVERY		
			31.0'			18" RECOVERY		
<u> </u>								
32.5								
		13	34.0'	5		Saturated medium dense green fine sand w/	A-2-4(0)	Glauconite
		'	34.0	5 8 8 10		some silt and coarse sand.	A-2-4(U)	Graucomite
35				10		Some one course said.		
			36.0'			16" RECOVERY		
37.5								

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

- u	5.11	1			ı			
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
		14	39.0'	6		Saturated medium dense green fine sand w/	A-2-4(0)	Glauconite
40				6 8 12 13		some silt and coarse sand.	112 (0)	
10								
			41.0'			18" RECOVERY		
42.5								
		15	44.0'	6 6 7 9		Saturated medium dense dark green fine sand w/trace of coarse sand and silt.	A-3	Glauconite
45				9		w/trace of coarse sand and sirt.		
			46.0'			16" RECOVERY		
			46.0			10 RECOVERT		
47.5								
						·()K)	
		A .						V
		16	49.0'	11 11 17 17		Saturated medium dense dark green fine sand	A-3	Glauconite
50			Λ	17 17		w/trace of silt, coarse sand and organic	15	
						matter.		
			51.0'			20" RECOVERY		
52.5								
02.0								
		17	54.0'	9		Saturated modium dance deal Co 1	A 2 4(0)	Glauconite
		''	07.0	9 10 14 15		Saturated medium dense dark green fine sand w/some silt, trace of coarse sand and organic	A-2-4(0)	Giauconne
55						matter.		
			56.0'			21" RECOVERY		
57.5								
		18	59.0'	9 11 16 21		Saturated medium dense dark green fine sand	A-2-4(0)	Glauconite
60				21		w/some silt, trace of coarse sand, organic matter and gravel.		
			61.0'			22" RECOVERY		

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
(1t.)	Progress		Depth					
	-							
62.5	-							
	-							
		19	64.0'	20			1.2.4(0)	
05	-	19	64.0	20 29 34 39		Saturated very dense dark green silty fine sand w/some coarse sand and organic matter.	A-2-4(0)	Glauconite
65	-					_		
			66.0'			18" RECOVERY		
	-							
67.5	-							
07.0								
	-							
	_	20	69.0'	13		Saturated dense dark green silty fine sand w/	A-2-4(0)	Glauconite
70				13 16 20 29		some coarse sand and organic matter, trace of		
	-					gravel.		
			71.0'		-	ORBIDI		
		\mathbf{V}				HOR BII JI		
72.5] "			•				
	=						4 =	
	-					11181 20	15	
		21	74.0'	18 17 23 23	111111111	Saturated dense dark green clayey fine sand	A-2-4(0)	Glauconite
75	<u> </u> -			23		w/some coarse sand and organic matter, trace of gravel.		
	-		76.0'			20" RECOVERY		
			70.0			Boring Terminated at 76 feet.		
77.5	-							
	-							
	-							
80	1							
00.5	-							
82.5	†							
	1							

KEY TO SYMBOLS

Symbol Description

Strata symbols

Silty sand

Sand

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- Exploratory borings were drilled on 1/26/2008 using a
 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55
- No free water was encountered at the time of drilling or when re-checked the following day.
- 3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: BR2-5-05

Contract: 25-113-01

Boring Location: Sta. 271+96.94, 67' Lt. C.L.

Boring Surface Elev.: 42.0 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: 2 IN. Type of: Split-Barrel O.D. IN. IN. O.D. U-Sampler: 3 Ball Sampler

Core Bit: O.D. O.D. of Rock Core:

Casing Size: 3 1/4 Inches From Depth of: To:

Size: 3 1/4 Inches From Depth of: To:
Hollow Stem Auger: From Depth of: 0.0' To:

Water Level Readings

 Date
 Time
 Depth of Hole
 Depth of Casing
 Depth of Water
 Elev. of Water

 1/15/2008
 8
 6
 4.5 ft.
 37.5

 42.0
 42.0
 42.0

42.0 42.0 35.0'

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: Ft.; 3 Dia. U-Sample Boring: Ft. No. of 2 in. Dia. Shelby Tubes: ; No. of: U-Samples: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corperation **Driller:** Wayne Hurd

Driller: Wayne Hurd **Helpers:** Tom Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	1 2 2 3	No Sieve Analysis - Indication of brown silty sand.		
			2.0'		7" RECOVERY		
2.5		2	2.0	3 4 3 4	Wet loose orange fine to coarse sand w/some silt and gravel.	A-2-4(0)	1G
			4.0'		15" RECOVERY	_	
5		3	4.0'	3 4 5 7	Saturated loose orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			6.0'		18" RECOVERY		
		4	6.0'	7 7 12 12	Saturated medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	Clay lenses.
7.5			8.0'		22" RECOVERY		
		5	8.0'	5 7 9 11	Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	Clay lenses.
10			10.0'	-	16" RECOVERY		
		6	10.0'	5 9 11 16	Saturated medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	Clay lenses.
		7	12.0' 12.0'	4	16" RECOVERY Saturated medium dense brown fine to coarse	A-2-4(0)	
12.5		'	12.0	4 8 12 15	sand w/some silt.	A-2-4(0)	

Remarks: Mud Rotary @ 35 ft.

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		8	14.0' / 14.0'	6 9 13 13	Saturated medium dense brown fine to coarse	A-2-4(0)	
15			17.0	13 13	sand w/some silt, trace of gravel.		
					, ,		
		9	16.0' 16.0'	6	13" RECOVERY Saturated medium dense brown fine to coarse	A 2 4(0)	
		9	10.0	6 8 10 12	sand w/some silt, trace of gravel.	A-2-4(0)	
17.5				12	, 6		
17.5			18.0'		14" RECOVERY		
		10	18.0'	4 7 10 13	Saturated medium dense brown fine to coarse	A-2-4(0)	
				10 13	sand w/some silt, trace of gravel.		
20			20.0'		12" RECOVERY		
22.5					DRAFI		
	A	11	24.0'	6	Saturated medium dense brown fine sand w/	A-2-4(0)	
		VI (2 1.0	6 8 12 15	some coarse sand and silt.	A-2-4(0)	
25	•						
			26.0'_		17" RECOVERY		
					GUST 20	15	
				\ \	JUSI ZU		
27.5							
		12	29.0'	6 9 10 11	Saturated medium dense green fine sand w/	A-2-4(0)	
30				10 11	some silt and coarse sand, trace of gravel.		
			31.0'		20" RECOVERY		
32.5							
32.3							
		13	34.0'	5 10 13 17	Saturated medium dense grayish green fine sand w/some coarse sand and silt.	A-2-4(0)	Glauconite
35				17	sand w/some coarse sand and sitt.		
			26.0		22" DECOVEDY		
			36.0'		22" RECOVERY		
37.5							

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

	l = "	I	l	1	1		ı	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
		14	39.0'	5		Cotumoted modium dones arouigh aroon fine	A-2-4(0)	Glauconite
		'-	00.0	5 6 6 7		Saturated medium dense grayish green fine sand w/some coarse sand and silt.	A-2-4(0)	Giauconite
40				,				
			41.0'			16" RECOVERY		
			41.0			IV RECOVERT		
42.5								
		15	43.0'	7 11 12 17		Saturated medium dense grayish green fine sand w/some coarse sand, trace of silt.	A-3	Glauconite
				17		sand w/some coarse sand, trace or sin.		
45			45.0'			20" RECOVERY		
						DDAET		
						DRAFI		
47.5								
						MD BIIN	M	
		16	48.0'	9 13 15 15		Saturated medium dense dark green fine sand	A-2-4(0)	Glauconite
	_			15		w/some silt, trace of gravel.		
			_					
50			50.0'			14" RECOVERY	15	
				1		JUJ1 ZU		
52.5								
		17	53.0'	8 10 12 15		Saturated medium dense dark green fine sand	A-2-4(0)	Glauconite
				15		w/some silt, trace of gravel.		
55			55.0'			22" RECOVERY		
-								
57.5								
31.5								
		18	58.0'	10 16 26 36		Saturated dense dark green fine sand w/some	A-2-4(0)	Glauconite
				26 36		silt and coarse sand, trace of gravel.		
60			60.0'			19" RECOVERY		
<u> </u>								
1	1				.			

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

	l	1		ı	1	1		Г
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	<u></u>	Sample Description	Class./G.I.	Remarks
62.5								
		19	63.0'	10 14 20 23		Saturated dense dark green fine to coarse sand	A-2-4(0)	Glauconite
				20 23		w/some silt.		
65			65.0'			20" RECOVERY		
67.5								
		20	68.0'	7		C. a. a. 1. 1	A 2 4(0)	Classic
		20	00.0	7 13 20 30		Saturated dense dark green silty fine to coarse sand.	A-2-4(0)	Glauconite
				30		DDAET		
70			70.0'			21" RECOVERY		
						OR BIDI		
70.5		V '						
72.5								
		21	73.0	13 30 50/4"		Saturated hard dark green clayey fine sandy	A-4(0)	
				50/4"		silt w/some coarse sand and organic matter, trace of gravel.		
			74.3'	1		13" RECOVERY		
75						Boring Terminated at 74.3 feet.		
						Boring reminated at 7 1.5 rect.		
77.5								
-								
80								
82.5								
]							
L		I			1			

KEY TO SYMBOLS

Symbol Description

Strata symbols

Sand

Silty sand

silt

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- Exploratory borings were drilled on 1/18/2008 using a
 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55
- No free water was encountered at the time of drilling or when re-checked the following day.
- 3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

35.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR2-5-06

Contract: 25-113-01

Boring Location: Sta. 273+60.94, 19' Lt. C.L.

Boring Surface Elev.: + 41.16 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split-Barrel O.D. 2 IN. IN. O.D. 3 Ball Sampler

Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Water Time Depth of Hole **Depth of Casing** Elev. of Water Date 1/21/2008 14 10 3.0'

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Dia. U-Sample Boring: U-Samples: Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corperation Driller: Jason Truver

Helpers: Dan Zmijewski

Depth	Daily	Ī	Sample		1			
(ft.)	Progress	No.	Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	Ü	1	0.0'	1 1 1 1		Wet very loose brown silty fine to coarse sand w/trace of gravel.	A-2-4(0)	
			2.0'			18" RECOVERY		
2.5		2	2.0' 3.0'	1 5		Wet loose brown silty fine to coarse sand w/ trace of gravel. 8" RECOVERY	A-2-4(0)	JG
	_	2A	3.0' 4.0'	6 5		Wet medium dense light brown fine to coarse sand w/some gravel and silt.	A-2-4(0)	
5		3	4.0'	5 8 8 5 5		Wet medium dense light brown silty fine to coarse sand w/trace of gravel.	A-2-4(0)	
		4	6.0'	6 6 6 16		Saturated medium dense light brown fine sand w/some coarse sand, silt and gravel.	A-2-4(0)	
7.5			8.0'			19" RECOVERY		
		5	8.0'	5 9 10 13		Saturated medium dense light brown fine to coarse sand w/some gravel, trace of silt.	A-3	
10			10.0'			19" RECOVERY		
		6	10.0'	11 14 17 19		Saturated dense brown fine to coarse sand w/ some gravel and silt.	A-2-4(0)	
		7	12.0' 12.0'	10		20" RECOVERY Saturated medium dense brown fine to coarse	A-2-4(0)	
12.5		,	12.0	10 15 12 14		sand w/some silt and gravel.	A-2-4(0)	

Remarks: Mud rotary @ 35.0 ft.

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description CI	Class./G.I.	Remarks
15		8	14.0' / 14.0'	6 19 15 11	Saturated dense brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
		9	16.0' 16.0'	6 15 19 13	19" RECOVERY Saturated dense brown fine to coarse sand w/ A some silt.	A-2-4(0)	
17.5			18.0'		24" RECOVERY		
		10	18.0'	2 4 10 11		A-2-4(0)	
20			20.0'		18" RECOVERY		
22.5					DRAFT		
25		11	24.0	5 8 10 10	Saturated medium dense brown fine sand w/ A some coarse sand and silt.	A-2-4(0)	1G
27.5			26.0'	l	GUST 201	15	
30		12	29.0'	11 10 9 11	Saturated medium dense gray green fine sand w/some silt and coarse sand.	A-2-4(0)	
			31.0'		18" RECOVERY		
32.5							
35		13	34.0'	5 10 11 12	Saturated medium dense dark green fine sand w/some silt and coarse sand.	A-2-4(0)	Glauconite
37.5			36.0'		20" RECOVERY		

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
40		14	39.0'	4 9 13 13	Saturated medium dense dark green fine sand w/trace of silt and coarse sand.	A-3	Glauconite
40							
			41.0'		15" RECOVERY		
42.5							
		15	44.0'	8		A 2	GI :
45		13	44.0	8 12 17 23	Saturated medium dense dark green fine sand w/trace of silt and coarse sand.	A-3	Glauconite
			46.0'		20" RECOVERY		
			10.0				
47.5				_			
		M (OK RIDI		IG
	•	16	49.0'	6 13	Saturated medium dense dark green fine sand	A-3	Glauconite
50			\wedge	17 18	w/some silt, trace of coarse sand.	15	
			51.0'	10	24" RECOVERY	10	
52.5							
		17	54.0'	7 13 16 21	Saturated medium dense dark green fine sand	A-2-4(0)	Glauconite
55				21	w/some silt, trace of coarse sand, organic matter and gravel.		
			56.0'		21" RECOVERY		
57.5							
		18	59.0' 59.4'	50/5"	Saturated very dense dark green fine to coarse sand w/some silt, trace of organic matter and	A-2-4(0)	Glauconite
60					gravel. 5" RECOVERY		

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.5							
65		19	64.0' 65.9'	14 24 37 50/5"	Saturated very dense dark green silty fine to coarse sand w/trace of organic matter. 19" RECOVERY	A-2-4(0)	Glauconite
67.5		20	69.0'	22	Saturated very hard dark green clayey fine	A-4(0)	Glauconite
70 72.5	N		71.0'	22 29 29 50	sandy silt w/some coarse sand and organic matter, trace of gravel. 24" RECOVERY		
75		21	73.0 73.3	50/4"	Saturated very dense green silty fine to coarse sand w/trace of gravel and organic matter. 3.5" RECOVERY		Glauconite
77.5					Boring Terminated at 73.3 feet.		
80							
82.5							

KEY TO SYMBOLS

Symbol Description

Strata symbols

Silty sand

Sand

silt

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- Exploratory borings were drilled on 1/22/2008 using a
 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 75
- No free water was encountered at the time of drilling or when re-checked the following day.
- 3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

20.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR2-5-07

Contract: 25-113-01

Boring Location: Sta. 274+70.49, 29' Lt. C.L.

Boring Surface Elev.: + 45.0 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split-Barrel O.D. 2 IN. IN. O.D.

3 Ball Sampler Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Water Time Depth of Hole **Depth of Casing** Elev. of Water Date 1/21/08 10.0' 5.5' 12.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corperation **Driller:** Gary Truver Sr.

Helpers: Amber Joseph

Depth	Daily	l	Sample			
(ft.)	Progress	No.	Depth	Blows/6"	Sample Description Class./G.I. Remarks	
		1	0.0'	2 2 3 3	Wet firm brown coarse to fine sandy silt w/ A-4(0) trace of gravel.	
2.5	N	2	2.0' 2.0' 4.0'	2 3 3 2	18" RECOVERY Wet loose brown silty fine to coarse sand w/ A-2-4(0) trace of gravel. 10" RECOVERY	
5		3	4.0'	2 5 7 9	Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel. 14" RECOVERY	
7.5		4	6.0'	10 14 15 17	Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel. 17" RECOVERY	
10		5	8.0'	6 9 13 14	Saturated medium dense brown fine to coarse sand w/trace of silt and gravel. 16" RECOVERY	
		6	10.0'	7 12 18 26	Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel. 24" RECOVERY	
12.5		7	12.0'	1 8 12 17	Saturated medium dense brown fine to coarse sand w/trace of silt and gravel. A-3	

Remarks: Mud rotary @ 20.0'

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
		8	14.0'	2	24" RECOVERY A-3	
<u> </u>	1		14.0'	2 5 17 18	Saturated medium dense brown fine to coarse	
15				18	sand w/trace of silt.	
	1		16.0'		20" RECOVERY	
	1	9	16.0'	10	Saturated medium dense brown fine to coarse A-2-4(0)	
			10.0	10 13 14 23		
				23	sand w/some silt, trace of gravel.	
17.5						
17.5	1					
		10	18.0' 18.0'	5	18" RECOVERY	
		10	16.0	5 10 17 23	Saturated medium dense brown fine to coarse A-2-4(0)	
				23	sand w/some silt.	
	1					
	-					
20			20.0'		15" RECOVERY	
<u> </u>						
22.5					DRAFT	
22.0	1					
	-					
	1 🔼	11	24.0'	10 13 15 18	Saturated medium dense reddish brown fine A-2-4(0)	
	1			15	to coarse sand w/some silt.	
25		4		18		
			26.0		24" RECOVERY	
	1		20.0			
-	ł					
					(GUST 2015	
27.5			_			
]					
	1					
	<u> </u>					
		12	29.0'	7 10 11 12	Saturated medium dense brown fine sand w/ A-2-4(0)	
30]			11 12	some coarse sand and silt, trace of gravel.	
30	1					
<u> </u>						
			31.0'		17" RECOVERY	
]					
32.5						
	1					
	1	13	34.0'	7	Saturated medium dense brown fine sand w/ A-2-4(0)	
			5	7 10 9 10	some silt and coarse sand. A-2-4(0)	
35				10	SUITE SIIL AND COAISE SAND.	
	1		26.01		16" DECOVEDY	
-			36.0'		16" RECOVERY	
37.5						
57.5	4	ı	I	l	1999-1999	į.

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
40		14	39.0'	8 12 13 15	Saturated medium dense greenish brown fine sand w/some silt and gravel.	A-2-4(0)	Glauconite
40							
			41.0'		15" RECOVERY		
42.5							
		15	44.0'	9 7			GTA - pH testing
45				9 7 10 12			
			46.0'		15" RECOVERY		
47.5	N			Т			
		V '			OK RIDI	יווע)	U
		16	49.0'	8 11 17 17	 Saturated medium dense dark gray fine sand w/some silt, trace of coarse sand.	A-2-4(0)	Glauconite
50					JUS 1 20	15	
			51.0'		18" RECOVERY		
52.5							
		17	54.0'	8	Saturated medium dense dark gray fine sand	A-2-4(0)	Glauconite
55				8 11 13 19	w/some silt, trace of gravel.	N-2-4(0)	Giauconne
			56.0'		17" RECOVERY		
57.5							
		18	59.0'	9 13 14 26	Saturated medium dense dark gray silty fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	Glauconite
60				26	sand wisome coarse sand, nace of graver.		
			61.0'		24" RECOVERY		

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
(- /						
62.5						
		19	64.0'	25	Saturated very dense dark gray fine to coarse A-2-4(0)	Glauconite
				25 35 40 45	sand w/some silt.	Gladeomic
65	1					
			66.0'		24" RECOVERY	
67.5						
		20	69.0'	15		Claracita
		20	09.0	15 22 35 37	Saturated very hard dark grayish green fine A-4(0) sandy silt w/some coarse sand and organic	Glauconite
70				37	matter, trace of gravel.	
			71.0'		2011 DECOVEDY	
	R		71.0		20" RECOVERY	
					ORBIDDII	VI (¬
72.5		•				
			Λ		PLICT ON 1E	
		21	74.0'	11 16 36 35	Saturated very dense dark gray silty fine to A-2-4(0) coarse sand w/some organic matter.	Glauconite
75				35	Coarse saild w/some organic matter.	
			76.0'		24" RECOVERY Boring Terminated at 76 feet.	
					Doing Terminated at 10 feet.	
77.5						
1	1					
80						
-						
00.5						
82.5						
1	ı	ı	1	1	1	I

18.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR2-5-08

Contract: 25-113-01

Boring Location: Sta. 274+30.68, 94' Rt. C.L.

Boring Surface Elev.: + 40.23 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: Type of: Split-Barrel O.D. 2 IN. IN. O.D. 3

U-Sampler: Ball Sampler Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Water Time Depth of Hole **Depth of Casing** Elev. of Water Date 1/17/2008 8.0 6.0 4.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Dia. U-Sample Boring: U-Samples: Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corperation **Driller:** Gary Truver Sr.

Helpers: Jeff Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks	
		1	0.0'	W/H W/H W/H W/H	No Sieve Analysis - Indication of dark brown organic silty sand.	
			2.0'		3" RECOVERY	
2.5		2	2.0'	4 5 5 6	Saturated loose green fine to coarse sand w/ A-2-4(0) some silt, trace of gravel.	
			4.0'		14" RECOVERY	
5		3	4.0'	5 8 11 14	Saturated medium dense reddish brown fine to coarse sand w/some silt. A-2-4(0)	
			6.0'		12" RECOVERY	
		4	6.0'	5 26 35 42	Saturated very dense reddish brown fine to coarse sand w/some silt, trace of gravel. A-2-4(0)	
7.5			8.0'		24" RECOVERY	
		5	8.0'	11 16 21 28	Saturated dense reddish brown fine to coarse sand w/some silt. A-2-4(0)	
10			10.0'		24" RECOVERY	
		6	10.0'	10 16 36 27	Saturated very dense reddish brown fine to coarse sand w/some silt. 24" RECOVERY	
12.5		7	12.0'	6 12 19 28	Saturated dense reddish brown fine to coarse sand w/some silt. A-2-4(0)	

Remarks: Mud rotary @ 18.0 ft.

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
(11.)		8	\ 14.0'	4	10" RECOVERY	A 2 4(0)	
15		o	14.0'	4 5 19 29	Saturated medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
			16.0'		16" RECOVERY		
47.5		9	16.0'	4 8 12 14	Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
17.5			18.0'		16" RECOVERY		
		10	18.0'	4 8 12 15	Saturated medium dense reddish brown fine sand w/some coarse sand, trace of silt.	A-3	
20			20.0'		24" RECOVERY		
22.5					DRAFT		
		11	23.0'	7 11 11 13	Saturated medium dense reddish brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
				13	OR RIDI		JG
25			25.0'		18" RECOVERY		
27.5			Δ	l	GUST 20	15	
		12	28.0'	7 8 13 13	Saturated medium dense greenish brown fine sand w/some silt and coarse sand, trace of gravel.	A-2-4(0)	
30			30.0'		24" RECOVERY		
32.5							
		13	33.0'	4 6 12 18	Saturated medium dense green fine sand w/ some silt and coarse sand.	A-2-4(0)	
35			35.0'		19" RECOVERY		
33			33.0		17 RECOVERT		
37.5							

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Desc	ription	Class./G.I.	Remarks
		14	38.0'	6 10 16 18	Saturated medium den sand w/some silt, trace	se greenish brown fine of coarse sand.	A-2-4(0)	Glauconite
40			40.0'		19" REC	OVERY		
42.5								
		15	43.0'	7 13 21 24	Saturated dense green and coarse sand.	fine sand w/trace of silt	A-3	Glauconite
45			45.0'		DRA	OVERY		
47.5			O'	Τ	FOR	BIDI		1G
50		16	49.0' 51.0'	4 16 20 25	Saturated dense dark g silt, trace of coarse san 24" REC	1 20	A-2-4(0)	Glauconite
52.5								
55		17	54.0'	11 18 22 25	Saturated dense dark g silt, trace of coarse sar	reen fine sand w/some ad and gravel.	A-2-4(0)	Glauconite
57.5			56.0'		24" REC	OVERY		
60		18	59.0' 59.5'	34 50/0"	Saturated very dense d sand w/some silt, trace 6" RECO	ark green fine to coarse of gravel. OVERY	A-2-4(0)	Glauconite

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.5	-						
	-						
	-						
		19	64.0'	13 18 22 28	Saturated dense dark green silty fine to coarse	A-2-4(0)	Glauconite
65	<u> </u> -			28	sand.		
	-		66.0'		18" RECOVERY		
67.5	-						
67.5]						
	-						
	-	20	69.0'	14 18 28 46	Saturated very hard dark green clayey fine	A-4(0)	Glauconite
70				28 46	sandy silt w/some organic matter and coarse sand, trace of gravel.		
	-		71.0'				
			71.0		ORBIDI		
	-	V			OK DIDI	ノロ	V
72.5	1						
	-		Λ		TOUT ON	15	
	_	21	7 <mark>4</mark> .0' 74.5'	95	Saturated very dense dark green fine to coarse	A-2-4(0)	Glauconite
75	-		74.5'		sand and gravel w/some silt, trace of organic matter.	, ,	
	-				6" RECOVERY Boring Terminated at 74.5 feet.		
					Borning reminiment at 7 Hz Teet.		
	-						
77.5	-						
	-						
80]						
	-						
	_						
	1						
82.5	<u> </u>						
	-						
	1						

KEY TO SYMBOLS

Symbol Description

Strata symbols

Silt

Silty sand

Sand

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- Exploratory borings were drilled on 1/22/2008 using a
 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 55
- No free water was encountered at the time of drilling or when re-checked the following day.
- 3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

18.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR2-5-08

Contract: 25-113-01

Boring Location: Sta. 274+30.68, 94' Rt. C.L.

Boring Surface Elev.: + 40.23 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split-Barrel O.D. 2 IN. IN. O.D. 3 Ball Sampler

Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 1/17/2008 8.0 6.0 4.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corperation **Driller:** Gary Truver Sr.

Helpers: Jeff Hillebrand

			1	1				
Depth	Daily	No.	Sample	Blows/6"		Sample Description	Class./G.I.	Remarks
(ft.)	Progress		Depth					
		1	0.0'	W/H W/H W/H W/H		No Sieve Analysis - Indication of dark brown		
				W/H W/H		organic silty sand.		
			2.0'			3" RECOVERY		
2.5		2	2.0'	4		Saturated loose green fine to coarse sand w/	A-2-4(0)	
2.5				4 5 5 6		some silt, trace of gravel.		
		W 1		6		some sit, trace of graver.	_ / `	
	_	_		_				
			4.0'			14" RECOVERY		
		3	4.0'	5		Saturated medium dense reddish brown fine	A 2 4(0)	
L			7.0	5 8 11 14	47		A-2-4(0)	
5				14		to coarse sand w/some silt.		
				1				
			6.0'			12" RECOVERY		
		4	6.0'	5 26 35 42		Saturated very dense reddish brown fine to	A-2-4(0)	
				35 42		coarse sand w/some silt, trace of gravel.		
-						_		
7.5								
			8.0'			24" RECOVERY		
		5	8.0'	11		Saturated dense reddish brown fine to coarse	A-2-4(0)	
				11 16 21 28		sand w/some silt.	11 2 1(0)	
				28		Sand w/Some sitt.		
10			40.0			AA!! DEGOVERY		
10		6	10.0' 10.0'	10		24" RECOVERY	A 0 4(0)	
		٥	10.0	10 16 36 27		Saturated very dense reddish brown fine to	A-2-4(0)	
				27		coarse sand w/some silt.		
			12.0'			24" RECOVERY		
12.5		7	12.0'	6 12 19 28		Saturated dense reddish brown fine to coarse	A-2-4(0)	
12.0				19		sand w/some silt.		
<u> </u>				20				

Remarks: Mud rotary @ 18.0 ft.

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
(11.)		8	14.0'	4	10" RECOVERY	A 2 4/0)	
15		0	14.0'	4 5 19 29	Saturated medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
			16.0'		16" RECOVERY		
47.5		9	16.0'	4 8 12 14	Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
17.5			18.0'		16" RECOVERY		
		10	18.0'	4 8 12 15	Saturated medium dense reddish brown fine sand w/some coarse sand, trace of silt.	A-3	
20			20.0'		24" RECOVERY		
22.5					DRAFT		
		11	23.0'	7 11 11 13	Saturated medium dense reddish brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
				13	OR RIDI		JG
25			25.0'		18" RECOVERY		
27.5			Δ	V	GUST 20	15	
		12	28.0'	7 8 13 13	Saturated medium dense greenish brown fine sand w/some silt and coarse sand, trace of gravel.	A-2-4(0)	
30			30.0'		24" RECOVERY		
32.5							
		13	33.0'	4 6 12 18	Saturated medium dense green fine sand w/ some silt and coarse sand.	A-2-4(0)	
35			35.0'		19" RECOVERY		
			30.0		I RECOVERT		
37.5							

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Desc	ription	Class./G.I.	Remarks
		14	38.0'	6 10 16 18	Saturated medium den sand w/some silt, trace	se greenish brown fine of coarse sand.	A-2-4(0)	Glauconite
40			40.0'		19" REC	OVERY		
42.5								
		15	43.0'	7 13 21 24	Saturated dense green and coarse sand.	fine sand w/trace of silt	A-3	Glauconite
45			45.0'		DRA	OVERY		
47.5			O'	Τ	FOR	BIDI		1G
50		16	49.0' 51.0'	4 16 20 25	Saturated dense dark g silt, trace of coarse san 24" REC	1 20	A-2-4(0)	Glauconite
52.5								
55		17	54.0'	11 18 22 25	Saturated dense dark g silt, trace of coarse sar	reen fine sand w/some ad and gravel.	A-2-4(0)	Glauconite
57.5			56.0'		24" REC	OVERY		
60		18	59.0' 59.5'	34 50/0"	Saturated very dense d sand w/some silt, trace 6" RECO	ark green fine to coarse of gravel. OVERY	A-2-4(0)	Glauconite

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.5	-						
	-						
	-						
		19	64.0'	13 18 22 28	Saturated dense dark green silty fine to coarse	A-2-4(0)	Glauconite
65	<u> </u> -			28	sand.		
	-		66.0'		18" RECOVERY		
67.5	-						
67.5]						
	-						
	-	20	69.0'	14 18 28 46	Saturated very hard dark green clayey fine	A-4(0)	Glauconite
70				28 46	sandy silt w/some organic matter and coarse sand, trace of gravel.		
	-		71.0'				
			71.0		ORBIDI		
	-	V			OK DIDI	ノロ	V
72.5	1						
	-		Λ		TOLICE OF	15	
	_	21	7 <mark>4</mark> .0' 74.5'	95	Saturated very dense dark green fine to coarse	A-2-4(0)	Glauconite
75	-		74.5'		sand and gravel w/some silt, trace of organic matter.	, ,	
	-				6" RECOVERY Boring Terminated at 74.5 feet.		
					Borning reminiment at 7 Hz Teet.		
	-						
77.5	-						
	-						
80]						
	-						
	_						
	1						
82.5	<u> </u>						
	-						
	1						

KEY TO SYMBOLS

Symbol Description

Strata symbols

Sand

Silty sand

silt

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- Exploratory borings were drilled on 1/21/2008 using a
 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 75
- No free water was encountered at the time of drilling or when re-checked the following day.
- 3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

35.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR2-5-09

Contract: 25-113-01

Boring Location: Sta. 272+30.65, 31' Lt. C.L.

Boring Surface Elev.: + 42.75 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split-Barrel O.D. 2 IN. IN. O.D. 3 Ball Sampler Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of:

Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 1/21/2008 10.0 8.0 4.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Dia. U-Sample Boring: U-Samples: Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corperation **Driller:** Wayne Hurd

Helpers: Tom Kane

Donth	Deily	1	Commis			
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
		1	0.0'	2 2 2 1	Wet very loose orange silty fine to coarse sand w/trace of gravel. A-2-4(0)	
2.5	N	2	2.0' 2.0'	1 1	19" RECOVERY Wet very loose orange silty fine to coarse A-2-4(0)	
		۷ı		1 1 2 5	sand w/some gravel.	NG
			4.0'	4	10" RECOVERY	
5		3	4.0'	4 4 4 5 5	Saturated loose orange silty fine to coarse A-2-4(0) sand.	
			6.0'		18" RECOVERY	
		4	6.0'	5 6 8 9	Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel. A-2-4(0)	
7.5			8.0'		16" RECOVERY	
		5	8.0'	5 6 7 7	Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel. A-2-4(0)	
10			10.0'		16" RECOVERY	
		6	10.0'	6 10 11 12	Saturated medium dense brown silty fine to coarse sand. A-2-4(0)	
12.5		7	12.0'	2 5 6 8	Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel. A-2-4(0)	

Remarks: Mud roatary @ 35.0 ft.

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15		8	\ 14.0' / 14.0'	4 5 8 11	Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
17.5		9	16.0' 16.0'	5 9 10 11	18" RECOVERY Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
		10	18.0' 18.0'	5	17" RECOVERY	A 2 4(0)	
		10	16.0	5 6 7 8	Saturated medium dense brown fine sand w/some silt and coarse sand.	A-2-4(0)	
20			20.0'		16" RECOVERY		
22.5				_	DRAFI		
25	I	11	23.5'	5 5 8 12	Saturated medium dense brown fine sand w/some coarse sand and silt. 15" RECOVERY	A-2-4(0)	IG
27.5			A	\U	GUST 20	15	
		12	28.0'	6 7 7 10	Saturated medium dense brown fine sand w/some coarse sand and silt.	A-2-4(0)	
30			30.0'		15" RECOVERY		
32.5							
35		13	33.5'	5 7 9 11	Saturated medium dense brownish green fine sand w/some silt and coarse sand.	A-2-4(0)	Glauconite
37.5			35.5'		20" RECOVERY		

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		14	38.5'	4 6 8 9	Saturated medium dense dark green fine sand w/some coarse sand, trace of gravel.	A-3	Glauconite
40				9			
			40.5'		19" RECOVERY		
42.5	_						
42.5							
		15	43.5'	5 9 12 16	Saturated medium dense dark green fine sand	A-2-4(0)	Glauconite
				12 16	w/some silt, trace of gravel.		
45			45.5'		20" RECOVERY		
					DRAFI		
47.5	N						
		16	48.5'	5	UK DIUI		
		10	46.5	5 9 13 20	Saturated medium dense dark green fine sand w/some silt, trace of coarse sand.	A-2-4(0)	Glauconite
50					CC TRILE	15	
			50.5'	1	22" RECOVERY		
52.5	-						
		17	53.5'	5 7 10 11	Saturated medium dense dark green fine sand w/some silt, trace of coarse sand.	A-2-4(0)	Glauconite
55				11	m some sin, there or comes cand.		
			55.5'		17" RECOVERY		
57.5							
37.3		40	50.0 '	10		1010	
		18	58.0'	10 13 16 25	Saturated medium dense dark green fine sand w/some silt, coarse sand and gravel.	A-2-4(0)	Glauconite
60			60.0'		19" RECOVERY		

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
62.5	-							
				47				
	-	19	63.0'	17 25 35 50/5"		Saturated very dense dark green silty fine to coarse sand w/trace of organic matter.	A-2-4(0)	
	-			50/5		5		
65			64.9'		-	22" RECOVERY		
	<u> </u>							
	_							
67.5								
	-	20	68.0'	12		Saturated dense dark green fine to coarse sand	A-2-4(0)	Glauconite
	1			12 17 23 39		w/some silt and organic matter, trace of	(*)	
						gravel.		
70	-		70.0'			23" RECOVERY		
	_	_						_
				Т			\mathcal{I}	
	-	V				FOR BIDI	JII `	
72.5	1							
		21	73.0	12 16 31 50/2"		Saturated dense dark green silty fine sand w/	A-2-4(0)	Glauconite
	-			50/2"		some coarse sand, gravel, clay and organic matter.		
75	-		74.7'			18" RECOVERY		
70						Boring Terminated at 74.7 feet.		
	-							
	_							
77.5								
	-							
	_							
80	_							
	-							
	1							
	-							
82.5	-							
	1							
]							
]							

KEY TO SYMBOLS

Symbol Description

Strata symbols

Silty sand

Sand

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- Exploratory borings were drilled on 1/22/2008 using a
 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55
- No free water was encountered at the time of drilling or when re-checked the following day.
- 3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

24.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: BR2-10-01

Contract: 25-113-01

Boring Location: Sta. 424+54, 62' Lt. C.L.

Boring Surface Elev.: + 71.25 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D. 3 1/4" **Casing Size:**

From Depth of: From Depth of: To: To: Inches **Hollow Stem Auger:** 0.0'

Water Level Readings

Depth of Casing Depth of Water Time Depth of Hole Elev. of Water Date 9.6

10/21/2009 12.0 10.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 101 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver sr.

Helpers: K. Kershaw

Depth	Daily	No.	Sample	Blows/6"	Sample Description	Class./G.I.	Remarks
(ft.)	Progress	INO.	Depth	DIOW5/0	Sample Description	Class./G.i.	Remains
	10/21/09	1	1.0'	2 3	Wet firm brown clayey silt w/some fine sand, trace of coarse	sand. A-4(3)	Topsoil -
	l '	<u> </u> '	2.0'		12" RECOVERY		12".
	l '	2	2.0'	3 8 9	Wet medium dense brownish orange silty fine to coarse sand	w/trace of A-2-4(0)	
	·	'		9 8	fine gravel.		
3.75	_ '	_'	4.0'		18" RECOVERY	_	
		3	4.0'	3	Wet loose tan silty fine sand w/trace of coarse sand.	A-2-4(0)	1
				4 3	Wet loose tail sitty tille said without of coalse said.	11 2 7(0)	
	1 '			6			
	"		6.0'		18" RECOVERY		
	l '	4	6.0'	8 6	Wet medium dense tan fine to coarse sand w/some silt and fir	ne gravel. A-2-4(0)	
7.5	l '	'		7 5		_	
7.5	 	'	8.0'		20" RECOVERY		
	1 '	5	8.0'	2	Saturated loose tan silty fine to coarse sand w/trace of fine gra	avel. A-2-4(0)	
	l '			2 3 3	Saturated 10050 tall stity line to coalse sailed with accounting gro	1 A-2 +(0)	
	l '	'		3			
	1 '	<u> </u>	10.0'		16" RECOVERY		
	1 '	6	10.0'	3 3	Saturated loose tan silty fine sand w/some coarse sand, trace of	of fine A-2-4(0)	
11.25	l '	'		3 4	gravel.		
	l '	'	12.0'		24" RECOVERY		
	1 '	7	12.0'	1	Saturated very loose white fine to coarse sand w/some silt, tra	ace of fine A-2-4(0)	-
	1 '	' '	12.0	1 2		1Ce 01 1111e A-2-4(0)	
	l '	'		1	gravel.		
	l '	<u> </u>	14.0'		24" RECOVERY		
	1 '	8	14.0'	W/H 1	Saturated very loose white coarse to fine sand w/some silt, tra	ace of fine A-1-b	
15	1 '	'		3 3	gravel.		
	l '	'	16.0	٥			
	l '	9	16.0' 16.0'	1	24" RECOVERY	CC A 2 4(0)	
	1 '	"	10.0	2 2	Saturated very loose white fine to coarse sand w/some silt, tra	ace of fine $A-2-4(0)$	
	· '	'		4	gravel.		
	l '	'	18.0'		24" RECOVERY		
18.75	l '	10	18.0'	4 7	Saturated medium dense white coarse to fine sand and fine gr	avel w/some A-1-b	
16.75	 	<u> </u>	19.0'		silt.		
	1 '	10A	19.0'	7 8	12" RECOVERY	/ A-2-6(0)	
	l '	<u> </u> '	20.0'	-	Saturated medium dense brownish orange and green mottled	clayey fine	
	l '	'			sand and fine gravel w/trace of coarse sand.		
	1 '	'			12" RECOVERY		
ľ	1 '	1 '	1				

Remarks: Mud Rotary @ 24.0

Reviewed By: Maureen Kelley Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

				1			1
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
22.5							
		11	24.0'	9 7 9	Saturated medium dense green fine to coarse sand w/some silt, trace of	A-2-4(0)	Mud
				9 10	fine gravel.		Rotary @ 24.0'.
26.25			26.0'		19" RECOVERY		24.0.
		12	29.0'	4		A 2 4(0)	CI.
30		12	29.0	4 5 7 12	Saturated medium dense brownish orange and green mottled silty fine sand w/trace of coarse sand.	A-2-4(0)	Glauconit
			31.0'		22" RECOVERY		
33.75							
		13	34.0'	6 7 12 15	Saturated medium dense green fine sand w/some silt, trace of coarse sand	A-2-4(0)	Glauconit
			36.0'	15	and organic matter. 24" RECOVERY		
	_		30.0				
37.5	N						
		7			FOR BIDDING		
		14	39.0'	6 10	Saturated medium dense green fine sand w/trace of silt, coarse sand and	A-3	Glauconit
				11 18	organic matter.		
41.25			41.0'	\rightarrow	21" RECOVERY		
				1	references		
					10 13 10 10 10 10 10 10		
				45	(#154) # (#1		
45		15	44.0'	15 18 21 27	Saturated dense green fine sand w/some coarse sand and silt, trace of fine gravel and organic matter.	A-2-4(0)	Glauconit
			46.0'	21	20" RECOVERY		
48.75							
		16	49.0'	9 19 32 37	Saturated very dense green fine to coarse sand w/some silt, trace of fine	A-2-4(0)	Glauconit
			F4.0!	37	gravel and organic matter.		
			51.0'		24" RECOVERY		
52.5							
		17	54.0'	11	Saturated very dense green organic silty fine sand w/some coarse sand,	A-2-5(0)	Glauconit
				11 20 35 50/2"	trace of fine gravel.	11 2 3(0)	Siauconit
56.25			56.0'		24" RECOVERY		
			l .	I.			I

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
		18	59.0'	78		Saturated very dense green silty fine to coarse sand w/some fine gravel,	A 2 4(0)	Glauconi
60		10	59.5'			trace of organic matter.	A-2-4(0)	Giauconi
						6" RECOVERY		
63.75								
		19	64.0'	11 16 30 45		Saturated dense gray silty fine sand w/some coarse sand, trace of fine gravel and organic matter.	A-2-4(0)	
			66.0'	45		24" RECOVERY		
67.5								
		20	69.0'	15 23 44 50/3"		Saturated very dense gray fine sand w/some silt and coarse sand, trace of	A-2-4(0)	
			74.0	50/3"		fine gravel and shell fragments.		
71.25			71.0'			22" RECOVERY		
	R							
		M				-()K BII)I)IN(
		21	74.0'	22 50		Saturated very dense gray fine sand w/some silt and coarse sand, trace of	A-2-4(0)	
75			75.0'	30		fine gravel		
						GUST ^{12*} RECOVERY 15		
				76		9001 2010		
78.75		22	79.0'	17	33333	Saturated very dense gray fine sand w/some coarse sand, trace of silt.	A-3	
			80.5'	17 36 50	90 1996 	18" RECOVERY	A-3	
			00.0		64 44 13 C	10 RECOVERT		
00.5								
82.5								
			2.1.21	07	ii			
		23	84.0'	27 39 63	66 1 4 1 1 1 1 6 1 6 1 1 1 1 1 1 1 1 1 1 1 1 1	Saturated very dense gray fine sand w/some coarse sand and silt, trace of fine gravel.	A-2-4(0)	
86.25			85.5'		(1010) (1014) (1014) (1011)	18" RECOVERY		
00.20					()			
					663156 663546 663366 661456			
90		24	89.0'	26 38 65		Saturated very dense gray fine sand w/some silt and coarse sand, trace of	A-2-4(0)	
			90.5'			fine gravel. 18" RECOVERY		
I	I	I	1				1	1

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Contra	act: 25-11	3-01					
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
93.75							
		25	94.0'	15 21 34 40	Saturated very dense gray fine sand w/some silt, trace of coarse sand and fine gravel. 24" RECOVERY	A-2-4(0)	
97.5			96.0		24 RECOVERT		
		26	99.0'	13 23 42 44	Saturated very dense gray fine sand w/some silt, trace of coarse sand. 24" RECOVERY	A-2-4(0)	
101.25			101.0		End of Boring		
105					DRAFT		
		١.					
108.75		V	O		FOR BIDDING		
				\ I	IOLIOT OOAE		
112.5			F	AU	JGUST 2015		
116.25							
120							
123.75							
127.5	-						

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity clay



Silty sand



Clayey sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- 1. Exploratory borings were drilled on 10/21/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is an ATV CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

24.0

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Boring No.:** BR2-10-02

Contract: 25-113-01

Boring Location: Sta. 424+56, 62' Rt. C.L.

Boring Surface Elev.: + 71.93 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4" **Casing Size:** Inches **Hollow Stem Auger:** 0.0

Water Level Readings

Depth of Casing Time Depth of Hole **Depth of Water** Elev. of Water Date 10/29/2009 10.2 14.0 12.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 100 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	10/29/09	1	0.5'	3 2 3	Wet firm brown clayey fine sandy silt w/some coarse sand.	A-4(3)	Topsoil -
			2.0'	3	13" RECOVERY		7".
		2	2.0'	3 5 6	Wet stiff brown fine to coarse sandy silt w/some clay, trace of fine gravel	A-4(0)	
				6		(-)	
3.75			4.0'		14" RECOVERY		
		3	4.0'	2 5 5	Wet stiff tan fine to coarse sandy clay w/trace of fine gravel.	A-6(2)	
		7		5 7			
			6.0'		12" RECOVERY		
		4	6.0'	5	Wet medium dense tan silty coarse sand w/some fine sand and fine gravel	. A-1-b	
7.5				7 8	PIPT 9045		
7.0			8.0'	-	17" RECOVERY		
		5	8.0	2 5 5 5	Wet loose tan fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
				5 5	11Vizi. H) 300		
			10.0'		15" RECOVERY		
		6	10.0'	4 3 2 3	Wet loose tan silty fine sand w/some coarse sand.	A-2-4(0)	
11.25				3			
			12.0'	4	22" RECOVERY		
		7	12.0'	1	Wet very loose tan fine sand w/some silt and coarse sand, trace of fine	A-2-4(0)	
				3	gravel.		
		0	14.0' 14.0'	W/R	15" RECOVERY		
15		8	14.0	1 1	Wet very loose tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
				2 6	11 12 12 13 13 13 13 13 13 13 13 13 13 13 13 13		
		9	16.0' 16.0'	2	18" RECOVERY	A 1 L	
		9	10.0	2 3 4 5	Wet loose tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			40.01	5	1011 Processing		
\vdash		10	18.0' 18.0'	2	10" RECOVERY Wet medium dense brown fine gravel and fine to coarse sand w/some silt	A-1-b	
18.75		.0		2 9 13 10	wet medium dense brown thie graver and thie to coarse sand w/some sht	A-1-0	
			20.01	10	7" DECOVERY		
			20.0'		7" RECOVERY		

Remarks: Mud Rotary @ 24.0

Reviewed By: Maureen Kelley Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

	act. 25-11.	3-01						
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
22.5								
		11	23.0'	4		No Sample Recovery		
		' '	20.0	4 6 9 13				
			25.0'			0" RECOVERY		
26.25								
		40	20.01	5			1.0.5(1)	
		12	28.0'	5 6 7 9		Saturated medium dense brown clayey fine sand w/some coarse sand, trace of fine gravel and organic matter.	A-2-6(1)	
30			30.0'			20" RECOVERY		
33.75		13	33.0'	5 8 8 10		Saturated medium dense brown clayey fine sand w/trace of coarse sand and organic matter.	A-2-6(1)	
			35.0'	10		23" RECOVERY		
37.5		N				OK DIDDING	J	
		14	38.0'	5 7 8 13		Saturated medium dense green clayey fine sand w/trace of coarse sand and organic matter.	A-2-6(0)	Glauconit
			40.0'	13		22" RECOVERY		
44.05			-	$A \cup$		GUS 22" RECOVERY 15		
41.25						00012010		
		15	43.0'	9 10 15 19		Saturated medium dense green fine sand w/trace of silt, coarse sand and	A-3	Glauconit
45			45.0'	19		organic matter. 23" RECOVERY		
					eritekt Gritage Gritager Gritager			
48.75		16	48.0'	10 11 11 17		Saturated medium dense green fine to coarse sand w/some silt, trace of	A-2-4(0)	Glauconit
			50.0'	17		fine gravel and organic matter. 21" RECOVERY		
			00.0			21 RECOVERT		
52.5								
	10/30/09	17	53.0'	7 10 12 16		Saturated medium dense green silty fine to coarse sand w/trace of organic	A-2-4(0)	Glauconit
			EE O'	12 16		matter and fine gravel.		
			55.0'			20" RECOVERY		
56.25								
$\overline{}$			L	l l			l	

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Contr	act: 25-11	3-01					
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	 Sample Description	Class./G.I.	Remarks
60		18	58.0'	65/5"	Saturated very dense gray silty fine to coarse sand w/trace of fine gravel and organic matter. 5" RECOVERY	A-2-4(0)	
63.75		19	63.0' 65.0'	13 13 23 50/4"	Saturated dense gray clayey fine sand w/some coarse sand, trace of fine gravel and organic matter. 22" RECOVERY	A-2-6(0)	
67.5		20	68.0'	16 25 44 50/5"	Saturated very dense gray silty fine sand w/some coarse sand, trace of	A-2-4(0)	
71.25			70.0'	44 50/5"	organic matter. 23" RECOVERY		
75		21	73.0' 75.0'	27 34 50/5"	Saturated very dense gray silty fine sand w/some coarse sand, trace of organic matter and fine gravel. 17" RECOVERY	A-2-4(0)	
78.75	- - -	22	78.0'	43 50/5"	Saturated very dense gray fine sand w/some silt and coarse sand, trace of	A-2-4(0)	
70.73			80.0'	333	organic matter and fine gravel. 11" RECOVERY		
82.5		23	83.0' 85.0'	28 39 50/5"	Saturated very dense gray fine sand w/some silt and coarse sand, trace of organic matter. 17" RECOVERY	A-2-4(0)	
86.25		24	88.0'	22 34 50	Saturated very dense gray fine sand w/some silt and coarse sand, trace of	A-2-4(0)	
90	-		90.0'	50	organic matter. 18" RECOVERY		

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Contra	act. 25-11	3-01					
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
93.75		25	93.0'	20 23 29 36	Saturated very dense gray fine sand w/some silt and coarse sand, trace of	A-2-4(0)	
			95.0'	36	organic matter. 24" RECOVERY		
			90.0		24 RECOVERT		
97.5							
		26	98.0'	15	Seturated dange grow fine conditions silt trace of coorse and and	A-2-4(0)	
		20	30.0	15 17 26 30	Saturated dense gray fine sand w/some silt, trace of coarse sand and organic matter.	A-2-4(0)	
			100.0'	55	24" RECOVERY		
404.05					End of Boring		
101.25							
					DRAFT		
105					DRAFI		
					FOR BIDDING		
108.75		V					
					IOLIOT OOAE		
			 	Δ	JGUST 2015		
112.5				1	70001 2010		
]						
440.05							
116.25	1						
120							
123.75							
127.5	1						

KEY TO SYMBOLS

Symbol Description

Strata symbols

Low plasticity clay

Poorly graded clayey silty sand

Clayey sand



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- 1. Exploratory borings were drilled on 10/29/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is an ATV CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

18.0

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Boring No.:** BR2-10-03

Contract: 25-113-01

Boring Location: Sta. 426+06, 62' Lt. C.L.

Boring Surface Elev.: + 72.74 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4" **Casing Size:** Inches **Hollow Stem Auger:** 0.0

Water Level Readings

Depth of Casing Depth of Water Time Depth of Hole Elev. of Water Date 10/22/2009 10.8 14.0 12.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 100 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: T. Kane

_			Г	1		1	1
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	10/22/09	1	0.5'	2 2 3	Wet soft brown clayey fine sandy silt w/some coarse sand and fine grave	. A-4(1)	Topsoil - 6".
			2.0'		8" RECOVERY		0.
		2	2.0'	4 4 5 5	Wet stiff brown clayey fine sandy silt w/some coarse sand, trace of fine gravel.	A-4(0)	
3.75	N		4.0'	5	12' RECOVERY		
		3	4.0'	4 6 6 8	Wet medium dense brown fine sand w/some coarse sand and silt, trace of fine gravel.	A-2-4(0)	
		<u> </u>	6.0'		14" RECOVERY		
7.5		4	6.0' 8.0'	4 4 5 5	Wet loose brown fine to coarse sand w/some silt, trace of fine gravel. 18" RECOVERY	A-2-4(0)	
		5	8.0'	4 4 5 5	Wet loose brown coarse sand w/some fine sand, trace of silt and fine gravel.	A-1-b	
			10.0'		16" RECOVERY		
11.25		6	10.0'	3 4 5 5	Saturated loose tan fine sand w/some silt and coarse sand, trace of fine gravel.	A-2-4(0)	
			12.0'		20" RECOVERY		
		7	12.0'	3 3 4 4	Saturated loose tan fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
			14.0'		16" RECOVERY		
15		8	14.0'	4 4 5 4	Saturated loose orange coarse to fine sand w/some fine gravel and silt.	A-1-b	
			16.0'		13" RECOVERY		
		9	16.0'	2 3 4 4	Saturated loose gray coarse to fine sand w/some fine gravel and silt.	A-1-b	
			18.0'		16" RECOVERY		
18.75		10	18.0'	3 4 5 12	Saturated loose brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	Mud Rotary @
			20.0'		12" RECOVERY		18.0'.

Remarks:

Reviewed By: Maureen Kelley Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Contra	act: 25-113	3-01						
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	ЛИВИНИЕ	Sample Description	Class./G.I.	Remarks
22.5	<u> </u>							
	<u> </u>	11	23.0'	3 4 4 7		Saturated loose green fine to coarse sand w/some silt.	A-2-4(0)	Glauconit
	 -		25.0'	7		20" RECOVERY		
26.25								
	<u> </u> -	12	28.0'	5 4 7 7		Saturated medium dense green fine sand w/some coarse sand and silt,	A-2-4(0)	Glauconit
30	<u> </u>		30.0'	7 7		trace of fine gravel. 21" RECOVERY		
30	<u> </u> -		30.0			21 RECOVERT		
	<u> </u> 							
	<u> </u>		20.01		1			
33.75	<u> </u>	13	33.0'	4 5 7 8	131 14 13 166 1 193 136 1 193 136 1 193 166 1 193	Saturated medium dense green fine sand w/some silt, trace of gravel and organic matter.	A-2-4(0)	Glauconit
	<u> </u>		35.0'			19" RECOVERY		
				<u> </u>			1	
37.5]	N				FOR BIDDING	<u>.</u>	
	_ '	14	38.0'	4 5 7 9		Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matter.	A-2-4(0)	Glauconit
	<u> </u>		40.0'		-	20" RECOVERY		
41.25	<u> </u>			70		JUJI ZUIJ		
	<u> </u> -	15	43.0'	6		Saturated medium dense green fine sand w/some coarse sand and silt,	A-2-4(0)	Glauconit
45	 		45.0'	10 11		trace of organic matter. 20" RECOVERY		
40	<u> </u>		70.0			20 RECOVERT		
	<u> </u> 							
	 -	16	48.0'	6			1 2 4(0)	Classit
48.75	<u> </u> 	10	40.0	6 7 10 13		Saturated medium dense green silty fine sand w/some coarse sand, trace of organic matter and fine gravel.	A-2-4(0)	Glauconit
	 	_	50.0'		-	19" RECOVERY		
	<u> </u>							
52.5	 							
		17	53.0'	2 6 5 7		Saturated medium dense grayish green silty fine sand w/some coarse sand and organic matter, trace of fine gravel.	A-2-4(0)	Glauconit
	 		55.0'	7		16" RECOVERY		
56.25								

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
60		18	58.0'	27 50/4*	Saturated very dense grayish green silty fine to coarse sand w/trace of fine gravel and organic matter. 10" RECOVERY	A-2-4(0)	Glauconit
63.75		19	63.0' 65.0'	14 16 28 50/5"	Saturated dense gray fine sand w/some silt and coarse sand. 24" RECOVERY	A-2-4(0)	
67.5		20	68.0'	15 16 34 55	Saturated dense gray fine sand w/some silt and coarse sand.	A-2-4(0)	
71.25			70.0'	34 55	24" RECOVERY		
		21	73.0'	19 25 41 50/5"	Saturated very dense gray silty fine to coarse sand w/trace of gravel and organic matter.	A-2-4(0)	
75			75.0'		GUST 2015		
78.75		22	78.0' 80.0'	24 40 50/4"	Saturated very dense gray silty fine sand w/some coarse sand, trace of fine gravel. 16" RECOVERY	A-2-4(0)	
	10/23/09	23	83.0' 85.0'	22 31 41 45	Saturated very dense gray fine sand w/some silt and coarse sand, trace of fine gravel. 24" RECOVERY	A-2-4(0)	
86.25							
90		24	90.0'	18 30 37 44	Saturated very dense gray fine sand w/some silt and coarse sand. 24" RECOVERY	A-2-4(0)	

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Depth	Daily	No.	Sample	Blows/6"	Sample Description	Class./G.I.	Remarks
(ft.)	Progress		Depth				
93.75		25	93.0'	21 26 26 36	Saturated very dense gray fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
			95.0'		24" RECOVERY		
97.5							
97.5		26	98.0'	13 16 25 50/5"	Saturated dense gray fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
			100.0'	50/5"	24" RECOVERY		
101.25					End of Boring		
105					DRAFT		
				T	FOR BIDDING		
108.75		V					
				\ I	JGUST 2015		
112.5				76	16031 Z013		
116.25							
120							
123.75							
127.5							

KEY TO SYMBOLS

Symbol Description

Strata symbols

Clayey sand



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- 1. Exploratory borings were drilled on 10/22/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is an ATV CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: BR2-10-04

Contract: 25-113-01

Boring Location: Sta. 426+10, 62' Rt. C.L.

Boring Surface Elev.: + 73.21 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D. Core Bit: O.D.

To: To: 3 1/4" **Casing Size:** Inches

From Depth of: From Depth of: **Hollow Stem Auger:** 0.0 24.0

Water Level Readings

Depth of Casing Depth of Water Time Depth of Hole Elev. of Water Date 10/26/2009 14.0 12.0 12.1

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 100 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	10/26/09	1	1.0' 2.0'	3 3	Wet firm brown clay w/some fine sand, trace of coarse sand.	A-6(10)	Topsoil -
-		2	2.0'	3 5 9	Wet stiff brown clayey fine sandy silt w/some fine gravel and coarse	A-4(2)	10".
				9 8	sand.		
3.75			4.0'		16" RECOVERY		
-	ŀ	3	4.0'	3 4 5	Wet loose tan silty fine sand and fine gravel w/some coarse sand.	A-2-4(0)	
		V	6.0'	7	12" RECOVERY		
		4	6.0'	8 9	Wet medium dense tan coarse sand w/some silt and fine sand, trace of	A-1-b	
7.5			8.0'	7	fine gravel. 17" RECOVERY		
		5	8.0'	2 3 3 4	Wet loose tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			10.0'		13" RECOVERY		
		6	10.0'	4 5 5 6	Wet loose tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
11.25			12.0'	6	16" RECOVERY		
		7	12.0'	4	Wet loose tan coarse sand w/some fine sand, fine gravel and silt.	A-1-b	
				4 5 5 6	ilijiisi rivinati		
			14.0'		11.11.00 14" RECOVERY		
15		8	14.0'	5 4 4 3	Wet loose tan coarse sand w/some fine sand and fine gravel, trace of silt.	A-1-b	
-			16.0'		######################################		
		9	16.0'	3 5 5 7	Wet loose tan coarse sand w/some fine sand and fine gravel, trace of silt.	A-1-b	
			18.0'				
18.75		10	18.0'	6 4 17 13	Wet medium dense tan coarse to fine sand and fine gravel w/some silt.	A-1-b	
			20.0'		5" RECOVERY		
	1	L			BBBBBB		

Remarks: Mud Rotary @ 24.0

Reviewed By: Maureen Kelley Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

	act. 25-11:	J-01				,	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
22.5							
- 25		11	24.0'	4 6 6 8	Wet medium dense green clayey fine to coarse sand w/trace of fine gravel and organic matter. 8" RECOVERY	A-2-7(3)	Mud Rotary @ 24.0'.
26.25							
		12	28.0'	6 7 9	Wet medium dense brownish green clayey fine sand w/some coarse sand, trace of organic matter.	A-2-6(1)	
30			30.0'		19" RECOVERY		
33.75		13	33.0' 35.0'	6 10 12 15	Saturated medium dense brownish green silty fine sand w/some coarse sand, trace of organic matter. 23" RECOVERY	A-2-4(0)	
37.5				2	FOR BIDDING	2 ((2)	
41.25		14	38.0'	8 9 12	Saturated medium dense green fine sand w/some silt, trace of coarse sand. 21" RECOVERY 15	A-2-4(0)	Glauconit
45		15	43.0'	7 9 12 17	Saturated medium dense green fine sand w/some silt, trace of coarse sand and organic matter. 21" RECOVERY	A-2-4(0)	Glauconit
					in (a) aid (a) aid (a) in (a) aid (a) aid (a) in (a) aid (a) aid (a) in (a) aid (a) aid (a) in (a) aid (a) aid (a) in (a) aid (a) aid (a) in (a) aid (a) aid (a) in (a) aid (a) aid (a) aid (a) in (a) aid (a) aid (a) aid (a) in (a) aid (a) aid (a) aid (a) aid (a) in (a) aid (a) aid (a) aid (a) aid (a) in (a) aid (a) aid (a) aid (a) aid (a) aid (a) in (a) aid (a) aid (a) aid (a) aid (a) aid (a) aid (a) in (a) aid (a) ai		
48.75		16	48.0'	10 9 12 13	Saturated medium dense green silty fine sand w/some coarse sand, trace of gravel and organic matter. 19" RECOVERY	A-2-4(0)	Glauconit
52.5							
		17	53.0' 55.0'	8 8 10 11	Saturated medium dense green silty fine sand w/some coarse sand, trace of gravel and organic matter. 24" RECOVERY	A-2-4(0)	Glauconit
56.25							

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Contr	act: 25-11	3-01					
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		18	58.0'	50/5"	Saturated dense green fine to coarse sand w/some silt and fine gravel, trace of organic matter.	A-2-4(0)	Glauconit
60			60.0'		5" RECOVERY		
63.75		19	63.0'	21 22 50	Saturated very dense gray silty fine to coarse sand w/trace of fine gravel and organic matter.	A-2-4(0)	
			65.0'		18" RECOVERY		
67.5		20	68.0'	17 23 50/5"	Saturated very dense gray silty fine sand w/some coarse sand, trace of fine gravel and organic matter.	A-2-4(0)	
71.25			70.0'		17" RECOVERY		
				21	EOR RIDDING		
75		21	73.0' 75.0'	21 41 50/5"	Saturated very dense gray fine sand w/some silt and coarse sand, trace of fine gravel and organic matter. 17" RECOVERY	A-2-4(0)	
				λL	GUST 2015		
78.75		22	78.0'	35 50/3"	Saturated very dense gray fine sand w/some silt and coarse sand, trace of organic matter.	A-2-4(0)	
			80.0'		9" RECOVERY		
82.5		23	83.0'	35		1 2 4(0)	
		23	85.0'	35 36 50/4"	Saturated very dense gray fine sand w/some silt and coarse sand, trace of fine gravel and organic matter. 16" RECOVERY	A-2-4(0)	
86.25							
	10/29/09	24	88.0'	22 35 50	Saturated very dense gray fine sand w/some silt and coarse sand, trace of organic matter.	A-2-4(0)	
90			90.0'		17" RECOVERY		

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Contra	act: 25-11	3-01					
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
93.75	-	25	93.0'	42 50/4"	Saturated very dense gray fine sand w/some silt and coarse sand, trace of organic matter.	A-2-4(0)	
	-		95.0'		6" RECOVERY		
	-						
97.5	=						
57.5	-	26	98.0'	25 31 50/5"	Saturated very dense gray silty fine sand w/trace of coarse sand and	A-2-4(0)	
	=			50/5"	organic matter.		
	-		100.0'		End of Boring		
101.25	_						
	- -						
	-						
105	1				DRAFT		
	_						
		١.					
108.75		M			FOR BIDDING		
		V					
	-						
				$\Delta \Pi$	JGUST 2015		
112.5	_				7001 Z010		
	-						
116.25							
	-						
120	_						
	-						
	-						
	=						
123.75							
	=						
	-						
127.5	1						

KEY TO SYMBOLS

Symbol Description

Strata symbols

Low plasticity clay



Silty sand



Poorly graded sand with silt



Clayey sand

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- 1. Exploratory borings were drilled on 10/26/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is an ATV CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

Boring No.: BR2-1-01 7.A. Project: U.S. 301, Maryland State Line to I-95

ontract: 25-113-01

Boring Location: Sta. 452+93.36, 67' Rt. C.L.

Boring Surface Elev.: 64.40 Reference:

Average Fall: Average Fall: O.D. of Sampler: O.D. of Samp. Tube: O.D. of Samp. Tube: O.D. of Rock Core: Wt. of Casing Hammer: Wt. of Sample Hammer: Type of: D-Sampler: S-Sampler: IN. IN. IN, Lbs. O.D. O.D. 30 Split Barrel 2 ΪÑ. U-Sampler: Core Bit: IN. IN. Ball Sampler O.D. 3 Ŏ.D.

Casing Size: 3 1/7 Hollow Stem Auger: From Depth of: From Depth of: To: To: Inches 26.0'

Water Level Readings Date

Elev. of Water 57,1 Depth of Hole **Depth of Casing Depth of Water** Time 3/4/08 8.0 10.0 64.4

Pay Quantities:

Dia. U-Sample Boring: U-Samples: 2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Ft. 74.5 No. of: Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Dave Burt

Helpers: J. Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"			Sample	Descript <mark>ion</mark>	Т	Class./G.I.	Remarks
		1	1.0' 2.0'	7		Wet st	tiff brown c trace of fine	layey silt w/ some e sand and gravel. ' RECOVERY	coarse	A-4(6)	9" Topsoil.
2.49		2	2.0'	16 18 19 22				silty coarse to fin		A-2-4(0)	
) 			4.0'					RECOVERY			VG
		3	4.0'	3 9 9				se brown silty coa	rse to fine	A-2-4(0)	
4.98			6.0'	ğ				' RECOVERY	20	15	
		4	6.0'	9 9 11 12				se light brown coa sand, and gravel.	rse sand	A-1-b	
				12		W/ SOI	ne siii, ime	sand, and gravel.			
7.47			8.0'					' RECOVERY			
9.96	4.1	5	8.0' 10.0'	1 3 7 8			coarse sand	ght brown silty fir trace of gravel.	ne sand w/	A-2-4(0)	
		6	10.0'	10 8 9 6			nted medium and w/ some	n dense light brow e gravel, trace of g		A-1-b	
		7	12.0' 12.0'	2	CERCICAL CTTT INT CTTT INT CTTT INT	Cotura		<u>"RECOVERY</u> n dense light brow	n coarea	A-1-b	
12.45		•		2 3 8 9			v/ some gra	vel, trace of fine s		A-1-0	,
<i>}</i>		8	14.0' 14.0'	2	F117124	Satura		RECOVERY dense light brow	n coarse	A-1-b	
				2 5 9 9				v/ some silt, trace		11 1-0	

Remarks: Mud Rotary at 26.0'

Reviewed By: Maureen Kelley Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to I-95 ontract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	- y				sand.		
			16.0'		10" RECOVERY		
		9	16.0'	7 9 9 13	Saturated medium dense light brown coarse	A-1-b	
				13	sand and gravel w/ some fine sand and silt.		
17.43			40.01		1011 NTGOVERNY		
		10	18.0' 18.0'	7 8	18" RECOVERY Saturated medium dense brown-green clayey	A-2-6(2)	
				7 8 9 11	fine sand, trace of coarse sand.	, ,	
19.92	,	U-1	20.0' 20.0'		12" RECOVERY	4.4/1	D G 1 G1.11T1
		U-1	20.0		Saturated medium dense brown-green clayey fine sand, trace coarse sand.	A-4(1)	Press Sample - Shelby Tube.
			22.0'		16" RECOVERY		
22.41						:	
<u> </u>		11	24.0'	4	Saturated medium dense green-brown silty	A-2-4(0)	
24.9	R			4 8 10 12	fine sand, trace of coarse sand.		
					UR BII JI		
			26.0'		18" RECOVERY		
				l			
27.39			Λ		3UST 20	115	
21.00					JUSI ZU		
			_				
<u> </u>				· .			
<u> </u>		12	29.0'	5 7 11 13	Saturated medium dense green-brown clayey fine sand, trace of coarse sand.	A-2-6(0)	glauconitic
29.88				13	The sand, thoe of coarse sand.		
	60°		31.0'		14" RECOVERY		
			31.0		14 RECOVERY		
32.37	1					-	
	}						
<u> </u>							
		13	34.0'	4 7	Saturated medium dense green clayey fine	A-2-6(0)	
34.86				4 7 8 9	sand w/ some coarse sand.		
l							
<i></i>	}		36.01		20" RECOVERY		
	1						
37.35]						
		1					
]						

S.A. Project: U.S. 301, Maryland State Line to I-95 ontract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		14	39.0' 41.0'	1 4 6 10	Saturated loose gray clayey fine sand w/ some coarse sand, trace of gravel and organic matter. 16" RECOVERY	A-2-6(0)	· ·
42.33		U-2	42.0' 43.0'		Saturated dense green clayey fine to coarse sand w/ some gravel 7" RECOVERY	A-4(6)	Press Sample - Shelby Tube.
44.82		15	44.0' 45.5'	27 37 50/4"	Saturated very dense green organic silty fine to coarse sand, trace of gravel. 8" RECOVERY	A-2-5(0)	glauconitic
47.31				-	DRAFT	•	
		16	49.0'	7 15 17 50	Saturated dense green clayey fine to coarse	A-2-4(0)	glauconitie
49.8			51.0'	50	sand, trace of gravel. 18" RECOVERY	15	
52.29							
54.78		17	54.0'	7 11 12 13	Saturated very stiff gray clayey fine sandy silt, trace of gravel and seashell fragments.	A-4(1)	
57.27			56.0'		12" RECOVERY		
59.76		18	59.0°	10 27 50/5"	Saturated very dense gray silty fine sand w/ some coarse sand, trace of gravel and seashell fragments. 14" RECOVERY	A-2-4(0)	

S.A. Project: U.S. 301, Maryland State Line to I-95 ontract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks	
62.25						
		19	64.0'	17 27 50/5"	Saturated very dense gray silty fine sand w/ A-2-4(0)	
64.74				50/5"	some coarse sand, trace of gravel.	
		<u> </u>	65.5		17" RECOVERY	
67.23						
67.23	r					
69.72		20	69.0'	11 27 43 50/1"	Saturated very dense green and gray silty fine A-2-4(0) sand, trace of coarse sand and gravel.	
			70.51	50/1"	14" RECOVERY	
			70.5'		14" RECOVERY	
7						
72.21						
		N /				
		21	73.0'	29 36 36 50/1"	Saturated very dense gray silty fine sand w/ A-2-4(0)	
			Λ	50/1"	some coarse sand.	
74.7		<u> </u>	74.6'		18" RECOVERY Boring terminated at 74.6 feet.	
					Bornig terminated at 74.0 feet.	
77.19						
79.68						
00.47						
82.17						
84.66						
04.00						
	I	I	ı	ı I		

F.A. Project: U.S. 301, Maryland State Line to I-95

ontract: 25-113-01

Boring Location: Sta. 453+84.49, 29' Lt. C.L.

Reference:

Average Fall: Average Fall: O.D. of Sampler: O.D. of Samp. Tube: O.D. of Samp. Tube: O.D. of Rock Core: Wt. of Casing Hammer: Wt. of Sample Hammer: Type of: D-Sampler: S-Sampler: Lbs. Lbs. 30 O.D. O.D. Split Barrel IN. IN. U-Sampler: **Ball Sampler** O,D. 3 Core Bit: O.D. IN.

Casing Size: **Hollow Stem Auger:** Inches

From Depth of: From Depth of:

 0.0°

To: To:

31.0

Boring No.: BR2-1-02

Water Level Readings Date

3/5/08

Boring Surface Elev.: 65.00

Time Depth of Hole **Depth of Casing** 10.01

Depth of Water 8.9

Elev. of Water

56.1 65.0 65.0 65.0

Pay Quantities: 2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring:

75.3

Ft.; Ft.;

Dia. U-Sample Boring: U-Samples: No. of:

Core Drilling in Rock:

Ft.

Ft.

Boring Contractor: Walton Corporation Driller: Dave Burt

Helpers: J. Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
		1	. 0.5'	1 2 3		Wet firm brown clayey silt, trace of fine to coarse sand and gravel.	A-4(5)	8" Topsoil.
I			2.0'			18" RECOVERY		
)2.49		2	4.0'	3 4 15 17		Wet very stiff brown and light brown clayey all tw/some fine sand, trace of coarse sand and gravel. 12" RECOVERY	A-4(4)	NG
		3	4.0'	5		Wet very stiff gray and brown fine sandy silt	A-4(0)	
4.98			6.0'	5 10 15 13		v/ some coarse sand, trace of gravel. 20" RECOVERY)15	
		4	6.0'	14 13 15 17	161014144614	Wet medium dense brown coarse sand w/ come silt, fine sand, and gravel.	A-1-b	
7.47			8.0'			18" RECOVERY		
	· .	5	8.0'	4 5 7 9		Wet medium dense light brown fine sand w/some coarse sand and silt, trace of gravel.	A-2-4(0)	
9.96			10.0'			20" RECOVERY		
		6	10.0'	10 10 12 12		Saturated medium dense light brown gravel and coarse sand w/ some fine sand and silt.	A-1-b	
			12.0'			16" RECOVERY		
12.45		7	12.0'	4 5 5 7		Saturated loose light brown coarse to fine and w/ some gravel and silt.	A-1-b	
			14.0'			17" RECOVERY		
		8	14.0'	7 8		Saturated medium dense light brown gravel	A-1-a	

Remarks: Mud Rotary at 31.0'

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

5.A. Project: U.S. 301, Maryland State Line to I-95 ontract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
14.94			1-31	3 4	温度	and coarse sand, trace of silt and fine sand.		
			16.0'			8" RECOVERY		
		9	16.0'	6 8 9 8	66611161 88111161 8811161	Saturated medium dense light brown coarse sand w/ some gravel and fine sand, trace of	A-1 <i>-</i> b	
				8		silt.		·
17.43			40.01			24" RECOVERY		
		10	18.0' 18.0'	10 10		Saturated medium dense light brown coarse to	A-1-b	
				10 10 11 13		fine sand, trace of gravel and silt.		
	774				ELERERII ELERERII ELERERII ELERERII			
19.92			20.0'			24" RECOVERY		
22.41						DRAFI		
								•
1					86111118 861111118 861111118			
)	R	11	24.0'	7 2		Saturated loose brown and green silty fine	A-2-4(0)	
24.9				2 3 3		sand w/ some coarse sand, trace of gravel.		
				•				10
		 	26.0'			8" RECOVERY	_	
			Λ			HICT ON	15	
27.39		U-1	27.0'			Saturated medium dense fine sand w/ some	A-4(5)	Press Sample - Shelby Tube.
						silt.		
		12	29.0' 29.0'	<u> </u>		22" RECOVERY	A 2 ((0)	-1
29.88		12	28.0	8 11 13		Saturated medium dense green and brown clayey fine sand, trace of coarse sand.	A-2-6(0)	glauconitic
25.00				13				
			31.0'			16" RECOVERY		
		1						
32.37								
		13	34.0'	8 12 14 17		Saturated medium dense dark gray and green	A-2-4(0)	
34.86				17		clayey fine sand w/ some coarse sand, trace of gravel.		
1								
L			36.0'	•		20" RECOVERY		
37.35								
<u></u>			<u> </u>				***	

F.A. Project: U.S. 301, Maryland State Line to I-95 ontract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		14	39.0' 41.0'	3 8 14 15	Saturated medium dense dark gray and green fine to coarse sand w/ some silt, trace of gravel and organic matter. 16" RECOVERY	A-2-4(0)	
42.33						· .	
44.82		15	44.0' 45.5'	14 27 50/5"	Saturated very dense green organic silty fine to coarse sand, trace of gravel. 15" RECOVERY	A-2-4(0)	glauconitic
47,31				·	DRAFI		
)					OR BIDI		VG
49.8		16	49.0' 50.0	27 50/2"	Saturated very dense gray and green coarse to fine sand w/ some silt, trace of gravel, organic matter, and clay. 8"RECOVERY	A-2-4(0)	glauconitic
52.29							
54.78	·	17	54.0'	7 17 17 18	Saturated dense gray clayey fine sand w/ some coarse sand, trace of gravel.	A-2-6(0)	
			56.0'	-	18" RECOVERY		
57.27							
59.76		18	59.0'	6 12 19 21	Saturated dense gray fine sand w/ some coarse sand and silt, trace of gravel and seashell fragments.	A-2-4(0)	
		PH-1	61.0' 61.0'	17 27	18" RECOVERY Visual Description: Saturated very dense fine		Sample brought to GTA lab

F.A. Project: U.S. 301, Maryland State Line to I-95 ontract: 25-113-01

	act. 25-115				-	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
			,	36 50/3"	sand w/ some coarse sand and silt.	for pH testing.
62.25						
			63.0'		21" RECOVERY	
		-40	-04.01	16		
64.74		19	64.0'	16 43 50/2*	Saturated very dense gray fine sand w/ some A-2-4(0) coarse sand and silt, trace of gravel.	
	٠					
			65.5'		14" RECOVERY	
						·
67.23						
		20	69.0'	27		
69.72		_∠∪	U.80	27 34 50/5"	Saturated very dense gray fine sand w/ some A-2-4(0) silt and coarse sand.	
			70.5			
1			70.5'		17" RECOVERY	
			7-			
<u> </u>					OR BIDDII	
72.21						10
			Λ		DIJOT OO 4 E	
		21	74.0'	17		
74.7		21	4.0	17 34 50/2"	Saturated very dense gray fine sand w/ some A-2-4(0) silt and coarse sand, trace of gravel.	
			75.2'		14" RECOVERY	
					Boring terminated at 75.2 feet.	
	٠					
77.19	٠.					
79.68						
L				ĺ		
 						
82.17						
84.66						
						Ī

KEY TO SYMBOLS

Symbol Description

<u>trata symbols</u>

Low plasticity

clay

||||||| Silt

Silty sand



Well graded gravel with silt



Well graded sand with silt



Clayey sand

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- 1. Exploratory boring was drilled on 3/5/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 75.
- 2. Groundwater levels recorded at time of drilling. Boring backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- Results of tests conducted on samples recovered are reported on the logs.
- 6. All SPT blow counts are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to I-95

ontract: 25-113-01

Boring Location: Sta. 454+63.32, 33' Rt. C.L.

Reference:

Average Fall: Average Fall: O.D. of Sampler: O.D. of Samp. Tube: O.D. of Samp. Tube: O.D. of Rock Core: Wt. of Casing Hammer: Wt. of Sample Hammer: Type of: D-Sampler: S-Sampler: Lbs. Lbs. 30 O.D. O.D. Split Barrel 2 **U-Sampler:** Ball Sampler 3 Core Bit: O.D.

Casing Size: Hollow Stem Auger:

Boring Surface Elev.: 64.95

Inches

From Depth of: From Depth of:

0.0'

To:

35.0

Boring No.: BR2-1-03

Water Level Readings Date

3/5/08

Time

Depth of Hole

Depth of Casing 14.0'

Depth of Water 12.01

Elev. of Water

53.0 65.0 65.0 65.0

Pay Quantities: 2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring:

73.9

Ft.; Ft.;

No. of:

Core Drilling in Rock:

Dia. U-Sample Boring: U-Samples:

Ft.

Ft.

Boring Contractor: Walton Corporation Driller: Jason Truver Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
;		1	0.5'	2 2 2		oft light br <mark>own claye</mark> y silt, trace of carse sand.	A-4(10)	8" Cultivated Soil.
.			2.0'			12" RECOVERY		
2.49		2	4.0'	5 7 9 8		ery stiff light brown clayey fine sand ome coarse sand and gravel.	A-4(2)	VG
4.98		3	4.0'	5 9 19 22		ery stiff white coarse to fine sandy siles clay, trace of gravel.	t A-4(0)	
7.47		4	6,0' 8,0'	21 18 17 13	Wet den silt and	ase white coarse to fine sand w/ some gravel. 19" RECOVERY	A-1-b	
9,96		5	8.0' 10.0'	3 16 15 15		ase light brown coarse to fine sand w/ avel and silt. 16" RECOVERY	A-1-b	
		6	10.0'	14 16 13 5		dium dense light brown gravel and and w/ some silt and fine sand.	A-1-b	
12.45		7	12.0' 14.0'	9 8 10 7		ed medium dense light brown gravel e coarse to fine sand and silt.	A-1-a	
		8	14.0'	3 5	Saturate	d medium dense light brown gravel	A-1-b	

Remarks: Mud Rotary at 35.0'

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

S.A. Project: U.S. 301, Maryland State Line to I-95 ontract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
14.94				6 3		w/ some coarse to fine sand and silt.		
						_		
			16.0'			12" RECOVERY	A 1 1	
		9	16.0'	3 5 6		Saturated medium dense light brown coarse sand and gravel w/ some fine sand, trace of	A-1-b	
17.43				ь		silt.		
17.43			18.0'			16" RECOVERY		
		10	18.0'	4 5 5 6		Saturated stiff brown fine sandy silt w/ some	A-4(0)	
				5 6		coarse sand, trace of gravel.		
19.92			20.0			7" RECOVERY		
, <u> </u>							i	
22.41						DRAFT		
<u> </u>]						
<u> </u>		U-1	24.0'			Saturated stiff brown low plasticity clay, trace	A-4(6)	Press Tube - Shelby Tube.
24.9			24.0			of fine to coarse sand.	714(0)	Tross Tuot Isholoy Tuot.
24.5		A						10
			26.0'			24" RECOVERY		
			\			GUST 20	AF	
						GUST 20		
27,39				1		5001 20		
	1 .			i				
]	11	29.0'	2 5		Saturated loose brown silty fine sand, trace of	A-2-4(0)	
29.88				5 9		coarse sand.		
ļ	1		31.0'	<u> </u>		13" RECOVERY		
	1							•
32.37	1							
2								
]					·		
<u> </u>								
	-	12	34.0'	4 7 10 12		Saturated medium dense green silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	glauconitic
34.86	1			12		w. some coarse sand, trace of graver.		
1	1		00.01			100 BECOVERY		
]		36.0'		1	18" RECOVERY		
]							
37.35	1							
<u></u>			l					

A. Project: U.S. 301, Maryland State Line to I-95 ontract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	¥	13	38.0'	6 6 6 5	Saturated medium dense green silty fine to coarse sand, trace of gravel and organic matter.	A-2-5(0)	glauconitic
39.84		 	40.0'		21" RECOVERY		
42.33							
		14	43.0'	12 20 30 33	Saturated dense green silty fine to coarse sand w/ some gravel and organic matter, trace of clay.	A-2-5(0)	glauconitic
44.82			45.0'		24" RECOVERY		
				·	DRAFT		
47.31	R			_			
		15	48.0' 48.5'	50/4"	Saturated very dense green silty coarse to fine sand and gravel, trace of seashells. 4" RECOVERY	A-1-b	glauconitic
49.8			A	U	GUST 20	15	
52.29	:				·		
		16	53.0'	10 13 20 26	Saturated dense green and gray clayey fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	glauconitic
				26	sand w/ some coarse sand, nace of graver.		
54.78			55.0'		24" RECOVERY	,	
							·
57.27							
				40			
		17	58.0'	19 33 50	Saturated very dense green and gray silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	glauconitic
59.76		·· - -	59.5'		18" RECOVERY		
					·		

F.A. Project: U.S. 301, Maryland State Line to I-95

Contract: 25-113-01

(ft.) Progress W. Depth Bows Saturated Very dense green and gray silty fine sand w/ some coarse sand, trace of gravel. 18 63.0° 21 6605° 84.5° 10° 85.0° 10° 10° 85.0° 10° 10° 85.0° 10° 10° 85.0° 10° 10° 10° 85.0° 10° 10° 10° 10° 10° 10° 10° 10° 10° 1		Daily		Comple		
Saturated very dense green and gray sitly fine sand w/ some coarse sand. Saturated very dense green and gray sitly fine sand w/ some coarse sand. Saturated very dense green and gray sitly fine sand w/ some coarse sand. Saturated very dense green and gray sitly fine sand w/ some coarse sand. Saturated very dense green and gray sitly fine sand w/ some coarse sand. The sand w/ some coarse sand, trace of gravel. Saturated very dense green and gray sitly fine sand w/ some coarse sand, trace of gravel. Saturated very dense green and gray sitly fine sand w/ some coarse sand, trace of gravel. Saturated very dense green and gray sitly fine sand w/ some coarse sand, trace of gravel. Saturated very dense green and gray sitly fine sand w/ some coarse sand, trace of gravel. Saturated very dense green and gray sitly fine sand w/ some coarse sand. The sand w/ some coar	Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.i. Remarks
Saturated very dense green and gray silty fine sand w/ some coarse sand. Trace of gravel. 19 68.0 10 10 10 10 10 10 10 10 10 10 10 10 10	60.05					
84.74 19 68.0 10 Saturated very dense green and gray silty fine A-2-4(0) glauconitic sand w/ some coarse sand. 19 68.0 10 Saturated very dense green and gray silty fine sand w/ some coarse sand. 10 RECOVERY 20 73.0 20 Saturated very dense green and gray silty fine sand w/ some coarse sand, truce of grayel. 10 RECOVERY Boring terminated at 73.9 feet.	Q2,43					
19 68.0 19 Saturated very dense green and gray silty fine A-2-4(0) glauconitic sand w/ some coarse sand. 20 73.6 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3			18	63.0'	21	Saturated very dense green and gray silty fine A-2-4(0) glauconitic
Saturated very dense green and gray silty fine A-2-4(0) glauconitic sand w/ some coarse sand. DRBDDDG 72.21 20 73.0 20 50					50/5°	sand w/ some coarse sand, trace of gravel.
Saturated very dense green and gray silty fine A-2-4(0) glauconitic sand w/ some coarse sand. ORBODIG Saturated very dense green and gray silty fine A-2-4(0) glauconitic sand w/ some coarse sand. DRBDDG Saturated very dense green and gray silty fine sand w/ some coarse sand. Innce of grayel. Boring terminated at 73.9 feet.	64.74			64.5'		16" RECOVERY
19 68.0° 30	04.74					
19 68.0° 30						
19 68.0° 30 Saturated very dense green and gray silty fine and w/ some coarse sand. 10 RECOVERY 20 73.0° 500° Saturated very dense green and gray silty fine sand w/ some coarse sand, trace of grave 10 NECOVERY Boring terminated at 73.9 feet.						
19 68.0° 30 Saturated very dense green and gray silty fine and w/ some coarse sand. 10 RECOVERY 20 73.0° 500° Saturated very dense green and gray silty fine sand w/ some coarse sand, trace of grave 10 NECOVERY Boring terminated at 73.9 feet.	67 23		•			
20 73.0 29 Saturated very dense green and gray silty fine A-2-4(0) glauconitic sand w/ some coarse sand, trace of gravel. 10 RECOVERY 20 73.0 29 Saturated very dense green and gray silty fine sand w/ some coarse sand, trace of gravel. 10 RECOVERY Boring terminated at 73.9 feet.	01.23					
20 73.0 29 Saturated very dense green and gray silty fine A-2-4(0) glauconitic sand w/ some coarse sand, trace of gravel. 10 RECOVERY 20 73.0 29 Saturated very dense green and gray silty fine sand w/ some coarse sand, trace of gravel. 10 RECOVERY Boring terminated at 73.9 feet.			19	68.0'	10 33	Saturated very dense green and gray silty fine A-2-4(0) glauconitic
20 73.0° 28 Saturated very dense green and gray sitty fine A 2-4(0) glauconitic sand w/ some coarse sand, trace of gravel. 10 RCOVERNOUS RECOVERNOUS					50/4*	sand w/ some coarse sand.
20 73.0′ 28 Saturated very dense green and gray sitty fine Sand w/ some oparse sand, trace of gravel. 73.9′ Boring terminated at 73.9 feet. 8 Boring terminated at 73.9 feet.	69.72			69.5'		10" RECOVERY
20 73.0' 58.0' Saturated very dense green and gray silty fine sand w/ some coarse sand, trace of gravel. 10" RECOVERY Boring terminated at 73.9 feet.						
20 73.0 26 5605 Saturated very dense green and gray silty fine sand w/ some coarse sand, trace of gravel. Boring terminated at 73.9 feet. 77.19 79.68	· ·	_				
20 73.0 26 Saturated very dense green and gray silty fine sand w/ some coarse sand, trace of gravel. 74.7 Boring terminated at 73.9 feet.)					
20 73.0 26 Saturated very dense green and gray silty fine A-2-4(0) glauconitic sand w/ some coarse sand, trace of gravel. 74.7 Boring terminated at 73.9 feet.	72.21					
73.9' Sand w/ scine coarse sand, trace of gravel. 10" RECOVERY Boring terminated at 73.9 feet.		_			_	
73.9' Sand w/ scine coarse sand, trace of gravel. 10" RECOVERY Boring terminated at 73.9 feet.			20	73.0'	26 50/5"	Saturated very dense green and gray silty fine A-2-4(0) glauconitic
74.7 Boring terminated at 73.9 feet.				73.9'		
77.19	74.7	****				
79.68						
79.68						
79.68						
79.68	77.19	₩.,				
	79.68					
32.17						
32.17						
32.17						
	82 17					
i	ye.11					
	84.66					

KEY TO SYMBOLS

Symbol Description

<u>Strata symbols</u>

Low plasticity clay

Silty low plasticity

clay

Silty sand

Silty gravel



Well graded sand



Poorly graded clayey silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- 1. Exploratory boring was drilled on 3/5/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55.
- 2. Groundwater levels recorded at time of drilling. Boring backfilled upon completion.
- Surveyed boring locations and elevations were provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- Results of tests conducted on samples recovered are reported on the logs.
- 6. All SPT blow counts are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR2-1-04

Contract: 25-113-01

Boring Location: Sta. 455+55.12, 66' Lt. C.L.

Boring Surface Elev.: 65.91 Reference:

Wt. of Casing Hammer: Wt. of Sample Hammer: Type of: D-Sampler: S-Sampler: Average Fall: Average Fall: O.D. of Sampler: O.D. of Samp. Tube: O.D. of Samp. Tube: O.D. of Rock Core: Lbs. Lbs. 140 30 0,D. 0,D. Split Barrel 2 O.D. O.D. U-Sampler: **Ball Sampler** 3 IN. Core Bit: IN.

Casing Size: Hollow Stem Auger: From Depth of: From Depth of: Inches To: 0.0'To: 35.01

Water Level Readings Date

Elev. of Water Time Depth of Hole **Depth of Casing Depth of Water** 55.9 65.9 65.9 65.9 3/6/08 12.0' 10.01

Pay Quantities:

Dia. U-Sample Boring: U-Samples: uantules: 2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Ft. 74.3 No. of: Ft.: Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Jason Traver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.5'	2 2 3	Moist firm light brown clayey silt w/ some fine sand, trace of coarse sand and gravel.	A-4(8)	8" Cultivated Soil.
(2.0'		10" RECOVERY		
<u>)2,49</u>		2	2.0'	5 5 13	Moist stiff light brown clayey coarse to fine sandy silt w/ some gravel.	A-4(0)	NG
		3	4.0' 4.0'	7	16" RECOVERY Moist medium dense white coarse sand w/	A-1-b	
4.98			6.0'	8 10 8	some silt and fine sand, trace of gravel. 18" RECOVERY	15	
7.47		4	6.0'	13 11 11 10	Wet medium dense white coarse sand and gravel w/ some silt and fine sand.	A-1-b	
			8.0'		19" RECOVERY		·
9.96		5	8.0' 10.0'	4 6 6 7	Wet medium dense white coarse to fine sand w/ some silt, trace of gravel. 16" RECOVERY	A-1-b	r
9.90		6	10.0'	6 8 10 11	Saturated medium dense light brown clayey gravel w/ some fine to coarse sand.	A-2-4(0)	
12.45		7	12.0'	13 16 13 14	Saturated medium dense light brown gravel and coarse sand w/ some silt and fine sand. 18" RECOVERY	A-1-b	
		8	14.0'	4 10	Saturated medium dense light brown gravel	A-1-a	

Remarks: Mud Rotary at 35.0'

Soils Supervisor: Randy Ferguson Reviewed By: Maureen Kelley

F.A. Project: U.S. 301, Maryland State Line to I-95 contract: 25-113-01

Denth	Daily		Sample		1			
Depth (ft.)	Progress	No.	Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
14.94	,			13 14		w/ some coarse to fine sand and silt.	:	
	·							
		9	16.0' 16.0'	7		11" RECOVERY	A-1-b	
-		9	10.0	7 9 7 7		Saturated medium dense light brown gravel and coarse to fine sand w/ some silt.	A-1-0	
 17.43				,				
17.45			18.0'			14" RECOVERY		
		10	18.0'	9 6 10 11		Saturated medium dense brown silty fine sand	A-2-4(0)	
				10 11		w/ some coarse sand and gravel.		
<u> </u>								
19.92			20.0'			12" RECOVERY		
								:
							•	
22,41						DRAFI		·
			,					
)		11	24.0'	W/R		Saturated loose brown fine sand w/ some silt,	A-2-4(0)	
24.9				W/R 2 6 7		trace of coarse sand.	A-2-4(0)	
24.3								V
			26.0'			13" RECOVERY		
						VI IOT OO		
			Δ				15	
27.39		U-1	27.0'			Saturated loose dark green clayey fine sand.	A-4(8)	Press Sample - Shelby Tube.
					22.23 00.22			
			20.01			24 PECOMEDA		
		12	29.0' 29.0'	10		24" RECOVERY Saturated very stiff brown fine sandy clay,	A-6(3)	
29.88				10 14 13 13		trace of coarse sand.		
						·		
			31.0'			16" RECOVERY		
32.37								
JE.J1								
		13	34.0'	4 6 5 6		Saturated stiff green fine sandy silt w/ some	A-4(0)	glauconitic
34,86				6		coarse sand, trace of organic matter and gravel.		
1								
			36.0'			18" ŘECOVERY		
37.35								

F.A. Project: U.S. 301, Maryland State Line to I-95 ontract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		14	38.0'	3 4 6 8	Saturated loose green silty fine to coarse sand, trace of gravel and organic matter.	A-2-4(0)	glauconitic
39.84			40.0'		21" RECOVERY		
					·		
42.33							
	••	15	43.0'	14 13 26 27	Saturated dense green silty coarse to fine sand w/ some gravel and organic matter.	A-2-4(0)	glauconitic
14.80					, , , , , , , , , , , , , , , , , , ,		
44.82			45.0'		20" RECOVERY		
					DRAFI		·
47.31						:	
1		16	48.0'	13 -	Saturated dense green silty fine to coarse	A-2-4(0)	glauconitic
		V \		13 - 16 16 16 14	sand, trace of gravel and organic matter.		ginaconne
49.8			50.0'	-	20" RECOVERY	145	
					JUS 1 ZU		
52.29							
		17	53.0'	6 10 16 24	Saturated medium dense gray and green silty fine sand w/ some coarse sand, trace of	A-2-4(0)	
54.78					gravel.		
			55.0'		24" RECOVERY		
57.27							
		18	58.0'	16 31 50	Saturated very dense gray and green fine sand	A-2-4(0)	
)			E0 E1	50	w/ some coarse sand and silt.	• •	
59.76		PH-2	59.5'		18" RECOVERY Visual Description: Saturated very dense gray		Sample brought to GTA lab
					and green fine to coarse sand w/ some silt and gravel.		for pH testing.
<u></u>							

7.A. Project: U.S. 301, Maryland State Line to I-95 ontract: 25-113-01

	act; 25-113	·- ·					
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.l.	Remarks
62.25	-						
_62.25							
		19	63.0'	25 45 50/4"	Saturated very dense gray and green silty fine	A-2-4(0)	V-11-1-2-2-2
				50/4"	sand w/ some coarse sand, trace of gravel.		
64.74	;		64.5'		16" RECOVERY		
67.23							
					·		
		20	68.0	32 40 50/3"	Saturated very dense light gray and green fine sand w/some silt and coarse sand.	A-2-4(0)	
			60.5		sand w/ some sin and coarse sand.		
69.72			69.5'		15' RECOVERY		
)	R		-				
					OR BID		NG
72.21							10
		21	73,0'	20 55	Saturated very dense gray and green fine sand	A-2-4(0)	
		- '	74.0'	55	w/ some silt and coarse sand, trace of gravel. 12" RECOVERY	13-2-4(0)	
74.7			7.0		Boring terminated at 74.0 feet.		
14.1							
77.19					·		
79.68							
<u>32.17</u>							
·							
84.66							

KEY TO SYMBOLS

Symbol Description

<u>trata symbols</u>

Low plasticity clay



Clayey sand



Silty sand



Poorly graded clayey silty sand



Silty gravel



Poorly graded sand with silt



Poorly graded sand with clay

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- 1. Exploratory boring was drilled on 3/6/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55.
- 2. Groundwater levels recorded at time of drilling. Boring backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- Second Results of tests conducted on samples recovered are reported on the logs.
- 6. All SPT blow counts are uncorrected.

0.0'

To:

A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR2-2-01

Contract: 25-113-01

Boring Location: Sta. 444+47.45, 84' Rt. C.L.

Boring Surface Elev.: 59.70 Reference:

Average Fall: Average Fall: O.D. of Sampler: O.D. of Samp. Tube: O.D. of Samp. Tube: O.D. of Rock Core: Wt. of Casing Hammer: Wt. of Sample Hammer: Type of: D-Sampler: S-Sampler: Lbs. Lbs. O.D. 30 Split Barrel 2 U-Sampler: Ball Sampler 3

Core Bit: O.D. Casing Size: Hollow Stem Auger: From Depth of: From Depth of: Inches To:

Water Level Readings

Elev. of Water Time Depth of Hole Depth of Casing **Depth of Water** Date 53.2 59.7 3/3/08 10.0 8.0 6.5

46.01

Pay Quantities: 2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 74.4 Ft.; Ft. Ft.: Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Jason Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	-	1	0.5'	1 1 3 3	Wet loose brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	4" Topsoil.
2.49		2	2.0' 2.5'	3 3 3 3	Wet firm brown clayey silt w/ some fine to coarse sand, trace of gravel. 10" RECOVERY	A-4(2)	1G
4.98		3	4.0' 4.0'	1 2 2	6" RECOVERY Wet very loose black silty coarse to fine sand w/ some gravel and organic matter. 10" RECOVERY	A-2-4(0)	
7,47		4	6.0' 8.0'	4 6 6 8	Saturated medium dense black and gray coarse sand and gravel w/ some silt and fine sand, trace of organic matter. 13" RECOVERY	A-1-b	
9,96	et '	5	8.0' 10.0'	2 3 6 8	Saturated loose brown silty fine sand w/ some coarse sand. 18" RECOVERY	A-2-4(0)	
		6	10.0'	4 6 6 6	Saturated medium dense brown fine sand w/some silt and coarse sand. 16" RECOVERY	A-2-4(0)	
12.45		7	12.0' 14.0'	6 10 13 27	Saturated medium dense brown fine sand w/ some silt and coarse sand, trace of gravel. 17" RECOVERY	A-2-4(0)	
		8	14.0'	WOH 10	Saturated medium dense brown and green	A-3	

Remarks: Mud Rotary at 46.0'

Reviewed By: Maureen Kelley Soils Supervisor: Randy Ferguson

A. Project: U.S. 301, Maryland State Line to I-95 Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
14.94	•			15 15	fine sand w/ some coarse sand, trace of silt.	
-					61. 60 61 63	·
<u> </u>		9	16.0' 16.0'	20 25	17" RECOVERY Saturated very dense brown and green fine A-2-4(0)	glauconitic
		÷		20 25 30 35	sand w/ some silt, trace of coarse sand.	
17.43						
		10	18.0' 18.0'	4	14" RECOVERY Saturated medium dense brown and green A-2-4(0)	glauconitic
				4 8 14 16	fine sand w/ some silt and coarse sand.	
77.						
19,92			20.0'		18" RECOVERY	·
-						
<u> </u>					DRAFT	
22.41						
24.9		11	24.0'	6 8 12 16	Saturated medium dense green fine sand w/ A-2-4(0) some silt, trace of coarse sand.	glauconitic
24.8	•					
			26.0'		16" RECOVERY	
					141181 20115	
27.39	!				POOL ZYIO	
]	ŀ				
	-					
	1	12	29.0'	6	Saturated medium dense green silty fine to A-2-4(0)	glauconitic
29.88]			6 6 8 12	coarse sand, trace of organic matter and	
					gravel.	
]	 	31.0'		18" RECOVERY	,
]					
32.37						·
	1					
	1					
]	U-1	34.0'		No recovery.	Press Sample - Shelby Tube.
34.86	-					
	1		20.01		ON BECCOMEDA	
]		36.0'		0" RECOVERY	
						, i
37.35						

A. Project: U.S. 301, Maryland State Line to I-95 Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description C	Class./G.I.	Remarks
	3						
		13	39.0'	45		1.0.4(0)	.1
39.84		13	39.0	15 20 25 49	Saturated dense green fine to coarse sand w/ some silt and organic matter, trace of gravel.	A-2-4(0)	glauconitic
			41.0'		22" RECOVERY		
42.33							
		14	44.0'	9 11 11		A-2-4(0)	glauconitic
44.82				11 11	sand w/ some coarse sand, trace of gravel and organic matter.		
			Ae ei				
			46.0'		20" RECOVERY		
7.31							_
<u>//.51</u>				Т		\mathcal{I}	
		15	48.0'	8 10 25 23	Saturated dense green silty fine to coarse	A-2-4(0)	glauconitic
				23	sand, trace of gravel.		
49.8			50.0'		15" RECOVERY	15	
			30,0				
52.29							
		16	53.0'	16	Control of Control	A-2-4(0)	glauconitic
		10	33.0	16 38 50/3"	Saturated very dense green and gray fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	grauconnic
	•						
54.78			55.0'		16" RECOVERY		
57.27							
")——		17	58.0'	18 30 50/3*		A-2-4(0)	glauconitic
<u>f</u>				ວນເວົ	w/ some silt and coarse sand, trace of gravel.		
59.76			60.0'		15" RECOVERY		
<u> </u>			40.0		I ALCOTENT		
 							

A. Project: U.S. 301, Maryland State Line to I-95 Contract: 25-113-01

Depth	Dally Progress	No.	Sample Depth	Blows/6"	ľ	Sample Description	Class./G.I.	Remarks
(ft.)	riogress	-	⊔eptn	-		,		Towns of the same
62.25								
		18	63.0'	23 35 50/6 70/5"		Saturated very dense green and gray fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	glauconitic
				70/5"		some course since the sin, thee of Braven		
64.74			65.0'			20" RECOVERY		
		PH-1				Visual Description: Saturated very dense green and gray fine sand w/ some coarse sand		Sample brought to GTA lab for pH testing.
						and silt.		Tot pix tooting.
<u>67.23</u>				:				
		19	68.0'	12		Saturated very dense green and gray fine sand	A-2-4(0)	glavaonitia
		`•		12 23 34 43		w/ some coarse sand and silt.	A-2-4(U)	glauconitic
69.72						JKAFI		
09.72			70.0'			24" RECOVERY		
)	-							
-						OR BIDI		
72.21							ノ ロ	V
		20	73.0'	23 30 50/5"		Saturated very dense green and gray fine sand	A-3	glauconitic
				50/5"		w/ some coarse sand, trace of silt and gravel.		- -
74.7			74.4'			10" RECOVERY		
			ĺ			Boring terminated at 74.4 feet.	İ	
77.19	·							
79.68								
				٠.				
\								
82.17								
						J		
			Ì					
84.66								

KEY TO SYMBOLS

Symbol Description

rata symbols



Silty sand



Silty low plasticity clay



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- 1. Exploratory boring was drilled on 3/3/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55.
- 2. Groundwater levels recorded at time of drilling. Borings backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century Engineering.
- These logs are subject to the limitations, conclusions, and recommendations in this report.
- Results of tests conducted on samples recovered are reported on the logs.
- 6. All SPT blow counts are uncorrected.

A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: BR2-2-02

Contract: 25-113-01

Boring Location: Sta. 446+98.37, 79' Lt. C.L.

Boring Surface Elev.: 61.65

Reference: Lbs. Lbs.

Average Fall: Average Fall: O.D. of Sampler: O.D. of Samp. Tube: O.D. of Samp. Tube: O.D. of Rock Core: Wt. of Casing Hammer: Wt. of Sample Hammer: Type of: D-Sampler: Split Barrel S-Sampler: U-Sampler: **Ball Sampler** 3 Core Bit: O.D.

Casing Size:

Hollow Stem Auger:

Inches

From Depth of: From Depth of:

To: To: 0.0

36.0

Water Level Readings

Time Date 3/3/08

Depth of Hole 12.0

Depth of Casing 10.01

Depth of Water 8.8'

Elev. of Water 52.9 61.7

Ft.;

Dia. U-Sample Boring: U-Samples:

Ft.

Pay Quantities: 2 1/2 in. Dia, Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring:

74.8 Ft.;

Core Drilling in Rock:

Ft.

Boring Contractor: Walton Corporation Driller: Dave Burt

Helpers: J. Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Desc	ript <mark>ion</mark>		Class./G.I.	Remarks
		1	0.0'	2 4 4 7		m brown clayed ne sand and gra		silt w/	A-4(1)	8" Cultivated Soil.
) <u> </u>	N		2.0°			10" REC				
2.49		2	2.0'	5 10 12 14		ry stiff gray cla sand and grave		of fine to	A-4(6)	NG
		3	4.0'	9	37.4	18" REC			1 2 4(0)	
4.98		3	1,0	9 9 6 6	sand, tr	edi <mark>um dense</mark> gra ace of gravel.	ly sitty coarse	to line	A-2-4(0)	
			6.0'	45		20" REC				
7.47		4	6.0' 8.0'	15 28 17 7		nse gray-brown id gravel. 12" REC		oarse	A-2-4(0)	
		5	8.0'	12 50/3"	Saturat some g	ed very dense b ravel, fine sand	rown coarse s , and silt.	and w/	A-1-b	
9.96		6	10.0' 10.0'	27	Saturat	2" RECO ed loose brown				No sieve analysis
			12.0'	27 5 5 7		5" RECO				
12.45		7	12.0'	7 8 8 13		ed medium den / some coarse s	se brown-gray	/ fine	A-2-4(0)	

Remarks: Mud Rotary at 36.0'

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to I-95 Contract: 25-113-01

Contra			10 1			***		
Ďepth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class,/G.I.	Remarks
		8	\ <u>14.0'</u> /	6 6 10 10		24" RECOVERY Saturated medium dense green fine sand w/	A-2-4(0)	glauconitic
14.94				10 10		some silt and coarse sand.		!
				-				
-			16.0'	-		18" RECOVERY		:
		U-1	16.0'			Saturated dark green fine sand with a trace of gravel and silt.	A-2-4(0)	Press Sample - Shelby Tube.
]	1		graver and sm.		
17.43				:				
		9	18.0' 18.0'	3		24" RECOVERY Saturated medium dense green-gray silty fine	A-2-4(0)	glauconitic
				3 5 8 10		sand w/ some coarse sand.	11 2 1(0)	giudomitiv
19.92			20.0'			24" RECOVERY		
				:				
								:
22.41						DRAFI		
								·
		10	24.0'	5	13.6	Saturated medium dense gray fine sand, trace	A-3	glauconitic
24.9				5 5 8 14		of coarse sand and silt.		
							ノ ロ	
			26.0'			24" RECOVERY		
	>		_					
					11111	4UST 20	15	
27.39						JUSI ZU		
					111116			
		11	29.0'	3 5	mi	Saturated medium dense green silty fine sand	A-2-4(0)	glauconitic
29.88				3 5 11 12		w/ some coarse sand.	` '	Ü
			31.0'			20" RECOVERY		
								·
<u></u>				1				
32,37				:				
								:
		12	34.0'	8		Saturated medium dense green silty fine to	A-2-4(0)	glauconitic
34.86				8 12 7 11		coarse sand, trace of gravel and organic	~ ¬(∪)	0
)						matter.		
Ĺ			36.0'			18" RECOVERY		
37.35							<u></u>	

A. Project: U.S. 301, Maryland State Line to I-95

Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./C	G.I. Remarks
	V					
39.84		13	39.0'	27 22 50/4"	Saturated very dense green organic silty fine to coarse sand w/ some gravel. A-2-4(O) glauconitic
			41.0'		12" RECOVERY	
42.33	·			:		
44.82		14	44.0' 46.0'	27 50/4"	Saturated very dense green silty fine to coarse sand, trace of gravel and organic matter. 10" RECOVERY)) glauconitic
47.31				T	FOR BIDD	ING
49.8		15	49.0' 51.0'	8 12 27 28	Saturated dense green-gray silty fine sand w/ some coarse sand, trace of gravel, organic matter, and clay. 18" RECOVERY	
52.29						
54,78		16	54.0'	6 19 23 30	Saturated dense gray silty fine sand w/ some A-2-4(coarse sand.)) <u> </u>
			56.0'		16" RECOVERY	
57.27						
59.76		17	59.0'	5 23 50/5"	Saturated very dense gray silty fine sand w/ A-2-4(0 some coarse sand, trace of gravel.))

A. Project: U.S. 301, Maryland State Line to I-95

18 84.0	Depth	Daily	1 .1	Sample	Diame (Of	Sample Description Class./G.I. Remarks
18 64.0° 17 Saturated very dense gray fine sand w/ some silt and coarse sand. 19 69.0° 20 Saturated very dense gray fine sand w/ some silt and coarse sand, trace of gravel. 19 69.0° 20 Saturated very dense gray fine sand w/ some silt and coarse sand, trace of gravel. 19 69.0° 20 Saturated very dense gray fine sand w/ some silt and coarse sand, trace of gravel. 10 Fix RECOVERY 10 Saturated very dense gray fine sand w/ some silt and coarse sand. 10 Saturated very dense gray fine sand w/ some silt and coarse sand. 10 Saturated very dense gray fine sand w/ some silt and coarse sand. 11 Saturated very dense gray fine sand w/ some silt and coarse sand. 12 Saturated very dense gray fine sand w/ some silt and coarse sand. 13 Saturated very dense gray fine sand w/ some silt and coarse sand. 14 Saturated very dense gray fine sand w/ some silt and coarse sand. 15 Saturated very dense gray fine sand w/ some silt and coarse sand. 16 Saturated very dense gray fine sand w/ some silt and coarse sand. 17 Saturated very dense gray fine sand w/ some silt and coarse sand.	(ft.)	Progress	No.	Sample Depth	Blows/6"	
18 64.0° 17 Saturated very dense gray fine sand w/ some A-2-4(0) silt and coarse sand. 19 69.0° 27 Saturated very dense gray fine sand w/ some A-2-4(0) silt and coarse sand, trace of gravel. 71.0° CPRECOVERY 19 69.0° 27 Saturated very dense gray fine sand w/ some A-2-4(0) silt and coarse sand, trace of gravel. 71.0° CPRECOVERY 20 74.0° 509 Saturated very dense gray silty fine sand w/ some coarse sand. 8° RECOVERY Boring terminated at 74.8° 19 69.0° 27 Saturated very dense gray silty fine sand w/ some coarse sand.				\ 01.U' /		TO KECOVEKI
18 84.9" 37 Saturated very dense gray fine sand w/ some A-2-4(0) silt and coarse sand. 19 68.0" 39 Saturated very dense gray fine sand w/ some A-2-4(0) silt and coarse sand, trace of gravel. 7.23						
19 68.0° 230 Saturated very dense gray fine sand w/ some silt and coarse sand. 7.10 Saturated very dense gray fine sand w/ some silt and coarse sand, trace of gravel. 7.10 Saturated very dense gray silty fine sand w/ some coarse sand. 7.11 Saturated very dense gray silty fine sand w/ some coarse sand. 7.12 Saturated very dense gray silty fine sand w/ some coarse sand. 8° RECOVERY DOM 7.12 A.2 Saturated very dense gray silty fine sand w/ some coarse sand.	2,25					
19 68.0° 230 Saturated very dense gray fine sand w/ some silt and coarse sand. 7.10 Saturated very dense gray fine sand w/ some silt and coarse sand, trace of gravel. 7.10 Saturated very dense gray silty fine sand w/ some coarse sand. 7.11 Saturated very dense gray silty fine sand w/ some coarse sand. 7.12 Saturated very dense gray silty fine sand w/ some coarse sand. 8° RECOVERY DOM 7.12 A.2 Saturated very dense gray silty fine sand w/ some coarse sand.						
19 69.0" Saturated very dense gray fine sand w/ some A-2-4(0)		•				
19 69.0° 30 Saturated very dense gray fine sand w/ some A-2-4(0)	-		40	04.01	47	G
19 69.0° 20 Saturated very dense gray fine sand w/ some A-2-4(0)	34.74		18	64.0	37 50/5*	
19 69.0' 29 Saturated very dense gray line sand w/ some A-2-4(0)	- 111 .					
19 69.0' 29 Saturated very dense gray line sand w/ some A-2-4(0)						OII DECOVEDA
18 69.0' 22 50/4* Saturated very dense gray line sand w/ some silt and coarse sand, trace of gravel. 71.0	4.2			66.0'		8" RECOVERY
19 69.0° 20 50/4* Saturated very dense gray fine sand w/ some silt and coarse sand, trace of gravel. 71.0° TO TO TO TO TO TO TO TO TO TO TO TO TO						
\$\frac{\(\text{s0}^{4}\)}{\(\text{71.0}^{\text{9}}\) \ \ \ \text{Fig. 1.0} \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	<u> </u>					
\$\frac{\(\text{s0}^{4}\)}{\(\text{71.0}^{\text{9}}\) \ \ \ \text{Fig. 1.0} \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \					,	
\$\frac{\(\text{s0}^{4}\)}{\(\text{71.0}^{\text{9}}\) \ \ \ \text{Fig. 1.0} \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \						
\$\frac{\(\text{s0}^{4}\)}{\(\text{71.0}^{\text{9}}\) \ \ \ \text{Fig. 1.0} \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \						
72.21 AUST 2015 20 74.0'			19	69.0'	20 27	
72.21 AU BUST 20 15 20 74.0' 37 500' Saturated very dense gray silty fine sand w/ some coarse sand. 8" RECOVERY Boring terminated at 74.8	69.72	1			5U/4"	silt and coarse sand, trace of gravel.
72.21 AU BUST 20 15 20 74.0' 37 500' Saturated very dense gray silty fine sand w/ some coarse sand. 8" RECOVERY Boring terminated at 74.8)					
72.21 AUBUST 20 15 74.7 74.7 74.8' 50/3' Saturated very dense gray silty fine sand w/ some coarse sand. 8' RECOVERY Boring terminated at 74.8				71.0	<u> </u>	12" RECOVERY
74.7 20 74.0' 50/2" Saturated very dense gray silty fine sand w/ some coarse sand. 8" RECOVERY Boring terminated at 74.8 777.19 79.68			M .			
74.7 20 74.0' 50/2" Saturated very dense gray silty fine sand w/ some coarse sand. 8" RECOVERY Boring terminated at 74.8 777.19 79.68	72.21	1				
74.7] 🔳 1	
74.7						
74.7						
74.7 74.8 some coarse sand. 8" RECOVERY Boring terminated at 74.8			20	74.0'	37	Saturated very dense gray silty fine sand w/ A-2-4(0)
77.19 79.68	74.7			74.81	<i>50</i> //5	some coarse sand.
77.19 79.68		-				
79.68		1				
79.68		1			1	
79.68	77 40					
	<u>;;;19</u>					
		1	-			
		1				
<u>)</u> 82.17	79.68]				
82.17		_				
<u>82.17</u>		_				
<u>/ 82.17 </u>		4				
82.17	<u> </u>	4				
	82.17	4				
		4				
		-				
		-				

KEY TO SYMBOLS

Symbol Description

rata symbols



Silty low plasticity

clay

Low plasticity

/// clay

Silty sand

F19000 1.630169 C12000

Poorly graded sand with silt

Poorly graded sand

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- 1. Exploratory boring was drilled on 3/3/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 75.
- 2. Groundwater levels recorded at time of drilling. Borings backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All SPT blow counts are uncorrected.

A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR2-2-03

Contract: 25-113-01 **Boring Location:**

Boring Surface Elev.: 56.90 Reference:

Average Fall: Average Fall: O.D. of Sampler: O.D. of Samp. Tube: O.D. of Samp. Tube: O.D. of Rock Core; Wt. of Casing Hammer: Wt. of Sample Hammer: Type of: D-Sampler: S-Sampler: U-Sampler: Lbs. Lbs. Split Barrel O.D. Ball Sampler O.D. 3 Core Bit: O.D.

From Depth of: From Depth of: Casing Size: 3 1/4 Hollow Stem Auger: To: To: Inches 41.0' 0.0

Water Level Readings

Depth of Hole **Depth of Casing** Depth of Water 12.0' Elev. of Water Date 3/4/08 Time 44.9 56.9 56.9 56.9 16.0 14.0

Pay Quantities: 2 1/2 in, Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 74.5 Ft.; Ft.; Core Drilling in Rock:

Ft.

Ft.

Boring Contractor: Walton Corporation Driller: Jason Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description		Class./G.I.	Remarks
	-	1	0.5'	1 1 2 2		ft brown clayey co <mark>a</mark> rse sandy ine sand, trace of gravel and c		A-4(1)	3" Topsoil.
2.49		2	2.0' 2.5'	1 2 3 4	Wet loo some g	ose brown silty coarse to fine ravel, trace of organic matter 14" RECOVERY	sand w/	A-1-b	VG
4.98		3	4.0'	1212		ry loose green clayey fine sar oarse sand and gravel.	nd w/	A-2-7(3)	
_7.47		4	6.0' 8.0'	2 4 6 8		ff green and brown fine sand f coarse sand.	y clay,	A-7-6(9)	
9,96	·	5	8.0'	WOH 3 7 8		ose brown fine sand w/ some se sand.	silt, trace	A-2-4(0)	
		6	10.0'	5 6 7		edium dense brown silty fine f coarse sand. 16" RECOVERY	sand,	A-2-4(0)	
12.45		U-1	12.0' 13.0'			ed medium dense green and l fine sand. 12" RECOVERY	orown	A-4(1)	Press Sample - Shelby Tube.
		7	14.0'	1 5	Saturat	ed medium dense green fine	sand w/	A-2-4(0)	glauconitic

Remarks: Mud Rotary at 41.0'

Reviewed By: Maureen Kelley Soils Supervisor: Randy Ferguson

A. Project: U.S. 301, Maryland State Line to I-95 Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14,94			·········	9 11	some silt, trace of coarse sand.		
			16.0'		11" RECOVERY		
		8	16.0'	11 17 23 24	Saturated dense green fine sand w/ some silt,	A-2-4(0)	glauconitic
				23	trace of coarse sand.		
17.43			18.0'		13" RECOVERY		
		9	18.0'	7 8 12 13	Saturated medium dense green fine sand w/	A-2-4(0)	glauconitic
				13	some silt, trace of coarse sand and organic matter.		
19.92			20.0'		16" RECOVERY		
			2015				
					DDAET		
22.41					DRAFI		
				:			
04.0	\	10	24.0'	18 12 15 20	Saturated medium dense green fine sand w/ some coarse sand and silt, trace of gravel and	A-2-4(0)	glauconitic
24.9		,		20	organic matter.		
			26.0		21" RECOVERY	4 -	
					411ST 20	174	
27.39				10	3001 20		
		11	29.0'	8 13 17 21	Saturated medium dense green fine to coarse	A-2-4(0)	glauconițic
29.88				21	sand w/ some silt, trace of gravel and organic matter.		
		:	31.0'		17" RECOVERY		
32.37							
02,01							
		12	34.0'	17 33 50/2*	Saturated very dense green-gray organic	A-2-4(0)	glauconitic
34.86				50/2"	clayey fine sand w/ some coarse sand, trace of gravel.		
					_	,	
			36.0'		14" RECOVERY		
37.35	1						

A. Project: U.S. 301, Maryland State Line to I-95 Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
						·
39.84		13	39.0'	23 50/3"	Saturated very dense green-gray fine to coarse sand w/ some silt and gravel, trace of organic matter and clay.	glauconitic
		· 	41.0'		9" RECOVERY	
42.33						
		14	43.0'	17 23 50/5"	Saturated very dense green-gray fine sand w/ A-2-4(0) some coarse sand and silt, trace of gravel.	glauconitic
44,82			45.0'	:	DRAFT	
)7.31		15	48.0'	12 24 28 50/5"	Saturated dense gray-green fine sand w/ some A-2-4(0) a silt and coarse sand, trace of gravel.	glauconitic
49.8			50.0'	l	22" RECOVERY	
		16	53.0'	24 50/6	Saturated very dense gray-green silty fine A-2-4(0) and w/ some coarse sand.	glauconitic
54.78			55.0'		12" RECOVERY	
57.27				15		
		17	58.0'	45 50/2"	Saturated very dense gray-green fine sand w/ A-3 some coarse sand, trace of silt.	glauconitic
59.76			60.0'		7" RECOVERY	
						•

A. Project: U.S. 301, Maryland State Line to I-95 Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.25							
		18	63.0'	22 39 50/4"	Saturated very dense gray-green fine sand w/ some silt and coarse sand.	A-2-4(0)	glauconitic
64.74			65.0'		14" RECOVERY		
				:			
67.23							
		19	68.0'	32 50/4*	Saturated very dense gray-green fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	glauconitic
69.72			70,0'		10" RECOVERY		
) -				Τ	FOR BID		NG
72.21		20	73.0'	23		A-2-4(0)	glauconitic
		20	74.5'	23 40 50/6	Saturated very dense gray-green fine sand w/ some silt, trace of coarse sand. 16" RECOVERY	A-2-4(0)	giauconitic
74.7					Boring terminated at 74.5 feet.		
77.19	- ;						
79.68							
						:	
32,17							
34.66							

KEY TO SYMBOLS

Symbol Description

trata symbols

Silt



Silty sand



Clayey sand



Low plasticity clay



Poorly graded sand with silt



Poorly graded sand



DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- 1. Exploratory boring was drilled on 3/4/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55.
- 2. Groundwater levels recorded at time of drilling. Borings backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All SPT blow counts are uncorrected.

Boring No.: BR2-2-04

Elev. of Water 55.9

62.8

Ft.

Depth of Water

6.9

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION**

DIVISION OF HIGHWAYS

A. Project: U.S. 301, Maryland State Line to I-95

Contract: 25-113-01

Boring Location: Sta. 447+40.27, 79' Lt. C.L.

Boring Surface Elev.: 62.81

Reference:

Wt. of Casing Hammer: Wt. of Sample Hammer: Type of: D-Sampler: S-Sampler: U-Sampler: Core Bit: Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Lbs. Split Barrel O.D. 2 O.D. **Ball Sampler** 3 O.D. Ö.D.

Casing Size: Hollow Stem Auger: From Depth of: From Depth of: To: To: inches

10.0

0.0 29.0

 $\begin{array}{c} \text{Depth of Casing} \\ 8.0' \end{array}$

Water Level Readings Date Time Depth of Hole

3/6/08

62.8 62.8 Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia, U-Sample Boring: U-Samples: Ft.; No. of: Ft.; Ft. Core Drilling in Rock:

Boring Contractor: Walton Corporation Driller: Dave Burt

Helpers: J. Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"			Sample Description		Class./G.I.	Remarks
	-	1	0.5'	1			n brown clayey silt w/ some į	gravel	A-4(2)	9" Cultivated Soil.
				3		and coa	rse sand, trace of fine sand.			
`)		-								
2.49		2	2.0' 2.5'	6 16 18 17	771		d brown clayey fine to coars It and gravel.	e sand w	A-4(0)	
				17		Some si	17" RECOVERY			VO
			4.01				· Mil Dylcolledil			
		3	4.0' 4.0'	16	инани	Wet ver	17" RECOVERY y dense brown silty coarse sa	nd w/	A -1-b	
4.98				16 30 27 19			ne sand, trace of gravel.	77	116	
7,00						フし		<u> </u>		
		-	6.0'				18" RECOVERY			
		4	6.0'	16 18 22 18			saturated dense light brown si		A-1-b	
				18		coarse s gravel.	sand w/ some fine sand, trace	01		
7.47				-		Braver.				
		5	8.0' 8.0'	18		0 4 4	16" RECOVERY	11	A-1-b	1.1.1. 1. 1
		,	8.0	18 23 27 27			ed dense light brown coarse sa v/ some silt and fine sand.	and and	A-1-0	cobble lodged in shoe of spoon
				21		B				·F - · · · ·
9,96			10.0'				20" RECOVERY			
0.00		6	10.0'	8 9		Saturate	ed medium dense light brown	gravel	A-1-b	
				8 9 9 13		and coar	rse sand w/ some fine sand ar	nd silt.		,
			12,0'				24" RECOVERY		····	
12.45	,	7	12.0'	3 3 4 5			ed loose brown coarse sand ar	nd gravel	A-1-b	
•				5		w/ some	e fine sand, trace of silt.			
\leftarrow	-									
		8	14.0' 14.0'	27 19		Caturata	24" RECOVERY ed medium dense brown coars	ea to tine	A-1-b	
Bamai	vices Mard		+ 20 0			Januale	a meanin dense brown coars	se to tine	A-1-U	

Remarks: Mud Rotary at 29.0'

Soils Supervisor: Randy Ferguson Reviewed By: Maureen Kelley

A. Project: U.S. 301, Maryland State Line to I-95 Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
14.94			•	5 4		sand w/ some gravel and silt.		
			16.0' 16.0'	5		18" RECOVERY	1.0.4(0)	
		9	10.0	5 5 6 8		Saturated medium dense green-brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
47.42				8		The to compe summ, and on Brances.		
17.43			18.0'			24" RECOVERY		
		U-1	18.0'			Saturated dark green fine sand with a trace of	A-4(10)	Press Sample - Shelby Tube.
				:	2000	silt.		
	·					·		
19.92		40	20.0'	6	x 7 / 2	21" RECOVERY	1.0.4(0)	
		10	20.0'	6 9 11 13		Saturated medium dense brown silty fine sand, trace of coarse sand.	A-2-4(0)	·
				13		sund, these of source buria.		
			22.0'			24" RECOVERY		
22.41			22.0			A RECOVER		
·- 								
)	R	<u> </u>						
		11	24.01	6 6 10 13		Saturated medium dense brown-green silty fine sand, trace of coarse sand.	A-2-4(0)	
24.9		"		13		This suite, true of course suite.		10
			26.0'_			14" RECOVERY		
			20.0				AE	•
						703170		
27.39								
		12	29.0'	3		Saturated medium dense brown-gray silty fine	A-2-4(0)	
29.88				3 4 9 9		sand w/ some coarse sand.	112 1(0)	
		!						·
			31.0'	<u> </u>		14" RECOVERY		
								,
32.37								
<u>-</u> ,								
		13	34.0'	3 5		Saturated medium dense gray silty fine to	A-2-4(0)	
34.86				3 5 7 9		coarse sand, trace of gravel.		
]						
			36.0'	ļ		15" RECOVERY		
37.35								
_07.00								

A. Project: U.S. 301, Maryland State Line to I-95 Contract: 25-113-01

Depth (ft.)	Dally Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	V						
39,84		14	39.0' 41.0'	6 17 24 23	Saturated hard gray fine sandy silt w/ some coarse sand and organic matter, trace of gravel, clay, & seashell fragments 18" RECOVERY	A-4(0)	glauconitic
42.33	ī						
44.82		15	46.0'	16 50/3"	Saturated very dense gray-green silty fine to coarse sand w/ some gravel. 6" RECOVERY	A-2-4(0)	glauconitic
)7.31		16	49.0'	10	OR BID		NG
49.8		10	51.0'	10 16 27 34	Saturated dense gray clayey fine sand w/ some coarse sand, trace of gravel. 24" RECOVERY	A-2-4(0)	
52.29		17	54.0'			4.0.1(0)	
54.78		17		4 16 19 32	Saturated dense gray silty fine to coarse sand, trace of gravel.	A-2-4(0)	
57.27			56.0'		19" RECOVERY		
59.76		18	59.0'	14 13 37 50/3*	Saturated dense gray silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
		PH-2	61.0' 61.0'	30 50/3*	16" RECOVERY Visual Description: Saturated dense gray		Sample brought to GTA lab

A. Project: U.S. 301, Maryland State Line to I-95 contract: 25-113-01

Contra	act: 25-113-	-01			
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	
					clayey fine sand w/ some coarse sand. for pH testing.
62,25					
			63.0'		9" RECOVERY
		19	64.0'	27 50/4"	Saturated very dense gray fine sand w/ some A-2-4(0)
64,74	İ				silt and coarse sand.
			66.0'		9" RECOVERY
			,		
67.23	1				
07.20					
	İ				
	-			24	
69.72	1	20	69.0'	31 50/5"	Saturated very dense gray silty fine sand. A-2-4(0)
)			71.0'	-	11"RECOVERY
<u> </u>	1				IORBIDDING
72.21	1	י שן			
<u> </u>	1			l	
	-		 		IIICT 2015
		21	74.0'	16	Saturated very dense gray fine sand w/ some A-2-4(0)
74.7	<u> </u>	-		16 32 50/5"	silt and coarse sand.
-	-		75.4		16" RECOVERY
					Boring terminated at 75.4 feet.
	1 :				
77.19	- ·				
	-				
	_				
<u> </u>	4				
79.68	-				
	<u> </u>				
82.17					
	_				
94 96			1		
84.66		į			

KEY TO SYMBOLS

Symbol Description

rata symbols

Silty low plasticity clay

Poorly graded clayey silty sand



Silty sand



Well graded sand with silt



Poorly graded sand with clay



Clayey sand

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- 1. Exploratory boring was drilled on 3/6/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 75.
- 2. Groundwater levels recorded at time of drilling. Borings backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All SPT blow counts are uncorrected.

10.0

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Mainline, Maryland State Line to S.R. 1 Boring No.: BR2-2-05

Contract: 25-113-01

Boring Location: Sta. 484+49.70, 71' Rt. C.L.

Boring Surface Elev.: + 61.4 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 12/18/2009 8.0 6.0 2.6

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 101.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers: J. Lafferty/T. Kane

						1	1
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/18/09	1	0.5' 2.0'	1 2 3	Wet loose grayish orange clayey coarse to fine sand w/some fine gravel and silt. 14" RECOVERY	A-2-4(0)	Topsoil - 6".
		2	2.0'	2 2	Saturated very loose black organic clayey coarse to fine sand w/some fine	A-2-6(0)	
3		J	4.0'	2	gravel and silt. 9" RECOVERY		
	•	3	4.0'	W <mark>/H</mark> 2 2 2	Saturated very loose green clayey fine to coarse sand w/some silt, trace of fine gravel.	A-2-7(1)	
6			6.0'		17" RECOVERY		
		4	6.0'	2 3 4 6	Saturated loose green silty fine to coarse sand.	A-2-4(0)	
			8.0'		16" RECOVERY		
		5	8.0'	3 7 11	Saturated medium dense green silty fine sand w/some coarse sand.	A-2-4(0)	
9				11 18			
			10.0'		19" RECOVERY		
		6	10.0'	10 19 26 40	Saturated dense green fine sand w/some silt and coarse sand.	A-2-4(0)	Mud Rotary @
12			12.0'		20" RECOVERY		10.0'.
12		7	12.0'	3 19 17 28	Saturated dense green fine sand w/trace of coarse and, silt and fine gravel	. A-3	
			14.0'	28	11 11 11 11 11 11 11 11 11 11 11 11 11		
15		8	14.0'	8 13 17 23	Saturated medium dense green fine sand w/some silt, trace of coarse sand	. A-2-4(0)	
			16.0'	23	18" RECOVERY		
		9	16.0'	11 13 19 18	Saturated dense green fine sand w/some silt, trace of coarse sand.	A-2-4(0)	

Remarks: Mud Rotary @ 10.0 Feet.

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301 Mainline, Maryland State Line to S.R. 1

Contract: 25-113-01

Contra			1				1
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'		21" RECOVERY		
		10	18.0'	9 13 17 20	Saturated medium dense green fine sand w/some silt, trace of coarse sand	. A-2-4(0)	
21			20.0'		22" RECOVERY		
24		11	24.0'	7 10 14 15	Saturated medium dense green fine to coarse sand w/some silt, trace of organic matter.	A-2-4(0)	
27			26.0'		DRAFT		
33		12	31.0'	7 11 16 16	Saturated medium dense green fine to coarse sand w/some silt, trace of organic matter. 19" RECOVERY	A-2-4(0)	
		13	34.0'	7 10 12 9	Saturated medium dense green organic silty fine to coarse sand.	A-2-4(0)	
36			36.0'		20" RECOVERY		
	12/22/09	14	39.0'	36 50/3"	Saturated very dense gray silty fine to coarse sand w/trace of fine gravel and organic matter.	A-2-4(0)	
42			41.0'		9" RECOVERY		
45	12/23/09	15	44.0'	7 11 19 23	Saturated medium dense gray silty fine to coarse sand.	A-2-4(0)	

F.A. Project: U.S. 301 Mainline, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
,			46.0'		23" RECOVERY		
48							
	_	40	40.01	11		. 2 4(0)	
		16	49.0'	11 19 17 20	Saturated dense gray fine sand w/some coarse sand and silt, trace of shell fragments.	A-2-4(0)	
	1			20			
51			51.0'		22" RECOVERY		
	-						
	1						
54		17	54.0'	10	Saturated medium dense gray fine sand w/some coarse sand and silt, trace	A-2-4(0)	
				10 11 18 23	of organic matter and shell fragments.		
			56.0'		22" RECOVERY		
57		١.					
		V					
		18	59.0'	18 29 50/4"	Saturated very dense gray fine sand w/some coarse sand and silt, trace of	A-2-4(0)	
60	-			30,4	organic matter.		
			61.0'	+	15" RECOVERY		
					114565. 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
63					11 17 12 1 11 17 12 1 11 17 12 1		
		19	64.0'	17	(1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	1 2 1(0)	
		19	64.0	17 32 36 32	Saturated very dense gray fine sand w/some silt and coarse sand, trace of shell fragments.	A-2-4(0)	
				32			
66	-		66.0'		21" RECOVERY		
69	-	20	69.0'	11	Saturated very dense gray fine sand w/some coarse sand, trace of silt and	A-3	
				11 29 33 36	shell fragments.		
			71.0'		20" RECOVERY		
					115,5551 31,3465 14,3451		
72					11725 11725 11725 11725		
					27 August 17 August 18 August 18 August 18 August		
					# 10 mg # 15 mg # 14 mg		

F.A. Project: U.S. 301 Mainline, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	1/4/10	21	74.0'	18 25 23 34	Saturated dense gray fine sand w/some silt and coarse sand.	A-2-4(0)	
75				34			
			76.0'		23" RECOVERY		
78							
		22	79.0'	11 14 17 29	Saturated dense gray fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
				29			
81			81.0'		24" RECOVERY		
0.4							
84		23	84.0'	12 17 22 29	Saturated dense gray fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
				22 29			
	N		86.0'		23" RECOVERY		
87		N			FOR BONE (フ	
						T	
				\ I	CLICT 2015		
		24	89.0'	17 29 45 50/3"	Saturated very dense gray fine sand w/some coarse sand and silt.	A-2-4(0)	
90				50/3"			
			91.0'		20" RECOVERY		
93							
		25	94.0'	12 16 20 30	Saturated dense gray fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
				30			
96			96.0'		23" RECOVERY		
99		26	99.0'	12 15 20 42	Saturated dense gray silty fine sand w/trace of coarse sand.	A-2-4(0)	
				20 42			
			101.0'		24" RECOVERY		
102					End of Boring		

KEY TO SYMBOLS

Symbol Description

Strata symbols

Poorly graded clayey silty sand



Silty sand



Clayey sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- 1. Exploratory borings were drilled on 12/18/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

15.0

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Mainline, Maryland State Line to S.R. 1 Boring No.: BR2-2-06

Contract: 25-113-01

Boring Location: Sta. 487+19.10, 72' Rt. C.L.

Boring Surface Elev.: + 61.6 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 1/6/2010 10.0 8.0 3.8

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 100.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	1/6/10	1	0.5' 2.0'	2 2 2	Wet soft brown fine gravelly silt w/some clay and coarse to fine sand. 10" RECOVERY	A-4(0)	Topsoil - 6".
3		2	2.0'	3 4 5	Saturated loose gray fine gravelly coarse sand w/some fine sand, trace of silt.	A-1-b	
		V	4.0'	0	6" RECOVERY		
	•	3	4.0'	2 3 4	Saturated loose greenish brown silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
6			6.0'	\ 	10" RECOVERY		
		4	6.0'	3 4 5 5	Saturated stiff brown fine sandy silt w/some coarse sand.	A-4(0)	
			8.0'		14" RECOVERY		
9		5	8.0'	5 7 6 6	Saturated medium dense brown silty fine sand w/some coarse sand.	A-2-4(0)	
			10.0'		16" RECOVERY		
		6	10.0'	4 3 6 6	Saturated stiff greenish brown fine sandy silt w/trace of coarse sand.	A-4(0)	
12			12.0'		10" RECOVERY		
		7	12.0'	3 4 9 11	Saturated stiff green fine sandy silt w/trace of coarse sand.	A-4(0)	
			14.0'		10" RECOVERY		
15		8	14.0'	3 8 10 13	Saturated very stiff green fine sandy silt w/trace of coarse sand.	A-4(0)	
			16.0'	44	15" RECOVERY		
		9	16.0'	11 13 15 18	Saturated medium dense green fine sand w/some silt, trace of coarse sand.	A-2-4(0)	

Remarks: Mud Rotary @ 15.0 Feet

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301 Mainline, Maryland State Line to S.R. 1

Contract: 25-113-01

D ::	Б.,		0- :				1
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	 Sample Description	Class./G.I.	Remarks
18			18.0'		17" RECOVERY		
		10	18.0'	6 8 10 12	Saturated medium dense green fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
21			20.0'		16" RECOVERY		
24		11	23.0'	6 11 15 16	Saturated medium dense green fine sand w/some coarse sand and silt.	A-2-4(0)	
			25.0'		18" RECOVERY		
27					DRAFT		
		12	28.0'	9 9 17 19	Saturated medium dense green fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
30		V	30.0'		- COVERY 18" RECOVERY		
33		10	00.01	AL	GUST 2015	1.00	
		13	33.0	5 7 12 17	Saturated very stiff green fine sandy silt w/some coarse sand and fine gravel.	A-4(0)	
36			35.0'		17" RECOVERY		
39		14	38.0'	50	Saturated very dense green silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
			40.0'		6" RECOVERY		
42							
		15	43.0'	17 22 50/5"	Saturated very dense gray silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
45			45.0'		16" RECOVERY		

F.A. Project: U.S. 301 Mainline, Maryland State Line to S.R. 1 **Contract:** 25-113-01

	•						
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
48		16	48.0'	11 21 50/5"	Saturated very dense gray fine to coarse sand w/some silt and fine gravel	. A-2-4(0)	
				50/5"			
			50.0'		17" RECOVERY		
51							
		17	53.0'	29 41 50/4"	Saturated very dense gray fine sand w/some silt and coarse sand, trace of	A-2-4(0)	
54				30,4	fine gravel.		
			55.0'		16" RECOVERY		
					III)KAFI		
57							
		18	58.0'	40		2.4(0)	
		10	36.0	40 50/3"	Saturated very dense gray fine sand w/some silt and coarse sand.	A-2-4(0)	
			00.01				
60			60.0'	\land \Box	GUST ^{9" RECOVERY} 15		
			<i>F</i>	AL	JUSI ZUIS		
63							
63	1/8/10	19	63.0'	50/5"	Saturated very dense gray fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
			65.0'		5" RECOVERY		
66							
00							
69		20	68.0'	25 39 50	Saturated very dense gray fine sand w/some silt and coarse sand.	A-2-4(0)	
09							
			70.0'		18" RECOVERY		
72							
12							
		21	73.0'	36 50/5"	Saturated very dense gray fine sand w/some coarse sand and silt.	A-2-4(0)	
				50/5"	23.02.000 Fig. 11.00 Said 17.00 Me Course Said and Sitt.	112 1(0)	

F.A. Project: U.S. 301 Mainline, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Б	l _{P "}	_				 	T
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
75			75.0'		9" RECOVERY		
78		22	78.0'	21 25 50	Saturated very dense gray silty fine sand w/trace of coarse sand.	A-2-4(0)	
	_		80.0'		17" RECOVERY		
81							
84		23	83.0' 85.0'	18 19 23 47	Saturated dense gray fine sand w/some silt, trace of coarse sand. 24" RECOVERY	A-2-4(0)	
87	P	V	O	T	FOR BIDDING)	
90		24	88.0' 90.0'	23 32 50	Saturated very dense gray fine sand w/some silt, trace of fine gravel. 18" RECOVERY	A-2-4(0)	
93							
93		25	93.0'	18 20 25 40	Saturated dense gray fine sand w/some silt, trace of coarse sand and fine gravel.	A-2-4(0)	
			95.0'		24" RECOVERY		
96							
99		26	98.0'	23 33 50/3"	Saturated very dense gray silty fine sand w/trace of coarse sand.	A-2-4(0)	
			100.0'		End of Boring		
	_						
102]						

KEY TO SYMBOLS

Symbol Description

Strata symbols

Poorly graded clayey silty sand



Well graded sand with silt



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- 1. Exploratory borings were drilled on 1/6/2010 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

15.0

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Mainline, Maryland State Line to S.R. 1 Boring No.: BR2-2-07

Contract: 25-113-01

Boring Location: Sta. 486+07.92, 64' Lt. C.L.

Boring Surface Elev.: + 60.0 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 12/17/2009 8.0 6.0 4.5

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 101 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/17/09	1	0.5' 2.0'	4 7 10	Moist medium dense brown fine gravelly coarse sand w/some fine sand and silt. 8" RECOVERY	A-1-b	Topsoil - 4".
	1	2	2.0'	18 19 19	Saturated dense orange silty coarse sand w/some fine sand and fine	A-1-b	
3		J	4.0'	19 15	gravel. 16' RECOVERY		
	•	3	4.0'	8 8 11	Saturated medium dense orange fine gravelly coarse sand w/some fine sand and silt.	A-1-b	
6			6.0'		14" RECOVERY		
		4	6.0'	12 10 12 18	Saturated medium dense orange fine gravelly fine to coarse sand w/some silt.	A-1-b	
			8.0'		16" RECOVERY		
9		5	8.0'	5 4 5 6	Saturated stiff brown fine sandy clay w/trace of coarse sand.	A-6(1)	
			10.0'		11" RECOVERY		
		6	10.0'	8 10 9 13	Saturated very stiff brown fine asnady clay w/some coarse sand.	A-6(2)	
12			12.0'		16" RECOVERY		
		7	12.0'	6 6 9 10	Saturated medium dense brown silty fine sand w/some coarse sand.	A-2-4(0)	
			14.0'		14" RECOVERY		
15		8	14.0'	3 6 7 9	Saturated medium dense brown clayey fine sand w/some coarse sand, trace of silt.	A-2-6(0)	
			16.0'		16" RECOVERY		
	·	9	16.0'	4 6 8 9	Saturated medium dense brown clayey fine sand w/some coarse sand, trace of silt.	A-2-4(0)	
		. =					

Remarks: Mud Rotary @ 15.0 Feet

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301 Mainline, Maryland State Line to S.R. 1

Contract: 25-113-01

Contra	25 11						
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'		16" RECOVERY		
10		10	18.0'	4 5 8 8	Saturated medium dense brown clayey fine sand w/trace of coarse sand and silt.	A-2-4(0)	
21			20.0'		17" RECOVERY		
24							
		11	24.0'	5 8 9 15	Saturated medium dense green fine sand w/some silt, trace of coarse sand and organic matter.	A-2-4(0)	
			26.0'		15" RECOVERY		
27					DRAFT		
30		12	31.0'	7 12 14 16	Saturated medium dense green fine to coarse sand w/some silt, trace of fine gravel and organic matter. 20" RECOVERY	A-2-4(0)	
33				4	GUST 2015		
	12/18/09	13	34.0'	5 6 5 4	Saturated medium dense green silty fine to coarse sand w/trace of fine gravel and organic matter.	A-2-4(0)	
36			36.0'		16" RECOVERY		
39		14	39.0'	25 50/4"	Saturated very dense green silty fine to coarse sand w/some fine gravel, trace of organic matter.	A-2-4(0)	
			41.0'		10" RECOVERY		
42							
45		15	44.0'	19 37 50/4"	Saturated very dense green silty fine to coarse sand.	A-2-4(0)	

F.A. Project: U.S. 301 Mainline, Maryland State Line to S.R. 1 **Contract:** 25-113-01

			I .				
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			46.0'		16" RECOVERY		
	-						
48							
		16	49.0'	10	Catamata d danas anno site. Cara ann d an /anna a ann an d	A 2 4(0)	
		'0	49.0	10 16 22 26	Saturated dense gray silty fine sand w/some coarse sand.	A-2-4(0)	
				26			
51			51.0'		24" RECOVERY		
	-						
54	-	17	54.0'	13	Saturated dense gray fine sand w/some silt and coarse sand, trace of fine	A-2-4(0)	
		''	07.0	13 13 19 21	Saturated dense gray fine sand w/some slit and coarse sand, trace of fine gravel.	A-2-4(0)	
				21			
<u> </u>			56.0'		23" RECOVERY		
57	_	١.					
		V					
	•	18	59.0'	23	Saturated very dense gray fine sand w/some silt and coarse sand.	A-2-4(0)	
60		'		23 26 42 40	Saturated very dense gray fine said w/some sitt and coarse said.	A-2-4(0)	
	1			40	ICHET 2015		
	-		61.0'	$\rightarrow \downarrow \downarrow$	24" RECOVERY		
	-						
63							
	-	19	64.0'	25 50	Saturated very dense gray fine sand w/some silt and coarse sand.	A-2-4(0)	
				50	Saturated very dense gray rine said w/some sin and coarse said.	11 2-4(0)	
]						
66	-		66.0'		12" RECOVERY		
	1						
69	1	20	69.0'	22 36 50	Saturated very dense gray fine snad w/some silt and coarse sand.	A-2-4(0)	
]			50 50	gray and state of the state of		
1							
<u> </u>	-	_	71.0'		18" RECOVERY		
72							
'-	1						
	<u> </u>			I		1	<u> </u>

F.A. Project: U.S. 301 Mainline, Maryland State Line to S.R. 1

Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		21	74.0'	25 32 50	Saturated very dense gray fine sand w/some silt and coarse sand.	A-2-4(0)	
75				50			
			76.0'		18" RECOVERY		
78							
76							
	12/22/09	22	79.0'	16 42 50	Saturated very dense gray fine sand w/some silt and coarse sand.	A-2-4(0)	
				50			
81			81.0'		16" RECOVERY		
84		23	84.0'	16	Saturated very dense gray fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
				16 22 32 33	Saturated very delise gray fine saild wisonic sitt, trace of coarse saild.	A-2-4(0)	
			86.0'		23"RECOVERY		
		V			FOR BOOKERY	-	
87							
		24	89.0'	20		1.2.40	
90		24	89.0	20 6 31 40	Saturated very dense gray fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
			91.0'		20" RECOVERY		
			91.0		20 RECOVERT		
93							
		25	94.0'	19 26 30 30	Saturated very dense gray fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
			65.51	30			
96			96.0'		23" RECOVERY		
99							
		26	99.0'	19 26 36 40	Saturated very dense gray silty fine sand w/trace of coarse sand.	A-2-4(0)	
				40			
			101.0'		23" RECOVERY End of Boring		
102					End of Borning		

KEY TO SYMBOLS

Symbol Description

Strata symbols

Silty sand



Clayey sand



Poorly graded clayey silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- 1. Exploratory borings were drilled on 12/17/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

31.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR2-3-01

Contract: 25-113-01

Boring Location: Sta. 409+95.39, 67' Lt. C.L.

Reference: **Boring Surface Elev.:** 68.21

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D. U-Sampler: 3 Ball Sampler

Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Casing Depth of Water Elev. of Water Time **Depth of Hole** Date 61.7 68.2 68.2 68.2 3/5/08 8.0 6.0' 6.5'

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 75.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: William Sharp

Helpers: A. Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Re	emarks
		1	1.0'	2 3	Wet firm gray clayey silt w/ some fine to A-4(4) 9" Cultivate	ed Soils.
			2.0'		coarse sand, trace of gravel.	
2.49		2	2.0'	4 14	Wet medium dense gray coarse to fine sand A-1-b	
		_		4 14 12 13	w/ some silt and gravel.	
		\mathbf{V}	4.0'		17" RECOVERY	
	•	3	4.0'	4 7	Saturated medium dense orange and brown A-1-b	
4.98				7 5	coarse sand w/ some fine sand and silt, trace	
7.50			Λ		of gravel.	
			6.0'		-18" RECOVERY	
		4	6.0'	3	Saturated loose gray coarse to fine sand w/ A-1-b	
				3 3 3	some silt, trace of gravel.	
7.47						
7.47			8.0'		16" RECOVERY	
		5	8.0'	1	Saturated loose orange and brown coarse sand A-1-b	
				1 3 4 5	w/ some fine sand and silt.	
					7.000 7.000 7.000	
0.00			40.01		1100 1100 1100	
9.96		6	10.0' 10.0'	5	20" RECOVERY Saturated medium dense orange and brown A-2-4(0)	
				5 6 11 13	coarse to fine sand w/ some silt.	
				13		
		7	12.0' 12.0'	6	11" RECOVERY	
12.45		'	12.0	6 10 13 24	Saturated medium dense orange and brown coarse to fine sand and gravel, trace of silt.	
-				24	Course to time saind and graver, trace of sitt.	
<u> </u>						
			14.0'		10" RECOVERY	
		8	14.0'	8 11 20	Saturated dense orange and brown coarse A-1-b	
				19	sand and gravel w/ some fine sand and silt.	

Remarks: Mud Rotary at 31.0'

Reviewed By: Maureen Kelley Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description C	Class./G.I.	Remarks
			·				
		9	16.0' 16.0'	9	10" RECOVERY Saturated medium dense brown fine to coarse	A-2-4(0)	
				9 6 9 12	sand w/ some silt, trace of gravel.	(-)	
17.43			40.01		12" PEGOVERY		
		10	18.0' 18.0'	1 6 10 9		A-2-4(0)	glauconitic
				9	fine to coarse sand w/ some silt, trace of gravel.		
19.92			20.0'		16" RECOVERY		
20.44							
22.41					DDAET		
					UKAFI		
		11	24.0'	3 6 8		A-2-4(0)	glauconitic
24.9	N	1/		12	brown fine to coarse sand w/ some silt, trace of gravel.) I K	
		V	26.0'		16" RECOVERY	7111	U
27.39		U-1	27.0'		No recovery.	15	Press Sample - Shelby Tube.
				1	JUOI ZU		
			28.5'		0" RECOVERY		
		12	29.0'	4 4 6 7	Saturated loose dark green fine to coarse sand, trace of silt.	A-3	glauconitic
29.88				7	RAYMAN SAIRU, TRACE OF SHU.		
			31.0'		18" RECOVERY		
					12 14 15 15 15 15 15 15 15 15 15 15 15 15 15		
32.37					FFIANCE CHIPTUS CHIPTUS CHIPTUS		
					ie i Aire i 10: 1 August 10: 1 August 10: 1 Victoria (
					EF 1 3 m C		
34.86		13	34.0'	5 8 10 11	Saturated medium dense dark green fine sand w/ some silt and coarse sand.	A-2-4(0)	glauconitic
			36.0'		18" RECOVERY		
37.35							

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		14	39.0'	4 7 7 11	Saturated medium dense dark green fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	glauconitic
42.33			41.0'		20" RECOVERY		
44.82		15	44.0'	4 6 9 13	Saturated medium dense dark green fine sand w/ some silt, trace of coarse sand and gravel.	A-2-4(0)	glauconitic
49.8		16	49.0' 51.0'	6 6 6 5 5	Saturated medium dense dark green fine sand w/ some coarse sand, silt, and gravel. 16" RECOVERY	A-2-4(0)	glauconitic
54.78		17	54.0'	12 15 27 50/5"	Saturated dense dark green clayey fine sand w/ some coarse sand and gravel, trace of seashells. 24" RECOVERY	A-2-6(0)	glauconitic
59.76		18	59.0' 59.5'	50/4"	Saturated very dense dark green silty fine to coarse sand w/ some gravel, trace of organic matter and seashells. 3" RECOVERY	A-2-4(0)	glauconitic

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
62.25								
		19	64.0'	10 14 25 36		Saturated dense dark gray silty fine sand w/	A-2-4(0)	
64.74				36 36		some coarse sand, trace of gravel and seashells.		
			00.01					
		20	66.0' 66.0'	18 21 50		24" RECOVERY Visual Description: Saturated dense dark gray		Sample brought to GTA lab
67.00				50		silty fine sand w/ some coarse sand, trace of		for pH testing.
67.23			67.5'		-	gravel and seashells. 14" RECOVERY		
69.72		21	69.0'	12 21 33 50/4"		Saturated very dense dark gray silty fine sand	A-2-4(0)	
09.72				50/4"		w/some coarse sand, trace of gravel and seashells.		
			71.0'			20" RECOVERY		
			7 1.0		-	20 RECOVERT		
72.21	N			T				
		M				OR BIDI	<i></i>	
				•				
						DIJOT OO		
74.7		22	74.0'	21 50		Saturated very dense green fine sand w/ some silt and coarse sand, trace of gravel and	A-2-4(0)	glauconitic
			75.0'	10		seashells. 10" RECOVERY		
						Boring terminated at 75.0 feet.		
77.19								
79.68								
82.17								
84.66								

KEY TO SYMBOLS

Symbol Description

Strata symbols

Low plasticity clay



Silty sand



Poorly graded sand with silt



Well graded sand with silt



Clayey sand

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- 1. Exploratory boring was drilled on 3/5/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 55.
- 2. Groundwater levels recorded at time of drilling. Borings backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All SPT blow counts are uncorrected.

34.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR2-3-02

Contract: 25-113-01

Boring Location: Sta. 411+42.58, 79' Rt. C.L.

Boring Surface Elev.: 70.76 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D. 3 Ball Sampler

U-Sampler: Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of:

Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Water Time Depth of Hole **Depth of Casing** Elev. of Water Date 63.0 70.8 3/7/08 10.0 8.0' 7.8' $\frac{70.8}{70.8}$

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 75.9 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Hillebrand

	1	1	1 -	1	1			T
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
(11.)	1 Togicss	1	0.5'	2	TURTUR	Wet firm brown silt w/ some fine sand and	A-4(3)	5" Topsoil.
				2 3 5		clay, trace of coarse sand and gravel.	A-4(3)	3 Topson.
						ciay, trace of coarse sailed and graver.		
			2.0'			14" RECOVERY		
2.49		2	2.0'	5 6 11 13		Wet very stiff brown clayey silt w/ some fine	A-4(4)	
	1 N			11 13		to coarse sand, trace of gravel.		
		4						
		3	4.0' 4.0'	2		20" RECOVERY		
		3	4.0	3 6		Wet medium dense brown clayey coarse to	A-2-4(0)	
4.98				6 8		fine sand, trace of gravel.	15	
	1		6.0'	10		18" RECOVERY		
		4	6.0'	14		Wet medium dense brown silty fine to coarse	A-2-4(0)	
				14 14 8 9		sand, trace of gravel.	11 2 1(0)	
				9		gante, trace or graver		
7.47								
			8.0'			20" RECOVERY		
		5	8.0'	3 5 5 5		Saturated loose light brown silty fine to	A-2-4(0)	
				5 5		coarse sand, trace of gravel.		
-								
9.96		6	10.0' 10.0'	6		20" RECOVERY	A 2 4(0)	
		0	10.0	6 6 7 8		Saturated medium dense brown fine to coarse	A-2-4(0)	
				8		sand w/ some silt.		
			12.0'			24" RECOVERY		
12.45	1	7	12.0'	1		Saturated very loose light brown fine to	A-2-4(0)	
12.43	1			1 1 2 3		coarse sand w/ some silt.		
				3				
-								
			14.0'			24" RECOVERY		
		8	14.0'	1 2		Saturated loose light brown coarse to fine	A-2-4(0)	

Remarks: Mud Rotary at 34.0

Reviewed By: Maureen Kelley Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
14.94	J			4 6		sand w/ some silt.		
		9	16.0' 16.0'	6	jairjai.	24" RECOVERY Saturated medium dense light brown fine to	A-3	
				6 6 8 14	66433966 66333966 66343966	coarse sand, trace of silt.	A-3	
17.43					0761 TO 1612 664 194 66 1863 A 1766 1863 TA 1864			
		10	18.0' 18.0'	30		24" RECOVERY		No Sieve Analysis.
		10		30 50/3"		Visual Description: Saturated medium dense light brown fine to coarse sand w/ some		No sieve Alialysis.
			19.0'			gravel, trace of silt. 5" RECOVERY		
19.92					001111111 0011111111 00111111111	3.2.2		
					111 3 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
					110 11 11 11 11 11 11 11 11 11 11 11 11			
					400466 400466 400466			
22.41						DDAET		
						DRAFI		
					06141366 0614366 0614366			
	R	11	24.0'	6 5 8		Saturated medium dense green and brown	A-2-4(0)	
24.9				8		fine to coarse sand w/ some silt.		
	•		26.0'	•		14" RECOVERY		
			20.0			14 RECOVERT		
		U-1	27.0'		**/ <i>/</i> /	31151 20		D G 1 G 1 T 1
27.39		0-1	27.0	10		Saturated medium dense green and brown clayey fine to coarse sand.	A-2-6(0)	Press Sample - Shelby Tube.
			29.0'	40	27227 27227	23" RECOVERY		
29.88		12	29.0'	10 15 17 24		Saturated dense brown and green silty fine to coarse sand.	A-2-4(0)	
29.00				24				
			31.0'			24" RECOVERY		
32.37								
		13	34.0'	5		Saturated medium dense gray and green fine	A-2-4(0)	
34.86				5 6 6 6		sand w/ some silt and coarse sand, trace of	A-2-4(0)	
						gravel.		
			36.0'			10" RECOVERY		
37.35								

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		14	39.0'	3		A 2 4(0)	
39.84		14	39.0	3 4 7 7	Saturated medium dense gray fine sand w/ some silt and coarse sand.	A-2-4(0)	
00.0				,			
			41.0'		18" RECOVERY		
42.33							
72.00							
44.82		15	44.0'	9 9 15 14	Saturated medium dense green and gray fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	
44.02				14	sand w/ some site, trace of course sand.		
			46.0'		14" RECOVERY		
					IJRAFI		
47.31							
47.51							
					·OR BIIN		
		7					\mathbf{V}
49.8		16	49.0'	6 7 13	Saturated medium dense green and gray fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	
49.0			Λ	17	said w/ some site, trace of coarse said.	15	
			51.0'		16" RECOVERY		
52.29							
32.29							
54.78		17	54.0'	6 16 20 37	Saturated dense gray fine sand w/ some coarse sand, gravel, and silt, trace of organic	A-2-4(0)	
04.70				37	matter.		
			56.0'		18" RECOVERY		
			00.0				
57.27							
51.21							
59.76		18	59.0'	18 22 27 37	Saturated hard gray fine sandy silt w/ some organic matter and coarse sand, trace of clay	A-6(3)	
55.76				37	and gravel.		
			61.0'		24" RECOVERY		
			J				

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.25		19 PH-1	64.0' 65.0' 65.0' 65.5'	29 50/3" 50/2"	Visual Description: Saturated very dense gray fine to coarse sand w/ some silt. 6" RECOVERY No Sample Recovery 0" RECOVERY		Sample brought to GTA lab for pH testing.
69.72		20	69.0' 69.5'	50/2"	Visual Description; Saturated very dense gray clayey sand w/ gravel. 2" RECOVERY		No Sieve Analysis.
72.21		21	74,0'	10 15 37 50/5"	Saturated very dense gray silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
			75.9'		23" RECOVERY		
77.19					Boring terminated at 75.9 feet.		
79.68							
82.17							

KEY TO SYMBOLS

Symbol Description

Strata symbols

Silty low plasticity clay

Low plasticity clay

Clayey sand



Silty sand



Poorly graded sand with silt



Poorly graded sand with clay

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- 1. Exploratory boring was drilled on 3/7/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 75.
- 2. Groundwater levels recorded at time of drilling. Borings backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All SPT blow counts are uncorrected.

41.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR2-3-03

Contract: 25-113-01

Boring Location: Sta. 410+48.86, 79' Rt. C.L.

Reference: **Boring Surface Elev.:** 70.13

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D.

U-Sampler: 3 Ball Sampler Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Casing Time **Depth of Hole Depth of Water** Elev. of Water Date 63.7 70.1 3/3/08 8.0 6.0' 6.4 $70.1 \\ 70.1$

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 74.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Gary Truver, Sr.

Helpers: A. Joseph

				,			
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	1.0'	3 4	Wet loose brown coarse to fine sand w/ some	A-1-b	9" Cultivated Soils.
			2.0'		silt, trace of gravel. 12" RECOVERY		
2.49		2	2.0'	3 5 6 7	Wet medium dense brown fine to coarse sand	A-2-4(0)	
		l .		6 7	w/ some silt, trace of gravel.		
						$\supset I \setminus I$	
		M	4.0'		18" RECOVERY	711	
		3	4.0'	5 8 8 7	Wet medium dense brown fine to coarse sand,	A-3	
4.98				8 7	trace of silt and gravel.		
					DIIOT OO	15	
			6.0'		18" RECOVERY		
		4	6.0'	6 5 4 3	Saturated stiff brown fine to coarse sandy silt	A-4(0)	
				4 3	w/ some clay.		
7.47							
			8.0'		15" RECOVERY		
		5	8.0'	3 3 3 4	Saturated loose brown silty coarse to fine	A-2-4(0)	
				3 4	sand.		
9.96			10.0'		17" RECOVERY		
		6	10.0'	6 5 7 6	Saturated medium dense light brown silty fine	A-2-4(0)	
				7 6	to coarse sand.		
			12.0'		20" RECOVERY		
12.45		7	12.0'	3 3	Saturated loose brown fine sand w/ some	A-2-4(0)	
				3 3 7 7	coarse sand and silt, trace of gravel.		
			14.0'		19" RECOVERY		
		8	14.0'	2 3	Saturated loose brown fine to coarse sand w/	A-2-4(0)	
				2 3 5 8	some silt.		

Remarks: Mud Rotary at 41.0'

Reviewed By: Maureen Kelley Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
(111)								
		9	16.0' 16.0'	14		20" RECOVERY Saturated very dense brown coarse to fine	A-1-b	
				14 18 35 36		sand and gravel w/ some silt.	71 1 0	
17.43								
		10	18.0' 18.0'	18 15		18" RECOVERY Saturated dense red-brown clayey fine to	A-2-6(0)	
				18 15 21 27		coarse sand, trace of gravel.		
19.92			20.0'			11" RECOVERY		
			20.0		-	II RECOVERI		
22.41								
						L)RAFI		
		11	24.0'	7			A 2 4(0)	
24.9		''	24.0	7 10 11		Saturated medium dense brown and red- brown fine to coarse sand w/ some silt.	A-2-4(0)	
						() R BII) I) \	J(-j
	•		26.0'	•	-	15" RECOVERY		
						DIIOT OO	4 -	
27.39						GUST 20	15	
		12	29.0'	7 10		Saturated medium dense dark green and	A-2-4(0)	
29.88				13 14		brown fine to coarse sand w/ some silt.	112 .(0)	
			31.0'		-	17" RECOVERY		
32.37								
32.31								
		13	34.0'	6 11		Saturated very stiff dark green fine sandy silt	A-4(0)	glauconitic
34.86				6 11 15 15		w/ some coarse sand.		
			36.0'			16" RECOVERY		
			30.0			10 RECOVERT		
37.35								
57.50								

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
39.84		14	39.0'	7 10 13 19		Saturated medium dense dark green fine sand w/ some coarse sand, trace of silt.	A-3	glauconitic
			41.0'			21" RECOVERY		
42.33					001133166 001133166 00113166 10113166 101133166 00113166 00113166			
44.82		15	44.0'	9 10 13 19		Saturated medium dense gray and green fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	glauconitic
47.31			46.0'		_	DRAFT		
49.8		16	49.0′	6 10 13 18		Saturated medium dense gray and green fine sand w/ some silt, trace of coarse sand and gravel.	A-2-4(0)	glauconitic
52.29			51.0	\U		22" RECOVERY	15	
54.78		17	54.0'	4 6 9 10		Saturated medium dense gray and green silty fine to coarse sand, trace of gravel and seashells.	A-2-4(0)	glauconitic
57.27			56.0'			21" RECOVERY		
59.76		18	59.0' 60.0'	18 50	-	Saturated hard dark gray and green fine sandy silt w/ some organic matter, trace of coarse sand, gravel, clay, and seashells. 12" RECOVERY	A-4(0)	

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

	act. 25-113	-01			<u>, </u>		
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description (Class./G.I.	Remarks
62.25			·				
64.74		19	64.0' 65.0'	35 50/4"	fine to coarse sand, trace of gravel and seashells.	A-2-4(0)	
					12" RECOVERY		
67.23							
		20	69.0'	16 35 50/5"		A-2-4(0)	
69.72			70.5'	50/5"	fine to coarse sand, trace of gravel and seashells. 17" RECOVERY		
72.21	N		<u> </u>	Т			IG
		21	73.0' 74.0'	21 60	Saturated very dense gray silty fine sand w/ some coarse sand, trace of gravel. 12" RECOVERY	A-2-4(0)	
74.7			A	\U	Boring terminated at 74.0 feet.	15	
77.19							
79.68							
82.17							
84.66							

KEY TO SYMBOLS

Symbol Description

Strata symbols

Silty sand



Poorly graded sand



Poorly graded clayey silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- 1. Exploratory boring was drilled on 3/3/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 55.
- 2. Groundwater levels recorded at time of drilling. Borings backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All SPT blow counts are uncorrected.

30.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR2-3-04

Contract: 25-113-01

Boring Location: Sta. 410+89.10, 67' Lt. C.L.

Reference: **Boring Surface Elev.:** 68.33

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D.

U-Sampler: 3 Ball Sampler Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Casing Depth of Water Elev. of Water Time **Depth of Hole** Date 63.8 68.3 3/1/08 6.0' 4.0' 4.5' $\begin{array}{c} 68.3 \\ 68.3 \end{array}$

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 74.3 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: William Sharp

Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
		1	1.0'	3 3		Wet firm gray and orange mottled clayey coarse sandy silt w/ some fine sand, trace of	A-4(1)	10" Cultivated Soils.
		2	2.0' 2.0'	5		gravel.	A-1-b	
2.49		_		5 6 8 6		8" RECOVERY Wet medium dense gray silty coarse to fine	A-1-0	
						sand w/ some gravel.		
			4.0'			16" RECOVERY	711	
	•	3	4.0'	3 4		Wet loose gray and brown coarse to fine sand	A-1-b	
4.98				L .		w/ some silt.		
			Δ				15	
		4	6.0' 6.0'			20" RECOVERY Saturated loose gray coarse to fine sand w/	A-1-b	
				2 3 3		some silt.	71 1 0	
7.47								
7.47			8.0'			24" RECOVERY		
		5	8.0'	2 3 4 5		Saturated loose gray and orange coarse to fine	A-1-b	
				4 5		sand w/ some silt.		
9.96			10.0'			21" RECOVERY		
		6	10.0'	2 3 4 6		Saturated loose orange coarse to fine sand w/	A-2-4(0)	
				6		some silt, trace of gravel.		
			12.0'			20" RECOVERY		
12.45		7	12.0'	1 4 5 7		Saturated loose orange coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
<u> </u>				7		some sin, nace of graver.		
		8	14.0' 14.0'	5		22" RECOVERY	A 1 1	
		0	14.0	5 8 11		Saturated medium dense orange coarse sand w/ some gravel and fine sand, trace of silt.	A-1-b	
				10	13333333	in some graver and this said, trace of site.		

Remarks: Mud Rotary at 30.0'

Reviewed By: Maureen Kelley Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to I-95

Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G	I. Remarks
			·		10-10-10-1 10-10-10-1 10-10-10-1 10-10-10-1	
		9	16.0' 16.0'	3	19" RECOVERY Saturated medium dense orange coarse sand A-1-b	
				3 5 6 9	w/ some fine sand and gravel, trace of silt.	
17.43						
		10	18.0' 18.0'	3	19" RECOVERY Saturated medium dense brown fine to coarse A-2-4(0)
				3 6 7 11	sand w/ some silt, trace of gravel.	,
19.92			20.0'		19" RECOVERY	
22.41						
		44	00.01	1	DDAET	
		11	23.0'	1 4 7 9	Saturated medium dense brown fine to coarse A-2-4(0 sand w/ some silt.)
24.9	R	U-1	25.0' 25.0'		17' RECOVERY	
		0-1	25.0		Saturated medium dense brown clayey fine to A-2-7(1 coarse sand, trace of gravel.	Press Sample - Shelby Tube.
	_					
27.39			27.0		24"RECOVERY	
21.55					JUSI ZUI	
		12	28.0'	3 4 4	Saturated loose brown fine sand w/ some silt A-2-4(0 and coarse sand.	
				7	and coarse sand.	
29.88			30.0'		19" RECOVERY	
32.37						
		13	33.0'	2 6 7 7	Saturated medium dense dark green fine sand A-2-4(0)
				7 7	w/ some silt and coarse sand, trace of organic matter.	
34.86			2F 0'		15" RECOVERY	
			35.0'		13 RECOVERY	
37.35						
		14	38.0'	4 5	Saturated medium dense dark green fine sand A-2-4(0	<u> </u>
		L '-T	30.0	5	Saturated medium dense dark green fine sand A-2-4(0	<i>/</i>

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sa	mple Description	Class./G.I.	Remarks
	J		·	6 10	w/ some silt	and coarse sand.		
39.84			40.0'			24" RECOVERY		
			40.0			24 RECOVERY		
42.33								
		15	43.0'	1 3	Saturated loc	ose dark green fine sand w/ some	A-2-4(0)	
				1 3 4 5	silt, trace of	coarse sand and organic matter.		
44.82			45.0'			21" RECOVERY		
			45.0			21 RECOVER I		
						RAFI		
47.31						\ / \		
		16	48.0'	6 8 9		edium dense dark green fine to	A-2-4(0)	
				8 9	coarse sand organic matt	w/ some silt, trace of gravel and er.		J(–
49.8			50.0'	•		17" RECOVERY		
			↑				4 -	
						ST 20	15	
						O . L O		
52.29								
		17	53.0'	4 17 25 39	Saturated de	nse dark green clayey fine sand	A-2-4(0)	glauconitic
				39	w/ some coa matter.	rse sand, gravel, and organic		
54.78			55.0'			23" RECOVERY		
57.27								
01.21								
		18	58.0' 58.5'	50		ry dense dark green silty fine to	A-2-5(0)	glauconitic
					clay, and sea	trace of gravel, organic matter, shells. 6" RECOVERY		
59.76						O RECOVERT		

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

	Ontract. 25-115-01									
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks				
62.25										
		19	63.0'	7 17 22 29	Saturated dense dark gray silty fine sand w/ Some coarse sand, trace of gravel and organic A-2-4(0)					
				29	matter.					
64.74			65.0'		24" RECOVERY					
			05.0		24 RECOVERT					
67.23										
		20	68.0'	10 20 30 43	Saturated dense dark gray fine sand w/ some A-2-4(0)					
				30 43	silt and coarse sand, trace of gravel and					
69.72					organic matter.					
09.72			70.0'		22" RECOVERY					
	I.									
72.21					#()					
		21	73.0'	12		1 🔾				
		21	73.0	12 22 50/4"	Saturated very dense green fine sand w/ some A-2-4(0) silt and coarse sand, trace of gravel and	glauconitic				
			74.5'		organic matter. 14" RECOVERY					
74.7			14.0		Boring terminated at 74.3 feet.					
77.19										
79.68										
82.17										
84.66										
07.00]									

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey silty sand



Silty sand



Well graded sand with silt



Poorly graded sand



Clayey sand

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- 1. Exploratory boring was drilled on 3/1/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 55.
- 2. Groundwater levels recorded at time of drilling. Borings backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All SPT blow counts are uncorrected.

F.A. Project: US 301, Maryland State Line to S.R. 1 Boring No.: BR2-3-05

Contract: 25-113-01

Boring Location: Sta. 410+78, 74', Lt. C.L.

Boring Surface Elev.: + 68.4 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 O.D.

IN. IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0 24.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 11/4/2009 8.0 6.0 3.8

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 100 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
(14.7)	11/4/09	1	0.5'	2 5 6		Wet firm grayish orange mottled clayey coarse sandy silt w/some fine	A-4(1)	Cultivated
			2.0'	6		sand, trace of fine gravel.		Soil - 8".
		2	2.0'	7 13 13 15		Wet medium dense grayish orange mottled silty fine to coarse sand w/	A-2-4(0)	
0.75				13 15		trace of fine gravel.		
3.75			4.0'	2		24" RECOVERY		
		3	4.0'	3 5 6 5		Saturated medium dense grayish orange coarse to fine sand w/some silt.	A-1-b	
			6.0'			20" RECOVERY		
		4	6.0'	4 4 7		Saturated medium dense orange coarse to fine sand w/some silt.	A-2-4(0)	
7.5			8.0'	8		18" RECOVERY		
		5	8.0'	2 2 2 2	iit i i i i i i i i Pi i i i i i i i i	Saturated very loose orange coarse to fine sand w/some silt, trace of fine	A-1-b	
				2 2	00133000 Januaran 60133000	gravel.		
			10.0'		100 10 10 10 1 100 1 10 10 10 1	20" RECOVERY		
		6	10.0'	5 13 12 12		Saturated medium dense orange coarse sand w/some fine sand and fine	A-1-b	
11.25				12 12		gravel, trace of silt.		
			12.0'			18" RECOVERY		
		7	12.0'	6 11	etiket. Etiket	Saturated medium dense orange coarse to fine sand w/some fine gravel,	A-1-b	
				14 14		trace of silt.		
			14.0'			19" RECOVERY		
15		8	14.0'	11 12		Saturated medium dense brown fine gravel and coarse to fine sand w/	A-1-b	
'				14 19		some silt.		
			16.0'	4.		10" RECOVERY		
		9	16.0'	11 10 10 9		Saturated medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
			18.0'			16" RECOVERY		
18.75		10	18.0'	6 8		Saturated medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
13.75				12 10				
			20.0'			22" RECOVERY		
-								
	•				** Labeled de la labeled			

Remarks: Mud Rotary @ 24.0 feet

Reviewed By: Maureen Kelley Soils Supervisor: Randy Ferguson

F.A. Project: US 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
22.5							
22.0							
		11	24.0'	6 7 11 10	Saturated medium dense brown silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
22.05			26.0'	10	22" RECOVERY		
26.25							
		12	29.0'	7 12 21 28	Saturated dense brown silty fine sand w/some coarse sand.	A-2-4(0)	
30				21 28			
			31.0'		16" RECOVERY		
33.75		10	0.4.01	E			
		13	34.0'	5 7 12 13	Saturated medium dense green fine sand w/some coarse sand and silt, trace of organic matter.	A-2-4(0)	Glauconi
			36.0'	13	19" RECOVERY		
					FOR BIDDING		
37.5		N				J	
				_			
		14	39.0'	7 5 8 9	Saturated medium dense green fine sand w/some silt, trace of coarse sand	A-2-4(0)	Glauconi
				8 9	and organic matter.		
41.25			41.0	1	21" RECOVERY		
	11/5/09	15	44.0'	6	Saturated medium dense green fine sand w/some silt, trace of coarse sand	A-2-4(0)	Glauconi
45	1 170700		11.0	6 7 12 12	and organic matter.	A-2-4(0)	Giaucoiii
			46.0'		21" RECOVERY		
48.75							
		16	49.0'	16 12 12 13	Saturated medium dense green fine to coarse sand w/some silt, trace of	A-2-4(0)	
			51.0'	13	organic matter. 18" RECOVERY		
			31.0		16 RECOVERT		
52.5							
		17	54.0'	25	Saturated hard gray fine sandy clay w/some coarse sand and organic	A-6(1)	
				25 32 46 50/4"	matter.	110(1)	
56.25			56.0'		24" RECOVERY		

F.A. Project: US 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Depth	Daily	No.	Sample	Blows/6"	Sample Description	Class./G.I.	Remarks
(ft.)	Progress		Depth	2.5113/0	WWW	0.000./0.1.	. tomans
		18	59.0'	50/5"	Saturated dense gray silty fine to coarse sand w/trace of fine gravel and	A-2-4(0)	
60					organic matter.		
			61.0'		5" RECOVERY		
63.75							
		19	64.0'	14 14 28 32	Saturated dense gray fine to coarse sand w/trace of silt, fine gravel and organic matter.	A-3	
			66.0'	32	organic matter.		
			00.0		11111111111111111111111111111111111111		
67.5					23 TFP 7 17 190 7 17 190 7		
					61.91067 81.9865		
		20	69.0'	14		A 2 4(0)	
		20	09.0	14 22 38 50	Saturated very dense gray fine sand w/some silt and coarse sand, trace of organic matter.	A-2-4(0)	
71.25			71.0'	30	24" RECOVERY		
71.23				_			
		M			FOR BIDDING	-	
		A					
		21	74.0'	27 50/5"	Saturated very dense gray fine sand w/some silt and coarse sand, trace of	A-2-4(0)	
75				\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	organic matter.		
			76.0'	$\overline{}$	11" RECOVERY		
78.75							
		22	79.0'	24 50/5"	Saturated very dense gray fine sand w/some coarse sand and silt, trace of	A-2-4(0)	
			04.01		organic matter.		
			81.0'		10" RECOVERY		
82.5					51-0-554 \$1.3855 \$1.3855		
			04.01	5	######################################	1.420	
		23	84.0'	5 32 50	Saturated hard gray silt w/some fine sand, trace of coarse sand and organic matter.	A-4(0)	
00.05		L	86.0'		18" RECOVERY		
86.25							
		24	89.0'	25 50/5"	Saturated very dense gray fine sand w/some coarse sand, trace of silt and	A-3	
90				50/5"	organic matter.	113	
			91.0'		11" RECOVERY		
					61 3 4 6 6 6 81 3 3 6 6 6 81 4 3 6 6 6		
<u></u>	<u> </u>		<u> </u>		STATION CONTRACTOR CON	1	

F.A. Project: US 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	-						
93.75	_	25	94.0'	16	Software days and troop of	A 2 4(0)	
		20	34.0	16 22 25 43	Saturated very dense gray fine sand w/some silt and coarse sand, trace of organic matter.	A-2-4(0)	
	-		96.0'		21" RECOVERY		
97.5	-						
	_	26	99.0'	18	Saturated dense gray fine sand w/some silt, trace of coarse sand and	A-2-4(0)	
				18 23 27 44	organic matter.		
101.25	-		101.0'		24" RECOVERY End of Boring		
	-						
405	_				DRAFT		
105					DIAL		
					FOR BIDDING		
108.75		V			LOK DIDDING		
	-						
	_			Λ I	ICLICT 2015		
			<i> </i>	$\mathcal{A}U$	JGUST 2015		
112.5	-						
	-						
116.25							
	-						
	-						
120							
	-						
<u> </u>	_						
123.75	1						
]						
	_						
127.5	1						

Symbol Description

Strata symbols



Silty low plasticity clay



Silty sand



Poorly graded sand with silt



Well graded sand with silt



Clayey sand



silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 11/4/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

29.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR2-4-01

Contract: 25-113-01

Boring Location: Sta. 307+19.68, 89' Lt. C.L.

Boring Surface Elev.: 64.00 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D. U-Sampler: 3 Ball Sampler Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of:

Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Casing Elev. of Water Time **Depth of Hole Depth of Water** Date 54.3 64.0 10.0' 9.7' 3/5/08 12.0 $\begin{array}{c} 64.0 \\ 64.0 \end{array}$

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Dia. U-Sample Boring: U-Samples: 76.0 Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Billy Holden

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	11 7 7 7	ff brown clayey fine sandy silt w/ urse sand and gravel.	A-4(2)	
2.49		2	2.0'	7 7 8 9	edium dense brown and orange fine sand w/ some silt and gravel.	A-2-4(0)	1G
4.98		3	4.0'	2 4 8 7	18" RECOVERY ium dense light brown silty coarse to , trace of gravel.	A-2-4(0)	
7.47		4	6.0' 6.0'	9 9 9 8	16" RECOVERY ium dense light brown fine to coarse come clay, trace of gravel. 20" RECOVERY	A-2-4(0)	
9.96		5	8.0'	3 3 3 2	e light brown silty coarse to fine ce of gravel.	A-2-4(0)	
		6	10.0'	2 2 2 2 2	loose light brown silty fine to coarse ce of gravel.	A-2-4(0)	
12.45		7	12.0'	2 3 3 2	l loose light brown silty fine to nd, trace of gravel.	A-2-4(0)	

Remarks: Mud Rotary at 29.0

Reviewed By: Maureen Kelley Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
, ,	. 9	8	14.0'	4 4	14" RECOVERY Saturated loose light brown coarse to fine A-1-b	
14.94			14.0	4 3 4	sand w/ some gravel and silt.	
		9	16.0' 16.0'	3	14" RECOVERY Saturated loose light brown coarse sand w/ A-1-b	
				3 5 4 2	Saturated loose light brown coarse sand w/ A-1-b some gravel, fine sand, and silt.	
17.43					11/1/10 11/1/10 11/1/10	
			18.0'		Hijiir Hijiir Hijiir Hijiir 18" RECOVERY	
		10	18.0'	3 5 5 6	Saturated loose light brown coarse to fine sand w/ some silt, trace of gravel. A-2-4(0)	
				6	sand w/ some sitt, trace of graver.	
19.92			20.0'		24" RECOVERY	
			20.0		24 RECOVERT	
22.41					II)RAFI	
22.71						
	R	1.4		4		
04.0		11	24.0'	4 6 10 11	Saturated medium dense brown fine to coarse A-2-4(0) sand w/some silt, trace of gravel.	$\mathbf{V}(\mathbf{z})$
24.9	•			• ''		
			26.0		18" RECOVERY	
					IGUST 2015	
				10	PUOI ZUIJ	
27.39						
		12	28.0'	7 9	Saturated medium dense brown fine to coarse A-2-4(0)	
				11 14	sand w/ some silt, trace of gravel.	
29.88			30.0'		18" RECOVERY	
32.37						
		13	34.0'	9 11 12 14	Saturated medium dense brown and green A-2-4(0)	
34.86				12 14	silty fine sand w/ some coarse sand.	
			36.0'		20" RECOVERY	
37.35						

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			·				
39.84		14	39.0'	8 8 11 12	Saturated medium dense brown and green fine sand w/ some silt and coarse sand.	A-2-4(0)	
00.04				12			
			41.0'		16" RECOVERY		
42.33							
		15	44.0'	10 10 12 14	Saturated medium dense brown and green	A-2-4(0)	
44.82				12	silty fine sand w/ some coarse sand.		
			46.0'		20" RECOVERY		
47.31	N	1/		_			
		11			FOR BIDI	ノル	1G
		16	49.0'_	9	Saturated medium dense brown and green	A-2-4(0)	
49.8			Λ	9 12 14 13	fine sand w/ some silt, trace of coarse sand.		
			51.0'	10	18" RECOVERY		
			31.0		10 KECOVEKT		
52.29							
54.78		17	54.0'	7 11 11 14	Saturated medium dense brown and green fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	
			56.0'		16" RECOVERY		
57.27							
59.76		18	59.0'	12 19 26 23	Saturated dense dark gray and green silty fine sand, trace of coarse sand.	A-2-4(0)	
39.70				23	Sanu, nace of coarse sand.		

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
(11.)	1 1091633		61.0'		18" RECOVERY		
	-						
62.25	-						
	-						
	-	19	64.0'	12 13 17 20	Saturated medium dense dark gray and green	A-2-4(0)	
64.74	-			17 20	silty fine sand, trace of coarse sand.		
	=						
			66.0'		18" RECOVERY		
	-						
67.23	-						
	-						
	-						
		20	69.0'	10	Saturated medium dense dark gray and green	A-2-4(0)	
69.72	-			10 12 16 21	silty fine sand, trace of coarse sand.	11 2 1(0)	
	-						
			71.0'		22" RECOVERY		
		M			IUR BIIJI		JG
72.21	•			•			
	-					4	
	_				21191 20	15	
	-	21	74.0'	15	<u> </u>		
74.7		21	74.0	15 19 27 50	Saturated dense dark gray and green silty fine sand w/ some coarse sand and gravel, trace of	A-2-4(0)	
	-			30	organic matter.		
	-		76.0'		24" RECOVERY		
	-				 Boring terminated at 76.0 feet.		
77.19]						
	-						
	-						
79.68	-						
	-						
82.17	-						
02.17	1						
]						

Symbol Description

Strata symbols

Clayey sand



Silty sand



Poorly graded clayey silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING **AUGUST 2015**

- 1. Exploratory boring was drilled on 3/4/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55.
- Groundwater levels recorded at time of drilling. backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All SPT blow counts are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR2-4-01A

Contract: 25-113-01

Boring Location: Sta 307+19.38, 89' Lt. C.L.

Boring Surface Elev.: + 64.57 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split-Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

To: To: 3 1/4" **Casing Size:** Inches From Depth of: **Hollow Stem Auger:** From Depth of: 0.0 98.0

Water Level Readings

Time **Depth of Casing Depth of Water Date** 3/27/2009 Depth of Hole Elev. of Water 51.0' 51.0' 13.0' 10.9' 53.0' 53.0' 3/28/2009

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 100.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: David Burt

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
(11.)	3/27/09	1	51.0'	3 5 7 9		Wet medium dense dark grayish green silty fine sand w/trace of coarse sand and gravel.	A-2-4(0)	Glauconitic
52.5			53.0'	9		Tine sand w/trace of coarse sand and gravel. 24" RECOVERY		
	_		33.0			24 RECOVERT		
		111				OR BIDI		
		AI					ノ Ⅱ】	
56								
	1					GUST 20	15	
				NU		JUJI ZU		
59.5								
]							
	ļ ,	2	61.0'	9		Wet dense deals arrapidly and Co.	A 2 4(0)	Clayage:4: a
			31.0	13		some silt, trace of coarse sand.	A-2-4(0)	Glauconitic
63]		63.0'		/414166 	4		
					100 1 7 2 10 0 100 1 7 2 10 0 100 1 7 2 10 0 100 1 7 2 10 0			
]				ecolorei. George Georges Georges			
66.5								
]							
<u> </u>								
70	<u> </u>							

Remarks: Blank augered 51.0'.

Reviewed By: Maureen Kelley Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
73.5		3	71.0'	17 30 49 50/4"	Wet very dense dark grayish green fine sand w/some silt, trace of coarse sand and organic matter. 22" RECOVERY	A-2-4(0)	Glauconitic
77		4	74.0'	14 24 31 50/4"	Wet very dense dark grayish green silty fine sand w/some gravel and coarse sand, trace of organic matter. 22" RECOVERY	A-2-4(0)	Glauconitic
80.5		5	81.0' 82.5'	47 51 50/3"	14 RECOVER I	A-2-4(0)	Glauconitic
87.5		6	84.0' 86.0'	15 21 33 59	Wet very dense dark gray silty fine to coarse sand w/some organic matter, trace of gravel. 24" RECOVERY	A-2-4(0)	IG
91		7	89.0'	38 36 56 50/1"	Wet very dense dark gray clayey fine sand w/ some coarse sand and gravel, trace of organic matter. 19" RECOVERY	A-2-6(0)	
94.5		8	94.0'	10 10 24 40	Wet dense dark gray silty fine sand w/some coarse sand, trace of organic matter and gravel. 24" RECOVERY	A-2-4(0)	
98	-	9	98.0'	13 18 38 50/4"		A-2-4(0)	
101.5			99.8'		End of Boring 22" RECOVERY		

Symbol Description

Strata symbols



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 3/24/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
- Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to I-95

Contract: 25-113-01

Boring Location: Sta. 307+12.33, at C.L.

Boring Surface Elev.: 64.00 Reference:

Wt. of Casing Hammer: Average Fall: IN. Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D. U-Sampler: Ball Sampler IN. Core Bit: O.D.

Casing Size: 3 1/4 Inches From Depth of: To: Hollow Stem Auger: From Depth of: To:

Water Level Readings

 Date
 Time
 Depth of Hole
 Depth of Casing
 Depth of Water
 Elev. of Water

 3/6/08
 16.0'
 14.0'
 14.0'
 50.0
 64.0

 64.0
 64.0
 64.0
 64.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 76.0 Ft.; 3 Dia. U-Sample Boring: Ft. No. of 2 in. Dia. Shelby Tubes: ; No. of: U-Samples: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Billy Hurd

Driller: Billy Hurd **Helpers:** W. Hurd

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks	
		1	2.0'	5 5 4 6	Moist stiff brown clayey silt w/ some fine to coarse sand, trace of gravel. 22" RECOVERY	
2.49		2	2.0'	5 7 14 14	Moist medium dense brown fine to coarse sand w/ some clay, trace of gravel. 20" RECOVERY	
4.98		3	4.0'	5 14 12 8	Moist medium dense brown silty fine to coarse sand. 20" RECOVERY	
7.47		4	6.0'	10 11 12 11	Moist medium dense brown silty coarse to fine sand, trace of gravel. 24" RECOVERY	
9.96		5	8.0'	4 6 5 5	Moist medium dense brown coarse to fine sand w/ some silt. A-1-b 22" RECOVERY	
		6	10.0'	3 3 3 2	Wet loose brown silty fine sand w/ some coarse sand. A-2-4(0)	
12.45		7	12.0'	2 2 4 4	Wet loose brown silty fine to coarse sand w/ Some gravel. A-2-4(0)	

Remarks:

Reviewed By: Maureen Kelley Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.	. Remarks
14.94		8	\14.0'/ 14.0'	2 2 3 2	Saturated loose brown coarse sand w/ some gravel and silt, trace of fine sand. A-1-b	
17.43		9	16.0' 16.0'	3 3 3 4	Saturated loose brown coarse sand w/ some silt, trace of fine sand and gravel. A-1-b	
		10	18.0' 18.0'	1 2 1 2	24" RECOVERY Saturated very loose brown fine sand w/ some silt, trace of coarse sand. A-2-4(0	
19.92			20.0'		24" RECOVERY	
22.41					DRAFT	
24.9		11	24.0'	5 11 13 11	Saturated medium dense brown and green silty fine to coarse sand w/ some gravel. A-2-4(0	NG
27.39			26.0	\U	3US 2015	
29.88		12	29.0'	6 10 14 18	Saturated medium dense brown and green fine to coarse sand w/ some silt, trace of gravel. 18" RECOVERY	
32.37						
34.86		13	34.0'	10 10 15 17	Saturated medium dense brown and green fine sand w/ some coarse sand and silt. 20" RECOVERY	
37.35			55.0			

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Danth	Delle	1	0				
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		14	39.0'	7		1.2.1(0)	
39.84		14	39.0	7 8 8 9	Saturated medium dense brown and green fine sand w/ some silt and coarse sand.	A-2-4(0)	
33.04				9			
			41.0'		18" RECOVERY		
			71.0		10 RECOVERT		
42.33							
		15	44.0'	7	Saturated medium dense brown and green	A-2-4(0)	
44.82				7 8 9 11	fine sand w/ some silt, trace of coarse sand.		
					DDATT		
			46.0'		20" RECOVERY		
47.31							
					FOR BIDI		IG
		N 1					
40.0		16	49.0'	9 13 14	Saturated medium dense green fine sand w/	A-2-4(0)	
49.8				14	some silt, trace of coarse sand.	15	
			-1.01	1		10	
			51.0'		20" RECOVERY		
52.29							
		17	54.0'	6 9	Saturated medium dense dark green fine sand	A-2-4(0)	
54.78				9 11 12	w/ some silt, trace of coarse sand.		
			56.0'		20" RECOVERY		
57.27							
		18	59.0'	11 19	Saturated dense dark green silty fine sand,	A-2-4(0)	
59.76				23 26	trace of coarse sand.		
	1				Ш		

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
()			61.0'		20" RECOVERY		
	-						
62.25	-						
	1						
	-	19	64.0'	11 16 18 23	Saturated dense dark gray and green silty fine	A-2-4(0)	
64.74	1			18 23	sand, trace of coarse sand.		
	-						
			66.0'		20" RECOVERY		
	_						
67.23	-						
	-						
	-						
		20	69.0'	9	Saturated dense dark gray and green silty fine	A-2-4(0)	
69.72	_			9 13 18 20	sand, trace of coarse sand and gravel.	11 2 1(0)	
			71.0'		20" RECOVERY		
		M			UR BIIJI		JG
72.21				•			
	=						
	1				21191 20	15	
	=	21	74.0'	18		A 2 4(0)	
74.7		21	74.0	18 18 29 35	Saturated dense dark gray and green silty fine sand w/ some gravel and coarse sand, trace of	A-2-4(0)	
	-			55	organic matter.		
			76.0'		16" RECOVERY		
	-				Boring terminated at 76.0 feet.		
77.19							
	-						
	_						
	_						
79.68]						
	1						
	-						
	-						
82.17	-						
]						
	1						
	-						
L	4						

Symbol Description

Strata symbols

Low plasticity clay

Poorly graded clayey silty sand

Silty sand

1.63 (1.14) 1.63 (1.14) 1.63 (1.14) Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory boring was drilled on 3/6/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 55.
- 2. Groundwater levels recorded at time of drilling. Borings backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All SPT blow counts are uncorrected.

29.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR2-4-03

Contract: 25-113-01

Boring Location: Sta. 307+09.51, 89' Rt. C.L.

Boring Surface Elev.: 64.00 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D. U-Sampler: 3 Ball Sampler

Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Elev. of Water Time **Depth of Hole Depth of Casing Depth of Water** Date 54.0 64.0 10.0' 10.0' 3/7/08 12.0 $64.0 \\ 64.0$

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Dia. U-Sample Boring: U-Samples: 75.0 Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Billy Hurd

Helpers: W. Hurd

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks	
		1	2.0'	2 3 5 6	Wet firm light brown clayey silt w/ some fine to coarse sand, trace of gravel. 18" RECOVERY	
2.49	ı	2	2.0'	7 6 6 8	Wet stiff light brown clayey fine sandy silt w/ A-4(0) some coarse sand and gravel. 18" RECOVERY	
4.98		3	4.0'	5 8 7 7	Wet medium dense light brown silty coarse to fine sand, trace of gravel. 20" RECOVERY	
7.47		4	6.0'	6 7 7 8	Wet medium dense light brown silty fine to coarse sand, trace of gravel. 24" RECOVERY	
9.96		5	8.0'	5 6 5 3	Wet medium dense light brown coarse to fine sand w/ some silt, trace of gravel. 24" RECOVERY	
		6	10.0'	1 2 1 1	Saturated very loose light brown coarse to fine sand w/ some silt, trace of gravel. 16" RECOVERY	
12.45		7	12.0'	1 1 1 1	Saturated very loose light brown silty fine to coarse sand, trace of gravel. A-2-4(0)	

Remarks: Mud Rotary at 29.0

Reviewed By: Maureen Kelley Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

						
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G	s.l. Remarks
		8	14.0'	1 1	22" RECOVERY A-2-4(D)
14.04			14.0'	1	Saturated very loose light brown sitty line to	
14.94				'	coarse sand, trace of gravel.	
			16.0'		24" RECOVERY	
		9	16.0'	1 1 2 3	Saturated very loose light brown fine to A-2-4(0)
				3	coarse sand w/ some silt, trace of gravel.	
17.43						
			18.0'		24" RECOVERY	
		10	18.0'	2	Similar Setumeted Loose Light housen fine to occur.	0)
				2 3 3 3	Saturated roose light brown the to coarse A-2-4(
					11 5 101 16 17 161 16 17 161 16 17 161	
					123.4181 1813.518 1813.188	
19.92			20.0'		24" RECOVERY	
					161 7 3 161	
					if i) sec it i a i c	
					E	
					SELECTION OF THE SELECT	
22.41					DRAFI	
					1	
					(5) (4) (6) (7) (6) (7) (7) (7) (7) (7) (7) (7) (7) (7) (7	
		11	24.0'	22		
			24.0	22 18 18 14	Saturated dense light brown fine to coarse A-1-t sand w/ some gravel and silt.	
24.9		4 ,		14	salid w/ some graver and sint.	
			26.0		22" RECOVERY	_
					15051701	
27.39						
27.100						
		40	00.01	12		
		12	29.0'	13 11 9 8	Saturated medium dense brown and green A-2-4("
29.88) š	coarse to fine sand w/ some silt, trace of	
					illini glavel.	
			31.0'		20" RECOVERY	
					(1) 1 30 C (1) 1 30 C (1) 1 30 C	
					(() 1) (() () () () () () () () () () () () (
32.37					6FFA36FF 10173700 6143169	
					######################################	
					107.73.17 CP 107.73 CP 107.73 CP	
					ratvijat. Gradistra Halater	
		13	34.0'	10	r:1143ms 51133ms	2)
		13	34.0	10 9 11 10	Saturated medium dense brown and green A-2-4("
34.86				10	fine to coarse sand w/ some silt, trace of gravel.	
					giavei.	
			36.0'		20" RECOVERY	
37.35						
			<u> </u>	<u> </u>		

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Cla	ass./G.I.	Remarks
	-						
39.84		14	39.0'	10 12 12 14	Saturated medium dense brown and green silty fine sand w/ some coarse sand.	-2-4(0)	
			41.0'		22" RECOVERY		
42.33							
44.82		15	44.0'	9 10 13 15	Saturated medium dense brown and green fine sand w/ some silt and coarse sand.	-2-4(0)	
			46.0'		18" RECOVERY		
47.31			0	Т	OR BIDD		IG
49.8		16	49.0' 51.0'	9 11 14 18	Saturated medium dense brown and green fine sand w/ some silt, trace of coarse sand. 22" RECOVERY	-2-4(0)	
52.29			0.10				
54.78		17	54.0'	8 10 11 10	dark gray and green fine sand w/ some silt, trace of coarse sand.	-2-4(0)	
57.27			56.0'		22" RECOVERY		
59.76		18	59.0'	8 10 10 14	Saturated medium dense dark gray and green fine sand w/ some silt, trace of coarse sand.	-2-4(0)	

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	 Sample Description	Class./G.I.	Remarks
(***)	·		61.0'		22" RECOVERY		
00.05	-						
62.25	1						
	-	19	64.0'	7 11 15 20	Saturated very stiff dark gray and green fine	A-4(0)	
64.74	1			15 20	sandy silt, trace of coarse sand.		
	=						
			66.0'		24" RECOVERY		
	-						
67.23	-						
	=						
					DD A ET		
	-	20	69.0'	7 10 14 16	Saturated medium dense dark gray and green	A-3	
69.72	_			14 16	fine sand w/ some gravel and coarse sand, trace of silt and organic matter.		
	_				_		_
			71.0'		24' RECOVERY		JG
		N١			UR DIDI	ノロ`	
72.21	-						
	-		Λ		DI IOT OO	4	
					-1131/1		
	-	21	74.0'	19 50	Saturated very dense dark gray and green fine	A-2-4(0)	
74.7	_		75.0'		sand w/ some silt, trace of coarse sand and gravel.		
	-				12" RECOVERY		
					Boring terminated at 75.0 feet.		
	-						
77.19	_						
	=						
	-						
79.68	-						
	=						
]						
	-						
82.17	1						
	-						
]						

Symbol Description

Strata symbols



Silty low plasticity clay



Clayey sand



Silty sand



Poorly graded sand with silt



Poorly graded sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory boring was drilled on 3/7/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55.
- Groundwater levels recorded at time of drilling. Borings backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All SPT blow counts are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR2-4-03A

Contract: 25-113-01

Boring Location: Sta. 307+09.51, 89' Rt. C.L.

Boring Surface Elev.: + 63.32 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split-Barrel O.D. 2 IN. IN. O.D. Core Bit: O.D.

To: To: 3 1/4" **Casing Size:** Inches From Depth of:

Hollow Stem Auger: From Depth of: 0.0 98.0

Water Level Readings

Time **Depth of Casing Depth of Water** Depth of Hole Elev. of Water Date 51.0' 51.0' 13.0' 10.9' 3/24/2009 53.0' 53.0' 3/25/2009

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 100.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: David Burt

Depth	Daily		Sample			A. 15.	
(ft.)	Progress	No.	Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/24/09	1	51.0'	6 8 9	Wet medium dense green silty fine sand w/	A-2-4(0)	Glauconitic
52.5]			9	trace of coarse sand and gravel.		
]		53.0'		22" RECOVERY		
					$\cdot (\cdot) \bowtie \bowtie (\cdot) \mid$) [\	
		1 1			OR BIDI		
56							
					DIIOT OO		
					GUST 20	14	
				N	JUUI 20		
59.5							
		2	61.0'	11	Wet medium dense green fine sand w/some	A-2-4(0)	Glauconitic
				11 11 16 18	silt, trace of coarse sand and gravel.	-12 .(0)	
63			63.0'		24" RECOVERY		
]						
66.5							
<u> </u>							
70							

Remarks: Blank augered to 51.0'.

Reviewed By: Maureen Kelley Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

	1		T -	1		<u> </u>	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		3	71.0'	11 16 18 22	Wet dense greenish gray fine sand w/some silt, trace of coarse sand and gravel. 24" RECOVERY	A-2-4(0)	Glauconitic
73.5							
77							
80.5							
		4	81.0' 83.0'	40 50/4"	Wet very dense greenish gray silty fine to coarse sand w/trace of gravel. 10" RECOVERY	A-2-4(0)	Glauconitic
84	N	5	84.0'	8 14 26 47	Wet dense greenish gray fine sand w/some silt, coarse sand and organic matter, trace of gravel. 24" RECOVERY	A-2-4(0)	Glauconitic
87.5			A		GUST 20	15	
91		6	89.0' 91.0'	13 15 35 46	Wet dense greenish gray clayey fine to coarse sand w/trace of organic matter and gravel. 24" RECOVERY	A-2-6(0)	Glauconitic
94.5		7	94.0'	16 33 50/4"	Wet very dense greenish gray silty fine sand w/some coarse sand, trace of gravel. 16" RECOVERY	A-2-4(0)	Glauconitic
98		8	98.0' 99.3'	28 48 50/3"	Wet very dense greenish gray fine sand w/ some silt and coarse sand, trace of gravel. 15" RECOVERY	A-2-4(0)	Glauconitic
101.5					End of Boring		

Symbol Description

Strata symbols

Silty sand



Clayey sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 3/27/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

24.0

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to SR-1 Boring No.: BR2-4-04

Contract: 25-113-01

Boring Location: STA. 347+49 65' Lt. C.L.

Boring Surface Elev.: + 64.53 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 O.D.

IN. IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches **Hollow Stem Auger:** 0.0

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 1/3/11 24.0 24.0 13.1

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 100.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Jason Truver

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks
25.9	1/3/11	1	24.0'	9 8 9 8	Saturated medium dense orangish brown fine to coarse sand w/some fine gravel and silt. 18" RECOVERY A-2-4(0) Blank augered to 24.0' per boring request sheet.
	N		0	T	FOR BIDDING
29.6		2	29.0' 31.0'	12 12 14 15	Saturated medium dense orangish brown fine sand w/some coarse sand and silt, trace of fine gravel. 18" RECOVERY
33.3					
		3	34.0'	8 10 11 11	Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of fine gravel. 17" RECOVERY
37					
40.7		4	39.0' 41.0'	9 9 10 10	Saturated medium dense orangish green fine sand w/some silt and coarse sand. 20" RECOVERY
44.4		5	44.0'	10 10	Saturated medium dense green fine sand w/ A-2-4(0)

Remarks:

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301 Maryland State Line to SR-1 **Contract:** 25-113-01

	_			1	1				T
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"			Sample Description	Class./G.I.	Remarks
				12 12			some silt, trace of coarse sand.		
			46.0'				19" RECOVERY		
48.1									
		6	49.0'	6 8 9 9			Saturated medium dense green fine sand w/	A-2-4(0)	
				9			some silt, trace of coarse sand and fine gravel.		
			51.0'		_		22" RECOVERY		
51.8									
		7	54.0'	9	E011		Saturated medium dense green fine sand w/	A-3	
55.5				8 8	1111		trace of silt, coarse sand and fine gravel.		
			56.0'				15" RECOVERY		
							DDAET		
							IJRAFI		
					100013	1316.F 1316.F 1316.G			
59.2						uijei. Parte Parte			
00.2		8	59.0'	8 10 12 14			Saturated medium dense green fine sand w/	A-3	
				14			trace of coarse sand and silt.		
		7	61.0'			11:07 11:07 11:07	22" RECOVERY		
62.0			_				SIIOT OO		
62.9							2119171	15	
						ulei. Mari	JUOI ZU		
	1/4/11	9	64.0'	7 13 21 23			Saturated dense green fine sand w/some silt,	A-2-4(0)	
				23			trace of coarse sand.		
			66.0'		-		20" RECOVERY		
66.6									
		40	00.01	7					
		10	69.0'	7 13 16 25			Saturated medium dense green fine sand w/	A-2-4(0)	
70.3				25			some silt, trace of coarse sand and fine gravel.		
			71.0'		-		21" RECOVERY		
74			74.01	1.4	Щ	Щ			
		11	74.0'	14 32 50/5"		1.11.67. 1316.7 1316.7	Saturated very dense green fine sand w/some	A-2-4(0)	
							fine gravel, coarse sand and silt, trace of shell fragments.		
			76.0'				16" RECOVERY		
77.7						iner.			
					126 2 1	rj.ri. 13:e:C			
			70.0	24	100	73 m.c.			
		12	79.0'	21			Saturated very dense green fine to coarse sand	A-2-4(0)	

F.A. Project: U.S. 301 Maryland State Line to SR-1 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	·	Class./G.I.	Remarks
	-			36 41 50/3"	w/some silt, trace of fine gravel and shell		
			81.0'	50/3	fragments. 20" RECOVERY		
81.4	-						
	-						
	-						
	-			10			
85.1	-	13	84.0'	16 21 29 39	Saturated hard green fine sandy clay w/some	A-6(1)	
00.1	1		00.01	39	coarse sand and silt, trace of fine gravel and shell fragments. 22" RECOVERY		
			86.0'		22" RECOVERY		
	-						
	1						
88.8							
	1	14	89.0'	50/4"	Saturated dense green silty fine to coarse sand	A-2-4(0)	
					w/some fine gravel, trace of shell fragments.		
			91.0'		4" RECOVERY		
92.5							
				24			
		15	94.0'	31 39 45 50/1"	Saturated very dense gray silty fine sand w/ some coarse sand, trace of fine gravel and	A-2-4(0)	
		\mathbf{M}	00.01	50/1"	shell fragments.		
96.2	•		96.0'	•	19" RECOVERY		
	-					_	
	<u> </u>					15	
	-	16	98.0'	24 41 50/2"	Saturated very dense gray silty fine sand w/	A-2-4(0)	
	-			50/2	some coarse sand, trace of fine gravel. 14" RECOVERY		
99.9			100.0'		14" RECOVERY End of Boring		
	-				End of Borning		
	-						
103.6	-						
1.00.0	1						
	1						
]						
107.3							
111							
<u> </u>							
	-						
1	I		1				1

Symbol Description

Strata symbols

Silty sand



Poorly graded sand with silt



Clayey sand

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on January 3, 2011 using 3 1/4-inch diameter continuous flight power auger. Rig is a Truck Mounted CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

24.0

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to SR-1 Boring No.: BR2-4-05

Contract: 25-113-01

Boring Location: STA 348+00 0' C.L.

Boring Surface Elev.: + 65.15 Reference:

IN. IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

O.D. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches **Hollow Stem Auger:** 0.0

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 14.0 1/3/11 24.0 24.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 100.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers: T. Kane

			$\overline{}$		 		
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	 Sample Description	Class./G.I.	Remarks
	1/3/11	1	24.0'	5 6 9 11	Wet medium dense orange coarse sand w/ some fine sand, fine gravel and silt.	A-1-b	Topsoil - 6". Blank augered to 24.0' then
25.9			26.0'		15" RECOVERY		started sampling. Mud Rotary @ 24.0'.
					OR BIDI		IG
29.6		2	29.0'	10 8 8 10	Wet medium dense brownish green silty fine	A-2-4(0)	
			31.0'	10	to coarse sand w/trace of fine gravel. 16" RECOVERY	15	
		ļ		NU	JUUI ZU	IJ	
		ļ					
33.3	l 1	ļ					
		3	34.0'	8 11	Wet very stiff brownish green fine sandy silt	A-4(0)	
			36.0'	9	w/trace of coarse sand and fine gravel. 18" RECOVERY		
			30.0	†	16 RECOVER 1		
37	1	ļ					
		4	39.0'	8	Wet very stiff brownish green fine sandy silt	A-4(0)	
40 =		ļ		8 9 10 12	w/trace of coarse sand.	(~)	
40.7	1	<u> </u>	41.0'		17" RECOVERY		
	1	ļ					
		ļ					
 							
44.4	l ,	5	44.0'	7 9	Wet medium dense brownish green fine sand	A-2-4(0)	

Remarks:

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301 Maryland State Line to SR-1 **Contract:** 25-113-01 Boring No.: BR2-4-05

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
				11 12		w/some silt, trace of coarse sand.		
			46.0'			21" RECOVERY		
48.1								
		6	49.0'	7 8 12 14		Wet medium dense brownish green fine sand	A-2-4(0)	
			F4.01	14		w/some silt, trace of coarse sand.		
54.0			51.0'			21" RECOVERY		
51.8								
		7	54.0'	6 8 12 14		Wet medium dense green fine sand w/trace of silt and coarse sand.	A-3	
55.5			56.0'	14		sitt and coarse sand. 19" RECOVERY		
			30.0		126143166 126173360 126173360	19 RECOVERT		
					66149366 6614366 6614366	DRAFI		
					11.614116.6 12.11712.61 13.11712.61			
59.2					131333361. 121333361 13133361			
		8	59.0'	8 12 17 22		Wet medium dense green fine sand w/trace of coarse sand and silt.	A-3	
		M	61.0'	22	11111	24" RECOVERY	711	
	•		01.0	-	(12 14 11 0 0 12 1 1 1 1 1 0 0 11 1 1 1 1 0 0 0	24 RECOVERT		
					(** (**) + (** (**) 13:0 (** (** (**) 15:0 (**		4 —	
62.9						THE TON	15	
					100 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
		9	64.0'	9 15 17 21	130 13.1127. 160 13166 131 13 1107	Wet dense green fine sand w/some silt and coarse sand.	A-2-4(0)	
			66.0'	21	11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	22" RECOVERY		
66.6			00.0			22 1.550 · 2.K1		
					126 13 13 16 C 126 13 13 16 C			
		10	69.0'	8	12 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Watership	A 2 4/0\	
70.3		10	09.0	8 10 16 20	13. 13.112 () 15. 13.112 () 13. 13. 13.113 ()	Wet medium dense green fine sand w/some silt, trace of coarse sand and fine gravel.	A-2-4(0)	
10.3			71.0'	∠∪		21" RECOVERY		
74		11	74.0'	15	117124	Wet your dance Contact	A 2 4(0)	
		''	74.0	15 25 61		Wet very dense green fine to coarse sand w/ some fine gravel and silt, trace of organic	A-2-4(0)	
			76.0'			matter.		
						16" RECOVERY		
77.7								
	1/4/11	12	79.0'	14		Wat dance green fine to coorse and wisems	A 2 4(0)	
Щ_	1/7/11	14	, 5.0			Wet dense green fine to coarse sand w/some	A-2-4(0)	<u> </u>

F.A. Project: U.S. 301 Maryland State Line to SR-1 **Contract:** 25-113-01

	act: 25-113	-01						
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
				18 29 35		silt, trace of fine gravel.		
81.4			81.0'	33	-	20" RECOVERY		
01.4								
		13	84.0'	20 22 42 50/3"		Wet very dense green clayey fine sand w/	A-2-4(0)	
85.1				42 50/3"		some coarse sand and silt, trace of fine gravel.		
			86.0'		-	18" RECOVERY		
88.8				40				
		14	89.0'	42 50/4"		Wet very dense green clayey fine to coarse sand w/some silt and fine gravel.	A-2-5(0)	
			91.0'			10" RECOVERY		
						DDAET		
92.5						DRAFI		
		15	94.0'	12		Wet very dense gray silty fine sand w/some	A-2-4(0)	
				12 20 42 50/4"		coarse sand, trace of fine gravel.		
96.2		A '	96.0'			20" RECOVERY		
			Λ			DIICT ON	15	
		16	98.0'	16 21 30 50/4"		Wet very dense gray silty fine to coarse sand	A-2-4(0)	
99.9			100.0'	50/4"		w/trace of fine gravel. 20" RECOVERY		
00.0			100.0			End of Boring		
103.6								
103.6								
107.3								
111								

Symbol Description

Strata symbols



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on January 3, 2011 using 3 1/4-inch diameter continuous flight power auger. Rig is a Truck Mounted CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

24.0

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to SR-1 Boring No.: BR2-4-06

Contract: 25-113-01

Boring Location: STA. 347+89 65' Rt. C.L.

Boring Surface Elev.: + 64.94 Reference:

IN. IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D. **Casing Size:**

From Depth of: From Depth of: To: To: 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Casing Time **Depth of Hole Depth of Water** Elev. of Water Date 13.9 1/4/11 24.0 24.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 100.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers: T. Kane

								-
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	1/4/11	1	24.0'	6 6 10 12		et medium dense orange fine gravelly arse sand w/trace of fine sand and silt.	A-1-b	Topsoil - 8". Blank augered to 24.0' then
25.9			26.0'			12" RECOVERY		started sampling. Mud Rotary @ 24.0'.
						<u> JK BIDI</u>		IG
29.6		2	29.0'	7 10 10 13		et medium dense brown fine to coarse sand some silt.	A-2-4(0)	
			31,0'			17" RECOVERY	15	
33.3								
		3	34.0'	10 18 18 21	111111111111	et dense brown fine sand w/some coarse ad and silt, trace of fine gravel.	A-2-4(0)	
			36.0'			20" RECOVERY		
37								
		4	39.0'	9 10 12 13		et medium dense brownish green fine sand some coarse sand and silt.	A-2-4(0)	
40.7			41.0'			19" RECOVERY		
44.4		5	44.0'	10 11	We	et medium dense brownish green fine sand	A-3	

Remarks:

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301 Maryland State Line to SR-1 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	<u> </u>			16 18	0619366 2217220 6611366	w/some coarse sand, trace of silt.		
			46.0'		er i alier De i alier De i alier De i circie	22" RECOVERY		
					p. 6 1) 41 6 6 p. 6 1 (41 6 6 p. 6 1 (41 6 6 p. 6 1 3 3 6 6 7			
48.1					172 172 1261. 126 1 3 4 1 6 6 126 1 3 1 1 1 1 1 1			
		6	49.0'	10 10 10		Wet medium dense brownish green fine sand	A-2-4(0)	
			51.0'	10 14		w/some silt, trace of coarse sand.		
51.8			51.0		-	20" RECOVERY		
31.0								
	.,_,,							
	1/5/11	7	54.0'	4 7 8 11		Wet medium dense green fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
55.5			56.0'	11		19" RECOVERY		
						IJKAFI		
59.2		8	59.0'	8	10.24 3 410 10	W/	A 2	
		ľ	39.0	8 9 12 16		Wet medium dense green fine sand w/trace of coarse sand, silt and fine gravel.	A-3	
		\ \ \	61.0'	10		20" RECOVERY	JII '	
	_							
62.9			_					
02.9					enieniei Minier	31181 70	15	
		9	64.0'	8		Wet dense green fine sand w/some silt, trace	A-2-4(0)	
				8 15 23 27		of coarse sand.	112 1(0)	
			66.0'			21" RECOVERY		
66.6								
		10	69.0'	11 13		Wet dense green fine sand w/some silt, trace	A-2-4(0)	
70.3				11 13 18 23		of coarse sand.		
			71.0'			21" RECOVERY		
74								
'*		11	74.0'	28 50/3"	0.113712.0 0.1137127 0.1131127	Wet very dense greenish gray fine sand w/	A-2-4(0)	
						some fine gravel and silt, trace of coarse sand		
			76.0'			and shell fragments. 9" RECOVERY		
					11.6149166 64449166 88419166			
77.7					12 / 23 12 1 12 1 / 3 2 12 1 12 1 4 1 1 2 1 1 2 1 1 1 1 2 1 1			
					0000 1000 0 1200 1000 0 1200 1000 0 1200 1000 0			
		12	79.0'	18		Wet hard green coarse sandy silt w/some fine	A-4(0)	

F.A. Project: U.S. 301 Maryland State Line to SR-1 **Contract:** 25-113-01

Contract. 25-115-01										
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks		
				23 28 44		sand, trace of fine gravel.				
81.4			81.0'	44		22" RECOVERY				
01.4										
		13	84.0'	16		Wet very dense green silty fine to coarse sand	A-2-4(0)			
85.1				16 28 38 44		w/some fine gravel, trace of shell fragments.				
			86.0'			22" RECOVERY				
88.8										
		14	89.0'	50/4"		Wet dense gray fine sandy fine gravel w/some	A-1-b			
						coarse sand and silt, trace of shell fragments.				
			91.0'			D D A E T				
						DRAFI				
92.5										
	R	15	94.0'	18 27 50/5"		Wet very dense gray silty fine sand w/some	A-2-4(0)			
				50/5"		coarse sand, trace of fine gravel and shell				
96.2		1	96.0'			fragments. 16" RECOVERY				
			Λ			DIICT OA	15			
		16	98.0'	20 25 50 50/2"		Wet very dense gray fine sand w/some coarse	A-2-4(0)			
99.9			100.0'	50/2"		sand and silt, trace of fine gravel and shell fragments.				
00.0			100.0			End of Boring				
						End of Bornig				
103.6										
107.3										
111										

Symbol Description

Strata symbols

Poorly graded sand

Silty sand

Poorly graded sand with silt



silt

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on January 4, 2011 using 3 1/4-inch diameter continuous flight power auger. Rig is a Truck Mounted CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

24.0

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR2-5-03A

Contract: 25-113-01

Boring Location: Sta. 275+23.63, 83.00' Rt. C.L.

Boring Surface Elev.: + 42.63 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split-Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4" **Casing Size:** Inches **Hollow Stem Auger:** 0.0

Water Level Readings

Depth of Casing Depth of Water Time Depth of Hole Elev. of Water Date 3/5/2009 24.0 24.0 3.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 95.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/5/09	1	49.0' 51.0'	5 9 11 13	No Sieve Analysis - pH sample retained by GTA. 21" RECOVERY		
52.5				T	FOR BIDI		1G
56			Δ	\U	GUST 20	15	
59.5		2	59.0'	7 11 12 18	No Sieve Analysis - pH sample retained by GTA.		
63			61.0'	10	20" RECOVERY		
66.5							

Remarks: Mud Rotary @ 24.0 feet. Sampling started at 49.0 feet.

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Boring No.: BR2-5-03A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.	l. Remarks
70		3	69.0'	10 16 21 23	Wet dense greenish gray fine to coarse sand w/some silt, trace of gravel. A-2-4(0)	
		4	71.0' 71.0'	12 15 25 20	21" RECOVERY No Sieve Analysis - pH sample retained by GTA.	
73.5			73.0'	20	20" RECOVERY	
	3/6/09	5	74.0' 75.2'	14 42 50/2"	Wet very dense gray clayey gravel and fine sand w/some coarse sand.)
77					14" RECOVERY	
80.5		6	79.0'	10 14 24 33	Wet dense gray clayey fine sand w/some A-2-4(0 coarse sand, trace of gravel.	
80.5		7	81.0' 81.0'	8 11 25 33	24" RECOVERY No Sieve Analysis - pH sample retained by GTA.	
			83.0	33	24" RECOVERY	NG
84		8	84.0'	15 18 28 38	Wet dense gray clayey fine sand w/some A-2-4(0 coarse sand, trace of gravel.	
			86.0'		24" RECOVERY	
87.5			_			
		9	89.0'	13 23 40 50/4"	Wet very dense gray fine sand w/some coarse sand and silt, trace of gravel.	
91			91.0'		22" RECOVERY	
94.5		10	94.0' 95.0'	35 50	Wet very dense gray silty fine sand w/some coarse sand, trace of gravel. 12" RECOVERY)
					End of Boring	
98						
101.5						

Symbol Description

Strata symbols

Silty sand



Clayey sand



Poorly graded clayey silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 3/5/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR2-5-05A

Contract: 25-113-01

Boring Location: Sta. 271+96.94, 67.00' Lt. C.L.

Boring Surface Elev.: + 42.67 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split-Barrel O.D. 2 IN. IN. O.D. Core Bit: O.D.

3 1/4" **Casing Size:** Inches From Depth of:

To: To: **Hollow Stem Auger:** From Depth of: 0.0 14.0

Water Level Readings

Time **Depth of Casing Depth of Water** Depth of Hole Elev. of Water Date 2/27/2009 Dry 4.4 14.0 14.0 50.0 3/5/2009 14.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 95.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/4/09	1	49.0'	7 10 13 18	No Sieve Analysis - pH sample retained by GTA.		
			51.0'	10	20" RECOVERY		
52.5	N	1					
52.5		V			FOR BIDI	JII'	IG
						_	
56					IGUST 20	15	
56				10	0001 20	10	
		2	59.0'	a	No Sieve Analysis - pH sample retained by		
59.5		2	39.0	9 11 17 31	GTA.		
			61.0'		24" RECOVERY		
63							
66.5							

Remarks: Mud Rotary @ 14.0 feet. Sampling started at 49.0 feet.

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Boring No.: BR2-5-05A

	1					
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
70		3	69.0'	5 10 16 24	wet medium dense gray silty fine to coarse sand w/some organic matter, trace of gravel. A-2-4(0)	
			71.0'	40	24" RECOVERY	
		4	71.0'	16 29 41 59/5"	No Sieve Analysis - pH sample retained by GTA.	
			73.0'	59/5"	22" RECOVERY	
73.5			73.0		22 RECOVERT	
		5	74.0'	10	Wet hard gray organic clayey fine sandy silt A-4(0)	
				10 17 22 27	w/some coarse sand, trace of gravel.	
			76.0'		24" RECOVERY	
77						
		6	79.0'	15	Wet dense gray silty fine sand w/some coarse A-2-4(0)	
90.5				15 20 26 50/5"	sand, trace of organic matter and gravel.	
80.5			81.0'		23" RECOVERY	
		7	81.0'	12 13 24 50/3"	No Sieve Analysis - pH sample retained by GTA.	
	R		83.0	50/3"	20" RECOVERY	
			83.0		20 RECOVERY	
84		8	84.0'	11 18	Wet dense gray silty fine sand w/some coarse A-2-4(0)	
				18 24 50/4"	sand, trace of gravel.	
			86.0'		22" RECOVERY	
					MJUSI ZUIJ	
87.5						
		9	89.0'	14	Wet very dense gray fine sand w/some coarse A-2-4(0)	
				14 20 37 50/5"	sand and silt, trace of gravel.	
91			91.0'		23" RECOVERY	
94.5		10	94.0'	20 50	Wet very dense gray fine sand w/some silt A-2-4(0)	
			95.0'	00	Wet very dense gray fine sand w/some silt and coarse sand, trace of gravel. 12" RECOVERY	
					End of Boring	
00						
98						
101.5						

Symbol Description

Strata symbols

Silty sand



Clayey sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 2/27/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR2-7-01

Contract: 25-113-01

Boring Location: Sta. 264+95.39, 284' Lt. C.L.

Boring Surface Elev.: 38.30 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: IN. Type of: Split Barrel O.D. 2 O.D.

IN. IN. U-Sampler: 3 Ball Sampler Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of:

Hollow Stem Auger: From Depth of: 0.0' 25.0'

Water Level Readings

Elev. of Water Time **Depth of Hole Depth of Casing Depth of Water** Date 35.1 38.3 3.2' 3/2/08 6.0' 4.0' 38.3 38.3

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 73.3 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Billy Holden

Helpers: T. Kane

		1	1 -		1			Т
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
(11.)	1 10g1000	1	0.5'	2		Wet very loose brown silty fine to coarse sand	A-2-4(0)	4" Forest Duff.
-				2 2 1		w/ some gravel.	11 2 4(0)	4 Totest Buil.
						W some grave.		
			2.0'			5" RECOVERY		
2.49		2	2.0'	2 3 3 4		Saturated loose brown fine to coarse sand w/	A-2-4(0)	
				3 4		some silt and gravel.		
		M						
		4						
		3	4.0' 4.0'	4		11" RECOVERY	A 2	
			4.0	6	120 Y 120 444 3 434 120 4 4 134	; Saturated medium dense brown fine to coarse	A-3	
4.98				6		sand, trace of silt and gravel.	15	
			6.0'	1		16" RECOVERY		
		4	6.0'	5	1.(143.6) 1.41.(15).6	No Sample Recovery.		
				5 6 6 7		;		
				/):[143]64):[173:6]			
7.47					100 J.A. 1 10 I			
			8.0'		126 1 2 3 3 6 6 176 1 7 7 7 7 7 16 6 1 1 3 1 6 1	0" RECOVERY		
		5	8.0'	5 7	126 17 121C 126 17 121C 126 1 1 1 1 1 1 1	Saturated medium dense brown fine to coarse	A-3	
				9	ist a haire i	sand w/ some silt, trace of gravel.		
					126 13 326 0 126 17 126 1 46 1 3 426 (
					1:0 3 A.1 (0 0 1:0 1 (4:0)			
9.96			10.0'			16 RECOVER I		
		6	10.0'	6 9 10 13		Saturated medium dense brown fine to coarse	A-2-4(0)	
				10 13		sand w/ some silt, trace of gravel.		
			10.0			A W DEGOVERN		
		7	12.0' 12.0'	1		24" RECOVERY Saturated medium dense brown fine to coarse	A-3	
12.45		′	12.0	1 3 8 12		i	A-3	
				12		sand, trace of silt.		
			14.0'			: 15" RECOVERY		
		8	14.0'	3 5	1:013 1:00 1:01 1:01:01 2:01 1:01:01		A-3	

Remarks: Mud Rotary at 25.0

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
14.94				8 10	1:01 /3: 1:01 / 3: 1:01 / 1:	sand, trace of silt and gravel.		
					13(11.1) 13(11.1) 13(11.1)	9 14 15 15		
			16.0'			18" RECOVERY		
		9	16.0'	6 8 11 12		Saturated medium dense brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
				12		sand w/ some sitt, trace of graver.		
17.43			40.01			All DEGOVEDV		
		10	18.0' 18.0'	5		24" RECOVERY Saturated medium dense light brown fine to	A-2-4(0)	
				5 8 10 11		coarse sand w/ some silt, trace of gravel.	(*)	
19.92			20.0'			15" RECOVERY		
22.41						D D A E T		
22.41						\square		
		U-1	23.0'			Saturated medium dense light brown and	A-2-4(0)	Press Sample - Shelby Tube.
						green fine to coarse sand w/ some silt, trace of		
	I.					gravel.		
24.9			25.0'			24" RECOVERY		
		11	25.0'	8 9 10	11 11 11 11 11 11 11 11 11 11 11 11 11		A-3	glauconitic.
				10 13)::117): :::1111 ::(::11)	sand, trace of sitt.		
			Λ				15	
27.39			27.0'			24" RECOVERY		
27.53				1			10	
		12	28.0'	8 10 14		Seturated medium dense green fine send w/	A-2-4(0)	glauconitic
				14 14		some coarse sand and silt.		
					130 131 131 136 1 1 1 1 1 136 1 2 1 2	14 9 6		
29.88			30.0'			18" RECOVERY		
						5) (1) (2)		
					196 (196) 186 (196) 186 (196)			
					1:[141 1::11:1 1::11:1			
32.37					150 / 7.10 170 1 / 37 176 1 / 37 176 1 / 73	7.1 V 1.1		
02.01					11 (1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	i.		
		13	33.0'	9		Saturated medium dense green fine sand w/	A-2-4(0)	glauconitic
				9 10 14 15		some silt and coarse sand.		
34.86			35.0'			20" RECOVERY		
37.35								
57.55								
	i		l	<u>I</u>			<u> </u>	L

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
		14	38.0'	8 11 13 13	1217 1121 011 121 121 011 121 121 121 121 121 121 121 121 121 121	Saturated medium dense gray and green fine sand w/ some coarse sand and silt.	A-2-4(0)	
39.84		PH-1	40.0' 40.0'		PETTANEN PETTANET PETTANET PETTANET PETTANET PETTANET PETTANET PETTANET PETTANET PETTANET PETTANET	12" RECOVERY Visual Description: Saturated medium dense gray and green fine sand w/ some coarse sand and silt.		Sample brought to GTA lab for pH testing.
42.33			42.0'		100 7 100 6 100 7 100 6 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6 100 100 6	12" RECOVERY		
		15	43.0'	8 13 15 14	CETTARE CETTARE CETTARE CETTARE CETTARE CETTARE CETTARE	Saturated medium dense gray and green fine sand, trace of silt and coarse sand.	A-3	
44.82			45.0'		6617366 6617366 66173666 66173666	14" RECOVERY		
47.31					10133169 10117161 10133169 10133169 10133169 10133169 10133169 10133169	DRAFT		
		16	48.0'	9 12 14 16	6933966 16333966 16333966 16333966 16333966 16333966 16333966 16333966 16333966 16333966	Saturated medium dense gray fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	1G
49.8			50.0	VU		3US ^{14"} RECOVERY 20	15	
52.29					ist jäätei vet 13 juu val 13 juu val 13 juu val 13 juu val 13 juu			
		17	53.0'	9 13 17 13		Saturated medium dense gray fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	
54.78			55.0'		-	18" RECOVERY		
57.27								
		18	58.0'	15 18 19 21		Saturated dense dark brown (black) silty fine sand w/ some coarse sand and organic matter, trace of gravel.	A-2-4(0)	
59.76			60.0'		-	20" RECOVERY		

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

			1			T	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.25		19	63.0'	17 17 17 17 24	Saturated dense black and green fine to coarse sand w/ some silt and organic matter, trace of clay.		glauconitic
64.74			65.0'		19" RECOVERY		
69.72		20	70.0'	18 30 28 41	Saturated very dense black and green fine to coarse sand w/ some silt and organic matter, trace of gravel. 22" RECOVERY	A-2-4(0)	glauconitic
72.21	ľ	21	73.0'	50/4"	FOR BIDI		
74.7		21	73.0' 73.5'		Saturated very dense green and gray silty fine to coarse sand, trace of gravel. 4"RECOVERY Boring terminated at 73.3 feet.	A-2-4(0)	glauconitic
77.19							
79.68							
82.17							

Symbol Description

Strata symbols

Silty sand

1.00000 1.000000 1.0000000

Poorly graded sand with silt



Poorly graded sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory boring was drilled on 3/2/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55.
- 2. Groundwater levels recorded at time of drilling. Borings backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All SPT blow counts are uncorrected.

46.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR2-7-02

Contract: 25-113-01

Boring Location: Sta. 266+53.75, 281' Lt. C.L.

Boring Surface Elev.: 38.00 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D. U-Sampler: 3 Ball Sampler

Core Bit: O.D. **Casing Size:** 3 1/4 Inches From Depth of:

To: To: Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 34.0 38.0 3/1/08 6.0' 4.0' 4.0' 38.0 38.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 73.3 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Jason Truver

Helpers: J. Lafferty

	T =	1		1 1		_
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
(11.)	1 1091633	1	0.5'	1	Wet very loose brown silty fine to coarse A-2-4(0)	5" Topsoil
	1	l '	0.0	1 2		3 Topson
					sand, trace of gravel.	
			2.0'		13" RECOVERY	
2.49		2	2.0'	1 2 2 4	Wet very loose brown clayey coarse to fine A-2-6(1)	
2.10				2 4	sand, trace of gravel.	
						VI (¬
		<i>A</i> '				N
			4.0'		20" RECOVERY	
		3	4.0'	3 5 5 5	Saturated loose brown and orange fine to A-3	
4.98			Λ	5 5	coarse sand, trace of silt.	
4.90	1					
			6.0'		20" RECOVERY	
		4	6.0'	3 4 4 5	Saturated loose brown and orange fine to A-3	
				4 5	coarse sand, trace of silt.	
7.47					(*):61 1986	
7.47					1.3.1.C.1 1.3.1.C.1 1.3.1.C.1	
			8.0'		21" RECOVERY	
		5	8.0'	8 10	Saturated medium dense brown and orange A-3	
				10 13	fine to coarse sand, trace of silt and gravel.	
	1				7000 1996	
—					74364 5364	
9.96	1		10.0' 10.0'	10	19" RECOVERY	
		6	10.0	10 13 16 18	Saturated medium dense brown and orange A-2-4(0)	
				18	silty fine to coarse sand, trace of gravel.	
	1		40.01		AND DEGOVERY	
	1	7	12.0' 12.0'	8	23" RECOVERY	
12.45		'	12.0	8 5 7 9	Saturated medium dense brown and orange A-2-4(0)	
				9	silty fine to coarse sand, trace of gravel.	
	[14.0'		17" RECOVERY	
		8	14.0'	3 5	Saturated loose brown and orange fine to A-2-4(0)	
1	I	ı	1	1 5	Saturated 10085 brown and brange fine to A-2-4(0)	

Remarks: Mud Rotary at 46.0

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth	Daily	No.	Sample	Blows/6"		Sample Description	Class./G.I.	Remarks
(ft.)	Progress	NO.	Depth			coarse sand w/ some silt.	Class./G.I.	iveillaiks
14.94				5 6		coarse sand w/ some sit.		
		9	16.0' 16.0'	7		18" RECOVERY Saturated medium dense brown and orange	A-2-6(0)	
				7 7 15 18		clayey fine sand w/ some coarse sand.	A-2-0(0)	
17.43								
17.10			18.0'			21" RECOVERY		
		10	18.0'	8 9 15 19		Saturated medium dense brown and orange	A-2-4(0)	
				15 19		fine to coarse sand w/ some silt.		
19.92			20.0'			21" RECOVERY		
22.41								
22.41						DRAFI		
		11	24.0'	5 6 8 11		Saturated medium dense brown and orange	A-2-4(0)	
24.9				8 11		fine to coarse sand w/ some silt.) \	
		7 '						
			26.0'			20" RECOVERY		
			\wedge			DI IOT OO	1	
07.00							15	
27.39				10		7001 20		
		12	28.0'	5		Saturated medium dense green and brown	A-2-4(0)	glauconitic
				5 9 9 13		fine sand w/ some silt and coarse sand.	11 2 1(0)	giadeomae
29.88			30.0'			22" RECOVERY		
32.37								
		13	34.0'	13		Saturated dense green fine sand w/ some	A-3	glauconitic
34.86				13 14 17 20	esanaire Esanaire Esanaire Prenance	coarse sand, trace of silt.	-	
					66133166 66133166			
			36.0'		nacionice Nacionice Nacionice Nacionice	19" RECOVERY		
					661)466 6011466 6011466			
37.35								

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
(111)			200		00 / 10:00 00 / 10:00 00 / 10:00 00 / 10:00 00 / 10:00			
39.84		14	39.0'	8 13 27 50/4"		Saturated dense green silty fine to coarse sand, trace of gravel.	A-2-4(0)	glauconitic
			41.0'			17" RECOVERY		
42.33								
		15	44.0'	8 13 17 20	12177121 121771211 12179121	Saturated medium dense green fine sand,	A-3	glauconitic
44.82				17 20	150 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	trace of coarse sand and silt.		
			46.0'			20" RECOVERY		
					13 13 13 15 15 13 13 13 15 15 15 13 13 15 15 15 13 13 15 15 15 13 13 15 15	DRAFI		
47.31					0.000 1000 0 1000 1000 0 1000 1000 0 1000 1000 0 1000 1000 0			
		16	48.0'	5 9 9 11	a istea	Saturated medium dense green fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	glauconitic
49.8			50.0			23" RECOVERY	4	
						4UST 20	15	
						3001 20		
52.29								
		17	53.0'	9		Saturated medium dense green fine sand w/	A-2-4(0)	glauconitic
				9 10 15 21		some silt, trace of coarse sand and organic matter.	A-2-4(0)	gradeomite
54.78			55.0'			23" RECOVERY		
			30.0					
57.27								
		18	58.0'	16			A 2 4(0)	
		10	30.0	16 19 30 38		Saturated dense green silty fine sand w/ some coarse sand, trace of gravel, organic matter,	A-2-4(0)	glauconitic
59.76			60.0			and seashells.		
			60.0'			22" RECOVERY		

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

D- "	D. "		0		<u> </u>	-	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.25							
		19	63.0'	19 22 32 50/3"	Saturated very dense green fine to coarse sand w/ some clay and organic matter, trace of gravel and seashells.	A-2-4(0)	glauconitic
64.74			65.0'		21" RECOVERY		
69.72		20	68.0'	13 30 50/4"	Saturated very dense green silty fine to coarse sand w/ some organic matter, trace of gravel and seashells. 16" RECOVERY	A-2-4(0)	glauconitic
72.21		21	73.0'	50/4"	ORBIDI Saturated very dense green clayey fine sand	A-2-4(0)	glauconitic
74.7			73.5	\U	and gravel w/ some organic matter, trace of coarse sand and seashells. 4" RECOVERY Boring terminated at 73.3 feet.	15	
77.19							
79.68							
82.17							

Symbol Description

Strata symbols

Silty sand



Clayey sand



Poorly graded sand



Poorly graded sand with silt



Poorly graded clayey silty sand



- 1. Exploratory boring was drilled on 3/1/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55.
- 2. Groundwater levels recorded at time of drilling. Borings backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All SPT blow counts are uncorrected.

22.0

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to I-95 Boring No.: BR2-7-03

Contract: 25-113-01

Boring Location: Sta. 264+64, 242' Lt.

Boring Surface Elev.: + 40.11 Reference:

Wt. of Casing Hammer: Average Fall: IN. Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split-Barrel O.D. 2 IN. IN. O.D. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4" **Casing Size:** Inches **Hollow Stem Auger:** 0.0

Water Level Readings

Depth of Water Time Depth of Hole **Depth of Casing** Elev. of Water Date 2/20/2009 5.5 6.0 4.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 100.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks
	2/20/09	1	0.5'	1 3 3	Moist firm brown fine sandy silt w/some clay A-4(0) Topsoil - 4". and coarse sand, trace of gravel.
2.5	N	2	2.0' 2.0' 3.0'	2 2	14" RECOVERY Moist soft brown fine sandy silt w/some clay A-4(0) and coarse sand, trace of gravel. 12" RECOVERY
		2A	3.0' 4.0'	2 2	Moist very loose brown silty fine to coarse sand w/trace of gravel. 12" RECOVERY
5		3	4.0' 6.0'	1 7 4	Wet loose grayish black fine to coarse sand w/some silt and gravel, trace of organic matter. 15" RECOVERY
7.5		4	6.0'	5 4 9 10	Wet medium dense brown fine to coarse sand w/some silt, trace of gravel. A-2-4(0)
		5	8.0' 8.0'	4 7 8 12	16" RECOVERY Wet medium dense brown fine to coarse sand w/some silt, trace of gravel. A-2-4(0)
10		6	10.0'	9 12 17 23	Wet medium dense brown fine to coarse sand w/some silt, trace of gravel. A-2-4(0)
12.5		7	12.0' 12.0'	2 6 10 10	21" RECOVERY Wet medium dense brown fine to coarse sand w/some silt. A-2-4(0)
		8	14.0' 14.0'	5 8	19" RECOVERY Wet medium dense brown fine to coarse sand A-2-4(0)

Remarks:

F.A. Project: U.S. 301 - Maryland State Line to I-95 **Contract:** 25-113-01

		1						
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
15				9 11	w/so	ome silt, trace of gravel.		
			16.0'	_		17" RECOVERY		
		9	16.0'	5 6 10 12		medium dense brown fine to coarse sand ome silt.	A-2-4(0)	
				12	W/S0	ome siit.		
17.5								
		10	18.0' 18.0'	4	Wet	15" RECOVERY medium dense brown fine to coarse sand	A-2-4(0)	
				4 9 12 14	101010101010101	ome silt, trace of gravel.	11 2 4(0)	
						-		
20			20.0'			18" RECOVERY		
	1					30 3.200 . 2003		
22.5								
)RAFT		
	_	11	24.0'	4	Wet	medium dense brown fine to coarse sand	A-2-4(0)	Mud Rotary @ 22.0'.
25		11A	24.0' 24.5' 24.5'	9 11 13		ome silt.	A-2-4(0)	Mad Roury & 22.0.
		M	2	13	Wei	6" RECOVERY medium dense grayish green fine sand w/		
	•		26.0'	•		e coarse sand and silt.		
						12" RECOVERY	4	
						UST 20	15	
27.5				$\setminus \bigcup$		USI ZU		
			_					
		12	29.0'	5	Wet	medium dense greenish brown silty fine	A-2-4(0)	
				5 9 10 14		d w/some coarse sand.	A-2-4(0)	
30								
			31.0'			20" RECOVERY		
32.5								
		13	34.0'	7	W	medium dense green fine sand w/some	A-2-4(0)	
		.	07.0	7 9 10 12	silt	and coarse sand.	M-2-4(U)	
35				'-				
			36.0'			21" RECOVERY		
			30.0			2. RECOTERT		
37.5								

F.A. Project: U.S. 301 - Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
40		14	39.0'	6 8 10 12	Wet medium dense greenish gray fine some coarse sand, trace of silt and or matter.		
			41.0'		20" RECOVERY		
42.5					Sice Sict Sict Sice		
45		15	44.0'	8 11 16 16	Wet medium dense greenish gray fine some silt, trace of coarse sand and or matter.		
47.5			46.0'		19" RECOVERY		
		16	49.0'	6	Wet medium dense greenish gray find	e sand w/ A-3	1G
50			51.0	13	trace of silt, coarse sand and organic		
52.5					rice rice		
55		17	54.0'	5 9 13 14	Wet medium dense greenish gray fine some silt, trace of coarse sand and organiter.		
57.5			56.0'		21" RECOVERY		
60		18	59.0'	6 8 17 17	Wet medium dense green fine to coar w/some silt, trace of gravel and organ matter.		Glauconitic
			61.0'		20" RECOVERY		

F.A. Project: U.S. 301 - Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.5							
65	2/23/09	19	64.0'	13 22 33 40	Wet very dense green fine to coarse sand w/ some silt, trace of organic matter. 21" RECOVERY	A-2-4(0)	
67.5							
70		20	69.0' 71.0'	8 14 15 24	Wet medium dense gray fine to coarse sand w/some silt, trace of organic matter. 24" RECOVERY	A-2-4(0)	
72.5			0	Ţ	FOR BIDI		1G
75		21	74.0' 75.5'	9 16 50	Wet hard grayish green clayey fine sandy silt w/some coarse sand and organic matter, trace of gravel. 18" RECOVERY	A-4(1)	
77.5			73.3		16 RECOVERT		
80		22	79.0' 81.0'	13 22 40 50/5"	Wet very dense grayish green clayey fine sand w/some coarse sand, trace of gravel. 22" RECOVERY	A-2-6(0)	
82.5		23	84.0'	11 18 34 41	Wet very dense gray silty fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	

F.A. Project: U.S. 301 - Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
			86.0'			24" RECOVERY		
			00.0					
87.5								
	2/24/09	24	89.0'	12 17 28 50/5"		Wet dense gray silty fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	
90				50/5"		sand, trace of graver.		
			91.0'			23" RECOVERY		
92.5								
						DDAET		
		25	94.0'	21		LINALL		
		25		21 50/5"		Wet very dense gray silty fine sand w/some coarse sand, trace of gravel. 11" RECOVERY	A-2-4(0)	
95	R		95.0'					
		M				()K BII)I		J(j
				•				
97.5							4	
97.5						4UST 20	15	
				10		JUUI ZU		
		26	99.0'	25 50		Wet very dense gray fine sand w/some silt	A-2-4(0)	
100			100.0'			and coarse sand	A-2-4(0)	
100			100.0		1212121212121	End of Boring		
102.5								
105								
107.5								

Symbol Description

Strata symbols

Poorly graded clayey silty sand



Silty sand



Poorly graded sand with silt



Clayey sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 2/20/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

24.0

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to I-95 Boring No.: BR2-7-04

Contract: 25-113-01

Boring Location: Sta. 265+89, 154' Lt.

Boring Surface Elev.: + 38.20 Reference:

Wt. of Casing Hammer: Average Fall: IN. Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split-Barrel O.D. 2 IN. IN. O.D. O.D.

Core Bit: O.D. 3 1/4" **Casing Size:**

From Depth of: From Depth of: To: To: Inches **Hollow Stem Auger:** 0.0

Water Level Readings

Depth of Water Time Depth of Hole **Depth of Casing** Elev. of Water Date 2/26/2009 4.0 2.0 3.4

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 100.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers: T. Kane

		ī				
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
(11.)	2/26/09	1	0.5'	1	Main and Language Gran A 2 4(0)	Forrest Duff - 3".
	2/20/03	l '	0.5	1 1 2	Moist very loose tan clayey coarse to fine A-2-4(0)	Forrest Dull - 5.
				_	sand w/some gravel.	
			2.0'		18" RECOVERY	
2.5	_	2	2.0'	3 5 7	Wet loose orange fine to coarse sand w/some A-2-4(0)	
2.5				5 7	silt.	
				,		
		N 1				
	_		4.0'		16" RECOVERY	
		3	4.0'	4 6	Wet medium dense orange fine to coarse sand A-2-4(0)	
5				8 7	w/some silt.	
1 3						
			6.0'		20" RECOVERY	
		4	6.0'	6 12 18 24	Wet medium dense orange fine to coarse sand A-2-4(0)	
				18 24	w/some silt.	
 						
7.5						
		5	8.0' 8.0'	6	16" RECOVERY	
		5	0.0	6 9 10 9	Wet medium dense orange fine to coarse sand A-2-4(0)	
				9	w/some silt, trace of gravel.	
40			10.0'		19" RECOVERY	
10		6	10.0'	5	Wet medium dense orange silty fine to coarse A-2-4(0)	
				5 5 8 12	sand.	
				12	Sand.	
			12.0'		16" RECOVERY	
12.5		7	12.0'	4	Wet medium dense orange silty fine to coarse A-2-4(0)	
12.3				4 6 9 10	sand w/trace of gravel.	
				10		
			14.0'		17" RECOVERY	
		8	14.0'	6 9	Wet medium dense orange silty fine to coarse A-2-4(0)	

Remarks:

F.A. Project: U.S. 301 - Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15	J		15.0'		sand w/trace of gravel. 10" RECOVERY		
		8A	15.0'	11 12	Wet medium dense greenish brown fine to	A-2-4(0)	
		9	16.0' 16.0'	4	coarse sand w/some silt.	A-2-4(0)	
			.0.0	4 9 12 14	Wet medium dense greenish brown silty fine to coarse sand w/trace of gravel.	A-2-4(0)	
17.5					to coarse saild w/trace of graver.		
			18.0'		18" RECOVERY		
		10	18.0'	6 8 8 12	Wet medium dense greenish brown fine to coarse sand w/some silt.	A-2-4(0)	
				12	Coarse sand w/some sit.		
20			20.0'		20" RECOVERY		
20			20.0		20 RECOVERT		
22.5							
22.5					II)RAFI		
		<u>1</u> 1	24.0'	4	N/ L	A 2 4(0)	M 1D (@ 24.0)
0.5			24.0	4 7 9 10	Wet medium dense greenish brown fine to coarse sand w/some silt.	A-2-4(0)	Mud Rotary @ 24.0'.
25		V		10			
			26.0'	_	21" RECOVERY		
			_				
					GUST 20	115	
27.5				10			
		12	29.0'	4 6 7 9	Wet medium dense greenish brown fine sand w/some coarse sand and silt.	A-2-4(0)	
30				9	w/some coarse said and site.		
			31.0'		19" RECOVERY		
			51.0		D ALCO LEAT		
32.5							
		13	34.0'	6 9 11 14	Wet medium dense green fine sand w/some	A-3	Glauconitic
35				14	coarse sand, trace of silt.		
					14607 14706 14766		
			36.0'		1416/1 21" RECOVERY		
					1.43cF 1.17cF 1.17cF 1.17cF		
37.5					17300 13360 13360		
					15167. 14399		

F.A. Project: U.S. 301 - Maryland State Line to I-95 **Contract:** 25-113-01

		1	1	1	1			
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
					PE 1 3 3 PE 104 14-14-14 PE 2 1 7 PE			
		14	39.0'	5				
		14	39.0	5 6 8 9	130 3 A.1; e 140 1 4 A.1; 14 1 1 2 3 1 2 14 1 14 14 15 16	; wet mediam dense green time same with deep of	A-3	Glauconitic
40				9		sin und course sund.		
			44.0			ALL DECOVERY		
			41.0'			21" RECOVERY		
42.5								
					000 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
					(611136 (611336 (611336			
				_		<u>il</u>		
		15	44.0'	7 10 11 14	130 3 5.12 6 140 1 4 3 5 6 140 1 7 3 5 6 170 1 7 7 3 6	; vvet mearam acrise green time same wysome	A-2-4(0)	Glauconitic
45				14		sht, trace of coarse said.		
			46.0'		66 44-16 (28 4 1320 (28 4 1320	22" RECOVERY		
						DRAFI		
47.5								
17.0					rkitrik Gerian Eline			
					6 1336 12 TOG			1/2
		\ !						
		16	49.0'	6 9 13 14		Wet medium dense green fine sand w/some silt, trace of coarse sand.	A-2-4(0)	Glauconitic
50			_	14		sin, trace of coarse saint.		
							15	
			51.0'	1		22" RECOVERY		
52.5								
			540	-				
		17	54.0'	5 9 12 16	150 JA. 150 140 JA. 150 150 JA. 150	e vict mediam dense green time sand withdee or	A-3	Glauconitic
55				16		one and course sand.		
			F0.0'			22# RECOVERY		
			56.0'		(56 14-156) (56 14 13:6) (56 14 13:6)	23" RECOVERY		
57.5								
					(C) 3 13 00 (C) 3 13 00 (C) 3 13 00 (C) 3 13 00 (C) 3 13 00			
		18	59.0'	12		W. d. Lander	A 2 4/0	Cl
		18	59.0	12 17 25 31		Wet dense green fine sand w/some coarse sand and silt, trace of gravel.	A-2-4(0)	Glauconitic
60				31		grand state of grands.		
			64.0			22" RECOVERY		
			61.0'			22" RECOVERY		

F.A. Project: U.S. 301 - Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
62.5	-							
		19	64.0'	10 18 20 25		Wet dense green fine to coarse sand w/some	A-2-4(0)	Glauconitic
65			66.0'	25		clay, trace of gravel. 23" RECOVERY		
67.5								
		20	69.0'	10		Wet very dense green fine to coarse sand w/	A-2-4(0)	Glauconitic
70			71.0'	10 23 40 50		some silt, trace of gravel. 23" RECOVERY	A-2-4(U)	Giauconiuc
72.5		J(Т	-	OR BIDI		JG
	·	21	74.0'	35			1 F	
75		21	75.0'	35 50/3"		Wet very dense gray silty fine sand and gravel w/some coarse sand. 9" RECOVERY	A-2-4(0)	
77.5								
11.5								
80	2/27/09	22	79.0'	10 17 35 50		Wet very dense gray clayey fine sand and gravel w/some coarse sand.	A-2-4(0)	
			81.0'			24" RECOVERY		
82.5								
85		23	84.0'	10 14 23 40		Wet dense gray fine sand w/some coarse sand and clay, trace of gravel.	A-2-4(0)	

F.A. Project: U.S. 301 - Maryland State Line to I-95 **Contract:** 25-113-01

	act. 25-113	-01				
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
	-		86.0'		24" RECOVERY	
			00.0			
	-					
87.5	_					
		24	89.0'	12		
90	-	24	09.0	12 23 43 50/3"	Wet very dense gray fine sand w/some silt A-2-4(0) and coarse sand, trace of gravel.	
90	1					
			91.0'		19" RECOVERY	
	-					
92.5	-					
	-				III)RAFI	
	-	25	94.0'	34 50	Wet very dense gray fine sand w/some silt A-2-4(0)	
95			95.0'		and coarse sand, trace of gravel. 12" RECOVERY	
					FOR BIDDIN	JG
	1	N 1				
	-					
97.5	-				GUST 2015	
	-			1	JUSI ZUISI	
		00	00.01	20		
400	-	26	99.0'	20 50	Wet very dense gray fine sand w/some silt A-2-4(0) and coarse sand, trace of gravel. 12" RECOVERY	
100			100.0'		End of Boring	
	-					
	-					
102.5	-					
	-					
	-					
105						
	-					
107.5	_					
	-					
	1	I	I	1		

Symbol Description

Strata symbols



Poorly graded clayey silty sand



Poorly graded sand with silt



Silty sand



Clayey sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 2/26/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

29.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR2-8-01

Contract: 25-113-01

Boring Location: Sta. 262+32.32, 76' Lt. C.L.

Reference: **Boring Surface Elev.:** 46.57

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D.

U-Sampler: 3 Ball Sampler Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Casing Elev. of Water Time **Depth of Hole Depth of Water** Date 2/12/08 10.0' 9.2' 12.0 37.4 46.6 $\begin{array}{c} 46.6 \\ 46.6 \end{array}$

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 77.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Billy Holden

Helpers: A. Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
		1	1.0' 2.0'	3 3	Moist loose orange-brown clayey fine to A-2-4(0) 9" Cu coarse sand, trace of gravel. 12" RECOVERY	ltivated Soil
2.49		2	2.0'	3 4 5 5	Moist loose orange-brown coarse to fine sand A-2-4(0)	
			4.0'	Τ	w/ some silt, trace of gravel.]
	_	3	4.0'	8 5 9 12	Moist medium dense orange-brown gravel A-1-b	
4.98			6.0'		Transfer of the state with some state and single state an	
		4	6.0'	10 9 7	Wet medium dense red-brown fine to coarse A-2-4(0) sand w/ some silt, trace of gravel.	
7.47			8.0'	9	18" RECOVERY	
		5	8.0'	4 9 15 20	Saturated medium dense red-brown fine to A-2-4(0)	
				15 20	coarse sand w/ some silt.	
9.96			10.0'	44	10" RECOVERY	
		6	10.0'	14 19 15 19	Saturated dense red-brown fine to coarse sand w/ some silt.	
-			12.0'	2	19" RECOVERY	
12.45		7	12.0'	3 2 10 13	Saturated medium dense red-brown fine to A-3 coarse sand, trace of silt.	
<u> </u>		0	14.0'	10	13" RECOVERY	
		8	14.0'	10 24 26 33	Saturated dense red-brown silty fine to coarse sand.	

Remarks: Mud Rotary at 29.0'

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
		9	16.0' 16.0'	23	antist,	16" RECOVERY Saturated very dense red-brown fine to coarse	A-3	
				23 33 34 38	66133126. 15032126. 15033126. 150333126	sand, trace of silt and gravel.	110	
17.43					641)466 6614166 8614166			
		10	18.0' 18.0'	8		12" RECOVERY Saturated dense red-brown silty fine to coarse	A-2-4(0)	
				8 17 24 35		sand.	(*)	
19.92			20.0'		-	17" RECOVERY		
22.41								
						DRAFI		
		11	24.0'	8 10		Saturated medium dense red-brown silty fine	A-2-4(0)	
24.9				8 10 13 20		to coarse sand.		
						TOR BILL		J(j
	•		26.0'		-	20" RECOVERY		
						SUICE OF		
27.39		U-1	27.0'			Saturated medium dense red-brown clayey fine sand.	A-2-6(0)	Press Sample - Shelby Tube.
			28.5'	1		18" RECOVERY		
		40		7				
29.88		12	29.0'	7 14 18 24		Saturated dense red-brown fine to coarse sand w/ some silt.	A-2-4(0)	
20.00								
			31.0'			16" RECOVERY		
32.37								
		13	34.0'	15 17 19 19		Saturated dense red-brown fine sand w/ some	A-2-4(0)	
34.86				19 19		coarse sand and silt.		
			36.0'			16" RECOVERY		
			30.0			IU RECOVERI		
27.05								
37.35								

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	J						
39.84		14	39.0'	10 10 15 15	Saturated medium dense red-brown fine to coarse sand w/ some silt.	A-2-4(0)	
33.04				15	Sund III		
			41.0'		18" RECOVERY		
42.33							
		15	44.0'	5 8 10 11	Saturated medium dense gray-green fine sand	A-2-4(0)	glauconitic
44.82				11	w/ some silt and coarse sand.		
			46.0'		18" RECOVERY		
		PH-1	46.0'	11 14 18 21	Visual Description: Saturated medium dense		Sample brought to GTA lab for pH testing.
47.31				21	gray-green fine sand w/ some silt and coarse sand.		for pri testing.
			48.0'		15" RECOVERY		
	A	1/) I V	
		16	49.0'	6 7	Saturated medium dense green fine sand w/	A-2-4(0)	glauconitic
49.8	_			10 12	some silt and coarse sand.	_ \ _	
			^		PLICT OO	15	
			51.0'		24" RECOVERY		
52.29							
32.29							
		17	54.0'	6	Saturated medium dense dark green fine sand	A-2-4(0)	glauconitic
54.78		''	04.0	6 8 8 8	w/ some silt, trace of coarse sand.	A-2-4(0)	gradeomue
					(2) (A. (2) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1		
			56.0'		17" RECOVERY		
					70: 1970 V 10: 1970 V 10: 1970 V 10: 1970 V 10: 1970 V		
57.27					100 1 2 2 10 10 10 10 10 10 10 10 10 10 10 10 10		
					1617A1861 MR17A1861 MR17A1861		
			_		6.5.4 14.5.1. 16.5.4 14.5.1. 16.1.5 14.5.1. 16.1.5 14.5.1.		
59.76		18	59.0'	8 10 14 13	Saturated medium dense dark green silty fine sand, trace of coarse sand and organic matter.	A-2-4(0)	glauconitic
				13	γ		
			61.0'		24" RECOVERY		
		<u> </u>	<u> </u>	1			

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.25							
64.74		19	64.0'	9 11 13 19	Saturated medium dense dark green fine sand w/ some silt, trace of coarse sand and organic	A-2-4(0)	glauconitic
					matter.		
			66.0'		24" RECOVERY		
67.23							
69.72		20	69.0'	16 22 29 34	Saturated very dense dark green silty fine sand w/ some coarse sand, trace of organic	A-2-4(0)	glauconitic
					matter and gravel.		
			71.0'		15" RECOVERY		
				_			
72.21					FOR BIDI		
	•			•			
				40		4 -	
74.7		21	74.0'	19 30 33 46	No Sample Recovery	15	
			76.0'		0" RECOVERY		
77.19							
77.19					Boring terminated at 77.0 feet.		Rods could not be advanced any further.
							•
79.68							
82.17							
52.17							
84.66							

Symbol Description

Strata symbols

Poorly graded clayey silty sand



Silty sand



Poorly graded sand with silt



Clayey sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 2/12/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 55.
- 2. Groundwater levels recorded at time of drilling and rechecked the following day.
- 3. Surveyed boring locations and elevations were provided by Century Engineering.
- These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All SPT blow counts are uncorrected.

24.0

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: BR2-8-01A

Contract: 25-113-01

Boring Location: Sta. 262+32.32, 76' Lt.

Boring Surface Elev.: + 46.57 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: Type of: Split-Barrel O.D. 2 O.D.

IN. IN. **U-Sampler:** Core Bit: O.D.

To: To: 3 1/4" **Casing Size:** Inches From Depth of: **Hollow Stem Auger:** From Depth of: 0.0

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 2/19/2009 Dry 10.5 24.0 2/19/09

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 84.5 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remark	s
	2/17/09	1	49.0'	6 6 10 11	Wet medium dense greenish brown fine sand A-2-4(0) Mud Rotary @ 2 w/some coarse sand and silt.	4.0'.
51	R	2	51.0' 51.0'	5 8 10 12	18" RECOVERY No Sieve Analysis - pH sample retained by GTA.	
		1	53.0'	12	GTA. 20" RECOVERY	
54			Δ		GUST 2015	
				10		
57						
60		3	59.0'	6 10 12 15	Wet medium dense green fine sand w/some silt, trace of organic matter and gravel. Glauconitic	
		4	61.0' 61.0'	8	20" RECOVERY No Sieve Analysis - pH sample retained by	
				8 10 21 22	GTA.	
63			63.0'		16" RECOVERY	

Remarks: Mud Rotary @ 24.0 Feet.

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: BR2-8-01A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks	
	-								
	-								
69									
69	2/19/09	5	69.0'	16 21 40 36		Wet very dense green fine sand w/some silt	A-2-4(0)	Glauconitic	
				36		and coarse sand, trace of organic matter and gravel.			
		6	71.0' 71.0'	18	-	20" RECOVERY			
72		0	71.0	18 35 69		No Sieve Analysis - pH sample retained by GTA.			
			72.5'			17" RECOVERY			
	-								
	-	7	74.0'	19		Wet very dense green silty fine sand w/some	A-2-4(0)	Glauconitic	
75				19 24 42 58		coarse sand and organic matter.	112 (0)		
			76.0'			22" RECOVERY			
	_							_	
78				Т			\mathcal{I}		
		<u>\</u>		12		UN DIDI		NG	
		8	79.0'	18 30 45 50/4"		Wet very dense green silty fine to coarse sand w/some organic matter.	A-2-4(0)	Glauconitic	
	-		Λ	50/4*			15		
81		9	81.0' 81.0'	20		21" RECOVERY No Sieve Analysis - pH sample retained by			
				20 24 31 38		GTA.			
			83.0'			23" RECOVERY			
84									
04		10	84.0' 84.5'	50/4"		No Sample Recovery - Lost tip of spoon. 0" RECOVERY			
			0			End of Boring			
87									
	-								
	-								
90									
	1								
93									

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- 1. Exploratory borings were drilled on 2/17/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

74.4'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR2-8-02

Contract: 25-113-01

Boring Location: Sta. 263+36.43, 60' Lt. C.L.

Boring Surface Elev.: 43.00 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: 2 Type of: Split Barrel O.D. IN. IN. O.D. U-Sampler: 3 Ball Sampler

Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Water Time Depth of Hole **Depth of Casing** Elev. of Water Date 38.7 43.0 3/2/08 8.0 6.0' 4.3' $\begin{array}{c} 43.0 \\ 43.0 \end{array}$

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 74.4 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Billy Holden

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks
		1	0.0'	1 1 1	Wet very loose black organic silty coarse to fine sand, trace of gravel. (Fill) 3" Topsoil
2.49		2	2.0'	W/R W/R 1	Wet very loose black silty fine to coarse sand, trace of gravel and organic matter. (Fill)
4.98		3	4.0'	W/R W/R W/R W/R	12" RECOVERY Saturated very loose gray silty fine to coarse A-2-4(0) sand, trace of gravel.
		4	6.0' 6.0'	3 5 6 10	14" RECOVERY Saturated medium dense gray silty fine to coarse sand, trace of gravel. A-2-4(0)
7.47		5	8.0' 8.0'		16" RECOVERY Saturated medium dense orange silty fine to A-2-4(0)
9.96			10.0'	3566	coarse sand, trace of gravel.
		6	10.0'	5 8 9 8	Saturated medium dense orange silty fine to coarse sand, trace of gravel. A-2-4(0)
12.45		7	12.0' 12.0'	3 4 7 10	17" RECOVERY Saturated medium dense orange fine to coarse sand w/ some silt, trace of gravel. A-2-4(0)

Remarks:

Reviewed By: Maureen Kelley Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
(/	. 9 3	8	14.0'	3 5 7 10	16" RECOVERY Saturated medium dense orange silty fine to A-2-4(0)	
14.94			14.0	7 10	coarse sand, trace of gravel.	
		9	16.0' 16.0'	8	12" RECOVERY Saturated medium dense orange silty fine to A-2-4(0)	
				8 12 16 21	coarse sand, trace of gravel.	
17.43						
			18.0'		9" RECOVERY	
		10	18.0'	7 7 18 18	Saturated medium dense brown-gray silty fine to coarse sand, trace of gravel. A-2-4(0)	
				18	to course sund, trace of graver.	
19.92			20.0'		18" RECOVERY	
22.41					IIDRAH I	
	A	11	24.0'	1	Saturated medium dense brown-gray fine to A-2-4(0)	
24.9		VI (24.0	1 5 19 13	coarse sand w/ some silt.	
	_			_		
			26.0		17" RECOVERY	
					3US 2015	
27.39				10		
27.00						
		12	29.0'	5		
29.88		12	29.0	5 8 15 16	Saturated medium dense brown-gray fine A-2-4(0) sand w/ some coarse sand and silt.	
23.00				10		
			31.0'		18" RECOVERY	
32.37						
52.31						
24.00		13	34.0'	8 12 13 18	Saturated medium dense dark gray fine sand w/ some coarse sand and silt, trace of gravel.	
34.86				18	some course said and sitt, trace of graver.	
			36.0'		18" RECOVERY	
			30.0			
07.55						
37.35						

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth	Daily	No.	Sample	Blows/6"		Sample Description	Class./G.I.	Remarks
(ft.)	Progress	INO.	Depth	DIOW5/0		Sample Description	Class./G.I.	iveillaiks
		14	39.0'	6		Saturated medium dense dark gray fine sand	A-2-4(0)	
39.84				6 10 14 16		w/ some coarse sand and silt.	(-)	
			41.0'			20" RECOVERY		
42.33								
42.00					16143166 16173166 161733166			
					00173700 01143060 10173700			
					664 1306 G 137 333 G 261 4306 G			
		15	44.0'	8 12 12 12		Saturated medium dense dark gray fine sand	A-2-4(0)	
44.82				12		w/ some silt, trace of coarse sand.		
						DDAET		
			46.0'		-	20" RECOVERY		
47.31								
						·OR BIDI](-
		7						
		40	40.01	12				
49.8		16	49.0'	13 16 22 19		Saturated dense green fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	glauconitic
40.0				19				
			51.0'	1	1	20" RECOVERY		
			31.0		-	20 KLCOVEKT		
52.29								
		17	54.0'	12		Saturated dense green silty fine sand, trace of	A-2-4(0)	glauconitic
54.78				12 18 18 19		coarse sand and gravel.	112 1(0)	0
			56.0'			12" RECOVERY		
57.27								
01.21								
		18	59.0'	12 26 24 40		Saturated dense green fine sand w/ some	A-2-4(0)	glauconitic
59.76				24 40		coarse sand and silt, trace of gravel.		

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
			61.0'		13" RECOVERY	
00.05						
62.25						
	-					
04.74		19	64.0'	24 37 38 50/5"	Saturated very dense green silty fine to coarse A-2-4(0)	glauconitic
64.74				50/5"	sand, trace of gravel.	
			00.01		16" PEGOVERY	
	-		66.0'		16" RECOVERY	
07.00						
67.23						
	1					
00.70		20	69.0'	22 23 50	No Sample Recovery	Trap Broke - Lost Sample.
69.72				50		
		-	70.5'		0" RECOVERY	
					FOR BIDDII	MC2
70.04		N 1				NO
72.21						
		21	73.0'	22	Saturated hard green clayey fine sandy silt w/ A-4(0)	glauconitic
	-			22 25 50/5"	some coarse sand, trace of gravel.	gladeomile
74.7			74.5'		13" RECOVERY	
14.1					Boring terminated at 74.4 feet.	
77.19						
77.15						
79.68						
75.00						
82.17						
02.17]					
L]					

KEY TO SYMBOLS

Symbol Description

Strata symbols

Silty sand



Poorly graded sand with silt



Poorly graded clayey silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- 1. Exploratory borings were drilled on 3/2/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55.
- 2. Groundwater levels recorded at time of drilling and rechecked the following day.
- 3. Surveyed boring locations and elevations were provided by Century Engineering.
- These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All SPT blow counts are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR2-8-03

Contract: 25-113-01

Boring Location: Sta. 264+68.79, 67' Rt. C.L.

Boring Surface Elev.: 43.62 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: 2 Type of: Split Barrel O.D. IN. IN. O.D. U-Sampler: 3 Ball Sampler Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of:

Hollow Stem Auger: From Depth of: 0.0' 18.0'

Water Level Readings

Elev. of Water Time Depth of Hole **Depth of Casing Depth of Water** Date 36.8 43.6 2/25/08 10.0 8.0' 6.8 $\begin{array}{c} 43.6 \\ 43.6 \end{array}$

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 75.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Gary Truver, Sr.

Helpers: J. Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
(11.)	Flogless	1	0.0'	2	Wet loose brown fine to coarse sand and	A-2-4(0)	3" Topsoil
				2 3 4 4	gravel w/ some clay.	A-2-4(0)	3 Topson
				4	grater w some day.		
			2.0'		7" RECOVERY		
2.49		2	2.0'	5 5 7 10	Wet medium dense brown fine to coarse sand	A-2-4(0)	
		V		10	w/ some silt, trace of gravel.	<i></i> /	
	•			_			
			4.0'_		8" RECOVERY		
		3	4.0'	4	Wet medium dense brown fine to coarse sand	A-2-4(0)	
4.98				4 10 20 20	w/ some silt, trace of gravel.		
4.90					J		
		4	6.0' 6.0'	24	14" RECOVERY	A-2-4(0)	
			0.0	24 24 34 38	Saturated very dense brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
				38	sand w/ some snt, trace or graver.		
7.47							
			8.0'		24" RECOVERY		
		5	8.0'	8 10 26 32	Saturated dense brown silty fine to coarse	A-2-4(0)	
				26 32	sand, trace of gravel.		
9.96			10.0'		15" RECOVERY		
5.50		6	10.0'	15	Saturated dense brown silty fine to coarse	A-2-4(0)	
				15 20 22 28	sand, trace of gravel.	112 .(0)	
				20			
			12.0'	3	24" RECOVERY	1.0.1(0)	
12.45		7	12.0'	3 5 9 17	Saturated medium dense brown silty fine sand	A-2-4(0)	
				17	w/ some coarse sand, trace of gravel.		
1		l	1				

Remarks: Mud Rotary at 18.0

Reviewed By: Maureen Kelley Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

<u> </u>							T
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	<u> </u>	8	14.0' /	10	12" RECOVERY	A-2-4(0)	
44.04			14.0'	10 13 13 27	Saturated medium dense brown silty fine to	11 2 1(0)	
14.94				21	coarse sand, trace of gravel.		
			16.0'	4-7	20" RECOVERY		
		9	16.0'	17 22 30 33	Saturated very dense red-brown fine to coarse	A-2-4(0)	
				33	sand w/ some silt, trace of gravel.		
17.43							
			18.0'		24" RECOVERY		
		10	18.0'	8	Saturated medium dense brown fine to coarse	A-2-4(0)	
				8 8 12 14	sand w/ some silt, trace of gravel.	11 2 1(0)	
				14	···, g		
19.92			20.0'		20" RECOVERY		
22.41					DRAFI		
22.41							
		11	24.0'	9 13 10 18	Saturated medium dense brown silty fine to	A-2-4(0)	
24.9		V 1		10 18	coarse sand.	—	
			00.0		2011 DECOMEDA		
			26.0		20" RECOVERY	15	
					JUST 20		
				10	7001 20		
27.39							
		12	29.0'	13 17	Saturated dense brown and red-brown fine	A-3	
29.88				13 17 21 22	sand w/ some coarse sand, trace of silt.		
20.00							
			31.0'		24" RECOVERY		
32.37							
		13	34.0'	11	Saturated medium dense brown and green	A-2-4(0)	
34.86				11 13 17 23	fine sand w/ some coarse sand and silt.	112 1(0)	
57.00				23			
			36.0'		18" RECOVERY		
37.35							

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth	Daily		Sample	Blows/6"	County Bookinties	01 /0.1	Damada
(ft.)	Progress	No.	Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		PH-2	38.0'	12 20 24 30	Visual Description: Saturated dense green gray fine to coarse sand w/ some silt.	and	Sample brought to GTA lab for pH testing.
39.84			40.0'		18" RECOVERY		
		14	41.0'	12 10 17 25	Saturated medium dense green and gray fi to coarse sand w/ some silt.	ne A-2-4(0)	
42.33			43.0'		24" RECOVERY		
44.82		15	44.0'	10 14 21 29	Saturated dense green and gray fine sand some silt and coarse sand.	w/ A-2-4(0)	
			46.0'		24" RECOVERY		
47.31			0	T	FOR BID	DIN	1G
49.8		16	49.0' 51.0'	8 9 12 14	Saturated medium dense gray fine sand w some silt, trace of coarse sand. 15" RECOVERY	A-2-4(0)	
52.29		U-1	51.5'		Saturated medium dense gray fine sand was some silt.	A-2-4(0)	Press Sample - Shelby Tube.
		17	53.5' 53.5'	10	23" RECOVERY Saturated dense gray silty fine sand, trace	of A-2-4(0)	
54.78			00.0	10 23 26 29	coarse sand.	OI A-2-4(0)	
57.27			55.5'		22" RECOVERY		
59.76		18	59.0'	17 24 28 40	Saturated very dense green and gray silty sand, trace of coarse sand and gravel.	fine A-2-4(0)	glauconitic

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
(11.)	Flogless		\ 61.0' /		18" RECOVERY		
	-						
62.25	-						
	=						
]						
	-	19	64.0'	17 20 17 20	Saturated dense green and gray silty fine sand	A-2-4(0)	glauconitic
64.74	-			17 20	w/ some coarse sand, trace of gravel.		
	-						
			66.0'		18" RECOVERY		
	-						
67.23	_						
	-						
]						
	-	20	69.0'	15 20	Saturated dense green and gray silty fine to	A-2-4(0)	glauconitic
69.72	_			15 20 22 27	coarse sand, trace of gravel.		
	=						
			71.0'		24' RECOVERY	\mathcal{I}	
		N١			UK DIVI	ノロ	IG
72.21	-			_			
	-	- 04	70.01	20	DIJOT OO	4.5	
		21	73.0'	20 29 30 58	Saturated very dense green and gray fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	glauconitic
	-			30			
74.7	_		75.0'		24" RECOVERY		
	=				Boring terminated at 75.0 feet.		
	-						
77.19	-						
	-						
	-						
79.68	1						
	=						
]						
	-						
82.17	-						
	-						
]						
]						

KEY TO SYMBOLS

Symbol Description

Strata symbols

Poorly graded clayey silty sand



Silty sand



Poorly graded sand

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- 1. Exploratory borings were drilled on 2/25/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 75.
- 2. Groundwater levels recorded at time of drilling and rechecked the following day.
- 3. Surveyed boring locations and elevations were provided by Century Engineering.
- These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All SPT blow counts are uncorrected.

19.0

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: BR2-8-03A

Contract: 25-113-01

Boring Location: Sta. 264+68.79, 67' Rt.

Boring Surface Elev.: + 43.62 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: Type of: Split-Barrel O.D. 2 IN. IN. O.D. **U-Sampler:**

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4" **Casing Size:** Inches **Hollow Stem Auger:** 0.0

Water Level Readings

Depth of Water Time Depth of Hole **Depth of Casing** Elev. of Water Date 2/24/2009 19.0 19.0 Dry 2/25/2009 10.3 5.6

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 100.5 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/25/09	1	49.0'	6 8 11 13	No Sieve Analysis - pH sample retained by GTA.		Mud Rotary @ 19.0'.
51			51.0'		19" RECOVERY		
			0	Τ	FOR BIDI		1G
54							
					IGUST 20	15	
				10	0001 20		
57							
60		2	59.0'	5 10 13 19	No Sieve Analysis - pH sample retained by GTA.		
60				19			
			61.0'		21" RECOVERY		
63							

Remarks: Mud Rotary @ 19.0 Feet.

Reviewed By: Maureen Kelley Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
()			Бори			
69						
		3	69.0'	8 14 21 30	Wet dense grayish green silty fine to coarse sand w/some organic matter. A-2-4(0)	Glauconitic
			71.0'	11	21" RECOVERY	
72		4	71.0'	11 18 30 37	No Sieve Analysis - pH sample retained by GTA.	
			73.0'		20" RECOVERY	
		5	74.0'	8 15	Wet dense grayish green silty fine to coarse A-2-4(0)	
75	<u> </u>			8 15 17 27	sand w/trace of gravel.	
			76.0'		23" RECOVERY	
78				_		
70					HOK BIDDII	NG
		6	79.0'	12 14 24 34	Wet dense grayish green silty fine sand w/ A-2-4(0) some coarse sand, trace of gravel.	1/2 of sample sent to GTA for pH testing.
81			81.0'		23" RECOVERY	
	-			10		
84		7	84.0'	12 18 30 50/5"	Wet dense gray clayey fine to coarse sand w/ A-2-4(0)	Driller washed past 81.0' -
				30 50/5"	trace of gravel.	83.0' pH sample.
0.7			86.0'		23" RECOVERY	
87						
90		8	89.0'	10 23 50	Wet very dense gray silty fine sand w/some coarse sand, trace of gravel.	
			90.5'		18" RECOVERY	
93						

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

$\overline{}$			1				
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description C	Class./G.I.	Remarks
	<u> </u>	9	94.0'	11 28 43 50		A-2-4(0)	
				50 50	and coarse sand.		
96			96.0'		22" RECOVERY		
99		10	99.0'	24	Wet very dense gray fine sand w/some silt	A-2-4(0)	
				24 43 50/3"	and coarse sand.		
			100.5'		15" RECOVERY		
					End of Boring		
102							
					DRAFT		
105							
100							
					FOR BIDE		
		4				/	
108							
			Λ		CLICT ON	1 [
					GUST 20	15	
				1	000120		
111							
114							
117							
120							
120							
\vdash		I		1			

KEY TO SYMBOLS

Symbol Description

Strata symbols

Silty sand



Clayey sand

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- 1. Exploratory borings were drilled on 2/24/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

24.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR2-8-04

Contract: 25-113-01

Boring Location: Sta. 261+99.23, 67' Rt. C.L.

Boring Surface Elev.: 40.96 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: 2 IN. Type of: Split Barrel O.D. O.D.

Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. U-Sampler: 3 Ball Sampler Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of:

Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Water Time Depth of Hole **Depth of Casing** Elev. of Water Date 35.0 41.0 2/8/08 10.0 8.0' 6.0' $\begin{array}{c} 41.0 \\ 41.0 \end{array}$

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Dia. U-Sample Boring: U-Samples: 74.9 Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Helpers: J. Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks
		1	2.0'	2333	Wet loose brown silty fine to coarse sand, trace of gravel. 20" RECOVERY
2.49		2	2.0	2 4 6 2	Wet stiff dark brown and gray fine to coarse sandy silt, trace of gravel and clay. 12" RECOVERY
4.98		3	4.0' 6.0'	2 3 3 3 3	Wet loose brown silty fine to coarse sand, trace of gravel. 18" RECOVERY
7.47		4	6.0' 8.0'	3 4 5 7	Saturated loose brown fine to coarse sand w/ A-2-4(0) some silt, trace of gravel. 24" RECOVERY
9.96		5	8.0'	3 5 8 10	Saturated medium dense brown silty fine to coarse sand. 17" RECOVERY
		6	10.0'	3 7 8 10	Saturated medium dense brown fine to coarse sand w/ some silt, trace of gravel. 20" RECOVERY
12.45		7	12.0'	1 7 8 9	Saturated medium dense brown fine to coarse sand w/ some silt. A-2-4(0)

Remarks: Mud Rotary at 24.0

Reviewed By: Maureen Kelley Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
14.94		8	\ 14.0' / 14.0'	2 3 5 7	Saturated loose brown fine to coarse sand w/ Some silt. A-2-4(0)	
		9	16.0' 16.0'	6 8 9 12	18" RECOVERY Saturated medium dense red-brown fine to coarse sand w/ some silt, trace of gravel. A-2-4(0)	
17.43		10	18.0' 18.0'	3 8 9 10	24" RECOVERY Saturated medium dense red-brown fine to coarse sand w/ some silt. A-2-4(0)	
19.92			20.0'		24" RECOVERY	
22.41					DRAFT	
24.9	N	11	24.0'	7 8 10 13	Saturated medium dense red-brown fine to coarse sand w/ some silt. A-2-4(0)	IG
27.39		U-1	26.0' 26.0'	\U	24" RECOVERY Saturated medium dense reddish brown fine sand, trace of silt	Press Sample - Shelby Tube.
			28.0'		24" RECOVERY	
29.88		12	29.0'	5 8 9 12	Saturated medium dense red-brown fine sand w/ some coarse sand, trace of silt.	
32.37			31.0'		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
34.86		13	34.0'	10 11 12 14	Saturated medium dense red-brown fine sand w/ some coarse sand and silt. A-2-4(0)	
37.35			36.0'		19" RECOVERY	

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth	Daily	No.	Sample	Blows/6"		Sample Description	Class./G.I.	Remarks
(ft.)	Progress		Depth	, J, G		1 1 = ===========================		
		14	39.0'	5 8 10	661) 966 661/30166 661/4066 661/3066	Saturated integrand delige gray and ere wil inte	A-3	
39.84				10 11		sand w/ some coarse sand, trace of silt.		
			41.0'		66 144 166 1 126 14 15 16 1 126 14 15 16 1	20" RECOVERY		
					1:61771:10 1:61771:60 1:6171:61 1:6171:06			
42.33					1883 A. 1966. 1961 J. 1966 1961 J. 1966 1961 T. 1966.			
					156 3 3 3 5 6 6 2 6 6 7 7 3 6 6 7 2 6 7 7 3 7 5 6 7 2 6 7 7 7 7 7 6 7			
		15	44.0'	5 7	1:61431:E	Saturated medium dense gray fine sand w/	A-3	
44.82		10	14.0	7 8 10		some coarse sand, trace of gravel.	A-3	
					66139166 66143166 66143166			
			46.0'			19" RECOVERY		
					/: 6 / 1 / 1 / 1 / 1 / 1 / 1 / 1 / 1 / 1 /			
47.04					/			
47.31					10 43.64 10 171.61 10 13006			
		M			11	OR BIDI		1G
				•				
		16	49.0'	4 5 6 7		Saturated medium dense gray fine sand w/	A-3	
49.8				6 7		some coarse sand, trace of silt.	15	
				1		JUJ1 ZU		
			51.0'		100 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	17" RECOVERY		
					1:61/3:55 1:11/3:56 1:11/5:51			
52.29					00313100 188343106 188343100 188343106			
					66143166 121712121212121212121212121212121212121			
		47	540		150 3 3 1 1 1 1 1 2 1 3 3 3 5 6 1 3 3 3 3 5 6 6		1.4(0)	
54.78		17	54.0'	5 8 12 15		Saturated very stiff green and gray fine sandy silt, trace of coarse sand.	A-4(0)	glauconitic
				15		,		
			56.0'			24" RECOVERY		
			50.0			24 NECO (ERI		
57.27								
		18	59.0'	13 19		Saturated dense green and gray fine sand w/	A-3	glauconitic
59.76				13 19 21 31	725	some coarse sand, trace of silt, gravel, and		
					166143166 166173166 166143166	organic matter.		
					/			

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth	Daily	No.	Sample	Blows/6"		Sample Description	Class./G.I.	Remarks
(ft.)	Progress	INO.	Depth 61.0' /	DIUWS/0		24" RECOVERY	UIASS./U.I.	Remarks
					onivico Controleo Controleo Controleo			
62.25					(113)(6) (113)(6) (113)(6)			
	<u> </u>							
		10	0.4.01	42				
64.74	-	19	64.0'	12 16 31 46		Saturated dense dark gray and green silty fine to coarse sand w/ some organic matter, trace	A-2-4(0)	
]			46		of gravel.		
			66.0'			24" RECOVERY		
	-		00.0			24 RECOVERT		
07.00								
67.23								
	-	20	69.0'	10 17 30 50/5"		Saturated dense dark gray and green clayey	A-2-4(0)	glauconitic
69.72				30 50/5"		fine sand w/ some coarse sand and organic		
	-					matter.		
			71.0'			20" RECOVERY		
		M				20" RECOVERY	711	
72.21				•				
	-		_				4	
		21	73.0'	15 15 31 50/5"		Saturated dense dark gray and green fine to	A-2-4(0)	
	-			50/5"		coarse sand w/ some organic matter and silt, trace of gravel.		
74.7						_		
			75.0'			18" RECOVERY Boring terminated at 74.9 feet.		
	-							
77.19	-							
70.00								
79.68	1							
]							
	-							
82.17	1							
	-							
]							

KEY TO SYMBOLS

Symbol Description

Strata symbols

Silty sand



Poorly graded clayey silty sand



Poorly graded sand with silt



Clayey sand

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- 1. Exploratory borings were drilled on 2/8/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 55.
- 2. Groundwater levels recorded at time of drilling and rechecked the following day.
- 3. Surveyed boring locations and elevations were provided by Century Engineering.
- These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All SPT blow counts are uncorrected.

73.6'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR2-8-05

Contract: 25-113-01

Boring Location: Sta. 263+53.27, 44' Rt. C.L.

Boring Surface Elev.: 36.60 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: 2 Type of: Split Barrel O.D. IN. IN. O.D. U-Sampler: 3 Ball Sampler Core Bit: O.D.

Casing Size: 3 1/4 Inches From Depth of:

To: To: Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Casing Depth of Water Elev. of Water Time **Depth of Hole** Date 35.1 36.6 2.0' 1.5' 3/2/08 4.0' 36.6 36.6

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 73.6 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Jason Truver

Helpers: J. Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks
		1	0.0'	W/H W/H W/H W/H	Saturated soft dark brown organic silt. No sieve analysis
			2.0'		5" RECOVERY
2.49		2	2.0	W/H W/H W/H W/H	Saturated very loose gray silty fine sand w/ some gravel, coarse sand, and organic matter. A-2-4(0)
			4.0'_		10" RECOVERY
4.98		3	4.0'	2 2 2 5 5	Saturated very loose brown silty fine to coarse sand, trace of gravel. A-2-4(0)
		4	6.0' 6.0'	2	18" RECOVERY
7.47		4	6.0	2 1 1 2	Saturated very loose brown silty fine to coarse sand, trace of gravel. A-2-4(0)
			8.0'		24" RECOVERY
		5	8.0'	5 5 6 9	Saturated medium dense brown silty fine to coarse sand. A-2-4(0)
9.96			10.0'		16" RECOVERY
		6	10.0'	4 5 9 13	Saturated medium dense brown silty fine to coarse sand. A-2-4(0)
40.45		7	12.0' 12.0'	5	24" RECOVERY Saturated medium dense brown silty fine to A-2-4(0)
12.45		·		5 6 8 8	coarse sand.

Remarks:

Reviewed By: Maureen Kelley Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
(11.)	1 Togrood	U-1	14.0' /		22" RECOVERY	Duran Committee Challes Tasks
			14.0'		Saturated medium dense brown fine sand,	Press Sample - Shelby Tube.
14.94					trace of silt.	
			15.7'			
			10.7		113161 20 RECOVERT 1171611 113661	
		8	16.0'	8 10 12 13	Saturated medium dense brown fine to coarse A-2-4(0)	
				12 13	sand w/ some silt.	
17.43						
17.45						
		9	18.0' 18.0'	8	23" RECOVERY Saturated medium dense brown fine to coarse A-2-4(0)	
			10.0	8 8 9 12	sand w/ some silt.	
				12	Sand w/ some sit.	
19.92			20.0'		18" RECOVERY	
					IDRAH I	
22.41						
		10	24.0'	8 10	Saturated medium dense green and brown A-2-4(0)	
24.9	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	V		10 10 14	silty fine to coarse sand.	
24.9				• '*		
			26.0		1	
					ISUSI 2015	
27.39			_			
		11	29.0'	9	Cotanoted and liver deposit province of constant	
		''	29.0	9 10 15 18	Saturated medium dense brown and green A-2-4(0) silty fine sand w/ some coarse sand.	
29.88				18	sitty time saild w/ some coarse saild.	
			31.0'		24" RECOVERY	
32.37						
		12	34.0'	5 10 12 13	Saturated medium dense green and brown A-2-4(0)	
34.86				13	silty fine to coarse sand.	
			36.0'		22" RECOVERY	
			30.0		22 RECOVERT	
27.05						
37.35						

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
		13	39.0'	6		Saturated medium dense gray and green silty	A-2-4(0)	
39.84			00.0	6 7 13 14		fine sand w/ some coarse sand.	A-2-4(0)	
			41.0'			20" RECOVERY		
42.33								
.2.00								
44.82		14	44.0'	4 8 12 18		Saturated medium dense gray and green silty fine sand, trace of coarse sand.	A-2-4(0)	
44.02				18				
			46.0'			24" RECOVERY		
47.04								
47.31						OR BIDI		
		N١				UR DIDI		IG
	_			_				
		15	49.0'	6 10 18 21		Saturated medium dense gray and green silty	A-2-4(0)	
49.8				21		fine sand, trace of coarse sand.	15	
			54.01	10			10	
			51.0'			20" RECOVERY		
52.29								
		16	54.0'	9 20 35 50/3"	######################################	Sucuration (or) delise gray and green into to	A-3	
54.78				35 50/3"		toarse sand, trace of sill and graver.		
			56.0'		13.14.11.67 10.67.1916.6 13.61.1916.6 13.61.793.61	21" RECOVERY		
					11.01411.00 (14.111.00 (14.111.00			
57.27					12 14 14 16 1 12 14 15 15 16 16 12 14 15 15 16 16 16 16 16 16 16 16 16 16 16 16 16			
					100 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
					preimprei Marianier Marianier Marianier			
		17	59.0'	13 15		Saturated hard dark green fine sandy silt w/	A-4(0)	
59.76				13 15 24 33		some coarse sand, trace of gravel.	` ′	

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Contra	act: 25-113	-01				
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks	
			61.0'		20" RECOVERY	
	-					
62.25	-					
	-	18	64.0'	9 16 27 50/4"	Saturated hard green and gray clayey fine to A-4(0)	
64.74	<u>.</u>			27 50/4"	coarse sandy silt.	
	-					
			66.0'		20" RECOVERY	
	-					
67.23						
	-					
	1	19	69.0'	12	Saturated dense gray silty fine to coarse sand, A-2-4(0)	
69.72				12 14 27 30	trace of gravel.	
		1	71.0'		C 24' RECOVERY D D G	
		M				
72.21						
			_			
	-	20	73.0' 73.7'	27 50/2"	Saturated very dense gray fine to coarse sand A-2-4(0)	
					w/ some silt, trace of gravel. 7" RECOVERY	
74.7					Boring terminated at 73.8 feet.	
	-					
	-					
77.19						
79.68						
	-					
82.17	-					
]					
<u> </u>						
1	I	I	1	1		

KEY TO SYMBOLS

Symbol Description

Strata symbols

Silty sand

Poorly graded sand with silt



Clayey sand

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- 1. Exploratory borings were drilled on 3/2/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 55.
- 2. Groundwater levels recorded at time of drilling and rechecked the following day.
- 3. Surveyed boring locations and elevations were provided by Century Engineering.
- These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All SPT blow counts are uncorrected.

20.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: BR2-8-06

Contract: 25-113-01

Boring Location: Sta. 265+07.35, 67' Lt. C.L.

Boring Surface Elev.: 40.76 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D. U-Sampler: 3 Ball Sampler

Core Bit: O.D. **Casing Size:** 3 1/4 Inches From Depth of:

To: To: Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Water Elev. of Water Time **Depth of Hole Depth of Casing** Date 35.4 40.8 2/21/08 8.0 6.0' 5.4' $\begin{array}{c} 40.8 \\ 40.8 \end{array}$

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 73.8 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Gary Truver, Sr.

Helpers: J. Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
		1	0.5'	3 4 3	silt w/ some gravel.	Topsoil
		2	2.0' 2.0'	3	10" RECOVERY Wet loose brown silty coarse to fine sand, A-2-4(0)	
2.49			4.0'	3 2 4 6	trace of gravel. 18" RECOVERY	G
		3	4.0'	4 6	Saturated medium dense red-brown fine to A-2-4(0)	
4.98			6.0'	9 13	coarse sand w/ some silt, trace of gravel. 18" RECOVERY	
		4	6.0'	14 18 22 32	Saturated dense red-brown fine to coarse sand A-2-4(0)	
				22 32	w/ some silt, trace of gravel.	
7.47						
7.47			8.0'		18" RECOVERY	
		5	8.0'	7 12 9 9	Saturated medium dense red-brown fine to coarse sand w/ some silt, trace of gravel. A-2-4(0)	
-						
9.96		6	10.0' 10.0'	17	18" RECOVERY Saturated very dense red-brown silty fine to A-2-4(0)	
			10.0	17 30 40 46	Saturated very dense red-brown silty fine to coarse sand, trace of gravel. A-2-4(0)	
			12.0'		24" RECOVERY	
12.45		7	12.0'	6 11 10 17	Saturated medium dense red-brown fine to coarse sand w/ some silt, trace of gravel.	
			14.0		18" RECOVERY	
		8	14.0' 14.0'	9 10	Saturated medium dense brown silty fine to A-2-4(0)	
$\overline{}$	I	ــــــــــــــــــــــــــــــــــــــ		10	Buttated medium dense blown sitty fine to A-2-4(0)	

Remarks: Mud Rotary at 20.0'

Reviewed By: Maureen Kelley Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth	Daily	No.	Sample	Blows/6"		Sample Description	Class./G.I.	Remarks
(ft.)	Progress	NO.	Depth			coarse sand, trace of gravel.	Class./G.I.	iveillains
14.94				17 20		coarse sand, trace of graver.		
		9	16.0' 16.0'	13		19" RECOVERY Saturated very dense brown silty fine to	A-2-4(0)	
				13 26 33 38		coarse sand, trace of gravel.	112 1(0)	
17.43								
			18.0'			24" RECOVERY		
		10	18.0'	6 9 9		Saturated medium dense brown silty fine to	A-2-4(0)	
				9		coarse sand, trace of gravel.		
19.92			20.0'			16" RECOVERY		
22.41		U-1	22.0'		X X / / / / / / / / / / / / / / / / / /	Saturated medium dense brown clayey fine	A-2-6(0)	Press Sample - Shelby Tube.
					X 7	sand.		
					2722 2722			
			24.0'		x 7 2 2 7 2 2 2	24" RECOVERY		
	N.	11	24.0'	6 11 15 17		Saturated medium dense brown and gray fine sand w/ some silt and coarse sand, trace of	A-2-4(0)	
24.9		$\mathbf{M}_{\mathbf{I}}$		17		gravel.		
	•	`		•				
			26.0'			15" RECOVERY		
						PHQT 90	15	
27.39						GUST 20		
		12	29.0'	5			1.0.1(0)	
20.00		12	29.0	5 9 13 17		Saturated medium dense gray and brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
29.88				17		54440 11/1 504450 54440 6440 5444		
			31.0'			20" RECOVERY		
			31.0			20 RECOVERT		
32.37								
		13	34.0'	10		Saturated medium dense gray and green fine	A-2-4(0)	glauconitic
34.86		.	5	10 11 12 15		sand w/ some silt and coarse sand, trace of	Λ-2-4(U)	giaucomuc
						gravel.		
			36.0'			24" RECOVERY		
<u> </u>								
37.35								

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			22.01				
39.84		14	39.0'	8 13 17 21	Saturated medium dense gray and green fine sand w/ some coarse sand and silt.	A-2-4(0)	glauconitic
39.04				21	Sale Wy Solid Could Suit and Sile		
			41.0'		18" RECOVERY		
42.33							
42.55							
44.82		15	44.0'	7 7 10 13	Saturated medium dense gray and green fine sand w/ some silt, trace of coarse sand and	A-2-4(0)	glauconitic
44.02				13	gravel.		
			46.0'		20" RECOVERY		
					DRAFI		
47.31							
47.51							
					IOR BIDI		
		V					V
49.8		16	49.0'	12 15 17	Saturated dense dark gray fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	
10.0			Λ	18		15	
			51.0'		20" RECOVERY		
52.29							
02.20							
			54.0				
54.78		17	54.0'	9 12 13 15	Saturated medium dense dark gray silty fine sand, trace of coarse sand.	A-2-4(0)	
				15	,		
			56.0'		24" RECOVERY		
57.27							
		40	59.0'	14		1.0.1(0)	
59.76		18	59.0°	14 28 34 50	Saturated very dense dark green silty fine sand w/ some coarse sand and gravel.	A-2-4(0)	glauconitic
				30	5		
			61.0'		18" RECOVERY		

F.A. Project: U.S. 301, Maryland State Line to I-95 **Contract:** 25-113-01

	act: 25-113	0.1				
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
62.25		19	64.0'	15 25 31 50	Saturated very dense dark green silty fine to coarse sand, trace of gravel. 24" RECOVERY	glauconitic
69.72		20	69.0'	15 25 50 50/3"	Saturated hard dark green fine to coarse sandy silt, trace of gravel. A-4(0)	glauconitic
72.21	N		71.0'	T	OR BIDDIN	IG
74.7		21	73.0'	34 50/3"	Saturated hard dark green fine sandy silt w/ some coarse sand and organic matter, trace of gravel and clay. Boring terminated at 73.8 feet.	
					Bornig terminated at 75.6 feet.	
77.19						
79.68						
82.17						
84.66						

KEY TO SYMBOLS

Symbol Description

Strata symbols

Poorly graded clayey silty sand



Silty sand



Poorly graded sand with clay

DRAFT NOT FOR BIDDING AUGUST 2015

Notes:

- 1. Exploratory borings were drilled on 2/21/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 75.
- 2. Groundwater levels recorded at time of drilling and rechecked the following day.
- 3. Surveyed boring locations and elevations were provided by Century Engineering.
- These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All SPT blow counts are uncorrected.

30

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Boring No.:** C2-1-01

Contract: 25-113-01

Boring Location: Sta. 481+85 124 L.T. C.L.

Reference: **Boring Surface Elev.:** + 57.89

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D. O.D.

Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of:

Hollow Stem Auger: From Depth of: 0.0

Water Level Readings

Depth of Casing Depth of Water Time Depth of Hole Elev. of Water Date 12/14/09 10.0 8.0 4.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Dia. U-Sample Boring: U-Samples: 30.0 Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Jason Truver

Helpers: J. Laffery

				,			
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/14/09	1	0.5'	2 2 5	Saturated firm black organic coarse sandy clayey silt w/some fine sand and fine gravel.	A-4(3)	Topsoil - 5".
			2.0'		18" RECOVERY		
2.5		2	2.0'	5 5 7 9	Saturated medium dense gray coarse sand and fine gravel w/some silt and fine sand. 11" RECOVERY	A-1-b	
		3	4.0'	2 4 4	Saturated loose orangish green clayey fine sand w/some coarse sand, trace	A-2-4(0)	
5			6.0	4 5 5	of silt. UST 2015	,	
7.5		4	6.0'	2 4 5 5	Saturated loose orangish green clayey fine sand w/some coarse sand, trace of silt.	A-2-6(0)	
		5	8.0' 8.0'	3	21" RECOVERY	A-2-6(0)	
10		J	10.0'	3558	Saturated loose orangish green clayey fine sand w/trace of coarse sand, silt and fine gravel. 20" RECOVERY	A-2-0(0)	
		6	10.0'	3 6 7 12	Saturated medium dense green silty fine sand w/some coarse sand.	A-2-4(0)	
		7	12.0'	3	17" RECOVERY	A 2 4(0)	
12.5		7	12.0'	3 7 7 12	Saturated medium dense green silty fine sand w/some coarse sand.	A-2-4(0)	
<u> </u>			14.0'	7	19" RECOVERY	1.0.470	
		8	14.0'	7 9	Saturated medium dense green silty fine sand w/some coarse sand.	A-2-4(0)	

Remarks:

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: C2-1-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15				10 12			
			16.0'		18" RECOVERY		
		9	16.0'	9 12 12 13	Saturated medium dense green silty fine sand w/trace of coarse sand.	A-2-4(0)	
				13			
17.5							
		10	18.0' 18.0'	7 7	18" RECOVERY Saturated medium dense green fine sand w/some silt, trace of coarse sand	A-2-4(0)	
				7 7 11 10	and organic matter.		
	1						
20			20.0'		20" RECOVERY		
-							
22.5	1						
		11	23.0'	7 8 10 10	Saturated medium dense green fine to coarse sand w/some silt, trace of	A-2-4(0)	
]			10 10	organic matter.		
25		M	25.0'		20" RECOVERY	Hi .	
		A					
	<u> </u>						
				\ I	\bigcirc		
27.5			4	$\Delta \Pi$	GUST 2015		
27.5	1			1			
]	12	28.0'	6 7 9 9	Saturated medium dense black clayey fine to coarse sand w/trace of silt,	A-2-4(0)	
				9	fine gravel and organic matter.		
30			30.0'		18" RECOVERY		
-	-				End of Boring		
	1						
	1						
32.5]						
]						
<u> </u>							
35	1						
	1						
37.5]						
<u> </u>	1						

30

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Boring No.:** C2-1-02

Contract: 25-113-01

Boring Location: Sta. 482+85 24 R.T. C.L.

Reference: **Boring Surface Elev.:** + 60.0

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrle O.D. 2 IN. IN. O.D. O.D.

Core Bit: O.D.

To: To: 3 1/4 **Casing Size:** Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0

Water Level Readings

Time **Depth of Casing Depth of Water** Depth of Hole Elev. of Water Date 12/11/09 10.0 8.0 3.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Dia. U-Sample Boring: U-Samples: 30 Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Jason Truver

Helpers: J. Lafferty

	,							1
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
(11.)	12/11/09	1	1.0'	4 4		Saturated loose tan silty fine gravelly coarse sand w/some fine sand, trace	A-2-4(0)	Topsoil -
	,, 00			4		of organic matter.	A-2-4(0)	9".
			2.0'			10" RECOVERY		٠.
2.5		2	2.0'	3		Saturated loose tannish orange silty coarse sand w/some fine sand, trace	A-1-b	
				6		of fine gravel.		
		\mathbf{M}	4.01					
		3	4.0' 4.0'	5		Saturated medium dense orange coarse sand w/some silt, fine sand and	A-1-b	
				6 6		fine gravel.	A-1-0	
5			,	7		The graver.		
						CHICT ON 15		
			6.0'	-1		18" RECOVERY		
		4	6.0	7 6	14 14 14 1	Saturated medium dense orange coarse sand w/some fine gravel and fine	A-1-b	
				5 8		sand, trace of silt.		
7.5								
		5	8.0' 8.0'	1	11111111 2222	16" RECOVERY	1 2 7(2)	
		Э	8.0	4 5 6		Saturated medium dense orangish green clayey fine sand w/some coarse	A-2-7(2)	
				6		sand, trace of silt.		
10			10.0'			20" RECOVERY		
10		6	10.0'	4		Saturated medium dense orangish green clayey fine sand w/some coarse	A-2-4(0)	
				4 5 6 8		sand, trace of silt.	(*)	
				°		,		
			12.0'			21" RECOVERY		
12.5		7	12.0'	8 13 10 13		Saturated very stiff orangish green fine sandy clay w/some coarse sand	A-6(2)	
				10 13		and silt.		
			44.01			ANII DE GOVERNA		
	12/14/09	8	14.0' 14.0'	6		20" RECOVERY No Sieve Analysis - Indication of saturated stiff green clay w/some sand.		
	12,17,00			6 7 8		130 Sieve Anarysis - mulcation of saturated stiff green clay w/some sand.		

Remarks:

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: C2-1-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			16.0'		3" RECOVERY		
		9	16.0'	5 7 7 10	Saturated stiff orangish green fine sandy clay w/trace of fine gravel and silt.	A-6(1)	
				10			
17.5	1		18.0'		22" RECOVERY		
		10	18.0'	5 5	Saturated medium dense green silty fine sand w/trace of coarse sand.	A-2-4(0)	
				5 5 9 9			
20			20.0'		18" RECOVERY		
22.5							
2.0							
]	11	23.0'	7 8 12 15	Saturated medium dense green fine sand w/some silt and coarse sand,	A-2-4(0)	
				12 15	trace of organic matter.		
5	N		25.0'		FOR BIDDING		
		M				•	
	•						
5]			Λ	CHET 2015		
]		<i>F</i>	HL			
		12	28.0	8 12 13 15	Saturated medium dense green fine to coarse sand w/some silt, trace of	A-2-4(0)	
				15	organic matter.		
					20" RECOVERY		
0			30.0'		End of Boring		
2.5							
35							
<u></u>	1						
37.5	-						
	l						
	l	I	1	1			I

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: C2-1-03

Contract: 25-113-01

Boring Location: Sta. 483+87 163 R.T. C.L.

Reference: **Boring Surface Elev.:** + 61.00

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D.

O.D. Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0 30.0

Water Level Readings

Time **Depth of Casing Depth of Water** Depth of Hole Elev. of Water Date 12/10/09 1.5 10.0 8.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Dia. U-Sample Boring: U-Samples: 30.0 Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Jason Truver

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	12/10/09	1	1.0'	2 3	12 14 1906 12 14 1906 12 17 14 15 12 14 15 15	Moist loose brown coarse sand w/some fine gravel and silt, trace of fine	A-1-b	Topsoil -
			2.0'			sand. 7" RECOVERY		9".
2.5		2	2.0'	2 3		Saturated loose brown coarse sand w/some fine sand, fine gravel and silt.	A-1-b	
]'			4				
]	V	4.0'			18' RECOVERY		
	•	3	4.0'	2 5		Saturated medium dense brown coarse sand w/some fine sand and silt,	A-1-b	
5				6 5		trace of fine gravel.		
						OLICT OO1E		
			6.0'			20" RECOVERY		
		4	6.0	3 4		Saturated loose brown silty coarse sand w/some fine gravel and fine sand.	A-1-b	
				3				
7.5								
]		8.0'			17" RECOVERY		
		5	8.0'	6 2 3 3		Saturated firm greenish brown fine sandy clay w/some coarse sand and	A-6(1)	
				3 3		silt, trace of fine gravel.		
]							1
10	1		10.0'			14" RECOVERY		
]	6	10.0'	7 7 7		Saturated stiff greenish brown fine sandy clay w/some coarse sand and	A-6(2)	
	1			7 9		silt, trace of fine gravel.		
	1		12.0'			10" RECOVERY		
12.5	1	7	12.0'	6 4		Saturated firm orangish green fine sandy clay w/some coarse sand and	A-7-6(3)	
				4 5		silt.		
	1							
	1		14.0'			15" RECOVERY		
		8	14.0'	3 5 7		Saturated medium dense orangish green clayey fine sand w/trace of	A-2-6(1)	
				7 6		coarse sand, fine gravel and silt.		

Remarks:

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: C2-1-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		9	16.0' 16.0'	4	20" RECOVERY	1 1(0)	
		9	16.0	4 9 12 12	Saturated very stiff green fine sandy silt w/trace of coarse sand.	A-4(0)	
17.5				12			
17.5			18.0'		20" RECOVERY		
		10	18.0'	4 8 9 9	Saturated medium dense green silty fine sand w/trace of coarse sand.	A-2-4(0)	
				9			
			00.01		AND DESCRIPTIVE		
20			20.0'		22" RECOVERY		
22.5							
					■I)RAFI		
		11	24.0'	10 10 13 20	Saturated medium dense green fine sand w/some silt, trace of coarse sand	A-2-4(0)	
25	N			20			
		M	26.0'		23" RECOVERY	7	
	•		20.0	-			
27.5					W 31181 2015		
		12	28.0"	6	Saturated medium dense green fine sand w/some coarse sand and silt,	A-2-4(0)	
				6 8 11 12	trace of fine gravel and organic matter.		
30			30.0'		20" RECOVERY		
-					End of Boring		
32.5							
-							
35							
37.5							
1	1						1

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: C2-1-04

Contract: 25-113-01

Boring Location: Sta. 481+02 107 L.T. C.L.

Reference: **Boring Surface Elev.:** + 59.50

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0

Water Level Readings

Depth of Casing Depth of Water Time Depth of Hole Elev. of Water Date 12/11/09 3.5 10.0 8.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 35.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Jason Truver

Helpers: J. Lafferty

Depth	Daily	No.	Sample	Blows/6"	Sample Description	Class./G.I.	Remarks
(ft.)	Progress 12/11/09	1	Depth 0.5'	1			
	12/11/09	'	0.5	2 2	No Sieve Analysis - Indication of saturated soft tan sandy silt w/some clay.		Topsoil - 6".
			2.0'		9" RECOVERY		
2.5		2	2.0'	8 13 13 13	Saturated medium dense brown coarse sand w/some fine sand, fine gravel and silt.	A-1-b	
		3	4.0' 4.0'	4	18" RECOVERY Saturated medium dense orange coarse sand w/some silt and fine sand,	A-1-b	
5			6.01	7 7 4	trace of fine gravel. 20" RECOVERY		
7.5		4	6.0'	3 4 5 3	Saturated loose tannish orange fine gravel and coarse sand w/some fine sand, trace of silt.	A-1-b	
7.5			8.0'		的說 18" RECOVERY		
		5	8.0'	5 5 3 6	Saturated loose orangish green silty fine sand w/some coarse sand and fine gravel.	A-2-4(0)	
10		6	10.0' 10.0'	3	16" RECOVERY Saturated loose orangish green clayey fine sand w/some coarse sand, trace	A 2 6(0)	
			12.0'	3 6 7	of silt. 17" RECOVERY	A-2-0(U)	
12.5		7	12.0'	8 8 9 10	Saturated very stiff orangish green fine sandy clay w/some silt, trace of coarse sand.	A-7-6(5)	
		اا	14.0'		20" RECOVERY		
	!	8	14.0'	4 3	Saturated loose green clayey fine sand w/some coarse sand, trace of silt.	A-2-4(0)	

Remarks:

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: C2-1-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15				4 6			
	-	9	16.0' 16.0'	4	22" RECOVERY Saturated loose orangish green silty fine sand w/some coarse sand.	A-2-4(0)	
			10.0	4 3 7 7	Saturated loose orangish green shry fine sand w/some coarse sand.	A-2-4(0)	
17.5	-			·			
17.5	1		18.0'		16" RECOVERY		
		10	18.0'	6 5 4 6	Saturated stiff orangish green fine sandy silt w/trace of coarse sand.	A-4(0)	
				6			
	-						
20			20.0'		20" RECOVERY		
	-						
	•						
22.5							
					WIJKAFI		
	-	11	23.0'	6 7 8 7	Saturated medium dense green fine sand w/some coarse sand, trace of silt and organic matter.	A-3	
	-			7			
	-		25.01				
25	1	M	25.0'		20" RECOVERY		
	•			•	Ting.		
					GUST 2015		
27.5				76			
	-	12	28.0'	9	Saturated medium dense green fine to coarse sand w/some silt, trace of	A-2-4(0)	
	-		20.0	9 10 10 11	organic matter.	A-2-4(0)	
30			30.0'		21" RECOVERY		
]						
32.5	-						
	-	13	33.0'	69 7	Saturated medium dense green silty fine to coarse sand w/some organic	A-2-4(0)	
	-			69 7 8 7	matter, trace of fine gravel.		
35			35.0'		21" RECOVERY		
					End of Boring		
	-						
	-						
07.5	-						
37.5	1					1	

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: C2-1-05

Contract: 25-113-01

Boring Location: Sta. 481+52 100 R.T. C.L.

Boring Surface Elev.: + 64.60 Reference:

IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. IN. IN. O.D.

O.D. Core Bit: O.D.

To: To: 3 1/4 **Casing Size:** Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0 30.0

Water Level Readings

Depth of Casing **Depth of Water** Time Depth of Hole Elev. of Water Date 12/10/09 10.0 8.0 3.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 30.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Lafferty

	5							
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	12/10/09	1	0.5'	336		Saturated stiff brown clayey silt w/some coarse sand and fine gravel, trace of fine sand.	A-4(2)	Topsoil - 6".
			2.0'		MMM.	11" RECOVERY		
2.5		2	2.0'	5 9 11 12		Saturated medium dense brown coarse sand w/some fine sand and fine gravel, trace of silt. 17" RECOVERY	A-1-b	
		3	4.0'	7		Saturated medium dense brown coarse to fine sand w/some silt, trace of	A-1-b	
5			6.0	8 10 12		fine gravel. 17" RECOVERY		
		4	6.0'	10 10 12 13		Saturated medium dense orange coarse to fine sand w/some silt, trace of	A-1-b	
7.5			8.0'	12 13		fine gravel. 20" RECOVERY		
		5	8.0'	2 3 4 4		Saturated loose tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
10			10.0'			19" RECOVERY		
		6	10.0'	6 8 6 5		Saturated medium dense orange fine gravel and coarse to fine sand w/some silt.	A-1-b	
			12.0'			20" RECOVERY		
12.5		7	12.0'	2 3 3 4		Saturated loose tan coarse to fine sand w/some silt and fine gravel.	A-1-b	
			14.0'			10" RECOVERY		
		8	14.0'	4 5		Saturated stiff greenish orange fine sandy clay w/some coarse sand and	A-7-6(3)	

Remarks:

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: C2-1-05

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	1 1091655		Dehm	4 5	sil			
15	1			5				
			16.0'			19" RECOVERY		
		9	16.0'	5 9 11 11		aturated very stiff greenish orange fine sandy clay w/some silt, trace of	A-7-6(6)	
				11	<i>7///</i> // cc	parse sand.		
17.5	1							
17.5	1		18.0'			17" RECOVERY		
	1	10	18.0'	9	III S	aturated medium dense orangish green clayey fine sand w/trace of	A-2-7(2)	
	-			9 10 9 10		parse sand, fine gravel and silt.	11 2 7(2)	
				10		Sales Sales, The graver and short		
20]		20.0'			23" RECOVERY		
	1							
	1							
	1							
	-							
22.5	-					DRAFT		
						JKALI		
		11	24.0'	7 8	Sa	aturated medium dense green silty fine sand w/trace of coarse sand.	A-2-4(0)	
25	i n			7 7				
	1	\mathcal{M}						
				•				
			26.0'			23" RECOVERY		
						NIIOT OO 4E		
						GUST 2015		
27.5			<i> </i>	$\dashv \iota$		JUOI /UID		
	1	12	28.0'	7 9	///// Sa	aturated medium dense green clayey fine sand w/some coarse sand, trace	A-2-6(0)	
	1			7 9 10 11		f organic matter.	, ,	
	-					•		
-								
30			30.0'		<i>HH</i>	22" RECOVERY		
					Eı	nd of Boring		
]							
20.5	1							
32.5	1							
	-							
	-							
]							
35								
]							
	1							
	1							
	-							
37.5]							
	l							

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: C2-2-01

Contract: 25-113-01

Boring Location: Sta. 302+18 372 R.T. C.L.

Reference: **Boring Surface Elev.:** + 37.1

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D. O.D.

Core Bit: O.D.

To: To: 3 1/4 **Casing Size:** Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0

Water Level Readings

Depth of Casing Depth of Water Time Depth of Hole Elev. of Water Date 12/10/09 10.0 8.0 2.7

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 31.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/10/09	1	0.0'	1 3 5 4	Saturated loose brown silty coarse to fine sand w/some fine gravel, trace of clay.	A-1-b	Topsoil - 2".
2.5		2	2.0'	3 4 3 3	No Sieve Analysis - Indication of saturated loose brown silty sand w/ some clay.		
<u> </u>		3	4.0' 4.0'	W/H	6" RECOVERY	1 2 6(0)	
5		3	F	1 2 2	Saturated very loose green clayey fine to coarse sand w/trace of fine gravel and silt.	A-2-6(0)	
			6.0'		14" RECOVERY		
7.5		4	6.0'	2 3 2 5	Saturated loose brown clayey fine to coarse sand w/trace of silt.	A-2-4(0)	
			8.0'		16" RECOVERY		
		5	8.0'	2 2 4 4	saturated loose brown clayey fine to coarse sand w/trace of silt.	A-2-6(0)	
10		6	10.0' 10.0'	2	17" RECOVERY	1 2 4(0)	
		0	12.0'	2 5 9 12	Saturated medium dense brownish green silty fine to coarse sand. 18" RECOVERY	A-2-4(0)	
12.5		7	12.0'	5 9 13 16	Saturated medium dense brownish green fine to coarse sand w/some silt.	A-2-4(0)	

Remarks:

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01 **Boring No.:** C2-2-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		8	\ 14.0' \ 14.0'	5 10 12 17	18" RECOVERY	A-2-4(0)	
15			14.0	12 17	Saturated medium dense brownish green fine to coarse sand w/some silt.		
			16.0'		19" RECOVERY		
		9	16.0'	7 12 18 28	Saturated medium dense brownish green fine to coarse sand w/some silt.	A-2-4(0)	
				18 28			
17.5							
			18.0'		12" RECOVERY		
	12/11/09	10	18.0'	10 14 17 19	Saturated dense brownish green fine to coarse sand w/some silt.	A-2-4(0)	
				17 19			
20			20.0'		22" RECOVERY		
					BBAET		
22.5					DRAFT		
22.0							
	N	11	24.0'	9	Saturated medium dense brownish green fine to coarse sand w/some silt.	A-2-4(0)	
05		M		11 13 24		11 2 1(0)	
25	•						
					450 DD GOVERN		
			26.0'		GUST 2015		
			Z				
				1	JUUI ZUIU		
27.5							
		12	29.0'	8		1 2 4(0)	
		12	29.0	8 12 23 31	Saturated dense brownish green fine to coarse sand w/some silt.	A-2-4(0)	
30				31			
			31.0'		16" RECOVERY		
					End of Boring		
32.5							
35							

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Boring No.:** C2-2-02

Contract: 25-113-01

Boring Location: Sta. 302+40 464 R.T. C.L.

Reference: **Boring Surface Elev.:** + 37.03

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D. O.D.

Core Bit: O.D.

To: To: 3 1/4 **Casing Size:** Inches From Depth of:

Hollow Stem Auger: From Depth of: 0.0

Water Level Readings

Time **Depth of Casing Depth of Water** Depth of Hole Elev. of Water Date 12/10/19 1.5 10.0 8.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Dia. U-Sample Boring: U-Samples: 31.0 Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	12/10/09	1	0.0'	W/H 1 W/R W/R		Saturated soft brown clayey silt w/some fine sand, trace of coarse sand and fine gravel.	A-5(7)	Forrest Duff - 2".
2.5		2	2.0'	1 1 W/R W/R		Saturated very loose black organic fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
		3	4.0' 4.0'	W/R		16" RECOVERY	1 2 4(0)	
5		3	F	W/R W/R 2 3		Saturated very loose blackish gray coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
		4	6.0' 6.0'	2		16" RECOVERY	A 2 4(0)	
7.5		7		2 2 2 2		Saturated very loose greenish brown silty fine to coarse sand w/trace of fine gravel and organic matter.	A-2-4(0)	
			8.0'	2		12" RECOVERY		
10		5	8.0'	2356		Saturated loose greenish brown fine to coarse sand w/some silt. 16" RECOVERY	A-2-4(0)	
10		6	10.0'	6		Saturated medium dense greenish brown silty fine to coarse sand.	A-2-4(0)	
		Š		6 7 11 13			A-2-4(0)	
			12.0'			14" RECOVERY		
12.5		7	12.0'	4 7 10 13		Saturated medium dense greenish brown fine to coarse sand w/some silt.	A-2-4(0)	
					444141414141			

Remarks:

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01 **Boring No.:** C2-2-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		8	14.0' / 14.0'	3 6 11 14	19" RECOVERY	A-2-4(0)	
15			14.0	11 14	Saturated medium dense greenish brown fine to coarse sand w/some silt.		
			16.0'		17" RECOVERY		
		9	16.0'	7 10 18 19	Saturated medium dense green fine to coarse sand w/some silt.	A-2-4(0)	
				18 19			
17.5							
			18.0'		10" RECOVERY		
		10	18.0'	5 7 12 15	Saturated medium dense green fine to coarse sand w/some silt.	A-2-4(0)	
				12 15			
20			20.0'		18" RECOVERY		
20			20.0		I ILLEG VERT		
00.5					DRAFT		
22.5							
	_						
		11	24.0'	7	Saturated medium dense green fine to coarse sand w/trace of silt.	A-3	
	l l			7 9 13	Saturated inection dense green thie to coarse saild w/trace of sitt.	A-3	
25				19			
					13 167 17 194		
			26.0'		18" RECOVERY		
					GUST ^{18"} RECOVERY 15		
				$\neg \cup$			
27.5					17 july 17 july 17 july		
					11 (14) 14 (14)		
					13 pre 17 pre 13 pre		
					55.1971 174.00- 18.00-		
		12	29.0'	8 11 18 30	Saturated medium dense brownish green fine sand w/some coarse sand	A-2-4(0)	
30				30	and silt.		
			31.0'		16" RECOVERY		
					End of Boring		
32.5							
02.0							
35							
33							
37.5	I	I	I	1			

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: CBR2-1

Contract: 25-113-01

Boring Location: Sta. 266+50 39 L.T. C.L.

Boring Surface Elev.: + 49.36 Reference:

Wt. of Casing Hammer: Average Fall: IN. Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0 10.0

Water Level Readings

Depth of Water Time Depth of Hole **Depth of Casing** Elev. of Water Date 8/20/09 Dry 10.0 8.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Dia. U-Sample Boring: U-Samples: Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Jason Truver

Helpers: T. Kane

<u> </u>		ı		I		T	1
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/20/09	1	0.0'	3 3 4 4	Moist loose brown clayey fine sandy fine gravel w/some coarse sand and silt.	A-2-4(0)	Topsoil - 3".
			2.0'		18" RECOVERY		
2.5		2	2.0'	9 11 14 18	Moist medium dense brown coarse to fine sand w/some fine gravel, trace of silt.	A-1-b	
			4.0'		17" RECOVERY		
5		3	4.0'	4 4 8 9	Moist medium dense orange fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
			6.0'		19" RECOVERY		
		4	6.0'	6 10 11 10	Moist medium dense orange fine to coarse sand w/some fine gravel and silt.	A-2-4(0)	
7.5			8.0'		17" RECOVERY		
		5	8.0'	10 14 13 16	Moist medium dense brown fine to coarse and w/some silt, trace of fine gravel.	A-2-4(0)	
10			10.0'		20" RECOVERY		
					End of Boring		
<u> </u>							
12.5							
12.5							

Remarks:

Symbol Description

Strata symbols

Clayey sand

Well graded sand with silt



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 8/20/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 Track.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: CBR2-10

Contract: 25-113-01

Boring Location: Sta. 355+00 45 L.T. C.L.

Boring Surface Elev.: + 63.76 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 O.D.

IN. IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time Depth of Hole **Depth of Casing** Elev. of Water Date 7/14/09 10.0 8.0 7.6

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Dia. U-Sample Boring: U-Samples: Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/14/09	1	0.5'	6 4 4	Moist loose brown silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	Topsoil - 6".
			2.0'		12" RECOVERY		
2.5		2	2.0'	3 3 2 3 3	Moist loose brown silty coarse to fine sand w/trace of fine gravel. 18" RECOVERY	A-2-4(0)	
		3	4.0'	4 7	Moist medium dense brown coarse to fine sand w/some silt, trace of fine	A-2-4(0)	
5			6.0	7 5	gravel. UST 2015		
7.5		4	6.0'	5 3 2 1	Saturated loose brown coarse to fine sand w/some silt.	A-2-4(0)	
7.0			8.0'		18" RECOVERY		
		5	8.0'	1 1 2 2	Saturated very loose brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
10			10.0'		End of Boring	+	
					End of Borning		
12.5							

Remarks:

Symbol Description

Strata symbols



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/14/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 Track.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: CBR2-11

Contract: 25-113-01

Boring Location: Sta. 20+00 30 L.T. C.L.

Boring Surface Elev.: + 68.30 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date 1/8/10 10.0 8.0 4.8

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Dia. U-Sample Boring: U-Samples: Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
(11.)	1/8/10	1	0.0'	3 5 3 3	Wet firm gray clayey silt w/some fine sand, trace of coarse sand and fine gravel.	A-4(2)	
2.5		2	2.0'	6 5 5 7	11" RECOVERY Wet stiff gray fine sandy silt w/trace of coarse sand.	A-4(0)	
	_		4.0'	6	20" RECOVERY		
5		3	4.0'	6 5 8 4	Saturated medium dense tan silty coarse to fine sand w/some fine gravel, trace of clay.	A-2-4(0)	
		4	6.0' 6.0'	5 7 5 5	21" RECOVERY Saturated medium dense tan fine to coarse sand w/some silt and fine gravel.	A-2-4(0)	
7.5			8.0'		20" RECOVERY		
		5	8.0'	3 7 7 7	Saturated medium dense tan fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
10			10.0'		19" RECOVERY		
					End of Boring		
12.5							
12.0							

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 1/08/2010 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 ATV.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: CBR2-12

Contract: 25-113-01

Boring Location: Sta. 30+00 5 L.T. C.L.

Boring Surface Elev.: + 71.30 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D. 3 1/4 **Casing Size:**

From Depth of: From Depth of: To: To: Inches Hollow Stem Auger: 0.0 10.0

Water Level Readings

Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date 1/8/10 10.0 8.0 4.7

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Dia. U-Sample Boring: U-Samples: Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Lafferty

	Ticipora). J.	Larrerty				
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	1/8/10	1	0.5'	4 4 5	Wet firm brown clayey silt w/trace of fine to coarse sand.	A-4(7)	Topsoil - 5".
			2.0'		14" RECOVERY	<u> </u>	
2.5		2	2.0'	9 10 10 9	Wet very stiff brownish orange clayey coarse to fine sandy silt w/trace of fine gravel. 20" RECOVERY	A-4(0)	
5		3	4.0' 6.0'	3 7 7 6	Saturated medium dense tan clayey fine sand w/some coarse sand, trace of fine gravel and silt. 20" RECOVERY	A-2-6(0)	
7.5		4	6.0'	7 7 8 7	Saturated medium dense orange fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
			8.0'		21" RECOVERY		
		5	8.0'	4 4 4 3	Saturated loose tan coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
10			10.0'		22" RECOVERY		
					End of Boring		
12.5							

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Clayey sand

Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 1/08/2010 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 ATV.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: CBR2-13

Contract: 25-113-01

Boring Location: Sta. 40+00 0 C.L.

Boring Surface Elev.: + 69.10 Reference:

IN. IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0 10.0

Water Level Readings

Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date 1/8/10 10.0 8.0 4.6

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Dia. U-Sample Boring: U-Samples: Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Lafferty

Depth	Daily	No.	Sample	Blows/6"	Sample Description	Class./G.I.	Remarks
(ft.)	Progress		Depth				
	1/8/10	1	0.5'	2 3 4	Wet firm brown clayey fine to coarse sandy silt w/trace of fine gravel.	A-4(1)	Topsoil -
				4			5".
			2.0'		14" RECOVERY		
2.5	_	2_	2.0'	11 19	Wet dense orange silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
2.5				14			
		M					
		M					
			4.0'		19" RECOVERY		
		3	4.0'	4 2 8	Saturated loose orange silty coarse to fine sand w/trace of fine gravel.	A-1-b	
5				6			
			6.0'	16	21" RECOVERY		
		4	6.0'	3	Saturated loose orange coarse to fine sand w/some silt, trace of fine	A-2-4(0)	
				3 5 5 5	gravel.	112 1(0)	
-				5	8-11-11		
7.5							
			8.0'		22" RECOVERY		
		5	8.0'	6 6 7 7	Saturated medium dense brown coarse to fine sand w/some silt, trace of	A-2-4(0)	
				7 7	fine gravel.		
—			40.01		2011 DECOVEDY		
10			10.0'		20" RECOVERY End of Boring		
-					End of Doring		
12.5							
12.0							
<u> </u>							
ı	I	ı	l			1	

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 1/08/2010 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 ATV.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: CBR2-14

Contract: 25-113-01

Boring Location: Sta. 50+00 0 C.L.

Boring Surface Elev.: + 63.40 Reference:

IN. IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0

Water Level Readings

Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date 5.0 1/8/10 10.0 8.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Dia. U-Sample Boring: U-Samples: Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	1/8/10	1	0.5'	4 1 2	Wet firm brown clayey silt w/trace of fine to coarse sand.	A-4(7)	Topsoil - 5".
			2.0'		13" RECOVERY		
2.5		2	2.0' 4.0'	3 5 8 8	Wet stiff brown fine gravelly clay w/some fine sand, trace of coarse sand and silt. 18" RECOVERY	A-6(3)	
		3	4.0'	6 10	Saturated medium dense brown fine gravelly coarse sand w/some fine	A-1-b	
5			6.0	9 10	sand and silt. 20" RECOVERY		
7.5		4	6.0'	7 8 3 4	Saturated medium dense tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			8.0'		21" RECOVERY		
		5	8.0'	3586	Saturated medium dense brown coarse to fine sand w/some silt, trace of fine gravel. 20" RECOVERY	A-1-b	
10			10.0'		20" RECOVERY End of Boring	+	
					End of Boring		
12.5							

Remarks:

Symbol Description

Strata symbols

SCIACA SYMBOLS

Low plasticity clay

Poorly graded sand with silt



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 1/08/2010 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 ATV.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: CBR2-15

Contract: 25-113-01

Boring Location: Sta. 60+00 5 L.T. C.L.

Boring Surface Elev.: + 65.70 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D. 3 1/4 **Casing Size:**

From Depth of: From Depth of: To: To: Inches Hollow Stem Auger: 0.0

Water Level Readings

Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date 1/8/10 10.0 8.0 4.7

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Dia. U-Sample Boring: U-Samples: Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	1/8/10	1	0.5'	1 2 2		Wet soft brownish orange silt w/some clay, trace of fine to coarse sand.	A-4(3)	Topsoil - 4".
			2.0'			14" RECOVERY		
2.5		2	2.0'	8 12 18 14		Wet medium dense brown fine gravelly fine to coarse sand w/some silt. 20" RECOVERY	A-1-b	
5		3	4.0' 6.0'	8 12 13 15		Saturated medium dense brown fine gravelly coarse sand w/trace of fine sand and silt.	A-1-b	
7.5		4	6.0'	14 10 8 7		Saturated medium dense brown fine gravelly coarse sand w/some fine sand and silt.	A-1-b	
			8.0'		00111100	22" RECOVERY		
		5	8.0'	10 11 11 15		Saturated medium dense brown fine gravelly coarse sand w/trace of fine sand and silt.	A-1-b	
10			10.0'			19" RECOVERY End of Boring		
						End of Boring		
12.5								

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Poorly graded sand with silt



Well graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 1/08/2010 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 ATV.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: CBR2-2

Contract: 25-113-01

Boring Location: Sta. 269+00 0 C.L.

Boring Surface Elev.: + 51.32 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 /14 **Casing Size:** Inches Hollow Stem Auger: 0.0 10.0

Water Level Readings

Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date 8/21/09 10.0 8.0 Dry

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Dia. U-Sample Boring: U-Samples: Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Jason Truver

Helpers: T. Kane

	•						
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/21/09	1	0.5'	3 5 8	Moist firm brown fine sandy silty clay w/some coarse sand.	A-6(7)	Topsoil - 5".
			2.0'		12" RECOVERY		
2.5		2	2.0' 4.0'	8 7 8 7	Moist medium dense brown fine gravelly coarse to fine sand w/some silt	A-1-b	
		3	4.0'	5 7	Moist medium dense brown coarse to fine sand w/some silt, trace of fine	A-1-b	
5			6.0	888	gravel. ST2015		
7.5		4	6.0'	13 25 35 21	Moist very dense brown fine gravelly fine to coarse sand w/some silt.	A-2-4(0)	
			8.0'		16" RECOVERY		
		5	8.0'	9 11 11 13	Moist medium dense brown fine to coarse sand w/some fine gravel and silt.	A-2-4(0)	
10			10.0'		13" RECOVERY		
					End of Boring		
12.5							

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Sil

Silty sand

Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 8/21/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 Track.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: CBR2-3

Contract: 25-113-01

Boring Location: Sta. 271+50 39 R.T. C.L.

Hollow Stem Auger:

Boring Surface Elev.: +61.25 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches

Water Level Readings

Time **Depth of Water** Elev. of Water Depth of Hole **Depth of Casing** Date 8/20/09 10.0 8.0 Dry

61.3 $\begin{array}{c} 61.3 \\ 61.3 \end{array}$

0.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Dia. U-Sample Boring: U-Samples: Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Jason Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/20/09	1	0.5'	6 6 7	Moist medium dense brown silty coarse to fine sand w/trace of fine gravel.	A-1-b	Topsoil - 4".
			2.0'		15" RECOVERY		
2.5		2	2.0'	8 8 7 7	Moist medium dense brown fine to coarse sand w/some silt, trace of fine gravel. 17" RECOVERY	5	
		3	4.0'	5 11	Moist medium dense orange coarse to fine sand w/some silt, trace of fine	A-1-b	
5			6.0	10 9	gravel. ST _{16" RECOVERY}		
7.5		4	6.0'	7 8 13 10	Moist medium dense orange fine to coarse sand w/some silt and fine gravel.	A-2-4(0)	
			8.0'		16" RECOVERY		
		5	8.0'	5 5 5 5	Moist loose orange fine sand w/some silt and coarse sand, trace of fine gravel.	A-2-4(0)	
10			10.0'		23" RECOVERY		
					End of Boring		
12.5							

Remarks:

Symbol Description

Strata symbols



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 8/20/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 Track.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: CBR2-4

Contract: 25-113-01

Boring Location: Sta. 307+00 44 L.T. C.L.

Boring Surface Elev.: + 64.11 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0

Water Level Readings

Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date 8/19/09 10.0 8.0 Dry

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Dia. U-Sample Boring: U-Samples: Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Jason Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/19/09	1	0.5'	10 13 10	Moist very stiff brown silt w/some fine gravel, clay and fine to coars sand.	e A-4(0)	Topsoil - 4".
			2.0'		15" RECOVERY		
2.5		2	2.0'	8 9 13 9	Moist medium dense brown silty fine gravelly fine to coarse sand. 14" RECOVERY	A-2-4(0)	
		3	4.0'	4 9	Moist medium dense orange silty coarse to fine sand w/trace of fine	A-2-4(0)	
5			6.0	10 9	gravel. ST 15		
7.5		4	6.0'	7 11 9 9	Moist medium dense orange silty coarse to fine sand.	A-2-4(0)	
			8.0'	7	20" RECOVERY		
		5	8.0'	7 11 6 8	Moist medium dense orange coarse to fine sand w/some silt.	A-2-4(0)	
10			10.0'		21" RECOVERY		
12.5					End of Boring		
	1			l		'	I

Remarks:

Symbol Description

Strata symbols

Silty low plasticity clay



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 8/19/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 Track.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: CBR2-5

Contract: 25-113-01

Boring Location: Sta. 310+00 34 R.T. C.L.

Boring Surface Elev.: + 65.30 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0 10.0

Water Level Readings

Depth of Water Time Depth of Hole **Depth of Casing** Elev. of Water Date 8/21/09 10.0 8.0 Dry

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Dia. U-Sample Boring: U-Samples: Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

						1	
Depth	Daily	No.	Sample	Blows/6"	Sample Description	Class./G.I.	Remarks
(ft.)	Progress		Depth				
	8/21/09	1	0.5'	3 3 3	Moist firm brown clayey silt w/some fine to coarse sand.	A-4(2)	Topsoil -
				3			5".
			0.01		1AN DE COVERY		
		2	2.0' 2.0'	4	12" RECOVERY	1 2 ((0)	
2.5		_	2.0	6	Moist medium dense brown clayey coarse to fine sand w/trace of silt and	A-2-6(0)	
				6	fine gravel.		
		V					
			4.0'		17" RECOVERY		
\vdash		3	4.0'	4 7	Moist medium dense brown silty coarse to fine sand.	A-2-4(0)	
				6	violst incutali delise blown sitty coalse to fine said.	A-2-4(0)	
5				8			
			<i> </i>	\rightarrow \Box			
			6.0		18" RECOVERY		
		4	6.0'	5	Moist loose brown silty coarse to fine sand.	A-2-4(0)	
				5 5 5 6			
7.5							
			8.0'		20" RECOVERY		
		5	8.0'	3 1	Saturated very loose brown silty fine to coarse sand.	A-2-4(0)	
				3 2			
-							
10			10.0'		20" RECOVERY		
					End of Boring		
12.5							

Remarks:

Symbol Description

Strata symbols

Silty low plasticity clay



Clayey sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 8/21/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 Track.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: CBR2-6

Contract: 25-113-01

Boring Location: Sta. 347+00 45 L.T. C.L.

Boring Surface Elev.: + 61.92 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 O.D.

IN. IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0 10.0

Water Level Readings

Time Depth of Water Depth of Hole **Depth of Casing** Elev. of Water Date 7.2 7/9/09 10.0 8.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Dia. U-Sample Boring: U-Samples: Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: T. Kane

Depth	Daily	No.	Sample	Blows/6"	Sample Description	Class./G.I.	Remarks
(ft.)	Progress		Depth				
	7/9/09	1	0.5'	4 5 4	Moist stiff brown fine sandy clay w/some coarse sand and silt.	A-6(2)	Topsoil -
				4			5".
	1		2.0'		18" RECOVERY		
	1	2	2.0'	8	Moist medium dense brown clayey coarse to fine sand w/some fine	A-2-4(0)	
2.5				10	gravel, trace of silt.	11 2 1(0)	
				12			
		V					
	_	_	4.0'	_	18" RECOVERY		
		3	4.0'	8 9	Moist medium dense brown coarse to fine sand w/some silt, trace of fine	A-1-b	
_	1			10 9	gravel.		
5	1						
			6.0		16" RECOVERY		
		4	6.0'	8 9 7 9	Moist medium dense brown coarse to fine sand w/some silt, trace of fine	A-1-b	
				7 9	gravel.		
	1						
7.5	-						
			8.0'	4	19" RECOVERY		
		5	8.0'	4 3 2 2	Moist loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
				2			
					11 4 11 6 7 14 4 19 6 7 14 1 19 6 7		
	-		40.01		(14.96) (14.96)		
10			10.0'		17" RECOVERY		
					End of Boring		
	1						
12.5	1						
	1						1

Remarks:

Symbol Description

Strata symbols

//// T

Low plasticity clay

Poorly graded clayey silty sand

Silty sand

Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/09/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 Track.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: CBR2-7

Contract: 25-113-01

Boring Location: Sta. 349+00 33 R.T. C.L.

Boring Surface Elev.: + 65.23 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0 10.0

Water Level Readings

Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date 7/9/09 10.0 8.0 Dry

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Dia. U-Sample Boring: U-Samples: Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: T. Kane

of fine A-2-4(0)	Sample Description Moist firm brown fine to coarse sandy clay w/trace of silt and fine graves. 8" RECOVERY Moist medium dense brown silty fine to coarse sand w/trace of fine gravel. 18" RECOVERY	Depth 0.5' 3 5 6 2.0' 2.0' 5 6 5	0.5'	Daily Progress No. 7/9/09 1	Depth (ft.) 2.5
d fine gravel. A-6(1) Topsoil - 5".	Moist firm brown fine to coarse sandy clay w/trace of silt and fine graves. 8" RECOVERY Moist medium dense brown silty fine to coarse sand w/trace of fine gravel. 18" RECOVERY	2.0' 2.0' 5 6 5	0.5'	7/9/09 1	
of fine A-2-4(0)	8" RECOVERY Moist medium dense brown silty fine to coarse sand w/trace of fine gravel. 18" RECOVERY	2.0'	2.0'		2.5
of fine A-2-4(0)	Moist medium dense brown silty fine to coarse sand w/trace of fine gravel. 18" RECOVERY	2.0'		2	2.5
NG	Moist medium dense brown silty fine to coarse sand w/trace of fine gravel. 18" RECOVERY	2.0' 5 6 6 5		2	2.5
NG	gravel. B B B B B B B B B B B B B B B B B B B	2.0' 5 6 6 5		2	2.5
e of fine A-2-4(0)	TUR BIJUINU	6 5			2.0
te of fine A-2-4(0)		10		-	
e of fine A-2-4(0)		4.01			
ce of fine A-2-4(0)				1	
ee of fine A-2-4(0)			4.0'		
	Moist medium dense tan fine to coarse sand w/some silt, trace of fine	4.0' 9 9	4.0	3	
II	gravel.	14 20			5
		\mathbf{A}	<i> </i>		
	14" RECOVERY	6.0'	6.0'	1	
nd, trace of A-1-b	Moist medium dense tan coarse sand w/some silt and fine sand, trace o	6.0' 12		4	
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	fine gravel.	6.0' 12 16 14 17		1	
		"		1	
				4	7.5
	22" RECOVERY	8.0'	8.0'		
ce of fine A-1-b	Wet loose grayish brown coarse to fine sand w/some silt, trace of fine	8.0' 6 4 3 3 3	8.0'	5	
	gravel.	3			
				1	
	10# DECOVERY	10.0'	10.0'	1 1	10
		10.0	10.0		10
	18" RECOVERY End of Boring		1	1 1	1
	End of Boring		1	1 1	
					12.5
					12.5
					12.5
					12.5
			10.0'		10

Remarks:

Symbol Description

Strata symbols

Clayey sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/09/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 Track.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: CBR2-8

Contract: 25-113-01

Boring Location: Sta. 351+00 45 L.T. C.L.

Boring Surface Elev.: + 64.75 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0 10.0

Water Level Readings

Depth of Water Time Depth of Hole **Depth of Casing** Elev. of Water Date 7/14/09 10.0 8.0 8.1

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Dia. U-Sample Boring: U-Samples: Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers: T. Kane

Depth	Daily	Nia	Sample	Blows/6"	Correla Deceriation	Class /C.	Damari
(ft.)	Progress	No.	Depth		Sample Description	Class./G.I.	Remarks
	7/14/09	1	0.5'	6 4 4	Moist stiff brown fine to coarse sandy silt w/some clay, trace of fine gravel.	A-4(0)	Topsoil - 5".
			2.0'		10" RECOVERY		
2.5	ľ	2	2.0'	3 5 7 7	Moist medium dense brown silty fine to coarse sand w/trace of fine gravel. 16" RECOVERY	A-2-4(0)	
		3	4.0'	3 5 8	Moist medium dense brown silty fine sand w/some coarse sand, trace of	A-2-4(0)	
5			6.0	8 26	fine gravel. ST 2015		
		4	6.0'	4 6 7 8	Moist medium dense tan coarse to fine sand w/some silt, trace of fine	A-1-b	
				7 8	gravel.		
7.5							
			8.0'		18" RECOVERY		
		5	8.0'	5 6 7	Wet medium dense tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
10			10.0'		16" RECOVERY		
1					End of Boring		
12.5							
12.0							

Remarks:

Symbol Description

Strata symbols

Poorly graded clayey silty sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/14/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 Track.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: CBR2-9

Contract: 25-113-01

Boring Location: Sta. 353+00 33 R.T. C.L.

Boring Surface Elev.: + 65.15 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0 10.0

Water Level Readings

Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date 9/2/09 10.0 8.0 Dry

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Dia. U-Sample Boring: U-Samples: Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/2/09	1	0.5'	3 3 5	Moist loose brown silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	Topsoil - 5".
			2.0'		16" RECOVERY		
2.5		2	2.0'	2 2 2 2 2	Moist very loose brown silty fine to coarse sand w/trace of fine gravel. 18" RECOVERY	A-2-4(0)	
		3	4.0'	3 4	Moist loose orange coarse sand w/some fine sand and silt, trace of fine	A-1-b	
5			6.0	555	gravel. UST 2015		
7.5		4	6.0'	6 4 4 5	Moist loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			8.0'		22" RECOVERY		
		5	8.0'	5 6 6	Wet medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
10			10.0'		22" RECOVERY	+	
					End of Boring		
-							
-							
12.5							

Remarks:

Symbol Description

Strata symbols

Silty sand

Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 9/02/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 45 ATV.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to S.R. 1 **Boring No.:** IB2-10-01

Contract: 25-113-01

Boring Location: Sta. 376+37 260 R.t. C.L.

Boring Surface Elev.: + 63.9 Reference:

IN. IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Wt. of Sample Hammer: Lbs. 30 Type of: Split Barrel O.D. O.D.

Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: D-Sampler: S-Sampler: U-Sampler: IN. IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches **Hollow Stem Auger:** 0.0

Water Level Readings

Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date 7.9 7/8/09 10.0 8.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: T. Kane

			T -	ı		1	ı
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/8/09	1	0.5'	3 4 5	Wet firm brown clayey silt w/some fine to coarse sand, trace of fine gravel.	A-4(4)	Cultivated Soil - 4".
2			2.0'		14" RECOVERY		
	R	2	2.0'	5	Wet medium dense brown silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
		V	U	5 5 6 6	LOK RIDDING	7	
4		3	4.0' 4.0'	7	18" RECOVERY		
		3	4.0	7 8 15 13	Wet medium dense orange coarse to fine sand w/some silt and fine grave	. A-1-b	
6			6.0'		17" RECOVERY		
		4	6.0'	15 17 11 13	Wet medium dense orange silty coarse sand w/some fine gravel and fine sand.	A-2-4(0)	USDA Classifica : Clay Loam
			8.0'		20" DECOVEDY		
8		5	8.0'	8 6 4 4	20" RECOVERY Wet loose orange coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
10			10.0'		20" RECOVERY		
10			10.0		End of Boring		
	1		1				1

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/8/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301 Maryland State Line to S.R. 1 **Boring No.:** IB2-10-02

Contract: 25-113-01

Boring Location: Sta. 376+37 365 R.t. C.L.

Boring Surface Elev.: + 61.0 Reference:

IN. IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0 8.0

Water Level Readings

Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date 7/9/09 10.0 8.0 6.8

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: T. Kane

						_	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/9/09	1	0.5'	8 8 6	Moist very stiff gray clayey coarse to fine sandy silt w/trace of fine gravel.	A-4(0)	Cultivated Soil - 5".
2			2.0'		15" RECOVERY		
		2	2.0'	6 5 6 5	Moist medium dense tan silty coarse to fine sand w/trace of fine gravel.	A-1-b	USDA Classifica : Sandy Loam
4			4.0'		20" RECOVERY		
		3	4.0'	8 9 9 7	Wet medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
6			6.0'		19" RECOVERY		
		4	6.0'	6 5 8 5	Saturated medium dense brown silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
8		<u> </u>	8.0'		20" RECOVERY		
		5	8.0'	3 2 2 2	Saturated very loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
10			10.0'		20" RECOVERY		
10			10.0		End of Boring		
	i						

Remarks:

Symbol Description

Strata symbols

Poorly graded clayey silty sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/9/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to S.R. 1 **Boring No.:** IB2-10-03

Contract: 25-113-01

Boring Location: Sta. 377+50 260 R.t. C.L.

Boring Surface Elev.: + 61.3 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 O.D.

IN. IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 7/9/09 10 8.0 6.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Dia. U-Sample Boring: U-Samples: 10 Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/9/09	1	1.0'	8 9	Moist medium dense gray silty fine to coarse sand w/trace of fine grave	I. A-2-4(0)	Cultivated Soils 12".
2	 	2	2.0' 2.0'	4	6" RECOVERY	A-1-b	
			0	6 6 5 5	Moist medium dense gray coarse to fine sand w/some silt, trace of fine gravel.	A-1-0	
4		3	4.0' 4.0'	7	15" RECOVERY	1 2 1(0)	TIODA
		3	4.0	7 10 9 9	Moist medium dense brown silty coarse sand w/some fine sand and fine gravel.	A-2-4(0)	USDA Classifica : Clay Loam
6			6.0'		11" RECOVERY		
		4	6.0'	5 6 5 5	Saturated medium dense orange coarse to fine sand w/some silt, trace o fine gravel.	A-1-b	
8	'		8.0'		16" RECOVERY		
		5	8.0'	4 4 3 3	Saturated loose orange coarse to fine sand w/some fine gravel and silt.	A-1-b	
10			10.0'		HAREI HAREI HAREI		
					End of Boring		
]						
12							

Remarks:

Symbol Description

Strata symbols

Silty sand

Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/9/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to S.R. 1 Boring No.: IB2-10-04

Contract: 25-113-01

Boring Location: Sta. 377+50 365 R.t. C.L.

Boring Surface Elev.: + 59.8 Reference:

IN. IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches

Hollow Stem Auger: 0.0

Water Level Readings

Time Depth of Hole **Depth of Casing Depth of Water** Elev. of Water Date 7/10/09 10.0 8.0 6.4

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: T. Kane

		_					,
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/10/09	1	0.0'	1 3 4 5	Moist firm gray clayey coarse to fine sandy silt w/trace of fine gravel.	A-4(0)	Forrest Duff - 2".
2	N		2.0'		14" RECOVERY		
		2	2.0'	8 12 16 16	Moist medium dense tan coarse sand w/some silt, fine sand and fine gravel.	A-1-b	USDA Classifica : Loamy Sand
4			4.0'	$\Delta \Box$	21" RECOVERY		
·		3	4.0'	8 12 11 11	Moist medium dense tan coarse to fine sand w/some silt and fine gravel.	A-1-b	
				11			
6			6.0'		18" RECOVERY		
		4	6.0'	8 9 8 8	Saturated medium dense orange silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
			8.0'		21" RECOVERY		
8		5	8.0'	2 2 1 2	Saturated very loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
				2	graver.		
]						
10			10.0'		19" RECOVERY		
					End of Boring		
	1	l					

Remarks:

Symbol Description

Strata symbols



Poorly graded clayey silty sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/10/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301 Maryland State Line to S.R. 1 **Boring No.:** IB2-10-05

Contract: 25-113-01

Boring Location: Sta. 378+62 260 R.t. C.L.

Boring Surface Elev.: + 66.4 Reference:

IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 O.D.

IN. IN. O.D. IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0 8.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 7/10/09 5.8 10 8.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: T. Kane

								-
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	7/10/09	1	0.5'	3 3 3		Moist firm gray fine gravelly silt w/some fine to coarse sand and clay.	A-4(0)	Forrest Duff - 4".
2			2.0'			18" RECOVERY		
		2	2.0'	5		Moist stiff gray clayey coarse sandy silt w/some fine sand and fine gravel.	A-4(0)	
		V	U	9		-OK BIDDING		
				<u> </u>				
4		<u> </u>	4.0'			24" RECOVERY		
		3	4.0'	8 9 9 8		Moist medium dense brown coarse to fine sand w/some silt and fine gravel.	A-1-b	USDA Classifica : Loamy Sand
6			6.0'	!		12" RECOVERY		
		4	6.0'	4 6 5 5		Wet medium dense brown fine gravelly coarse to fine sand w/some silt.	A-1-b	
8			8.0'	!		20" RECOVERY		
		5	8.0'	3 4 4 3		Wet loose brown silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
-	ł							
10			10.0'			24" RECOVERY		
						End of Boring		
	1	I		1 '	l		1	

Remarks:

Symbol Description

Strata symbols



Poorly graded clayey silty sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/10/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301 Maryland State Line to S.R. 1 **Boring No.:** IB2-10-06

Contract: 25-113-01

Boring Location: Sta. 378+62 365 R.t. C.L.

Boring Surface Elev.: + 62.4 Reference:

IN. IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0 8.0

Water Level Readings

Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date 7/10/09 5.9 10.0 8.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: T. Kane

		_					,
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/10/09	1	0.0'	1 2 3 3	Moist firm gray fine sandy silt w/some coarse sand and clay, trace of fine gravel.	A-4(0)	Forrest Duff - 3".
2			2.0'		16"RECOVERY		
		2	2.0'	8 9 9	Mo <mark>i</mark> st medium dense gray silty fine to coarse sand w/some fine gravel and clay.	A-2-4(0)	
			3.5'	A I	13" RECOVERY		
4		2A	3.5' 4.0'	10	Moist medium dense orange coarse sand w/some silt, fine sand and fine	A-1-b	
4		3	4.0	10	gravel. 6" RECOVERY	A-1-b	USDA
				10 11 7 10	Wet medium dense orange coarse sand w/some silt and fine sand, trace or		Classifica
					fine gravel.		: Loamy Sand
6			6.0'		20" RECOVERY		
		4	6.0'	10 8 5 5	Wet medium dense orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
8			8.0'		14" RECOVERY		
Ĭ		5	8.0'	4 3 3 3	Saturated loose orange coarse to fine sand w/trace of silt and fine gravel.	A-1-b	
				3 3	HELENE HELENE		
					DELEMEN BETERREN BETERREN BETERREN		
10			10.0'		17" RECOVERY		
					End of Boring		
\vdash							

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Poorly graded clayey silty sand



Silty sand



Well graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/10/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to S.R. 1 **Boring No.:** IB2-10-07

Contract: 25-113-01

Boring Location: Sta. 378+65 382 R.t. C.L.

Boring Surface Elev.: + 59.6 Reference:

IN. IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date 7/10/09 10.0 8.0 6.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: T. Kane

		Г				1	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/10/09	1	0.0'	1 1 1 6	Moist soft gray fine sandy silt w/some coarse sand and clay, trace of fine gravel.	A-4(0)	Forrest Duff - 2". USDA Classifica
2			2.0'		14" RECOVERY		: Loam
		2	2.0'	13 11 12 13	Moist very stiff gray fine sandy silt w/some coarse sand, fine gravel and clay.	A-4(0)	
4			4.0'		20" RECOVERY		
		3	4.01	6 9 12 11	Moist medium dense orange coarse to fine sand w/some silt and fine gravel.	A-1-b	
6			6.0'		17" RECOVERY		
		4	6.0'	8 7 7 6	Saturated medium dense orange coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
8			8.0'		16" RECOVERY		
		5	8.0'	4 2 5 2	Saturated loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
10			10.0'		18" RECOVERY		
					End of Boring		

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Poorly graded clayey silty sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/10/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
- Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to S.R. 1 **Boring No.:** IB2-11-01

Contract: 25-113-01

Boring Location: Sta. 383+34 190 L.t. C.L.

Boring Surface Elev.: + 59.6 Reference:

IN. IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0

Water Level Readings

Time Depth of Water Depth of Hole **Depth of Casing** Elev. of Water Date 5.2 7/9/10 10.0 8.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: T.Kane

						_	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/9/09	1	0.5'	6 6 4	Moist loose gray silty fine to coarse sand w/trace of fine gravel and clay.	A-2-4(0)	Cultivated Soil - 7". USDA classificat
2	_		2.0'		9" RECOVERY		: Sandy
		2	2.0'	6	Moist medium dense brown fine to coarse sand w/some silt, trace of fine	A-2-4(0)	Loam
		N	U	98	gravel.	י ל י	LUaill
4			4.0'		17" RECOVERY		
4		3	4.0'	4 5 8	Wet medium dense orange fine to coarse sand w/some silt, trace of fine	A-2-4(0)	
				888	gravel.		
6		L	6.0'		15" RECOVERY	<u></u>	
		4	6.0'	4 3 3 2	Saturated loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
8			8.0'		17" RECOVERY		
		5	8.0'	2 3 4 3	Saturated loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
10			10.0'		18" RECOVERY		
10			10.0		End of Boring	+	
]						

Remarks:

Symbol Description

Strata symbols



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/9/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301 Maryland State Line to S.R. 1 **Boring No.:** IB2-11-02

Contract: 25-113-01

Boring Location: Sta 348+57190 L.t. C.L.

Boring Surface Elev.: + 60.2 Reference:

IN. IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D. O.D.

Core Bit: O.D. 3 1/4 **Casing Size:** Inches

From Depth of: From Depth of: To: To: Hollow Stem Auger: 0.0 8.0

Water Level Readings

Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date 1/27/10 10.0 8.0 4.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth	Daily	No.	Sample	Blows/6"	Sample Description	Class./G.I.	Remarks
(ft.)	Progress 1/27/10	1	Depth 0.5'	2	Wet soft gray silt w/some fine to coarse sand, fine gravel and clay.	A-4(1)	Topsoil -
	.,,.	•	0.0	2 2 5	wet soft gray she wisome fine to coarse saile, fine graver and cray.	A-4(1)	8".
			2.0'		15" RECOVERY		
2		2	2.0'	7	Wet medium dense gray silty fine gravelly fine sand w/some coarse sand,	A-2-4(0)	
				9	trace of clay.	1 2 1(0)	
		V					
4		3	4.0' 4.0'	3	18" RECOVERY	A-1-b	
		3	4.0	3 4 4 2	Saturated loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-0	
				2	gaiven		
6			6.0'		17" RECOVERY		
		4	6.0'	2 3 4 3	Saturated loose orange coarse to fine sand w/some silt, trace of fine	A-1-b	
				3	gravel.		
8			8.0'		14" RECOVERY		
		5	8.0'	1 1 2 2	Saturated very loose orange fine to coarse sand w/some silt.	A-2-4(0)	
				2 2			
10			10.0'		18" RECOVERY		
'			10.0		End of Boring		
1							
	i						

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 1/27/2010 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to S.R. 1 **Boring No.:** IB2-12-01

Contract: 25-113-01

Boring Location: Sta. 397+50 220 R.t. C.L.

Boring Surface Elev.: + 60.0 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0

Water Level Readings

Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date 1/27/09 10.0 8.0 3.6

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Dia. U-Sample Boring: U-Samples: Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
2	1/27/10	1	0.5' 2.0'	2 3 3	Moist firm gray coarse sndy silt w/some fine sand, fine gravel and clay. 12" RECOVERY	A-4(0)	Topsoil - 5".
		2	2.0'	6 7 7 6	Saturated medium dense gray coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
4		3	4.0'	233333	Saturated loose grayish brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
6			6.0'		16" RECOVERY		
		4	6.0' 8.0'	2333	Saturated loose brown coarse to fine sand w/some silt, trace of fine gravel. 10" RECOVERY	A-1-b	
8		5	8.0'	2 5 4 3	Saturated loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
10			10.0'		HANN 12" RECOVERY		
					End of Boring		

Remarks:

Symbol Description

Strata symbols

Poorly graded clayey silty sand



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 1/27/2010 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to S.R. 1 **Boring No.:** IB2-12-02

Contract: 25-113-01

Boring Location: Sta. 398+82 220 R.t. C.L.

Boring Surface Elev.: + 61.9 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches

Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time Depth of Hole **Depth of Casing** Elev. of Water Date 7/15/10 5.7 10 8.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/15/09	1	0.0'	2 4 5 7	Moist stiff brown silt w/some fine to coarse sand, trace of fine gravel.	A-4(0)	Forrest Duff - 2".
2			2.0'		14" RECOVERY		
		2	2.0'	6 13 10 9	Moist medium dense orange clayey coarse to fine sand w/trace of silt and fine gravel.	A-2-4(0)	USDA Classifica : Sandy Loam
4		3	4.0' 4.0'	4	19" RECOVERY	4.1.1	
6		3	6.0'	4 6 7 6	Wet medium dense orange coarse sand w/some fine sand and silt, trace of fine gravel. 18" RECOVERY	A-1-b	
6		4	6.0'	4	Saturated loose brown coarse to fine sand w/some silt, trace of fine	A-2-4(0)	
				4 4 5 4	gravel.		
8		5	8.0' 8.0'	1	5" RECOVERY Saturated loose brown coarse to fine sand w/some silt, trace of fine	A-1-b	
				1 3 2 3	gravel.	71 1 0	
10			10.0'		22" RECOVERY		
10			10.0		End of Boring		

Remarks:

Symbol Description

Strata symbols

Silt



Poorly graded clayey silty sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/15/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
- Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to S.R. 1 **Boring No.:** IB2-13-01

Contract: 25-113-01

Boring Location: Sta. 400+50 215 R.t. C.L.

Boring Surface Elev.: + 62.8 Reference:

IN. IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 140 **Casing Size:** Inches **Hollow Stem Auger:** 0.0

Water Level Readings

Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date 7/15/09 10.0 8.0 7.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Dia. U-Sample Boring: U-Samples: Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers: T. Kane

							т
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/15/09	1	0.0'	3 4 5 5	Moist stiff brown clayey silt w/some coarse to fine sand, trace of fine gravel.	A-4(1)	Forrest Duff - 2".
2	N		2.0'		17" RECOVERY		
		2	2.0'	7 5 10 8	Moist medium dense brown silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
4			4.0'	AL'	18" RECOVERY		
		3	4.01	5 7 8 7	Moist medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	USDA Classifica : Loamy Sand
6	l '	4	6.0' 6.0'	4	17" RECOVERY Saturated loose brown coarse to fine sand w/some silt, trace of fine	A-1-b	<u> </u>
8			8.0'	4 3 7 7	gravel. 16" RECOVERY	Α-1-υ	
o o	1	5	8.0'	3 3 3 5	Saturated loose brown coarse sand w/some fine sand, trace of silt and fine	e A-1-b	
				3 5	gravel.		
	'	'	Í'				
10		 	10.0'	 	18" RECOVERY End of Boring		
					Elia of Borning		

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/15/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

0.0

F.A. Project: U.S. 301 Maryland State Line to S.R. 1 **Boring No.:** IB2-13-02

Contract: 25-113-01

Boring Location: Sta. 401+50 225 R.t. C.L.

Hollow Stem Auger:

Boring Surface Elev.: + 70.26 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D. From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches

Water Level Readings

Depth of Water Time Depth of Hole **Depth of Casing** Elev. of Water Date 7/15/09 10.0 8.0 7.8

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Dia. U-Sample Boring: U-Samples: Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers: T. Kane

						1	1
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/15/09	1	0.0'	3 4 6 6	Moist stiff brown clayey fine sandy silt w/some coarse sand, trace of fine gravel.	A-4(3)	Forrest Duff - 2".
2			2.0'		18" RECOVERY		
4		2	2.0'	5 6 7 6	Moist medium dense brown coarse to fine sand w/some silt, trace of fine gravel. 18" RECOVERY	A-1-b	USDA Classifica : Loamy Sand
		3	4.01	7 9 9 9	Wet medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
6		4	6.0' 6.0'	5	20" RECOVERY Saturated medium dense brown coarse to fine sand w/some silt, trace of	A-1-b	
8		•	8.0'	5 7 5 5	gravel. 17" RECOVERY	A-1-0	
0		5	8.0'	1 2	Saturated very loose brown coarse to fine sand w/some silt, trace of fine	A-1-b	
				1 2 2 2	gravel.		
10			10.0'		13" RECOVERY		
					End of Boring		

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/15/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301 Maryland State Line to S.R. 1 Boring No.: IB2-3-01

Contract: 25-113-01

Boring Location: Sta. 313+00, 350' Lt. C.L.

Boring Surface Elev.: + 50.7 Reference:

IN. IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches **Hollow Stem Auger:** 0.0 8.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 8-20-2009 10.0 8.0 Dry

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Williams

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/20/09	1	1.0'	5 6	Moist stiff brown clayey fine sandy silt w/some coarse sand, trace of fine gravel.	A-4(2)	Topsoil - 10".
2		2	2.0' 2.0'	5	11" RECOVERY	A 2 4(0)	
			2.0	5 13 14	Moist medium dense brown fine to coarse sand w/some silt and fine	A-2-4(0)	
			O	10	-OR BIDDING	j	
4			4.0'		15" RECOVERY		
		3	4.0'	4 3 6 8	Moist stiff tan fine sandy clay w/some coarse sand and fine gravel, trace of silt.	A-6(2)	
6			6.0'		20" RECOVERY		
		4	6.0'	13 18 23 20	Moist dense brown fine gravelly coarse sand w/some fine sand, trace of silt.	A-1-b	
8			8.0'	20	17" RECOVERY		
		5	8.0'	10 11 13 9	Moist medium dense brown coarse sandy fine gravel w/some fine sand and silt.	A-1-b	USDA Classifica
							: Loamy Sand
10			10.0'		15" RECOVERY		
			-		 End of Boring		
-							
12							

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Silty sand



Clayey sand



Well graded sand with silt

DRAFT NOT FOR BIDDING **AUGUST 2015**

- Exploratory borings were drilled on 8/20/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 45.
- Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301 Maryland State Line to S.R. 1 Boring No.: IB2-3-02

Contract: 25-113-01

Boring Location: Sta. 313+50, 275' Lt. C.L.

Boring Surface Elev.: + 56.9 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0 8.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 8/19/2009 10.0 8.0 Dry

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Williams

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/19/09	1	0.0'	2 6 4 8	Moist stiff brown clayey silt w/some fine sand, trace of coarse sand.	A-4(6)	USDA CLassifica : Silt Loam
2			2.0'		12" RECOVERY		
		2	2.0'	8 30 20 10	Moist dense brown fine gravelly coarse to fine sand w/some silt.	A-1-b	
4			4.0'	Δ [$'$	16" RECOVERY		
•		3	4.0	12 18 19 12	Moist dense tan coarse to fine sand w/some fine gravel, trace of silt.	A-1-b	
6			6.0'	'	TEREBER TEREBER TEREBER TEREBER TEREBER		
		4	6.0'	13 20 12 10	Moist dense brown coarse sand w/some fine sand, fine gravel and silt.	A-1-b	
8	1	5	8.0' 8.0'	10	19" RECOVERY Moist medium dense brown coarse sand w/some fine sand and fine	A-1-b	-
			0.0	10 12 11 10	Moist medium dense brown coarse sand w/some fine sand and fine gravel, trace of silt.	A-1-0	
10			10.0'	<u> </u>	THEREINE THE TRECOVERY		
					End of Boring		

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Silty sand



Well graded sand with silt



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 8/19/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301 Maryland State Line to S.R. 1 Boring No.: IB2-3-03

Contract: 25-113-01

Boring Location: Sta. 314+00, 200' Lt. C.L.

Boring Surface Elev.: + 56.2 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches

Hollow Stem Auger: 0.0 8.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 8/19/2010 8.0 8.0 Dry

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Williams

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
2	8/19/09	1	1.0' 2.0'	7 9	Moist stiff brown clayey fine sandy silt w/some coarse sand, trace of fine gravel. 9" RECOVERY	A-4(2)	Topsoil - 10".
		2	2.0'	8 13 18	Moist dense brown silty fine to coarse sand w/some clay, trace of fine	A-2-4(0)	
4		V	4.0'	18 14	gravel. BIDDING 19" RECOVERY		
		3	4.0'	13	Moist medium dense tan fine gravelly coarse to fine sand w/some silt.	A-1-b	
			-	13 14 10 14	GUST 2015		
6	4	<u> </u>	6.0'	<u> </u>	14" RECOVERY		
8		4	6.0' 8.0'	12 10 8 10	Moist medium dense tan coarse to fine sand w/some fine gravel and silt.	A-1-b	
		5	8.0'	5 6 5	Moist medium dense tan fine to coarse sand w/trace of silt.		USDA Classifica : Sand
10		<u> </u>	10.0'	!	HEISTEFF 19" RECOVERY		
					End of Boring		
12							

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Poorly graded clayey silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 8/19/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to S.R. 1 Boring No.: IB2-3-05

Contract: 25-113-01

Boring Location: Sta. 314+50, 275' Lt. C.L.

Boring Surface Elev.: + 52.1 Reference:

IN. IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 8/20/2010 10.0 8.0 Dry

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Williams

	Петрега	· J.	** IIIIdili				
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/20/09	1	0.0'	3 3 3 4	Moist firm brown clayey fine sandy silt w/some coarse sand.	A-4(3)	
2	N		2.0'	T	7' RECOVERY		
_		2	2.0'	6 10 12 14	Moist medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
4		2	4.0' 4.0'		15" RECOVERY	1.4(0)	
		3	4.0	6 9 6 12	Moist stiff tan fine sandy silt w/some fine gravel and coarse sand, trace of clay.	A-4(0)	
6			6.0'		20" RECOVERY		
8		4	6.0' 8.0'	18 14 13 17	Moist medium dense tan coarse sand w/some fine gravel and fine sand, trace of silt. 17" RECOVERY	A-1-b	
0		5	8.0'	6 7 7 8	Moist medium dense orange coarse to fine sand w/some silt and clay.	A-1-b	USDA Classifica : Sand.
10			10.0'		18" RECOVERY		
					End of Boring		

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Silty sand



Poorly graded sand with silt



Well graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 8/20/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301 Maryland State Line to S.R. 1 Boring No.: IB2-3-06

Contract: 25-113-01

Boring Location: Sta. 315+25, 195' Lt. C.L.

Boring Surface Elev.: + 52.5 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 O.D.

IN. IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0 8.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 8/19/2010 10.0 8.0 Dry

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Williams

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/19/09	1	1.0'	6 8	Moist stiff brown silty fine sandy clay w/trace of coarse sand.	A-6(5)	Topsoil - 10".
2			2.0'	40	10" RECOVERY		
		2	2.0'	10 22 23	Moist dense brown fine to coarse sand w/some silt and fine gravel.	A-2-4(0)	
			O	23 13	FOR BIDDING)	
4			4.0'		18" RECOVERY		
		3	4.0'	11 7 9 10	Moist medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
6			6.0'		15" RECOVERY		
		4	6.0'	13 14 14 9	Moist medium dense tan coarse to fine sand w/some silt and fine gravel.	A-1-b	
8			8.0'		21" RECOVERY		
		5	8.0'	5 6 6 5	Moist medium dense tan fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	USDA Classifica : Loamy Sand
10			10.0'		16" RECOVERY		
					End of Boring		
12							

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 8/19/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301 Maryland State Line to S.R. 1 Boring No.: IB2-5-02

Contract: 25-113-01

Boring Location: Sta. 343+56, 200' Lt. C.L.

Boring Surface Elev.: + 59.8 Reference:

IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0 8.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 8/18/2009 Dry 10.0 8.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Williams

Depth	Daily	No.	Sample	Blows/6"	Sample Description	Class./G.I.	Remarks
(ft.)	Progress 8/18/09	1	Depth 0.5'				
	0/10/09	'	0.5	2 3 4	Moist firm brown clayey silt w/some fine sand, trace of coarse sand.	A-4(6)	Topsoil - 5".
							USDA
							Classifica
2			2.0'	6	10" RECOVERY		: Silt
	N	2	2.0'	7	Moist stiff brown clayey fine sandy silt w/some coarse sand, trace of fine	A-4(1)	Loam
		N	3.0'		gravel.		
		2A	3.0'	14 10	Moist medium dense brown fine gravelly fine to coarse sand w/some silt.	A-1-b	
4		3	4.0' 4.0'	4	11" RECOVERY		
		3	4.0	4 11 10 10	Moist medium dense tan coarse to fine sand w/some silt, trace of fine	A-1-b	
				10	gravel.		
6			6.0'		19" RECOVERY		
		4	6.0'	8 10	Moist medium dense tan coarse to fine sand w/some silt, trace of fine	A-1-b	
				11 10	gravel.		
8		5	8.0' 8.0'	6	18" RECOVERY	1 0 1(0)	
		3	0.0	6 4 3 2	Wet loose tan coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
				2			
10			10.0'		20" RECOVERY		
1,0			1010		End of Boring		

Remarks:

Symbol Description

Strata symbols

SCIACA SYMBOLS

Low plasticity clay

Clayey sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 8/18/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to S.R. 1 Boring No.: IB2-5-03

Contract: 25-113-01

Boring Location: Sta. 344+26, 260' Lt. C.L.

Boring Surface Elev.: + 60.7 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 O.D.

IN. IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 8/18/2010 10.0 8.0 Dry

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Jason Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/18/09	1	1.0'	8 9	Moist stiff brown silty clay w/some fine to coarse sand, trace of fine gravel.	A-6(5)	Topsoil - 10".
2		2	2.0' 2.0'	18	8" RECOVERY	A-1-b	
				18 20 20 40	Moist dense brown coarse to fine sand w/some silt and fine gravel.	A-1-0	
4			4.0'		18" RECOVERY		
		3	4.0'	5 8 8 8	Moist medium dense brown coarse sand w/some silt and fine sand, trace of fine gravel.	A-1-b	
6			6.0'		16" RECOVERY		
		4	6.0' 8.0'	8 8 7 5	Moist medium dense orange coarse sand w/some fine sand and silt. 17" RECOVERY	A-1-b	
8		5	8.0'	3	Moist very loose orange coarse sand w/some fine sand and silt, trace of	A-1-b	USDA
				3 2 2 3	fine gravel.	A-1-0	Classifica : Loamy Sand
10			10.0'		20" RECOVERY		
					End of Boring		
12							

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 8/18/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to S.R. 1 Boring No.: IB2-5-04

Contract: 25-113-01

Boring Location: Sta. 344+91, 195 Lt. C.L.

Boring Surface Elev.: + 61.4 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 8/18/2009 10.0 8.0 Dry

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Jason Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/18/09	1	0.5'	5 7 8	Moist stiff brown fine sandy clay w/some coarse sand, trace of fine grave and silt.	A-6(1)	Topsoil - 4".
2		2	2.0'	8	14" RECOVERY	A-2-4(0)	
		2	2.0	11 8 10	Moist medium dense brown silty fine to coarse sand w/some fine gravel.	A-2-4(0)	
4			4.0'		19" RECOVERY		
		3	4.0'	6 8 10 9	Moist medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			0.01				
6		4	6.0'	5 5 6 4	19" RECOVERY Moist medium dense brown coarse to fine sand w/some silt.	A-1-b	
8			8.0'		20" RECOVERY		
		5	8.0'	4 5 4 3	Moist loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	USDA Classifica : Loamy Sand
10			10.0'		20" RECOVERY		
10			10.0		End of Boring		

Remarks:

Symbol Description

Strata symbols

Clayey sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 8/18/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to S.R. 1 Boring No.: IB2-7-01

Contract: 25-113-01

Boring Location: Sta. 349+55, 250' Lt. C.L.

Boring Surface Elev.: + 61.8 Reference:

IN. IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches **Hollow Stem Auger:** 0.0

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 7/7/2009 9.5 10.0 10.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	7/7/09	1	0.5'	4 2 2	N	Moist loose brown silty coarse sand w/some fine gravel and fine sand.	A-1-b	Cultivated Soil - 5".
2		2	2.0'	2 3 4 5		Moist loose brown coarse sand w/some fine sand, trace of silt and fine gravel.	A-1-b	
4		3	4.0'	6 12 21 21		Moist dense brown coarse sand w/some fine sand, trace of silt and fine gravel.	A-1-b	
6		4	6.0' 6.0'	19 16 17 17	Militari Mil	16" RECOVERY Moist dense brown silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
8		5	8.0' 8.0'	9 11 7 5		21" RECOVERY Moist medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	USDA CLassific : Loamy
10			10.0'		E	21" RECOVERY End of Boring		Sand

Remarks:

Symbol Description

Strata symbols

Silty sand

Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/7/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301 Maryland State Line to S.R. 1 Boring No.: IB2-7-02

Contract: 25-113-01

Boring Location: Sta. 350+47, 175' Lt. C.L.

Boring Surface Elev.: + 61.8 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D. Core Bit: O.D.

Casing Size: 3 1/4 Inches

From Depth of: From Depth of: To: To: Hollow Stem Auger: 0.0 8.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 7/7/2009 9.0 10.0 10.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/7/09	1	1.0'	3 3	Moist firm brown clayey silt w/some fine to coarse sand.	A-4(5)	Cultivated Soil - 9".
2			2.0'	,	12" RECOVERY		
		2	2.0'	4	Moist loose brown silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
			O	4	FOR BIDDING)	
4			4.0'		16" RECOVERY		
		3	4.0'	53335	Moist loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
6			6.0'		20" RECOVERY		
		4	6.0'	6 3 2 2	Moist loose orange silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	USDA Classifica : Sandy Loam
8			8.0'		21" RECOVERY		
		5	8.0'	3 1 2 2	Wet very loose orange coarse to fine sand w/some silt.	A-2-4(0)	
10			10.0'		16" RECOVERY		
			10.0		End of Boring		
12							

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/7/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to S.R. 1 Boring No.: IB2-7-03

Contract: 25-113-01

Boring Location: Sta. 351+32, 245' Lt. C.L.

Boring Surface Elev.: + 60.6 Reference:

IN. IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3-1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Casing Time **Depth of Water** Depth of Hole Elev. of Water Date 7/7/2009 10.0 9.1 10.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: T. Kane

D (1)	5 "	г -					1
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/7/09	1	0.5'	3 2 3	Wet firm brown clayey silt w/some fine sand, trace of coarse sand.	A-4(4)	Cultivated Soil - 5". USDA Classifica
2	_		2.0'		10" RECOVERY		Tassifica
		2	2.0'	6666	Wet medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	Loam
4			4.0'		15" RECOVERY		
		3	4.0'	8 7 6 7	Wet medium dense orange silty coarse to fine sand w/trace of fine grave	. A-2-4(0)	
6			6.0'		19" RECOVERY		
		4	6.0'	7 7 5 7	Wet medium dense orange coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
8		5	8.0' 8.0'	5	20" RECOVERY	A 1 1	
		3	0.0	5 4 5 5	Wet loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
10			10.0'		18" RECOVERY		
			-		End of Boring		

Remarks:

Symbol Description

Strata symbols

Silty low plasticity clay



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/7/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to S.R. 1 Boring No.: IB2-8-01

Contract: 25-113-01

Boring Location: Sta. 361+00, 190' Lt. C.L.

Boring Surface Elev.: + 61.0 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3-1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0

Water Level Readings

Time **Depth of Water Depth of Hole Depth of Casing** Elev. of Water Date 10.0 8.0 7.8

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/7/09	1	1.0'	3 4	Wet firm orange clay w/some silt, coarse to fine sand and fine gravel.	A-6(6)	Cultivated Soil -
2			2.0'		9" RECOVERY		12".
		2	2.0'	6 12 14	Wet medium dense brown fine gravelly coarse to fine sand w/some silt.	A-1-b	USDA
			O	14	FOR BIDDING		Classifica : Loam
4			4.0'		14" RECOVERY		
		3	4.0'	7	Wet medium dense brownish orange coarse to fine sand w/some silt, trac	e A-1-b	
			F	7 12 11 16	of fine gravel. ST 2015		
6		4	6.0'	11	18" RECOVERY		
		4	6.0'	11 8 7 8	Wet medium dense orange coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
8			8.0'		21" RECOVERY		
		5	8.0'	2 2 3 3	Wet loose orange silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
10			10.0'		18" RECOVERY		
'0			10.0		End of Boring		
					G		
12							

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/7/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to S.R. 1 Boring No.: IB2-8-02

Contract: 25-113-01

Boring Location: Sta. 362+50 190 L.t. C.L.

Boring Surface Elev.: + 60.2 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Casing Depth of Water Time Elev. of Water Depth of Hole Date 7/7/09 10 8 6.1

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Dia. U-Sample Boring: U-Samples: 10 Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: D. Zmijewski

						_	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/7/09	1	1.0'	3 4	Moist firm gray clayey silt w/some coarse to fine sand and fine gravel.	A-4(2)	Cultivated Soil -
2			2.0'		10" RECOVERY		12".
		2	2.0'	6 12 12	Moist medium dense yellowish brown coarse sand w/some fine gravel,	A-1-b	
		V	0	12	Fine sand and silt. BIDDING		
4			4.0'		12" RECOVERY		
		3	4.0'	5	Moist medium dense yellow silty fine to coarse sand w/trace of fine	A-2-4(0)	USDA
				5 6 6 7	gravel.	712 1(0)	Classifica : Sandy Loam
			0.01		20" RECOVERY		
6		4	6.0' 6.0'	6	20" RECOVERY Wet loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
8		·	8.0'	6 5 5 4	24" RECOVERY	A-1-0	
°		5	8.0'	2	Wet loose orange coarse to fine sand w/some silt.	A-1-b	
				2 3 2 2	wet toose orange coarse to fine saild w/some sitt.	A-1-0	
10			10.0'		18" RECOVERY		
					End of Boring		
12							

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/7/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301 Maryland State Line to S.R. 1 Boring No.: IB2-9-01

Contract: 25-113-01

Boring Location: Sta. 372+00 180 L.t. C.L.

Boring Surface Elev.: + 64.5 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. O.D.

IN. IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0 8.0

Water Level Readings

Depth of Hole Depth of Water Time **Depth of Casing** Elev. of Water Date 7/8/09 10 8.0 8.9

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/8/09	1	0.5'	3 2 4	Moist firm brown clayey silt w/some fine to coarse sand, trace of fine gravel.	A-4(4)	Cultivated Soil - 5". USDA Classifica
2			2.0'		14" RECOVERY		: Loam
		2	2.0'	5565	Moist medium dense brown silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	\. LOam
4			4.0'		16" RECOVERY		
		3	4.0'	7 7 7 7	Moist medium dense orange silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
6			6.0'		17" RECOVERY		
		4	6.0'	5 6 5 6	Moist medium dense orange coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
8			8.0'		23" RECOVERY		
		5	8.0'	5 2 4 3	Moist loose orange coarse sand w/some fine gravel and fine sand, trace of silt.	of A-1-b	
10			10.0'		16" RECOVERY		
10			10.0		End of Boring		

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/8/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to S.R. 1 Boring No.: IB2-9-02

Contract: 25-113-01

Boring Location: Sta. 373+25 180 L.t. C.L.

Boring Surface Elev.: + 64.6 Reference:

IN. IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. O.D.

IN. IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches **Hollow Stem Auger:** 0.0

Water Level Readings

Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date 7/8/09 10.0 8.0 8.5

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: T. Kane

		_				_	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/8/09	1	0.5'	3 6 5	Moist stiff brown silty fine sandy clay w/some coarse sand, trace of fine gravel.	A-6(4)	Cultivated Soil - 5".
2			2.0'		12" RECOVERY		
		2	2.0'	4	Moist medium dense orange coarse to fine sand w/some silt, trace of fine	A-1-b	
		V	U	5 5	gravel.		
4			4.0'		16" RECOVERY		
4		3	4.0'	7	Moist medium dense orange coarse sand w/some fine sand, silt and fine	A-1-b	
				7 8 8 10	gravel.	A-1-0	
6			6.0'		17" RECOVERY		
		4	6.0'	7 5 6 5	Moist medium dense orange coarse sand w/some silt, trace of fine gravel and fine sand.	A-1-b	USDA Classifica : Sand
8			8.0'		16" RECOVERY		
		5	8.0'	5 4 5 3	Moist loose tan coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
10			10.0'		14" RECOVERY		
10			10.0		End of Boring		
					6		

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/8/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301 Maryland State Line to S.R. 1 Boring No.: IB2-9-03

Contract: 25-113-01

Boring Location: Sta. 374+75 180 L.t. C.L.

Boring Surface Elev.: + 65.3 Reference:

IN. IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D. **Casing Size:**

From Depth of: From Depth of: To: To: 3 1/4 Inches Hollow Stem Auger: 0.0 8.0

Water Level Readings

Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date 9.5 7/8/09 10.0 8.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: T. Kane

$\overline{}$		$\overline{}$	$\overline{}$				
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/8/09	1	0.5'	4 4 4	Moist firm brown clayey silt w/some fine to coarse sand.	A-4(2)	Cultivated Soil - 5".
2		ļ į	2.0'		10" RECOVERY		
		2	2.0'	4 7	Moist medium dense brown clayey fine to coarse sand w/trace of silt and	A-2-4(0)	
		N	U	7 7	fine gravel.		
		t i		<u> </u>			
4	<u> </u>		4.0'		21" RECOVERY		
		3	4.0'	8 10 10 9	Moist medium desne brown silty fine to coarse sand w/some fine gravel.	A-2-4(0)	
		()					
6		!	6.0'		18" RECOVERY		
O		4	6.0'	8 6 10 9	Moist medium dense orange silty coarse to fine sand w/trace of fine gravel.	A-1-b	
				9	β		
8		()	8.0'	۱ ۱	20" RECOVERY		
		5	8.0'	4 4 3 4	Moist loose orange coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	USDA Classifica : Sand
		()		l	(1) 11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
10		Щ	10.0'	\vdash	16" RECOVERY		
		ļ ,	ļ į		End of Boring		
		ļ ,	ļ į		I		
		ļ ,	ļ į		I		
		ļ j	ļ į		I		

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Clayey sand



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/8/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

Boring No.: IT2-1-06 F.A. Project: US 301 Maryland State Line to SR 1

Contract: 25-113-01

Boring Location: Sta. 327+00, 80' Lt. C.L.

Boring Surface Elev.: + 60.4 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0 8.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 8/19/09 10.0 8.0 Dry

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Jason Truver

Helpers: T. Kane

D #	5 "		<u> </u>			T	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/19/09	1	1.0'	6 10	Moist stiff brown clayey coarse sandy silt w/some fine sand, trace of fine	A-4(3)	Topsoil -
			2.0'		gravel		10".
		2	2.0'	9 9 8	12" RECOVERY Moist medium dense brown silty coarse to fine sand w/trace of fine	A-2-4(0)	
3	_			9	gravel.		
			4.0'		21" RECOVERY		
	ı	3	4.0'	3 5 6 5	Moist medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
6			6.0'		19" RECOVERY		
		4	6.0'	5 6 7 7	Moist medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
			8.0'		17" RECOVERY		
		5	8.0'	5 6 7	Moist medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
9				7 4			
			10.0'		21" RECOVERY		
					End of Boring		
12							
15							

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 8/19/2009 using a 3 1/4-inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

Boring No.: IT2-1-07 F.A. Project: US 301 Maryland State Line to SR 1

Contract: 25-113-01

Boring Location: Sta. 332+00, 80' Rt. C.L.

Boring Surface Elev.: + 61.7 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0 8.0

Water Level Readings

Time **Depth of Water Depth of Hole Depth of Casing** Elev. of Water Date 8/19/09 10.0 8.0 Dry

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Jason Truver

Helpers: T. Kane

		_	1				
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/19/09	1	0.5' 2.0'	5 5 9	Moist stiff brown clayey silt w/some fine to coarse sand, trace of fine gravel. 12" RECOVERY	A-4(3)	Topsoil - 6".
		2	2.0'	6	Moist medium dense orange silty coarse to fine sand.	A-2-4(0)	
3			4.0'	8 9 9	E C C 16' RECOVERY		
6	•	3	4.0' 6.0'	4 6 6 6	Moist medium dense orange coarse to fine sand w/some silt. 19" RECOVERY	A-1-b	
		4	6.0' 8.0'	4 4 7 6	Moist medium dense orange coarse to fine sand w/some silt, trace of fine gravel. 19" RECOVERY	A-2-4(0)	
9		5	8.0'	8 8 8 9	Moist medium dense tan coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
			10.0'		22" RECOVERY		
					End of Boring		
12							
15							

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 8/19/2009 using a 3 1/4-inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

Boring No.: IT2-1-08 F.A. Project: US 301 Maryland State Line to SR 1

Contract: 25-113-01

Boring Location: Sta. 337+00, 80' Lt. C.L.

Boring Surface Elev.: + 66.5 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0 8.0

Water Level Readings

Time **Depth of Water Depth of Hole Depth of Casing** Elev. of Water Date 8/18/09 10.0 8.0 Dry

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Jason Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/18/09	1	0.5' 2.0'	5 7 8	Moist medium dense brown clayey coarse sandy fine gravel w/some fine sand, trace of silt. 9" RECOVERY	A-2-4(0)	Topsoil - 4".
		2	2.0'	6 7	Moist medium dense brown silty coarse to fine sand.	A-2-4(0)	
3			4.0'	7 10	E D D 21' RECOVERY		
	_	3	4.0'	9 7 6	Moist medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
6			6.0'		19" RECOVERY		
		4	6.0'	11 10 7 6	Moist medium dense orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			8.0'		21" RECOVERY		
9		5	8.0'	5 4 5 5	Moist loose orange fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
			10.0'		20" RECOVERY		
					End of Boring		
12							
15							

Remarks:

Symbol Description

Strata symbols

Clayey sand

Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 8/18/2009 using a 3 1/4-inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

Boring No.: IT2-1-10 F.A. Project: US 301 Maryland State Line to SR 1

Contract: 25-113-01

Boring Location: Sta. 347+00

Boring Surface Elev.: + 64.5 Reference:

IN. IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time Depth of Hole **Depth of Casing** Elev. of Water Date 7/7/09 10.0 8.0

Dry

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
·	7/7/09	1	1.0' 2.0'	8 6	Moist stiff brown clayey fine sandy silt w/some coarse sand, trace of fine gravel.	A-4(2)	Cultivated Soil -
3		2	2.0'	2 4 7 7	Moist medium dense brown clayey fine sand w/some coarse sand and silt trace of fine gravel.	A-2-4(0)	12". USDA Classifica
			4.0'		15" RECOVERY		: Sandy
	ı	3	4.0'	4 5 3 2	Moist loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	Loam
6		L.	6.0'		16" RECOVERY		
		4	6.0'	2 3 4 1	Moist loose orange silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
			8.0'		20" RECOVERY		
9		5	8.0'	2 1 1 1	Moist very loose orange coarse to fine sand w/some silt.	A-1-b	
			10.0'		19" RECOVERY		
					End of Boring		
12							
15							

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Poorly graded clayey silty sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/7/2009 using a 3 1/4-inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

Boring No.: IT2-1-11 F.A. Project: US 301 Maryland State Line to SR 1

Contract: 25-113-01

Boring Location: Sta. 352+00, 80' Rt. C.L.

Boring Surface Elev.: + 62.9 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Time **Depth of Water Depth of Hole Depth of Casing** Elev. of Water Date 7/7/09 10.0 8.0 Dry

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: D. Zmijewski

D #	5 "						
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/7/09	1	1.0'	4 3	No Sieve Analysis - Indication of moist loose brown silty sand.		Topsoil -
			2.0'		2" RECOVERY		12".
		2	2.0'	2 5 6	Moist medium dense orange coarse to fine sand w/some silt, trace of fine	A-1-b	USDA
3				6 3	gravel.		Classifica
							: Loamy Sand
		3	4.0' 4.0'	4	19" RECOVERY Moist medium dense yellow silty coarse to fine sand.	A-2-4(0)	Sano
		1	4.0	4 7 7 5	Worst medium dense yenow strry coarse to thie said.	A-2-4(0)	
				5			
6			6.0'		18" RECOVERY		
		4	6.0'	7 6 7	Moist medium dense orange coarse to fine sand w/some silt, trace of fine	A-1-b	
			<i> </i>	7 4	gravel.		
		5	8.0' 8.0'	5	19" RECOVERY	A 1 L	
9			0.0	5 3 3 3	Wet loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
9				3			
			10.0'		24" RECOVERY		
					End of Boring		
12							
15							
1	I	i l	1			1	

Remarks:

Symbol Description

Strata symbols



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/7/2009 using a 3 1/4-inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

Boring No.: IT2-1-12 F.A. Project: US 301 Maryland State Line to SR 1

Contract: 25-113-01

Boring Location: Sta. 357+00, 80' Lt. C.L.

Boring Surface Elev.: + 65.24 Reference:

IN. IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0 8.0

Water Level Readings

Time **Depth of Water Depth of Hole Depth of Casing** Elev. of Water Date 7/7/09 10.0 8.0 Dry

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/7/09	1	1.0' 2.0'	3 4	Moist firm brown clayey fine to coarse sandy silt w/trace of fine gravel. 12" RECOVERY	A-4(0)	Cultivated Soil - 8".
3		2	2.0'	3 3 2 3	Moist loose brown silty fine to coarse sand w/trace of fine gravel and clay.	A-2-4(0)	USDA CLassifica
	N		4.0'		18" RECOVERY		: Sandy Loam
	ı	3	4.0'	3 5 6 5	Moist medium dense yellow coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
6			6.0'		18" RECOVERY		
		4	6.0'	5 8 8 8	Moist medium dense orange coarse sand w/some fine asand, fine gravel and silt.	A-1-b	
			8.0'		16" RECOVERY		
9		5	8.0'	7 7 6 6	Moist medium dense orange silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
			10.0'		24" RECOVERY		
					End of Boring		
12							
15							

Remarks:

Symbol Description

Strata symbols

Clayey sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/7/2009 using a 3 1/4-inch diameter continous flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

Boring No.: IT2-1-13 F.A. Project: US 301 Maryland State Line to SR 1

Contract: 25-113-01

Boring Location: Sta. 362+00, 108' Rt. C.L.

Boring Surface Elev.: + 66.56 Reference:

IN. IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches **Hollow Stem Auger:** 0.0

Water Level Readings

Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date 7/9/09 10.0 8.0 2.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: T. Kane

Depth	Daily	No.	Sample	Blows/6"	Sample Description	Class./G.I.	Remarks
(ft.)	Progress 7/9/09	1	Depth 0.0'	2 3 4 4	Moist loose orange coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	USDA Classifica : Loamy
			2.0'		20" RECOVERY		Sand
3		2	4.0'	3 2 1	Wet loose orange coarse sand w/some fine sand and silt, trace of fine gravel. 12" RECOVERY	A-1-b	
6		3	4.0' 6.0'	3 2 1 2	Wet very loose orange coarse sand w/some fine sand and silt, trace of fine gravel. 17" RECOVERY	A-1-b	
		4	6.0 ¹	4 3 3 4	Wet loose orange coarse sand w/some fine sand and silt, trace of fine gravel. 16" RECOVERY	A-1-b	
9		5	8.0'	4 6 5 6	Wet medium dense brown coarse sand w/some fine sand, trace of silt and fine gravel.	A-1-b	
			10.0'		15" RECOVERY		
					End of Boring		
12							
15							

Remarks:

Symbol Description

Strata symbols

Silty sand

Poorly graded sand with silt

Well graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/9/2009 using a 3 1/4-inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

Boring No.: IT2-1-14 F.A. Project: US 301 Maryland State Line to SR 1

Contract: 25-113-01

Boring Location: Sta. 367+00, 80' Lt. C.L.

Boring Surface Elev.: + 62.44 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 O.D.

IN. IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0 8.0

Water Level Readings

Time **Depth of Water Depth of Hole Depth of Casing** Elev. of Water Date 7/8/09 10.0 8.0 7.8

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: T. Kane

Dep (ft.		s No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/8/09	1	0.5' 2.0'	3 4 5	Wet firm brown clayey silt w/some fine sand, trace of coarse sand and fine gravel. 13" RECOVERY	A-4(4)	Topsoil - 5".
		2	2.0'	10 8 12	Wet medium dense orange coarse to fine sand w/some silt and fine grave	. A-1-b	
3		V	4.0'	13	18" RECOVERY		
	-	3	4.0'	8 12 13 15	Wet medium dense orange coarse sand w/some fine sand, silt and fine gravel.	A-1-b	
6			6.0'		16" RECOVERY		
_		4	6.0'	13 10 9 9	Wet medium dense orange fine gravelly coarse sand w/some silt, trace of fine sand.	A-1-b	USDA Classifica : Sand
		_	8.0'	2	######################################		
9	4	5	8.0'	3 2 4 4	Saturated loose orange coarse to fine sand w/some silt.	A-2-4(0)	
			10.0'		17" RECOVERY		
	_				End of Boring		
12	4						
	_						
	\dashv						
15							

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING **AUGUST 2015**

- Exploratory borings were drilled on 7/8/2009 using a 3 1/4-inch diameter continues flight power auger. Rig is a Track CME 55.
- Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

Boring No.: IT2-1-15 F.A. Project: US 301 Maryland State Line to SR 1

Contract: 25-113-01

Boring Location: Sta. 372+00, 80' Rt. C.L.

Boring Surface Elev.: + 63.18 Reference:

IN. IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches **Hollow Stem Auger:** 0.0

Water Level Readings

Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date 7/8/09 10.0 8.0 8.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
(11.)	7/8/09	1	0.5'	4 3 4	Moist firm brown silty fine andy clay w/some coarse sand.	A-6(4)	
			2.0'	4	13" RECOVERY		
		2	2.0'	6 7 8	Moist medium dense orange coarse sand w/some silt and fine sand, trace	A-1-b	USDA
3			4.0'	8	of fine gravel. 18' RECOVERY		Classifica : Loamy Sand
	•	3	4.0'	6 8 9 8	Moist medium dense orange coarse sand w/some fine gravel, fine sand and silt.	A-1-b	
6			6.0'		16" RECOVERY		
		4	6.0'	5 4 3 4	Moist loose orange coarse sand w/some fine sand, fine gravel and silt.	A-1-b	
			8.0'		17" RECOVERY		
9		5	8.0'	2 2 1 3	Wet very loose brown coarse sand w/some fine sand, trace of silt and fine gravel.	A-1-b	
			10.0'		16" RECOVERY		
					End of Boring		
12							
15							

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Silty sand



Well graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/8/2009 using a 3 1/4-inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

Boring No.: IT2-1-16 F.A. Project: US 301 Maryland State Line to SR 1

Contract: 25-113-01

Boring Location: Sta. 377+00, 80' Lt. C.L.

Boring Surface Elev.: + 64.42 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 O.D.

IN. IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0 8.0

Water Level Readings

Time **Depth of Water Depth of Hole Depth of Casing** Elev. of Water Date 7/10/09 9.4 10.0 8.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: T. Kane

<u> </u>		_					
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/10/09	1	0.5' 2.0'	2 3 4	Wet firm brown clayey fine sandy silt w/some coarse sand, trace of fine gravel. 17" RECOVERY	A-4(4)	Cultivated Soil - 5".
		2	2.0'	4	Wet firm brown clayey fine sandy silt w/some coarse sand, trace of fine	A-4(0)	
3		V	4.0'	4 4 4	gravel. 16" RECOVERY		
	•	3	4.0	6 9 10	Wet medium dense orange silty fine to coarse sand w/trace of fine gravel	A-2-4(0)	
6		4	6.0' 6.0'	18 16 13 17	Wet medium dense orange silty coarse sand w/some fine sand, trace of fine gravel.	A-1-b	USDA Classifica : Sandy
]		8.0'		20" RECOVERY		Loam
9		5	8.0'	3 4 6 5	Wet loose orange coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
			10.0'		15" RECOVERY		
					End of Boring		
12]						
15							

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Poorly graded clayey silty sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/10/2009 using a 3 1/4-inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

Boring No.: IT2-1-17 F.A. Project: US 301 Maryland State Line to SR 1

Contract: 25-113-01

Boring Location: Sta. 382+00, 80' Rt. C.L.

Boring Surface Elev.: + 59.32 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0 8.0

Water Level Readings

Time **Depth of Water Depth of Hole Depth of Casing** Elev. of Water Date 5.3 7/9/09 10.0 8.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: T. Kane

Depth	Daily		Sample				
(ft.)	Progress	No.	Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/9/09	1	0.5' 2.0'	5 7 8	Moist stiff gray coarse to fine sandy silt w/trace of clay and fine gravel. 17" RECOVERY	A-4(0)	Topsoil - 3".
3		2	2.0'	5 6 6 5	Moist stiff gray fine sandy silt w/some coarse sand, trace of fine gravel.	A-4(0)	USDA Classifica
		M	4.0'	6	17' RECOVERY	<u> </u>	: Sandy Clay
	_	3	4.0	6 7 9 4	Wet medium dense orange coarse sand w/some silt, trace of fine sand and fine gravel.	A-1-b	Loam
6			6.0'	Λ	15" RECOVERY		
		4	6.0'	4 5 5 4	Saturated loose orange coarse sand w/some silt, trace of fine sand and fine gravel.	A-1-b	
			8.0'		14" RECOVERY		
9		5	8.0'	4 5 4 4	Saturated loose orange coarse sand w/some fine sand, fine gravel and silt.	A-1-b	
			10.0'		18" RECOVERY		
					End of Boring		
12							
15							
10							

Remarks:

Symbol Description

Strata symbols



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/9/2009 using a 3 1/4-inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

Boring No.: IT2-1-18 F.A. Project: US 301 Maryland State Line to SR 1

Contract: 25-113-01

Boring Location: Sta. 387+00, 81' Lt. C.L.

Boring Surface Elev.: + 61.55 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0

Water Level Readings

Time **Depth of Hole Depth of Casing Depth of Water** Elev. of Water Date 7/13/09 10.0 8.0 6.4

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: T. Kane

<u> </u>				1			
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/13/09	1	0.5'	5 4 5	Moist stiff brown fine sandy silt w/some coarse sand and clay, trace of fine gravel.	A-4(1)	Cultivated Soil - 5".
		2	2.0' 2.0'	8 10	16" RECOVERY Moist very stiff grayish brown fine sandy silt w/some coarse sand and	A-4(0)	
3		-	3.0'	10	clay trace of fine gravel.	A-4(0)	
		2A	3.0' 4.0'	11 11	9" RECOVERY Moist medium dense orange coarse sand w/some silt and fine gravel, trace	A-1-b	USDA Classifica
		3	4.0'	5 10 11	of fine sand.	A-1-b	: Loamy
				11 9	Moist medium dense orange coarse sand w/some silt, fine sand and fine		Sand
6			6.0'		gravel. 18" RECOVERY		
		4	6.0'	6 8	Saturated medium dense orange coarse sand w/some fine sand and silt,	A-1-b	
				8 10	trace of fine gravel.		
			8.0'		17" RECOVERY		
		5	8.0'	5	Saturated loose orange coarse to fine sand w/trace of silt and fine gravel.	A-1-b	
9				5 3 2 2	STREETING STREET TO SEE STREET TO SEE STREET WITH THE GRAVEN		
					HEREREN GEREREE GEREREE		
			10.0'		17" RECOVERY		
					End of Boring		
12							
14							
15							

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Poorly graded clayey silty sand



Silty sand



Poorly graded sand with silt



Well graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/13/2009 using a 3 1/4-inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

Boring No.: IT2-1-19 F.A. Project: US 301 Maryland State Line to SR 1

Contract: 25-113-01

Boring Location: Sta. 392+00, 80' Rt. C.L.

Boring Surface Elev.: + 62.00 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Time **Depth of Water Depth of Hole Depth of Casing** Elev. of Water Date 7/14/09 10.0 8.0 6.8

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/14/09	1	0.5' 2.0'	5 7 4	Moist medium dense brown silty coarse to fine sand w/some clay, trace o fine gravel. 16" RECOVERY	A-2-4(0)	Cultivated Soil - 5".
3		2	2.0'	7 7 5 3	Moist medium dense gray coarse to fine sand w/some silt, trace of fine gravel. 19" RECOVERY	A-1-b	USDA Classifica : Loamy Sand
6		3	4.0' 6.0'	7 3 2 2	Wet loose gray coarse to fine sand w/some silt, trace of fine gravel. 15" RECOVERY	A-1-b	
	_	4	6.0' 8.0'	33333	Saturated loose brown coarse sand w/some fine sand, trace of silt and fine gravel.	A-1-b	
9		5	8.0'	3 2 2 2	Saturated very loose orange silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
			10.0'		End of Boring		
12							
15							

Remarks:

Symbol Description

Strata symbols

Poorly graded clayey silty sand



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/14/2009 using a 3 1/4-inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

Boring No.: IT2-1-20 F.A. Project: US 301 Maryland State Line to SR 1

Contract: 25-113-01

Boring Location: Sta. 397+00, 80' Lt. C.L.

Boring Surface Elev.: + 63.38 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time Depth of Hole **Depth of Casing** Elev. of Water Date 7/14/09 10.0 8.0 7.3

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Dia. U-Sample Boring: U-Samples: 10.0 Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/14/09	1	0.5' 2.0'	3 7 6 6	Moist stiff brown clayey silt w/some fine to coarse sand, trace of fine gravel. 16" RECOVERY	A-4(4)	Cultivated Soil - 6".
		2	2.0'	8 14	Moist medium dense brown coarse sand w/some silt, fine sand and fine	A-1-b	
3		J	4.0'	14	gravel. 20' RECOVERY		
	•	3	4.0'	3 7 6 4	Moist stiff brown coarse to fine sandy silt w/trace of fine gravel.	A-4(0)	USDA Classificat : Sandy Clay
6	-	4	6.0' 6.0'	3	19" RECOVERY Wet very loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	Loam
			8.0'	3 2 2 2 2	19" RECOVERY	A-1-0	Bouni
		5	8.0'	1 1	Saturated very loose orange fine to coarse sand w/some silt, trace of fine	A-2-4(0)	
9				1 2 2	gravel.		
			10.0'		18" RECOVERY		
			10.0		End of Boring		
12							
. =							
15							

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/14/2009 using a 3 1/4-inch diameter continues flight power auger. Rig is a Track CME 55.
- Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

Boring No.: IT2-1-21 F.A. Project: US 301 Maryland State Line to SR 1

Contract: 25-113-01

Boring Location: Sta. 402+00, 80' Rt. C.L.

Boring Surface Elev.: + 62.10 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 7/14/09 10.0 8.0 7.1

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	7/14/09	1	0.5'	3 7 5		Moist stiff brown silt w/some clay and fine gravel, trace of coarse to fine sand.	A-4(1)	Cultivated Soil - 5".
			2.0'			14" RECOVERY		USDA
		2	2.0'	3		Moist very loose orange silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	Classifica
3			4.0'	2		19" RECOVERY		: Clay
	•	3	4.0'	1 1 3		Wet very loose orange silty fine sand w/some coarse sand.	A-2-4(0)	
6			6.0'			13" RECOVERY		
		4	6.0'	3 2 2 3		Wet very loose orange silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
-		_	8.0'	2		18" RECOVERY		
9		5	8.0'	3 2 3 3		Saturated loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			40.01		00 3 1500 0 00 14 1500 150 17 3500			
-			10.0'		200	16" RECOVERY		
						End of Boring		
12								
- '-								
15								
13								

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/14/2009 using a 3 1/4-inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

Boring No.: IT2-1-22 F.A. Project: US 301 Maryland State Line to SR 1

Contract: 25-113-01

Boring Location: Sta. 407+00, 80' Lt. C.L.

Boring Surface Elev.: + 63.5 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 7/14/09 10.0 8.0 Dry

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers: T. Kane

	_	_					1
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/14/09	1	0.5' 2.0'	7 7 9	Moist stiff brown coarse sandy silt w/some fine sand and clay, trace of fine gravel. 16" RECOVERY	A-4(0)	Cultivated Soil - 6".
3		2	2.0'	9 7 7 6	Moist medium dense orange silty coarse to fine sand w/trace of fine gravel. 20' RECOVERY	A-2-4(0)	USDA Classifica : Sandy Loam
6	•	3	4.0' 6.0'	5 5 5 4	Wet loose brown silty fine to coarse sand w/trace of fine gravel. 15" RECOVERY	A-2-4(0)	
		4	6.0' 8.0'	2 4 5 4	Saturated loose brown fine to coarse sand w/some silt, trace of fine gravel. 19" RECOVERY	A-2-4(0)	
9		5	8.0'	3 3 2 2	Saturated loose orange fine to coarse sand w/some silt.	A-2-4(0)	
			10.0'		End of Boring		
12							
15							

Remarks:

Symbol Description

Strata symbols



Silty sand

DRAFT NOT FOR BIDDING **AUGUST 2015**

- 1. Exploratory borings were drilled on 7/14/2009 using a 3 1/4-inch diameter continues flight power auger. Rig is a Track CME 55.

- Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

Boring No.: IT2-1-23 F.A. Project: US 301 Maryland State Line to SR 1

Contract: 25-113-01

Boring Location: Sta. 412+00, 80' Rt. C.L.

Boring Surface Elev.: + 66.24 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 7/14/09 10.0 8.0 7.5

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/14/09	1	0.5' 2.0'	5 4 4	Moist stiff brown clayey fine sandy silt w/some coarse sand, trace of fine gravel. 17" RECOVERY	A-4(1)	Cultivated Soil - 5".
		2	2.0'	4 7	Moist stiff orange fine sandy silt w/some coarse sand and clay.	A-4(0)	
3		V	4.0'	8 9	21' RECOVERY		
	•	3	4.0	5 9 10 11	Moist medium dense brown coarse to fine sand w/some silt and fine gravel.	A-1-b	USDA Classifica : Loamy
6			6.0'		17" RECOVERY		Sand
		4	6.0'	8 6 6 6	Wet medium dense brown coarse to fine sand w/some silt.	A-1-b	
			8.0'		22" RECOVERY		
9		5	8.0'	2 3 3 3	Saturated loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			10.0'		19" RECOVERY		
					End of Boring		
12							
12							
15							

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Poorly graded clayey silty sand



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/14/2009 using a 3 1/4-inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

Boring No.: IT2-1-40 F.A. Project: US 301 Maryland State Line to SR 1

Contract: 25-113-01

Boring Location: Sta. 497+00, 80' Lt. C.L.

Boring Surface Elev.: + 66.23 Reference:

IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 12/1/10 8.0 6.0 6.1

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/1/09	1	1.0'		Wet brown clayey silt w/some fine to coarse sand, trace of fine gravel.	A-4(7)	Hand
			2.0'		12" RECOVERY		Auger
3		2	2.0'		Wet tan silty fine sand w/some coarse sand, trace of fine gravel.	A-2-4(0)	Topsoil - 9".
							Hand
			4.0'		24" RECOVERY		Auger
		3	4.0'		Wet orange clayey silt w/some fine to coarse sand and fine gravel.	A-4(0)	Hand
	•	4	5.0' 5.0'	•	12" RECOVERY		Auger
		4			Saturated orangish tan coarse sand w/some fine sand, fine gravel and silt.	A-1-b	Hand
6		5	6.0' 6.0'	\	12" RECOVERY Saturated tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	Auger Hand
					Saturated tail coalse to fine saild w/some sitt, trace of fine graver.	A-1-0	Auger
				16			110001
			8.0'		24" RECOVERY		
					End Of Boring		
9							
12							
-							
15							
15							

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Silty sand

Poorly graded clayey silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 12/1/2009 using a 3 1/4-inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

Boring No.: ITS2-1-01 F.A. Project: US 301 Maryland State Line to SR 1

Contract: 25-113-01

Boring Location: Sta. 345+00 67 R.T. C.L.

Boring Surface Elev.: + 61.74 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0 29.0

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 12/17/10 9.2 10.0 8.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Dia. U-Sample Boring: U-Samples: 31.0 Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth	Daily		Sample	DI '0"	0 1 5	01 (0)	<u> </u>
(ft.)	Progress	No.	Depth	Blows/6"	 Sample Description	Class./G.I.	Remarks
	12/17/09	1	0.5' 2.0'	2 2 3	Wet soft brown fine sandy silt w/some coarse sand, trace of fine gravel. 6" RECOVERY	A-4(0)	Topsoil - 8".
		2	2.0'	8 9	Wet medium dense brown coarse to fine sand w/trace of fine gravel and	A-1-b	
3		V	4.0'	8 10	silt. 20' RECOVERY		
	·	3	4.0'	5 9 9 9	Wet medium dense orange fine to coarse sand w/some silt, trace of fine gravel. 15" RECOVERY	A-2-4(0)	
6		4	6.0' 6.0'	11 8 7 5	Wet medium dense orange fine to coarse sand w/some silt.	A-2-4(0)	
			8.0'	_	18" RECOVERY		
9		5	8.0'	3 5 8 8	Wet medium dense orange fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
			10.0'		15" RECOVERY		
12		6	10.0'	4 7 6 6	Wet medium dense orange coarse to fine sand w/some silt, trace of fine gravel. 16" RECOVERY	A-1-b	
12		7	12.0'	2 2 3 3	Wet loose orange fine to coarse sand w/some silt, trace of fine gravel. 6" RECOVERY	A-2-4(0)	
		8	14.0'	1	Wet very loose orange fine to coarse sand w/some silt, trace of fine	A-2-4(0)	
15				1 2 2	gravel.		
		9	16.0' 16.0'	2	6" RECOVERY	A 2 4(0)	-
		9	10.0	2 2 2 5	Wet very loose orange fine sand w/some coarse sand and silt, trace of fine gravel.	A-2-4(0)	

Remarks:

STATE OF DELAWARE DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

F.A. Project: US 301 Maryland State Line to SR 1 **Contract:** 25-113-01

Boring No.: ITS2-1-01

Contr	act: 25-11	3-01					
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18	-	10	18.0' 18.0'	3 6 10 20	16" RECOVERY Wet medium dense orange coarse to fine sand w/some silt and fine grave	el. A-1-b	
	-		20.0'		15" RECOVERY		
21	_						
	_						
24							
	-	11	24.0'	10 14 15 15	Wet medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
	-		26.0'		17" RECOVERY		
27	_				DRAFT		
	-				SEL 1 / 15 CS 1		
30		12	29.0' 31.0'	7 9 10 14	Wet medium dense brown fine to coarse sand w/some silt, trace of fine gravel. 19" RECOVERY	A-2-4(0)	
33	-		-	JL	JGUST 2015		
	-						
36	-						
30							
	-						
39	_						
	_						
42							
	-						
	-						
45	-						

Symbol Description

Strata symbols

Silt

Poorly graded sand

Silty sand

Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 12/17/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 ATV.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to SR-1 Boring No.: ITS2-1-02

Contract: 25-113-01

Boring Location: STA. 345+50 18' Rt. C.L.

Boring Surface Elev.: + 62.0 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 O.D.

IN. IN. Core Bit: O.D. IN.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Casing Time Depth of Hole **Depth of Water** Elev. of Water Date 9/29/10 10.9 12.0 12.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 30.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/29/10	1	0.5' 2.0'	8 13 14	Moist very stiff brown clayey fine sandy silt w/some coarse sand, trace of fine gravel.	A-4(2)	Topsoil - 5".
		2	2.0'	12 24 30	Moist very dense brown fine to coarse sand and fine gravel w/some silt.	A-1-b	
3.6	N		4.0'	28	10" RECOVERY		
		3	4.0	9 10 9 8	Moist medium dense orange fine to coarse sand w/some silt.	A-2-4(0)	NG
			6.0'		20" RECOVERY		
		4	6.0'	7 8 8 8	Moist medium dense orange coarse to fine	A-2-4(0)	
7.2			8.0'	8 8	sand w/some silt. 14" RECOVERY	15	
		5	8.0'	4 4 4 5	Moist loose orange silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
			10.0'	5	18" RECOVERY		
10.8		6	10.0'	4 8 8 8	Moist medium dense orange coarse sand w/ some fine gravel, fine sand and silt.	A-1-b	
		7	12.0' 12.0'	3	Wet loose groups fine to george and w/geme	A-2-4(0)	
		,		3 5 5 4	Wet loose orange fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
14.4		8	14.0' 14.0'	2	20" RECOVERY Wet loose orange fine to coarse sand w/some	A-2-4(0)	
				2 3 4 3	silt, trace of fine gravel.	A-2-4(0)	
			16.0'		18" RECOVERY		
		9	16.0'	5 5 6 7	Wet medium dense orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
18			18.0'		15" RECOVERY		
		10	18.0'	4 3 6 7	Wet loose orange fine sand w/some silt and coarse sand, trace of fine gravel.	A-2-4(0)	
			20.0'		18" RECOVERY		

Remarks:

STATE OF DELAWARE DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

F.A. Project: U.S. 301 Maryland State Line to SR-1 **Contract:** 25-113-01

Boring No.: ITS2-1-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
21.6							
		11	23.0'	5	Wet and in dense house it was fire to	A 2 4(0)	
		''		5 7 14 17	Wet medium dense brownish green fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
25.2			25.0'		18" RECOVERY		
28.8		12	28.0'	7 9	Wet medium dense greenish brown fine to	A-2-4(0)	
20.0			30.0'	7 9 11 14	coarse sand w/some silt, trace of fine gravel. 18" RECOVERY		
					End of Boring		
32.4					DRAFT		
	N		O .	Т			
36	l l	1			FOR BIDI	יווע)	1G
			^		OLIOT OO	4 -	
39.6					IGUST 20	15	
43.2							
46.8							
50.4							
54							

Symbol Description

Strata symbols



Silty low plasticity clay



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on September 29, 2010 using 3 1/4-inch diameter continuous flight power auger. Rig is a Truck Mounted CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

10.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: R2-004

Contract: 25-113-01

Boring Location: Sta. 260+00.00, 45' Rt. C.L.

Boring Surface Elev.: + 50.54 Reference:

IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: 2 IN. Type of: Split Barrel O.D. IN. IN. O.D. 3 Ball Sampler

Core Bit: O.D. **Casing Size:**

To: To: 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 3/18/2008 Dry' 10.0 8.0'

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/18/08	1	0.8' 2.0'	4 3 4	Wet firm brown clayey fine sandy silt w/ some coarse sand, trace of gravel. 15" RECOVERY	A-4(1)	9" of cultivated soil.
3		2	2.0'	3 4 4 11	Wet firm brown clayey fine sandy silt w/ some coarse sand, trace of gravel.	A-4(3)	2
		3	4.0'	6 7 10 11	Wet medium dense brown fine to coarse sand w/ some gravel and silt.	A-2-4(0)	IG
6		4	6.0' 6.0'		Wet dense orange-brown fine to coarse sand	A-1-b	
			8.0'	12 14 17 15	and gravel w/ some silt. 16" RECOVERY	10	
9		5	8.0'	16 25 29 33	Wet very dense orange-brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			10.0'		9" RECOVERY Boring terminated at 10.0 feet.		
12							
15							

Remarks:

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

Symbol Description

Strata symbols

Silty low plasticity clay



Low plasticity clay



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 3/18/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
- Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

16.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: R2-006

Contract: 25-113-01

Boring Location: Sta. 279+93.08, 129' Lt. C.L.

Boring Surface Elev.: + 54.64 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: 2 IN. Type of: Split Barrel O.D. IN. IN. O.D. 3 Ball Sampler

Core Bit: O.D. **Casing Size:**

To: To: 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 3/18/2008 14.0

12.0' 11.3'

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Helpers: Amber Joseph

		1	T			
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remark	(S
(11.)	3/18/08	1	0.5'	6		•1
	3/10/00	'	0.5	6 8 9	Moist very stiff brown clayey fine to coarse A-4(1) 7" of cultivated s	SO11.
					sandy silt, trace of gravel.	
			2.0'	6	17" RECOVERY	
		2	2.0'	6 7 6 3	Moist medium dense brown fine to coarse A-2-4(0)	
3				3	sand w/ some clay, trace of gravel.	
			4.0'	_	19" RECOVERY	
	•	3	4.0'	5 9 7 13	Moist medium dense brown silty coarse to A-2-4(0)	
				7 13	fine sand, trace of gravel.	
6			6.0'		18" RECOVERY	
		4	6.0'	14 16 14 14	Moist medium dense light brown coarse to A-1-b	
				14	fine sand w/ some silt and gravel.	
			8.0'		16" RECOVERY	
		5	8.0'	9 12 10 10	Moist medium dense light brown coarse to A-1-b	
9				10 10	fine sand w/ some gravel and silt.	
			10.0'		19" RECOVERY	
		6	10.0'	9	Wet medium dense orange-brown coarse to A-1-b	
				9 6 5 6	fine sand w/ some silt, trace of gravel.	
					TELLY STREET	
12			12.0'		19" RECOVERY	
	1	7	12.0'	5	Saturated medium dense orange-brown coarse A-1-b	
				5 6 7 5	sand w/ some gravel, trace of fine sand and	
	1				silt.	
			14.0'		ESECUTION 19" RECOVERY	
	1	8	14.0'	3	Saturated loose orange-brown coarse to fine A-1-b	
15				3 4 5 6	sand w/ some gravel, trace of silt.	
' <u>`</u>	1			0	[814:63]	
			16.0'		ESTABLE STATES 22" RECOVERY	
					Boring terminated at 16.0 feet.	
	1					

Remarks:

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

Symbol Description

Strata symbols

Clayey sand



Poorly graded clayey silty sand



Silty sand



Poorly graded sand with silt



Well graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 3/18/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling and rechecked the following day.
- 3. Surveyed boring locations and elevations were provided by Century engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

16.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: R2-007

Contract: 25-113-01

Boring Location: Sta. 285+00.00, 122' Lt. C.L.

Boring Surface Elev.: + 56.98' Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: 2 Type of: Split Barrel O.D. O.D.

IN. IN. U-Sampler: 3 Ball Sampler Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Water Depth of Casing Time **Depth of Hole** Elev. of Water Date 3/18/2008 12.0' 12.4' 14.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks
	3/18/08	1	1.0' 2.0'	2 2	Moist soft brown clayey silt w/ some coarse to fine sand, trace of gravel. 12" RECOVERY A 1 b
3		2	2.0'	3 3 3 3	Moist loose brown silty coarse sand w/ some fine sand, trace of gravel. A-1-b
			4.0'		16' RECOVERY
		3	4.0'	2 3 2 4	Moist loose brown silty coarse to fine sand, A-1-b trace of gravel.
6			6.0'		17" RECOVERY
		4	6.0'	3 2 3 4	Moist loose brown coarse to fine sand w/ A-1-b some silt, trace of gravel.
		İ	8.0'		19" RECOVERY
9		5	8.0'	3 3 2 3	Moist loose brown coarse sand w/ some fine sand, gravel, and silt. A-1-b
			10.0'		16" RECOVERY
		6	10.0'	3 3 3 1	Wet loose brown coarse sand w/ some fine A-1-b sand and silt, trace of gravel.
12			12.0'		18" RECOVERY
		7	12.0'	1 1 1	Saturated very loose orange-brown silty fine sand w/ some coarse sand, trace of gravel. A-2-4(0)
			14.0'		17" RECOVERY
15		8	14.0'	1 2 3 3	Saturated loose orange-brown fine to coarse sand w/ some silt, trace of gravel. A-2-4(0)
		 	16.0'	 	19" RECOVERY
					Boring terminated at 16.0 feet.

Remarks:

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

Symbol Description

Strata symbols



Silty low plasticity clay



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 3/18/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

10.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: R2-008

Contract: 25-113-01

Boring Location: Sta. 290+00.00, 45' Rt. C.L.

Boring Surface Elev.: + 59.29' Reference:

IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: 2 IN. Type of: Split Barrel O.D. IN. IN. O.D. 3 Ball Sampler

Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 3/18/2008 10.0 8.0' Dry

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sam	nple Description	Class./G.I.	Remarks
	3/18/08	1	1.0' 2.0'	2 3	Wet firm brov	vn clayey fine sandy silt w/ and, trace of grayel.	A-4(2)	10" of cultivated soil.
3		2	2.0'	6 10 9 8	Wet medium of	and, trace of gravel. 12" RECOVERY dense orange-brown silty fine coarse sand, trace of gravel.	A-2-4(0)	
			4.0'	4		17" RECOVERY		
		3	4.0	4 5 7 10		dense orange-brown silty fine coarse sand, trace of gravel.	A-2-4(0)	
6			6.0'			19" RECOVERY		
		4	6.0′	9 9 9 7		dense orange-brown coarse to ome silt, trace of gravel.	A-2-4(0)	
			8.0'			18" RECOVERY		
9		5	8.0'	4 5 5 7		nge-brown coarse to fine sand race of gravel.	A-2-4(0)	
			10.0'			20" RECOVERY		
					Boring termin	ated at 10.0 feet.		
12								
15								

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 3/18/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: R2-008A

Contract: 25-113-01

Boring Location: Sta. 330+60, 10' Lt. C.L.

Boring Surface Elev.: + 59.1 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D. **U-Sampler:**

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches **Hollow Stem Auger:** 0.0 14.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 8/19/2009 13.5 16.0 14.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 35.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Jason Truver

Helpers: T. Kane

Depth	Daily		Sample				
(ft.)	Progress	No.	Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/19/09	1	0.5'	4 8 9	Moist stiff brown clayey fine sandy silt w/some coarse sand, trace of fine gravel.	A-4(3)	Topsoil - 5".
			2.0'		12" RECOVERY		
2.5		2	2.0'	19 17 14 11	Moist dense brown silty fine to coarse sand w/trace of fine gravel. 19" RECOVERY	A-2-4(0)	
5		3	4.0'	3 5 8 11	Moist medium dense brown silty fine sand w/some coarse and, trace of fine gravel.	A-2-4(0)	
		4	6.0' 6.0'	8 8 8 7	14" RECOVERY Moist medium dense orange fine to coarse and w/some silt, trace of fine gravel.	A-2-4(0)	
7.5			8.0'		21" RECOVERY		
		5	8.0'	4 7 7 9	Moist medium dense orange fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
10		6	10.0' 10.0'	4	20" RECOVERY	A 2 4(0)	USDA
		. 3	12.0'	4 4 4 4	Wet loose tan silty coarse to fine sand. 17" RECOVERY	A-2-4(0)	Classificate: Sandy Loam
12.5		7	12.0'	3 4 3 4	Saturated loose brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
		0	14.0' 14.0'	1	22" RECOVERY	1 2 4(0)	
		8	14.0	1	Saturated very loose brown fine sand w/some coarse sand and silt, trace	A-2-4(0)	

Remarks:

Reviewed By: Hany Fekry Soils Supervisor: Randuy Ferguson

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: R2-008A

Donth	Daile	Ι	Comple				Т
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15				2 2	of fine gravel.		
	-						
	-	9	16.0' 16.0'	2	16" RECOVERY	1 2 1(0)	
		9	16.0	2 4 8 11	Saturated medium dense brown fine sand w/some coarse sand, silt and fine gravel.	A-2-4(0)	
				11	The graven		
17.5	-		18.0'		17" RECOVERY		
	_	10	18.0'	12 16	Saturated dense brown fine to coarse sand w/some silt, trace of fine	A-2-4(0)	
	1			12 16 16 21	gravel.		
20			20.0'		16" RECOVERY		
	-						
	-						
22.5	1				DRAFT		
	1						
	-						
		11	24.0'	3 4	Saturated medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
25				8 12			
		V					
			26.0'		16" RECOVERY		
	_				GUST 2015		
27.5	-			76			
	-						
	_						
	-	12	29.0'	8 11	Saturated medium dense brown fine to coarse sand w/some silt, trace of	A-2-4(0)	
30	-			8 11 14 19	fine gravel.		
	1						
]		31.0'		18" RECOVERY		
]						
]						
32.5							
	-	13	33.0'	16	Setupoted dense busyon fine cond w/some accordened oils turce of fine	A 2 4(0)	_
		'	33.0	16 16 20 23	Saturated dense brown fine sand w/some coarse sand and silt, trace of fine gravel.	A-2-4(0)	
	1			23			
25	1		35.0'		17" RECOVERY		
35			33.0		End of Boring		
	1				-		
	1						
]						
37.5]						

Symbol Description

Strata symbols

Low plasticity clay



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 8/19/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 Track.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: R2-008B

Contract: 25-113-01

Boring Location: Sta. 330+00, 50' Rt. C.L.

Boring Surface Elev.: + 60.1 Reference:

IN. IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 O.D.

IN. IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches **Hollow Stem Auger:** 0.0 14.0

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 8/19/2009

12.0 16.0 14.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Jason Truver

Helpers: T. Kane

Depth	Daily		Sample					
(ft.)	Progress	No.	Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	8/19/09	1	1.0' 2.0'	10 10		Moist very stiff brown silty clay w/some fine sand, trace of coarse sand and fine gravel. 10" RECOVERY	A-4(7)	Topsoil - 9".
2.5		2	2.0'	14 19 14 13		Moist dense brown silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
			4.0'	13		FOR BY RECOVERY		
5	_	3	4.0'	4 4 4 9		Moist loose brown silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
7.5		4	6.0'	8 10 11 9		Moist medium dense brown coarse sand w/some fine sand, silt and fine gravel.	A-1-b	
			8.0'		611736F 611436F	21" RECOVERY		
		5	8.0'	7 7 7 7 9		Moist medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
10		6	10.0' 10.0'	6		17" RECOVERY	A 2 4(0)	USDA
		0		6 7 7 8		Moist medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	Classificate: Loamy Sand
		7	12.0' 12.0'	2		18" RECOVERY	1 2 112	
12.5		7	12.0	2 3 4 4		Wet loose tan fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
			14.0'			17" RECOVERY		
		8	14.0'	2 2 4 6		Wet loose brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	

Remarks:

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: R2-008B

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			·				
			16.0'		18" RECOVERY End of Boring		
	_				End of Borning		
17.5							
	-						
	-						
20							
	_						
	=						
22.5	-						
					DRAFT		
	-						
25		۱.					
25		M			FUB BILLINING		
		N			FOR BIDDING		
	-						
27.5				Λ I	JGUST 2015		
	-			76	JGUST ZUTS		
	-						
	-						
30	-						
	-						
00.5	-						
32.5]						
	-						
	-						
35							
	-						
	_						
	-						
37.5							
	_						

Symbol Description

Strata symbols

Strata Symbols

Low plasticity clay



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 8/19/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 Track.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

10.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: R2-009

Contract: 25-113-01

Boring Location: Sta. 295+00.00, 45'Lt. C.L.

Boring Surface Elev.: + 65.88' Reference:

IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: 2 IN. Type of: Split Barrel O.D. IN. IN. O.D. 3 Ball Sampler

Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 3/17/2008 10.0 8.0' Dry

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/17/08	1	0.8' 2.0'	3 4 4	Moist loose brown clayey fine sand and gravel w/ some coarse sand. 15" RECOVERY	A-2-4(0)	9" of cultivated soil.
3	N	2	2.0'	3 5 4 3	Moist loose red-brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
		3	4.0'	2 1 1 2 2	Moist very loose orange-brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	\mathbf{U}
6		4	6.0'	2 3 2 4	Moist loose orange-brown silty coarse to fine sand, trace of gravel.	A-2-4(0)	
9		5	8.0' 8.0'	3 2 2 2 3	16" RECOVERY Moist very loose orange-brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			10.0'		16" RECOVERY Boring terminated at 10.0 feet.		
12							
15							

Remarks:

Symbol Description

Strata symbols

Clayey sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 3/17/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
- Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

10.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: R2-010

Contract: 25-113-01

Boring Location: Sta. 300+00.00, 45' Rt. C.L.

Boring Surface Elev.: + 66.03' Reference:

IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: 2 IN. Type of: Split Barrel O.D. IN. IN. O.D. 3 Ball Sampler

Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 3/17/2008 10.0 8.0' Dry

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks
	3/17/08	1	1.0' 2.0'	2 2	Moist soft brown clayey fine sandy silt w/ A-4(1) 10" of cultivated soil.
		2	2.0'	3 4 5 5	some coarse sand, trace of gravel. 12" RECOVERY Moist loose orange-brown silty coarse to fine
3	N	1/	4.0'	5	sand, trace of gravel. 16" RECOVERY
	ì	3	4.0	2 4 6 7	Moist loose orange-brown silty coarse to fine A-1-b sand, trace of gravel.
6			6.0'		18" RECOVERY
		4	6.0	6 6 7 6	Moist medium dense orange-brown coarse to fine sand w/ some silt, trace of gravel. A-1-b
			8.0'		20" RECOVERY
9		5	8.0'	3 2 3 4	Moist loose orange-brown coarse to fine sand w/ some silt, trace of gravel.
			10.0'		16" RECOVERY
					Boring terminated at 10.0 feet.
12					
15					

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 3/17/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

33.0

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: R2-010A

Contract: 25-113-01

Boring Location: Sta. 340+00, 50' Rt. C.L.

Boring Surface Elev.: + 65.8 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 O.D.

IN. IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 8/18/2010 16.9 20.0 18.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 35.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Jason Truver

Helpers: T. Kane

							T	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
(11.)	8/18/09	1	0.5'	7	HHHH	Moist very stiff brown clayey fine sandy silt w/some coarse sand and fine	A-4(0)	Topsoil -
				7 9 11		gravel.	A-4(0)	5".
			2.0'	44		9" RECOVERY		
2.5		2	2.0'	14 10 10		Moist medium dense brown coarse to fine sand w/some silt, trace of fine	A-1-b	
				6		gravel.		
		V						
	•		4.0'	•		18" RECOVERY		
		3	4.0'	6 9		Moist medium dense brown coarse to fine sand w/some silt, trace of fine	A-1-b	
<u> </u>				10 10		gravel.		
5				10				
				\neg				
			6.0	0		15" RECOVERY		
		4	6.0'	9 8 8		Moist medium dense tan coarse sand w/some silt and fine sand, trace of	A-1-b	
				7		fine gravel.		
7.5								
			8.0'			19" RECOVERY		
		5	8.0'	3		Moist loose tan coarse to fine sand w/some silt, trace of fine gravel.		
				3 3 3 3		and said of the graver		
10		6	10.0' 10.0'	3		15" RECOVERY	A-1-b	
		U	10.0	3 2 3 2		Moist loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-0	
				2				
			12.0'			18" RECOVERY		
12.5		7	12.0'	2 3		Moist loose orange coarse to fine snad w/some silt, trace of fine gravel.	A-1-b	
12.3				4 4				
			440		20" RECOVERY			
—		8	14.0' 14.0'	2 4		20" RECOVERY Wet loose orange coarse to fine sand w/some silt. A-1-b		USDA
	l		17.0	4		Wet loose orange coarse to fine sand w/some silt.	A-1-0	OSDA

Remarks:

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: R2-010A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15	3.000			3			Classifica : Sand
	-						Sand
	-	9	16.0' 16.0'	3	19" RECOVERY Saturated loose brown coarse to fine sand w/some silt, trace of fine	A-2-4(0)	
	_			3 3 4 5	gravel.	A-2-4(0)	
17.5	1						
			18.0'		20" RECOVERY		
	1	10	18.0'	3 4 5 5	Saturated loose brown fine gravelly coarse sand w/some fine sand, trace of silt.	A-1-b	
	1			5	EREBERER OF SITE. REFERER FERENCE FOR FOR FOR FOR FOR FOR FOR FOR FOR FOR		
20	-		20.0'		HEREN HER HEREN HER		
20	1		20.0		TERRETE TO RECOVER TO THE PERSON OF THE PERS		
					SERBERGE SERBERGE SERBERGE SERBERGE		
	1				CHERRICH CHERRICH CHERRICH CHERRICH		
	+						
22.5	1						
]						
	1	44	04.01	6			
		11	24.0'	6 10 10	Saturated medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
25	1 [M		11		7	
	1 .		26.0'	•	17" RECOVERY		
	-				GUST 2015		
27.5	1			76			
	1						
]						
	1	12	29.0'	6 10 12 17	Saturated medium dense brown fine to coarse sand w/some silt, trace of	A-2-4(0)	
30	-			17	fine gravel.		
	1		31.0'		18" RECOVERY		
	1		31.0		16 RECOVERT		
32.5	1						
	-	13	33.0'	W/H	Saturated loose brown fine to coarse sand w/some silt, trace of fine	A-2-4(0)	
	†			W/H 2 6 7	gravel.	11 2 4(0)	
	1						
35			35.0'		15" RECOVERY		
	-				End of Boring		
	1						
	1						
37.5							
I	1	I	1			1	1

Symbol Description

Strata symbols

Poorly graded clayey silty sand



Silty sand



Well graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 8/18/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 Track.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

16.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: R2-011

Contract: 25-113-01

Boring Location: Sta. 305+00.00, 119' Lt. C.L.

Boring Surface Elev.: + 61.58' Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D. Ball Sampler

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0'

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 3/17/2008 10.0' 10.0' 12.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Helpers: Amber Joseph

Depth	Daily	I	Sample			
(ft.)	Progress	No.	Depth	Blows/6"	Sample Description Class./G.I. Remarks	
	3/17/08	1	0.8'	5 3 3	Moist firm brown clayey silt w/ some fine to A-4(4) 9" of cultivated soil.	
			2.0'		coarse sand, trace of gravel.	
		2	2.0'	7 15 15 15	Moist medium dense orange-brown gravel A-1-b	
3				15	and coarse sand w/ some fine sand and gravel.	
			4.0'		16" RECOVERY	
		3	4.0'	6 7 7 7	Wet medium dense orange-brown silty coarse A-1-b	
				7 7	to fine sand.	
6			6.0'		17" RECOVERY	
		4	6.0'	8 8 9	Wet medium dense orange-brown silty coarse A-1-b	
				9 7	to fine sand, trace of gravel.	
			0.01			
		5	8.0' 8.0'	9	19" RECOVERY Wet loose orange-brown coarse to fine sand A-1-b	
9				9 5 5 6	w/ some silt, trace of gravel.	
			10.0'	-	20" RECOVERY	
		6	10.0'	5 5 5 4	Saturated loose orange-brown silty coarse to A-2-4(0) fine sand.	
				4	The said.	
12			12.0'		17" RECOVERY	
		7	12.0'	2 4 8 8	Saturated medium dense orange-brown coarse A-1-b	
				8	to fine sand and gravel w/ some silt.	
			14.0'		16" RECOVERY	
		8	14.0'	3 5 5 5	Saturated loose orange-brown coarse sand A-1-b	
15				5 5	and gravel w/ some fine sand, trace of silt.	
			16.0'		17" RECOVERY	
			10.0		Boring terminated at 16.0 feet.	

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 3/17/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
- Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

35.0

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: R2-011A

Contract: 25-113-01

Boring Location: Sta. 343+00, 40' Lt. C.L.

Boring Surface Elev.: + 60.1 Reference:

Wt. of Casing Hammer: Wt. of Sample Hammer: IN. IN. IN. Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: 30 Lbs. D-Sampler: S-Sampler: U-Sampler: Core Bit: 2 Type of: Split Barrel O.D. O.D. O.D.

IN. IN. IN. O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches **Hollow Stem Auger:** 0.0

Water Level Readings

Time **Depth of Casing** Elev. of Water **Depth of Hole Depth of Water** Date

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Driller:

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	8/19/09	1	0.5'	3 2 2		Moist loose brown silty coarse to fine sand.	A-1-b	Topsoil - 8". USDA
			2.0'			14" RECOVERY		Classifica
2.5		2	2.0'	2 2 2 2 2		Moist very loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	: Sandy Loam
		3	4.0' 4.0'	4		15" RECOVERY	1 2 1(0)	
5			6.0	4 7 8 13		Moist medium dense orange silty coarse to fine sand w/trace of fine gravel. 16" RECOVERY	A-2-4(0)	
7.5		4	6.0'	9996		Moist medium dense orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
		L	8.0'	0		21" RECOVERY	A-1-b	
		5	8.0'	3 4 4 4		Wet loose orange coarse to fine sand w/some silt.		
10		<u> </u>	10.0'	2		19" RECOVERY	A-2-4(0)	
		6	10.0' 12.0'	2 2 3 2		Saturated loose brown fine sand w/some silt, trace of coarse sand. 20" RECOVERY		
1.5.5		7	12.0'	4		Saturated loose brown fine to coarse sand w/some fine gravel and silt.	A-2-4(0)	
12.5				4 5 5 4			A-2-4(0)	
		8	14.0' 14.0'	1	12" RECOVERY Saturated loose brown coarse to fine sand w/some silt_trace of fine		A-1-b	
		<u> </u>	17.0	2		Saturated loose brown coarse to fine sand w/some silt, trace of fine		

Remarks:

Reviewed By:	Soils Supervisor:	

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: R2-011A

15. 16.0' 9 16.0' 17.6 18.0' 18.0' 18.0' 19 16.0' 19 16.0' 10 16.0'	Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
16.0 3' RECOVERY		1.109,000		Dopui	3 4	gravel.		
Saturated medium dense brown coarse to fine sand w/some fine gravel. 10 18.0° 1	10	1						
18.0						(1) 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
18.0		-	9	16.0'	10 9 11		A-1-b	
18.0' 5' RECOVERY		-			13	in ace of sht.		
10	17.5	-				60 (
20 20.0° 15" RECOVERY DRAFT 22.5 DRAFT Saturated medium dense brown fine sand w/some coarse sand, silt and fine gravel. BIBLE Saturated medium dense brown fine sand w/some coarse sand, silt and fine gravel. BIBLE Saturated medium dense grayish brown fine to coarse sand w/some silt. A-2-4(0) 12 29.0° 8 9 14 115 115 115 115 115 115 115 115 115		1	10		8 9		A-2-4(0)	
DRAFT		1			13 13	fine gravel.		
DRAFT								
11 24.0' 14	20	_		20.0'		15" RECOVERY		
11 24.0' 14		-						
11 24.0' 14		-						
11 24.0' 14		_						
11 24.0' 14	22.5	1						
11 24.0' 14]				IIIII)RAFI		
25 26.0' ALL GUST 2015 12 29.0' \$ 9 14 13 30 31.0' 19" RECOVERY Fine gravel. BBDD 1								
25 16 18 18 18 18 18 18 18		-	11	24.0'	14		1 2 1(0)	
25.5 26.0'		- N	(' '	24.0	11		A-2-4(0)	
27.5 27.5	25	1 [M		13			
27.5 27.5		·		26.0'	•	15" RECOVERY		
12 29.0'								
12 29.0'						1 121121 2015		
31.0' 19" RECOVERY 32.5	27.5	-			76	JUSI ZUIS		
31.0' 19" RECOVERY 32.5		-						
31.0' 19" RECOVERY 32.5		-						
31.0' 19" RECOVERY 32.5		_	12	29.0'	8 9	Saturated medium dense grayish brown fine to coarse sand w/some silt.	A-2-4(0)	
32.5	30	1			14 13			
32.5]						
				31.0'		19" RECOVERY		
		-						
		1						
13 33.0' 8 Saturated medium dense brown fine sand w/some silt and coarse sand, trace of fine gravel.	32.5	1						
trace of fine gravel.		1	13	33.0'	8 14		A-2-4(0)	
]			13 15	trace of fine gravel.		
35 35.0' 16" RECOVERY	35			35.0'				
End of Boring		1				End of porting		
		1						
		1						
37.5	37.5]						

Symbol Description

Strata symbols

Poorly graded clayey silty sand



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 8/19/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 Track.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

16.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: R2-012

Contract: 25-113-01

Boring Location: Sta. 310+00.00, 119' Rt. C.L.

Boring Surface Elev.: + 66.09' Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: 2 Type of: Split barrel O.D. IN. IN. O.D. 3

U-Sampler: Ball Sampler Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Casing Time **Depth of Hole Depth of Water** Elev. of Water Date 3/17/2008 14.0' 16.0 12.7

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks
	3/17/08	1	1.0' 2.0'	2 2	Moist soft brown clayey fine sandy silt w/ A-4(3) 10" of cultivated soil.
3		2	2.0'	6 10 10 11	Moist medium dense brown silty coarse to fine sand, trace of gravel. A-2-4(0)
			4.0'		15" RECOVERY
		3	4.0	5 9 12 12	Moist medium dense brown silty coarse to fine sand, trace of gravel. A-1-b
6	'	1	6.0'		17" RECOVERY
		4	6.0'	11 10 13 12	Moist medium dense light brown fine sand w/ A-2-4(0) some coarse sand and clay.
	'		8.0'		16" RECOVERY
9		5	8.0'	6 4 4 6	Moist loose light brown silty fine to coarse A-2-4(0) sand.
9			10.0'	6	18" RECOVERY
		6	10.0'	3 3 3 3	Wet loose light brown silty coarse to fine sand, trace of gravel. A-2-4(0)
12	'	1	12.0'		19" RECOVERY
		7	12.0'	2 2 1 1	Wet very loose light brown coarse to fine sand w/ some silt, trace of gravel. A-1-b
	'		14.0'		17" RECOVERY
15		8	14.0'	2 1 1 3	Wet very loose light brown fine to coarse sand w/ some gravel and silt.
	'	<u> </u>	16.0'		17" RECOVERY
					Boring terminated at 16.0 feet.

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Silty sand



Poorly graded clayey silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 3/17/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
- Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: R2-012A

Contract: 25-113-01

Boring Location: Sta. 350+00 50 R.T. C.L.

Boring Surface Elev.: + 65.21 Reference:

Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

U-Sampler: Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches **Hollow Stem Auger:** 0.0 10.0

Water Level Readings

Time **Depth of Hole Depth of Casing Depth of Water** Elev. of Water Date 8/21/09 14.9 16.0 14.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; 40.0 Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	_	Sample Description	Class./G.I.	Remarks
	8/21/09	1	0.5'	2 2 2		Moist soft brown clayey fine sandy silt w/some coarse sand.	A-4(2)	Topsoil - 6".
			2.0'			12" RECOVERY		
2.5		2	2.0'	4 4 5 7		Moist loose brown silty fine to coarse sand w/trace of fine gravel. 16" RECOVERY	A-2-4(0)	
		3	4.0'	4 7		Moist medium dense tan silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
5			6.0	4 7 7 7		GUST _{19" RECOVERY} 015		
7.5		4	6.0' 8.0'	3 3 3 3		Moist loose tan coarse to fine sand w/some silt. 20" RECOVERY	A-2-4(0)	
10		5	8.0'	3 4 5 4		Moist loose tan coarse to fine sand w/some silt, trace of fine gravel. 20" RECOVERY	A-1-b	
		6	10.0'	3 4 4 5		Moist loose tan coarse sand w/some fine sand and silt, trace of fine gravel. 22" RECOVERY	A-1-b	USDA Classifica : Loamy Sand
12.5		7	12.0'	2 3 4 4		Saturated loose tan fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
		8	14.0' 14.0'	3 4		Seturated loose ten fine to coarse send w/some silt, trace of fine gravel	A-2-4(0)	
		٥	14.0	4		Saturated loose tan fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	

Remarks:

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: R2-012A

Depth (ft.) Progress No. Sample Blows/6" Sample Description	A-1-b	Remarks
16.0' 9 16.0' 18" RECOVERY 9 16.0' 8 211121 8 211121 8 211122 8 21122 8		
9 16.0' 3 Saturated medium dense brown fine gravelly coarse to fine sand w/some silt. 17.5 18.0' 18.0' 18" RECOVERY 10 18.0' 4 Saturated loose brown coarse to fine sand w/some silt, trace of fine gravel.		
9 16.0' 3 Saturated medium dense brown fine gravelly coarse to fine sand w/some silt. 17.5 18.0' 18" RECOVERY 10 18.0' 4 Saturated loose brown coarse to fine sand w/some silt, trace of fine gravel.		
17.5 18.0' 18.0' 18.0' Saturated loose brown coarse to fine sand w/some silt, trace of fine gravel.		
18.0' 18.0' 18" RECOVERY 10 18.0' 4 Saturated loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
18.0' 18" RECOVERY 10 18.0' 4 4 3 Saturated loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
Saturated loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
gravel.	A-1-0	
20 20.0' 17" RECOVERY		
20 20.0' 17" RECOVERY		
DRAFT		
11 24.0' 6 Saturated medium dense orange fine gravelly coarse sand w/some fine	A-1-b	
12 sand trace of silt		
26.0' 10" RECOVERY		
20.0 FIFEEEE TO RECOVER I		
27.5 AUGUST 2015		
EFFECTEE EFFECTE EFFE		
8/24/09 12 29.0' 12 17 Saturated dense brown fine to coarse sand w/some silt.	A-2-4(0)	
30 19 21 19		
31.0' 15" RECOVERY		
32.5		
13 34.0' 4 Saturated medium dense brown fine sand w/some coarse sand and silt.	A-2-4(0)	
35 10 10 10 10 10 10 10 10 10 10 10 10 10		
36.0' 17" RECOVERY		
37.5		

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: R2-012A

	act. 25-11					1	•
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		14	38.0'	5 9 9 11	Saturated medium dense brown fine sand w/some coarse sand and silt, trace of fine gravel.	A-2-4(0)	
	_			11	trace of fine graver.		
40	1		40.0'		18" RECOVERY		
40			40.0		End of Boring		
	-						
	-						
42.5	1						
72.0]						
	-						
	_						
45	1						
10]						
					DDAET		
	-				DRAFT		
47.5	1						
17.0							
		M			FOR BIDDING		
	-	A					
50	1						
]				ICLICT 2015		
			<i>F</i>	+L	JGUST 2015		
	_						
52.5	1						
02.0]						
	-						
55	-						
]						
	_						
	-						
57.5	-						
07.5]						
	_						
	-						
60	-						
60	1						
1	1	ı	1	1			I

Symbol Description

Strata symbols

Low plasticity clay



Silty sand



Poorly graded sand with silt



Well graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 8/21/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 Track.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

10.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: R2-013

Contract: 25-113-01

Boring Location: Sta. 315+00.00, 45' Lt. C.L.

Boring Surface Elev.: + 65.11' Reference:

IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: 2 IN. Type of: Split Barrel O.D. IN. IN. O.D. 3 Ball Sampler

Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 3/17/2008 10.0 8.0' Dry

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
	3/17/08	1	0.8' 2.0'	1 3 3	Moist firm brown fine to coarse sandy clay, trace of gravel. 15" RECOVERY	8" of cultivated soil.
3		2	4.0'	2 3 4 5	Moist loose red-brown clayey coarse to fine sand, trace of gravel.	
		3	4.0'	9 9 13 14	Moist medium dense red-brown silty coarse to A-1-b fine sand, trace of gravel.	NG
6		4	6.0'	12 11 10 8	Moist medium dense orange-brown fine to coarse sand w/ some silt and gravel. A-2-4(0)	
9		5	8.0' 8.0'	5 4 3 3	19" RECOVERY Moist loose light brown coarse to fine sand w/ A-1-b some silt.	
			10.0'		Boring terminated at 10.0 feet.	
12						
15						

Remarks:

Symbol Description

Strata symbols

Clayey sand



Poorly graded clayey silty sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 3/17/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
- Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: R2-014

Contract: 25-113-01

Boring Location: Sta. 320+00.00, 45' Rt. C.L.

Boring Surface Elev.: + 56.72' Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: 2 IN. Type of: Split Barrel O.D. IN. IN. O.D. 3 Ball Sampler

Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0' 10.0'

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 3/17/2008 2.0' 4.0' 1.0'

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Helpers: Amber Joseph

Depth	Daily	No.	Sample	Blows/6"	Sample Descr	intion	s./G.I. Remarks	
(ft.)	Progress		Depth					
	3/17/08	1	0.0'	1 1 1 2	Wet very loose orange-	br <mark>own c</mark> oarse to fine A-	·1-b	
				2	sand w/ some silt.			
			2.0'		18" RECC	WEDV		
		2	2.0'	2	Saturated very loose or		1-b	
3				2 2 2 3	fine sand w/ some silt,			
		M		3				
	•		4.0'		18" RECO			
		3	4.0'	3 2	Saturated loose orange-		·1-b	
			Λ	4	sand w/ some silt, trace	of gravel.		
					2011 DEGG			
6		4	6.0'	3	20" RECC Saturated loose orange-		-4(0)	
				4 6 6	sand w/ some silt, trace		- 4 (0)	
				ь	gane w some sm, auc	or graver.		
			8.0'		17" RECC	VERY		
		5	8.0'	4 6 8 6	Saturated medium dens		·1-b	
9				8 6	to fine sand w/ some si	t, trace of gravel.		
			10.0'		17" RECO			
					Boring terminated at 10	J.O Teet.		
12								
15								

Remarks:

Symbol Description

Strata symbols



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 3/17/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

10.0

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: R2-014A

Contract: 25-113-01

Boring Location: Sta. 360+00 45 R.T. C.L.

Boring Surface Elev.: 56.66 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: Type of: Split Barrel O.D. 2 O.D.

IN. IN. **U-Sampler:** Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Elev. of Water Time **Depth of Hole Depth of Casing** Date 54.2 56.7 8/24/09 8.0 8.0 2.5

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Dia. U-Sample Boring: U-Samples: 61.0 Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	8/24/09	1	0.0'	2 2 2 2 2		Moist very loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	USDA Classificat : Sand
		<u> </u>	2.0'			20" RECOVERY		
2.5		2	2.0'	2 3 4 3		Saturated loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
		<u> </u>	4.0'			16" RECOVERY		
5		3	4.0'	2 3 5 7		Saturated loose orange fine gravelly coarse sand w/some fine sand, trace of silt.	A-1-b	
	-	<u> </u>	6.0'			15" RECOVERY		<u> </u>
	-	4	6.0'	2 3 4 4		Saturated loose orange coarse to fine sand w/some fine gravel, trace of silt.	A-1-b	
7.5	-	'			1:3:3:3:3:3:3:3:3:3:3:3:3:3:3:3:3:3:3:3			
	-	<u> </u>	8.0'			17" RECOVERY		
	-	5	8.0'	4 4 5 5		Saturated loose orange fine gravelly coarse sand w/some fine sand, trace of silt.	A-1-b	
10	'	<u> </u>	10.0'	16		14" RECOVERY		
		6	10.0'	16 13 5 5		Saturated medium dense brown fine gravelly coarse sand w/some fine sand, trace of silt.	A-1-b	
12.5	- -	7	12.0' 12.0'	6 5 5 8		10" RECOVERY No Sample Recovery		Gravel clogging spoon

Remarks:

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: R2-014A

Depth	Daily	No.	Sample	Blows/6"		Sample Description	Class./G.I.	Remarks
(ft.)	Progress	140.	Depth 14.0' /	Blows/0	*******	0" RECOVERY	01000.70.11.	rtomanto
			14.0			U RECOVERT		
15]							
		8	15.0'	15 25 27 25		Saturated very dense brown fine gravelly coarse sand w/some fine sand	A-1-b	
				25	135 14 1366 125 17 17 18 19 18 17 17 18 19	and silt.		
			17.0'			16" RECOVERY		
17.5		9	17.0'	15 19 15 19		Saturated dense brown fine gravelly coarse sand w/some fine sand, trace	A-1-b	
				19		of silt.		
			19.0'			14" RECOVERY		
		10	19.0'	13 13 11 11		Saturated medium dense brown fine to coarse sand w/some silt, trace of	A-2-4(0)	
20				11 11		fine gravel.		
	1							
			21.0'			10" RECOVERY		
	1							
22.5						DRAFT		
22.0	1							
	1							
	i N	11	24.0'	5		Saturated medium dense brownish green fine sand w/some silt and coarse	A-2-4(0)	
	-	V		5 10 9		sand.	1 2 .(0)	
25	•							
						ALL DESCRIPTIVE		
	•		26.0'			11" RECOVERY		
	-			7		GUST 2015		
						0001 Z010		
27.5	-							
		12	29.0'	5			1 2 4(0)	3.6.1
		12	29.0	5 6 10 13		Saturated medium dense green fine sand w/some silt and coarse sand.	A-2-4(0)	Mud Rotary @
30				13				29.0'.
			31.0'			16" RECOVERY		
32.5								
<u> </u>]							
]							
]		_					
]	13	34.0'	10 12 14 17		Saturated medium dense green fine sand w/trace of silt and coarse sand.	A-3	
35]			17				
]							
]		36.0'			18" RECOVERY		
]							
]							
37.5]							
<u></u>	1		<u> </u>	I	h::::::::::		1	1

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: R2-014A

Depth	Daily		Sample				
(ft.)	Progress	No.	Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		14	39.0'	11		A 2 4(0)	
	-	14	39.0	11 11 18 20	Saturated medium dense green fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
40	-			20	(1) (1) (1) (1) (1) (1) (1) (1) (1) (1)		
	-		41.0'		18" RECOVERY		
			-		i) jine 13166 17166		
	<u> </u>				11127 11136 11136		
42.5					113788 13768 19768		
	<u> </u> -				113007 113007 113008		
					ATVIR. 11 Mars 1 Mars		
	-	15	44.0'	12 15	Saturated dense green fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
45	1			12 15 19 22			
			46.0'		21" RECOVERY		
	-						
H							
47.5	l N						
		V			FOR BIDDING	7	
	-	16	49.0'	8	Saturated medium dense green fine sand w/some silt, trace of coarse sand	A-2-4(0)	
50	-			8 12 16 16	and organic matter.		
]		/	$A \sqcup$			
			51.0'		21" RECOVERY		
	-						
	=						
52.5							
]						
		17	54.0'	7 11 18 16	saturated medium dense green fine sand w/some silt, trace of coarse sand	A-2-4(0)	
55				16	and organic matter.		
			_	[1975 1976 1976		
	-		56.0'		22" RECOVERY		
					14/65 14/65 14/65 10/100		
57.5					194067 19404 19404		
]				51 Yang 17 Mari 17 Mari		
					1) 4366 11 11 12 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
		18	59.0'	8		A 2 4(0)	
	-	10	J3.U	8 13 22 25	Saturated dense green fine sand w/some coarse sand and silt, trace of organic matter.	A-2-4(0)	
60	}			25	1996 1996 1996		
	-		61.0'		22" RECOVERY		
—			51.0		turbed 22 NECOTENT		

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: R2-014A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
(' '	- 3				End of Boring		
00.5							
62.5							
65							
67.5							
67.5							
					DDAET		
70					DRAFT		
70							
		M			FOR BIDDING		
72.5		1					
				\setminus \Box	ICHET 2015		
				70	JGUST 2015		
75							
77.5							
80							
82.5							

Symbol Description

Strata symbols

Silty sand

Well graded sand with silt

Poorly graded sand with silt



Well graded sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 8/24/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 Track.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

16.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: R2-015

Contract: 25-113-01

Boring Location: Sta. 325+00.00, 135' Lt. C.L.

Boring Surface Elev.: + 60.16' Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: 2 IN. Type of: Split Barrel O.D. IN. IN. O.D. U-Sampler: 3 Ball Sampler

Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 3/17/2008 8.0 6.0' 5.4'

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
	3/17/08	1	0.0'	3 3 3 6	Wet firm gray clay, trace of fine to coarse sand and gravel. A-6(10)	
			2.0'	7	18" RECOVERY	
3		2	4.0'	7 11 14 15	Wet very stiff gray silty clay, trace of fine to Coarse sand and gravel. 19" RECOVERY	IG
		3	4.0'	9 21 15	Saturated dense orange-brown and gray A-1-b	
6			6.0'	15 16	coarse sand and gravel w/ some fine sand and silt.	
		4	6.0'	8	Saturated medium dense light brown coarse to A-1-b	
				8 7 7	fine sand w/ some silt, trace of gravel.	
			8.0'	-	15" RECOVERY	
9		5	10.0'	5 4 3 3	Saturated loose light brown coarse to fine sand w/ some silt, trace of gravel. 17" RECOVERY	
		6	10.0'	5	Saturated loose light brown coarse to fine A-1-b	
				5 3 3 4	sand w/ some silt, trace of gravel.	
12			12.0'		15" RECOVERY	
		7	12.0'	3 3 5 7	Saturated loose light brown coarse to fine Sand w/ some silt, trace of gravel. A-1-b	
			14.0'		24" RECOVERY	
45		8	14.0'	7 5 6 6	Saturated medium dense orange-brown coarse A-1-b to fine sand w/ some gravel, trace of silt.	
15				6	[11 13 16 17] [2 13 14 16 17]	
			16.0'		15" RECOVERY	
					Boring terminated at 16.0 feet.	

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 3/17/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
- Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: R2-015A

Contract: 25-113-01

Boring Location: Sta. 365+00 45 L.T. C.L.

Boring Surface Elev.: + 60.17 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 O.D.

IN. IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0 10.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 8/25/09 10.0 8.0 7.3

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 51.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Dave Burt/Cecil Velazco

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/25/09	1	0.0'	3 4 6 8	Wet stiff gray silty clay w/trace of fine to coarse sand and fine gravel.	A-6(11)	Topsoil - 3".
2.5		2	2.0'	8 10 18 30	Wet very stiff gray clayey silt w/some fine sand, trace of coarse sand and fine gravel.	A-4(3)	
5		3	4.0' 4.0' 6.0'	5 8 9 11	Saturated medium dense tan silty coarse to fine sand. 14" RECOVERY	A-2-4(0)	USDA Classifica : Loamy Sand
7.5	-	4	6.0' 8.0'	6 6 6	Saturated medium dense tan coarse to fine sand w/some silt. 17" RECOVERY	A-2-4(0)	
10	-	5	8.0'	6 5 5 5	Saturated loose brown coarse sand w/some fine sand, trace of silt and fine gravel. 19" RECOVERY	A-1-b	
		6	10.0'	3 4 5 7	Saturated loose brown coarse to fine sand w/some silt, trace of fine gravel. 12" RECOVERY	A-1-b	
12.5	8/26/09	7	12.0'	14 10 9 6	Saturated medium dense brown coarse to fine sand w/some fine gravel and silt.	A-1-b	

Remarks:

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: R2-015A

Б. //	l 5 "		0 1	<u> </u>		1	1
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15		8	14.0' / 14.0'	3566	19" RECOVERY Saturated medium dense brown coarse asand w/some fine sand and fine gravel, trace of silt.	A-1-b	
			16.0'		21" RECOVERY		
17.5		9	16.0'	6 4 5 4	Saturated loose brown fine gravelly coarse to fine sand w/trace of silt.		
17.5			18.0'		24" RECOVERY		
		10	18.0'	13 5 8 12	Saturated medium dense brown fine to coarse sand w/some fine gravel and silt.	A-1-b	
20			20.0'		19" RECOVERY		
22.5		11	24.0'	3	Saturated loose green fine sand w/some coarse sand and silt.	A-2-4(0)	Mud
25			26.0'	4 6 8	18" RECOVERY	A-2-4(0)	Rotary @ 24.0'.
27.5			-	4	GUST 2015		
30		12	29.0'	3 5 7 10	Saturated medium dense green fine sand w/some coarse sand and silt.	A-2-4(0)	
32.5			31.0'		21" RECOVERY		
35		13	34.0'	6 6 7 9	Saturated medium dense green fine sand w/some silt, trace of coarse sand and organic matter.	A-2-4(0)	
			36.0'		20" RECOVERY		
37.5							

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: R2-015A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
40		14	39.0'	4 5 6 11	Saturated stiff green fine sandy silt w/trace of coarse sand and organic matter.	A-4(0)	
			41.0'		18" RECOVERY		
42.5							
45		15	44.0'	6 7 11 14	Saturated medium dense green fine sand w/some silt, trace of coarse sand and organic matter.	A-2-4(0)	
			46.0'		DRA 21"RECOVERY		
47.5		V	O	T	OR BIDDING		
50		16	49.0' 51.0'	5 8 10 12	Saturated medium dense green fine sand w/some silt, trace of coarse sand and organic matter. 19" RECOVERY	A-2-4(0)	
			01.0		End of Boring		
52.5							
55							
57.5							
60							

Symbol Description

Strata symbols

Low plasticity clay



Silty sand



Poorly graded sand with silt



Well graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 8/25/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 Track.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

10.0'

STATE OF DELAWARE DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

F.A. Project: U.S. 301, Maryland State Line to I-95

Boring No.: R2-016

Contract: 25-113-01

Boring Location: Sta. 330+00.00, 45' Rt. C.L.

Boring Surface Elev.: +61.64' Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: 2 IN. Type of: Split Barrel O.D. IN. IN. O.D. U-Sampler: 3 Ball Sampler Core Bit: O.D.

Casing Size: 3 1/4 Inches From Depth of: To: Hollow Stem Auger: From Depth of: 0.0' To:

Water Level Readings

Date Time Depth of Hole Depth of Casing Depth of Water Elev. of Water 8.0' 6.0' 4.9'

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 10.0 Ft.; 3 Dia. U-Sample Boring: Ft. No. of 2 in. Dia. Shelby Tubes: ; No. of: U-Samples: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Driller: Dan Taylor **Helpers:** Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks
	3/14/08	1	0.8' 2.0'	2 4 5	Wet loose brown silty fine to coarse sand, A-2-4(0) 8" of cultivated soil. trace of gravel.
3	N	2	4.0'	4 11 12 13	Wet medium dense orange-brown coarse to fine sand w/ some silt and gravel. 16" RECOVERY
6		3	4.0' 6.0'	9 9 9 8	Wet to saturated medium dense orange-brown A-2-4(0) coarse to fine sand w/ some silt, trace of gravel.
		4	6.0' 8.0'	5 4 4 4	Saturated loose orange-brown coarse to fine sand w/ some silt, trace of gravel. 14" RECOVERY
9		5	8.0'	4 3 3 5	Saturated loose orange-brown coarse to fine sand w/ some silt, trace of gravel. 19" RECOVERY
			10.0		Boring terminated at 10.0 feet.
12					
15					

Remarks:

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

Symbol Description

Strata symbols



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 3/14/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: R2-016A

Contract: 25-113-01

Boring Location: Sta. 370+00 50 R.T. C.L.

Boring Surface Elev.: + 62.11 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0 29.0

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 8/27/09 10.0 8.0 7.4

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 61.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Cecil Velazco

Helpers: T. Kane

						ı	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	 Sample Description	Class./G.I.	Remarks
	8/27/09	1	0.5'	3 3 4	Moist firm brown clayey coarse sandy silt w/some fine sand, trace of fine gravel.	A-4(3)	Topsoil - 4".
			2.0'		16" RECOVERY	A-1-b	
2.5		2	2.0'	3 4 5 6	Moist loose brown silty coarse to fine sand w/trace of fine gravel. 16" RECOVERY		
5		3	4.0' 6.0'	5 6 8 10	Moist medium dense brown coarse sand w/some fine sand, silt and fine gravel. 17" RECOVERY		USDA Classificat : Sand
7.5		4	6.0' 8.0'	7 6 5 4	Wet medium dense brown coarse to fine sand w/some silt, trace of fine gravel. 19" RECOVERY	A-1-b	
10		5	8.0'	3 3 4 3	Wet loose brown coarse to fine sand w/some silt, trace of fine gravel. 18" RECOVERY	A-1-b	
		6	10.0'	2 4 5 6	Wet loose brown coarse sand w/some fine sand, trace of silt and fine gravel. 17" RECOVERY	A-1-b	
12.5		7	12.0'	5 2 3 4	Wet loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
		8	14.0'	5 4	Wet loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
L				4	et 1995e blown combe to line band w/some sitt, trace of line gravel.	4110	

Remarks:

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: R2-016A

	,		T -				
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15				4 2			
			16.0'		10" RECOVERY		
		9	16.0'	2 2 2 4	Wet very loose brown fine to coarse sand w/some silt, trace of fine gravel	. A-2-4(0)	
				4			
17.5							
	-	10	18.0' 18.0'	4	18" RECOVERY	2 4 1 1	
		10	18.0	5 6 5	Wet medium dense brown coarse to fine sand w/some fine gravel, trace o silt.	A-1-b	
	-			5	EREER SHI.		
	-			,			
20	-		20.0'		14" RECOVERY		
				j 1	HOREE HEREE HOREEN		
	-			1	GENERAL HEREND HEREND		
	-			1	CECEREII TETETETE TETETETE		
00.5	-						
22.5	1				DRAFT		
	-			j 1			
	-						
		11	24.0'	15	Wet medium dense brown fine sand w/some coarse sand, silt and fine	A-2-4(0)	
25				9	gravel.		
20	1	V				J	
	•		26.0'	_	21" RECOVERY		
	1						
	1				GUST 2015		
27.5			<i> </i>	+L			
		12	29.0'	3 6 6 8	Wet medium dense brownish green fine sand w/some silt, trace of coarse	A-2-4(0)	Mud
30				8	sand.		Rotary @ 29.0'.
							29.0.
			31.0'		18" RECOVERY		
<u> </u>							
32.5							
	-						
<u> </u>	-	13	34.0'	2	Seturated medium deposits and the set of the	A 2 4(0)	
<u> </u>	-	13	34.0	2 5 6 8	Saturated medium dense brownish green fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
35	-			8			
	-						
<u> </u>	-		36.0'		23" RECOVERY		
	-						
37.5	1						
<u> </u>							

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: R2-016A

Saturated medium dense green fine sand w/race of silt, coarse sand and organic matter. 15	Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15 44.0 2		-		-				
42.6 42.6 42.6 43.6 44.0° 46.0° 46.0° 47.8 47.8 47.8 48.0° 48.0° 48.0° 49.0° 58.0° 59.6° 50.5 51.0° 52.6 53.6° 54.0° 55.6° 55.6° 57.6° 60.6° 58.0° 58.0° 58.0° 58.0° 59.0	40		14	39.0'	5 7 9 10		A-3	
Saturated medium dense green fine sand w/some silt, trace of coarse sand A-2-4(0) and organic matter. DRAF FORBIDDING Saturated medium dense green fine sand w/some silt, trace of coarse sand A-2-4(0) and organic matter. Solution of the same o				41.0'		19" RECOVERY		
46.0 DRAP TORBIDING 16 49.0 \$ Saturated medium dense green fine sand w/some silt, trace of coarse sand and organic matter. 51.0 All SQUST22 RECOVERY 52.5 Saturated medium dense green fine sand w/trace of silt, coarse sand and organic matter. 55.0 \$ Saturated medium dense green fine sand w/trace of silt, coarse sand and organic matter. 56.0' \$ Saturated dense green fine sand w/trace of coarse sand and organic matter. 57.5 \$ Saturated dense green fine sand w/some silt, trace of coarse sand and organic matter. 58.0 \$ Saturated dense green fine sand w/some silt, trace of coarse sand and organic matter. 59.0 \$ Saturated dense green fine sand w/some silt, trace of coarse sand and organic matter.	42.5					[2] 5, 10 6, 10 1,		
47.5 16 49.0 \$ Color of the stand with the stand of the stand and organic matter. 50 50 50 50 50 50 50 50 50 50 50 50 50 5	45		15	44.0'	5 6 9 11		A-2-4(0)	
and organic matter. 51.0	47.5			46.0'		DRAF PRECOVERY		
50 51.0 51.0 51.0 51.0 51.0 51.0 51.0 51.0 51.0 52.5 52.5 53.5 54.0 55.5 55.6 56.0 56.0 57.5 58.0 59.0 59.0 50			16	49.0'	5 8 9		A-2-4(0)	
17 54.0' 6 12 13 14 15 15 15 15 15 15 15 15 15 15 15 15 15	50			51.0'	0 14	navran and organic matter.		
56.0' 57.5 18 59.0' 8 3133 18 59.0' 8 3133 Saturated dense green fine sand w/some silt, trace of coarse sand and organic matter. 18 61.0' 21" RECOVERY	52.5					### 1 1 1 1 1 1 1 1 1		
57.5 18 59.0' 8 15 23 23 21" RECOVERY Saturated dense green fine sand w/some silt, trace of coarse sand and organic matter. 21" RECOVERY	55		17	54.0'	6 12 14 19		A-3	
18 59.0' 8 15 1315 23				56.0'		22" RECOVERY		
61.0' [13156] 21" RECOVERY	57.5					### ##################################		
	60		18	59.0'	8 15 23 23	organic matter.	A-2-4(0)	
I DIGO BOTOO				61.0'				

Symbol Description

Strata symbols

Low plasticity clay



Silty sand



Poorly graded sand with silt



Well graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 8/27/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 Track.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

10.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: R2-017

Contract: 25-113-01

Boring Location: Sta. 335+00.00, 45' Lt. C.L.

Boring Surface Elev.: + 65.29' Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: 2 IN. Type of: Split Barrel O.D. IN. IN. O.D. 3 Ball Sampler

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0'

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 3/14/2008 10.0 8.0' 8.0'

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks
	3/14/08	1	0.8' 2.0'	2 3 4	Wet firm brown clayey silt w/ some fine sand, trace of coarse sand and gravel. 15" RECOVERY
3		2	2.0'	4 5 7 7	Wet stiff brown fine to coarse sandy silt w/ A-4(0)
3			4.0	Т	some clay, trace of gravel.
	•	3	4.0'	5 6 7 11	Wet medium dense gray silty fine to coarse sand, trace of gravel. A-2-4(0)
6			6.0'		17" RECOVERY
		4	6.0'	11 11 10 7	Wet medium dense orange-brown coarse to fine sand w/ some silt, trace of gravel. A-1-b
			8.0'		20" RECOVERY
9		5	8.0'	5 7 5 5	Wet medium dense light brown coarse sand W/ some gravel, fine sand, and silt.
			10.0'		HANGE COLUMN COL
					Boring terminated at 10.0 feet.
12					
12					
15					

Remarks:

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

Symbol Description

Strata symbols

Low plasticity clay



Poorly graded clayey silty sand



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 3/14/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: R2-017A

Contract: 25-113-01

Boring Location: Sta. 375+00 45 L.T. C.L.

Reference: **Boring Surface Elev.:** + 65.33

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: Type of: Split Barrel O.D. 2 O.D.

IN. IN. **U-Sampler:** Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0 9.0

Water Level Readings

Depth of Casing Time **Depth of Water** Elev. of Water Depth of Hole Date 8/27/09 10.2 12 8.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 50.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Cecil Velazco/Jason Truver

Helpers: T. Kane

			I -			1	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
()	8/27/09	1	0.5'	3 3 4	Wet firm brown clayey silt w/some fine to coarse sand.	A-4(4)	Topsoil - 4".
			2.0'		17" RECOVERY		
2.5		2	2.0'	2 2 2 1	Wet soft brown silt w/some coarse to fine sand, trace of fine gravel and clay. 14" RECOVERY	A-4(0)	
		3	4.0'	3 3	Wet loose tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	USDA
5			6.0	4 3	GUST _{18" RECOVERY} 015		Classifica : Loamy Sand
		4	6.0'	3 4 5 6	Saturated loose tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
7.5			8.0'	6	18" RECOVERY		
		5	8.0'	3 4 4 5	Saturated loose tan coarse to fine sand w/some fine gravel, fine sand and silt.	A-1-b	
10		6	10.0' 10.0'	5	18" RECOVERY Saturated loose orange coarse sand w/some fine sand, trace of silt and fine	A-1-b	
				5 6 4 5	gravel.	A-1-0	
	8/31/09	7	12.0'	3	17" RECOVERY	A 1 1	
12.5	6/31/09	,	12.0'	3 3 4 4	Saturated loose orange coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
		8	14.0' 14.0'	2	15" RECOVERY	A 1 1.	
		l °	14.0	2 2	Saturated loose orange coarse sand w/some fine sand, trace of silt and fine	A-1-b	

Remarks:

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: R2-017A

Depth	Daily	No.	Sample	Blows/6"		Sample Description	Class./G.I.	Remarks
(ft.)	Progress	1	Depth	3 5	1:	gravel.		
15	1							
	-		16.0'			17" RECOVERY		
	1	9	16.0'	3 3 6 10		Saturated loose brown coarse to fine sand w/some silt and fine gravel.	A-1-b	
	1			6 10				
17.5								
			18.0'			22" RECOVERY		
		10	18.0'	6 6 6 7	100 100 100 100 100 100 100 100 100 100	Saturated medium dense brown fine gravelly coarse to fine sand w/trace	A-1-b	
				7		of silt.		
	-							
20	-		20.0'			14" RECOVERY		
	-							
	1				663 13366 663 13366 661 23366			
	_							
22.5	1				0614366 0614366			
22.5	†				erilbee Hibbee Vilianer			
	1	11	23.0'	5 5	11111111	Saturated medium dense brown silty fine sand w/some coarse sand.	A-2-4(0)	
	1			5 5 6 7				
25			25.0'			18" RECOVERY		
		V						
	-					OLIOT OCAE		
	-					GUST 2015		
27.5	-			$\neg \cup$				
	-	12	28.0'	5		Saturated medium dense brown fine sand w/some silt, trace of coarse	A-2-4(0)	
	1	'-	20.0	5 5 7 10		sand.	A-2-4(0)	
	_			10				
30	1		30.0'			22" RECOVERY		
30	†		30.0			22 RECOVERT		
	1							
	1							
	1							
32.5								
	1	13	33.0'	4 5 6 7		Saturated medium dense brown clayey fine snad w/trace of coarse sand	A-2-6(1)	
	-			7		and silt.		
	-							
35	-		35.0'			21" RECOVERY		
	-							
	1							
	1							
07.5	1							
37.5	1							
			1	ı .	p. p. p. p. p.		1	

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: R2-017A

Depth Progress No. Semple Blowstr Sample Description Class./G.1. Remarks	Contr	act: 25-11	3-01					
14 38.0° 15 40.0° 20° RECOVERY 20° RECOVERY 40.0° 20° RECOVERY 40.0° 20° RECOVERY 40.0° 20° RECOVERY 40.0° 20° RECOVERY 40.0° 20° RECOVERY 40.0° 20° RECOVERY 40.0° 20° RECOVERY 40.0° 20° RECOVERY 40.0° 20° RECOVERY 40.0° 20° RECOVERY 40.0° 20° RECOVERY 40.0° 20° RECOVERY 40.0° 20° RECOVERY 40.0° 20° RECOVERY 40.0° 20° RECOVERY 40.0° 40° 20° RECOVERY 40.0° 20° RECOVERY 40.0° 20° RECOVERY 40.0° 20° RECOVERY 40.0° 20° RECOVERY 40.0° 20° RECOVERY 40.0° RECOVERY 4	Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
40.0 20° RECOVERY 45.0 2			14	38.0'	4 5 6	Saturated stiff green clayey fine sandy silt w/trace of coarse sand.	A-4(0)	
42.5 15 43.0 3		-			8			
42.5 15 43.0 3	40	-		40.0'		20" RECOVERY		
15 43.0 5 8	40	1		40.0		20 RECOVERT		
15 43.0° 5 8 8 8 19° RECOVERY 19° R								
15 43.0 5 8		1						
15 43.0° 5 8 8 8 19° RECOVERY 19° R	12.5	-						
45.	42.5	1						
45.0' 19° RECOVERY DRAFT 47.5 16 43.0' 7 Saturated medium dense green sity fine sand w/trace of coarse sand and organic matter. 50 50.0' End of Boring 2015 55.5 57.5 57.5			15	43.0'	5 6 7		A-2-4(0)	
16 48.0° 20 Saturated medium dense green silty fine sand w trace of coarse sand and organic matter. 23° RECOVERY End of Boring 23° RECOVERY 55.5 55.5 57.5		-			8	trace of organic matter.		
16 48.0° 20 Saturated medium dense green silty fine sand w trace of coarse sand and organic matter. 23° RECOVERY End of Boring 23° RECOVERY 55.5 55.5 57.5	15	1		45.0'		19" RECOVERY		
16	45]		40.0		TO RECOVER		
16		1						
16		-				IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII		
16 48.0°	47.5	1						
50 50.0' 23" RECOVERY Endlof Boring 2 1 5 52.5 55 55.5 55 57.5 57.5 57.5 57.5 57.5	47.0							
50.0°			16	48.0'	7 9 12		A-2-4(0)	
52.5 55.5 57.5 57.5		-	A		20			
52.5 55.5 57.5	50	1		50.0'		23" RECOVERY		
52.5 55 57.5					\	End of Boring		
		1		<i> </i>	$\mathcal{A}_{\mathcal{L}}$	JGUSI ZUIS		
		1		_				
	52.5	1						
57.5]						
57.5		-						
57.5		1						
57.5	55	1						
]						
		-						
		1						
	57.5	1						
60		-						
60		-						
	60]						
		-						

Symbol Description

Strata symbols

Low plasticity clay



Silt



Silty sand



Poorly graded sand with silt



Well graded sand with silt



Clayey sand



Poorly graded clayey silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 8/27/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 Track.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

16.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: R2-018

Contract: 25-113-01

Boring Location: Sta. 340+00.00, 121' Rt. C.L.

Boring Surface Elev.: + 60.87' Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: 2 IN. Type of: Split barrel O.D. IN. IN. O.D.

U-Sampler: 3 Ball Sampler Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 3/14/2008 8.0 6.0' 5.1'

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/14/08	1	0.5'	1 1 2	Wet soft brown coarse to fine sandy silt w/	A-4(0)	7" of leaf litter/topsoil.
			2.0'	2	some clay, trace of gravel. 15" RECOVERY		
		2	2.0'	2 2 7	Wet stiff gray clayey fine sandy silt w/ some	A-4(2)	
3				7 16	coarse sand, trace of gravel.		
			4.0'		19" RECOVERY		
		3	4.0'	8 12 11 9	Wet medium dense orange-brown silty coarse	A-2-4(0)	
				11 9	to fine sand, trace of gravel.		
6			6.0'		16" RECOVERY	15	
		4	6.0'	4 4 5	Saturated loose orange-brown and gray coarse to fine sand w/ some silt, trace of gravel.	A-2-4(0)	
			_	6	to fine sand w/ some sitt, trace of graver.		
			8.0'		17" RECOVERY		
		5	8.0'	4 5 4 4	Saturated loose orange-brown coarse to fine	A-1-b	
9				4	sand w/ some silt, trace of gravel.		
			10.0'		17" RECOVERY		
		6	10.0'	5 3 3 4	Saturated loose orange-brown coarse sand w/	A-1-b	
				3 4	some fine sand and silt, trace of gravel.		
12			12.0'		17" RECOVERY		
12		7	12.0'	4 2	Saturated loose orange-brown coarse to fine	A-2-4(0)	
				4 2 4 3	sand w/ some silt, trace of gravel.		
			14.0'		20" RECOVERY		
		8	14.0'	5	Saturated medium dense orange-brown silty	A-2-4(0)	
15				5 5 8 9	fine to coarse sand, trace of gravel.	'(*)	
			16.0'		16" RECOVERY		
					Boring terminated at 16.0 feet.		
-							

Remarks:

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

Symbol Description

Strata symbols

Poorly graded clayey silty sand



Clayey sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 3/14/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling and rechecked the following day.
- 3. Surveyed boring locations and elevations were provided by Century engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

9.0

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: R2-018A

Contract: 25-113-01

Boring Location: Sta. 380+00 40 L.T. C.L.

Boring Surface Elev.: + 65.57 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 /14 **Casing Size:** Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 8/31/10 10.0 8.0 7.5

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 35.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Jason Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/31/09	1	0.0'	2 2 2 2	Wet soft gray silt w/some clay and fine sand, trace of coarse sand and fine gravel.	A-4(1)	Topsoil - 3".
			2.0'		16" RECOVERY		
2.5		2	2.0'	2333	Wet firm brown clayey coarse sandy silt w/some fine sand, trace of fine gravel.	A-4(0)	
			4.0'		16" RECOVERY		
5		3	4.0'	6 9 15 15	Wet medium dense tan coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
			6.0'		14" RECOVERY		
7.5		4	6.0'	13 17 16 15	Wet dense tan coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	USDA Classifica : Loamy Sand
			8.0'		19" RECOVERY		
		5	8.0'	5 6 7 4	Wet medium dense orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	Mud Rotary @ 9.0'.
10			10.0'		15" RECOVERY		
		6	10.0'	4 4 5 7	Wet loose orange silty coarse sand w/trace of fine sand and fine gravel.	A-2-4(0)	
			12.0'		17" RECOVERY		
12.5		7	12.0'	6 5 5 5	Wet loose orange coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	

Remarks:

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

37.5

Boring No.: R2-018A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
\)	1 2 g	8	14.0'	4	13" RECOVERY	A-1-b	
	-		14.0'	4 4 7 10	Wet medium dense orange coarse to fine sand w/trace of silt and fine		
15	1				gravel.		
					0.11900 15.200 17.200		
	1	9	16.0' 16.0'	7	16" RECOVERY Wet medium dense orange fine gravelly coarse sand w/some fine sand,	A-1-b	
	-			7 8 8 17	trace of silt.	A-1-0	
				17	HERENEEL HERENEEL HERENEEL		
17.5	-				RECERE RECERE RECERE		
		10	18.0' 18.0'	3	15" RECOVERY	A-1-b	
	-	'	10.0	3 10 12 10	Wet medium dense orange fine to coarse sandy fine gravel w/some silt.	A-1-0	
	-			10			
20			20.0'		10" RECOVERY		
22.5					III)KAFI		
		11	23.0'	3 4	Wet loose green silty fine sand w/trace of coarse sand.	A-2-4(0)	
				6			
		M					
25			25.0'		16" RECOVERY		
					CHET 2015		
			<i> </i>	$\dashv \iota$	GUST 2015		
27.5							
	1						
	1	12	28.0'	3 4	Wet stiff green fine sandy silt w/trace of coarse sand.	A-4(0)	
	1			4 5 7			
	1						
30	1		30.0'		17" RECOVERY		
	1		30.0		I, ABOOTERI		
	1						
	1						
	†						
20.5	1						
32.5	1						
	1	13	33.0'	3	Saturated loose green silty fine sand w/some coarse sand.	A-2-4(0)	
	1			3 4 5 7	and module course suit.		
\vdash	1						
<u> </u>	-		05.01		AND DECOMPAN		
35	-		35.0'		22" RECOVERY End of Boring		
	1				Did of Doring		
	1						
	-						
	-						

Symbol Description

Strata symbols



Silty low plasticity clay



Poorly graded clayey silty sand



Silty sand



Poorly graded sand with silt



Well graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 8/31/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 Track.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

14.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: R2-019

Contract: 25-113-01

Boring Location: Sta. 345+35.76, 119' Lt. C.L.

Boring Surface Elev.: + 60.00' Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: 2 IN. Type of: Split Barrel O.D. IN. IN. O.D. 3 Ball Sampler

Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 3/14/2008 6.0' 4.0' 2.0'

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 14.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Helpers: Amber Joseph

Depth	Daily		Sample		
(ft.)	Progress	No.	Depth	Blows/6"	Sample Description Class./G.I. Remarks
	3/14/08	1	0.8' 2.0'	4 3 5	Wet firm gray clay w/ some coarse to fine sand, trace of gravel. 15" RECOVERY
		2	2.0'	6 9	Wet stiff gray clayey coarse sandy silt w/ A-4(3)
3		2A	3.0' 3.0' 4.0'	12 23	some fine sand, trace of gravel. 12" RECOVERY Saturated dense gray coarse sand w/ some silt,
		3	4.0'	6 8 10 7	trace of gravel and fine sand. 9" RECOVERY Saturated medium dense orange-brown coarse
6			6.0		sand w/ some silt, trace of fine sand and gravel.
		4	6.0'	3 3 3	17" RECOVERY Saturated loose orange-brown coarse to fine
			8.0'		sand w/ some silt, trace of gravel. 18" RECOVERY
9		5	8.0'	2 3 3 5	Saturated loose orange-brown coarse sand w/ A-1-b some fine sand and silt, trace of gravel.
			10.0'		15" RECOVERY
		6	10.0'	5 4 6 5	Saturated loose orange-brown coarse sand w/ A-1-b some fine sand and silt, trace of gravel.
12			12.0'		Hiller Haller Haller Hi
		7	12.0'	7 7 6 7	Saturated medium dense orange-brown coarse sand w/ some fine sand, trace of silt and gravel.
			14.0'		18" RECOVERY
					Boring terminated at 14.0 feet (due to
15					excessive heave).

Remarks:

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

Symbol Description

Strata symbols

Low plasticity clay



Silty sand



Poorly graded sand with silt



Well graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 3/14/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling and rechecked the following day.
- 3. Surveyed boring locations and elevations were provided by Century engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

10.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: R2-020

Contract: 25-113-01

Boring Location: Sta. 349+99.87, 33' Rt. C.L.

Boring Surface Elev.: + 62.97' Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: 2 IN. Type of: Split Barrel O.D. IN. IN. O.D. 3 Ball Sampler

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0'

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 3/14/2008 4.8' 8.0 6.0'

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks	
	3/14/08	1	0.8' 2.0'	1 2 3	Wet soft brown clayey coarse to fine sandy silt, trace of gravel. 15" RECOVERY	
		2	2.0'	1 2 2 2	Wet very loose brown coarse sand w/ some A-1-b	
3			4.0'		silt and fine sand, trace of gravel. 15" RECOVERY	
		3	4.0'	6 7 10 9	Wet medium dense brown coarse sand w/ A-1-b some gravel, silt, and fine sand.	
6			6.0'		17" RECOVERY	
		4	6.0'	6 4 5 6	Saturated loose orange-brown coarse sand w/ A-1-b some silt and fine sand, trace of gravel.	
			8.0'		17" RECOVERY	
9		5	8.0'	4 4 4 4	Saturated loose orange-brown coarse sand w/ A-1-b some silt and fine sand, trace of gravel.	
			10.0'		18" RECOVERY	
					Boring terminated at 10.0 feet.	
12						
12						
15						

Remarks:

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

Symbol Description

Strata symbols

Clayey sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 3/14/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

16.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: R2-021

Contract: 25-113-01

Boring Location: Sta. 355+00.00, 119' Lt. C.L.

Boring Surface Elev.: + 63.74' Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: 2 Type of: Split Barrel O.D. IN. IN. O.D. 3 Ball Sampler

U-Sampler: Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of:

Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Water Time Depth of Hole **Depth of Casing** Elev. of Water Date

3/14/2008 7.0' 10.0 8.0'

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks	
	3/14/08	1	0.8' 2.0'	2 3 2	Moist loose brown silty fine to coarse sand, A-2-4(0) 9" of cultivated soil trace of gravel.	
3		2	2.0'	1 2 2 2	Moist very loose brown silty fine to coarse A-2-4(0) sand, trace of gravel.	
			4.0'		19" RECOVERY	
		3	4.0'	1 2 1 1	Wet very loose brown silty fine to coarse sand, trace of gravel. A-2-4(0)	
6			6.0'		13" RECOVERY	
		4	6.0'	1/12"	Wet very loose gray fine to coarse sand w/ A-2-4(0) some silt, trace of gravel.	
]		8.0'		16" RECOVERY	
9		5	8.0'	1 1 3 3	Saturated soft orange fine to coarse sandy silt, trace of gravel.	
l			10.0'	!	16" RECOVERY	
	 	6	10.0'	3 3 2 3	Saturated loose orange-brown coarse sand, trace of fine sand, gravel, and silt.	
12			12.0'	'	17" RECOVERY	
	-	7	12.0'	2 4 3 4	Saturated loose orange-brown coarse to fine sand w/ some silt, trace of gravel. A-2-4(0)	
]		14.0'		15" RECOVERY	
15		8	14.0'	3 4 2 6	Saturated loose light brown coarse to fine sand w/ some silt, trace of gravel. A-2-4(0)	
l	l'		16.0'	!	18" RECOVERY	
					Boring terminated at 16.0 feet.	
	!					

Remarks:

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

Symbol Description

Strata symbols

Silty sand

Silt

Poorly graded sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 3/14/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling and rechecked the following day.
- 3. Surveyed boring locations and elevations were provided by Century engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: R2-022

Contract: 25-113-01

Boring Location: Sta. 375+00.00, 45' Lt. C.L.

Boring Surface Elev.: + 66.04' Reference:

IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: 2 IN. Type of: Split Barrel O.D. IN. IN. O.D. U-Sampler: 3 Ball Sampler

Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0' 10.0'

Water Level Readings

Depth of Casing Depth of Water Time Depth of Hole Elev. of Water Date 3/13/2008 8.0 6.0' 5.1'

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Helpers: Dan Žmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks
	3/13/08	1	1.0' 2.0'	1 1 1 3	Wet soft brown clayey fine sandy silt w/ some A-4(0) 11" of cultivated soil. coarse sand, trace of gravel. 12" RECOVERY A-2-4(0)
3		2	2.0'	1 1 3 3 3 5 6	Wet loose brown silty fine to coarse sand,
	N		4.0'		trace of gravel. 16" RECOVERY
		3	4.0	5 6 9 6	Wet medium dense brown coarse to fine sand A-1-b w/ some silt and gravel.
6			6.0'		17" RECOVERY
		4	6.0′	5 7 5 6	Saturated medium dense brown coarse to fine sand w/ some silt, trace of gravel.
			8.0'		18" RECOVERY
9		5	8.0'	5 4 5 5	Saturated loose brown coarse to fine sand w/ A-1-b some silt, trace of gravel.
			10.0'		11" RECOVERY
					Boring terminated at 10.0 feet.
12					
15					

Remarks:

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

Symbol Description

Strata symbols



Poorly graded clayey silty sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 3/13/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

35.0

STATE OF DELAWARE DEPARTMENT OF TRANSPORTATION **DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: R2-022A

Contract: 25-113-01

Boring Location: Sta. 415+00 50 L.T C.L.

Reference: **Boring Surface Elev.:** + 65.87

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Casing Time **Depth of Hole Depth of Water** Elev. of Water Date 9/1/10 10.0 8.0 8.4

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 35.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Jason Truver

Helpers: T. Kane

Depth	Daily		Sample			a	
(ft.)	Progress	No.	Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/1/09	1	0.5'	2 2 3	Moist soft brown clayey fine gravelly fine sandy silt w/some coarse sand.	A-4(0)	Topsoil - 8".
			2.0'		9" RECOVERY		
2.5		2	2.0'	34455	Moist loose brown silty fine to coarse sand w/some clay, trace of fine gravel. 17" RECOVERY	A-2-4(0)	
5		თ	4.0' 6.0'	2 3 3 2	Moist loose brown coarse sand w/some fine sand and silt, trace of fine gravel. 18" RECOVERY	A-1-b	USDA Classifica : Loamy Sand
7.5		4	6.0' 8.0'	1 1 1	Wet very loose brown coarse to fine sand w/some silt, trace of fine gravel. 16" RECOVERY	A-2-4(0)	
10		5	8.0'	1 2 2 2 2	Wet very loose tan fine to coarse sand w/some silt. 16" RECOVERY	A-2-4(0)	
		6	10.0'	2 2 3 3	Wet loose tan coarse to fine sand w/some silt, trace of fine gravel. 18" RECOVERY	A-2-4(0)	
12.5		7	12.0'	1 2 1 1	No Sample Recovery 0" RECOVERY		Trap Broke
		8	14.0'	1 1	Wet very loose tan silty fine sand w/trace of coarse sand.	A-2-4(0)	
				1	The tery roose an only the said without of course said.	1127(0)	

Remarks:

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: R2-022A

	act: 25-11	3-01					
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15				1 2			
	-						
	-	9	16.0' 16.0'	2	20" RECOVERY Wet very loose brown fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
	-			2 2 2 3	Wet very roose brown the said w/some six, trace of coarse said.	112 4(0)	
17.5							
		<u> </u>	18.0'	4	18" RECOVERY		
	_	10	18.0'	1 1 1 2	Wet very loose brown fine sand w/some silt and coarse sand.	A-2-4(0)	
	-			2			
20	-		20.0'		17" RECOVERY		
	1		20.0		I/ KBCOVEKI		
	=						
22.5	1				DRAFT		
	-						
		11	24.0'	5 8	Wet medium dense tan coarse to fine sand w/trace of silt and fine gravel.	A-1-b	
25	-	M		5			
	•		26.0'		操 排 16" RECOVERY		
	-		20.0		IN ALCOVERY		
					GUST 2015		
27.5	-			70	JUJI ZUIJ		
	-			1	13.1061 13.300 13.106		
				ļ Į	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
	1	12	29.0'	5 3 6 9	Wet loose brown fine gravelly coarse sand w/some fine sand, trace of sil	. A-1-b	
30				9	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
	-				refer: 1946 1946 1947		
	-		31.0'		16" RECOVERY		
	-				1730 F 4 1866 1746 F		
32.5]				4326 4306 4306		
		<u> </u>	22.21		9966 1986		
	_	13	33.0'	6 6 6 7	Wet medium dense brown fine gravelly fine to coarse sand w/trace of sil	. A-1-b	
	-			7			
35	-		35.0'		1990 Riffel 1990 Hiffel 1990 G" RECOVERY		
			30.0	 	End of Boring		
07.5	-						
37.5	1						

Symbol Description

Strata symbols

Clayey sand



Poorly graded clayey silty sand



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 9/01/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 Track.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

16.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: R2-023

Contract: 25-113-01

Boring Location: Sta. 380+55.51, 265' Rt. C.L.

Boring Surface Elev.: + 67.00' Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: 2 Type of: Split Barrel O.D. IN. IN. O.D. U-Sampler: 3 Ball Sampler

Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Water Time Depth of Hole **Depth of Casing** Elev. of Water Date 4/1/2008 7.0' 10.0 8.0'

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Gary Truver Sr.

Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks
	4/1/08	1	0.5' 2.0'	3 3 3	Wet firm brown clayey silt w/ some fine to coarse sand, trace of gravel. 16" RECOVERY 8" of cultivated soil.
		2	2.0'	8	Wet very stiff orange-brown clayey fine A-4(0)
3			4.0	8 12 15 12	sandy silt, trace of coarse sand. 23" RECOVERY
	•	3	4.0'	4 4 5 8	Wet loose orange-brown silty fine sand w/ A-2-4(0) some coarse sand, trace of gravel.
6		l	6.0		15" RECOVERY
		4	6.0'	9 10 9 10	Wet medium dense orange-brown silty fine to coarse sand, trace of gravel. A-2-4(0)
			8.0'		17" RECOVERY
9		5	8.0'	3 6 6 6	Saturated medium dense orange-brown coarse sand w/ some silt and fine sand, trace of gravel.
		6	10.0' 10.0'	7	13" RECOVERY
		0	10.0	7 8 7 10	Saturated medium dense orange-brown coarse sand w/ some silt, gravel, and fine sand.
12		<u> </u>	12.0'		16" RECOVERY
		7	12.0'	3 4 5 5	Saturated loose light brown coarse sand w/ Some silt and fine sand, trace of gravel. 18" RECOVERY
		8	14.0'	6	Saturated medium dense light brown coarse to A-1-b
15				6 6 9 9	fine sand w/ some silt, trace of gravel.
		<u> </u>	16.0'		15" RECOVERY
					Boring terminated at 16.0 feet.

Remarks:

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

Symbol Description

Strata symbols

Low plasticity clay



Poorly graded clayey silty sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 4/1/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a CME 55.
- Groundwater levels recorded at the time of drilling. Borings Backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

30.0

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: R2-023A

Contract: 25-113-01

Boring Location: Sta. 420+00 50 R.T. C.L.

Boring Surface Elev.: + 65.94 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 9/1/09 10.0 8.0 6.9

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 30.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Jason Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/1/09	1	0.5'	3 4 4	Wet firm brown fine sandy clay w/some coarse sand, fine gravel and silt. 12" RECOVERY	A-6(2)	Topsoil - 5". USDA
2.5		2	2.0'	7 9 9 9	Wet medium dense brown silty fine to coarse sand w/trace of fine gravel. 18" RECOVERY	A-2-4(0)	Classifica : Sandy Loam
5		З	4.0' 6.0'	5 12 9 7	Wet medium dense brown coarse sand w/some fine gravel, silt and fine sand.	A-1-b	
7.5		4	6.0' 8.0'	4 7 5 5	Saturated medium dense brown coarse sand w/some fine sand and silt, trace of fine gravel. 19" RECOVERY	A-1-b	
10		5	8.0'	3 3 4 3	Saturated loose brown coarse sand w/some fine sand and silt, trace of fine gravel. 13" RECOVERY	A-1-b	
10		6	10.0'	3 3 3 4	Saturated very loose brown coarse to fine sand w/some silt, trace of fine gravel. 14" RECOVERY	A-1-b	
12.5		7	12.0'	2 2 2 2 2	Saturated very loose brown coarse to fine sand w/some silt, trace of fine gravel. 15" RECOVERY	A-2-4(0)	
		8	14.0'	W/R 1	Saturated very loose brown fine sand w/some coarse sand and silt.	A-2-4(0)	

Remarks:

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: R2-023A

16.0" 16.0" 3 Saturated loose brown fine sand w/some sit and coarse sand. A-2-4(0) 17.5	Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15.0° Saturated loose brown fine sand w/some silt and coarse sand. A-2-4(0)					1 2			
9 16.0 15 16.0 15 16.0								
17.5 18.0° 18.0° 18.0° 18.0° 18.0° 18.0° 18.0° 19. RECOVERY 17. RECOVERY 17. RECOVERY 17. RECOVERY 18.0° 18.0° 19. Saturated very loose brown silty fine sand wirace of coarse sand. 19. RECOVERY 19. RECOVERY 19. RECOVERY 19. RECOVERY 19. RECOVERY 19. RECOVERY 19. RECOVERY 10. RECOVERY 10. RECOVERY 10. RECOVERY 10. RECOVERY 11. Saturated medium dense brown fine gravelly coarse to fine sand wirace of silt. 12. 28.0° 13. Saturated medium dense brown fine gravelly coarse to fine sand wirace of silt. 14. Saturated medium dense brown fine gravelly coarse to fine sand wirace of silt. 15. Saturated medium dense brown fine gravelly coarse to fine sand wirace of silt. 16. Saturated medium dense brown fine gravelly coarse to fine sand wirace of silt. 17. RECOVERY 18. RECOVERY 19. RECOVERY 19. RECOVERY 19. RECOVERY 19. RECOVERY 19. RECOVERY 19. RECOVERY 19. RECOVERY 19. RECOVERY 19. RECOVERY 19. RECOVERY 19. RECOVERY								
17.5		_	9	16.0'	1 2 3	Saturated loose brown fine sand w/some silt and coarse sand.	A-2-4(0)	
18.0					3			
10 18.0 William Saturated very loose brown silty line sand w/race of coarse sand. A-2-4(0)	17.5	-						
20 DRAFT DRAFT 11 240 2 240 3 30 240 30 30 30 30 30 30 30		-	10		W/R	 	A 2 4(0)	
22.5 DRAFT DRAFT 11 24.0° 2				10.0	W/R 1 2	Saturated very loose brown sitty fine said w/trace or coarse said.	A-2-4(0)	
DRAFT DRAFT 11 240 2 Saturated loose brown fine sand w/some fine gravel and coarse sand, trace A-3 26 25 C RECOVERY AL SATURATED HOLD TO STREET TO STREE		-			_			
DRAFT DRAFT 11 240 2 Saturated loose brown fine sand w/some fine gravel and coarse sand, trace A-3 26 25 C RECOVERY AL SATURATED HOLD TO STREET TO STREE	20	-		20.0'		17" PECOVERY		
11 240 2 133 Saturated loose brown fine sand w/some fine gravel and coarse sand, trace A-3		1		20.0		17 RECOVERT		
11 240 2 133 Saturated loose brown fine sand w/some fine gravel and coarse sand, trace A-3		-						
11 240 2 133 Saturated loose brown fine sand w/some fine gravel and coarse sand, trace A-3								
11 240 2 133 Saturated loose brown fine sand w/some fine gravel and coarse sand, trace A-3								
11 240 2 133 Saturated loose brown fine sand w/some fine gravel and coarse sand, trace A-3	22.5							
11 240 2 133 Saturated loose brown fine sand w/some fine gravel and coarse sand, trace A-3		-				IIII		
25 26.0' AUST 2015 12 28.0' 6 Saturated medium dense brown fine gravelly coarse to fine sand w/trace of silt. 30 30.0' End of Boring A-1-b 32.5 35.								
25 26.0' AUST 2015 12 28.0' 6 Saturated medium dense brown fine gravelly coarse to fine sand w/trace of silt. 30 30.0' End of Boring A-1-b 32.5 35.		-	11	24.0'	2	11775 C	A 2	
25. ALEGOVERY ALEGOVERY ALEGOVERY 12 28.0' 8		- 1	(' '	24.0	3 4	Saturated loose brown line sand w/some line gravel and coarse sand, trace of silt.	e A-3	
27.5 12 28.0' 6 Saturated medium dense brown fine gravelly coarse to fine sand w/trace of silt. 30 8" RECOVERY End of Boring	25	-	M		5		†	
27.5 12 28.0' 6 Saturated medium dense brown fine gravelly coarse to fine sand w/trace of silt. 30 8" RECOVERY End of Boring				20.01	•			
12 28.0° 6		-		26.0		6" RECOVERY HJEFF		
12 28.0° 6		-			Λ			
12 28.0° 6	27.5			<i> </i>	41			
30 30.0' 8" RECOVERY End of Boring 32.5 35	27.0	1			1			
30 30.0' 8" RECOVERY End of Boring 32.5 35]	12	28.0'	6 6	Saturated medium dense brown fine gravelly coarse to fine sand w/trace	A-1-b	
30 30.0 End of Boring End of Boring 32.5 35 35 35 35 35 35 35 35 35 35 35 35 35					6	of silt.		
30 30.0 End of Boring End of Boring 32.5 35 35 35 35 35 35 35 35 35 35 35 35 35						BEREI Bereig Bereig		
32.5	30			30.0'		8" RECOVERY		
		_				End of Boring		
		-						
	00.5							
	32.5	1						
		-						
		1						
		1						
	35]						
37.5]						
37.5]						
37.5								
37.5		1						
	37.5							

Symbol Description

Strata symbols

Clayey sand

Silty sand

10.10.10.10.10.10 10.10.10.10.10.10.10 10.10.10.10.10.10.10 Well graded sand with silt



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 9/01/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 Track.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

35.0

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: R2-023B

Contract: 25-113-01

Boring Location: Sta. 421+00 50 L.T. C.L.

Boring Surface Elev.: + 67.41 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Spoon O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Time **Depth of Water Depth of Hole Depth of Casing** Elev. of Water Date 9/1/10 10.0 8.0 8.6

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Dia. U-Sample Boring: U-Samples: 35.0 Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Jason Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/1/09	1	0.0'	11 21 19 19	Moist dense black fine gravel w/some coarse sand and silt, trace of fine sand.	A-1-a	
2.5		2	2.0'	9 9 11 11	Moist very stiff brown clayey fine sandy silt w/some fine gravel and coarse sand.	A-4(0)	
5		3	4.0' 4.0'	6 7 7 8	Moist medium dense brown silty coarse to fine sand. 16" RECOVERY	A-2-4(0)	USDA Classifica : Loamy Sand
7.5		4	6.0'	5 7 7 6	Moist medium dense brown coarse sand w/some fine sand and silt, trace of fine gravel. 20" RECOVERY	A-1-b	
10		5	8.0'	2 2 3 3	Wet loose brown coarse to fine sand w/some silt, trace of fine gravel. 14" RECOVERY	A-1-b	
		6	10.0'	4 4 5 5	Wet loose brown coarse to fine sand w/some silt, trace of fine gravel. 14" RECOVERY	A-1-b	
12.5		7	12.0'	1 1 1 1	Wet very loose brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	

Remarks:

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: R2-023B

Danish	Delle	1	Comme				
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		8	14.0'	W/R 1	20" RECOVERY	A-2-4(0)	
15			14.0'	1 1	Wet very loose brown fine sand w/some silt, trace of coarse sand.		
13	1						
			16.0'		21" RECOVERY		
		9	16.0'	1	Wet very loose tan fine sand w/some silt and coarse sand.	A-2-4(0)	
				1 2 2 3			
L							
17.5	ł		40.0		221 DECOVEDY		
		10	18.0' 18.0'	W/R	23" RECOVERY Wet very loose brown silty fine sand w/trace of coarse sand.	A-2-4(0)	
				1 1 1	Wet very 100se brown sitty rine said wittace of coarse said.	11 2 4(0)	
				'			
20			20.0'		23" RECOVERY		
22.5					DRAFT		
		11	24.0'	7 9	No Sample Recovery		Gravel
25		V		10 13	No Sample Recovery		blocking
	1 -						spoon
	1		26.0'		0" RECOVERY		
			20.0				
			 	41	GUST 2015		
27.5				10			
27.5							
		12	29.0'	9	Wet medium dense tan coarse to fine sand w/trace of fine gravel and silt.	A-1-b	
		-		5	refered wet incutum dense tan coarse to fine sand w/trace of fine graver and site.	Λ-1-0	
30	-			5	REGISE REGISE REGISE		
					HEREE HEREE HEREE		
			31.0'		10" RECOVERY		
	1				HEREN Herens Person		
32.5					HEREE HEREE		
				40	HIGHER		
		13	33.0'	10 10 17 13	Wet medium dense tan coarse sandy fine gravel w/some fine sand, trace	A-1-a	
				13	of silt.		
					14-16-6- 11 19-6-6 14-14-6-7		
35	<u> </u>	L	35.0'	<u> </u>	10" RECOVERY		<u>L</u>
					End of Boring		
	1						
	1						

Symbol Description

Strata symbols

Silty sand



Clayey sand



Well graded sand with silt



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 9/01/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 Track.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

10.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: R2-024

Contract: 25-113-01

Boring Location: Sta. 385+60.44, 2' Lt. C.L.

Boring Surface Elev.: + 68.76' Reference:

IN. IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: 2 Type of: Split Barrel O.D. IN. IN. O.D. U-Sampler: 3 Ball Sampler

Core Bit: O.D. **Casing Size:** 3 1/4 Inches

To: To: From Depth of: Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 3/13/2008

10.0 8.0' 7.0'

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Helpers: Dan Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks	
	3/13/08	1	1.0' 2.0'	2 4	Wet firm brown clayey silt w/ some fine to A-4(5) 10" of cultivated soil.	
		2	2.0'	9 14 14 10	coarse sand, trace of gravel. 12" RECOVERY Wet medium dense brown silty fine to coarse A-2-4(0)	
3				10	sand, trace of gravel.	
		3	4.0	5 5 6 7	18" RECOVERY Wet medium dense brown silty fine to coarse A-2-4(0)	
	•			6 7	sand.	
6			6.0'		19" RECOVERY	
		4	6.0	5 6 7 7	Wet to saturated medium dense brown silty fine sand, trace of coarse sand. A-2-4(0)	
			8.0'	1	TO DECOMPNY	
		5	8.0'	5	19" RECOVERY Saturated medium dense light brown fine to A-2-4(0)	
9				5 6 6 7	coarse sand w/ some silt, trace of gravel.	
			10.0'		18" RECOVERY	
					Boring terminated at 10.0 feet.	
12						
15						

Remarks:

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

Symbol Description

Strata symbols

Low plasticity clay

Silty sand

DRAFT NOT FOR BIDDING **AUGUST 2015**

- 1. Exploratory borings were drilled on 3/13/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
- Groundwater levels recorded at the time of drilling. Borings Backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

16.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: R2-025

Contract: 25-113-01

Boring Location: Sta. 390+00.00, 123' Rt. C.L.

Boring Surface Elev.: + 65.11' Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: 2 IN. Type of: Split Barrel O.D. IN. IN. O.D. 3 Ball Sampler

U-Sampler: Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Casing Time **Depth of Hole Depth of Water** Elev. of Water Date 3/13/2008 2.0' 1.9' 4.0'

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Helpers: Dan Žmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks
	3/13/08	1	1.0' 2.0'	3 4	Wet firm brown clayey silt w/ some fine to A-4(0) 12" of cultivated soil.
		2	2.0'	9	12" RECOVERY A-2-4(0)
3				9 15 15 17	Wet medium dense gray and brown fine to
					coarse sand w/ some silt, trace of gravel.
			4.0	0	18" RECOVERY
		3	4.0	8 12 11 13	Wet to saturated medium dense orange silty A-2-4(0)
				13	fine to coarse sand, trace of gravel.
6			6.0'		15" RECOVERY
		4	6.0	8 8 12 15	Saturated medium dense orange fine to coarse A-2-4(0)
				12 15	sand w/ some silt, trace of gravel.
			0.01		
		5	8.0' 8.0'	4	18" RECOVERY Saturated loose orange coarse to fine sand w/ A-1-b
9				3 4 3	some silt, trace of gravel.
J				3	
			10.0'		16" RECOVERY
		6	10.0'	3 3 3 3	Saturated loose orange coarse to fine sand w/ A-2-4(0)
				3	some silt, trace of gravel.
12			12.0'		19" RECOVERY
12		7	12.0'	2	Saturated very loose orange fine to coarse A-2-4(0)
				2 2 2 4	sand w/ some silt, trace of gravel.
			14.0'	2	20" RECOVERY
l		8	14.0'	2 3 10 10	Saturated medium dense orange fine to coarse A-2-4(0) sand w/ some silt, trace of gravel.
15				10	Sand w/ Some Sitt, trace of graver.
			16.0'		22" RECOVERY
					Boring terminated at 16.0 feet.

Remarks:

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

Symbol Description

Strata symbols



Poorly graded clayey silty sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 3/13/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
- Groundwater levels recorded at the time of drilling. Borings Backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

25.0

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: R2-025A

Contract: 25-113-01

Boring Location: Sta. 430+00 50 R.T. C.L.

Boring Surface Elev.: + 64.62 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings Time **Depth of Water Depth of Hole Depth of Casing** Elev. of Water Date

9/2/09 10.0 8.0 4.9

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 25.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/2/09	1	0.0'	2 2 2 5	Wet soft gray silty clay w/trace of fine to coarse sand.	A-6(10)	Topsoil - 2".
2.5		2	2.0'	10 15 20 22	Wet dense gray fine to coarse sand w/some clay and silt, trace of fine gravel.	A-2-4(0)	USDA Classifica : Loamy Sand
5		3	4.0'	7 8 9 9	Saturated medium dense gray silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
7.5		4	6.0' 6.0'	4 8 6 8	18" RECOVERY Saturated medium dense tan coarse to fine sand w/some silt and fine gravel.	A-1-b	
10		5	8.0' 8.0'	2 4 4 4	Saturated loose brown fine gravelly coarse sand w/some fine sand, trace of silt. 15" RECOVERY	A-1-b	
10		6	10.0'	3 5 5 6	Saturated loose orange coarse sand w/some fine gravel and fine sand, trace of silt. 12" RECOVERY	A-1-b	
12.5		7	12.0'	7 27 18 23	Saturated dense brown silty fine gravelly fine sand w/some coarse sand.	A-2-4(0)	

Remarks:

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: R2-025A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
()		8	\ 14.0' / 14.0'	8 6 4	5" RECOVERY	A-2-4(0)	
15			14.0	4 4	Saturated loose brown fine to coarse sand w/some silt and fine gravel.		
			16.0'		7" RECOVERY		
		9	16.0'	5 9 11 13	Saturated medium dense brown silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
	1			13	giavei.		
17.5							
		10	18.0' 18.0'	5	11" RECOVERY No Sample Recovery		
	-			5 6 7 8	To Sample Recovery		
	-						
20	-		20.0'		0" RECOVERY		
20	1						
22.5					IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII		
	-	11	23.0'	4	Sotumeted loose green silty fine to cooper and mysems fine groups	A-2-4(0)	
		l ''_	20.0	4 5 5	Saturated loose green silty fine to coarse sand w/some fine gravel.	A-2-4(0)	
25		V	25.0'		14' RECOVERY		
			25.0	_	End of Boring		
				Λ	JGUST 2015		
			<i> </i>	$\dashv \iota$	JUSI ZUIS		
27.5			_				
	-						
	_						
	-						
30	1						
	-						
	!						
32.5							
	-						
35	-						
	-						
	-						
	1						
	1						

Symbol Description

Strata symbols

Low plasticity clay



Poorly graded clayey silty sand



Silty sand



Poorly graded sand with silt



Well graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 9/02/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 Track.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

16.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: R2-026

Contract: 25-113-01

Boring Location: Sta. 395+00.00, 124' Lt. C.L.

Boring Surface Elev.: + 63.43' Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: 2 IN. Type of: Split Barrel O.D. O.D.

Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. U-Sampler: 3 Ball Sampler Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 3/13/2008 2.0' 0.6' 4.0'

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Helpers: Dan Žmijewski

				1		T
Depth	Daily	No.	Sample	Blows/6"	Sample Description Class./G.I.	Remarks
(ft.)	Progress	4	Depth	WOH		
		1	0.0'	1	Wet soft brown fine to coarse sandy clay w/ A-6(3)	
				1 1	some organic matter, trace of gravel.	
			2.0'		12" RECOVERY	
		2	2.0'	9 12 11 9	Wet medium dense gray clayey coarse to fine A-2-4(0)	
3				11	sand, trace of gravel.	
Ť	1			9		
		4 ,	4.0'		15" RECOVERY	
		3	4.0'	4	Saturated loose gray to orange silty fine to A-2-4(0)	
				4 4	coarse sand, trace of gravel.	
				8	coarse saile, trace of graver.	
6			6.0'		16" RECOVERY	
		4	6.0'	5	Saturated medium dense orange fine to coarse A-2-4(0)	
				8 8	sand w/ some silt, trace of gravel.	
			8.0'		14" RECOVERY	
		5	8.0'	3 4	Saturated loose orange coarse to fine sand w/ A-2-4(0)	
9				3 4 3 2	some silt, trace of gravel.	
Ť						
			10.0'		18" RECOVERY	
		6	10.0'	4	Saturated loose orange coarse to fine sand w/ A-2-4(0)	
			10.0	4 4 5 6		
				6	some silt, trace of gravel.	
12			12.0'	7	21" RECOVERY	
		7	12.0'	11	Saturated medium dense orange fine to coarse A-2-4(0)	
				7 11 16 13	sand w/ some silt, trace of gravel.	
			14.0'		18" RECOVERY	
		8	14.0'	8	Saturated medium dense green fine to coarse A-2-4(0)	Glauconitic.
15				8 6 5 7	sand w/ some silt, trace of gravel.	
'				_ ′	3 ga - 2	
			16.0'		15" RECOVERY	
			10.0			1
					Boring terminated at 16.0 feet.	

Remarks:

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

Symbol Description

Strata symbols

Clayey sand



Poorly graded clayey silty sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 3/13/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
- Groundwater levels recorded at the time of drilling. Borings Backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

32.0

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: R2-026A

Contract: 25-113-01

Boring Location: Sta. 435+00 50 L.T. C.L.

Boring Surface Elev.: + 62.83 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Time Depth of Water **Depth of Hole Depth of Casing** Elev. of Water Date 9/3/09 10.0 8.0 5.2

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 32.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/3/09	1	0.0'	1 2 3 4	Saturated firm gray clayey fine to coarse sandy silt.	A-4(1)	Topsoil - 3".
2.5	ľ	2	2.0' 2.0' 4.0'	3 11 12 17	15" RECOVERY Saturated medium dense gray clayey fine to coarse sand w/trace of silt. 19" RECOVERY	A-2-4(0)	USDA Classifica : Sandy Loam
5		3 3A	4.0' 5.0' 5.0'	3 6	Saturated stiff gray clayey fine sandy silt w/some coarse sand. 10" RECOVERY	A-4(0)	
		JA.	6.0'	5 6	Saturated medium dense brown silty fine to coarse sand. 8" RECOVERY	A-2-4(0)	
7.5		4	6.0'	2 8 7 7	Saturated medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
			8.0'		13" RECOVERY		
		5	8.0'	3 4 4 5	Saturated loose brown fine gravelly coarse to fine sand w/some silt.	A-1-b	
10			10.0'	5	12" RECOVERY		
		6	10.0'	5 6 5 7	Saturated medium dense brown fine gravelly coarse sand w/some fine sand and silt.	A-1-b	
			12.0'	5	16" RECOVERY	4 1 1	
12.5		7	12.0'	5 6 10 18	Saturated medium dense brown fine gravelly coarse sand w/some silt and fine sand.	A-1-b	

Remarks:

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

37.5

Boring No.: R2-026A

•								
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
(111)		8	14.0' /	17	**************************************	17" RECOVERY	A 1 b	
		ľ	14.0'	17 13 18 21		Saturated dense brown fine sandy fine gravel w/some coarse sand, trace	A-1-b	
15				21		of silt.		
						of sit.		
			16.0'			9" RECOVERY		
		9	16.0'	8 10		Saturated medium dense brown fine gravelly fine to coarse sand w/some	A-1-b	
				10		silt.		
			17.0'	40	11111111111111111111111111111111111111	12" RECOVERY		
17.5		9A	17.0'	12 16		Saturated medium dense brown clayey fine to coarse sand w/trace of silt.	A-2-6(1)	
	1		40.01			12" RECOVERY		
		10	18.0' 18.0'	12			1 2 6(1)	
		10	10.0	12 5 6 7		Saturated medium dense brown clayey fine to coarse sand w/trace of silt	A-2-6(1)	
				7		and fine gravel.		
20			20.0'			12" RECOVERY		
			20.0			12 RECOVERT		
	1							
00.5						DRAFT		
22.5								
		11	24.0'	7 8		Saturated medium dense green fine to coarse sanad w/some silt, trace of	A-2-4(0)	
		71		10 11		organic matter.		
25								
			26.0'			10" DECOVEDY		
			20.0			Ty RECOVERT		
						GUS 19" RECOVERY 15		
			<i> </i>	\rightarrow \Box				
27.5								
		12	28.0'	8		No Sample Recovery		
				8 16 16 16		, , , , , , , , , , , , , , , , , , ,		
				16				
30		L	30.0'			0" RECOVERY		
		13	30.0'	5		Saturated medium dense green fine sand w/some coarse sand and silt,	A-2-4(0)	
				5 8 8 8		trace of organic matter.		
				8		auto or organic manor.		
			60.5			10# PEGGVERY		
		\vdash	32.0'			18" RECOVERY		
32.5						End of Boring		
35								
	1	I	ĺ		Ī		1	I

Symbol Description

Strata symbols

Clayey sand



Poorly graded clayey silty sand



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 9/03/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 Track.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: R2-027

Contract: 25-113-01

Boring Location: Sta. 400+00.00, 45' Rt. C.L.

Boring Surface Elev.: + 67.23' Reference:

IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: 2 IN. Type of: Split Barrel O.D. IN. IN. O.D. 3 Ball Sampler

Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0' 10.0'

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 3/13/2008 8.0 6.0' 4.4'

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Helpers: Dan Žmijewski

D #	- ·				
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks
	3/13/08	1	0.5'	2 4 7	Wet stiff brown and gray mottled clayey silt, A-4(3) 8" of topsoil.
			2.0'	/	trace of fine to coarse sand. 15" RECOVERY
		2	2.0'	7	Wet dense brown silty fine to coarse sand, A-2-4(0)
3	R			7 14 17 16	trace of gravel.
			4.0		14" RECOVERY
	•	3	4.0'	8 8 11 17	Wet very stiff gray and brown fine to coarse A-4(0)
			_	17	sandy silt w/ some clay, trace of gravel.
6			6.0'		18" RECOVERY
		4	6.0'	16 12 11 10	Saturated medium dense brown and light A-2-4(0)
			_	10	brown silty fine to coarse sand, trace of gravel.
			8.0'		20" RECOVERY
		5	8.0'	4 6 4 4	Saturated stiff brown and light brown fine to A-4(0)
9				4	coarse sandy silt, trace of gravel.
			10.0'		24" RECOVERY
					Boring terminated at 10.0'.
12					
15					

Remarks:

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

Symbol Description

Strata symbols



Silty low plasticity clay



Silty sand



Poorly graded clayey silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 3/13/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
- Groundwater levels recorded at the time of drilling. Borings Backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

16.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: R2-028

Contract: 25-113-01

Boring Location: Sta. 405+00.00, 138' Lt. C.L.

Boring Surface Elev.: + 66.17' Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: 2 Type of: Split Barrel O.D. O.D.

IN. IN. U-Sampler: 3 Ball Sampler Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 3/13/2008 6.0' 4.0' 2.1

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Helpers: Dan Žmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks
		1	0.0'	WOH WOH 2 4	Wet soft gray and brown clayey silt, trace of gravel and fine to coarse sand. A-4(6)
			2.0'	12	16" RECOVERY
3			4.0'	12 16 13 15	Wet medium dense gray fine to coarse sand A-2-4(0) w/ some clay and gravel. 17" RECOVERY
		3	4.0'	8 9	Saturated medium dense gray coarse to fine A-2-4(0)
6			6.0'	10 10	sand w/ some silt, trace of gravel. 24" RECOVERY
		4	6.0' 8.0'	6 6 5	Saturated medium dense gray silty coarse to fine sand, trace of gravel. 16" RECOVERY
		5	8.0'	2	Saturated very loose brown silty fine to coarse A-2-4(0)
9				2 1 2 2	sand, trace of gravel.
		<u> </u>	10.0'		21" RECOVERY
12		6	10.0'	1 1 1 2	Saturated very loose brown silty fine sand w/ A-2-4(0) some coarse sand.
14		7	12.0'	2	Saturated very loose brown silty fine sand w/ A-2-4(0)
				2 2 2 2	some coarse sand, trace of gravel.
			14.0'		20" RECOVERY
		8	14.0'	2 4 11 14	Saturated medium dense brown fine sand w/ A-2-4(0)
15				11 14	some silt and coarse sand, trace of gravel.
		 	16.0'	 	24" RECOVERY
		ĺ			Boring terminated at 16.0 feet.

Remarks:

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

Symbol Description

Strata symbols

Low plasticity clay

Silty sand

DRAFT NOT FOR BIDDING **AUGUST 2015**

- 1. Exploratory borings were drilled on 3/13/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
- Groundwater levels recorded at the time of drilling. Borings Backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

36.0

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: R2-028A

Contract: 25-113-01

Boring Location: Sta. 445+00 50 L.T. C.L.

Boring Surface Elev.: + 67.83 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 O.D.

IN. IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 9/3/09 10.0 8.0 6.5

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 36.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Donth	Doily		Comple					
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	9/3/09	1	0.5'	6 3 3		Moist stiff brown clayey fine gravelly silt w/some coarse to fine sand.	A-4(1)	Topsoil - 5".
			2.0'			14" RECOVERY		
2.5		2	2.0'	5 8 8 15		Moist medium dense tan clayey coarse to fine sand w/some silt and fine gravel. 18" RECOVERY	A-2-4(0)	
5		3	4.0' 6.0'	7 8 6 6		Moist medium dense tan clayey fine sand w/some silt and coarse sand, trace of fine gravel. 17" RECOVERY	A-2-4(0)	USDA Classifica - Sandy Loam
7.5		4	6.0' 8.0'	4 4 4 3		Saturated loose tan silty fine sand w/trace of coarse sand. 18" RECOVERY	A-2-4(0)	
10		5	8.0'	1 2 1 2		Saturated very loose tan fine to coarse sand w/some silt. 19" RECOVERY	A-2-4(0)	
		6	10.0'	2 2 4 5		Saturated loose tan fine to coarse sand w/some silt.	A-2-4(0)	
12.5		7	12.0'	4 2 4 3		Saturated loose brown coarse to fine sand w/some fine gravel and silt. 14" RECOVERY	A-1-b	
		8	14.0' 14.0'	4 4			A-1-b	
I		ıř		4	1.111111	Saturated 100se brown time graverry coarse saild w/some time saild and	M-1-0	

Remarks:

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: R2-028A

Depth	Daily	l	Sample			T	<u> </u>
(ft.)	Progress	No.	Depth	Blows/6"	 Sample Description	Class./G.I.	Remarks
15				5 5	silt.		
]						
	1		16.0'		16" RECOVERY		
		9	16.0'	2 3	Saturated loose brown coarse to fine sand w/some fine gravel, trace of	A-1-b	
	1			2 3 5 6	silt.		
17.5	1						
17.5	1		18.0'		17" DECOVEDY		
	1	10	18.0'	5	17" RECOVERY Saturated medium dense brown fine gravelly fine sand w/some coarse	A-2-4(0)	Mud
				5 6 14 9	sand and silt.	112 1(0)	Rotary @
	1			9			19.0'.
	-						
20	-		20.0'		8" RECOVERY		
	-						
22.5					DDAET		
					DRAFT		
]						
	1						
	1	11	24.0'	5	Saturated medium dense brown silty fine to coarse sand.	A-2-4(0)	
25	t N			8 12			
	1	M			יועות תוום אנו:		
	† •		00.01	•			
	1		26.0'		17" RECOVERY		
	-			\			
	-				GUST 2015		
27.5	-			76	JUJ1 ZU1J		
	-						
		12	29.0'	6 6 9 15	Saturated medium dense brown clayey fine sand w/some coarse sand and	A-2-6(0)	
30				15	silt.		
	1		31.0'		20" RECOVERY		
	1						
32.5	1						
32.5	1						
	1						
	1						
		13	34.0'	4	Saturated firm brown fine sandy clay w/trace of silt and fine gravel.	A-7-6(4)	
	-	'`	34.0	4 4 4 7	Saturated firm brown time sandy ciay w/trace of sitt and time graver.	A-7-0(4)	
35	4			7			
	-						
			36.0'		22" RECOVERY		
	1				End of Boring		
37.5]						

Symbol Description

Strata symbols

Clayey sand



Poorly graded clayey silty sand



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 9/03/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 Track.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

16.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: R2-029

Contract: 25-113-01

Boring Location: Sta. 415+00.00, 164' Rt. C.L.

Boring Surface Elev.: + 69.00' Reference:

Wt. of Casing Hammer: Average Fall: IN. Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: 2 IN. Type of: Split Barrel O.D. IN. IN. O.D. U-Sampler: 3 Ball Sampler

Core Bit: O.D. **Casing Size:** 3 1/4 Inches

To: To: From Depth of: Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 3/12/2008 8.0' 10.0 6.3'

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Helpers: Tom Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks	
	3/12/08	1	1.0'	2 2	Wet soft light brown clayey silt, trace of fine A-4(5) 12" of cultivated so to coarse sand and gravel.	oil.
		2	2.0'	3	9" RECOVERY A-2-4(0)	
3		_	2.0	3 9 12 14	Wet medium dense brown silty fine to coarse A-2-4(0)	
3				14	sand w/ some gravel.	
			4.0'		13" RECOVERY	
		3	4.0	6 9 9 10	Wet medium dense orange silty fine sand w/ A-2-4(0)	
				9 10	some coarse sand, trace of gravel.	
6			6.0'	6	13" RECOVERY	
		4	6.0'	6 7 6 6	Saturated medium dense orange silty fine A-2-4(0)	
				Ğ	sand w/ some coarse sand, trace of gravel.	
			8.0'		18" RECOVERY	
		5	8.0'	2	Saturated very loose orange coarse to fine A-1-b	
9				2 2 2 3	sand w/ some silt, trace of gravel.	
				3	8-11-11-11-11-11-11-11-11-11-11-11-11-11	
			10.0'		22" RECOVERY	
		6	10.0'	3 2 3 3	Saturated loose orange coarse to fine sand w/ A-1-b	
				3 3	some silt, trace of gravel.	
12			12.0'	2	14" RECOVERY	
		7	12.0'	3 2 3 4	Saturated loose orange silty fine to coarse A-2-4(0)	
				4	sand, trace of gravel.	
			14.0'		18" RECOVERY	
		8	14.0'	2	Sithiff Seturated loose light brown fine to goorse A 2	
15				2 3 4 4	sand, trace of silt and gravel.	
'				4	initiality in the control of the and graves.	
			16.0'		16" RECOVERY	
					Boring terminated at 16.0 feet.	

Remarks:

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

Symbol Description

Strata symbols

beraca Bymborn

Low plasticity clay



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 3/12/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
- Groundwater levels recorded at the time of drilling. Borings Backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: R2-029A

Contract: 25-113-01

Boring Location: Sta. 455+00 50 R.T. C.L.

Boring Surface Elev.: + 68.13 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D. **U-Sampler:**

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0 59.5

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 10/23/09 10.0 8.0 4.1

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 59.5 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: D. Zmijewski

Depth	Daily	No.	Sample	Blows/6"		Sample Description	Class./G.I.	Remarks
(ft.)	Progress		Depth		CACACAS MON	<u> </u>		
	10/23/09	1	0.5'	2 2 2		Moist soft gray clayey fine to coarse sandy silt w/trace of fine gravel.	A-4(0)	Cultivated
				2				Soil - 6".
			2.0'			15" RECOVERY		
2.5		2	2.0'	4		Wet medium dense orangish gray silty coarse to fine sand w/trace of fine	A-2-4(0)	
2.5				8		gravel.		
		M				-()R		
		N						
			4.0'			21" RECOVERY		
		3	4.0'	4 7		Saturated medium dense yellowish gray coarse to fine sand w/some silt,	A-1-b	
5				8 10		trace of fine gravel.		
			Z	7				
			0.01			16" RECOVERY		
		4	6.0' 6.0'	4		Saturated loose yellowish gray coarse to fine sand w/some silt, trace of	A-1-b	
			0.0	4 3 3		fine gravel.	A-1-0	
				3		ine graver.		
7.5								
			8.0'			15" RECOVERY		
		5	8.0'	1		Saturated very loose gray coarse sand w/some fine sand and silt, trace of	A-1-b	
				2 3		fine gravel.		
10		6	10.0' 10.0'	1		18" RECOVERY	A 1 1	
		0	10.0	2 4		Saturated loose gray coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
				4				
			12.0'			24" RECOVERY		
12.5		7	12.0'	1 2		Saturated very loose gray coarse sand w/some fine sand and silt, trace of	A-1-b	
12.3				1 2 2 2	111111	fine gravel.		
				_		-		
<u> </u>								
			14.0'			17" RECOVERY		
		8	14.0'	1 3	ati tama ati tama	Saturated loose orange coarse sand w/some fine sand and fine gravel,	A-1-b	

Remarks:

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: R2-029A

Depth Progress No. Sample Blowds Sample Description Class /G.I. Remarks								
15. 16.07 16.07 2 2 2 3 3 3 4 0 2 2 2 3 3 3 4 0 3 3 3 3 4 0 3 3 3 3 4 0 3 3 3 3 3 3 4 0 3 3 3 3 3 3 4 0 3 3 3 3 3 3 3 3 3		Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
17.5 16.0				·	2 3	trace of silt.		
17.5 16.0						H 14 HeF. Hef 14 Andre Gel 13 HeF.		
18.0 18.0 2 20.0 15" RECOVERY 10 18.0 2 20.0 15" RECOVERY 1		-			7	21" RECOVERY		
17. RECOVERY 18.0		<u> </u> -	9	16.0	6 8		A-1-b	
18.0 18.0 19 18.0 19 18.0 19 18.0 19 18.0 19 18.0 19 18.0 19 18.0 19 18.0 19 18.0 18.0 19 18.0 19 18.0 1					6	hititiii		
Saturated loose brown silty fine to coarse sand w/some fine gravel. 20	17.5			40.0		ERECEER FERENCE FERENC		
20		-	10		5		A-2-4(0)	
DRAFT Saturated medium dense brown silty fine sand w/some coarse sand and A-2-4(0) 12 29.0 4 5133 12 29.0 4 6133 30 30 31.0 5343 13 34.0 7 12 13 13 13 13 14 15 15 15 15 15 15 15 15 15 15 15 15 15		1			6 8			
DRAFT Saturated medium dense brown silty fine sand w/some coarse sand and A-2-4(0) 12 29.0 4 5133 12 29.0 4 6133 30 30 31.0 5343 13 34.0 7 12 13 13 13 13 14 15 15 15 15 15 15 15 15 15 15 15 15 15								
11 24.0° 5	20			20.0'		15" RECOVERY		
11 24.0° 5								
11 24.0° 5								
11 24.0° 5		=						
11 24.0° 5	00.5	-						
11	22.5	-						
25 Saturated loose dark green fine sand w/some coarse sand and silt, trace of A-2-4(0) Mud Rotary @ 29.0'. 31.0 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matte. 32.5 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matte. 34.2 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matte. 35.3 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matte. 36.0 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matte. 36.0 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matte. 37.5 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matte. 38.7 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matte. 39.7 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matte. 30.8 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matte. 30.8 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matte. 30.8 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matte. 31.0 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matte. 32.5 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matte. 32.6 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matte. 32.7 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matte. 33.8 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matter. 34.7 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matter. 35.8 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic ma		-						
25 Saturated loose dark green fine sand w/some coarse sand and silt, trace of A-2-4(0) Mud Rotary @ 29.0'. 31.0 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matte. 32.5 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matte. 34.2 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matte. 35.3 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matte. 36.0 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matte. 36.0 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matte. 37.5 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matte. 38.7 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matte. 39.7 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matte. 30.8 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matte. 30.8 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matte. 30.8 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matte. 31.0 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matte. 32.5 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matte. 32.6 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matte. 32.7 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matte. 33.8 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matter. 34.7 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matter. 35.8 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic ma								
27.5 AL GUST 2015 12 29.0° 4 2113			11	24.0'	5 7		A-2-4(0)	
27.5 22.5	25		M		10	fine gravel.		
27.5 22.5			M					
12 29.0' 4 31131 Saturated loose dark green fine sand w/some coarse sand and silt, trace of organic matter. 31.0' 16" RECOVERY 16" RECOVERY 18" RECOVERY 18" RECOVERY 19" RECOVERY 19" RECOVERY 19" RECOVERY 19" RECOVERY 10" RECOVERY 29.0' A-2-4(0) A-2-4(0) A-2-4(0) Trace of organic matte.				26.0'		18" RECOVERY		
12 29.0' 4 31131 Saturated loose dark green fine sand w/some coarse sand and silt, trace of organic matter. 31.0' 16" RECOVERY 16" RECOVERY 18" RECOVERY 18" RECOVERY 19" RECOVERY 19" RECOVERY 19" RECOVERY 19" RECOVERY 10" RECOVERY 29.0' A-2-4(0) A-2-4(0) A-2-4(0) Trace of organic matte.		-						
12 29.0' 4 31131 Saturated loose dark green fine sand w/some coarse sand and silt, trace of organic matter. 31.0' 16" RECOVERY 16" RECOVERY 18" RECOVERY 18" RECOVERY 19" RECOVERY 19" RECOVERY 19" RECOVERY 19" RECOVERY 10" RECOVERY 29.0' A-2-4(0) A-2-4(0) A-2-4(0) Trace of organic matte.	27.5	1		<i>F</i>	41			
31.0' 31.0' 31.0' 16" RECOVERY Rotary @ 29.0'. 13 34.0' 7 7 12 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matte. 33 36.0' 23" RECOVERY		1						
31.0' 31.0' 31.0' 16" RECOVERY Rotary @ 29.0'. 13 34.0' 7 7 12 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matte. 33 36.0' 23" RECOVERY								
31.0' 31.0' 31.0' 16" RECOVERY Rotary @ 29.0'. 13 34.0' 7 7 12 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matte. 33 36.0' 23" RECOVERY		1		00.01	4			
31.0' 31.0' 31.0' 32.5 32.5 13 34.0' 7 7		-	12	29.0	4 4 6		A-2-4(0)	
32.5 13 34.0' 7	30				4	idianici organici mattori. idianici idianici		
32.5 13 34.0' 7				24.0'		開発的 開発的 開発的		
13 34.0' 7 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matte. 35 36.0' 23" RECOVERY		1		31.0		TO RECOVERT		
13 34.0' 7 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matte. 35 36.0' 23" RECOVERY		1				101 102 103		
13 34.0' 7 Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matte. 35 36.0' 23" RECOVERY	32.5]				56 73 354 61 7 367 64 7 367		
36.0' 23" RECOVERY						66 (1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
36.0' 23" RECOVERY		-				12 13 15 15 15 15 15 15 15		
36.0' 23" RECOVERY		-	13	34.0'	7	Saturated medium dense green fine sand w/some silt and coarse sand	Δ_2-4(0)	
36.0' 23" RECOVERY	0.5	-		31.3	7 12 11	trace of organic matte.	Λ-2-4(0)	
	35	1						
		1		36.0'		23" RECOVERY		
37.5]						
37.5]						
	37.5							

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: R2-029A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	<u> </u>						
		14	39.0'	9	Saturated medium dansa green fine and w/game silt trage of coerse son	l A-2-4(0)	
40		'-	00.0	9 9 12 16	Saturated medium dense green fine sand w/some silt, trace of coarse sand and organic matter.	A-2-4(0)	
40							
			41.0'		24" RECOVERY		
42.5							
		15	44.0'	7 9 12 14	Saturated medium dense green fine sand w/some silt, trace of coarse sand and organic matter.	A-2-4(0)	
45				14	and organic matter.		
			46.0'		24" RECOVERY		
					DRAFI		
47.5							
		V				7	
	_	16	49.0'	9 9 11 15	Saturated medium dense green fine to coarse sand w/some silt, trace of organic matter.	A-2-4(0)	
50				15			
			51.0'	Δ	20" RECOVERY		
			31.0	1			
52.5							
		17	54.0'	3 3 4 8	Saturated loose green silty fine sand w/some coarse sand and fine gravel,	A-2-4(0)	
55				8	trace of organic matter.		
			E6 0'		20" DECOVEDY		
			56.0'		20" RECOVERY		
57.5							
		18	59.0' 59.5'	70	Saturated very dense green silty fine sand w/some coarse sand and fine	A-2-4(0)	
60					gravel, trace of organic matter. 6" RECOVERY		
					End of Boring		

Symbol Description

Strata symbols



Poorly graded clayey silty sand



Silty sand



Poorly graded sand with silt



Well graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 10/23/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 Truck.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

10.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: R2-030

Contract: 25-113-01

Boring Location: Sta. 420+00.00, 43' Lt. C.L.

Boring Surface Elev.: + 70.90' Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: 2 Type of: Split Barrel O.D. IN. IN. O.D. U-Sampler: 3 Ball Sampler

Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 3/12/2008 8.0 6.0' 4.6'

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Helpers: Tom Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks	
	3/12/08	1	1.0' 2.0'	2 1	Wet soft brown fine to coarse sandy silt w/ A-4(0) 10" of cultivated soil. some clay, trace of gravel. 10" RECOVERY	
3		2	2.0'	3 5 6 6	Wet stiff gray fine sandy clay w/ some coarse sand, trace of gravel. A-6(2)	
		3	4.0'	2	19" RECOVERY	
		4	4.0	2 7 12 14	Saturated medium dense gray clayey coarse to A-2-4(0) fine sand, trace of gravel.	
6			6.0'		17" RECOVERY	
		4	6.0'	15 16 17 12	Saturated dense light brown silty coarse to fine sand w/ some gravel.	
			8.0'	_	21" RECOVERY	
9		5	8.0'	5 5 5 5	Saturated loose light brown coarse sand w/ A-1-b some silt and fine sand, trace of gravel.	
			10.0'		17" RECOVERY	
					Boring terminated at 10.0 feet.	
12						
15						

Remarks:

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

Symbol Description

Strata symbols

Poorly graded clayey silty sand



Clayey sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 3/12/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling. Borings Backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: R2-030A

Contract: 25-113-01

Boring Location: Sta. 460+00 43 L.T. C.L.

Boring Surface Elev.: + 70.24 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 O.D.

IN. IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0 61.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 10/26/10 10.0 8.0 6.1

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 61.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	10/26/09	1	1.0'	2 2	Wet soft tan clayey fine sandy silt w/trace of coarse sand.	A-4(3)	Cultivated
			2.0'		11" RECOVERY		Soil - \10".
2.5		2	2.0'	4 8 8	Wet medium dense grayish tan silty fine gravelly coarse to fine sand.	A-1-b	10.
				6			
		V	4.0'		18" RECOVERY		
	_	3	4.0'	4 4 6	Wet loose tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
5				6			
		L_	6.0'		17" RECOVERY		
		4	6.0'	8 8	Saturated medium dense tan coarse sand w/some fine sand, silt and fine gravel.	A-1-b	
				9	giavei.		
7.5							
		<u> </u>	8.0'	2	21" RECOVERY		
		5	8.0'	3 3 4 5	Saturated loose gray coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
				5			
10		6	10.0' 10.0'	8	17" RECOVERY	1 2 4(0)	
-		ľ	10.0	8 3 3 2	Saturated loose tan fine to coarse sand w/some silt and fine gravel.	A-2-4(0)	
				2			
-		7	12.0' 12.0'	3	21" RECOVERY	A 2 4(0)	
12.5		′	12.0	3 1 1	Saturated very loose tan fine sand w/some silt and coarse sand, trace of fine gravel.	A-2-4(0)	
				1	ine graven		
-							
		8	14.0' 14.0'	1	22" RECOVERY	A-1-b	
			17.0	2 2 2	Saturated very loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-0	
				2	<i>6</i>		

Remarks:

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: R2-030A

Depth	Daily	No.	Sample	Blows/6"	Sample Description	Class./G.I.	Remarks
(ft.)	Progress	INO.	Depth	טוטעס/ט	Запре резонрион	Glass./G.I.	Nemarks
			16.0'		21" RECOVERY		
		9	16.0'	2 7 10 5	Saturated medium dense white fine to coarse sand w/some silt and fine	A-2-4(0)	
				10 5	gravel.		
17.5	1						
	-	10	18.0' 18.0'	5	19" RECOVERY Saturated medium dense silty fine to coarse sand.	A-2-4(0)	
	1			5 6 8 10			
20			20.0'		14" RECOVERY		
	-						
	1						
22.5							
	-						
	-						
		11	24.0'	6 6 6	Saturated medium dense tan silty fine to coarse sand.	A-2-4(0)	
25				9			
		M	26.0'		20" RECOVERY	7	
	1 .		20.0	_	20 KICOVEKI		
27.5	_				GUST 2015		
				10			
	-						
		12	29.0'	7 7 7 10	Saturated medium dense green silty fine sand w/some coarse sand.	A-2-4(0)	
30	_			10			
	-		31.0'		24" RECOVERY		
	-		31.0		24 RECOVERT		
32.5	<u> </u>						
	-						
	1						
	-	13	34.0'	8 7 8 11	Saturated medium dense green silty fine sand w/some coarse sand.	A-2-4(0)	
35				11			
			36.0'		21" RECOVERY		
			30.0		21 RECVERT		
37.5							
<u> </u>	-						

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: R2-030A

Conti	act: 25-11	3-01					
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
40	-	14	39.0'	5 6 8 9	Saturated medium dense green silty fine sand w/trace of coarse sand.	A-2-4(0)	
	-		41.0'		24" RECOVERY		
42.5	-						
.2.0							
45	_	15	44.0'	6 8 8 10	Saturated medium dense green fine sand w/some silt and coarse sand, trace of organic matter.	A-2-4(0)	
45			46.0'		24" RECOVERY		
47.5					DRAFT		
				_			
50		16	49.0'	8 8 9 12	Saturated medium dense green fine to coarse sand w/some silt, trace of organic matter.	A-2-4(0)	
			51.0'		20" RECOVERY End of Boring		
52.5	-			10	7001 Z010		
	_						
55	- - -						
	_						
57.5							
	_						
60							
	_						
	-						

Symbol Description

Strata symbols

Low plasticity clay

Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 10/26/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 Truck.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

16.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: R2-031

Contract: 25-113-01

Boring Location: Sta. 425+00.00, 130' Rt. C.L.

Boring Surface Elev.: + 73.30' Reference:

Wt. of Casing Hammer: Average Fall: IN. Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: 2 IN. Type of: Split Barrel O.D. IN. IN. O.D. 3

U-Sampler: Ball Sampler Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Depth of Casing Time **Depth of Hole Depth of Water** Elev. of Water Date 3/12/2008 10.0' 9.5' 12.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Helpers: Tom Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/12/08	1	1.0'	2 3	Moist firm brown clayey fine sandy silt w/	A-4(2)	10" of cultivated soil.
			2.0'		some coarse sand. 8" RECOVERY		
		2	2.0'	3 5 7	Moist stiff brown fine sandy silt w/ some	A-4(0)	
3				4	coarse sand, trace of gravel.		
	A	1	4.0'		18" RECOVERY		
		3	4.0	4	Moist medium dense light brown clayey fine	A-2-4(0)	
		4		4 5 7 7	to coarse sand, trace of gravel.		
				,	β		
6			6.0'		15" RECOVERY	4	
		4	6.0'	8 10	Wet very stiff gray fine to coarse sandy clay,	A-6(2)	
				8 10 12 15	trace of gravel.		
				1			
			8.0'		21" RECOVERY		
		5	8.0'	5 9 9 7	Wet medium dense light brown fine to coarse	A-2-4(0)	
9				9 7	sand w/ some clay and gravel.		
			10.0'		19" RECOVERY		
		6	10.0'	3 3 3 4	Saturated loose light brown coarse to fine	A-2-4(0)	
				4	sand w/ some silt, trace of gravel.		
12		7	12.0' 12.0'	3	15" RECOVERY	. 2 4(2)	
		<i>'</i>	12.0	3 3 3 4	Saturated loose light brown fine sand w/ some	A-2-4(0)	
				4	silt and coarse sand, trace of gravel.		
			44.01		ATH DE GOVERNA		
		8	14.0' 14.0'	2	15" RECOVERY Saturated very loose light brown fine sand w/	A-2-4(0)	
1 45			14.0	2 1 1	some silt and coarse sand.	A-2-4(0)	
15				4	some sin and coarse sand.		
			16.0'		20" RECOVERY		
			10.0		Boring terminated at 16.0 feet.		
1							

Remarks:

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

Symbol Description

Strata symbols

Low plasticity clay



Silty sand



Poorly graded clayey silty sand



Clayey sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 3/12/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling and rechecked the following day.
- 3. Surveyed boring locations and elevations were provided by Century engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

16.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: R2-032

Contract: 25-113-01

Boring Location: Sta. 430+00.00, 152' Lt. C.L.

Boring Surface Elev.: + 68.00' Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: 2 IN. Type of: Split Barrel O.D. IN. IN. O.D. 3 Ball Sampler

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0'

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 3/12/2008 10.0 8.0' 7.6'

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 16.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Helpers: Tom Kane

Danth	Deily		Comente	T	<u> </u>
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks
	3/12/08	1	1.0' 2.0'	2 3	Wet firm brown clay, trace of fine to coarse sand and gravel. A-6(10) 10" of cultivated soil.
3		2	2.0'	4 12 14 16	Wet medium dense light brown silty fine to coarse sand w/ some gravel. A-2-4(0)
		3	4.0	4 5 10 10	Wet medium dense light brown coarse to fine sand w/ some silt, trace of gravel. A-1-b
6		4	6.0' 6.0'	5 7 6 6	Saturated medium dense light brown fine to coarse sand w/ some silt, trace of gravel. A-2-4(0)
9		5	8.0' 8.0'	2 2 3 3 3	17" RECOVERY Saturated very loose light brown coarse to fine sand w/ some silt, trace of gravel. 17" RECOVERY
12		6	10.0'	2 3 3 5	Saturated loose light brown coarse to fine sand w/ some silt, trace of gravel. 15" RECOVERY
12		7	12.0'	2 2 1 1	Saturated very loose light brown coarse to fine sand w/ some silt and gravel. 12" RECOVERY
15		8	14.0'	8 13 13 11	Saturated medium dense light brown fine sand and gravel w/ some silt and coarse sand. 8" RECOVERY
					Boring terminated at 16.0 feet.

Remarks:

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

Symbol Description

Strata symbols

Low plasticity clay

Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 3/12/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: R2-032A

Contract: 25-113-01

Boring Location: Sta. 50 L.T. C.L.

Boring Surface Elev.: + 68.81 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D. **U-Sampler:**

Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: **Hollow Stem Auger:** From Depth of: 0.0 46.0

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 10/29/09 10.0 8.0 7.9

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 46.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Lafferty

Donth	Deily		Comple				<u> </u>
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	10/29/09	1	0.5'	2 2 3	Wet firm brown clayey silt w/trace of fine to coarse sand.	A-4(7)	Topsoil - 7".
			2.0'		13" RECOVERY		
2.5		2	3.0'	8 12	Wet very stiff brownish orange clayey silt w/some fine sand, trace of coarse sand and gravel. 12" RECOVERY	A-4(3)	
		2A	3.0' 4.0'	14 9	Wet medium dense orange coarse to fine sand w/some fine gravel and silt. 12" RECOVERY	A-1-b	
5		3	4.0' 6.0'	7 8 8 7	Wet medium dense brown coarse sand w/some silt and fine sand, trace of fine gravel. 20" RECOVERY	A-1-b	
7.5		4	6.0' 8.0'	5 4 4 3	Saturated loose brown coarse to fine sand w/some silt, trace of fine gravel. 22" RECOVERY	A-1-b	
10		5	8.0'	2 3 3 3	Saturated loose tan fine to coarse sand w/some silt, trace of fine gravel. 21" RECOVERY	A-2-4(0)	
		6	10.0'	2 4 6 6	Saturated loose tan coarse to fine sand w/some silt, trace of fine gravel. 22" RECOVERY	A-1-b	
12.5		7	12.0'	1 1 2 3	Saturated very loose tan fine sand w/some coarse sand and silt, trace of fine gravel. 20" RECOVERY	A-2-4(0)	
		8	14.0'	6 3	Saturated loose tan fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	Mud
			-	3	Saturated 1005c tan fine to coarse said w/some sit, trace of fine graver.	11-2-4(0)	17144

Remarks:

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: R2-032A

(ft.)	Progress	No.	Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
15	<u> </u>			4 6				Rotary @ 14.0'.
								14.0.
		9	16.0' 16.0'	8		20" RECOVERY Saturated medium dense orange fine to coarse sandy fine gravel w/some	A-1-b	
			10.0	8 8 8 10		silt.	A-1-0	
17.5								
17.5			18.0'			22" RECOVERY		
		10	18.0'	8 7 4		Saturated medium dense orange clayey fine to coarse sand w/some silt,	A-2-7(2)	
				4		trace of fine gravel.		
20			20.0'			16" RECOVERY		
22.5						DDAET		
						DRAFT		
	_	11_	24.0'	4		Saturated medium dense green fine sand w/some silt and coarse sand,	A-2-4(0)	
25				7 9		trace of fine gravel.	A-2-4(0)	
		N				TOR DIDDING	7	
			26.0'	_		16" RECOVERY		
						GUST 2015		
27.5				76		3031 Z013		
		12	29.0'	8 8		No Sieve Analysis - Indication of saturated medium dense green silty		
30				8 8 8 11		sand.		
			31.0'			2" RECOVERY		
32.5								
		13	34.0'	6 9 9 10	:(15.1;27. :(15.1;27. :(15.1;27.	Saturated medium dense green fine sand w/some coarse sand, trace of silt	A-3	
35				10		and organic matter.		
			36.0'			23" RECOVERY		
37.5					:: 12.1161. :: 12.1161. :: 12.1161			

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: R2-032A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			·				
	_	14	39.0'	6	Saturated medium dense green fine sand w/some silt and coarse sand,	A-2-4(0)	
40	-			6 8 13 16	trace of organic matter.	112 1(0)	
	-		41.0'		23" RECOVERY		
	_						
42.5							
	_						
	-	15	44.0'	13 16 16 19	Saturated dense green fine sand w/some coarse sand and silt, trace of fine	A-2-4(0)	
45				16 19	gravel and organic matter.		
	-						
			46.0'		End of Boring		
					DIALI		
47.5	_						
					FOR BIDDING		
	1 (M			FOR BIDDING		
				-			
50	_			A	IOLIOT OOAE		
	-			$\Delta \Pi$	JGUST 2015		
				1	7001 2010		
	-						
52.5	_						
	-						
55	1						
	-						
57.5	_						
50]						
	-						
	-						
60							
	_						
1	I	I					Ī

Symbol Description

Strata symbols



Low plasticity clay



Silty low plasticity clay



Silty sand



Poorly graded sand with silt



Clayey sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 10/29/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 Truck.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: R2-033

Contract: 25-113-01

Boring Location: Sta. 433+21.61, 12' Lt. C.L.

Boring Surface Elev.: + 72.00' Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: 2 IN. Type of: Split Barrel O.D. IN. IN. O.D. U-Sampler: 3 Ball Sampler

Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0' 10.0'

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 3/31/2008 10.0' 9.0' 12.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Gary Truver Sr.

Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks
	3/31/08	1	0.5' 2.0'	4 4 6	Moist stiff brown clayey silt w/ some fine to coarse sand, trace of gravel. 18" RECOVERY
3		2	2.0'	5 6 8 6	Moist medium dense orange-brown clayey coarse to fine sand w/ some gravel. 15" RECOVERY
		3	4.0'	5 6 10 13	Moist medium dense light brown coarse to fine sand w/ some silt and gravel. A-1-b
6		4	6.0	15 13 12 9	Moist medium dense light brown coarse sand and gravel w/ some silt and fine sand. A-1-b
9		5	8.0' 8.0'	4 2 4 4	17" RECOVERY Wet loose light brown coarse to fine sand w/ some silt, trace of gravel. A-1-b
			10.0'		Boring terminated at 10.0 feet.
12					
15					
13					

Remarks:

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

Symbol Description

Strata symbols

Low plasticity clay

Clayey sand

Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 3/31/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
- Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

41.0

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: R2-033A

Contract: 25-113-01

Boring Location: Sta. 475+00 50 L.T. C.L.

Boring Surface Elev.: + 67.82 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D. 3 1/4 Inches

From Depth of: From Depth of: To: To: **Casing Size:** Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 10/30/09 10.0 8.0 7.4

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 41.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	10/30/09	1	0.5'	356	Moist loose brown silty fine to coarse sand w/some fine grave	el and silt. A-2-4(0)	Cultivated Soil - 8".
		2	2.0'	6	10" RECOVERY	6.6.	
2.5		2	2.0'	6 6 11	Moist medium dense tan coarse to fine sand w/some silt, trac gravel. 13" RECOVERY	e of fine A-2-4(0)	
		3	4.0'	11 15	Saturated dense tan fine gravelly coarse sand w/some silt, tra	ce of fine A-1-b	
5			6.0	11 15 25 24	sand. UST 2015		
		4	6.0'	23 19	Saturated dense orange silty coarse sand w/some fine sand an	nd fine A-1-b	
				23 19 18 16	gravel.		
7.5			8.0'		20" RECOVERY		
		5	8.0'	3586	Saturated medium dense tannish orange silty coarse to fine sa of fine gravel.	and w/trace A-2-4(0)	
10			10.0'		21" RECOVERY		
		6	10.0'	2 4 6 8	Saturated loose orange coarse sand w/some fine sand, silt and	l fine gravel. A-1-b	
			40.01		WI DECOMPAN		
		7	12.0' 12.0'	3	22" RECOVERY Saturated loose tan coarse sand w/some fine sand and fine grant sand and fine grant sand sand sand sand sand sand sand sand	avel, trace of A-1-b	
12.5		,	12.0	3 3 4 3	silt.	aver, trace of A-1-0	
			14.0'		20" RECOVERY		
		8	14.0'	10 6	Saturated medium dense tan silty coarse sand w/some fine gr	avel and fine A-2-4(0)	

Remarks:

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: R2-033A

Depth	Daily	No.	Sample	Blows/6"		Sample Description	Class./G.I.	Remarks
(ft.)	Progress	INU.	Depth		8888888		Ciass./G.I.	Nemarks
15				8 8		sand.		
			16.0'			10" RECOVERY		
		9	16.0'	14 9 8 11		Saturated medium dense brown clayey fine gravelly fine sand w/some	A-2-6(0)	
				8 11		coarse sand and silt.		
17.5								
			18.0'			13" RECOVERY		
		10	18.0'	5 7		Saturated medium dense brown clayey fine sand w/some coarse sand and	A-2-6(1)	Mud
				5 7 11 12		silt.		Rotary @
								18.0.
20			20.0'			20" RECOVERY		
20			20.0			20 RECOVERI		
22.5						DRAFT		
						IJKALI		
		11	24.0'	7 6		Saturated medium dense brown silty fine sand w/some coarse sand.	A-2-4(0)	
25				11		-()P		
		N						
	_		26.0'	_		22" RECOVERY		
						GUST 2015		
27.5			<i></i>	41				
21.5				10		3001 2010		
		12	29.0'	5		Saturated medium dense green clayey fine sand w/some silt, trace of	A-2-6(1)	
		'-	20.0	5 11 12 16		coarse sand.	A-2-0(1)	
30				16		Course suita.		
			31.0'			15" RECOVERY		
32.5								
		13	34.0'	8 9		Saturated medium dense green fine sand w/some silt and coarse sand,	A-2-4(0)	
35				8 9 12 15		trace of organic matter.		
35								
			20.01			AN DECOVERY		
			36.0'			23" RECOVERY		
37.5								

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: R2-033A

Depth	Daily	Ι.	Sample			1	Τ_
(ft.)	Progress	No.	Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	-						
	-	14	39.0'	4 8	Saturated medium dense green silty fine to coarse sand w/trace or organic	A-2-4(0)	
40				4 8 9 9	matter.		
			41.0'		22" RECOVERY End of Boring		
	_				End of Bornig		
42.5	1						
	-						
45	1						
1 45	1						
	-				DRAFT		
<u> </u>	-						
47.5	1 _	١.					
					FOR BIDDING		
		N				7	
	-						
50	1				IOLIOT OOAE		
	-			71	JGUST 2015		
				10	3001 Z010		
52.5	-						
	-						
	1						
55	1						
	-						
	_						
	1						
57.5]						
	-						
	1						
60	1						
	1						
]						
1							

Symbol Description

Strata symbols

Poorly graded clayey silty sand



Silty sand



Poorly graded sand with silt



Clayey sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 10/30/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 ATV.
- Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

10.0'

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: R2-034

Contract: 25-113-01

Boring Location: Sta. 439+68.81, 29' Lt. C.L.

Boring Surface Elev.: + 67.00' Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D. 3

Ball Sampler Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0'

Water Level Readings

Time **Depth of Hole Depth of Casing Depth of Water** Elev. of Water Date 3/12/2008 10.0 8.0' 7.7'

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Helpers: Dan Žmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks	
	3/12/08	1	0.5' 2.0'	1 2 2	Moist soft brown clay, trace of fine to coarse A-6(11) 8" of topsoil. 16" RECOVERY	
		2	2.0'	3 7 10	Moist medium dense light brown coarse sand A-2-4(0)	
3			4.0		w/ some clay, fine sand, and gravel.	
	•	3	4.0'	5 6 5 7	Wet medium dense orange and light brown clayey coarse sand w/ some fine sand and gravel. A-2-6(0)	
6]		6.0'		15" RECOVERY	
		4	6.0'	5 6 8 7	Wet medium dense orange and light brown silty fine to coarse sand w/ some gravel. A-2-4(0)	
			8.0'		20" RECOVERY	
9		5	8.0'	4 7 9 6	Wet medium dense orange and light brown silty coarse sand w/ some organic matter, fine sand, and gravel. A-1-b	
	 	├	10.0'	 	17" RECOVERY	
					Boring terminated at 10.0 feet.	
12						
15						
	<u> </u>					
	-					

Remarks:

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

Symbol Description

Strata symbols

Low plasticity clay



Poorly graded clayey silty sand



Clayey sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 3/12/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
- Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

36.0

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: R2-034A

Contract: 25-113-01

Boring Location: Sta. 480+00 50 L.T. C.L.

Boring Surface Elev.: + 65.51 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 11/2/09 10.0 8.0 7.7

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 36.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: D Zmijewski

Б "	Б ;;	l	0 1				
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	11/2/09	1	0.5'	3 3 4	Moist firm orange clayey coarse sandy silt w/some fine sand, trace of fine gravel.	A-4(1)	Topsoil - 8".
			2.0'		8" RECOVERY		
2.5		2	2.0'	6 4 5 6	Moist loose brown silty coarse sand w/some fine sand and fine gravel. 8" RECOVERY	A-1-b	
		3	4.0'	3 3	Moist loose orange silty coarse sand w/some fine gravel and fine sand.	A-1-b	
5			6.0	4 4	GUST _{14" RECOVERY} 15		
		4	6.0'	4 7	Saturated medium dense orange coarse to fine sand w/some silt and fine	A-1-b	
				6 6	gravel.		
7.5							
		5	8.0' 8.0'	3	17" RECOVERY	A-1-b	
			0.0	3 3 2 3	Saturated loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-0	
10			10.0'		20" RECOVERY		
		6	10.0'	2 3 4 5	Saturated loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			12.0'		24" RECOVERY		
12.5		7	12.0'	17 7 8 3	Saturated medium dense tan coarse sandy fine gravel w/some fine sand, trace of silt.	A-1-b	
			14.0'		14" RECOVERY		
		8	14.0'	3 4	No Sample Recovery		

Remarks:

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: R2-034A

Depth	Daily	No	Sample	Blows/6"		Sample Description	Class /C I	Domorko
(ft.)	Progress	No.	Depth		MMMMMMM	Sample Description	Class./G.I.	Remarks
15				6 9	1:1:1:1:1:1:1: 1:1:1:1:1:1:1:1: 1:1:1:1:1:1:1:1:			
			16.0'		::::::::::::::::::::::::::::::::::::::	0" RECOVERY		
		9	16.0'	3 4 7		Saturated medium dense brown clayey fine sand w/some coarse sand, fine	A-2-6(1)	
				9		gravel and silt.		
17.5								
			18.0'			15" RECOVERY		
		10	18.0'	2 5 6 10		Saturated medium dense brown silty fine sand w/some coarse sand.	A-2-4(0)	Mud
				6 10				Rotary @
								18.0'.
20			20.0'			19" RECOVERY		
	1							
22.5	1							
22.0	1					DRAFT		
		11	24.0'	6		Saturated medium dense brown clayey fine sand w/trace of coarse sand	A-2-7(2)	
25				5 7 7		and silt.		
25	İ	V				TUR DIIJIJINU		
	•		26.0'	•		23" RECOVERY		
			20.0					
				\		GUST 2015		
07.5				41				
27.5	1			1		3001 Z010		
		12	29.0'	6		Saturated medium dense brown clayey fine sand w/trace of coarse sand	A-2-6(1)	
<u> </u>				6 7 8 10		and silt.	11 2 0(1)	
30	-			10				
		-	31.0'			19" RECOVERY		
32.5								
		13	34.0'	7		Soturated madium dance green fine to coorse and w/some silt trace of	A-2-4(0)	
		'	34.0	7 8 10 15		Saturated medium dense green fine to coarse sand w/some silt, trace of organic matter.	A-2-4(U)	
35	-			15				
			36.0'			21" RECOVERY		
						End of Boring		
37.5								
			1		i		i e	

Symbol Description

Strata symbols

Clayey sand



Silty sand



Well graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 11/02/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 ATV.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to I-95 Boring No.: R2-035

Contract: 25-113-01

Boring Location: Sta. 444+00.00, 80' Lt. C.L.

Boring Surface Elev.: + 56.45' Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: 2 IN. Type of: Split Barrel O.D. O.D.

IN. IN. 3 Ball Sampler Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0' 10.0'

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 3/12/2008 6.0' 4.0' 3.0'

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dan Taylor

Helpers: Dan Žmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks
	3/12/08	1	2.0'	1 2 5 5	Wet loose black clayey gravel and coarse sand w/ some organic matter and fine sand. 16" RECOVERY
3		2	4.0'	2 4 3 4	Saturated loose black clayey organic gravel A-2-7(1) and fine sand w/ some coarse sand. 18" RECOVERY
6		3	4.0'	1 2 4 7	Saturated loose green silty fine sand w/ some coarse sand. 16" RECOVERY
		4	6.0' 8.0'	7 7 7 10	Saturated medium dense green clayey fine A-2-6(0) sand, trace of coarse sand. 17" RECOVERY
9		5	8.0'	2 10 10 13	Saturated medium dense green clayey fine sand w/ some coarse sand, trace of gravel. 21" RECOVERY
					Boring terminated at 10.0 feet.
12					
15					

Remarks:

Reviewed By: Maureen Kelly Soils Supervisor: Randy Ferguson

Symbol Description

Strata symbols

Silty sand



Clayey sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 3/12/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
- 3. Surveyed boring locations and elevations were provided by Century engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

61.0

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: R2-035A

Contract: 25-113-01

Boring Location: Sta. 484+00 50 L.T. C.L.

Boring Surface Elev.: + 56.76 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 11/2/09 10.0 8.0 2.1

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 61.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: D. Zmijewski

_	1		1			1	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	11/2/09	1	0.0'	1 2 3 3	Saturated loose black organic clayey fine to coarse sand w/some fine gravel and silt.	A-2-6(1)	Topsoil - 2".
			2.0'		18" RECOVERY		
2.5		2	2.0'	4 3 2 2	Saturated loose black fine gravelly coarse to fine sand w/some silt, trace of organic matter.	A-1-b	
			4.0'		19" RECOVERY		
5		3	4.0'	2 2 2 2 3	Saturated very loose green silty fine sand w/some coarse sand.	A-2-4(0)	
			6.0'		22" RECOVERY		
7.5		4	6.0'	2 4 6 8	Saturated loose green silty fine sand w/some coarse sand.	A-2-4(0)	
			8.0'		18" RECOVERY		
		5	8.0'	3 7 8 10	Saturated medium dense green fine sand w/some silt and coarse sand.	A-2-4(0)	
10			10.0'		19" RECOVERY		
		6	10.0'	7 10 20 18	Saturated medium dense green fine sand w/some silt and coarse sand.	A-2-4(0)	
			12.0'		17" RECOVERY		
12.5		7	12.0'	3 4 9 10	Saturated medium dense green fine sand w/some silt and coarse sand.	A-2-4(0)	

Remarks:

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: R2-035A

(ft.)		No.	Sample	Blows/6"	Sample Description	Class./G.I.	Remarks
(,	Progress		Depth		17" RECOVERY		Remarks
15		8	\14.0'/ 14.0'	3 8 11 14	Saturated medium dense green fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
			16.0'		18" RECOVERY		
17.5		9	16.0'	8 12 20 24	Saturated dense green fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
17.5			18.0'		18" RECOVERY		
		10	18.0'	4 7 10 15	Saturated medium dense green fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
20			20.0'		17" RECOVERY		
22.5					DRAFT		
25		11	24.0'	9 10 12 24	Saturated medium dense green fine to coarse sand w/some silt, trace of organic matter.	A-2-4(0)	
27.5			26.0'	\L	GUST 20" RECOVERY 2015		
30		12	29.0'	2 3 4 10	Saturated loose green silty fine to coarse sand w/trace of fine gravel and organic matter.	A-2-4(0)	
32.5			31.0'		19" RECOVERY		
		13	34.0'	25	Soturated years dance aroun city fine to economic and mylesma fine around	A 2 4(0)	
35		13	57.0	25 50/5"	Saturated very dense green silty fine to coarse sand w/some fine gravel and organic matter, trace of shell fragments.	A-2-4(0)	
			36.0'		11" RECOVERY		
37.5							

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: R2-035A

	act: 25-11	J 01	01-				I	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	-							
	-							
		14	39.0'	12 31 50/5"		Saturated very dense gray silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
40				50/5"				
	-							
	-		41.0'			17" RECOVERY		
42.5								
	-							
	_							
		15	44.0'	10 12 18 23		Saturated medium dense gray silty fine to coarse sand w/trace of fine	A-2-4(0)	
45				18 23		gravel.		
	-					DDAET		
	-		46.0'			23" RECOVERY		
47.5				_				
		M				FOR BIDDING		
		M						
	11/4/09	16	49.0'	9 11 13 30		Saturated medium dense gray fine sand w/some silt and coarse sand, trace	A-2-4(0)	
50				30		of shell fragments.		
	-			70		JUSI ZUIJ		
	-		51.0			20" RECOVERY		
52.5								
	-							
	-							
		17	54.0'	23 35 50/5"		Saturated very dense gray fine sand w/some silt and coarse sand, trace of	A-2-4(0)	
55	<u> </u>			30/3		shell fragments.		
	_		50.01			LUI DECOVEDY		
			56.0'			14" RECOVERY		
57.5								
	_							
	-							
		18	59.0'	18 35 50	11111111111111111111111111111111111111	Saturated very dense gray fine sand w/some coarse sand and silt.	A-2-4(0)	
60								
			64.01			16! DECOVEDY		
		-	61.0'	ļ	::::::::	16" RECOVERY		

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: R2-035A

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
(14.)	1 Togrood		Борин		End of Boring		
62.5							
65							
67.5							
					DRAFT		
70					IJRAFI		
70							
	R				FOR BIDDING		
		M			FUR BILLING		
72.5							
				\wedge	JGUST 2015		
			/	$\Delta \mathbf{I}$	\mathcal{N}_{1}		
					70001 Z010		
75							
77.5							
80							
82.5							
<u> </u>							
1							

Symbol Description

Strata symbols



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 11/02/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 ATV.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

25.0

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: R2-41

Contract: 25-113-01

Boring Location: Sta. 14+00 12 L.T. C.L.

Boring Surface Elev.: + 61.30 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 1/12/10 10.0 8.0 7.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 25.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Jason Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	1/12/10	1	1.0' 2.0'	8 9		Moist medium dense orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	Topsoil - 10".
2.5		2	2.0'	7 8 7		8" RECOVERY Moist medium dense orange coarse sand w/some fine sand and silt, trace	A-1-b	
			4.0'	6		of fine gravel. 20" RECOVERY		
	_	3	4.0'	3 2		Saturated loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
5			6.0'	2		16" RECOVERY		
		4	6.0	2 2 1	11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Saturated very loose brown coarse to fine sand w/some silt.	A-1-b	
7.5			8.0'	2		15" RECOVERY		
		5	8.0'	W/R 1		Saturated very loose brown coarse to fine sand w/trace of silt and fine	A-1-b	
				3 2		gravel.		
10			10.0'			12" RECOVERY		
		6	10.0'	2 2 4 4		Saturated loose brown coarse to fine sand w/some silt.	A-1-b	
			12.0'			12" RECOVERY		
12.5		7	12.0'	2 3 6 5		Saturated loose brown coarse sand w/some fine sand and fine gravel, trace of silt.	A-1-b	
			14.0'			17" RECOVERY		
		8	14.0'	2 3 5 9		Saturated loose brown fine gravelly coarse sand w/trace of fine sand and silt.	A-1-b	

Remarks:

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: R2-41

epth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		_	16.0' 16.0'	0	16" RECOVERY		
		9	16.0	8 7 8 10	Saturated medium dense brown coarse to fine sand w/some fine gravel, trace of silt.	A-1-b	
7.5			18.0'		16" RECOVERY		
		10	18.0'	16 10 11 12	Saturated medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
				12			
)			20.0'		13" RECOVERY		
2.5							
		11	23.0'	4 9 11 15	Saturated medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
				15			
5			25.0'	T	16" RECOVERY End of Boring		
		V				7	
7.5				$\Delta \Pi$	JGUST 2015		
				10	70001 2010		
0							
2.5							
5							
7.5							
	1		1				1

Symbol Description

Strata symbols

Silty sand

1.000000

Poorly graded sand with silt

70 30

Well graded sand with silt



Poorly graded sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 1/12/2010 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 Track.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: R2-041A

Contract: 25-113-01

Boring Location: Sta. 500+00 50 R.T. C.L.

Boring Surface Elev.: + 64.27 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

U-Sampler: Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0 50.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 11/10/09 9.2 10.0 8.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 50.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	11/10/09	1	1.0'	3 3		Moist loose orange clayey fine gravelly fine to coarse sand w/some silt.	A-2-4(0)	Cultivated
	'	l'	2.0'			8" RECOVERY	l'	Soil -
2.5	'	2	2.0'	10 15 12 11		Moist medium dense tan coarse to fine sand w/some silt, trace of fine	A-1-b	\10".
	'	[12		gravel.	<u>'</u>	
						-OR RIDDING		
<u> </u>	- '	3	4.0'	4		22' RECOVERY Moist medium dance grow silty accret to fine and w/troop of fine grows	1 2 4(0)	-
<u> </u>	- '		4.0	8 10		Moist medium dense gray silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
5	-	'		12			, 	
	 		6.0'	$\Delta \Gamma$		19" RECOVERY		
	'	4	6.0	8 6 5		Moist medium dense gray coarse to fine sand w/some silt, trace of fine	A-2-4(0)	
	'	'		5 5		gravel.	, 	
7.5	'	'				J		
	'	'	8.0'			23" RECOVERY	, 	
	'	5	8.0'	4 5 5		Saturated loose grayish orange fine gravelly coarse sand w/some fine sand	A-1-b	
	'	'		5 4		and silt.		
	'	'				ļ		
10	'	'	10.0'			18" RECOVERY	, 	
10	· '	6	10.0'	4 10		Saturated medium dense orange coarse to fine sand w/some fine gravel,	A-1-b	
\vdash	'	'		10 14 10		trace of silt.		
\vdash	· '	'				ļ	, 	
<u> </u>	·	'					, 	
<u> </u>	'	7	12.0' 12.0'	6		18" RECOVERY	A 1 h	-
12.5	-	'	12.0	6 12 17 13		Saturated medium dense orange fine sandy fine gravel w/some coarse sand and silt.	A-1-b	
	<u> </u>	'		13		Sand and Sit.	, 	
<u> </u>	-	'				ļ	, 	
	<u> </u>	<u> </u>	14.0'	ļ'	11111111111111111111111111111111111111	17" RECOVERY	<u> </u>	
-	 	8	14.0'	13 13 13 14		Saturated medium dense orange clayey fine sandy fine gravel w/some coarse sand and silt.	A-2-4(0)	

Remarks:

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: R2-041A

- ·								
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
			16.0'			7" RECOVERY		
		9	16.0'	9 8 9 11		Saturated very stiff orange fine sandy clay w/some coarse sand.	A-7-6(2)	
				11				
17.5								
		10	18.0' 18.0'	8	////	10" RECOVERY	A 2 7(2)	M 1
		10	10.0	8 3 7 7		Saturated loose brown clayey fine sand w/some coarse sand, trace of fine gravel and silt.	A-2-7(2)	Mud Rotary @
				/		graver and sha		18.0'.
20			20.0'			12" RECOVERY		
22.5								
22.5								
		11	23.0'	5 5		Saturated medium dense brown clayey fine sand w/trace of coarse sand	A-2-6(1)	
				5 5 6 8		and silt.		
25			25.0'			20" RECOVERY		
						FOR BUDING		
		V						
27.5								
		12	28.0"	5			1.2.4(0)	
		12	20.0	5 6 6 7		Saturated medium dense green silty fine sand w/trace of coarse sand and organic matter.	A-2-4(0)	
				/				
			00.01			ATH DESCRIPTIVE		
30	1		30.0'			17" RECOVERY		
32.5								
02.0	1							
		13	33.0'	4 4 9 8		Saturated medium dense green fine to coarse sand w/some silt, trace of	A-2-4(0)	
				8		organic matter.		
35			35.0'			22" RECOVERY		
37.5								
-		14	38.0'	3		Saturated madium dance green silts fine to assure and authors of fine	A 2 4(0)	
		Ĺ ^{'→}	30.0	3 3		Saturated medium dense green silty fine to coarse sand w/trace of fine	A-2-4(0)	

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: R2-041A

	act: 25-11					_	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			,	9 13	gravel and organic matter.		
40	-		40.0'		21" RECOVERY		
	_						
	1						
42.5	_						
	-	15	43.0'	44 50/3"	Saturated very dense green fine gravelly fine to coarse sand w/some silt,	A-2-4(0)	
	-			50/3"	Saturated very dense green fine gravelly fine to coarse sand w/some silt, trace of organic matter and shell fragments.	112 1(0)	
45			45.0'		8" RECOVERY		
	-						
	_						
	-				DRAFT		
47.5]						
	-	16	48.0'	10		1 2 4(0)	
		16	46.0	10 10 30 42	Saturated dense gray silty fine to coarse sand w/trace of fine gravel and organic matter.	A-2-4(0)	
	1	M		42			
50	1 •		50.0'	•	24" RECOVERY		
					End of Boring		
	-				JGUST 2015		
	-			76	JOOSI ZUIS		
52.5	-						
02.0]						
	-						
55	-						
33	1						
	-						
	-						
57.5	1						
	_						
-	-						
60	-						
	1						
]						
1	1	I	1				1

Symbol Description

Strata symbols

Clayey sand



Silty sand



Poorly graded sand



Poorly graded sand with silt



Poorly graded clayey silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 11/10/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 45 ATV.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: R2-42

Contract: 25-113-01

Boring Location: Sta. 19+00 12 L.T. C.L.

Boring Surface Elev.: + 64.25 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0 30.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 1/11/10 9.0 10.0 8.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 25.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Jason Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	1/11/10	1	0.5'	8 10 7		Moist medium dense brown clayey fine sandy silt w/some coarse sand, trace of fine gravel.	A-4(1)	Topsoil - 8".
			2.0'		עעו	6" RECOVERY		
2.5		2	4.0'	9 8 13		Moist medium dense brown silty coarse to fine sand w/some fine gravel. 16" RECOVERY	A-2-4(0)	
5		3	4.0' 6.0'	7 10 10 10		Moist medium dense tan silty coarse to fine sand w/some clay, trace of fine gravel. 17" RECOVERY	A-2-4(0)	
7.5		4	6.0' 8.0'	12 8 8 10		Moist medium dense tan coarse sand w/some fine sand and silt, trace of fine gravel. 21" RECOVERY	A-1-b	
40		5	8.0'	4 4 5 6		Wet loose orange coarse to fine sand w/some silt, trace of fine gravel. 15" RECOVERY	A-1-b	
10		6	10.0'	11 8 8 11		Wet medium dense orange coarse sandy fine gravel w/some fine sand, trace of silt.	A-1-b	
			12.0'	_	1961 # 116 F	10" RECOVERY		
12.5		7	12.0'	6 8 9 12		Wet medium dense orange fine gravelly coarse sand w/some fine sand, trace of silt.	A-1-b	
			14.0'			15" RECOVERY		
		8	14.0'	3 5		Wet loose orange fine gravelly coarse sand w/some fine sand, trace of silt.	A-1-b	

Remarks:

Reviewed By: Hany Fekry Soils Supervisor: Randy Ferguson

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: R2-42

Contra	act: 25-11	3-01					
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15				5 5	REMERIKK REMERIKK REMERIKK REMERIKK		
					EEETELEE EEELEELE SEEREELE		
		9	16.0' 16.0'	3	6" RECOVERY	A 1 L	
			10.0	3 5 6 5	Wet medium dense orange coarse to fine sand w/trace of fine gravel and silt.	A-1-b	
47.5				3	ref 1986 charles chiviet		
17.5			18.0'		前龍 記述 10" RECOVERY		
		10	18.0'	2 2 5 7	Wet loose orange coarse sand w/some fine gravel and fine sand, trace of	A-1-b	
				5 7	#### silt.		
					51 () 151 16 () 16 () 16 () 16 ()		
20			20.0'		10" RECOVERY		
					\$14.65. \$1.16.65 \$1.10.65		
					647784 614185 614786		
					61) 386. FIA 1061 161 / 1780		
22.5							
			0.4.01	F	(ELIVEC) (ELIVEC)		
	N	11	24.0'	5 12 15 12	Wet medium dense orange coarse sand w/some fine gravel and fine sand, trace of silt.	A-1-b	
25	l l	M		12	F (")		
			20.01				
			26.0'		12" RECOVERY		
				Λ			
27.5			<i>-</i>	AU	IGUS1 2015		
		12	28.0'	10 11 11	Wet medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
				14	gravel.		
					(\$) 19:00 \$14.465 \$14.464		
30			30.0'		19" RECOVERY End of Boring		
					- <i>G</i>		
32.5							
35							
37.5							
1	l	I	1			1	1

Symbol Description

Strata symbols



Silty low plasticity clay



Silty sand



Poorly graded clayey silty sand



Poorly graded sand with silt



Well graded sand with silt



Well graded sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 1/11/2010 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 Track.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: R2-43

Contract: 25-113-01

Boring Location: Sta. 22+00 12 R.T. C.L.

Boring Surface Elev.: + 65.40 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0 20.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 1/11/10 10.0 10.1 12.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 20.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Jason Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	1/11/10	1	1.0' 2.0'	4 4		Wet stiff brown fine sandy silt w/some clay, trace of coarse sand. 7" RECOVERY	A-4(0)	Cultivated Soil -
2.5	<u> </u>	2	2.0'	3 7 8		Wet stiff brown fine sandy silt w/some coarse sand and clay, trace of fine gravel.	A-4(0)	\10".
			4.0'	7		13" RECOVERY		
		3	4.0'	3 4 6		Wet loose brown silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
5			6.0'	8		GUST13" RECOVERY 15		
<u> </u>	·	4	6.0	8 8 8 12		No Sample Recovery		
7.5	'			12				
<u> </u>	. '	<u> </u>	8.0'	<u> </u>		0" RECOVERY	<u> </u>	ļ
		5	8.0'	5 6 6 5		Wet medium dense brown coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
10	'		10.0'		6614366 6614366	17" RECOVERY		
		6	10.0'	4 6 4 5		Wet loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
	'	Í	12.0'	!		16" RECOVERY	ĺ'	
12.5		7	12.0'	4 6 5 7		Wet medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
	'		14.0'	'		16" RECOVERY		
		8	14.0'	3 3 3 5	126 13 12 15 126 13 12 15 126 13 13 15 15 126 13 13 15 15 126 13 13 15 15	Wet loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	

Remarks:

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: R2-43

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	-				611467 611766		
		9	16.0' 16.0'	5	19" RECOVERY Wet medium dense brown coarse to fine sand w/trace of silt and fine	A 1 h	
		"	10.0	5 6 8 10	Wet medium dense brown coarse to fine sand w/trace of silt and fine gravel.	A-1-b	
17.5					CHARLES CONTROL CONTRO		
17.0			18.0'		EFFECIE EFFECIE EFFECIE EFFECIE EFFECIE TOWNS TOWNS TO THE PROOF TO TH		
		10	18.0'	1 5 10	Wet medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
				9	graver.		
20			20.0'		2" RECOVERY		
20					End of Boring		
22.5							
					DDATT		
					DRAFT		
25							
		M			FOR BIDDING		
		1					
27.5				Λ	JGUST 2015		
				70			
30							
32.5							
35							
37.5							

Symbol Description

Strata symbols



Silty low plasticity clay



Poorly graded clayey silty sand



Silty sand



Poorly graded sand with silt



Well graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 1/11/2010 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 Track.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: SS2-1-01

Contract: 25-113-01

Boring Location: Sta. 315+50 75 L.T. C.L.

Boring Surface Elev.: + 52.14 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 O.D.

IN. IN. Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0 31.0

Water Level Readings

Depth of Water Time **Depth of Casing** Elev. of Water Depth of Hole Date 12/11/09 12 14 11.7

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Dia. U-Sample Boring: U-Samples: 31.0 Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/11/09	1	1.0'	3 3	Moist firm brown silty clay w/some fine sand, trace of coarse sand.	A-6(6)	Topsoil - 10".
		2	2.0' 2.0'	3	12" RECOVERY		'
2.43			2.0	3 17 28 21	Moist dense brown fine to coarse sandy fine gravel w/some silt.	A-1-b	
			4.0'		FOR BOOKERY DICE		
		3	4.0'	5 10 11 12	Moist medium dense brown coarse sand w/some fine sand and silt, trace	A-1-b	
4.86			6.0'	AL	of fine gravel. G S T T RECOVERY 17" RECOVERY		
		4	6.0	3 8 9 7	Moist medium dense brown fine to coarse sand w/some silt, trace of fine	A-2-4(0)	
				7	gravel.		
7.29							
			8.0'		19" RECOVERY		
		5	8.0'	4 4 4 4	Wet loose brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
9.72							
		6	10.0' 10.0'	4	18" RECOVERY Saturated loose brown fine sand w/some coarse sand and silt, trace of fine	A 2 4(0)	
		U	10.0	4 6 4 3	gravel.	A-2-4(0)	
12.45			12.0'		22" RECOVERY		
12.15		7	12.0'	1 3 20 24	Saturated medium dense brown coarse to fine sand w/trace of silt and fine gravel.	A-1-b	
			14.0'		10" RECOVERY		
14.58		8	14.0'	4 10	Saturated medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	

Remarks:

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: SS2-1-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
				10 14			
		9	16.0' 16.0'	9	18" RECOVERY Saturated dense brown fine to coarse sand w/some silt.	A-2-4(0)	
17.01				9 12 23 24			
	1	10	18.0' 18.0'	8	10" RECOVERY	1 2 4(0)	
		10	16.0	8 13 13 15	Saturated medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
19.44				15			
13.44			20.0'		19" RECOVERY		
21.87							
21.01							
					DRAFT		
04.0	_		04.01		170.60		
24.3		11	24.0'	6	Saturated medium dense brown fine to coarse sand w/trace of silt.	A-3	
		N		19			
			26.0'		10" RECOVERY		
				\			
26.73			ļ ļ	$\Delta \Box$	GUST 2015		
					1923 1183 1836		
29.16		12	29.0'	4 8 11 11	Saturated medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
				11 11			
			31.0'		End of Boring		
31.59					Lite of Bornig		
34.02							
36.45							
1	I	l	I			1	1

Symbol Description

Strata symbols

Low plasticity clay



Silty sand



Well graded sand with silt



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 12/11/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 ATV.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to SR-1 Boring No.: SS2-1-02

Contract: 25-113-01

Boring Location: Sta. 310+00 80' Lt. C.L.

Boring Surface Elev.: + 52.2 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 9/29/10 17.0 20.0 18.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 30.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/29/10	1	0.5'	6 12 12	Moist very stiff brown clayey fine sandy silt w/some coarse sand, trace fine gravel.	A-4(1)	Topsoil - 7".
2.5		2	2.0' 2.0' 4.0'	12 12 14 22	8" RECOVERY Moist medium dense brown fine to coarse sand w/some silt, trace fine gravel. 15" RECOVERY	A-2-4(0)	IG
5		3	4.0' 6.0'	8 14 15 21	Moist medium dense brown coarse to fine sand w/some silt, trace fine gravel. 17" RECOVERY	A-2-4(0)	
7.5		4	6.0' 8.0'	22 17 15 16	Moist dense brown coarse sand w/some fine sand and fine gravel, trace silt.	A-1-b	
		5	8.0'	8 9 10 10	Moist medium dense orange coarse to fine sand w/trace silt and fine gravel.	A-3	
10		6	10.0'	10 9	20" RECOVERY Moist medium dense orange coarse to fine sand w/some silt, trace fine gravel. 12" RECOVERY	A-1-b	
		6A	11.0' 12.0'	8 9	Saturated medium dense brown silty fine to coarse sand w/trace fine gravel. 8" RECOVERY	A-2-4(0)	
12.5		7	12.0'	6 8 8 13	Saturated medium dense brownish green silty coarse to fine sand.	A-2-4(0)	
		8	14.0' 14.0'	5 9	20" RECOVERY Saturated medium dense brownish green fine	A-2-4(0)	

Remarks:

F.A. Project: U.S. 301 Maryland State Line to SR-1 **Contract:** 25-113-01

Boring No.: SS2-1-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15			·	9 12	to coarse sand w/some silt.		
		9	16.0' 16.0'	10	18" RECOVERY	1.2.4(0)	
	-	9	16.0	10 12 11 13	Saturated medium dense brownish green fine to coarse sand w/some silt, trace fine gravel.	A-2-4(0)	
47.5				13			
17.5			18.0'		20" RECOVERY		
		10	18.0'	7 11 13 16	Saturated medium dense brownish green silty	A-2-4(0)	
				13 16	fine to coarse sand.		
20			20.0'		21" RECOVERY		
	1						
22.5							
		11	00.01	7		1.2.4(0)	
		11	23.0'	7 11 12 12	Saturated medium dense brownish green silty fine to coarse sand w/trace fine gravel.	A-2-4(0)	
	_	_		12	The to course said with the graven		
25			25.0'	T	21" RECOVERY		
25	i '	V	20.0				NG
	_			_			
			_				
					 	115	
27.5				1	1001 20		
	-	12	28.0'	5	Saturated medium dense brownish green silty	A-2-4(0)	
	-			5 9 10 13	fine to coarse sand.		
30			30.0'		20" RECOVERY		
					End of Boring		
32.5	1						
02.0]						
	-						
-							
35	1						
	1						
]						
37.5]						
1							

Symbol Description

Strata symbols



Silty low plasticity clay



Silty sand



Well graded sand with silt



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on September 29, 2010 using 3 1/4-inch diameter continuous flight power auger. Rig is a Truck Mounted CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: SS2-2-01

Contract: 25-113-01

Boring Location: Sta. 389+00 75 R.T. C.L.

Boring Surface Elev.: + 64.63 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

To: To: **Casing Size:** 3 1/4 Inches From Depth of: Hollow Stem Auger: From Depth of: 0.0 10.0

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 12/8/10 10.0 8.0 6.8

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Dia. U-Sample Boring: U-Samples: 30.0 Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Lafferty

					ı			
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	12/8/09	1	0.5'	2 4 4		Moist firm brown clayey fine to coarse sandy silt w/trace of fine gravel.	A-4(0)	Topsoil - 7".
			2.0'			13" RECOVERY		
2.43		2	2.0'	5 5 5 6		Moist loose orangish tan clayey fine to coarse sand w/trace of fine gravel and silt.	A-2-4(0)	
			4.0'			20" RECOVERY		
4.86		3	4.0' 6.0'	6 4 4 4		Wet loose brown coarse sand w/some fine sand and silt, trace of fine gravel. 21" RECOVERY	A-1-b	
		4	6.0'	3		Saturated loose brown coarse sand w/some fine sand and silt, trace of fine	A-1-b	
7.29			8.0'	3 4 4 4		gravel. 19" RECOVERY	71 1 0	
		5	8.0'	2 2 2	10 17 11 11 12 17 12 12 12 13 12 16 17 13 13 14 16	Saturated very loose orange coarse sand w/some fine sand, trace of silt	A-1-b	
9.72			10.0'	1	100 100 100 100 100 100 100 100 100 100	and fine gravel. 17" RECOVERY		
		6	10.0'	2 3 3 4		Saturated loose orange coarse sand w/some fine sand, trace of silt and fine gravel.	A-1-b	Mud Rotary @ 10.0'.
12.15			12.0'		1:1:1:1:1:1:1: 1:1:1:1:1:1:1:1: 1:	23" RECOVERY		
12.15		7	12.0'	2 3 3 4		Saturated loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
			14.0'			17" RECOVERY		

Remarks:

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: SS2-2-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.58		8	14.0'	4 5 5 5	Saturated loose brown coarse sand w/some fine sand and fine gravel, trace of silt.	A-1-b	
	-		16.0'		19" RECOVERY		
17.01		9	16.0'	4 5 6 8	Saturated medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			18.0'		22" RECOVERY		
	-	10	18.0'	4 6 7 7	Saturated medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
19.44			20.0'		######################################		
					5 1 1 1 1 1 1 1 1 1		
21.87	-				DRAFT		
24.3		11	24.0'	6 7 8 14	Saturated medium dense brown coarse to fine sand w/some fine gravel, trace of silt.	A-1-b	
26.73			26.0'	41	GUST ^{16'} RECOVERY 15		
	-						
29.16		12	29.0'	10	Saturated medium dense orangish green silty fine sand w/some coarse	A-2-4(0)	
	-			10 11 10 9	sand, trace of fine gravel.	112 1(0)	
	-		31.0'		19" RECOVERY		
31.59					End of Boring		
	-						
	-						
34.02	_						
	=						
36.45	-						
00.40	1						

Symbol Description

Strata symbols

Clayey sand



Poorly graded clayey silty sand



Silty sand



Poorly graded sand with silt



Well graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 12/08/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 ATV.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to SR-1 Boring No.: SS2-2-02

Contract: 25-113-01

Boring Location: STA. 397+00 78' Rt. C.L.

Boring Surface Elev.: + 60.7 Reference:

IN. IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches **Hollow Stem Auger:** 0.0

Water Level Readings

Time **Depth of Casing Depth of Water** Depth of Hole Elev. of Water Date 10/6/10 12.0 12.0 8.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 30.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers: T. Kane

		ī						<u> </u>
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
(11.)	10/6/10	1	0.5'	4	CKGKLKK		1 (0)	T
	10/6/10	'	0.5	4 4 4		Moist firm gray coarse sandy silt w/some fine	A-4(0)	Topsoil - 6".
				4		sand, trace clay and fine gravel.		
			2.0'			12" RECOVERY		
		2	2.0'	4	WWW.	Moist loose gray clayey coarse to fine sand w/	A-2-4(0)	
2.5				4 5 5 5		some silt, trace fine gravel.	A-2-4(0)	
				5		some sin, trace time graver.	111/	
		\sim						
	•		4.0'	•		22" DECOVERY		
		3	4.0' 4.0'	2		22" RECOVERY	A 2 4(0)	
			7.0	2 2 2 2		Wet very loose gray coarse to fine sand w/	A-2-4(0)	
5				2		some silt, trace fine gravel.	15	
			2.01	1				
		4	6.0' 6.0'	3		13" RECOVERY	A 2 4(0)	
		+	0.0	3 2 3 2		Saturated loose brown coarse to fine sand w/	A-2-4(0)	
				2		some silt.		
7.5								
7.5			0.01			2011 DE GOVERNA		
		5	8.0' 8.0'	1		20" RECOVERY	4.0.4(0)	
)	0.0	1 1 2 2		Saturated very loose brown coarse to fine	A-2-4(0)	
				2		sand w/some silt, trace fine gravel.		
10			10.0'	2	ЩЩ	17" RECOVERY		
		6	10.0'	2 3 4 5		Saturated loose brown coarse to fine sand w/	A-1-b	
1				5		some silt.		
			12.0'		11614116 111111	18" RECOVERY		
12.5		7	12.0'	1 1	1:1:1:1:1:1: 1:1:1:1:1:1:		A-1-b	
				4 4	1:1:1:1:1:1: 1:1:1:1:1:1:1: 1:1:1:1:1:1	sand w/some fine sand, trace silt.		
-)			
			14.0'			14 KECOVEK I		
1		8	14.0'	3		Saturated loose brown fine to coarse sand w/	A-2-4(0)	

Remarks:

F.A. Project: U.S. 301 Maryland State Line to SR-1 **Contract:** 25-113-01

Boring No.: SS2-2-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
15				2 4	some silt, trace fine gravel.	
	1					
			16.0'		15" RECOVERY	
		9	16.0'	3 3 3 7	Saturated loose brown coarse to fine sand w/ A-2-4(0)	
	-			7	some silt, trace fine gravel.	
17.5						
	-	10	18.0' 18.0'	4	19" RECOVERY Saturated loose brown coarse sand w/some A-1-b	
			10.0	4 4 6 6	Saturated loose brown coarse sand w/some A-1-b fine sand, fine gravel and silt.	
	-				Hatter Hatter Hatter	
20	-		20.0'		4" RECOVERY	
20	1		20.0		11300 11300 11300	
					12.7.65 (1).01, 1).10, 14.10,	
					173700 14166 14160	
	_				13 acc) 13 acc) 14 acc) 17 acc)	
22.5	-				10000	
	-	11	23.0'	6	Saturated medium dense brown fine gravelly coarse sand w/some fine sand, trace silt.	
		''	20.0	6 6 8 20	coarse sand w/some fine sand, trace silt.	
				20	13 (13 (13 (13 (13 (13 (13 (13 (13 (13 (
25			25.0'		HEITE TO THE PARTY OF THE PARTY	
20	1 '	11	20.0		6" RECOVERY	NG
	_			_	13 (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	
					CERTER CONTROL OF THE CERTER CONTROL OF THE	
27.5	-			1		
	_	12	28.0'	6 8	Saturated medium dense brown fine gravelly A-1-b	
	_			8 11 25	Saturated medium dense brown fine gravelly coarse sand w/some fine sand, trace silt. 10" RECOVERY	
	-					
30			30.0'		10" RECOVERY	
					End of Boring	
32.5	-					
	-					
	-					
	1					
35	1					
]					
<u> </u>						
37.5	-					
<u> </u>]					

Symbol Description

Strata symbols



Poorly graded clayey silty sand



Clayey sand



Silty sand



Poorly graded sand with silt



Well graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on October 6, 2010 using 3 1/4-inch diameter continuous flight power auger. Rig is a Truck Mounted CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: SS2-3-01

Contract: 25-113-01

Boring Location: Sta. 446+00, 75' Rt.

Boring Surface Elev.: + 67.11 Reference:

IN. IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split-Barrel O.D. 2 IN. IN. O.D.

O.D. Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4" **Casing Size:** Inches **Hollow Stem Auger:** 0.0

Water Level Readings

Time **Depth of Casing** Depth of Water Depth of Hole Elev. of Water Date 4/7/2010 8.0 6.0 4.2

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 45.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: Jason Truver

				1		1	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	4/7/10	1	0.5'	1 1 4	Wet soft brownish gray clayey fine sandy silt w/some coarse sand, trace of fine gravel.	A-4(2)	Topsoil - 6".
			2.0'		12" RECOVERY		
2.43		2	2.0'	3 6 8 9	Saturated medium dense brownish gray clayey fine sand w/some coarse sand, trace of silt and fine gravel.	A-2-4(0)	
			4.0'	-	24" RECOVERY		
4.86		3	4.0'	5 6 7 6	Saturated medium dense brownish gray clayey fine sand w/some coarse sand, trace of silt and fine gravel.	A-2-4(0)	
		4	6.0' 6.0'	4	20" RECOVERY Saturated medium dense brownish gray silty fine to coarse sand.	A-2-4(0)	
7.29		7	8.0'	4 7 6	24" RECOVERY	A-2-4(0)	
9.72		5	8.0'	3 3 4 4	Saturated loose brownish gray fine to coarse sand w/some silt.	A-2-4(0)	
		6	10.0' 10.0'	2	22" RECOVERY	1 2 4(0)	
		0		2 3 5 5	Saturated loose brown fine to coarse sand w/some silt.	A-2-4(0)	
12.15		7	12.0' 12.0'	1	24" RECOVERY	A 2 4(0)	
		,	14.0'	1 2 2 4	Saturated very loose dark brown fine to coarse sand w/some silt. 24" RECOVERY	A-2-4(0)	

Remarks:

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: SS2-3-01

Depth	Daily	No.	Sample	Blows/6"	Sample Description	Class./G.I.	Remarks
(ft.)	Progress	8	Depth 14.0'	1 1	Saturated loose dark brown silty coarse to fine sand.	A-2-4(0)	
14.58				2 7 11			
			16.0'	7	19" RECOVERY		
		9	16.0'	7 13 9 11	Saturated medium dense brown fine gravelly fine sand w/some coarse sand, trace of silt.	A-3	
17.01				11	ilijus siviali Hijasi		
			40.01		(IARE) (IARE) (IARE) (IARE) (IARE)		
		10	18.0' 18.0'	8 10	13" RECOVERY Saturated medium dense brown coarse to fine sandy fine gravel w/trace of	A-1-b	
				8 10 20 28	silt.		
19.44					Niviber 11 June 11 June		
			20.0'		6" RECOVERY		
					(1) Steff ti Albert ti Albert ti Victor		
					# 1705 # 1705		
21.87							
					DRAFT		
					11 Meta 11 April - 11 April - 11 April -		
	N						
24.3	1	11	24.0'	6 7 8	Saturated medium dense brown clayey fine to coarse sand w/trace of silt and fine gravel.	A-2-6(0)	
	•			11	and thic graver.		
			26.0'		GUS 722" RECOVERY 15		
26.73				70	JUSI ZUIJ		
		12	28.0'	5 8 9 11	Saturated very stiff brown fine sandy clay w/some coarse sand, trace of	A-7-6(3)	
29.16				11	silt.		
			30.0'		24" RECOVERY		
31.59							
31.59	1						
34.02		13	34.0'	7	Saturated hard brown fine sandy clay w/some coarse sand, trace of silt.	A-7-6(3)	
			3	7 14 17 19	Saturated hard brown time sainty clay w/some coarse saint, trace of silt.	A-7-0(3)	
				'`			
			36.0'		19" RECOVERY		
36.45			30.0				

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: SS2-3-01

Contra	act: 25-11	3-01					
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	-	14	38.0'	2	Saturated medium dense dark gray silty fine sand w/some coarse sand,	A-2-4(0)	
38.88				2 5 9 13	trace of organic matter.	A-2-4(0)	
			40.0'		22" RECOVERY		
41.31							
		15	43.0'	8 10	Saturated medium dense dark gray fine sand w/some silt, trace of coarse	A-2-4(0)	
43.74				8 10 16 16	sand and organic matter.		
			45.0'		24" RECOVERY End of Boring		
40.47							
46.17		١.					
					FOR BIDDING		
		V					
48.6							
				Λ	JGUST 2015		
				7	JGUSI ZUIS		
51.03							
53.46							
55.89							
58.32							
30.02							
1	I	I	1				Ì

Symbol Description

Strata symbols

Low plasticity clay



Poorly graded clayey silty sand



Silty sand



Poorly graded sand with silt



Clayey sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 4/07/2010 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 ATV.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to SR-1 Boring No.: SS2-3-02

Contract: 25-113-01

Boring Location: STA. 453+50 78' Rt. C.L.

Boring Surface Elev.: + 69.5 Reference:

Wt. of Casing Hammer: Average Fall: IN. Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D. **Casing Size:**

From Depth of: From Depth of: To: To: 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Depth of Casing Time **Depth of Hole** Elev. of Water Date 10/6/10 12.0 12.0 11.6

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 30.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
	10/6/10	1	0.5' 2.0'	2 2 3	Moist soft brown clayey fine sandy silt w/ A-4(0) Topsoil some coarse sand, trace fine gravel. 14" RECOVERY	7".
2.5		2	2.0'	4 7 10 11	Moist medium dense tan silty coarse to fine A-2-4(0) sand w/trace fine gravel.	j
5		3	4.0'	12 12 10 11	Moist medium dense tan silty coarse to fine sand w/trace fine gravel. 20" RECOVERY	
7.5		4	6.0' 8.0'	10 9 7 9	Moist medium dense tan silty fine sand w/ A-2-4(0) some coarse sand, trace fine gravel.	
		5	8.0'	3 3 4 4	Saturated loose tan fine to coarse sand w/ A-2-4(0) some silt, trace fine gravel.	
10		6	10.0' 10.0'	3 4 3 3	17" RECOVERY Saturated loose tan fine to coarse sand w/ some silt, trace fine gravel. 10" RECOVERY	
12.5		7	12.0'	2 2 2 2 3	Saturated very loose tan coarse to fine sand w/some silt. 18" RECOVERY	
		8	14.0' 14.0'	1 1	Saturated very loose tan coarse to fine sand A-1-b	

Remarks:

F.A. Project: U.S. 301 Maryland State Line to SR-1 **Contract:** 25-113-01

Boring No.: SS2-3-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15	1.091000		Борит	2 4	w/some silt, trace fine gravel.		
10							
			16.0'		6" RECOVERY		
		9	16.0'	1 4 6 12	Saturated loose brown coarse sand w/some fine sand and fine gravel, trace silt.	A-1-b	
				12	The sand and thie graver, trace sitt.		
17.5			40.01		DELECTION REMODER REMODER		
		10	18.0' 18.0'	7	8" RECOVERY Saturated medium dense brown coarse sandy	A-1-a	
				7 13 15 13	fine gravel w/some fine sand and silt.		
					idialieri Filiaderi Filiaderi		
20			20.0'		6" RECOVERY		
					(60 9 9 0 0 6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
					ETTTER ETTTER ETTTER		
					net space Post types Set Dated		
22.5					RITARIA PARA PARA PARA PARA PARA PARA PARA		
22.5							
		11	23.0'	8 6 11 12	Saturated medium dense brownish green silty	A-2-4(0)	
				11 12	fine to coarse sand.		
	R						
25		Н	25.0'		14" RECOVERY		J(-j
		'					
					PHOT ON	15	
27.5					 		
			20.01				
		12	28.0'	5 6 9 11	Saturated medium dense brownish green silty fine sandy clay w/some coarse sand, trace fine	A-6(1)	
				11	gravel.		
20			30.0'		18" RECOVERY		
30			30.0		End of Boring		
32.5							
35							
<u></u>							
37.5							
	ı	i	1	1	1		

Symbol Description

Strata symbols



Poorly graded clayey silty sand



Silty sand



Well graded sand with silt



Poorly graded sand with silt



Clayey sand

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on October 6, 2010 using 3 1/4-inch diameter continuous flight power auger. Rig is a Truck Mounted CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 Boring No.: SS2-4-01

Contract: 25-113-01

Boring Location: Sta. 484+00 75 L.T. C.L.

Boring Surface Elev.: + 57.36 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split-Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0 10.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 12/8/09 4.0 4.0 2.6

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 30.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Lafferty

	•						
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/8/09	1	0.5'	3 2 4	Saturated firm grayish black organic clay w/some coarse to fine sand and fine gravel, trace of silt.	A-6(3)	Topsoil - 4".
			2.0'		18" RECOVERY		
2.43		2	2.0'	2 3 4 4	Saturated loose grayish black coarse sand w/some fine gravel, coarse sand, organic matter and clay, trace of silt.	A-2-4(0)	
		3	4.0' 4.0'	8	19" RECOVERY	A 1 1-	
4.86		3	-	8 2 3 3	Saturated loose grayish black coarse to fine sandy fine gravel w/trace of silt and organic matter.	A-1-b	
			6.0'		8" RECOVERY	<u> </u>	
7.29		4	6.0'	9 9 10 10	Saturated medium dense gray fine gravelly coarse to fine sand w/trace of silt.	A-1-b	
-			8.0'		18" RECOVERY		
9.72		5	8.0'	5 7 12 13	Saturated medium dense green clayey fine sand w/trace of coarse sand, silt and fine gravel.	A-2-4(0)	
			10.0'	6	20" RECOVERY	1 2 4(0)	
		6	10.0'	6 12 14 19	Saturated medium dense green silty fine sand w/some coarse sand.	A-2-4(0)	Mud Rotary @ 10.0'.
12.15			12.0'		22" RECOVERY	<u></u>	
.2.13		7	12.0'	4 6 12 16	Saturated medium dense green silty fine sand w/some coarse sand, trace of fine gravel.	A-2-4(0)	
			14.0'		19" RECOVERY		

Remarks:

F.A. Project: U.S. 301, Maryland State Line to S.R. 1 **Contract:** 25-113-01

Boring No.: SS2-4-01

	act: 25-11	3-01					
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.58		8	14.0'	8 13 14 17	Saturated medium dense green silty fine sand w/trace of coarse sand.	A-2-4(0)	
			16.0'		17" RECOVERY		
17.01		9	16.0'	8 13 15 11	Saturated medium dense green fine sand w/some silt, trace of coarse sand and fine gravel.	A-2-4(0)	
			18.0'		20" RECOVERY		
		10	18.0'	3 8 9 9	Saturated medium dense green fine sand w/some silt and coarse sand, trace of fine gravel.	A-2-4(0)	
19.44			20.0'		16" RECOVERY		
21.87					DRAFT		
24.3		11	24.0'	7 11 11 17	Saturated medium dense green fine to coarse sand w/some silt, trace of fine gravel and organic matter.	A-2-4(0)	
			26.0'	\	GUST ¹⁹ RECOVERY 015		
26.73			<i></i>	70	JUSI 2015		
29.16		12	29.0'	8 12 12 13	Saturated medium dense green fine to coarse sand w/some silt, trace of fine gravel and organic matter.	A-2-4(0)	
			31.0'		20" RECOVERY End of Boring		
31.59					Life of Boring		
34.02							
36.45							

Symbol Description

Strata symbols

Clayey sand



Silty sand



Poorly graded sand with silt



Well graded sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 12/8/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a CME 55 ATV.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to SR-1 Boring No.: SS2-5-01

Contract: 25-113-01

Boring Location: STA. 301+00 18' Lt. C.L.

Boring Surface Elev.: + 49.5 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Depth of Casing Time **Depth of Hole** Elev. of Water Date 9/28/10 10.0 12.0 12.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 30.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers: T. Kane

D #	- B 11	1			1			<u> </u>
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
()	9/28/10	1	0.5'	6 10 9		Moist very stiff brown clayey fine sandy silt w/some coarse sand, trace fine gravel.	A-4(1)	Topsoil - 6".
			2.0'			16" RECOVERY		
2.5	l	2	2.0' 4.0'	8 10 16 12		Moist medium dense brown silty fine sand w/some coarse sand, trace fine gravel. 18" RECOVERY	A-2-4(0)	G
		3	4.0'	8 6		Moist medium dense brownish green silty fine	A-2-4(0)	
5			6.0'			to coarse sand. 17" RECOVERY	15	
		4	6.0'	6 6 9 22		Moist medium dense brownish green fine to coarse sand w/some silt, trace fine gravel.	A-2-4(0)	
7.5			8.0'			18" RECOVERY		
		5	8.0'	8 13 16 14		Saturated medium dense brownish green fine to coarse sand w/some silt, trace fine gravel.	A-2-4(0)	
10			10.0'			18" RECOVERY		
		6	10.0'	4 19 22 23		Saturated dense brownish green fine to coarse sand w/some silt, trace fine gravel.	A-2-4(0)	
			12.0'			19" RECOVERY		
12.5		7	12.0'	11 13 18 21	11.0 1 2 3 1 0 1 12.0 4 3 1 3 1 0 0 12.0 3 3 3 1 0 0 12.0 3 3 3 1 0 0 12.0 3 3 3 3 1 0 0 12.0 3 3 3 3 1 0 0 12.0 3 3 3 3 1 0 0 12.0 3 3 3 3 1 0 0 12.0 3 3 3 3 1 0 0 12.0 3 3 3 3 1 0 0 12.0 3 3 3 3 1 0 0 12.0 3 3 3 3 1 0 0 12.0 3 3 3 3 3 1 0 0 12.0 3 3 3 3 3 1 0 0 12.0 3 3 3 3 3 1 0 0 12.0 3 3 3 3 3 1 0 0 12.0 3 3 3 3 3 1 0 0 12.0 3 3 3 3 3 1 0 0 12.0 3 3 3 3 3 3 1 0 0 12.0 3 3 3 3 3 3 1 0 0 12.0 3 3 3 3 3 3 1 0 0 12.0 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	Saturated dense brownish green fine to coarse sand w/some silt, trace fine gravel.	A-2-4(0)	
			14.0'			21" RECOVERY		
1		8	14.0'	9 19		Saturated dense brownish green fine to coarse	A-2-4(0)	

Remarks:

F.A. Project: U.S. 301 Maryland State Line to SR-1 **Contract:** 25-113-01

Boring No.: SS2-5-01

Depth	Daily		Sample	<u> </u>		Ī
(ft.)	Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
15				20 32	sand w/some silt, trace fine gravel.	
		9	16.0' 16.0'	18	17" RECOVERY Saturated dense brownish green fine to coarse A-2-4(0)	
				18 24 26 39	sand w/some silt, trace fine gravel.	
17.5						
17.0			18.0'		14" RECOVERY	
		10	18.0'	7 14 15 14	Saturated medium dense brownish green silty A-2-4(0)	
				14	fine to coarse sand.	
20			20.0'		17" RECOVERY	
22.5						
			00.01	0	No Comple Plantage	
		11	23.0'	8 8 12 12	No Sample Recovery	
	_	_		12		
0.5			25.0'	т.	0" RECOVERY	
25		M	25.0		V RECOVERY	J G
	•					
					11151 2015	
27.5				1	DUOI ZUIJ	
		12	28.0'	12	Saturated dense brownish green fine to coarse A-3	
				12 16 23 27	sand w/trace silt and fine gravel.	
					### 1 4 5 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	
30			30.0'		17" RECOVERY	
					End of Boring	
32.5						
35						
37.5						
37.3						

Symbol Description

Strata symbols

Poorly graded clayey silty sand



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on September 28, 2010 using 3 1/4-inch diameter continuous flight power auger. Rig is a Truck Mounted CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to SR-1 Boring No.: SS2-5-02

Contract: 25-113-01

Boring Location: STA. 301+00 72' Lt. C.L.

Boring Surface Elev.: + 53.1 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Casing Time **Depth of Hole Depth of Water** Elev. of Water Date 9/28/10 14.3 18.0 18.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 30.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers: T. Kane

Danilla	D-II.		0			
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
	9/28/10	1	0.0'	2 4 8 10	Moist medium dense brown fine to coarse sand w/some silt. A-2-4(0)	Topsoil - 3".
		2	2.0' 2.0'	10	12" RECOVERY Moist medium dense orange fine to coarse A-2-4(0)	
2.5			2.0	10 10 12 15	sand w/some silt, trace fine gravel.	IG
			4.0'		15" RECOVERY	
5		3	4.0'	5 6 6 5	Moist medium dense orange fine sand w/some A-2-4(0) silt and coarse sand, trace fine gravel.	
			6.0'		18" RECOVERY	
		4	6.0'	5 6 6 7	Moist medium dense orange fine to coarse sand w/some silt, trace fine gravel. A-2-4(0)	
7.5			8.0'		16" RECOVERY	
		5	8.0'	3 5 8 11	Moist medium dense orange fine gravelly coarse to fine sand w/trace silt.	
10			10.0'		17" RECOVERY	
		6	10.0'	6 12 18 16	No Sample Recovery	Gravel blocking spoon.
		7	12.0' 12.0'	10	0" RECOVERY Moist done browsish green fine to coorse A 2 4(0)	
12.5		,	12.0	10 16 15 15	Moist dense brownish green fine to coarse sand w/some silt. A-2-4(0)	

Remarks:

F.A. Project: U.S. 301 Maryland State Line to SR-1 **Contract:** 25-113-01

Boring No.: SS2-5-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
		8	14.0' /	8	20" RECOVERY A-2-4(0)	
			14.0'	8 10 10 14	Saturated medium dense brownish green fine	
15				14	to coarse sand w/some silt.	
			16.0'		20" RECOVERY	
		9	16.0'	10	Saturated dense brownish green fine to coarse A-2-4(0)	
				10 16 21 29	sand w/some silt.	
				29		
17.5						
			18.0'		16" RECOVERY	
		10	18.0'	13 12 17 23	Saturated medium dense brownish green fine A-2-4(0)	
				17 23	to coarse sand w/some silt.	
20			20.0'		21" RECOVERY	
22.5						
		11	23.0'	11 12 18	Saturated medium dense brownish green silty A-2-4(0)	
				18 20	fine sand.	
	`	\mathbf{M}				J(j
25			25.0'		20 RECOVERY	
			/ 1			
					IIGUST 2015	
07.5				1		
27.5						
		12	28.0'	12	S.4	
		'2	20.0	12 16 25	Saturated dense brownish green silty fine to A-2-4(0)	
				25 16	coarse sand.	
30			30.0'		18" RECOVERY	
					End of Boring	
32.5						
<u></u>						
35						
l .						
37.5						1

Symbol Description

Strata symbols



Silty sand



Well graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on September 28, 2010 using 3 1/4-inch diameter continuous flight power auger. Rig is a Truck Mounted CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-10-01

Contract: 25-113-01

Boring Location: Sta. 376+50, 310' RT C.L.

Boring Surface Elev.: + 61.62 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Casing Time **Depth of Water** Depth of Hole Elev. of Water Date 14.0 12.0 7.8

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: T. Kane

Donth	Daily		Cample					
Depth (ft.)	Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	7/9/09	1	1.0'	6 5		Moist medium dense tan silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	Cultivated
			2.0'			11" RECOVERY		Soil - 9".
		2	2.0'	8 5		Moist loose brown silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
3				5 7				
			4.0'			20" RECOVERY		
		3	4.0'	11 16 12 11		Moist medium dense brown gravelly coarse sand w/some fine sand, trace	A-1-b	USDA
	-			12 11		of silt and clay.		Classifica
								- Loamy
6		4	6.0' 6.0'	7		16" RECOVERY	A 1 1	Sand
		4	0.0	7 9 8 8		Moist medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
						00012010		
		<u> </u>	8.0'			20" RECOVERY		
		5	8.0'	4 3 2 3	136 14-13-64 15-15-15-15-15-15-15-15-15-15-15-15-15-1	Saturated loose orange coarse sand w/some fine sand, trace of silt and fine	A-1-b	
9				3		gravel.		
			40.01		611 15 ec 111 14 15 ec	AND PERSON IPPAY		
	ļ	6	10.0' 10.0'	2		18" RECOVERY	A-1-b	
		ັ	10.0	2 2 4		Saturated loose orange coarse to fine sand w/some fine gravel and silt.	A-1-0	
				4				
12			12.0'		C	19" RECOVERY		
12		7	12.0'	4 3		Saturated very loose orange coarse to fine sand w/some silt, trace of fine	A-1-b	
				1 1		gravel.		
				'				
			14.0'			23" RECOVERY		
						End of Boring		
15								
	ļ							

Remarks:

Symbol Description

Strata symbols



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/9/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-10-02

Contract: 25-113-01

Boring Location: Sta. 377+50, 310' RT C.L.

Boring Surface Elev.: + 60.48 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0 12.0

Water Level Readings

Depth of Casing Time **Depth of Water** Depth of Hole Elev. of Water Date 14.0 12.0 7.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: T. Kane

	-						
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/10/09	1	0.5'	10 6 6	Moist very stiff light gray fine to coarse sandy silt w/some clay, trace of fine gravel. 12" RECOVERY	A-4(0)	Topsoil - 6".
		2	2.0'	5	Moist medium dense grayish brown coarse sand w/some fine sand, fine	A-1-b	
3			4.0'	6 6 5	gravel and silt. 17' RECOVERY		
	•	3	4.0' 6.0'	8 10 12 14	Moist medium dense grayish brown coarse sand w/some fine sand, silt and fine gravel, trace of clay. 16" RECOVERY	A-1-b	USDA Classifica - Loamy Sand
6		4	6.0'	13 11 9 8	Moist medium dense grayish brown silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	Sanu
			8.0'		19" RECOVERY		
9		5	8.0'	5 4 2 2	Saturated loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			10.0'	4	22" RECOVERY		
		6	10.0'	4 3 2 1	Saturated loose orange coarse to fine sand w/trace of silt and fine gravel.	A-1-b	
12			12.0'	4	20" RECOVERY		
		7	12.0'	1 W/H W/H 1	Saturated very loose tan silty fine sand w/trace of coarse sand.	A-2-4(0)	
			14.0'		17" RECOVERY		
15					End of Boring		

Remarks:

Symbol Description

Strata symbols

Poorly graded clayey silty sand



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/10/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-10-03

Contract: 25-113-01

Boring Location: Sta 379+00, 310' RT C.L.

Boring Surface Elev.: + 59.54 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0

Water Level Readings

Time **Depth of Casing Depth of Water** Depth of Hole Elev. of Water Date 14.0 8.6

12.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/10/09	1	0.0'	3 3 3 3	Moist firm gray fine sandy silt w/some coarse sand and clay, trace of gravel.	A-4(0)	Forrest Duff - 3".
	<u> </u>	<u> </u>	2.0'	<u> </u> '	16" RECOVERY		
3		2	2.0'	12 10 9 10	Moist very stiff gray fine sandy silt w/some coarse sand, trace of fine gravel. 18" RECOVERY	A-4(0)	
6		3	4.0' 6.0'	0.000	Moist medium dense orange silty coarse to fine sand w/trace of fine gravel. 14" RECOVERY	A-2-4(0)	
		4	6.0'	7 6 5 5	Wet medium dense orange fine to coarse sand w/some fine gravel, trace of silt and clay. 15" RECOVERY	A-2-4(0)	USDA Classifica - Loamy Sand
9		5	8.0'	4 4 5 4	Wet loose orange fine to coarse sand w/some fine gravel and silt.	A-2-4(0)	build
12		6	10.0' 10.0'	6 2 2 5	11" RECOVERY Wet very loose orange fine to coarse sand w/some silt, trace of fine gravel. 18" RECOVERY	A-2-4(0)	
<u> </u>		7	12.0'	3 2 3 5	Wet loose orange fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
 	 '	 '	14.0'	 '	8" RECOVERY End of Boring		-
15					End of Boring		

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/10/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-1-01

Contract: 25-113-01

Boring Location: Sta. 305+00, 220' RT C.L.

Boring Surface Elev.: + 50.68 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0

Water Level Readings

Time **Depth of Casing Depth of Water** Depth of Hole Elev. of Water Date 11.9 16.0

14.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Jason Truver

Helpers: T. Kane

Donth	Doily		Comple					1
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	8/20/09	1	0.5' 2.0'	4 5 5		Moist loose brown silty coarse to fine sand w/some fine gravel. 15" RECOVERY	A-1-b	Topsoil - 6". USDA
		2	2.0'	6 8		Moist medium dense brown gravelly coarse sand w/some fine sand, trace	A-1-b	Classifica
3			4.0'	10 13		of silt. 14' RECOVERY		- Sandy Loam
	•	3	4.0'	8 18 18 20	20.24.4002. 10.21.2000 10.21.2000 10.21.2000 10.21.2000 10.21.2000 10.21.2000 10.21.2000 10.21.2000	Moist dense brown gravelly coarse to fine sand w/some silt.	A-1-b	
6			6.0'	11	91 77 Sty	14" RECOVERY		
		4	6.0'	11 14 17 19		Moist dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
			8.0'			19" RECOVERY		
9		5	8.0'	3 6 8 8		Moist medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
			10.0'			16" RECOVERY		
		6	10.0'	8 11 13 13		Wet medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
10			12.0'			20" RECOVERY		
12		7	12.0'	1		Wet medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
			-	1 9 13 14		wet incutuil delise brown the to coarse sand w/some site.	A-2-4(0)	
			14.0'			18" RECOVERY		
15		8	14.0'	11 13 16 19		Wet medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
			16.0'			20" RECOVERY		
			10.0			End of Boring		
						C		

Remarks:

Symbol Description

Strata symbols

Silty sand

Well graded sand with silt

1.60 minus 1.60 minus 1.61 minus 1.61 minus

Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 8/20/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-1-02

Contract: 25-113-01

Boring Location: Sta. 306+00, 140' RT C.L.

Boring Surface Elev.: + 50.85 Reference:

IN. IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

O.D. IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0

Water Level Readings

Time **Depth of Casing Depth of Water** Depth of Hole Elev. of Water Date 12.9 16.0 14.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Jason Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/20/09	1	0.6'	9 11 10	Moist very stiff brown clayey fine sandy silt w/some coarse sand.	A-4(1)	Topsoil - 5".
		_2	2.0' 2.1'	10 14 14	Moist medium dense orange coarse to fine sand w/trace of silt and fine	A-1-b	
3		V	4.0'	13	gravel. 15" RECOVERY 18" RECOVERY		
	•	3	4.0'	9 14 12 15	Moist medium dense orange gravelly fine to coarse sand w/trace of silt	A-1-b	
6			6.0'		16" RECOVERY		
		4	6.0'	10 10 14 13	Moist medium dense brown coarse to fine sand w/some silt and fine gravel.	A-2-4(0)	
			8.0'		15" RECOVERY		
9		5	8.0'	4 8 12 10	Moist medium dense brown coarse to fine sand w/some silt, trace of fin gravel.	A-2-4(0)	
			10.0'		17" RECOVERY		
		6	10.0'	9 8 8 5	Wet medium dense brown silty coarse to fine sand w/trace of fine grave	el. A-2-4(0)	USDA Classifica - Loamy
12		7	12.0' 12.0'	4	18" RECOVERY	A 2 4(0)	Sand
		′	12.0	4 5 9 11	Wet medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
			14.0'		17" RECOVERY		
15		8	14.0'	4 6 10 11	Wet medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
1			16.0'		21" RECOVERY		
					End of Boring		

Remarks:

Symbol Description

Strata symbols

Clayey sand

Poorly graded sand with silt



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 8/20/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-1-03

Contract: 25-113-01

Boring Location: Sta. 308+00, 125' RT C.L.

Boring Surface Elev.: + 51.68 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0

Water Level Readings

Time **Depth of Casing** Depth of Hole **Depth of Water** Elev. of Water Date 12.5 16.0 14.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Jason Truver

Helpers: T. Kane

	-						
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/21/09	1	0.5'	3 4 9	Moist firm brown clayey silt w/some fine to coarse sand.	A-4(3)	Topsoil - 4".
		2	2.0'	!	15" RECOVERY	. 2 4(0)	
			2.0	9 11 11	Moist medium dense brown fine to coarse sand w/some fine gravel and	A-2-4(0)	
3		J	4.0'	7	silt. 19" RECOVERY		
	•	3	4.0'	3 4	Moist medium dense brown clayey fine sand w/some coarse sand and fine	A-2-4(0)	
		l	ĺ	10 16	gravel, trace of silt.	ļ	
6			6.0'		17" RECOVERY		
		4	6.0'	14 11	Moist medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
		l		11 9 9		ļ	
		l	ĺ	"		ļ	
			8.0'	'	20" RECOVERY	ļ	
		5	8.0'	6 8	Moist medium dense brown fine to coarse sand w/some silt, trace of fine	A-2-4(0)	
9		l	ĺ	10 13	gravel.	11 2 1(0)	
9		l	ĺ	13	giavoi.	ļ	
			10.0	'	15" PEGGYERY	ļ	
		6	10.0' 10.0'	14	17" RECOVERY	. 2 4(0)	110D 4
		٥	10.0	14 11 13 13	Moist medium dense brown coarse to fine sand w/some silt.	A-2-4(0)	USDA Classifica
		l	ĺ	" !			- Loamy
12		l	12.0'	'	22" RECOVERY	ļ	Sand
<u> </u>		7	12.0'	8	Wet medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
		l	ĺ	8 12 11 15	The state of the s	11(0)	
			İ	15		ļ	
			14.0'	'	20" RECOVERY	ļ	
		8	14.0'	14	Wet dense brown fine to coarse sand w/some silt.	A 2 4(0)	
l		Ĭ	14.0	14 16 19 24	wet dense brown line to coarse sand w/some sitt.	A-2-4(0)	
15		l	ĺ	24		ļ	
		l	ĺ	'		ļ	
		<u> </u>	16.0'	<u> '</u>	21" RECOVERY		
		l	ĺ	'	End of Boring	ļ	
		l	Í	'		ļ	

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Silty sand

Clayey sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 8/21/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-11-01

Contract: 25-113-01

Boring Location: Sta. 383+10, 190' LT C.L.

Boring Surface Elev.: + 59.48 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0

Water Level Readings

Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date 10.0 8.0 7.6

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/9/09	1	0.5' 2.0'	4 3 6	Moist firm gray clayey silt w/some fine to coarse sand and fine gravel. 15" RECOVERY	A-4(1)	Cultivated Soil - 4".
	'	2	2.0'	8 7	Moist medium dense brown silty coarse to fine sand w/trace of fine	A-2-4(0)	
3		V	4.0'	12 10	gravel. 22' RECOVERY		
	•	3	4.0'	6 6 7 8	Wet medium dense tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	USDA Classificat : Loamy
6] '	<u> </u>	6.0'	$\Delta \perp$	17" RECOVERY		Sand
		4	6.0'	4 4 3 3	Saturated loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
	'	l	8.0'	l'	20" RECOVERY		
9		5	8.0'	3 2 2 3	Saturated very loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			10.0'	<u> </u>	21" RECOVERY		
					End of Boring		
12							
15				'			
	'		['			

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/9/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-11-02

Contract: 25-113-01

Boring Location: Sta. 384+90, 190' LT C.L.

Boring Surface Elev.: + 60.44 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0

Water Level Readings

Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date 10.0 8.0 6.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/9/09	1	0.5' 2.0'	4 4 6	Moist firm gray fine sandy silt w/some coarse sand and clay, trace of fine gravel. 14" RECOVERY	A-4(0)	Cultivated Soil - 4".
3		2	2.0'	6666	Moist medium dense gray clayey coarse to fine sand w/some fine gravel and silt. 18' RECOVERY	A-2-4(0)	
		3	4.0'	4 5 5 5	Wet loose gray coarse sand w/some fine sand and silt, trace of fine grave	. A-1-b	USDA CLassifica : Sand
6		4	6.0'	4 4 2 1	12" RECOVERY Saturated loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			8.0'		21" RECOVERY		
9		5	8.0'	2 4 2 1	Saturated loose brown fine to coarse sand w/some silt. 17" RECOVERY	A-2-4(0)	
					End of Boring		
12							
15							

Remarks:

Symbol Description

Strata symbols



Silty sand



Poorly graded clayey silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/9/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-12-01

Contract: 25-113-01

Boring Location: Sta. 397+50, 220' RT C.L.

Boring Surface Elev.: + 60.00 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D. Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches

Hollow Stem Auger: 0.0

Water Level Readings

Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date 10.0 12.0 3.8

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers: T. Kane

	•						
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/14/09	1	0.0'	4 6 4 2	Moist stiff gray clayey coarse sandy silt w/some fine sand, trace of fine gravel.	A-4(0)	Cultivated Soil - 3".
			2.0'		16" RECOVERY		
3		2	4.0'	3 3 4 4	Wet loose gray coarse to fine sand w/some silt, trace of fine gravel. 21" RECOVERY	A-1-b	USDA CLassifica : Loamy Sand
6		3	6.0'	3 2 2 2	Saturated very loose gray coarse to fine sand w/some silt, trace of fine gravel. 17" RECOVERY	A-2-4(0)	
		4	6.0'	3 3 3 5	Saturated loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
9		5	8.0' 8.0'	2 2 3 3	14" RECOVERY Saturated loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			10.0'		19" RECOVERY		
		6	10.0'	3 5 5 5	Saturated loose orange fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
12			12.0'		18" RECOVERY		
					End of Boring		
15							

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/14/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-12-02

Contract: 25-113-01

Boring Location: Sta. 398+75, 220' RT C.L.

Boring Surface Elev.: + 61.88 Reference:

IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D.

IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0 10.0

Water Level Readings

Time Depth of Hole **Depth of Casing Depth of Water** Elev. of Water Date 10.0 12.0 6.4

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	7/15/09	1	0.0'	4 6 9 10	M	oist stiff brown silt w/some fine to coarse sand, fine gravel and clay.	A-4(0)	Forest Duff - 2".
			2.0'			16" RECOVERY		
		2	2.0'	7 15	Mo	oist dense orange coarse to fine sand w/some silt and fine gravel.	A-1-b	
3.5			4.0'	21 15		14" RECOVERY		
		3	4.0'	3 8 10 9		et medium dense orange coarse sand w/some fine sand, silt and fine avel.	A-1-b	USDA Classifica : Loamy
			6.0'			17" RECOVERY		Sand
7		4	6.0'	3 3 4 5		uturated loose brown coarse to fine sand w/some silt, trace of fine avel.	A-1-b	Sand
			8.0'			18" RECOVERY		
		5	8.0'	3 3 4 4	Sa	turated loose brown coarse to fine sand w/some silt.	A-1-b	
			10.0'			18" RECOVERY		
10.5		6	10.0'	4 5 6 7	99999999	turated medium dense brown coarse to fine sand w/some silt, trace of ne gravel.	A-1-b	
			12.0'			20" RECOVERY		
					En	nd of Boring		
						č		
14								
17.5								

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/15/2009 using a 3 1/4-inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-13-01

Contract: 25-113-01

Boring Location: Sta 400+50, 220' RT C.L.

Boring Surface Elev.: + 62.95 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: IN. IN. Wt. of Sample Hammer: Lbs. 30 Type of: Split Barrel O.D. 2 O.D.

Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: D-Sampler: S-Sampler: U-Sampler: IN. IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0 10.0

Water Level Readings

Depth of Casing Time **Depth of Water** Depth of Hole Elev. of Water Date 10.0 12.0 6.7

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Gary Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/15/09	1	0.0'	2 4 6 6	Moist loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	Forest Duff - 2".
			2.0'		15" RECOVERY		
3		2	4.0'	5 6 6 8	Moist medium dense orange silty coarse sand w/some fine sand, trace of fine gravel. 15" RECOVERY	A-1-b	
		3	4.0'	5 7	Moist medium dense brown silty fine to coarse sand w/some fine gravel.	A-2-4(0)	
6			6.0'	7 6	17" RECOVERY		
		4	6.0	4 5 4 4	Saturated loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	USDA Classifica : Loamy
<u> </u>		5	8.0' 8.0'	1	18" RECOVERY		Sand
9		ົ່ວ	0.0	2 2 3	Saturated very loose brown coarse to fine sand w/trace of silt and fine gravel.	A-1-b	
			10.0'		14" RECOVERY		
		6	10.0'	3 3 4 4	Saturated loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
12			12.0'		16" RECOVERY		
					End of Boring		
15							

Remarks:

Symbol Description

Strata symbols



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/15/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1

Boring No.: SWM2-13-02

Contract: 25-113-01

Boring Location: Sta. 401+50, 275' RT C.L.

Boring Surface Elev.: +61.39 Reference:

 Wt. of Casing Hammer:
 Lbs.
 Average Fall:
 IN.

 Wt. of Sample Hammer:
 140
 Lbs.
 Average Fall:
 30
 IN.

 Type of:
 D-Sampler:
 Split Barrel
 O.D.
 O.D. of Sampler:
 2
 IN.

 S-Sampler:
 U-Sampler:
 O.D.
 O.D. of Samp. Tube:
 IN.

 U-Sampler:
 O.D.
 O.D. of Samp. Tube:
 IN.

 Core Bit:
 O.D.
 O.D. of Rock Core:
 IN.

Core Bit: O.D. O.D. of Rock Core: IN

Casing Size: 3 1/4 Inches From Depth of: To:

e: 3 1/4 Inches From Depth of: To: Hollow Stem Auger: From Depth of: 0.0 To: 10.0

Water Level Readings

Date Time Depth of Hole Depth of Casing Depth of Water Elev. of Water 12.0 10.0 6.1

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: Ft.; Dia. U-Sample Boring: Ft. No. of 2 in. Dia. Shelby Tubes: ; No. of: U-Samples: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Driller: Dave Burt Helpers: T. Kane

						1	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
(11.)	9/2/09	1	0.0'	2 2 3 3	Moist firm gray fine to coarse sandy silt w/some clay, trace of fine gravel	A-4(0)	Forest Duff - 2". USDA
			2.0'		4" RECOVERY		Classifica
3		2	2.0' 4.0'	3 2 4 5	Moist loose orange silty fine to coarse sand w/trace of fine gravel. 22" RECOVERY	A-2-4(0)	: Sandy Loam
		3	4.0'	2 3 3 4	Wet loose tan fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
6		4	6.0' 6.0'	2 3	19" RECOVERY Wet loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			8.0'	4 4	18" RECOVERY		
9		5	8.0'	1 2 4 3	Wet loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
			10.0'		16" RECOVERY		
		6	10.0'	2 2 3 3	Wet loose brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
12			12.0'		16" RECOVERY		
.=					End of Boring		
15							
]						

Remarks:

Symbol Description

Strata symbols



Poorly graded clayey silty sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 9/2/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-13-03

Contract: 25-113-01

Boring Location: Sta. 402+90, 305' RT C.L.

Boring Surface Elev.: + 60.80 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D.

O.D. Core Bit: O.D. IN.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0 10.0

Water Level Readings

Depth of Casing Time **Depth of Water** Depth of Hole Elev. of Water Date 10.0 12.0 7.3

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	1/26/10	1	0.5' 2.0'	2 2 2 2	Wet soft gray coarse to fine sandy silt w/trace of clay and fine gravel. 10" RECOVERY	A-4(0)	Topsoil - 6". USDA
3	N	2	2.0'	7 7 8 6	Wet medium dense orangish tan coarse to fine sand w/some silt, trace of fine gravel. 17" RECOVERY	A-1-b	Classifica : Sandy Loam
6	•	3	4.0' 6.0'	2 4 4 5	Saturated loose orangish tan coarse to fine sand w/some silt, trace of fine gravel. 20" RECOVERY	A-2-4(0)	
		4	6.0' 8.0'	2 3 4 3	Saturated loose orange coarse to fine sand w/some silt, trace of fine gravel. 21" RECOVERY	A-1-b	
9		5	8.0'	2 4 4 5	Saturated loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
		6	10.0'	2 4 5 4	22" RECOVERY Saturated loose brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
12			12.0'		End of Boring		
15							

Remarks:

Symbol Description

Strata symbols



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 1/26/2010 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-14-01

Contract: 25-113-01

Boring Location: Sta. 416+75, 185' RT C.L.

Boring Surface Elev.: + 63.85 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D. Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches

Hollow Stem Auger: 0.0 8.0

Water Level Readings

Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date 5.7 10.0 8.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Williams

							,
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/1/09	1	0.5' 2.0'	4 3 4	Moist firm brown clayey fine sandy silt w/some coarse sand, trace of fine gravel. 13" RECOVERY	A-4(3)	Cultivated Soil - 7".
		2	2.0'	12 10 19	Moist medium dense brown clayey coarse to fine sand w/trace of silt and	A-2-4(0)	
3		V	4.0'	17	fine gravel. 24' RECOVERY		
	•	3	4.0	5 10 12 12	Moist medium dense tan coarse to fine sand w/some silt and fine gravel.	A-1-b	USDA Classifica : Loamy
6			6.0'		12" RECOVERY		Sand
		4	6.0'	5 8 7 9	Wet medium dense orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			8.0'		18" RECOVERY		
9		5	8.0'	8 10 9 8	Wet medium dense orange coarse sand w/some fine sand, trace of silt and fine gravel.	A-1-b	
			10.0'		HEREIE HER HEREIE HEREIE HEREIE HEREIE HEREIE HEREIE HEREIE HER HEREIE HER HEREIE HEREIE HEREIE HEREIE HEREIE HEREIE HEREIE HER HEREIE HER HER HER HER HER HER HER HER HER HE		
					End of Boring		
12							
12							
15							
1	I						1

Remarks:

Symbol Description

Strata symbols

SCIACA SYMDOIS

Low plasticity clay

Clayey sand



Silty sand



Well graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 9/1/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-14-02

Contract: 25-113-01

Boring Location: Sta. 418+25, 185' RT C.L.

Boring Surface Elev.: + 64.18 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0

Water Level Readings

Time Depth of Water Depth of Hole **Depth of Casing** Elev. of Water Date 10.0 8.0 5.2

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Williams

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/1/09	1	0.5' 2.0'	3 3 5	Wet firm gray clayey silt w/some fine sand, trace of coarse sand and fine gravel. 14" RECOVERY	A-4(3)	Cultivated Soil - 6".
		2	2.0'	9 19	Wet dense tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
3			4.0'	20 17	FOR BY RECOVERY		
	•	3	4.0'	6 8 10	Wet medium dense tan coarse sand w/some fine sand and silt, trace of	A-1-b	USDA
6			6.0'	10 13	fine gravel. 17" RECOVERY		CLassifica : Loamy Sand
		4	6.0'	6 9 12 10	Wet medium dense tan coarse to fine sand w/some silt, trace of fine	A-1-b	
				10	gravel.		
			8.0'		17" RECOVERY		
9		5	8.0'	7 6 4 5	Wet loose brownish tan coarse sand w/some fine sand, trace of silt and fine gravel.	A-1-b	
			10.0'		17" RECOVERY		
					End of Boring		
12							
15							

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 9/1/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-15-01

Contract: 25-113-01

Boring Location: Sta. 437+60, 190' RT C.L.

Boring Surface Elev.: + 73.23 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date 10.0 8.0 Dry

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/1/09	1	0.5' 2.0'	1 1 3	Wet soft brown clayey fine sandy silt w/some coarse sand. 12" RECOVERY	A-4(3)	Cultivated Soil - 7".
		2	2.0'	3 4	Wet stiff brown clayey fine sandy silt w/some coarse sand, trace of fine	A-4(2)	
3			4.0'	9	gravel. 14' RECOVERY		
	ľ	3	4.0'	4 7 7 4	Wet medium dense tan silty coarse to fine sand w/some fine gravel.	A-1-b	
6			6.0'		15" RECOVERY		
		4	6.0'	3 2 2 4	Wet very loose tan coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
			8.0'		12" RECOVERY		
9		5	8.0'	1 2 2 3	Wet very loose orange silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	USDA Classifica : Loamy
			10.0'		16" RECOVERY		Sand
					End of Boring		
12							
15							

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Clayey sand

Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 9/1/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-15-02

Contract: 25-113-01

Boring Location: Sta. 439+00, 195' RT C.L.

Boring Surface Elev.: + 67.34 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0 8.0

Water Level Readings

Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date 10.0 8.0 7.3

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Williams

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/1/09	1	0.5' 2.0'	2 2 3	Wet soft brown fine to coarse sandy clay w/some fine gravel and silt. 10" RECOVERY	A-6(1)	Cultivated Soil - 7".
		2	2.0'	2 3	Wet loose brown silty fine to coarse sand.	A-2-4(0)	
3		J	4.0'	3 2	FOR 17' RECOVERY		
6	•	3	4.0' 6.0'	3 2 2 1	Wet very loose brown coarse to fine sand w/some silt. 16" RECOVERY	A-2-4(0)	
		4	6.0'	2 2 2 2 2	Wet very loose brown fine to coarse sand w/some silt, trace of fine grave	1. A-2-4(0)	
			8.0'		19" RECOVERY		
9		5	8.0'	4 3 2 2	Wet loose brown coarse to fine sand w/some silt, trace of fine gravel. 17" RECOVERY	A-1-b	USDA Classifica : Loamy Sand
			10.0		End of Boring		Sund
12							
15							

Remarks:

Symbol Description

Strata symbols

Clayey sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 9/1/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-16-01

Contract: 25-113-01

Boring Location: Sta. 441+50, 135' Rt. C.L.

Boring Surface Elev.: + 66.9 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split barrel O.D. 2 IN. IN. O.D. O.D.

IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Time **Depth of Water Depth of Hole Depth of Casing** Elev. of Water Date 4/7/10 6.0 8.0 3.5

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: Jason Truver

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/1/09	1	0.5' 2.0'	2 4 4	Moist firm tan fine to coarse sandy silt w/trace of fine gravel and clay. 11" RECOVERY	A-4(0)	Topsoil - 7".
		2	2.0'	8 14	Moist medium dense tan coarse to fine sand w/some silt, trace of fine	A-1-b	
3			4.0'	13 9	gravel. 19" RECOVERY		
	•	3	4.0'	5 4 7 8	Moist medium dense tan silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	USDA Classifica Loamy
6			6.0'		19" RECOVERY		Sand
		4	6.0'	11 9 9 10	Moist medium dense tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
		5	8.0' 8.0'	4	22" RECOVERY	4.1.1	
9		э	8.0	4 3 4 6	Saturated loose orange coarse sand w/some silt and fine sand, trace of fin gravel.	e A-1-b	
			10.0'		21" RECOVERY		
					End of Boring		
12	-						
15							
	ı	1	1	1		1	

Remarks:

Symbol Description

Strata symbols



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 4/7/2010 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-17-01

Contract: 25-113-01

Boring Location: Sta. 461+30, 145' Rt. C.L.

Boring Surface Elev.: + 69.7 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D. O.D.

Core Bit: O.D. **Casing Size:**

From Depth of: From Depth of: To: To: 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 12/4/2009 6.0 4.0 2.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/4/09	1	0.5' 2.0'	2 2 3	Wet firm brown clayey silt w/some fine sand and fine gravel, trace of coarse sand. 14" RECOVERY	A-4(3)	Topsoil - 6".
		2	2.0'	7	Saturated medium dense brown coarse to fine sand w/some fine gravel	A-1-b	
3			4.0'	7 12 14 16	and silt. 21" RECOVERY		
	•	3	4.0'	12 9 9 9	Saturated medium dense brown silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	USDA CLassifica : Loamy
6	12/7/09	4	6.0' 6.0'	7	19" RECOVERY	1 2 4(0)	Sand
	12/1/09	4	0.0	7 9 9 8	Saturated medium dense tan coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
			8.0'		20" RECOVERY		
9		5	8.0'	6 8 9 7	Saturated medium dense tan silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
			10.0'		20" RECOVERY		
					End of Boring		
12							
15							

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 12/4/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-17-02

Contract: 25-113-01

Boring Location: Sta. 463+00, 145' Rt. C.L.

Boring Surface Elev.: + 70.1 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D. 3 1/4 **Casing Size:** Inches

From Depth of: From Depth of: To: To: Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 12/4/2009 6.0 4.0 3.7

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/4/09	1	0.5' 2.0'	3 3 4	Wet firm brown silt w/trace of fine to coarse sand, fine gravel and clay. 13" RECOVERY	A-4(2)	Topsoil - 6".
3		2	2.0'	4 6 9 9	Wet stiff brownish orange clayey fine sandy silt w/some coarse sand, trace of fine gravel.	A-4(1)	USDA Classifica : Loam
		3	4.0'	8 17 12 15	20" RECOVERY Wet medium dense tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
6		4	6.0' 6.0'	12 12 12 9 8	21" RECOVERY Wet medium dense tan coarse to fine sand w/some silt, trace of fine	A-2-4(0)	
			8.0'	8	gravel. 19" RECOVERY		
9		5	8.0'	5689	Wet medium dense tan coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
			10.0'		20" RECOVERY		
					End of Boring		
12							
15							

Remarks:

Symbol Description

Strata symbols

Silt



Silty low plasticity clay



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 12/4/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1 Boring No.: SWM2-17-03

Contract: 25-113-01

Boring Location: STA. 463+31 141' Lt. C.L.

Boring Surface Elev.: + 69.0 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D. 3 1/4 **Casing Size:**

From Depth of: From Depth of: To: To: Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Casing Depth of Water Time Depth of Hole Elev. of Water Date 9/23/10 12.0 12.0 8.4

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corportation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks
	9/23/10	1	0.5'	10 12 14	Moist very stiff brown clayey silt w/some fine sand, trace coarse sand and fine gravel. 11" RECOVERY Topsoil - 7". 10 YR - 6/6
3		2	4.0	13 22 28 30	Moist dense brown silty fine to coarse sand A-2-4(0) 10 YR - 6/6 w/some fine gravel.
6		3	4.0°	11 16 16 14	Moist dense brown coarse to fine sand w/ A-1-b 10 YR - 6/6 some silt, trace fine gravel.
		4	6.0' 8.0'	15 13 14 12	Moist medium dense brown coarse sand w/ some fine sand, fine gravel and silt. A-1-b 10 YR - 6/6 USDA Classification: Loamy Sand
9		5	8.0'	4 4 5 4	Wet loose tan silty coarse to fine sand w/some fine gravel. 18" RECOVERY
		6	10.0'	3 4 5 4	Wet loose tan coarse sand w/some fine sand, A-1-b 10 YR - 7/2 fine gravel and silt.
12			12.0'		End of Boring
15					

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on September 23, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-18-01

Contract: 25-113-01

Boring Location: Sta. 459+00, 245' Lt. C.L.

Boring Surface Elev.: + 70.2 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0 10.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 12/7/2009 6.0 4.0 3.4

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/7/09	1	0.5' 2.0'	2 2 3	Wet firm brown clayey silt w/some fine sand, trace of coarse sand and fine gravel. 12" RECOVERY	A-4(6)	Topsoil - 6".
3		2	2.0'	7 9 8 5	Wet medium dense brown silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	USDA Classifica
		Ň	4.0'	2	21' RECOVERY	j	: Sandy Loam
		3	4.0'	5 6 6	Saturated medium dense tan silty coarse to fine sand w/trace of fine gravel.	A-1-b	
6			6.0'		22" RECOVERY		
		4	6.0'	4 4 7 8	Saturated medium dense tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			8.0'		19" RECOVERY		
9		5	8.0'	2 3 2 3	Saturated loose orange coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
			10.0'		19" RECOVERY		
		6	10.0'	2 3 3 2	Saturated loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
12			12.0'		22" RECOVERY		
12					End of Boring		
	ļ						
15							
	!						

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 12/7/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-18-02

Contract: 25-113-01

Boring Location: Sta. 460+75, 285' Lt. C.L.

Boring Surface Elev.: + 70.2 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

O.D. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0 10.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 12/7/2009 10.0 8.0 6.2

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Lafferty

				1		T	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/7/09	1	0.5' 2.0'	1 2 3	Wet firm brown clayey silt w/some fine to coarse sand and fine gravel. 13" RECOVERY	A-4(4)	Topsoil - 7".
		2	2.0'	5 6	Wet stiff grayish orange clayey fine to coarse sandy silt w/trace of fine	A-4(0)	USDA
3			4.0'	6 6 8	gravel. 23" RECOVERY		Classifica : Sandy Loam
	•	3	4.0'	6 7 7 8	Saturated stiff grayish orange fine sandy clay w/some coarse sand and sil trace of fine gravel.	, A-6(1)	
6			6.0'		21" RECOVERY		
		4	6.0'	9 10 11 9	Saturated medium dense tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			8.0'		18" RECOVERY		
9		5	8.0'	2 2 3 3	Saturated loose tan coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
			10.0'		18" RECOVERY		
		6	10.0'	3 3 4 6	Saturated loose tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
10			12.0'		23" DECOVEDY		
12			12.0		End of Boring		
15							

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Clayey sand

Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 12/7/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-18-03

Contract: 25-113-01

Boring Location: Sta. 462+50, 315' Lt. C.L.

Boring Surface Elev.: + 68.7 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 O.D.

IN. IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0 10.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 12/7/2009 8.0 6.0 4.9

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Lafferty

_							
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/7/09	1	0.5' 2.0'	3 2 3	Wet firm brown clayey fine gravelly silt w/some coarse to fine sand. 14" RECOVERY	A-4(1)	Topsoil - 7".
3		2	2.0'	3 5 7 6	Saturated medium dense brown coarse sand w/some silt and fine sand, trace of fine gravel. 18' RECOVERY	A-1-b	USDA CLassifica : Loamy Sand
		3	4.0'	3 2 4 2	Saturated loose brown coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
6		4	6.0'	2 2 2 2 3	Saturated very loose tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
9		5	8.0' 8.0'	3 2 3 3	17" RECOVERY Saturated loose tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
		6	10.0'	3 3 3 3	21" RECOVERY Saturated loose tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
12			12.0'		22" RECOVERY End of Boring		
15							

Remarks:

Symbol Description

Strata symbols

Clayey sand



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 12/7/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-19-01

Contract: 25-113-01

Boring Location: Sta. 469+00, 350' Lt. C.L.

Boring Surface Elev.: + 68.9 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 O.D.

IN. IN. O.D. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0 10.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 12/1/2009 5.0 8.0 6.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Lafferty

D .:	Б. 11	ı					
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/1/09	1	0.5' 2.0'	2 3 4	Moist firm brown fine to coarse sandy silt w/some clay, trace of fine gravel. 12" RECOVERY	A-4(0)	Topsoil - 7".
		2	2.0'	5 5	Moist medium dense orangish tan coarse to fine sand w/some fine gravel,	A-2-4(0)	USDA
3			4.0'	6 5	clay and silt. 18" RECOVERY		Classifica : Sandy Loam
		3	4.0'	6 7 7 8	Saturated medium dense orangish tan fine sand w/some silt and fine gravel.	A-2-4(0)	
6			6.0'		20" RECOVERY		
		4	6.0'	4 7 7 5	Saturated medium dense tan coarse to fine sand w/some fine gravel and silt.	A-1-b	
			8.0'		20" RECOVERY		
9		5	8.0'	2 3 3 2	Saturated loose tan coarse sand w/some fine gravel, fine sand and silt.	A-1-b	
			10.0'		18" RECOVERY		
		6	10.0'	3 3 3 5	Saturated loose tan coarse to fine sand w/trace of fine gravel and silt.	A-1-b	
12			12.0'		19" RECOVERY		
12			.2.0		End of Boring		
15							

Remarks:

Symbol Description

Strata symbols

Poorly graded clayey silty sand



Silty sand



Poorly graded sand with silt



Well graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 12/1/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1

Contract: 25-113-01

Boring Location: Sta. 470+75, 325' Lt. C.L.

Boring Surface Elev.: +67.4 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D. O.D.

Core Bit: O.D. O.D. of Rock Core: IN.
Casing Size: 3 1/4 Inches From Depth of: To:

e: 3 1/4 Inches From Depth of: To: Hollow Stem Auger: From Depth of: 0.0 To: 10.0

Water Level Readings

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 12.0 Ft.; Dia. U-Sample Boring: Ft. No. of 2 in. Dia. Shelby Tubes: ; No. of: U-Samples: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Driller: Dave Burt **Helpers:** J. Lafferty

	1	_		1		1	1
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/1/09	1	0.5' 2.0'	3 4 5	Wet stiff grayish orange clayey silt w/trace of fine to coarse sand. 12" RECOVERY	A-4(7)	Topsoil - 8".
3.5		2	2.0'	5 11 10	Wet very stiff grayish orange clayey fine sandy silt w/some coarse sand and fine gravel.	A-4(0)	USDA CLassifica
3.5			4.0'		20" RECOVERY		: Sandy Loam
		3	4.0'	5 8 8 6	Saturated medium dense tan coarse tof ine sand w/some silt and fine gravel.	A-1-b	Loam
			6.0'		22" RECOVERY		
7		4	6.0' 8.0'	5 6 6 7	Saturated medium dense tan coarse sand w/some fine sand and silt, trace of fine gravel. 19" RECOVERY	A-1-b	
		5	8.0'	1 3 3 3	Saturated loose tan silty fine sand w/trace of coarse sand.	A-2-4(0)	
10.5		6	10.0' 10.0'	3 3 6 6	20" RECOVERY Saturated loose tan silty fine sand w/trace of coarse sand and fine gravel.	A-2-4(0)	
			12.0'	0	23" RECOVERY		
					End of Boring		
14							
17.5							

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Poorly graded clayey silty sand



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 12/1/2009 using a 3 1/4-inch diameter continues flight power auger. Rig is a ATV CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

10.0

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-19-03

Contract: 25-113-01

Boring Location: Sta. 472+50, 300' Lt. C.L.

Boring Surface Elev.: + 65.5 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 12/1/2009 3.2 6.0 4.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Lafferty

Depth	Daily		Sample			T	1
(ft.)	Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/1/09	1	0.5' 2.0'	353	Moist firm brown clayey fine gravelly fine sand w/some coarse sand and silt. 16" RECOVERY	A-2-4(0)	Topsoil - 6".
		2	2.0'	5 10	Moist medium dense orangish tan silty coarse to fine sand w/some fine	A-1-b	USDA
3			4.0'	6 9	gravel. 22" RECOVERY		CLassifica : Sandy Laom
	•	3	4.0'	3 5 6 4	Saturated medium dense tan coarse to fine snad w/some silt and fine gravel.	A-1-b	
6			6.0'		20" RECOVERY		
		4	6.0'	5 5 6 6	Saturated medium dense tan coarse sand w/some silt and fine gravel.	A-1-b	
			8.0'		22" RECOVERY		
9		5	8.0'	2 2 2 3	Saturated very loose tan fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
			10.0'		19" RECOVERY		
		6	10.0'	3 4 4 7	Saturated loose tan silty fine and w/some fine gravel, trace of coarse sand	. A-2-4(0)	
12			12.0'		18" RECOVERY		
14			12.0		End of Boring		
15							

Remarks:

Symbol Description

Strata symbols



Poorly graded clayey silty sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 12/1/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-19-04

Contract: 25-113-01

Boring Location: Sta. 474+00, 295' Lt. C.L.

Boring Surface Elev.: + 64.5 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D. O.D.

Core Bit: O.D. IN.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0 10.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 12/4/2009 8.0 6.0 4.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Lafferty

Donath	Dailu		Camanla	I				1
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	12/4/09	1	0.5'	2 2 6	Wet firm grayish	orange clayey silt w/trace of fine to coarse sand.	A-4(8)	Topsoil -
			2.0'	6		17" RECOVERY		6".
		2	2.0'	1 12	Wet stiff grayish	n orange clayey fine sandy silt w/some coarse sand, trace	A-4(1)	USDA
3.5		2A	3.0'		of fine gravel.	OFFICOVERY	A 1 L	Classifica
3.5		27	4.0'	12 14	Saturated mediu	9" RECOVERY m dense gray silty coarse to fine sand w/some fine gravel,	A-1-b	: Loam
		3	4.0'	2 3 5		12" RECOVERY	A-1-b	
	•			5 6	Saturated loose g	gray coarse to fine sand w/some silt and fine gravel.		
			6.0'			20" RECOVERY		
7		4	6.0'	6 4 3 2	Saturated loose t	an coarse sand w/some fine sand, silt and fine gravel.	A-1-b	
			<i>F</i>	2		51/115		
			8.0	2		20" RECOVERY	1.0.1(0)	
		5	8.0'	2 2 3 3	Saturated loose t	tan silty fine sand w/trace of coarse sand.	A-2-4(0)	
				3				
10.5		6	10.0' 10.0'	3	C-44-14	19" RECOVERY	A 2 4(0)	
10.5		ľ	10.0	3 3 7 8		tan fine sand w/some fine gravel, silt and coarse sand.	A-2-4(0)	
			12.0'			18" RECOVERY		
					End of Boring			
14								
17.5								

Remarks:

Symbol Description

Strata symbols



Low plasticity clay



Silty low plasticity clay



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 12/4/2009 using a 3 1/4-inch diameter continues flight power auger. Rig is a ATV CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-2-01

Contract: 25-113-01

Boring Location: Sta. 307+75, 240' LT C.L.

Boring Surface Elev.: + 50.23 Reference:

Wt. of Casing Hammer: Average Fall: IN. Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D. O.D.

Core Bit: O.D. IN.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0 14.0

Water Level Readings

Time **Depth of Casing Depth of Water** Depth of Hole Elev. of Water Date 16.0 14.0 12.1

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Jason Truver

Helpers: T. Kane

		ı					1
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
(111)	8/21/09	1	0.5'	4 5 6	Moist stiff brown clayey fine sandy silt w/some coarse sand, trace of fine	A-4(0)	Topsoil -
				6	gravel	(-)	4".
			2.0'		14" RECOVERY		USDA
		2	2.0'	8 7	Moist medium dense brown coarse to fine sand w/some fine gravel, trace	A-1-b	Classifica
3				8	of silt.		- Sandy
		V	4.0'		15" RECOVERY		Loam
	•	3	4.0'	7 9 10	Moist medium dense brown coarse to fine sand w/some fine gravel, trace	A-1-b	
				10 11	of silt.		
6			6.0'		16" RECOVERY		
		4	6.0'	5 8	Moist medium dense orange fine to coarse sand w/some silt, trace of fine	A-2-4(0)	
				10 8	gravel.		
			0.01		ANI DEGOVERY		
		5	8.0' 8.0'	3	20" RECOVERY Moist loose orange coarse to fine sand w/trace of fine gravel and silt.	A-1-b	
9				4 4 3	EXERCISE WORST 1005C Orange Coarse to time said witrace of time graver and sitt.	A-1-0	
	1			3	HERBERE HERBERE HERBERE		
			10.0'		17" RECOVERY		
		6	10.0'	4 8	Moist medium dense brown fine to coarse sand w/some silt, trace of fine	A-2-4(0)	
				13 9	gravel.		
l			40.01		ATT DESCRIPTION		
12		7	12.0' 12.0'	8	15" RECOVERY	A 2	
		′	12.0	8 12 18 23	Wet medium dense brown fine to coarse sand w/trace of silt.	A-3	
				23	11/255 11/2167 11/1/21		
			14.0'		19386 19386 1938		
	1	8	14.0'	17 19	Wet dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
15				17 19 22 21			
			16.0'		15" RECOVERY		
					End of Boring		
-	-						

Remarks:

Symbol Description

Strata symbols

Poorly graded clayey silty sand

Well graded sand with silt

Poorly graded sand



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 8/21/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

14.0

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-2-02

Contract: 25-113-01

Boring Location: Sta. 309+25, 230' LT C.L.

Boring Surface Elev.: + 50.98 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 O.D.

IN. IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0

Water Level Readings

Time **Depth of Casing Depth of Water** Depth of Hole Elev. of Water Date 13.0 16.0 14.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Jason Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/20/09	1	0.5' 2.0'	3 6 8	Moist stiff brown clayey fine sandy silt w/some coarse sand, trace of fine gravel. 14" RECOVERY	A-4(2)	TOpsoil - 5".
	'	2	2.0'	9 13 11	Moist medium dense tan fine to coarse sand w/some silt, trace of fine	A-2-4(0)	
3			4.0'	11 8	gravel. 16" RECOVERY		
		3	4.0'	6 8 11 19	Moist medium dense tan coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
6		<u></u> '	6.0'		17" RECOVERY		
		4	6.0'	11 14 13 11	Moist medium dense brown coarse to fine sand w/some fine gravel, trace of silt.	A-1-b	
		<u></u> '	8.0'		21" RECOVERY		
9		5	8.0'	4 7 7 6	Moist medium dense orange coarse sand w/some fine sand and fine gravel, trace of silt.	A-1-b	
	1	1 '	10.0'		17" RECOVERY		
		6	10.0'	10 9 7 7	Moist medium dense brown fine to coarse sand w/some silt and clay, trace of fine gravel.	A-2-4(0)	USDA Classifica - Sandy
12] '	<u> </u>	12.0'	<u> </u>	16" RECOVERY		Loam
		7	12.0'	3 9 9 11	Wet medium dense brown fine to coarse sand w/some silt, trace of fine gravel. 19" RECOVERY	A-2-4(0)	
	1 '	8	14.0'	9	Wet medium dense brown fine to coarse sand w/some silt, trace of fine	A-2-4(0)	
15				9 9 9 12	gravel.	112 1(0)	
	<u> </u> '	└	16.0'	<u> </u> '	20" RECOVERY		
	'	'			End of Boring		

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Poorly graded sand with silt



Well graded sand



Well graded sand with silt



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 8/20/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1

Contract: 25-113-01

Boring Location: Sta. 476+00, 250' Lt. C.L.

Boring Surface Elev.: +64.8 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D. O.D.

Core Bit: O.D. O.D. of Rock Core: IN.
Casing Size: 3 1/4 Inches From Depth of: To:

ze: 3 1/4 Inches From Depth of: To:
Hollow Stem Auger: From Depth of: 0.0 To: 8.0

Water Level Readings

Date Time Depth of Hole Depth of Casing Depth of Water Elev. of Water 4.0 3.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 12.0 Ft.; Dia. U-Sample Boring: Ft. No. of 2 in. Dia. Shelby Tubes: ; No. of: U-Samples: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Driller: Dave Burt Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/4/09	1	1.0' 2.0'	2 2	Wet soft brown clayey silt w/trace of fine to coarse sand. 12" RECOVERY	A-4(5)	Topsoil - 9".
		2	2.0'	8 10 10 10	Wet medium dense grayish orange silty coarse to fine sand w/trace of fine grayel.	A-1-b	USDA Classifica
3				10			: Sandy
		3	4.0' 4.0'	5	22" RECOVERY	A 1 1	Loam
		3	4.0	5 4 5 6	Saturated loose grayish orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
6			6.0'		22" RECOVERY		
		4	6.0'	5 6 5 8	Saturated medium dense tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			8.0'		18" RECOVERY		
9		5	8.0'	3 3 5 7	Saturated loose tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			10.0'		[編] 13 13 13 13 13 13 13 13		
					End of Boring		
12							
15							

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 12/4/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-21-02

Contract: 25-113-01

Boring Location: Sta. 477+10, 230' Lt. C.L.

Boring Surface Elev.: + 65.6 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0 10.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 1/26/2010 10.0 12.0 8.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Lafferty

			_					
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	1/26/10	1	1.0'	3 3		Wet firm brown silt w/some clay, trace of fine to coarse sand.	A-4(4)	Topsoil -
			2.0'			12" RECOVERY		9".
2.5		2	2.0'	12 14 10		Wet medium dense blackish brown silty fine gravelly coarse to fine sand.	A-2-4(0)	USDA
				8				Classifica
								: Sandy Loam
		V	4.0'			19" RECOVERY		Louin
	_	3	4.0'	3		Saturated loose orangish tan coarse sand w/some fine sand and silt, trace	A-1-b	
5				3 3		of fine gravel.		
				Λ		CHQT 2015		
			6.0'	-		15" RECOVERY		
		4	6.0'	5 6 7		Saturated medium dense tan fine gravelly coarse sand w/some fine sand	A-1-b	
				7		and silt.		
7.5								
			8.0'			15" RECOVERY		
		5	8.0'	3 6 6 7		Saturated medium dense tan coarse to fine sand w/some silt and fine	A-1-b	
				7		gravel.		
10			10.0'	1		19" RECOVERY		
		6	10.0'	4 8 11		Saturated medium dense brown coarse sand w/some fine gravel, fine sand and silt.	A-1-b	
				8		and sitt.		
-					(1) 1500 ((1) 14 150 ((1) 14 150 (
			12.0'		1111166	17" RECOVERY		
12.5						End of Boring		

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 1/26/2010 using a 3 1/4-inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-21-02A

Contract: 25-113-01

Boring Location: Sta. 477+10, 230' Lt. C.L.

Boring Surface Elev.: + 65.2 Reference:

IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. D-Sampler: S-Sampler: U-Sampler: IN. Type of: O.D. IN. IN. O.D. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** Inches **Hollow Stem Auger:**

Water Level Readings

Time Depth of Hole **Depth of Casing Depth of Water** Elev. of Water Date

12/1/2009 8.0 4.7

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/1/09	1	1.0'		Wet brown clayey silt w/trace of fine to coarse sand.	A-4(9)	Hand
			2.0'		12" RECOVERY		Auger
2.5		2	2.0'		Wet tan silty coarse to fine sand w/some fine gravel.	A-1-b	Topsoil -
2.5	ł				graver		9".
							Hand
					-()K KII)I)IN(Auger USDA
-			4.0'		24" RECOVERY		CLassifica
		3	4.0'		Wet orange silty fine gravelly coarse sand w/some fine sand.	A-1-b	: Sandy
5			5.0'		12" RECOVERY		Loam
		4	5.0'	Λ	Saturated orangish tan coarse sand w/some fine sand, silt and fine gravel	A-1-b	Hand
			6.0'	Δ I	12" RECOVERY		Auger
		5	6.0	11	Saturated tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	Hand
							Auger
7.5	1						Hand
7.5			8.0'		A# DECOVEDY		Auger
			8.0		End of Boring		
					Life of Borning		
10							
12.5							
12.3	1						

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 12/1/2009 using a hand auger.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.

F.A. Project: US 301 Maryland State Line to SR-1

Boring No.: SWM2-21-03

Contract: 25-113-01

Boring Location: STA. 476+58 350 Lt. C.L.

Boring Surface Elev.: +62.7 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D. O.D.

Core Bit: O.D. O.D. of Rock Core: IN.

Casing Size: 3 1/4 Inches From Depth of: To:

e: 3 1/4 Inches From Depth of: To:
Hollow Stem Auger: From Depth of: 0.0 To: 10.0

Water Level Readings

Date 9/24/10 Time Depth of Hole Depth of Casing Depth of Water 6.0 S.9 Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 12.0 Ft.; Dia. U-Sample Boring: Ft. No. of 2 in. Dia. Shelby Tubes: ; No. of: U-Samples: 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Driller: Dave Burt **Helpers:** T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
	9/24/10	1	0.5' 2.0'	6 9 9	Moist stiff tan fine sandy silt w/some coarse A-4(0) sand, fine gravel and clay. 14" RECOVERY	Topsoil - 5". 2.5 YR - 6/2
3		2	4.0'	9 12 13 11	Moist medium dense tan silty coarse to fine A-2-4(0) sand and fine gravel.	2.5 YR - 6/2
6	ľ	3	4.0' 6.0'	8 9 9 5	Wet medium dense brown coarse to fine sand w/some silt, trace clay and fine gravel. 16" RECOVERY	2.5 YR - 6/6 USDA Classification : Sandy Loam
		4	6.0' 8.0'	8 7 5 6	Wet medium dense brown coarse to fine sand w/some fine gravel and silt. 18" RECOVERY	10 YR - 6/6
9		5	8.0'	9 7 6 5	Wet medium dense tan coarse sandy fine A-1-a gravel w/some fine sand, trace silt.	2.5 YR - 7/3
			10.0'		5" RECOVERY End of Boring	
12						
15						

Remarks:

Symbol Description

Strata symbols

Poorly graded clayey silty sand



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on September 24, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

8.0

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1 Boring No.: SWM2-21-04

Contract: 25-113-01

Boring Location: STA. 478+74 319' Lt. C.L.

Boring Surface Elev.: + 60.6 Reference:

IN. IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D. O.D.

IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0

Water Level Readings

Time **Depth of Water Depth of Hole Depth of Casing** Elev. of Water Date 9/23/10 4.0 4.0 3.6

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks	
	9/23/10	1	0.5' 2.0'	8 9 10	Moist very stiff gray clayey silt w/some coarse to fine sand, trace fine gravel. 15" RECOVERY A-4(4) Topsoil - 4". 5 YR - 5/1	
3		2	4.0'	7 6 7 7	Moist medium dense gray coarse to fine sandy fine gravel w/some silt, trace clay. 4" RECOVERY Moist medium dense gray coarse to fine A-1-b USDA Classification: Loamy Sand	
6	ľ	3	6.0	9 7 7 6	Wet medium dense gray fine gravelly coarse sand w/some fine sand and silt. 13" RECOVERY	
		4	6.0' 8.0'	3 3 7 7	Wet loose gray coarse sand w/some fine gravel and fine sand, trace silt. 14" RECOVERY	
9			0.0		End of Boring	
12						
15						

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Silty sand



Well graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on September 23, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

8.0

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1 Boring No.: SWM2-21-05

Contract: 25-113-01

Boring Location: STA. 480+73 160' Lt. C.L.

Boring Surface Elev.: + 59.3 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 9/24/10 3.9 4.0 4.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks	
	9/24/10	1	0.5' 2.0'	10 18 20	Moist medium dense tan silty coarse sand w/ some fine sand and fine gravel, trace clay. 10" RECOVERY A-2-4(0) Topsoil - 4". 10YR - 5/3 USDA Classificatio	n : Sandy
		2	2.0'	8 7 7	Moist medium dense tan coarse to fine sand A-1-b Loam	
3			4.0'		w/some silt, trace fine gravel. 7.5YR - 7/2	
		3	4.0'	10 8 10 10	Saturated medium dense orange coarse to fine A-1-b 10YR - 6/8 sand w/some fine gravel and silt.	
6			6.0'		12" RECOVERY	
		4	6.0'	14 13 9 5	Saturated medium dense orange fine sandy fine gravel w/some coarse sand and silt. 10YR - 6/8	
			8.0'		12" RECOVERY	
9					End of Boring	
9						
12						
15						

Remarks:

Symbol Description

Strata symbols



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on September 24, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

10.0

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-22-01

Contract: 25-113-01

Boring Location: Sta. 488+25, 235' Rt. C.L.

Boring Surface Elev.: + 55.6 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 1/22/2010 5.5 10.0 8.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	1/22/10	1	2.0'	1 1 6 12	Wet loose orange clayey coarse sand w/some fine sand, fine gravel and silt.	A-2-4(0)	USDA Classifica : Sandy Loam
2.5		2	2.0'	6654	Saturated medium dense orangish brown fine to coarse sand w/some silt and fine gravel.	A-2-4(0)	USDA Classifica Loamy Sand
-			4.0'	1	18" RECOVERY		
5		3	4.0' 6.0'	1 2 3 3 3	Saturated firm green clayey fine sandy silt w/some coarse sand, trace of fine gravel. 13" RECOVERY	A-5(1)	
-		4	6.0'	4		A 7 6(5)	
7.5		7		4 5 6 8	Saturated stiff brownish green fine sandy clay w/some coarse sand and silt.	A-7-6(5)	
		<u> </u>	8.0'	4	18" RECOVERY	 	
10		5	8.0'	4 6 8 11	Saturated medium dense green silty fine sand w/some coarse sand. 18" RECOVERY	A-2-4(0)	
		6	10.0'	6	Saturated very stiff green fine sandy clay w/some silt, trace of coarse	A-6(1)	
				6 7 9 12	sand.		
				12			
			12.0'		16" RECOVERY		
12.5					End of Boring		

Remarks:

Symbol Description

Strata symbols

Silty sand



Clayey sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 1/22/2010 using a 3 1/4-inch diameter continues flight power auger. Rig is a Track CME 55.
- Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-22-01A

Contract: 25-113-01

Boring Location: Sta. 488+25, 235' Rt. C.L.

Boring Surface Elev.: + 55.6 Reference:

IN. IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. D-Sampler: S-Sampler: U-Sampler: Type of: O.D. IN. IN. O.D. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** Inches **Hollow Stem Auger:**

Water Level Readings

Time Depth of Hole **Depth of Casing Depth of Water** Elev. of Water Date 11/30/2009 8.0

0.6

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Lafferty

Depth (ft.)	Daily	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
2.5 5	Progress 11/30/09	1 2 3	Depth 0.5' 1.5' 2.0' 3.0' 3.0' 8.0'	T	Wet orangish gray clayey coarse sandy silt w/some fine sand, trace of fine gravel and organic matter. 12" RECOVERY Saturated gray coarse sand w/some fine sand, silt and fine gravel. 6" RECOVERY Saturated tan coarse to fine sandy fine gravel w/trace of silt. 12" RECOVERY No Sample 0" RECOVERY End of Boring	A-4(2) A-1-b A-1-b	Topsoil - 6". Hand Auger Hand Auger USDA Classifica : Loamy Sand Hand Auger Hand Auger
10					End of Boring		

Remarks:

Symbol Description

Strata symbols

Clayey sand



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 11/30/2009 using a hand auger.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-22-02

Contract: 25-113-01

Boring Location: Sta. 489+25, 235' Rt. C.L.

Boring Surface Elev.: + 57.9 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

O.D. Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0 10.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 1/22/2010 2.9 6.0 4.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corpoartion **Driller:** Dave Burt

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	1/22/10	1	0.0'	2 4 4 6	Wet firm tan fine sandy silt w/some fine gravel and coarse sand.	A-4(0)	USDA Classifica : Sandy
			2.0'		14" RECOVERY		Clay
3		2	4.0'	3 6 12 13	Saturated medium dense tan fine gravelly fine sand w/some silt, trace of coarse sand. 18" RECOVERY	A-2-4(0)	Loam USDA Classifica : Sandy
6		3	4.0' 6.0'	4 18 9 11	Saturated medium dense orange coarse sandy fine gravel w/some fine sand and silt. 17" RECOVERY	A-1-b	Loam
		4	6.0'	4 11 14 9	Saturated medium dense brown clayey fine gravel w/some coarse to fine sand, trace of silt.	A-2-6(0)	
			8.0'		16" RECOVERY		
9		5	8.0'	2 2 4 8	Saturated loose green silty fine sand w/some coarse sand, trace of fine gravel.	A-2-4(0)	
			10.0'		18" RECOVERY		
		6	10.0'	7 9 11 13	Saturated very stiff green fine sandy clay w/some coarse sand and silt.	A-6(3)	
12			12.0'		15" RECOVERY		
					End of Boring		
15							

Remarks:

Symbol Description

Strata symbols



Silty sand



Clayey sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 1/22/2010 using a 3 1/4-inch diameter continues flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-22-02A

Contract: 25-113-01

Boring Location: Sta. 489+25, 235' Rt. C.L.

Boring Surface Elev.: + 57.9 Reference:

IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. D-Sampler: S-Sampler: U-Sampler: IN. Type of: O.D. IN. IN. O.D. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** Inches **Hollow Stem Auger:**

Water Level Readings

Time Depth of Hole **Depth of Casing Depth of Water** Elev. of Water Date 11/30/2009 4.0 0.9

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	11/30/09	1	0.5'		Moist gray coarse sandy fine grayel w/some fine sand and silt.	A-1-b	Topsoil -
			1.5'		12" RECOVERY		6". Hand
		2	1.5'		Saturated tan fine to coarse sandy fine gravel w/trace of silt.	A-1-b	Auger
2.5		3	2.5'		12" RECOVERY	2.4(0)	Hand
		3	2.5		Saturated grayish orange silty fine sand w/trace of coarse sand and fine gravel.	A-2-4(0)	Auger USDA
		N	4.01				Classificat
			4.0'		18" RECOVERY End of Boring		: Sand
5				\ I	JGUST 2015		Hand Auger
J				ΔI	1(-11.51 /111.5		ruger
				10	7001 Z010		
7.5							
10							
1.0							
12.5							

Remarks:

Symbol Description

Strata symbols



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 11/30/2009 using a hand auger.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-23-01

Contract: 25-113-01

Boring Location: Sta. 498+75, 175' Rt. C.L.

Boring Surface Elev.: + 64.2 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0 8.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 1/26/2010 10.0 8.0 6.9

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Lafferty

		_				_	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	1/26/10	1	0.5' 2.0'	2 2 2	Wet soft brown clayey silt w/some fine gravel, trace of coarse to fine sand. 10" RECOVERY	A-4(5)	Topsoil - 8".
		2	2.0'	2 2	Wet firm brown silty clay w/some fine gravel, trace of coarse to fine sand	l. A-6(6)	
3		V	4.0'	3	E D 11' RECOVERY		
	•	3	4.0' 6.0'	3 4 6 6	Saturated loose tan coarse to fine sand w/some silt, trace of fine gravel. 15" RECOVERY	A-1-b	USDA Classifica : Sand
6		4	6.0'	4 4 3 5	Saturated loose orangish tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			8.0'		7" RECOVERY		
9		5	8.0'	6 5 6 6	Saturated medium dense tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			10.0'		21" RECOVERY		
					End of Boring		
12							
15							

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Well graded sand with silt

Silty sand

DRAFT NOT FOR BIDDING **AUGUST 2015**

- Exploratory borings were drilled on 1/26/2010 using a 3 1/4-inch diameter continues flight power auger. Rig is a ATV CME 45.
- Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-23-02

Contract: 25-113-01

Boring Location: Sta. 499+75, 175' Rt. C.L.

Boring Surface Elev.: + 62.7 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches

Hollow Stem Auger: 0.0

Water Level Readings **Depth of Water** Time **Depth of Hole Depth of Casing** Elev. of Water Date 7.0

1/26/2010 10.0 8.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	1/26/10	1	0.5'	2 2 4	Wet firm brown silty clay w/some coarse to fine sand, trace of fine grave	l. A-6(6)	Topsoil - 8".
			2.0'		10" RECOVERY		USDA
	_	2	2.0'	6 8 7	Wet medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	Classifica : Loam
3			4.0'	6	gravel. 20' RECOVERY		Loam
	•	3	4.0'	2 2 2 4	Saturated very loose tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
6			6.0'		15" RECOVERY		
		4	6.0'	2 2 3 4	Saturated loose tan coarse to fine sand w/some silt and fine gravel.	A-1-b	
			8.0'		22" RECOVERY		
9		5	8.0' 9.0'	4 6	Saturated loose orange fine gravelly coarse to fine sand w/some silt. 10" RECOVERY	A-1-b	
9		5A	9.0'	6 8	Saturated stiff orange clayey fine sandy silt w/some coarse sand and fine	A-4(0)	
			10.0'		gravel. 8" RECOVERY		
					End of Boring		
12							
12							
15							
1			1			1	1

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 1/26/2010 using a 3 1/4-inch diameter continues flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-24-01

Contract: 25-113-01

Boring Location: Sta. 408+10, 335' Rt. C.L.

Boring Surface Elev.: + 62.1 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0 10.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 12/7/2009 2.9 6.0 4.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Lafferty

			1	1			
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/7/09	1	0.5' 2.0'	1 2 2	Wet soft grayish orange fine sandy silt w/some clay, trace of coarse sand and fine gravel. 13" RECOVERY	A-4(1)	Topsoil - 6".
3		2	2.0' 4.0' 4.0'	3 7 6 5	Saturated medium dense grayish orange silty coarse to fine sand w/trace of fine gravel. 17' RECOVERY Saturated loose grayish orange silty coarse to fine sand w/trace of fine	A-2-4(0) A-2-4(0)	USDA Classifica : Sandy Loam
6		4	6.0' 6.0'	4 4 2 3 3 2	gravel. 8" RECOVERY Saturated loose brown silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
9		5	8.0' 8.0'	2 3 2 2	13" RECOVERY Saturated loose brown coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
		6	10.0' 10.0'	2 3 2 2	5" RECOVERY Saturated loose brown coarse sand w/some silt, trace of fine sand and fine	A-1-b	
12			12.0'	2 2	gravel. 6" RECOVERY		
					End of Boring		
15							

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 12/7/2009 using a 3 1/4-inch diameter continues flight power auger. Rig is a ATV CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-24-02

Contract: 25-113-01

Boring Location: Sta. 409+40, 310' Rt. C.L.

Boring Surface Elev.: + 62.70 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D. O.D.

IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0 10.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 12/7/2009 6.0 4.0 3.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/7/09	1	0.5' 2.0'	3 3 5	Wet firm orangish tan coarse sandy silt w/some fine sand and clay, trace of fine gravel. 13" RECOVERY	A-4(0)	Topsoil - 6".
		2	2.0'	3 11 8	Saturated very stiff orangish tan clayey fine sandy silt w/trace of coarse sand.	A-4(0)	USDA Classifica
3		V	4.0'	10	20" RECOVERY		: Sandy Loam
		3	4.0'	8 11 8 9	Saturated medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
6			6.0'		18" RECOVERY		
		4	6.0'	2 5 4 4	Saturated loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			8.0'		20" RECOVERY		
9		5	8.0'	2 2 2 2	Saturated very loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
			10.0'		22" RECOVERY		L_
		6	10.0'	2 3 4 3	Saturated loose tan coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
12			12.0'		22" RECOVERY		L
					End of Boring		
15							
	1 1	1	1				

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 12/7/2009 using a 3 1/4-inch diameter continues flight power auger. Rig is a ATV CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1 Boring No.: SWM2-24-03

Contract: 25-113-01

Boring Location: STA. 412+47 237' Rt. C.L.

Boring Surface Elev.: + 64.7 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D. Core Bit: O.D.

Casing Size: 3 1/4 Inches

From Depth of: From Depth of: To: To: Hollow Stem Auger: 0.0

Water Level Readings

Depth of Casing Depth of Water Time Depth of Hole Elev. of Water Date 9/24/10 7.9 12.0 12.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
	9/24/10	1	0.5' 2.0'	13 10 10	Moist very stiff brown clayey fine sand w/ A-4(1) trace coarse sand and fine gravel. 7" RECOVERY	Topsoil - 8". 10 YR - 7/6
		2	2.0'	11 11	Moist very stiff brown coarse sandy silt w/ A-4(0)	10 YR - 7/6
3			4.0'	10 9	some fine sand.	JG
	•	3	4.0'	8 10 10 9	Moist medium dense orange coarse to fine A-1-b sand w/some silt, trace fine gravel.	7.5 YR - 6/8
6			6.0'		20" RECOVERY	
		4	6.0' 8.0'	7 7 6 7	Moist medium dense orange coarse to fine sand w/some silt, trace fine gravel and clay. 18" RECOVERY	7.5 YR - 6/8 USDA Classification : Loamy Sand
9		5	8.0'	3 4 4 3	Wet loose brown coarse sand w/some fine sand and silt, trace fine gravel.	10 YR - 5/8
		6	10.0'	4 4 7 7	15" RECOVERY Wet medium dense brown coarse sand w/ A-1-b some fine sand and silt, trace fine gravel.	10 YR - 5/8
12			12.0'		18" RECOVERY	
			1=12		End of Boring	
15						

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Silt



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on September 24, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1 Boring No.: SWM2-25-01

Contract: 25-113-01

Boring Location: STA. 424+43 212' Rt. C.L.

Boring Surface Elev.: + 70.2 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Time **Depth of Casing Depth of Water Depth of Hole** Elev. of Water Date 9/21/10 12.0 12.0 Dry

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks
	9/21/10	1	0.5' 2.0'	116 12 16	Moist very stiff brown silt w/some fine to coarse sand and clay, trace fine gravel. 10 'RECOVERY A-4(1) Topsoil - 7". 10 YR - 6/6
3	N	2	4.0	13 10 13 15	Moist medium dense brown coarse to fine sand w/some silt, trace fine gravel. 14" RECOVERY
		3	4.0'	6 16 16 16	Moist dense tan coarse to fine sand w/trace A-1-b 10 YR - 8/8 silt and fine gravel.
6		4	6.0' 6.0' 8.0'	15 10 9 11	Moist medium dense tan fine to coarse sand w/some silt, trace clay and fine gravel. 10 YR - 8/8 USDA Classification: Loamy Sand
9		5	8.0'	4 4 4 5	Moist loose brown fine to coarse sand w/some silt, trace fine gravel. A-2-4(0) 10 YR 6/8
		6	10.0'	7 4 5 6	T7" RECOVERY Wet loose brown fine to coarse sand w/some silt, trace fine gravel. A-2-4(0) 10 YR - 6/8
12			12.0'		End of Boring
15					
15					

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Silty sand



Well graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on September 21, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1 Boring No.: SWM2-25-02

Contract: 25-113-01

Boring Location: STA. 428+39 210' Rt. C.L.

Boring Surface Elev.: + 66.7 Reference:

IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D. O.D.

IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 9/21/10 12.0 12.0 7.7

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	9/21/10	1	1.0' 2.0'	13 11		Moist very stiff brown clayey fine sandy silt w/some coarse sand, trace fine gravel.	A-4(0)	Topsoil - 9". 7.5 YR - 6/8
		2	2.0'	10	manna	9" RECOVERY	A-2-4(0)	7.5 YR - 5/8
3				10 8 8 5		Moist medium dense orange coarse to fine sand w/some silt, trace fine gravel.	,	
	N		4.0'			18" RECOVERY		
		3	4.0	3 4 4		Moist loose brown coarse to fine sand w/some silt.	A-1-b	7.5 YR - 4/6
6			6.0'			17" RECOVERY		
		4	6.0	3 2		Wet loose brown coarse to fine sand w/some	A-1-b	7.5 YR - 4/6
				3 2 3 3		silt, trace clay and fine gravel.		USDA Classification:
			0.01		1	10% DECOVEDY		Loamy Sand
		5	8.0' 8.0'	3		18" RECOVERY Wet loose brown coarse to fine sand w/some	A-1-b	7.5 YR - 5/8
9				3 3 4 3		silt, trace fine gravel.	11 1 0	7.6 111 6,6
		6	10.0' 10.0'	3	314337	15" RECOVERY		7.5.VD 5/0
		0	10.0	4 4		Wet loose brown coarse to fine sand w/some silt, trace fine gravel.	A-1-b	7.5 YR - 5/8
				4		sin, trace time graver.		
12			12.0'		0011100 0011100 00111100 00111100 00111100 00111100 00111100 00111100 00111100	16" RECOVERY		
						End of Boring		
15								

Remarks:

Symbol Description

Strata symbols

Poorly graded clayey silty sand



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on September 21, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1 Boring No.: SWM2-26-01

Contract: 25-113-01

Boring Location: STA. 477+61 181' Rt. C.L.

Boring Surface Elev.: + 68.8 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D. Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches

Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time **Depth of Casing** Depth of Hole Elev. of Water Date 9/24/10 12.0 12.0 Dry

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks
	9/24/10	1	0.5' 2.0'	9 15 16	Moist medium dense brown coarse to fine A-1-b Topsoil - 6". sand w/some silt, trace fine gravel. 6" RECOVERY
		2	2.0'	14 16	Moist dense brown silty coarse to fine sand A-2-4(0) 10YR - 5/6
3			4.0	18 21	w/trace fine gravel. 18" RECOVERY
	•	3	4.0'	6 7 8 6	Moist medium dense brown coarse sand w/ A-1-b 10YR - 7/6 some silt, fine sand and fine gravel.
6			6.0'		20" RECOVERY
		4	6.0'	6 5 4 4	Moist loose brown coarse to fine sand w/some A-1-b 10YR - 6/8 silt and fine gravel.
			8.0'		18" RECOVERY
9		5	8.0'	3 2 1 2	Moist very loose brown coarse sand w/some fine sand, fine gravel and silt, trace clay. 10YR - 6/8 USDA Classification: Loamy Sand
		6	10.0'	2 2	Wet very loose brown coarse sand w/some fine sand and silt, trace fine gravel. 9" RECOVERY A 2 4(0) 10VR 5/8
12		6A	11.0' 12.0'	2 2	Wet very loose orange fine sand w/some silt,
					trace coarse sand and fine gravel. 8" RECOVERY
					End of Boring
45					
15					

Remarks:

Symbol Description

Strata symbols



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on September 24, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1 Boring No.: SWM2-26-02

Contract: 25-113-01

Boring Location: STA. 478+49 381' Rt. C.L.

Boring Surface Elev.: + 66.3 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D. O.D.

IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 9/24/10 9.1 12.0 12.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks
	9/24/10	1	0.5' 2.0'	10 10 15	Moist very stiff brown silt w/some fine A-4(0) Topsoil - 5". 10 YR - 6/6
3	N	2	4.0	12 20 21 17	Moist dense brown silty coarse to fine sand A-2-4(0) 10 YR - 6/6 w/some fine gravel.
6	•	3	6.0'	9 10 11 12	Moist medium dense brown fine gravelly coarse sand w/some fine sand and silt. 18" RECOVERY
		4	6.0' 8.0'	11 12 8 9	Moist medium dense tan coarse sand w/some fine gravel, fine sand and silt, trace clay. A-1-b 10 YR - 7/6 USDA Classification: Loamy Sand
9		5	8.0'	4 5 5 4	Wet loose brown coarse to fine sand w/some silt, trace fine gravel. 19" RECOVERY
12		6	10.0'	3 3 4 6	Wet loose brown coarse sand w/some fine sand and silt, trace fine gravel. 15" RECOVERY
12			, 2.0		End of Boring
15					

Remarks:

Symbol Description

Strata symbols

Silt

Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on September 24, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

IN.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1 Boring No.: SWM2-26-03

Contract: 25-113-01

Boring Location: STA. 480.38 217 Rt. C.L.

Boring Surface Elev.: + 67.0 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D. **Casing Size:** 3 1/4 Inches

From Depth of: From Depth of: To: To: Hollow Stem Auger: 0.0

Water Level Readings

Depth of Casing Depth of Water Time Depth of Hole Elev. of Water Date 9/24/10 12.0 12.0 Dry

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks	
	9/24/10	1	0.5'	8 11 16	Moist medium dense brown coarse sand and fine gravel w/some fine sand and silt. Topsoil - 5". 10YR - 6/6	
3		2	2.0'	19 22 23 27	Moist dense brown fine gravelly fine sand w/ A-2-4(0) 10YR - 5/6 some silt, trace coarse sand.	
6		3	4.0' 6.0'	17 13 9 8	Moist medium dense brown silty coarse sand w/some fine sand and fine gravel. 21" RECOVERY	
		4	6.0' 8.0'	12 13 10 11	Moist medium dense brown coarse sand w/ some fine sand, fine gravel and silt, trace clay. 10YR - 5/8 USDA Classification: Loamy Sand	
9		5	8.0'	5 10 5 4	Moist medium dense brown fine to coarse sand w/some silt, trace fine gravel. 15" RECOVERY	
12		6	10.0'	5 6	Moist medium dense orangish brown coarse to fine sand w/trace silt and fine gravel. 18" RECOVERY	
					End of Boring	
15						

Remarks:

Symbol Description

Strata symbols

Silty sand

Well graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on September 24, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1 Boring No.: SWM2-26-04

Contract: 25-113-01

Boring Location: STA. 482+73 159' Rt. C.L.

Boring Surface Elev.: + 65.5 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0

12.0

Water Level Readings

Time **Depth of Casing Depth of Water** Depth of Hole Elev. of Water Date 9/23/10 12.0 12.0 8.1

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth	Daily		Sample			
(ft.)	Progress	No.	Depth	Blows/6"	Sample Description Class./G.I.	Remarks
	9/23/10	1	0.0'	13 18 28 30	Moist hard brown clayey coarse to fine sandy A-4(0) silt w/some fine gravel.	10 YR - 7/3
			2.0'	12	18" RECOVERY	10.000
3		1	4.0'	12 18 18 13	Moist dense brown silty coarse to fine sand w/some fine gravel. 17" RECOVERY	10 YR - 6/8
6		3	4.0'	9 14 16 18	Moist medium dense brown coarse sand w/ some fine sand, fine gravel and silt. 19" RECOVERY	10 YR - 6/8
		4	6.0' 8.0'	8 5 4 3	Moist loose brown coarse to fine sand w/some silt and fine gravel, trace clay. 19" RECOVERY	10 YR - 6/8 USDA Classification : Loamy Sand
9		5	8.0'	2 3 5 9	Wet loose brown coarse to fine sand w/some silt, trace fine gravel. 15" RECOVERY	10 YR - 6/8
		6	10.0'	7 14 14 16	Wet medium dense brown coarse sandy fine gravel w/some fine sand and silt.	10 YR - 6/8
12			12.0'		End of Boring End of Boring	
15						

Remarks:

Symbol Description

Strata symbols



Poorly graded clayey silty sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on September 23, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1 Boring No.: SWM2-27-01

Contract: 25-113-01

Boring Location: STA. 419+16 242' Lt. C.L.

Boring Surface Elev.: + 70.0 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Casing Depth of Water Time Depth of Hole Elev. of Water Date 9/21/10 9.1 12.0 12.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
	9/21/10	1	0.0'	21 29 18 14	Moist hard brown clayey silt w/some fine A-4(0) gravel and fine to coarse sand.	10YR - 3/6
			2.0' 2.0'	18 12	19" RECOVERY Moist very stiff brown clayey fine sandy silt A-4(1)	10YR - 3/6
3			3.0'		w/some coarse sand, trace fine gravel.	
		2A	3.0' 4.0'	13 17	Moist medium dense orange silty fine to	10YR - 6/8 USDA Classification : Sandy
		3	4.0'	5 5 5	coarse sand w/trace clay and fine gravel. 12" RECOVERY A-2-4(0)	Loam 10YR - 6/8
6			6.0'	6	Moist loose orange silty fine sand w/trace coarse sand. 17" RECOVERY	101K - 0/8
		4	6.0'	12 11 15 12	Moist medium dense orange coarse sand w/ A-1-b some fine sand and silt, trace fine gravel.	10YR - 6/8
			8.0'	12	20" RECOVERY	
9		5	8.0'	5 3 3 5	Wet loose brown coarse sand w/some fine sand and silt, trace fine gravel.	10YR - 7/6
			10.0'		10" RECOVERY	
		6	10.0'	6 5 5 5	Wet loose brown coarse to fine sand w/some silt, trace fine gravel.	10YR - 7/6
12			12.0'		19" RECOVERY	
12					End of Boring	
15						
1				1		

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Poorly graded clayey silty sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on September 21, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1 Boring No.: SWM2-27-02

Contract: 25-113-01

Boring Location: STA. 420+12 230' Lt. C.L.

Boring Surface Elev.: + 67.6 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D. O.D. IN. Core Bit: O.D.

Casing Size: 3 1/4 Inches

From Depth of: From Depth of: To: To: Hollow Stem Auger: 0.0 12.0

Water Level Readings

Time **Depth of Casing Depth of Water Depth of Hole** Elev. of Water Date 9/21/10 12.0 12.0 8.8

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
	9/21/10		0.0'		No Sampling	Gravel/Asphalt - 24".
			2.0'		0" RECOVERY	
3			4.0'	14 13 14 9	Moist very stiff gray clayey silt w/some fine A-4(2) to coarse sand, trace fine gravel. 17" RECOVERY	7.5YR - 4/1
6		2	4.0'	6 8 14 19	Wet very stiff brown silt w/some fine to coarse sand and clay, trace fine gravel. 18" RECOVERY	7.5YR - 5/2 USDA Classification : Silt Loam
		3	6.0' 8.0'	18 15 15 13	Wet medium dense brown coarse to fine sand w/some silt, trace fine gravel. 19" RECOVERY	10YR - 4/6
9		4	8.0'	6 8 7 8	Wet medium dense brown coarse to fine sand w/some silt, trace fine gravel. 16" RECOVERY	10YR - 6/8
		5	10.0'	6 6 5 7	Wet medium dense brown fine to coarse sand w/some silt, trace fine gravel. A-2-4(0)	10YR - 5/8
12			12.0'		16" RECOVERY	
					End of Boring	
15						

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on September 21, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1 Boring No.: SWM2-27-03

Contract: 25-113-01

Boring Location: STA. 421+20 524 Lt. C.L.

Boring Surface Elev.: + 66.97 Reference:

IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D. O.D. IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches

Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 12/17/10 8.0 8.0 7.7

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks	
	12/17/10	1	0.5' 2.0'	4 5 5	Wet firm brown clayey silt w/some fine to coarse sand, trace of fine gravel. 7" RECOVERY Topsoil - 6".	
		2	2.0'	6 7 7 8	Wet medium dense brown silty fine to coarse A-2-4(0)	
3			4.0'		sand w/trace of fine gravel. 18" RECOVERY	
	•	3	4.0'	3 4 6 3	Wet loose brown silty fine sand w/trace of coarse sand. A-2-4(0)	
6			6.0		15" RECOVERY	
		4	6.0'	3 3 2 3	Saturated loose brown silty fine sand w/trace A-2-4(0) USDA Classification: Loamy Sand	
			8.0'		15" RECOVERY	
9		5	8.0'	2 2 2 3	Saturated very loose brown fine to coarse sand w/some silt, trace of fine gravel. A-2-4(0)	
			10.0'		16" RECOVERY	
					End of Boring	
12						
12						
15						

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on December 17, 2010 using 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1 Boring No.: SWM2-27-04

Contract: 25-113-01

Boring Location: STA. 422+92 677 Lt. C.L.

Boring Surface Elev.: + 67.09 Reference:

IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D. O.D.

IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 12/17/10 10.0 10.0 7.7

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	12/17/10	1	0.5' 2.0'	3 3 3		t firm brown silty clay w/trace of coarse to sand and fine gravel. 8" RECOVERY	A-6(11)	Topsoil - 8".
		2	2.0'	6 6 7 8		t stiff brown clayey coarse sandy silt w/	A-4(0)	
3			4.0			ne fine sand, trace of fine gravel. 14" RECOVERY		JG
	•	3	4.0'	4 9 7 8	Wet sand	t medium dense brown silty fine to coarse d.	A-2-4(0)	
6			6.0'			20" RECOVERY	15	
		4	6.0'	5 5 4		urated loose brown fine to coarse sand w/ne silt, trace of fine gravel and clay.	A-2-4(0)	USDA Classification: Loamy Sand
			8.0'			16" RECOVERY		
9		5	8.0'	1 3 5 4	[4] [4] [4] [4] [4]	urated loose brown fine to coarse sand w/ ne silt, trace of fine gravel.	A-2-4(0)	
			10.0'			14" RECOVERY		
					End	l of Boring		
12								
15								

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Poorly graded clayey silty sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on December 17, 2010 using 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1 Boring No.: SWM2-28-01

Contract: 25-113-01

Boring Location: Sta. 298+69 285 Rt. C.L.

Boring Surface Elev.: + 61.2 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D.

IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Casing Depth of Water Time Depth of Hole Elev. of Water Date 9/22/10 12.0 12.0 Dry

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/22/10	1	0.5' 2.0'	9 9 10	Moist very stiff brown fine sandy silt w/some coarse sand and clay. 11" RECOVERY	A-4(0)	Topsoil - 7". 10 YR - 4/6 USDA Classification : Loam
		2	2.0'	8 8 8 7	Moist medium dense brown silty fine sand w/	A-2-4(0)	7.5 YR - 5/6
3			4.0		some coarse sand and clay. 16" RECOVERY		JG
	•	3	4.0'	5 10 11 11	Moist medium dense brown silty fine to coarse sand w/trace fine gravel.	A-2-4(0)	7.5 YR - 5/6
6			6.0'		18" RECOVERY	15	
		4	6.0'	11 7 8 7	Moist medium dense orange silty fine sand w/some coarse sand, trace fine gravel.	A-2-4(0)	10 YR - 5/6
			8.0'	<u> </u>	19" RECOVERY		
9		5	8.0'	3 5 6 6	Moist medium dense orange coarse to fine sand w/some silt, trace fine gravel.	A-2-4(0)	10 YR 5/6
			10.0'		17" RECOVERY		
		6	10.0'	6 8 9 7	Moist medium dense brown fine to coarse sand w/some silt, trace fine gravel.	A-2-4(0)	10 YR - 5/6
12			12.0'		19" RECOVERY		
					End of Boring		
15							

Remarks:

Symbol Description

Strata symbols

Silt



Poorly graded clayey silty sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on September 22, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1 Boring No.: SWM2-28-02

Contract: 25-113-01

Boring Location: STA. 298+89 154' Rt. C.L.

Boring Surface Elev.: + 60.7 Reference:

IN. IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D. O.D. IN.

Core Bit: O.D. **Casing Size:** 3 1/4 Inches

From Depth of: From Depth of: To: To: **Hollow Stem Auger:** 0.0

Water Level Readings

Depth of Water Time **Depth of Casing** Depth of Hole Elev. of Water Date 9/22/10 Dry 12.0 12.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/22/10	1	0.5' 2.0'	9 9 10	Moist very stiff brown coarse to fine sandy silt w/some clay, trace fine gravel. 9" RECOVERY	A-4(0)	Topsoil - 8". 10 YR - 6/8
		2	2.0'	11 9 10	Moist medium dense brown silty fine to	A-2-4(0)	10 YR - 6/8
3			4.0		coarse sand.	110	JG
	_	3	4.0'	9 6 5 7	Moist medium dense brown coarse to fine	A-1-b	10 YR - 6/8
				7	sand w/some silt, trace fine gravel.		
6			6.0'		15" RECOVERY	15	
		4	6.0'	12 7 6 6	Moist medium dense brown fine to coarse sand w/some fine gravel and silt.	A-2-4(0)	10 YR - 6/8
			8.0'		20" RECOVERY		
9		5	8.0'	4 4 5 6	Wet loose brown coarse to fine sand w/some silt, trace clay.	A-2-4(0)	10 YR - 6/8 USDA Classification : Loamy Sand
			10.0'		16" RECOVERY		Louiny Sand
		6	10.0'	9 7 7 5	Wet medium dense orange silty coarse to fine sand w/trace fine gravel.	A-2-4(0)	7.5 YR - 5/8
40			12.0'		10" DECOVEDY		
12			12.0		18" RECOVERY End of Boring		
					2 01 2 01		
15							

Remarks:

Symbol Description

Strata symbols



Poorly graded clayey silty sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on September 22, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1 Boring No.: SWM2-29-01

Contract: 25-113-01

Boring Location: STA. 298+41 273' Rt. C.L.

Boring Surface Elev.: + 52.6 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 O.D.

IN. IN. O.D. IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time **Depth of Casing Depth of Hole** Elev. of Water Date 9/22/10 Dry 12.0 12.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks
	9/22/10	1	0.5' 2.0'	7 14 16	Moist very stiff brown clayey fine sandy silt A-4(0) Topsoil - 8". w/some coarse sand. 7" RECOVERY
3	N	2	4.0	15 15 15 15	Moist medium dense brown coarse to fine A-2-4(0) 10 YR - 6/8 sand w/some silt.
6		3	6.0	9 11 12 10	Moist very stiff brown fine sandy silt w/some A-4(0) 10 YR - 6/8 coarse sand, trace clay.
		4	6.0°	12 9 13 8	Moist medium dense brown silty coarse to A-2-4(0) 10 YR - 6/8 fine sand w/trace fine gravel.
9		5	8.0'	9 10 10 10	Moist medium dense brown coarse to fine sand w/some silt, trace fine gravel and clay. 16" RECOVERY A-2-4(0) 5 YR - 5/6 USDA Classification: Loamy Sand
12		6	10.0'	7 9 10 10	Moist medium dense brown coarse sand w/ A-1-b 5 YR - 5/6 some fine sand and fine gravel, trace silt.
			. 2.0		End of Boring
15					

Remarks:

Symbol Description

Strata symbols

Poorly graded clayey silty sand



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on September 22, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1 Boring No.: SWM2-29-02

Contract: 25-113-01

Boring Location: STA. 299+26 185 Rt. C.L.

Boring Surface Elev.: + 49.9 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Casing Time **Depth of Water** Depth of Hole Elev. of Water Date 9/22/10 Dry 12.0 12.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Rema	ırks
	9/22/10	2	1.0' 2.0' 2.0'	15 23	Moist very stiff brown coarse to fine sandy clay w/some silt, trace fine gravel. 8" RECOVERY A-6(3) Topsoil - 9". 10 YR - 6/6	
3	N	14	4.0'	11 13 20 27	Moist dense brown coarse sand and fine gravel w/some fine sand and silt. 10" RECOVERY	
		3	4.0	6 8 8 11	Moist medium dense brown coarse to fine A-1-b 5 YR - 4/6 sand and fine gravel w/some silt.	
6			6.0'_		18" RECOVERY	
		4	6.0	10 9 11 16	Wet medium dense brown fine to coarse sand w/some clay, trace silt. Wet medium dense brown fine to coarse sand A-2-4(0) USDA Classifi Loamy Sand	cation :
		5	8.0' 8.0'	6	18" RECOVERY Wet medium dense brown fine to coarse sand A-2-4(0) 5 YR - 5/6	
9		J	0.0	6 9 12 15	Wet medium dense brown fine to coarse sand w/some silt. A-2-4(0) 5 YR - 5/6	
			10.0' 10.0'	7	20" RECOVERY	
		6	10.0	7 9 9 12	Wet medium dense brown silty coarse to fine sand. A-2-4(0) 5 YR - 5/6	
12			12.0'		20" RECOVERY	
					End of Boring	
15						

Remarks:

Symbol Description

Strata symbols

Clayey sand

Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on September 22, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1 Boring No.: SWM2-30-01

Contract: 25-113-01

Boring Location: STA. 56+90 242' Rt. C.L.

Boring Surface Elev.: + 62.9 Reference:

IN. IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D. O.D.

IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Time **Depth of Casing Depth of Water Depth of Hole** Elev. of Water Date 9/23/10 12.0 12.0 8.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/23/10	1	0.5' 2.0'	6 14 20	Moist very stiff gray clayey fine gravelly silt w/trace fine to coarse sand. 10" RECOVERY	A-4(3)	Topsoil - 6". 2.5 YR - 7/1
3		2	2.0' 4.0' 4.0'	18 20 18 18 18	Moist dense brown coarse to fine sand and fine gravel w/some silt. 14" RECOVERY Sample Missing	A-1-b	7.5 YR - 5/8 7.5 YR - 6/4
6			6.0'		19" RECOVERY	15	
		4	6.0' 8.0'	11 12 15 15	Moist medium dense brownish tan coarse to fine sand w/some fine gravel and clay, trace silt. 18" RECOVERY	A-2-6(0)	7.5 YR - 6/4 USDA Classification : Sandy Loam
9		5	8.0'	1 3 4 6	Saturated firm brownish green fine sandy clay w/some silt and coarse sand, trace fine gravel.	A-7-6(8)	10 YR - 4/2
		6	10.0'	5 5 4 5	20" RECOVERY Saturated stiff brownish green fine sandy clay w/some silt and coarse sand, trace fine gravel.	A-7-6(4)	10 YR - 4/2
12			12.0'		9" RECOVERY		
					End of Boring		
15	•						

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Silty sand

Clayey sand

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on September 23, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1 Boring No.: SWM2-30-02

Contract: 25-113-01

Boring Location: STA. 59+25 223' Rt. C.L.

Boring Surface Elev.: + 64.1 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D. O.D. IN.

Core Bit: O.D. **Casing Size:**

From Depth of: From Depth of: To: To: 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Casing Time **Depth of Water** Depth of Hole Elev. of Water Date 9/23/10 12.0 12.0 7.4

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class	s./G.I. Remarks
	9/23/10	1	0.5' 2.0'	5 5 9	Wet stiff gray silty clay w/trace fine sand and fine gravel. 10" RECOVERY	(23) Topsoil - 6". 7.5 YR - 7/1
		2	2.0'	7 7 12 16		4(5) 7.5 YR - 7/1
3			4.0'		gravel, trace fine to coarse sand. 14" RECOVERY	ING
	•	3	4.0'	12 18 16 18	Wet dense grayish brown fine gravelly coarse sand w/some fine sand, trace silt and clay.	1-b 10 YR - 6/2 USDA Classification : Sand
6			6.0'		18" RECOVERY	
		4	6.0'	14 15 18 18	Wet dense brown coarse sand w/some fine A-sand, fine gravel and silt.	1-b 10 YR - 6/3
			8.0'		福館 福野 17" RECOVERY	
9		5	8.0'	4 6 6 6	Wet medium dense gray coarse to fine sand w/some silt and fine gravel.	1-b 10 YR - 6/2
			10.0'		16" RECOVERY	
		6	10.0'	6 16 9 7	Wet medium dense gray fine to coarse sand and fine gravel w/some silt.	1-b 10 YR - 6/2
12			12.0'		12" RECOVERY	
					End of Boring	
15						

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Poorly graded sand with silt



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on September 23, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-3-01

Contract: 25-113-01

Boring Location: Sta. 313+50, 310' LT C.L.

Boring Surface Elev.: + 51.14 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0

Water Level Readings

Time **Depth of Casing** Depth of Hole **Depth of Water** Elev. of Water Date 10.7 16.0 14.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: B. Holden

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
(11.)	3/24/09	1	0.5'	4		Moist stiff brown fine sandy silt w/some clay and coarse sand, trace of	A-4(1)	Topsoil -
	0,2 1,00	· ·	0.0	4 5 4		gravel.	A-4(1)	3".
			2.0'			18" RECOVERY		5.
		2	2.0'	5 7 10		Moist medium dense brown coarse to fine sand w/some gravel and silt.	A-1-b	
3.5				10 11				
0.0			4.0'			_18" RECOVERY		
		3	4.0'	3 5 7 13		Moist stiff brown coarse sandy silt w/some clay and gravel, trace of fine	A-4(0)	
	•			7 13		sand.		
			6.0'			22" RECOVERY		
		4	6.0'	13 14	HURR	Moist dense brown coarse to fine sand w/trace of silt and gravel.	A-1-b	
7				20 22				
			8.0'	٦L		22" RECOVERY		
		5	8.0'	9		Moist medium dense dark brown clayey fine to coarse sand w/trace of	A-2-4(0)	
				9 12 10 14		gravel.	(*)	
			10.0'	'		17" RECOVERY		
10.5		6	10.0'	11		Wet medium dense dark brown silty fine to coarse sand w/trace of gravel.	A-2-4(0)	
10.0	1			11 12 14 18		Wet inedian dense dark brown sitty line to course saile wittace of graver.	11 2 4(0)	
				10				
		7	12.0' 12.0'	10		22" RECOVERY	A 2 4(0)	
		,	12.0	10 14 18 20		wet dense dark brown clayey fine to coarse sand w/trace of gravel.	A-2-4(0)	
				20				
14			14.0'	0		23" RECOVERY		
		8	14.0'	8 13 17 23		Wet medium dense dark brown fine to coarse sand w/some silt, trace of	A-2-4(0)	
				23		gravel.		
			16.0'			24" RECOVERY		
		9	16.0'	8 12 17 22		Wet medium dense dark brown fine to coarse sand w/some silt.	A-2-4(0)	
17.5				22				
17.5			18.0'			24" RECOVERY		
						End of Boring		
	l							

Remarks:

Symbol Description

Strata symbols

Silty low plasticity clay



Silty sand



Poorly graded clayey silty sand



Well graded sand with silt



Clayey sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 3/24/2009 using a 3 1/4-inch diameter continues flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-3-01A

Contract: 25-113-01

Boring Location: Sta. 313+50, 310' LT C.L.

Boring Surface Elev.: + 51.14 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D. Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches

Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time **Depth of Casing** Depth of Hole Elev. of Water Date 16.0

14.0 12.4

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Williams

Depth	Daily		Sample				
(ft.)	Progress	No.	Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
, ,	8/20/09	1	1.0'	6 7	Moist stiff brown silty clay w/trace of fine to coarse sand and fine gravel.	A-6(10)	Topsoil -
		<u> </u>	2.0'		9" RECOVERY		10".
		2	2.0'	8 16 16 18	Moist hard brown fine to coarse sandy silt w/trace of fine gravel.	A-4(0)	USDA
3.5				18			Classifica
			4.0'		14" RECOVERY		- Silty
		3	4.0'	6 6 14	Moist medium dense brown silty coarse to fine sand w/some fine gravel.	A-1-b	Loam
		N		14 17			
	_		6.0'	_	15" RECOVERY		
		4	6.0'	11 11	Moist medium dense brown coarse to fine sand w/some silt, trace of fine	A-1-b	
7				13	gravel.		
			8.0'	7	20" RECOVERY		
		5	8.0'	11	Moist medium dense brown fine gravelly coarse sand w/some silt and fine	A-1-b	
				11 13 14 12	sand.	11 1 0	
				12			
10.5		6	10.0' 10.0'	13	17" RECOVERY Wet medium dense brown silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
10.5		ਁ	10.0	13 7 9 10	wet medium dense brown sitty fine to coarse sand w/trace of fine graver.	A-2-4(0)	
				10			
		<u> </u>	12.0'	0	16" RECOVERY		
		7	12.0'	9 9 12 12	Wet medium dense brown fine to coarse sand w/some silt, trace of fine	A-2-4(0)	
				12	gravel.		
14			14.0'		19" RECOVERY		
		8	14.0'	9 9 15 17	Wet medium dense brown fine to coarse sand w/some silt.	A-2-4(0)	
				15 17			
			16.0'		19" RECOVERY		
		9	16.0'	9 16	Wet dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
				19 24		, ,	
17.5			18.0'		23" RECOVERY		
			10.0		End of Boring		
					End of Boring		

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 8/20/2009 using a 3 1/4-inch diameter continues flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-3-02

Contract: 25-113-01

Boring Location: Sta. 314+10, 225' LT C.L.

Boring Surface Elev.: + 51.50 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Casing Depth of Water Time Depth of Hole Elev. of Water Date 13.0 18.0 16.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: Bill Holden

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/24/09	1	0.5' 2.0'	2 2 3	Moist firm brown clayey silt w/some fine sand, trace of coarse sand and gravel.	A-4(5)	Topsoil - 3".
		2	2.0'	6 8 8 10	18" RECOVERY Moist medium dense brown silty fine to coarse sand w/some gravel.	A-2-4(0)	
4	R		4.0'		21" RECOVERY		
		3	6.0'	8 8 11 13	Moist medium dense brown silty gravel and coarse to fine sand. 15" RECOVERY	A-2-4(0)	
		4	6.0'	9 10	Moist medium dense coarse sand w/some fine sand, silt and gravel.	A-1-b	
8			8.0'	8 9	21" RECOVERY		
		5	8.0'	5 3 2 2	Moist loose brown coarse to fine sand w/trace of clay and gravel.	A-2-4(0)	
			10.0'		19" RECOVERY		
-		6	10.0'	3 2 2 3	Wet very loose brown fine to coarse sand w/some silt.	A-2-4(0)	
12		7	12.0' 12.0'	4	20" RECOVERY	1 2 4(0)	
		,	14.0'	4 5 5 6	Wet loose brown silty fine to coarse sand w/trace of gravel. 19" RECOVERY	A-2-4(0)	
		8	14.0'	9	Wet medium dense brown fine to coarse sand w/some silt, trace of grave	1. A-2-4(0)	
				9 11 12 11		1. A-2-4(0)	
16			16.0'	10	23" RECOVERY	1.2.40	
		9	16.0'	10 12 14 20	wet medium dense brown fine to coarse sand w/some silt, trace of grave	. A-2-4(0)	
			18.0'		24" RECOVERY		
					End of Boring		
20							
<u> </u>							
<u> </u>							
1	ı	1	ı	1		1	1

Remarks:

Symbol Description

Strata symbols

SCIACA SYMBOLS

Low plasticity clay

Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 3/24/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-3-02A

Contract: 25-113-01

Boring Location: Sta. 314+10, 225' LT C.L.

Boring Surface Elev.: + 51.50 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: IN. IN. Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Casing Time **Depth of Water** Depth of Hole Elev. of Water Date 11.9 18.0 16.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Williams

	-						
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/20/09	1	1.0' 2.0'	5 7	Moist stiff brown silty clay w/some fine to coarse sand, trace of fine	A-6(6)	Topsoil -
		2	2.0'	6 8 10	gravel. 8" RECOVERY	A-4(0)	\10".
4			4.0'	13	Moist very stiff brown fine sandy silt w/some coarse sand, trace of fine gravel.		
4	R	3	4.0'	15 21 21 17	16" RECOVERY	A-1-b	
		V	6.0'		Moist dense brown fine gravelly coarse to fine sand w/trace of silt.	7	
		4	6.0'	13 16 14	Moist medium dense brownish tan coarse sand w/some fine sand and silt,	A-1-b	
8			8.0'	12	trace of fine gravel.		
0		5	8.0'	5 6	Moist medium dense tan coarse to fine sand w/some silt, trace of fine	A-1-b	
				6 7 7	gravel.		
		6	10.0' 10.0'		12" RECOVERY	A 2 4(0)	USDA
		O	10.0	4 5 6	Wet medium dense tan fine to coarse sand w/trace of silt and clay.	A-2-4(0)	Classifica
12			12.0'	4	ERECEE: HERELE		- Sand
		7	12.0'	3 6 8 5	Wet medium dense tan fine sand w/some coarse sand and silt, trace of fine gravel.	A-2-4(0)	
			14.0'		iffici ityrich Histo		
		8	14.0'	6 13 10 14	Wet medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
16			16.0'		16" RECOVERY		
		9	16.0'	9 18 32 34	Wet very dense brown fine to coarse sand w/some silt, trace of fine	A-2-4(0)	
			18.0'	34	gravel. 23" RECOVERY		
			10.0		End of Boring		
-							
20							
1	I		l			1	1

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Silty sand



Poorly graded sand with silt



Well graded sand with silt

DRAFT NOT FOR BIDDING **AUGUST 2015**

- Exploratory borings were drilled on 8/20/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-3-03

Contract: 25-113-01

Boring Location: Sta. 315+75, 200 LT C.L.

Boring Surface Elev.: + 52.10 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0

Water Level Readings

Time **Depth of Casing Depth of Water** Depth of Hole Elev. of Water Date 18.0 16.0 12.1

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Williams

						ı	
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/20/09	1	1.0' 2.0'	6 7	Moist stiff brown clayey fine sandy silt w/some coarse sand, trace of fine	A-4(4)	Topsoil -
	'	2	2.0'	6 8 12 14	gravel. 11" RECOVERY	A-2-4(0)	10".
4	1		4.0'	14	Moist medium dense brown clayey fine to coarse sand w/some silt and fine gravel.		
		3	4.0'	5	20" RECOVERY	A-4(0)	
		N	6.0'	8	Moist firm tan fine sandy silt w/some coarse sand and clay. 15" RECOVERY	J	
	- '	4	6.0'	8 10 13 13	Moist medium dense orange fine sand w/some coarse sand and silt, trace	A-2-4(0)	
8	'		8.0'	13	of fine gravel. 18" RECOVERY		
	'	5	8.0'	8 7 7	Moist medium dense tan fine to coarse sand w/some silt and fine gravel.	A-2-4(0)	
	'		10.0'	7 6	18" RECOVERY		
	1	6	10.0'	8 6 7 9	Wet medium dense brown fine to coarse sand w/trace of clay, silt and fine	A-2-4(0)	USDA
10	'		12.0'	7 9	gravel. 12" RECOVERY		Classifica - Loamy
12	'	7	12.0'	6 11	Wet medium dense brown fine to coarse sand w/some silt, trace of fine	A-2-4(0)	Sand
	1			6 11 12 13	gravel.		
	l '	L	14.0'		18" RECOVERY		
		8	14.0'	8 10 13 17	Wet medium dense brown fine to coarse sand w/trace of silt.	A-3	
16	l '	l	16.0'	"	REFERENCE 23" RECOVERY		
		9	16.0'	8 22 32 44	Wet hard brown fine sandy silt w/some coarse sand.	A-4(0)	
			18.0'	44	24" RECOVERY		
					End of Boring		
20	'						
	'						
	'						
	1						

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Poorly graded clayey silty sand



Silty low plasticity clay



Silty sand



Poorly graded sand with silt



silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 8/20/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1 Boring No.: SWM2-3-04

Contract: 25-113-01

Boring Location: STA. 318+74 152' Lt. C.L.

Boring Surface Elev.: + 54.8 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Time **Depth of Casing Depth of Water** Depth of Hole Elev. of Water Date 9/20/10 12.0 12.0 Dry

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks
	9/20/10	1	0.5' 2.0'	14 12 15	Moist very stiff brown clayey silt w/some fine sand, trace coarse sand and fine gravel. 8" RECOVERY Topsoil - 6". 7.5YR - 6/6
3		2	4.0	23 27 19 13	Moist dense brown coarse to fine sand w/ A-1-b 7.5YR - 6/8 some silt, trace fine gravel.
6		3	4.0'	5 12 12 9	Moist medium dense brown fine to coarse sand w/some silt, trace fine gravel. 15" RECOVERY
0		4	6.0' 8.0'	10 10 8 10	Moist very stiff brownish gray fine sandy silt w/some coarse sand and fine gravel, trace clay. 18" RECOVERY
9		5	8.0'	6 9 8 9	Moist medium dense tan silty fine to coarse sand w/trace fine gravel. A-2-4(0) 10YR - 7/4
		6	10.0'	10 8 7 5	Moist medium dense orange fine to coarse sand w/trace silt, clay and fine gravel. 16" RECOVERY A-2-4(0) 10YR - 6/8 USDA Classification : Sand
12			12.0'		End of Boring
15					

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on September 20, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1 Boring No.: SWM2-3-05

Contract: 25-113-01

Boring Location: STA. 323+56 142' Lt. C.L.

Boring Surface Elev.: + 56.7 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 O.D.

IN. IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Casing Time **Depth of Water** Depth of Hole Elev. of Water Date 9/22/10 Dry 12.0 12.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
	9/22/10	1	0.5' 2.0'	9 11 15	Moist very stiff brown clayey fine sandy silt w/some coarse sand. 11" RECOVERY	Topsoil - 7". 7.5YR - 5/6 USDA Classification : Loam
		2	2.0'	8 10 12 14	Moist medium dense brown fine to coarse A-2-4(0)	7.5YR - 6/8
3			4.0'		sand w/some silt, trace fine gravel. 15" RECOVERY	JG
	•	3	4.0'	8 18 20 20	Moist dense brown coarse to fine sand w/ A-1-b some silt, trace fine gravel.	7.5YR - 6/8
6			6.0'		16" RECOVERY	
		4	6.0'	12 8 9 10	Moist medium dense brown fine to coarse sand w/some silt. A-2-4(0)	7.5YR - 6/8
			8.0'		22" RECOVERY	
9		5	8.0'	4 8 7 7	Moist medium dense silty fine to coarse sand w/trace fine gravel. A-2-4(0)	7.5YR - 6/8
			10.0'		17" RECOVERY	
		6	10.0'	5 5 5 4	Moist loose brown fine to coarse sand w/some silt.	7.5YR - 6/8
12			12.0'		18" RECOVERY	
					End of Boring	
15						

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on September 22, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1 Boring No.: SWM2-3-05*

Contract: 25-113-01

Boring Location: STA. 323+56 142' Lt. C.L.

Boring Surface Elev.: + 57.0 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Casing Time **Depth of Hole Depth of Water** Elev. of Water Date 12/17/10 12.5 15.0 15.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 15.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks
	12/17/10	1	0.5' 2.0'	4 3 4	Wet firm brown clayey fine sandy silt w/some A-4(3) Topsoil - 8". 8" RECOVERY
3	N	2	4.0'	4 4 6 6	Wet loose brown silty fine to coarse sand w/ A-2-4(0) trace of fine gravel. 16" RECOVERY
6	ľ	3	4.0' 6.0'	9 13 11 12	Wet medium dense brown coarse to fine sand w/some silt, trace of fine gravel.
		4	6.0' 8.0'	12 10 9 9	Wet medium dense brown coarse to fine sand A-2-4(0) w/some silt, trace of fine gravel.
9		5	8.0'	6 7 6 6	Wet medium dense brown fine to coarse sand w/some silt, trace of fine gravel. 20" RECOVERY
12		6	10.0'	6 6 6	Wet medium dense brown fine to coarse sand w/some silt, trace of fine gravel. 18" RECOVERY
12		7	12.0'	3 3 3	Wet loose brown fine to coarse sand w/some silt, trace of clay. 15" RECOVERY A-2-4(0) USDA Classification: Sand
15		8	13.5' 15.0'	6 6 6	Wet medium dense brown coarse to fine sand w/some fine gravel, trace of silt. 10" RECOVERY
					End of Boring

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Silty sand



Well graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on December 17, 2010 using 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1 Boring No.: SWM2-3-06

Contract: 25-113-01

Boring Location: STA. 314+02 134' Lt. C.L.

Boring Surface Elev.: + 50.3 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D. **Casing Size:** 3 1/4 Inches

From Depth of: From Depth of: To: To: Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 9/20/10 9.5 10.0 10.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
	9/20/10	1	0.5' 2.0'	15 12 13		opsoil - 8". 5 YR - 6/6
3		2	4.0	10 12 14 13	sand w/some silt, trace fine gravel. 18" RECOVERY	5 YR - 5/3
6	ľ	3	4.0' 6.0'	5 7 6 6	Moist medium dense orange silty fine to coarse sand w/some fine gravel. 18" RECOVERY	YR - 6/8
		4	6.0' 8.0'	5 5 4 3		YR - 6/8 SDA Classification : Sand
9		5	8.0'	1 1 1 2) YR - 6/8
		6	10.0'	1 4	Wet loose orange fine to coarse sand w/some A-2-4(0) 10) YR - 6/8
12		6A	11.0' 12.0'	8 9	6" RECOVERY Wet medium dense brown silty fine to coarse A-2-4(0) 7.5	5 YR - 4/4
					sand w/trace fine gravel. 12" RECOVERY End of Boring	
15						

Remarks:

Symbol Description

Strata symbols



Poorly graded clayey silty sand



Silty sand



Well graded sand with silt



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on September 20, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1 Boring No.: SWM2-31-01

Contract: 25-113-01

Boring Location: STA. 22+27 98' Rt. C.L.

Boring Surface Elev.: + 67.4 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D. O.D. IN. Core Bit: O.D.

Casing Size: 3 1/4 Inches

From Depth of: From Depth of: To: To: Hollow Stem Auger: 0.0

Water Level Readings

Time **Depth of Casing Depth of Hole Depth of Water** Elev. of Water Date 9/23/10 12.0 12.0 8.2

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
	9/23/10	1	0.5' 2.0'	8 12 13	Moist very stiff tan silt w/some clay, trace A-4(6) Topson fine to coarse sand. 10 YR USDA	
3		2	2.0'	11 17 11 8	Moist medium dense tan clayey fine sand and A-2-4(0) Loam fine gravel w/some silt and coarse sand.	7/6
			4.0'	7	18" RECOVERY	j
		3	4.0	7 9 10 7	Moist medium dense tan clayey fine sand w/ A-2-4(0) 10 YR some silt and fine gravel, trace coarse sand.	- 6/6
6			6.0'		13" RECOVERY	
		4	6.0'	7 6 7 7	Wet medium dense brown silty fine to coarse A-2-4(0) 7.5 YF sand w/trace fine gravel.	C - 6/8
			8.0'		18" RECOVERY	
9		5	8.0'	3 4 4 5	Wet loose tan silty fine to coarse sand w/trace A-2-4(0) 10 YR fine gravel.	- 7/6
			10.0'		19" RECOVERY	
		6	10.0'	5 5 4 3	Wet loose brown coarse to fine sand w/some A-1-b 7.5 YF silt, trace fine gravel.	L - 5/8
12			12.0'		18" RECOVERY	
					End of Boring	
15						

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Clayey sand



Poorly graded clayey silty sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on September 23, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1 Boring No.: SWM2-31-02

Contract: 25-113-01

Boring Location: STA. 23+25 140' Rt. C.L.

Boring Surface Elev.: + 69.2 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 9/22/10 12.0 12.0 8.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

	T	1	T	1				
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"		Sample Description	Class./G.I.	Remarks
	9/22/10	1	0.5' 2.0'	9 10 12		st very stiff brown fine sandy silt w/some and coarse sand, trace fine gravel. 8" RECOVERY	A-4(0)	Topsoil - 7". 7.5 YR - 6/3 USDA Classification : Loam
3	N	2	2.0'	8 10 10 8		st medium dense brown silty fine sand w/ e coarse sand, trace fine gravel.	A-2-4(0)	7.5 YR - 6/3
		3	4.0' 4.0'	8 7 8 7	[4]4[4]4[4]4[4]	st medium dense brown coarse to fine l w/some silt, trace fine gravel.	A-1-b	7.5 YR - 6/6
6		4	6.0' 6.0'			15" RECOVERY st loose brown fine to coarse sand w/some	A-2-4(0)	7.5 YR - 5/8
			8.0'	5 3 3 3		and fine gravel. 17" RECOVERY	A-2-4(0)	7.5 TK - 5/6
9		5	8.0'	2 4 6 5		loose brown coarse to fine sand w/some trace fine gravel.	A-1-b	5 YR - 5/8
			10.0'	6	1313:00 134:06 1173:00 1173:00	17" RECOVERY		7777 770
		6	10.0'	6 10 10 12		medium dense brown silty fine to coarse l w/trace fine gravel.	A-2-4(0)	5 YR - 5/8
12			12.0'			18" RECOVERY		
					End	of Boring		
15								

Remarks:

Symbol Description

Strata symbols

Poorly graded clayey silty sand



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on September 22, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1 Boring No.: SWM2-33-01

Contract: 25-113-01

Boring Location: STA. 6+43 281' Rt. C.L.

Boring Surface Elev.: + 62.04 Reference:

IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D. O.D.

IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Time **Depth of Water Depth of Hole Depth of Casing** Elev. of Water Date 12/17/10 3.9 8.0 8.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 10.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/17/10	1	0.5' 2.0'	2 3 7	Moist firm gray fine sandy silt w/some coarse sand and clay, trace of fine gravel. 12" RECOVERY	A-4(0)	Topsoil - 6".
		2	2.0'	13 10 7	Moist medium dense gray silty fine to coarse	A-2-4(0)	
3			4.0'		sand w/trace of fine gravel. 18" RECOVERY		JG
	•	3	4.0'	3 6 6 7	Wet medium dense gray coarse to fine sand	A-2-4(0)	USDA Classification:
				7	w/some silt, trace of fine gravel and clay.		Loamy Sand
6			6.0'		16" RECOVERY	15	
		4	6.0'	4 6 5 5	Wet medium dense orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			8.0'		18" RECOVERY		
9		5	8.0'	6 6 8 9	Wet medium dense orange fine to coarse sand w/some silt.	A-2-4(0)	
			10.0'		12" RECOVERY		
					End of Boring		
12							
15							

Remarks:

Symbol Description

Strata symbols



Poorly graded clayey silty sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on December 17, 2010 using 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-4-01

Contract: 25-113-01

Boring Location: Sta. 317+75, 240 RT' C.L.

Boring Surface Elev.: + 47.87 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0

Water Level Readings

Time **Depth of Casing Depth of Water** Depth of Hole Elev. of Water Date 16.0 14.0 6.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: Bill Holden

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/24/09	1	0.5'	5 5 5	Moist loose brown silty fine to coarse sand w/some gravel. 18" RECOVERY	A-2-4(0)	Topsoil - 3".
		2	2.0'	6		1	٥.
			2.0'	6 8 8	Moist medium dense brown coarse to fine sand w/some silt, trace of	A-2-4(0)	
				7	gravel.		
4	N	3	4.0'	4	23" RECOVERY	A 1.1	
		3	6.0'	7 6 7	Moist medium dense brown silty coarse to fine sand w/trace of gravel. 21" RECOVERY	A-1-b	
		4	6.0'	5 4	Wet loose brown coarse to fine sand w/some silt, trace of gravel.	A-1-b	
8			8.0'	3 3	23" RECOVERY		
		5	8.0'	2 2 2	Wet very loose brown silty fine to coarse sand w/trace of gravel.	A-2-4(0)	
			40.01	2	AU DECOMENY		
		6	10.0' 10.0'	2	24" RECOVERY Wet medium dense dark brown fine to coarse sand w/some silt, trace of	A-2-4(0)	
				2 6 9	gravel.	A-2-4(0)	
12			12.0'	11	24" RECOVERY		
12		7	12.0'	1	Wet medium dense dark brown fine to coarse sand w/some silt, trace of	A-2-4(0)	
				8 8 10	gravel.	112 (0)	
			14.0'	10	24" RECOVERY		
		8	14.0'	5 7	Wet medium dense dark brown fine to coarse sand w/some silt.	A-2-4(0)	
				5 7 12 10		\ \ \ \	
16			16.0'		24" RECOVERY		
					End of Boring		
1							
20							

Remarks:

Symbol Description

Strata symbols



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 3/24/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-4-01A

Contract: 25-113-01

Boring Location: Sta. 317+75, 240' RT C.L.

Boring Surface Elev.: + 47.87 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D. O.D.

Core Bit: O.D. IN.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0

Water Level Readings

Time **Depth of Casing Depth of Water** Depth of Hole Elev. of Water Date 5.1 16.0 14.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Williams

Dan!	D-ii.	l	0				
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/19/09	1	1.0'	4 4	Moist loose brown fine gravelly fine to coarse sand w/some silt, trace of	A-2-4(0)	Topsoil -
			2.0'		clay.		10".
		2	2.0'	4 4	12" RECOVERY	A-2-4(0)	USDA
3				3 3	Moist loose brown fine to coarse sand w/some silt, trace of fine gravel.		Classifica
	N		4.0'		17" RECOVERY		- Loamy Sand
		3	4.0'	4 5 4 3	Wet loose tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
6			6.0'		13" RECOVERY		
		4	6.0'	3 5 3 3	Saturated loose tan coarse to fine and w/some silt, trace of fine gravel.	A-1-b	
			8.0'		18" RECOVERY		
9		5	8.0'	3 3 1 3	Saturated very loose tan coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
			10.0'		15" RECOVERY		
	1	6	10.0'	3	Saturated medium dense tan coarse to fine sand w/some silt, trace of fine	A-2-4(0)	
				3 3 8 12	gravel.	N-2-4(0)	
12			12.0'		22" RECOVERY		
		7	12.0'	16 23 12 16	Saturated dense tan coarse to fine sand w/trace of silt and fine gravel.	A-1-b	
			14.0'		14(18) 14(18) 24" RECOVERY		
15		8	14.0'	10 13 13 15	Saturated medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
			16.0'		24" RECOVERY		
					End of Boring		

Remarks:

Symbol Description

Strata symbols



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 8/19/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-4-02

Contract: 25-113-01

Boring Location: Sta. 319+20, 240' RT C.L.

Boring Surface Elev.: + 50.54 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0

Water Level Readings

Time **Depth of Casing Depth of Water** Depth of Hole Elev. of Water Date 16.0 14.0 8.5

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: J. Williams

_								
	Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
Ī		8/19/09	1	0.0'	2 3 5 10	Moist firm brown fine to coarse sandy silt w/trace of fine gravel.	A-4(0)	
L		l '	L'	2.0'	<i>'</i>	14" RECOVERY		
	3		2	4.0'	8 9 7	Moist medium dense brown silty fine to coarse sand w/trace of fine gravel. 17" RECOVERY	A-2-4(0)	
	,	l '	3	4.0'	3 3	Wet loose brown silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
	6			6.0'	4 3	19" RECOVERY		
			4	6.0 ¹	5 4 4 5	Wet loose brown coarse to fine sand w/trace of fine gravel, silt and clay.	A-1-b	USDA Classifica - Sand
H		l '	5	8.0'	3	1127.EV	ce A-1-b	
-	9			0.0	3 3 3 5	Saturated loose brown coarse sand w/some fine sand and fine gravel, tra of silt.	ce A-1-b	
	!	1	ĺ'	10.0'	!	11395 24" RECOVERY		
			6	10.0'	4 3 2 1	Saturated loose brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
L	12	1 '	L'	12.0'	!	15" RECOVERY		
-			7	12.0'	1 2 2 4	Saturated very loose brownish tan fine sand w/some silt, trace of coarse sand and fine gravel.	A-2-4(0)	
	!	l '	 '	14.0'	!	23" RECOVERY		
	15		8	14.0'	3 6 8 16	Saturated medium dense brown silty fine sand w/trace of coarse sand an fine gravel.	d A-2-4(0)	
ı		l '		16.0'	"	24" RECOVERY		
ŀ				10.0	 	End of Boring		
	,	1 '	1 '	1	1 ,	Zina or Borning		1

Remarks:

Symbol Description

Strata symbols



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 8/19/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-5-02

Contract: 25-113-01

Boring Location: Sta. 345+00, 225' LT C.L.

Boring Surface Elev.: + 61.56 Reference:

IN. IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 O.D.

IN. IN. O.D. IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time **Depth of Casing** Depth of Hole Elev. of Water Date 12.0 16.0 14.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Jason Truver

Helpers: T. Kane

							-
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	8/18/09	1	0.5'	3 5 4	Moist firm brown clayey silt w/some fine to coarse sand.	A-4(5)	Topsoil - 5".
	-	2	2.0' 2.0'	<u> </u>	14" RECOVERY	+	
		-	2.0	8 11 10	Moist medium dense brown coarse to fine sand w/some silt and fine	A-1-b	
3		V	4.0'		gravel. 19' RECOVERY		
		3	4.0'	4 10 9 7	Moist medium dense brown silty coarse sand w/some fine sand, trace of fine gravel.	A-1-b	
6		1	6.0'	Λ Γ	18" RECOVERY		
		4	6.0'	6 5 7 6	Moist medium dense tan coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
		1	'	'			
<u> </u>	-	5	8.0' 8.0'	<u>'</u>	23" RECOVERY	4 1 1	
9		5	8.0	2 2 2 3	Moist very loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
		1	10.0'	'	19" RECOVERY		
		6	10.0'	2 1 2 3	Wet very loose brown coarse to fine sand w/trace of silt, clay and fine gravel.	A-1-b	USDA Classifica
		1	'	'	44-144 1-17:50		- Sand
12			12.0'	↓ '	11" RECOVERY		
		7	12.0'	1 2 1 2	Wet very loose orange fine sand w/some silt and coarse sand, trace of fin gravel.	e A-2-4(0)	
		1	'	'			
<u> </u>	-	8	14.0' 14.0'	<u>'</u>	20" RECOVERY	1 2 4(0)	
15		°	14.0	6 7 8 7	Wet medium dense orange fine sand w/some silt, coarse sand and fine gravel.	A-2-4(0)	
	'		16.0'		20" RECOVERY		
			'	<u>'</u>	End of Boring		
]	1	'	'			
	1	1		1 .			

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 8/18/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1 Boring No.: SWM2-5-03

Contract: 25-113-01

Boring Location: STA. 344+62 166' Lt. C.L.

Boring Surface Elev.: + 60.9 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Time **Depth of Water Depth of Hole Depth of Casing** Elev. of Water Date 9/20/10 10.0 10.0 8.5

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
3	9/20/10	2	1.0' 2.0' 2.0'	24 28 28 23 17 13	coarse sand, trace fine gravel. 7" RECOVERY A-1-b USD	oil - 12". R - 6/6 A Classification : Loam R - 5/6
			4.0'		16" RECOVERY	
6		3	6.0'	5 6 5 5	Moist medium dense brown coarse to fine A-1-b 10YI sand w/some silt.	R - 7/8
		4	6.0' 8.0'	5 5 5 5		R - 7/8
9		5	8.0'	2 6 7 5		R - 6/8
		6	10.0'	5 4 5 4		R - 6/8
12			12.0'		18" RECOVERY End of Boring	
					End of Boring	
15						

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on September 20, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1 Boring No.: SWM2-5-04

Contract: 25-113-01

Boring Location: STA. 346+90 166' Lt. C.L.

Boring Surface Elev.: + 64.4 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D. **Casing Size:**

From Depth of: From Depth of: To: To: 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 9/20/10 Dry 12.0 12.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

			T			-
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
	9/20/10	1	0.5' 2.0'	14 16 16	Moist very stiff brown clayey silt w/some fine to coarse sand. 10" RECOVERY	Topsoil - 6". 7.5 YR - 6/6 USDA Classification : Loam
		2	2.0'	7 12	Moist very stiff brown clayey fine sandy silt A-4(1)	7.5 YR - 6/6
3		2A	3.0' 3.0' 4.0'	14	w/some coarse sand and fine gravel. 10" RECOVERY Moist medium dense brown clayey coarse to	7.5 YR - 6/8
		3	4.0'	7 9 12 10	fine sand w/some silt, trace fine gravel. 8" RECOVERY Moist medium dense orange silty coarse to	7.5 YR - 5/8
6			6.0'		fine sand w/trace fine gravel. 16" RECOVERY	1
		4	6.0'	10 9 11 12	Moist medium dense orange coarse sand w/ A-1-b some fine sand and silt, trace fine gravel.	7.5 YR - 5/8
			8.0'		19" RECOVERY	
9		5	8.0'	5 7 6 5	Moist medium dense orange coarse to fine sand w/some silt.	7.5 YR - 5/8
.		l	10.0'		16" RECOVERY	
		6	10.0'	5 4 2 2	Moist loose orange coarse to fine sand w/ A-1-b some silt, trace fine gravel.	7.5 YR - 5/8
12			12.0'		18" RECOVERY	
					End of Boring	
	1					
	1					
15						
'`						
	1					

Remarks:

Symbol Description

Strata symbols

BCTCCC BYMBOTE

Low plasticity clay

Clayey sand

Poorly graded clayey

Silty sand

silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on September 20, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-7-01

Contract: 25-113-01

Boring Location: Sta. 349+75, 210' LT C.L.

Boring Surface Elev.: + 62.13 Reference:

IN. IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0

Water Level Readings

Time **Depth of Casing Depth of Water** Depth of Hole Elev. of Water Date 10.0 14.0 12.0

Pay Quantities: 2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: T. Kane

Depth	Daily	NI-	Sample	DI/0"	Occupate Decembring	01 /0 !	Damad
(ft.)	Progress	No.	Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/7/09	1	0.5' 2.0'	4 3 4	Moist loose brown silty coarse sand w/some fine sand, trace of fine gravel. 14" RECOVERY	A-2-4(0)	Cultivated Soil - 5".
		2	2.0'	4	Moist loose brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
3			4.0'	3 4	E P P 17" RECOVERY		
	•	3	4.0'	8 11 12 11	Moist medium dense orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
6			6.0'		16" RECOVERY		
		4	6.0'	19 12 11 10	Moist medium dense orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			8.0'		19" RECOVERY		
9		5	8.0'	4 6 7 10	Moist medium dense orange coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
		6	10.0' 10.0'	4	16" RECOVERY	1 2 1(0)	
		О	10.0	4 6 8 2	Wet medium dense orange coarse to fine sand w/some silt.	A-2-4(0)	
12			12.0'		21" RECOVERY		
		7	12.0'	7 10 10 10	Wet medium dense orange fine sand w/some coarse sand, clay and silt.	A-2-4(0)	USDA Classifica - Sandy
			14.0'		16" RECOVERY		Loam
15					End of Boring		

Remarks:

Symbol Description

Strata symbols



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/7/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-7-02

Contract: 25-113-01

Boring Location: Sta. 351+00, 210' LT C.L.

Boring Surface Elev.: + 60.65 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Casing Time **Depth of Water** Depth of Hole Elev. of Water Date 9.8 14.0 12.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/7/09	1	1.0'	2 3	Moist firm brown clayey coarse sandy silt w/some fine sand, trace of fine	A-4(0)	Cultivated
			2.0'		gravel.		Soil -
		2	2.0'	4 4	8" RECOVERY Moist loose orange silty coarse to fine sand.	A-1-b	10".
3				3	Moist loose orange sitty coarse to fine saild.		
			4.0'		18" RECOVERY		
		3	4.0'	3 4 2	Moist loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
				2 4			
6		<u> </u>	6.0'		19" RECOVERY		
		4	6.0'	3 2 3 2	Moist loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
<u> </u>				2	III JUJI ZUIJ		
			8.0'		10" DECOVERY		
		5	8.0'	3	18" RECOVERY Wet loose orange coarse to fine sand w/some clay and silt, trace of fine	A-2-4(0)	USDA
9		-		3 2 3	gravel.	A-2-4(0)	Classifica
				4	garen		- Sandy
<u> </u>		l	10.0'		12" RECOVERY		Loam
		6	10.0'	8 6	Saturated medium dense orange fine gravelly coarse sand w/some fine	A-1-b	
]			6 4	sand and silt.		
					44-91-66-1 1-3-1-5-1-6-1 1-3-1-5-1-5-1-5-1-5-1-5-1-5-1-5-1-5-1-5-		
12			12.0'	6	16" RECOVERY		
		7	12.0'	6 5 5	Saturated loose orange coarse to fine sand w/some silt, trace of fine	A-1-b	
-				6	gravel.		
			14.0'		16" RECOVERY		
					End of Boring		
15							
] !						
<u> </u>							

Remarks:

Symbol Description

Strata symbols

Clayey sand



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/7/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1 Boring No.: SWM2-7-03

Contract: 25-113-01

Boring Location: STA. 349+09 353' Rt. C.L.

Boring Surface Elev.: + 64.7 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D. IN. **Casing Size:**

From Depth of: From Depth of: To: To: 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Casing Depth of Water Time Depth of Hole Elev. of Water Date 9/20/10 12.0 12.0 Dry

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
3	9/20/10	2	1.0' 2.0' 2.0'	10 16 10 9 10 11	Moist very stiff brown clayey fine to coarse sandy silt w/trace fine gravel. 8" RECOVERY Moist medium dense brown clayey fine to coarse sand w/some silt, trace fine gravel.	A-4(0) A-2-4(0)	Topsoil - 9". 7.5 YR - 4/6 10 YR - 5/6
	l	3	4.0'	6 7 10 10	Moist medium dense brown coarse sand w/ some fine sand, silt and fine gravel.	A-1-b	10 YR - 6/8
6		4	6.0' 6.0'	10 9 10 8	Moist medium dense brown coarse to fine sand and fine gravel w/some silt. 17" RECOVERY	A-1-b	10 YR - 6/8
9		5	8.0' 10.0'	3 5 7 7	Moist medium dense orange fine to coarse sand w/some silt, trace clay and fine gravel. 18" RECOVERY	A-2-4(0)	7.5 YR - 5/8 USDA Classification : Loamy Sand
12		6	10.0'	9 7 6 5	Moist medium dense orange coarse sand w/some fine sand and silt, trace fine gravel. 20" RECOVERY	A-1-b	7.5 YR - 5/8
					End of Boring		
15							

Remarks:

Symbol Description

Strata symbols

Clayey sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on September 20, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1 Boring No.: SWM2-7-04

Contract: 25-113-01

Boring Location: STA. 351+23 272' Rt. C.L.

Boring Surface Elev.: + 62.5 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D. Core Bit: O.D.

Casing Size: 3 1/4 Inches

From Depth of: From Depth of: To: To: Hollow Stem Auger: 0.0 12.0

Water Level Readings

Time **Depth of Casing Depth of Water** Depth of Hole Elev. of Water Date 9/20/10 12.0 12.0 Dry

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/20/10	1	0.5' 2.0'	8 11 10	Moist very stiff brown coarse to fine sandy clay w/some silt, trace fine gravel. 10" RECOVERY	A-6(2)	Topsoil - 8". 10 YR - 6/8
		2	2.0'	11 7	Moist medium dense brown coarse sand w/	A-1-b	10 YR - 6/6
3			4.0'	6 4	some fine sand and silt, trace fine gravel. 18" RECOVERY		JG
		3	4.0'	3 3 2 3	Moist loose tan coarse to fine sand w/some silt, trace fine gravel.	A-1-b	10 YR - 7/4
6			6.0'		16" RECOVERY	14	
		4	6.0' 8.0'	3 2 2 2	Moist very loose tan coarse to fine sand w/some silt and fine gravel, trace clay.	A-1-b	10 YR - 7/4 USDA Classification : Loamy Sand
9		5	8.0'	1 2 1 1	Wet very loose tan coarse to fine sand w/ some silt, trace fine gravel.	A-1-b	10 YR - 8/1
		6	10.0' 10.0'	2	14" RECOVERY	A 1 1	10 VD 9/1
		0	10.0	2 2 2 3	Wet very loose tan coarse to fine sand w/some silt, trace fine gravel.	A-1-b	10 YR - 8/1
12			12.0'		17" RECOVERY		
					End of Boring		
15							
.,							

Remarks:

Symbol Description

Strata symbols

Clayey sand



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on September 20, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1 Boring No.: SWM2-7-05

Contract: 25-113-01

Boring Location: STA. 356+11 189' Lt. C.L.

Boring Surface Elev.: + 62.0 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D. Core Bit: O.D.

Casing Size: 3 1/4 Inches

From Depth of: From Depth of: To: To: Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 9/20/10 10.0 10.0 8.7

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

						-
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
	9/20/10	1	0.5' 2.0'	7 6 8	Moist stiff brown silt w/some clay, trace A-4(3) coarse to fine sand and fine gravel.	Topsoil - 8". 10 YR - 6/6
3		2	2.0'	8 9 10 13	Wet very stiff brown clayey silt w/trace fine A-4(8) to coarse sand.	10 YR - 6/6
			4.0		18" RECOVERY	NG.
		3	4.0'	10 17 17 16	Wet dense brown fine to coarse sand w/some A-2-4(0) silt, trace fine gravel.	7.5 YR - 7/8
6			6.0		16" RECOVERY	
		4	6.0'	12 10 11 12	Wet medium dense orange coarse to fine sand w/some silt, trace clay.	7.5 YR - 6/8 USDA Classification : Loamy Sand
		L	8.0'		21" RECOVERY	
9		5	8.0'	5 6 6	Wet medium dense orange coarse to fine sand w/some silt, trace fine gravel.	7.5 YR - 6/8
			10.0'		17" RECOVERY	
		6	10.0'	6 4 4 4	Wet loose orange coarse to fine sand w/some silt, trace fine gravel.	7.5 YR - 6/8
12		<u></u>	12.0'		20" RECOVERY	<u> </u>
		Ţ <u></u>			End of Boring	
15						

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Low plasticity clay



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on September 20, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1 Boring No.: SWM2-7-06

Contract: 25-113-01

Boring Location: STA. 362+79 222' Rt. C.L.

Boring Surface Elev.: + 55.3 Reference:

Wt. of Casing Hammer: IN. Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: IN. Lbs. 30 D-Sampler: S-Sampler: U-Sampler: IN. Type of: Split Barrel O.D. 2 IN. IN. O.D.

IN. Core Bit: O.D.

From Depth of: From Depth of: To: To: **Casing Size:** 3 1/4 Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time **Depth of Hole Depth of Casing** Elev. of Water Date 9/21/10 6.0 6.0 2.4

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 6.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I.	Remarks
	9/21/10	1	2.0'	1 2 2 1	Wet very loose orange fine to coarse sand w/ some silt, trace clay and fine gravel. 20" RECOVERY	7.5YR - 5/8 USDA Classification : Loamy Sand
3		2	4.0'	1 2 2 2	Saturated very loose orange coarse to fine sand w/some silt, trace fine gravel. 15" RECOVERY	7.5YR - 5/8
6		3	4.0'	1 1 1 1	Saturated very loose brown coarse to fine A-1-b sand w/some silt.	7.5YR - 5/6
					End of Boring	
9						
12						
15						

Remarks:

Symbol Description

Strata symbols



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on September 21, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-8-01

Contract: 25-113-01

Boring Location: Sta. 361+10, 190' LT C.L.

Boring Surface Elev.: + 60.69 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0 10.0

Water Level Readings

Time **Depth of Water** Depth of Hole **Depth of Casing** Elev. of Water Date 12.0 10.0 7.5

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/7/09	1	1.0' 2.0'	3 4	Moist firm orange silty clay w/some coarse to fine sand, trace of fine gravel.	A-6(9)	Cultivated Soil -
3		2	2.0'	14 12 14 11	Moist medium dense orange gravelly coarse sand w/some fine sand and silt.	A-1-b	12".
			4.0'		15" RECOVERY		
		3	4.0'	6 10 9 10	Moist medium dense orange fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
6		ļ	6.0'		17" RECOVERY		ļ I
		4	6.0'	8 3 5 5	Wet firm orange coarse to fine sandy silt w/some clay.	A-4(0)	USDA Classifica - Sandy
			8.0'		19" RECOVERY		Clay
9		5	8.0'	3 2 2 2	Saturated loose orangish brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	Loam
L		<u> </u>	10.0'		16" RECOVERY	<u></u>	<u> </u>
		6	10.0'	5 5 3 5	Saturated loose orangish brown coarse sand w/trace of fine sand, silt and fine gravel.	A-1-b	
					Destrocts Controct Destrocts		
12		<u> </u>	12.0'		ELL CD:	-	<u> </u>
					End of Boring		
15							
		ļ					

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/7/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
- Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-8-02

Contract: 25-113-01

Boring Location: Sta. 363+50' 190' LT C.L.

Boring Surface Elev.: + 60.13 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0 10.0

Water Level Readings

Time Depth of Water Depth of Hole **Depth of Casing** Elev. of Water Date 7.2 12.0 10.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: D. Zmijewski

			ı				
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/7/09	1	1.0' 2.0'	3 3	Moist firm gray clayey silt w/some coarse to fine sand, trace of fine gravel.	A-4(2)	Cultivated Soil -
3		2	2.0'	3 4 5 5	12" RECOVERY Moist loose grayish orange silty coarse to fine sand w/some fine gravel.	A-2-4(0)	10".
			4.0'		19" RECOVERY		
		3	4.0'	8 5 4 3	Moist loose grayish orange coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
6			6.0'		19" RECOVERY		
		4	6.0'	4 4 6 5	Wet loose orange fine to coarse sand w/trace of silt and clay.	A-2-4(0)	USDA Classifica - Loamy
			8.0'		15" RECOVERY		Sand
9		5	8.0'	2 2 1 2	Saturated very loose orange coarse to fine sand w/some silt.	A-2-4(0)	
			10.0'		20" RECOVERY		
		6	10.0'	2 2 2 4	Saturated very loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
12			12.0'		20" RECOVERY		
					End of Boring		
15							

Remarks:

Symbol Description

Strata symbols

Silty low plasticity clay



Silty sand

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/7/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-9-01

Contract: 25-113-01

Boring Location: Sta. 372+00, 180' LT C.L.

Boring Surface Elev.: + 64.55 Reference:

IN. IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0

Water Level Readings

Time **Depth of Casing** Depth of Hole **Depth of Water** Elev. of Water Date 10.7 14.0 12.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: T. Kane

			_				1
Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/8/09	1	0.5' 2.0'	4 3 3	Moist firm brown clayey coarse sandy silt w/some fine sand, trace of fine gravel. 17" RECOVERY	A-4(1)	Cultivated Soil - 5".
		2	2.0'	5 5	Moist medium dense brown silty coarse sand w/some fine sand, trace of	A-1-b	
3			4.0'	6	fine gravel. 18" RECOVERY		
6		3	4.0' 6.0'	3 8 5 5	Moist medium dense orange coarse to fine sand w/some silt, trace of fine gravel. 18" RECOVERY	A-2-4(0)	
0		4	6.0'	4 3 2 2	Moist loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			8.0'	4	18" RECOVERY		
9		5	8.0'	4 2 3 3	Wet loose orange coarse sand w/trace of silt, fine sand and fine gravel.	A-1-b	
		6	10.0'	3 2 2 3	Wet very loose orange coarse sand w/some fine sand, trace of silt, fine gravel and clay.	A-1-b	USDA Classifica - Sand
12		7	12.0' 12.0'	4	20" RECOVERY Wet loose around a course to fine and w/come silt trace of fine ground	A-1-b	
		,	14.0'	4 2 3 3	Wet loose orange coarse to fine sand w/some silt, trace of fine gravel. 18" RECOVERY	A-1-0	
					End of Boring		
15							

Remarks:

Symbol Description

Strata symbols

Clayey sand



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/8/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 - Maryland State Line to S.R. 1 Boring No.: SWM2-9-02

Contract: 25-113-01

Boring Location: Sta. 374+50, 180' LT C.L.

Boring Surface Elev.: + 65.12 Reference:

IN. IN. IN. Wt. of Casing Hammer: Average Fall: Lbs. Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Water Time **Depth of Casing** Depth of Hole Elev. of Water Date 11.0 14.0 12.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation Driller: Bill Holden

Helpers: T. Kane

Depth	Daily	No.	Sample	Blows/6"	Sample Description	Class./G.I.	Remarks
(ft.)	Progress		Depth				
	7/8/09	1	0.5'	3 5 6	Moist stiff brown silty clay w/some fine to coarse sand, trace of fine	A-6(6)	Cultivated Soil - 8".
			2.0'		gravel. 9" RECOVERY		3011 - 8 .
		2	2.0'	10 10 10	Moist medium dense gray silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
3				10		` ′	
			4.0'		16' RE <mark>C</mark> OVERY	j	
	•	3	4.0'	8 7	Moist medium dense tan silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
				7			
6			6.0'		15" RECOVERY		
		4	6.0'	7 6 6 7	Moist medium dense orange coarse sand w/some silt and fine sand, trace	A-1-b	
				7	of fine gravel.		
			8.0'		20" RECOVERY		
		5	8.0'	8 7	Moist medium dense tan coarse sand w/some fine sand and silt, trace of	A-1-b	
9				4 4	fine gravel.		
			10.0'	4	13" RECOVERY		
		6	10.0'	4 4 5 5	Saturated loose tan coarse to fine sand w/trace of silt, fine gravel and clay	A-1-b	USDA
				5	HALDER Harder Harder		Classifica - Sand
12			12.0'		20" RECOVERY		- Sand
14		7	12.0'	3	Saturated loose tan coarse to fine sand w/trace of silt and fine gravel.	A-1-b	
				3 3 3 4	HALLING HELDER HELDER		
					iëriës Regere Regere		
			14.0'		17" RECOVERY		
,,					End of Boring		
15							
		ı	1	ı		1	1

Remarks:

Symbol Description

Strata symbols

Low plasticity clay

Silty sand

Well graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- 1. Exploratory borings were drilled on 7/8/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
- 2. Groundwater levels recorded at the time of drilling and re-checked the following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recomendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blow counts are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1 Boring No.: SWM2-9-03

Contract: 25-113-01

Boring Location: STA. 368+90 205' Lt. C.L.

Boring Surface Elev.: + 63.6 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D. Core Bit: O.D.

3 1/4 **Casing Size:** Inches

From Depth of: From Depth of: To: To: Hollow Stem Auger: 0.0 12.0

Water Level Readings

Depth of Casing Depth of Water Time **Depth of Hole** Elev. of Water Date 9/21/10 9.5 0.0 12.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.I. Remarks
	9/21/10	1	0.5'	7 9 11	Moist very stiff brown clayey fine sandy silt w/some coarse sand. 15" RECOVERY Moist very stiff brown clayey fine sandy silt A-4(4) 7.5 YR - 6/0
3		2	2.0'	12 16 13 12	Moist medium dense brown coarse to fine A-1-b 7.5 YR - 6/8 sand w/some silt, trace fine gravel.
6	•	3	4.0' 6.0'	5 7 9 11	Moist medium dense brown coarse sand w/ A-1-b 7.5 YR - 6/8 USDA Classification : Loamy Sand
		4	8.0'	7 7 8	Moist medium dense brown coarse sand w/ A-1-b 7.5 YR - 6/8 some silt, fine sand and fine gravel. 18" RECOVERY
9		5	8.0'	1 3 2 3	Moist loose brown coarse sand w/some fine A-1-b 7.5 YR - 5/8 sand and silt, trace fine gravel.
		6	10.0'	2 2 3 3	Wet loose brown coarse to fine sand w/some silt, trace fine gravel. 7.5 YR - 5/8
12			12.0'		End of Boring
15					

Remarks:

Symbol Description

Strata symbols

Low plasticity clay



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on September 21, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.

STATE OF DELAWARE **DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**

F.A. Project: US 301 Maryland State Line to SR-1 Boring No.: SWM2-9-04

Contract: 25-113-01

Boring Location: STA. 370+62 141' Lt. C.L.

Boring Surface Elev.: + 64.2 Reference:

IN. IN. IN. Wt. of Casing Hammer: Lbs. Average Fall: Average Fall:
O.D. of Sampler:
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core: Wt. of Sample Hammer: Lbs. 30 D-Sampler: S-Sampler: U-Sampler: Type of: Split Barrel O.D. 2 IN. IN. O.D.

Core Bit: O.D.

From Depth of: From Depth of: To: To: 3 1/4 **Casing Size:** Inches Hollow Stem Auger: 0.0

Water Level Readings

Depth of Casing Depth of Water Time Depth of Hole Elev. of Water Date 9/21/10 9.7 12.0 12.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: No. of 2 in. Dia. Shelby Tubes: 2 1/2 in. Dia. Contin. Sample Boring: Dia. U-Sample Boring: U-Samples: 12.0 Ft.; Ft. Ft.; Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation **Driller:** Dave Burt

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description Class./G.	I. Remarks
	9/21/10	1	0.0'	2 6 6 8	Moist stiff brown clayey silt w/some fine A-4(3) sand, trace coarse sand and fine gravel.	7.5 YR - 6/8
			2.0'	12	7" RECOVERY	7.777 1/0
3			4.0'	13 11 16 15	Moist medium dense brown silty coarse to fine sand w/some fine gravel. 17" RECOVERY	7.5 YR - 6/8
		3	4.0'	6 8 9 10	Moist medium dense brown coarse sand w/ A-1-b some fine gravel, trace fine sand, silt and clay.	7.5 YR - 6/8 USDA Classification : Sand
6			6.0'		15" RECOVERY	
		4	6.0'	8 7 8 8	Moist medium dense brown coarse sand w/ A-1-b some fine sand and silt, trace fine gravel.	7.5 YR - 6/8
			8.0'	0	19" RECOVERY	
9		5	8.0'	5 4 3 2	Moist loose brown coarse sand w/some fine A-1-b sand and silt, trace fine gravel.	7.5 YR - 5/8
			10.0'		14" RECOVERY	
		6	10.0'	4 4 3 3	Moist loose brown coarse to fine sand w/some silt, trace fine gravel.	7.5 YR - 5/8
12			12.0'		17" RECOVERY	
					End of Boring	
15						

Remarks:

Symbol Description

Strata symbols



Silty low plasticity clay



Silty sand



Poorly graded sand with silt

DRAFT NOT FOR BIDDING AUGUST 2015

- Exploratory borings were drilled on September 21, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is an ATV Mounted CME 45.
- 2. Groundwater levels recorded at the time of drilling and re-checked to following day.
- 3. Surveyed boring location and elevation was provided by Century Engineering.
- 4. These logs are subject to the limitations, conclusions, and recommendations in this report.
- 5. Results of tests conducted on samples recovered are reported on the logs.
- 6. All blows are uncorrected.